Movicon 11

MONITORING VISION AND CONTROL

Supervision and control XML-based
from Windows Vista to Windows CE

Programmer Guide

Version 11.3 - Ed. Feb. 2012

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1. Introduction

1.1. Introduction

Movicon Programmer's Guide Contents

The Programmer's Guide contains all the necessary information for Movicon developers.
The chapters in this guide describe the projects, the Resources, the Objects and the techniques for logical and graphic programming to permit the optimal use of the system's resources in developing projects.
The manual describes how to program and structure projects, how to use the logic editor, how to animate screens, how to do data or recipes settings by building dialog boxes, how to use objects and any other item which constitutes a system resource.
One chapter has been dedicated on how to use the Movicon vectorial graphic editor and the default Bitmap editor, how to use the standard symbol library which Movicon places at the user's disposal, how to import symbols or strings using the "Drag & Drop" techniques.
The Movicon supervision package fully complies with the Windows standard, therefore the reader is advised to consult the Ms Windows™ 'User's Manual' for further information on windows, menus and dialog boxes.

Any corrections or updates that may have been made to this manual can be referred to in the "Readme.txt" file contained in the installation CD-ROM and installed in the Movicon user directory.

1.2. Installing and Running applications

The procedures for installing, running up and configuring Movicon for correct system usage are described below.
The Microsoft Windows installation already provides a operating system configuration for adapting to the hardware platform. However, it would be to your benefit to follow the few indications below for further optimization.

Installing Movicon

The procedures for installing Movicon on the hardware platform are very simple, and comply with the Microsoft Windows specifications. When inserting the CD-ROM you will automatically enter into the installation environment where the guide command will activate for installing the Movicon components desired. When you wish to install Movicon manually from the CD, you can access the CD's folder from the Windows Explorer and execute the "Setup.exe" file contained in it, for example:

D:\Movicon\setup\Setup.exe

The Setup will carry out the Movicon installation on the PC, creating a group of Movicon icons upon terminating which can be accessed with the "Start" button from the Windows application bar. The Movicon Group, in icon form, will contain the shortcut to the Movicon .exe file. During installation, which takes a few minutes, you will be asked to enter the name of the folder in which files necessary to Movicon are to be organized. When you do not wish to change the name or path, simply confirm the "Movicon11.2" default folder which will then be created with the path: "..\Program Files\Progea\Movicon11.2".
In the first installation phases you will be asked for the installation type you wish to executed. The options are:

- **Typical**: installs the most commonly used components without requiring anything from the user (recommended)

- **Custom**: consents the user to select the components to install (recommended for expert users only)

Installing Movicon in panels with Windows 32/64 bit (standard o embedded) operating systems may not always end successfully if using a "removable disk" compact flash to do this operation (type can be viewed in disk properties).
This anomaly is due to a problem in the Windows Installer.

Installing Languages

During the Movicon installation phase you will be asked to select the application's installation language (a following window will show to allow you to select other installation languages as well). The language resource files that are selected will be copied to the Movicon "LANG" folder after which it will be possible to change the Movicon installation languages using the "LangManagerPlus.exe" tool when need be. The langauges made availabel will be those installed during the setup phase.

Installing CAB files for WinCE

When installing Movicon in the normal way on a PC with Win32 and "MS ActiveSync" (for Windows XP systems) or Windows Mobile Device Center" (for Windows Vista systems) is detected, the "MovCESetup" folder will automatically be created in the Movicon installation folder as well. The ".cab" files will be copied within this "MovCESetup" folder for installing Movicion, Communication Drivers, ADO and SQL Server Mobiles in WinCE devices. In addition, the "Start-All Programs-Movicon11.x-MovCE" connections group will also be created consenting you to install Movicon and the necessary components on WinCE devices later on.
In cases where "MS ActiveSync" or "Windows Mobile Device Center" are not present therefore not detected when installing Movicon, the standard setup procedure will not create the "MovCESetup" folder. In this case you will need to select the "Custom" mode to implement the setup procedures if installing for the first time, or if Movicon has already been installed you must redo the setup using the "Modify" mode and enabling the "Movicon-Movicon Development-MovCE Setup" item including the sub-features to create the "MovCESetup" containing the ".cab" files for installing Movicon and relative components for WinCE. However, this mode will not create any connections in the Windows "Start" menu, therefore when installing on CE devices, you will need to copy the ".cab" files manually to the CE device (by selecting the right files for device type) and then run them in the device.

Uninstalling Movicon

Movicon, in compliance with the Windows standards, consents to a simple system uninstalling to remove all its files from the PC.
To proceed with uninstalling Movicon simply activate the appropriate icon from the Windows Control Panel for installing/removing applications.
The uninstalling procedure will completely remove all the Movicon files upon receiving confirmation.

Restore Default settings

All default settings will be restored if you press the "CTRL" key while starting up Movicon and keep it pressed down until Movicon has completely started up. This will restore the work area availability (windows, menus etc.) with their default parameters. This command must also be used when needing to change languages in the Movicon development environment using the "LangManager" tool.

Movicon Execution

Movicon is a software platform which allows you to plane supervision applications and run them. Movicon therefore works in two modes:

- Project Desiging (Developement)
- Running Projects (Runtime)

The platform is installed as a executable application available in two versions:: Movicon.exe and MoviconRunTime.exe. Movicon.exe consents both project development and runtime execution, while MoviconRunTime.exe consents runtime execution only.

If not specified otherwise, the information given here refers to Movicon.exe, the product version which consents both development and runtime execution. Only the runtime execution engine (MoviconRunTime.exe). can be installed in plant systems.

Movicon Startup

The Movicon installation will create a group of icons which can be accessed from the Windows' Start menu. When running the Movicon .exe without specifying any options will enter you into the Movicon environment in programming mode, with the automatic opening of a new project or with he last opened project.
By using the appropriate syntaxes in the Options for the command line at the Movicon startup you will be able to change the system's default settings, associate project files, custom modules and other options as explained below. The syntax for starting up Movicon with the command options is:

Movicon /[Options] <project file>

If you wish to startup Movicon and run a previously programmed project at the same time, you need to use the /R. option. Below an example is given for automatically running the TEST.MOVPRJ project file:

C:\Program Files\Progea\Movicon11.2\Movicon.exe /R C:\Documents\Test.movprj

If you wish to add or change the command options or the Movicon working folder in Windows, use the following procedures:
Press the right mouse key in the workspace of the Windows Desktop and select the "New - Shortcut" command. Then write the desired command line for the Movicon Startup in the settings window which appears.

Startup Movicon in RunTime Mode

Once you have created the project it can be run directly without having to pass through the development environment. In order for this to happen you must create a link/connection, as explained above, to the Movicon Runtime Module being the "MoviconRunTime.exe" file which is found in the same Movicon installation folder. The following example is a command line for automatically running the TEST.MOVPRJ project file:

C:\Program Files\Progea\Movicon11.2\MoviconRunTime.exe C:\Documents\Test.movprj

You can get the same result by using the "Movicon.exe." followed by the "/R" option as already explained above.

Movicon Startup as Service

The Windows Services are applications which are run automatically at the Windows startup, before and independently from User log on. Movicon fully supports the Windows Services as described below:
When Movicon is started up as Service, after the operating system LogOn, the user interface will not be displayed but will be shown as a Movicon icon in the Windows application bar. To open the project's user interface double click this icon.

In order to make the project's user interface open automatically after Windows user login you will have to enable the project's "Show Service at Log On" execution property.

You can install Movicon as Service in addition to the development environment by using the "Install this Project as Windows Service" command and also by means of the Windows command line using the "/i" or "-i" option. By executing the command line from the Windows "Start - Run" menu:

MoviconService.exe -i

Movicon will be installed as Service. You must then add the parameter, which identifies the project that the service must run, in the Windows configuration Registry. The key to be modified is:

```
Windows Registry Editor Version 5.00

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\MOVICON X\Parameters]
"Project"="C:\\Project Path\\ProjectName.movprj"
```

The text above can be copied in a text file with a ".reg." extension in order to automatically create the key by double-clicking on the ".reg" file to insert key in the Windows registry. To insert the key manually you will have to go to the following parameter group:

"[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\MOVICON X\Parameters]"

and create the "Project" key string type inserting the "C:\\Project Path\\ProjectName.movprj" value.

"Forced" Startup in Demo Mode

Running the application with the "D" key pressed, Movicon will start up in Demo Mode. This function is used for modifying certain places in the project which have a Runtime software or hardware license only in order not to replace this licence. This function has been created for the sole purpose of modifying projects by remote control (with PCAnywhere type applications) where it is impossible to remove the license from the PC if too far away.
In addition, you can save projects when the inserted license, hardware or software, is runtime only with Movicon already started up normally. In this case you will need to keep the "D" key pressed down and execute the project save command. This will enter the application into "Demo Mode" saving the project. To escape form the "Demo Mode" you will have to close and reopen Movicon.

Using Windows Terminal Server

Movicon supports the Windows Terminal Server (or Remote Desktop) and consents more than one program instances to be run on the server. Using Movicon with Windows Terminal Server requires a "NET" license. Normal licenses will be ignored by Movicon if run from the Windows Terminal Serve consequently running program in Demo mode. For further information please refer to "Windows Terminal Server".

Silent Installation

Movicon can be installed without user interface (silent mode) by using the following command line:

path\Setup.exe /s /l1033 /v/qn

where:

"path" = relative or absolute path where the Movicon setup file is found (setup.exe, Movicon11.2.msi, etc.)
/s = silent mode
/l = installation language. 1033 for English (default), 1031 for German, 1036 for French, 1040 for Italian and 2052 for Chinese
/v/qn = user interface exclusion

If you wish to specify the installation directory, i.e. C:\MyDir use:

path\Setup.exe /s /l1033 /v"/qn INSTALLDIR=C:\MyDir"

If you wish to install the runtime module only, write:

path\Setup.exe /s /l1033 /v"/qn INSTALLDIR=C:\MyDir ADDLOCAL=MoviconRun"

when installing MoviconBA, the string for installing rutime only is:

setup.exe /s /v"/qn INSTALLDIR=c:\temp\progea\movba ADDLOCAL=BA_MoviconRun"

or

setup.exe /s /v"/qn ADDLOCAL=BA_MoviconRun"

This works in WindowsXP, but the UAC in Windows Vista and Windows 7 will intervene asking for administrator installation rights. In this case you can use the following command line (but a password is needed):

runas /user:administrator "c:\temp\setup\setup.exe /s /l1040 /v\"/qn INSTALLDIR=C:\MyDir ADDLOCAL=MoviconRun\""

Considering that:

1) the complete path where setup.exe file is found is required
2) all that follows after the user name must be written between double quotation marks. Since the topic of the command line contains double quotation marks, the " character must be replaced with \".

This procedure works only if the user is a built-in pc administrator (user = administrator) and the UAC will intervene for other Administrator level users as explained in the microsoft document:

http://msdn.microsoft.com/en-us/library/aa511445.aspx

For other cases you will need to disable the UAC in order to carry out the installation procedure.

1.3. Movicon PowerHMI

Movicon Power HMI is a limited version of Movicon. The PowerHMI projects can be developed with the same Movicon environment while keeping in mind the limits explained and listed in the below paragraphs. To make it easier for the programmer not to use functionalities not supported by Power HMI, a project "Target License Type" property has been provided with two options: to develop a Movicon project (Standard Option) or to develop a PowerHMI project (Basic option). when selecting the "Basic" opton, the system will be configured to hide or disable all those functionalities not supported by Power HMI so that the programmer does not used them by mistake.
However, when the project is run, it is the installed software license type which has discrimination exclusivity over the Movicon or PowerHMI project.
If the software licence is Basic type, the project will be run with PowerHMI limits. Licensed for PowerHMI are only software type and are generated based on the device's network card MAC address. If machine has different types of licenses installed, priority of use will be as follows:

1. SG-Lock: USB SG-Lock hardware dongle (Movicon license only)
2. SmartKey: USB/Parallel Eutron hardware dongle (Movicon license only)
3. CrypKey: Crykey unlock software code (Movicon license only)
4. SoftKey: unlock software code codice generated in device's MAC address (Movicon CE, Power HMI and Power HMI CE licenses only)

Restart Movicon when passing from one license type to another to ensure it starts with the new settings.

The product documentation is the same for all versions Movicon and PowerHMI.
Possible references in the help to functionality that, like described above, are not supported, must not be considered valid.

Power HMI limits compared to the Movicon full version

PowerHMI does **NOT** support any of the following functionalities or resources:

- ODBC
- ActiveX/OCX
- OLE objects
- ROT
- Report
- AlarmDispatcher

- Web Client
- Power Templates containing Basic Script code

Detailed comparison table:

Function	PowerHMI	Movicon
RealTime DB	Max. 2048 byte(Max. 512 bytes for WinCE)	to unlimited
Scaling	Yes	Yes
ODBC Realtime	No	Yes
Trace DB	No	Yes
Data Structure	Yes	Yes
OPC Client DA	Yes	Yes
OPC Server DA	No	Yes
OPC Client XML DA	Yes	Yes
OPC Server XML DA	No	Yes
Networking	Yes	Yes
Tag in IntelliSense in Basic Script	Yes	Yes
Graphic Interface		
Vectorial Graphic Editor	Yes	Yes
Support for BMP, GIF, JPG, WMF, EMF	Yes	Yes
Dynamic Animation	Yes	Yes
Symbols Library	Yes	Yes
Import/Export Symbols	Yes	Yes
Public Symbols	Yes	Yes
Power Templates (VBA Symbols)	No	Yes
Charts 3D	No	Yes
Grid	No	Yes
Sinapsis	No	Yes
Scheduler	Yes	Yes
Editing Menu	Yes	Yes
Style Source Management in Symbols	Yes	Yes
Dundas Gauge	Yes	Yes
IP Camera Viewer	Yes	Yes
Alias management in Objects	Yes	Yes
Alarms Logs	Max. 2048 Alarms for Windows 32/64 bit Max. 1024 Alarms for WinCE	unlimited
Alarms Management	Yes	Yes
Historical Management (XML)	Yes	Yes
Historical Management (ODBC)	No	Yes
Alarms Notification (SMS, Email, Voice)	No	Yes
Server OPC AE	No	Yes
Alarms Area	Yes	Yes
Statistic Reports	No	Yes
Text-To-Speech	No	Yes
Comments on alarm ACK	No	Yes
Recipes - Data Loggers		
Recipes / Data Logger (XML)	Max no. 2 DataLoggers, Unlimited Recipes	Yes
Recipes / DataLoggers (ODBC)	No	Yes

Report Engine	No	Yes
Textual Report	Yes	Yes
Embedded Report	No	Yes
Trends		
Trend RealTime	Yes	Yes
Historical Trends on file .CSV	Yes	Yes
Historical Trends (linked to DataLogger XML)	Yes	Yes
Historical Trends Database (ODBC)	No	Yes
Data Analysis	No	Yes
Users & Passwords		
Use 1024 levels	Yes	Yes
User Groups	Yes	Yes
CFR21	No	Yes
Runtime Users	Yes	Yes
Dynamic Multilanguage	Yes	Yes
Unicode Support	Yes	Yes
Drivers		
Drivers Library	Complete	Full
Max. number of Driver	Max nr. 2	unlimited
PLC Tag Importer	Yes	Yes
Event Object	Yes	Yes
Scaling Object	Yes	Yes
Scheduler Object	Yes	Yes
Logics		
IL Logic (Step5-Step7)	Yes	Yes
VBA Logic (WinWrap Basic)	Reduced	Yes
Sinapsis Logic	No	Yes
Networking	Yes	Yes
Redundancy	No	Yes
Child Projects	Yes	Yes
Screen Navigation	Yes	Yes
Visual Studio SourceSafe 2005 Integration	Yes (the menu items will be disabled)	Yes
Speech Recognition	No	Yes
Web Client	No	Yes
Services Support	Yes	Yes
Touch Screen Support	Yes	Yes

Cross Reference	Yes	Yes
Debugger	Yes	Yes

License Management

The Power HMI version runs on a license which can only be activated with a Softkey containing an unlocking code. There are no hardware keys available for this version. Unlicensed Project runtimes will be executed in Demo mode only.
PowerHMI licences can be purchased in single quantities over the internet.

Startup in Runtime Mode

The PowerHMI doesn't not have a specific runtime module for running projects. Therefore projects must be run using the PowerHMI.exe module followed by the "/R" option. For instance, if you wish to run a "Test.movprj" project you will have to enter the following command line:

C:\Program Files\Progea\PowerHMI11.1\PowerHMI.exe /R C:\Test\Test.movprj

VBA (WinWrap Basic) Restrictions

The usage of the Basic Script resources has some restrictions:

- Only two Basic Script resources can be loaded in Ram and executed at the same time
- It's not possible to associate the script code to the Objects, Screens and Alarms Threshold
- The basic script expressions in the objects properties are not supported
- It's possible to insert the variable script events in the Basic Script
- The usage of Public Basic Scripts is supported
- The direct access to the project variables is supported
- Does not support the use of the project's RealTimeDB variable IntelliSense. This means it will not be able read/write structure variables with <Variable>.<Member> syntax or byte array variables with <Variable>.<e>n syntax.
- The Basic Script Resources can not be run in "Safe Mode"
- The Basic Script Resources can access and use external libraries, but only libraries that don't need any licence
- All the WinWrap Basic functions are supported in the Basic Script Resources
- The Basic Script resources can only access methods and properties of the "UIInterface", "IOPortInterface", "ScriptMEIterface" and "DBVariableCmdTarget" interfaces. Not all the methods and properties from the "DBVariableCmdTarget" interface are supported, as specified below.

The supported methods and properties of the "DBVariableCmdTarget" interface are:

- EnableInUseVarMng
- GetDynamicVariable
- GetNumDynTag
- GetNumStructDefinitions
- GetNumVariables
- GetVariableAddressInfo
- GetVariableDescription
- GetVariableSize
- GetVariableValue
- GetXMLSettings
- IsFirstDBInstance
- IsValidVariable
- PurgeDynTag
- PurgeDynTagTimer
- SetVariableValue

- UseSharedDynTag
- VariableInUse

All the events, methods and properties of the "ScriptMEIterface" interface are supported.

Variable restrictions

System Variables

Some system variables are not managed by PowerHMI. These variables are:

SysVar:NumWebClientConnected
SysVar:PendingTraceEntries
SysVar:NumExpressions
SysVar:OPCServerNumClients

These variables will not be inserted in the "_SysVar_" structure prototype when activating the command to add a system variable.

Array Variables

The array variables are supported but indexes can only be numeric and cannot be a variable.

Restrictions on System Variables

The following system variables are not managed by PowerHMI:

SysVar:NumWebClientConnected
SysVar:PendingTraceEntries
SysVar:NumExpressions
SysVar:OPCServerNumClients

The command for adding the system variable to the database will not add these variable in the "_SysVar_" structure prototype.

Restrictions on Historical Log tables

The Historical Log tables (Alarms, Drivers and SysMsgs) created with the 10.x PowerHMI version are no more compatible with the 11 version since the tables structure for 11 version includes two additional fields. Moving to 11 version these tables will be re-created, loosing all recorded data.

Restrictions on Page Change commands

The "back history" screens list used for "Close and Return back" command is not available. The first time the "Close and Return back" commands is executed, the supervision goes back to the previous screen, the second time it goes back to the start screen.

Restrictions on String Table

The columns of the String Table do not support neither the properties for the Reference Style (Style Source Container) nor the properties for Text -To-Speech (TTS Engine, TTS Volume, TTS Rate. It is not possible to change the TTS engine for the Text-To-Speech function on the project language change.

Other restrictions

Other restrictions may be:

- PowerHMI cannot access in write a Movicon project variable with Trace comments enabled.
- PowerHMI is not able to acknowledge Movicon project alarms which have been enabled for acknowledgement comment entries.

1.4. New features in Movicon 11.3

Movicon has introduced some important new features with its new 11.3 version. The main features have been described in the table below:

Area	New Feature
Child Projects	It is now possible to specify a BackUp Server for Child Project to connect to if the main Server should no longer be available for use.
Design	Some new shortcuts have been added for managing screen symbols: ALT+F5: Shortcut command for distributing objects on screen Ctrl+Shift++: Shortcut for symbol grouping Ctrl+Shift+-: Shortcut for ungroup a symbol Ctrl+Shift+*: Shortcut for regrouping a symbol
Design	It is now possible change languages for all Data Analysis object buttons by inserting ID string in the object's appropriate properties.
Design	The Movicon Setup now adds the "CustomStringID_UNICODE.csv" file in which all the special ID strings with all the columns of the Movicon installation languages and relative translations with default texts have been inserted.
Design	The "Dynamic Property Explorer" had been made resizable. Therefore, it can now be enlarged to make it easier for users to edit script code directly through its window. The set window sizes will be retained for when window is opened again afterwards.
Design	The "Check Missing Strings" command can now also be executed by selecting the name of the project in the Project Explorer Window so that strings will be searched within all the project's resources.
Design	A "Custom" button is now available in the color palette through which colors can be selected using RGB code without having to insert it into the customized colors.
Design	A "Replace texts in all project" command is now available for searching for texts to replace in all the project resources.
Design	A project general property has been added which displays the project's work folder path with a command to open this path in a Windows Resource Explorer window.
Design	A "Runtime" field has been added to the "Check License Requirements" window, in addition to the "Development" field, to make it clearer which type of license has been installed.
Design	The Variable Cross Reference feature now opens with collapsed nodes and also shows a list of variable not in use in the project.
DOM (Document Object Model)	A new GetSelectedRange function has been added to the GridWndCmdTarget through which it is possible to recover the number of start and end rows and columns for multi-cell selections.
Historical Log Management	Web Client user log-on and Log-offs are now recorded in the Historical Log.
ODBC	A signal has been added to alert interruptions with the Movicon historical log ODBC connections. Three system variables have been inserted for the Historical Log, TraceDB and the RealTime I/O Link. The possibility to obtain "Variable Status" for each DataLogger and Recipe has also been included.
OPC Communication	OPC tags/variables now published by Movicon as OPC Server can be set with the following access rights: Readable Writable Readable-Writable This new property is available in the variable property "Options" group.
Real Time DB	The RealTimeDB "Write on Disk every…" property value is now set at "0". All modified Retentive variables will be written all at the time without delays.
Real Time DB	The following message: "The running project is without enabled InUse Variable manager!" is now displayed in the Output window and Historical Log when a project is launched without its "Variables In-use Management"

	activated.
Real Time DB	The "Active" column in the variable Trace table now also reports the IP address of Network Client projects responsible for modifying variables.
Recipes Management	A "Read" command is now available for Recipe objects. This command reads values from the field and updates them in the Recipe's temporary variables.
Report Management	String values can now be customized by defining its number of characters in Text Report displays. This allows Reports to be printed with fixed lengths to avoid disrupting columns.
Report Management	A new resource called "Embedded Reports" has been added through which it is possible to create Report directly within Movicon. These Reports are also supported in Windows CE.
Screen Management	Screens can now be opened in a second monitor (Open Frame) with customizable sizes.
Screen Objects	The Zoom management for Trend and Data Analysis objects has been revised and modified. The selected Zoom area is now represented with a size-as-pleased rectangle. Once the area has been defined, a click on the rectangle will apply the Zoom.
Screen Objects	A column has been added to the Data Analysis legend to show the date and time of the recording selected by the cursor. Furthermore, a tooltip appears showing the date and time of the position in which cursor has moved or the position on which the mouse button has been kept pressed down in the chart area.
Screen Objects	Pens deriving from diverse DataLoggers can now be added in the Data Analysis.
Screen Objects	The format of the Historical Log window's Duration Column can now be customized.
Screen Objects	The format of the Historical Log window's Date and Time column can now be customized.
Screen Objects	Grid column sizes can now be defined in pixles using the new "Grid Column Width" property.
Screen Objects	Integer floating point values can now be formatted for the Meter, Trend and Data Analysis objects as well. Incompatibility: No conversion management has been setup for projects deriving from previous versions, and therefore these projects may display different integer values.
Screen Objects	Two variables can now be inserted in the Meter Alarm Zone properties to dynamically manage the Alarm Zone's Start and End thresholds.
Screen Objects	The pen curves in Trend and Data Analysis objects can now be set with "step" styles.
Screen Objects	A new "Invert Selection" property has been added to the Combo-Box object so that lists can be opened upwards or downwards as desired.
Screen Objects	Fields have been added in the "Sort by" list for the Variable Name, Variable Group, Variable Description and Variable TimeStamp columns in the TraceDB filter window.
Screen Objects	The Display object default size has been changed from 100x50 to 70x30 pixels when inserted on screen.
Screen Objects	Variable TimeStamp can now be displayed using a Display object.
Screen Objects	A new SelectAllTextOnEdit registry key has been added to allow Display text to be selected with one single click.
Screen Objects	When keeping the "<" and ">"buttons pressed down in the Data Analysis object, the multiplication factor will now decrease or increase by one unit at a time, while the "<<" and ">>" buttons will decrease or increase by ten units at a time when pressed.
Screen Objects	Three new columns have been added to the Alarm Window object to show the alarm's "Total ON number", "Total ACK Number", and "Total RESET number" statistical values.
Screen Objects	In the installation folder for the symbol libraries (i.e. in Win7: C:\Users\Public\Documents\Progea\Movicon\Symbols\), ".csv" files can now be found containing strings in the Italian and English language that can be imported into the project using the "StringImpExp.exe" tool.
Screen Objects	The IP camera viewer object now supports the "Motion JPEG (MJPEG)"

	protocol, through which continuous image sequences can be received from the IP camera.
Setup	The Movicon setup now installs the special String ID file in the folder for public documents as well. For example: C:\Users\Public\Documents\Progea\Movicon\CustomStringID_UNICODE.csv
Setup	The basic script Win Wrap engine has been upgraded to the 9.3 version.
Tools	It is now possible to specify which port to use in the TCP plug-in project Upload properties by using this syntax: "ServerName:PortNumber".
User Interface	A new Gestuality function has been added for performing operations for changing pages and scrolling lists in display windows by dragging the mouse during runtme mode.
User Interface	The Movicon About window has been updated and simplified.
Users Management	The possibility to specify User level request for system operations to resize or reduce the Movicon window to an icon has been added.
WebClient	A list of Servers to connect to can now be inserted in the Midlet.

1.5. Movicon BA Restrictions (Buidling Automation)

The Movicon BA version (Building Automation & Domotics) has some restrictions in respect the complete version of Movicon. A list reporting these restrictions is shown below.

Movicon BA installs and supports only the graphic symbols library explicitly designed for Building Automation, and only the Communication Drivers explicitly designed for Building Automation' devices.

All the specific BA drivers require an Activation Code to unlock the communication runtime.
The updated list of BA drivers is available from the **Progea** website "Movicon Building Automation" section referring to this product, or you can contact the Progea sales offices or distributors.

Communication, using Movicon BA, can be also established using the following:

- **OPC**
- **ODBC RealTime**

1.6. System Requisites

The System Requisites for the Editor are listed in the table below for Runtime in Windows 32/64 bit and Web Client.

Product	Operating System	HW Requirement
Editor	Windows 7 Windows Vista Windows XP Windows 2008 Server Windows 2003 Server	Celeron 1,6 GHz, 512 Mb RAM at the minimum. Advised Pentium IV 3 GHz, 1 Gb RAM at the least.
Runtime Desktop	Windows 7 Windows Vista Windows XP Windows XP Embedded Windows 2008 Server Windows 2003 Server	Celeron f1,6 GHz, 512 Mb RAM at the minimum. Advised at lease Pentium IV 3 GHz, 1 Gb RAM.

	Windows Terminal Server, WinXP Embedded*, Windows Tablet Edition	Nevertheless, these requisites depend on the applied project size.
Runtime CE	Windows CE* 5.0 Windows CE 6.0 Windows Mobile	Cpu 200 MHz, 32 Mb RAM, 32 MB Flash at the minimum. Advised Cpu 500 MHz 64 Mb RAM. Nevertheless, these requisites depend on the applied project size. List of the type of processors supported can be found at www.progea.com
Client Web	All operating systems including Windows, Linux, Palm, PocketPC, J2ME	Cpu 200 Mhz at the minimum. These requisites depend on the platform being used and the screen sizes displayed.

1.7. Terminology

The terms most commonly used in this manual and their meaning have been listed below in this table.

Termine	Acronimo	Descrizione
XML	Extensible Markup Language	Metalanguage in text format, simple and flexible to use, defined by the SGML (ISO 8879) standard. Originally designed for HTML enhancement, today is widely used as a strategic tool in exchanging data not only between web applications, but wherever needed thanks to its simple Tag and multiplatform structure.
OPC	OLE for Process Control	OPC is a communication and connectivity standard used between software applications, defined by the OPC foundation. The OPC DA technology is based on DCOM for interchanging data. OPC XML DA is the new specification based on SOAP and its Web Services for communicating in web architectures.
ODBC	Open Data Base Connectivity	Microsoft technology through which applications can access or record data on relational Databases. The ODBC drivers are incorporated in the Microsoft operating systems or can be retrieved from DB producers or from third parties.
SOA	Service Oriented Application	This is an architecture built on services and user services that communicate through a series of specifically designed and independent interfaces using the Web Services.
SOAP	Simple Object Access Protocol	This protocol is considered to be the one for implementing Web Serves in the next few years. It is built on XML and consents applications to communicate with each other, independently from the hardware and

		software used and the programming languages used for developing it. SOAP, used and supported by the leading software producers (Microsoft, Sun, IBM) is the only firewall friendly protocol and exceeds connectivity limits without compromising security.
VBA	Visual Basic for Application	This is the most widely used language worldwide. It uses the Visual Basis syntax for managing script executions within applications. VBA™ is a Microsoft product, while the VBA language guarantees 100% compatibility.
Web Services		These are Software tools accessible through normal protocols in use on the Internet (HTTP, XML, SMTP, etc...). The advantage of the Web Services is using a basic set of protocols available absolutely everywhere, permitting interoperability between different platforms and maintaining the option to use more advance protocols which are more specialized in carrying out specific tasks. The Web Services are built on XML and SOAP.
SMPP	Short Message Peer to Peer	This is a messaging protocol used as an industrial standard for simplifying application integration with wireless networks such as GSM, TDMA, CDMA and PDC. It is widely used in the telecommunications industry sectors and mobile devices.

2. Important Information

2.1. Assumptions

All the information provided in the Movicon documentation is based on the assumption that:

- All the illustrations in this manual refer to the last Movicon version with Windows™32/64 bit platform
- Windows™ 32/64 bit refer to the trademarks of Microsoft inc
- Ms Access™ and SQL Server™ refer to the Microsoft inc. registered products
- Crystal Report refers to the product registered by Business Objects - Seagate, version 10 or later
- Movicon™ refers to the supervision system developed by Progea and is protected by the international Copyright
- Any other product or trademark cited is registered or protected by their relative owners
- Windows is installed in the system. For information about this installation please consult the relevant chapters in the Windows 'Introduction Guide'
- A mouse had been installed. If a mouse is not being used please check the keyboard equivalents
- All the information contained in this manual is subject to change without prior notification due to system updating

2.2. Conventions

Movicon exploits the Windows standard techniques such as Copy, Paste, Drag, Multi-selecting etc., for managing projects.
This documentation assumes that you are:

- Familiar with the appropriate operating system working environment.
- Knowledgeable of how to use of a mouse, Windows menus, select options, and accessing online Help.
- Experienced with a programming or macro language. For best results, you should have an understanding of programming concepts such as variables, statements, functions and methods.
- Experienced with automation systems that the product is referred to

Important: The combo keys indicated in this guide, are to be considered valid provided they are not being used by in the project by the Movicon Shortcuts, i.e. the plants keyboards commands. If used in the project, the plant commands keys have precedence over the system keys.

For further information, please consult the chapter on Shortcut Resource in this guide.

2.3. Copyright

Progea
Via S. Anna 88/E
41100 Modena, Italy

2.4. Warning

This software is not guarantee for a level of reliability suitable for use in or in connection with surgical, nuclear, military or other critical plants and in any life support systems whose failure to perform can reasonably be expected to cause significant injury to a human.

In any application, including the above, reliability of operation of the software products can be impaired by adverse factors, including but not limited to fluctuations in electrical power supply, computer hardware malfunctions, computer operating system software fitness, fitness of compilers and development software used to develop an application, installation errors, software and hardware compatibility problems, malfunctions or failures of electronic monitoring or control devices, transient failures of electronic systems (hardware and/or software), unanticipated uses or misuses, or errors on the part of the user or applications designer (adverse factors such as these are hereafter collectively termed "system failures"). Any application where a system failure would create a risk of harm to property or persons (including the risk of bodily injury and death) should not be reliant solely upon one form of electronic system due to the risk of system failure. To avoid damage, injury, or death, the user or application designer must take reasonably prudent steps to protect against system failures, including but not limited to back-up or shut down mechanisms. Because each end-user system is customized and differs from Progea' testing platforms and because a user or application designer may use Progea products in combination with other products in a manner not evaluated or contemplated by Progea, the user or application designer is ultimately responsible for verifying and validating the suitability of Progea products whenever Progea products are incorporated in a system or application, including, without limitation, the appropriate design, process and safety level of such system or application.

Disclaimer of All Warranties

- PROGEA DISCLAIMS ANY AND ALL WARRANTIES WITH RESPECT TO MOVICON AND THE RELATED DOCUMENTATION, WHETHER EXPRESS OR IMPLIED, INCLUDING SPECIFICALLY THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A GENERAL OR PARTICULAR PURPOSE.
- MOVICON AND THE RELATED DOCUMENTATION ARE PROVIDED "AS IS," AND YOUR COMPANY UNDERSTANDS THAT IT ASSUMES ALL RISKS OF THEIR USE, QUALITY, AND PERFORMANCE.

Disclaimer of Liability

- YOUR COMPANY AGREES AND ACKNOWLEDGES THAT PROGEA SHALL HAVE NO LIABILITY WHATSOEVER TO YOUR COMPANY FOR ANY PROBLEMS IN OR CAUSED BY MOVICON OR THE RELATED DOCUMENTATION, WHETHER DIRECT, INDIRECT, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL (INCLUDING LOSS OF PROFITS).

2.5. Waste Disposal

The Eutronsec dongles must be disposed of separately in the right disposal or recycling bin according to the waste disposal regulations and as indicated by the "dispose separately" symbol on device.

Users must dispose used product at local waste and recycle points in their area or take it back to vendor when purchasing a new one. Waste disposal and recycling process of used products into new ones helps protect the environment from illegal dumping and the harmful pollution caused by it. The improper disposal of products by the user is an illegal offense according to government Waste Disposal Act 254 and following D.Lgs. 152 of 3rd April 2006.

In relation to Art.13, D. Lgs. July 25, 2005, n. 151 "Implementation of Directives 2002/95/EC, 2002/96/EC and 2003/108/EC", on reducing the use of harmful substances in electric and electronic appliances and devices, and their disposal.

2.6. Windows Vista/7 Support

Movicon 11 has successfully passed all tests needed for obtaining the certification and compatibility with Windows Vista and Windows 7 ("Certified for Windows Vista (tm)").

Windows Vista/7 installs a new component called UAC (User Account Control) for default. When this component is active, certain operations cannot be performed in all programs (such as entering information in certain points of the registry) even when an Administrator user is logged in. The user in which the process is run is in fact a virtual reality user and not a real life administrator user.

For further information please read this Microsoft documentation:
http://technet2.microsoft.com/WindowsVista/en/library/0d75f774-8514-4c9e-ac08-4c21f5c6c2d91033.mspx?mfr=true

Some modifications have been made to Movicon which consent the product to run the following operations even when the UAC is active in the Windows Vista/7 operating system:

- Movicon registration in the ROT (Running Object Table) is done during the product's installation phase and at project startup.
- 'Alarm Dispatcher registration in the ROT (Running Object Table) is done during the product's installation phase and at project startup.
- Icons associated to project files are registered during installation, in addition to opening the project in development mode.
- The Movicon service is installed/uninstalled using the "RegService.exe external tool. This tool is used in automatic mode when needed, and is completely transparent to users.
- The Movicon OPC Server is registered/unregistered with the "RegOPCServer.exe" external tool. This tool is used in automatic mode when needed, and is completely transparent to

users. The automatic registration and unregistration of the OPC Server at application startup or termination remains impossible when the UAC is active in Windows Vista/7.

Important! the graphical interface is not supported when running Movicon as Windows Vista/7 service. to increase security Window Vista/7 keeps services and user applications running in separate sessions. This increases system service security but impedes the user to interact with the service's user interface. In this case it is possible to used the Windows Vista/7 "Interactive Services Detection". When a interactive service requires user interaction the "Interactive Services Detection" opens a dialog window through which the user can switch over to the session where the service is running to interact with it. However, only the session in question will be available for use and the only way to return back to the Windows user interface session is to use the command provided. The "Interactive Services Detection" has been set with Manual startup for default therefore the user must start it up when needed.

2.7. Technical Support

Progea supplies a Technical Support Service very fast and highly efficient. The Technical Support Team is at customers disposal, according to service rules, for all customers having purchased at least one Editor licence and having registered as Movicon users.
Sending back the Registration form or registering the product on-line, Progea assures the customer service technical support and the product warranty according to the use licence agreement and the standard procedures.
All technical support information must be obtained from the dealer where this product was purchased. For any further information on this product or the technical support service, you can contact Progea, the product developers, by telephoning the numbers either on the registration form or the telephone assistance contract or in the "Readme.txt" file. Always quote the product's serial number when making enquiries.

Web Support Center

The registered users can access Technical Support Web Service. Please visit our site at www.progea.com to see Support and Services offered by Progea. And while you are there you can take a look at the BugBase, Knowledge base, Examples, FAQs, the last Build available, support centres and the Solution Providers. You can also fill in a form to let us know of any suggestions you may have.

Support via E-mail

The registered users can also access the Technical Support Web Service by sending an e-mail to the Support Team. Each technical support request is traced and recorded in the Technical Support Database and managed as described in support section in Progea web site.
To get technical information quickly and easily via e-mail, 24 hours a day, seven days a week, send us your technical questions to support@progea.com or your commercial requests to sales@progea.com.

Phone Support

The access to phone assistance service (Hot Line Support) is reserved to customers which subscribe the Technical Support contract. Please check in support section in Progea web site http:://www.progea.comhow to access the Hot Line support service.
If you like to subscribe a **Technical Support contract** and taking advantage of its benefits, please contact Progea sales offices at sales@progea.com or contact your local dealer.

Note: For a more efficient technical support, we suggest to use the "Support Inquiry" form available at www.progea.com, support section. The use of this form allows to better define the problem and to quickly find a solution, for a better customer service.

2.7.1. Web Support Center

The web site for the Progea support is available at the address www.progea.com, on the Support section ("Web Support" link).
The access to this page require the user registration (reserved access).
A WebHelp is available on the Web Support Center page where you can check out the BugBase, Knowledgebase, the examples, FAQs and the last product Build available. This tool, which is constantly kept updated by Progea, is particularly useful to the user who will be able to see a series of examples and answers to the most frequently asked questions by clients. In addition to this there is a list of fixed bugs from different versions and information on the new items introduced.

2.8. Updates and BugBase

The Movicon software is periodically updated with the release of new updating Builds by the Progea 'Research and Development' team which can be downloaded from the www.progea.com site free of charge.
You can also access the download page on the website to check out the last **release** available and the reasons why it was released.

- You should always check, when the system is not running correctly, whether our problem has already been put right in the **bugbase**, where there is a historical list of all the problems found so far and resolved.

The solution to a problem or improvements involves the unavoidable release of a build, which is available and can be downloaded from the Progea website free of charge.

2.8.1. Updates

Below the Update and Upgrade concepts will be defined, referring as always to the version number of the product purchased.
As well as the ' splash' at the program's start the version number can also be checked out through the information window accessed with the "**Information On...**" command from the '**Help**' (**'?'**) menu.
The first two numbers refer to the program version, the next three numbers refer to the Build.
Example, version 11.2.1083 means : Version 11.2, Build 1083.

Update	Updates are the patches updating one build to another within the same program version. The Build change is always free of charge.
Upgrade	Upgrades are all changes which upgrade one Movicon version to another. Not only is the software upgraded but also the dongle and the set of manuals that go with it. The upgrade can always be purchased on request.

Upgrading a project to a next build does not always maintain compatibility with the previous build. Before upgrading, we suggest you to check the eventual loosing of compatibility with the past. By consulting the Web Support Center, Bugbase section, you can check any eventual incompatibility list.

2.8.2. Bugbase

The bugbase is the program's historical archive containing a chronological report of all the version releases and builds with explanations of the solved problems and the new items inserted.
When installing new updates you should make it a habit to also read the bugbase to check-out the new items inserted, as regards to the previous versions, or to look over the resolved problems in order to save time or asking for technical support.

The Bugbase is available online at the Progea website in the "**Support"** section, so that users can go over the problems already taken care of and decide whether to they want to update or not by executing the free download.

3. Before Starting

Movicon is a software platform to create and run projects for the supervision and control any kind of automation system.
Movicon's main task is to save you time in creating supervision projects by providing you with all the necessary functionalities in resources and object libraries, prebuilt to suit any purpose.
This product has two working modes: **Development** and **Runtime**

Development	The development mode allows you to edit projects. In this mode, the system permits you to create or modify project files by means of inserting resources and to configure them using properties.
Runtime	The Runtime mode lets you run the project. In this mode the user can view data and use commands predisposed by the programmer.

Nearly all the project's documentation refers to using Movicon in **"Development"** mode with illustrated techniques for creating powerful supervision projects according to the requirements that need to be made available to the supervisor users in "runtime".

What you can do with Movicon

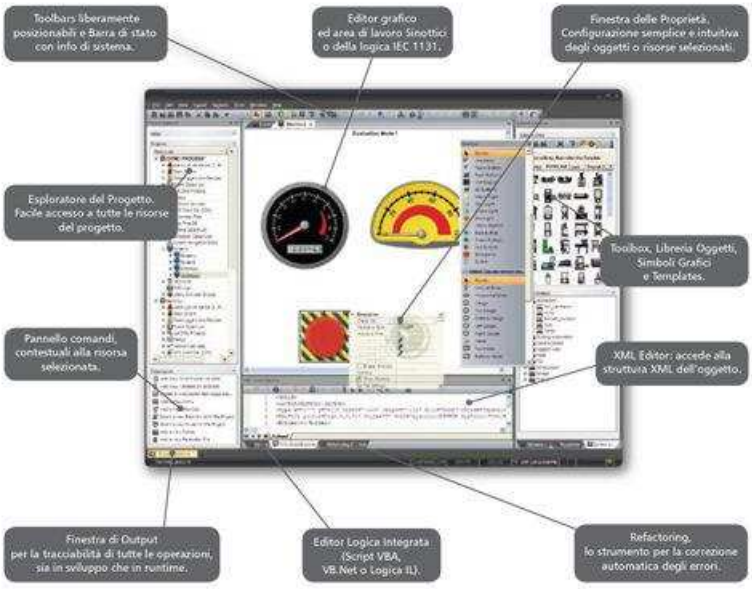
Any necessity relating to creating automation software for vision and control, whether sophisticated supervision systems (Scada) or simple operator interface systems (HMI) can be easily created by using Movicon.
The editing techniques have been conceived to lighten the work load and reduce developing. Naturally, as for all development platforms, the optimal product use must take into consideration all the best techniques to maximize profits and optimize results.

These brief tips do not have the aim of planning you a good user interface, which is the job of the programmer based of the objectives and results required of and by client specifications, but to give you a guideline and better understanding of the techniques used and functionalities of the system before starting to use Movicon.

Let's look at the Workspace

First of all, start up Movicon and briefly observe and study the workspace. This operating environment has left various tools at your disposal which, when used correctly, allow you to speed up your work.
The main tools are:

Project Explorer Window: displays all the project **resources** in a tree structure
Properties Window: displays all the **properties** which can be configured for the selected object or resource
Objects Window: Displays the Toolbox with graphics **object** libraries which can be inserted on screens
Symbols Library Window: Displays the graphic **symbol** libraries



Working in "Easy" mode

For those who are beginners, the object properties windows may seem quite daunting in how many there are available for each object. As time passes you will get to appreciate the many properties which permit you to completely configure all the functionalities reducing the need to resort to codes. However, at the beginning it would be more helpful to start working in 'Easy Mode' where the properties windows hide the more sophisticated and less used ones, reducing the availability of functions and simplifying the initial approach.

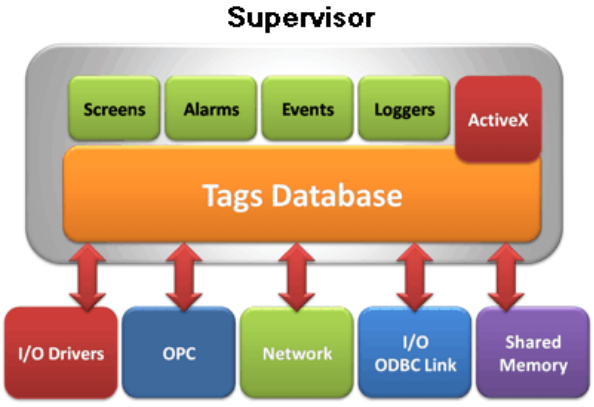
The display change is done by using the button from the toolbar of the same window.

Linked arguments:
Project Structure

Let's start with the Variables from the RT Database

The Supervisor's main objectives to communicate with the field devices and provide information. The dynamic information is called 'Variables' or Tags, which reside in the Real Time DB resource. The communication drivers are setup in this resource and permit data exchange with the devices. This data is associated to the variables defined in the Variable List(Tags).

Real Time DB: Project resource which contains **driver** settings and the list of Tags
Variable List(Tags): Lists all the project's **global** variables. At least the name, type and the **dynamic** device address must be set in the properties of each Tag. When dynamic addresses are not associated, the variables will be "internal" and not counted by the license.

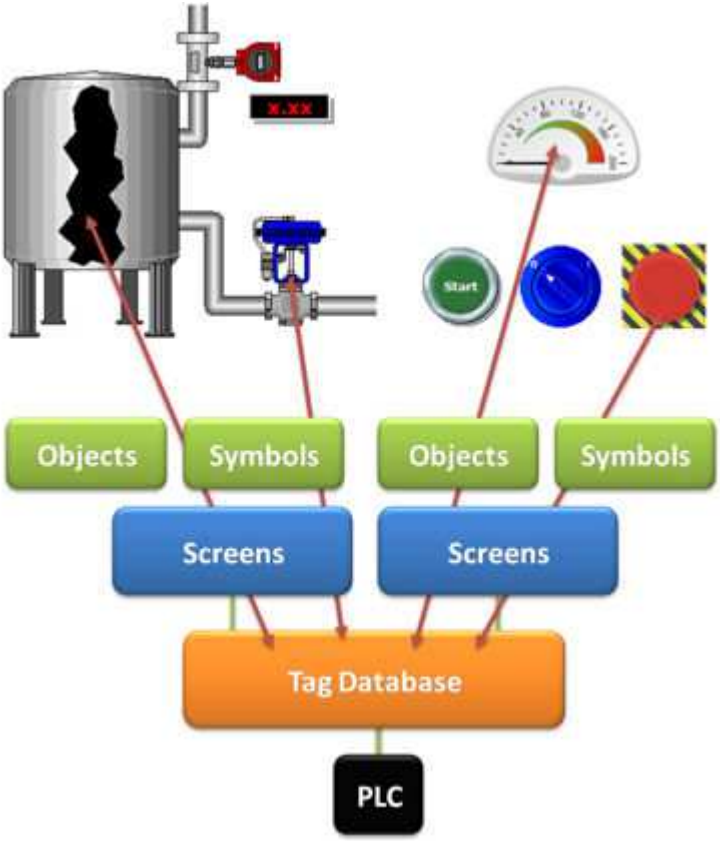


The Graphic Interface

After having observed where the variables, these variables will contain dynamic information to be associated to the various supervisor functionalities. The Graphic Interface is one of the main functionalities, where you can create graphical displays known as video pages or Screen Resources, which are inserted into the project "Screens". The **graphic tools** (objects, symbols) can then be used in the **screens** to create drawings to build the user interface. The screens reside in the "resources" group of the project structure.
Fundamentally, each graphic object inserted on screen, is made dynamic because it is associated with the variable (or variables) in its properties for graphical animations or commands desired. The command objects can, however, execute one or more commands such as change page, data settings, operations commands on alarms, reports, etc.

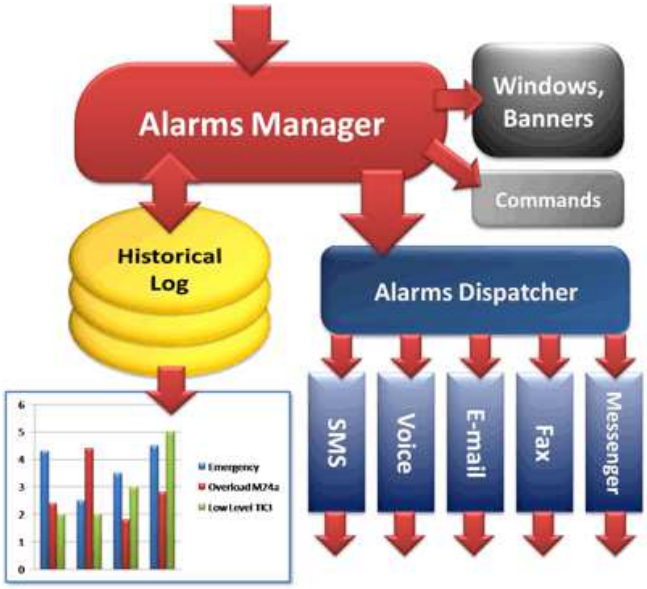
Linked arguments:

Graphic Interface
How to create Graphic Interfaces
Editing Symbol Graphics



The Alarms

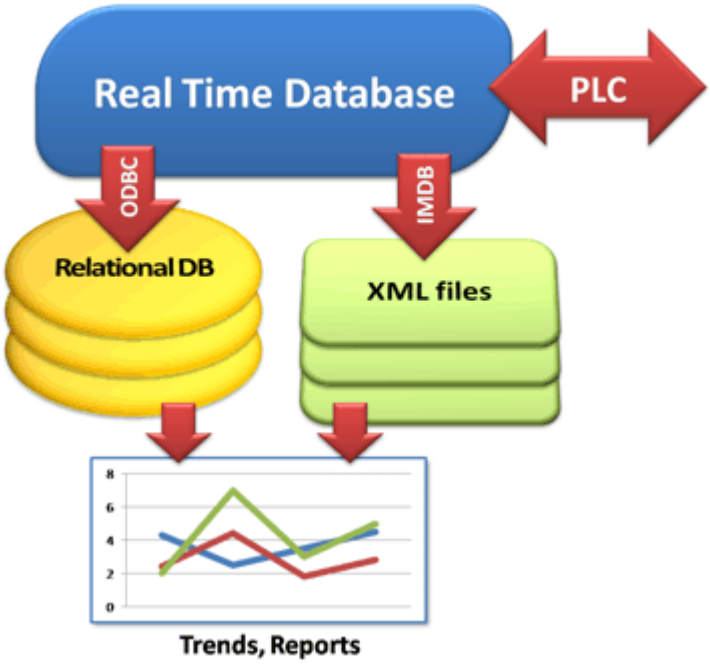
One of fundamental supervisor tasks is to manage alarms. The target is to obtain is to associate an alarm to a variable, which can have one or more intervention thresholds. Generally, these alarms then must be filed in a log, known as the Historical Log, which can be displayed as pleased. These alarms can then be set to give notifications via SMS, E-mail, Voice etc.
The alarms are setup in the project's Alarms Resource where the 'alarm' objects receive the variables associated in their properties. The thresholds are then set and the properties relating to the text, logic conditions along with and any colors and styles.
Once set, the alarms are then managed in the project. When the condition is activated, the alarm will display in a predisposed Alarm Window, which is a graphic object from the toolbox that can be inserted in any screen.
The alarms, if not specified otherwise in their properties, are recorded on filed in the Log by the system. The stored data can be viewed through the Log Window, which is another graphic object from the toolbox which can be inserted in any screen.



Linked Arguments:
Alarms
Inserting Alarms
Historical Log

The Historical Logs

The log recording tools constitute one of the fundamental aspects of any supervisor. In addition to historically recording events that, as indicated above, takes place through the Historical log tool, it is often necessary to record data log files containing process information. These data files can be used for the production Recipes or for recording process variable on log (Data Log). The tool to use in each case, is the Data Loggers and Recipes resource.



The DB objects can be used in both cases which manage the filing of data as needed when configured appropriately.
Recorded data from the Data Loggers and Recipes may be displayed for the following reasons:

Recipes
DataLogger Window
The Grid
Chart Objects
Trend
Report

The desired Data Logger can be associated to any one of the above mentioned graphic objects, being a historical data base managed by the supervisor. The graphic objects display historically logged data according to the contents in the filed managed by the Data Logger objects.

The Logics

Even though the job of a supervision platform is to avoid, as much as possible, the use of codes (to reduce development times), it may be necessary to resort them nevertheless for executing calculations, logic functions whether for customizing the object's or resource function to adapt them to the specifications required. In this case, the logics permits you to get the function type you want, even when not provided in the object's properties.
Movicon provides you with three types of languages to create control logics:

VBA Language (Visual Basic for Application)

Basic Scripts as Resources
VBA™ Basic Script in Object Properties
VBA™ Basic Scripts in Object code

PLC-like Language

IL Logic (Instructions List)

Synapses (graphic object orientated language, based on VBA)

Other Objects and Resources

Movicon offers many other functionalities, such as menus, accelerators (keyboard) schedulers, event objects, change language, Users and password management, networking, OPC, modem, etc.. Each functionality is described in the appropriate chapter.
In this context, the aim was to give you general view of the main functionalities and basic concepts of use.

3.1. Microsoft Windows Certified

Movicon, compliant to the standards required by Microsoft for Windows™ compatibility, completely supports the standard resource usage and management techniques.

The Microsoft standard techniques supported refer to:

- Editing Techniques
- Drag & Drop
- Right mouse key
- Color selections

- File, font, printout selections

The Microsoft standards supported in managing system and other applications refer to:

- ODBC Support
- SQL Support
- OLE2, OLE2 Automation Support
- VBA Compatible and ADO Support
- OCX - ActiveX Support

This part of the guide will briefly deal with the Movicon editing and usage techniques being the Windows standard techniques.
The less advanced user should refer to the Windows User's Manual for further information on these techniques.

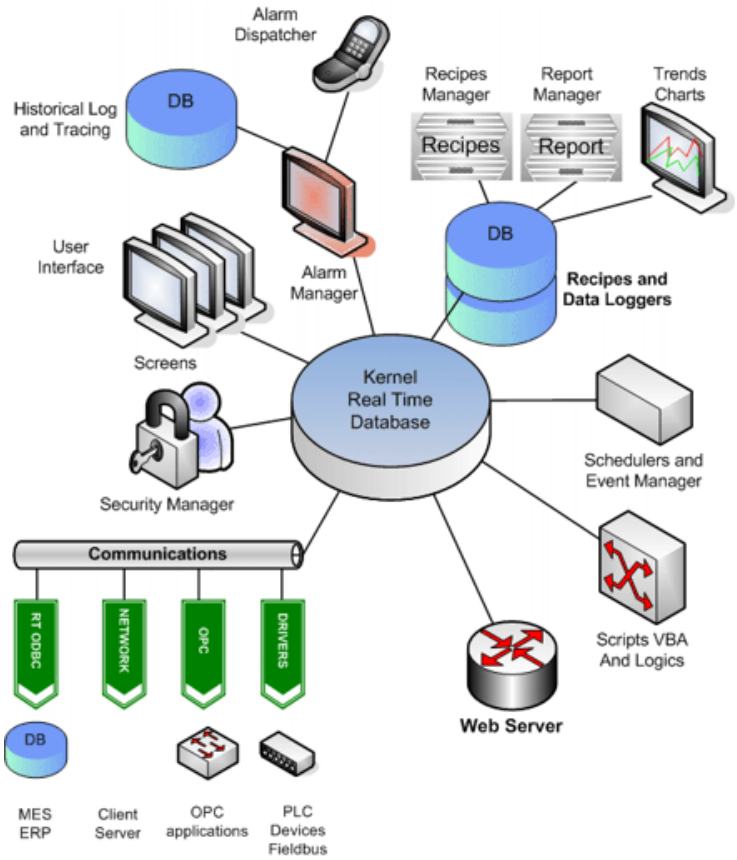
3.2. Project Programming Limits

There are some limits with Movicon programming and the components used by Movicon (i.e. Databse, ODBC, etc) that you should take into account when creating projects. The programming limits concerning the various project resources are described in the relative chapters from the "Technical Specifications" guide.
While consulting these limits you should also consider that:

1. **These recommended limits are not constraints but suggestions based on tests run by the builders. It is totally the user's responsibility to decide what's best for their project according to hardware resources being used and the total amount of resources in use.**
2. **The resource limits refer to projects run on Personal Computer with at least WinXP PRO and CPU Pentium 4 configuration with at least 2 GB RAM.**
3. **Additional programming limits may exist, even though not indicated in the product documentation, caused by restrictions deriving from circumstances or a combination of circumstances internal or external to the project.**

4. Projects Structure

The Movicon Projects are composed of diverse component groups (known also as project Resources), such as the Real Time Data DB, the Resources, The Data Loggers, etc. These groups of components are displayed in a tree structure in the "Project Explorer" window and are described in full detail in the appropriately dedicated sections.



This figure illustrates the Movicon project structure in a block diagram.

The "Project Explorer" window is the main window used in programming a Movicon project.
This window is displayed straight away upon opening a project and its function is to report the Resources and their Groups of Components, contained within, in a tree structure. Each single object can easily be selected from this tree structure to carry out any editing or settings through the corresponding "Properties Window".

4.1. A New Project

An application project is built with folders and files created by Movicon and programmers. When the command for creating a new project (Menu **File**->**New**) is executed, Movicon opens a dialog window through which three options can be executed, when the **'New'**, **'Existing'** and **'Recent'** Tab are selected:

1. create **New** project

2. opens **Exiting** project
3. opens a project in the list of **Recent** projects

Obviously a new project is created only in the first case, while an already created project will be opened in the other two situations.

The same dialog window will also be opened when the project's open command ((Menu **"File->Open"**) is executed with a difference that only the options in point 2 and 3 will appear.

New

When selecting the 'New' Tab, you will be asked to choose which project type you wish to create and, above all, which destination software platform the project is to be executed on.
The choices are:

1. **Movicon Project for Win32 platform**
2. **Movicon Project for Terminals (j2se)**
3. **Movicon Project for WinCE platform**
4. **Movicon Project for Mobile phones (j2me)**

After having chosen the platform desired another dialog window will display through which the projects start settings are defined. These settings, described in the relative sections, concern:

Project Name
Users
Communication Drivers
Screens (Pages)
DataBase Settings (ODBC)
Data Loggers and Recipe Settings (ODBC)
Alarms Settings

Exiting

When selecting the 'Existing' Tab the usual Windows' window will display to execute the browser of the local computer or network resources for selecting the project you wish to open for programming. In this case you have to select a Movicon project file with the ".movprj" extension.

Recent

When selecting the 'Recent' Tab the list of the last projects opened, in chronological time order from most recent to the oldest, will be displayed. Select the project you wish to open for programming from this list.

4.1.1. Project Name

When creating a new project you can define the 'Project Name' settings to assign the Project with a name, its location and its file encoding type. It is obligatory to enter a project name in order to continue programming. These settings can also be changed afterwards during the developing phase.

Name
The Project's name is entered here. Specify the name without extensions only.

Folder
The path and the folder where the Project is to be saved is entered here. You can also use the Browse button ("...") on the right.
Movicon will propose the 'My Documents' folder as the path for the user logged in Windows for default, adding the 'Movicon Projects' folder and the folder with the same Name as the Project's. To make things clearer let's suppose that the Log-on has been carried out by 'Administrator' user and the new project has already been named 'Project1', the path and the folder proposed by Movicon will then be:

C:\Documents and Settings\Administrator\My Documents\...

Any part of this path can be changed due forth.

Crypt Core Project File

When this option is checked the Movicon Project file will be saved in encrypted mode, and therefore cannot be read with other editors. This setting can be changed after the project has been created, through the "Crypted Project" properties accessed from the 'General Project Settings'.

Crypt all Project Resource Files

When this option is checked the Movicon Project resource files will be saved in encrypted mode, and therefore cannot be read with other editors. This setting can be changed after the project has been created through the "Crypted Project Resources" properties accessed from the Project's 'General Settings'.

Compress all the files

When this option is checked the Movicon Project will be saved in compressed format. This setting can be change after the project has been created through the "Zipped Project" properties accessed from the Project's 'General Settings'.

Encode using Unicode UTF-16

When this option is checked the Movicon Projet will be saved in Unicode UTF-16 format. This setting can be change after the project has been created through the "Unicode Project" properties accessed from the Project's 'General Settings'.

4.1.2. Users

When creating the new project you can define the 'User' settings to create default users and groups and define whether or not to activate the password management in the Project. These settings can also be modified afterwards, during the project developing phase.

Password Protected Project

When this option is enabled the project's password protection will be activated. When this protection is enabled only users with Developer rights (level 1024) can open the project in developing mode. This setting can be changed after the project has been created through the "Password Protected Project" property which is accessed from the 'Users and User Group General Properties'.

When activating the 'Password Protected Project' option you must also fill in the 'Developer Name', 'Developer Password' and 're-type Developer Password' text boxes.

Developer Name

This edit box is activated only if the 'Password Protect Project' setting has been enabled and must be used for entering the Project Developer's user name. Movicon will automatically assign the user with a Developer Level. When the project has been created you can add other users with Developer Levels through the 'User & User Groups' management to allow the project to be opened to and by other users.

Alphanumeric and 'Case Sensitive' characters can be inserted into this field and discriminates between lowercase letters and uppercase ones.
The minimum length for the User Name set for default by Movicon is four characters. We advise you not to go lower than this number for normative and security reasons.

Developer Password

This edit box is activated only if the 'Password Protect Project' setting has been enabled and must be used for entering the Project Developer user's password.

Alphanumeric and 'Case Sensitive' characters can be inserted into this field and discriminates between lowercase letters and uppercase ones.
The minimum length for the User Name set for default by Movicon is four characters. We advise you not to go lower than this number for normative and security reasons.

Re-type Developer Password

This edit box is activated only if the 'Password Protect Project' setting has been enabled and must be used for re-entering the Project Developer user's password to confirm whether this has been typed correctly. The characters are inserted in encrypted mode.

Enable Password Mng

Enabling this option will activate the project's password management during Runtime phase. This setting can be changed after the project has been created through the "Enable Password Manager" property which is accessed from the 'Users and User Group General Properties'.

Create Default User Groups

When enabling this option Movicon will insert four default User Groups in the 'Users & User Groups' in the 'Project Explorer' window: "**Developers**", "**Administrators**", "**Users**" and "**Guests**". Apart from the 'Developer' group the other three use the usual O.S. group modality. When the project has been created other groups can be added or the existing ones can be modified through the 'Users & User Groups' management.

Create Users from Windows Users -> Server Name

When enabling this option the users belonging to the Operating System dominion will be inserted into the 'Users & User Groups' in the 'Project Explorer' window by Movicon. These Users will automatically be inserted in the relative "**Administrators**", "**Users**" and "**Guests**" groups if the 'Create Default User Groups' option has been enabled. If a name of a Server Network has been specified in the edit box on the right the Users of that Server will be acquired. After the project has been created other users can be added or existing ones can be modified or moved to other Groups through the 'Users & User Groups' management.

Enable Runtime Users' changes

Enabling this option will activate the Runtime Users management where it will be possible to add, change and cancel new users during project Runtime. This setting can be changed after the project has bee created through the "Enable Runtime users" property which is accessed from the 'Users and User Groups General Properties'.

Enable Windows User Login

When enabling this option it will become possible to share users from the operating system domain or Windows Server in the applied project. This setting can be changes after the project has been created, through the "Enable Windows Users" property which is accessed from the Windows Users and User Groups Property'.

Enable CRF-21 Settings

When enabling this option any editing done to the User settings will be managed in conformance with the **"FDA21 CFR Part 11"** normative. This setting can be change after the project has been created through the "Enable CRF21- Part 11 Settings" property which is accessed from the 'Users and User Groups General Properties'.

4.1.3. Communication Drivers

When creating a new project you can define the 'Add Communication Driver' settings to enable one or more communication Drivers to be used in the Project. These settings can then be also edited afterwards, during the project developing phase, through the 'Real Time DB -> List Available Communication Driver ' in the Project Explorer' window.

Only the Communication Drivers to be used can be selected in this phase. Their settings can be done during the project developing phase.

4.1.4. Screens

When creating a new project you can defined the 'Screens' settings to create a certain number of screens with automatically set sizes. The screens in question can then be modified afterwards during the project developing phase.

Create Nr. Screens
The number of Screens, to be inserted in the "Screens" group in the 'Project Explorer' window to create the project, is entered in this edit box. The screens in question can be modified afterwards during the project developing phase.

Add Screen Caption
When this box is checked, a text box with the Screen's name will be entered into the Screens which were inserted to create the project. This means that each screen will be identified with a header. Since they are realised with vectorial drawings, the header can be changed or removed during the programming stage.

Add Screen Navigation Bar
Enabling this option, apart from the Screens set in the 'Create N. Sub Screens', another Screen will be inserted in the project being created which will appear as a command bar (reduced height) to contain as many buttons as the screens set in the 'all the button which have been 'Create N. Sub Screens'.
Each button will open the Screen it is related to (Page1 Button = opens Screen page 1). In addition to this an embedded Footer Screen will be inserted in each page so that the bar of command buttons is available in all of them. This results in having a determined number of screen pages contained in a command bar to execute page changes. All the pages and command can be changed and customized during the programming phase.

Default Screen Width
The default width in pixels with which the Screen is to be created is entered in this edit box. This setting can be changed after the project has been created through the "CX" property which is accessed from the 'General Screen Properties'.

Default Screen Height
The default height in pixels with which the Screen is to be created with is entered in this edit box. This setting can be changed after the project has been created through the "CY" property which accessed from the 'General Screen Properties'.

Default Color
This selection box is used for assigning the Screen background color.
For further information please refer to the paragraph on "Colour Threshold Settings in Drawings and Controls".

4.1.5. DataBase Settings (ODBC)

When creating new projects you can set the "DataBase Settings (ODBC)" which Movicon will use for default for recording data inherent to the Historical Log and the Variable Trace.

In this phase you will be able to select the provider wished to be used through the combobox and then configure its parameters through the mask opened with the "Customize ODBC Settings" command. This selection will then be associated to the project's "Plugin ODBC Default" property whichh can be modified afterwards.
The ODBC drivers that can be selected are:

- **MSAccess**: MS Access (uses the "Microsoft Access Driver (*.mdb)" driver and is the predefined choice)
- **MySQL**: MySQL 5.1 (uses the driver installed with this MySQL version)
- **OracleEx10**: Oracle Express (uses the client-less driver installed with this Oracle version)
- **SQLServer2000**: MS SQL Server 2000 (uses "SQL Server" driver)
- **SQLServer2005**: MS SQL Server 2005 (uses the "SQL Native Client" driver)
- **SQLServer2008**: MS SQL Server 2008 (uses the "SQL Native Client 10.0" driver)
- **SQLServerExp2000**: MS SQL Express 2005 (uses the "SQL Native Client" driver)
- **SQLServerExp2008**: MS SQL Express 2008 (uses the "SQL Native Client 10.0" driver)

Naturally, in order to use one of above listed providers you will need to install its relating ODBC driver on your machine beforehand. "MsAccess" is the only native Operating System driver.

The "Customize ODBC Settings" button permits you to set some connection parameters, for each plugin specifically, such as the driver or the database instance name. If you already know the values of these paramaters this is the best time to set them. When presseing the "Next" button a connection test is carried out after which the set parameters will be reviewed if failed. You can, however, proceed in executin the wizard independently from the test result.

For further information please refer to sections: "Project ODBC Plugin " and "ODBC Plugin list".

4.1.6. Data Loggers and Recipe Settings (ODBC)

When creating a new project you can set the "Data Logger and Recipe Settings (ODBC)" to define if any DataLoggers as Templates should be added to the project. The ODBC driver used for defualt for creating DSNs for the DataLoggers and Recipes will be the same one defined in the project's "Plugin ODBC Default" property. (and initially selected with the wizard when creating a new project in the "Database settings (ODBC)").

Create Data Logger Template

When this box is checked 1 to 5 Data Loggers will be automatically added to the list of the project's Data Loggers as Templates. The only difference between these Data Loggers is the recording which may be:

every 5 seconds
every 10 seconds
every 30 seconds
every minute
every 10 minutes

otherwise they are all the same without any associated columns. Their purpose is to be used as Templates which can be associated to variables directly, as described in the section on "Associating Data Loggers and Recipes to Variables", when diverse variables are to be recorded with the same modalities. This is a very quick way of assigning variables to DataLoggers.
The programmer then has the task of carrying out any changes to the Data Logger settings regarding the recording modalities and columns can be added to them or they can be used as standard Data Loggers and not as Templates.

4.1.7. Alarms Settings

When creating a new project you can use the 'Alarms Settings' to create a digital and an analog alarm to be eventually used as Templates.

Create Digital Alarm Template

When enabling this selection box a Digital Alarm will automatically be added to the project's 'Alarms List', which is an alarm with only one intervention threshold set at '1' value, and a Digital Message, being an alarm with only one intervention threshold set at value '1' with its "Support ACK" and "Support RESET" disabled. This alram and this message can be used as Templates and associated directly to the Movicon Real Time DB variables. An alarm or message can in fact be associated to several variables, as described in the "Alarms as Template" section, in cases where the alarm or message type remains always the same and when repeated for different devices. However the alarm or message can always be configured in the normal way, associating them a variable and managing them as single alarms or messages.

Create Analog Alarm Template

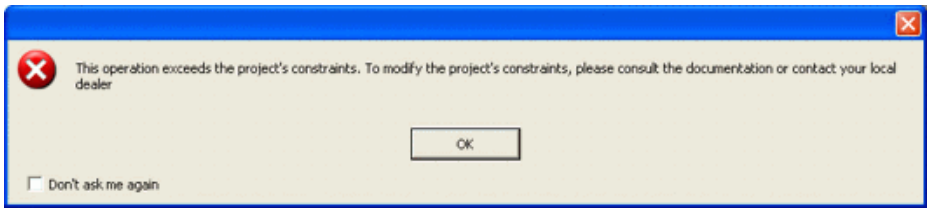
When enabling this selection box an Analog alarm will automatically added to the project's 'Alarms List', which is an alarm with more than one intervention thresholds. These alarms have four thresholds which are defined as follows:

LowLow (intervention for values < -100)
Low (intervention for values < -90)
High (intervention for values > 90)
HighHigh (intervention for values > 100)

This alarm can be used as a Template to be directly associated to the variables from the Movicon Real Time DB. An alarm can also be associated to more than one variable, as described in the section on "Alarms as Template", when the same alarm type is repeated on different devices. The programmer therefore should configure the alarm to be used as template appropriately. The alarm can always be configured as a normal alarm, by associating it to a variable and managing it as a single alarm.

4.2. Project Constraints

Each project can be set with constraints when being developed. When these constraints are exceeded the following alert window will appear:



These constraints are managed with a xml file which has the name of the project with the ".Constraints" extension. These files contain default values which can be changed. The purpose of these constraints is to set projects with limits to stop them from getting too big for the chosen platform they are to be run on. However, it is important to keep in mind that any possible value changes made to these limits may degrade the project's performances.

Furthermore, there are some items which consent certain information in the project structure to be displayed or hidden such as that shown in the Project Explorer Window.

The various attributes in the ".Constraints" file must be inserted in the right order so that they can be valued properly. Following this, the ".Constraints" file is proposed once again with the list of all the attributes, in order, that have been set with the default value:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<Constraints>
<MaxNumVariables>4294967295</MaxNumVariables>
<MaxNumScreens>4294967295</MaxNumScreens>
<MaxNumScripts>4294967295</MaxNumScripts>
<AllowScriptInScreen>1</AllowScriptInScreen>
<AllowILInScreen>1</AllowILInScreen>
<MaxNumScreenObjects>4294967295</MaxNumScreenObjects>
<MaxScreenSizeCx>2147483647</MaxScreenSizeCx>
<MaxScreenSizeCy>2147483647</MaxScreenSizeCy>
<MaxDaysAgeHistoric>65535</MaxDaysAgeHistoric>
<MaxCacheBeforeFlush>32767</MaxCacheBeforeFlush>
<MaxNumberRecordsDL>10000</MaxNumberRecordsDL>
<AllowGradientFill>1</AllowGradientFill>
<EditVariables>1</EditVariables>
<EditDrivers>1</EditDrivers>
<EditStructures>1</EditStructures>
<EditScreens>1</EditScreens>
<EditScripts>1</EditScripts>
<EditShortcuts>1</EditShortcuts>
<EditMenus>1</EditMenus>
<EditParameters>1</EditParameters>
<EditUsers>1</EditUsers>
<EditDLRs>1</EditDLRs>
<EditAlarms>1</EditAlarms>
<EditEvents>1</EditEvents>
<EditSoftLogic>1</EditSoftLogic>
<EditScreenNavigation>1</EditScreenNavigation>
```

```
<EditSchedurs>1</EditSchedurs>
<EditScaling>1</EditScaling>
<EditChildProjects>1</EditChildProjects>
<EditNetwork>1</EditNetwork>
<EditOPCDACOM>1</EditOPCDACOM>
<ShowExtendedBrowseTag>0</ShowExtendedBrowseTag>
</Constraints>
```

Each attribute means:

- **MaxNumVariables**: maximum number of variable that can be entered in the project's RealTimeDB
- **MaxNumScreens**: maximum number of screens that the project can have
- **MaxNumScripts**: maximum number of basic scripts that can be entered in the project
- **AllowScriptInScreen**: allows the script code to be edited in the screen or in its objects (default value is "true")
- **AllowILInScreen**: allows the IL codes to be edited in the screen or in its object (default value is "true")
- **MaxNumScreenObjects**: maximum number of objects that can be inserted on one screen. One symbol counts as one object
- **MaxScreenSizeCx**: maximum length set in pixels that a screen can be set with
- **MaxScreenSizeCy**: maximum height in pixels that a screen can be set with
- **MaxDaysAgeHistoric**: specifies the maximum project historical table age in days. This setting is used in the Historical Log tables, the variable Trace DB tables, and in Data Logger tables. This value is also used in project design mode to reduce the default age of the various historical logs, in cases where values may be more than the set limit.
- **MaxCacheBeforeFlush**: consents the maximum size of the cache to be specified before the system unloads data on files. This value represents the "Max. cache size" property of the "ODBC manager" properties group, for the project historical logs or for DataLoggers.
- **MaxNumberRecordsDL**: consents the entry of a further control on Data Loggers. Frequency values or age values that produce a total number of records higher than this limit, set through the constraints, will not be accepted. The "Tot. Nr. Records" property allows you to see the total number calculation of records estimated for a determined Data Logger. This calculation uses the age set in the historical and the sampling frequency in this formula:

  Total Nr. Records = (Data Max.Age/Sampling Frequency)*2

  ie: When setting MaxNumberRecordsDL = 68400 in the constraints file, it will not be possible to change the ""Data Max Age" or the Sampling Frequency if this results (Data Max.Age/Sampling Frequency)*2 > 68400
  Only the "MaxDaysAgeHistoric" value is used when creating a new project, while the **MaxNumberRecordsDL** value is controlled only when the Data Logger age or sampling frequency are being edited
- **AllowGradientFill**: when set at 0, consents all the properties, for setting the back color Gradient types of screens and objects, to be hidden
- **EditVariables**: when set at 0 the "Real TimeDB" node in the Project Explorer window will not be displayed, the "Edit Real Time DB Variables" will be disabled from the project's Edit menu (right mouse click), the "Edit Realtime DB Variable..." and "Add a New Variable (Tag)" from the Project Explorer's window's command panel will also be disabled
- **EditDrivers**: when set at 0 the 'List Com.Drivers' sub-node from the RealTime DB group in the Project Explorer window and the "Add New Comm.Driver" from the same menu of the "Real TimeDB group and the "Add New Comm.Driver" item form the Project's Explorer's command panel will also be disabled
- **EditStructures**: when set at 0 the "List Structure Prototypes" sub-node from the RealTime DB group in the Project's Explorer window and the "New Structure Definition" from the Real time DB edit menu and the "Add a new Struct Prototype" item from the Project's Explorer window's command window will both be disabled.
- **EditScreens**: When set at 0 the "Screens" node in the Project's Explorer window will not be displayed, the "Add a new Screen" from the edit menu (right mouse click), the "Insert a new screen in the Project" item in the Porject's Explorer window's command panel and the "New Screen" icon from the Toolbar will all be disabled
- **EditScripts**: when set at 0 the "Basic Script" node in the Project's Explorer window will not be displayed, the "Add a new Script" the edit menu (right mouse click), the "Insert a new

Basic Script in the Project" in the Project Explorer window's command panel and the "New script" icon in the Toolbar will all be disabled

- **EditShortcuts**: when set at 0 the "Shortcuts" node in the Project Explorer window will not be displayed, the "Add a new Shortcut" item from its edit menu (right mouse click), and the "Add a new Shortcut" from the Project Explorer window's command panel and the "new shortcut" icon in the toolbar will all be disabled
- **EditMenus**: when set at 0, the "Menus" node in the Project Explorer window will not be displayed, the "Add a New Menu" item from the edit menu (right mouse click), the "Add a new Menu" from the Project Explorer window's command panel and the "New Menu" icon in the ToolBar will all be disabled
- **EditParameters**: when set at 0, the "Parameter Files" node will not display in the Project Explorer window, the "Add a new Parameter File" from the edit menu (right mouse click), the "Add a new Parameter File" item from the Project Explorer window's command panel and the "New Parameter File" icon from the ToolBar will all be disabled
- **EditUsers**: when set at 0, the "Users and User Groups" node will not be displayed in the Project Explorer window
- **EditDLRs**: when set at 0, the "DataLoggers And Recipes" node will not be displayed in the Project Explorer window
- **EditAlarms**: when set at 0, the "Alarm List()" node will not be displayed in the Project Explorer window
- **EditEvents**: when set at 0, the "Event Object List" node will not be displayed in the Project Explorer window
- **EditSoftLogic**: when set at 0, the "Soft Logic" node will not be displayed in the Project Explorer window
- **EditScreenNavigation**: when set at 0, the "Screen Navigation Editor" node will not be displayed in the Project Explorer window
- **EditSchedurs**: when set at 0, the "Scheduler Object List" node will not be displayed in the Project Explorer window
- **EditScaling**: when set at 0, the "Scaling Object List" node will not be displayed in the Project Explorer window
- **EditChildProjects**: when set at 0, the "List Child Projects" node will not be displayed in the Project Explorer window, the "New Child Project....' item in the edit menu (right mouse click), the "New Child Project...." item in the Project Explorer window's command panel will all be disabled
- **EditNetwork**: when set at 0, the "Network Services" node will not be displayed in the Project Explorer window
- **EditOPCDACOM**: when set at 0, the "OPC Client DA (COM) " node will not be displayed in the Project Explorer window
- **ShowExtendedBrowseTag**: when set at 0, allows the "OPC", 'Network' and "Comm. I/O Drivers" tabs to be hidden in the Tag Browser window. This should stop programmers from inserting dynamic addresses to variables (Fixed I/O address)

The properties that are not in this file are to be considered active, meaning as if set at 1. However, those that have been inserted will be managed according to the value entered in the file. Please keep in mind that all the above listed properties may be modified by the programmer and the new settings will be acquired by the project when opened again afterwards (this means that you will need to close and reopen the project after having modified the ".Constraints" file).

A child project, when created for the same parent project's platform, inherits the same constraints as its parent project. However, if the child project is created for a different platform, ie. the parent project is Windows 32/64 bit type and child project is WinCE, the child project will inherit the constraints of its platform, WinCE.constraints, found in the Movicon installation folder.

When a new project is being created with the Wizard, Movicon will search for an existing ".Constraints" file with the name of the project to be created. The search for this file is carried out in the Movicon installation folder. When it is found it is then copied in the projects destination folder with the project name and ".Constraints" extension.
The files originally created in the installation phase are:

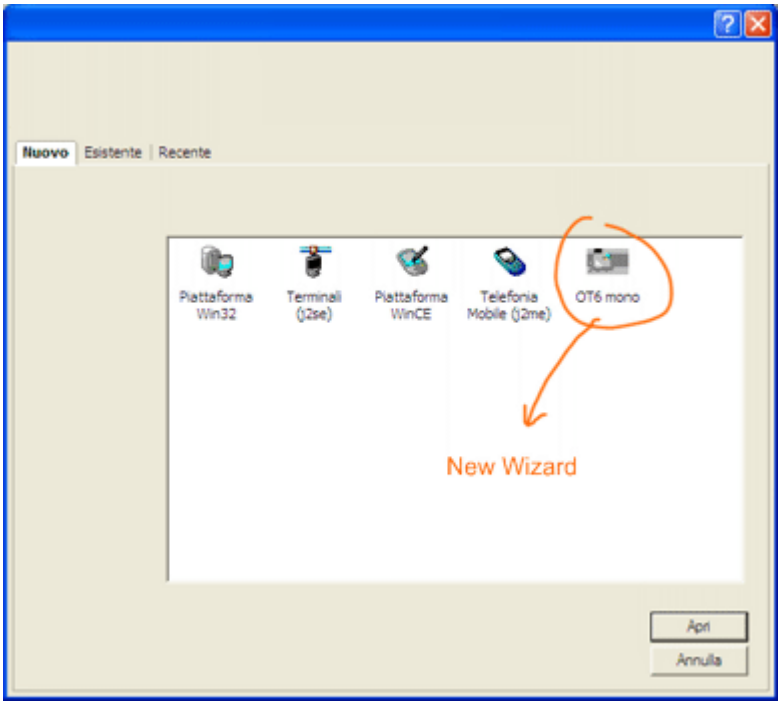
Win32.Constraints: file containing the Windows 32/64 bit project constraints
WinCE.Constraints: file containing WinCE project constraints
j2se.Constraints: file containing j2se terminal project constraints
j2me.Constraints: file containing j2me mobile phone project constraints

4.3. New Project Wizard customizing

One of the most powerful tools, that Movicon has made available for use, can be used to create new and customized "wizards" as new supervision project creation models. This potentiality opens the way to "auto-planning", where new Movicon projects can be created ready with presettable components (Variables, resources, objects).
The wizard concept is based on the possibility to build a "macro" procedure, based on VBA codes, in order to create XML project files or any of its components.
By using this criteria, companies can preset the project's creation criteria, by creating for instance variables and their links, stiles and sizes of screens, their contents, the alarms, etc.

- **Once this criteria has been established and setup, therefore the VBA macro, you can click on the corresponding icon to get a complete creation of the project according to the set features and functionalities.**

When creating a "New Project, "Movicon will search for the 'wizard' sub-folder (which needs to be created), where the program is installed, for all eventual files with the ".movwiz" extension. Those present will be listed as additional icons in the Movicon "New Project" dialog window. If, apart from these files, exists another file with the same name and an .ico extension, it will be used as the icon to be displayed in the window otherwise Movicon will use a default icon.
The figure below illustrates the creation window of a new project. In addition to the standard Movicon projects, you will see a new icon corresponding to a custom project creating wizard.



The .movwiz file must be in **unicode text format** containing the basic code with the following entry function:

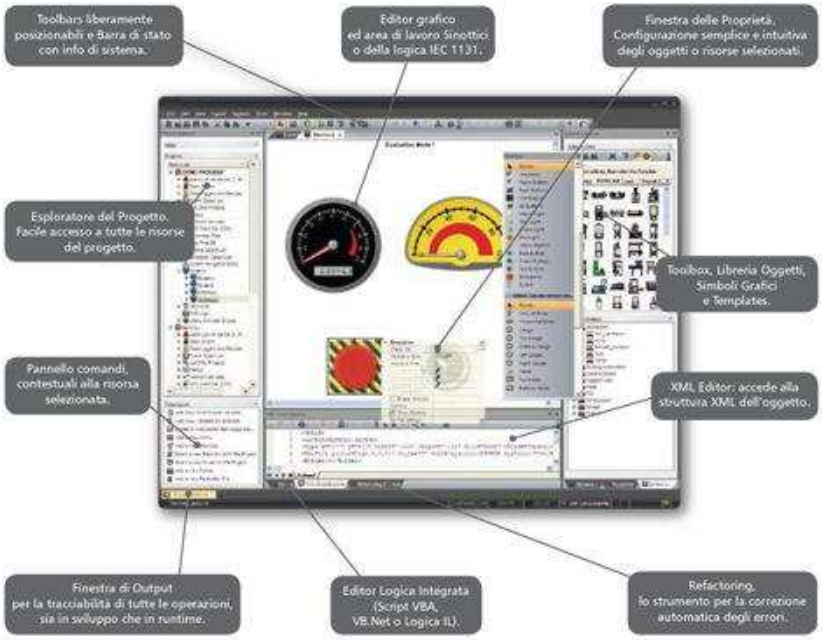
Sub OnWizard(bRet As Boolean, ByRef szFilePath As String)

End Sub

The bRet pareameter when set at True will allow Movicon to proceed with opening the file passed with the szFilePath parameter.
The necessary operations are to be done within this basic procedure (including the use of dll, ocx etc) to create the various projects files to be then opened by Movicon.
Usually, XML files creating is based on the Microsoft XML Parser.
Contact technical support to get further information and/or wizard examples.

4.4. The Workspace

The workspace provided for the programmer is completely customizable. By using the commands from the 'View' menu, or the right mouse key, you can select the windows and the toolbars to be displayed for configuring the programming interface as you please.



The **Tools Bar**, **Menu** and the **Project Windows** can be positioned inside the workspace where you please. The Project Windows can be **"Docked"** in order to keep them in the workspace's foreground.

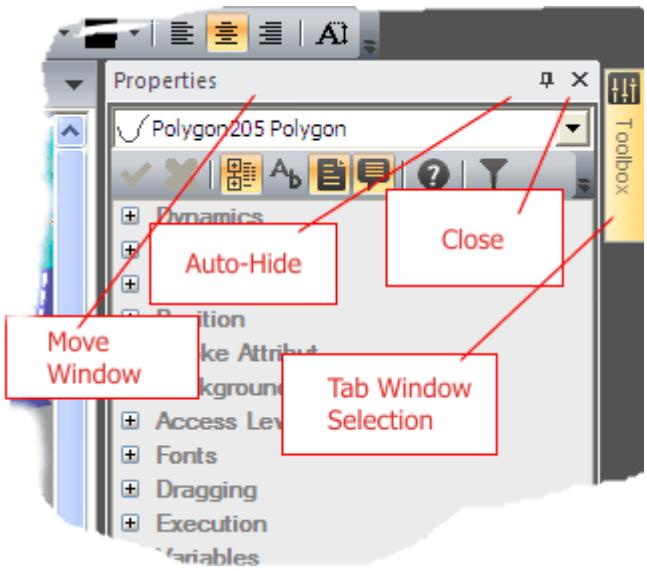
MDI Tabs

Editing resources which open a window in the workspace, such as Screens, String Tables, Basic Scripts, etc., allow a series of MDI Tabs to be displayed at the top of the window to allow you to quickly pass from one resource to another:

- Right clicking on these Tabs a context menu is open, containing the following commands:
-
    - **Close**: closes the resource in question
    - **Go to Resource**: highlights the resource in question in the "Project Explorer" tree. This command is useful when resources of different projects or child projects are opened at the same time, to identify the project the resource belongs to, especially if resources belonging to different projects have the same name.
        - **Resource TAB Groups**
    - **New Horizontal Tab Group**: opens a new tabs group and tiles the groups horizontally.
    - **New Vertical Tab Group:** opens a new tabs group and tiles the groups vertically.

4.4.1. Docking Project Windows

The Project Windows are the fundamental tools through which the programmer can interface with the project. Each window has a precise function, such as gathering and displaying the project resources, setting or modifying the components' properties, editing script codes, etc.
As the Project Windows are sources of precious information and are therefore used frequently, they can be kept active to be displayed continuously, independently of the resource or screen you are working with. The windows which are kept constantly active can then be set with the **'Dock'** or **'Hide'** modes.



When a window is **"Docked"** it will always remain visible and will occupy space within the workspace. Some project windows, such as the Properties window, when parked, dynamically change their contents to adapt to the resource or the component being focused on.
When the window is **'Hidden'** only the Tab identifying it is visible and is positions on one of the sides of the Movicon window. When the mouse cursor is position on the Tab desired the window is displayed like a drop-down menu, When the window is not longer being focused on it will automatically be hidden again.

To turn the window from being **'Docked'** to **'Hidden'** and viceversa, simply use the **'Pin'** button on the top right title bar at the side of the **"X"** button which closes the window. The status of the button's icon shows which display mode is in action:

This icon means that the window is 'Docked', therefore it will remain in the foreground and always visible in the position defined by the programmer.

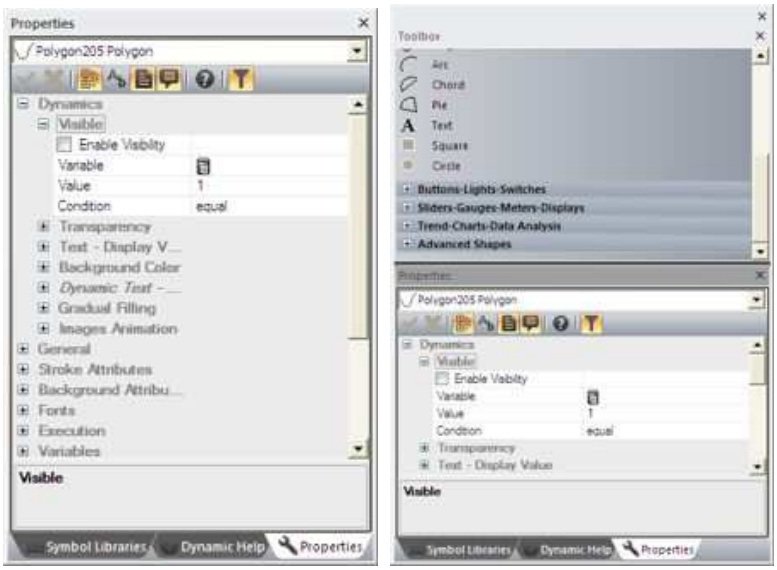
This icon means that the window is 'Hidden', therefore only the Tab with its name on remains visible at the side of the screen. When the mouse cursor is positioned on the Tab, or clicked on, the relating window will be displayed in its entirety. When changing focus to another window or area in the workspace, the window will automatically be hidden again.

The Movicon Project Windows which are subject to these settings are:

- **Project Explorer**: this window contains all the project's resources
- **Properties Window**: this window is used for editing or modifying the properties or each project resource and component
- **Script explorer**: this window is used for editing the project's components' script codes
- **Logic Explorer**: this window is used for editing the project's components' codes in PLC Logic format
- **Symbols Library**: this window is used for accessing tghe Movicon Power Template symbols

- **Toolbox**: this window is used for accessing lists of drawings, controls and components which can be inserted within project Screens
- **Dynamic Help**: this window reports the main links to help topics inherent to the component being focused on
- **Output**: this is the window where all the system messages are reported by Movicon, such as errors, alerts etc., which are checked during programming or runtime
- **Watch**: this is the project debug window which is displayed during the Runtime phase. Variables can be forced or the project can be debugged through this window

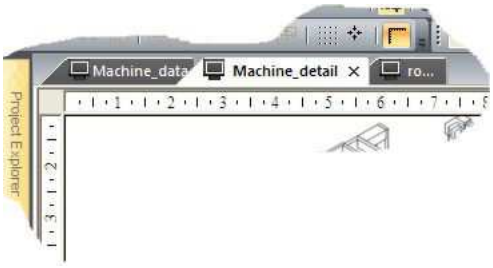
When a window is docked you can drag it to a more suitable position either by attaching it to the Movicon window border or moving it to the centre of the Movicon workspace or to any other area. In order to do this drag the window by its title bar.
In addition to this you can also create compositions with more windows. By dragging one window onto another and dropping it into a suitable position you can get two composition types. In the first case you get one single window where the Tabs of the component windows are visible at the bottom and by clicking on the one desired will activate its relating window. Whereas in the second case, the windows are all visible but are attached to one another to form one window only:



Above are shown two configuration which can be obtained by overlapping two or more project windows. The programmer can choose the mode most suitable to his requirements in the workspace.

4.4.2. The Rulers

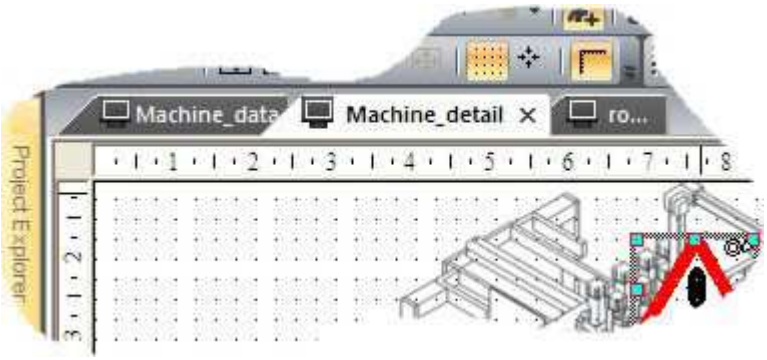
The Movicon Screen windows can be given lateral **'Rulers'** to facilitate designing the graphical interface.



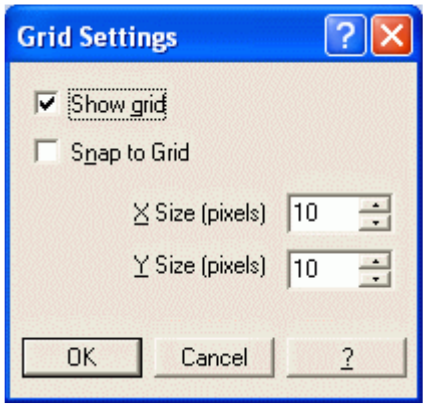
To enable or disable the Rulers just simply use the appropriate command found on the **"Aligning Bar"**, or use the **"Ruler"** item from the **"Layout"** menu. When using the menu item you can enable the horizontal and vertical rulers separately as well as setting the referential measure units (Millimetres, Centimetres, Inches).

4.4.3. The Screen Grid

The Movicon Screen windows can be given **"Grids"**, to make designing the graphical interface and in particular any alignments easier. To enable or disable the Grid display, simply use the appropriate command found on the **"Aligning Bar"**, or use the **"Grid Settings..."** item from the **"Layout"** menu.



In addition to the command for making the Grid visible or invisible there is also another command to enable the alignment of objects with the Grid. This command can also be found on the **"Aligning Bar"**, or you can use the **"Grid Settings..."** item from the **"Layout"** menu. When using this menu you can also set the Grid's sizes, in pixels, being the space you wish to obtain between one point of the Grid and the next.



Show Grid
Enables or disables the displaying of the grid on screen.

Snap to Grid
When enabling this setting the screen's objects will be aligned to the grid according to the grid's resolution.

Size X (pixels)
The distance in pixels between one point on the grid's horizontal axis and the next is set in this field. Obviously lower the value, more precise the resolution will be.

Size Y (pixels)
The distance in pixels between one point on the grid's vertical axis and the next is set in this field. Obviously lower the value, more precise the resolution will be.

4.4.4. The Movicon Grid

Every screen has a second grid (different from the "The Screen Grid" which is customizable through the "Layout Menu-Grid Settings....") which is 1x1 in size and is always present but not visible. This grid is used by Movicon for forcing Snaps (alignment) of objects when the "Snap to Grid" property is enabled.

This second grid is handy in cases where using the zoom for positioning objects in areas that, with a normal 100% zoom, does not correspond to a pixel exactly. When using the zoom, therefore objects moved with the mouse or the keyboard direction arrow keys cannot be moved as pleased, but are moved according to the base multiple of pixels at 100% zoom. For instance when zoomed at 200%, each move will correspond to double the number of pixels with zoom at 100%.

The object's real sizes and position, being those corresponding to zoom = 100%, are always displayed in the Movicon Status Bar. When a multiplicative zoom (ie. 500%) is active, the values in the object's Properties Window (Position X, Position Y, Width, Height) are also multiplied by the zoom's factor. For instance, a rectangle sized 20X10 zoomed at 500% will have "Width = 100" and "Height = 50" in its Properties Window. If, while zooming, the values of these properties are changed using values that are not multiplied by the base unit (ie. 5 pixels), it will not snap back to grid correctly.

4.4.5. Customizing Menus and Toolbars

Movicon allows you to customize the system menu and toolbar configurations to accord with your personal user styles.
By accessing the 'Customize' command from the 'Tools' menu, which opens by right mouse clicking in the workspace, the system settings window will display as illustrated in the figure below.
Each different setting card can be accessed through this window by clicking its corresponding Tab to activate it.

Commands

You can view the complete list of menu commands, which are available in both in the programming and runtime phases, on the Commands Card.
These commands cannot be modified or their order changed.

The Toolbars

From the Toolbar chard you can view the complete list of the Movicon toolbars, which can be enabled or displayed by using the selection button found on the side.
You can restore the default positions of all the Toolbars by using the Reset All command.
New toolbars can be added but not commands.

Tools

By using the Tool card you can customize the available commands in the Tool commands menu containing the utility applications which can be launched. The commands from the Tool menu can be customized, by adding new items or by modifying the existing ones. Each menu item has a command line ('Commands') with the relative argument, which will be executed when the command is activated from the menu.
By using the tools from the bar at the top of the card you can add or delete the item from the Tools menu. The list of applications existing on the menu are initially loaded from the "Tool.xml" configuration file (see paragraph on "Tools Menu Configuration").

Keyboard

From the Keyboard card you can view the complete list of keyboard commands of the Movicon Toolbars.
The default settings can be restored by using the Reset All command.
The keyboard commands can be removed but not added to.

Menu

You can customize the display of the system menu through the Menu card. The Project Menu selection is not active at this time.
The 'Application Frame Menus' command lets you defined the type of animation you wish to use each a menu is opened.

The 'Menu shadows' box lets you enable or disable the menu's shadow when opened.

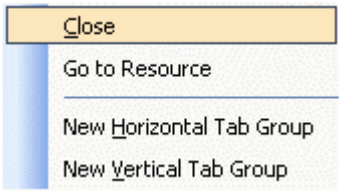
Options

The Options card lets you customize the further use of the menus in Movicon. Through the selection box, you can set the style in which you wish the menus to be displayed.
The 'Large Icons' box lets you enlarge the sizes of the icons from the Toolbars.
The 'Visualizations' box lets you enable the tooltips when the mouse is pauses on the icons of the toolbars.
The 'Menus show recently used commands first' command lets you set how to manage the menu commands being used, by defining whether to immediately display only those used the most or those recently used.

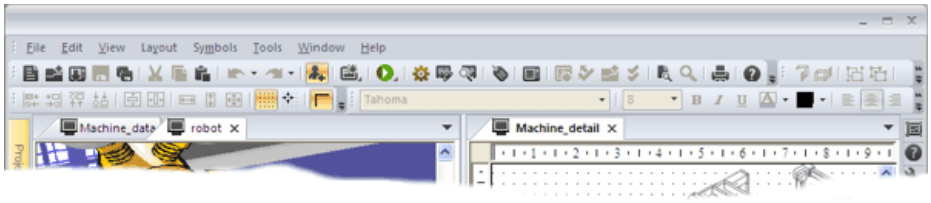
4.4.6. Resource TAB Groups

When having various resources opened at the same time during the project editing phase, a series of TABs will be displayed with which you can use to pass from one resource to another very quickly. This series of TABs is called the **"TAB Group"**.

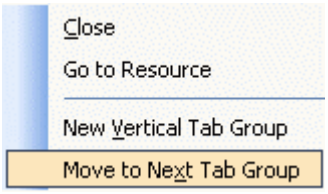
When right mouse clicking on the TAB group a menu will appear to let you execute certain commands:



The **"Close"** command closes the selected resource, whereas the **"Go to Resource"** command highlights in the 'Project Explorer' window which resource is active in the workspace.
The **"New Horizontal TAB Group"** and **"New Vertical TAB Group"** commands are used for creating new horizontal or vertical TAB Groups so that more resources can be displayed at the same time and regrouped as pleased if required:



In the example above a second vertical TAB group has been created to group the screen and Basic Script resources separately.
Once two or more TAB groups have been created you can move a resource from one group to another by simply clicking and dragging it to the other group. This can also be done by using the **"Move to Next TAB Group"** command found on the menu which appears when clicking the right mouse button on the resource's TAB:



4.5. Tool Bars

Movicon provides a few **Tool Bars** which can be displayed or hidden by using the items from the **"View Menu"** or by right mouse clicking on the tool bars in the area they occupy.
The functions which can be executed from anyone of the tool bars are described in the relevant sections. Below we will briefly describe the how the bars work according to the Windows standards. The tool bars, after being displayed, can be dragged to any point of the workspace, and can be sized as pleased.
Movicon also lets you customize the bars to display, for example, only a few of the commands by using the button found at the far right of the bar. The automatic bar reset, for reactivating all the commands for default, can be done with the **"Reset Toolbar"** command which is situated in the bar's properties or in the **"Customizing Menu and Toolbars"** window. To return the bar back to its original position just double-click the title of each single ToolBar or on the icon on the bar's far left.

Double-clicking this tool bar icon will position the bars onto the workspace where they can then be dragged and moved to any area of the screen desired.

Double-clicking on this icon will open a menu through which you can customize the bar by enabling or disabling the display of commands or reset any setting already carried out.

All the tool bars support the right mouse key, through which the same commands can be set from the **View** menu.

The available Tool Bars are:

Tools Bar
Aligning Bar
Formatting Bar
Symbols Bar
Layer Bar
Menu Bar
Status Bar

The Tool bars also show the commands on the Movicon Menus. Therefore the tool bars are used for getting to the main commands (those frequently used) directly with a press of a button to speed up project editing operations.

4.5.1. Tool Bar

The Movicon Tool Bar reports the major part of the commands existing in the **"File Menu"** and in the **"Edit Menu"**.

New (Ctrl+N)

Opens a new project by presenting the wizard window to create it.

This command is also available in the Movicon **"File Menu"** of Movicon.

Open (Ctrl+A)

Opens an existing project, by presenting the browse window for you to search for it.

This command is also available in the Movicon **"File Menu".**

Open Device Project

Opens the Download window to consent downloading of project from the CE device connected. For further information please consult the section on "Upload/Download Project" in the Movicon CE manual.

This command is also available from the Movicon **"File Menu"**.

Save (Ctrl+S)

Saves the modifications made to the current project resource, which the one selected in the "Project Explorer" window at that moment.
You can save a project even when the license inserted, hardware or software, is only runtime type. In order to do this, you will need to keep the "D" key pressed down and then activate the project save command. This will save the project and enter the application into "Demo Mode". Close and reopen Movicon to exist from "Demo Mode".

This command is also available in the Movicon **"File Menu".**

Save all

This makes a complete save of all the projects opened in the "Project Explorer" window.

This command is also available in the Movicon **"File Menu".**

Cut (Ctrl+X; Uppercase+Cancel)

Cuts the object, resource or any other thing which has been selected by cancelling it and saving it in memory on the Windows Clipboard.

This command is also available from the Movicon **"Edit Menu".**

Copy (Ctrl+C; Ctrl+Ins)

Copies the object, resource or any other thing which has been selected in memory on the Windows Clipboard.

This command is also available from the Movicon **"Edit Menu".**

Paste (Ctrl+V; Uppercase+Ins)

Pastes the object, resource or any other thing which has previously been Copied or Cut on to the Windows Clipboard on the point selected by the mouse in the workspace.

This command is also available from the Movicon **"Edit Menu".**

Undo (Ctrl+Z; Alt+Backspace)

Undoes the last operation executed, (ie. cancelling of a resource, editing of an object, etc.). By clicking on the arrow on the right hand side of the icon a window will appear showing the last operations executed in chronological order. More than one operation can be selected and cancelled at the same time.

This command is also available in the Movicon **"Edit Menu".**

Redo

Reverses the last Undone operation (ie. the cancelling of a resource, editing of an object, etc). By clicking the arrow on the right hand side of the icon a window will open showing the last cancelled operations in chronological order. More than one operation can be selected and restored at the same time.

This command is also available in the Movicon **"Edit Menu"**.

Disable User In Debug

By using this button you can disable or enable the user management in the Debug, by putting the project in Runtime from the development environment. This function is very handy when carrying out project tests without having to activate or deactivate the password management. This also safeguards against accidentally leaving the password management disabled after having completed the test run.

New Resource

This command allows you to insert a new Multiple Resource in the **"Project Explorer"** window. In this case, five resources can be inserted with the possibility of creating simple folders. By keeping the mouse button pressed down on the icon, for at least a second, a drop down menu will open containing six icons for selecting the resources to be inserted. Normally the tool bar displays the icon of the last resource selected. The choices are as follows:

New Menu. Inserts a new menu into the previously selected folder from **'Menu'** Group in the **'Project Explorer'** window.

New Shortcut. Inserts a new Shortcut into the previously selected folder from **'Shortcuts'** Group in the **'Project Explorer'** window.

New Basic Script. Inserts a new Basic Script into the previously selected folder from **'Basic Script'** Group in the **'Project Explorer'** window.

New Screen. Inserts a new Screen into the previously selected folder from **'Screens'** Group in the **'Project Explorer'** window.

New Parameter File. Inserts a new Parameter File in the pre-selected folder within the **"Parameter File"** in the **'Project Explorer'** window**.**

New Folder. Creates a new folder in the pre-selected position within the **"Multiple Resource"** in the **'Project Explorer'** window. Structuing "Multiple Resouce" groups with folders and sub-folders helps you organize the project's resources better but does not change its way of functioning.

Project Run

This command allows you to Run the project. There are four runtime modes that can be executed from the management environment. By keeping the mouse button pressed down on the icon for at least one second you will get a drop down menu containing the four icons for selecting the mode to be activated. Normally the last selected Run modality is displayed in the Tool Bar. The choices are the following:

Start Project. Executes the project Runtime in the usual way.

Run Screen. Only runs the project's graphics. This means that only the graphical and animation part of the project will be run and not the Communication Drivers, the Data Loogers, etc.

Step Mode. The project is run one step at a time. The programmer has to confirm the execution of the next step. The same goes for the project stop phase. This modality is very handy to identify which phase generates the error when problems arise at the project startup.

Attach Running. When using this mode, Movicon will propose a browse window from which you can select a PC, local or network, on which a Movicon project is already running. You will then be able to interact with the project by using the **"Watch Window"** for executing any debugs for instance.

This command is also available from the Movicon **"File Menu".**

Edit RealTime DB Variable (Alt+D)

This opens the window listing the project's RTDB Variables.

This command can also be found in the Movicon **"View Menu"**.

Edit String Table (Alt+S)

This opens the "String Table" for editing the project strings

This command can also be found in the Movicon **"View Menu"**.

Check Missing Strings (Alt+M)

This activated the Inserting Missing Strings command for the selected resource.

This command can also be found in the Movicon **"View Menu"**.

Options Used

This opens the dialog window to check the options of the licence being used.

This command can also be found in the Movicon **"View Menu"**.

Upload Project

This opens the dialog window for uploading the project to a CE device. For further information please refer to the section on "Upload/Download Project" in the Movicon CE manual.

Device Control Panel...

Command currently not available.

Get Latest Version

This command allows you to read the last version of the resource selected in the Project's Explorer Window with the project in Visual SourceSafe.

This command can also be found in the Movicon **"File Menu"** and in the resource menus.

Check Out

This command allows you to extract a resource file from the SourceSafe project.

This command can also be found in the Movicon **"File Menu"** and in the resource menus.

Check In

This command allows you to put back a resource file in the SourceSafe project.

This command can also be found in the Movicon **"File Menu"** and in the resource menus.

Undo Check Out

This command allows you to undo the changes made to a resource.

This command can also be found in the Movicon **"File Menu"** and in the resource menus.

Find Next

After having started a search with the Find button you can carry out another search for the next specified text with the Find Next command, also executable with the F3 key.

This command is also available from the Movicon **"Edit Menu".**

Find

This is made available after a resource, set with this tool, has been opened. The 'Find What' command permits you to specify a character or text string to be searched for within the selected resource.

This command is also available from the Movicon **"Edit Menu".**

Print (Ctrl+P)

This button is used for printing the currently opened screen window. A window will appear to select and set the printer.

This command is also available from the Movicon **"File Menu".**

Help (F1)

This button activates the Movicon online help directly on the topic belonging to the description of the current resource, component, etc. being used.

4.5.2. Aligning Bar

The Movicon **Aligning Bar** mostly shows the commands presented in the **"Layout Menu".** By using these commands you can align and side the diverse components and designs inserted in the screens.

Aligning objects on screen can also be done according to their baricenter. You can get hold of this function by keeping the "Shift" key pressed down and selecting the command from the "toolbar" or from the aligning menu.

Align Left

This command aligns the selected objects to the left hand side of the screen.

Align Right

This command aligns the selected objects to the right hand side of the screen.

Align Top

This command aligns the selected objects at the top of the screen.

Align Bottom

This command aligns the selected objects at the bottom of the screen.

Centre Vertically

This command centres the selected objects vertically in the screen's area. When more than one object are selected, they will be centred in the area they occupy.

Centre Horizontally

This command centres the selected objects horizontally in the screen's area. When more than one object are selected, they will be centred in the area they occupy.

Same Width

This command resizes with the same width of the objects selected on screen.

Same Height

This command resizes with the same height of the objects selected on screen.

Same Size

This command resizes with the same width and height of the objects selected on screen.

Grid ON-OFF

This command lets you activate or deactivate the Grid display on screen.

Snap to Grid

This command lets you activate or deactivate the objects' alignment to the Grid on screen. This command also works when the Grid is not displayed, which means that the objects will be aligned according to the Grid's settings.

Rulers

This command lets you activate or deactivate the display of the screen's Rulers.

4.5.3. Symbol Bar

The Movicon **Symbol Bar** shows some commands that are found in the **"Symbols Menu".** By using these commands you can change the tab order of the different components and drawings inserted on screen and manage symbol creations.

Bring to Front

This command is used for setting the selected symbol at the top of the tabulation order.

Send to back

This command is used for setting the selected symbol at the bottom of the tabulation order.

Move Next

This command is used for moving the selected object one place forward in the overlap order.

Move Previous

This command used for moving the selected object one place back in the overlap order.

Create Symbol

This command creates symbols. For further information, please refer to the section on **"Commands for Creating Symbols"**.

Ungroup

This command ungroups symbol formations. For further information, please refer to the section on **"Commands for Creating Symbols"**.

Re-Create Symbol

This command re-creates the symbol. For further information, please refer to the section on **"Commands for Creating Symbols"**.

Add Symbol to Library

This command adds the symbol at the Template Library. For further information, please refer to the section on **"Commands for Creating Symbols"**.

Dynamic Property Inspector

This command opens the **"Dynamic Property Inspector"** window relating to the selected symbol.

Edit Image...

This command allows you to open the back image associated to the screen in edit mode.

4.5.4. Layer Bar

The Movicon **Layer Bar** allows you to activate or deactivate the screen page Layers in programming mode. When the layer management is enabled you will be able to display or hide the objects associated to the layers.

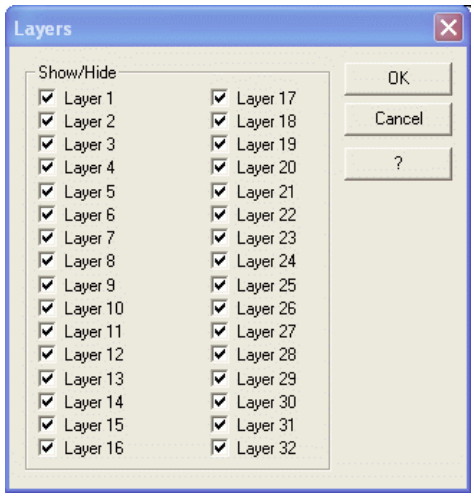
Layer

Each one of the buttons shown enable or disable the indicated level. Only the first 16 levels have been provides for space reasons. To access the other 16 layers you need to use the **"Set Layer Display Mode"** button.

Set Layer Display Mode

This command opens the dialog window which allows you to display/hide all of the 32 levels.

The "Set Layer Display Mode" button opens the following dialog window where you can set the visibility of all the screen's 32 layers.



4.5.5. Formatting Bar

The Movicon **Formatting Bar** is needed for editing and configuring the texts in the controls and drawings inserted in the screens.

Change Font

By using this drop down list you can select the Character Font to be set. The list shows the Operating System's Fonts.

Change Font Size

By using this drop down list you can select the character size to be set. The list reports the values based on the Font selected in the 'Character Font' box.

Bold

This command activates or deactivates the displayed text, from the selected component or symbol, in Bold.

Italic

This command activates or deactivates the italic property of the displayed text from the selected component or symbol.

Underline

This command activates or deactivates the underline property of the displayed text from the selected component or symbol.

Text- Pen Color

This command is used for selecting the color for the displayed text from the selected component or symbol.

Back Color

This command is used for selecting a color to associate to the background of the selected component, symbol or screen.

Align Left

This command is used for aligning the text, displayed in the selected component or symbol, on the left. The alignment refers to the internal of the area occupied by the control or symbol in question.

Centre

This command is used for aligning the text, displayed in the selected component or symbol, in the centre. The alignment refers to the internal of the area occupied by the control or symbol in question.

Align Right

This command is used for aligning the text, displayed in the selected component or symbol, on
the left. The alignment refers to the internal of the area occupied by the control or symbol in question.

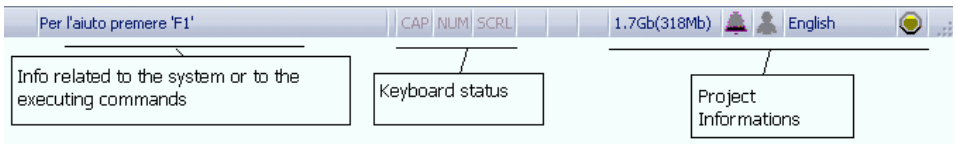
AutoSize Text

This command is used for activating or deactivating the AutoSize property to adjust the displayed text to the size of the selected component or symbol. When this function is enabled the 'Change Font Size' will no longer have effect, but the text will be adapted in proportion to the sizes of the component or symbol in order to cover the area made available.

4.5.6. Status Bar

The **Status Bar**, found on the bottom border of the workspace, supplies the main information relating to the operating status of Movicon.
The status bar can be activated or deactivated by using the **Status Bar** command from the View menu.

The Status Bar will appear as shown below during the Project Runtime phase:



The icons presented on the right side of the bar indicate the Alarms Status, Users activation and the Communication Driver Status:

The first part of this field indicates memory allocated to the operating system for all the processes (Physical memory + Paging memory); while the second par indicates the physical and virtue memory available for the Movicon process. This value is updated around every 5 seconds and is expressed in Kb, Mb or Gb according to the value. In Windows 32/64 bit the value shown is greatly influenced by the system's paging file. This value has more significance when monitored in WinCE systems.

These two icons when shown blinking, indicate the there are active alarms or messages in the system. These icons will not show when there are no active alarms or messages.

This icon represents the log on status of users. When this icon is coloured it means that there is an active user in the system. Double-clicking this icon with the mouse will log-off the active user. When the

icon is grey this means that there are no active users in the system. Double-clicking on the icon will open the authentication window to execute user log-on.

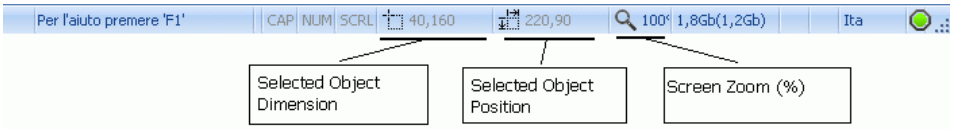
This text indicates which project language is active. By double-clicking on this icon, a dialog window will show where you can select the language to activate in the project.

This icon represents a 'Led' that when green/yellow means that the communication driver is working correctly, and when red means that the communication is not working correctly or has been interrupted. The Log will indicate the communication Driver problem type.

The text in the bar always indicates the operating status of Movicon or the description of the command being setup.
The operating status can be represented, for example, by the last alarm or message from the project.

The Status Bar can also display texts for command descriptions relating to the project's customized menus.

During the project design mode the Status Bar will show information on the positions of the objects selected:



When an object is selected on screen, its X and Y coordinates and sizes will appear on the Status Bar. Furthermore, by double clicking on the Zoom information (100% for default) you can change Screen's zoom percentage.

4.5.7. RunTime Bar

The Movicon **RunTime Bar** is shown when the project is being run in the development environment only and allows you to execute certain debug commands and display the "Watch Window".

Resume

When pressed this command resumes the run previously stopped with the Pause command.

Pause

When pressed this command stops the following project processes:

Project IL Logic
IL Logic of Screens and the objects in them
Event Objects
Scheduler Objects
Scaling Objects
Data Loggers
Alarm management
Communication Drivers

Plus the status bar led starts blinking in yellow to indicate that the pause status is active.

This command does not effect Basic Scripts or OPC communications.

Design Mode(ALT+F12)

Aborts the project run and returns it to development mode.

Toggle Local Project View (CTRL+F2)

Shows or hides the project's local information display window in the "Watch Window".

Toggle Statistic Project View (CTRL+F3)

Shows or hides the display window for viewing the project's statistics in the "Watch Window".

Toggle Watch Project View (tag)(CTRL+F1)

Shows or hides the display window to view the debugging of the project's variables in the "Watch Window".

Toggle Script Watch View

Shows or hide the display window to view the project's basic script resources in the "Watch Window".

Alarm Script Debugger...

Opens the "Alarm Script Debugger..." window which links all the alarms managed in the project.

Toggle Project IL Logic View (CTRL+F4)

Shows or hides the display window to view the project's general IL Logic in the "Watch Window".

Toggle local IL Logic View (CTRL+F5)

Shows or hides the display window to view the project's Local IL Logic in the "Watch Window".

Show or Hide the Soft Logic Debug window

Shows or hides the SoftLogic debug window.

Open Screen

This command can be used to open any screen from the project in MDI mode.

Run a Script

This command can be used for executing any one of the project's Basic Scripts.

4.6. Menus

Movicon has a **Main Menu Bar** which lets you access some of the Movicon principle commands. The Menu Bar is only available during the project development phase and is deactivated during Runtime. The Menu Bar can be dragged to any point in the workspace and can easily be returned to its original position by double-clicking the title bar or by dragging it again.

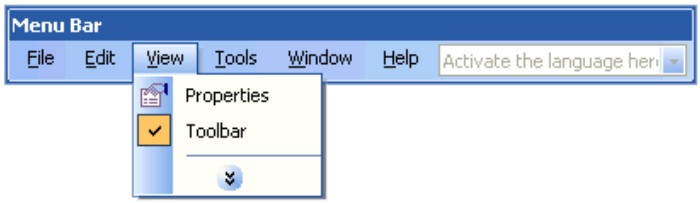
The sub-menus which are available from the Menu Bar are:

File Menu
Edit Menu

View Menu
Layout Menu
Insert Menu
Symbols Menu
Tools Menu
Window Menu
Help Menu
Activate Language

Hidden Menus

Movicon, as consolidated in the Windows environment, hides the not so frequently used menu items to make the selecting of item lists much easier and intuitive.



To display all of the menu's items, you need to click the scroll arrows at the bottom of the item list to display the ones less used. To disable this functionality and display the whole list of menu items you have to access the settings of the **"Customize"** window.

4.6.1. File Menu

The **File Menu** commands refer to the general project use.
The menu items follows by dots indicate that the command, when selected, opens a system dialog window to let you set the options relating to the command.
The name of the last project may also be shown in this menu (or the last 8 projects), to allow you to open them quicker. By selecting and activating the project name shown in the menu items (if present), determines the Open command of that same project.

New... (Ctrl+N)
This executes the opening of a new project by presenting the wizard window to create it.
This command is also available from the Movicon **"Tool Bar".**

Open... (Ctrl+A)
This executes the opening of an existing project, by presenting the browse window to search for the project desired.
This command is also available from the Movicon **"Tool Bar".**

Open device Project...
This opens the Download window to allow project downloading from the connected CE device. For further information please refer to the section on "Upload/Download Project" in the Movicon CE manual.
This command is also available in the Movicon **"Tool Bar"**.

Close (Ctrl+A)
Executes the closure of the resource being edited. If there are no resources opened, the active project will be closed instead.

Set as Active Project
When more than one project is opened in 'Project Explorer' window this command sets the one selected as Active Project.

Start Project (ALT+F12)
Project is put into Runtime mode.
This command is also available from the Movicon **"Tool Bar"**.

Save (Ctrl+S)

Executes the saving of any modifications done to the current project resources, being those selected in the "Project Explorer!" window.
This command is also available from the Movicon **"Tool Bar"**.
Projects can also be saved when the runtime license, hardware or software, has been inserted. In this case you will need to keep the "D" key pressed down and activate the project save command which will enter the application into "Demo" mode and save the project. To exit from "Demo" mode you will have to close and re-open Movicon.

Save as...(Ctrl+S)

A window will be displayed for renaming the project when executing a complete save of all the project. This command will save all the files contained in the DATA and IMAGES folder as well as the project's resources. The DATA folder, or the one set as the data folder, contained information on retentive variables statuses and Schedulers plans, which are usually handy to keep generally even after the project has been saved with another name. The IMAGES folder is also saved for obvious reasons. Folders created by the programmer for other reasons are not saved.

Save All

Executes the complete save of all the projects opened in the "Project Explorer" window.
This command is also available from the Movicon **"Tool Bar"**.

Source Control

By using this menu item you can access to commands for the project's SourceSafe management. For further information please refer to the relevant section.

Device Control Panel...

Command not yet available.

Print Setup...

This command lets you set all the options relating to the type of printer used through an appropriate dialog window.

Print Preview

The Print Preview command lets you preview the active document page as it will be when printed. This command accesses to a display area in which other command buttons are made available and where the mouse pointer automatically turns into a zoom in the proximity of the print preview.

Print (CTRL+P)

The print command's job is to send the currently active resource, for example screen, to the printer. This command accesses a dialog window through which you can set the relevant print options. When you want to print a document different from the current one you must select it first.
This command is also available from the Movicon **"Tool Bar"**.

Projects

The last eight projects opened by Movicon are listed in this area of the window. You can directly click on the project name to open it without having to go to the selection window presented by the 'Open' command.

Exit

Executes exit from Movicon.

4.6.2. Edit Menu

The Edit menu commands concern the use of some of the project resources and their availability depends on the function of the resource selected.

Undo (Ctrl+Z; Alt+Backspace)

This cancels the last operation executed (eg. cancelling a resource, object modification, etc.). This command is also available from the Movicon **"Tool Bar"**.

Redo

This command restored the last operation cancelled (i.e. cancelling a resource, object modification, etc.). This command is also available from the Movicon **"Tool Bar".**

Cut (Caps+Canc; Ctrl+X)
Cuts the object, the resource or anything selected. In this case the object is cancelled but stored in memory on the Windows Clipboard.
This command is also available from the Movicon **"Tool Bar".**

Copy (Ctrl+C; Ctrl+Ins)
Copies the object, the resource or anything that has been selected and stored in memory on the Windows Clipboard.
This command is also available from the Movicon **"Tool Bar".**

Paste (Ctrl+V; Caps+Ins)
Pastes the object, resource or anything that has previously been Copied or Cut to the Windows Clipboard on the point selected by the mouse within the workspace.
This command is also available from the Movicon **"Tool Bar".**

Delete (Cancel)
Deletes the select object without copying it in the Windows Clipboard.

Paste Special
Inserts clipboard contents (paste) and a link to its source.

Find (ALT+F3)
This is made available after a resource, set with this tool, has been opened. The 'Find What' command permits you to specify a character or text string to be searched for within the selected resource.
According to the standard procedures you can specify whether the text to be searched for must respect the lower/uppercase characters.
The 'Find Next' starts a new search, while the 'Cancel' button closes the search.
The Find command can also be accessed with the ALT+F3 keys from the keyboard, or from the **"Tool Bar"**, if available, through the Find editing box.
This command is also available from the Movicon **"Tool Bar".**

Find Next (F3)
After having started a search with the Find button you can carry out another search for the next specified text with the Find Next command, also executable with the F3 key.
This command is also available from the Movicon **"Tool Bar".**

Replace
The Replace command lets you specify a text to be searched for and a text to replace it when found.

Replace in Project...
The Replace in Project...command allows your to find and replace texts within the project by searching in both the different variable and text fields. For further information about this feature please refer to the section on "Replacing Texts in Projects".

Find Symbol
This command opens the "Find Symbol" window through which you can see if a variable has been used in the animation properties of objected inserted on screen in edit mode.

Replace Symbol
This command opens the "Find Symbol" window through which you can see if a variable has be been used in the animation properties of objects inserted on screen in edit mode and replace them with a different one if need be.

Update Public Symbols
This command is used for updating Public Symbols, as described in the secton on "Refresh Public Symbol with the command "Refreshi Pubblic Symbol". This command is also available from the menu which appears after right clicking on an object. this command is active only when a drawing or symbol has a public name. This command is not available when muilti-selecting or selecting one element from the symbol.

Select All
The Select All command lets you select all the resource's currently active contents at the same time when this is permitted.

Distribute Object Space...
By using this command you can automatically position a series of objects on the screen so that they are equally distanced between each other by being organized in rows and columns.

For further information please refer to paragraph **"Distribute Object Space"**.

Edit Text (F2)
This command consents entry in edit mode of the selected object's Title.

Import Draw...
This command is used to import a vectorial drawing into the screen which has been realized with an external editor. Windows Metafile (EMF, WMF) is the format supported.
For further information please refer to paragraph **"Importing/Exporting Vectorial drawings"**.

Export Draw...
This command is used to export a Movicon vectorial design in Windows metafile (EMF, WMF) format.
For further information please refer to paragraph **"Importing/Exporting Vectorial drawings"**.

Image Edit...
This command opens the background image, associated to the selected screen or object in the workspace, in edit mode. This command opens the application predefined and associated to that file type (ie. "MS Paint" might be run if a ".bmp" file).
This same command is also available from the menu which appears with a right click on the screen or on the object contained in the screen.

Edit String Table...(Alt+S)
Opens window for editing Movicon strings.

Edit RealTime DB Variable ...(Alt+D)
Opens window for displaying the Movicon List Variables.

Check Missing Strings...(Alt+M)
Executes the Inserting Missing Strings command for the selected resource.

Apply Renamed Variables and Resources
This command is used for applying the new names of renamed variables and resources (screens, basic scripts, menus and accelerators) to all the project resources. Once this command has been activated, all the project resources, and all objects within each resource, will be controlled and any variables or resources found the 'original' name will be replaced with the new current one.
For further information relating to this procedure please refer to paragraphs: "Rename Variables" and "Rename Resources".

Check Options used (Dongle Requirements)...
Opens window to check dongle options.

Install this Project as Windows Service
Installs Movicon as Windows Service so that when you start your PC Movicon will startup as Service.

Uninstall from Windows Services
Removes Movicon from the Windows Services. This command is only active when the project has been installed as Service beforehand.

Compile Cross Reference
Compiles the project's Cross Reference. This command is only available when the Cross Reference window is open.

4.6.3. View Menu

The View Menu commands consent activation or deactivation of the main window displays and tool bars within the workspace.

Full Screen
This selection displays the Movicon workspace in full screen hiding the **Title bar**, the **Main Menu Bar** and the **Status Bar**. To restore the previous display just use the appropriate command key which appears in the workspace.

Auto Load State Mode

This command allows you to enable/disable this behaviour mode for the Movicon editor windows. When this mode is enabled, the working environment status is loaded and saved in automatic according to the type of resources active. For instance, opening a screen will automatically activate the "Toolbox" window, display the "Symbol Bar" and hide all the other windows in the working environment. Predefined behaviour modes can however be customized by setting the working environment to another mode and then this new status will be saved and re-proposed when activating that type of resource. The resources which are loaded/saved with the working environment status are:

- No resource opened in edit mode
- Screen Window
- Basic Script code edit window
- Parameter File edit window
- Project variable edit window
- Project String edit window
- SoftLogic configuration window

Opening a resource while keeping the "Ctrl" key pressed restores the default windows configuration.

Project Explorer

This selection displays the **"Project Explorer"** window. This command only works when the window is not currently displayed.

Properties

This selection displays the **"Properties Window"**. This command only works when the window is not currently displayed.

Symbols Library

This selection displays the **"Symbols Library"** window. This command only works when the window is not currently displayed.

Dynamic Help

This selection displays the **"Dynamic Help"** window. This command only works when the window is not currently displayed.

Formatting

This selection displays or hides the **"Formatting Bar"** tool bar.

Aligning

This selection displays or hides the **"Aligning Bar"** tool bar.

Symbols

This selection displays or hides the **"Symbols Bar"** tool bar.

Layer

This selection displays or hides the **"Layer Bar"** tool bar.

Script Explorer

This selection displays the "Script Explorer" window. This command only works when the window is not currently displayed.

Logic Explorer

This selection displays the **"Logic Explorer"** window. This command only works when the window is not currently displayed.

Output

This selection displays the **"Output"** window. This command only works when the window is not currently displayed.

ToolBox
This selection displays the **"Toolbox"** window. This command only works when the window is not currently displayed.

ToolBar
This selection displays or hides the **"Tool Bar"**.

Status Bar
This selection displays or hides the **"Status Bar"**.

Application Look
This command allows you to select different ways on how you want the Movicon development environment to look by changing the windows' graphics and colors.

Edit String Table...
Opens the window for editing the Movicon Strings.

Edit Real Time DB Variables...
Opens the window for displaying the Movicon Variables List.

Check missing Strings...
Activates the Inserting Missing Strings command for the selected resource.

Only Dynamic Object Properties
This setting allows only animated objects to be displayed inside a selection of more than one component. This is needed particularly for being able to see only the animated objects in grouped symbols. Only the animated objects will be available from the Combo-box of the "Properties Window".

Apply Renamed Variables and Resources
This command allows the names of renamed variables and resources (screens, basic scripts, menus and shortcuts) to be applied to all the project's resources. When activating this command all the project resources and their object contents (screens, basic scripts, menus and shortcuts) are controlled and all variables and resources found with their original set name will be replaced with the new current one.
For further information on the procedures used for activating this command please refer to the "Rename Variables" and "Rename Resources" paragraphs.

Show the Renamed Variables and Resources
This setting allows the original names of the renamed resources and variables to be shown in the Project Explorer window. When this option is active along with the renaming manager, the variables' and resources' 'old' names will be shown in brackets after their new names. The "Apply Variables and Renamed Resources" or "Apply New Name" commands from the context menus can be used for applying new names conclusively in all the project's resources.

4.6.4. Insert Menu

You will find commands for inserting strings and variables in the **Insert Menu.** This Menu is only available for some resources such as the "String Table", the "Variable List" window and the "Basic Script" window.

New String (Ins)
This command inserts a new string in the table. The string's ID is inserted with a progressive number with the following syntax: "String00001".

New Language Column... (ALT+Ins)
This commands inserts a new column representing a new language. When the command is executed a input box opens for inserting the column's name (normally the name of the language in question).

New Variable...
Inserts a new variable in the Real Time DB.

New Variable Group
Inserts a new Variable group within the Real Time DB.

New Structure Definition
Inserts a new Structure Prototype in the Real Time DB.

New Communication Driver
Inserts a new Communication Driver in the Real Time DB.

Add System Variables
Inserts the Structure Prototype of the relative **"_SysVar_"** variable within the Real Time DB.

4.6.5. Layout Menu

The Layout Menu commands refer to the use and management of the vectorial graphics contained in the screen and to the relative use of the window.

The layout of on screen objects can also be done according to their barycenter. This function is obtained by keeping the "Shift" key pressed down while selecting the command from the toolbar or from the layout menu.

Alignment Objects
This command opens a window for setting the objects' alignments.
For further information please refer to the section on Movicon **"Object Alignment Functions"**.

Center in Window
This command opens a window for centering the objects.
For further information please refer to the section on Movicon **"Object Alignment Functions"**.

Set Same
This command opens a window for setting the objects' sizes.
For further information please refer to the section on Movicon **"Object Alignment Functions"**.

Grid Settings...
This command opens a window for setting the screens with the Grids.
For further information please refer to the section on Movicon **"The Grid"**.

Ruler
This command opens a submenu for setting the screens with Rulers.
For further information please refer to the section on Movicon **"The Rulers"**.

TAB Order... (CTRL+D)
This command lets you activated the Tabulation order of the objects on the screen.
For further information please refer to the section on Movicon **"Tab Order"**.

Resize
Not available at this moment

Remote Device Size (WinCE)
This command lets you size the screen window with the target WinCE PC characteristics to which the project will be exported. Before launching this function you need to put into effect the connection between the desktop PC and the target PC with ActiveSync.

Zoom In (CTRL+Più(Tn))
This command enlarges the screen graphic.

Zoom Out (CTRL+-(Tn))
This command reduces the screen graphic.

Zoom To
The Zoom To function lets you enlarge a selected part of the screen.
To select the part to be enlarged, mouse click on the first corner of the square and drag it. When releasing the mouse the screen will show an enlargement of the selected square.

Refresh
The Refresh command regenerates the video drawing.

4.6.6. Symbols Menu

The Drawings Menu commands are used for changing or setting objects presented on the screen.

First
This command is used for placing the selected object in foreground.
For further information please refer to the paragraph on **"Overlap Order"**.

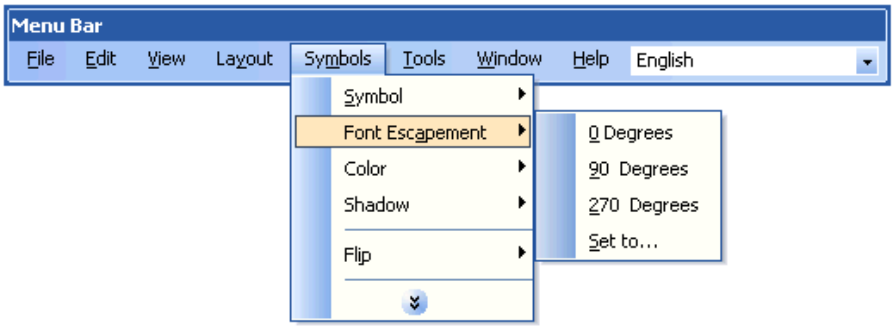
Last
This command is used for placing the selected object in background.
For further information please refer to the paragraph on **"Overlap Order"**.

Move Next (+(Tn))
This command is used to move the selected object one place ahead in the overlapping order.
For further information please refer to the paragraph on **"Overlap Order"**.

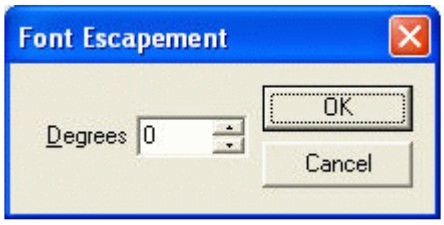
Move Previous (-(Tn))
This command is used to move the selected object one place back in the overlapping order.
For further information please refer to the paragraph on **"Overlap Order"**.

Symbol
This command is used to group, ungroup or insert Movicon symbols in the library.
For further information please refer to the paragraph on **"Commands for Creating Symbols"**.

Font Escapement
You can type in the text for the title of each object by using 'Properties Window'. The text will be made visible in the object itself. This property lets you establish the modifications for the font's standard direction, being zero degrees (Horizontal towards right).
The title font can be then set at 90° (vertical upwards), 270° (vertical downwards) or on a customized angle.

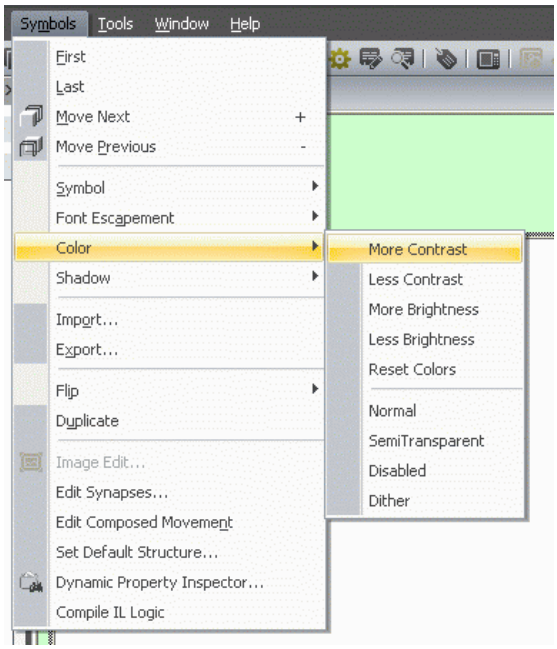


A customized angle can be inserted by using the appropriate dialog window as shown below:



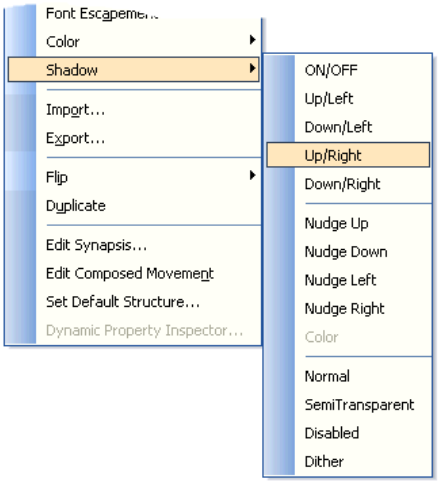
Color
The objects inserted on screen can be associated with the Colours desired which relate to the background, line around the edge or the text. Apart from using the 'Properties Window', the color settings can also be done by using the appropriate commands from the Drawing Menu or with the

right mouse key. This command offers the advantage of speeding up the most common and frequent editing operations in drawings.
The Color is settable when the colour display has been enabled in the object's property otherwise the object will result transparent.



Shadow

The objects inserted on screen can be associated with a Shadow effect by means of using the appropriate command from the Drawing menu or with the right mouse key.
The Shadow effect is settable when the shadow display has been enabled in the object's property.
The shadow will be displayed with the standard configuration and colour.



Import...

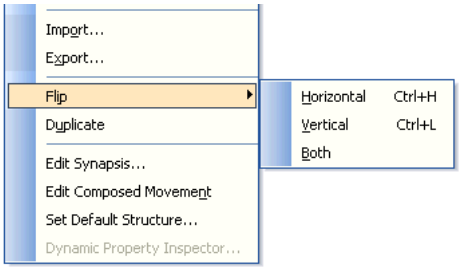
This command is used for importing a vectorial drawing realized with an external editor onto the screen. The Windows metafile (EMF, WMF) is the supported format.
For further information please refer to the paragraph on **"Importing/Exporting Vectorial drawings"**.

Export...

This command is used to export a Movicon vectorial drawing in Windows metafile ((EMF, WMF) format.
For further information please refer to the paragraph on **"Importing/Exporting Vectorial drawings"**.

Flip

The Reflects command is used for turning over the selected drawing in Horizontal, Vertical or both mode.
These commands are settable from the Drawing Menu or by using the right mouse key.



Duplicate

The Duplicate command is used for copying the object or the objects selected. Practically, this command is a 'copy-cat' of the system's Copy and Paste operations.

Edit Image

This command consents you open the screen's associated back image in edit mode.

Edit Synapses...

This command lets you create a new Synapses object. According to the block function editing techniques, the symbol's element can become an active working logic, linked in sequence to other Synapses function blocks.
For further information please refer to the paragraph on "Synapses ".

Edit Composed Movement

This command lets you edit the object's 'Composed Movement'.
For further information please refer to the paragraph on **"Composed Movement Editing"**.

Set Default Structure...

This command lets you associate a Default Structure to the selected object.
For further information please refer to the paragraph on **"Default Structures in symbols"**.

Dynamic Property Inspector...

This command lets you open the selected object's **"Dynamic Property Inspector Window"** window.

Compile IL Logic

This command compiles the IL Logic for the selected symbol.

Rotate

The Rotate command is only available for Polygon drawing types and is can also be accessed from the text menu which opens when right clicking on the drawing.
This command permits the object to rotate permanently by setting the desired angle vale from 1 to 359 degrees (integer values). However, this command rotates Polygon objects in 'static' mode by repositioning their angle vertexes in permanent mode in the object's XML definition. The Undo command can be used to cancel modifications if the screen or project has not already been saved, otherwise the rotation will be always be applied to the object.
If polygons are part of a Symbol's contents, the "Rotate" command can be applied to all the supported objects (Polygons) contained in that symbol and a message to confirm operation will show if symbol also contains objects that the rotate command cannot be applied to.

This function responds to integer coordinate values (pixel) where each rotation may be subjected to inevitable approximates. As a consequence, repeated rotations may alter the polygon's shape.

The 'Rotate' function does not accept negative angle values, but when setting an angle with a negative value instead of "α", the resulting value from this operation (360- the absolute value of "α",) is its equivalent. However when setting this value for the "Rotation" you will get a negative rotation. For instance, to rotate the polygon at -45° you will need to enter 360°-45° = 315°.

Edit Aliases...
The Edit Aliases..." command opens the selected object's alias table. The same command is also available from the menu which appears when right clicking the object or from the object's properties window with the General "Object Alias Editor" property.
For further information about using the aliases please refer to the paragraph entitled "Aliases in Objects".

4.6.7. Tools Menu

The **Tools Menu** shows the commands for executing frequently used applications. The list here below is the default list, but it can be customized editing the "Tools.xml" file (see "Tools Menu configuration") or using the "Customize" command (see "Customizing Tools Menus and Toolbars").

Upload/Download service
Starts TCPUploadServer.exe.

Alarm Dispatcher
Open the Alarm Dispatcher application session.

Notepad
Opens a Notepad application session.

Paint Brush
Opens a Paint Brush application session.

Windows Explorer
Opens a Windows Explorer application session.

CSV Tag Importer-Exporter
Opens a CVE Tag Importer-Exporter application session.

Tag-Alarm Wizard
Opens a Tag-Alarm Wizard application session.

Development CodeIinfo
Runs the "RegDevCode.exe" application to read the Movicon development (or registration) code.

Customize
Opens the Movicon **"Customize"** setting window.

4.6.8. Window Menu

The Window Menu commands refer to the usage and management of the Movicon resource windows or icons within the workspace.

Window Split
This command refers to the order of the windows present in the Movicon workspace. This command accesses to a selection Menu where you have to select either Vertical alignment or Horizontal alignment.
The Horizontal item puts all the windows, presented in the workspace, into order by aligning them horizontally across the screen starting from the left border towards the right border.
The Vertical item puts all the windows, presented in the workspace, into order by aligning them vertically down the screen starting from the top border towards the bottom border.

Close All Documents
The Close All command closes all the resource windows, currently active in the project's workspace, all at the same time.

Workspace

This command allows you to save the Movicon Workspace settings. In this way many configurations can be saved so that they can be called when needed. It is therefore possible, for example, to save one configuration where the project window have been docked in a certain way and another where the project windows have been set with hidden. By using this command you will be able to pass from one configuration to another at an instant. The commands available for menu item are:

- **Save**: save current configuration. You can specify the name to be assigned to the configuration or select an already existing one to overwrite
- **Load**: loads the selected configuration

Window Name

The last nine windows open the workspace are listed in this area of the window. When clicking on the name of the window with the mouse will bring it to the forefront and display it in full view.

Window...

This command is used for opening a dialog window containing a list of the window open in the workspace. This command is handy when more than nine windows are open in the workspace and therefore not all listed in the Menu.
The commands available in the this window are:

- **Activate:** activates the window selected in the list by bringing it into forefront vision in the workspace
- **OK:** closes the dialog window without activating any commands
- **Save:**
- **Close Window:** closes the window selected in the list

Reset Windows Layout

This command restores the layout of windows in the workspace window to the original Movicon predefined positions. The "Auto Load State Mode" option value from the "View" menu will not influence this command's behaviour.
The workspace window layout menu option is an alternative to pressing the Ctrl key at the Movicon Startup.

4.6.9. Help (?) Menu

The Help menu indicated by the **"?"** character is the last item of commands available from the Menu bar.
By using Help the user can access system information and the on-line guide if available.

Help Topics

This command opens the general Help window of the 'Movicon Online Guide'.

Tutorial

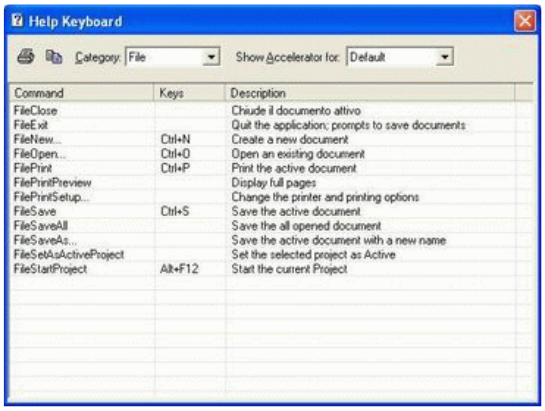
Opens the Movicon tutorial.

Dynamic Help

This command opens the Movicon **"Dynamic Help"** window.

Keyboard Map...

This command opens the window where the accelerators set for Menu commands are reported.
This window is only for consultation and not for making changes.



About Movicon...

By using this "Information on...", you can access information of the Movicon system being used which is very helpful when having to ask for any **"Technical Support"**.
The Progea Web and Email addresses are also available from this Information window, so that the user can get hold of them easily when needed or for requiring information on the most recent Movicon versions or its new products.
The **"Check for Updates"** button lets you check and download any product updates.

When selecting the **"Version Infos"** tab you can check all the information concerning the **version** of the project being used. As mentioned above, this information is fundamental to the **"Technical Support"** when contacting them for assistance.

Bugbase

This opens a connection to Progea's Bugbase page on the Internet. Therefore the WEB connection must be active in order for this to happen. Access to the BugBase is reserved for Clients and requires user to have a Customer access code and password.

Knowledgebase

This opens a connection to the Progea Knowledgebase page on the Internet. Therefore the WEB connection must be active in order for this to happen. Access to this BugBase is reserved to registered users and requires authentication using the credentials inserted on the registration form.

4.6.10. Context Resource Menus

When right mouse clicking on one of the different resources available from the **"Project Explorer Window"** window, Movicon will provide you with a set of contextual Menus through which you can execute a certain number of commands inherent to the resource selected. All these command are also available from the Project Explorer's **"Commands"** window.
All the available commands are described below.

Open Project...

Executes the opening of an existing project by presenting the browse window to search for the one desired.
This command is also available from the Movicon **"Tool Bar"**.

New Project...

Executes the opening of a new project by presenting the wizard window to create it.
This command is also available from the Movicon **"Tool Bar"**.

Close (Ctrl+A)

Closes the opened resources and the active project.

New Child Project...

Executes the insertion of a child project by presenting the wizard window to search for and create the project desired. In this case you can insert an existing project or create a new one.

Remove Child Project

Eliminates the selected child project. This operation simply removes the child project from the list of child projects, but it remains integral and is not cancelled.

New Variable...
Inserts a new tag in the Real Time DB. Before insert the variable Movicon allow to edit the variable name. The default name is "VAR" followed by a progressive number "00001" (i.e. VAR00001).

New Variable Group...
This inserts a new Variable Group within the Real Time DB. The purpose of having Variable Groups is only for organizing variables together. Variables which are linked to the same device, for example, are grouped together in folders. Before inserting a Group of variables, Movicon will display a dialog window where a name can be assigned to the Group. The "GROUP" name is proposed for default followed by a progressive number "00001" (eg. GROUP0001).

New Communication Driver...
Inserts a new Communication Driver in the Real Time DB. The command opens a dialog window to select the Driver from those available.

Install this Project as Windows Service
Installs Movicon as Windows service. In this way Movicon will startup as Service when the PC is started.
raph

Uninstall from Windows Services
Removes Movicon from Windows service. This command is only active when the project is installed as Service beforehand.

Edit String Table...
Opens the window for editing the Movicon Strings.

Check Options Used (Dongle Requirements)...
Opens the window for checking the options contained in the License. Please refer to paragraph on "Licensing Requirements".

Upload Project to Device/FTP...
Open dialog window for uploading project to CE device. For further information, please consult the section on "Upload/Download Project" in the Movicon CE manual.
This command is also available from the Movicon **"Tool Bar"**.

Device Control Panel...
Command not yet available.

New Structure Prototype
Inserts a new Structure Prototype internal the Real Time DB. The Prototype will be inserted with the 'STRUCT' name followed by a progressive number "00001" (i.e. STRUCT00001).

Add System Variable
Inserts the Structure Prototype and the relating **"_SysVar_"** variable internal the Real Time DB,. This particular variable is managed by Movicon and reports a series of system information which may by be very useful for the programmer.

Compile Cross Reference
Activates the project's cross reference compilation and automatically opens the window displaying the Cross Reference for variables.

Associate a Data Logger/Recipe to this Variable
Executes the association of a Data Logger or Recipe to the variable selected.
For further information please refer to the section on **"Associating Data Loggers and Recipes to Variables"**.

Associate an Alarm to this Variable
Executes the association of an Alarm to the variable selected.
For further information please refer to the section on **"Associating Alarms to Variables"**.

Associate an Event to this Variable
Executes the associated of an Event to the variable selected.
For further information please refer to the section on **"Associating Events to Variables"**.

Comm. Driver Settings...
Opens a window for setting the parameters of the selected Communication Driver.

Import Device Database...
Opens the window for setting the symbolic file of the device (PLC, etc.).

Add new Struct Member
Inserts a new member variable in the selected Structure. The variable will be inserted with the "VAR" name followed by a progressive number "00001" (Eg. VAR00001).

Change Struct Member Order...
Opens the window for changing the order of the members internal the structure.
For further information please refer to the section on **"Variable Member Order"**.

Add a New Menu
Inserts a new **"Menu"** resource internal the "Menu" group.

Add a New Shortcut
Inserts a new **"Shortcut"** resource internal the "Shortcuts" group.

Add a New Script
Inserts a new **"Script"** resource internal the "Basic Script" group.

Add a New Screen
Inserts a new **Screen"** resource internal the "Screens" group.

Add a New Folder
Inserts a new **"Folder"** internal the Mutiple Resources group.

Add a New Parameter File
Inserts a new **"Parameter File"** in the "Parameter Files" group.

Add New Local Variable...
This command allows you to insert a new local variable in the selected Screen.

New Variable Script Event...
This commands permits an event generated by a variable change to be inserted internal the Script code of the selected object or resource. Executing this command in fact opens a variable browse window enabling you to select the variable desired, after which Movicon will add an event defined as "OnNameVariableChanged" (Eg. OnVAR00001changed). This event will be called every time the variable changes its value during Runtime.
For further information please refer to the section on **"Associating Variable Script Events to Screens"**, **"Associating Variable Script Events to Symbol".**

Create a WebClientX html page based on this Screen
This command generates a HTML page which will be saved in the "\RESOURCE\ProjectName\ScreenName.html" Project Folder. The html page can then be used for linking up to the Server project as Web Client.

Apply New Name
This command applies the new name of the selected variable or resource (Screen, basic script, menu or accelerator) to all the project's resources. Upon activating this command, a control search will be carried out in all of the project's resources and their objects to find the variables and resources set with the 'original' name to replace it with the new one.
For further information on this matter please refer to "Rename Variables" and "Rename Resuorces".

Add New Shortcut Command
Inserts a new Shortcut Command in the selected Shortcut resource.
For further information please refer to the section on **"Shortcut Resource"**.

New Menu Item
Inserts a new Menu Item in the selected Menu Resource.
For further information please refer to the section on **"Movicon Menu Items"**.

New Popup Item
Inserts a new Popup Item in the selected Menu resource.
For further information please refer to the section on **"Movicon Menu Items"**.

New Separator Item
Inserts a new Separator Item in the selected Menu resource.
For further information please refer to the section on **"Movicon Menu Items"**.

Change Menu Item Order...
Executes the opening of a dialog window for modifying the Item order.
For further information please refer to the section on **"Movicon Menu Items"**.

Test Menu
Executes a Menu Test during the programming phase.
For further information please refer to the section on **"Test Menus"**.

New User Group
Inserts a new User Group in the 'Users and User Group' resource.
For further information please refer to the section on **"Users and Passwords management"**.

New User
Inserts a new Users in the selected User Group.
For further information please refer to the section on **"Users and Passwords management"**.

Add Users to Windows Local Domain
Inserts users from the selected group in the PC's Local Windows Domain.

Add a New Data Logger
Inserts a new Data Logger in the "Data Logger and Recipe" resource.
For further information please refer to the section on **"Data Loggers and Recipes"**.

Add a New Recipe
Inserts a new Recipe in the "Data Logger and Recipe" resource.
For further information please refer to the section on **"Data Loggers and Recipes"**.

Add a New Column
Inserts a new column in the selected Data Logger or Recipe resource.
For further information please refer to the section on **"Data Loggers and Recipes"**.

Import Database...
Creates a Data Logger or a Recipe by importing the structure from an already existing Database.

Create Recipe Editor
Creates a Screen by automatically inserting the components (display, buttons, etc.) needed for displaying and changing the selected recipe. This command is very handy as there is no need for the programmer to create any recipe graphics. For further information please refer to the section on "Creating Recipe screens".

Create-Edit Report File...
This command runs the Report Designer for creating or modifying properties to be associated to the Data Logger or Recipe.

Create Web Report Page
This command creates the Web page for displaying the Report associated to the Data Logger or Recipe via Web.
For further information, please refer to the section on "Reports and Viewing Data via WEB".

Create Web DataView Page
This command creates the Web page for displaying data from the Data Logger or Recipe via Web. In this case, the data will be displayed in table format and therefore the Data Logger or Recipe will not need to be associated with a Report.
For further information, please refer to the section on "Reports and Viewing Data via WEB".

Add a new Alarm
Inserts a new alarm object in the Movicon 'Alarm List' resource.
For further information please refer to the section on **"Alarms"**.

Add a new Alarm Threshold
Inserts a new threshold event for the selected alarm object.
For further information please refer to the section on **"Alarms"**.

Add a new Alarm Area...
This inserts a new Alarm Area. Before inserting the Area, Movicon will display a dialog window where you can assign the name of the Area. The "AREA" name is proposed for default followed by a progressive number "00001" (eg. AREA00001).
For further information please refer to the section on **"Alarms Area"**.

Add a new Event Object
Inserts a new Event Object in the Movicon 'Event Objects List' resource.
For further information please refer to the section on **"Commands on Event"**.

Add a new Scaling Object
Inserts a new Scaling Object in the Movicon 'Scaling Objects List' resource.
For further information please refer to the section on **"Variable Scaling"**.

Add a new Scheduler Object
Inserts a new Scheduler Object in the Movicon 'Scheduler Objects List' resource.
For further information please refer to the section on **"Command Scheduler"**.

Add new RAS Station
Inserts a new RAS Station.
For further information please refer to the section on **"RAS Stations"**.

Add new Client Rules
Inserts new Client Rules.
For further information please refer to the section on **"Client Profiles"**.

Edit DCOM Settings
Opens the Windows' window for the system's DCOM settings.

4.6.11. Tools Menu Configuration

The **Tools Menu** can be configured by the programmer. There is a "Tools.xml" file in the Movicon installation folder which allows the Tool menu list to be customized. These tools can be Movicon add-ons and simple external executables.
The list of tools available in the menu is managed by using a Windows registry key. When Movicon is started up, it controls whether the tool list is already present in the Windows registry keys or not. If these keys have not yet been configured, Movicon will read the "Tools.xml" file and then compile the Windows registry keys with the attributes defined in this file. After this has been done, this file will no longer get read unless to remove registry keys. When Movicon is started up with the "CTRL" key pressed down, the registry keys will reset and the "Tools.xml" file will be read again.

After having modified the "Tools.xml" file you will have to restart Movicon keeping the "CTRL" key pressed down to activate them.

However, menu items can be added to the Tools menu using the menu's "Customize" command. In this case, modifications for adding or deleting applications from the menu are done directly in the Windows registry keys. This means that any resets to these keys due to restarting Movicon with the "CTRL" key pressed down, may cause the "Tools.xml" file to lose settings done using the "Customize" command when loading.

The "Tools.xml" file must be in this structure:

```
<?xml version="1.0" encoding="utf-8"?>
<ToolList>
<Tool Label="Servizio Upload/Download" Arguments=""
InitialDirectory="" Command="TCPUploadServer.exe" />
<Tool Label="Alarm Dispatcher" Arguments="" InitialDirectory=""
Command="Dispatcher.exe" />
<Tool Label="Tag Alarms Generator" Arguments="" InitialDirectory=""
Command="AlarmGen.exe" />
<Tool Label="Csv Tag Importer-Exporter" Arguments=""
InitialDirectory="" Command="CSVTagIE.exe" />
<Tool Label="Notepad" Arguments="" InitialDirectory=""
Command="Notepad.exe" />
<Tool Label="Paint" Arguments="" InitialDirectory=""
Command="MsPaint.exe" />
<Tool Label="Windows Explorer" Arguments="" InitialDirectory=""
Command="Explorer.exe" />
</ToolList>
```

where the attributes have these following meanings:

Label = name of application to appear on menu
Arguments = parameters to pass to the application in the command line
InitialDirectory = initial folder in which to execute the application search
Command = name of the application's executable file

When invoking a command from the Tools menu when the "InitialDirectory" attribute has not been specified, Movicon will set the current Windows folder (even if this installation path has been deleted from the Windows "PATH" environment variable). This behaviour consents will always execute the tool corresponding to Movicon, event when other products or add-ons, which install tools with the same name, are present. In cases where the tool to be executed is not present in the Movicon installation folder, it will be searched for in the folder defined in the Windows "PATH" environment variable folder.

4.7. Project Explorer Window

All the Project's Resources are grouped in the **'Project Explorer'** window. This is the main window of the Movicon Workspace. This window allows you to display all the information relating to the resources which are the essence of the project itself.
The 'Project Explorer' window gathers all the Resource Groups into a tree structure. When selecting each single Resource Group or any of their sub-items, the properties of the object in question will be activated in the "Properties Window", through which you will be able to carry out any changes or necessary settings.
The **"Project Explorer"** can be activated with the 'Project Explorer' command from the 'View' menu.

You can use the "+" key from the number keypad for expanding or collapse a node from the project's tree structure list, displayed in the Project Explorer window.
This key functions independently with or without the Numlock, but the standard keyboard "+" key does not have this function.
When the selected node shows with a + sign next to it, pressing the "+" key will expand it. When the selected node shows with a - sign next to it, pressing the + key will collapse it back to its original state.
When the selected node has sub-nodes, the + sign will not display at its side.

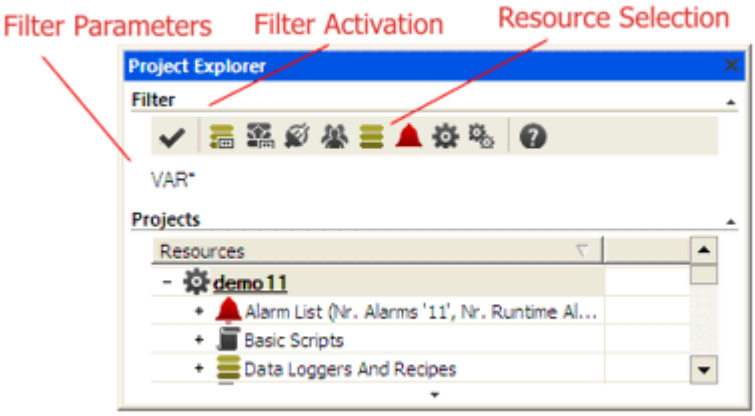
The 'Project Explorer', as all the Movicon windows, can be **'Docked and kept in foreground view'** as described in the section titled "Docking Project Windows".

The project structure's items, displayed in the "Project Explorer" window, appear in alphabetical order the first time a resource is explored. when the number of items to be put into alphabetical exceeds the value of 30,000, they will be put into order automatically to save time and bother.

The 'Project Explorer' window divides into three different areas, which can be exploded to display the contents or compressed to hide them. The three areas are **"Filter"**, **"Projects"** and **"Commands"**.

Filter

This 'Project Explorer' sub-window is used for creating display filters in elements from various Project Resource groups, displayed in a tree structure in the Project's sub-window as described further ahead:



To execute a filter you must first type the text or the characters to be used as filter in the appropriate box. The "*" and "?" jolly characters are also allowed. Then you need to select the resource group in which the activate the filter, and this can be done by clicking on the appropriate icon shown in the bar of filters, or by directly selecting the resource group in question with the mouse in the 'Projects' sub-window. After this you only need to activate the filter with the appropriate button presented in the bar of filters ( ).
To delete any active filters just cancel the filter's characters from the box or leave the "*" jolly character only, then press the filter activation button again.

Projects

This 'Project Explorer' sub-window gathers the project's resources together in groups in a tree structure.
Each group is composed of elements which can be added, changed and cancelled by the programmer to get a complete project as required.

Comands

This sub-window in the 'Project Explorer' shows a list of commands which dynamically changed according to the Resource Group selected at that moment:
For example, if you select the "Real Time DB" group the listed commands will be:

- Add a New Variable
- Add a New Comm. Driver
- Add a New Struct Prototype
- Add a System Variable

The same commands can also be accessed by right mouse clicking on the desired element. To check the list of all the available commands see the section titled **"Context Resource Menus"**.

4.8. Properties Window

The Movicon **"Properties Window'** is fundamentally important in any project for setting the characteristics of the Movicon resources or components.
Due to the extreme simplicity of the Movicon characteristics the properties window is always used for configuring its resources.
This window is easy to understand and use allowing the characteristics, variables according to the object or resource selected to be set very quickly and easily.
The set properties will be activated immediately after confirmation has been received from the OK icon on the bar at the top of the same window.
The **"Properties Window"** is activated by using the 'Property' Command from the 'View' menu.

Movicon memorizes the status of each property group for each object type. In this way when an object is selected the property groups will be represented with the settings they were given the last time.

Properties Window Activation

There are various ways of displaying the 'Properties Window':

1. Activate the 'Property' command from the Project's Edit menu
2. Right mouse click on the Movicon 'Workspace' and select the 'Property' item
3. Right mouse click on any one of the Movicon Resources or Controls and select the 'Property' item

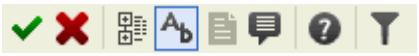
By using any one of these modes will display the 'Properties Window' relating to the Resource or the Control selected in that moment.
Every time you select a different Resource or Control the 'Properties Window' will automatically refresh its fields different adapting them to the properties of the component being focused on.
The 'Properties Window', as all the Movicon windows, can be **'Docked and kept in foreground view'** as described in the section on ("Docking Project Windows").

Properties Window Settings

The 'Properties Window' of a Resource or Control allow one or more setting modalities according to the type of Resource or Control selected. After having activated the 'Property Window', you can select the Resource's or Control's settings by choosing them from those available in the window.
The main settings concern the Style, Execution or the General settings of the specified Resource or Control. You can also select how to display the list of available properties inside the window as described below:

Properties Window Displays

The display of properties in the 'Properties Window' can be customized by using the command bar at the top of the window:



The icons shown on the command bar mean:

Pressing this validation button activates any modifications carried out in the 'Properties Window' in the component selected.

Pressing this button deletes any modifications carried out in the 'Properties Window'. In this case only the modifications done after the last validation command execution will be cancelled.

Pressing this button displays the properties by group type. For instance the groups may be 'General', 'Style', Execution', etc.

Pressing this button displays the properties in alphabetical order. In this case subdivisions in group effect will disappear.

This button is enabled only when the properties are displayed in groups. In this case by pressing this button you can pass from 'Exploded' to 'Compressed' group displays or vice-versa. This allows you to hide or view all the properties contained in each group.

Pressing this button permits you to display or hide the help window which appears at the bottom of the 'Properties Window'. This help window only gives a reduced description string of the property selected. It may be handier to supply the property description immediately and without having to open a supplementary help window.

Pressing this button directly opens a Movicon help online file on the top belonging to the selected property description.

Pressing this button allows you to pass from the "Advanced" (not easy) to the "Easy" display and viceversa of the properties listed in the window.

Easy Mode

The Properties Window has two display modes. "Easy" and "Normal". The display is changed by using the  bottom from the toolbar in the same window.
In "normal" mode (button released) Movicon displays all the available properties. In "Easy" mode (pressed button) the most advanced and least used properties are hidden from view to simplify user interfacing for the less experienced programmer.
Further more, you can define new property groups and custom colour the property fields as desired. Property window customizing is done using xml files which can be edited as pleased. These files are described below.

The xml files' configuration for customizing the properties window has been purposely designed by Progea based on the most common uses of the product. However, these files can be modified as pleased and are found in the Movicon installation folder. This type of operation is recommended for the expert user only.

"PropVis.xml", "PropVisEasy.xml" and "PropVisEasyPopup.xml.xml" Files

These three files allow you to decide which properties, or property groups, are to be hidden in the Properties Window during project design mode. All of these files have identical structures. The "property id" attribute is used in the xml files to identify the property through its id in the Movicon resources. To make things easier, this ID also appears in the Help string of each property which appears just by clicking on the interested property so that you can verify it. The "visible" attribute allows you to define whether the property must be visible or not. The property will be visible when set at "1", otherwise it will remain hidden when set at "0".
The settings of the two PropVis.xml e PropVisEasy.xml files are activated with the "Toggle Easy Mode" button. The PropVis.xml file settings will be loaded when the Easy mode is not active, while the PropVisEasy.xml. file settings will be loaded when the Easy mode is active. The PropVisEasyPopup.xml file is used for loading the settings for screen object property Popup windows (click on the top right corner of the object).

".xml" file structure:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<VisibleState>
<property id="12001" visible="1" description="Crypted Project - Allows you to save the project file crypted"/>
<property id="12004" visible="1" description="Windows 32/64 bit - Enables project development for Windows 32/64 bit"/>
…
…
</VisibleState>
```

The "description" attribute's only purpose is to describe the property being edited, and is not at all taken into consideration by Movcion.

"PropGroup.xml", "PropGroupEasy.xml" e "PropGroupEasyPopup.xml" Files

These three files allow you to decide which property groups are to be displayed in the Properties Window. By using these files you can define which groups each property is to belong to. Each one of these files has an identical structure. The "property id" attribute is used in the xml files to identify the property through its id in the Movicon resources. To make things easier, this ID also appears in the Help string of each property which appears just by clicking on the interested property so that you can verify it. The two PropGroup.xml and PropGroupEasy.xml file settings are activated with the "Toggle Easy Mode" button. The PropGroup.xml file settings will be loaded when the Easy mode is not active, while the PropGroupEasy.xml. file settings will be loaded when the Easy mode is active. The PropGroupEasyPopup.xml file is used for loading the settings for screen object property Popup windows (click on the top right corner of the object).

".xml" file structure:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<GroupState>
<property id="12000" groupid="" groupname="" child="0"
description="General"/>
<property id="12001" groupid="" groupname="" child="0" description="Crypted
Project - Allows you to save the project file crypted"/>
<property id="12081" groupid="30011" groupname="Advanced" child="1"
description="Area - Select the variable memory area"/>
<property id="12082" groupid="30011" groupname="Advanced" child="1"
description="Address - Enter the variable address (for bits use the form x.x, for
arrays x (x))"/>
...
...
</GroupState>
```

The "groupid" attribute represents the ID of the group to which the property must belong to. When this attribute is left blank or is the same as its default property's group ID, the property will be associated to its default group and therefore everything will remain the same as before. When the "groupid" attribute is associated with an ID of another group, the property will be moved to the group identified by that ID. When the "groupid" attribute is associated with a new ID not already assigned, a new group will be created in the properties window with the name specified in the "groupname" attribute. This happens only if the "child" attribute is set a"0". However, if the "child" attribute is set at "1", the new group will be created as a subgroup of the property's default group. In this case the subgroup will also have the name defined in the "groupname" attribute.
The group IDs created using these files can then be inserted in the PropVis.xml, PropVisEasy.xml and PropVisEasyPopup.xml files for managing their visibilities.
The "description" attribute's only purpose is to describe the property being edited, and is not at all taken into consideration by Movcion.

"PropColors.xml", "PropColorsEasy.xml" and "PropColorsEasyPopup.xml" Files

These three files allow you to pick the back and text colours of the properties displayed in the Properties Window. By using these files you can define each property with a background colour and the colour to be used in the text. Each one of these files has identical structures. The "property id" attribute is used in the xml files to identify the property through its id in the Movicon resources. To make things easier, this ID also appears in the Help string of each property which appears just by clicking on the interested property so that you can verify it. The two PropColors.xml and PropColorsEasy.xml file settings are activated with the "Toggle Easy Mode" button. The PropColors.xml file settings will be loaded when the Easy mode is not active, while the PropColorsEasy.xml. file settings will be loaded when the Easy mode is active. The PropColorsEasyPopup.xml file is used for loading the settings for screen object property Popup windows (click on the top right corner of the object).

Struttura dei file ".xml":

```
<?xml version="1.0" encoding="iso-8859-1"?>
<ColorsState>
<property id="12001" back="255" text="16777215" description="Crypted
Project - Allows you to save the project file crypted"/>
<property id="12004" back="255" text="16777215" description="Windows
32/64 bit - Enables project development for Windows 32/64 bit"/>
...
...
</ColorsState>
```

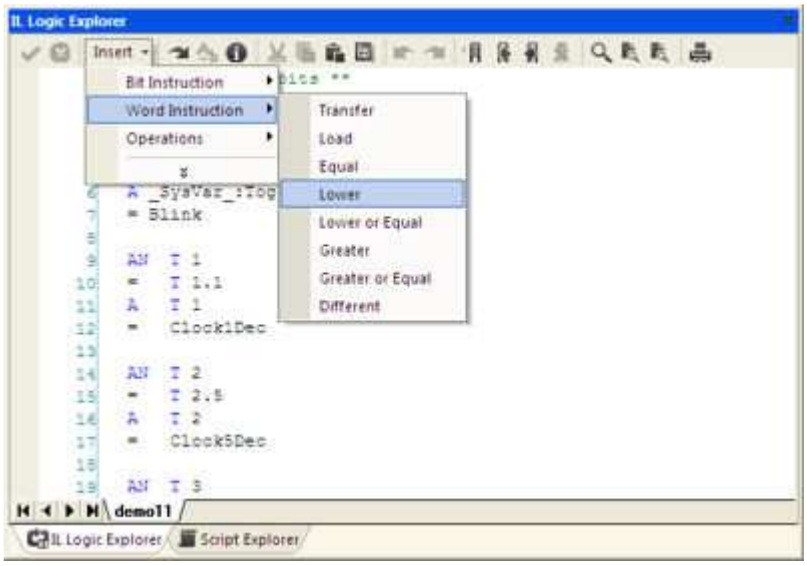
The "back" attribute represents the property's backcolor whereas the "text attribute represents the property's text color. The value is a long number type that identifies the color code.
The "description" attribute's only purpose is to describe the property being edited, and is not at all taken into consideration by Movcion.

4.9. Logic Explorer Window

The **'Logic Explorer**' Window is of fundamental importance for editing the project's **"IL Logic"**. This window, acting as a text editor, allows you to insert IL logic codes. The window's contents change dynamically according to the project's object or resource currently being selected. Codes can be associated in IL Logic format either to the project (General Logic) or to each single Movicon symbol or drawing (Local Logic). Therefore by selecting a symbol, any inserted code relating to that symbol will appear in the 'Logic Explorer' window.

Typing in code has been made easy due to the fact that the instruction syntaxes are automatically acknowledged and represented with different colours. For instance the instructions are represented in blue while the comments are displayed in green. The rest remain in black.

The insertion of the instructions can also be executed by using the appropriate 'Insert' menu from the 'Logic Explorer' window. This is very handy especially when the exact syntax of the instructions to be used is not known.



In addition to this, the F8 key has also been provided for calling the "Tag Browser" window, which is very handy to have when inserting variables.

You can execute the editing commands and run checks on the logic by using the command bar positioned at the top of the 'Logic Explorer' window:

The icons presented in the command bar are:

Pressing this OK button will activate any changes made in the 'Logic Explorer' window.

Pressing this button will delete any changes carried out in the 'Logic Explorer' window. In this case only the changes done after the last OK button command execution are deleted.

Pressing this button will execute a control of any syntax or instruction errors inserted in the code. Any errors found will be described in the Movicon status bar.

Pressing this button will consent to the automatic completion of the instructions being inserted.


Cuts the selected text. In this case the text is cancelled but kept in memory on the Windows Clipboard.


Copies the text selected to the Windows Clipboard.


Pastes the Windows Clipboard's contents on the pointed indicated by the cursor.


Selects all the texts contained in the 'Logic Explorer' window.


reverses the last operation executed (ie. cancelling of a text, etc.).


restores the last operation Cancelled (ie. cancelling of a text, etc).


bookmark


toggle bookmark


next bookmark


cancel bookmark


Find

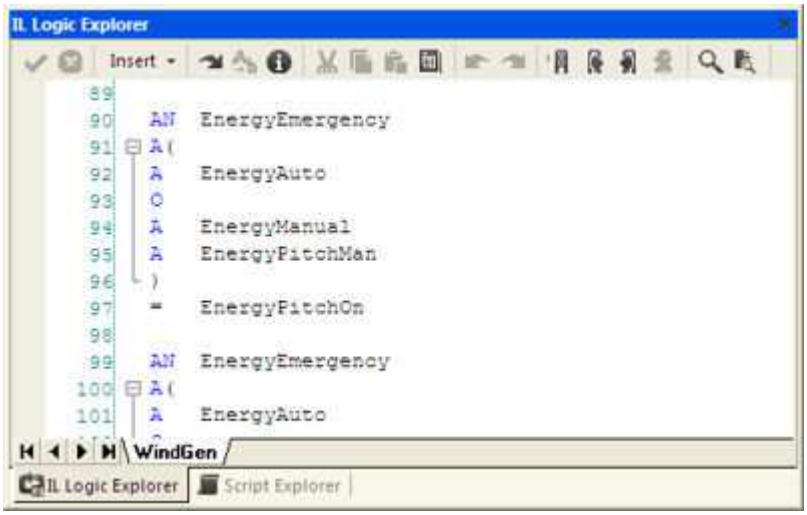

Replace


Find Next


This button is used for getting a printout of the Logic text. The print selection settings window will appear.

Objects being Edited

When a component is selected, its name is shown in the bar at the bottom of the window. This helps you understand which component is being referred to by the logic displayed in the window:



4.10. ToolBox Window

The Movicon **"ToolBox"** has a great variety of drawings and controls to choose from and insert within the Sinottico and Report Interni resources. All these components have been grouped into different categories with the ToolBox according to function type.
The **"ToolBox"** can be activated with the "ToolBox" command from the "View" menu.
All the Drawings and Controls are vectorial object types and represent a series of different and similar functions especially regarding their Animation properties. Some of these properties are also common to all these objects.

The Movicon Drawings and Controls can be grouped together for form composed Symbols. Composed symbols can be inserted in to the Movicon "Symbols Library" to be used later on in other projects.

The Movicon **"ToolBox"** automatically updates every time a Screen or Embedded Report resource is selected within the workspace. Those categories and objects supported by the two Screens or Embedded Report resources, will be made available accordingly.

ToolBox components for Screens

When a Screen resource is opened with the workspace of a Movicon project, the **"ToolBox"** will automatically open showing all supported components that can be inserted on screen. These components are grouped into different categories in the **"ToolBox"** based on how they function.
The **"ToolBox"** can be activated with the **"ToolBox"** command from the **"View"** menu.
The three **"ToolBox"** object categories provided for Screens are as follows:

Basic Shapes

In this category you will find a series of drawings, or simple geometric shapes, which are mainly dedicated to create the screen's graphical design. These components do not have properties specified for Command executions but they support all the animation properties common to all the other Movicon vectorial components.

Even though they do not have specific properties for executing command, they can, however, execute Commands by being edited with Script codes internally.

Buttons-Lights-Switches

In this category you will find a series of **"Buttons"** type controls which are dedicated to executing the Commands defined in the **"Command List"** or simple variable settings. This category includes list of various types of objects such as Coloured Lights or Coloured Buttons which all derived from the same Button component modified in the Style Properties.

Switches-Selectors

In this category you will fined a series of **"Switches and selectors"** control types which are designed to execute Commands defined through the **"Command list"** or by simply setting variables. This category lists various switch and selector objects which derive from the same Button component but modified differently in their style properties. These objects can be set with tri-state mechanics to assume three different positions.

Sliders-Gauges-Meters-Displays

In this category you will find a series of **"Gauge"** type controls in all sorts of graphical shapes. There are a list of different objects which all derive from the same Gauge component modified in the Style properties. In addition to this you will also find an "Editbox - Display" object.

Trend-Charts-Data Analysis

In this category You will find a set of **"Trend"** controls and the Chart object. The purpose of these controls is to display variable behaviour graphically.

Objects

In this category you will find a series of controls of diverse types and functionalities. These include types such as Displays, Alarm Viewers, Historical Log and Data Logger Viewers, Charts, etc.

Clocks

This category contains a series of "clock" symbols for displaying time and dates. These symbols differ in graphics and use system variables for retrieving times and dates. Therefore it is indispensable that the "_SysVar_" be inserted in the project's Real Time DB.

The symbols which display days and months in letters also use script code, therefore it is not advised to use them in Windows CE.

The "Clock" objects in certain cases use local screen variables. If these objects are used within a screen displayed as an embedded Embedded Screen, it will be necessary to redefine the local variables in the project's RealTimeDB so that the clocks work correctly.

Custom ToolBox Objects

New Symbols can be created added to the Toolbox as new categories. These symbols can also be inserted into the Movicon "Symbols Library" to create new library categories. In order to do this, you first need to create, if not already done so, a Movicon Installation subfolder in the name of "ToolBox". Then create a category in the "Symbols Libraries", containing the symbols of interest and copy the created symbol libraries ".msxz" file inside the "ToolBox" folder. The new symbols will then be displayed within the ToolBox as a new category with the same name of the ".msxz" file and containing the symbols inserted in the ".msxz" file.
This will allow you to extend the "ToolBox" contents with customized symbols rendering them available for immediate use without having to get them from the "Symbol Libriaries".

ToolBox Objects for Reports

When a Report or Embedded Report is openend within the Movicon project's workspace, the ToolBox automatically displays containing the list of objects that can be inserted in Embedded Reports. All these components are grouped into different categories within the "**ToolBox"** according to how they function. The **"ToolBox"** objects can also be activated using the "Objects" command from the "View" menu.
Most of these objects that can be inserted into the Movicon Embedded Reports are also the same ones that are normally inserted on screen. The main difference between the two categories are:

- those objects that can be inserted in Reports can only manage some graphical animations, such as visibility, transparency, etc. These animations are only considered in the reporting generating phase only. Once the report has been displayed or printed, they can no longer be modified.
- those objects that cannot be used in Reports cannot be edited, therefore those properties for entering data or command executions are not available

Most of these objects used by the Movicon Reports are a subset of those objects that can be inserted in Screens and in turn provide their own subset of properties.

The **"ToolBox"** Drawings and Controls usable in Reports can also be grouped together to form composed Symbols and then added to the Symbol Library to be use later in other projects.

The three "**ToolBox"** object categories that can be used in Reports are:

Basic Shapes

This category contains a series of drawings or simple geometric shapes that are used for creating the Report's graphical design.

Objects

This category contains a series of controls with the purpose to display data. Data that can be displayed by these controls include the project's RealTimeDB variables, table fields or recordsets associated to the Report or special fields that show information from the system or the Report itself. These values can be selected using the "Tag Browser" window or typed directly in the field.
The objects available in this category are:

Checkbox: this is a "Check Box Button" object type that displays boolean values graphically. This object has two "Close Bit String" and "Open Bit String" properties for specifying the boolean value to be displayed according to the string recorded in the database. This object can be associated with a Movicon RealTimeDB variable, a table field or a recordsets associated to the Report.

Radio Button: this is a "Check Box Button" type object that displays values graphically. In cases where the object must display a boolean value, the two "Close Bit String" and "Open Bit String" can be used for specifying the boolean value to be displayed according to the string recorded in the database. This object can be associated with a Movicon RealTimeDB variable, a table field or recordsets associated to the Report.
Standard Display: this is a "Display" object type in read only. This object can be associated with a Movicon RealTimeDB variable, a table field or recordsets associated to the Report.
Date Time: this is a "Display" object type in read only. This object exclusively displays the "[SP:time]" parameter which shows the date and time when report was generated. This format can be customized through the object's "Value Format" property (i.e. "%d:%m:%Y: %H:%M:%S").
Current User: this is a "Display" type object in read only. This object exclusively displays the "[SP:user]" parameter which shows the name of user that was logged in the project when report was generated. This format can be customized through the object's "Value Format" property (i.e.: "User: %s").
Page-Pages: this is a "Display" type object in read only. This object exclusively displays the "[SP:pages]" parameter which shows the current report page number and total report page number. This format can be customized through the object's "Value Format" property (i.e.: "Page %d of %d").
Query: this is a "Display" type object in read only. This object exclusively displays the "[SP:filterQuery]" parameter which shows the query used for extracting data from the database.
Selected Period: this is a "Display" type object in read only. This object exclusively displays the "[SP:filterPeriod]" parameter which shows the period selected in the "Period" parameter set in the report's generation command. (i.e.: Today, Yesterday and Today, Current Week, etc.).
Duration Threshold: this is a "Display" type object in read only. This object exclusively displays the "[SP:filterDuration]" parameter which shows the duration defined in the "Duration" parameter set in the report generation command for Alarm Statistics. The display format can be customized through the object's "Value Format" property (ie: "Duration Threshold: %H:%M:%S").
Start Date-Time: this is a "Display" type object in read only. This object exclusively displays the "[SP:filterFrom]" parameter which shows the start date set for extracting data from the database. The display format can be customized through the object's "Value Format" property (ie: %H:%M:%S").
End Date-Time: this is a "Display" type object in read only. This object exclusively displays the "[SP:filterTo]" parameter which shows the end date set for extracting data from the database. The display format can be customized through the object's "Value Format" property (ie: %H:%M:%S").

The **"Radio Button**", "Checkbox" and "Standard Display" objects can display RealTimeDB and Database field variables. In cases where database fields are set to display, these objects can only be inserted in the "Details" section, otherwise no values will display when the report is created generating an error message in the Output and Historical Log windows.

When two or more objects of the same type that display special fields are inserted in the Report, such as "Date Time", "Start Date"etc, the format of these objects should be the same. If this is not the case, Movicon will apply the same object format applied to the first object in tab order to the following objects in tab order. For instance, when inserting two "Date Time" objects with two different formats, these objects will display the same format as the one defined in the first object in tab order.

Trends

In this category a series of controls types such as the **"Trend"** and **"Chart"** objects have been made available for use within the reports. These controls are designed to graphically display data extracted from the database by queries. Data extraction queries can be set at different levels through the Trend's "Default Query" property, Report Generator command's "Report - Query" parameter and the Report's"Query Report" property. The query execution priority order is: if a query has been set in the Trend's "Default Query" property, it will have priority of use over the rest. If query has not been defined in this property but in the Report generation command's parameter, this will obtain priority of use. If no queries have been in either the Trend's "Default Query" or the Reports generation command's "Report - Query" but one has been defined in the Report's "Query Report" property, this will have priority of use. If no customized query has been defined in all three

mentioned properties, the report's default query will be applied for extracting all data (query default = "SELECT * FROM TableName ORDER BY TimeCol DESC").
The objects available in this category are:

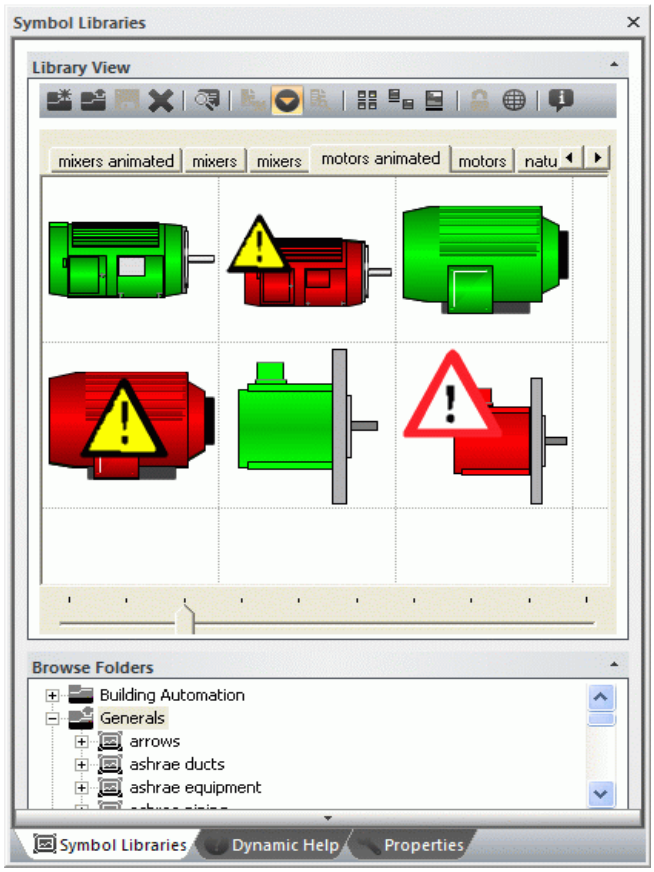
Horizontal and Vertical Trend: this is a "Trend" type object that displays data obtained through applying a query in the Horizontal or Vertical Trend in standard mode.
Trend XY: this is a "Trend" type object that displays data obtained by applying a query to the the XY Trend in standard mode.
Basic Chart: this is a "Trend" type object that displays data obtained by apply a query. The difference with this object in respect to a normal Trend object is that times or any set of discrete values can be displayed along the X axis. It is necessary that this object be specified with which resulting query recordset column is to be used as the X axis in its "Label Data Source" property. In cases where no column has been specified in this property, the object will use the table's time column, LocalCol, by also adding milliseconds. This object also provides an additional three properties for customising the X axis: "Show Item Side by Side", "Show Labels" and "Show Labels every".
Advanced Chart: is a "Chart Object" type object that displays data obtained from report queries. In respect to the "Basic Chart" object, the "Advanced Chart" object allows more advanced and configurable charts to be displayed. This object like the "Basic Object" can display times or any subset of discrete values on its X axis. It is necessary that this object be specified with which resulting query recordset column is to be used as the X axis in its "Label Data Source" property. In cases where no column has been specified in this property, the object will use the table's time column, LocalCol, by also adding milliseconds. The name of one or more database field can be inserted in the Advanced Chart's 'Curve Variable' properties for displaying data extracted by report queries, or a project array type variable can be associated for displaying values.

Caution! The "Advanced Chart" object uses libraries that are NOT supported in Windows CE and therefore cannot be used in projects running on Windows CE plattforms.

"#samples" properties can be set In "Trend", "Basic Chart" and "Advanced Chart" objects. The value set in this property will represent the maximum number of points that the object can display. In cases where the number of record sets extracted by the report's query exceeds the value set in the "Num.Samples" property, the Trend or Chart object will only display a number of records equal to the one set in this property.

4.11. Symbols Library Window

The graphics from the library can be customized and used in Movicon vectorial drawings. The system provides you with a pre-built library of standard graphic symbols which can be accessed through the **'Symbols Library'**, and used as vectorial drawings by the programmer in editing screens.
The **'Symbols Library'** can be modified by the same programmer who can create his/her own symbols and insert them into the library which can customized and made bigger.
The **'Symbols Library'** can be activated with the 'Symbols Library' command from the 'View' menu.



The Symbol library can be displayed by category or in a tree structure.

This current list of symbols and categories may be subject to changes without prior warning but can be customized by the user to create new symbols or to change existing ones.

The symbols are subdivided into categories in the library. This window is divided into two panes, the top pane shows the objects within the selected category, while the bottom pnae shows existing categories in a tree structure. When clicking on one of the categories in the tree structure, the top pane will automatically update and show the objects of the category selected. These categories can be browsed through by clicking on the relative tabs or using the scroll buttons located on the top right of the top window pane.

Category symbols can be inspected by using the side scroll bars. In addition, the cursor on the preview window's bottom bar can be used for zooming the symbol's size in and out.

The command bar at the top of the "Symbol Library" can be used for creating new categories or deleting them, customize window display, etc:

The icons presented in the command bar are described below:

Pressing this button adds a new category to the library. Movicon will request you to insert the name of the new category.

Pressing this button allows a category to be opened by selecting it directly through the Windows file browser window.

Pressing this button executes a library save. This button is only active after the library has been modified.

Pressing this button deletes the category selected in the library.

This button executes a search for the specified category.

This button is used for inserting the selected symbol on facing screen. This operation can also be done by dragging the symbol directly on screen with the mouse.

This button is used for activating or deactivating the symbol's animation preview.

Pressing this button opens the **"Dynamic Property Inspector"** window relating to the selected symbol.

By using these three buttons you can select three different symbol display sizes. You can also use the bar at the bottom of the window to get a more precise symbol size.

This button is used for protecting or removing the protection of the selected category. For further information please refer to the praragraph on "Symbol Library" protection" reported below.

Pressing this button executes a search on Progea's website for any symbol library updating. This can only be done when the PC is connected to Internet.

Pressing this button calls up the selected symbol's or category's help.

The path which Movicon uses for searching for the Symbol Library's ".msxz" files can be customized using the "SymbolsPath" registry key.

Symbol Library Protection

The 'Symbol Library' can be given password protection to safeguard any customization carried out. To activate the symbols' password protection you will need to press the padlock icon on the window's command bar. The system will request you to type in the protection password, after which the library will be protected. To deactivate this protection repeat the same procedure. The protection button icon will declare whether the protection is active or not:

Locked Symbol Category.
When the symbols window shows this icon, it means that the symbols of the selected category have been locked and cannot be ungrouped or exported. To unlock the category click on the icon and re-enter the protection password.

Unlocked Symbol Category.
When the symbols window shows this icon, it means that the symbols in the selected category have been unlocked and freed. To protect the category, click on the icon and enter the protection password.

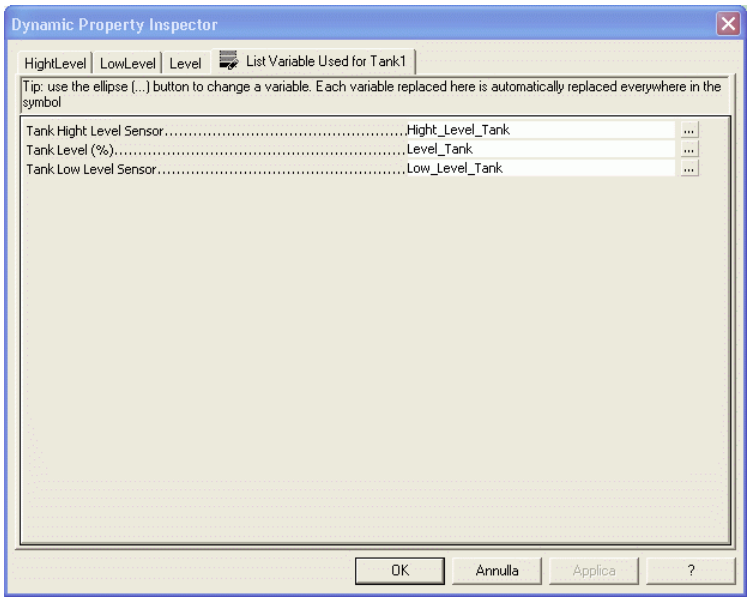
Favourite Categories

The 'Symbols Library' contains a large series of categories, listed in alphabetical order. The scroll arrows and the [...] search button are used for a much easier search of the symbol categories desired.
You may find it handier to use the 'Favourite Categories' which allows you to show the most frequently used categories on the left hand side of the library to point them out quicker.
To label a symbol category as 'Favourite', right mouse click on the category of interest, then execute the 'Add to Favourites' command that displays ?.
The Tab relating to the selected category will appear on the left hand side to evidence it from the rest.
To delete one of your Favourite categories, carry out the same procedure by selecting the **'Remove from Favourites'** command instead.

4.12. Dynamic Property Inspector Window

The **'Dynamic Property Inspector Window'** is a very handy tool for the programmer to have when editing symbols.
This tool consists of a inspection window through which you can examine the whole structure of the variable associated to the dynamic property and any basic script codes existing in the symbol.
The **'Dynamic Property Inspector Window'** is activated by selecting the symbol of interest with the appropriate command which appears when clicking the right mouse key.

This function is not available when the symbol has been withdrawn from a symbol category protected with a password in the library.



By using the symbol's 'Dynamic Property Inspector' window you can view the symbol's structure and directly access all the variables used and the basic script codes contained in the symbol's elements.
Each one of the Tabs, at the top to the window, represents each single component of the symbol.
When clicking on the desired symbol element the dynamic property inspector will display the variables associated to the symbol's execution dynamic properties and any script codes.

The **'Dynamic Property Inspector'** window normally is presented every time a symbol from the "Symbols Library" is inserted containing animation variables or basic codes. In this case the window will open on the "List Variables Used for..." tab where all the variables used within the symbol are be listed.

The Dynamic Property Inspector window allows you view help indications or tips on each tab describing objects contained in the symbol which have variables used in animation properties. The animation types for which existing variables are used are always displayed in the tabs of each of the symbol's object. Also listed in the tabs are variables used in the symbol where set variable descriptions can be displayed as displayed at RealtimeDB level with same description shown in the 'Dynamic Property Inspector" window. In cases in which the variable has not been given a description, the "Used in:" string followed by the list of objects in which the variable is used, separated by ";" will be shown in the Dynamic Property Inspector. Therefore it is possible to create a symbol that uses variables with or without descriptions and add them to the library so that when the symbol is next reinserted on screen, the tab will show listing the variables used along with their descriptions.

If the variables to be replaced have also been used in the symbol's script code, they will also get replaced in the code as well by using the same rules used for the "Permanent application of renamed variables" command.

Replacing Variables

The inspector window indicates the variables which the selected drawing element has been associated with by specifying the interested dynamic property. Each one of the variables can be replaced with a different one, or the Variables DB can be accessed by clicking on the **[...]** setting button on the right of the Variable's box. By doing this you can directly assign a replacement variable existing in the DB or create a new one, which will be introduced in the Variables DB and assigned to the selected element to replace the one previously associated to the symbol.

If the variable being modified is contained more than one symbol object, just modify it in one object only after which it will be updated in all the other objects when the symbol is created on screen. In this case however, is the variable is changed completely, any description presented for the variable associated to the symbol will not get updated with the new variable's description.

Editing Basic Scripts

The inspector window will show any base codes associated to the selected drawing element.
The basic code can be displayed and changed directly from the inspector window. The changes made will be assigned to the drawing object and the new code will replace the old one.

You may also find it very handy to use the F8 key to call the "Tag Browser" window when inserting variables.

By using the same window you can select the events which each symbol element is to dispose in function with its characteristics.

Editing Aliases

When opening the 'Dynamic Property Inspector' window of an object or symbol in which Aliases have been defined, these Aliases will be shown within this window (for further information about using aliases please refer to the paragraph on "Aliases in Objects".). For instance., when it is a symbol composed of one or more elements the following will appear in the different window tabs:

Each single object Tab

When selecting a Tab of one single symbol component object, the part that displays the variable list will be divided into two parts. The top part will show the list properties in which variables or Aliases at object level have been inserted. In the bottom part displays the list of Aliases used or defined locally in the object's table, whether valued or not valued. Any modifications done to these Aliases will be saved in the object's local Alias Table.

Style Source Container Tab

When selecting a Tab of a symbol, the part that displays the variable list will be divided into two parts. The Top part shows the list or properties in which variables or Aliases at symbol level have been inserted. The bottom part shows the list of Aliases used or defined in the symbol's table, whether valued or not valued. Any modifications done to these Aliases will be saved in the symbol's local Alias Table.

Variable List Summary Tab

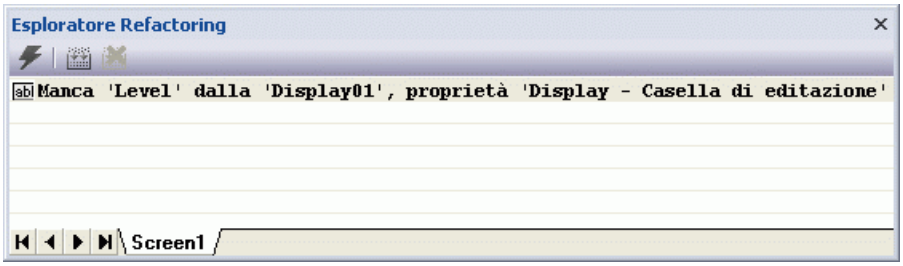
When selecting the summary Tab of variables used in the symbol, the part displaying the variables will be divided into two parts. The top part shows the list of properties in which variables or Aliases have been inserted indicating the property and object in which they were used. The bottom part

shows the list of Aliases used or defined in the tables of the various objects and symbols, where valued or not valued. In this case, at the side of each Alias you should find the name of the object in which they were defined. Any modifications to Aliases at this level will be saved in the Alias Table of the composed symbol as a whole. If an object's Alias has not been valued locally, its row will appear in grey and uneditable.

4.13. Refactoring Explorer Window

The "Refactoring Explorer" window, once displayed, allows you to view any errors that may have arisen for the resource you selected. The errors refer to variables inserted in the properties of the resources and objects which have not been defined in the Real Time DB, or can be due to objects placement out of the screen area (see "Outside Screen Objects"). This control is active for all the project's resources which can be associated variables. By selecting a resource, i.e. a Screen, the Refactoring Explorer window will be populated with the errors found for that screen or for the objects it contains. Error messages already give explicative details on the problem verified. By double-clicking on the error line in cased concerning objects in screen errors, the screen will open with focus on the object in question, along with the "Dynamic Property Inspector" window.

The variables used in the basic script code are taken from the Refactoring Explorer window. Only the "Status Variables" associated in the basic script execution properties can be taken from the Refactoring Explorer window.



By using the command bar place at the top of the "Refactoring Explorer" window, you can execute rebuild commands for the resource you selected:

The function of the icons shown in this command bar are:

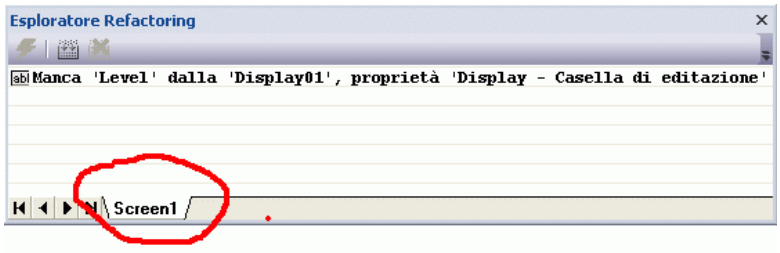
Open: pressing this button will open the screen where the error was found. When the selected resource is not a screen, this command will have no effect.

Rebuild: pressing this button will rebuild the list of errors for the selected resource.

Stop build: pressing this button will stop the rebuilding of the error list which was requested with the "Rebuild" button.

Editing Objects

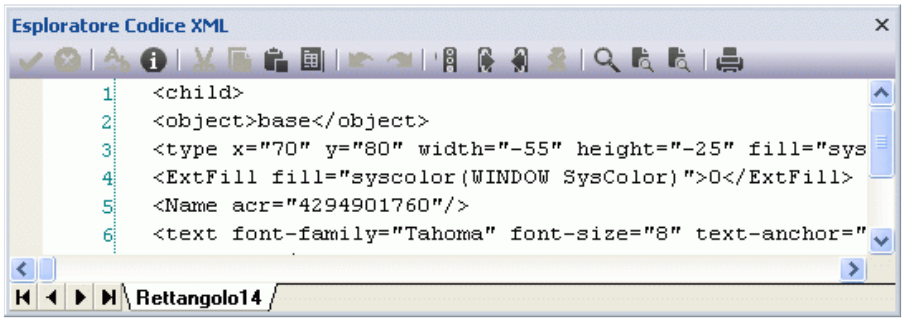
When selecting an item, its name will appear in the window's bottom bar to let you know which component type is being referred to in the error list displayed in the window:



4.14. XML Code Explorer Window

The "XML Code Explorer", once made visible, consents you to view the xml codes relating to the resource or object selected. Apart from viewing object xml codes, this window can also be used to modify them. These modifications will then be applied graphically to the object once confirmed while the object's properties will only be updated the next time it is selected.

The selected object's XML code can be modified directly through this window. However, you will need to know the right syntax to use and what the XML tags mean.

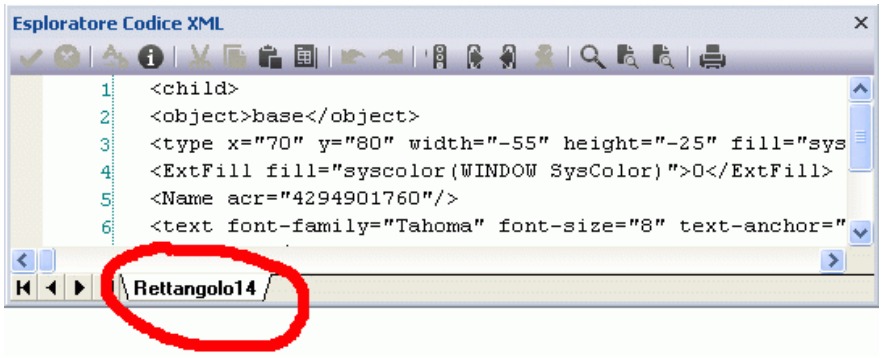


You can execute XML code editing commands by using the command bar place at the top of the "XML Code Explorer":

The commands provided are for editing text, copy&paste, find, etc.

Editing Objects

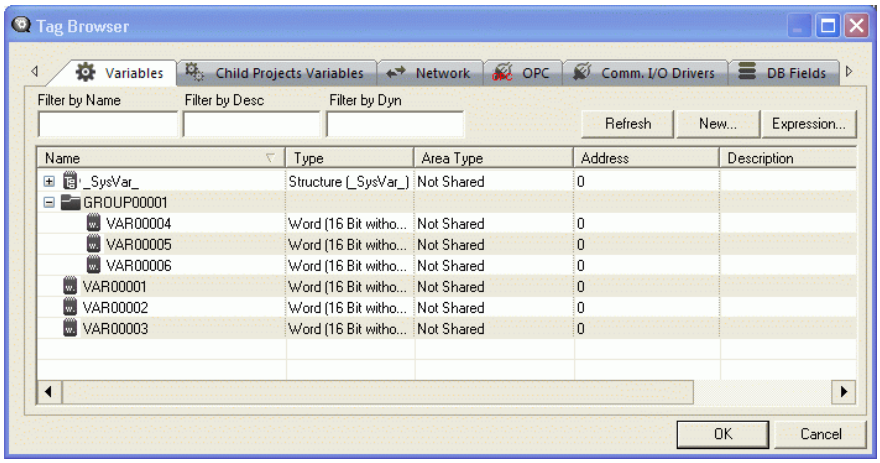
When selecting an item, its name will be displayed in the window's bottom bar. This lets you know which item the XML code, displayed in the window, refers to:



4.15. Tag Browser Window

The "Tag Browser" window can be opened with the "..." button in all those object or resource properties where variables or dynamic links can be inserted. This window provides the list of all the project's variables and dynamic links (OPC, Networking and Communication Drivers and Data Base fields) which can be selected and then inserted in the object and resource properties.

Tab display for inserting dynamic links is disabled for default. Therefore, to insert dynamic links using the "Tag Browser" you will need to set the "ShowExtendedBrowseTag" value to 1 in the project constraints file (there is not default tag in this file, therefore it must be added and set to 1).



The "Tag Explorer" window can also be opened with the F8 key when in the following windows for editing script codes or IL logic:

- Script Explorer Window
- Logic Explorer Window
- Dynamic Property Inspector Window

The "Tag Explorer" window opens upon pressing the F8 key and after having selected the variable, focus will return to the point in which the variable was inserted in the code. Using the F8 cuts down on the number clicks/operations usually needed for adding variables to code.

The "Tag Explorer" window cannot be opened with the F8 key from a Basic Script Edit window where it functions in a different way within this context.

The types of selections available on the Tag Browser's Tabs are:

Variables

This window shows the list of the variables available in the Real Time DB for the project currently opened. The command buttons presented are:

Refresh: refreshes the list taking into account any filter conditions inserted in the "Filter" field
New...: inserts a new variable in the Real Time DB by opening a window where you can also edit the new variable's properties
Expression...: opens a VBA Expression editor to allow you to insert a "Basic Script Expressions " (this will replace the single variable)

Variable properties can be edited by using a window which opens with a right mouse click on the variable you wish to edit.

Child Project Variables

This window shows the list of variables available in the Real Time DB of eventual child projects. The 'Refresh' and 'New' command buttons are provided and have the same functions as the buttons provided in the "Variables" group but refer to the child project's Real Time DB.

Network

This window consents you to select a project locally or from a PC in network and displays a list of the variables which the project has been provided with for networking.

OPC

This window consents you to select a local OPC Server or one from PC in network and displays the list of available tags for the Client.

Comm. I/O Drivers

This window consents you to add dynamic links to the Communication Driver. The Drivers inserted in the project will be displayed on the list and Tasks can be inserted by double-clicking on the driver of interest.

DB Fields

This window shows the list of field which can be associated to Movicon "Embedded Report" objects. These fields are in fact table columns resulted by the query associated to the Report. For example if the Report is not associated with a customized query, all table columns will be listed as the Report's default query will extract all data from the table. However, if a customized query is specified in the report's "Query Report" property, the list of fields will only show those columns of the resulting recordset. In addition, it is also possible to enter the name of the recordset field in the query, for example applying a query with alias as column names. For example, executing the following query:

SELECT UniID, EvDescCol, Count(UniID) AS Frequency FROM Alarms WHERE EventCol = 'ALARM OFF' GROUP BY UniID, evDescCol ORDER BY 3 DESC

in the field list it will be possible to select the "Frequency" even those it is not a column form the "Alarms" table.
When the "Alarm Statistic" option is enabled afterwards, some more fields will be made available on the list of selectable fields for the Alarm statistics. These fields are:

TotalNumOn
TotalNumAck
TotalNumReset
TotalTimeOn
ProgressiveId
DateTimeOn

The values of these additional fields, which do not belong to any of the tables, will be taken from statistical data of each individual alarm. This statistical data is the same data described in the "Alarm Statistic" and "Alarm Status File" paragraphs.

In order to compile the list of fields available, Movicon must be able to access the database. If this does not happen for various reasons, i.e. incorrect or no ODBC connection or data extraction query incorrect, one of the following error messages will show:

- Error on connecting with the report datasource (see the Output window for more information)
- Error on executing the report query (see the Output window for more information)

A this point by opening the Movicon Output window you will be able to get more detailed information on error type from the "DBMS Log " tab.

When using an IMDB database the list of fields gets populated without considering whether or not a query has been entered and therefore all table fields will be listed. In this case the report query is only evaluated in runtime only.

Applying filters to variables

Three entry fields are made available for applying filters to variable lists to be displayed when the "Variables" and "Child Project Variables" tabs are selected in the Tag Browser. These three fields are:

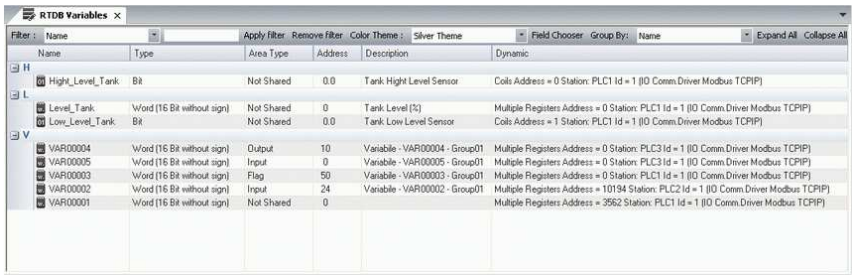
- **Filter by Name**: the text entered in this field is used for filtering the table's "Name" column, therefore the name of the variable.
- **Filter by Desc**.: the text entered will be used for filtering the table's "Description" column, therefore any variable descriptions
- **Filter by Dyn**: the text inserted in this field will be used for filtering the "Dynamic" column, therefore any variable dynamics.

All three entry fields support the use of the "*" and "?" jolly characters. and can be used at the same time for applying more detailed filters. In this case the three filter clauses are entered with "and" between each one. Once the filter has been set, use the "Refresh" button for applying the filter, or prest the "enter" button when the cursor is within one of the entry fields.

4.16. List Variables Window

Movicon has a variable editor in table format, which can be opened from the Project Explorer window and consents you to set and search for variables much faster. This table can be presented in two versions, light and full:

- A very fast version (light), displayed purely in table form like the one used for editing project strings. This version allows you to open a database composed of many variables (even more than 50,000) in less than one second. Filtering or grouping cannot be performed on this table.
- Not so fast version (full) but consents variable filtering, ordering and grouping.



This variable can be opened with a double-click on the "List Variables (Tags)" group or on the name of a variable group in the Project Explorer window. If the project contains more than 3000 variables (this value can be modified through the "MaxVariableToOpenLightDBVariable" registry key), Movicon will ask you if you wish to use the less powerful but extremely faster editor instead (light version).
In any case it is always possible to force the faster editor open by pressing the keyboard "CTRL" key while double-clicking with the mouse.

By using the new editor you will find it much faster to put into order and filter the variables compared to just using the project Explorer window.
This RealTimeDB Variables table's only purpose is to very clearly and quickly display variable lists, but it does not allow you to carry out any modifications directly in it. The properties of one or more selected variables can be changed using the Properties Window.

The list can be put into order by its item types by simply clicking the column's title. The commands for applying filters or grouping variables are at the top of the window and include:

- **Filter**: this list-box allows a filter to be applied by "Name", "Description" or "Dynamic", "Dynamic". In the edit field at the side of the list you can insert the filter cause to apply. the string in which the filter is to be applied supports the "*" and "?" jolly characters. The filter will be applied once this field has been edited by pressing the Enter key.
- **Apply Filter**: this command is used for applying the filter as set in the field described above.
- **Remove Filler**: this command removes the filter currently being applied and empties the contents written in the filter clause field.

- **Color Theme**: this list-box allows you to select the color to apply to the table. The choice of colors are light blue, silver and Green
- **Field Chooser**:this command opens a "field chooser" window which is used for adding or removing table fields. The field choices are: "Name", "Type", "Area Type", "Address", "Description" and "Dynamic". These fields can be dragged to and from the table and field chooser window by simply clicking on the field to be dragged (release mouse key when two red arrows appear in the table heading). The table fields can be changed around by using the same dragging and dropping techniques as well as being resized.
- **Group by**: this list-box allows you to select how to group variables by. The current group by options are: "None", "Type", "Area", "Address", "Name" and "Members". The "members" option applies a filter to the project's structure variables only to show and explore each single member of each variable. When selecting a member, the property window will show its settings which can also be modified.
- **Expand all**: this command is used for expanding any groups displayed in the table based on the "Group" field settings.
- **Collapse all**: this command does the opposite of expanding groups displayed in the table based on the "Group" field settings. In this case a line for each group item will be displayed in the table.

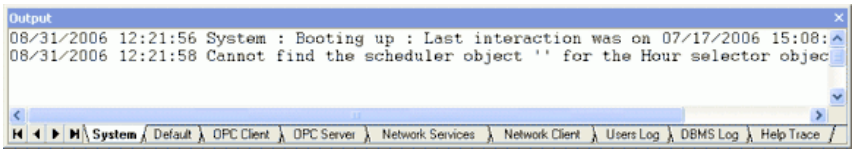
When changing the properties of variables, they may appear in the wrong groups until regrouped again. This functionality has been purposely designed to give priority to quicker editing when dealing with large amounts of variables.

The applied filters and table layout (column positions and visibility) are saved by Movicon, meaning that when you close and restart Movicon these settings will remain the same.

Filter operations are not available and displayed columns can only be repositioned and not removed when the RTDB variables window is opened in "light" mode.

4.17. Output Window

The Movicon **"Output"** window is used for displaying system and error messages which are generated by Movicon during the development or Runtime phase. These messages are also saved on log files during the Runtime phase as usual, but by using this window you can get a more immediate view of the situation which is especially handy in the project debug phase.



You can select different Tabs from the bottom of the window for viewing messages according to the different groupings as described below.

When right clicking on the area of the window a menu will appear with the **"Clear all messages"** command. When this command is confirmed all the active TAB messages will be cancelled, but only those from the Output window and the Historical Log window.

System
Lists the system messages, such as project run, driver communication status, etc.

Default
Lists the Project's default messages.

OPC Server
Lists the messages inherent in the Movicon OPC Server.

OPC Client
Lists the messages inherent in the Movicon OPC Client.

Networking Services
Lists the messages inherent in the Movicon Networking Server messages.

Networking Client
Lists the messages inherent in the Movicon Networking Client messages.

Users Log
Lists the messages inherent in the Project's Users Log.

DBMS Log
Messages, inherent to log recordings and executed through the ODBC or IMDB, are listed.

Trace Help
Returns the index number of the Movicon dynamic help required.

Basic Script Messages
When the Basic Script's "Create its Tab Trace" property is enabled, a new TAB will be created with the same name of the Basic Script in runtime where the Debug.Print messages, in the Basic code, will be printed.

4.18. Dynamic Help Window

The Movicon **'Dynamic Help'** window makes is easier to search the guide for the argument relating to the selected resource, component or symbol. The difference between this and the usual Help, which opens the specific topic on the selected argument only, is that this window shows different links to arguments linked to the main topic in order to give the programmer a wider panorama of information.
Topics are show in groups in the Dynamic Help window some of which change every time according to the object selected, while others are linked to general or frequently consulted arguments:

- **Linked Topics**: are a series of links which change dynamically according to the Topic which has been selected.
- **General Information**: is a series of links concerning the general or frequently consulted information/asked questions.
- **Technical Support**: is a series of links regarding the Movicon technical support.

4.19. Watch Window

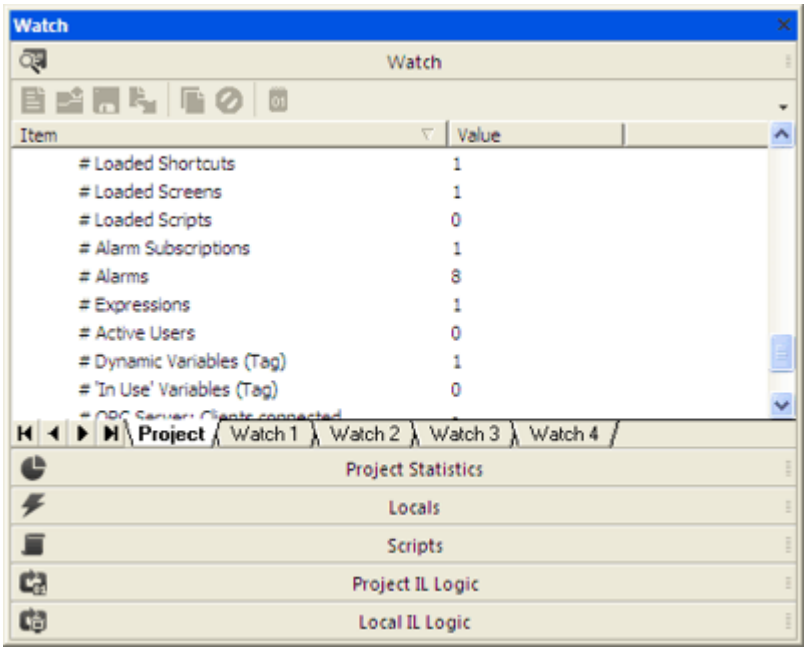
The Movicon **"Watch"** window is used for displaying the status of the project, logic debugging and forcing variables during the project Runtime phase. This window is only available when the project's Runtime is started up from the development session.
By running a project from the design environment you will be able to view information on items contained within a symbol using the CTRL key upon pressing the mouse. This will load only the information on the item, pointed to by the mouse, in the current watch window and not on the symbol containing it.
This will allow you, for example, to see the IL logic of only a symbol's item and not the IL logic of the symbol container.
The **"Watch"** window is composed of groups, each one displays certain information:

Watch

The Watch group is composed of different TABs. The 'Project' TAB contains information on the project's general characteristics, such as the number of variables in use, the number of active

screens, the number of connected Clients, etc. The other TABs, called 'Watch 1', 'Watch 2'. etc., allow one or more variables to be selected for monitoring or changing.

In order to carry out any changes to a variable, simply click the right side of the displayed value and then enter a new one. As an alternative, after having selected the line with the variable, press down the F3 key to enable value editing.



When clicking on the command for selecting variables to insert in the window, the Movicon Tag Browser window will open. This window is used for selecting Variables from either the project or any child project to view in the watch window. However, this window cannot be used for inserting new variables, basic script expressions or dynamic links or modifying variable properties. (right clicking on varialbe name is also denied).

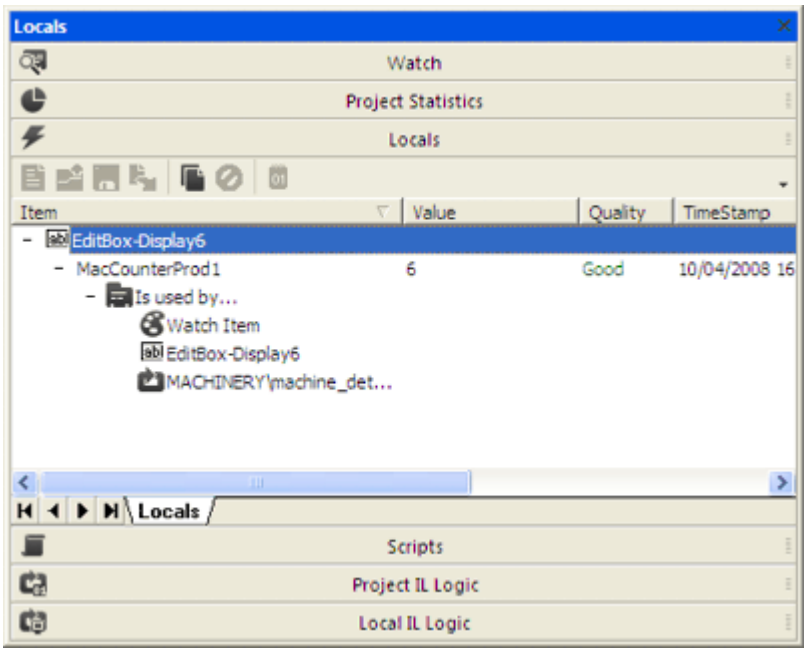
Project Statistics

The Project Statistics group documents the use of the resources retrieved by the system by representing them on a table correlated with pie charts.

by using the buttons from the menu bar you will be able to perform, for instance, data refreshes, select pie or histogram data displays and reset statistical data using the "Cancel" button. The "Cancel" button can be used to zero project statistical data recorded up to that moment to then restart from scratch.

Locals

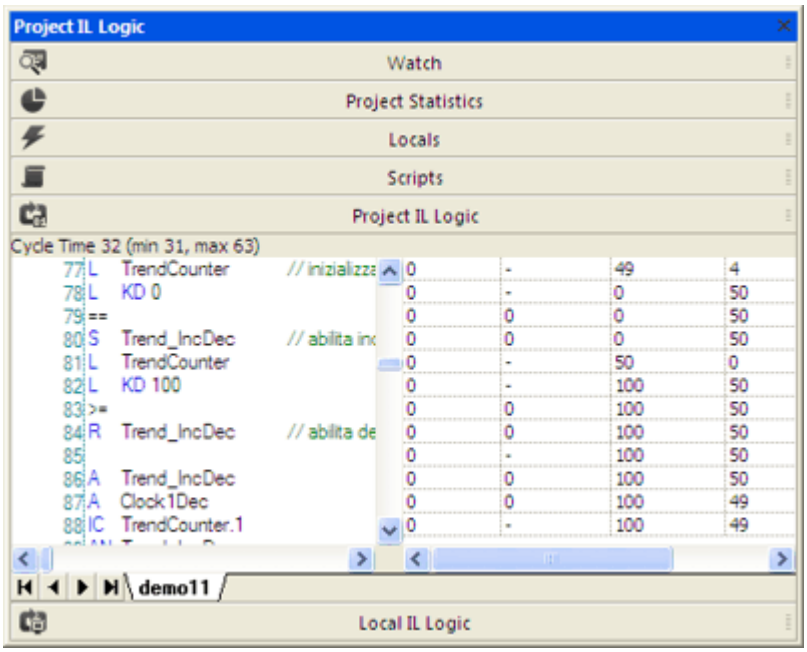
This Locals group allows information on the on screen components to be displayed. When clicking on an on screen object, the window will change its contents by displaying information based on that component.



When double-clicking on an object in this window containing Basic Script code, its Basic Script code debug window will open. When the object does not contain code, a beep will sound and no window will open.

IL General Logic

The IL General Logic group allows the Debug of the IL Logic resource associated to the project to be run.



IL Local Logic

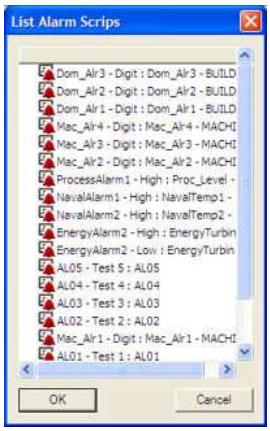
The IL Local Logic group allows the Debug of the IL Log associated to the component or screen selected with the mouse to be run.

Script

the Script group lists the Basic Script resources loaded in memory with some useful information such as status (running or stop) and total execution time of last run or the run taking place. When double-clicking on the name of a listed Basic Script, the debug window of that basic script resource will open.

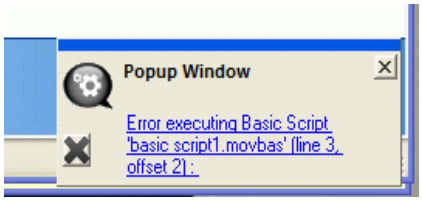
Alarm Script Debugger...

This window is opened by using the "Alarm Script Debugger..." command from the "RunTime Bar". This window lists all the alarms managed in the project. When selecting one of these alarms, the debug window of the Basic Script code inserted in the alarm's threshold will open.



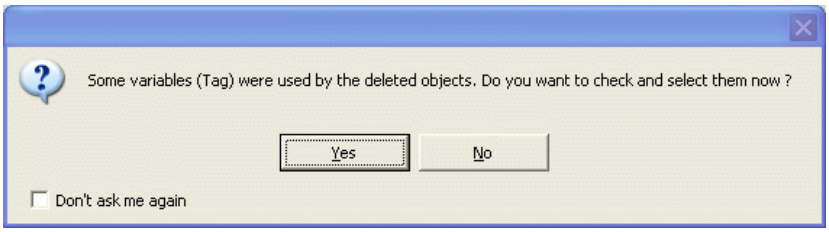
4.20. Popup Window

The Popup Window appears near the system icon when Movicon opens a non modal error window during project Runtime. This Popup Window is used to allow the error window to open when it has been put in background in respect to the Movicon window.



4.21. Confirmation Dialogs

Movicon will open dialog windows requesting confirmation for certain operations while you are programming. For instance, when cancelling an object associated with a variable from a screen, you will be asked whether you wish to view and select this variable. These confirmation dialogs have a "Don't ask me again" checkbox for certain operations. When enabling this checkbox, the dialog window not show again and the last selection made will be memorized.



Movicon memorizes this setting through the Windows registry keys. If you wish to re-enable this dialog window, you will need to cancel its corresponding registry key at this location:

HKEY_CURRENT_USER\Software\Progea Automation x.11\movicon.exe\DoNotAskAgain

4.22. The Resources

The **Resources** form the foundations of the Movicon applied project. Each project gathers all the Resources by organizing them into **Groups**, based on function types, which are listed in the **"Project Explorer"** window. This window, in tree structure, is the container of all the project's resources, and therefore the project itself.
Resources can be accessed from the 'Project Explorer' window for configuring properties, or inserting new resources or deleting them from the project.

Inserting a new Resource

To add new Resources to the project, position the mouse on the Group where you wish to add an item, then right mouse click and select one of the items available from the menu which opens. The same list of options can also be accessed from the **"Commands"** window of the 'Project Explorer's' window.

The list of commands displayed in the menu opened with the right mouse key or in the 'Commands' window changes dynamically according to the Group or Resource being selected.

Editing Resources

To edit a Resource you only need to select it and open the **"Properties Window"**. By using the **"Properties Window"** you can change the settings in the properties of each Resource. The "Screens" and "Basic Script" resources are the only ones that need opening iwht a double-click.

Deleting Resources

Before deleting a resource you need to select it first. The resource is deleted by using the CANC key or the "Cut" or "Delete" commands from the "Edit" menu.
A command executed in error can be cancelled by using the "Undo" command from the "Edit" menu or the CTRL+Z keys.
You can delete the Resources inserted within groups but you cannot delete the "Resource Groups" listed in the "Project Explorer" window created for default by Movicon.

Cut, Copy and Paste Resources

Each resource can be cut, copied and pasted within the same project or in different projects. Before carrying out any one of these command you need to select the resource or resources first.
The Cut, Copy and Paste command can be accessed from the "Edit" menu by using the right mouse key or from the keyboard using the CTRL+X, CTRL+C and CTRL+V keys respectively. These command can also be carried out with multiple resource selections. To select more than one resource keep the CTRL key pressed down and click on the resources desired or keep the SHIFT key pressed down and select the resources with the UP/DOWN arrow keys (also see the "Cut, Copy, Paste" paragraph in the "Standard Editing Techniques" section).
A command executed by mistake can be cancelled with the ""Undo" command from the "Edit" menu or with the CTRL+Z keys.

The Resources can be pasted inside the same Group it belongs to only. For instance, a variable can be pasted inside the "Real Time DB - Variable List (Tag)" Group only and not inside the "Alarm List" or "DataLogger & Recipe" Groups etc..

4.22.1. The Multiple Project Resources

The project's Multiple Resources are those which are saved in a XML file for each inserted resource. These xml files are found in the project's "RESOURCES" folder. There is a group in the **"Project Explorer"** window which identifies each of these resource categories. The resources and consequent relating groups are:

Screens
Menu
Accelerators
Basic Script
Parameter Files

Within each of these five groups of resources you can create other folders to simply organize your project better. It may be very handy to group these resources in different Folders in a logical order by keeping different resources which have the same requisites in common (such as belong to same area) grouped together. For instance, supposing you need to create a project for monitoring a plant divided into different zones, you could create one folder for each plant zone and then group in each folder the Screen, menu sources etc, concerning that zone. To get the same folder available in all five groups of the multiple resources you will need to create the folder five times over, meaning that you have to create a folder for each one of the five groups. The folder in reality results as one only In the project structure displayable through the Windows Resource Explorer window where all the files of the five resource groups, inserted in this folder, will be saved.
This folder must be empty before it can be cancelled and therefore you must check that it is also empty for all the five multiple resource categories, listed above, before doing so.
During the development phase, only those folders containing just one type of multiple resource category can be renamed, otherwise an error will show: "This folder is shared across multiple resource types and cannot be renamed".

A folder used in a resource group can not be renamed using a folder name already in use in another resources group or in the resource group itself.

The only of purpose of creating tree structures within the multiple resource groups in the created custom folders, is to organize the project better and do not influence how the project works in any way.

4.22.2. Common General Resource Properties

By using the General properties you can set the name of the resource selected in the "Project Explorer" window. In order to do this just select the Resource desired and then change its settings through the Movicon **"Properties Window"**.

Name
This edit box lets you enter the name of the selected resource. You can also change the text through the "Project Explorer" window by clicking the resource and pressing the F2 key.

4.22.3. Resource Folder General Properties

The name of the folder inserted in the 'Project Explorer' window's Multiple Resource groups can be defined using its General properties. This is done by selecting the Folder desired and then modifying its settings through the Movicon **"Properties Window"**.

Folder Name
The name of the folder is entered in this edit box. The text can also be changed through the 'Project Explorer' window by clicking the folder and pressing the F2 key.

Folder Path
This text box is in read only and shows the folder's complete path.

Filter
This edit box is used for inserting a string for executing filters on files contained in the folder. The "*" (star) and "?" (question mark) wild card characters can also be used.

4.23. Project Files

Movicon executes the saving of project files in one unique folder, commonly called **'Project Folder'**. In addition to project files, sub-folders containing data relating to the project are also created so that the project's architecture is structured clearer and readable.

All the Movicon project files are saved in XML format, and therefore can be read and edited with any text editor or XML editor. This can only be done if the project files have not been crypted by the programmer.

The data and information of the Movicon projects are contained in files with '.movprj' extensions. Once the project is saved, Movicon will always carry out a backup of the project file before saving it again. The back-up copy will have the same name as the project's but with the 'movbak' extension.
If for any reason the project file is lost, just simply open the backup file (renaming the extension from '.movbak' to '.movprj').
Movicon also associates other files to the project, one for each Resource type. The files will be created in the same project folder.
The following table describes the types of files identified by their extensions:

File Extension	Description
.movprj	Project file
.movbak	Back-up copy of project file
.movalr	File containing the data and the configurations inherent to the 'Alarms List' Resource
.movdlrec	File containing the data and the configurations inherent to the 'Data Loggers & Recipe' Resource
.movevt	File containing the data and the configurations inherent to the 'Event Objects List' Resource
.movils	File containing the "IL General Logic" code of the project
.movnetclt	File containing the data and configurations inherent to the Client 'Network Services' Resource
.movnetsvr	File containing the data and configurations inherent to the Server 'Network Services' Resource

.movopcclient	File containing the data and configurations inherent to the OPC Client
.movrealtimedb	File containing the data and configurations inherent to the 'Real Time DB' Resource
.movsch	File containing the data and the configurations inherent to the 'Scheduler Object List' Resource
.movscl	File containing the data and configurations inherent to the 'Scaling Object List' Resource
.scrnav	File containing the data and configurations inherent to the "Screen Navigation" Resource.
string.language	File containing the Movicon text strings in the language specified in the file extension. If, for instance, the Italian and English language have been inserted into the Movicon String Table defining two columns as 'Italian' and 'English', this will create two files as follows: ProjectNamestring.Italian ProjectNamestring.English
string.language.bak	Backup file of files containing Movicon text strings
.actstr	File containing the actual language column name.
.constraints	This file consents you to define project editing restrictions. This file is generated while a new project is being created depending on the platform type selected (Win32/64, WinCE, etc). For further information please refer to the section on "Project Constraints".
.movrefactoring	This file contains the project's Cross References.
.hisupg	This file is created by the "HisLogUpdate.exe" tool when a control is carried out at project startup and when modifications are made to the Historical Log tables. This usually happens when projects originate from previous Movicon versions. This file will remain empty if no modifications are made to tables.
_c	Some files have the above described description plus the "_c". For example: ProjectName.movalr_c These are compiles files which are used by Movicon in Runtime mode for enhancing high speed performances of the project being run. These are the same XML files compile in binary format. These compiled files are automatically generated by Movicon at runtime and are re-created each time the related project file is modified. **Warning**: directly changing an "_c" compiled file can cause unpredictable behaviour in Movicon, according to the resource type the file refers to. Changing the compiled files for the Data Logger/Recipes, Event objects and Alarms (as an example with an external tool like Notepad), these files will not be re-created at the following start of the project and the project will

	be executed with the changes made in the complied files. In case of other resource types, like the screens, if a compiled file differs from the project xml file, the "_c" file will be re-created anyway.
.uxp	This file is created when a user password change is executed. Typically when the property is enabled to force password change at first login or when passwords expire.
.rtusers	This file is generated when project runtime users are edited. Groups and the Users created in Runtime with the "EditUsr.exe" tool are saved in this file.
.zip	Project Backup File.
.movrtmembers	File contains settings of the structure variable members.

As already mentioned above, in addition to the project files, Movicon also creates some folders which will contain information relating, above all, to the saving and recording of data during the runtime phase:

Folder Name	Description
ALARM	Files with the '.alr' extension which contain information on alarms in runtime are inserted into this folder. A file will be created for each project alarm with the following syntax: ProjectName_ThresholdName_VariableName.alr
DATA	In this folder you can find the following file types: ".var" Contains information relating to the variables declared as retentive are inserted into this folder. A file will created For each retentive variable in the project with the following syntax: ProjecNamet_VariableName.var ".watch" Contains the configuration information of the Watch window in the project's debug Runtime phase. These files will be named: Watch 1.watch Watch 2.watch Watch 3.watch Watch 4.watch ".mdb" The Database file can be found for the **"Real Time DBMS Settings"** management. The file will be created in this folder for default with the name: ProjectName_RealTimeDB.mdb You can also find the Database file for the managing of "**Variable Trace**". this will be created only when data recording is activated through the ODBC and not the IMDB. The file will be created for default in this file with the name:

	ProjectName_TraceDB.mdb ".dat" You can find this file type for managing the **"Variable Trace"**. This will only be created when data recording is activated through the IMDB and not the ODBC. The file is in text format but can also be crypted when desired. A file will be created for each variable being traced with the name: VariableName.dat ".xml" You can find this type of file for managing the **"Variable Trace"**. This will be created only when the data recording is activated in the IMDB and not the ODBC. the file is in xml text format. A file will be created for each variable being traced with the name: VariableName.xml ".sxml" o ".tsxml" These are used for any eventual object "Symbol Configuration Files". ".shp" This file contains a Sheduler's programming which was done using the Scheduler Window. The name of the file identifies the scheduler in question. ".ssp" This file contains the execution status of a Scheduler command. The name of the file identifies the scheduler in question. ".settings" This file contains the ODBC plug-in configuration information. The file name identifies the database type. ".TraceDBEx" These files contain flush data for variables being traced in cases when an error have been detected in the ODBC connection. The names of the files will be the same names used by the variable trace tables. These Flush files will be automatically deleted by Movicon, after data has been restored to database, once the ODBC connection returns into activity. .upldsettings This file contains the settings of the last PlugIn used fro transferring the project to a remote device.
DLOGGERS	In this folder you can find the following file types: ".mdb" Here you will find the database file containing the project Data Loggers and Recipe tables. This file will only exist if the selected format is MS Access, while in cases using another Database, such as SQL Server, it will be created based on the provider's characteristics. Furthermore, this will only be created when the data recording is activated in the ODBC and not the IMDB. The file will be named: ProjectName_DLR.mdb ".dat"

	Here you will find the file for managing the project's Data Loggers and Recipes. This file will only be created when the data recording is activated with the IMDB and not with ODBC. The file will be in text format but can also be cryted if desired. A file will be created for each Datalogger and Recipe with the name: DataLoggerName.dat RecipeName.dat ".xml" You can find this file type for managing the project's Data Loggers and Recipes. This file will only be created when the data recording is activated with the IMDB and not ODBC. This file will be in xml text format. A file will be created for each Datalogger and Recipe with the name: DataLoggerName.xml RecipeName.xml ".DataLoggerEx" These files contain DataLogger flush data in cases when an error have been detected in the ODBC connection. The names of the files will be the same names used by the Datalogger tables. These Flush files will be automatically deleted by Movicon, after data has been restored to database, once the ODBC connection returns into activity.
LOGS	A few log files, in ASCII format are presented in this folder which report information relating to the different project components, such as system messages, OPC messages, user activation messages, etc. All these files have the '.log' extension and their names indicate their contents type. This file, in Database MS Access format, may be found in this folder, containing data relating to the project's Historical Log. This will only be created when the data recording is activated through the IMDB and not the ODBC. The file will have the default name of: ProjectName_HisLog.mdb If however, the data recording is set through the IMDB and not the ODBC there will be files with the ".dat" extension and "xml. containing data relating to the Historical Log. The ".dat" files are in text format but can be crypted. ".HisLogEx" These files contain the Historical Log flush data in cases when an error have been detected in the ODBC connection. The names of the files will be the same names used by the Historical Log tables. These Flush files will be automatically deleted by Movicon, after data has been restored to database, once the ODBC connection returns into activity.
NETLOG	Some log files, in ASCII format, are in this folder reporting information relating to the Networking communications. The information relating to the active connections are returned to the variable changes executed by the Client or Server, etc.
RESOURCES	In this folder there are files relating to the project's Multiple resources (Screens, Accelerators, Menus,

	Parameterization File, Basic Scripts and Embedded Report). Movicon will create a file with the resource's name and extension, based on the resource type, for each resource inserted into the project: Screens = .movscr Accelerators = .movacc Menu = .movmenu Basic Script = movbas Parameter Files = movpar Embedded Report = movrep A file with the name of "<Screen>_c.jpg" will be created for each Screen resource. This file is used to preview screens during design mode and is used in Embedded Screen objects when the "Embedded Screen Style Properties" property is enabled. In addition to this, the same tree structure created also in the 'Project Explorer' window in the Multiple Resource Groups will be reproduced in this folder and therefore with the eventual resources' folder groups. The files containing the communication driver settings to be enables will also be kept in this folder. These files will have the name: **DriverName.drvsettings**: file containing the Communication Driver settings **DriverName.dynsettings**: file containing the list of the Communication Driver's dynamic tasks **DriverName.dyndrv**: file containing the list of tags created dynamically in the variables
IMAGES	Images used in the project are kept in this folder. Each time an image is associated to a Movicon screen or object, it will be automatically copied in this folder and its relating path will be used for retrieving it.

The Project Folders listed above are those which Movicon uses for default. However, they can be customized, creating new ones and with different paths, by means of using the "Project Path Settings".

Project Backup

Movicon keeps a project build count save in the ".movprj" file's <ProjectBuild> xml tag. When the project's "Increase Project Build Number" execution property is enabled the project's internal build number will increase by 1 each time the project is saved, When this property is not enabled, the build number will remain always the same. When the project's "Save Backup" execution property is enabled, a backup of all the project's files and resources will be done in the ".zip" file in the name of <Project Name>_<Project Build> each time the project is saved. Therefore, with the project's "Increase Project Build Number" execution property is enabled as well, a new ".zip" file will be created at each project save. When not enabled, the ".zip" file will remain with the same name and overwritten instead each time the project is saved. The folder containing the project will also contain all the backup files of the saves taken place. The ".zip" format has been used so as not to occupy too much space on disk and because it contains files with paths that allow easy extraction.

4.23.1. Renaming Resources

Movicon has a functionality which consents to automatic refreshing of all references to resources when renamed. The resources concerned are:

- Screens

- Basic Scripts
- Menùs
- Shortcuts

When you rename a resource you do not need to replace the old name with the new one in all the various parts of the project it is used.

The automatic resource name replacement mechanism only works if the project's execution **"Enable Renaming Manager"** property is enabled. If not, the aliasing mechanism, described below, will not be used and old names of any renamed resources will have to be replaced manually in the project.

Movicon uses an"aliasing" mechanism which keeps trace of the resource's original name and its new one. When the resource is remained may times, only its original name and the last name will be traced. This information, the relationship between the resource's original name and its new one, is kept in the ".movprj" file. The tags which enclose this information are different for each resource and are <RenamedScreens> for Screens, <RenamedScripts> for Basic Scripts, <RenamedMenus> for Menus and <RenamedAccelerators> for Shortcuts.

```
...
<RenamedScreens>
<item key="Screen4" value="Main"/>
</RenamedScreens>

<RenamedScripts>
<item key="Basic Script1" value="Basic Script2"/>
</RenamedScripts>

<RenamedMenus>
<item key="Menu1" value="Main"/>
</RenamedMenus>

<RenamedAccelerators>
<item key="Shortcut1" value="Exit"/>
</RenamedAccelerators>
...
```

Where:

item key: represents the resource's original name
value: represents the last name used for renaming the resource

When the Renaming Manager has been enabled, it would be a good rule of thumb to re-use original resource names for creating new resources. This kind of operation is always controlled by Movicon displaying this warning message:

Warning! The resource name 'Screen1' has been renamed to 'Screen2' in this project. Do you want to use this resource name? Answering 'Yes' will remove the recorded renamed link.

The above message was generated because the user was trying to create or rename a screen with the 'Screen1' name, which was already used as an original name and then changed to "Screen2". At this point, when answering with 'Yes', the alias link will be deleted and the automatic aliasing mechanism will be annulled for this screen. For instance, if you associated the VAR00001 to a display object and then rename it with VAR00002, the display will result associated to VAR00002. In addition, only one variable, the VAR00002, will be in the RealTimeDB. However, if you insert a new variable with the name of VAR00001 into the database and confirm the use of this name, the alias link will be deleted and the display will result associated to VAR00001 again, which however is the new variable. In this case both the VAR00001 and VAR00002 will result as being in the RealTimeDB as two separate variables.

Lets take another example, if you associate a command to open Screen1 to a button object and then remain the Screen1 to Screen2, the button will result associated to the command to open Screen2. In addition to this, only one screen, screen2, will be present in the Project Explorer window. However, if you then insert a new screen in the name of Screen1, and confirm its use, the alias link will be deleted and the button will result associated again to the open command of Screen1, which is

the new screen. In this case both Screen1 and Screen2 will be present in the project and will result as being two separate screens.

When inserting a new resource, Movicon will propose a name which has not yet been used or in use in the project and not been used as an original name for a renamed resource. To make things clearer, if you insert 'Screen1' which then gets renamed to 'Screen2', if you insert a new screen after this, Movicon will propose 'Screen3' as its name.

WARNING! the "aliasing" mechanism can be deleted by deleting the xml tags which show the list of renamed resources from the ".movprj" file. By doing this, the resources which were renamed will remain with their last associated name, while the references inserted in commands will keep links to the resources' original names. This means that the references to these resources may no longer be valid.

Automatic replacing of renamed resources is done in different ways according to the object or resource in question, as described below:

Screen Resources:

- **Startup Screen Execution Properties**: the new screen name will automatically appear in the project's "Startup Screen" properties
- **Command List Screen Command**: the new screen name will automatically appear in the command's "Screen" property
- **Basic Script**: the original screen name will always appear in the basic script code, for all functions which have a screen name parameter, but the code will be executed in relation to the new screen name

Basic Script Resource:

- **Start/Stop Script Execution Property**: the new basic script name will automatically appear in the project's "Start Script" and "Stop Script"
- **Command List Script Commands**: the new name of the basic script will automatically appear in the command's "Script" property
- **Basic Script**: the original name of the basic script will always appear in the basic script code for all function which have a script name as parameter, but the code will be executed in relation to the new basic script name

Menù Resource:

- **Command list Menu command**: the new name of the menu will automatically appear in the command's "Menu" property
- **Basic Script**: the original menu name will always show in the basic script code for all functions with a menu name parameter, but the code will be executed in relation to the new menu

The "screen name - menu name" or "screen name - accelerator name" correspondence will not benefit from the automatic name replacement, which means that if you change the name of the screen you will also have to change the name of the menu or accelerator so that they continued being associated to that screen. For example, lets suppose you need to define a "LayOut" screen, a "LayOut" menu and a "LayOut" accelerator in such a way that the screen is loaded, the corresponding menu and accelerator are also activated. Then after having done this, you rename the screen to "PlantLayOut", you will also have to rename the corresponding menu and accelerator with this new name if you want to keep them associated. This also applies to other menus or accelerators associated to the Startup Screen and used for default by all those screens which have not got their own. Also in this case, menus or accelerators must be renamed with the same name of the Startup Screen.

Applying Renamed Resources Permanently

You can apply the new names of renamed resources permanently (screens, basic scripts, menu and shortcuts) by using the "Apply Renamed Variables and Resources" command from the "Edit" and "View" menus or by using the "Apply New Name" command from the resources' context menus. In this case, a search will take place in all the project resources and objects to replace all the variable old names with the new one and the renamed varialbe in the ".movprj" file will be deleted. However, this will eliminate the Aliasing mechanismn for this resource.
A request to activate this command will also appear when the option for renaming variables and resources management has been disabled.

This command also replaces the names of resources used within basic script code of objects or basic script resources (except for the shortcut resources which do not have basic script commands). Comments are also inserted in the code to indicate where the replacement was made:

''Menù1' Menu replaced with new 'Menù2' name'
''Screen1' Screen replaced with new 'Screen2' name
'Script2' Basic Script replaced with new 'Script3' name

Criteria for Replacing the Resources in Basic Script Code

When activating the command for applying the new names of resources when the parser finds a text in the basic script code that corresponds to the name of the renamed resource, it replaces this text with the resource's new name using the following procedures only:

- searches for the specific Movicion DOM commands which may have been used for managing these resources with code: executecommand, showmenu, openscript, startupscript, shutdownscript, unloadscript, runscript, openscreen, opensynopticparameter, opensynopticex, openmodalsynoptic, opensynoptic, startupscreen, getsynopticinterface. When found, the replacement is done in the parameter in which the screen name is indicated.
- only the texts in between the double inverted marks are replaced.

4.23.2. Modifying Resources with external XML editors

Movicon project files and resources, when not crypted or compressed, can also be modified outside Movicon with XML or text editors. If modifications are done to projects already opened in edit mode by Movicon, Movicon will detect that a file had been modified and will request that it be reloaded. If this request is confirmed, Movicon will reload the modified resource file rendering all modifications made externally visible. If the resource in question has also been modified by Movicon and not yet saved, they will all be lost when the request to reload resources or project or external modification is confirmed.
If this is request is answered with a NO, the resource will not be reloaded. In this case any modifications to the resource with Movicon relative save will cause the loss of modifications made with an external editor.

The editor used for modifying editing project resources may also be another Movicon instance. In this case opening the project with two Movicon instances would mean using the bidirectional resource loading mechanism when a resource is modified and saved in one instance, the other instance will load it and viceversa.

Once the project has been opened with Movicon and modifying a file with an external editor, when reactivating the Movicon window the following message window will show:

The "..\Test\Project.movprj" project or some of its files have been modified outside Movicon.
Do you want to reload the whole project?

Modifying some resources will also cause project files to be reloaded.
In cases where the same resources have been modified with the Movicon editor but not saved, the following messages will show instead:

"..\Test\Project.movprj" project or some of its files have been modified outside Movicon.
Do you want to reload the entire project?
WARNING! All unsaved modifications will be lost.

This mechanism is valid for all the project resources accept those that use their own editor window, such as Screens, Basic Script, Parameter Files and String Tables. The reload file message will only appear for these resources if the modified resource was opened in edit mode by Movicon when reactivating the editor window. If the modified resource is not already opened in editing mode, the modifications will be automatically loaded when opened without requiring confirmation unless already modified in Movicon as well.

Modifying a resource which creates the relative compiled "_c" (movalr_c, movevt_c, movdlrec_c, movopcclient_c e movscr_c) files in runtime, will reset these files when the resource is reloaded.

Modifying the RealTimeDB resource ("movrealtimedb" file), will reset the movalr_c, movevt_c, movdlrec_c, movopcclient_c, movscr_c, dynsettings files when this resource is reloaded.
Modifying any one of the resources needing project to be reloaded, when the project is reloaded the movalr_c, movevt_c, movdlrec_c, movopcclient_c, movscr_c, dynsettings fields will be reset.
Modifying the driver's "drvsettings" settings file, when this resource is reloaded, the "drvsettings" filed will be reset. If while modifying the "drvsettings" file with the driver's settings window open in the Movicon editor, file reload will NOT be requested.

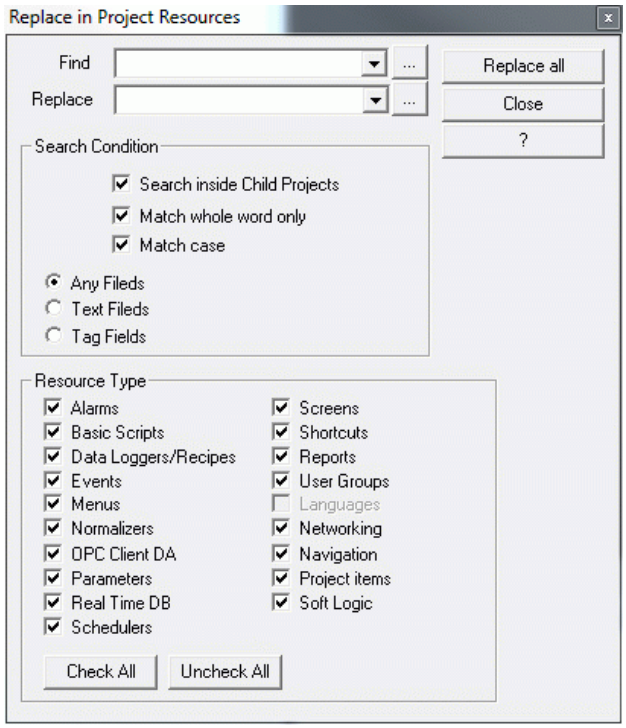
The management for reloading modified resource with external editors is also active for Child Projects. In addition, this management is also active when the project is added to SourceSafe database. In this case, those resources to be modified must be checked out beforehand.

The automatic resource reload management can be disabled by setting the **"ReloadResources"** registry key. This management is enabled by default.

Warning! During the project runtime phase with project launched directly into run mode from a development session, the modified resource reloading management will be disabled. However, when files are modified during run mode using an external editor, the modified resources will not get reloaded when aborting project run to return back development mode and therefore you will have to close and reopen the project again.

4.23.3. Replacing Texts in Projects

The Movicon "Edit" menu you will find the "Replace in Project..." command through which you can find and replace texts within the project. The fields in which texts can be searched in can either be variable or text type. When clicking this command the following dialog window will open:



The text you wish to search for must be entered in the "Find" field and the text you wish to replace it with must be entered in the "Replace" field. The text search criteria can be defined in the 'Search Conditions' dialog box section which provide the following options:

Search inside Child projects: enable this option if you wish the search to extend to any existing Child projects as well.

Match whole word only: enable this option if you wish the search to match the string specified with the whole string. In this case if the string specified in the 'Find' field is part of an extended string it will not be found without enabling this option. For example, when enabling this option to find "Var1" text, it will not be found in "Var1=1" but in "Var1 = 1".
Match case: when this option is enable the text search will become case sensitive and therefore will recognize lower case from uppercase letters.

In addition, you can also define which fields you wish search to be carried out in:

Any Field: the specified string will be searched for and replaced if found in both text and project variable (Tag) fields.
Text Fields: the specified string will be searched and replaced if found in project resource text fields only
Tag fields: the string specified will be search for and replaced if found in project resource variable (Tag) fields only

When selecting the "Any field" or "Tag field" option, if the text to be searched for corresponds to a variable (tag) name, searched for tag will also be renamed in the RealTimeDB variable list.
Variables will not be renamed when selecting the "Text Fields" option.

The "Resourse Type" lets you select one or more resource types where the text must be searched for and replace if found. The "Check All" and "Uncheck All" can be used for selecting or deselecting all field options or they can be selected individually as desired.

Once Movicon finds the specified text, after having activated the replace command, a dialog window will open to confirm replacement. This confirm window will show the specified text searched for, the text to be replaced and the name of the resource or object where text was found. In addition the "Project Explorer" window will be updated showing the resource in which the text was found. At this point, the replacement can be confirmed by pressing the "Yes" button or aborted by pressing the "No" button. When confirming with "Yes to all" the replace will take place in all resources without requiring a confirm from each individual one. When pressing the "Cancel" button, the whole replacement operation will be aborted and text replacements not yet processed will not be replaced. When operation has terminated, another window will display showing all the replacements that took place.

In cases, where a project variable (tag) (or even only a part of the name if the "Match whole word only" has not been selected), is replaced, it will also get renamed in the RealTimeDB variable list showing the old name between brackets at the side. In this case you will need to activate the "Apply New Name" command to make new name definite.

4.24. Project Settings

Each Movicon project can be configured to adopt the specific functionalities needed for your customizing requirements.
Each new project has standard configurations therefore the fundamental requirements for being used normally on any machine with acceptable performances for standard applications.
This is usually the programmer's job who carries out the necessary customizing operations to fit the system to the requirements proposed.
The configurations of the system and of the project can be done by the programmer whenever necessary by using the **'Property Windows'**.

You may find it necessary to configure the system before programming the project for which we advise you to check through your own requirements before consulting the possible settings offered by the system.

4.24.1. General Project Settings

By using the General properties of a project you can set which project format will be saved and whether to crypt it or not.

To modify the Project's General Properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Crypted Project

Movicon saves all the project files in XML format to also enable the programmer to open and carry out any changes to the project files and resources with a simple test editor (or even simpler with a XML editor). However, when this property is enabled the project file will be saved in encrypted format and therefore can only be opened with a Movicon editor and no other.

Crypted Project Resources

Movicon saves all the project files in XML format to also enable the programmer to open and carry out any changes to the project files and resources with a simple test editor (or even simpler with a XML editor). However, when this property is enabled the project's resource files will be saved in encrypted format and therefore can only be opened with a Movicon editor and no other.

Crypted Sting Table

Movicon saves all project string files in XML format, giving the user the possibility to open and modify these files using a simple text editor (or a XML editor to make it more simple). When enabling this property the files from the project's String Table will be saved in crypted format, after which can only be opened with the Movicon editor, independently from whether the actual project has been crypted or not.

Unicode Project

When enabling this property all of the project will be saved in UTF-16 Unicode format.

Zipped Project

When enabling this property all of the project will be saved in compressed format. The compression or decompression of files is managed by Movicon automatically in real-time therefore transparent to the programmer. This will only slightly effect performances in the programming and execution phase but has the advantage of occupying less disk space.

Save Backup

When this property is enabled a "Project Backup" file will be created every time the project is saved. For further information on "Project Backup" files please see the section on "Project Files".

Increase Project Build Number

By enabling this property the project build will be increased each time the project is saved. Otherwise, if not enabled, the build will always remain the same and the Backup file, created after each save, will always have the same name and overwrite the previous one. For further information on 'Project Backup Files' please refer to "Project Files".

Default ODBC Plugin

By using this property you can select which ODBC driver should be used for default by the Movicion project for creating the historical log DSNs. this driver will be used only if no other DSN has been created manually and associated in the historicals "ODBC DSN" property. For further information please see "Project ODBC Plugins".
The drivers currently selectable are:

- **MSAccess**: MS Access (uses the "Microsoft Access Driver (*.mdb)" driver. This one is the predefined choice)
- **MySQL**: MySQL 5.1 (uses the driver installed with this MySQL version)
- **OracleEx10**: Oracle Express (uses the client-less driver installed with this version of Oracle)
- **SQLServer2000**: MS SQL Server 2000 (uses the "SQL Server" driver)
- **SQLServer2005**: MS SQL Server 2005 (uses "SQL Native Client" driver)
- **SQLServer2008**: MS SQL Server 2008 (uses the "SQL Native Client 10.0" driver)
- **SQLServerExp2000**: MS SQL Express 2005 (uses the "SQL Native Client" driver)
- **SQLServerExp2008**: MS SQL Express 2008 (uses the "SQL Native Client 10.0" driver)

ODBC Settings

This command opens the window used for setting DSN configuration parameters relating to the ODBC driver selected in the "Default ODBC Plugin" property. For further information please refer to "ODBC Plugin List".

SMTP Settings

This command can be used for opening the SMTP plug-in settings window which is used for "Esportazione e Invio Mail" commands or reports associated to DataLogger/Recipes. The SMTP plug-in used is the same one used by the Alarm Dispatcher.
The plug-in editor generates a file with the name of "smtp_direct.settings" in the "ProjectName\DATA" folder.

Default Screen Width

This property sets the default width in pixels with which the Screen window is to be created.

Default Screen Height

This property sets the default height in pixels with which the Screen window is to be created.

Project Folder

The project's work folder path is shown in this property. The work folder will open in a Windows Resource Explorer resource window when cliking the browse button to the right of this field.

Default Screen Color

This property sets the default background color with which the Screen window is to be created..
For further information please refer to the paragraph on "Colour Threshold Settings in Drawings and Controls".

Screen Color Number

This property allows you to select the screen's default set of colors when created.

Get Connected Device Screen Size

This function allows you to set the default screen sizes according to the characteristics of the WinCE target PC where the project is to be exported. Before carrying out this function you need to setup a connection between the desktop PC and the target PC with ActiveSync.

Alphanumeric Pad Screen

The name of the Screen to be used as a Alphanumeric Pad instead of the one proposed by Movicon for default is entered in this box. For further information on how customized Alphanumeric Pads work see the section on "Numeric and Alphanumeric Screens".

Numeric Pad Screen

The name of the Screen to be used as a Numeric Pad instead of the one proposed by Movicon for default is entered in this box. For further information on how customized Numeric Pads work see the section on "Numeric and Alphanumeric Screens".

Get Password Screen

The name of the Screen to be used as the password dialog window for user logins, to replace the one proposed by Movicon for default, is defined here. For further information on how custom Password Dialog windows work please refer to "Custom Password Dialog Windows".

Expired Password Screen

The name of the Screen to be used as the expired user password is defined in this box to replace the one proposed by Movicon for default. For further information on how custom expired password screen work please refer to "Custom Password Dialog Windows".

Trace Comment Screen (Audit)

The name of customized screen/s can be defined in this field to be used as a trace window enabled with a variable instead of the one proposed for default by Movicon (This type of screen is not supported by Web client).
For further information on Trace Comment Screens please refer to the section on "Customizing Comment Dialog Windows".

ACK Comment Screen (Audit)

The name of the customized screen/s can be defined in this field to be used a s the alarm comment window instead of the one proposed for default by Movicon (This type of screen is not supported by Web client).
For further information on ACK Comment Screens please refer to the section on "Customizing Comment Dialog Windows".

Caption

This property, when enabled, allows the caption bar to be displayed in the customized "Alphanumeric Pad Screen", "Numeric Pad Screen", "Get Password Screen" and "Expired Password Screen".

Border
When enables this property allows the border to be shown around the customized "Alphanumeric Pad Screen", "Numeric Pad Screen", "Get Password Screen" and "Expired Password Screen".

Resize Border
When enabled this property allows the customized "Alphanumeric Pad Screen", "Numeric Pad Screen", "Get Password Screen" and "Expired Password Screen" window frames to be resized during Runtime. This can also be done using the mouse and the usual Windows' techniques.

System Menu
When enabled, this property consents the System Menu to be displayed in the caption bar in the customized "Alphanumeric Pad Screen", "Numeric Pad Screen", "Get Password Screen" and "Expired Password Screen" screen windows. This setting will have no effect if the "Caption Bar" has not been enabled. The System Menu can be accessed through the icon found on the top left of the caption bar.
When enabling this property, the button for closing the window will also be made visible on the caption bar's top right.

The System Menu is not displayed in Windows CE platforms.

4.24.2. Project Platform Settings

By using the project's Platform properties you can set which platform (Operating System) is to be used for creating the project. To modify the project's Platform, select the object with the mouse and then use the Movicon **'Properties Window'**.

Windows XP/Vista/7
This property enables project development for Windows 32/64 bit platforms.

Windows CE
This property enables the project development for Windows CE platforms.

Client WinXP/Vista/7
This property enables project development for Windows 32/64 bit Client platforms.

Client WinCE
This property enables the project development for Windows CE Client platforms.

WebClient Applet
This property enables the project development for J2SE Client (Java to Standard Edition, such as Windows, Linux or other Java-enabled platforms).

WebClient Middlet
This property enables the project development for J2ME Client (Java to Machine Edition, such as JavaPhones or mobile phone platforms).

Target License Type
This option is used for selecting the license type with which to use for developing the project. The project can be run with all the Movicon functionalities activated or run as a "Power HMI" project and therefore subject to a series of restrictions as described in detail in the paragraph on "Power HMI Limits". The target license selection is only needed during the project design phase for disabling the functions not supported by Power HMI to make it easier for the programmer to create project. The license types that can be selected are:

Standard = all the functionalities which are compatible with the selected platform type will be enabled in the Movicon editor.
Basic = Only those functionalities permitted by Power HMI and compatible with the selected platform type will be enabled in the Movicon editor.

When selecting the "Basic" option, the system will be configured to hide or disable all those functionalities which are not supported by Power HMI, so that the programmer does not use them by mistake.

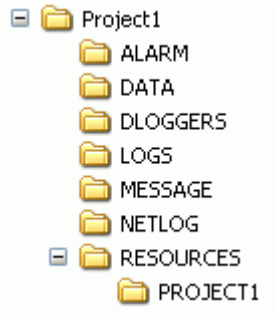
Once the project had been developed, independently from the selection made in the "Target License Type" property, all the Movicon or Power HMI functionalities will be enabled during runtime based exclusively on the license installed. However, if a Movicon project set with a Standard License in the "Target License Type" property is started up in runtime in a machine which has a software license for Power HMI (Basic License), this project will nevertheless be subject to the Power HMI restrictions.

Example: When you set the "Basic" platform, restrictions in WinCE and Win32/64 bit systems will be those imposed by the Power HMI platform (see section on "Power HMI Limits"). The number of Bytes allowed in use are 512 bytes in WinCE and 2048 in Win32/64 bit respectively. If this byte number is exceeded, the project will automatically switch into demo mode issuing a simple alarm message in the output window of event. The license installed in the machine has priority over the platform set in the project: a project using the Standard functionality (Movicon) with the Basic platform (Power HMI) selected will however be able to used those functionalities not allowed in Power HMI if installed with a Movicon License.

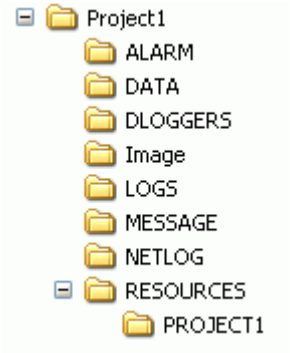
4.24.3. Project Path Settings

The project files can be organized in secondary folders according to the default settings or those carried out in the Project's **'Working folder Settings'**.
To modify the project Paths properties, select the object with the mouse and then use the Movicon **'Properties Window'**.

Normally the project files are organized according to a folder structure in which the data is organized in a logical order. At startup Movicon creates a few default folders from the main project folder where the system will organize its data.
The structure of the working folders can be customized as pleased, by declaring in the project's **'Path'** properties how you wish to organize your files and those of the system's.



An example of how standard Movicon project working sub-folders are organized on disk.



An example of how customized working sub-folders are organized with the 'Image' folder' where all the project's images will be inserted.

Alarms Path

The working folder, in which Movicon will file any comments associated to alarms by the operator, can be declared or selected in this box. The 'Alarms Comment' editing operations are described in the relative chapter on project Alarms. The selection of an exiting folder can be done with the '...' button on the right.
If the folder does not already exist it will be created by the system upon project startup.

Data Path

The working folder can be declared or selected in this box in which Movicon will file data relating to the retentive variables or the "Watch Window" settings. You can used the "..." button on the right to select an already existing folder. If a folder does not exist one will be created at the project startup.

Images Path

The working folder, in which Movicon will search for the bitmap or jpg type images used in the project, can be declared or selected in this box. The selection of an already exiting folder can be done with the '...' button on the right.
If the folder does not exist it will be created by the system upon project startup.

Starting from the 956 build Movicon will use the predefined "IMAGES" folder which will be created as the project folder when this property is not used.
Images set as screen backgrounds will first be searched for in the folder preset for containing images, then in the same folder in which the screen resource was saved, and then in the project folder.
Images set in controls, alarms or in variables will first searched for in the folder preset for containing these images and then in the project folder.
In addition to this, when an image is selected its copy will be saved in the preset folder containing images ('IMAGES' for default). This allows you to keep all your images localized in the project folder so you don't have problems localizing images when running the project in other computers or when exporting it to WinCE devices.

Resource Path

The working folder in which Movicon is to save the multiple project resources (Screens, Menus, Accelerators, etc.) is declared or selected in this box.
You can use the "..." button on the right to select existing folders.
If the folder does not exist it will be created by the system upon project startup.

Logs Path

The working folder in which Movicon is to file recorded data from the project's Historical Log Events and Variable Trace is declared or selected in this box. You can get further information on these functions from the 'Historical Log' chapter in the Manual.
You can use the "..." button on the right to select existing folders.
If the folder does not exist it will be created by the system upon project startup.

Data Loggers Path

The working folder in which Movicon is to file recorded from the project's Data Loggers is declared or selected in this box. You can get further information on this function from the 'Data Loggers' chapter in the Manual.
You can use the "..." button on the right to select existing folders.
If the folder does not exist it will be created by the system upon project startup.

Network User Path

This box is used for declaring or selecting the work folder in which Movicon will insert the Log files of the network connection coming from any eventual clients. If this field is left empty, Movicon will use the project's "NETLOG" folder for default.
You can use the "..." button on the right to select existing folders. If the folder does not exist it will be created by the system upon project startup.

HTML Help File

A help file to be associated to the project in HTML help format can be selected in this box. The Topic of this Help file can then be viewed through the **"Help Command"** which can be associated to the Movicon controls.

When inserting the Help file in the project's **".\Resources\ProjectName"** folder, Movicon will be able to use the path relating to the file as to avoid using any absolute paths due to moving the file to other PCs or to different folders.

4.24.4. Project Execution settings

By using the Execution properties of a project you can set by enabling or not enabling the procedures for the project's statistical data and any commands or basic routines to be executed upon the project startup or shutdown.
To edit the project's Execution properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Enable Statistics
This property is used for enabling or disabling project statistical data acquisition. This data can be seen using the "Watch window".

Startup Screen
The name of the Screen to be displayed at project startup is entered in this box. When this property is not set, therefore without any Startup Screen specified, Movicon will check to see if one exists in the name of 'Main' at the startup of the project's runtime and will load it if it does. However, when this property has not been set with a specific startup screen and a 'Main' screen does not exist, Movicon will randomly load one of those present in the project at startup.

Startup Script
The name of the Basic Script to be executed upon project startup is entered in this box. The selection of the Script can also be done by using the '...' button on the right.

Shutdown Script
The name of the Basic Script to be executed upon project shutdown is entered in this box. The selection of the Script can also be done by using the '...' button on the right.

Startup Commands
The Movicon **'Command List'** is opened by using this button through which you can set a list of one or more commands which must be executed upon project startup.
For further information on the commands available please refer to the paragraph on **"Command List"**.

Shutdown Commands
The Movicon **'Command List'** is opened by using this button through which you can set to list of one or more commands which must be executed upon project shutdown.
For further information on the commands available please refer to the paragraph on **"Command List"**.

Pre-load Screens
This option allows all those screens marked with **"Not destroyable"** option to be preloaded at the project startup. This option is not set for default when new screens are created in the project.
When this option is set, Movicon will scan all existing screens at the project run startup and preload in memory all those which are marked with the **"Not Destroyable"** option.
This operation, inserted to start from the 956 build, allows maximum velocity when changing pages - when needed - due to the fact that the screen to be opened will have been already preloaded before being activated.

Note: This operation also happens for **child project** screens only when the child project is marked as executable and in auto run, and when the screens are marked with the preload option.

Start Full Screen
Enabling this option will startup the project in Full Screen mode, therefore the Screen window will be displayed without the title bar.

Show Status Bar
Enabling this option will also display the Movicon status bar during the Runtime phase.

Show Output Window
Enabling this option will also display the Movicon Trace window during Runtime. The Trace, Output or Debug window is very handy to have especially during the project Debug phase.

Enable Renaming Manager
This option allows to enable or disable the variables and resources Renaming Manager (see "Renaming variables" and "Renaming Resources"). When this property is enabled, renaming a variable or a resource does not require to replace the previous name with the new name in the project, where the variable or the resource name has been used. Disabling this property, the automatic replacement of variables or resources name will not take place.

Static Object in Background
enabling this option will activate the static object management for all those screens which have their own "Static Object in Background" open enabled. For further information on this subject please refer to the paragraph on "Handling Static Objects in Screens".

Hide Desktop
When enabling this option the Desktop's icons will be hidden and therefore inactive.
Please note that the Windows "Show Desktop" button presented in the 'Quick Start' of "Task Bar", permits the Desktop to be reactivated. To avoid this from happening it is necessary to disable the 'Task Bar' as well.

Hide Start Button
When enabling this option the Windows Start button will be hidden and therefore inactive.

Hide Task Bar
When enabling this option the 'Task Bar' will be hidden and therefore inactive.

Hide System Clock
When enabling this option the clock, presented in the Windows' 'Task Bar', will be hidden.

Disable Task Switching Keys
When enabling this option the Windows switching keys such as CTL+EXIT, ALT+TAB, etc, will be deactivated.

Disable Task Manager
When enabling this option the Windows' Task Manager will be deactivated.

Disable Ctrl+Alt+Del
When enabling this option the use of the Windows Ctrl+Alt+Del will be deactivated.

ROT
when enabling this option the "PmeDocCmdTarget" interface will record in the ROT (Running Object Table) unsafe mode. This allows, for example, to connect to this interface even when the project is run as service.
In order to used the "ROT per tutti i Client" option correctly, you will need to enable the "ROT" option and insert some Windows registry keys as indicated below.
If the Movicon.exe and MoviconRuntime.exe modules have to be used the following keys must be inserted:

```
Windows Registry Editor Version 5.00
[HKEY_CLASSES_ROOT\AppID\{BD63E682-1B76-4DDD-AF96-57F3B7EE0567}]
"RunAs"="Interactive User"
[HKEY_CLASSES_ROOT\AppID\MoviconRuntime.exe]
"AppID"="{BD63E682-1B76-4DDD-AF96-57F3B7EE0567}"
[HKEY_CLASSES_ROOT\AppID\Movicon.exe]
"AppID"="{BD63E682-1B76-4DDD-AF96-57F3B7EE0567}"
```

In cases using the MoviconService.exe module, the following keys must be inserted:

```
Windows Registry Editor Version 5.00
[HKEY_CLASSES_ROOT\AppID\MoviconService.exe]
"AppID"="{BD63E682-1B76-4DDD-AF96-57F3B7EE0567}"
[HKEY_CLASSES_ROOT\AppID\{BD63E682-1B76-4DDD-AF96-57F3B7EE0567}]
"LocalService"="MOVICON"
```

ROT Any Client

When this option is enabled the "PmeDocCmdTarget" interface will be recorded in the Windows' ROT (Running Object Table) in non safe mode. This allows you to use the "PmeDocCmdTarget" also when the project is started as Windows service.

Show Service Sys Tray Icon

If the project is executed as "Windows Service", this property allows you to decide if show or hide the icon of the service on the Windows' Application Bar.

Show Service at Log On

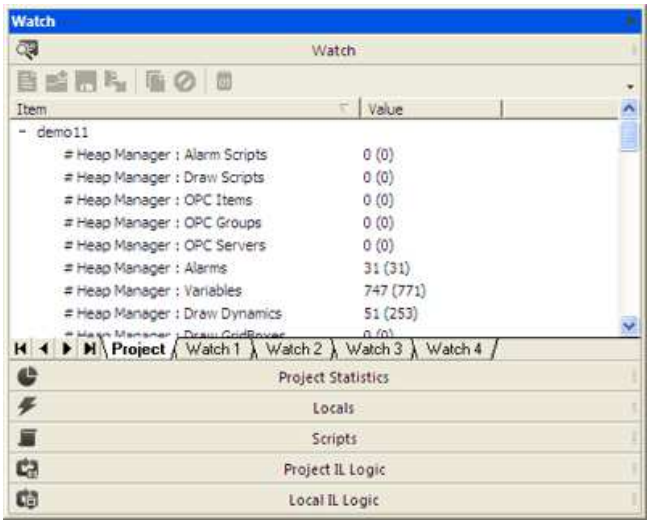
If the project is executed as "Windows Service", this property allows you to decide if open and display the project screen (Movicon application) of the started service, **automatically after the Log On for the operating system**.

4.24.5. Heap Manager Settings

Movicon allows you to get optimized memory allocation management during project runtime. Each project object group can be set with a quantity of memory that Movicon will allocate in fixed mode. If this management is not enabled, Movicon will allocate and deallocate memory as required during the Runtime phase. However, this may cause fragmentation in the Ram with consequent undesired memory consumption, especially when the project remains in run mode for a long time. On the other hand, when this management is enabled, Movicon will allocate a fixed portion of memory for each group of objects and will use only that fixed portion. These memory portions are called "Heaps". Caution must naturally be taken to set the right values to avoid errors of insufficient quantity of allocated memory during the runtime phase. It must also be taken into consideration that by enabling this management the Ram allocation may turn out to be higher than expected when not enabled. This is due to the fact that Movicon allocates all the configured memory even when not all of it is to be used.

The Heap Management is always remains disabled when the project is run from the development environment. However it is managed for the Movicon RunTime .exe, Movicon Service .exe, Movicon CE .exe and Movicon .exe modules only when run with the /R. option.

The Heap values can be set manually or with the appropriate button, which does nothing other than get the maximum values requested during the last project run. The heap values are kept traced during runtime (the current value and the maximum values reached) for each group of objects. These values can be viewed through the Watch window (the maximum values reached are those shown in brackets).



Therefore, once the project has been put into run mode you can return to development mode and by using the "set values from last run" all the heap manager properties will be updated with the values of the last run.

The Heap values can also be set by using the appropriate registry keys described in the "List of Movicon Registry Keys" section. However, the registry values are by-passed by the project values when the heap manager is activated.

Set Values from the last Run

This command allows you set the Heap values for each group based on the last value obtained during the Runtime phase.

Memory Used with the current Heap Values

This field shows the approximate memory value in Kbytes to be allocated based on the set Heap values.
Warning! this value is only a rough estimate and may differ according to the type of processor the project is being run on (ARM, X86, etc.).

Warning! This value is a rough estimate and may differ according to the type of processor the project is being run on (ARM, X86, etc.).

Recalculate memory Used

This command updates the value shown in the "Memory Used with the current Heap values" property with the values set at that moment.

Enable Heap Values

This option box is used for enabling or disabling the memory through the Heap Values. When disabled, any Heap registry key inserted in the Windows Registry will be bypassed by the values set in the project.

Heap...

These are used for inserting Heap Values for each group of objects. Keep into account that the values are not expressed in either KBytes or as object numbers, but is the heap quality necessary for managing that type of object. The meaning for each value is:

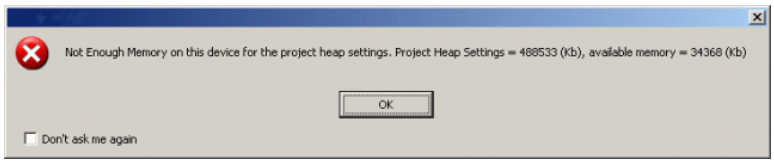
Rectangle Heap: maximum heap size for **"Rectangle"** object allocations (0 = unlimited)
Alarm Window Heap: maximum heap size for **"Alarm Window**" object allocations (0 = unlimited)
Historical Log Window Heap: maximum heap size for **"Historical Log Window"** object allocations (0 = unlimited)
DataLogger-Recipe Window Heap: maximum heap size for **"Historical Log Window"** object allocations (0 = unlimited)
TraceDB Window Heap: maximum heap size for **"TraceDB Window"** object allocations (0 = unlimited)
Button Heap: maximum heap size for **"Button"** object allocations (0 = unlimited)
Chart Heap: maximum heap size for **"Chart"** object allocations (0 = unlimited)
Polygon, Multiline, etc heap: maximum heap size for **"Polygon, Multiline, etc"** object allocations (0 = unlimited)
OLE object Heap: maximum heap size for **"OLE"** object allocations (0 = unlimited)
OCX/ActiveX Object Heap: maximum heap size for **"OCX/ActiveX"** object allocations (0 = unlimited)
Group Object Heap: maximum heap size for **"Group Box"** object allocations (0 = unlimited)
Embedded Screen Heap: maximum heap size for **"Embedded Screen"** object allocations (0 = unlimited)
Trend Heap: maximum heap size for "**Trend/Data Analysis**" object allocations (0 = unlimited)
Meter Heap: maximum heap size for "**Meter**" object allocations (0 = unlimited)
Display Heap: maximum heap size for "**Display**" object allocations (0 = unlimited)
Tab Group Heap: maximum heap size for "**Tab Group**" object allocations (0 = unlimited)
Scheduler Window Heap: maximum heap size for "**Scheduler Window**" object allocations (0 = unlimited)
List Box Object Heap: maximum heap size for "**List Box/Combo Box**" object allocations (0 = unlimited)
Grid Heap: maximum heap size for "**Grid**" object allocations (0 = unlimited)
Dynamic Object Heap: maximum heap size for allocations of those objects set with "Animation" properties (0 = unlimited)
Tag Heap: maximum heap size for project Tag allocations (0 = unlimited)
Alarm Heap: maximum heap size for "**Alarm"** object allocations (0 = unlimited)
OPC Item Heap: maximum heap size for "**OPC Item"** object allocations (0 = unlimited)
OPC Group Heap: maximum heap size for "**OPC Group"** object allocations (0 = unlimited)
OPC Server Heap: maximum heap size for "**OPC Server"** object allocations (0 = unlimited)

Drawing Script Heap: maximum heap size for allocation of script code associated to "**Drawings**" (0 = unlimited)
Alarm Script Heap: maximum heap size for allocation of script code associated to "**Alarms**" (0 = unlimited)

The "0 = unlimited" value means that no fixed heap portions are allocated, but will be allocated dynamically as needed.

Upload projects to WinCE

Movicon controls that the heap settings do not exceed the maximum amount of memory installed on the device (indications are given in approximate value counts which are not precise to the byte) when uploading projects to the WinCE device (ActiveSync only). The Movicon CE runtime also carries out this control before starting with these values and gives a warning message when there is insufficient memory:



The heaps in WinCE are allocated to the global memory (memory available for the programs) and do not occupy memory in the Movicon CE .exe process. In this way the fixed 32Mbytes memory, which each WinCE process can use, is by-passed by these Heap managers. Therefore you can check each screen as not destroyable providing that there is enough memory on the device.

4.24.6. Project Historical Log Settings

Movicon manages the Historical Log of events through a completely configurable registration engine. Movicon automatically records on Log all the significant system events, events inherent to communication drivers and plant alarms and messages which will only be recorded if the programmer has enabled this property in each single alarm.
The Log recording modalities for Movicon projects can be set through the Movicon **'Properties Window'** after having clicked the project name desired (from the 'Project Window').
The Historical Log's data recordings are done on DataBase files by exploiting the operating system's ODBC links or on text files using the Movicon IMDB manager.

Enable Log Recording
This property allows you to enable the Historical Log. Unmarking this property will disable the Historical Log database recordings, whether using the IMDB or ODBC manager. However the Historical Log will continue to record in text files within the project's "LOGS" folder. This new property is also enabled for default to guarantee compatibility with previous versions.

Use IMDB Manager
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Shared Tables
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Save XML File
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Save CSV File
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Crypt File
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Write Behind Delay
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Max Numero Rcords
See the **"IMDB Settings for Recording data"** paragraph in the **"IMDB"** section.

Keep the DB Connection open
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. Error Number
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. Transactions
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. Cache Size
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. VarChar Precision
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

ODBC DSN
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

ODBC DSN User
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Time Column
This setting permits you to insert the name of the Historical Log Table's Time Column. When left blank the default name will be used instead. The Time column indicates the recording's date and time in GMT (Greenwich Mean Time). GMT is universally used for time reference. Time zones are to be calculated by starting from GMT 00. hrs.

Local Time Column
This setting permits you to insert the name of the Historical Log Table's Local Time Column. When left blank the default name will be used instead. The Local Time Column indicates the recording's date and local time.

MSec Column
This setting permits you to insert the name of the Historical Log Table's MSec Column. When left blank the default name will be used instead. The MSec Column indicates the milliseconds relative to the recording's time.

User Column
This setting permits you to insert the name of the Historical Log Table's User Column. When left blank the default name will be used instead. The User Column indicates the name of the user active the moment the recording took place.

Event Type Column
This setting permits you to insert the name of the Historical Log Table's Event Column. When left blank the default name will be used instead. The Event Column indicates the event type recorded (ie. Alarm ON, Alarm OFF, System, etc.).

Num. Event Type Column
This setting permits you to insert the name of the Historical Log Table's Event Number Column. When left blank the default name will be used instead. The Event Number Column reports the recorded event identification number.

Desc. Column
This setting permits you to insert the name of the Historical Log Table's Description Column. When left blank the default name will be used instead. The Description Column reports the recorded event description.

Sub Event Column
This setting permits you to insert the name of the Historical Log Table's Sub Event Column. When left blank the default name will be used instead. The Sub Event Column reports different information for each table. In the Alarms Table for example, this field reports the Alarm's text.

Comment Column
This setting permits you to insert the name of the Historical Log Table's Sub Event Column. When left blank the default name will be used instead. The Comment Column reports the alarm's duration for the Alarm Table.

Duration Column
This setting permits you to insert the name of the Historical Log Table's Duration Column. When left blank the default name will be used instead. The Duration Column reports how long the event in question lasted.

Unique ID Column
This setting permits you to insert the name of the Unique ID Column in the Historical Log tables. The default name will be used when left blank. This column shows the alarm's Unique ID value when dealing with alarm tables. However, this field remains blank for the "System" and "Drivers" tables.

Transaction ID Column
This setting permits you to insert the name of the Transaction ID Column of the Historical Log tables. The default name will be used when left blank. This column shows the alarm's Transaction ID value when dealing with alarm tables. However, this field remains blank for the "System" and "Drivers" tables.

Alarms Table
This setting lets you insert the name of the Historical Log table which will contain the messages inherent to project's 'Alarms'.

Drivers Table
This setting lets you insert the name of the Historical Log table which will contain the messages inherent to the project's 'Drivers'.

System Table
This setting lets you insert the name of the Historical Log table which will contain the messages inherent to project's 'System Messages'.

Alarm Max.Age
This property lets you set how long the Alarm messages are to be kept internal the database. The Default setting is 180 days but can be changed according to what is required, keeping in mind how many recordings will be done in the time interval specified.
For further information see paragraph: "Archive Sizes".

Driver Max.Age
This property lets you set how long the Communication Driver messages are to be kept internal the database. The Default setting is 180 days but can be changed according to what is required, keeping in mind how many recordings will be done in the Time interval specified.
For further information see paragraph: "Archive Sizes".

System Max.Age
This property lets you set how long the System messages are to be kept internal the database. The Default setting is 180 days but can be changed according to what is required, keeping in mind how many recordings will be done in the Time interval specified.
For further information see paragraph: "Archive Sizes".

Create DB Table
This command executes the creation of the Historical Log tables internal the database. If tables already exist they will be cancelled by being recreated with the new ones upon the execution of this command. This means that any data recorded beforehand will be lost.

4.24.7. Child Project Options Settings

By using the Child Project Options properties you can set the start modalities of any declared Child Projects.

To modify the Child Project Options Properties, select the project form the 'Child Project List' group from the Project Explorer window with the mouse and then use Movicon **'Properties Window'**.

Startable
When this property is enabled the child project can then be run. This means that all the sever part of the project, being the Drivers, OPC, Networking etc, will be started. When a project is not enabled to start you can nevertheless access the child screens from the parent project.

Auto Startup
This property permits the child project to run automatically when the parent project is put into execution. In order for this setting to take effect you must also select the 'Startable' property.

Network Server
This property is used for defining the name or IP address of any eventual Network Server which the child project will use for updating its variable values and display windows.

Backup Network Server
This property is used for defining the name or IP address of any eventual Backup Network Server which the child project will use for updating its variable values and display windows if the primary servers is unavailable.

Child Project Name
This property permits you to associate a name to the child project. When this filed is left empty the child project's name will be used instead.

4.24.8. Project Spooler Manager Settings

The "Spooler Manager" manages the sending of project events to a LPT or COM port. The events managed by the Spooler are: Alarm ON, Alarm ACK, Alarm OFF, System. Comm.Driver. The use of LPT port needs the "printer spooler" service which is active in Windows. This service is normally always active. The "Spooler Manager" needs "data.spool" xml files (created in the project's "DATA" sub-folder) for saving certain information such as the current line number and the spooler's buffer.
To change the project's "Spooler Manager" properties, select the name of the project with the mouse and use the Movicon "**Properties Window**".

The spooling management for printing events directly does not support texts with Unicode code.

Cases where the printer in use does not support ASCII code for formatting text (ie. as with many inkjet printers), you will need to set the print styles of each event with the "10 cpi" character option and not set any of the style options.

Printer Port
The Port to be used for sending texts to be printed. LPT ports from 1 to 3 and COM ports from 1 to 9 are supported.
Where an opening of a COM port is concerned, you can set the port's opening parameters by using the following format:

COMx:BAUD=9600 PARITY=N DATA=8 STOP=1

Read Interval Timeout
This value is used after the selected port has been opened for setting a timeout on the two character reception (IOCTL_SERIAL_SET_TIMEOUTS). You may find it useful to modify this value if the serial printers or printers being used are very slow.

Read Timeout
This value is used after the select port has been opened for setting a timeout on the reception (IOCTL_SERIAL_SET_TIMEOUTS). The default value is 10000 milliseconds.

Write Timeout
This value is used after the selected port has been opened for setting a time on the transmission (IOCTL_SERIAL_SET_TIMEOUTS).The default value is 10000 milliseconds.

 # Lines per Page

This value allows you to decide how many printed lines are needed before sending the page end to the port. To print a continuous page you should enter the "0" value so that no change page takes place. when using single sheets of paper you should enter the number of line per sheet so that a change page takes place on the last line printed.

Events to be printed are sent immediately to the selected port. Laser or ink jet printers must be setup beforehand so their buffer contents are printed only when the end page character is received.

Max. Buffer Size

This property determines the buffer memory size in Kbytes used for the spooler. When the buffer is full the oldest events will be deleted from the buffer in function with the most recent ones and will not be printed. A message will be traced in the system log for each event deleted from the Spooler Buffer:

"The Spooler Buffer has reached the maximum value. Entry '<event text>' has been removed"

The buffer memory is saved in the "data.spool" file so that those events not printed due to unforeseen application aborts can be printed.

Time From

The spooler can be made active for a specific time interval. The events which are generated outside this time interval will not be printed. This property is used for entering the start time in hours and minutes.

Time To

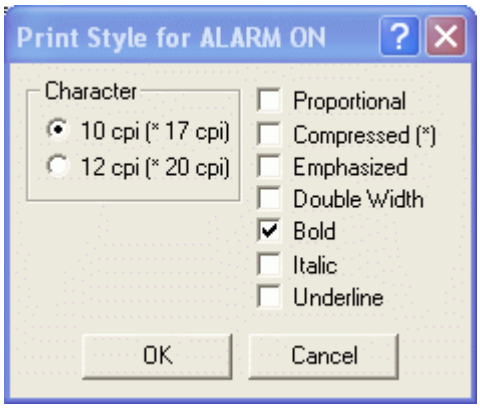
The spooler can be made active for a specific time interval. The events which are generated outside this time interval will not be printed. This property is used for entering the finish time in hours and minutes.

Enable Spooler...

You can activate or deactivate the spooler for each event category (Alarm ON, Alarm ACK, etc). The spooler can also be activated or deactivated for each alarm threshold ("Print" style properties) and for each Basic Script ("Spooler" Script Debug Output properties).

Event Style...

The message print style can be set for each event category. The following dialog window will open by clicking on the appropriate command button of each event (...) through which the print characters can be set:



The meaning of these settings are as follows:

- 10 cpi or 12 cpi: print character size (small or big)
- Proportional: the text is printed in proportion to the characters
- Compressed: the test is printed in compressed mode
- Emphasized: the text is printed emphasized
- Double Width: the text is printed with doubled width
- Bold: the text is printed in bold

- Italic: the text is printed in italic
- Underline: the text is printed underlined

The direct event's printout (spooling) doesn't support text using Unicode.

In case the printer doesn't support ASCII codes for test formatting (a lot of inkjet printers, for example) you have to set properly the print stile properties and, for each event, the character style option at "10 cpi" and don't set no other style options.

4.24.9. tools

Movicon uses some tools, developed by Progea as usual, to carry out certain operations or functions. Below you will find a list of these tools with a brief description on what they do. For further information on how they work and any application configurations please consult the Help online of the related application.

Upload/Download service

The executable file "TCPUploadServer.exe" is installed with Movicon setup and allows to use, for a desktop platform too, the service for projects upload/download to/from a remote client. For further information on this subject please see "Projects Upload/Download" in Movicon CE user manual.

Alarm Dispatcher

Movicon uses this application, "Dispatcher.exe", to configure the SMS, Voice, Fax alarms notifying. This tool can be also used within basic script routines for sending messages that have nothing to do with the alarms.
For further information please refer to the "AlarmDispatcher.chm" tool's help.

Import/Export Tag in CSV

The "CSVTagIE.exe" program consents you to import/export the Real Time DB to csv. files.
For further information please refer to the "CSVTagIE.chm" tool's help.

Import/Export CSV Alarms

The"AlarmsImpExp.exe" program consents you to import/export Alarm list to csv. files.
For further information please refer to the "AlarmsImpExp.chm" tool's help.

Import/Export CSV Strings

The"StringImpExp.exe" program consents you to import/export Alarm list to csv. files.
For further information please refer to the l "StringImpExp.chm" tool's help.

PrnWnd.exe

This program, "PrnWnd.exe", is installed in Movicon installation folder and consent the printing of screens or the Window desktop. The raster print is a graphical print mode which creates a uniform bitmap of the page and sends it to the printer. The syntax is:

PrnWnd.exe [-h<%d>] [-d] [-s] [-t<%s>] [-l] [-k] [-f<filename>] [-p[x];[y]] [-m[Sx];[Dx];[Top];[Bottom]]

where:

[-h<%d>]: %d is the handle's decimal value of the window to be printed. If the handle is not specified, all of the desktop will be printed
[-d]: dialog window appears for choosing the printer and the print options, otherwise the default printer will be used
[-s]: hides the window which indicates the print in action
[-t<%s>]: attributes the print document title
[-l]: forces a vertical print (portrait)
[-k]: permits prints with the dame proportions seen on screen, without the option (therefore for default) both the height and width will be adapted to the whole size of the page
[-f<filename>]: the -f parameter is used for specifying the name of the ".bmp" file to be printed. The file name must be specified with complete naem and path of the ".bmp" file to be printed.
[-p[x];[y]]: the -p parameter is used for seeing the sizes of the page to be printed. In this case the "x" value indicates page width in mms and the "y" value indicates page height in mms.

[-m[Sx];[Dx];[Top];[Bottom]]: this parameter consents to managing the print margins. This parameter is composed of four numbers alternated with the semi-colon character which define the left, right, top and bottom margins in millimeters. Each margin can be left out, leaving the tool to use the one for default retrieved through the printer's driver. If all of the "-m " parameter is left out, all the margins will be retrieved using th printer driver.

The tool can be activated using the commands from the "Capture and Print" Commands List of the "Screen", "Run Application" and "System" groups. This tool can also be launched directly from the Movicon script code where this command should be used:

Shell("PrnWnd.exe", vbNormalFocus)

The tool is available for these following platforms:

Win32/64
WinCE (SSDK ARMV4I)
WinCE (SSDK x86)

Tag-Alarm Wizard

This application, "AlarmGen.exe", allows lists of alarms to be created quickly by using a wizard.

CleanLog

This application, "CleanLog.exe", is used by Movicon for deleting old networking log files exceeding a preset life span. This date is calculated by Movicon according to the project's "Log and Security" property settings from the Networking Services resource.
This application can also be used by the programmer to cancel files. It can be called up by using the command line by passing the following parameters:

CleanLog.exe -d<x> [-r] <path>

Where:

-x = number of days
-r = also deletes the files in the sub folder
Path = path of the folder where the files are found

CleanLog deletes all the files contained in the folder <path> which are dated older than the actual date + <x> days.

ReportViewer

This application, "ReportViewer.exe", is used by Movicon for displaying Report files created with Crystal Report and associated to DataLoggers, Recipes, Historicals etc.. It can be ran from a command line by passing some parameters to customize settings which otherwise are set by Movicon with default values:

ReportViewer.exe [-p] [-t] [-g] [-iX] [-h] [-lLocalCol] [-mAlarms] <report file name>

Where:

-p = sends report to printer without passing through print preview
-t = displays the command toolbar
-g = displays group area
-iX = sets time range for data filtering. X indicates time range to be selected and can obtain the following values: 1 (Today), 2(Yesterday and Today), 3 (Current Week), 4 (Current Month), 5 (Current Year), 6 (Last 7 Days), 7 (Last 30 Days), 8 (Last 60 Days), 9 (Last 90 Days), 10 (Last Year), 11 (Last 2 Years), 12 (Last 5 Years), 13 (Last 10 Years)
-h = this parameter allows a dialog window to display when opening the Report which the operator can use for inserting the data filter selection date and time
-l = this parameter, used only in association with the -h parameter, consents to specifying the name of the column in which to apply the filter by date (i.e. LocalCol)
-m = this parameter, used only in association with the -h, consents to specify the name of the table in which to apply the filter by date

You can run ReportViewer using the "System/Launch Application" command from the Movicon commands list, adding the proper parameters in the "Command Line" property, or using a batch file.

ReportViewerNET

This application, "ReportViewerNET.exe", is used by Movicon for displaying Report files created with Report Designer and associated to DataLoggers, Recipes, Historicals etc.. It can be ran from a command line by passing some parameters to customize settings which otherwise are set by Movicon with default values:

ReportViewerNET.exe [-f] [-p] [-q"select * from Alarms"] [-cDSN][-u] [-w] [-eX] [-iX] [-h] [-lLocalCol] [-mAlarms] <ReportFileName>

where:

-f = allows to open the report with the Report Designer, instead of showing the preview
-p =prints the report without print preview
-q "query" = allows to specify a query string to select data to extract and be shown in the report
-cDSN = where DSN is the name of the ODBC connection to be used for connection to the database (i.e. TestProject_HisLog). If not specified, the connection set by the Report Designer when the report is first created is used (in this case it can no more be accessed or modified)
-u = this parameter is used for specifying the user name to be sued with the ODBC connection when the database has password protection
-w = this parameter is used for specifying the password,k relating to the user specified with the [-u] parameter, to be used with the ODBC connection when protected by password.
-eX = exports data in a different format. X stays for the format, valid values are: 2 (pdf), 3 (html), 4 (txt), 5 (csv), 6 (xls), 7 (Mht), 8 (rtf), 9 (jpg).
-iX = sets time range for filtering data. X indicates time range to be selected and can obtain the following values: 1 (Today), 2(Yesterday and Today), 3 (Current Week), 4 (Current Month), 5 (Current Year), 6 (Last 7 Days), 7 (Last 30 Days), 8 (Last 60 Days), 9 (Last 90 Days), 10 (Last Year), 11 (Last 2 Years), 12 (Last 5 Years), 13 (Last 10 Years)
-h = this parameter allows a dialog window to display when opening the Report which the operator can use for inserting the data filter selection date and time
-l = this parameter, used only in association with the -h parameter, consents to specifying the name of the column in which to apply the filter by date (i.e. LocalCol)
-m = this parameter, used only in association with the -h, consents to specify the name of the table in which to apply the filter by date
The export file is created in the folder where the report is palced, with the name of the report itself
<ReportFileName> = path and name of the report file to be shown (i.e. "E:\ProjectPath\TestProject\DLOGGERS\TestReport.repx")

You can run ReportViewerNET using the "System/Launch Application" command from the Movicon commands list, adding the proper parameters in the "Command Line" property, or using a batch file.

Run Time users

This application, "EditUsr.exe", is used by Movicon to create and modify the Run Time users.

Language Manager

This program, "LangManagerPlus.exe", is used for changing languages in the Movicon development environment. Upon launching this application a dialog window will appear within which you can select the language you wish to activate. When the selected language is confirmed with OK, this tool will automatically reset the Windows registry keys concerned. After this has been done, Movicon will restart with the new selected language (it is no longer needed to startup Movicon keeping the CTRL key pressed down as in the past).
The languages that can be selected using the "Language Manager" are those which were enabled during the Movicon installation. This is done through the "Languages" dialog window which appears during the setup phase. This dialog shows the languages available for the development environment allowing you to select one or more as desired (the setup language is preselected and cannot not be changed). When choosing two or more languages, a folder will be created for each one in the Movicon "..\Progea\Movicon11.2\LANG\" installation folder containing the manuals and resources in that language.
By using the "Language Manager" you will then be able to activate one of these installed languages.

Development Code Info

This application, "RegDevCode.exe", is used to show Movicon development (or registration) code.

4.25. Visual Studio SourceSafe 2005 Integration and Support

Visual Studio SourceSafe integration and support consents the development management of Movicon projects to be divided among diverse users. The Microsoft SourceSafe tool has been purposely created to manage project designing in teams and to keep track of all the modifications taken place in the project. This support has also been added to the symbol library so that symbol categories can be shred between the users by always using SourceSafe.

Full support to project sharing is guaranteed only by using Visual Studio SourceSafe 2005, or later.

Visual Studio SourceSafe 2005

As mention above, in order to manage Movicon project sharing you will need to install the Visual Studio SourceSafe 2005. Once installed you will then need to create a reference Database where all the updates on the modifications to the project, by the various users, are to be kept. When creating this database you can choose whether to create a new one or connect to an existing one. If the reference Database for the project already exists you will just need to connect to that database.
For further information on how the Visual Studio SourceSafe 2005 works, please refer to the Microsoft guide.

Using SourceSafe in Movicon

When opening a project, Movicon controls whether Visual SourceSafe has been installed, and then integrates its potentiality to the full. All of the SourceSafe management will be activated if a project has already been created in the Visual SourceSafe with the same name of the project opened by Movicon. Movicon will therefore ask if you want to load the last version of the project before opening it. It will then be possible to do the following operations in each of the project's resources: "Get Latest Version", "Check Out for Edit", "Check In..." and "Undo Check Out".

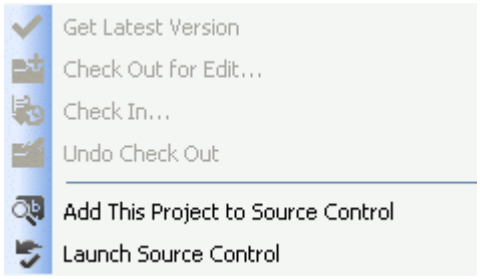
A problem has arisen when using Windows XP in Italian which does not permit files with names in Unicode chars to be added in SourceSafe. For instance when trying to create in SouceSafe a project with the following Unicode name "фисв.movprj", the "Incorrect Access Code (wrong parameter)" error is returned.

when a Movicon project is opened in SourceSafe all the resource icons open with a padlock showing on top. This means that these resources are locked and you will need to use the "Check Out for Edit" command to unlock it for editing if not already being edited by other users.

When a project is shared in SourceSafe, some of the project's options may only be set if the project resources are not being edited by another user. The options are all those which require a complete save of all the resources in the project: "Crypted Project Resources", "Unicode Project" "Compressed Project". In cases when one of these options is modified, Movicon will ask the user to check out all the project's resources from the SourceSafe to then resave them based on the new project options. If this operation does not terminate successfully (ie. because a resource if opened in editing mode by another user), the options will be restored back to their original values.

SourceSafe Commands

All the command for the SourceSafe management are available from the "File > Source Control" menu or from the "Source Control" menu which appears with a right mouse click on anyone of the project's resources:



Add This Project to Source Control

This command allows you to create a new project in SourceSafe and automatically adds all the local project's resource files to the project in SourceSafe. In this way the project can be shared with all the other SourceSafe users who may need to modify it. Projects created in SourceSafe can be deleted only by using the Sourcesafe application, which is done by using the "Launch Source Control" command. The project created in SourceSafe will have the same name as the local project's.

Launch Source control

This command allows you to launch the Visual Source Safe program. Visual Source Safe will open in the last database opened using the user currently using Movicon.

Get Last Version

This command allows you to read the last version of the resource selected in the Project Explorer window from the project in Visual SourceSafe. The last version of the current resource file in the SourceSafe project will be copied locally, and the user will be asked whether they wish to reload the project to put this command into effect.

Check Out for Edit...

This command allows you to extract a resource file from the SourceSafe project. In this case the extracted resource will be assigned in the SourceSafe project to the user who has extracted it and no other SourceSafe user will be able to edit it until the that assigned user has checked it back in. Please note that this command does not consent you to get the last resource file version from the "SourceSafe" project. If you wish to get the last version you must use the "Get Last Version" command.

Check In...

This command allows you to file a resource file in the SourceSafe project. Modifications carried out to the resource will be validated and filed in the sourceSafe project. In this way the resource will again be available for checking out with the "Check Out for Edit..." command by any one of the sourceSafe users. Movicon automatically files all the checked out resources when the project is closed. This consents the project's resource to be freed automatically for other users.

Undo Check Out

This command allows you to cancel modifications done to a resource. The local resource file will be restored to its last valid version of the file in the SourceSafe and the user will be asked whether they wish to reload the project to put this command into effect. Please note that the moment the project is reloaded it will no longer be possible to cancel any other modifications in other resources due to the fact that they are automatically validated and filed before the project is reloaded. For instance, if two different resources have already been edited the "Undo Check Out" command may only be executed on one of these two resources as the other one will be automatically validated and saved when the project is reloaded.

The "Undo Check Out" command will not be enabled until the modified resource has been saved.

Movicon cancels the check out automatically and exits from editing the resource without saving the its modifications, automatically freeing it for other users.

Registry Keys

You can modify some of the Windows configuration registry keys that Movicon reads to change certain behaviour due to SourceSafe integration. These registry keys are described in the "SourceSafe Keys" section.

4.25.1. SourceSafe in Symbol Libraries

SourceSafe support is also available for sharing the 'Symbol Libraries' categories. The command are the same ones available when using the project and can be accessed from the menu with the same name which appears with a right mouse click on any one of the library's categories. Therefore you can create a SourceSafe project for the Symbol Libraries containing all the categories inserted and manage the 'Get Latest version', 'Check Out for Edit..' and 'Check In' operatiions.
When opening the Symbol Libraries, Movicon will verify whether a project relating to the Symbol Library exists in the SourceSafe and if affirmative, will ask the user if they wish to have the latest version of all the files.

5. Real Time DB

This section describes how Variables are managed within Movicon projects, memory areas, the Variables List and their functionalities.

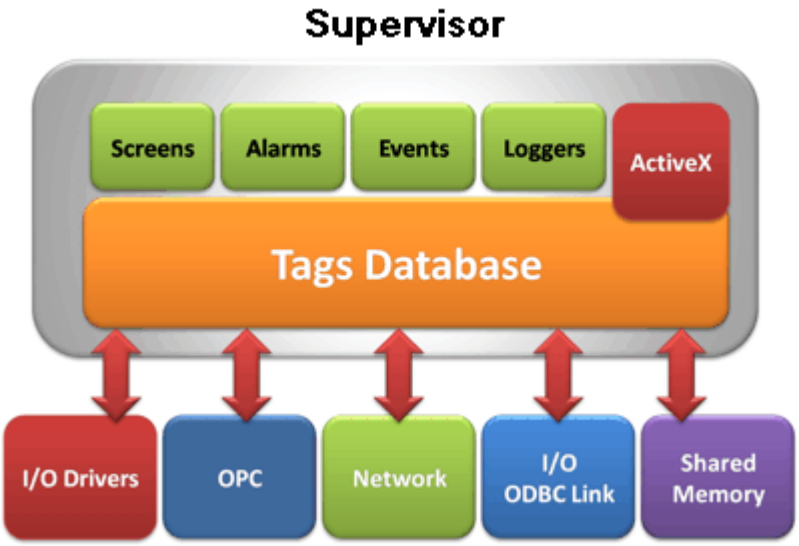
The purpose of a supervision system is to represent or acquire variables from the plant, process them and eventually return them back to the plant whether determined by settings or commands executed by the operator or generated by internal processing. The logic variables, constitute the information (deriving from digital or analogic values) which, combined together, consent Movicon program management.

The project variables, also called Tags, are defined in the Variable List(Tags) contained in the project's Real Time DB resource.
The Movicon realtime database is based on an extremely efficient and optimized technology. The kernel of the platform is based on a innovative system technology, even if based on XML, and is managed in runtime in total event-driven mode and with a highly efficient thread pooling management.
The Movicon Tags have numerous properties, to render Tags real operating centers. They can be associated with commands to be executed when preset threshold values are reached. They can be set with scaling, realtime connections to database, to OPC servers or clients and with networking modes. Each Tag can be traced with high precision accuracy in a DB with custom messages. The Tag can have fixed device addresses or be kept independent from the drivers as previously. "Structure" type variables can be managed in heterogenous data.
The project tags can be imported directly from the PLC (Simatic S7, Rockwell, Mitsubishi and other..), allowing noticeable time saving. Moreover the project can be associated to dynamic Tag objects, which means those not expressly declared in the current project (distributed Tag database structure).

The Movicon variables form the real-time database for all the project resources and executable logic. They can be associated to objects or the project's resources (Screens, Menus, Alarms, Data Loggers, Recipes, Trends, etc.) or combined together by using the logic (Compiled Logic or Basic Script).

Movicon can handle variables in memory areas up to 4 Gigabytes (over 4 billion bytes for each type of variable), according to the maximum quantity of dynamic memory manageable by the operating system. This number is defined as 'Virtually unlimited' when considering that it would be difficult for a multi-complex plant to exceed ten thousand variables.
The variables can be set in **'Shared'** or **'NON Shared'** Movicon areas. When using the **'Shared'** areas it is necessary to define the number of variable bytes to be used in the project, by means of the **"Real Time DB General Settings"**.

The number of variables to be exchanged with the field by Movicon (through communication Drivers, OPC, etc.) depends on how many Tags have been enabled by the system's protection key, based on the version purchased.



The project's variables can be allocated through the Movicon Real Time DB and they can also be connected to communication Drivers, to linking functionalities in network (TCP/IP), ODBC links or OPC (OLE for Process Control) links.

Movicon can organize its own variables within a database where they can be assigned an unique mnemonic code (symbolic) and descriptive comment to identify them through out the entire project.

The Variables Real Time DB also permit:

1. The project's local variables to be dynamically linked to the plant's variables through communication Drivers
2. The project's local variables to be dynamically linked to remote variables of Servers in net, using the TCP/IP protocol networking potentialities
3. The project's local variables to be dynamically linked to data fields in Database files using the ODBC functionalities
4. The variables to be dynamically linked to OPC Client applications by means of the OPC standards. The Variables DB can carry out OPC Server functions, while the project's OPC Editor permits links as OPC Client

The Movicon proprietary technology ensures that the increase in the number of variables inserted into the Real Time DB will not effect system performances due to the fact that Links to variables are executed during the startup of the project in Runtime only. This enables Movicon to manage huge amounts of variables in the Real Time DB without degrading system performances.

For further information about **"Communication Drivers"** please refer to the specific section.

5.1. System Variables

Movicon has a range of prefixed variables, dedicated to give the programmer the possibility to interact with the project and with the system, to facilitate information availability and managed commands by exploiting the logic.

The System Variables managed in Words contain a number in decimal format supplied or to be supplied to the system.
The ''strobe' bits are managed by using the logic state set at '1' for safe task synchronizing. When the strobe is 'from Movicon to Logic', the supervisor will set the strobe bit to '1' and the logic , after having

interpreted it, will return it to state '0'. When the strobe is 'from logic to Movicon', the logic should set the strobe bit to '1' and the supervisor, after having interpreted the request, will reset the state to '0'.

The System variables are grouped into a variable structure type. To use the System Variables you first need to insert the variable structure by using the **'Add a System Variable'** command in the **"Project Explorer"** window or by right mouse clicking on the **'Real Time DB'** resource. By executing this command the structure prototype and the relative variable called **"_SysVar_"** will be inserted. Each member of the structure variable has a precise significance as described in the table below:

Variable Name	Refresh Time	Type	Description
SimSinDouble	-	Double	Simulation of sine of an angle varying from 0 to 360 degrees. The resulting value will range from -1 to +1 including decimals.
SimSinInt	-	Sign Byte	Simulation of sine of an angle varying from 0 to 360 degrees, The value is express in percentages as an integer and will range from 100 to +100.
SimCosDouble	-	Double	Simulation of cosine of an angle varying from 0 to 360 degrees. The resulting value will range from -1 to +1 including decimals.
SimCosInt	-	Sign Byte	Simulation of cosine of an angle varying from 0 to 360 degrees. The value is expressed in percentages as an integer and will range from 100 to +100
SimRampDouble	-	Double	Simulation of a saw-tooth ramp with values ranging from -10 to +10 including decimals.
SimRampInt	-	Sign Word	Simulation of a saw-tooth ramp with values ranging from -10000 to +10000.
SimRandDouble	-	Double	Random number generation with values ranging from 0 to +32767.
SimRandInt	-	Sign Word	Random number generation with values ranging from 0 to +32767.
SimRandString	-	String	Random string Generation.
StrobeLocalTime	-	Bit	Command Strobe for carrying out changes to the system's time. Movicon executes the update and automatically returns the command to zero value.

ToggleBits	-	Byte	Each bit of this variable blinks with a different frequency: Bit 00 = 125 ms Blinks Bit 01 = 250 ms Blinks Bit 02 = 500 ms Blinks Bit 03 = 1 s Blinks Bit 04 = 2.5 s Blinks Bit 05 = 5 s Blinks Bit 06 = 10 s Blinks Bit 07 = not used
ActTimeSec	-	Byte	System Time: Seconds
ActTimeMin	-	Byte	System Time: Minutes
ActTimeHour	-	Byte	System Time: Hours
ActTimeDay	-	Byte	System Time: Day
ActTimeMonth		Byte	System Time: Month
ActTimeYear		Word	System Time: Year
ActTimeString		String	System Time in string value
ActDateString		String	System Date in string value
StrobeExitApp		Bit	setting this bit to true will control application exist and system shutdown.
StrobeYearLocalTime		Word	Year to be set in System's time (> 1980)
StrobeMonthLocalTime		Byte	Month to be set in system's time (1-12)
StrobeDayLocalTime		Byte	Day to be set in system's time (1-31)
StrobeHourLocalTime		Byte	Hour to be set in system's time (0-23)
StrobeMinuteLocalTime		Byte	Minutes to be set in system's time (0-59)
StrobeSecondLocalTime		Byte	Seconds to be set in system's time (0-59)
CommDriverStatus		Bit	Driver Communication Status
ControlKeyDown		Bit	CTRL key pressed
AltKeyDown		Bit	ALT key pressed
ShiftKeyDown		Bit	SHIFT key pressed
LastKeyPressed		Word	Code of the last key pressed
ActiveScreen		Word	The ID of the currently active screen is set in this variable.

			In order to use this variable correctly you need to associate each Screen with that different ID.
NumberNotAckAlarms		Word	Number of alarms still active but not yet acknowledged.
AlarmsActive		Word	Number of active alarms. Alarms which are still active, in the ON condition, are considered whether already acknowledge or still to be acknowledged.
NumActiveAlarms	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of current active alarms. This variable reports the number of ON and OFF alarms currently in the system. It is the same number of alarms displayed in the Alarm window as well.
NumActiveAlarmsON		Word	Number of active alarms with ON status.
NumActiveAlarmsOFF		Word	Number of active alarms with OFF status, which corresponds to "NumActiveAlarms - NumActiveAlarmsON".
NumActiveSubscribedAlarms	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Description: Represents the number of "entities" subscribed to receiving notifications when alarms change statuses. Entities which can currently subscribe are: Alarm Window Network Client Secondary Server Project OPC Server Child Project
AlarmsSoundState		Bit	Variable that shows the Alarm's sound status based on the user logged on. This variable can also be set for activating/deactivating the sound from logic.
MouseMove		Bit	This variable when set at true indicates that the Mouse is moving. This is not managed In Windows CE as touch panel devices do not have the mouse.
OutputAckAlarms		Bit	This variable is set at True by Movicon when alarms are acknowledged with the button in the alarm window. The programmer must reset the variable to false.

OutputResetAlarms		Bit	This variable is set at true by Movicon when alarms are reset with the button in the alarm window. The programmer must reset the variable to false.
IMDBLocalMemoryUsed		DWORD	Returns the size (in bytes) of memory being used by the InMemoryDB engine in the local process area. This value is updated every minute.
IMDBSharedMemoryUsed		DWORD	Returns the size (in bytes) of the memory being used by the InMemoryDB engine in shared process areas. This value is updated every minute.
IMDBLocalMemoryReserved		DWORD	Returns the size (in bytes) of reserved memory area that the InMemoryDB manager can use in the local process area. This value is updated every minute.
IMDBSharedMemoryReserved		DWORD	Returns size (in bytes) reserved memory area that the InMemoryDB manager can use in the shared process area. This value is updated every minute.
InputAckAlarms		Bit	This variable acknowledges alarms when set at true. After the command has been executed Movicon will reset the variable to false. Acknowledges only those alarms with have option requesting user to enter comment.
InputResetAlarms		Bit	This variable resets alarms when set at true. After the command has been executed Movicon will reset the variable to false.
ActiveUserName		String	This variable contains the name of the active user. Its value will be nothing when no users are logged on.
ActivePassLevel		Sign Word	This variable contains the active user's password level. Its value will be -1 when no user is logged on.
ActiveMaskLevel		Signed DWord	This variable contains the active user's access level. Its value will be -1 when no user is logged on.
NumActiveUsers	Win32/64: refreshes once a second WinCE: refreshed	Word	Indicates the how many users are logged on or connected to the project. This total includes all logged on user

	once a second		plus those users connected via WebClient.
LastAlarmText		String	In this variable are shown all the active alarm of the project with a scroll of three seconds. The scroll will be executed following the activation time of the alarms, from the oldest one to the newest one. The scroll will be executed only for the alarms with a status "ON" and not yet acknowledged.
DispatchingQueueCount		Word	All the alarms are displayed with a scroll lasting around 3 seconds. Scrolling is done according to the activation alarm sequence, being from the oldest to the newest. Only alarms with the ON status that have NOT yet been acknowledged are scrolled.
StrobeLoadScreen		Bit	The screen indicated by the _SysVar_:ScreenToLoad variable is loaded on strobe event when not at zero. Once the screen is loaded, Movicon will zero the_SysVar_:StrobeLoadScreen automatically.
ScreenToLoad		Word	Indices which is the ID of the screen to be opened when the StrobeLoadScreen command is given. Each screen can in fact be identified by a ID in their General properties. You can also open child project screens providing that they have a different ID from all the other Child and Parent projects, otherwise all those with the same ID will open. You can use the Parent project's system variable with or without the <..\> prefix in the child project.
HostType	Win32/64: refreshes at startup WinCE: refreshes at startup	String	Contains the PC's network name. Updates at project StartUp.
HostIP	Win32/64: refreshes once a minute WinCE: refreshes once a minute	String	Contains the computer's IP address. Updates every minute.
PlatformVerMajor	Win32/64: refreshes at startup WinCE: refreshes at startup	Word	Identifies the Movicon Major version (ie. PlatformVerMajor = 11 in the Movicon 11.0.1008). Updates at project StartUp.

PlatformVerMinor	Win32/64: refreshes at startup WinCE: refreshes at startup	Word	Identifies the Movicon minor version (ie. PlatformVerMinor = 0 in the Movicon 11.0.1008). Updates at project StartUp.
PlatformVerBuild	Win32/64: refreshes at startup WinCE: refreshes at startup	Word	Identifies the Movicon Build number (ie. PlatformVerBuild = 1008in the 11.0.1008 version). Updates at project StartUp.
PlatformType	Win32/64: refreshes at startup WinCE: refreshes at startup	String	Contains the name of the platform on which the project runs. This may be "MOVICON", "MOVCE", "POWERHMI", etc..
ProjectRunningInDemo		BIT	Gets set to "true" when the project goes into demo mode. Returns to "false" when the project returns back from demo mode. Can be used to give notification of project going into demo mode so that it can be intervened before closing, being after 120 minutes.
StartupTime	Win32/64: refreshes at startup WinCE: refreshes at startup	String	Contains the date and time of the project startup. Updates at project StartUp.
CPUNameString	Win32: refreshes at startup	String	Contains the name of the CPU (ie. Intel(R) Pentium(R) 4 CPU 3.00GHz). Updates at project StartUp (not available in the WinCE platform).
CPUVendorIdentifier	Win32: refreshes at startup	String	Contains the name of the CPU vendors (ie. GenuineIntel). Updates at project StartUp (not available in the WinCE platform).
CPUIdentifier	Win32: refreshes at startup	String	Contains the CPU version, family, model, step (ie. x86 Family 15 Model 3 Stepping 3). Updates at project StartUp (not available in the WinCE platform).
CPUSpeed	Win32: refreshes at startup	String	Indicates the CPU's speed (ie. 2993). Updates at project StartUp (not available in the WinCE platform).

CPUProcessorType		Word	Report the identification code of the microprocessor installed on the device in which the project is running. The value is retrieved at project startup. PROCESSOR_INTEL_386 386 PROCESSOR_INTEL_486 486 PROCESSOR_INTEL_PENTIUM 586 PROCESSOR_INTEL_IA64 2200 PROCESSOR_AMD_X8664 8664 PROCESSOR_MIPS_R4000 4000 PROCESSOR_ALPHA_21064 21064 PROCESSOR_PPC_601 601 PROCESSOR_PPC_603 603 PROCESSOR_PPC_604 604 PROCESSOR_PPC_620 620 PROCESSOR_HITACHI_SH3 10003 PROCESSOR_HITACHI_SH3E 10004 PROCESSOR_HITACHI_SH4 10005 PROCESSOR_MOTOROLA_821 821 PROCESSOR_SHx_SH3 103 PROCESSOR_SHx_SH4 104 PROCESSOR_STRONGARM 2577 PROCESSOR_ARM720 1824 PROCESSOR_ARM820 2080 PROCESSOR_ARM920 2336 PROCESSOR_ARM_7TDMI 70001
WinMajor	Win32: refreshes at startup	String	Indicates Windows' Major version number (ie. 5).Updates at project StartUp (not available in the WinCE platform).
WinMinor	Win32: refreshes at startup	String	Indicates Windows' Minor version number (ie. 1).Updates at project StartUp (not available in the WinCE platform).
BuildNumber	Win32: refreshes at startup	String	Indicates the Windows build (ie. 2600). Updates at project StartUp

			(not available in the WinCE platform).
ServicePack	Win32: refreshes at startup	String	Indicates the Windows Service Pack version number (is. 2). Updates at project StartUp (not available in the WinCE platform).
OSType	Win32: refreshes at startup	String	Indicates which Operating System edition type (ie. Windows XP Professional Edition Service Pack 2). Updates at project StartUp (not available in the WinCE platform).
TimeZoneBias	Win32/64: refreshes once a minute WinCE: refreshes once a minute	String	Indicates the local time zone in minutes considering the daylight saving time (not available in the WinCE platform).
IntColumnSep	Win32/64: refreshes once a minute WinCE: refreshes once a minute	String	Indicates the decimal separator character for Numbers set in the OS's International Options.
IntTimeSep	Win32/64: refreshes once a minute WinCE: refreshes once a minute	String	Indicates the separator character for the time set in the OS's International Options.
IntDateSep	Win32/64: refreshes once a minute WinCE: refreshes once a minute	String	Indicates the separator character of the data set in the OS's International Options.
ShortDateFmt	Win32/64: refreshes once a minute WinCE: refreshes once a minute	String	Indicates the short date format to display the date set in the OS's International Options.
TimeFmt	Win32/64: refreshes once a minute WinCE: refreshes once a minute	String	Indicates the time format to be display the date set in the OS's International Options date settings.
WorkingDir	Win32: refreshes once a minute	String	Contains the directory's current set value (not available in the WinCE platform).
LoginUserName	Win32: refreshes once a minute	String	Contains the name of the user currently logged in the OS (not available in the WinCE platform).
IsUserAdmin	Win32: refreshes once a minute	String	Indicates if the actual user logged on the Operating System is the system administrator with the value "1". (not available in the WinCE platform).

NumExpressions	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of expressions executed.
NumHTTPClient	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of HTTP Clients connected to project.
NumHTTPOutgoingMessages	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of outgoing HTTP messages from project.
NumLoadedAcceleratorRes	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of Accelerator resources loaded in memory.
NumLoadedMenuRes	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of Menu resources loaded in memory.
NumLoadedScreenRes	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of Screen resources loaded in memory.
NumLoadedScriptRes	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of Basic Scrip resources loaded in memory.
NumLocalClient	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of Local Clients connected to project.
NumLocalOutgoingMessages	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of outgoing local messages from project.
NumTCPClient	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of TCP Client connected to project.
NumTCPOutgoingMessages	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of outgpoing TCP messages from project.
NumUDPClient	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of UDP Clients connected to project.
NumUDPOutgoingMessages	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of outgoing UDP messaged from project.

NumWebClientConnected	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of WebClients connected to project.
OPCServerNumClients	Win32/64: refreshes once a second	Word	Number of OPC Clients connected to the Movicon OPC Server . di Client OPC connessi al Server OPC Movicon (not available in the WinCE platform).
PendingDLREntries	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of DataLogger/Recpe entries still to unload on file.
PendingLogEntries	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of Historical Log entries still to unload on file.
PendingTraceEntries	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of Variable DB Trace entries still to unload on file.
MemoryLoad	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Word	Indicates the percentage of allocated RAM.
MemoryTotalPhys	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the total of physical RAM in the system (in Bytes).
MemoryAvailPhys	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the quantity of physical RAM available in the process (in Bytes).
MemoryTotalPageFile	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the maximum memory limit that can be allocated in the system (in Bytes).
MemoryAvailPageFile	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates how much available memory not yet allocated in the system (in Bytes). The difference between MemoryTotalPageFile and MemoryAvailPageFile is the memory allocated in the system.
MemoryTotalVirtual	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the total virtual memory available in the system (in Bytes).
MemoryAvailVirtual	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the amount of virtual memory not yet used in the system (in Bytes).

FreeSpaceAlarmPath	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates available space in KBytes on the disk containing the project's Alarms folder set in the "Project Paths" settings properties.
FreeSpaceResourcePath	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the space available in bytes on the disk containing the project's resource folder set in the "Project Paths" settings properties.
FreeSpaceImagePath	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the space available in KByteson on the disk containing the project's Images file set in the "Project Paths" settings properties.
FreeSpaceLogPath	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the space available in KBytes on the disk containing the projects Logs folder set in the "Project Paths" settings properties.
FreeSpaceDLRPath	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the space available in KBytes on the disk containing the project's Data Logger/Recipe folder set in the "Project Paths" settings properties.
FreeSpaceNetworkUserPath	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the space available in KBytes on the disk containing the project's Networking log folder set in the "Project Paths" settings properties.
FreeSpaceDataUserPath	Win32/64: refreshes once a minute WinCE: refreshes once a minute	Double	Indicates the space available in KBytes on the disk containing the project's Data folder set in the "Project Paths" settings properties.
ILLogicCycleTime	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	The project's IL logic cycle time.
PeekInUseByte	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	retrieved peak of bytes in use during project run.
ProjectRunning	Win32/64: refreshes once a second WinCE: refreshed once a second	Bit	Indicates whether project is running. The "True" value means that the project is being Run.
TotalInUseByte	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Total number of Bytes currently in use in the project.

NumInUseVar	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Indicates the number of variables which have gone into use but are still pending because Movicon has not yes processed them. This value changes from zero to a different value when the variables go into the "In Use" from the "Not in Use" status, usually at project startup or page change. Once all the variables have been processed this value returns to the zero value. When the project does not have a high number of variables, this value will stay with a different value from zero for a very short time and therefore not always retrievable.
NumDynVar	Win32/64: refreshes once a second WinCE: refreshed once a second	Word	Number of variables created dynamically for objects set with a dynamic link in their "Variable" property.
SRActiveShortcut		String	Speech Recognition: contains the path and name of the Shortcut resource currently active in the project. (ie. C:\ProjectName\Resources\ProjectName\Shortcut1.movacc). If the active Shortcut has not been enabled with the Speech Recognition functions, the variable will be an empty string.
SRLastUnderstood		String	Speech Recognition: contains the last word or phrase understood by the system.
SRListening		Bit	Speech Recognition: when the value is "True", this means that the Speech Recognition functions have been enabled.
SRIsActive		Bit	Speech Recognition: when the value is "True", means that the system is active and listening.
LicenseCode		String	This variable contains the license code based on the product installed, Movicon or MoviconCE. To be more exact: Movicon: this variable returns the serial number if a hardware license (SGLock or Eutron) and returns the "Site Code" when a software license (CryptKey) Movicon CE: this variable returns the "Site Code"

			In cases where device is without license, the LicenseCode variable will display an empty string.
StrobeEmptyDispatcher	bit		This variable is used for emptying the queue of messages still not sent by the Alarm Dispatcher so that they don't get sent. Setting this variable to "1" will delete the queued messages, after which the variable will be reset to "0" by Movicon.
HisLogODBCStatus	Bit		This variable reveals the status of the Historical Log's ODBC connection. The "0" or "False" value indicates that the ODBC connection is working correctly, while the "1" or "True" indicates that there is an error with the connection.
TraceODBCStatus	Bit		This variable reveals the status of the Variable Trace's ODBC connection. The "0" or "False" value indicates that the ODBC connection is working correctly, while the "1" or "True" indicates that there is an error with the connection.
RealTimeODBCStatus	Bit		This variable reveals the status of the variables' Realtime I/O Link's ODBC connection. The "0" or "False" value indicates that the ODBC connection is working correctly, while the "1" or "True" indicates that there is an error with the connection.

In a network Server/Client architecture the "_SysVar_" variable must not be connected to the Server. In cases where the Server's "_SysVar_" information is needed on Client, you should then create a new variable on Client side with a different name to "_SysVar_" but with the same structure and share it as a customized variable.

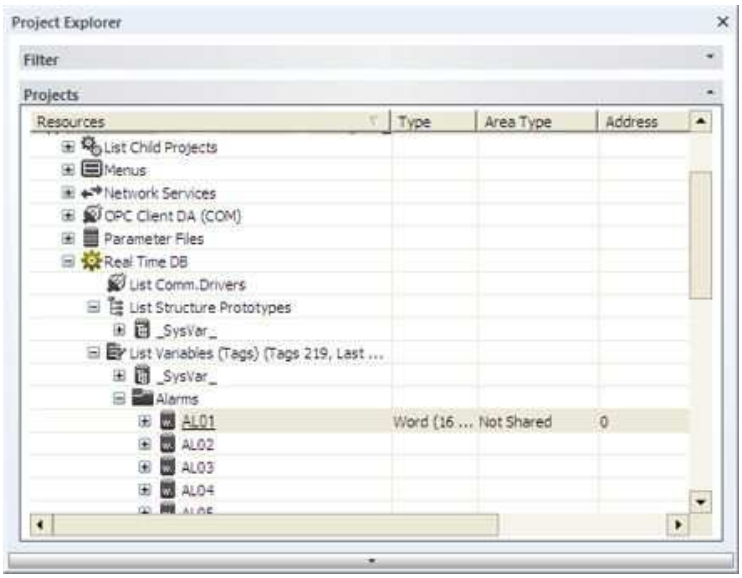
5.2. Variable List (Tags)

The 'Variable List (Tags)' resource is used for declaring which variables are to be used within projects for the logical, for the Resources, Controls, Communication drivers etc. Each variable must have a unique name within the 'Variable List (Tags)' resource, which will be recognized within the project by its symbolic name. When using Movicon "Shared" data areas to generate variables, these will also have an absolute address, but the variables' symbolic names will always refer to the project's internal. The absolute address can be changed after without jeopardizing the variables correct identification in points of the project where they are being used.
The Movicon 'Variables List (Tags)' are 'smart' types, which means Alarms, Data Loggers or Recipes can be associated to single variables. In addition to this each variable can be enabled with the Tracer, OPC, Networking, Scaling functions etc., through the 'Property Windows'.

Using the 'Variables list' will not effect system's performance, as links to variables take place all at once during the startup of the project's runtime. This technology does not sacrifice feedback times even when extended databases with thousands of variables are being managed.

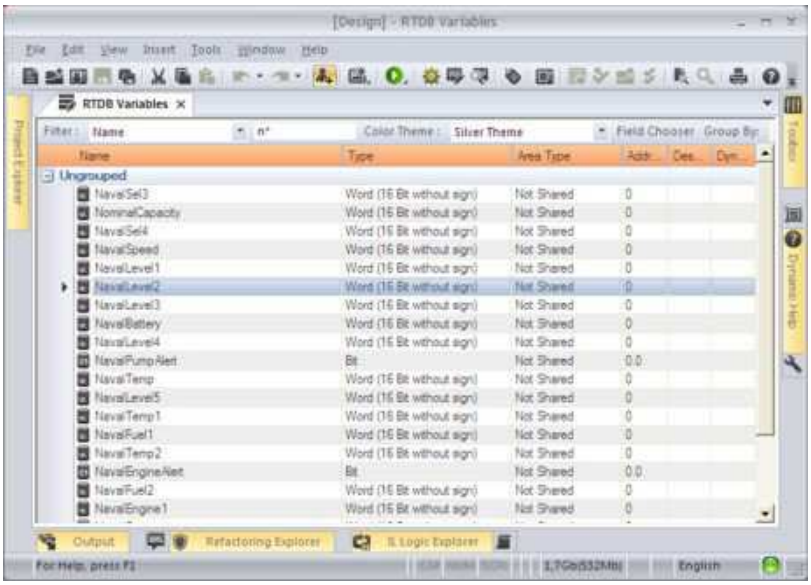
The advantages offered by using the 'Variables List (Tags)' are:

1. reduction in typing or addressing errors in logic programming
2. reduction in program editing time of varied logic addresses when using Movicon "Shared" data areas. Not necessary to modify project when changing absolute addresses of variables
3. direct association of events to variables of the Realtime DB such as Alarms, Data Loggers and Recipes
4. direct reading/writing of remote data on network Servers with Networking functionalities using TCP/IP standard protocol
5. direct reading/writing of data on Database files using ODBC
6. OPC Client application information availability due to the OPC Server function integrated in Variables' properties
7. variable Tracer option settings
8. Scaling option settings of the data associated to the variable



Positioning the cursor on the Variable list and digiting in a keyboard key, Movicon will search and move the cursor to the first variable that starts with that digited key. This search only works if the listed variables shown in the window are not more than 3000. For example, if variables have been divided into groups and only some of these groups have been expanded only the ones in the exploded groups should not exceed the limit of 3000.

To get a clearer and more readable display of the Variable list, defined in the project's Real Time DB, you can use the "List Variables" window which can be easily opened by double clicking on the "List Variable(Tags)" resource.



You can create Local Variables inside a Screen resource which are created and destroyed together with the Screen and which can be used only within the context of the Screen.

5.3. Variable Tracing (Audit Trail)

Variable Tracing is a Movicon functionality which allows you to historically log the behaviour of variables by recording on database files or text file every change taken place and the cause which changed the variables' values. This is done to keep track of the values which the variable changes to during a process run and the causes which modify the variables' values.

By enabling this functionality, Movicon will monitor the desired variable value internally and each single change of the value contained in the variable or change to its quality will prompt Movicon to record these events in the Database file or enabled test file for this purpose. The file containing the Variable trace information will be created automatically by Movicon in the project's "DATA" folder with the name of "ProjectName_TraceDB.mdb" in Ms Access format or VariableName.dat" in text format. If using another type of databases, such as the SQL Server, the variable table will be created in the database specified in the DSN settings. However you can customize the file name and **ODBC** link through the **"Real Time DB Trace DB Settings"**.
of the 'Real Time DB' resource. After which a table for every variable enabled with the Tracer will be created in the Database. Therefore for each variable enabled with the Tracer Option a Table will be generated inside the Database to contain a Record for each variation endured by the variable, with a number of columns which report the following information:

- **TimeCol:** indicates the recording's date and time in GMT
- **LocalCol:** indicates the recording's data and time in local time
- **MSecCol:** indicates the recording's time in milliseconds
- **UserCol:**the name of the user logged in the project will be recorded in this field only when the variable has been changed by that user. (i.e. through a display, the watch window, etc.)
- **ActionCol:** indicates which event changed the variable, eg. a Screen object, communication driver, watch window etc. If the variable being Traced is a structure type variable, the name of the Member Variable which underwent the change, will also be reported in this field. When the variable is modified by a Netwoek Client project, this field will show the IP address of the machine from where the variable was modified. This works in cases where the Client notifies the Server about the variable value change directly. When the variable change is cuased by invoking a script executed on the Server, the Client's IP address will not be returned. This IP address traceability is not carried out when the value is changed from WebClient or from a Secondary Server in redundancy mode.
- **BeforeCol:** indicates the value just before the variable was modified

- **AfterCol:** indicates the variable's new value
- **ValueCol:** indicates the variable's current value
- **QualityCol:** indicates the variable's quality status
- **Variable TimeStamp Column(TimeStampCol)**: indicates the timestamp of when variable was recorded.
- **Variable Name Column (TagNameCol)**: indicates the name of the variable. This column will be populated with the variable's name only when a different "Table Name" has been specified that is not null or if the recording of diverse number of variables in the same table has been set (see section on "Recording Diverse Variable in One")
- **Variable Description Column (TagDescCol)**: indicates the variable's Description. This column is only populated if the "Add Variable Description Column" property has been enbled in the variable trace options
- **Variable Group Column (TagGroupNameCol)**: indicates any group Gruppo that the variable belongs to. This column will only be populated if the "Add Variable Group Column " property has been enbled in the variable trace options

To enable this functionality, you need to set the "Variable Trace Options Proprieties" through the variable's Property Window. To enable the Tracer function in more than one variable all at once, just execute a multiple selection of the required variables in the 'Variable List (Tags)' list and enable the "Variable Trace Options Proprieties" through the 'Property Window' which will be activated in all the selected variables.

Array Variable Trace

The variable trace functions are also supported for Array variables. In this case, the table's "ActionCol will report the number of Array elements that have been changed and the values relating to the elements' will be reported inthe "Value..." column. In cased where the Array variable is modified by a Network client, the value of the whold Array represented as Array byte will be reported in the Server trace table's 'Value..." column.

Structure Variable Trace

The variable trace functions are also supported for Structure type variables and for each of their Members.
If the Trace property is enabled at Structure variable level, the name of the modified Structure Member will be indicated in the table's "ActionCol"and the relating member values will be indicated in the "Value..." column. In cases where the Structure variable is modified by a Network Client, the value of the whole Structure represented as array byte will be indicated in the "value..." column.
If the Trace property is enabled for each single Structure Member, they will be recorded as 'simple' variables in the table, with each Member having its own table.

In cases in which the Trace property is enabled both in the Structure Variable and in each single Member, the Trace will only be managed for the Structure as a whole ignoring the trace for each of its single members.

When the Trace property is enabled at Structure variable level, changes to the variable's quality will only be traced for the structure and not each of its members.

Recording diverse number of Variables in one

Normally each variable to be traced is created a table with its name. By using a variable's "Table Name" trace option you can give the table a custom name which is different from the variable's. In addition if the same "Table Name" is assigned to a diverse number of variables being traced, the traced data of these variables will all be recorded in the same table. In this case the "TagNameCol" column will indicate the name of the variable the record has been entered for.
In cases where the trace of diverse number of variables has been enabled in the same table and these variables are of different types, the three table fields for the "ValueBeforeCol", "ValueCol" and "ValueAfterCol" will be created with data type influenced by the following conditions:

- if all the variables sharing the same table are of the same type (all byte or all word or all float types etc.), these three trace table "Value...) coluns will be created with the same variable types.
- if the variables sharing the same table are of different types or if at least one of these bing a Bit, String, Array or Structure type (when the whole structure is being traced and not each single member), the three trace table "Value..." fields will be created in String type (nVarChar)

- if the variables sharing the same table are of different types, but are all numeric, (byte, word, dword, float or double), the three trace table "Value..." fields will be created in Double type (float 64 bit)

When a variable is "Bit" type, the three trace table "ValueBeforeCol", "ValueCol" and "ValueAfterCol" fields will be created in "String" type.

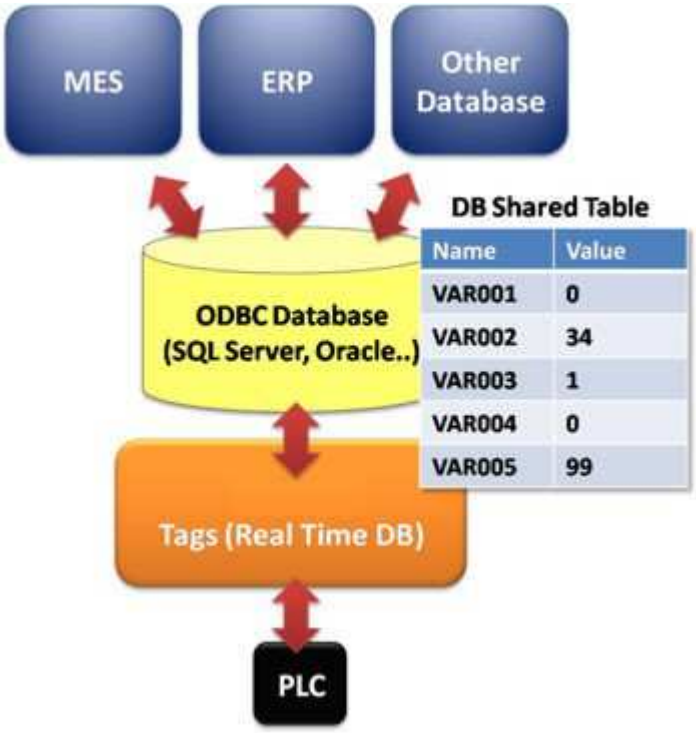
Displaying Trace Data

You can display Trace data in table formats through the appropriated TraceDB Window which can be inserted into any project screen. The operator can use this window to verify values which have been recorded for each variable enabled with the tracer.

A TraceDB Window can be dedicated to displaying remote data from a Server connected in network through the Networking facilities.

5.4. Variable Sharing with ODBC

This feature consents database variable value and statistical data sharing. This is aimed at, for instance, to render variable data available to other applications capable of reading/writing Database files. To enable this function you will need to configure the variable's "ODBC Real Time I/O Link" properties and customize the name of the table and ODBC link by means of using the "ODBC Real Time I/O Link Settings" if need be.



Movicon, if not specified otherwise, will create a table in the selected database format in the name of "RTVar". A record for each variable enabled for database sharing will be reserved within this table. The significance of each table column are as follows:

- **Name:** "nvarchar" data type field. This field shows the name of the variable
- **Val:** "nvarchar" data type field. This field shows the current variable value
- **MinVal:** "float" data type field. This field shows the variable's minimum obtained value

- **MaxVal:** "float" data type field. This field shows the variable's maximum obtained value
- **AveVal:** "float" data type field. This field shows the variable's average obtained value
- **TotTime:** "float" data type field. This field shows the total ON time in seconds (time in which the variable last remained at a value that was not zero)
- **LastTime:** "datetime" data type field. This field shows the variable's last ON Time (the time in which the variable last obtained a value that was not zero)
- **MinValDay:** "float" data type field. This field shows the minimum value reached by the variable during the current day
- **MaxValDay:** "float" data type field. This field shows the maximum value reached by the variable during the current day
- **AveValDay:** "float" data type field. This field shows the average value of the variable during the current day
- **TotTimeDay:** "float" data type field. This field shows the total time ON of the variable (the length, in seconds, of the time period the variable had a non zero value during the current day)
- **LastTimeDay:** "datetime" data type field. This field shows last time the variable was ON during the current day (the time when the variable had a non zero value for the last time)
- **MinValWeek:** "float" data type field. This field shows the minimum value reached by the variable during the current week
- **MaxValWeek:** "float" data type field. This field shows the maximum value reached by the variable during the current week
- **AveValWeek:** "float" data type field. This field shows the average value of the variable during the current week
- **TotTimeWeek:** "float" data type field. This field shows the total time ON of the variable (the length, in seconds, of the time period the variable had a non zero value during the current week)
- **LastTimeWeek:** "datetime"data type field. This field shows last time the variable was ON during the current week (the time when the variable had a non zero value for the last time)
- **MinValMonth:** "float" data type field. This field shows the minimum value reached by the variable during the current month
- **MaxValMonth:** "float" data type field. This field shows the maximum value reached by the variable during the current month
- **AveValMonth:** "float" data type field. This field shows the average value of the variable during the current month
- **TotTimeMonth:** "float" data type field. This field shows the total time ON of the variable (the length, in seconds, of the time period the variable had a non zero value during the current month)
- **LastTimeMonth:** "datetime" data type field. This field shows last time the variable was ON during the current month (the time when the variable had a non zero value for the last time)
- **MinValYear:** "float" data type field. This field shows the minimum value reached by the variable during the current year
- **MaxValYear:** "float" data type field. This field shows the maximum value reached by the variable during the current year
- **AveValYear:** "float" data type field. This field shows the average value of the variable during the current year
- **TotTimeYear:** "float" data type field. This field shows the total time ON of the variable (the length, in seconds, of the time period the variable had a non zero value during the current year)
- **LastTimeYear:** "datetime" data type field. This field shows last time the variable was ON during the current year (the time when the variable had a non zero value for the last time)

This information consents reports to be made for preventive maintenance for instance.
The "TotTime" column (time in which the variable remained at value that was not zero) is Float type and shows the value in seconds. This field is updated only when the variable returns to the zero value. The "LastTime" column (the time in which the variable last obtained a value that was not zero) shows the date and time the variable obtained a value that was not zero. This field is zeroed by obtaining the "1900-01-01 00:00:00.000" value when the variable returns to the value zero. The variable's TotalTimeOn value is calculated based on the "LastTime" and "TotTime" columns. If the "LastTime" column has a value higher than "1900-01-01 00:00:00.000", then the variable's TotalTimeOn will be equal to the value of the "TotTime" column plus the number of seconds between the current time and the one reported in the "LastTime" field.

The statistical data shown in the table is taken from the Retentive Variables file. To get all the above described data correctly, the shared database variables must be enabled in both the "Retentive not Shared" and "Enable Statistic Data" properties.

Structure Variables

Structure variables are managed by the Real Time DBMS as byte arrays, therefore in the shared database a String field is created where the values of each array item will be shown.

The string members of structure variables are not shared in the database. The strings in structures are managed as internal variables and have changeable sizes. As structures in the Real Time DBMS are managed as data byte arrays, it is not possible to read/write structure variable string members. Nevertheless, each string will be allocated with two bytes, even though they may not get used.
For instance, if a structure variable, composed of two Word members and a String member, is shared in the ODBC, the byte array to be shared in the database will be composed of 6 bytes (4 bytes for the Word members and 2 bytes for the String members).

5.5. Copy&Pasting Variables

When the copy&paste is used for Movicon variables, a smart numbering procedure is used upon pasting. When a variable is added it is actually copied increased, or ending with the next index if necessary. For instance, when you copy the "VAR00001" variable, it will be increased to "VAR00002" when pasted and any other copied variables will follow suit when pastes, in this case the next copied variable will be pasted as "VAR00003". However, if a "VAR00002" variable already exists, then the copied "VAR00001" variable will be pasted with the next available index.
Furthermore, you can also copy&paste variable groups and subgroups. The variable group tree is not limited to just one level but subgroups can be created with unlimited nodes. In any case, variables must have their own unique name within the RealTime DB, independently from the group they belongs to, meaning that no two variables can have the same name even when belonging to different groups.

5.6. Variable Areas

In Movicon the variables can be mapped in two different data areas, the data area defined 'Shared' and the other defined 'NOT Shared. The 'Shared' data area, to be managed as it was in the previous Movicon version, is subdivides into three variable areas: Input data Area, Output data Area and Internal data Area (Flag). The 'Shared' data area provides each variable with an absolute memory address associated by the programmer. The 'NOT Shared' data area does not provide any such address for variables which is done by Movicon by allocating the variable to an area unaccessible to absolute addresses.
All the Movicon variables can be managed in the program in bit, byte (8 bit), a word (16 bit), doubleword (32 bit), float (32 bit in floating comma), long (64 bit), string or array. Particular variables, called **"Structure Variables"**, are added to these which are real data structures.

All the variables, Input Area, Output Area, Flag Area and Non Shared Area can be exchanged with the field. The only reason that distinction is still made between the three areas for Shared variables is so they can be compatible with old and previous versions.

To avoid overlapping errors of unwanted variables it is advised to always use the 'Not Shared' areas. By doing this you can access to the variable bit using the "VariableName.NumberBit" (for instance typing a text for the '0' bit of the "VAR0001" just type 'VAR0001.0").

When using the "Shared" area, you can create more mapped variables in the same area. This is very handy for setting Word variables used for communicating with the field and 16 bit variables to be used as single items in objects in screens. In this case the Word variable and the Bit variable should be mapped in the same area (ie. Address Word = 0, AddressBit1 = 0.0, AddressBit2 = 0.1, etc). When using this technique you will need to keep in mind that each one of the variables in the mapped shared area (partly or completely) will be put into use in the same area of another variable already in use (therefore, if a Bit variable is put into use, the Word variable will be put into use as well) This behaviiour is valid for standard and array variables but not for structure variable members.

5.6.1. Retentive Variables and Statistical Data

You can use retentive variables when the project must store the variables' value after the project has been closed or the hardware platform turned off. The retentive variables can be specified for either the 'Shared' areas (Flag, Output, Input) or for those 'NOT shared'. To use the retentive variables you have to set their modes and quantities through the **"Real Time DB Retentive Data Settings"** for variables of 'shared' areas, and through the **"Retentive not Shared"** property (paragraph: "Variable General Properties") for variables of 'NON Shared' areas.

Any variables of the 'Shared' area declared retentive will start from the starting address to the ending address specified. It is also necessary to always check the congruency between the retentive variable area and the size of the established area. For instance, let's say 100 Outputs bytes are going to be used this means using the area from 0 to 99! The system will give warnings of any incongruities.

The retentive variable files not only keep current variable values saved they can also contain a series of statistical data about the variables. This statistical data only gets saved when the variable's "Enable Statistic Data" property is enabled.

"NOT Shared" Retentivity Area

Movicon will create a file in XML format for each variable defined as retentive belonging to the "NOT shared" area within which the value of the current variable will be saved. These files, which are found in the project's 'DATA' folder, will be named in the following way:

NameProject_NameVariable.var

for example the "VAR0001" variable of the "Project1" project will be in a retentivity file called:

Project1_VAR0001.var

"Shared" Retentivity Area

However, variables belonging to the "Shared" area need their retentivity settings defined through the "Real Time DB Retentive Data Settings". In this case one retentivity file will be created for each area, Input, Output and Flag, within the "DATA" folder. These files will have the following names:

ProjectName.FLG: retentivity file for variables in the "Flag" area
ProjectName.FBK: Backup retentivity file for variables in the "Flag" area
ProjectName.IN: retentivity file for variables in the "Input" area
ProjectName.IBK: Backup retentivity file for variables in the "Input" area
ProjectName.OUT: retentivity file for variables in the "Output" area
ProjectName.OBK: Backup retentivity file for variables in the "Output" area

Retentivity File and Statistical Data

The last value obtained by the variable and other statistical data, if enabled, are saved in the retentivity file of each variable. The information available is:

Current Data

- Actual variable value
- Date of last variable update

- Date of last transition from the zero value to a zero other than zero. This date (LastTimeOn) is only significant when the variable has a value that is not zero, and will be reset when the variable turns back to the zero value

Statistical Data

- Minimum variable value
- Maximum variable value
- Average variable value
- Total time in which the variable remained at a value different from zero (this data is updated on file only when the variable returned to the zero value)
- Date of the last time the variable obtained a value different from zero (the date is zeroed when the variable returns to the zero value)

The five Statistical Data items described above are calculated starting from the first project run and are zeroed only when the variable's "Reset Statistic" command is used.

Daily Statistical Data

- Daily minimum variable value
- Daily maximum variable value
- Daily average variable value
- Daily total time in which the variable remained at a value different from zero (this data is updated on file only when the variable returned to the zero value)
- Date of the last time the variable obtained a value different from zero for current day (the date is zeroed when the variable returns to the zero value)

The five Statistical Data items described above are calculated on a daily basis. This means that they will be automatically zeroed at midnight (passing over from the current day at 23:59:59 to 00:00:00 of the next day). The same zeroing will take place if the current day of the project startup is different from when the project was last stopped.

Weekly Statistical Data

- Weekly minimum variable value
- Weekly maximum variable value
- Weekly average variable value
- Weekly total time in which the variable remained at a value different from zero (this data is updated on file only when the variable returned to the zero value)
- Date of the last time the variable obtained a value different from zero for current week (the date is zeroed when the variable returns to the zero value)

The five Statistical Data items described above are calculated on a weekly basis. This means that they will be automatically zeroed at midnight before the new week begins (passing over from Sunday at 23:59:59 to 00:00:00 of Monday). The same zeroing will take place if the current week of the project startup is different from when the project was last stopped.

Monthly Statistical Data

- Monthly minimum variable value
- Monthly maximum variable value
- Monthly average variable value
- Monthly total time in which the variable remained at a value different from zero (this data is updated on file only when the variable returned to the zero value)
- Date of the last time the variable obtained a value different from zero for current month (the date is zeroed when the variable returns to the zero value)

The five Statistical Data items described above are calculated on a monthly basis. This means that they will be automatically zeroed at midnight before the new month begins (passing over from the last day of the month at 23:59:59 to 00:00:00 of the first day of the next month). The same zeroing will take place if the current month of the project startup is different from when the project was last stopped.

Yearly Statistical Data

- Yearly minimum variable value
- Yearly maximum variable value
- Yearly average variable value
- Yearly total time in which the variable remained at a value different from zero (this data is updated on file only when the variable returned to the zero value)
- Date of the last time the variable obtained a value different from zero for current year (the date is zeroed when the variable returns to the zero value)

The five Statistical Data items described above are calculated on a yearly basis. This means that they will be automatically zeroed at midnight before the new year begins (passing over from the last day of the year at 23:59:59 to 00:00:00 of the first day of the next year). The same zeroing will take place if the current year of the project startup is different from when the project was last stopped.

Structure Variable Data Statistics

When the data statistics management is enabled in a structure variable, the statistics will be managed for each single member and data will always get saved in the variable's retentive file but in compressed format (and therefore unreadable with other text editors). This solution has been adopted so that data can be exchanged in Networking without influencing performances that may be effected by structure variables containing a lot of members, where the main data bulk to be exchanged is usually quite extensive.

5.6.2. Renaming Variables

Movicon has a function which consents to updating all the references to variables in projects automatically when they are renamed. This means that when a variable is renamed you will not need to go and replace the old name with the new one in the various points of the project where the variable has been used.

The automatic replacement mechanism is active only if the project execution property **"Enable Renaming Manager"** is enabled. If not, all the aliasing mechanism as described below will not work and the renamed variables should be replaced manually where used in the project.

Movicon uses an 'aliasing' mechanism which keeps track of the variable's original name and its new one. When the variable is remained many times, only the first and last name is tracked down. This information, consisting of the relationship between the variable's original name and the last one associated, is contained in the ".movrealtimedb" file with the <RenamedVariables> tag, as shown below:

```
...
<RenamedVariables>
<item key="VAR00001"
value="VAR00002"/>
<item key="VAR00003"
value="VAR00006"/>
<item key="VAR00004"
value="VAR00007"/>
</RenamedVariables>
...
```

where:

item key: represents the variable's original name
value: represents the last name used for renaming the variable

If the Renaming Manager has been enabled, it is recommended not to use the original names of the renamed variables to create new variables. When trying doing so, Movicon shows an advice message as the following:

Warning! The variable Name 'VAR00001' has been renamed to 'VAR00002' in this project. Do you want to use this variable name? Answering "Yes" will remove the recorded renamed link.

Warning! The 'Screen1' resource name have been renamed in 'Screen2' in this project. Do you wish to use the same resource name? If you ask with 'Yes? the saved rename link will be removed.

The message above has been generated since you tried to create or rename a variable using the "VAR00001" as new name, which has already been used as original name for the variable renamed "VAR00002". Answering "Yes" to the message box, the link "original name - new name" will be deleted and the automatic replacing mechanism will be cancelled for that variable.

As an example, if "VAR00001" has been associated to a display object, then "VAR00001" is renamed as "VAR00002", the display object will result associated to "VAR00002". The RealTimeDB will contain only one variable, that is "VAR00002". If later a new variable is added to the database using "VAR00001" as new name, the renaming link will be deleted and the display object will result associated to "VAR00001", being VAR00001 a new variable. Both VAR00001 and VAR00002 will be present in the RealTimeDB, being two different variables.

When insert a new variable Movicon will propose a name which has not yet been used in the RealTimeDB and which has not yet been used as a original name of a variable which has already been renamed. If, for instance, you insert the VAR00001 and then rename it to VAR00002, when inserting a new variable Movicon will propose VAR00003 as its name.
When a variable is renamed, any retentivity file belonging to the variable will not get automatically renamed and as a result this variable will have a "0" value at the project startup and the first modification to this variable will create a new retentivity file with the variable's new name.

WARNING! The aliasing mechanism can be cancelled deleting from the".movrealtimedb" file the xml tags listing the renamed variables. This way the renamed variables will keep their last name, while the references added for example to objects or commands will be linked to the variables original names. As a result, the reference to original variables could be invalid.

The automatic variable aliasing works according to the object or resource in question:

- **Standard objects in screens**: new variable names will appear in properties where variables can be associated
- **Command List Variable commands**:new variable names will appear in properties where variables can be associated
- **Event Objects**: new variable names will appear in properties where variables can be associated
- **Scaling Objects**: new variable names will appear in properties where variables can be associated
- **Scheduler Objects**: new variable names will appear in properties where variables can be associated
- **Shortcuts**:new variable names will appear in properties where variables can be associated
- **Menù**: new variable names will appear in properties where variables can be associated
- **Redundancy**: the new variable name will appear in the "Status Variable" property
- **Screens**: the new variable name will appear in the "Screen Layer Variable" property
- **Alarm Objects**:new variable names will appear in properties where variables can be associated
- **Alarms as Templates**: new variable names will appear in the Alarm Window. If an String ID with the original variable name has been inserted for displaying the alarm's text, you will also need to rename the String ID with the variable's new name
- **Parameter File**: the variable's original name will always appear in the file but the new variable will be used in run mode
- **Trend/Data Analysis**: new variable names will appear in the Trend/Data Analysis properties where variables can be associated. This is also valid for the variables associated to the Trend/Data Analysis pens. However the pens' names with remain unchanged even in those cases when pens have the same variable names
- **Basic Script**: the variable's original name will always appear in the basic script code but the code will be executed according to the new variable in run mode
- **Basic Script Properties**: the new variable name will appear in the "Status Variable" property

- **IL Logic**: the original variable name will always appear in the code but it will be executed according to the new variable in run mode
- **DataLoggers/Recipes**: new variable names will appear in the DataLogger/Recipe properties where variables can be associated. However, the column names will remain unchanged, even in those cases where column names are the same as the variables'
- **Communication Drivers**: original variable names will always appear in Driver Station and Task properties where variables can be associated but the new variable will be used in runtime

Applying Renamed Variables Permanently

You can apply the new names of renamed resources permanently (screens, basic scripts, menu and shortcuts) by using the "Apply Renamed Variables and Resources" command from the "Edit" and "View" menus or by using the "Apply New Name" command from the variable's resources' context menus. In this case, a search will take place in all the project resources and objects to replace all the variable old names with the new one and the renamed variable in the ".movrealtimedb" file will be deleted. However, this will eliminate the Aliasing mechanismn for this variable.
A request to activate this command will also appear when the option for renaming variables and resources management has been disabled.

This command also replaces the names of the variables resources used within basic script code of objects or basic script resources.
Comments are also inserted in the code to indicate where the replacement was made:

"Var1' variable replaced with new 'Var2' name'

'Criteria for replacing Variables in Basic Script Code

When activating the command for applying new names of variables the parser will only replace the text of corresponding renamed variables with their new names when found in the basic script code if one of the following rules applies:

- The text is between speech marks or brackets
- The text is followed by a symbol character (not alphanumeric) before or after, without considering spaces. For instance; the *,=+- chars
- The text is preceded by one of the key words indicted in the "BasicKeywords.xml" settings file (the file should be located in the Movicon installation folder)

The "BasicKeywords.xml" external file consents you to define key word lists used while replacing variables in basic script code. The "BasicKeywords.xml" file structure is as follows:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<BasicKeywordsList>
<Key>If</Key>
<Key>ElseIf</Key>
<Key>Select Case</Key>
<Key>Loop Until</Key>
<Key>Loop While</Key>
<Key>While</Key>
</BasicKeywordsList>
```

Communication Drivers

A new item called "Renaming Manager" has been added to the list of communication driver features which consents you to find out whether the driver supports the renaming management or not. Those Drivers which support the remaining management have this option set at 'true' will display those variables with names modified within their configuration window; and will also support the apply renaming command.

5.7. Real Time DB Settings

This Settings window is used for customizing the variables management used by the projects in addition to that of the Server OPC, Networking and Variable Tracer Settings. The settings of the number of variables managed by the project are completely free hand to enable you to correctly allocate sufficient memory in function with the number of variables used in the project, adapting the system to the requirements needed. The number of variables to be set only concerns the Movicon Shared memory area and should only be used when really necessary.

5.7.1. Real Time DB General Settings

The general properties allow you to define the maximum number of variables from the Movicon Shared area which can be used in the project.
To modify the Real-Time DB General property, select the object with the mouse and use the Movicon '**Properties Window**'.

Inputs / Outputs / Flags

You have to specify the maximum number of bytes you wish to use for each variable type from the Movicon Shared area managed by the system. The edited number can also be freely set or modified afterwards.
The system request to specify the number of bytes of the variables used in the project permits the memory effectively necessary only to be allocated, consenting the hardware platform being used to optimize the project.

Input Image

When enabling this selection the synchronization between data read by the communication driver and the project's general logic will be activated. At the beginning of every processing cycle of the general logic a process image of all the project inputs is saved. In this way any updates on inputs, carried out by the communication driver, will not effect the current general logic process but the following general logic process cycle, thus consenting the use of the same input variables in more points in the general logic.

Output Image

When enabling this selection the synchronization between data written by the communication driver and the project's general logic will be activated. The general logic works with the outputs process image which is loaded into the project's outputs only at the end of each general logic processing cycle. By enabling this selection any undesired triggering on variables of external devices can be avoided when the output variables have been set in more than one point in the general logic.

5.7.2. Real Time DB Retentive Data Settings

The Retentive Data property allows you define the areas and which Movicon Shared area addresses must be retentive.
To edit the Real Time DB Retentive Data property, select the object with the mouse and use the Movicon **'Properties Window'.**

Write on disk every...

Time is settable in seconds and may vary from a minimum of "0" to "60". When setting "0" seconds the retentive files of modified variables are all written one after theother without waiting. If a time of more than zero seconds is se, only one file will be written each time the interval time elaspes. This means, for example, that if the values of more than one variable changes at the same time, the last file will be updated after the time inserted in this property multiplied by the number of variables that changed value at the same time. For example, if setting the '1' second value in this property and 5 variables change at the same time, one file will be written every second therefore it will take 5 seconds to write all the retentive files (1 second x 5 variables).
When set with the "0" value, a variable change check for recording will be made every second and any changes made will be recorded straight away without delay.

Caution: this time is used for updating one single file. This means that if the value changes in more than one variable at the same time, the last file will be updated according to the value set in this property times the number of variables changed. Example, when setting a one second value in this property and five variables change at the same time, each file will be updated one second at a time, meaning that it will take about 5 seconds in all to update all five files (1 second per variable: 1 sec. x 5 variables = 5 secs).

Inputs
This setting allows you to enable or disable the retentivity management for the Input area.

Inputs From:
This setting permits you to insert the starting address for the retentive Input area.

Inputs A:
This setting permits you to insert the ending address for the retentive Input area.

Flags
This setting permits you to enable or disable the retentivity for the Flag area.

Flags From:
This setting permits you to insert the starting address for the retentive Flag area.

Flags A:
This setting permits you to insert the ending address for the retentive Flag area.

Outputs
This setting permits you to enable or disable retentivity management of the Output area.

Outputs From:
This setting permits you to insert the starting address for the retentive Output area.

Outputs A:
This setting permits you to insert the ending address for the retentive Output area.

5.7.3. Real Time DB InUse Variable Manager Settings

The Variables in Use Management property allows you to optimize performances. A sophisticated architecture consents re-acknowledgement of variables being used by the system and to adapt variable updates to only those that need it.
In this way the system's overall performances will be increased to the advantage to the project's user.
To modify the Real-Time DB Variables in Use Management, select the object with the mouse and use the Movicon **'Properties Window'**.

InUse Manager
This setting allows you to enable or disable the Variables in use management.
This optimizes device communication (by means of Drivers, OPC, etc.) as only those jobs containing variables in use are kept active. When this property is disabled all communication jobs will be kept active which may effect system performances. Nevertheless, even when the "InUse Variable Manager" is disabled the byte count for license purposes will always be based on those variables effectively in use in the project. This option only influences communication with field devices, as specified above, and not license byte counts.

Use Shared Dyn. Tag
When this property is enabled the project's dynamic variables will be allocated to the Real Time DB Shared areas, and in particular the Output area. When this property is left disabled, the dynamic variables will be allocated to the Non Shared areas instead.

Notify TimeStamp Changes
When this option is enabled, variable TimeStamp changes will be notified to all those resources using them. Therefore, if a DataLogger is set to record on change, it will also record the variable's

TimeStamp change even though its value hasn't changed. This also goes for the variable TraceDB, where a new record will be inserted even though the variable's TimeStamp only changed. In this case, if the"Add Msg to SysLog" optoin has been enabled, the record will also be inserted in the Historical Log's "SysMsgs" table.
You can also modify variable TimeStamps using the "SetTimeStamp" script function from the "DBVariableCmdTarget".

5.7.4. Real Time DB OPC Server Settings

The Movicon OPC Server can be configured through the appropriated property accessible from the Real Time DB Settings.
The Movicon OPC Server, if registered within the list of OPC Servers available, will startup in automatic, with the last opened project, as soon as the OPC Client connects. To enable this functionality you need to disable the **Unregister Automatic Server** selection.
When selecting the **Automatic Shutdown**, Movicon will close as soon as the OPC Client is disconnected.
To modify the Real-Time DB OPC Server property, select the object with the mouse and use the Movicon **'Properties Window'.**

OPC Server DA
This selection box enables all the OPC Server's functionalities and has selection priority when this tool is to be used.

OPC Server Name
This edit box is used for setting the name with which the Movicon OPC Server will be registered with in the operating System.

OPC Server Description
This edit box is used for setting the description with which the Movicon OPC Server will be registered with in the operating System.

OPC Server AE
This selection box enables the OPC Server AE being the acknowledge function of the project's alarms and events, to all the OPC Clients connected.

OPC Dynamic Tag
This selection box is used to enable the possibility to dynamically create links to the project's variables. When checking this option, you can access any of the project's variables from the OPC Client by setting the Tag in the following way: *Name Variable*.
Otherwise only the Real Time DB variables will be show where the OPC Server option is explicitly enabled; please refer to the "Variable Options Properties" document for further information on the OPC Settings of project variables.

OPC Server Debug Trace
This selection box enables the OPC Server DA to trace any Debug events.

AutoShutDown
This selection box enabled the automatic shutdown of Movicon when the OPC Client disconnects form the project where the OPC Server is enabled.

AutoRegister
When this this box is enabled with a check mark, the OPC Server will automatically register at startup.

AutoUnregister
This selection box enables the automatic elimination of the Movicon OPC Server from list of available Servers when the project closes.

Register OPC Server
Command for registering the OPC Server.

Unregister OPC Server
Command for deleting the OPC Server registration.

Refresh Rate (ms)
This edit box permits you to set the time of the Tags updating by the Movicon OPC Server DA. Values are to be comprised of milliseconds between 10 and 1000.

> *The time set here is to be differentiated from the refresh time set in the property of a group inserted within any OPC Client. It is not advised to set fast refresh times when long times have been set inside the groups created in the Client.*

AutoShutDown Timeout (ms)
This setting permits you to insert the OPC Server's standby time before shutting down.

AE Ack
This selection box enables the acknowledge function of the events generated.

Free threaded
Enables OPC Server model for managing Threads.

5.7.5. Real Time DB OPC Server Security Settings

Security levels for any eventual Clients wishing to connect, can be setup by means of using the OPC Server Security Settings.
To edit the Real-Time DB OPC Server Security properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Enable Security
This property allows you to enable the OPC Server Security management. When enabled only users acknowledged by the Server, to which the users connect to through the Client, can carry out operations consented by their access rights.

OPC Server Min.Impers.Level
This property permits you to set the minimum Impersonalized access level to be assigned to users who connect to the Server and do not need to be acknowledged.

5.7.6. Real Time DB OPC XML DA Server Settings

The Movicon OPC XML DA Server are configured by using the appropriated properties which are accessed through the Real Time DB settings.
The Movicon OPC XML DA Server, when enabled, makes the OPC XML DA Server available on the system's OPC Server list.
To edit the Real Time DB OPC XML DA Server settings, select the object with the mouse and use the Movicon **"Properties Window"**.

The Movicon OPC XML DA Server does not support Array type data.

Enable
This selection box enables all the OPC Server XML DA functions.

Transport
The transport type to be used for Server/Client communication is selected in this box.

Port
The port socket number to be used.

Accepted # Threads
The number of thread to be left on hold for the new connections.

Thread Pool Min
Minimum number of Threads in a group.

Thread Pool Max.
Maximum number of Threads in a group.

Request Backlog
Number of backlog connection requests before the system starts to refuse connections.

Request Timeout
Timeout used when the Server responds to the Client. This value is expressed in milliseconds.

Request Buffer Size
Buffer Size used for receiving input messages. It would be best to use the default value as smaller values may effect performances and bigger values may occupy too many resources.

Keep Alive
When this property is enabled the connection will not close once a response has been sent to the Client.

Vendor Info
This allows you to insert a written comment regarding information on the OPC XML DA Server supplier.

Enable Security
Allows you to enable Server OPC XML DA access security.

Default Access Level
Allows you to enter the Default Access Level for anonymous connections.

5.7.7. Trace DB (Audit) Settings

The Variable Tracing is a Movicon functionality which allows you to historically log the behaviour of variables, by recording on Database files or text file each variable change and the cause changing the variable's value. This will enable you to keep track of the value changes that take place to variables and what were the causes. To modify the Real-Time DB Trace properties, select the object with the mouse and use the Movicon **'Properties Window'.**

Use IMDB Manager
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Shared Tables
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Save XML File
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Save CSV File
See paragraph **"IMDB Settings for Recording data" in the section on "IMDB".**

Crypt File
See paragraph "IMDB Settings for Recording data" in the section on "IMDB".

Write Behind Delay
See paragraph "IMDB Settings for Recording data" in the section on "IMDB".

Max Rows Nr.
See paragraph "IMDB Settings for Recording data" in the section on "IMDB".

Keep the DB Connection open
See paragraph "DBMS Settings for Recording data on DataBase" in the section on "Historical Log Management".

Max. Error Number
See paragraph "DBMS Settings for Recording data on DataBase" in the section on "Historical Log Management".

Max. Transactions
See paragraph "DBMS Settings for Recording data on DataBase" in the section on "Historical Log Management".

Max. Cache Size
See paragraph "DBMS Settings for Recording data on DataBase" in the section on "Historical Log Management".

Max. VarChar Precision
See paragraph "DBMS Settings for Recording data on DataBase" in the section on "Historical Log Management".

ODBC DSN
See paragraph "DBMS Settings for Recording data on DataBase" in the section on "Historical Log Management".

ODBC DSN User
See paragraph "DBMS Settings for Recording data on DataBase" in the section on "Historical Log Management".

Time Column
This setting is used for inserting the Trace Table's Time Column's name. If not specified the default's name will be used instead. The Time column indicates the recording's date and time referring to GMT.

Local Time Column
This setting is used for inserting the Trace Table' s Local Time Column's name. If not specified the default's name will be used instead. The Local Time column indicates the recording' s dates and Time referring to local time.

MSec Column
This setting is used for inserting the Trace Table's MSec Column's name. If not specified the default's name will be used instead. The MSec Column indicates the milliseconds relating to the recording time.

User Column
This setting is used for inserting the Trace Table's User Column's name. If not specified the default's name will be used instead. The User Column indicates the name of the active user when the recording took place.

Changer Column
This setting is used for inserting the name of the Trace Table's Changer Column's name. If not specified the default's name will be used instead. The Changer Column indicates by which event caused the variable's status change, eg. by a screen's object, by the communication driver, by the watch window, etc.

Value Before Column
This setting is used for inserting the Trace Table's Value Before Column's name. If not specified the default's name will be used instead. The Value Before Column indicates what the variable's value was before it was just last changed.

Value Next Column
This setting is used for inserting the Trace Table's Value Next Column's name. If not specified the default's name will be used instead. The Value Next Column indicates the variable's new value.

Value Column
This setting is used for inserting the Trace Table's Value Column's name. If not specified the default's name will be used instead. The Value column indicates the actual value that the variable was meant to be modified with. It may happen that the intended value is not always set exactly the same on the variable. The variable may undergo scaling or conversion which will therefore cause the inserted value to adapt. When this is the case the values reported in the 'Value Column' and the 'Value Next Column' tend to be different.

Quality Column
This setting is used for inserting the Trace Table's Quality Column's name. If not specified the default's name will be used instead. This column indicated the variable's quality status.

TimeStamp Column
This setting allows you to enter the name of the "TimeStamp" Column. The default name will be used If no name is specified. The TimeStamp Column indicated the variable's TimeStamp.

Variable Name Column
This setting allows you to enter the name of the "Variable Name" Column. The default name will be used If no name is specified. The "Variable Name" Column indicates the name of the variable when set to share the same trace table with other variables.

Variable Group Column
This setting allows you to enter the name of the "Variable Group" Column. The default name will be used If no name is specified. The "Variable Group" Column indicates the name of the group which the variable belongs to.

Variable Description Column
This setting allows you to enter the name of the "Variable Description" Column. The default name will be used If no name is specified. The "Variable Description" Column indicates the variable's description.

Recreate All
The command regenerates all the tables of the variables enabled with the Trace. All existing data will be lost.

5.7.8. ODBC Real Time I/O Link Settings

The **ODBC Real Time I/O Link Settings** consents the setting up of dynamic links between the Movicon Real Time DB and database file data fields in the preferred DB format.
To modify the ODBC Real-Time DB settings, select the Real Time DB group in the 'Project Explorer' window with the mouse and use the Movicon **'Properties Window'**.

The Database file will be organized with a column containing the names of variables (defined in the name box in the variables' General Properties) and a series of columns containing their current values and corresponding statistics.
When using MS Access as the preferred database, Movicon will create the Database file in the project's "DATA" folder for default with the following name:

ProjectName_RealTimeDB.mdb

To change the ODBC link and the linked file use the **"ODBC DSN"** properties described below:

Keep the DB Connection open
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. Error Number
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. Transactions
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. VarChar Precision
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

ODBC DSN
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

ODBC DSN User

See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Table Name
This setting is used for inserting the Table's name. If nothing is entered, the **"RTVar"** default name will be used instead.

Name Column
This setting is used for inserting a name for the DBMS table's Variable Name column. This column reports the name of the variables enabled with the ODBC Real Time I/O Link function. Each record in the table represents a variable. If nothing is entered the **'Name'** default name will be used instead.

Value Column
This setting is used for inserting the name of the DBMS table's Variable Value Column. This column reports the variable's value enabled with the ODBC Real Time I/O Link function. If nothing is entered, the **"Val"** name for default will be used instead.

Min. Value Column
This setting permits you to insert the name of the Min. Value Column of variables in the DBMS table. This column shows the minimum value of variables enabled with the ODBC Real Time I/O Link function. The **"MinVal"** default name will be used if left blank.

Max. Value Column
This setting permits you to insert the name of the Max. Value Column of variables in the DBMS table. This column shows the maximum value of variables enabled with the ODBC Real Time I/O Link function. The **"MaxVal"** default name will be used if left blank.

Ave. Value Column
This setting permits you to insert the name of the Ave. Value Column of variables in the DBMS table. This column shows the average value of variables enabled with the ODBC Real Time I/O Link function. The **"AveVal"** default name will be used if left blank.

Total Time ON Column
This setting permits you to insert the name of the Total Time ON Column variable from the DBMS table. This column shows the total ON time of the variables enabled with the ODBC Real Time I/O Link function. The **"TotTime"** default name will be used if left blank.

Last Time ON Column
This setting permits you to insert the name of the Last Time ON Column Variable of the DBMS Table. This column shows the last Time ON of variables enabled with the ODBC Real Time I/O Link function. The **"LastTime"** default name will be used if left blank.

Recreate All
This command regenerates the tables containing data of the variables enabled with the ODBC Real Time I/O Link functionality. Any existing data will be lost.

5.8. Dynamic Variables

The dynamic variables have been designed to make it easier for the programmer in building screens or anything else exploiting the use of remote variables. By using the dynamic variables you can connect to tags configured in OPC Servers, local or network, to variables belonging to other Movicon projects executed in remote by exploiting the Networking services, and to field devices through communication drivers. All this without having to create static project variables, tasks in communication drivers or OPC tags etc.
The dynamic variables can be used in all the controls and drawings in the screens. For example: in the drawing animation properties, in Buttons, etc. The use of dynamic variables is also consented internal Script codes by using the appropriate syntaxes described in the specific paragraphs ("Dynamic Network Variables", "Dynamic OPC Variables", "Dynamic Communication Driver Variables"). In addition to this, you can also use dynamic variables internal commands belonging to menu items and Shortcut keys.
The dynamic variables cannot be used internal IL Logic, also because these are also meant for writing or reading remote variables only in certain moments when absolutely necessary: when they are no longer in use Movicon actually frees them from system memory.

When using dynamic variables you are permitted to go over the number of tags enabled by the license which is being used for running the project. When opening a resource, in which dynamic variables are being used, Movicon automatically allocates these variables in memory, to then frees them from memory when the resource is closed. This makes it theoretically possible to have an unlimited number of dynamic variables within a project.

The dynamic variables are subdivided into three categories: Network Variables, OPC Variables and Communication Driver Variables. Their management by Movicon is identical for all categories.

The number of dynamic variables used must always be compatible with the number of tags provided by the Movicon license being used.

5.8.1. Dynamic Network Variables

The Dynamic Network Variables are needed for creating dynamic connections with remote Movicon projects, connected by means of the Networking functions, commonly known as the Server project. Dynamic network variable selecting can easily be done from the **"Network"** tab in the window which appears after double-clicking on the Variable selection box from any Movicon component or resource.
In order to be able to select Dynamic Network variables directly you need to have the remote computer connected in network and the Server project running.

You can also specify the name or TCP-IP address of the Server in the **"Server"** edit box in the window shown above.
All the considerations made for the Networking also apply when using the dynamic network variables: the connection modalities exploit the same technology.

The **"Refresh"** key can have diverse functions according to the element highlighted in the left square of the window:

- When the local computer or a network computer is highlighted, the **"Refresh"** button updates the list of all the Movicon projects running on that specific computer
- When a domain or a network group is highlighted, the **"Refresh"** button updates the list of computers available for the network highlighted
- When a Movicon Project is highlighted: the **"Refresh"** button updates the list of variables displayed in the square on the right, by applying the filter. The filter consists of alphanumeric characters which can preceded or followed by a "*" wildcard character. For instance, filters may be: VAR*, *000*, *05

If you do not have a remote computer connected in net you can write the correct syntax directly into the Variable insertion box, as follows:

[NET]\\ComputerName\VariableName

where:
[NET] = Movicon suffix which identifies a network connection
ComputerName = Name of remote Server computer Server
VariableName = Name of variable in the Server project to be connected

To be able to exploit the use of Dynamic Network variables you need to have the Networking option enabled on the dongle and both computers configured so that they can speak and see each other on the Ethernet network with the TCP-IP protocol. For further information please consult the section about "NetWorking".

5.8.2. Dynamic OPC Variables

The Dynamic OPC variables are used for creating dynamic connections with a local or remote OPC Server. The selection of a Dynamic OPC Variable can be easily done by using the **"OPC"** tab in the window which appears after double-clicking on the Variable selection box from any Movicon component or resource.

In order to directly select a Dynamic OPC variable you need to access the OPC Server installed on the local or remote machine. If the OPC Server is configured to startup automatically upon Client request, it is not necessary to manually start the OPC server on the local or remote computer.

You can also specify the name of the Server of the TCP-IP address in the **"Server"** edit box as shown above.
The **"Live Data"**, when enabled, allows you to the values of the variables in real-time. Once checked the value are displayed upon the next request.
The **"Refresh"** key functions differently according to the element highlighted in the window's left pane:

- When the local computer or a network computer is highlighted, the **"Refresh"** button executes a refresh of the list of OPC Servers installed on that specific computer.
- When a domain or a network group is highlighted, the **"Refresh"** button executes a refresh of the list of computers available for the one highlighted.
- When a device or a OPC Server group is highlighted, the **"Refresh"** button updates the list of items displayed in the right pane by applying the filter. The filter consists of alphanumeric characters which can be put before or after the "*" wildcard character. Filters may be for example: My*, *Tag*, *Tag1

If you cannot access the OPC Server you can directly write the correct syntax in the insertion box as follows:

[OPC] ServerName.Version\DeviceName.GroupName.TagName

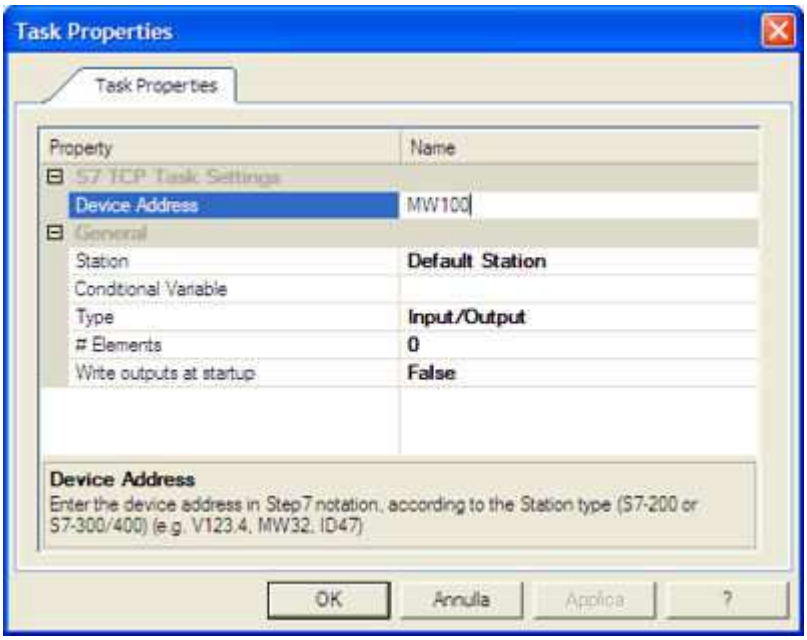
Where:
[OPC] = Movicon Suffix which identifies a OPC connection.
ServerName = Name with which the OPC Server is registered in, in the operating system.
DeviceName = Name of device configured in the Server.
GroupName = Name of group which variable belongs to.
TagName = Nome of tag configured in the Server.

In order to use these Dynamic OPC variables you need to have the OPC Client option enabled on the dongle and have an OPC Server already installed and configured. In addition, when accessing a remote OPC Server (on another computer) you need to configure the DCOM components appropriately on both the operating systems to get an adequate access level.

5.8.3. Dynamic Communication Driver Variables

The Dynamic Communication Driver variables are used for creating dynamic links to field devices (ie. PLC) by using the Movicon Communication Drivers. Selecting a Dynamic Communication Driver variable is easily be done through the **"Communication Drivers"** tab from the window which displays following a double-click on the variable selection box of any Movicon component or resource.
In order to directly select a Dynamic Communication Driver variable, it has to be inserted in the project's "Communication Driver list" beforehand.

The Settings of the selected Driver are displayed on the right hand side of the window. The driver's configuration mask is opened by using the **"Settings"** button.
By double-clicking on the driver's name displayed on the left hand side of the window or a click on the **"Add..."** button, another window will appear for inserting the communication Task which involves selecting the variable of the device which you wish to link to. The window in question, shown below, shows the different selection fields according to the type of driver being used:



By clicking on the **"Remove"** button it will be possible to delete the selected tag.

If you haven't yet configured the communication driver you can directly write the correct syntax, in the Variable insertion box, as follows:

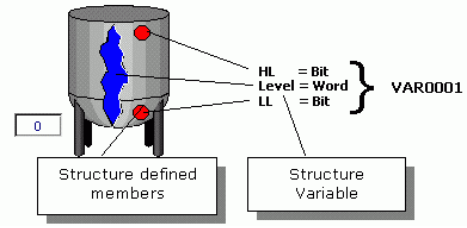
[DRV]DriverName.Sta=StationName|Addr=TagAddress

where:
[DRV] = Movicon Suffix which identifies a connection to a Communication Driver
DriverName = Name of Communication Driver to be used
StationName = Name of station configured in the driver
TagAddress = Address of Tag in device (use the syntax of the device itself)

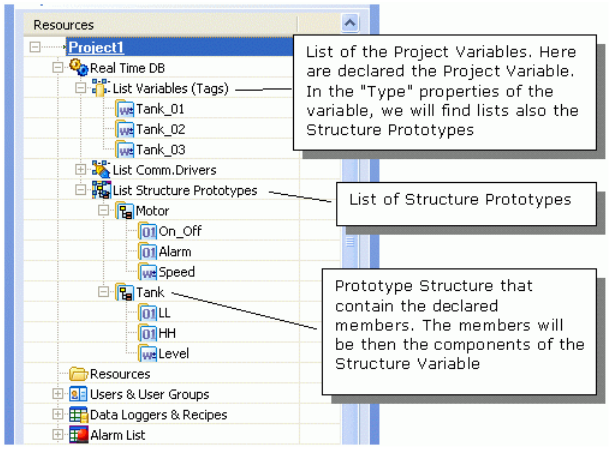
In order to use the Dynamic Communication Driver variables the appropriate communication drivers have to be enabled on the dongle.

5.9. Structure Variables

Movicon provides variables defined as Structures to simplify and slim down the employment of groups, containing a mixture of different type variables, in projects.
These type of variables therefore contain a series of information deriving from other variables of different types, grouped together by one variable known as Structure.
Let's take a tank as an example. Its informative structure is always given by a analogic variable (word type) for the level and two digital variables (bit type) for the minimum and maximum limits. A Structure variable can be composed of three member being a Level (word), HL (bit) and LL (bit). Together they can be called VAR0001, and will appear in the variable types list available for setting variables in the Real Time DB.

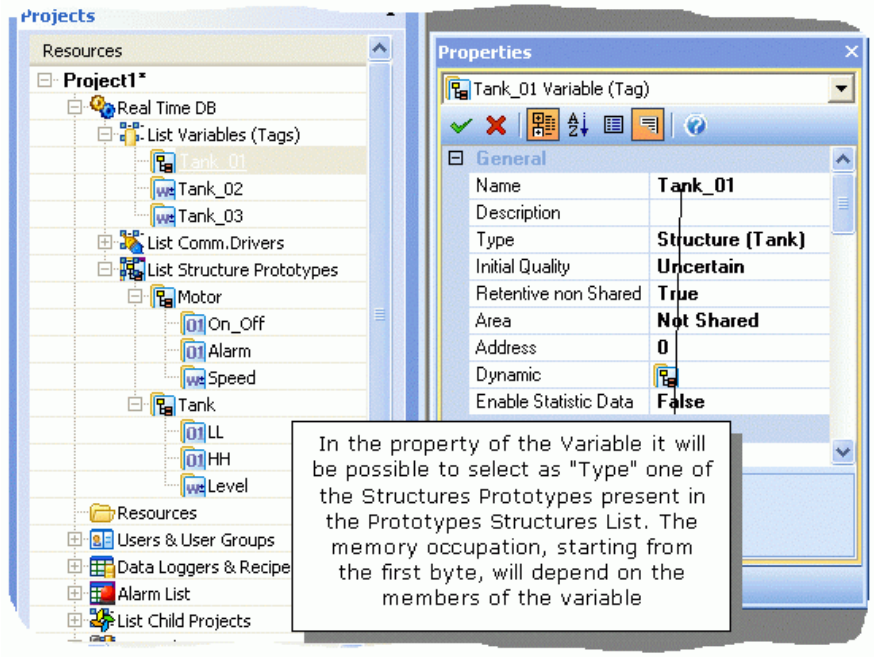


Using Structure type variables are very handy when managing repetitive objects made up of groups of data.
Once the Tank object's structure of variables has been setup, it can be inserted into the project many times, each time with a different name (Tank_1, Tank_2, Tank_3, etc.), all referring to the same data structure.
Each variable will refer to its own absolute address, starting from the initial byte, for the necessary number of bytes required by the members belonging to the same structure.



Before inserting a Structure variable into the Real Time DB, its Prototype needs to be set from the project's '**List Structure Prototypes**'.

The Structure Prototypes allow you to setup the Type of structure you wish to create by declaring the Member Variables which will take part in it. After having done this, it will appear as variable **Type** in the Variable properties
It will then be possible to insert new variables as **'Type'** being the name of one of the preset Structure Prototypes instead of bytes, words, floats, etc.
If you select the Input, Output or Flag area in the variable's **'Area'** property, the starting byte address must be specified in the **'Address'** property.
Movicon will always request, as for all the variables in the set shared areas in the project, the start byte address.



The bytes occupied by the structure variables in memory will depend on the types of variable members set in the structure prototype. Any editing of the members belonging to a Structure variable (changing the quantity of bytes) will always cause automatic compacting to take place within that structure variable.

WARNING! the "bit" members in structure variables occupy one memory byte. Therefore, if you create a structure prototype containing 8 bit members, the variable will occupy 8 Bytes and not 1 Byte only.

5.9.1. Structure Prototypes General Properties

The general properties are used for associating the main data relating to the Structure Prototypes. To edit the General Properties of Structure Prototypes, simply select the object with the mouse and use the Movicon **'Properties Window'**.

Name

The name to be assigned to the Structure Prototype as mnemonic code is entered in this edit box. Movicon will propose the 'STRUCT' characters followed by a progressive number for default. The default name can be replaced with another name as pleased.

The text for the Structure Prototype's name cannot have gaps or characters which are not alphanumeric. Any reserved gaps or characters can be replaced with the '_' character.

Description

A text string to be used as a comment for the Structure Prototype is entered in this edit box.

The comment will remain associated to the Structure Prototype but will only be available in the database.

Size
This field is read only, it reports the live occupation of the Structure Prototype in bytes.

Member Order
This button allows a window to be opened for changing the order of member variables internal a prototype structure. For further information please refer to the paragraph on **"Variable Member Order"**.

5.9.2. Modifying Structure Member Properties

The members of structure variable types can also be modified through their properties Just like the variables. Structure variable members can be explored in the Project Explorer window by opening the variable "Members" sub-folder and the selecting each member separately. Once a member has been selected, the Properties window will update with its properties. The member property list is simply a subset of normal variable properties as members can only be set with some and not all the properties available to variables.
The member's name, description and type can not be changed as they are inherited directly from the Structure Prototype. To modify the properties of a member you must first enable the 'Enable Member Properties'. Information off all the structure member's settings will be saved in the project folder with the ".movrtmembers" extension.

Warning! If the "'Enable Member Properties" property is disabled after all the structure member properties have been set, all the member properties will be restored with the default values and information previously saved in ".movrtmembers" file will be deleted.

The Copy&Paste operations of structure variables may reset any existing member settings. If the paste is used with the cursor positioned on an already existing variable, the pasted variable members will have their "Enable Member Properties" disabled along with all the values set for default. If however, the paste is used with the cursor positioned on a variable group name or on the "Variable (Tag)..." resource, the members of the pasted variable will keep the same settings of the copied variable. This also applies for variables copies and pasted into a different project opened in the Project Explorer window.

Here are some functionalities that can be used with structure members:

- Structure members can be drag&dropped in resources or objects that support them
- Each member has a "Variable Used in..." sub folder in the Project Explorer Window, which shows the cross reference list of that member. All the uses of each separate member are also shown in the Cross Reference window under the name of Structure Variable is belongs to
- "Members" groups can be selected from the List Variables window showing only the structure type variables that can be exploded to view a list of their members
- As with standard variables, Structure variables can also be associated with Alarms, DataLogger/Recipes or Events
- Variables structure members can be associated as events of Basic Script or Screen resources or objects ("Add New Variable Script Event")
- Dynamic links can be defined for each member (Driver, OPC or Networking)
- Data Scaling can be defined for each member
- Read/write access levels can be defined for each member
- The Trace (Audit Trail) can be enabled for each member
- Network connections can be defined for each member
- Each member can be defined with a connection to the RealTimeDBMS
- References to structure variable members can be retrieved using the "GetMemberObjectFromName" and "GetMemberObjectFromIndex" methods. This will allow

modifications to members both in runtime and development mode, such as in Dropping Template Code

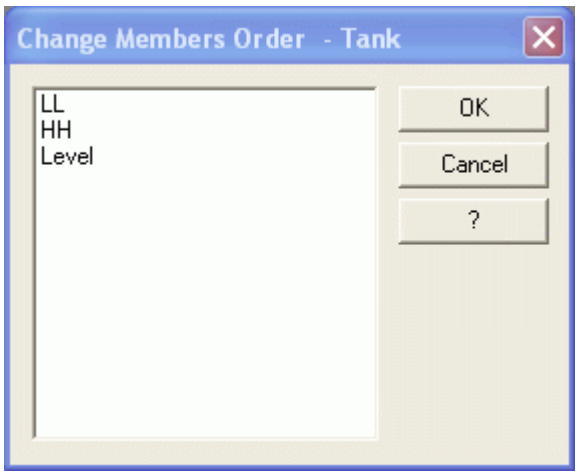
It is best to manage structure variable modifications completely at variable level or at the level of each single member, and not in both level modes. For some properties, if set in both levels, the value set in the member will be taken. For example, if defining a "Default Format" or "Engineering Data" at Structure level and single Member level, each member will use its own setting. However, a programming error will occur when setting the other properties at both levels. For example, it wouldn't make sense to set a dynamic link (Dynamic address), enable the Network services, etc whether at Structure or Member level.

Bytes in Use Management

When only some of members of a structure variable are exchanged with the field (Driver, OPC) or in Networking, the license count for bytes in use will only performed for the members in questions.

5.9.3. Variable Member Order

The order of variable members of a structure can be edited by using the '**Change Members Order**' command accessed from the '**Commands**' window or right mouse click on the Structure Prototype. When activating the **'Change Members Order'** command the following dialog window will display:



At this point drag the member variable with the mouse to the point required.

5.9.4. Pointing to Structure Variables

When having Structure type variables in the project it will be possible to go and point to each single member by appropriately addressing the variable member selection for the function or logic concerned. In this case you need to specify the name of the structure variable concerned followed by the name of the member variable 's name to be accessed in the syntax. The name of the structure and the name of the member must be separated by the ':' character.

Let's suppose for example that you want to access a Tank level value (tank number 10 of 20 tanks existing on the plant) to which corresponds to the structure variable Tank10 (in which the prototype has been set with the ' Level' variable word), you need to specify:

Tank10:Level

which should be:

<struct name>:<member name>

Accessing structure variable members can be done through out the project, by assigning this syntax whether to the graphic, Alarms, Data Loggers of logic functions.

If the structure variables are being used within Basic Scripts make sure the ':' is replaced with the '_' or "." character when accessing variables directly, without using the Movicon functions (GetVariableValue(), SetVariableValue(), etc). In addition to this you can use the ":" character by enclosing the variable between square brackets. The syntaxes entered are:

```
Sub Main()
        Dim nVar as Integer

        nVar = Tank10_Level
        nVar = Tank10.Level
        nVar = [Tank10:Level]
        nVar = GetVariableValue("Tank10:Level)
End Sub
```

Caution! the use of "structure var name.member name" syntax is only enabled if the "General - Advanced - Intellisense" option has been enabled in the structure variable's properties.

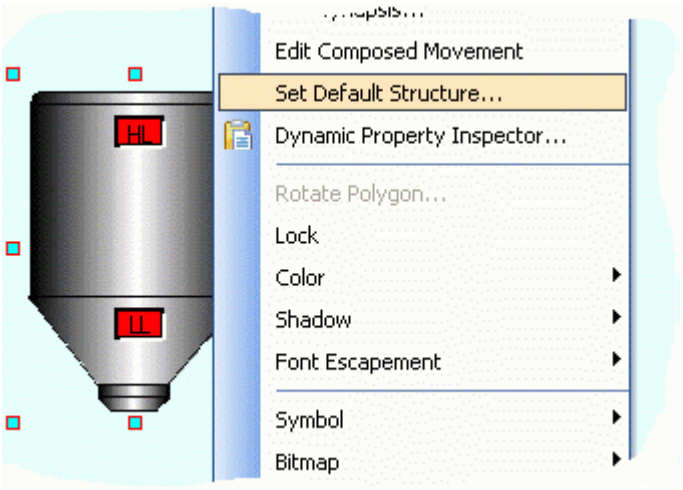
Movicon also accepts the <:><member name> syntax for the graphic functions of symbols. However, in this case, you have to specify which is the Default Structure Variable for the symbol as described in the 'Default Structures in symbols' document.

5.9.5. Default Structures in symbols

The functions for assigning Default Variable Structures can be used for each composed graphic symbol.
Assigning default variables offers the advantage to set only one structure of members in the symbol using Default Structure each time. In this way the composed symbol could effectively be independent from the variable, which is set only in the screen's editing phase.
The symbol must be preset with the interested variable member's name, preceded by the ':' separation character, when configuring the graphic animation functions.
For example, the level representation of the Tank symbol could have the following variable set in the filling function:

:Level

The starting Structure variable can be set using the symbol's Default Structure.
To assign the Default Structure you have to select the symbol and use the right mouse key and access the **'Set Default Structure'** command. The selection window will display showing the Variable Structure along with those exiting in the Variables DB.
To undo the Default Structure, select the symbol and use the right mouse key, then access the **'Set Default Structure'** command keeping the CTRL key pressed at the same time.



5.10. Array Variables

Array variables are one of types of variables that can be defined in the Movicon Real Time DB. The Array variables support the following element types:

- Sign Byte (8 Bit with sign)
- Byte (8 Bit without sign)
- Sign Word (16 Bit with sign)
- Word (16 Bit without sign)
- Sign DWord (32 Bit with sign)
- DWord (32 Bit without sign)
- Float (32 Bit single precision)
- Double (64 Bit double precision)

The following array types cannot be created:"Bit", "String", "Structure" Arrays or"Array" Arrays.

The Array type variables can have up to a maximum of 4096 elements. Considering that the first element is addressed with "0", for example if you take an Array with 10 elements, they would be addressed from "0" to "9".
The Array variables can be used in the different project controls and resources, such as the screen object, Alarms DataLogger-Recipes, Il Logic, etc. The syntaxes that can be used for accessing Array elements are:

- **Array[#]**
- **Array[IndexVar]**
- **Array[#].BitNum**
- **Array[IndexVar].BitNum**
- **Array.e#**

Where:
"#" = is a numeric value which represents the number of elements to be pointed to (i.e. Array[1])
"IndexVar" = is the name of a numeric variable that contains the number of elements to pointed to. It allows you to dynamically change the number of elements to be accessed (i.e. Array[VAR00001])
"BitNum" = is a numeric value which represents the number of the Array's element's bits to point to (i.e.Array[1].0)

All the above syntax can be used for accessing in Array elements in read/write and there is no need to enable the variables' "Intellisense" properties.

When opening the "Tag Browser" window for selecting a variable, you will find that the Array variables have a "+" cross on the left hand side of their name. When clicking on the Array, it will expand to show a list of its elements which can then be selected singularly.

Using Array Variables in Basic expressions

Array variables can also be used in the objects' basic expressions for which the following syntax can be used:

Array.e# ("Intellisense" property must be enabled)
[Array.e#] ("Intellisense" property can be enabled or disabled indifferently)

Variables CANNOT be used as element indexes and element bits CANNOT be accessed when using Array variable in basic expressions.

Basic expression examples

The VarArray1 is an Array variable type with its "Intellisense" property disabled:

[VarArray1.e0] + VAR00001
VAR00001 + ([VarArray1.e0] * VAR00002)

The VarArray2 is a array variable type with its "Intellisense" property enabled:

VarArray2.e0 + VAR00001
VAR00001 + (VarArray2.e0 * VAR00002)

Using Array variables in Basic Script code

The Array variables can be used within Basic Script Code for which the following syntax can be used:

Array.e# ("Intellisense" property must be enabled)
[Array.e#] (with or without enabling "Intellisense" property)
GetVariableValue("Array[#]") (with or without enabling "Intellisense")
SetVariableValue("Array[#]", 1) (with or without enabling "Intellisense")
GetVariableValue("Array[" & IndexVar & "]") (with or without enabling "Intellisense")
SetVariableValue("Array[" & IndexVar & "]", 1) (with or without enabling "Intellisense")

It is NOT permitted to access element bits when Using Array variables in basic expressions.

Examples of using Arrays in Script Code:

The VarArray1 is an Array type variable with its "Intellisense" property disabled:

```
VarValue = GetVariableValue("VarArray1[0]")
SetVariableValue("VarArray1[0]", 1)

VarValue = GetVariableValue("VarArray1[" & IndexVar & "]")
SetVariableValue("VarArray1[" & IndexVar & "]", 1)
```

The VarArray2 is an array type variable with its "Intellisense" property enabled:

```
VarArray2.e0  = VarArray2.e0 + 1
```

Events in Variables within Script Code

The element of an Array variable can also be used for managing a "Variable Script Event" for Basic Script and Objects. When selecting an Array element for managing a "New Event in Variable", the event created in the script will be the one inserted substituting the angled brackets with the underscore character. For example, when inserting an event in "VarArray1[5]" variable, the event will be inserted with this syntax:

```
Sub OnVarArray1_5_Changed(ByRef value As Variant)
```

Using Arrays between Parent-Child projects

The above described syntax can be used in Parent-Child architectures for accessing Array variables from the Parent project to the Child project and vice-versa. In this case you will also have to add the required syntax to all the variables for accessing Parent/Child resources.
Please take into account that when accessing from the Parent project to the Array variables of a Child project or from the Child project to Array variables of the Father project using a variable to define the array element's index to be pointed to, the variable's index will only be searched for within the variable's context in the project. For example, When accessing a Child project's Array, the index variable must be passed using the name of the variable only (without prefixes) and must defined in the Child project:

child1\VarArray1_Child1[ChildIndexVar1]

Where ChildIndexVar1 is the Child project.
The same goes when accessing Parent project variables from the Child project. The syntax uses is:

..\VarArray1[ParentIndexVar1]

where ParentIndexVar1 is a Parent project variable.

Examples of using Array variables between Parent and Child projects

Supposing we have a Parent project and a Child project called "child1" we could have:

child1\VarArrayChild1[0]
child1\VarArrayChild1[0].0
child1\VarArrayChild1.e0
[child1\VarArrayChild1.e0] + VAR00001
child1\VarArrayChild1[ChildIndexVar1]
child1\VarArrayChild1[ChildIndexVar1].0

..\VarArrayParent[0]
..\VarArrayParent[0].0
..\VarArrayParent.e0
[..\VarArrayParent.e0] + VAR00001
..\VarArrayParent[ParentIndexVar1]
..\VarArrayParent[ParentIndexVar1].0

Where:

VarArrayChild1 and ChildIndexVar1 are Child project variables.
VarArrayParent and ParentIndexVar1 are Parent project variables.

Importing Array variables from an OPC Server

When importing Array items from an OPC Server, Movicon will create the array variable with the same number of elements in the same type as the OPC Server's. However, if the OPC item is an array of values not supported by Movicon, for instance: Bit Array, Data Arrays, etc. The variable will be created as a byte or word Array according to the OPC type with element length equal to zero.

Even though Movicon does not support bit arrays, a bit array can be linked to a bit structure which the user can create with any number of elements.

Managing Bytes in Use

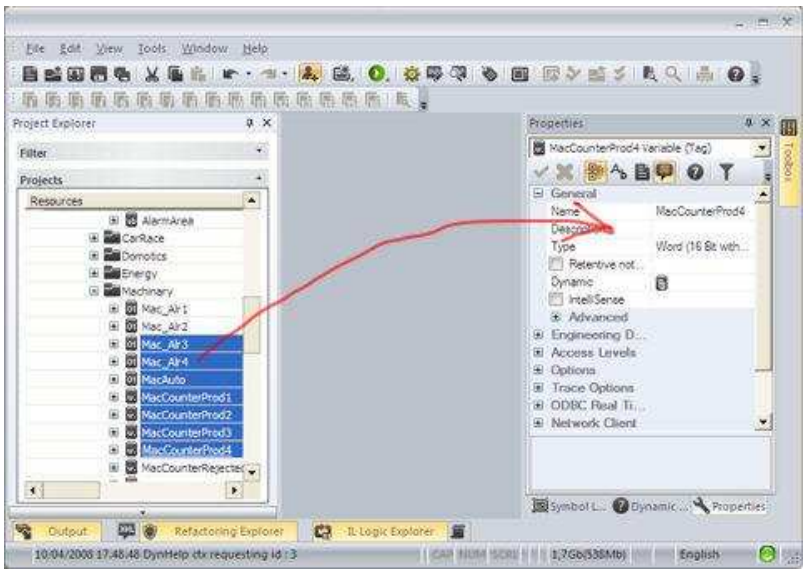
When an Array variable is exchanged with the field (Driver, OPC) or in Networking, the in-use byte count for licensing reasons is managed only those elements that are effectively in use in the project.

5.11. Variable Properties

The properties of Real Time DB variables are used to determine the variable's starting data area, the association of any commands or association with remote systems or database files.
To set or modify Movicon Real Time DB variables you need to use the **'Properties Window'**. The property window, which can be activated with the standard procedures, displays the variable's

property when it is selected from the 'Variables List (Tags)' resource from the 'Project Explorer' window.

Movicon allows you to carry out multiple variable selections for which only the properties common to all the variables selected will be enabled in the **'Properties Window'**. Any modifications carried out in anyone of these properties will effect all the variables selected.



As you can see in the figure above, by executing a multiple variable selection in the 'Properties Window' only some of the properties remain available being those common to all the variables. Any changes to the selected variables can be reported by modifying their properties altogether at the same time.

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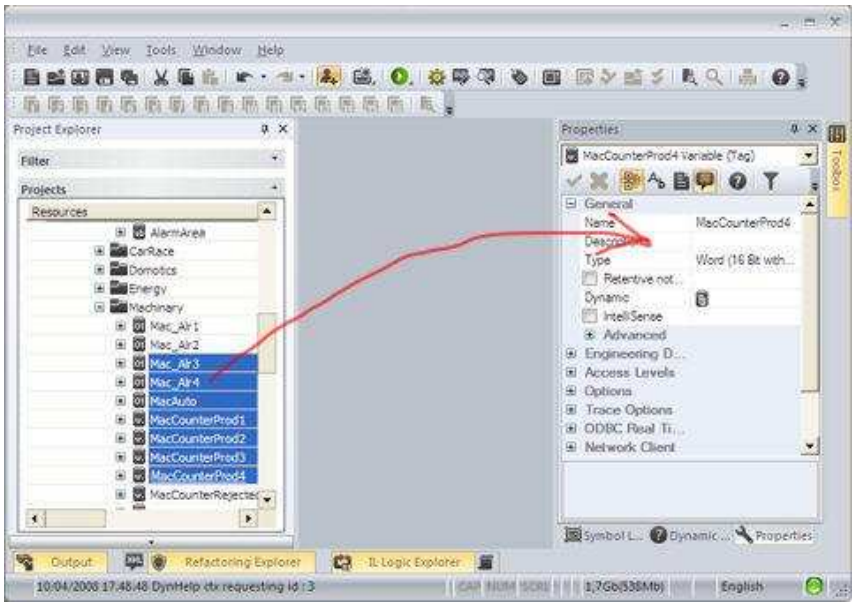


As you can see in the figure above, by executing a multiple variable selection in the 'Properties Window' only some of the properties remain available being those common to all the variables. Any changes to the selected variables can be reported by modifying their properties altogether at the same time.

5.12.1. General Variable Properties

You can associate the main data relating to the Movicon variables by using the general properties.
To modify the General properties of variables select the object with the mouse and use the Movicon 'Properties Window'.

Name

This edit box is used for entering the name to be assigned as an mnemonic code relating to the variable. The variable's name must be unique as it is used for identifying the variable anywhere in the project.
Movicon proposes the chars VAR followed by a progressive number for default. The default name can be replaced by another name as pleased.

The text for the variable's name must not have any spaces or characters that are not alphanumeric. Any reserved spaces or characters can be replaced with the '_' character.

Description

This edit box allows you to type a text string which can be used as a comment to describe the variable within the Real Time DB.

This description will remain associated to the variable but it will only be available inside the Real Time DB.

Type

This selection is used to specify the type of data represented by the variable in the Real Time DB. The list box will propose the following data types:

Bit
Byte with sign / Byte without sign (8 bit)
Word with sign / Word without sign (16 bit)
Doubleword with sign / Doubleword without sign (32 bit)
Float (32 bit single precision)
Double (long) (64 bit double precision)

String (each character one byte + termination character 0)
Byte array (fixed length with starting address and byte number)
Fixed Length Array
Structure: A list of Structure types available will be listed if present on the 'Structure Prototypes' group.

See paragraphs "Array Variables" and "Structure Variables" for further information on these variable types.

Element type for Array

This property is used for selecting they element type for the Array variables. This property can only be selected if the 'Fixed Length Array' option has been chosen in the "Type" field. The available element choices:

- Sign Byte (8 Bit with sign)
- Byte (8 Bit without sign)
- Sign Word (16 Bit with sign)
- Word (16 Bit without sign)
- Sign DWord (32 Bit with sign)
- DWord (32 Bit without sign)
- Float (32 Bit single precision)
- Double (64 Bit double precision)

Initial Quality

This selection lets you define the variable's initial quality. This setting is significant for those variables which are to be exchanged with other devices or programs, eg. through communication drivers, OPC, Networking. This property is very useful when finding out whether the variables which are read by the field are updated correctly and contain valid values. The variable quality states can be:

- **Good**: valid data
- **Uncertain**: the data has not yet been updated and therefore is not definite
- **Bad**: data is not valid
- **Not Connected**: not connected to field therefore data is not defined

Retentive not Shared

The variable's retentive is enabled when declared as 'Not Shared' area type.

Area

This property is used for defining the data area type in which the variable is to be mapped. The options are:

- **Not Shared**
- **Input**
- **Flag**
- **Output**

When you select the 'Not Shared' data area, it will not be necessary to define the variable's absolute address as this will be automatically allocated by Movicon without making any errors of superimposing unwanted addresses. When you use the Input, Output and Flag areas you can associate an absolute address to the variable but special attention must be paid as not to superimpose unwanted addresses.

It is advised to always use the 'Not Shared' areas when possible so as to avoid superimposing unwanted addresses.

The variables belonging to the 'Not Shared' areas can be exchanged with the field just like the ones belonging to the Input and Output areas.

Address

An absolute address must be specified for variables mapped in the Shared (Input, Flag, Output) data areas. The Movicon Shared memory is addressed in bytes. When having to address a bit you must use the 'x.x' syntax (eg. 10.5 = byte 10 bit 5) .

This field is enabled automatically when the variable has been defined as a "Fixed Length Array", even though the "Not Shared" internal area has been selected. The internal address, however, will be used for defining the number of array elements using the "x(x)" syntax. For instance, when entering "10(5)" an array with 5 elements will be defined starting from the 10 address. In this case the variable's start address will not have any meaning but only the parameter indicating the number of array elements will be considered. The Array variables can be defined with a maximum 4096 elements.

It is advised to always use the ' Not Shared' areas when possible so as to avoid superimposing unwanted addresses.

Auto Alloc

This command allows you to assign a free address to the variable ("Address" property) within the selected shared area.

Dynamic

This property is used for associating the variable to a network item, an OPC Server tag or a communication task, directly. You can type the command line, using the appropriate syntax, directly into the appropriated box, or use the 'Tag Browser' window which appears when double clicking the mouse on the edit box.

The syntax which will be reported in the property's box is as follows:

Networking Syntaxes

[NET]||ComputerName|VariableName

where:
[NET] = Movicon suffix which identifies a network connection
ComputerName = Name of remote computer Server
VariableName = Name of variable in Server project to be connected

OPC Syntaxes

[OPC] ServerName.Version|DeviceName.GroupName.TagName

where:
[OPC] = Movicon Suffix identifies a OPC connection
ServerName = Name with which the OPC Server registered in the operating system
DeviceName = Name of device configured in the Server
GroupName = Name of the tag's starting group.
TagName = Name of tag configured in the Server

Driver Syntaxes

[DRV]DriverName.Sta=StationName|Addr=TagAddress

where:
[DRV] = Movicon Suffix identifies a connection to a Communication Driver
DriverName = Name of Communication Driver to be used
StationName = Name of station configured in the driver
TagAddress = Address of Tag in the device (use the device's syntax)

If the variable has a dynamic link (Fixed I/O address) towards communication driver which hasn't been installed, the variable's quality will automatically get set to "Not Good".

OPC Group Name

The name of the OPC Group to which the variable is to belong is entered in this field. This setting only has meaning when the OPC link has been inserted in the variable's "Dynamic" property. When no Group name is entered Movicon will insert the dynamic tag in a generic group purposely created for dynamic tags.

Enable Statistic Data

Enable the statistic data for the variables in question. In this case you will get minimum, maximum and average variable value availability plus other information. To access this information you need to use the variable's appropriate Basic Script functions, such as "DBVarObjCmdTarget.StatisticDataMaxValue", "DBVarObjCmdTarget.StatisticDataMinValue", etc..

Statistic data can be moved from one variable to another by using the appropriate commands in the "Variable Commands List".
The variable statistic data, only if retentive, is persistent. The variable's statistic data is then save in the variable's retentive file together with other already existing data (values, quality and timestamp etc.).

IntelliSense
When enabled, this property consents you to add the variable to the VBA's 'IntelliSense, so that it becomes available in the popup list that appears when pressing the "Ctrl+Space" keys inside the basic script code (also see the section on "IntelliSense use for RealTimeDB variables").

It is a good rule of the thumb to set the "IntelliSense" option only for those variables that really need it. This is due to the fact that the operation to populate the IntelliSense when a script is opened or executed, could cause performances to slow down when number of variables enabled with the "IntelliSense" option is high (i.e. putting thousands of variables in order).

RESTRICTIONS: the IntelliSense never shows local screen variables and will not populate with variables enabled with this option if used in the "Dynamic Property Explorer" window.

Attention! When a Structure or Byte Array variable has its "IntelliSense" enabled, it cannot be used directly without specifying members. When used without specifying members, only one element of the array or structure variable will be read or written and not all of it.
For instance, lets consider that VAR00001 and VAR00002 are two Byte Array variable types, with the same number of elements the following code will have two different results according to the "IntelliSense" option:

```
Sub Click()
        VAR00001 = VAR00002
End Sub
```

"IntelliSense" Option = True -> Only the first byte of the "VAR00002" Array variable will be read and written in the first byte of the "VAR00001" variable
"IntelliSense" Option = False -> All the bytes of the "VAR00002" variable are read and written in the "VAR00001" variable bytes

This difference is due to the fact that the variable enabled with the "IntelliSense" option is considered by the basic script as an object with a series of properties (the variable's elements), and one of these properties (array item) is taken as a predefined property in cases where not specified.

Enable Member Properties
This check box allows you to enable the possibility to edit the properties of one member from a structure variable. This option only shows when a structure member has been selected and doesn't shoe for ordinary variables.
For further information please refer to the section on "Modifying Structure Member properties".

5.12.2. Variable Engineering Data Properties

By using the variable's Engineering data you can execute the variable's value scale. In this way the variables coming from the field are read and the scaled value is written directly in the variable.
To modify Variable Engineering Data Property select the object with the mouse and use the Movicon **'Properties Window'**.

The variable scaling is linear type only and is only significant for variables exchanged with the field. To execute scalings between variables within the project you will need to use the appropriate 'Scaling Objects List' resource which can be accessed through the 'Project Explorer' window.

Initial Value
This property allows you to specify the initial value to be used for a "Not Retentive" variable. At project startup the variable is set with its initial value before the project's logic is run. A retentive

variable (only when in a not shared area) is not initialized on the initial value if there is a valid value in its retentivity file.
Please note that this property is not supported in the basic script interface.

The initial quality value, if used, is set by using the following the rules:

- Integer numeric variables: any value can be set, even those preceded with the +/- signs. The positive number will be considered if a sign is omitted.
- Numeric variables with floating point:: numbers need to be set using the same decimal point configured in the Windows international settings, as separator.
- String variables: any ASCII or Unicode character can be set. The project will need to be set as "unicode" when using unicode characters so that they will get saved.
- Byte array variables: when setting the values of each single byte you will need to separate them with a comma and a space like this: var_array(3) = "125, 256, 34".
- Structure Variables : the values of each single byte will need to be set by separating them with a comma and a space like this: var_structure(1 byte + 1 word) = "125, 256, 34".

Default Format

This allows you to enter the format preset for default for displaying variable. The format types available are only those listed in the "Predefined Movicon Formats" paragraph from the "Data Formats" section.
The variable format set will be used in displaying data in the following objects:

- In the **display object** set for displaying variables and not set with a different format in its properties
- In the **numeric pad** to format values displayed in edit boxes. The numeric pad can also manage formats with integer numbers with floating points. Therefore, integer variables can be used for displaying and setting values with floating points, as with the display object, by using a format that includes decimal figures (ie. "x.xx"). If the numeric pad is used with variables without formats, it will behave by default using its base "%.g" format
- **Trend and Data Analysis objects**: are displayed according to the pen variable value format and, as a consequence, the pens scales as well.
- **Meter objects**: are displayed with scales formatted according to the variable format
- **Alarm Window Object**: the variable's format is used for defining the display value format of the variable inserted in threshold's alarm text when using the "%(VAR00001)" syntax. In cases where nothing is specified in the variable's "Default Format" property, the "%f" default value will be used.

Caution: The format set in objects that display the variable have priority over the format set in the variable. If you want to use the format set in the variable, you must leave the "Value Format" field empty in the object displaying the variable.

Caution: Display formats in numeric pads created on screen (see template library), are in "%G" so that variables can be displayed in the most compact form possible. In any case, values with floating points in integer numbers can be set using a preset variable format which included decimal figures.

Note: This function can also solve the problems of variables with floating point approximations (floating points in 32 bit) when displayed in numeric pads. The numeric pad will round off numbers with decimal points, as set in the variable format.

Engineering Units

By using this property you can associate the engineering units to the variable. This will be displayed in the controls provided for this property's management.

Close bit String

When the variable is Bit type, it can be associated with a text string to identify the variable's Close value, being when the bit assumes a value other than zero. In this way, by displaying the variable in the **"Watch Window"** the string will appear directly, replacing the binary value. In addition to this, if the variable has been inserted in a Datalogger, the recording of the variable will show the string's caption instead of the value "1". The DataBase field, for bit type variables, is in fact defined as string type.

This property is available for the "Check Box Button" and "Radio Button" objects when inserted in a Movicon "Report Interno" object. The moment boolean data is recorded using the DataLogger, it is executed by inserting a string data type in the database, when this data is associated to a "Check

Box Button" or "Radio Button" object, the correspondence between the boolean value and the string value recorded in the table field will need to be specified. In this case the text corresponding to the one registered in the database when the boolean value corresponds to "True" should be inserted in the "Check Box Button" or "Radio Button" object's "Open Bit String" property. By doing this the "Check Box Button" will be displayed with a tick when the table field value corresponds to the "Open Bit String" set in the object. In cases concerning the "Radio Button", which is set with only two options, the second option will be marked.

Open Bit String

When the variable is Bit type it can be associated with a text string to identify the variable's Open value, being when the bit assumes the zero value. other than zero. In this way, by displaying the variable in the **"Watch Window"** the string will appear directly in the place of the binary value. In addition to this, if the variable has been inserted in a Datalogger, the recording of the variable will report the string's caption instead of the value "0". The DataBase field, for bit type variables, is in fact defined as string type.

This property is available for the "Check Box Button" and "Radio Button" objects when inserted in a Movicon "Report Interno" object. The moment boolean data is recorded using the DataLogger, it is executed by inserting a string data type in the database, when this data is associated to a "Check Box Button" or "Radio Button" object, the correspondence between the boolean value and the string value recorded in the table field will need to be specified. In this case the text corresponding to the one registered in the database when the boolean value corresponds to "False" should be inserted in the "Check Box Button" or "Radio Button" object's "Close Bit String" property. By doing this the "Check Box Button" will be displayed with a tick when the table field value corresponds to the "Close Bit String" set in the object. In cases concerning the "Radio Button", which is set with only two options, the first option will be marked.

Enable

This setting enables or disables the variables scaling property.
The mathematic formula for a variable scaling is:

SCALED = ((SCALED_MAX - SCALED_MIN) / (RAW_MAX - RAW_MIN) * (RAW - RAW_MIN)) + SCALED_MIN

Where:

Input: RAW
Input Min: RAW_MIN
Input Max: RAW_MAX
Scaled Min: SCALED_MIN
Scalde Max: SCALED_MAX
Output: SCALED

Inverse

By enabling this property the scaling will be executed in reverse. For instance if the following was set:

Raw Max. Value = 100
Raw Min. Value = 0
Scale Max. Value = 1000
Scale Min. Value = 0

When the variable obtains the raw 0 value, the scaled value will be 1000 and when the variable obtains the 100 value the scaled value will be 0.
The mathematic formula for a variable inverted scaling is:

SCALED = ((SCALED_MAX - SCALED_MIN) / (RAW_MIN - RAW_MAX) * (RAW - RAW_MIN)) + SCALED_MAX

Where:

Input: RAW
Input Min: RAW_MIN
Input Max: RAW_MAX
Scaled Min: SCALED_MIN
Scalde Max: SCALED_MAX
Output: SCALED

Dead Band
This property is used for specifying the value to which the scaled data will be set the moment the raw value of the variable should exceed the maximum or minimum set limits. This property is set at '-1' for default.

Raw Max.
The maximum unscaled value that the variable can obtain.

Raw Min.
The minimum unscaled Value that the variable can obtain.

Scale Max.
The maximum scaled value that the variable can obtain.

Scale Min.
The minimum scaled Value that the variable can obtain.

Enable Factor
This property allows you to use the Gain and Offset factors for scale calculations. The expressions become:

(Value * Gain) + Offset

You must consider that in this formula the"Value" parameter refers to the Movicon variable and not the Communication Driver's value. Therefore the most explicative formula would be:

DriverValue = (Movicon Value * Gain) + Offset

Inverse Factor
This property consents the inverted use of the Gain and Offset factors for scale calculations (you will also need to check the "Enable Factor" property). The expression will become:

You must consider that in this formula the "-value" parameter refers to the Movicon variable and not the Communication Driver's value. Therefore the most explicative formula would be:

DriverValue = (Movicon Value - Offset) / Gain

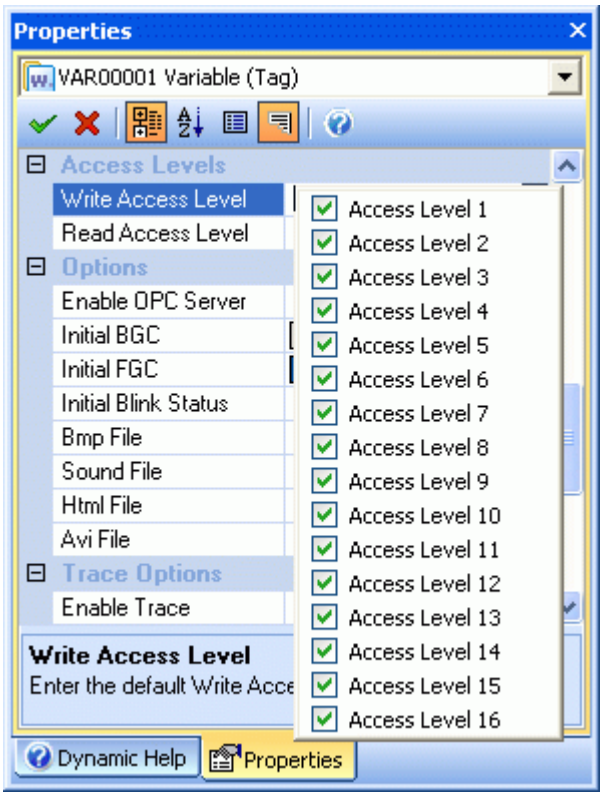
Gain
The Gain value for the scale calculation with the use of multiplication factors.

Offset
The Offset value for the scale calculation with the use of multiplication factors.

5.12.3. Variable Access Level Properties

You can enable default access levels in write or in read for the selected variable by using this Access Level property.
To modify the Access Level property select the object with the mouse and use the Movicon **'Properties Window'**.

There are 16 access levels and they can be selected singularly, one by one.



Write Access Level

The Access Levels can be set through this property for the selected variable in write. In addition to this, the access level of a variable in write is also considered for the users management in the project. A variable can be written:

1. Always when the password management is disabled
2. Always when the "Write Access Level" property is set with the "0000" value (default value)
3. In situations where points 1 and 2 do not count, only when the user's "Access Level" mask encounters the variable's "Write Access Level" mask

Setting Write Access Levels for NON default variables: the Server will not accept any modifications done to non default variable values by users granted access from the Client to the Server through the network services, who do not have access rights to certain non default variables.

Read Access Level

The Access Level can be defined through this property for the selected variable in read.
For further information on 'Access levels' please refer to the **"Read Access Levels"** paragraph.

In cases in which the variable can be selected in the "Hour Selector" window set for viewing plans in "Grid" mode, this Access Level allows the variable in the selection list to be available based on the Access Level of the user logged on .
For further information "Access Levels" please refer to the paragraph on "Users Levels and Access".

Setting Read Access Levels for NON default variables: Client users granted access to Server, through the network services, will not have access right to those variables which will not be subscribed by the Server and therefore will result as being not connected to on the Client side.

Always Visible

When enabled, this property will render the variable always visible, therefore available for selecting for those environments which require it.
This option is usually used in the following environments:

- In the "Scheduler Window" to determine which variables are to be made visible in the Variable list and therefore selected for commands (only for "Scheduler Windows" in Grid mode)

- When using the Network Server Tag browser, for instance for setting dynamic addresses, where variables are to be always visible and selectable even when the user connected to the Server does not have read access rights

When this option is not set (disabled for default), the variable will only be made visible and selectable in Runtime if the project has the user management active, and the user wishing to access has an access level compatible with the that set for the variable.
For further details on "Access Levels" please refer to the paragraph on "User Levels and Access Levels".

5.12.4. Variable Options Properties

Through this Variable Options Property you can enable the variable to be swapped via OPC and via Movicon Networking.
To modify the Variable's Options properties, select the object with the mouse and use the Movicon '**Properties Window**'.

Enable OPC Server

Enabling this property will make this variable available to other OPC Client applications.
To connect variables through the OPC Server to OPC Client applications, after having first configured the Movicon OPC Server settings, you need to configure the variables to be connected when enabling this property. Therefore variables will be defined causing a tag to be created.
The Tag is a connection to the Movicon variable made available to OPC Clients.

This operation is not absolutely necessary as tags can also be dynamically defined by a OPC Client by previously selecting the corresponding enabling in the Movicon OPC settings. However all the tags defined through enabling the 'Enabling OPC Server' property are displayed in a item list in the OPC Client and therefore can be viewed and quickly selected.

If the OPC Server RealTimeDB's "OPC Dynamic TAG" property is enabled, any project variable will be published in the OPC Server's address space upon access by an OPC Client using the appropriate dynamic syntax, and this also happens when the variable's "Enable OPC Server" is disabled.

Whenever you wish to use the OPC Server functionalities, you will have to enable and specify the OPC Server functionality from the project's "Real Time DB OPC Server Settings". How use the OPC functions are described in the respective section.

Access Rights

This property is used for selecting which type of access to use by the OPC Client to access the Movicon OPC Server.
The values that can be used are:

- readable
- writable
- readable-writable

When the variable is "Readable", it will only be possible to read and not set a value from an OPC Client. When the variable is "writable", it will only be possible to wet the value and not read it and therefore the communication quality will result always as "Bad".

Opening a project from a previous Movicon version will set the value in this property to readable-writable.

Enable Network Server

When enabling this property the variable is made available for sharing with other Movicon applications through the Networking functionalities.

Initial BGC

Through this property you can associate an initial background colour to the Variable. This property can be interpreted by the OPC Client if predisposed with the necessary functionalities.
For further information please refer to the paragraph on **'Threshold Colour Settings in Drawings and Controls'**.

This value when different from the default value, is also used in Runtime for animation in some objects. For example, it is used for Trend pen colours.
If you wish to return back to the default value, just open the pen color window with the mouse while pressing down the 'Control" ((CTRL) key.

Initial FGC

Through this property you can associate an initial border colour to the Variable. This property can be interpreted by the OPC Client if predisposed with the necessary functionalities.
For further information please refer to the paragraph on **'Threshold Colour Settings in Drawings and Controls'**.

This value, when different to the default value, is also used in Runtime for animation in some objects. For example, it is used for Trend pen colours.
If you wish to return back to the default value, just open the pen color window with the mouse while pressing down the 'Control" ((CTRL) key.

Initial Blink Status

By means of thie property you can associate the initial blink status to the Variable. This property can be interpreted by the connected OPC Client if predisposed with the necessary functionalities.

Bmp File

By means of this property you can associate a Bitmap file to the Variable. This property can be interpreted by the connected OPC Client if predisposed with the necessary functionalities.

Sound File

By means of this property you can associate a Html File to the Variable. This property can be interpreted by the connected OPC Client if predisposed with the necessary functionalities. This property can also be used for executing a customized sound to the eventual alarm associated to the variable. For further information on this please refer to the paragraph titled "Alarm Threshold Style Properties".

Html File

By means of this property you can associated a Html file to the Variable. This property can be interpreted by the connected OPC Client if predisposed with the necessary functionalities.

AVI File

By means of this property you can associate an .AVI file to the Variable. This property can be interpreted by the connected OPC Client if predisposed with the necessary functionalities.

5.12.5. Variable Trace Options Proprieties

You can record on database all the Movicon variable value changes by means of using the Trace properties.
To modify the Trace Options Properties of a variable. select the object with the mouse and use the Movicon **'Properties Window'**.

If an ODBC link is used, the database containing variable Trace information will be created automatically by Movicon in the project's DATAfolder with the name "NameProject_TraceDB.mdb" in Access2000 format. The file name and ODBC link can be customized through the "Real Time DB Trace DB Settings" property from the 'Real Time DB' resource. A table will be created within the database for each variable enabled with the Tracer.
If an IMDB link is used,will be created automatically by Movicon in the project's 'LOGS' folder a file ".dat" and ".xml" for each variable enabled with the Tracer.

If the "Notify TimeStamp Changes" property has been enabled in the RealTimeDB "InUse Variable Manager" property group, the TraceDB will insert a new record even when the variable's TimeStamp changes only and not its value.

Enable Trace

This property enables or disables the trace management of the selected variables.

If the trace is enabled for a structure variable, Movicon will create one table only with the Structure Variable's name. However, the names of the Member variables which underwent changes will also then be inserted in the "Changer Column" field.

Table Name

By using this property you can define the name of the table where the trace data for the variables selected is to be recorded. If this field is left empty the table's name will be the same as the variable's name.

If the same "Table Name" is set in a diverse number of variables, these variables will then be able to share the same table. This will allow you to get different variables trace data recorded all on the same table.

For further information please see the paragraph entitled "Variable Tracing (Audit Trail)" .

Data Max.Age

This field is used for defining the how long the trace data is to be stored before being recycled. The time entered should be based on how frequently the variable changes to avoid creating tables with too much data. Practically speaking, more frequently the variable changes, more the recording time should be reduced.

For further information please refer to the paragraph: "Archive Sizes".

The maximum recording time is to be inserted according to your requirements, keeping in mind the frequency of variable changes and the kind of database to be used. For instance when using a Access2000 database you will more limited with the recording data quantity than you would be with a SQL Server database.

Enable Day Timeframe

This setting is used for enabling a recording day timeframe when the variable's trace functionality has been enabled. In this case the variable's trace recording will be executed only within the time specified in the **'Timeframe from'** and **'Timeframe to'** properties.

Timeframe from

The time in which the variable's trace starts is set here when the **'Enable Day Timeframe**' option has been enabled.

Timeframe to

The time in which the variable's trace ends is set here when the **'Enable Day Timeframe**' option has been enabled.

Add Msg to SysLog

When this setting is enabled a message will be recorded on the 'SysLog' (System Messages' Historical log) every time the variable's value changes. This setting is only valid if the variable's trace is enabled. Also information reported in the database will be recorded in the Historical Log file.

Add Variable Description Column

Enabling this setting will also add the "Description" of the variable being traced to the "Variable Description (TagDescCol)" column in the record table.

For further information please refer to the topic on "Variable Tracing (Audit Trail)".

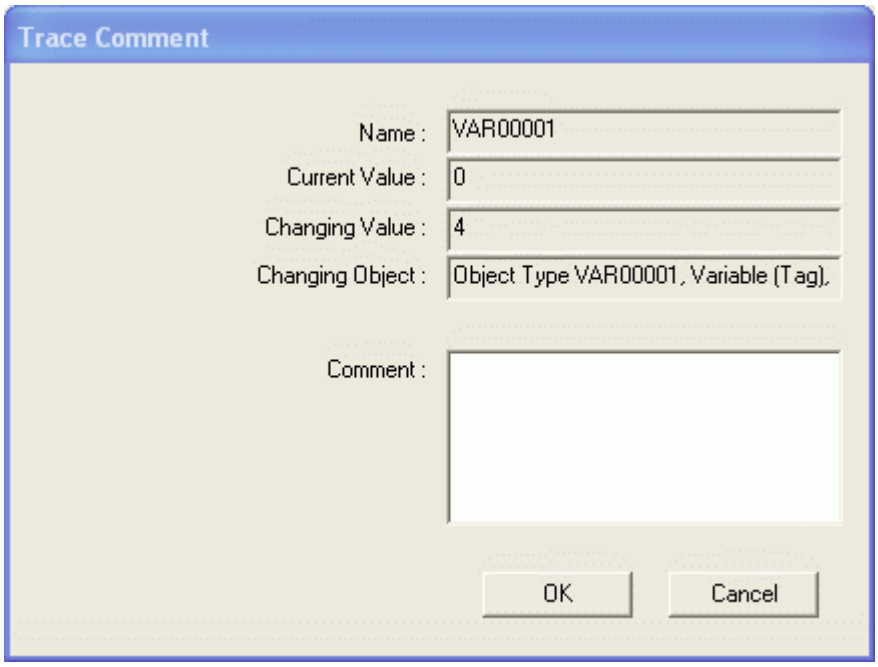
Add Variable Group Column0

Enabling this setting will also add any Group to which variable, being traced, belongs to the "Variable Group(TagGroupNameCol)" column in the record table.

For further information please refer to the topic on "Variable Tracing(Audit Trail)".

Trace Comment

This setting, when enabled, allows you to insert a comment in the variable's trace Database each time the variable under goes any changes. This comment will be recorded in the **"Action"** field replacing the text written by Movicon for default. The following will open each time a variable undergoes a change:



At this point the user can insert a comment in the appropriate window and confirm with "OK". The variable's value will only change when the user has confirmed with the "OK" key. If the "Cancel" button is pressed, the variable will not be changed and will keep its previous value.

You should take into consideration that comment do not need to be entered for those changes made to variables from logic which are not subjected to events undertaken by users. For example, this category includes the project or screen IL Logic, Communication Drivers, and the OPC. The window for entering comments will be called if the variable is changed by: Basic Script codes, controls taking action on variables, variable setting commands and in any point of the project they are set.

When the 'Trace Comment Window ' is opened on screen, the variable's value is frozen. Any other process, such as Communication Drivers, IL Logic and Basic Scripts cannot be change the variable's value.

When the **"Add Msg to SysLog"** property is enabled, the comment will also end up in the "DescCol" column from the "SysMsgs" table.

You can customize dialog window's character's font and size by using the appropriate registry keys:

TraceCommentFont
TraceCommentFontSize

Modifying the font or its size will also change the dialog window's sizes.

Create DB Table

This command executes the creation of the Variable Trace table within the database. If a table already exists it will be cancelled along with its next recreation when this command is executed. This means that any previously recorded data will be lost.

5.12.6. Variable ODBC Real Time I/O Link Properties

By using the ODBC Real Time I/O Link properties of a variable you can share a variable with a Database for the purpose of making the variable's value also available to other applications capable of reading/writing Database files. The link between the variable and the Database is carried out through the Windows ODBC driver. The ODBC link can be created or modified through the **"ODBC Real Time I/O Link Settings".**

To modify the Real Time DBMS properties of a variable you have select the object with the mouse and use the Movicon **'Properties Window'**.

Where the database linked to the RealTimeDBMS function management is concerned, the engine that updates this function always executes the UPDATE query first to update values currently saved on the table, and only if this query should fail will it execute the INSERT query of the new value.

Enable ODBC Sharing

This property allows you to enable the variable which is to be shared with the Database enabled for this purpose. For further information please refer to the section on "Variable Sharing with ODBC".

Update Quality

By enabling this property the variable's quality state will be updated according to the status of the ODBC link. If any errors are generated by the variable's ODBC link the quality status will change to 'Not Good'.

Reading Refresh Time

This setting expresses the time (in milliseconds) with which the reading refresh of the variables from the Database takes place.

I/O Mode

The operating modes of the ODBC link for the specified variable is set in this option box. The operating modes are:

- **read**: means that the variables on the Movicon side are read with a preset frequency time ("Reading Refresh Time"). If this data DOES NOT exist on database the value will not be modified in the application, and if the variable is retentive, it will keep its last value. However the variable's 'quality' can be managed to get information on the value type (when the quality is 'good' this means that the value is the one read from the database, otherwise means that a value has not been set for the variable on database)
- **write**: means on each variation of the variable's value, Movicon will insert the data on database. If the record exists it will be updated otherwise the data will be inserted
- **read-write**: Movicon keeps the variable of the Movicon project and the relative field of the linked Database file at the same value. Any variations of one of the two will consequently cause the other one to change, whether to the project locally or in the Database file. In any case, Movicon will NOT write anything at the Startup the data will be written when the first variation takes place in order to be more flexible

5.12.7. Variable Network Client Properties

This variable 'Network Client' properties allow you to establish a connection between one project's Real Time DB variable to another Movicon project's variable existing on a network station, by using standard protocols such as TCP/IP.
To remote connect in Networking means the dynamic connection between variables contained in the Real Time DB of two of more Movicon PC stations.
The remote connection functions (Networking) are enabled in Runtime only when the appropriate option is active on both the hardware keys (PC Client and PC Server).
To modify the Network Client Properties of a variable, select the object with the mouse and use the Movicon **'Properties Window'.**

Caution! When using structure variables, any string type member variables will not be supported and their values will not be updated. The string type variables can be exchanged in networking only when they are part of a structure variable.

Enable

This property allows you to enable the Networking connection between local project variable/s and another Movicon Station set up as Server.
The variables status notifications are managed by Movicon are 'event-driven', which means that only notification of status variations are given to optimize the network use.
The connection can use any network capable of supporting the protocols listed in the 'Tranport' property, including RAS modem connections, as hardware support.

Update Quality Status

This property only has meaning when the variable is connecting in Network to a Server. Based on the settings in this property, the Variable's quality status will be set in the Client as follows:

- **Update Quality Status = true:** the variable's quality in the Client will be the same one in the Server, except when the variable has still yet to connect ("uncertain") or when there is an error in the network connection ("bad"). When variables are connected to the Server in "read" or "read/write", their status quality will not be transmitted to the Server in the event of any to modifications to them on the Client side. This means that status quality of variables on the Server side will not get modified. When the variables are connected to the Server in "write", any modifications to these variables on the Client side, the quality status will be transmitted to the Server. Therefore the variables' quality in the Server will be managed based on the "Update Quality Status" option set in the Server.
- **Update Quality Status = false:** the variable's quality status in the Client will be set based on the connection status with the Server, "good" if connected correctly, "uncertain" if still yet to connect and "bad" if there is a networking connection error. However in this setting the client's variable's quality status does not influence the Server's variable quality and any modifications to variables on Client side will trigger transmit the quality status to the Server. Therefore, the quality of variables on the Server side will be managed based on the "Update Quality Status" option set in the Server.

The "Update Quality Status" is also managed by the Server (even though, as in this case, the "Enable Client" property has been disabled). The quality status of the variable, on the Server side will be set as below based on the this property's settings:

- **Update Quality Status = true:** when the Client modifies a variable, if the quality status gets transmitted to the Server in addition to the value, the quality of the variable on the Server side will get set to the one transmitted by the Client.
- **Update Quality Status = false**: the quality of the variable on the Server side will not get modified when the Client notifies any changes.

Update Quality

By enabling this property the variable's quality status will be updated according to the status of the Networking connection. If an error is generated in the Networking connection the quality status will change to 'Not Good'.

Network Server

The name or IP address of the connected PC Server station must be entered in this edit box.

Backup Network Server

The name of the Server PC Station, to be connected to, or its IP address must be entered in this edit box for cases when the main Server is not available. The IP address of any secondary network card of the main Server may also be entered.

The name or IP address of the Secondary Client is also entered in this field for when the Client has to connect to a Redundancy system (re. **"Redundancy"**). In this case the Network Server will be the Primary Server and the Backup Network Server will be the Secondary Server.

Network Server Variable

The mnemonic code of the Server project's variable, to which the selected local variable is to connect to, is entered in this edit box. When using the 'Tag Browser' to select the variable directly, you can only select the variable name from those existing in the local Real Time DB and not those existing in the Server project.

When the 'Network Server Variable' is left empty, Movicon will execute the local variable connection to the Server variable which has the same name. This can only be done if this variable exists in both projects (Server e Client).

When connecting variables of different types, Movicon will carry out data conversions to adapt the variable in read to the type of variable associated. However it is the programmer's responsibility to avoid any data lose generated by the conversion (i.e. passing over from 32 bit in read to 16 bit in write).

Mode

The Network connection operating modes for the specified variable are set though this option box:

- **Input**: Movicon reads the specified variable's value from the connected Server's Real Time DB and writes its contents on the variable from the local project's (Client) Real Time DB
- **Output**: Movicon writes the value contained in the variable of the local project's (Client) Real Time DB on the variable of the connected Server's Real Time DB
- **Input/Output**: Movicon keeps the connected variables at the same value. Any variations of one of the two will consequently change the one connected, whether in the Local project (Client) or in the Server project

Priority

This property is used for associating a priority level to the connection in question. The values are from 0 to 100. The highest number corresponds to the highest level and therefore a maximum of a 100 priorities can be used. The value inserted for default by Movicon is '-1', that is by selecting the priority set in the **Client Settings** or in any associated **Client Rules**.

5.13. Associating Alarms to Variables

Movicon has a very handy functionality which can be used when the project has many alarms with similar text messages and are of the same type associated to a series of different variables.
A description of this powerful Movicon feature can be found in the section headed "Alarms as Templates".

Associating an Alarm to a Variable (or a group of variables) can now be done by just clicking the right mouse key on the Variable desired in the "Variable List" group in the "Project Explorer" window and by selecting the "Associate an Alarm" command, or by using the same command in the Project Explorer's "Command Window".

5.14. Associating Data Loggers and Recipes to Variables

Movicon has a very handy function which you can use when needing to set many variables associated to the same Data Logger in the project.
A description of this powerful Movicon feature can be sound in the section headed "Data Loggers as Templates".
The association of a Data Logger to a Variable an be done by right mouse clicking on the Variable in the 'Variables List' group found in the 'Project Explorer' window and selecting the 'Associate a DataLogger/Recipe' command or by using the same command also found in the Project Explorer's 'Commands' window.

The request to associate a Data Logger/Recipe will open a further window containing the list of Data Loggers/Recipes available and which were inserted beforehand;

5.15. Associating Events to Variables

By using the Movicon 'Event Object' you can create a list of events, each one to be executed upon the change of its associated variable. A list of commands to be activated can be programmed for each event. However this procedure can be inverted by associating a specific event to a variable. This procedure is very handy when diverse variables have to execute the same list of commands, therefore the same event. In this case it would be much easier and faster to create only one event to which associate the command list desired, then associated this event to the variables of interest.

The association of an Event to a Variable can be done by clicking the right mouse button on the Variable in the 'List Variable' group presented in the 'Project Explorer' window and selecting the 'Associate an Event' command, or by using the same command also found in the 'Project Explorer's 'Commands' window.
A description of this powerful Movicon feature can be founded in the section headed Events as Templates.

5.16. Grouping Variables

Variables can be put into one or more groups within the "Real Time DB" resource. The **"New Variable Group..."** command can be accessed with a right mouse click on the resource or from the command list. The created groups cannot be renamed or cancelled (they do not have properties) from the "Real Time DB" window. They are automatically deleted when they do not contain any variables but only disappear from the "Real Time DB" when the project is reopened in development mode.
Since the order by and filters are applied according to the resource type selected only, the use of the variables groups is useful for speeding up these operations in projects with a very high number of variables.
Groups which are created in this way are also made available from the Movicon "Tag Browser" window.

When adding a new variable in the 'Tag Browser' window, it will be added to the main Variable list root. If, however, a variable group has been selected within the Project Explorer Window, the new variable added withiin the Tag Brower wndiow will get inserted within this group.

The "Group" property is found in the "DBVarObjCmdTarget" Basic Script interface and allows you to retrieve the group which the variable belongs to.

When using an alarm as a template, with the alarm's "Alarm Area" property left blank and the associated variable belongs to a variable Group, the alarm will be created belonging to the area with the same name of that variable's Group. For example, associating a digital alarm as a template to the "VAR00001" variable inserted in the "Group1" group, the alarm will be created belonging to the "Group1" area.
In addtion, if the variable is inserted in a sub-group, the alarm area will obtain the name composed of the groups' names separated with the "." character. For example if the "VAR00001" belonging to "Group1" is inserted into "Group2", the alarm will then belong to the "Group1.Group2" area.

5.17. Pointing to a Variable's Bit

In certain cases you may need to "read/write" one single bit of a variable (byte, word, etc). Movicon allows you to execute this operation by using the "VariableName.numbit" syntax. For instance if you want to probe the 0 bit of the "VAR00001" variable declared as Word type, you must write:

VAR00001.0

This type of syntax is supported in almost all the project's resources. You can use it in the following environments:

- Symbol animation properties
- alarms
- IL Logic
- Event Object list
- Scheduler Object List
- Generally in all those resource fields where a variable can be inserted

Variable bit Pointing is NOT supported in the Movicon Basic Scripts.

5.18. Variable TimeStamps

The variable TimeStamp property shows the date and time of the variable's last modfication. When a variable is used in communicating with the field, its TimeStamp is updated by the Communication Driver or the OPC Server, for instance, if the value changed or even just its quality status. When the variable is not used in communicatons, its TimeStamp is updated by Movicon each time its value changes.

6. Screens

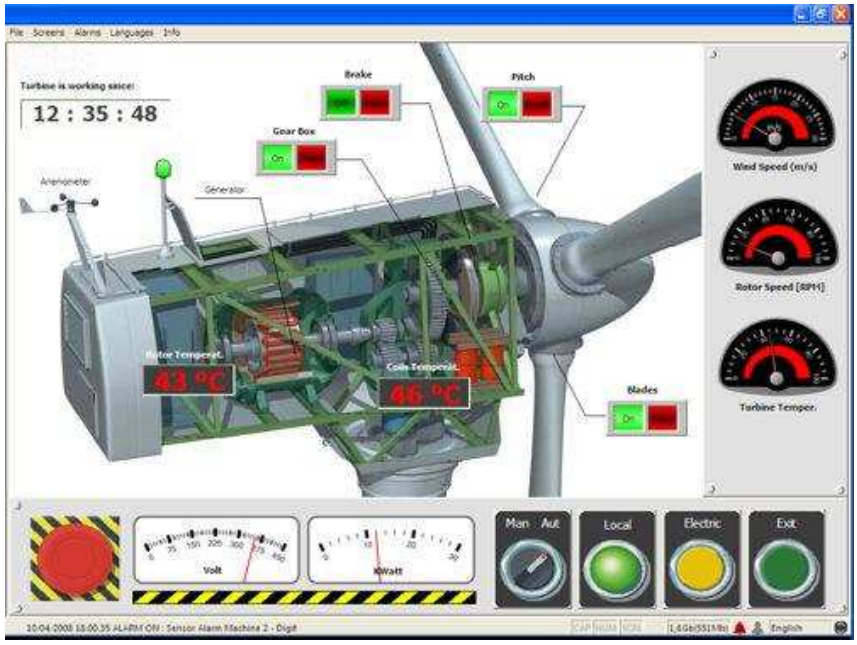
6.1. Screen Resources

The Screens are the fundamental resources in creating graphic interfaces. This chapter describes the Screen resources, by also referring to the appropriate chapters on the techniques used for inserting drawings, commands, controls into Screens.

The Screen window is one of the key elements in a Movicon project. The Screen is used to supervise the process (or part of it) by using the graphic commands for animations activated by field variables. The Screen controls, described in the appropriate chapters, are used for setting commands or variables to the field, as well as facilitating supervision tasks.
The Movicon workspace can be composed of one Screen only, but using the "Embedded View" control is possible display a Screen within other Screen.

The Screen window represents the projects screen pages. However Screen can be inserted into other Screens (by using the 'Embedded View' control) to get a composition of more Screens in the same page. In this case, however, the parent Screen will always remain the Container Screen.

The Screen windows are preset to contain, apart from graphical drawings, controls such as all the graphical command functions or displays already preset by Movicon. The descriptions for inserting and setting controls in Screen windows are found in the appropriate chapters.



An example of the Screen page. A Screen is the container of controls and designs and can receive background image files.

6.2. Inserting Screens

When you wish to insert a Screen into the project you need to start this procedure by inserting a new object in the "Screens" group residing in the 'Project Explorer' window. You can insert a new Screen either by right mouse clicking on the "Screens" group in the 'Project Explorer' window and then select the 'New Screen' command or by using the appropriate icon from the Movicon Tool bar. When using the later you have to left mouse click and keep pressed on the icon for about one second to open a drop-down list where you can select the resource to be inserted which should be the Screen resource in this case.
When confirming this operation the new Screen window, with default sizes and positions, in the group or in the point selected in the project structure. At this point you can go on and set the new window's properties as described in the documents about **"Screen Properties"**.

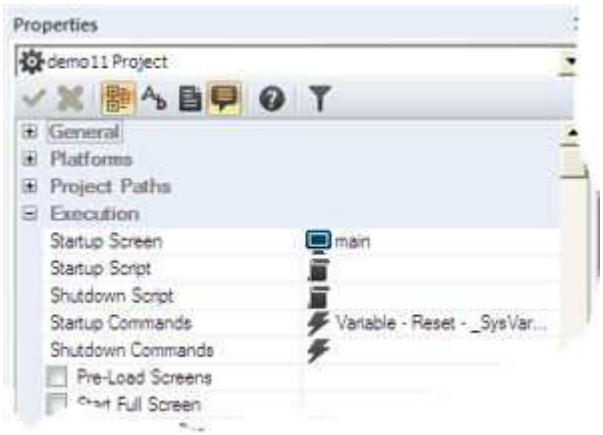
The resource can next be assigned a Name by clicking the resource and entering a name to replace the one proposed for default, or after having selected the resource press the F2 key and insert the new name.

Importing Screens from other Projects

Movicon allows one or more Screens to be copied from one project to another. In order to do this you must first open both projects, then select the Screen from the Project Explorer Window of the source project, execute the Copy command then point to an area in the "Screens" group of the Project Explorer window of the destination project and execute the Paste command. The copied Screens will then also be available in the destination project.
You can also use the Drag & Drop technique with the following procedure: select the Screens from the source project and, by keeping the mouse left key pressed, drag them to the point desired in the destination project and then release the mouse button.

6.3. Startup Screen

Movicon has been designed to open the Screen at the start of the project runtime which has been selected in the **"Startup Screen"** box in the **'Project Execution Settings'** properties. If these properties are not configured the Movicon project startup will not open a screen page leaving the operator to activate one by using the commands in the project's Menu and Accelerators if previously configured only.



The Startup Screen can be selected from any of those preset by the programmer, independently from its name.

Selecting the "Startup Screen" is indispensable so that when the project is put in Run mode a startup page is displayed, which usually represents the plant's general Layout or a simple presentation page.

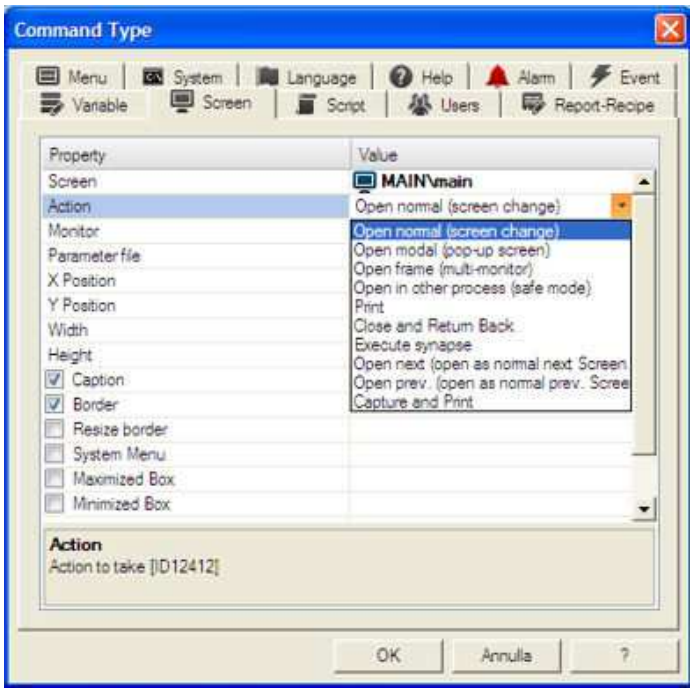
When a project is Run from the development environment with a screen still opened in the workspace, this screen will be considered as the startup screen. This is very handy when the screen you are working is started up directly.

6.4. Opening Screen Modalities

Once created and configured the Movicon Screens can be opened in different ways based on the type of command being used. This allows the programmer to display the Screen in different ways as he/she requires. A Screen can in fact be opened as a simple Video Page, or as a Modal Window acting as a Dialog Window which opens on top of the current page. As mentioned beforehand, the opening Screen modalities are selected by means of the **'Screen Commands'** settings residing in the **'Command List'** of each Movicon control.
The **"Startup Screen"** is displayed at project startup which will be opened as a normal Video Page.

The screen resources are saved in binary during project Runtime. This makes loading it in memory faster. This is more advantageous in WinCE where the XML passer in the resources is quite slow. In fact, the handling of the XML parser is not of interest when a screen (in compiled form) is opened on screen. The method applied is:
The first time a screen is opened on screen during Runtime, a control is made to see whether the "ScreenName.movscr_c" file exists and whether the data is the same or more updated than the "ScreenName.movscr" xml file. If this is so, it is then loaded instead of the xml file, otherwise the xml file will be loaded and the "ScreenName.movscr_c" file will be saved in binary mode. This operation is slow when the screen is opened for the first time but the next will be faster.
This function is managed by the "MoviconRunTime.exe", "MoviconService.exe", "MovCE.exe" and "Movicon.exe" modules when executed with the /R. option. This management is not activated when the project is run directly from the development environment.

The opening Screens Modalities are as described below. For further information see the paragraph **"Screen Commands"**.



Open Normal (screen change)

The "Open Normal" command opens the Screen as a Video Page. This modality is used for page changes, therefore for passing from one page to another. When the opening of a Screen is called the previous one will be closed and unloaded from the RAM, unless the **"Not destroyable"** option has been enabled in the 'Screen Style Properties'.

Open Modal (pop-up screen)

The 'Open Modal' command evokes the opening of a Screen as a Modal window. In this case the Screen is opened acting as a dialog window, therefore on top of the Video Page active at that moment. Nevertheless, in this condition the current page will remain in background and the Modal Screen will remain in foreground. It will not be possible to execute commands outside the Modal Screen area with the mouse until the Modal Screen is closed with the appropriate procedures. The sizes and positions, in which the Screen is to appear with, can be specified in the parameters which are a part of this command.
This functionality is usually used when the operator has to execute the settings or commands etc..

Open Frame (multi-monitor)

The 'Open Frame' command evokes the opening of a Screen in a window different from the Movicon Main window. The window in question will remain at the forefront but will not be modal, therefore you will also be able to execute commands presented in the window underneath. This command can also be used for opening the screen in another Monitor that is not for default in order to manage projects in a Multi-Monitor system.

Using the Open Frame command for opening a screen in a second monitor (different from the one where the project was started up in), the screen in question will always open within a window adapted accordingly to the monitor's sizes.

Open in other process (Safe Mode)

This command allows the opening and displaying of a Screen executing another instance. (therefore a process in a different memory area). This is useful when Screens using ActiveX might cause an error in the main application.
Using this mode however consumes more overall resources whether for the Screen in 'Safe Mode' (which acts as client) and for the one loading it (which acts as server).

Print

This command allows to send to the default printer a print of the selected screen.

Close and Return back

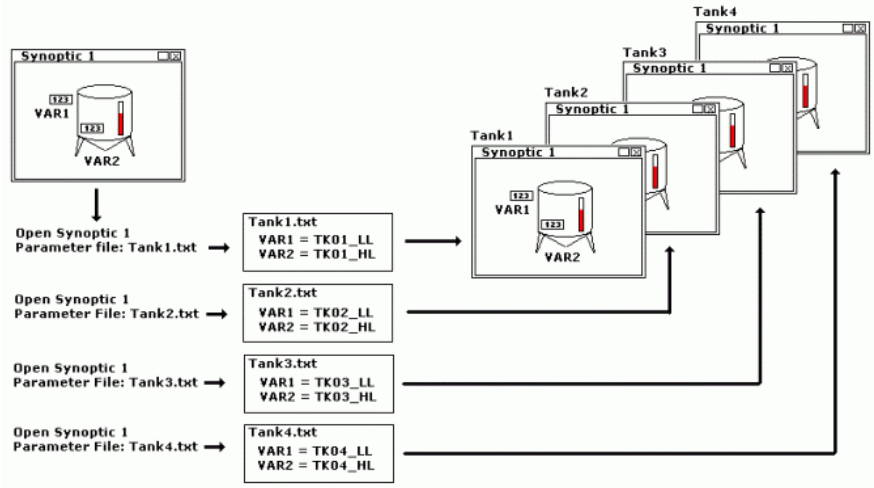
This commands force the closing of the specified screen or, if no screen is defined, of the active screen. If the active screen is a modal (pop-up) window, it will be simply closed. If the close command refers to a standard screen, Movicon will go back to the last loaded window.
Movicon manages a list of the previously opened screens. The maximum number of the "back" commands is 10 as a default value, but it can be changed through the "Back History Max Depth" property of the "Screen Navigation Editor " project resource.

Open next - Open Prev

This command allows to open project screens using the Screen ID number ("ID" property in "General" screen properties) instead of the screen name. You should properly set a screen ID for each screen (different from 0) and use this function to create a set of "<<BACK "and "NEXT>>" pages navigation commands. See also Screen Change commands based on Screen IDs

6.5. Screens with Parameters

The up-to-date automation techniques often require resources with parameters, in order to use only one resource repeatedly to get the required parameters.
The parameter techniques applied to Screens permit one only screen to be created, which can be called up many times with different parameters. In this case the parameters are the variables from the Movicon Real Time DB.

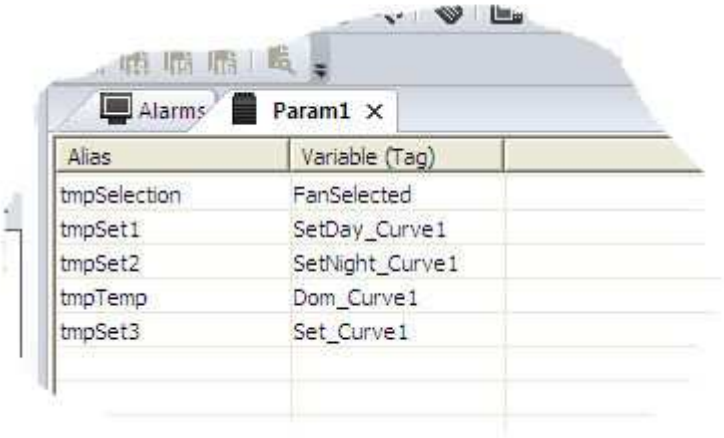


Movicon allows the functionalities, associated to displaying and animating the screen's vectorial drawings and Templates, to be indexed. The programmer will find this functionality extremely useful when handling projects containing screens with identical graphics, but different variables associated.
Let's take a plant containing 4 identical tanks as an example where only one screen is to be created and which can be called up by 4 buttons, one for each tank. The screen has to have parameters, which means it has to contain dummy variables which will be replaced in Runtime with real variables of each single tank.
In this case it is clearly necessary to have use of the indexing techniques (or parameter techniques), so that the variables associated to the Screen in the programming stage are replaced by the ones needed during Runtime, in function with the parameter file used for opening the Screen.
The parameter file is a simple text file (UNICODE format) within which the associations between the 'dummy-variable' and real-variable' are specified. This file has to be created by the programmer, and is to be inserted in the **"Parameter File"** properties of the **'Screen Commands'.**

Parameterized screens load the Parameter File while the screen is being loaded. Therefore it is fundamental that the parameterized screen not be already loaded in Ram which means you must make sure that you have disabled the "Keep always in Memory" option and set the "Close Screen Delay" property to "zero" beforehand.

Parameter File

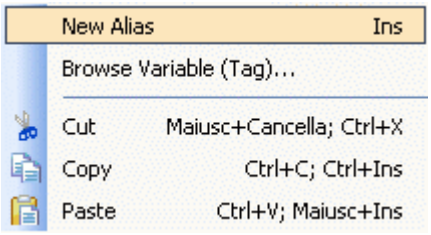
Movicon provides a resource through which you can edit these parameter files directly from the Movicon development environment. By invoking the "New Parameter File" command from the Project Explorer "Parameter Files" Group you can directly edit a file in table format. The following window will open:



The Alias column represents the name of the "Parameter Variable", being the name of the variable which will be replaced with the name of the variable to be displayed each time on screen. The "Variable (Tag)" column represents the effective variable which must be passed to the screen to replace the Alias one. The parameter files associated to the same screen contain the same Aliases, while the variables associated to the Aliases are different.
The parameter files are created in the project's "RESOURCES" folder by Movicon and will be saved in UNICODE format with the ".movpar" extension. The file's internal will be structured with the following syntax:

<Alias>,<Variable(Tag)>

When right clicking on the table the parameters will appear in a text menu with the commands needed for inserting a new Alias and selecting variables from the Real Time DB:



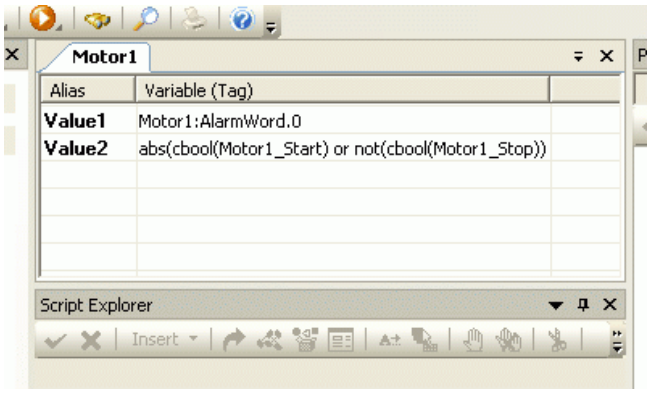
where:

New Alias: adds a new line to the table for inserting a new parameter
Browse Variable(Tag)...: allows you to select the variable from the project's Real Time DB with the Browse window

The browse window, for selecting variables, can be opened directly by clicking on the "Variable (Tag) field while keeping the ALT key pressed.

The parameter file can always be edited manually with a normal text editor as long as the characteristics described above are respected which involve the syntaxes inside the file and saving it in UNICODE format. The files created by the Movicon resource and those created manually should be structured in the same way.

In the "Variable(Tag)" field you can also insert a sting that doesn't necessarily have to correspond to the name of a variable from the RealTimeDB. You can specify a single bit of a variable or also a basic expression instead which practically means you can enter the syntax which is usually supported in the field where the alias has been inserted:



Example
In the example described above a Screen has been created with a tank and two animation variables, VAR1 and VAR2 (dummy variables). At this point the parameter file has to be created for each Tank to be displayed where the associations between dummy variables and the real variables are to be done. The four files shown below have been created with a text editor, but their contents are structured in the same way as those created by Movicon.

Tank1.txt
VAR1,TK01_LL
VAR2,TK01_HL

Tank2.txt
VAR1,TK02_LL
VAR2,TK02_HL

Tank3.txt
VAR1,TK03_LL
VAR2,TK03_HL

Tank4.txt
VAR1,TK04_LL
VAR2,TK04_HL

As you can see the dummy variables are always the same in the four files, while the real variables change according to the Tank. At this point the only thing remaining to do is to associate the parameter file, one at a time, to the required Screen opening command to display the data of one tank or of another.

The opening of a Screen with parameters can also be executed with the appropriate Basic Script functions as well as by using the Movicon '**Command List**'.

6.6. Local Screen Variables

The screens can contain local variables. The local variables are initialized only when the screen is loaded in memory and can be used only inside the context of that screen. Therefore they can be used in the Screen's Il Logic and Script codes and in the objects it contains. Keep in mind that:

1. the local variables in the script codes can only be managed by using the variable's name directly. The GetVariableValue() and SetVariableValue() functions do not support local variables
2. when a local variable has the same name of a variable contained in the Real Time DB, priority will be given to the local variable. To access Real Time DB global variables you must use the following syntax:

   ..\<variable name>

Caution: this type of syntax is supported in the animation and command properties and IL Logic only. Therefore it is not possible to use the syntax in the Basic Script code.

The "..\" suffix is needed for going back one hierarchy in a variable pointer. The hierarchy is as follows:

Local Screen Variables -> project Variables -> Parent project Variables

for instance, to access a variable from a parent project with the same Local Screen Variable name you must use this syntax:

..\..\<variable name>

The Local Variables cannot be retentive and cannot be used for communication. Furthermore they do not have all the properties that the global variables have.

Local variables are very handy to use with the symbol libraries. These variables are in fact exported to the template library on a par with global variables. When a template is then inserted on screen, its variables will be created as local variables by keeping the SHIFT key pressed down. If the SHIFT key is not pressed down the variables will be created as global variables in the Real Time DB.

Local Variables can be added by selecting the screen from the Project Explorer window and then activating the "Add New Local Variable..." command.

6.7. Numeric and Alphanumeric Screens

Movicon allows you to customize Numeric and Alphanumeric Pads which are opened up the "numeric pad" and "alphanumeric pad" commands, or with the respective basic script functions. Customized panels can be created by using the Movicon screens and symbols. The customized panel can be created with a screen within which an "Editable Display" and a series of "Buttons" can be positioned. You can then associate the "Append Value", "Remove Value", "Swap Plus-Minus" and "Append Decimal Mode ON-OFF" commands to these buttons so that the values in the display can be changed. To allow Movicon to manage this screen as a Pad you must insert it into the project's "Numeric Screen" or "Alphanumeric Screen" execution properties. When a request is made to open a Numeric or Alphanumeric Pad, Movicon will open the customized screen instead of the default Pad. The screen will be opened in modal mode. In addition to the two Numeric or Alphanumeric screens some of the system's local variables are managed so that the Pad can work properly. These local variables are:

Numeric Screen:
value
value_
minValue_
maxValue_
title_
OK_

Alphanumeric Screen:
value
value_
maxChars_
title_
isPassword_
OK_

The meaning of these variables are as follows:

value = current value of the variable to be changed. When Movicon loads the screen, the local variable is set to the same value as the variable to be set through the "numeric pad" and "alphanumeric pad" command. The "value" variable should be declared as string type if an Alphanumeric screen is used, or numeric type (i.e. Double) if a Numeric screen is used.

value_ = new value to be assigned to the variable through the "numeric pad" and "alphanumeric pad" command. When Movicon loads the screen, the"value_"variable is set to zero.
The "value_" variable should be declared as string type if an Alphanumeric screen is used, or numeric type (i.e. Double) if a Numeric screen is used.
minValue_ = the minimum value which the variable may obtain. When Movicon opens the Screen the local minValue_ variable minValue_ is set with the same value in the Pad's open command "Min. Value" field. No error message will be generated when this limit is exceeded but when the Screen is closed the value will not be transferred to the variable. The minValue_ variable must be declared numeric type (eg. Double)
maxValue_ = the maximum value that the variable may obtain. When Movicon opens the Screen the local mxValue_ variable is set with the same value in the Pad's open command's "Max. Value" field. No error message will be generated when this limit is exceeded but when the screen closed the value will not be transferred to the variable. The maxValue_ variable must be declared numeric type (eg. Double)
maxChars_ = maximum number of characters that the variable may obtain. When Movicon opens the Screen the local maxChars_ variable is set with the same value in the Pad's open command's "Max. Chars" field. No error messages are generated when this limit is exceeded but when the screen closes the value will not be transferred to the variable. The maxChars_ variable must be declared numeric type (eg. Word)
title_ = Pad title. When Movicon opens the Screen the local title_ variable is set with the name of the variable to be modified. The title_ variable must be declared string type
isPassword_ = this variable is set at 1 when the Alphanumeric screen is called from a password entry window. This allows the display to be set with the "Password" property and therefore display text entries are protected. The isPassword_ variable must be declared numeric or Bit type.
OK_ = this variable is needed in the screen's closing phase. If its value is different from zero, the local value_ variable's value will be returned to the variable to be modified when the screen is closed. If, however, its value is zero, the value of the variable to be modified will remain unvaried when the screen is closed. The OK_ variable must be declared numeric or Bit type

Local variables as described above should be created by the designer when needed, respecting the proper syntax. If Templates from the Symbols library are used, when the Template is added to a screen, the local variables will be automatically created.

An error message will arise when editing a value out of range (such as numbers for the numeric pad or figures for the alphanumeric pad). To customize the message's text use the appropriate string ID described in the section "Change System Language".

6.8. Screen Change commands based on Screen IDs

You can insert commands for opening screens before or after the current screen open, based on a map determined by the value of the "ID" property of each screen. Two commands, "Open Next (open as normal next ID screen)" and "Open Prev. (open as normal prev. ID screen)" have been provided for this purpose in the "Screen" Group from the Command List.
To insert a screen onto the scrolling map, it will need to have the ID value greater than zero. If the ID is equal to zero, the screen will be excluded from this navigation. Normally the ID value is left at zero for those screens to be excluded from the navigation such as those used inside objects as Embedded Screens or TAB Groups (page footers or headers).
You must also take into account that these navigation commands do not have effect if they are used when a screen is active with its ID set at zero. In addition to this, screens will open in "Normal" mode only and not in "Modal" or "Frame" mode.

These navigation commands are not supported outside the screen context. For instance, they cannot be used from menus, accelerators, event objects, schedulers, etc.

The screen map is based on the screens' IDs and created by Movicon the first time a command of this type is executed. The screen pages are scrolled in sequence to their ID numbers. If the screen IDs are modified or other screens are added or removed during application runtime, the map will become obsolete and recreated again.
These screen navigation commands are also supported in Web Client and can be extended to child project screens.

When a the screen with the lowest ID number is open, the "Open Prev." command will not do anything. This also goes for the "Open Next" command when the screen with the highest ID number is open.

Screens with the same ID number will be inserted on the list at random only. This condition should be avoided and considered a planning error.

6.9. Screen Resize

In design phase, when the size of a screen is changed, setting the "Width" and "Height" properties, Movicon will ask if the objects included in the screen should be resized keeping proportions. The message is the following:

> The screen is going to be resized. Do you want to scale up or down all the symbols in this screen?

Answering "Yes" the objects will be proportionally resized and placed in order to adapt to new screen size. Answering "No" the objects will keep their size and position and could be found out of the screen if it has been reduced.

6.10. Customizing Comment Dialog Windows

Movicon allows you to customize windows used for entering comments that open when a comment is required for Tracing variables or acknowledging alarms. This can be done by creating Customized panels using Movicon screens and symbols. This would entail creating a screen with an "Editable Display" and a series of "Buttons". In order to be managed by Movicon instead of the one for default, the screen must be inserted in the project's "Trace Comment Screen (Audit)" or "ACK Comment Screen (Audit)" execution properties. In this way when the comment window is requested, Movicon will open the customised screen instead of the one for default. This screen will open in modal mode.
In addition to the two "Trace Comment Screen" or the "ACK Comment Screen' other local system variables will be needed so that authentication procedures work correctly. The local variables are:

Comment Screen in variable trace:
title_
CurrentValue_
Comment_
ChangingValue_
ChangingObject_
OK_

Comment Screen in Alarm Acks:
Comment_
Help_
OK_
state_
TimeOff_
TimeOn_
UseForAll_

title_

The meanings of these variables are as follows:

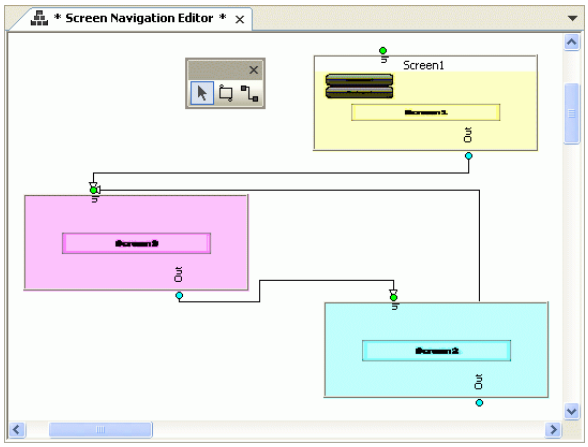
title_ = indicates the name of the variable changing value, in cases with pads for comments in the variable trace or text of an alarm to be acknowledged for the comment pad in the alarm.
CurrentValue_ = the variable's current value formatted using the variable's default format is set with one.
Comment_ = String value containing the edited comment
ChangingValue_ = New value obtained by variable, formatted using the variable's default format is set with one.
ChangingObject_ = String variable containing the name of the object changing variable
OK_ = This variable is needed when closing the screen. If its value is not set at zero, when the screen is closed the local Comment variable value will be recorded on Database. When set with the zero value, the comment value will not be recorded when the screen closes. The OK_ variable is Bit type.
Help_ = Contains any alarm help strings
state_ = Indicates the alarm state
TimeOn_ = Alarm activation date and time formatted using the international settings.
TimeOff_ = Alarm deactivation date and time formatted using the international settings.
UseForAll_ = Option for using comments for All alarm ACKs

The above described variables must be created by the programmer when needed respecting the syntax exactly. In cases where Templates are used from the Movicon Symbol library, the local variables will be created automatically when inserting the Template on screen.

6.11. Screen Navigation Editor

The Screen Navigation Editor resource allows you to manage screen navigation graphically and intuitively.

By using the "Screen Navigation Editor" resource you can define screen navigation graphically. This means that you can create screen connections that will automatically convert into a navigation bar to display in the different screens during runtime.
This is done by creating a navigation map using an editor specially for this purpose and which is opened with a double-click on the "Screen Navigation Editor" resource from the "Project explorer" window. This editor opens up with an empty screen within which you can create the screen navigation map:

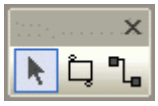


An example of a "Screen Navigation" page.

Creating the Navigation Map

The "Screen Navigation Editor" resource will open as an empty screen that can be set with a different back color, size etc., through its properties. "Embedded Screens" from the Toolbox are then inserted in this screen by using the appropriate commands. Each embedded screen has two dots known as Synapses one for Input ("In" green dot) and one for Output ("Out", light blue dot). The associations of the Embedded Screens to be displayed are done through their properties. You can create a navigation network by connecting the Embedded Screens to each other. For instance, if you connect the "Screen1" Out Synapses to the "Screen2" In Synapses, "Screen1" will then be able to provide commands, such as an open command, to open "Screen2" during runtime. During the Runtime mode the navigation map is converted into a "Button Navigation Bar" and made available in the screen opened at that moment. In the Button Bar, which will be generated for each screen, a button will be made available for each out connection ("Out" Synapses) presented in the navigation map of that screen. The name of the destination screen will be displayed in each bar button.

Once the "Screen Navigation Editor" window is opened , a toolbox will display with the tools needed for creating the navigation map:



By using this toolbox you can select the following objects:

Pointer: this selection consents to restoring the mouse back to its original pointer image in order to select the various objects on screen.
Screen: this selection consents to adding an Embedded Screen on the page. The Embedded Screen will already have an "In" and "Out" Synapses and once inserted a window will open for selecting a Screen to associate to the object. The Embedded Screen will display the Screen's static image but you can change the associated Screen through the object's properties later. After having inserted the object the mouse pointer will be automatically restored and therefore you will need to select the command from the toolbox again for inserting another object.
The drag&drop techniques can also be used for associating the Screen to the "Embedded Screen" object in the Project Explorer Window even Screen belongs to a Child project.
Connector: this selection consents to connecting an "Out" Synapses to an "In" Synapses. In order to do this you will need to click on the "Out" Synapses of one Embedded Screen (the pointer will change image only when clicked on the right zone) and the click on the "" Synapses of another Embedded Screen to connect them up. This procedure can then be repeated for all other connections desired. To restore the pointer back to its original image you will need to select the "Pointer" command from the Toolbox.

The navigation layout can be also be displayed in Runtime like any other screen page. In order to do this you will need to insert a "Screen Command" set as a "Open Normal (screen change)" action, and using "* Screen Navigation *" as the screen's name. This will allow you to get a graphical layout of the screen navigation map to use in runtime for changing pages: a click on an embedded screen on the map will open the screen it represents directly.

The screen navigation configuration set in the child project is used and not the one set in the Parent project when opening child project screens. Therefore different screen navigations are consented according the child project context being navigated.

You can further customize the navigation button bar with other buttons by using the "Screen Navigation Style Properties" which allows buttons to be added for going back to a previous screen or to open the Startup Screen directly, etc.

The "Screen Navigation Toolbar" is also displayed in design mode in screens inserted in the navigation editor allowing you to see which space is available for inserting screens in beforehand. An uneditable grid area is shown within the screens indicated as "Screen Navigation Toolbar".

6.11.1. Screen Navigation Style Properties

Some of the Screen Navigation bar parameters can be set through their style properties. This is done by selecting and opening, if need be, the Screen Navigation Editor resource to access its properties through the Movicon **Properties Window** and modify them.

Add Back Button
When enabled, this property consents a button to be added to the navigation bar for returning back to the previous screen.

Back History Max Depth
This property is used for inserting the maximum number of screen that can be scrolled backwards with the "Back" button (or by using the "Close" command from the Screen Command List without specifying the screen's name).

Add Back to Startup Button
When enabled, this property consents a button to be added to the screen navigation bar for returning to the main screen set as the project's "Startup Screen".

Assign Shortcuts
When enabled, this property allows a shortcut to be assigned automatically to the button inserted on the navigation bar. The F1 to F4 keys will be used as the shortcuts in button used for loading new screens, while the "backspace" key will be used for returning to a previous screen and the ESC key for returning to the main screen. These shortcut keys are also displayed in brackets along side the buttons' texts.

Back Button Text
The text to appear on the navigation bar's **"Back button"** is entered in this editbox. The default text will be used if this field is left blank.

Startup Screen Button Text
The text to appear on the navigation bar's **"Startup Screen button"** . The default text will be used if this field is left blank.

Button Size
The **"Button Size"** is described in the Drawing and Control **"Style Objects Proprieties"** section.

Align Buttons
The **"Align Buttons"** is described in the Drawing and Control **"Style Objects Proprieties"** section.

6.12. Screen Properties

The Screens inserted into the **"Screens"** folder in the 'Project Explorer' window can be completely customized in their properties. In order to this select and open the Screen required and then edit its settings through the Movicon '**Properties Window**'.

Screen Animations

Movicon manages animations in screens by using the timer notifications. For instance, blinking alarms or blinking object background colors, are linked to this management executed with timers in Movicon. There are two internal Movicon timers: the first timer controls the "fast" animations (blinking alarms, fast blinking backgrounds, etc); the second one controls there other animations (average or slow blinking backgrounds, etc). You can modify this timer management through the screen's "General" properties.

6.12.1. Screen General Properties

The General properties are used for defining the Screen's sizes and the position and sizes of any associated background files. In order to do this just select and open the Screen required and then edit its settings through the Movicon **'Properties Window'**.

When sizing the window on the Web Client side, the screens allocated on the Server side will be sized in the way as requested by the WebClient without controlling any maximum limits. This may be a problem for all those platforms, especially for WinCE where memory is limited, and also in Windows 32/64 bit left open to possible memory saturation on the Server in uncontrolled cases. Therefore, four properties have been provided for each screen on the WebClient side, described below, which consent you to choose the screen's max size on the WebClient side and also the max size of the packs sent by keeping them set at low values so that they are small enough and optimal for reduced bandwidths.

Name

This edit box is used for entering or modify the Screen name.

ID

Movicon let's you define a ID number for the Screen window. The ID code can be read in word format in the appropriated 'System Variables' when the Screen is active and an ID number can be declared for each Screen window by specifying it in this edit box. This property mainly enables you find out through the Movion logic and scripts which Screen window is active at a certain moment by reading the value reported by the "System variable" "_SysVar_:ActiveScreen", and it also consents you to load screens using the "_SysVar_:ScreenToLoad" and "_SysVar_:StrobeLoadScreen" system variables. For further inmformation please read the paragraph relating to "System Variables".

Width

The Screen's width in pixels, which it is to be displayed with, is entered in this edit box.

Height

The Screen's height in pixels, which it is to be displayed with, is entered in this edit box.

Save Screen Image

This command saves the screen shot of the displayed screen in the "<Screen>_c.jpg" file within the folder where the screen resource resides (usually in ..\ProjectName\RESOURCES\ProjectName\). This image is exploited by the Tooltip which appears in design mode when the mouse lingers over the screen resource. The Tooltip shows if the "GenTeral\ShowTooltipPreview" registry key has been set to True (value '1').

Delete Screen Image

This command deletes the "<Screen>_c.jpg" file created with the "Save Screen Image" command.
NB: If the "General\ShowTooltipPreview" registry key has been set to True (value '1'), the Tooltip gets created automatically each time the screen is opened and closed in edit mode while in the design environment.

Expression Waiting Time

This time, expressed in milliseconds, allows screen graphical animations to be synchronized with the any eventual handling of basic script expressions in the objects' properties instead of each single variable. Normally graphical animation is the basic script expression management are not synchronized with each other and therefore in cases where a certain variable had been used in a number of basic script expressions of different screen objects, not all the objects involved would update at the same time when this variable changed but one at a time. This is a default function which is obtained by setting the "Expression Waiting time" property to the "0" value. When setting this time higher than zero, for example 1 second (1000 value), when a variable value changes, the graphics will not update until all the basic script expressions using this variable have been processed. After the waiting time set in this property has expired, the graphics will however update even if there are still basic script expressions pending.

Due to limited performance in Windows CE, this property works best with not more than 10-15 expressions.

This property has practically no effect in Web Client based on the fact that web pages are nevertheless updated gradually anyway.

Max. WebClient Width

This property sets the maximum screen width size when displaying in the WebClient. No sizing limit will be enforced when leaving this value set at zero.

Max. WebClient Height

This property sets the maximum screen height size when displaying in the WebClient. No sizing limit will be enforced when leaving this value set at zero.

Max. WebClient Packed Width

This property sets the maximum width size of the frames sent to the WebClient. No sizing limit will be enforced when leaving this value set at zero.

Max. WebClient Packed Height

This property sets the maximum height size of the frames sent to the WebClient. No sizing limit will be enforced when leaving this value set at zero.

Screen Alias Editor

The 'Screen Alias Editor' command opens the alias table relating to the screen. The Aliases defined in the screen will then be used by screen objects in which the same Aliases have been inserted not defined at object level.

For further information please refer to the paragraph entitled "Aliases in Objects".

WebClient Quality

This property allows you to set the quality percentage (1-100%) with which the screen will be sent when first uploaded to Web Client. Leaving this property set at 100%, the screen will be sent with a maximum resolution, based on the Server's settings, otherwise the screen's images will be of poorer quality but faster to send. Once the first image has been sent at a lower resolution, the Server will send the image with full resolution, but the animations and commands will already be active with the first image. This setting may be very handy when a low band rate is being used for Server and Client connections, for instance, using a modem where transmitting pages can be rather slow. In this condition, a page can be loaded quicker at a lower resolution while being able to see what's on screen which is then updated to the normal resolution immediately after loaded. This normal page resolution update will be executed when sending three image portions in sequence, where the update can be seen taking effect gradually and not all at once.

Fast Timer Tick Animation

This edit box is used for entering the time frequency in milliseconds to double-check the screen's "fast" animations. This value does not changes the fast timer tick (default 500 milliseconds), it just changes the frequency with which these animations are double-checked. Therefore, this value obtains a high precision in the timer ticks, regardless of the amount of resources being used.

Fast Timer Tick Loop

This edit box is used for entering the value which expressed the maximum number of animations managed for each fast timer click, Each tick is executed with the frequency set in the "Fast Timer Tick". By increasing this value you will get a graphic refresh of a large number of objects (for which the timer is managed), regardless of the amount of resources being used. It may be necessary to increase this value when the screen contains many objects animated with fast blinks which blink with synchronization.

Slow Timer Tick Animation

This edit box is used for entering the frequency in milliseconds with which the screen's "average" and "slow" timer tick is to be double-checked. This value does not change the average or slow timer tick (default 1000 e 2000 milliseconds) but changes the frequency with which these animations are controlled. Therefore, by reducing this value you will get higher precision in the timer, regardless on the amount of resources being used.

Slow Timer Tick Loop

This edit box is used for entering the value which expresses the maximum number of animations managed for each slow timer tick. Each tick is executed with the frequency set in the "Slow Timer Tick" property. By increasing this value you will get a graphic refresh of a large amount of numbers (for which the timer is managed) regardless of the amount of resources being used. It may be necessary to increase this value when the screen contains many objects animated with average and slow blinks which blink with synchronization.

6.12.2. Screen Style Properties

By using this Style property you can set the Screen's parameters. In order to do this you only have to select the and open the required Screen and then edit its settings through the Movicon **'Properties Window'**.

Keep Always in Memory

When activating this option, it will be impossible to close the Screen absolutely during project processing which can only be reduced to an icon instead and made invisible so as not to create any problems in displaying other open Screens on screen. As a consequence the window, even though not displayed, will continue occupying memory and system resources with the advantage of being of being rapidly displayed on screen when recalled. If this option is deactivated Movicon will destroy (unload from memory) the Screen window when not active and reduced to an icon (therefore becoming unusable) thus freeing memory space and improving resources in proportion to the complexity and size of the destroyed Screen. This will, however, cause the Screen window to take more time to display but nevertheless precious memory will be saved especially when many Screens are being used.

The 'keep Always In Memory' option is not supported by Web Client and therefore will have no effect when selecting it.

Screens checked with the '**Not Destroyable**' option will **NOT** be automatically loaded at project startup, but only when requested. After the first loading they will continue to remain active in memory.

It is advised to enable this **"Not Destroyable"** option only when effectively necessary. Usually this option is enabled for 'heavy' Screens which may cause a slow down in page loading in Runtime. Another reason for enabling this option would be when logic has been inserted into the Screen that must remain running even when the page is not displayed.

Fit in Window

This property automatically adapts the Screen's size to fit into the window containing it, and therefore the screen resolution set in the graphic card. As a consequence the vectorial drawings and controls contained in the Screen will also be resized and therefore readapting the whole page according to the screen's resolution.

Screen Colors Type

This property allows you to select a set of colours to be used for the screen. The colours set will be used by the Server project to display the page locally and to update the page on a Web Client, if any.
Possible options are:

- Use Device Default
- Black and White

The 3D-look buttons should not be used in a screen where the "Black and White" option is selected, since they will be displayed as completely black.

Enable Scrollbars

When activating this option box, the system will allow the lateral scrollbars to be displayed when the drawing's size is bigger than the window's size. Otherwise the scrollbars will not be available in the window even when the drawing is bigger than the window.

The Scroll bars are not supported in Windows CE. Screen scroll bars are therefore not displayed in project run in Windows CE.

Show On MDI Tab

By activating this option box the Screen's MDI Tabs will be displayed during Runtime as well.

Show Synapses

By activating this option box the Screen's Synapses connectors will be displayed during Runtime as well.

Use Antialiasing

Screen " Antialiasing" properties reduce the 'step' effect of curved vector graphics in basic shapes and pens displayed in Trends, as well as imported vector designs. When activating this option you will noticeably see that curves or oblique lines in graphic designs will look more natural and continuous than before. Antialiasing is also noticeable when the screen zoom is active.

No Antialiasing Antialiasing

The Antialiasing property is effective in Basic Shapes (except in the Text object), Trend or Data Analysis pens,Symbols or Templates created with basic shapes and in imported metafiles (wmf). Antialiasing has no effect on the other graphical objects (such as Buttons, Switches, Meters, Advanced shapes).
This property is only managed when drawings have been set with solid backgrounds. It will be ignored when objects have been set with gradients and/or fillings other than solid.

NB: the Antialiasing gives straight lines a slight fuzzy effect. In addition to this, it is quite normal to find drawing sizes bigger by one pixel when the 'Use Antialiasing' option is enabled.

You cannot exploit libraries implemented with the Antialiasing option when using systems with Windows CE OS where this option has no effect. In fact the "Use Antialiasing" property will not appear among the Screen Style properties when the project platform has been set for "WinCE".

Static Object in Background

Enabling this option will activate "Static Object in Background" management for the screen provding that this same option has also been enabled in the project's execution properties. For further information about this feature please refer to the paragraph on "Handling Static Objects in Screens".

6.12.3. Screen Background Properties

By using the Background properties you can define the properties concerning the Screen window's background. To do this just select and open the required Screen and then edit its settings through the Movicon **'Properties Window'**.

Back Color

You may find it useful to set a different background colour to that proposed for default. Screen backgrounds do not have to be made up of drawings: Movicon Screens can also be made up with controls only (buttons, displays, graphics, etc), therefore the background need simply be a uniform colour.

Background colors can be very useful when the Screen's drawing does not measure up to the required sizes for the Screen window. Therefore by using a background colour you can effectively hide the difference between the window's borders.

Background Image

By using this dialog box you can associate a static image in BMP, JPG, GIF, WMF type, etc. as the Screen's background. As an alternative to entering the path and name, you can select the file by using the '...' browse command button found at the side of the edit box.

Pressing the "CRTL + (...)" keys consents to editing the selected background image, by opening the predefined application associated to that image in a new window.

Image X pos

This edit box is used for entering the X coordinates in pixels of the eventual background image's position associated to the Screen window.

The coordinate refers to the position of the image's highest left corner in relation to the Screen's highest left corner (being X0).

Image Y pos

This edit box is used for entering the Y coordinated in pixels of the eventual background image's position associated to the Screen window.

The coordinate refers to the position of the image's highest left apex in relation to the Screen's highest left apex (being X0).

Close Screen Delay

Delay in milliseconds before Movicon unloads the Screen from memory after changing pages. When executing a change page with two Screens open in MDI mode, the one which is closed is only hidden and will be destroyed after this time has been exceeded (unloaded from RAM). When the value is set at '0' the Screen will be unloaded immediately and then the next screen will be loaded.

Gradient

By using this selection you can set the background colour shades associated to the Screen. The shades of colour can be selected from those proposed on the drop-down list (horizontal, vertical shades etc).

The shades of colour are a combination of the '**Background Color**' associated to the Screen and the one selected from the 'Gradient Color' property.

The **'none'** option means that no shades of colour have been associated to the Screen.

Gradient Color

By using this selection you can define the colour for the Screen's background gradient. The resulting various shades of colour will be a combination of the **'Background Color**' associated to the Screen and the one selected from the '**Gradient Color'** property.

Image Width

By using this edit box you can define the width in pixels with which the background associated to the Screen is to be displayed. When using the '-1' value the image will be displayed with its default size, otherwise the image will be resized according to the sizes set but with the possibility of losing its graphical quality.

Image Height

By using this edit box you can define the height in pixels with which the background associated to the Screen is to be displayed. When using the '-1' value the image will be displayed with its default size, otherwise the image will be resized according to the sizes set but with the possibility of losing its graphical quality.

Tile Image

If the associated file as background colour is the right size this selection permits the image to be repeatedly displayed along side each other in the Screen until the whole area in the window is covered.

Spawn Thread Execution

Each Screen processes the logics and tasks associated in the User Interface thread. When this option is active, the Screen will execute in a separate thread, independently from other project threads. This is handy to use when there are Screens containing significant logic or synapses processes**.** In this case the logic processing will be executed in a separate thread without penalizing the graphic interface, which nevertheless requires a greater commitment of the memory resources.

The 'Chart' object cannot be used in screens opened in a separate thread (Screen 'Spawn Thread Execution' property). In cases contrary to this, the 'Chart9 object will not appear on screen and the following error message will appear in the output window:

Failed to create chart. Make sure the object isn't inside a synoptic with the separate thread option

Exclusive Write Access

Enabling this property, only the first user who get connected to the screen resource can have write access to that screen. All other users who get connected can only open the screen but can not give commands, like setting a variable value using a display, potentiometer, etc. or acting on button commands like page change etc. This mode allows to avoid that simultaneous connections can write the same variable. As an example, if in Server project a user has opened the "LayOut" screen, any other WebClient user who get connected to the same screen could not have write access to that screen. Vice-versa the rule is valid even if the WebClient user first accesses the screen. In this case the local user of the Server project will not have write access to that screen. When a user opens a screen already opened with exclusive access by another user, a warning message will appear, as follows:

The screen 'ScreenName' cannot be opened with the exclusive Write Access

Subsequnet Users who access the screen protected with Exclusive Write Access will only be able to activate command through a resource outside of the screen context such as: Menus, Shortcuts, Basic Script, Event Objects, Alarms, etc.. This means that once entering a screen with Exclusive Write Access, the user will have to use a command from the Menu or Shortcut in order to exit. However, Web Client users who do not have these resources at their disposal will have to restart the applet to reconnect to the project with a new session (and then try to re-access the screen with Exclusive Write Access).

6.12.4. Screen Execution Properties

By using the Execution properties you can define the Screen's advanced functionalities. In order to do this just select and open the Screen required and then edit its settings through the Movicon **'Properties Window'**.

Layer Variable

If required by using this edit box you can select a variable from the Movicon Real Time DB which determines the number of display layers for the Screen's controls and symbols. If you want to manage the layers, each Movicon drawing or symbol must be declared with the required level by using the **'Layer'** property from the control's or symbol's **'Properties Window'.**
A Screen can have up to 32 layers. Therefore it is essential that the variable defining the number of layers must be in DoubleWord (32 bit), keeping in mind that each single bit corresponds to the displaying of the layer relating to that number, starting from zero bit which corresponds to the first layer.

Activating one layer will not exclude another, which means that there can be many levels active at the same time based on the bit set in the logic state '1' in the associated variable. In addition to this, the 16 available levels do not have any priority hierarchy over each other.

Public Source Container

The base Screen's name for the Public Symbols is entered in this dialog box. The Movicon controls and symbols can infact be associated a 'Public Name'. When some symbols with the same 'Public Name' have been inserted into the project, and one of these is present in the 'Public Symbols Container', all the public symbols will be modified with the base symbol's properties, being the one contained in the Screen specified in the 'Public Symbols Container' property, at the Runtime startup. These modifications only take place in Runtime, therefore the symbols will resume their original properties when returning back into planning mode.

Style Source Container

By using this property you can select a screen to use as a style source container. For further information on how this property works please refer to "Style Sources in Symbols".

InUse Objects Manager

When enabling this property activates a management that puts 'Inuse' variables out of use (Not in use) when the object they are being used in becomes INVISIBLE on screen for more than 5 seconds

(not editable) and as a consequence these variables will no longer be exchanged with the field and not counted by the license. As soon as the object becomes visible again, its variables will return back in use.

The object's variables will change to NOT in use when the object comes invisible due to one of the following reasons:

- Visibility management performed through object's "Animation - Visible" property
- Visibility management performed through using "Screen Levels". In this case you must set the object's "Visibility - Level" property
- Visibility management performed through enabling the zoom factor (object's "Visibility - Control Zoom" and "Visibility - Percent Zoom/Size" properties)
- Visibility management performed through enabling scale factors (object's "Visibility - Control Size" and "Visibility - Percent Zoom/Size" properties). In this case the object's "Animation - Size" property should also be set appropriately
- Visibility management performed through user " Access Levels". In this case the object's "Access Levels- Read Access Levels" property should be set appropriately
- Visibility management performed through object's "Visibility - Visible on Web Client" option
- Visibility management performed through object's "Visibility - Visible on WinCE" option

Caution! Variables used in the **"Animation - Visibility"** and **"Animation - Size"** properties remain always In Use even when object is invisible. This is due to the obvious reason that once the object has been made invisible by one of these properties, it can return visible when the variable changes again.

The variables In use management is not performed for the "Animation - Transparency" property. If the object should become completely transparent (associated variable value equal to zero) the variable should remain in use because in this case it's the object's transparency that is being managed and not its visibility.

All the object's variables are subject to being placed in NOT In Use when object is not visible. These variables are those used in the following object's resouces:

- variables used in the object's dynamic properties
- variables used in the object's Command Lists
- variables used in the object's IL logic
- variables used in the object's script code
- variables used in the object's script code's "Variable Events" . In this case the variable's variation will not execute the associated event.

When the 'Inuse Objects Manage' is enabled, when no longer visible, some objects will obtain certain behaviours in they way they work when their variables are Not in use. The objects involved and their behaviours are as follows:

- **Button Objects**: when a button becomes invisible, the timer that controls the "Impulsive" or "Commands While Down" commands is terminated. This means that the command in execution will be aborted.
- **Trend Object**: when a Trend becomes invisible, the value recording facility in the Trend buffer is stopped as well as the recording of data in any preset ".csv" files. This means that, if the Trend is not connected to a DataLogger, no data will be recorded while the objectremains invisible. When the Trend returns back to being visible, it will show data recorded beforehand and commence adding new data as it is recorded. If the Trend has been set to record on ".csv" file, the "Execution - Record on File" file, with the "Execution - Create New File" property enabled, each time the Trend is made invisible the ".csv" file will close and another one will be created when Trend returns back visible. This means that each time the Trend returns to visible mode, its data buffer will result empty due to the fact that a new ".csv" file has just been created.

Global Container

Enabling this property permits the Screen's child objects be published in DOM format (Document Object Model, XML).

Style Source Back Color
By enabling this property, the screen will inherit the back color of the active style source container. For further information on how this property works see "Style Sources in Symbols".

Execute Synapse
When enabled this property activates the execution of any synapses logic upon Screen loading.

Synapses Cyclic Execution
When enabled this property activates the cyclic execution of any synapses logic when the Screen is active.

Max. Instances
This property, when set with a value higher than 1, allows more than one instance to opened in the same screen. The number of instances that can be opened is defined in this property. Once this set number has been reached an error message notifying limit of instances has been in exceeded in the system Log. The message only appears if the set maximum number of instances is higher than one, otherwise no message will show and focus will fall upon the window already opened.

Warning! Opening more than one instance in a screen may occur only when the screen is opened using the "Open Frame (multi-monitor)" command. Therefore, not more than one instance can be opened in the same window such as Popup modals.

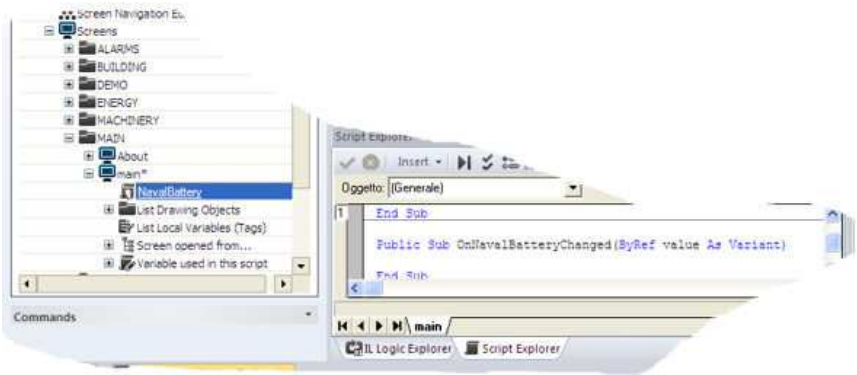
When the "Exclusive Write Access " property is enabled, only the first screen instance will have write access denying access to all others. For further information please refer to the chapter on "Screen Background Properties"

Opening a screen in more than one instance is NOT suppported in Windows CE.

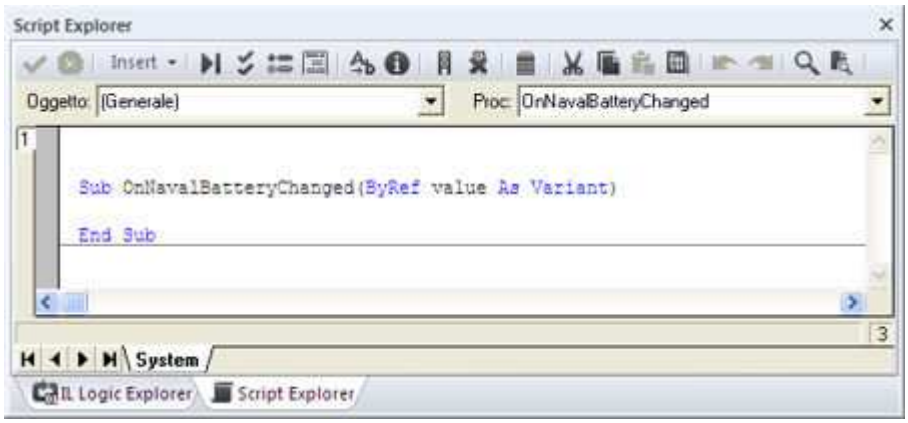
6.13. Associating Variable Script Events to Screens

In addition to the standard events made available by Movicon (Click, DblClick, KeyDown, etc.) customized events, associated to Movicon Real Time DB variable variations, can also be inserted into the screen's Script Code. Practically, an event can be added to be executed whenever the selected variable changes status. Therefore it is the programmer's task to insert the appropriate code into the event's internal according to what is required. By inserting the event in this way it will be active and processed only when the Screen is active, meaning when loaded in Ram.

Associating a Variable Script Event to a Screen can be done by selecting the Screen and activating the 'Add New Variable Script Event' which can also be found in the 'Command' window of the 'Project Explorer'.



The request for a Variable Script Event association to a Screen will open up a further window containing a list of the available Real Time DB variables. Once the variable has been selected the new event will automatically be inserted in the Script Explorer window with the syntax *"OnVariableNameChanged":*



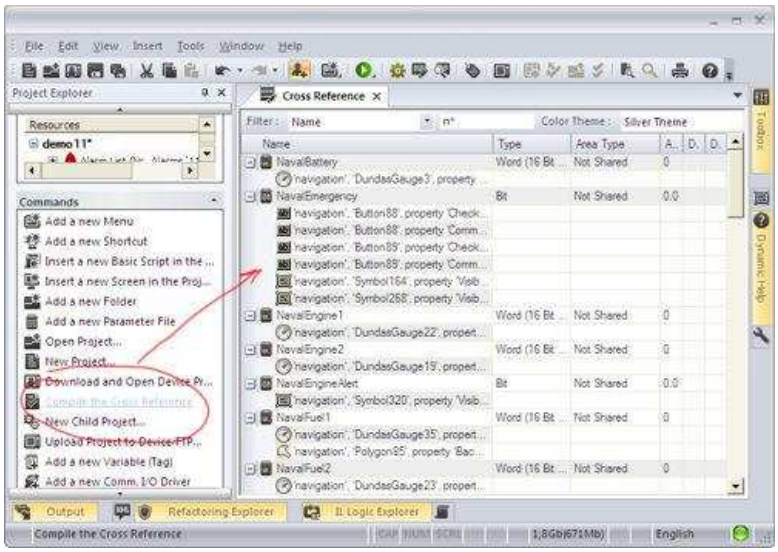
7. Cross Reference

The Movicon Cross Reference list can be applied to both the project Variables and Screens and consents you to find out where a Variable is being used or from where the screen was opened.

Movicon consents you to generate a Cross Reference List applied both to the project variables and screens. This functionality may be handy for quickly finding out in which resources or objects the variables and screens are being used and can be useful for printouts and documentation.

7.1. Variable Cross Reference

The Cross Reference for variables allows you to single out the resources or objects which use specific variables. To compile or update the variable Cross Reference you can use the **"Compile Cross Reference"** command found in the Project Explorer's "Commands" pane or in the menu which opens by right clicking on the Real Time DB resource. Once the Cross Reference has been compiled a window will open within the workspace similar to the "List Variables Window", in extended form containing both the variables already used in the project and those not yet used. The variables already used are listed first on the list followed by all those not yet used with a question mark symbol displayed at their side. When the window opens the nodes of the variables will be contracted and when expanded will show references to objects or resources in which the variables are used. The Cross Reference window can also be accessed by double clicking while pressing down SHIFT key on "Variable List". However it is always possible to check where a variable has been used by clicking on the "Variable Used in..." tree structure item provided for each variable in the "Variable List" resource.

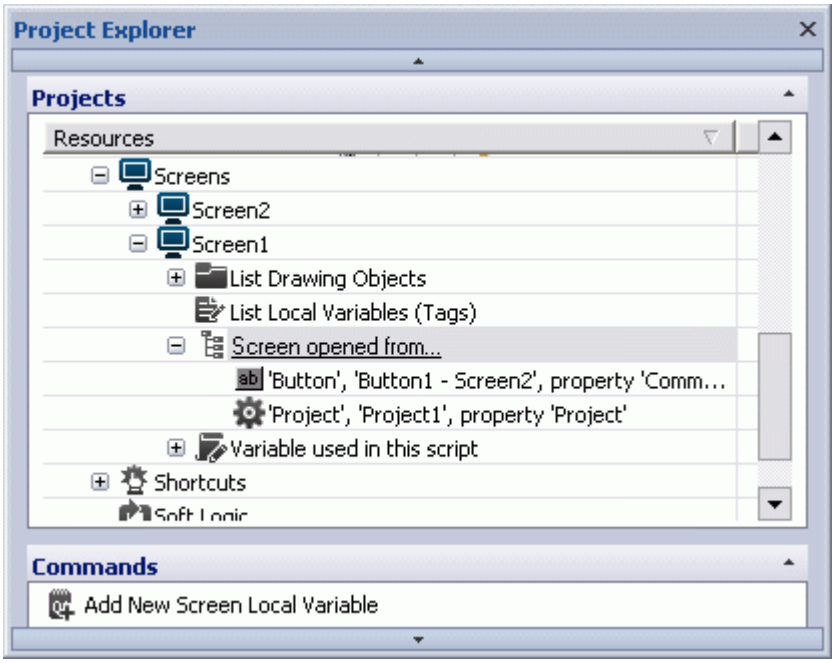


The variable Cross Reference has effect in all the project resources, even for those variables used in Communication Drivers, therefore in both Stations and Tasks.
In addition to this you can also compile Cross References for variables used in Basic Script codes on condition that they are used directly without using the "GetVariableValue()" and "SetVariableValue()" functions.

Once the Cross Reference window has been opened showing a variable that has been used in an object contained in a screen, by double clicking on the link, this screen will open focusing on the object in question, and the "Dynamic Property Explorer" window will open on the property to which the variable has been associated.

7.2. Screen Cross Reference

The Cross Reference for screens allows you to single out the resources or objects containing commands to open Screens. Unlike for Variables, a window does not display showing a Cross Reference for Screens. Instead, you can view the cross references of each Screen by expanding the "Screen Opened from..." tree item available for each Screen in the Project Explorer window. When this item is expanded (click on "+" node), and the Cross Reference has not yet been generated, you will be requested to compile and confirm the screen's cross reference which will then appear listed under the "Screen Open from..." item. You will then be able find out which resource or object contains a command to open the screen.

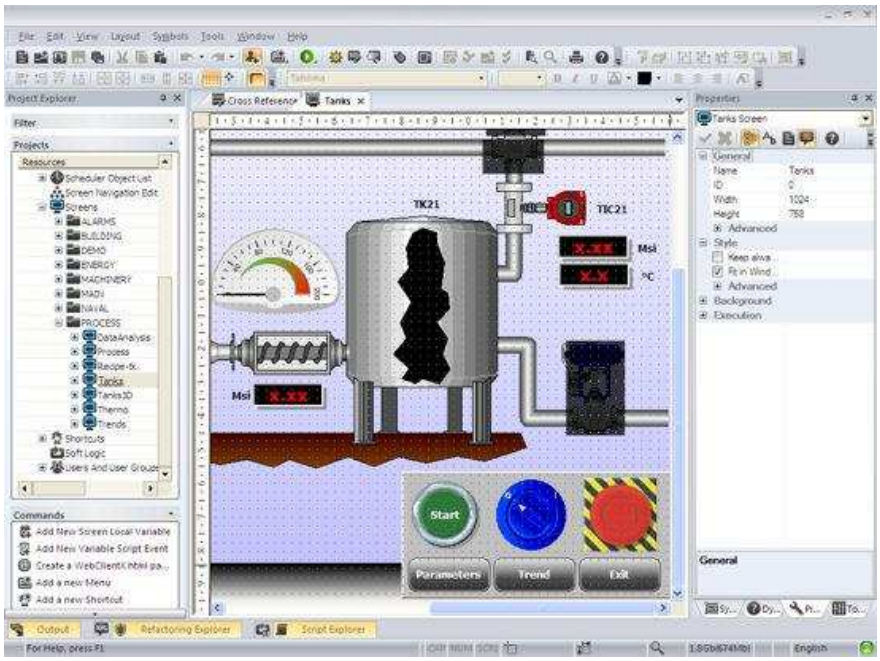


If the "Screen Opened from..." item expands (click on "+") already with a cross reference generated, just update it by using the same command used for the variables **"Compile Cross Reference"** which can be found either in the "Commands" pane at the bottom of the Project Explorer window, or in a menu which opens by right clicking on the Real Time DB Resource**.**

8. Graphic Interface

This chapter introduces the different techniques that can be used for creating graphic interfaces and drawing in Screens

The Movicon Screen resources are elements through which man-machine graphic interfaces can be created by using the drawing editor and graphic animation editing tools.
Movicon permits drawings to be created in two different ways: by using its own internal graphic editor or by inserting drawings ((bmp, jpg, gif, wmf, emf, etc.). Both ways can be used when working with graphics as they can co-exist together.
The Movicon Objects and Controls which can be inserted on screen are available from the **"Objects Window"**. These components can carry out different functions, from simple geometric shapes to advanced controls for executing commands or displaying data.
The Movicon Objects and Controls are created in proprietary vectorial format and symbols can also be created (composed of a number of different components) and associated with animation properties. These formats can be exported or imported from Metafile (WMF, EMF) format.
Your own Movicon vectorial drawings can be saved in the **"Symbols Library"** and reused.



An example of a screen page using a background image and a number of vectorial symbols taken from the Symbol Library

8.1. How to create Graphic Interfaces

Before going ahead with the animation procedures using the graphic objects and commands, it is always a good idea to establish which type of graphic solution you want to use, even though by choosing one solution does not mean the others cannot be used.

A 'classical' solution is usually to associate a static drawing file, such as a screen background, and then insert graphic objects and commands on the screen to be used for animating. These objects can naturally include the Movicon vectorial symbols.

The static drawing can be built from a file in BMP, JPG, GIF format etc. or from a vectorial file in WMF, EMF metafile format. The background drawing file can be graphically edited by using the appropriate image editor such as the Windows 'PaintBrush'. These programs can be linked to the Movicon **"Tools Menu"** so that they can be run straight away.
The background file constitutes the screen's static drawing, while animation is implemented by using the Movicon object techniques, which will be superimposed onto the background drawing.

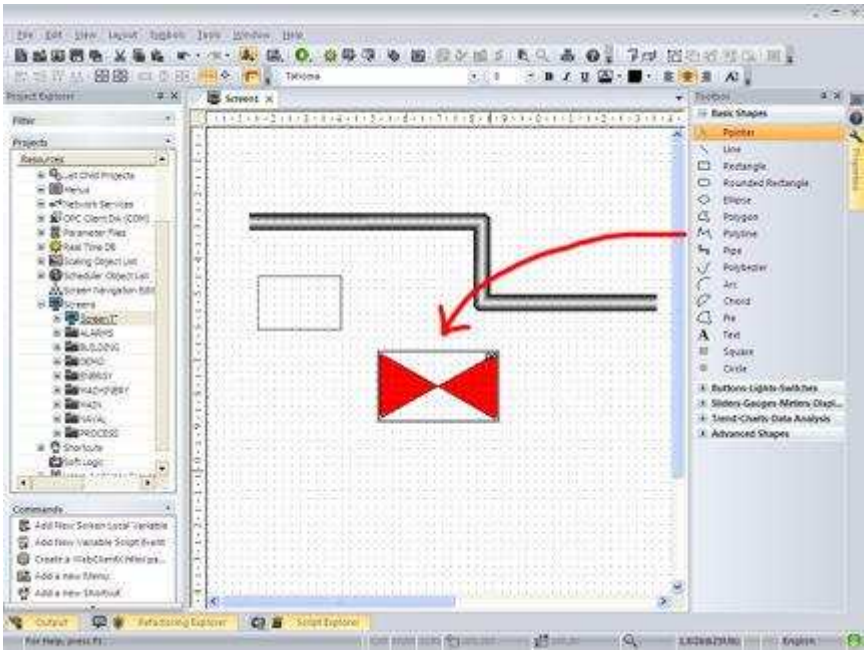
It is not compulsory for a screen to be associated with a background file as a static drawing. The screen's graphic interface can also be created with just a drawing and the Movicon vectorial symbols. The Movicon tools also permit you not to use any background drawings if you wish not to do so.
The drawing can be made up from lines, shapes or complex symbols which are already provided by Movicon, some of which can be coloured, customized or animated by using some of the symbols' or vectors' property windows.

Editing technique Synthesis

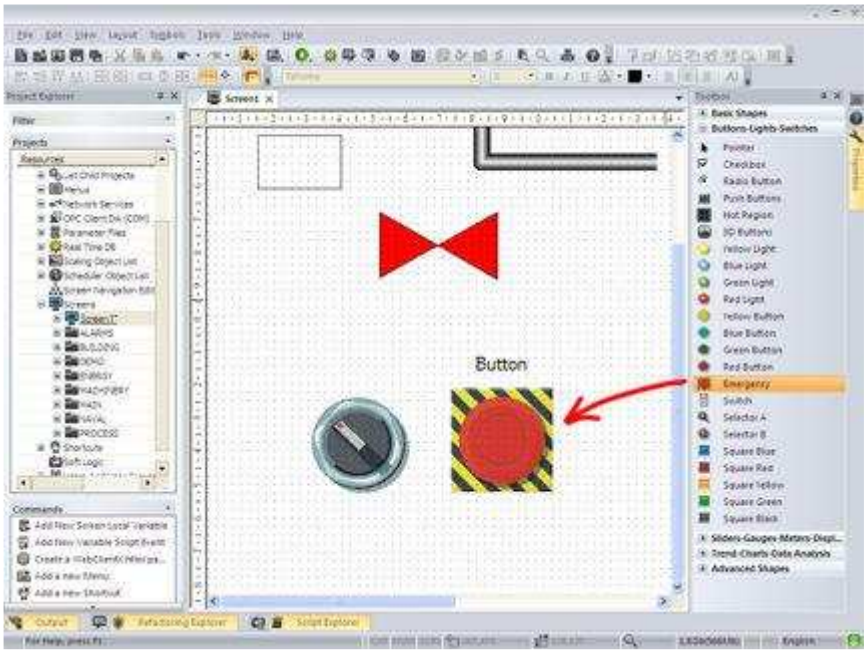
The editing techniques use as base the insertion of object or symbols by means of purposely designed toolboxes or object libraries. Each single potentiality, function and property of each object are described in detail in properties window relating to each specific graphic object.
The synthesis of the graphics editing techniques are provides below and will then be described in detail for each single component.
The synthesis aim is to give you a general overall picture of the operations to be executed in created screens.

Inserting objects into screens

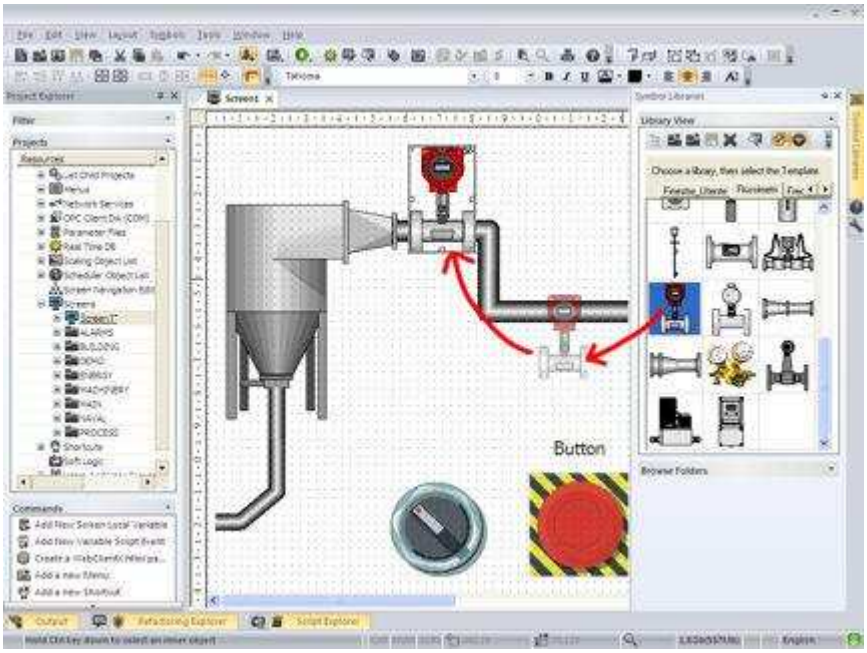
This operations consists of taking out the desired object from the Toolbox and inserting it in the point desired within the screen area.
After having inserted the object, it can then be sized and configured as pleased by using the object's borders and properties.



The objects from the Toolbox include pre-built graphics such as buttons, selectors, sliders, meters, gauges, etc.
In this case, according to the object inserted, you can set up a specific configuration by using the properties relating to each object.

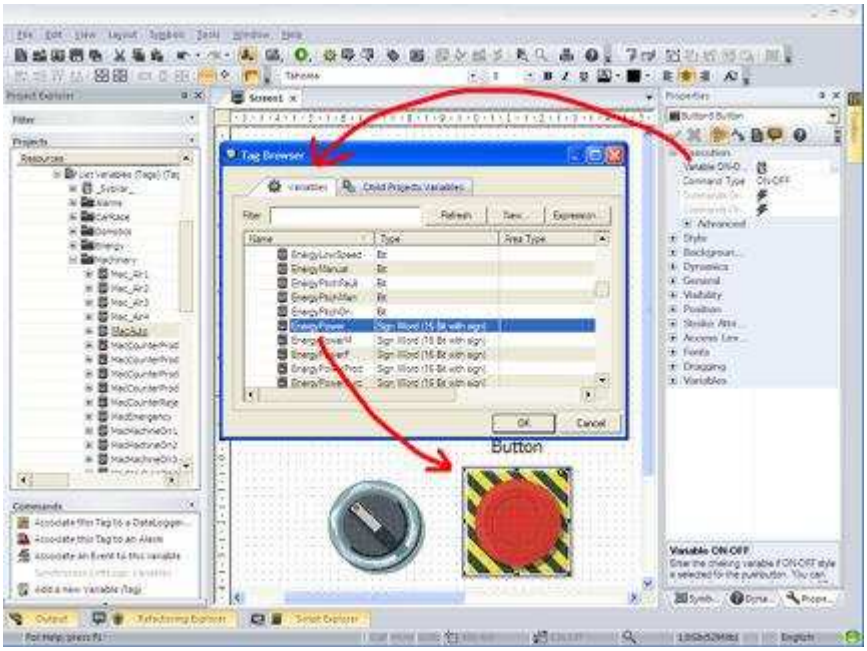


Movicon also has Symbols Library containing countless ready-made graphic symbols. The graphic libraries can be displayed from the "View > Symbols" menu. The graphic libraries reduce time in creating any type of graphical project for automation. A vast choice of graphic symbols (tanks, pumps, valves, motors, etc) allow you to high graphical impact drawings with ease.
Another thing to keep in mind is that you can import external drawings or you can expand the library even more by building your own custom graphic symbols.

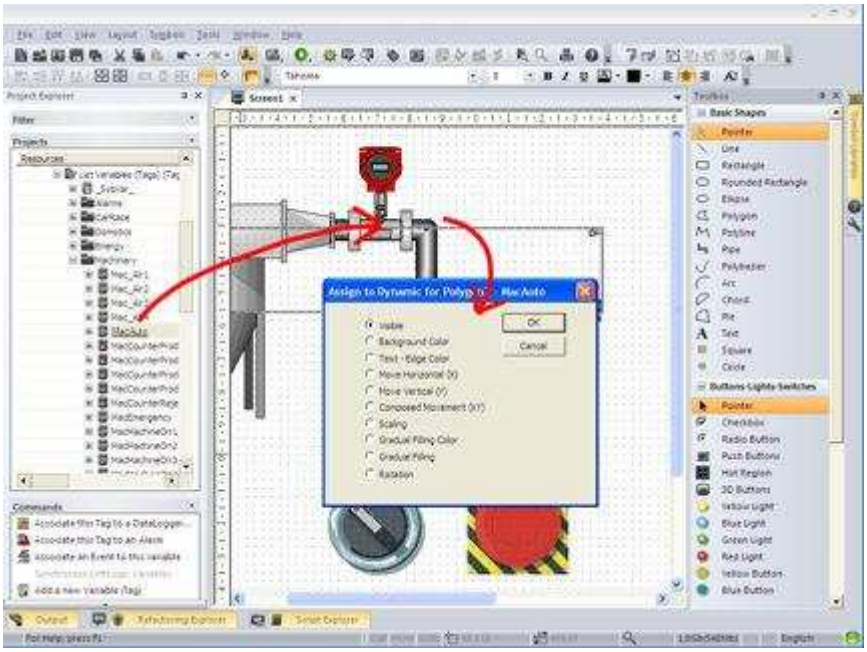


Assigning variables to dynamic functions

After having inserted a symbol or an object, you can access its properties to configure it. Configuring is done through the Properties Window, which can also be activated by simply double-clicking on the object.
To make drawing or symbol more dynamic you need to use its 'Animation Properties', where you can assign variables for the graphical function desired along with other dynamic settings (ie. colors or color changes, thresholds for fillings or visibility, etc.).
The variables can be selected through the "Tag Browser" window which allows you to select (or to create directly) variables from the project's Variable List(Tags).

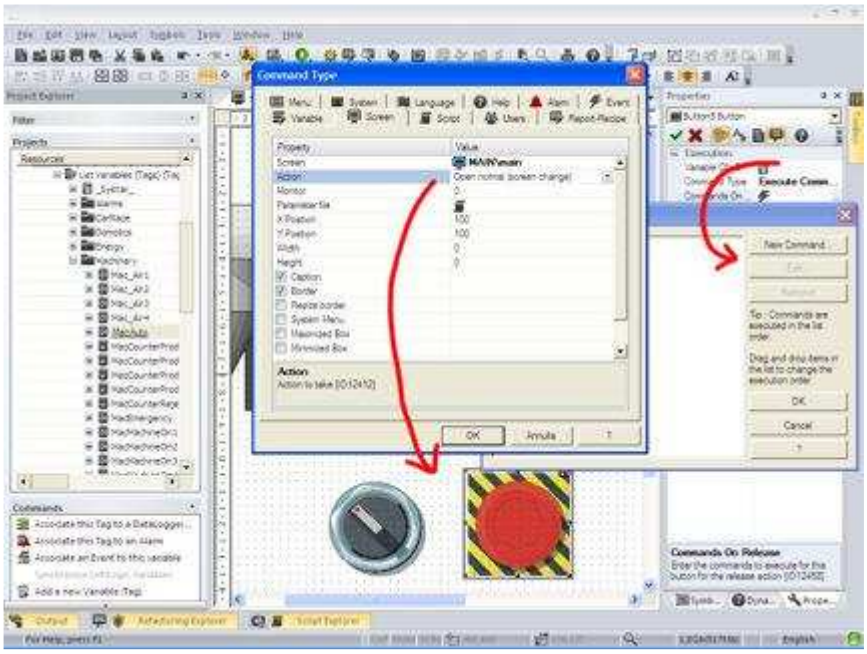


Assigning a variable (Tag) to a graphic object can be faster dragging the variable directly on the selected object, using the "Drag&Drop"method.
Just select the variable from the Project variables list and drag it to the graphic objects, as shown in the picture. If the object is a command-type object (i.e. a button, a potentiometer, etc.) the variable will be directly assigned to it. If the object is a graphic symbol, you will be asked to select one of its dynamic functions. You can specify more details (colours, thresholds, etc.) later, acting on the object properties.



Assigning commands

The command type graphic objects (such as buttons, but in the same way for menus, accelerators, events...) can be associated with one or more commands to be executed by clicking on the object.
In this case the command type window used for assigning commands can be displayed by **SHIFT+double clicking** on the object, or by using the 'execution properties'.



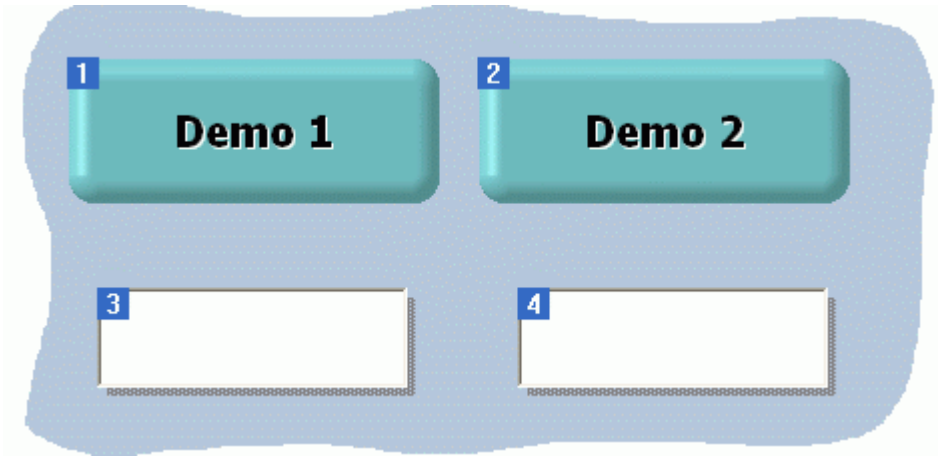
For any further information on the editing techniques and the object properties, please refer to the description on each object in this manual.

8.2. Graphic Editing Operations

Any drawing object inserted into the screen can be edited and handled according to the options provided by the graphic editor. The drawing is entered into the screen after being taken out from the library then by clicking the initial insertion point and releasing the mouse key when having dragged it to the size desired.
The inserted object can be repositioned by simply selecting and dragging it with the mouse to the new position.
To resize the object just click on one of the sizing points and drag it until the desired size is reached. To introduce or modify a text directly in the drawing, just select the drawing and click on it. The cursor, indicating the possibility to type the desired text, will appear. When the text has been entered press ENTER or press ESC key to cancel operation. The text entered will become the object's title and can be verified and modified through the **"Properties Window"**.

8.2.1. Tab Order

The order of insertion always determines the Tab order of the objects inserted in a screen window. The Tab Order determines the sequence of selecting objects by using the TAB keys on the keyboard.
The TAB order can always be changed by using the **"Tabulation Order... (CTRL+D)"** command from the Layout Menu or the CTRL+D keys on the keyboard.
The displayed order can be changed by clicking the mouse on the object repeatedly to get the order desired.



The object with the highest Tab order will also be the one with the highest overlapping order. placed on top (at the forefront) of the thelayer highest.

8.2.2. Overlap Order

The objects inserted on screen can be overlapped differently to the one they were inserted with.
To change the overlap order between the drawing object you need to use the commands from the **"Symbols Menu"**. These commands are used to change the objects' tabulation numbers. The commands available are:

- **First:** the selected object will be placed on the top layer in respect to the others (foreground). Therefore its tab number will be the highest number
- **Last:** the selected object will be placed at the back on the last layer (background) in respect to all the others. Its tab number will therefore be the lowest number
- **Move Next:** the selected object will be placed on top of the last layer. Its tab number will increased by one. The previous object will acquire a lower layer to which it had before
- **Move Previous:** the selected object is placed on the layer underneath the top one. Its tab number will be decreased by one. The previous object will acquire a higher layer to which is had before

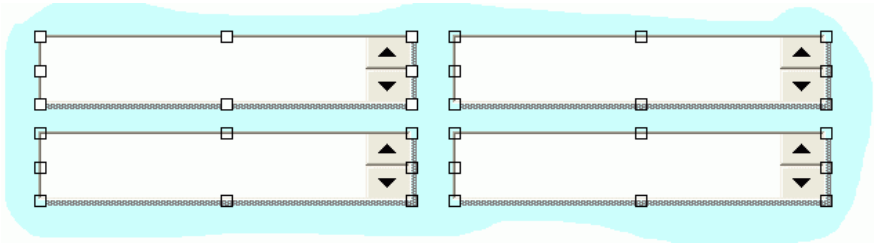
8.2.3. Multi-Object Selections

When using elements within a synoptic, it may sometimes be convenient to select an area containing a group of elements to modify their positions, alignments or sizes or select the Cut or Copy functions.
To select a group of elements in a synoptic, use the Windows standard techniques:

1. Click with the mouse on the initial point of the area you wish to select. Hold down the left button and move the mouse. A dashed extendible outline will appear to define the selected area. Move the mouse until the required dimension is reached
2. The Symbols can be selected also by clicking with the mouse on each individual symbol while holding down the CTRL key. The first symbol selected will be taken as reference

The commands you can use after having done a multi object selection are:

- Click on an object from the multi-selection and set it as the reference object
- Ctrl+Click on an object from the multi-selection to unselect that object
- Ctrl+Click on an object not included in the multi-selection to add it to the multi-selection



The reference control in a symbol group is the one that shows the delimitation border not transparent, but with solid black back color.

8.2.4. Accessible Properties with Multi-Selections

When multi-selecting objects of the same type you are given the possibility to modify their "common" properties with one single command. When multi-selecting only the properties which can be modified at the same time in the objects selected will remain visible in the Properties Window. For instance, if you select more than one variable in the Real Time DB, the "Name" property will not be displayed in the Properties Window because each variable should have a different name, but other properties such as "Type", "Retentive Not Shared" etc., will display for you to modify.
furthermore, the Properties Window will be set with the values defined in the multi-selection's reference object (please refer to "Multi-Object Selections").

Color Threshold and Image Threshold Animation Properties

When multi-selecting objects you can access and modify certain animation properties which include: "Back Color Properties Animation" or "Edge Color - Dynamic Text Animation" or "Filling Properties Animation" or "Images Properties Animation".
Color threshold lists can be accessed (for "Back Color", "Text-Edge color" and "Gradual Filling" properties) and the images list (for "Dynamic Image" properties).
When multi-selecting objects and accessing one of the above mentioned animation properties, click the button to the right to display the color list or image list edit window which will open showing the list relating to the referenced object within the multi-selection (object will have highlighted edges).
When confirming edited list with OK, a message window will show asking for confirmation. If the programmer confirms changes, the edited list will then be applied to all the multi-selected objects. If not confirmed, changes made to list will not be applied to the objects in question.
Modifications to these properties can also be done by selecting the desired number of objects from the "Project Explorer" window tree structure without having to open the screen.

8.2.5. Object Alignment Functions

The drawing objects inserted on screen can be can be exposed to the alignment and sizing functions which refer to one object or a group of objects.

The alignment functions are available when selecting in sequence two or more objects on screen by clicking the mouse with the CTRL key pressed down. The first selected object will become the reference object, which all the alignment or sizing commands will refer to. Once the group has been selected, the reference object can be changed by clicking it.

The Alignment functions also allow selected objects to be aligned according to their barycentres. This can be done by pressing the "Shift" key and activating the command from the **"Aligning Bar"** or **"Layout Menu"**. The command always considers one central barycentre for the selected objects.

The commands which can be used are available from the **"Layout Menu"** and in the **"Aligning Bar"**.

Alignment Objects

Left	This command aligns the selected objects on the screen's left hand side.
Right	This command aligns the selected objects on the screen's right hand side.
Up	This command aligns the selected objects at the top of the screen.
Down	This command aligns the selected objects at the bottom of the screen.
Centre Vert.	This command aligns the selected objects in the centre of the screen vertically.
Centre Horiz.	This command aligns the selected objects in the centre screen horizontally.

The object with the lowest Tab number will be used as the reference object for aligning the other objects. The reference object's small selection squares will be highlighted in a different colour in respect to the other objects. Once the group of objects has been selected you can change the reference object by clicking the one you desire.

Set Same

Width	This command resizes the selected objects to the same width on screen.
Height	This command resizes the selected objects to the same height on screen.
Both	This command resizes the select objects with the same width and height on screen.

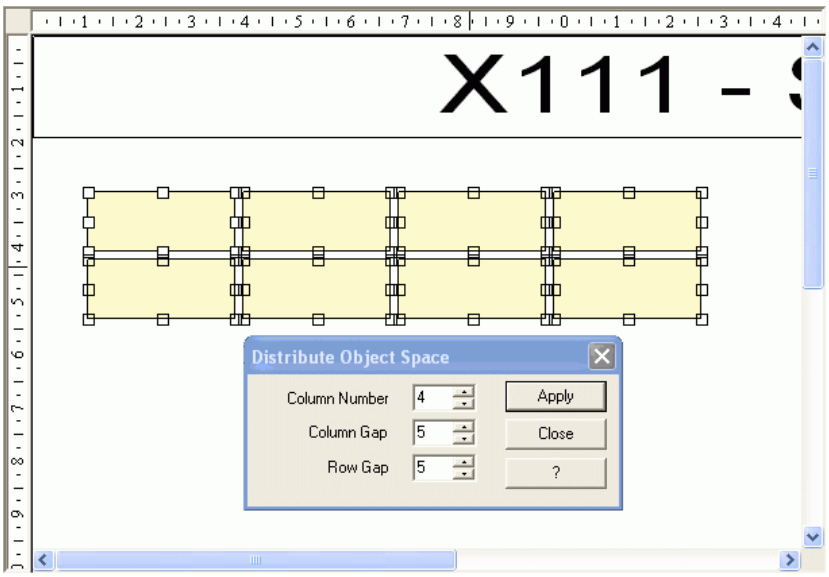
The object with the lowest Tab number will be used as the reference object for aligning the other objects. The reference object's small selection squares will be highlighted in a different colour in respect to the other objects. Once the group of objects has been selected you can change the reference object by clicking the one you desire.

Center in Window

Vertical	This command centers the selected objects vertically in the screen area. When more than one object has been selected the area occupied by the selected objects will be centered.
Horizontal	This command centers the selected objects horizontally in the screen area. When more than one object has been selected the area occupied by the selected objects will be centered.

8.2.6. Distribute Object Space

The **"Distribute space between Objects..."** function, from the Edit Menu, is one of the most important tools. This graphic editing function aligns screen objects equally. In this way the symbols will be positioned automatically by being subdivided and organized in rows and columns equally with the possibility to preview the result.



The ' Distribute Object Space' automatically aligns the symbols in rows and columns

To get this function working you must first select the group of objects you wish to align with the usual standard techniques. After having done this you can then access the **"Distribute space between Objects..."** command from the Edit Menu. A window will display for setting the following parameters:

- **Column Number:** sets the number of columns in which the group of symbols are to be subdivided
- **Column Gap:** sets the number of space pixels between the symbols and the set columns
- **Row Gap:** sets the number of space pixels between the symbols for the set rows

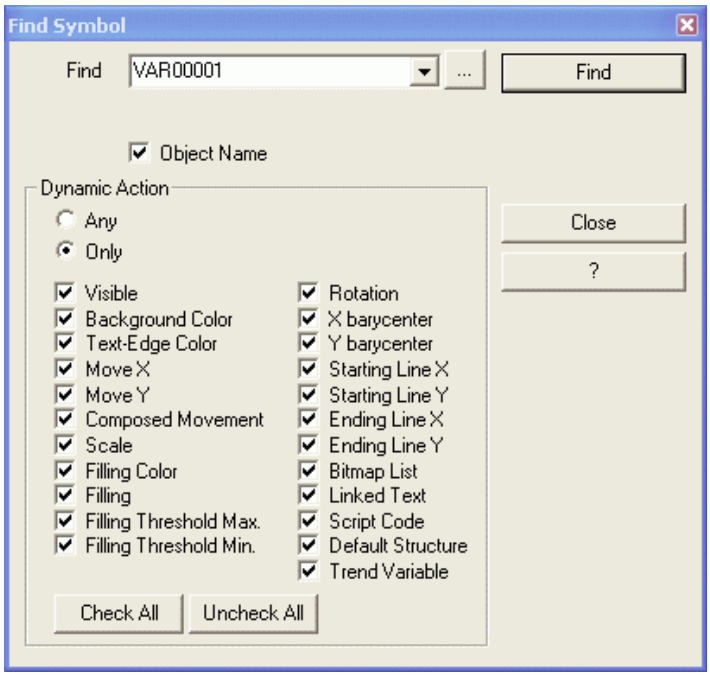
You can get a preview of how these settings will look like, by using the Apply button which will distribute the objects immediately.

8.2.7. Find and Replace symbol

When a screen is opened in edit mode in the workspace, the "Edit" menu includes two commands, "Find Symbol..." and "Replace Symbol...". They can be used to find if a variable is associated to one or more screen objects and, if required, to replace the variable in the objects with another one.

Find Symbol...

This command will open the following dialog window:



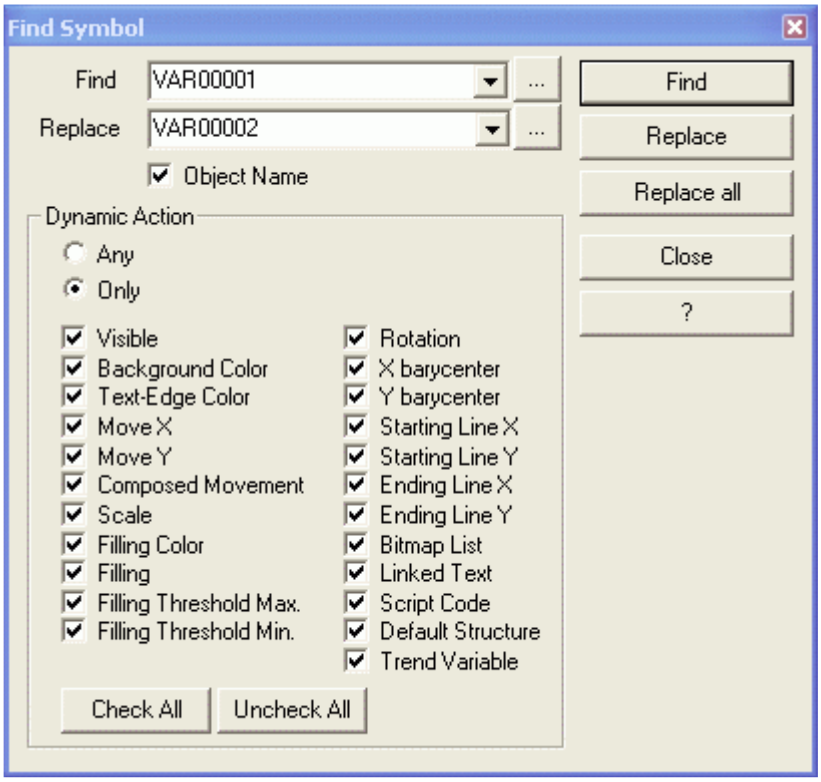
The command permits to establish if a variable has been used in animation properties for objects added to the screen currently open in edit mode. The fields in the above windows have the following meaning:

"Find": type in this filed the name of the variable to seek in Animation properties or in objects' Basic Script code. The drop down list includes the texts already searched before. Clicking on the ellipse button "... " on the right of the drop down list, the Tags Browser dialog is open, showing the project's variables list.
Object name:if this check-box is selected, the text typed in the "Find" field will also be searched in the "Object Name" screen objects property. This way you can search an object name instead of the variables used in it (in this case the text in the "Find" filed can be not a variable name).
Dynamic Action: in this options group you should define which object properties will be searched in. You can select all Dynamic Action properties or just some, you can also extend the search to the objects' Basic Script code selecting the "Script Code" option.
You can limit the search only to those properties selected with the check boxes by selecting the 'Only' option. When selecting the "All" option, a search will be made for all the animation properties, regardless of being checked or unchecked, and also for the "Dragging" properties.
"Find" button: this command starts the search. When an object containing the search text is found, the search is stopped and the object is selected. Clicking the "Find" button again the search will restart until the next object (if any) is found.

The variables search in the Dynamic Animation properties is executed only among the enabled Animation properties. As an example, if a variable has been associated to the "Variable" field of the "Dynamic-Visible" property of an object , but the "Enable Visibility" property is not set,the "Find" command will not include in the search the "Dynamic-Visible" property of that object.

When the search is executed in the Basic Script code, the text typed in the "Find " field is searched in the whole script. This means that any word or part of a word containing the text typed in the "Find " field will be found, being a variable name or not.

Replace Symbol...
This command will open the following dialog window:



The command permits to establish if a variable has been used in animation properties for objects added to the screen currently open in edit mode and to replace it with a different variable. The dialog window include the fields already described for the "Find" command, moreover some additional fields are present:
"Replace": type here the name of the variable to be used for replacement. The drop down list includes the texts already searched before. Clicking on the ellipse button "... " on the right of the drop down list, the Tags Browser dialog is open, showing the project's variables list.
"Replace" button: this command executes the replacement of the searched variable with the new variable specified in "Replace" field. You should first execute the "Find" command, and, as soon as an object containing the searched text is found, the search is stopped and the object is selected. At this point, pressing the "Replace" button, the found variable is replaced with the new variable, for the selected object only
"Replace all" button: this command executes the replacement of the variable specified in the "Find" field with the variable specified in "Replace" field. In this case you should not execute any search since the replacement is executed in all screen objects.

8.2.8. Importing/Exporting Vectorial drawings

The Movicon graphic editor has to be proprietary type due to its intrinsic graphic animating objects characteristics.
However, in upholding the system's philosophy of openness, you are guaranteed the possibility of importing or exporting vectorial graphic images with the Movicon graphic editor.
For instance, you can import drawings in Windows' metafile format (WMF, EMF) created by any vectorial graphic editor. Once imported into a Movicon screen these drawings can be edited and configured in their graphic and animation properties offered by the system.
It is likewise possible to export Movicon drawing objects in one of the above listed formats, thus making them available to other vectorial graphic editors.
To export a Movicon drawing object you need to select it, then access the **"Export Drawings..."** command from the Edit Menu or Drawing Menu. The path and name desired then need to be specified in the standard window for saving files.
To import a WMF or EMF drawing on screen, you need to use the **"Import Drawing..."** command from the Edit Menu or the Drawing Menu. By using the appropriate window you then need to select the file name desired. The file will be converted and made available on screen as a Movicon object. The Zoom Factor will be requested before importing on screen, i.e. the factor for resizing the original

drawing. If you wish to keep the original sizes confirm with OK or otherwise specify the conversion factor desired.

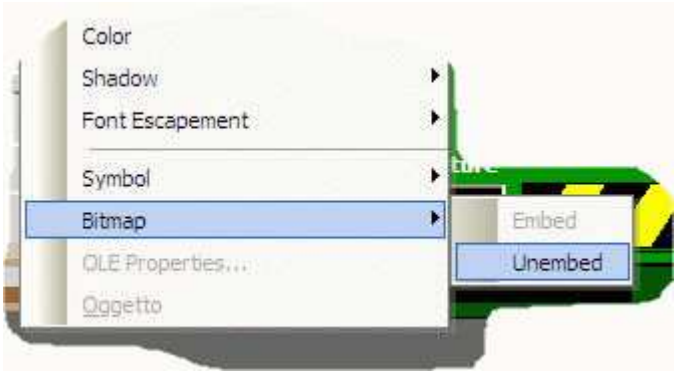
The command for importing/exporting Windows Meta File (WMF) or Enhanced MetaFile (emf) images within a screen also supports the possibility to import/export vector images that contain Bitmap definitions in addition to other primitive functions from the Windows design.

Vectorial image definitions that have areas set to be deleted/cut from the rest of the drawing will not be imported or exported correctly. Movicon does not support this type of operation in its primitive drawing functions.

When the window for importing drawings is opened using the "Edit -> Import drawing" command, you can set sizes in percentages or physical sizes in pixels of the object to be imported. The percentage limit is 1-500 which will alert and error when exceeded.
Sizes in percentages update automatically upon modification. The object's original sizes will be restored when passing from selection to size settings and returning back to selection in percentages.

8.2.9. Embedding Images in Symbols

This symbol function allows images to be embedded in symbols which have been linked to the symbol through the 'Fill Attributes' Group's "Image" property. The image or images will then be saved together with the symbol and the use of the image file will no longer be needed. The command for embedding the image can be found on the menu which appears by clicking the symbol with the mouse's right button:



If you execute the "Unembed" command the image file will be recreated by Movicon in the same path and with the same name it was embedded with. However, the original file path must still be in existence otherwise Movicon will create an error message.

Embedded symbol images are not supported in Windows CE platforms.

8.2.10. Locking-UnLocking Objects

The Lock function is very handy thing for the programmer to have.
By using the Lock command, which is activated with the right mouse key, on the point where the object drawing is on screen will block any changes made with the mouse but not those done with the keyboard's direction arrows.
This utility can be exploited to avoid any accidental movements being made to the object on screen.
When the mouse pointer enters in the proximity of a locked symbol or object, a cursor in the form of a lock will appear along side it to show they have been locked.

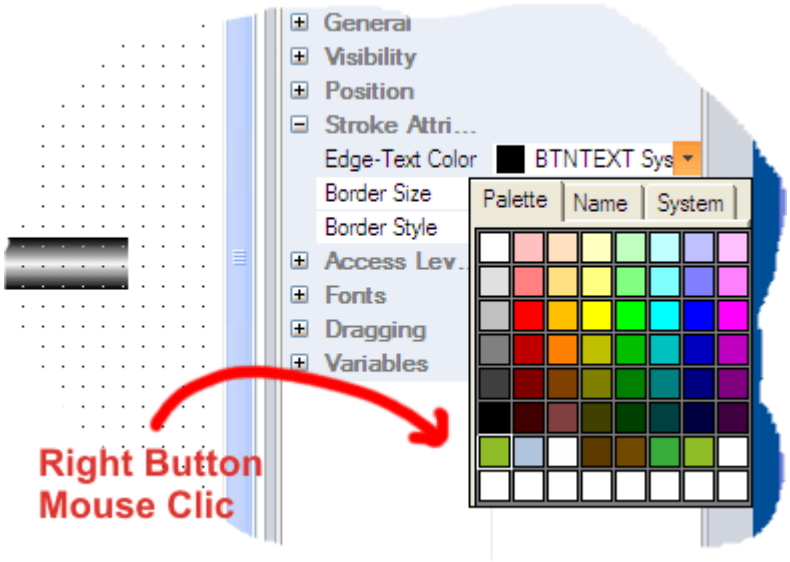
Re-click with the right mouse key on the lock command to unlock the object.

8.2.11. Colour Selection

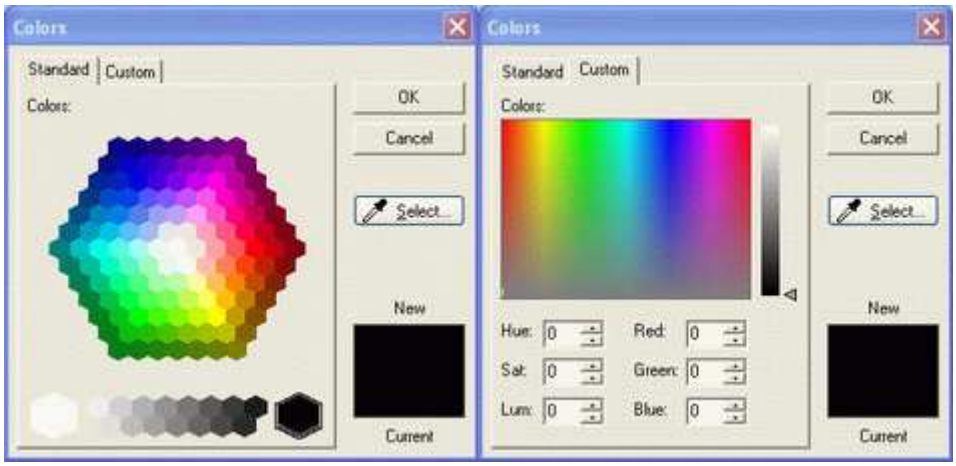
It is a general rule to set or select colours during the development of a Movicon project. The colours can be set through the 'Properties Window" of all those objects and resources which are provided with this possibility. The color settings are activated by using the purpose built button from the "Properties Window" (the button showing a down arrow, placed on the right side of the property field) of the object or resource.
Movicon, in this case, will automatically display a popup window split in three tabs:

1. "Palette" tab. It shows the standard colours palette, where the 48 basic colours are represented. You can define 16 persistent custom colours right clicking on one of the squares of the last two rows, by default representing 16 white squares. Placing the mouse cursor on a palette square, a tooltip will appear showing the RGB colour code (being R, G and B decimal numbers ranging from 0 to 255).
2. "Name" tab. It shows a colours list specifying each colour name.
3. "System" tab. It shows the system's colours list.

Windows system colours are tightly linked to the operating system. This means that the same colours may be displayed differently based on the operating system used. Furthermore the system colour sets may also differ according the operating system being used (i.e. in Windows CE the number of system colours is less than those used in the Windows 32/64 bit platform). It is for this reason that we advise you against using the Windows system colours and to use the standard Palette colours instead to avoid colours changing in projects according to the machine they are being run on.



When defining a new custom colour, right clicking on one of the squares of the last two rows of the "Palette" tab, a dialog window is open, showing two tabs. The first tab allows to select a colour among the standard colours, the second tab permits a complete colour customization, even typing the RGB colour code directly, as shown in the image below.



By using the **"Select..."** button in the window you can select a colour from the screen. When the button is pressed, the mouse pointer will change to a 'dropper' which draws up the color it is clicked on.

When the colour has been selected, it is saved in the object properties, using the colour name (if it is a standard colour) and the RGB code (3 pairs of hexadecimal numbers rrggbb, where rr=red component , gg=green component, bb=blue component). For instance, when selecting a standard yellow, the object property will show a yellow square and the "Yellow (ffff00)" string .

When pressing the "Custom" button in the Palette tab, a dialog window will show allowing you to customize colours and when closing this window the selected colour will automatically be set in the object's properties without being added to the 16 customizable colours.

Default Colours

Some project objects and resources have "Color" properties which also come with a 'Default' value (or "Automatic"). Once the default value has been modified it can be reset by keeping the "Control" (CTRL) key pressed down while opening the 'Colours' selection window with the mouse.

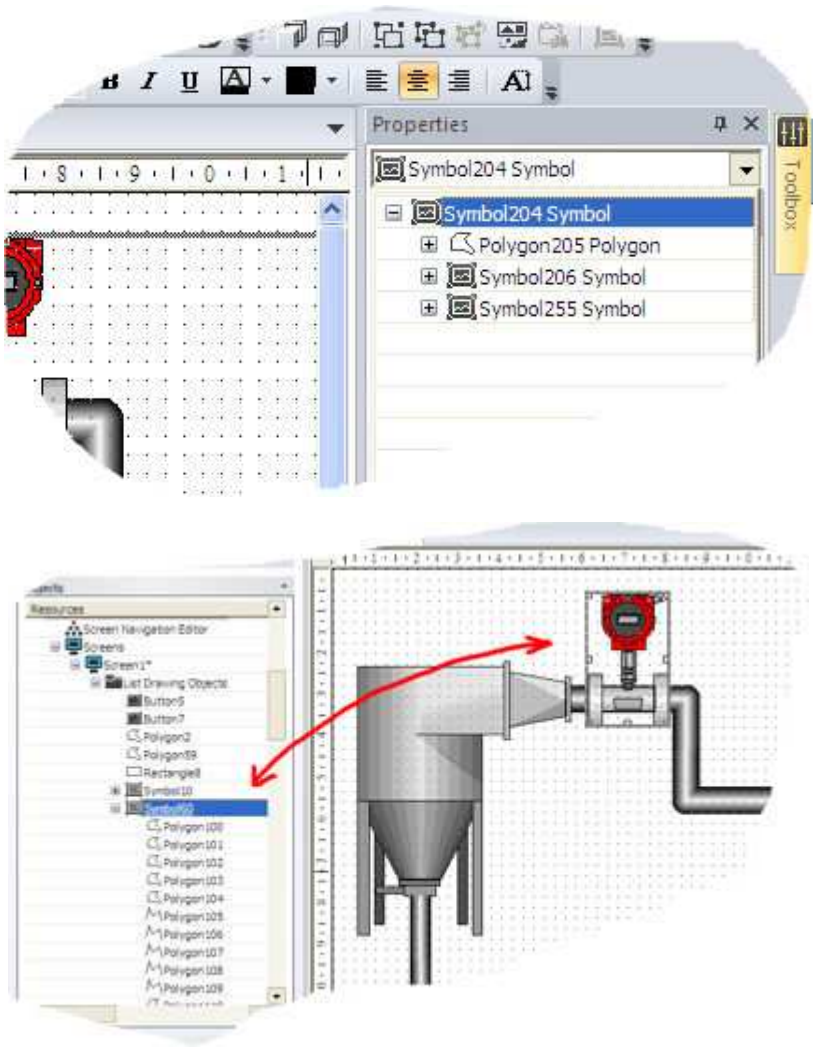
8.3. Editing Symbol Graphics

The Movicon vectorial drawings allow you to enter drawing objects which can be treated as static objects, dynamic objects or vectors can be grouped together and treated as one single object. These sets of vectors, grouped together in one single object, are called **Symbols**.
The Movicon Symbols can be edited and saved freely in an appropriate vectorial **"Symbols Library"**, which will be linked to the installed system in the folder:

"..\Documents and Settings\All Users\Application Data\....\symbols"

The Movicon vectorial symbols have *.msxz extensions.

Movicon has a vast library of pre-built vectorial symbols, subdivided into categories, to which the programmer can use to realize his/her own graphical interface in the screens. These libraries can be enlarged with new modified and customized symbols.

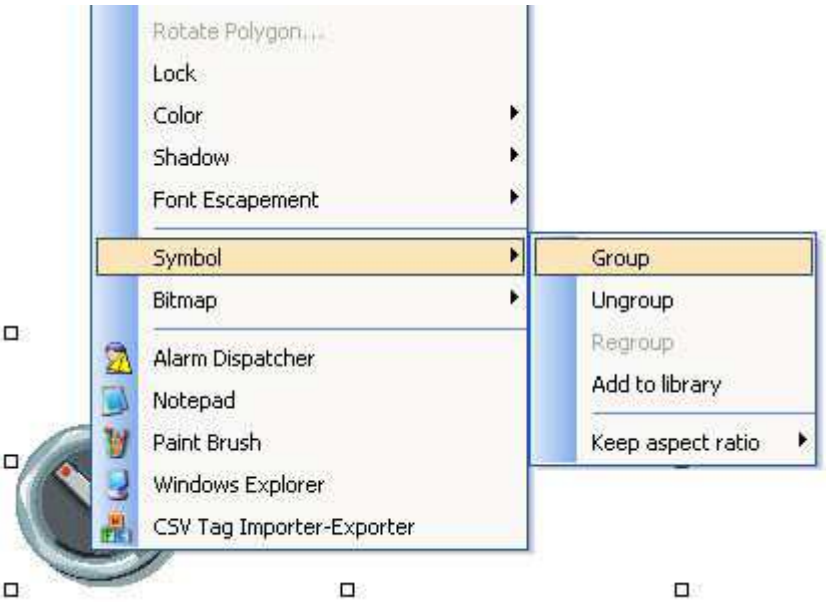


The images show a selection of a group of drawing elements. A group of drawings or symbols can be selected to create a new symbol, using the "Create Symbol" command available right clicking on it. This way the drawing objects group becomes a symbol which can be saved into the library. The symbol structure can be seen and selected from both the combo box in the symbol properties window (see first picture above) and the synoptic resource in the "Project Explorer" window (see second picture above).The symbol structure components list allows to select and associate the graphic commands to each single element.

The command for graphically editing symbols can be accessed from the **"Symbols Menu"** or by right mouse clicking on the Symbol item.

8.3.1. Commands for Creating Symbols

Creating Movicon Symbols is done by using the commands available from the **"Symbols Menu"** or by using right mouse key:



Group

This command is made available when a vector or a group of vectors (drawing objects) is selected. To select a group of vectors you need to click on a point outside the group and drag the selection until all the desired vectors are enclosed. As an alternative you can click all the vectors singularly while keeping the CTRL key pressed down. This command is activated after having selected the group of vectors to create one object thus a Symbol. This symbol can then be added to the Symbols library as described below.

Ungroup

This command is made available when a symbol is selected. This command, when executed, ungroups the symbol back to the original group of vectors which form it. The vectors are restored with their original sizes.

Regroup

This command allows you to put the previously ungrouped symbol back together, without altering any links or names assigned beforehand. This function works when the symbol is a Power Template and uses the Basic Script functionality for linking the symbol's objects. The regrouping restores these links without altering the functions of the symbol before is was ungrouped. Symbol regrouping is supported up to the first grouping of symbols, any symbols added after and then ungrouped will not be regrouped together at the same time with the first grouped symbols, but after by using the regroup command again.

Add to library

This command allows you to enter the selected symbol into the **"Symbols Library"**. A selection window will appear when activating this command to choose the desired category.
The commands relating to the **"Symbols Library"** are described in the appropriate sections.

Keep aspect ratio

This command allows you to restore the symbol to its original size. This command works when the symbol has been resized differently from its original sizes.

- **Vertical:** sets the selected symbol at a vertical size in direct ratio to the horizontal size.
- **Horizontal:** sets the symbol at a horizontal size in direct ratio to the vertical size.

8.4. Templates: Dynamic Symbols

Movicon allows you to use a technology which has been designed to simplify and decrease the time needed to building applications: the Power Template© technology. This philosophy allows the programmer to independently create his own objects, configure basic alarms, " type" recipes, Trends and Data Loggers.
After being configured as required, each symbol group can be saved in the Symbol Library by applying the "Template" concept. Each Template symbol can be inserted in an appropriate symbol category or in a new category created by the user.
This concept is the basis of the modern programming techniques to re-use and exploit previously created symbols in order to avoid having to go through the whole process again to create another one.

- **The Power Template technology allows Movicon to retain settings, animations, functionalities and any basic scripts associated to the symbols.**

When symbols are inserted on screen or in the project, Movicon will propose the automatic insertion of the variables associated to them with a default name and address. Therefore, those functions needed can be maintained and updated where necessary.
This is intended to save you a great deal of time in having to access and configure all the resources involved which can now be updated and managed completely in automatic.

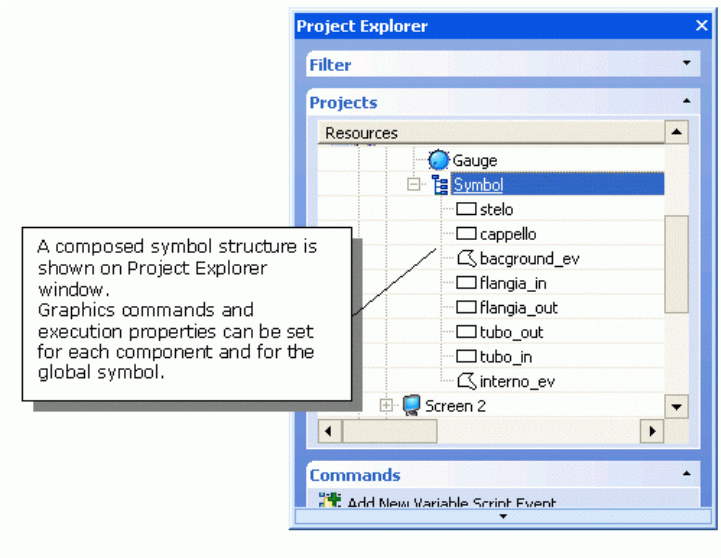
Each single property set for each symbol or object will become part of the Template and saved in the symbol or object in the library. The symbols will maintain each animation feature or each VBA script and can be saved and used as a Template.

8.5. Creating or Editing Symbols

New symbols can be created and added to libraries or already existing symbols in the library can be edited and customized.
In order to create a new symbol, you need to proceed as follows:

1. Design the symbol by inserting the various objects used for building vector components, until you get the graphical effect desired
2. Select the whole group of vectors by clicking on a point outside of the symbol and drag the selection to include all the vectors
3. At this point, activate the **'Symbol - Group'** command from the '**Symbols menu**' or activate the same command with the right mouse key

The symbol has now been created and is ready to be inserted into the library by using the appropriate command.
An existing symbol can be edited after it has been entered on screen, by selecting it and then activating the **'Symbol - Ungroup'** command from the **'Symbols Menu'**.
This will return the symbol back to its original form with its vectors ungrouped where each one can be edited as pleased.



A symbol, being a collection of drawing objects, is identified in a tree structure which shows a list of the parts it is built with.
The tree structure of each symbol can be displayed in the **'Project Explorer'** window. The example above illustrates a symbol structure.
When double-clicking on one of the symbol's components in the 'Project Explorer' window, the symbol will highlight the corresponding component on screen so that it can be identified straight away.
The symbols can also be modified without having to decompose the symbol if involving the properties of already existing components. A composed symbol can be modified through its components by simply selecting the drawing which must be edited from the **'Project Explorer'** window. By doing this the Movicon **'Properties Window'** will be updated with the property of each component, which then can be edited. It is also to select a symbol's component by keeping the "CTRL" key pressed down and left mouse key clicking on the component. In this case the component will turn completely black and the Properties Window will show all its properties.
If the symbol is to be changed graphically, for instance drawings must be added or taken away, the only solution is to decompose the symbol and then recreate it.

Resizing Symbols

Grouped symbols can be resized according to their original proportions. By clicking on one of the symbol's one-way directional sizing dots while keeping the "shift" key pressed down, the group will resize but will retain their original proportions.

8.5.1. Inserting Symbols into the Library

You can add new symbols to the Movicon vectorial **"Symbols Library"**, to meet any kind of customizing requirement you may have. Before inserting the symbol into the library you have to first create it by using the various vectors (lines or geometric shapes created with the Movicon graphic editing toolbox) which used together will compose the drawing of the symbol:

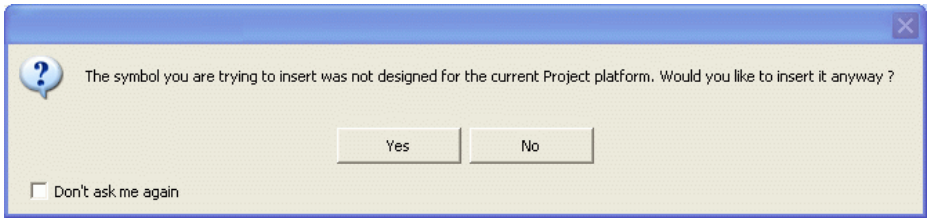
1. After having created the symbol, select the set of vectors with which it has been composed with and active the **'Symbol - Group'** from the **Symbols Menu** or by using the right mouse key. This operation will combine the set of vectors into one single vectorial. Use the **'Symbol - Ungroup'** to undo this operation.
2. After having created the symbol, activate the **'Symbol - Add to Library'** command from the Drawing menu or use the right mouse key to add it to the vectorial symbol library. By doing this a window will appear for selecting the category to which the symbol will be associated.
3. Select the symbol category desired, then insert the symbol by activating the **'Insert Template'** button. If you wish to create a new Symbol category, activate the **'New Library'** command in the **"Symbols Library"** window.

The Symbol Library can also host symbols containing Active X object inside.

8.5.2. Inserting Symbols on Screen

To insert a graphic symbol in the screen you need to activate **"Symbols Library"** with the 'Symbol Libraries' command from the View Menu.
Next select desired category and select the template among those presented then press the 'Insert Template' button found on the window's right border. You can also drag your chosen symbol from the library directly to the point desired on the screen (Drag & Drop). After having insert the symbol on screen you can then size it as pleased by dragging its borders or position it to the point desired.

The following message may appear when inserting a Template:



This message means that the selected Template is not supported on the WinCE platform. This control is carried out by Movicon when in the following conditions:

1. The "Visible on CE Platform" option has been disabled in the Symbol's "Visibility" property group.
2. The "Windows CE" platform has been selected in the project's "Platform" properties.

When these two conditions are eminent, it means that the template is not enabled to function on WinCE and that the project where the template is being edited is destined for the WinCE platform. Therefore, it would not make sense to insert the Template in that project.

8.5.3. Script Code Editing

The **"Dynamic Property Inspector"** window is a very powerful tool used for quickly editing Template script codes and is accessed by clicking the right mouse key on the Template.
This command opens a dialog window where a series of Tabs are presented at the top. Each one of these represents each single component composing the symbol, while the variables and script codes associated to the selected component are displayed in the center of the window.
This tool can be used for keeping an eye on and quickly editing the variables used in the drawing and also the script codes contained within them.
The symbol's component's code can also be edited by selecting it from the **"Project Explorer"** window and then opening the **"Script Explorer"** window.

8.5.4. Variables inside Symbols

When a symbol is exported to the **"Symbols Library"**, Movicon will also automatically export the variables which have been associated to the symbol. In this case Movicon will memorize the variable name and its data format. When the Movicon Real Time DB variables have been used in the symbol's or one of the component's basic script codes, the name of these variables must be written between two '#' chars. This is because Movicon has be able to distinguish which are the Movicon variables and which are the local variables within the basic.

Eg: GetVariableValue("#namevariable#")

This particular syntax is only done when the symbol has to be exported to the Library. A scrip code with the syntax, as shown above, cannot be executed and generates an error.

The Real Time DB variables in basic codes are not directly made visible by Movicon during the exporting of Symbols into the Library phase. They must be enclosed between two **'#'** characters before exporting the Symbol.

When a template is inserted on screen, its variables will be created as local screen variables by keeping the SHIFT key pressed down. If the SHIFT key is not pressed down the variables will be created as global variables in the Real Time DB.

8.5.5. Images inside Symbols

When the Symbol to be exported to the "Symbols Library" contains an image that must be also exported together with it, this image must be embedded within the symbol after which Movicon will automatically embed all other images not all ready done so. Images can also be embedded by right mouse clicking on the symbol and then selecting the "image > Embed" item from pop-up menu.
When an image is embedded in a symbol it will get save together with the symbol. As a consequence, when using the same symbol more than once on screen more memory will be used. Therefore, it would be best to unembed images from symbols, above all when the one same image is used by several symbols. When inserting templates in screens you can use the dropping code "OnUnembedImage" event, which consents the template images to be unembeded when inserted on screen.

8.5.6. Dropping Template Code

Movicon provides you with the possibility to edit basic routines which are to be executed when inserting Templates on Screen. Events will be made available internal these routines and automatically executed by Movicon while the Template is being inserted. These events are:

- **OnCustomizeSimbol()**
- **OnVariableCreating**
- **OnVariableCreated**
- **OnUnembedImage**

You can access this basic code from the **"Symbols Library"** by opening the **"Dynamic Property Inspector"** window of the Symbol in question. By opening the **"Dynamic Property Inspector"** of any one of the Templates within the Library, the Dropping Code tab will appear as the first item in the symbol's list of components. When selecting this item, where the variables and codes of each of the Symbol's components normally appear, the script code will appear, being the event routines listed above. Code can be inserted within in these routines in order to customize the Template. This functionality is very handy for setting the static properties of symbols. This can be done by using the **Prop()** function from the **DrawCmdTarget Interface** to set those static properties concerned in the symbol. When these properties are set then inserting the Template using the code contained in the Dropping Code, they will remain permanent in the symbol when saved together with that symbols characteristics, thus becoming the symbols unaccessible constants that cannot be changed throught the symbol's properties.
The Dropping Code is useful for customizing Templates being inserted from the Library.
Once the Templates has been inserted onto the screen you can Drop Code by "Shift + Double-Clicking" on the Template or by using the "Open..." button in the Template's Properties Window. This will allow you to modify the Template's properties later on as well.

OnCustomizeSimbol() Event

This event is executed when the Dropping Code is called, therefore while a Template is being inserted on Screen from the Symbol Library or by "Shift + Double-Clicking" on the Template after it has been inserted on Screen.
This event has the following declaration:

Sub **OnCustomizeSymbol**(bRet As Boolean, bShowPropInsp As Boolean, bCreateVariables As Boolean)

End Sub

This event's parameters are:

Parameters	Description
bRet as boolean	When set at False, the Template insertion operation will be cancelled (default = True)
bShowPropInsp as boolean	When set at False, the 'Dynamic Explorer Property' window will not display after the symbol has been inserted
bCreateVariables as Boolean	When set at False, the Template's variables will not be inserted in the Real Time DB (default = True)

Event OnVariableCreating()

This event is called each time a variable must be added to the project when a symbol is being inserted. In this way you can executed controls more accurately on variables which must be inserted with the template. This event has the following declaration:

Sub **OnVariableCreating**(bRet As Boolean, VariableName As String, bCreateLocal As Boolean)

End Sub

The parameters of this event are:

Parameter	Description
bRet as boolean	When set at False, it cancels the operation to insert the variable (default = True).
VariableName As String	Contains the name of the variable to be added to the project. The value of this parameter can be changed. In this way a variable will be inserted with a new name inserted. When the variable identified by the "VariableName" parameter already exists, then a new variable will be added with the same name but with a progressive final number.
bCreateLocal As Boolean	When set at True, the variable will be created locally to the screen. (default = False. When the symbol is inserted with the shift pressed: default = True).

OnVariableCreated() Event

This event is executed each time a variable is created in the project while a symbol is being inserted. By using this event you can modify the properties (only those in read/write) of variables which are added to the project while a Template is being inserted.
This event has the following declaration:

Sub **OnVariableCreated**(VariableName As String, bCreateLocal As Boolean)

End Sub

The parameters of this event are:

Parameter	Description
VariableName As String	Contains the name of the variable which has been created in the project.
bCreateLocal As Boolean	When the parameter's valued is True this means that the variable has been created as a local screen variable, otherwise when False this means that the variable has been created in the RealTime DB.

OnUnembedImage() Event

This event is executed each time an image is detected while inserting symbols. You can use this event to decide whether to keep image embedded in symbol or unembed it and create the relative file.

This event has the following declaration:

```
Sub OnUnembedImage(bRet As Boolean, ImageName As String, bOverwrite As Boolean)

End Sub
```

This event's parameters are:

Parameter	Description
bRet as Boolean	Permits you to choose whether to unembed the image or not to (default = 'false'). When setting this parameter to 'false', all other parameter will be ignored.
ImageName as String	Should contain the name of the image file. The file name can be modified is image is to be saved with a different name. In cases where the new name is left without an extension the original file will be taken.
bOverwrite as Boolean	Permits you to choose whether to overwrite image already on disk or not to (default 'true').

9. Gesture

9.1. Gestuality in Projects

Movicon provides a Gesture function for performing operations by dragging the mouse, such as changing pages or scrolling display window lists, during runtime. These operations can be performed in touch screen systems using fingers and in non touch screen systems where operations can be performed by dragging the mouse while keeping left button pressed down. The Gesture function can be activated with the project's "Enable Gestures" property. The type of Gesture movements supported are as follows:

- **right to left movement**
- **left to right movement**
- **top to bottom movement**
- **bottom to top movement**

In touch screen systems movements are done by pressing the monitor with a finger or a touch screen pen and dragging in one direction or the other. In non touch screen systems, these movements are done by clicking left mouse button and keeping it pressed to drag in the same way. Gestuality can be applied to Screens for changing pages or to display windows for scrolling lists.

Gestuality in Screens

Two types of operations can be performed by using gestures in screens: change pages and scroll pages when scroll bar is active. The fact that one operation is performed rather than another, considering both movements are the same, depends on the speed with which the movement is carried out. The movement used for changing pages is quite fast and precise, whereas the scrolling movement is slower. Below are a list of commands which have been provided according to movement type used:

- **right to left movement:** a "fast" movement will change page to the next one. The page that will load will be the one which has an ID following on from active window's ID. Therefore this command works only if screens have each been given an unique ID in succession that is not zero. A "slow" movement will scroll page towards the right but this will only work with the screen's horizontal scroll bar displayed.
- **left to right movement:** a "fast"movement will change page to the previous one. The page that will load will be the one which has an ID previous to the active window's ID. Therefore this command works only if screens have each been given an unique ID in succession that is not zero. A "slow" movement will scroll page towards the left but this will only work with the screen's horizontal scroll bar displayed.
- **top to bottom movement:** a "fast" movement will change page. The page that will load will be the Project's "Startup" page. This command works independently from the fact that screens have been associated with an ID or not. A "slow" movement will scroll page towards the bottom but this will only work if the vertical scroll bar is displayed.
- **bottom to top movement:** a "fast" movement will change page. The page that will be loaded will be the previous page to the one displayed. This command executes the same functionality as the "Close and Return Back" command from the Command List and works independently from the fact that screens have been associated with an ID or not. A "slow" movement will scroll page towards the top but this will only work if the vertical scroll bar is displayed.

In order for screen gestuality to work correctly, a portion of the screen must be left free from objects in order to receive focus. For example, the gestures will not work if objects like Displays, Buttons, Display windows and generally any object that can execute commands and receive focus. Gestuality will work in Static and animated objects, such as rectangles with animated background color, and zones populated with any object when invisible.

Gestuality in Window Objects

By using Gestuality in Display Window type objects, such as the Historical Log Window, Data Logger Window etc., lists can be scrolled fast and slowly. This naturally will only work if the scroll bars have been enabled to allow scrolling of this kind. What counts in operations like this counts is how fast or slow the scrolling movement is performed. Fast scrolling requires a quick and sharp gesture which is the opposite required for slow scrolling. The commands used for these types of guestures are:

- **right to left movement:** this movement scrolls lists towards the right. This only works if the horizontal scroll bar is displayed in the window to allow scrolling.
- **left to right movement:** this movement scrolls lists towards the left. This only works if the horizontal scroll bar is displayed in the window to allow scrolling.
- **top to bottom movement:** this movement scrolls lists towards the top. This only works if the vertical scroll bar is displayed in the window to allow scrolling.
- **bottom to top movement:** this movement scrolls lists towards the bottom top. This only works if the vertical scroll bar is displayed in the window to allow scrolling.

Gesture Speed Rate

Gesture sensitivity/Gesture Speed Rate allows you to customize the system's response to performed movements. For instance, a Display window scroll movement can be more or less slower depending on the rate set. The higher the value set, the faster the scroll will be. The Gesture speed rate can be set in value percentages, from 0% to 100%, using the "Gesture Speed Rate" property. In this case, the set percentage will be applied in respect to the absolute speed rate that can be set in the appropriated "MaxGestureSpeedRate" registry key. The default value is 200, but it may be necessary to change it due to the fact that this parameter may have a different rate value according to the device being used, above all in Windows CE panels.

9.1.1. Gestures Properties

This property group allows you set the project's Gesture operations.
To modify the Gesture settings, select the project name with the mouse and use the Movicon **"Properties Window"**.

Enable Gestures

This property allows you to enable the project's Gesture functions. For further information please refer to the section on "Gestuality in Projects".

Gesture Speed Rate

This property is used for setting the gesture speed rate value percentage from 0% to 100%. For further information please refer to the section on "Gestuality in Projects".

10. Draws and Objects

10.1. Drawings and Controls on Screen

The objects which can be inserted into screens are all vectorial type objects and all their properties can be configured and modified.

The Movicon Controls and Objects which can be inserted in to Screens are available from the **"Objects Window"**. These components can carry out different functions, from simple geometric shapes to advanced controls for command execution or displaying data.
The Movicon Objects and Controls are created in proprietary vectorial format, and symbols (composed of more components) can also be created and animation properties associated to them. This format can be exported or imported from the Metafile format (WMF,EMF).

Even though various components carry out different functionalities, some of their properties, in particular all the properties concerning graphic animations, are the same for all and are available for each object.

Deleting Objects from Screens

When an object or symbol, to which variables have been associated (ie. in their "Variables" or "Animations" properties) is removed from the screen a message window will open showing this text:

Some Variables (Tag) were used by the deleted object. Do you want to check or select them now?

When confirming with "Yes" the "List Variables (Tags) resource will open in the Project Explorer window with the interested variables highlighted (selected). At this point the programmer can decide which to delete or keep the variables as they are.

10.1.1. Tooltips in Controls

Each control that can be inserted on screen shows a Tooltip for default when the mouse pointer is positioned on it. This Tootip appears both in the project development and Runtime modes. During the Runtime mode this Tooltip shows information inherent to any variable associated to the object (name, value, quality, etc.). However, in development mode, the tooltip shows a list of variables associated to the object (if any) along with some information inherent to the object itself, such as how to access the object's properties etc. For instance, in the Trend object the tooltip explains how to add pens and so forth.

The tooltip can be disabled from displaying in Rumtime by simply disabling the "Show Dynamic Tooltip" property from each objects' 'General' property group. The Tooltip will always remain active in development mode.

10.2. Basic Shapes

The Movicon basic shapes which can be inserted on screen can be selected from the **"Objects Window"**. These components are mainly simple geometric shapes which can be graphically animated.
The objects available in this class are as follows:

Line

This object is a simple vectorial line. After activating the command, click on any point you wish the line to start from, then drag the mouse until you reach the point you wish to end the line with.
By doing this you should finish with a straight line whose style can be configured in the "Properties Window". Its position can be changed by re-selecting it and dragging with the mouse as please. To change its sizes, select one end and drag it with the mouse until you get the size desired.

Rectangle

This object represents a vectorial square or rectangle shape. After activating the command, click on any point corresponding to the top left corner for rectangles, then drag the mouse until you get the size desired. You can then configure the rectangle's style by using the "Properties Window". You can change its position by re-selecting it and dragging it to the new point desired. To change its size, just select the small squares on its borders and drag to the new size desired.

Rounded Rectangle

This object represents a vectorial square or rectangle shape with rounded corners. After activating the command, click on any point corresponding to the top left corner for rectangles, then drag the mouse until you get the size desired. You can then configure the rectangle's style by using the "Properties Window". You can change its position by re-selecting it and dragging it to the new point desired. To change its size, just select the small squares on its borders and drag to the new size desired.

Ellipse

This object represents a circular or elliptic vectorial shape. After activating the command, click on the desired point corresponding to the top left quadrant for circular shapes, then drag it with the mouse until you reach the point desired. You can then configure its style through the "Property Windows". Its position can be changed by re-selecting and dragging it to the position desired with the mouse. To change its sizes, just select the small squares on its border and drag it to the size desired with the mouse.

Polygon

This object represents a geometric shape made up of lines. After activating the command, click on the point desired and, by moving the mouse, each time a click is made a vertex will be added to the polygon. Movicon will create a vectorial geometric shape with lines by forming together all the vertexes which have been set. The start and end points will always be automatically connected together by a vertex line.

When the **ESC** key is pressed to terminate the drawing procedures, the last vertex proposed by Movicon will be kept even though not executed with a click.

When the **ENTER** key is pressed to terminate the drawing procedures, only the vertexes confirmed with the mouse click will be kept and not the last one proposed by Movicon.

To add joints to the polygon you will need to keep the ALT key pressed down while clicking on the line where you want the joint to be added.
To remove the joints from the polygon, keep the ALT key pressed down while clicking on the joint to remove.

After this has been done you can configure its style through its "Properties Window". You can change its on screen position by selecting it and dragging it to where you please with the mouse.
To change its shape or sizes, select the small squares which represent the polygon's vertexes and drag them with the mouse until you get the new shape desired.

Polyline

This object represents a geometric shape made up with a series of contiguous straight vectorial lines. After activating the command, click on the point desired and mouse it with the mouse. Every time you click a vertex will be added to the object where the cursor is positioned. Movicon will create a geometric vectorial shape made from contiguous lines of the vertexes which were set. The start and end points will not be connected together.

When the **ESC** key is pressed to terminate the drawing procedures, the last vertex proposed by Movicon will be kept even though not executed with a click.
When the **ENTER** key is pressed to terminate the drawing procedures, only the vertexes confirmed with the mouse click will be kept and not the last one proposed by Movicon.

After this has been done you can configure its style through its "Properties Window". You can change its on-screen position by selecting and dragging it to where you please with the mouse.
To change its shape or sizes, select the small squares which represent the Polyline's vertexes and drag them with the mouse until you get the new shape desired.

Pipe

This object is an extension of the "Polyline" object. This object performs a graphics rendering by toning down the background colour with the "Text and Edge" colour. In addition to this, its "Border Width" is set at 25 for default to give it a pipe appearance.

The 'Pipe' object does not support "Gradual filling" animation. However the background colour can be modified, for example, to show liquid passing through within it.

Polybezier

This object represents a geometric shape made up with a series of contiguous curved vectorial lines. The curve is formed by two intersections between the start and start point. After activating the command, click on the point desired and mouse it with the mouse. Every time you click a vertex will be added to the object where the cursor is positioned. Movicon will create a geometric vectorial shape made from contiguous lines of the vertexes which were set. The start and end points will not be connected together.

When the **ESC** key is pressed to terminate the drawing procedures, the last vertex proposed by Movicon will be kept even though not executed with a click.
When the **ENTER** key is pressed to terminate the drawing procedures, only the vertexes confirmed with the mouse click will be kept and not the last one proposed by Movicon.

The Polybezier must be composed of four points, one start point, two intersection points and an end point.

After this has been done you can configure its style through its "Properties Window". You can change its on-screen position by selecting and dragging it to where you please with the mouse.
To change the curved corner, select the small squares outside the curve and drag it with the mouse until you get the shape desired.
To change the start or end point, select and drag the small squares place at both ends of the curve.

Closed Polybezier

This object is a "Polybezier" object added with a "Close Figure" option in its style property group set to true for default. This option closes the "Polybezier" object with a straight line uniting the first point with the last point. This will allow you to set backgrounds in the Polybezier object which otherwise would have been possible before.
This option also allows you to set closed "Polybezier" vector objects contained in metafiles (.emf) enhanced format files.

Arc

This object represents a semicircular or semi-elliptic vectorial line. After activating the command, click on the point desired and drag it with the mouse until you reach the end point desired. You can then configure its style through the "Property windows.
To change the curve, select the small filled in squares on the border and drag them with the mouse until you get the size and arc desired.
To change the arc's start or end point, select and drag the corresponding small empty squares along the border.

Chord

This object represents a portion of a vectorial semicircle or elliptic. After command activation, click on the point desired, then drag the mouse until you reach the end point desired. Movicon will unite both ends of the circle portion with a straight line after which its style can be configured through its "Properties Window". You can change its position by selecting and dragging it to a another position.
To change its curve angle, select the filled in small squares on the border and drag them with the mouse until you get the size and angle desired.
To change cords's start and end point, select and drag the small empty squares placed inside the object.

Pie

This object represents a portion of a vectorial semicircle or elliptic. After command activation, click on the point desired, then drag the mouse until you reach the end point desired. Movicon will unite both ends of the circle with the centre of the ellipse you have drawn. After this you can configure its style through the "Properties Window". You can change its position by selecting and dragging it to a another position.
To change its curve angle, select the filled in small squares on the border and drag them with the mouse until you get the size and angle desired.
To change cords's start and end point, select and drag the small empty squares placed inside the object.

Text

This object represents a text object. After command activation, click on the point desired and drag it until you reach the end point desired. Movicon will display a default text inside which you can replace, along with the font, after you have activated its "Properties Window".
The Text object's properties allow you to set it with a fixed size or to make it adaptable to the object's sizes.
You can change its position by selection and dragging it with the mouse to another position.
You change it object's sizes, by selecting and dragging the small squares on its borders with the mouse until you reach the size desired.

Square

This object represents a vectorial square shape. This shape is originally a "Rectangle" with its **"Preserve Aspect Ratio"** enabled so that when it is resized it will always keep its sides in proportion to form a square and not a rectangle.

Circle

This object represents a vectorial circle shape. This shape is originally an "Ellipse" object with its **"Preserve Aspect Ratio" properties enabled so that when its is resized it will always keep its circle shape and not the shape of an ellipse.**

10.3. Object Editing Command Shortcuts

This paragraph is a detailed summary on a list of all the commands which are used to speed up graphic interface editing operations.
You may find that some of these commands are not part of your daily use of this product even though indicated in the descriptions of each single object. The detailed list in this recap will give you a better idea on how to use of these shortcuts to the full in order to perform your tasks quicker.

DRAG & DROP

The Drag & Drop technique, a standard widely used in Windows, permits you to drag and drop objects or resources to different locations according to the task one has been set with.
This technique has been used in Movicon to allow you to obtain associations between variables, Data Logger,Schedulers and objects, and object quickly, as well as the usual dragging of objects and resource to modify the project structure.

Object	DRAG & DROP Variable operations
Trend/Data Analysis Charts	To assign a variable to an object without going through the object's properties manually, Just drag & drop the variable (click and keep the mouse key pressed down on

Display/Spin ListBox Gauge/Meters Buttons Hot Region	the desired variable in the "Variable List" from the Project Explorer and drag it to the location desired and then drop it by releasing mouse key) onto an object on screen. The variable assigned in this way will become the object's reference variable.
Trend/Data Analysis	Dragging a variable (Tag) or a multi-variable selection, from the Variable List resource directly into a Trend will assign variable/s to object. The drag & drop works in the same way as above, but in Trend/Data Analysis objects all existing pens are removed and others are created in the same number as variables dragged. To keep pens you don't want to delete keep the CTRL key pressed down while dragging the new variable.

Object	DRAG & DROP Data Logger operations
Trend/Data Analysis Charts Data Logger/Recipes Windows	You only need to drag&drop a Data Logger (click and keep mouse key pressed down on the Data Logger, from the Data Logger and Recipes' resource in the Project Explorer, and drag it) on to an object on screen to assign it to that object, saving you time in having to do it manually through the object's properties. The Data Logger assigned in this way will become the object's reference Data Logger.

Objects	DRAG & DROP Data Logger column operations
Data Analysis	Moving a Data Logger column to a screen's Data Analysis object is simply done by using the Drag&Drop techniques (click mouse and keep pressed on Data Logger column from the "Data Logger & recipe" resource in the Project Explorer window" then drag it to object). When dropped in the Data Analysis a new pen will created in which the variable set in the Data Logger column will be associated and the same Data Logger will be used as the pen's referenced Data Logger. Dragging and Dropping Data Logger columns works in the way used for variables, where any already existing pens will remain when keeping pressed the CTRL key during the dragging phase of new columns or otherwise deleted to be replaced by new pens according to the number of columns dropped.

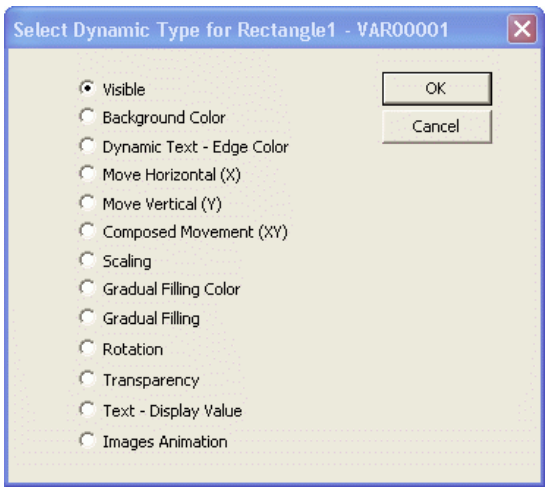
Object	DRAG & DROP Scheduler Operations
Scheduler Window	You only need to drag&drop a Scheduler (click and keep mouse key pressed down on the Scheduler, from the 'Scheduler Object List' resource in the Project Explorer, and drag it) on to an object on screen to assign it to that object, saving you time in having to do it manually through the object's properties. The Scheduler assigned in this way will become the object's reference scheduler.

You can also **create new objects** on screen associating them directly to the variable dragged on screen. In order to do this you need to:

1. select the object you wish to create from the toolbox (eg. Display)
2. select the desired variable from the Project Explorer's Variable List
3. Drag and drop the variable to an empty area in the screen
4. release the mouse key and Movicon will create the object and assign the variable

During the Drag & Drop operations the mouse icon will change image. If the resource is dragged onto an object that cannot be assigned with that resource, the mouse icon will change to the 'no entry' symbol. For example, this will happen when trying to drag a Data Logger onto a "Button" object.

if a variable is dragged onto an object and the object itself has no specific property for variable assignment, a dialog window is open in order to select the object's animation property to assign the variable to:



If a variable is dragged onto a composed symbol, keeping the "SHIFT" key pressed will cause the variable to be assigned to the container object (that is, to the symbol itself), otherwise the variable is assigned to the symbol component where the mouse cursor is placed.

Drag & Drop into Templates

Object	DRAG & DROP operation
Alarms (Templates)	Dragging and dropping an Alarm object (from the project's Alarms resource) on a variable will assign the alarm to the variable as a template.
Data Loggers (Templates)	Dragging and dropping a Data Logger object (from the project's DataLogger/Recipe resource) on a variable will assign it to the variable as a template.
Events (Templates)	Dragging and dropping an Event object (from the project's Event object resource) on a variable will assign it to the variable as a template.

SHIFT + DOUBLE CLICK

Some of the Movicon Objects and Controls that can be inserted into Screens, available in the **"Objects Window"**, can be configured through the supplementary setting windows as well as the "Properties Windows". To access these setting windows you need to:

- **Press the Shift key and double left mouse click on the object (Shift+DblClick)**
- **Press the "General" group's "Open" button in the object's "Properties Window"**
- **Click on the small circle which appears on top right of the object when selected**

This table shows the setting window which will open according to the control selected:

Object	SHIFT + DOUBLE CLICK result
Buttons and Hot Region	The "Command List" settings window is open where a list of commands to be executed can be associated to the control.
Chart	Chart's configuration window is opened.
Trend/Data Analysis	The Trend/Data Analysis Pen Configurations window is opened.
Grid	The window for selecting the 'data source DSN to be associated to the grid is opened.
Alarm Window	The "Field Choice" window is opened for setting the columns to be displayed in the Alarm Window.
Historical Log Window	The "Field Choice" window is opened for setting the columns to be displayed in the Historical Log Window.
DataLogger/Recipe Window	The "Field Choice" window is opened for setting the columns to be displayed in the DataLogger/Recipe Window.
DB Trace Window	The "Field Choice" window is opened for setting the columns to be displayed in the DB Trace Window.
Embedded Screen	A window opens for selecting the Screen to be associated to the object. **Caution**: for Embedded Screens clicking on the small circle which appears on the top right of the object will activate the open command in the workspace of the screen associated to the object.

"Dynamic Properties Explorer"window

The "SHIFT + Click" command on the small circle appearing on the top-right corner of the selected object opens the "Dynamic Property Inspector" window of the symbol itself.

SHIFT +CTRL+ DOUBLE CLICK

A very quick way for setting the object's main settings is to use the simplified properties POP-UP Window of an object. This window only contains the main properties without displaying the whole list of properties.

To activate this window you need to double click while keeping the Shift and CTRL keys pressed down or click on the object's top right corner. To deactivate this window just click on any point of the screen.

If you use this window, you will simplify and speedup your routine work. the listed properties have been further simplified and reduce in respect to those in the "Easy Mode" according to the description in the initial paragraph relating to "Properties Windows".

CTRL+ DOUBLE CLICK

The CTRL+double click command activated the explorer window of an object's VBA script.

Open applications using the "Browse File" button

Object properties which allow file names to be entered using the "Browse File" (...) button, such as image files or an object configuration file, permit you to use this same button (...) to launch any application associated to the file extension. This can be done by simply clicking on the browse button

while keeping the "CTRL" key pressed down. For instance, Screen Background Image properties permit you to select a background image. If you choose a "bmp"image, and this extension is associated to a "MS Paint application when pressing the CRTL key while clicking the (...) button will open the "MS Paint" application with the "bmp" image in edit mode in a new window. This mechanism will only work if a file has already been selected in the object's property and the file's extension has been associated to an application. The application window can be opened in minimize mode. The properties which have been equipped with this kind of function are:

- **Screens**: Background - Background image
- **Drawings and Symbols**: Background - Static Image
- **Button Objects**: Background - Released Button Image, Pressed Button Image, Selected Button Image
- **Grid Objects**: Execution - Text File
- **Drawings and Symbols**: Execution - Configuration File

ALT+F5

The ALT+F5 quick command activates the window for the "Distribute Object Space..." command.

Grouping Symbols

There are three shortcuts available for grouping, ungrouping and regrouping composed symbols. These commands are:

Ctrl+Shift++: Shortcut for symbol grouping
Ctrl+Shift+-: Shortcut for ungroup a symbol
Ctrl+Shift+*: Shortcut for regrouping a symbol

10.4. Data Formats

Some fields displayed in the project allow data formats according to their needs. You can select a format from those listed below according to the control or data type to be displayed:

Predefined Movicon Formats

The different types of predefined Movicon formats are:

"x", "xx", "xxx", "xxxx", "xxxxx": where the x number identifies the minimum integer figure to be displayed, independently form the value. Zeros are added before the number to reach the figure chosen.
"x.x", "x.xx", "x.xxx", "x.xxxx", "x.xxxxx": where the x number after the decimal point indicates the number of decimal figures to be displayed
"x,xx" ,"x,xxx", "x,xx.x", "x,xx.xx", "x,xx.xxx", "x,xxx.x", "x,xxx.xx", "x,xxx.xxx": where the comma puts figures into groups. For example you can have groups of thousands, hundreds, etc.

When using the **"x.x"** decimal figure format its meaning changes according to variable type whether being "integer" or "floating point". When being an "integer" number, the value can be displayed as a decimal (divided by 10,100,etc.), but only for "Display", "Meter", "Trend" and "Data Analysis type objects. For all the other objects, such as Basic Shapes, Charts, etc., just add the same number of "0"s as there are "x" after the dot, leaving the displayed numeric value unaltered. When being a "floating point" number, the selected decimal numbers will be displayed and the last figure will be rounded off based on the non displayed remaining figures.

Some objects/functions also support the option to group figures such as the the thousands. The format are the ones that use the comma (x,xx, x,xxx). These formats are not support by the following objects/functions:

- Editable Displays
- Meter Scales
- "Text - Show Value" Animations

- Numeric Pad (called from display or from button)
- Variable Watch Window
- Dynamic Object Tooltip
- Trace Comment Window (Audit Trail)
- Write/Reading values in RealTime ODBC
- Recipe Manager Object

You also can add the desired measures to the predefined Movicon formats. This is done by simply adding a space and then the text desired after the format (i.e. "x.xx mm", "x,xxx.x Kg", etc.).

Example 1
If you want to display a value formatted with three figures, select the **"xxx"** Format. The result will be according to how the variable's value is:

Variable Value	Value Displayed
1	001
10	010
100	100

Example 2
If you want to display a value formatted with two decimal figures, select the **"x.xx"** Format. The result will be according to how the variable's value is:

Variable Integer Value in Meters, Trend, Data Analysis displays	Value Displayed
1	0.01
10	0.10
100	1.00

Variable Integer Value in other objects (Basic Shapes, charts, etc.)	Value Displayed
1	1.00
10	10.00

Variable Float Value	Value Displayed
1.2345	1.23

When using formats with decimal figures applied to integer Variables, only their display and not their contents can be edited. In practise divisions of 10, 100, etc., is only for graphical displaying purposes and does not influence the real value of the variable in any way.

Example 3
If you wish to display a value formatted with a decimal figure and groups of hundreds, select the **"x,xx.x"** format. The resulted will depend on the value and the variable type:

Integer Variable Value in displays Meters, Trend, Data Analysis displays	Displayed Value
10	0.1
1000	1,00.0
10000	10,00.0

Integer Variable Values in other objects (Basic Shapes, charts, etc.)	Displayed Value
1	1.0
10000	1,00,00.0

Float Variable Value	Displayed Value
1234.567749	12,34.6

Formats for Numerical values and strings

The type of syntax supported for doing custom formats is as follows:

%[flags][width][.precision][{h | l | L}] type

Each field of the above syntax is a single character or a number indicating a certain option of the selected format. The most simple formats contain only the percent sign and a character indicating the type (eg. %s). The optional fields, which appear before each character indicating the type, control the other aspects of the format. If the per cent sign is followed by a character that has not meaning as a format character, it will get inserted in the output string. For instance, in order to print the "%" you will need to write "%%".

flags — Controls the presence of the sign, spaces, decimal characters, hexadecimal or octal or prefixes:

+: the sign is put in front of the value (+ o -). Only the - sign is returned for default.

0: When the field width is preceded by "0", the "0" characters are used for reaching the number of characters requested

#: when used with the "0", "x" or "X" formats, the "0", "0x" or "0X" prefixes are put in front respectively; when used with the "e", "E" or "f" formats it forces the presence of the decimal character no matter what; when used with the "g" or "G" formats it forces the presence of the decimal character without cutting off the initial zero

width — An integer signed value indicates the minimum number of characters to be printed. When the characters to be printed are lower than the number specified, spaces are added until the value provided is reached. When the width value is preceded by "0", the "0" characters are used instead of the spaces.

precision — An integer signed value preceded by the point (.) indicates the number of characters after the decimal character for those formats with decimals or the number of figures to be printed for integer formats.

type — indicates how to interpret the associated variable. The following formats are available:

d: integer decimal with sign
i: integer decimal with sign
o: integer octal without sign
u: integer decimal without sign
x: integer hexadecimal without sign. Uses the "abcdef" characters
X: integer hexadecimal without sign. Uses the "ABCDEF" characters
e,E: floating point with exponential sign "[-]d.dddd e [sign]ddd" where d is a decimal figure of the vlaue, dddd are one or more decimal figures of the sign, ddd are exactly three decimal of the exponent and "sign" is + or -
f: floating point with sign in the form of "[-]dddd.dddd" where dddd are on or more decimals, based on the number's value and on the parameters set in the above mentioned fields.
g: floating comma with sign in the form automatically selected between the "e" type and "f" type based on the number value and precision requested
G: as for the "g" type only that it uses the "E" character instead of the "e" character (when necessary)
s,S: string

In front of the character indicating which type, if this data type allows it, you can put the "h", "l" or "L" prefixes indicating:

h: short integer (default)
l,L: long interger

Formats for Date and Time values

The Date and Time values can be formatted using the following syntaxes:

Code	Meaning
%a	Abbreviated name of Weekday
%A	Complete name of Weekday
%b	Abbreviated name of month
%B	Complete name of month
%c	Local Time and Date
%d	Day of month expressed in numbers (01-31)
%H	Time expressed in 24 hours ((00-23)
%I	Time expressed in 12 hours (01-12)
%j	Day of year expressed in numbers (001-366)
%m	Month expressed in numbers (01-12)
%M	Minutes expressed in numbers (00-59)
%p	A.M./P.M. indicator for 12 hr representation
%S	Seconds expressed in numbers (00-59)
%U	Weeks of the year expressed in numbers, with Sunday as first day of the week (00-53)
%w	Days of the Week expressed in numbers (0-6; Sunday = 0)
%W	Weeks of the year expressed in numbers, with Monday as first day of the week (00-53)
%x	Local date
%X	Local time
%y	Year expressed in numbers without specifying century (00-99)
%Y	Year with century expressed in numbers.
%z,%Z	Time difference abbreviated or in full
%%	Percentage sign

The '#' character can be used for further modifying some formats to get the following results:

Code	Meaning
%#a, %#A, %#b, %#B, %#p, %#X, %#z, %#Z, %#%	The "#" character has no meaning to these formats and therefore will be ignored
%#c	Local date and time in full format. Example: "Friday, August 06, 2004, 08:48:55"
%#x	Local time represented in full format. Example: "Friday, August 06, 2004"
%#d, %#H, %#I, %#j, %#m, %#M, %#S, %#U, %#w, %#W, %#y, %#Y	The "#" character in these formats deletes any zeros preceding figures. Example: "05" becomes "5"

10.4.1. Symbol Configuration Files

Each control or composed symbol, that can be inserted on screen, may be associated with a Configuration File to save their settings in order to be reactivated in both the design/programming or Runtime phases. The file will be saved in XML format with the ".sxml" extension for default. Some execution properties have been provided for each control in order to setup its Configuration File:

- **Ext. File Settings**
- **Generate Unique File name**
- **Load**
- **Save**

If you do not specify the extension when entering a Configuration File name, it will be saved with the "sxml" extension (or "tsxml" for Trends) for default by Movicon. However, you can assign a different extension if inserted together with the file name.

The Configuration File settings are loaded in design mode with the "Load" command, but are loaded automatically when screens are loaded in Runtime mode.
Only some of the settings saved on file are restored when using the "Load" command (in design mode) or when screens are being loaded (in Runtime mode). Mostly all the properties are restored except those regarding the object's positions (Position X, Position Y, Width, Height).
To avoid XML files sizes being too big, many of the properties are saved only if different from their default values.

Properties which don't get saved in the "sxml" file are those which have a default value, and therefore will not be restored when the file gets loaded. For instance, when a "sxml" file is saved with some properties that still have their default values, which afterwards are changed and reloaded before the file is saved again, the default values for these properties will not be restored.

To display the restored properties in design mode using the "Load" command in the properties window, you will need to deselect and reselect the object.

During the Runtime phase you can save and restore configurations using the "SaveExtSettings", "LoadExtSettings" and "ExtSettingsFile" basic script functions.

While loading the Configuration File, the Trend will search for it in the "DATA" folder, then in the "RESOURCES" folder if not found. This only happens for the Trend object and only when the file name without the whole path has been entered in the "Configuration File" property.

Symbol size and position settings are never loaded while the Configuration File is being loaded and remains with its original settings. The Configuration File can be loaded using the "Load" command in design or runtime mode if the "Auto Load File Settings" has been enabled or by using the "LoadExtSettings" function.

10.4.2. Object Default Settings File

Movicon consents the programmer to customize those Objects contained in the "ToolBox Window" allowing the programmer to modify characteristics of simple Objects without having to create completely new symbols and adding them to the Symbol Library. This can be done by creating a "ObjectName.defxml" file depending on the object type and ".defxml" extension, containing the default settings for the object in question. Once you have done this, every time you insert one of these objects on screen from the Toolbox, it will already have the settings predefined in its file. These files contain tags and attributes specifically for the objects in question and have the same format with which the object is defined with on screen. The opening tag must be <default>.
For instance, the "64_Object.defxml" file shown below will be the one used by Movicon when a "Rectangle", is inserted on screen:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<default>
<type x="300" y="220" width="-250" height="-120" fill="rgb(255,0,0)"
stroke="syscolor(WINDOWTEXT SysColor)"
stroke-width="1" stroke-linecap="butt" stroke-linejoin="round">rect</type>
<ExtFill fill="syscolor(WINDOW SysColor)">0</ExtFill>
<Name acr="4294901760"/>
<text font-family="Tahoma" font-size="8" text-anchor="middle" font-weight="400"
pf="34" f3D="0"/>
<Shadow>0</Shadow>
<Rotation>0</Rotation>
</default>
```

By using this file, the inserted "Rectangle" object will have a red background color according to the modified "fill" tag. To create settings files for objects you can use this procedure as an example:

1. insert the desired object on the screen, the rectangle for instance, and modify the properties of interest (ie. the border, char font, etc.)
2. select the object, right click on it to open textual menu and activate the **"**Create or Remove Settings File Commands**"** command. This command will created the ".defxml" file for the selected object which will be saved in the project's DATA folder with its name indicated in the table as shown below

The created setting files must reside either in a specified project's "DATA" folder or in the Movicon installation folder. Movicon will check for any existing ".defxml" files within the opened project's "DATA" folder and if found will use it. Otherwise Movicon will check whether these files exist in the Movicon installation folder.
In order to restore an object's original settings, just delete the ".defxml" file referring to the object. To cancel the file contained in the "DATA" folder, use the **"**Create or Remove Settings File Commands**"** command.
The initial code that is copied in the text editor would have been as follows:

```
<MovClipboard>
<child>
<object>base</object>
<type x="290" y="170" width="-190" height="-120" fill="rgb(255,0,0)"
stroke="syscolor(WINDOWTEXT SysColor)" stroke-width="1" stroke-linecap="butt"
stroke-linejoin="round">rect</type>
<ExtFill gcolor="rgb(0,0,0)" Style="3" fill="syscolor(WINDOW SysColor)">0</ExtFill>
<Name acr="4294901760"/>
```

```
<text font-family="Tahoma" font-size="8" text-anchor="middle" font-weight="400"
pf="34" f3D="0"/>
<Shadow>0</Shadow>
<Rotation>0</Rotation>
</child>
</MovClipboard>
```

In order to use as a settings file, the code would then be modified as follows:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<default>
<type x="290" y="170" width="-190" height="-120" fill="rgb(255,0,0)"
stroke="syscolor(WINDOWTEXT SysColor)" stroke-width="1" stroke-linecap="butt"
stroke-linejoin="round">rect</type>
<ExtFill gcolor="rgb(0,0,0)" Style="3" fill="syscolor(WINDOW SysColor)">0</ExtFill>
<Name acr="4294901760"/>
<text font-family="Tahoma" font-size="8" text-anchor="middle" font-weight="400"
pf="34" f3D="0"/>
<Shadow>0</Shadow>
<Rotation>0</Rotation>
</default>
```

Any created setting files must then either reside in the specific project "DATA" folder or in the Movicon installation folder.

Modifications to the object's default sizes when being inserted on screen by the user have not been provided for. Setting the "width" and "height" attributes from the ".defxml" file to value "0" will cause the following behaviour when inserting the object on screen:

- a simple mouse click on the screen will ad the object with the default sizes established by Movicon
- the object can be resized by clicking and keeping mouse button pressed down to move the object to the size desired with the arrow starting from 0x0.

The "width" and "height" attributes have been already set at zero in the ".defxml" files which Movicon Setup installs.

As already mentioned beforehand, the names of files will be different according to the object type, and will not depend upon the Movicon installation language. In addition, you must take into account that some objects, such as the Rectangle and the Text, take settings from the same file, therefore the same customization will have effect on both objects.
The table below lists the name of files to be used for the different projects:

Object Name	File Name
Line	65_Object.defxml
Rectangle, Text, Square	64_Object.defxml
Rounded Rectangle	66_Object.defxml
Ellipse, Circle	67_Object.defxml
Polygon	not provided
Polyline	not provided
Pipe	not provided
Polybezier	not provided
Arc	71_Object.defxml
Chord	72_Object.defxml
Pie	73_Object.defxml
Horiz. Plotter	76_Object_0.defxml
Vert. Plotter	76_Object_1.defxml
Horiz. Trend	76_Object_0.defxml
Vert. Trend	76_Object_1.defxml
XY Trend	76_Object_2.defxml
Data Analysis	134_Object.defxml
Chart	96_Object.defxml
Grid	119_Object.defxml
Listbox	116_Object.defxml

Groupbox	94_Object_0.defxml
Embedded view	80_Object.defxml
Horizontal Spin	114_Object.defxml
Vertical Spin	114_Object.defxml
Display	97_Object.defxml
Tab Group	115_Object.defxml
ComboBox	117_Object.defxml
ActiveX	not provided
Ole	not provided

Alarm Window	99_Object.defxml
Log Window	101_Object.defxml
Data Logger Window	100_Object.defxml
Trace DB Window	102_Object.defxml
Hour Selector	122_Object.defxml
IP Camera Viewer	133_Object.defxml
Alarm Banner	138_Object.defxml
Recipe Manager	139_Object.defxml

The names of the different components for "Button" objects are::

Object Name	File Name
Pointer	92_Object_0.defxml
Check Box	93_Object_0.defxml
Hot Region	91_Object_0.defxml
Push Button	90_Object_0.defxml
3D Button	90_Object_1.defxml
Yellow Light	90_Object_2.defxml
Blue Lights	90_Object_3.defxml
Green Light	90_Object_4.defxml
Red Light	90_Object_5.defxml
Yellow Light	90_Object_6.defxml
Blue Button	90_Object_7.defxml
Green Button	90_Object_8.defxml
Red Button	90_Object_9.defxml
Emergency 1	90_Object_10.defxml
Emergency 2	90_Object_11.defxml
Blue Square	90_Object_12.defxml
Red Square	90_Object_13.defxml
Yellow Square	90_Object_14.defxml
Green Square	90_Object_15.defxml

Black Square	90_Object_16.defxml
Switch A	90_Object_17.defxml
Switch B	90_Object_18.defxml
Switch C	90_Object_19.defxml
Selector A	90_Object_20.defxml
Selector B	90_Object_21.defxml
Selector C	90_Object_22.defxml
Horizontal 3 State Switch	90_Object_23.defxml
Vertical 3 State Switch	90_Object_24.defxml
3 State Selector A	90_Object_25.defxml
3 State Selector B	90_Object_26.defxml
3 State Selector C	90_Object_27.defxml
3 State Selector D	90_Object_28.defxml
3 State Selector E	90_Object_29.defxml
3 State Selector F	90_Object_30.defxml
3 State Selector G	90_Object_31.defxml
3 state centered Zero Selector	90_Object_32.defxml

Radio and Check buttons do not inherit back colours from the ".defxml" file.

The names of the different components for "Meter" objects are based on certain parameters:

- **Meter**: "77_Object_<StartAngle>_<EndAngle>_<ShowSlider>.defxml"
- **Slider/Bar Graph**: "78_Object_<Type>_<ShowSlider>.defxml"

Will result as:

Object Name	File Name
Vertical Slider	78_Object_3_1.defxml
Horizontal Slider	78_Object_4_1.defxml
Gauge	77_Object_225_135_1.defxml
Top Gauge	77_Object_270_90_1.defxml
Bottom Gauge	77_Object_90_-90_1.defxml
Left Gauge	77_Object_180_0_1.defxml
Right Gauge	77_Object_0_180_1.defxml
Meter	77_Object_225_135_0.defxml
Top Meter	77_Object_270_90_0.defxml
Bottom Meter	77_Object_90_-90_0.defxml
Left Meter	77_Object_180_0_0.defxml
Right Meter	77_Object_0_180_0.defxml
Vertical Bargraph	78_Object_3_0.defxml
Horizontal Bargraph	78_Object_4_0.defxml
Vertical Grid Bargraph	78_Object_3_0.defxml
Horizontal Grid Bargraph	78_Object_4_0.defxml
Dundas Gauges	not provided

Create or Remove Settings File Commands

Two commands have been provided to create or remove an object's settings file. These commands are available in the menu that opens by right clicking on the screen object. These commands are:

Set Protoype Style : this command created the ".defxml" file for selected object. This file is saved in the project's DATA folder
Restore Default Style: this command deletes the selected object's ".defxml" file from the project's DATA folder

These two commands do not enable when composed symbols are selected.

10.4.3. Outside Screen Objects

While in Design mode you can verify situations where one or more objects have been placed completely outside the screens they belong to. These objects will remain visible in the area outside the screen and can be modified in the usual way by selecting them to access their properties through

the Properties Window. However, objects outside screens will not be made visible in project runtime mode, and those partly kept on screen will be shown with the part included on the screen only.
There are different reasons causing situations to show objects outside their screens:

- in screen edit mode where the object is dragged outside screen
- in screen edit mode when the object's X or Y Position properties have been inserted with external screen values
- in screen edit mode copying an object from one screen to a smaller one, where it can't fit in entirely and therefore remains outside
- in screen edit mode where the screen is reduced in size without adapting the objects it contains (see "Screen resize")

When selecting the screen in the "Refactoring Explorer" window, a list of the objects showing completely outside the screen will display. In this case, the following message will show:

The 'Object Name" is not in the screen boundary and won't be visible in runtime"

10.5. Aliases in Objects

The Alias management objects consists in the possibility to insert an Alias in object variable or text fields instead of the variable or text names (static or string ID). After which a table can be edited with the Alias names corresponding to with the variables, constants or texts to be used in the object in runtime mode afterwards. Movicon will replace the Alias identifications with the corresponding elements in the table when loading symbols in runtime. In this way all the objects will be the equal, with the same Aliases defined in the properties and with the Table's different correspondences.
This type of Alias mechanism may result particularly useful when using "Public Symbols". In this case the "Preserve Variables" property is also fundamental through which variables from the reference symbol can be inherited, in this case being the Aliases.

The Alias can only be managed in object properties and are not supported in the object's IL logic or Basic Script code. Nevertheless, an Alias can also be used in the object's basic script expression.

Alias syntax

In order to understand whether an Alias has been inserted in a field it is necessary that this Alias respects a certain syntax. This Alias identifier syntax must be written within double angled brackets: **<<AliasName>>**.
The Alias, as mentioned before, can be replaced with the name of a variable, a constant or a text. The possible combinations in which an Alias can be used are as follows:

Inserting Aliases in Variable fields

Aliases can be inserted in variable fields belonging to objects and in the objects' command lists' variable fields. Aliases can be inserted in variable fields in the following possible ways:

- Variable name : <<AliasVariable>>
- Pointing to variable bits: <<AliasVariable>>.0, VAR00001.<<AliasBit>>, <<AliasVariable>>.<<AliasBit>>
- Struture Variable: <<AliasStruct>>:VAR00001, StructVar:<<AliasMember>>, <<AliasStruct>>:<<AliasMember>>, <<AliasStruct>>:<<AliasMember>>.<<AliasBit>>
- Array Variable: <<AliasArray>>.e0, <<AliasArray>>[0], ArrayVariable.e<<AliasElement1>>, ArrayVariable<<AliasElement2>>, <<AliasArray>>.e<<AliasElement1>>, <<AliasArray>><<AliasElement2>>
- Basic Expressions : <<AliasVariable>> + <<AliasConstant>>, <<AliasVariable>> + VAR00001, VAR00001 + <<AliasVariable>> + <<AliasConstant>>, [<<AliasStruct>>:<<AliasMember>>] + <<AliasVariable>>, (VAR00001 + <<AliasVariable>>) / 10, etc.
- Using in Basic Script code: GetVariableValue(GetAlias("AliasVariable")), SetVariableValue(GetAlias("AliasVariable"), 10), etc.

The corresponding Alias table would result as:

ALIAS	VALUE
AliasVariable	VAR00001
AliasBit	0
AliasStruct	StructVar
AliasMember	VAR00001
AliasArray	ArrayVariable
AliasElement1	1
AliasElement2	[0]
AliasConstant	10

Where VAR00001, StructVar and ArrayVariable are RealTimeDB variables and the others are only values.

Inserting Aliases in Text fields

Aliases can be also inserted in text field belonging to objects and in their Command List text fields. Some examples would be:

- Object Name: <<AliasObjectName>>
- Object Title: <<AliasObjecTitle>>
- Static Image: <<AliasStaticImage>>

The corresponding Alias table would result as:

ALIAS	VALUE
AliasObjectName	ObjMotor01
AliasObjecTitle	Motor 1
AliasStaticImage	Motor01.jpg

Caution! Aliases uses in text fields are replaced only when loading the object. This means that Alias must be valued in the object's table of its style source container. In this case the screen's Alias Table will be ignored making it impossible to use it for changing the text field alias values.

If the value associated to a text field alias is as a String ID from the project's String Table, the string ID text will be displayed in both development and runtime mode, in relation to the selected language.

Alias Table

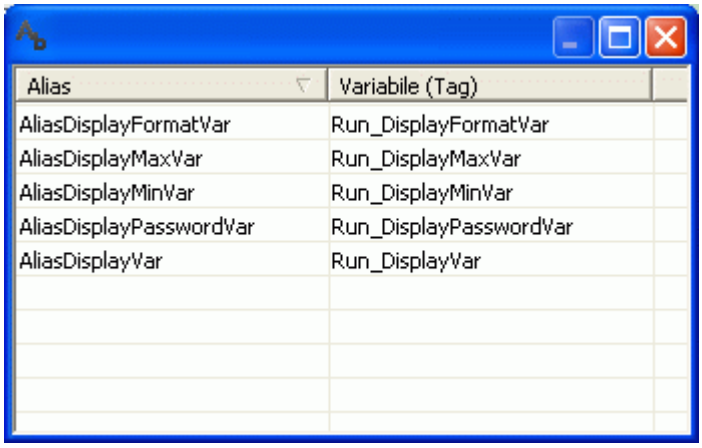
The Alias definitions, being value associations to Aliases, whether a variable, a simple numeric value or string, are done on the "Alias Table". Aliases can be defined both at simple object level, composed symbol level and also at screen level. The Alias table is saved in the xml code of the object or in the screen within which it was edited. If a composed symbol has been created, an Alias Table can be defined for each of the symbol's components and one can be defined for the style container source.
The Alias's resolution is done starting from the highest level to the lowest level. For example if an Alias has been inserted in a component its value will first be searched for in the component's table and if not found, it will then be searched for in the table of the parent/reference symbol containing it.
This will continue until the last symbol has been search for those symbols composed of diverse number of embedded sub-symbols. If by the end the search the Alias's value has still not been found, another search will take place in the Table defined in the Screen.

When the Alias Table is opened in an object, Movicon will carry out a control to check whether Aliases have been inserted in the object's properties and report the list of Aliases to the table. From this point on you can edit the Alias Table to associate values to the Aliases, insert new Aliases, delete or modify existing ones.

The Alias Table can be opened using the following commands:

- An object/symbol's "General - Object alias editor" property
- After having selected an object/symbol use Symbol Menu > "Edit Aliases..." command
- the "Edit Aliases..." comand from menu which appears right doublie clicking on object/symbol
- A screen's "General - Object alias editor" property for editing the screen's Alias Table

The Alias Table will open displayed as follows:



The table is composed of two columns, the first one shows the Alias name without the double angled brackets, the second shows the Alias to be replaced by the value , which may be a variable or a simple numeric or string value.

Alias values can also be set with an explicit Null value. In order to do this you will need to use the "(null)" keyword. Setting an alias with the null value, for instance in a display object, is the same as not associating this object with a variable.

Editing/Inserting Aliases

When the Alias Table is opened at object or symbol level, Movicon searches for the Aliases inserted in the symbol and then displays them. Values can be associated to Aliases when entering into edit mode from the field with a double click or using the F2 key followed by the TAB key to move from one to the next. On the other hand, if you right mouse click, a popup menu will appear through which you can perform the following operations:

- **New Alias**: adds a new Alias to the Table list
- **Browse Variable (Tag)**: opens the Tag Browser window for selecting variables from the RealTimeDB to insert in the "Variable" (Tag)" column
- **Cut**: eliminates the selected Alias
- **Copy**: copies the selected Alias to the windows clipboard
- **Paste**: pastes the Alias previously copied with an increasing index in the name

To delete an Alias just select the roe and use the "CANC" key.

Aliases inserted on object/symbol Alias Tables are saved in the object's code only if they have been associated with a value. This means that if a new Alias is added to the table and is not used in object's properties and doesn't get assigned with a value, it will not show next time the Alias Table is opened. However this behaviour does not happen with screen Alias Tables, where the inserted Aliases still get saved in the screen's xml code even though not valued.

Replacing Aliases in Runtime

Upon loading an object/symbol during runtime mode, any existing Aliases will get replaced statically with the value defined in the object's table or that of the symbol containing it. In this case, however, even though the Alias's value gets modified through the script functions (re. paragraph on "Handlig Aliases In Script Code"), the object is not influenced in any way and will continue to display the replaced value when loaded.
In cases where Aliases have not been valued in the object or style source symbol container's table, they will not get replaced with any values when the object is loaded, but will be resolved only after the object has been loaded in dynamic mode. In this case if the screen's Alias gets modified using the script functions (re. paragraph on "Handlig Aliases In Script Code"), the object will be re-initialized and displayed showing the new value associated to the Alias.

Caution! when associating the **Configuration Files** to an object that uses Aliases, when modifying the value of an Alias using the script functions, the configuration/settings file is reloaded and in this case the Alias will be reinitialized with the new value. If, however, the configuration/settings file is also saved the Alias management will go amiss because the file is saved inserting the value in the object's property which was replaced statically when the object was loaded and not the Alias. This, of course, is only if the object's Aliases have been defined in the object's table or that of the symbol container source.

Aliases in the Dynamic Property Inspector Window

Aliases or objects and symbols are also displayed in the "Dynamic Property Inspector" window through which they can also be modified.

"Set Screen Alias"

You can select the "Set Screen Alias" from the "Variable" group from the Command List, through which you can modify/add Screen Aliases in runtime.

Handling Aliases in Script code

The Alias Table of an object or a screen can be also accessed in runtime using the purpose Basic Script functions. These functions can be used for retrieving Alias lists, values and perform modifications. The available set of functions predisposed for these purposes are listed below. For further information about these functions please refer to the relating paragraphs written in the VBA Language section.

The functions used for accessing Object Alias Tables can be found in the "DrawCmdTarget" interface and are:

GetAlias(_lpszAlias, _bRecursive)
GetAliasListName()
GetAliasListValue()
SetAlias(_lpszAlias, _lpszValue)
RemoveAlias(_lpszAlias)
RemoveAllAliases()

The functions used for accessing Screen Alias Tables can be found in the "SynopticCmdTarget" interface and are:

GetAlias(_lpszAlias)
GetAliasListName()
GetAliasListValue()
SetAlias(_lpszAlias, _lpszValue)
RemoveAlias(_lpszAlias)
RemoveAllAliases()

Handling Aliases in Dropping Code

The above listed Basic Script functions can also be used in Dropping Template Code. In this way you can customize symbols while inserting them on screen from the Symbol Library.

10.6. Handling Static Objects in Screens

Handling static objects on screen is a feature that allows all unanimated objects to have a bitmap image which will be inserted as screen's background image. This feature, above all in devices with Windows CE platforms, allows screens containing unanimated objects to be loaded much faster.
Basically when transferring a project to a remote device, WinCE or Win32/64, and a certain screen has been enabled with the "Static Object in background" option, this screen will be checked to see if it contains any unanimated objects known as "static objects", if found a bitmap image will be created with the static objects (this file will have the same screen name plus a "_st" suffix and ".bmp" extension). After this, a temporary screen xml file will also be created (with the same screen name plus ".movscr_st" extension) in which the created bitmap will be associated as screen background without the static object definitions. This temporary screen file and bitmap image will be the one transferred to the device (therefore modified). This will allow the screen to be used in the device without its static objects defined as symbols but displayed as background bitmap image only.

To enable the Static Object in background management in screens you will have to enable the "Static Object in Background" option in the project's execution properties and the "Static Object in Background" option in the style properties of the screens you wish to have this feature. If the "Static Object in Background" option is not enabled in the project's execution properties, the static object management will not work even though the "Static Object in Background" option has been enabled in each of the screen's style properties. However, if the "Static Object in Background" option is enabled in the project's execution properties, this management will result active in all the screens enabled with the "Static Object in Background" option.

The static object in background management is executed during project transfer mode to a remote device using the "Upload Project to Device/FTP..." command, and is executed with all three of the default plug-ins, "TCP", "FTP" and "MS ActiveSync". During the project transfer phase the following operations will be performed:

1. If the "Static Object in Background" option has been enabled in the project, the following warning message will be generated:

   The project will be adapted on the target in order to manage the static objects in background image (option set inside this project).
   Make sure to preserve an updated copy of this project for continuing to develop!
   Would you like to proceed with uploading?

2. Responding with "Yes" to point 1) will start project transfer otherwise this operation will be cancelled
3. Each screen enabled with the "Static Object in Background" option will be initialized and a ".bmp" file will be created with the for all static objects detected with their images and a ".movscr_st" file will be created as a modified copy of the original screen's ".movscr" file. However the ".movscr_st" file will not include the static object's xml definitions and the background images will be the bitmaps created with the static objects. These two files, ".movscr_st" and ".bmp" will created in the same original screen's folder.
4. At this point the file that will be transferred to the device will not be the screen's original file with the ".movscr" extension, but the one with the ".movscr_st" extension and the bitmap file. During the transfer phase the file's extension will be renamed to ".movscr" otherwise the Movicon runtime module will not recognize the file as the screen's.

When enabling the "Static Object in Background" option, the project which will be transferred to the device may be different from the original therefore you will need to make a backup copy of the source files. The original project will not be returned when retrieving it from the device. A warning message will display on the device during the transfer.

At this point it is necessary to know what static objects are exactly. Basically, they are all those symbols inserted on screen without animation or logic associated to them. To be more precise, in order for an object to be considered 'static' it must have the following conditions:

- object must not have any set variables in any of its animation, execution etc. properties

- object must not have any IL Logic or Basic Script associated to it
- object must not have any text set as its title (text may be subject to language changes)
- object must not have a public name if screen has been set in a publc symbol container
- object must not be set with levels other than zero if the screen is associated with the Screen Layer Variable
- object must not have its "Visible on Web Client" option set at false (disabled)
- object must not have its "Visible on WinCE" option set at false (disabled)
- object must not have an access mask in read other than "FFFF" if project's user management is active.
- object must not be set to be invisible based on zooming factor (the "Enable Zoom" visibility property must be set at false - disabled)
- object must not be set with a Command List
- object must not be overlapped with other objects that are not static, otherwise it will not be visible in runtime because part of the bitmap background.
- some objects cannot be static for obvious reasons and include the: Alarm window and Alarm Banner, Historical Log window, DataLogger/Recipe Wndow, Recipe Manager, TraceDB, window, IP Camera viewer, Grid, Hour Selector and Scheduler TAB Group, Embedded Screen and ActiveX/OCX

When using a composed symbol it will be considered static if, in addition to being static as whole, each of its individual elements are static as well.

When the "Static Object in Background" is enabled, the screens with this option enabled will not be adapted to the page. In this case the "Fit in window" option will be in grey and no longer changeable, and the screen will not be adapted in runtime. The "Fit in Window" option will however be disabled only if the "Static Object in Background" option is enabled both at project and individual screen level.

Warning! If a certain screen is enabled for static object in background management, this screen will be managed as a container for all static objects even when they mustn't be retrieved. This means that, for instance, no background images will be created and no "movscr_st" file will be created, but the screen will however result as "Do not Fit in Window" during runtime.

Temporary ".movscr_st" and ".bmp" file management

The temporary ".movscr_st" and ".bmp" files, which are the modified screen and background image files to be associated to the screen, are created during project transfer when needed. These files will be created in the same folder belonging to the original screen, and will be kept in this folder after the project has been transferred. The next time the project is transferred, these files will be re-created only if the original screen file is dated after the date of the two files, otherwise the already existing ones will be transferred. The temporary files will keep the same screen name plus a suffix either in the name or extension. For example, two temporary files will be created for a screen called "Screen1.movscr" with the "Screen1.movscr_st" and "Screen1_st.bmp" names.
The temporary ".movscr_st" and ".bmp" files will automatically be deleted by Movicon when one of the following conditions verify:

- when the project's "Static Object in Background" option is disabled. In this case the temporary files of all project screens will be deleted
- when the "Static Object in Background" option of each individual screen is disabled. In this case the temporary files of those screens will be deleted
- when a screen is renamed. In this case the temporary files of those screens will be deleted
- when a screen is moved to a different folder. In this case the temporary files of those screens will be deleted
- when the project's "Enable Password Management" option is changed. In this case all the temporary files of all the project's screens will be deleted

Naturally, after the temporary files have been deleted, which can also be done manually by user, these files will be re-created by Movicon during the next project transfer if necessary.

Warning! when transferring a project to device, any previous unloaded 'bmp' files no longer used n the last project version will NOT be cancelled during project transfer therefore you will have to remove them manually. For example, let's suppose that a project with its "Static Objects in Background " option active has been transferred along with its ".bmp" files created for managing static objects to a remote device. If at this point, the "Static Object in Background" management is disabled in the project and then transferred again to the device, the screen files will be overwritten with the original project files but the image files will remain on the device even though no longer used.

10.7. Scrolling Screen Objects with Mouse

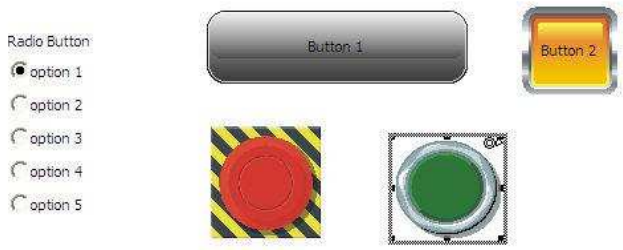
The mouse wheel can be managed for all screen objects that have lists for scrolling through. The use of the mouse wheel can be applied to the following objects:

- ComboBox and ListBox: the mouse wheel can be used to scoll the listed items
- Scheduler Window and Recipe Manager: the mouse wheel can be used to scroll the list of items in the recipe selection combo-box or the list of fields in the object table (according to which element has focus)i
- Alarm Window, Log Window, Trace DB Window and Grid: the mouse wheel can be used to scroll the object's table fields
- Trend and DataAnalysis: the mouse wheel can be used to move the cursor when a trend area has been selected or it can be used to scoll the list of pens when the legend is selected.

The scroll feature is only possible to use when needed. If lists of items or rows do not fit in one page the scroll bars will be enabled.
In addition the "Mouse Wheel" event is available which is called during the mouse scroll.

10.8. Buttons and Hot Regions

The Movicon Buttons and Hot Regions are elements through which Commands can be executed or project variables can be set. They are accessed from 'Buttons-Lights' group found in the **"Toolbox Window"**.



Objects in this category, buttons, lights and hot regions, do not support the "three states" commands.

Check Box Buttons

This is a typical two state button. A Movicon variable can be associated to this control and set at the '0' value (unchecked box) or '1' (checked box) according to the box's status.

The status is selected by mouse clicking or by using the TAB or SHIFT+TAB keys and pressing ENTER or the Space Bar on the keyboard.

Radio Button

This is a common exclusive option button. You can associate a Movicon variable to this control which will assume the progressive numeric value based on the box selected. For instance, when the first option box is selected the variable will assume the '0' value, when selecting the second option box the variable will assume the '1' value, then '2' and so forth. The number of options to be displayed is set through the object's properties.
The selection is done by Mouse clicking or using the keyboard by selecting the component with the TAB or SHIFT+TAB keys and pressing the UP/DOWN ARROW keys.

Buttons

The Movicon Buttons are objects of different graphically built shapes that consent command activation when activated with the mouse or keyboard keys during project processing.
The Buttons can be associated with the commands available in the Movicon **"Command List"** window.
The buttons' shapes or styles can be setup through the **'Properties Window'** by selecting the one desired from those already created.

The execution associated to the command is activated by clicking on the button or using the keyboard where the TAB or SHIFT+TAB keys are used to select the command and then ENTER or the Space Bar keys are used to activate it.

Controls such as "Lights", "Illuminated buttons" can be found in the "Buttons-Lights" group in the "Toolbox Window" . These controls derive from the Button objects simply using the control's Style and Execution properties.

Hot Regions

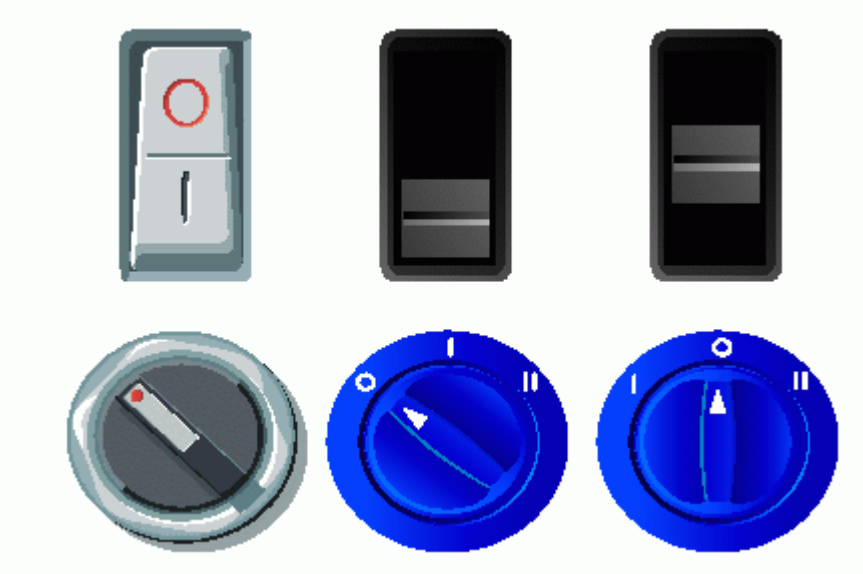
The Hot Regions are built from zones inserted in strategic points in the Screen which are invisible but mouse sensitive during project Runtime.
Since the Hot are invisible they do not have style properties but only one execution property for setting the associated command for when the operator clicks on Hot Region area.
When inserting a Hot Region in the Screen, this will appear as a shaded area with default sizes. After inserting the Hot Region it can be sized as pleased by dragging the borders with the mouse.

The Screen zone within which the Hot Region has been placed, it built only with a background representing the 'strategic' design. During project processing this zone will not be visible, but when the mouse pointer goes into or passes over the Hot Region area, the borders of this area will highlight. The programmer can also setup a 'ToolTip' text to appear if desired.

The execution of the command associated to the Hot Region is activated by clicking the mouse or using the keyboard by selecting the Hot Region with TAB or SHIFT+TAB keys and pressing ENTER or Space Bar.

10.9. Switches and Selectors

The Movicon Switches and Selectors are used for invoking commands or setting project variables. They can be accessed from the 'Switches - Selectors' group from the **"Window Objects"** . These objects can be set with tri-state mechanics to assume three different positions.



The "Switch" and "Selector" type buttons support "Tri-State" mechanics allowing the command/state variable ("Tag Command/State") to be managed with three values; zero, one and two.
The tri-state mechanism can be horizontal or vertical type. The variable set in the "Tag Commmand/State" field assumes a new value each time the switch or selector area is clicked on. Therefore, each time the object is clicked the variable switches from one value to the next beginning with 'zero' value, then the 'one' value, and finally the 'two' value. The switch/selector's image changes in function with the variable's new value, alternating three possible images: switch/selector in zero position, switch/selector in position one and switch/selector in position two. the variable can also be set by pressing the mouse button on the position where the selector is located, and dragging it to another position. In this case the variable is set to the new value only when the mouse button is released and the switch/selector is placed in a different position to the one it originally started off in.

In addition, the "Central zero" option has been made available (settable only with tri-state mechanics) to allow the switch/selector's zero value o use the central position and not the side position. If this option is left disabled, the zero will be set to the left for horizontal tri-states or at the bottom for vertical tri-states.

Tri-State switches/selectors can be commanded with accelerators or the space bar. In addition, they also support all the other mechanic types that can be set in button and light objects.

10.9.1. Components deriving from Button Objects

The Button object can take on different graphical shapes and different functions according to how it is configured. Some of these variations are already available in the **"Buttons-Lights"** or **"Switches-Selectors"** from the **"Objects Window"**.

3D Buttons
The 3D button is a normal button changed in the following properties:

- "Style - Style": changes its graphical aspect only, by giving it a round 3D look.
- "Rounded Style": only its graphcal aspect changes by obtaining a rounded corner look instead of a angled corner look.
- "Stroke Attributes Properties - Pen Size": only the border's graphical aspect changes

Lights (colored)
The "Light" objects that can be inserted are normal buttons changed in the following properties:

- "Style - Style": changes its graphical aspect only, by making it look like a luminous indicator.

- "Style - Clickable": this property is disabled when the light is for display only
- "Execution - Mechanic Style": this property is enabled for managing the mechanic "ON-OFF" which sets Light's modality with an On or Off status.

Buttons (colored)

The colored "Button" objects which can be inserted are normal buttons changed in the following properties:

- "Style - Style": changes its graphical aspect to look like a round switchboard button.
- "Execution - Mechanic Style": this property is enabled for managing the mechanic "ON-OFF" to make an ON/OFF command button type.

Emergency

The "Emergency" objects which can be inserted are normal buttons changed in the following properties:

- "Style - Style": changes only its graphical aspect to look like an emergency switchboard button.
- "Execution - Mechanic Style": this property is enabled for managing the mechanic "ON-OFF" to make an ON/OFF command button type.

Square (colored)

The colored "Square" objects that can be inserted on screen are normal buttons modified in the following properties:

- "Style - Style": only its graphical aspects change to make it look more like those found on a control panel.
- "Execution - Mechanic Style": the "ON-OFF" is enabled to make it a ON/OFF command type

Switch A/B/C

The "Switch" objects that can be inserted are buttons modified in the following properties:

- "Style - Style": only graphical aspect changes to look like an ON/OFF switch found in civil plant systems.
- "Execution - Mechanic Style": the "ON-OFF" mechanics is enabled to make it an ON/OFF command type.

Selector A/B/C

The "Selector" objects that can be inserted on screen are buttons modified in the following properties:

- "Style - Style": only graphical aspect changes to look like an ON/OFF selector found on control panels.
- "Execution - Mechanic Style": the "ON-OFF" mechanics is enabled to make it an ON/OFF command type.

3 State Switches

The "3 state switches" that can be inserted are buttons modified in the following properties:

- "Style - Style": only graphical aspect changes to look like a 3 state switch
- "Execution - Mechanic Style": the "Tri-State" mechanics is enabled to turn it into a 3 position command type.

3 State Selectors

The "3 State Selectors" that can be inserted on screen are buttons modified in the following properties:

- "Style - Style": only graphical aspect changes to look like a 3 state selector.
- "Execution - Mechanic Style": the "Tri-State" mechanics is enabled to turn it into a three position command type.

3 States Selector Central Zero

The "3 State Selectors" that can be inserted on screen are buttons modified in the following properties:

- "Style - Style": only graphical aspect changes to look like a 3 state selector.
- "Execution - Mechanic Style": the "tri-state mechanics is enabled to make it a 3 position command type.
- "Execution - zero central": this property is enabled to keep it in the central zero poistion.

10.9.2. Button and Hot Region Execution Properties

The Execution properties of Buttons and Hot Regions allow you to set the type of command which the control must execute.
To edit the Execution properties, select the object with the mouse and then use the Movicon **'Properties Window'**.

The push button objects executed two different actions types:

1. Direct action on a Tag
2. Command list execution

Actions are defined and configured depending from the "Mechanic Style" assigned to the button, as following described.

Command/State Variable
The name of the variable to be used as the check variable, which will be managed differently according to the command type selected in the "Mechanic Style" property, is entered in this editbox (or selected by using the '…' browse button on the right).
This property is only provided for "Buttons", **"Check Box Buttons"** and **"Radio Button"**.

The Check Variable can be configured with any kind of "Mechanic Style". If the style chosen is "Command Execution, the Check Variable allows to define the status of the button (pressed or released) or the colour for the light buttons.

Command Type
This selection is used for choosing the push button's operating mode.

ON-OFF	The button will act as On-Off on the Command/State Variable property assigned variable.
Impulsive	The button will act as a pulse on the Command/State Variable property assigned variable. It means that the variable will go to the "1" state for the time defined in the property "**Impulsive Time**".
Execute Commands	The button will execute the command or the commands list defined. The command execution could be executed on the button pression, on the button release or while down. In this last case, the execution could be cyclic, repeated depending from the time period defined from the property "**Impulsive Time**".
Tri-State Horizontal	This command is only available for Switches and selectors type objects and consents the object in question to be managed with tri-state horizontal graphics. The variable assigned in the **"Command/State Variable"** obtains the 0, 1 or 2 values according to the object's position.
Tri-State Vertical	This command is only available for Switches and selectors type objects and consents the object in question to be managed with tri-state vertical graphics. The variable assigned in the **"Command/State Variable"** obtains the 0, 1 or 2 values according to the object's position.

Central Zero

This can be used when setting Tri-State commands for choosing the central position and not on the side position for the switch/selector's zero value. If left disabled, the zero will be set to the left for tri-state horizontals, or at the bottom for tri-state verticals.

Impulsive Time

The property "Impulsive Time" can be used for two different scope:

1. Using the Mechanic Style "Impulsive" you can define the time (msec) for the pulse on the check variable. If you set this time to zero, the variable will be put to "ON" until the button is pressed.
2. Using the Mechanic Style "Execute Command" you can define the cyclic execution (msec) for the commands defined as ""Command while down". **In this case the time pulse as "zero" is not allowed and it will disable this function.**

Command on Release

This button opens the Movicon **'Command List'** window through which you can setup a list of one or more commands which will be executed **upon the button release event**.
This property is only available for 'Button' and 'Hot Region' objects.
For further information on the commands available please refer to the paragraph on **"Command List"**.

Command While Down

This button opens the Movicon **'Command List'** window through which you can setup a list of one or more commands which will be executed **while the button kept pressed down**. **In this case, commands can be executed several time (cyclically) until the button is pressed, with a period time defined by the property "Impulsive time"**.
This property is only available for 'Button' and 'Hot Region' objects.
For further information on the commands available please refer to the paragraph on **"Command List"**.

Command on Pressed

This button opens the Movicon **'Command List'** window through which you can setup a list of one or more commands which will be executed **upon the button pressed event**.
This property is only available for 'Button' and 'Hot Region' objects.
For further information on the commands available please refer to the paragraph on **"Command List"**.

Command on Mouse Down

When this property is enabled, the Command List associated to the button will be executed upon the Mouse Down event (when the mouse button is pressed down) instead of the Mouse Up event (when the mouse button is released).

This option is presented only for command buttons (being those which have been associated with a Command List) and not for selection or impulsive buttons.

Command Conditioned by Mouse Move/Command on Mouse Move'

When this property is enabled, the object button's "Commands on Release" list will be executed also if the cursor leaves the button area after being pressed. In this case when the mouse pointer goes outside the button area, Movicon will execute the "commands on Release" list as if the mouse had been released. In addition, moving the mouse pointer in and out of the button area with mouse key kept pressed down, the command list will be re-executed each time the mouse pointer goes out of the button area.
If this button has been associated to a "Commands on Pressed", the command list will be executed as normal when mouse key is pressed. At this point by keeping the mouse key pressed done and moving the mouse pointer in and out of the mouse area, the command list will be re-executed each time the mouse pointer enters into the button area again.
If the button has been associated with a "Commands while down/Command on Mouse Down" list, the commands list will be executed in cycled mode when keeping moused key pressed down. If the mouse pointer moves out of the button area at this point with mouse key still pressed down, the cycled command list execution will stop and restart again only when the mouse pointer re-enters the button area.

Conditioned Commands

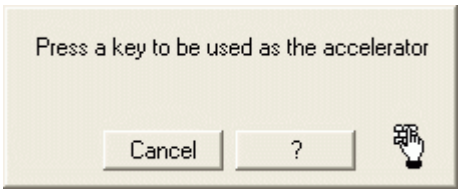
When this property is enabled, the button command list will only be executed when the variable inserted in the "Command/State variable" is set at 'zero'. Valid only if button has also been associated with the "Command/Status Variable".

This tued when the this property Enabling this property will

Num. Radio Buttons
The number of options buttons to appear for the control type 'Option Buttons' is entered in this edit box.

Enable Shortcut
When enabling this check-box, an Shortcut key will be associated to the control. Therefore the control's command can be executed during runtime by simply pressing the preset Shortcut key (eg. 'F1'). After having activated this property it will be necessary to setup the Shortcut key to be used through the **'Shortcuts'** property.

Shortcut
The key or combination keys you wish to associate to the control can be entered in this edit box. Movicon offers you the possibility to automatically enter the key to be associated by pressing the key directly on the keyboard. In order to do this press the '...' button on the right hand side of the entry box to display the following window:



At this point just press any one of the buttons on the keyboard, or a combination of keys also consisting of the 'modifier' keys, to register them in the 'Shortcut' box.
This operation can be cancelled with the 'Cancel' button.

The Shortcut key is only active when the control's 'Enable Shortcut' property has also been enabled.

Show Shortcut
Enabling this check-box will show the selected 'Shortcut' key at the side of the control's title.

10.9.3. Button Background Attributes Properties

The Button Background attributes consent you to associate images to the button object.
To modify the Background properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Each Button can be associated three different images, which will display according to the Button's status, being button pressed, button released and button checked when the ON-OFF variable's status is not zero.
The image formats that can be used are:

- ico
- jpg
- bmp
- gif
- tif
- png
- wmf
- emf

The option to manage this image association can only be applied to certain Button types as listed below:

- Push Buttons
- 3D buttons

- Lights (Yellow, Blue, Green, Red)
- Buttons with lights (Yellow, Blue, Green, Red)
- Emergency (A,B)
- Switch
- Selector (A,B)

It is not possible to associate images to Checkboxes, Radio buttons, and Hot Regions.

When the button associated an image contains a text, the associated image to each of the three statuses will change sizes to occupy the left half of the object, leaving the right half for the text. When the button does not contain any text, the image in each of the three statuses will be resized to fit all of the button area. In this way the button can be customized by replacing, for instance, the image proposed for default by Movicon (ie. selectors and switches) with a custom image for each button status.

Image When 0 / Image Button Released
This property is used for selecting an image to be displayed in the button when in the Released status. This image will be displayed when the tri-state switch or selector is in the 0 position.

Image when 1/ Image Button Pressed
This property is used for selecting an image to be displayed in the button when in the Pressed status. This image will be displayed when the tri-state switch or selector is in the 1 position.

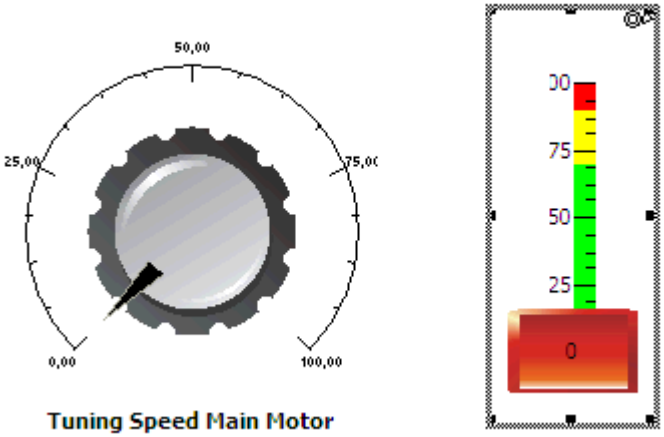
Image when 2/ Image Button Checked
This property is used for selecting an image to be displayed in the button when in the Checked status, being when the status of its ON-OFF variable is different to zero. This image will be displayed when the tri-state switch or selector is in the 2 position.

Image Button Disabled
This property is used for selecting the image to be visualized on the button when Disabled, which happens when the variable inserted in the "Enable Variable" has the '0' value therefore disabling the button.

Overlap Image/Text
This property is used for setting the button's Title's text to overlap image.

10.10. The Gauge

The Movicon Vectorial Gauge is a configurable object which allows specified plant variable values to be displayed or set graphically. The Gauge objects are available in the 'Slider-Gauge-Meters' group in the **"Objects Window"**.
The Vectorial Gauge is incorporated with a Slider, a Scale and a Bar which can be configured in various ways. The various components are in fact presented in the **"Objects Window"**, but they all actually derive from the Gauge's base components whose style properties have been configured in different ways.



This figure shows two Gauge examples, one circular and one vertical, each composed of one Scale, one Slider and one Bar.

Gauge functionalities

The Vectorial Gauge tool has the following functionalities:

1. Setting a variable by means of a Slider
2. Displaying a variable by means of a Scale
3. Displaying a variable by means of a Filler Bar

The Gauge can be configured in different ways, for instance to get a display of one of the scale, bar or slider components only, or to display the objects concerned when required. In addition to this, different geometric shapes can be used for the Gauge display in order to simulate different objects according what is required.

10.11. Dundas Gauges

The Dundas Gauges are a category of objects which have been implemented by Movicon by means of using external libraries. These object can be inserted from the **"Sliders-Gauges-Meters-Displays"** group in the Movicon "Toolbox". When the object is inserted on screen a wizard window will show to allow you configure the type of gauge you wish to insert with great detail:

The Dundas Gauge Configuration Window

The Dundas Gauge configuration window is only available in English and its documentation on all the functionalities and their settings have not been included in the Movicon help. You will find the wizard, which displays when inserting Dundas gauges, is more than helpful and intuitive, allowing you to customize the object's graphical aspect in its style properties with ease.

As you will see in the opened wizard page you can pick a gauge from any one the three object categories using the "Gauge Type Groups" list box:

- Circular Gauges
- Linear Gauges
- Numeric Indicators

After which you can go ahead and define its graphical aspect using the "Appearance Style" List-box. After having selected the object you wish to use you can configure it by using the buttons to the right of the window (Gauges, Scales, etc.) or by using the button placed at the bottom of the window (Prev, Next, etc.). Each time you enter a configuration page you will be provided with other TAB keys at the top of the window (Position, Gauge Frames, etc.). Each object has many settings to choose letting you customize them with every little detail. When you have finished just click the "Finish" key in the Wizard window to close it and insert the object on screen. At this point you can associate the object with the variable, which is to be displayed through the "Dundas Gauge Variable" property.

All the Dundas Gauge object graphics configuration is done through the wizard window, therefore many of the properties which can be set through the Movicon Property windows will not have effect on this object. For instance, the object's "visibility" Animation property can be used but the "Back Color" Animation property will not have effect on the object and therefore can't be used.

In the wizard window for configuring the Dundas Gauges, When opening the configuration page using the "Gauges" button and selecting the "Position" TAB, a "Selected Gauge" List-box appears where you can add other Gauges to the same container. By doing this more than one gauge object will appear inside the same rectangle container when inserting the object in the Movicon screen. The management of this configuration is not supported by Movicon and therefore, in this case, only the first Dundas Gauge object will be associated with the variable to be displayed.

Editing Dundas Gauges

Once the Dundas gauge has been inserted on screen you can reuse the wizard to recreate the object from the beginning, or open the object's properties window to modify it. The command to use are:

- **"CTRL + click on the Open button in the object's General Properties"**: opens the wizard window and therefore restarts the object's initial configuration. Previous settings will be lost
- **"Shift + double click on the object"** or **"Click on the Open button in the object's General properties"**: opens the Dundas Gauge's properties window through which you can modify the already inserted object without losing any previous settings

Furthermore, you can always modify the Dundas Gauge object directly in its XML code, using the "XML Code Explorer" window for instance.

The Dundas Gauges are more attractive to look at graphics wise compared to the normal Gauge objects, however you will need to keep in mind that more CPU will be used in those computers that don't have graphic cards with medium-high performance installed.

10.11.1. Components deriving from the Gauge object

The Gauge object can take on different graphical shapes and different functions according to how it is to be configured. Some of these variations are already available in the **"Sliders-Gauges-Meters"** from the **"Objects Window"**.

Vertical Slider
The Vertical Slider is a normal Gauge changed in the following properties:

- "Style - Type": refer to the gauge's graphical aspect only by changing it into a vertical shape.

Horizontal Slider
The Horizontal Slider is a normal Gauge changed in the following properties:

- "Style - Type": refers to the gauge's graphical aspect only by changing it into a vertical shape.

Gauge Top
The Gauge Top is a normal Gauge changed in the following properties:

- "Circular - Angle": changes the gauge's graphical aspect only by limiting the extension of the scale at the top part of the quadrant.

Gauge Bottom
The Gauge Bottom is a normal Gauge changed in the following properties:

- "Circular - Angle": changes the gauge's graphical aspect only by limiting the extension of the scale at the bottom part of the quadrant.

Left Gauge
The Left Gauge is a normal Gauge changed in the following properties:

- "Circular - Angle": changes the gauge's graphical aspect only by limiting the extension of the scale on the left hand side of the quadrant.

Right Gauge
The Left Gauge is a normal Gauge changed in the following properties:

- "Circular - Angle": changes the gauge's graphical aspect only by limiting the extension of the scale to the right hand side of the quadrant.

Meter
The Meter is a normal Gauge changed in the following properties:

- "Circular - Show Needle": changes the graphical display of the indicator represented as a needle
- "Style - Show Slider": changes the graphical display of the object's base

Top Meter
The Top Meter is a normal Gauge changed in the following properties:

- "Circular - Angle": changes the gauge's graphical aspect only, by limiting the extension of the scale to the top part of the quadrant
- "Circular - Show Needle": changes the needle's graphical display
- "Style - Show Slider": changes the graphical display of the object' s base

Bottom Meter
The Bottom Meter is a normal Gauge changed in the following properties:

- "Circular - Angle": changes the gauge' s graphical aspect only, by limiting the extension of the scales to the bottom part of the quadrant
- "Circular - Show Needle": changes the needle's graphical display
- "Style - Show Slider": changes the graphical display of the object's base

Left Meter
The Left Meter is a normal Gauge changed in the following properties:

- "Circular - Angle": changes the gauge' s graphical aspect only, by limiting the extension of the scales to the left hand side of the quadrant

- "Circular - Show Needle": changes the needle's graphical display
- "Style - Show Slider": changes the graphical display of the object's base

Right Meter
The Right Meter is a normal Gauge changed in the following properties:

- "Circular - Angle": changes the gauge' s graphical aspect only, by limiting the extension of the scales to the Right hand side of the quadrant
- "Circular - Show Needle": changes the needle's graphical display
- "Style - Show Slider": changes the graphical display of the object's base

Vertical BarGraph
The Vertical BarGraph is a normal Gauge changed in the following properties:

- "Style - Type": refers to the gauge's graphical aspect only by changing it into a vertical shape
- "Style - Show Slider": deletes the slider display

Horizontal BarGraph
The Horizontal BarGraph is a normal Gauge changed in the following properties:

- "Style - Type": refer to the gauge's graphical aspect only by changing it into a horizontal shape
- "Style - Show Slider": deletes the slider display

Vertical Grid BarGraph
The Vertical Grid BarGraph is a normal Gauge changed in the following properties:

- "Style - Type": refers to the gauge's graphical aspect only by changing it into a vertical shape
- "Style - Show Slider": deletes the slider display
- "Style - Bar Brush Style": associates a non solid bar filling style

Horizontal Grid BarGraph
The Horizontal Grid BarGraph is a normal Gauge changed in the following properties:

- "Style - Type": refers to the gauge's graphical aspect only by changing it into a horizontal shape
- "Style - Show Slider": deletes the slider display
- "Bar Brush Style": associates a non solid bar filling style

10.11.2. Gauge Variables Properties

The Gauge Variables Properties are used for associating the Movicon Real Time DB variables to the Gauge.
To edit the Variables properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Gauge-Slider Variable
The name of the variable, which is to be displayed or set by different configured Gauge elements is entered in this edit box (or selected with the browse '...' button on the right).

Gauge-Slider Variable Min.
The name of the variable whose value will be used as the minimum value which can be set in the '**Gauge-Slider Variable'** is entered in this edit box (or selected with the browse '...' button on the right). By doing this the threshold variable's value is made dynamic, allowing it to be also edited during the Runtime phase. In this case the Gauge Scale will be dynamically set according to the value assumed by the **'Min. Gauge-Slider Variable'**.

Max. Gauge-Slider Variable
The name of the variable whose value is to be used as the maximum value that can be set in the '**Gauge-Slider Variable'** is entered in this edit box. By doing this the threshold variable's value is

made dynamic, allowing it to be also edited during the Runtime phase. In this case the Gauge Scale will be dynamically set according to the value assumed by the **'Max. Gauge-Slider Variable'**.

Bar Offset Variable
The name of the variable whose value is to be used as the start Bar offset.

MaxRate Change
This edit box is used for entering the maximum value, in percentages, of variable changes that can be made when directly clicking on the value to be obtained instead of dragging the Gauge's needle.

Update value on Dragging
When this property is enabled the variable's value will be changed while dragging the Gauge's needle. Otherwise the variable will be updated only when the Gauge's needle is released.

Format Variable

The name of the variable whose value will be used to determine the scale format to be displayed in the gauge is entered in this editbox (or selected using the "..." browse button on the right). The gauge's scale format can also be modified during runtime using this variable. When this field is left empty, the format defined in the "Gauge Scale Setting" property will be used, otherwise the variable's contents will be used.
Numeric variables or string variables can be entered in this field:

- **Numeric Variable:** if the variable is numeric type, the number set will represent the number of decimal figures after the point. For example, when entering the '2' value in this field, the "x.xx" format will be used. If the set value is negative, the absolute value will be taken, therefore when entering "2" or "-2" the same result will be obtained. If the value is in floating type with decimal figures, the value will be rounded off, for example; an entered "1.4" will be taken as "1" and an entered "1.6" will be taken as "2".
- **String Variable:** if the variable is string type, its format must be one of those provided by the control system which are listed in the paragraph headed "Predefinided Movicon Format" from the section on "Data Formats" (i.e. "x.xx", "%s", etc.).

Caution! When using a string variable type make sure that you insert a correctly supported format. If the string inserted is not in a valid string format, the value will not get displayed correctly.

"Byte Array" or "Structure" variable types (inserted as global variables without using a single member) are not supported. In this case the value will be displayed with the format defined in the "Format Value". property.

10.11.3. Gauge Style Properties

The Gauge Style properties are used for setting the gauge's graphical display.
To edit the Style properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Gauge Type
This option box is used for selecting the display mode of the Gauge's elements:

- **Vertical**: the objects enabled in the Gauge will be displayed vertically
- **Horizontal**: the objects enabled in the Gauge will be displayed horizontally
- **Circular**: the objects enabled in the Gauge will be displayed in circular mode
- **Vertical2**: objects enabled in Gauge will be displayed vertically. This object type is inserted for default for Sliders and Bargraphs.
- **Horizontal2**: object enabled in the Gauge will be displayed horizontally. This object is inserted for default for Sliders and Bargraphs.

The "Verticle2" and "Horizontal2" have the following different graphics in respect to the other "vertical" and "horizontal" type objects, :

- The scale is never displayed under the button. The scale will not display if there isn't enough lateral space.
- The central slider underneath the button is very narrow and is displayed independently from the object's size.

Knob Style
This property allows you to choose from a default and 8 other different styles from a drop-down list which appears by clicking the arrow to the property's right. The 'default' style corresponds to a simple round knob, compared to the more complex and nice-looking 1/ 8 knob styles, and is shaped with a larger base circle with a narrower one on top for easy gripping.

Slider Color
This property allows you to select the color to associate to the Gauge's slider.
For further information on selecting colors please refer to the paragraph on "Color Selection".

Knob color
This property allows you to select the color to associate to the Gauge's knob.
For further information on selecting colors please refer to the paragraph on "Color Selection".

Bar Back Color
This property allows you to select the color to associate to the Gauge's bar back color.
For further information on selecting colors please refer to the paragraph on "Color Selection".

Bar Fill Color
This property allows you to select the color to associate to the Gauge's bar color.
For further information on selecting colors please refer to the paragraph on "Color Selection".

Bar Brush Style
This property allows you to select the brush style to associate to the Gauge's bar.

Scale Color
This property allows you to select the color to associate to the Gauge's scale.
For further information on selecting colors please refer to the paragraph on "Color Selection".

Gap
The border width of the Gauge window containing the different elements is set in this field.

Show Slider
This enabling box is used to display or hide the Slider associated to the variable in the Gauge window. The Slider is the only Gauge element that permits the variable's value associated to the Gauge to change.

Show Title
This enabling box is used to display or hide the Gauge object's title. The title is displayed on the top border of the window containing the Gauge.

Show Bar
This enabling box is used to display or hide the Filling Bar associated to the variable in the Gauge window. The Filling Bar displays the variable value associated to the Gauge in percentages.

Show Scale
This enabling box is used to display or hide the Scale associated to the variable in the Gauge window. The Scale is associated to the Slider to allow the current variable values of the Gauge to be displayed.

Reverse Scale
This option when enabled reverses the scales valued and all the "warning" thresholds set in the object as a consequence.

Scale Right-Bottom
This enabling box is used to display the Scale on the Right hand side of the Gauge window when in horizontal mode or at the bottom of the Gauge window when in vertical mode. When the Gauge is circular type the scale's text will be displayed outside the dial instead of inside.

Bias Bar
This enabling box is used to display or hide the Bias Bar associated to the variable in the Gauge window. This enabling only works if the Bar has already been enabled.

3D Effects
This enabling box is used to display the 3D effect when Gauge is set as Meter or Bargraph.

Border
A description of the **Border** property can be found in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Knob Border
This option is used for setting the Gauge knob border's display type.

Slider Border
This option is used for setting the Gauge Slider's border display type.

Bar Border
This option is used for setting the Gauge Bar's Border display type.

Needle Border
This option is used for setting the Gauge Needle's border display type.

10.11.4. Gauge Circular Setting Properties

The Setting properties for Circular Gauges are used for configuring the Gauge when set as 'Circular'. This property belongs to the Gauge's **'Style'** properties group.
To edit the Circular Settings, select the object with the mouse and use the Movicon **'Properties Window'**.

Start Angle
The start position of the circular arc, which will represent the Gauge elements, is entered in this edit box. By editing this value you can get a longer or shorter circular arc with varying angles also in function with the value entered in the **'End Angle'** property.

End Angle
The end position of the circular arc, which will represent the Gauge elements, is entered in this edit box. By editing this value you can get a longer or shorter circular arc with varying angles also in function with the value entered in the **'Start Angle'** property.

Needle Center Pos.
This parameter allows the needle's center to be moved thus moving all the semicircle of elements, to a different position to that set for default within the Gauge window.

Needle Width
This selection box is used for changing the width of Gauge needle.

Needle Length
This selection box is used for changing the length of the Gauge needle.

Needle Edge Color
This property is used for selecting the color to be associated to the Gauge needle's edge.
For further information on selecting colors please refer to "Color Selection".

Needle Fill Color
This property is used for selecting the color to be associated to the Gauge needle's filling.
For further information on selecting colors please refer to "Color Selection".

Needle Shadow Color
This property is used for selecting the color to be associated to the Gauge needle's shadow.
For further information on selecting colors please refer to "Color Selection".

Show Needle
This enabling box is used for displaying or hiding the Needle for indicating the values of the variable associated to the Gauge.

Show Needle shadow
This enabling box is used for displaying the or hiding the Needle's shadow for indicating the values or the variable associated to the Gauge. This enabling is only valid if the Needle's display has been enabled beforehand.

Circular 3D
This enables the 3D effect when the Gauge object has been configured as a Meter.

10.11.5. Gauge Scale Settings Properties

The Gauge Scale Settings properties are used for configuring the displaying the Gauge's Scale.
This property belongs to the Gauge **'Variables'** properties group.
To edit the Scale Settings properties, select the object with the mouse and use the Movicon **'Properties Window'.**

Min. Value
The lowest value that the Gauge's variable may reach is entered in this edit box. This value will be also reported to the Scale's lateral borders.

When the variable linked to the Gauge has its "Enable Scaling" property enabled, the minimum value used will be the one set in the variable's "Scale Min. Value" property.

The gauge's **"Min. Value "** property or the variable's **"Scale Min."** property will not be considered if a variable has been entered in the Gauge's "Min. Variable" property for managing thresholds dynamically.

Max. Value
The highest value that the Gauge's variable may reach is entered in this edit box. This value will be also reported to the Scale's lateral borders.

When the variable linked to the Gauge has its "Enable Scaling" property enabled, the minimum value used will be the one set in the variable's "Scale Max. Value" property.

The gauge's **"Max. Value "** property or the variable's **"Scale Max."** property will not be considered if a variable has been entered in the Gauge's "Max. Variable" property for managing thresholds dynamically.

 # Major Div.
The number of major divisions to be displayed in the Scale is entered in this edit box.

 # Minor Div.
The number of minor divisions to be displayed in the Scale is entered in this edit box. The minor divisions are those comprised between two major divisions.

Label every # div.
For how many major divisions of the Scale a numeric label is to be displayed, identifying the value in that position, is entered in this edit box.

Eng. Unit
The text for identifying the engineering units of the Gauge's variable to be represented can be entered in this edit box.

Label Format
The type of numeric format display of the variable associated to the Gauge is set through this option box.
The types of formats available are only those listed in the paragraph headed "Predefined Movicon Formats" found in the "Data Formats" sector.

In cases where this property is not set (therefore left blank) the Gauge will inherit the format defined in its associated variable's "Default Format" property.

10.11.6. Gauge Warning Zone Properties

The Gauge Warning Zone Properties are used for setting different background colours in the Scale according to the value assumed by the variable associated to the Gauge. By doing this one or more critical zones can be associated to the preset variable values.
This property belongs to the Gauge **'Style'** properties group.
To edit the Warning Zone properties, select the object with the mouse and use the Movicon '**Properties Window**'.

Enable
The Warning zone required can be activated by means of this option box. A maximum of 5 warning zones can be enables. Enable the corresponding option boxes according to the number of zones to be created.

Start
A start interval value has to be entered for each enabled Warning Zone. This value is to be expressed in percentages (%) in respect to the maximum value of the variable associated to the Gauge.

End
An End interval value has to be entered for each enabled Warning Zone. This value is to be expressed in percentages (%) in respect to the maximum value of the variable associated to the Gauge.

Usually the **'End'** of a warning zone coincides with the **'Start'** of the next warning zone. However, if there are any overlapping values between one warning zone and the next, the value of the next warning zone will be taken as a reference.

Start Variable
This edit box is used for entering (or selecting with the '...' browse button on the right) the name of the variable whose value will be used as the alarm intervention's Start value for the zone in question. This will make the threshold value dynamic therefore possible to change when in Runtime mode.

End Variable
This edit box is used for entering (or selecting with the '...' browse button on the right) the name of the variable whose value will be used as the alarm intervention's End value for the zone in question. This will make the threshold value dynamic therefore possible to change when in Runtime mode.

Color
This property is used for selecting the colour to be associated to the Warning Zone.
For further information on the colour selection please refer to the paragraph on "Color Selection".

10.11.7. Dundas Gauge Execution Properties

The Dundas Gauge Execution properties are used for setting their execution times.

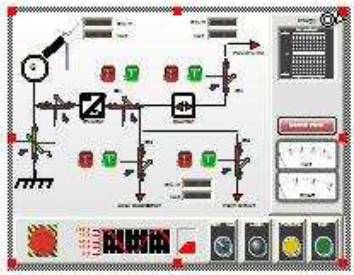
Dundas Gauge Refresh
The gauge's refresh time value can be set in milliseconds in this property. This value will "calibrate" the graphical refresh of the Dundas objects on screen, in relation to the performances of the computer being used. The '100' millisecond default value is a good compromise between the Dundas gauges's smooth pointer movement and CPU occupation, and therefore should easily adapt to almost any situation.

10.12. Embedded Screens

Movicon has a special component called 'Embedded Screens' which can be inserted into Screens. This object, as implied by its name, has the job of representing Screens existing in the project and embedding them, which means inserting them inside other Screens as vectorial components.
The special feature of this object is that it contains the drawings and components contained in the associated original Screen in any scaled size desired whilst still retaining its animation features.
This powerful tool consents the project's general layout, for example, to be created without redesigning absolutely nothing, therefore without wasting precious time by representing ready-made Screens directly.
The object, which reproduces a Screen within another Screen can receive configuration and animation properties just like all the other vectorial components, which noticeably enhancing the potentiality and flexibility of this particular type of object.

Note: Please keep in mind that this 'Embedded Screen' object adapts to the size of the drawing in function with sizes set in the style properties of the original Screen and the container Screen.

The Embedded Screen objects are available from the 'Controls' group of the **"Objects Window"**.



Embedded Screen Features

When using the Embedded Screen object you should keep in mind both its features and what is restricted in doing:

- The screen displayed by the Embedded Screen is not completely initialized. As a result the basic script interface of the screen associated to this object does not get initialized. Therefore none of the screen's VBA events can be used including variable notifications. As a consequence functions such as the "GetSynopticObject" which return the screen object containing the Embedded Screen object and not the screen displayed by the object. Events relating to the objects contained in the Embedded Screen are, however, active and managed.
- The local variables belonging to the screen displayed in the Embedded Screen are searched in the context of the screen containing the Embedded Screen.
- The IL Logic of the screen displayed by the Embedded Screen and the IL Logic of the objects it contains is executed correctly.

10.12.1. Embedded Screen Style Properties

The Embedded Synoptic Style Properties are used for associating the Screen to be displayed.
To edit the Style properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Embedded Screen

The name of the original Screen to be represented in the object is entered in this edit box (or selected with the '...' browse button on the far right). Therefore before this can happen the original Screen should have already been inserted in the project.
The contents of the original Screen will be tiled represented within the object and will be animated in real time with the same animations of the original Screen.
The Screen can be associated to the "Embedded Screen" object by using the drag&drop techniques from the Project Explorer Window even if belonging to a Child project.

The contents of the "Embedded Screen" are refreshed only after changes made to the connected screen have been saved and the screen containing the "Embedded Screen" has been reloaded.

Embedded Screen Variable

This edit box is used for entering or using the browse "..." button on the right to select the name of the variable to be used for "change screen on variable" functionality used for commanding a displayed screen change in the Embedded Screen object through a RealTimeDB variable. This variable can obtain the index (ID) name of index of the same screen and can be declared either as string or as a numeric value.
In cases where the variable is set as a "String" type, its value should assume the name of the screen to be opened.
In this case the screen can also belong to a sub work folder i.e. "Screen1" within the Screens resource "Myfolder" by just setting the word "Screen1" in the variable or the complete path of the subfolder name in which the screen is found:"MyFolder\Screen1".
In cases where the screen to be opened belongs to a child project and has an unique name in all of the Parent-Child project, its name can then be written in the Embedded Screen object's variable belonging to the Parent project, otherwise if will be necessary to specify the name indicating the screen together with the Child project name: i.e. "ChildPrjName\Screen1" (or, if screen is in a subfolder you will need to specify: "ChildPrjName\MyFolder\Screen1").

Warning: the Child project name inserted in the path for reaching the screen is Case Sensitive.

On the contrary, if the embedded screen object is in the Child project you can open a Father project screen by setting the same path in the variable using the "..\ParentScreenName" or "..\MyFolder\ParentScreenName" if the screen is in a Father project resource subfolder.
It is also possible to load a screen into the Embedded Screen object that is not in the project resources ("RESOURCES\ProjectName\") but in a somewhere else in the PC's file system for instance: in "C:\temp\". The variable set in the "Embedded Screen Variable" should therefore contain the absolute path of the screen to be displayed: "C:\temp\MyScreen.movscr".

In cases where the variable is numeric type, the screen can be changed on variable by exploiting each one of the screen's ID properties, as well as those that are in "Screens" resource subfolders, and those belonging to Child projects from Father projects: they just need to have a univocal ID. This, however cannot be reversed as Father project screens cannot be opened from a Child project.
For instance, by means of using a Display object, you only neet to set the value of the screen's ID index, or use a Combobox to get the index of the selected item.

The variable set in the "Embedded Screen Variable" property can be declared locally to the screen so that, for example, a Client or Web Client application can result independent from the Server.

You are allowed to use Child project variables (string or numeric type), (for instance: "ChildPrjName\ChildTagName") and on the contrary use Father project variables from the Child project (for instance: "..\..\FatherPrjName\FatherTagName").

Use the variable from the "Embedded Screen Variable" property within object or screen VB Script to speed up the change over of the screen to be displayed instead of the with the "DrawCmdTarget" interface's "EmbeddedSynoptic" property, which only has effect when the routine from where it was invoked has finished its run.

Show Background

When selecting this box the background colour or any associated background drawing of the original Screen will be represented. If this box is not selected, the object will assume a transparent background.

Static Screen Image

This property allows you to change the Embedded Screen object's behaviour as follows:

Disabled (default): the object will behave normally, meaning that any associated Screen animation properties will be active and the user will be able to interact within the associated Screen.
Enabled: the Embedded Screen will only display the image of the associated Screen and it will not be possible for the user to interact with the interactive objects internal the associated Screen. The displayed Screen can be opened by clicking on the Embedded Screen. This mode is handy for

creating change pages using screen previews. It is also exploited by objects which are used in the resource for managing the "Screen Navigation Editor".

The image that displays when the "Static Screen Image" option is active gets searched for in the same folder in which the screen resource set in the "Embedded Screen" object resides. The name of the image searched for is "<Screen>_c.jpg" and is created manually by the "Save Screen Image" command from the screen's "General" properties in design mode or automatically if the "General\ShowTooltipPreview" key has been set to the '1' value (for further details please refer the chapter on "Screen general properties"), and is deleted every time the screen is modified.

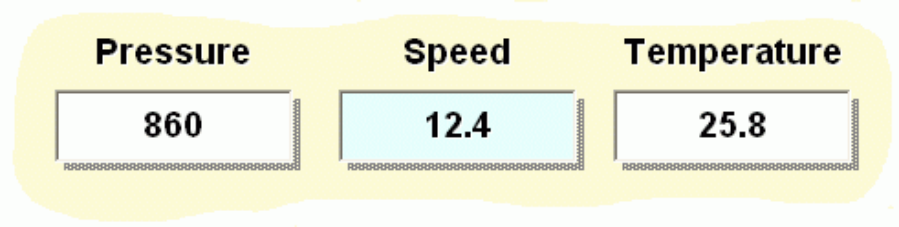
Border

The 'Border' property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

10.13. Displays

The Movicon Displays are components which can be inserted into any point of the Screen to allow variables to be dynamically displayed.
The displays carry out the task of displaying figures or strings whose values are contained in the associated variable, which can be set and configured through the properties window.
The Display objects are available in the 'Controls' group of the **"Objects Window"**.

The Display object also permit the operator to edit the value of the associated variable by selecting the Display and entering the value required. The Displays can also be in read only by setting the appropriate properties.



An example of Movicon Display application. The Movicon Real Time DB variables can be read and written through these Displays.

The Displays show the associated variable's value during project processing, with the style and sizes set through the **'Properties Window'.**

10.13.1. Display Variable Properties

The Display Variables properties are used for associating the Movicon Real Time DB variables to Displays. The majority of these properties are the same ones also used in "Spin", "List" and "Combo Box" objects.
To edit the Variables properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Edit-Box Display Variable

The name of the variable to be displayed or set using the Display is inserted in this editbox (or selected using the "**...**" browse button on the right).
(Also see "Tag Display" property described in the "Combo Box Variable properties" paragraph)

Value to Display

This display property consents you to select the data type to display for the variable associated to the display through the"Variable Display" display property. The selectable options are:

- **Variable Value**: displays the variable's current value
- **Variable Min. Value**: displays the variable's minimum value statistic
- **Variable Max. Value**: displays the variable's maximum value statistic
- **Variable Average Value**: displays the variable's average value statistic
- **Variable Total Time ON**: displays the statistic value which indicates how long the variable stayed at a value that was not zero. In this case the value is shown in days, hours, minutes and seconds
- **Daily Variable Min. Value**: displays the variable's minimum value statistic on a daily basis
- **Daily Variable Max. Value**: displays the variable's maximum value statistic on a daily basis
- **Daily Variable Average Value**: displays the variable's average value statistic on a daily basis
- **Daily Variable Total Time ON**: displays the statistic value which indicates how long the variable stayed at a value that was not zero on a daily basis. In this case the value is shown in days, hours, minutes and seconds
- **Weekly Variable Min. Value**: displays the variable's minimum value statistic on a weekly basis
- **Weekly Variable Max. Value**: displays the variable's maximum value statistic on a weekly basis
- **Weekly Variable Average Value**: displays the variable's average value statistic on a weekly basis
- **Weekly Variable Total Time ON**: displays the statistic value which indicates how long the variable stayed at a value that was not zero on a weekly basis. In this case the value is shown in days, hours, minutes and seconds
- **Monthly Variable Min. Value**: displays the variable's minimum value statistic on a monthly basis
- **Monthly Variable Max. Value**: displays the variable's maximum value statistic on a monthly basis
- **Monthly Variable Average Value**: displays the variable's average value statistic on a monthly basis
- **Monthly Variable Total Time ON**: displays the statistic value which indicates how long the variable stayed at a value that was not zero on a monthly basis. In this case the value is shown in days, hours, minutes and seconds
- **Yearly Variable Min. Value**: displays the variable's minimum value statistic on a yearly basis
- **Yearly Variable Max. Value**: displays the variable's maximum value statistic on a yearly basis
- **Yearly Variable Average Value**: displays the variable's average value statistic on a yearly basis
- **Yearly Variable Total Time ON**: displays the statistic value which indicates how long the variable stayed at a value that was not zero on a yearly basis. In this case the value is shown in days, hours, minutes and seconds
- **Variable TimeStamp**: displays the variable's TimeStamp being the date and time the variable was last updated. The default format with which the value is displayed with is composed of the date and time including milliseconds if the project is running on Windows 32/64 bit platforms (milliseconds are not available in Windows CE). To customize this format use the Display's "Value Format" property.

Total Time ON
When the "Total Time ON" is displayed, the value format is shown for default as follows:

d, HH.MM.SS

where: d = days, H = hours, M = minutes, S = seconds

you can also customize the value to be displayed by specifying the format desired in the display's "Value Format" field. The format may include the following codes:

%D = Days
%H = Hours
%M = Minutes
%S = Seconds

For examply by inserting the format string:

%H:%M:%S

the display will now show the day value.

Displaying Statistic Data
If you wish to display the variable's statistical values you will need to enable the variable's statistics and set the variable as retentive ("Enable Statistic Data" and "Retentive not Shared" variable properties). Otherwise the variable's current value will be always displayed.
You must also take into account that the variable's statistic data will be zeroes in different ways according to the data type. For further information about this please consult the section on "Retentive Variables and Statistical Data".

Default Structure
See paragraph "Variables Properties" for Drawings and Controls.

Min. Variable
The name of the variable whose value will be used as the lowest value which can be set in the **'Variable'** is entered in this edit box (or selected with the '...' browse button on the right). By doing this the threshold value is made dynamic and therefore editable during Runtime.

Max. Variable
The name of the variable whose value will be used as the highest value which can be set in the **'Variable'** is entered in this edit box (or selected with the '...' browse button on the right). By doing this the threshold value is made dynamic and therefore editable during Runtime.

Password Style Variable
The name of the variable whose value is to be used for enabling the "Password" style property is entered in this edit box (or selected by using the "..." browse button on the right). This means that when this variable has a zero value, the contents in the Display Variable will be made evident. When this value is different from zero the Display Variable contents will be displayed in protected mode with asterisks and not made evident.

Format Variable
The name of the variable whose value will be used to determine the display format of the variable associated to the Display is entered in this editbox (or selected using the "**...**" browse button on the right). The displayed value format can also be modified during runtime using this variable. When this field is left empty, the format defined in the "Format Value" property will be used, otherwise the variable's contents will be used.
Numeric variables or string variables can be entered in this field:

- **Numeric Variable:** if the variable is numeric type, the number set will represent the number of decimal figures after the point. For example, when entering the '2' value in this field, the "x.xx" format will be used. If the set value is negative, the absolute value will be taken, therefore when entering "2" or "-2" the same result will be obtained. If the value is in floating type with decimal figures, the value will be rounded off, for example; an entered "1.4" will be taken as "1" and an entered "1.6" will be taken as "2".
- **String Variable:** if the variable is string type, its format must be one of those provided by the control system which are listed in the paragraph headed "Predefinided Movicon Format" from the section on "Data Formats" (i.e. "x.xx", "%s", etc.).

Caution! When using a string variable type make sure that you insert a correctly supported format. If the string inserted is not in a valid string format, the value will not get displayed correctly.

"Byte Array" or "Structure" variable types (inserted as global variables without using a single member) are not supported. In this case the value will be displayed with the format defined in the "Format Value". property.

Enable Var.
See paragraph "Variables Properties" for Drawings and Controls.

Status Var.
See paragraph "Variables Properties" for Drawings and Controls.

10.13.2. Display Style Properties

The Display Style properties are needed for setting the graphical display of the object. A majority of these properties are also the same ones used in the "Spin", "List" and "Combo Box" objects.
To edit the Style properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Read Only
The display can be made read only through this selection box.

Prompt Pad
This option allows the Numeric or Alphanumeric Pad to show when user clicks on the editable display.

For further information please refer to "Prompt Pad" property from the object "Style properties".

Spin Enable
By using this check box you can associate Spin button to the display so that the variable's value can be increased or decreased without having to use the keyboard.

Password Style
This property, when enabled, is used for protecting the display's contents. Each character will be displayed as an asterisk during and after editing. This is used when editing texts, such as passwords, whose original characters must not be revealed.

The display object password option is also supported in the Web Client and using a server project in Windows CE. When in editing mode, a editbox opens showing asterisks for the inserted text which will show in the display when confirmed.

Horizontal Spin
By using this check box you can set the Spin to be horizontal or vertical.

Spin Delay
The delay time in enabling the fast Increase/Decrease function is entered in this edit box. By pressing one of the two spin buttons with the mouse for the time set, when exceeded the variable will start to Increase/Decrease in fast mode.

Spin Size
When the Spin button associated to the display has been enabled you can select the button's size from the ones below:

- **small**
- **medium**
- **large**

Min. Value
This edit box is used for specifying the minimum value which the Display variable can obtain when this display is being written in.
When the variable linked to the display has its "Enable Scaling" property enabled, the minimum value used will be the one set in the variable's "Scale Min. Value" property.

The display's **"Minimum Value"** property or the variable's **"Scale Min."** property will not be considered if a variable has been specified in the display's "Min. Variable" property for managing the threshold dynamically.

Max. Value
This edit box is used for specifying the maximum value which the Display variable can obtain when this display is being written in. When the associated variable is string type this value will be considered as the maximum number of characters which can be inserted in the variable.
When the variable linked to the display has its "Enable Scaling" enabled, the maximum value used will be the one set in the variable's "Scale Max. Value" property.

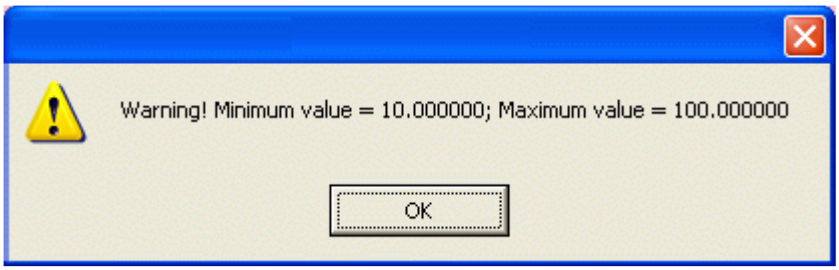
The display's **"Maximum Value"** property or the variable's **"Scale Max."** property will not be considered if a variable has been specified in the display's "Max. Variable" property for managing the threshold dynamically.

Error String

This edit box can be used for inserting a text string which will displayed in a MsgBox each time an attempt is made to set a value not within the preset limits. The minimum and maximum limits allowed can also be displayed by using the "%f" syntax. An example string is shown below:

Warning! Minimum value = %f; Maximum value = %f

In runtime this would result as follows:



When using the "%f" parameter, the value will display in floating comma with a fixed decimal figure. When using the"%g" parameter, the value will be formatted based on the display format. For example, if an integer variable is used with a "x" display format, an eventual 100 value will be displayed as follows:

%f = 100,000000
%g = 100

Spin Step

In this edit box the increment or decrement value can be entered to be applied to the variable by using the spin buttons.

Eng. Unit

A text to identify the Display variable's engineering unit to be represented is entered in this edit box.

Format Value

The associated Display variable's numeric format to be displayed is selected through this box.
The type of formats available are only those listed in the "Data Formats" section found in the paragraph headed "Predefined Movicon Formats".

In cases where a Basic expression is used as the result to be displayed, , it must be set in the "%f" format.

When integer type variables link to the display with a format for showing decimals, the minimum, maximum limits and the spin step do not keep to the format set in the display and will always work on the variable's total value. For example, for a "x.x" format and a maximum limit of "100", it will be possible to edit a maximum value equal to "100" in the variable to be shown on display with a "10.0" maximum.

In cases where this property is not set (therefore left blank) the display will inherit the format defined in the associated variable's "Default Format" property.

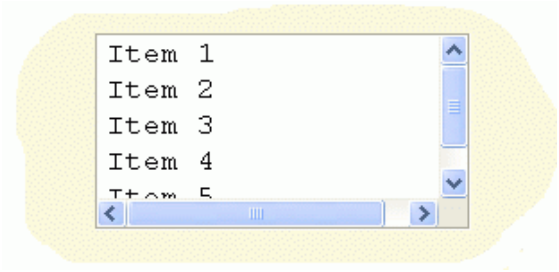
In situations where the Display's "Value To Display" is the variable's TimeStamp (Date of last update), the value format may be defined using the syntax described in the "Time Format" paragraph where the date and time formats can be customized as pleased.

Border

The **'Border'** is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

10.14. The List Objects

The Movicon List objects are components which can be inserted in at any point of the screen so that item lists can be displayed. A numeric or string type variable can be associated to the object. Each line of the list corresponds to a numeric value which is made available on the variable associated to the object when this variable is numeric type. When the variable is string type, this will be updated with the selected Item's text. Each time a line is selected the list's variable is updated with the corresponding numeric value (the value is progressive, starting from 0 to indicate the first line) or with the selected Item's text.
The List objects are available from the 'Special Objects' group in the **"Object Window"**.



An example of a Movicon List.

The list will display the Items during project processing with the style and sizes setup through the **'Properties Window'**.

The List object can be managed and compiled by using the component's Basic Script functions (ListBoxCmdTarget interface).

10.14.1. ListBox Style Properties

The List's Style properties are used for setting the object's graphical settings
To change the Style properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Border
The **"Border"** property is described in the paragraph headed **"Style Proprieties common to Drawings and Controls"**.

Clickable
The **"Clickable"** property is described in the paragraph headed **"Style Proprieties common to Drawings and Controls"**.

Show Control Wnd
The **"Show Control Wnd"** property is described in the paragraph headed **"Style Proprieties common to Drawings and Controls"**.

ListBox Items
The texts to appear in the list are inserted in this edit box. To insert more than one item you need to use the "|" pipe character to separate them (ie. Item1|Item2|Item3|etc.). ID strings, existing in the **"String Table"**, can also be inserted as well as the Item texts and also need to be separated with the "pipe" ("|") character.

The list can be dynamically compiled by using the objects appropriate Basic functions.

Sort Items
When this property is enabled, the list items will be put into alphabetical order. This property also works for new items dynamically added to the list.

10.14.2. ListBox Execution Properties

The ListBox Execution properties allow you to associate the Variable and Items to be displayed.
To change the Execution properties, select the object the mouse and use the Movicon **'Properties Window'**.

Variable ListBox

The name of the variable in which the numeric value or text corresponding to the selected Item is entered in this box (or selected with the "..." browse button on the right). The variable can be either numeric or string type. When the variable is numeric the selected item's index will be written in it, starting from the "0" value. When the variable is string type the text corresponding to the selected item will be written in it.

When the display variable is string type, the displayed text and the text contained in the string will not change when a change is made to the list of items associated to the object.
when the display variable is numeric type, the value associated to the display variable will not change when a change is made to the list of items associated to the object but the displayed text will obtain the new text corresponding to the index contained in the display variable. However, if the new list of items is inferior to the previous one and the index contained in the display variable has value higher than the new number of items, the display variable will keep the old index and the old text will remain shown in the display.

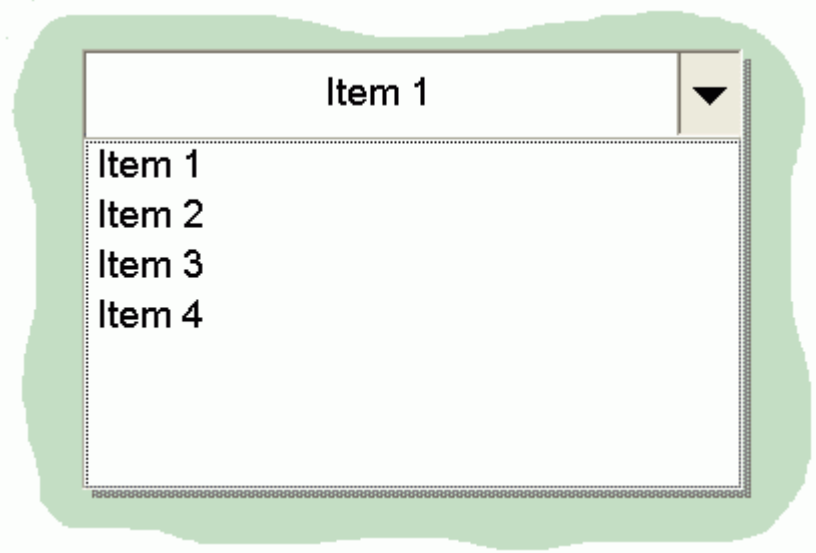
Items ListBox

The texts which are to appear in the list are entered in this box. To insert more than one Item you need to separate the texts with the pipe character "|" (i.e. Item1|Item2|Item3|etc.). As well as fixed texts you can also insert String IDs which are presented in the **"String Table"**. In this case you only need to create a String ID and insert all the Item's texts in its internal which are to appear on the list using the 'pipe' character ("|").

You can compile the List dynamically by using the object's appropriate Basic functions.

10.15. Combo Box Objects

The Movicon Combo Box objects are components which can be inserted into any point to the screen to allow item lists (texts) to be displayed and edited. The object can be associated with a numeric or string type variable. Each line of the list corresponds to a numeric value which is made available in the variable associated to the object, when this variable is numeric type. When the variable is string type, it will be updated with the text of the Item selected. Each time a line is selected the Combo Box's variable is updated with the corresponding numeric value (the value is progressive, starting from 0 to indicate the first line) or with the text of the Item selected. However, when the variable is numeric type, no values are displayed in the Combo Box's editing box, therefore a string variable type is normally used. In addition to the Combo Box a second string type variable can be associated which will be compiled with the text of the item to be displayed.
The Combo Box objects are available from the "Special Object" group in the **"Object Window"**.



Movicon Combo Box example

The Combo Box will display the Items during project processing, with the style and sizes setup through the **"Properties Window"**.
You can also insert new items with the Combo Box by using the appropriate edit boxes.

The managing and compilation of Combo Box objects can also be done through the component's Basic Script functions (DisplyCmdTarget and ListBoxCmdTarget interface). For instance, if wishing to retrieve a combo-box item list from a Button object ("ComboBox" is name associated to object), the script code to insert in the Button would be:

```
Option Explicit
Dim objCombo As DrawCmdTarget
Dim objDisplay As DisplayEditCmdTarget
Dim objList As ListBoxCmdTarget
Dim sListItems As String

Public Sub Click()
	Set objCombo = GetSynopticObject().GetSubObject("ComboBox")
	Set objDisplay = objCombo.GetObjectInterface()
	Set objList = objDisplay.GetComboListInterface

	sListItems = objList.ListData
	MsgBox("List items = " & objList.ListData,vbInformation,GetProjectTitle)

	Set objDisplay = Nothing
	Set objList = Nothing
	Set objCombo = Nothing
End Sub
```

10.15.1. Combo Box Style Properties

The Combo Box Style properties are used for setting the graphical properties of the object.
To change the Combo Box properties, select the object with the mouse and use the Movicon **"Properties Window"**.

The Combo Box is a combination of a **"Display"** and a **"ListBox"**. All its Style properties are therefore the same described for the two Display and ListBox components.

Read Only
The **"Ready Only"** property is described in the paragraph headed **"Display Style Properties"**.

Spin Size
The **"Spin Size"** property is described in the paragraph headed **"Display Style Properties".**

Min. Value
The **"Min. Value"** property is described in the paragraph headed **"Display Style Properties".**

Max. Value
The **"Max. Value"** property is described in the paragraph headed **"Display Style Properties".**

Eng. Unit
The **"Eng. Unit"** property is described in the paragraph headed **"Display Style Properties".**

Format
The **"Format"** property is described in the paragraph headed **"Display Style Properties".**

Show Control Wnd
The **"Show Control Wnd"** property is described in the paragraph headed **"Style properties common to Draws and Controls"**.

ListBox Items
The **"ListBox Items"** property is described in the paragraph headed **"Display Style Properties".**

Border
The **"Border"** property is described in the paragraph headed **"Style properties common to Draws and Controls".**

Sort Items
The **"Sort Items"** property is described in the paragraph headed **"Listbox Style Properties"**.

Invert Selection
When enabled, the property will open the combo-box displayed list upwards instead of downwards. This will allow the object to be positioned near the screen's bottom border so that when the list is opened, it will open upwards and not downwards thus out of view.

10.15.2. Combo Box Variables Properties

The Variable properties of Combo Box allow associations of the Variables and the Items to be displayed.
To change the Variables properties, select the object and use the Movicon **"Properties Window"**.

The Combo Box is a combination of a **"Display"** and a **"ListBox"**. All its Variables properties are therefore the same as described for the two Display and ListBox components.

EditBox-Display Variable
This property is described in the paragraph headed **"Display Variables Properties"**.
You must also consider that when this variable is string type it will contain the text of the selected item and when it is numeric type it will contain the index number of the selected item. In this case, however, the text selected will be shown in the display while the index will be returned to the variable. The item's index starts from the "0" value.

when the display variable is string type, the text displayed and the text contained in the string will not change when the list of items associated to the object is changed.
When the display variable is numeric type, its value will not change when the object's list of items is changed but the displayed text will assume a new text corresponding to the index contained in the display variable. If, however, the number of items in the list is lower than before and the index contained in the display variable value is higher than the number of new items, the display variable will keep the old index and the old text will remain shown in the display.

ListBox List Variable
This property is described in the paragraph headed **"ListBox Execution Properties"**.

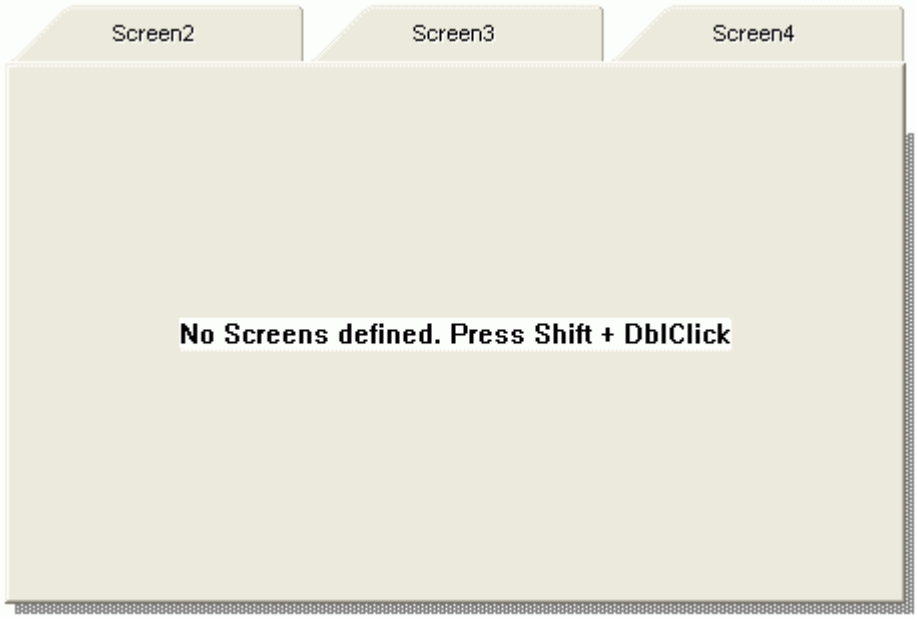
EditBox-Display Min. Variable
This property is described in the paragraph headed **"Display Variables Properties".**

EditBox-Display Max. Variable
This property is described in the paragraph headed **"Display Variables Properties".**

Tag Stile Password
The **"Tag Stile Password"** property has been described in the "Display Variables Properties" paragraph.

10.16. TAB Group Object

The Movicon TAB Group objects are components which can be inserted into any point of the screen. This object's task is to display the project's Screens within its window This is done by selecting the desired screen's corresponding TAB. The list of screens available should be put together in the object's programming phase.
The particularity of these objects is that they represent, in scale, the symbols and components which are contained in the Screens they are associated to while conserving any animation characteristics.
This powerful feature allows you to realize, for example, the general layout of the project, without having to redraw absolutely anything, by using the ready-to-use Screens.
This particular object, which reproduces a screen inside another screen, can receive its own configuration and animation properties just like all the other vectorial components, which remarkably enhance its potentiality and flexibility.
The TAB Group objects are available from the "Special Objects" group found in the **"Objects Window"**.



The tags of the "TAB Group" object adapt to the length and height of the text starting from the top when there isn't enough space horizontally.

The object's tabs are headed with the names of the associated screens. To custom these texts you will need to insert a String ID in the String Table with the name of the screen to be displayed. In this way the text will automatically be replaced with the string contents. When screens are in resource groups you will need to specify the group name as well:

ID = Group1\Synoptic1

10.16.1. TAB Group Object Features and Constraints

When using the TAB Group object you will need to keep in mind some of its characteristics and restrictions of use:

- The TAB Group object keeps all loaded screens within its internal memory and therefore all the variables contained in these screens and exchanged with the field will always remain in use independently from the screen displayed by the object. This function serves for quick screen navigation and no option exists for Movicon to discharge memory when passing from one screen to another
- The screens displayed by the TAB Group object are not completely initialized. As a result the screen basic interfaces do not initialize. Therefore, none of the screen VBA events can be used, including variable notifications. As a consequence, functions such as the "GetSynopticObject" return the screen object which contains the TAB Group object and not the screen displayed by the object. Events relating to objects contained in Embedded Screens are however active and managed.
- Screen Local variables displayed by te TAB Group are created in the context of the Screen that contains the TAB Group object.
- Screen IL logic displayed by the TAB Group and IL logic of the objects it contains is executed correctly.

10.16.2. TAB Group Style Properties

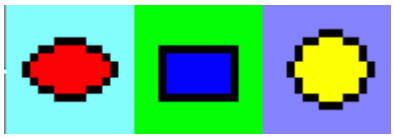
The TAB Group Style properties are used for setting the object's graphic aspect.
To edit the Style properties, select the object with the mouse and use the Movicon **"Property Window"**.

Flat
This property displays the TAB flat and not raised.

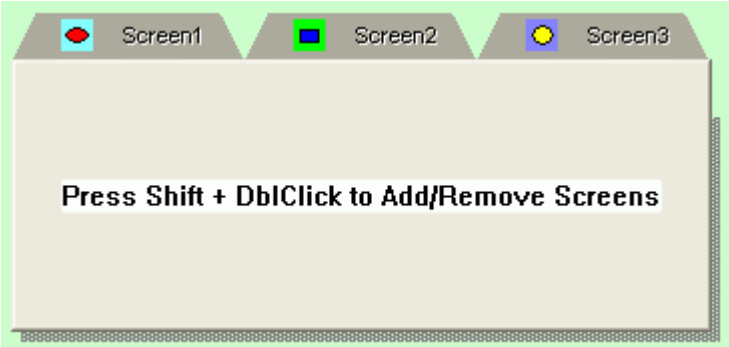
Wider 3D Style
This property displays the TAB in 3D. This setting has only effect when the **"Flat"** property is disabled.

Bottom TabBar
This property displays the TAB bar at the bottom of the object instead of at the top.

Tab Image
This property allows you to select an image to be displayed at the side the text on the label of each tab. The associated image must be sized 16x16 pixels for each screen set in the "Tab group" object. The complete image to be associated to the property should measure 16 pixels in height with length equal to the of screens multiplied by 16. For example, if you insert three screens in the TAB Group, the associated image will look like this:



the completed size is therefore 16x48 pixels. The end result will look like this on the TAB Group object:



10.16.3. TAB Group Execution Properties

The TAB Group Execution properties are used for setting up the list of screens to be displayed in the object.
To change the Execution properties, select the object with the mouse and use the Movicon **"Property Window"**.

Edit Screen List

When executing this command a dialog window will open through which you can select the screen list you wish to associate to the object.
The current screen list is shown on the left hand side of the window. Other screens can be added to the list by using the **"Add New Screen...."** button while the **"Remove"** button is used to remove the selected screen from the list. To change the order of list just click on the screen to be moved and drag it to the position desired.

10.17. Alarm Windows

The Movicon Alarm Window is a configurable object designed to represent and control local or area plant alarms, or remote station alarms (Server) connected in net.
The Alarm Window is available from the 'Controls' group in the **"Objects Window"**.

When the Alarm Window is inserted into the Screen it will appear with default settings. After having inserted the Alarm Window it can be sized as pleased by dragging its borders with the mouse.

A number of Alarm Windows can be inserted into the project, i.e. in more Screens, as required.

In the Alarm Window alarms supporting Reset and Ack have to be acknowledged and reset to disappear from the window, and alarms not supporting the Reset and Ack, and therefore result as simple Messages, appear and disappear automatically in function with the ON/OFF status of the alarm itself.

Managing multi-row texts in the Alarm Window

If the length of an alarm text, defined by the Alarm threshold name or the threshold object's "Alarm Text" property, exceeds the width of the Alarm Window's length "Alarm Description" column, it can be viewed in full by double-clicking on the alarm's row displayed in the Alarm Window. In this way the test will display in the row directly underneath the one with the alarm normally reserved for Threshold Help text. This behaviour is only valid if no Help text has been set, otherwise this row will give priority the Threshold's Help text.

10.18. Alarm Banner

The "Alarm Banner" object derives from the "Alarm Window" and is used for displaying existing alarms in the plant system, locally or remote stations (Server) connected in net. The "Alarm Banner" object is available from the "Advanced Shapes" category in the "Window objects".

By using the "Alarm Banner Window" you will be able to view the alarms one at time by scrolling through them automatically or manually.

Only the alarm text, its date and time of activation (Alarm ON) are displayed in the "Alarm Banner". Other information such as date and time or acknowledgement, off date and time, etc. cannot be viewed. In addition, this object is only used for viewing information and does not consent to executing commands such at alarm acknowledgement or reset, neither does it allow comments to be inserted. Unlike the "alarm Window", this object cannot be displayed with any command buttons. The purpose of this "Alarm Banner Window" is strictly to scroll alarms on one line only. However the following functionalities can be configured for this object:

- Possibility to set automatic or manual alarm scroll with spin button
- Possibility to set scroll speed when in automatic. When set time expires, the next alarm is scrolled to. When the last alarm on the list has been reached, the scroll goes back to the beginning.
- Possibility to display and customize the alarm activation date and time format.
- The scroll sequence starts with the most recent to the most oldest. If a new alarm intervenes while the scrolling is in action, this alarm will be displayed immediately and the scroll will be updated by restarting from the last activated alarm.
- Possibility to force scroll sequence bases on alarm priorities.

Insert an "Alarm Banner" on screen, this will appear with the default settings. After having inserted the window you can size it as pleases by dragging its borders with the mouse. The alarms which will appear in this window are those that support both Acknowledgement and Reset, which must therefore be acknowledged and reset in order to disappear, and those that do not need acknowledging or resetting being simple Messages which appear and disappear automatically in function with the alarm's ON/OFF status. In cases where alarms needing to be acknowledged and reset are displayed, you should use an "Alarm Window" to invoke these commands or you can insert two buttons on the screen separate from the Alarm Banner to manage the "Ack All" and "Reset All" command (Command List -> Alarm).

10.18.1. Alarm Window Fields

The fields to be presented in the Alarm Window can be selected by the programmer from those available through the **"Field Choice"** window.
The fields or columns that can be displayed are as follows:

Alarm Description
The Alarm Description column reports descriptive text of the alarm. The text is composed of strings in the following formations:

Text	Condition
Device Name - Title	This formation will be displayed when a text has been inserted in either the 'Alarms->General->Device Name' property or the 'Threshold->General->Title' property.
Device Name - Name	This formation will be displayed when a text has been inserted in the 'Alarms->General->Device Name' property but not in the 'Threshold->General->Title' property. In this case the text of the 'Threshold->General->Name' will be considered.
Title	This formation will be displayed when a text in the 'Alarms->General->Device Name' property has not been inserted but only in the 'Threshold->General->Title' property.
Name	This formation will be displayed when a text has not be entered in either the "Alarms->General->Device Name" or the "Threshold->General->Title" properties. In this case the 'Threshold->General->Name' property will be considered.
Variable Name - Title/Caption	This formation will be displayed when the template alarm associated to a variable has been used. Therefore the name of the variable and the text inserted in the "Threshold->General->Title" will be considered.
Variable Name - Name	This formation will be displayed when the template alarm associated to the variable has been used. The name of the variable and the text inserted in the Threshold->General->Name' property will be considered if a text has not been inserted in the "Threshold->General->Title" property.

Time ON
The 'Time ON' column reports the date and time of alarm occurrence. The time will always be that of operating system's and can be displayed with the formation specified in the **"Time Format"** property from the **'Alarm Window Style Properties'**. Any Clients connected to the Server will display the time in their local format.

Time ACK
The 'Time ACK' column reports the date and time of the alarm's acknowledgement. The time will always be that of the operating system's local time and can be displayed with the formation specified in the **"Time Format"** property from the **'Alarm Window Style Properties'**. Any Clients connected to the Server will display the time in their local format.

Time OFF
The 'Time OFF' column reports the date and time of the alarm's deactivation. The time will always be that of the operating system's local time and can be displayed with the formation specified in the

"Time Format" property from the **'Alarm Window Style Properties'**. Any Clients connected to the Server will display the time in their local format.

Time RESET

The 'Time RESET' column reports the date and time of the alarm's reset. The time will always be that of the operating system's local time and can be displayed with the formation specified in the **"Time Format"** property from the **'Alarm Window Style Properties'**. Any Clients connected to the Server will display the time in their local format.

Total Time ON

the "Total Time ON" column displays the total time in which the alarm remained active from the moment in which it was initialized. The "Total Time ON" value is set in days, hours, minutes and seconds for default:

D,H:M:S

where: D = days, H = hours, M = minutes, S = seconds

You can however customize how the value is to be displayed by specifying the desired format in the Alarms Window "Duration Format" property. The formats may include the following codes:

%D = Days
%H = Hours
%M = Minutes
%S = Seconds

For instance, when inserting the format string:

%H:%M:%S

the total duration value for the current day (i.e. "12:23:45") will be displayed in the Alarm Window.

Alarm Total Num On

The "Alarm Total Num On" column shows the alarm's statistical value representing how many times the alarm turned ON.

Alarm Total Num ACK

The "Alarm Total Num Ack" column shows the alarm's statistical value representing how many times the alarm was acknowledged.

Alarm Total Num RESET

The "Alarm Total Num Reset" column shows the alarm's statistical value representing how many time alarm was reset.

Image

The "Image" column displays the image to be associated in the alarm threshold's "File-stile. Bmp" property, or in the alarm's activation variable property "Options - Bmp File". If images are associated in both these properties, the one associated to the alarm's threshold will have priority.

Status

The 'Status' column reports the current status of the alarms. The Alarm status are:

- **ON:** alarm active and not acknowledged
- **OFF:** alarm not active and not acknowledged
- **ACK:** alarm active and acknowledged
- **OFF (ACK):** alarm not active and acknowledged

Duration

The 'Duration' Column reports the duration of the alarm occurrence. This value indicates the amount of time passed between the alarm's last "ALARM ON" and "ALARM OFF" events and is written only in the "ALARM OFF" event. The "Duration" value is shown with the day, hour, minute and seconds format for default:

D,H:M:S

where: D = days, H = hours, M = minutes, S = seconds

You can of course customize how this value is shown by specifying the one desired in the Alarms Window's "Duration Format" field. Formats may include the following codes:

%D = Days
%H = Hours
%M = Minutes
%S = Seconds

For example if you insert this format string:

%H:%M:%S

in the Alarm window, the total duration value will display for the current day (i.e. "12:23:45").

Severity

The 'Severity' column reports the alarm priorities. This value should have been previously inserted in the **"Severity"** property from the **'Alarm Threshold Execution Properties'**.

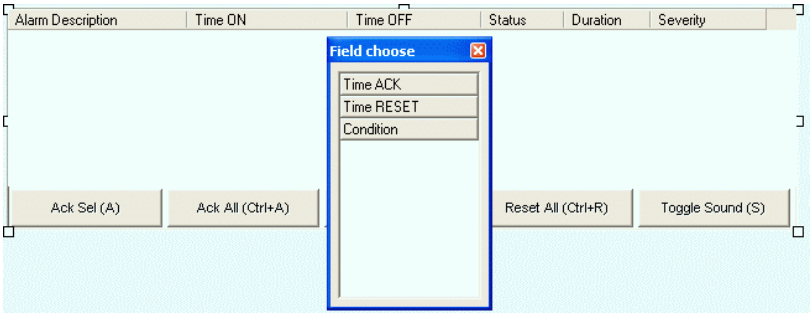
Condition

The 'Condition' column reports the alarm's current condition. The options are:

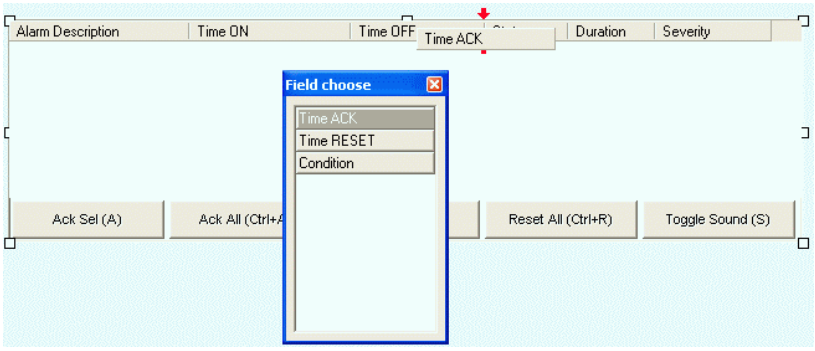
- **ON:** alarm active
- **OFF:** alarm not active

10.18.2. Alarm Window Field Choice

The Alarm Window allows you to select the fields or columns which can be displayed. In order to carry out this operation you need to open the **'Field Choice'** window by clicking on the **'Open'** button in the **'General'** group of the object's **'Properties Window'**, or by double-clicking on the object and pressing down the **'SHIFT'** key at the same time.



In the 'Field Choice' window are listed available fields which have not yet been inserted into the Alarm Window. To move a field from 'Field Choice' window to the Alarm Window simply select it with the mouse and drag it to the position desired in the Alarm Window. Please bare in mind that the field can only be released at the beginning or the end of a already positioned field, and two red arrows should appear:



To move a field from the Alarm Window to the 'Field Choice' window, simply select it with the mouse and drag it to the 'Field Choice' window.

When the window is set with the "Show Control Wnd" option during Runtime phase the columns can then be dragged out of the window and deleted. However the initial configuration must be restored by using the "RecalcLayout" basic script method from the AlarmWndCmdTarget interface or when the page is reloaded.

10.18.3. Alarm Help in the Alarm Window

A string help can be associated to each single alarm through the **"Help"** property found in the 'Alarm Threshold General Properties'. This help string can be displayed during Runtime in the Alarm Window by double-clicking on the line of the alarm required.
When alarms are managed as Templates and associated to variables without the associated help strings, the description of the variables will be displayed.
In addition to this you can also get more extended help associated to each single arlarm by using a HTML or CHM file. To open these files, just select the alarm in the Alarm Window and click the **"Help"** key. Obviously, this can only be done when the help files have already been created and configured in one of the two ways:

1. Associate a "htm" file to the variable which generates the alarm. This setting must e done in the **"Html File"** property from the "Variable Options Properties" group. In order to avoid absolute file path problems if would be advisable to insert the "htm" files into the project's resource folder.
2. Associate a help "chm" file format to the project, and create a topic referring to the alarm/s. Then insert the topics in the chm file's index and give them the same name of the varialbe associated to the alarm. For instance, if the "Alarm001' has been set with the "Alarm_1" variable associated to it, the topic will be inserted into the file index in the name of "Allarme_1"

10.18.4. Alarm Window and Banner Window Style Properties.

The Alarm Window Style Properties are used for setting the object's graphical properties.
To edit the Style properties, select the object with the mouse and use the Movicon **'Properties Window'**.

The "Alarm Window" and "Alarm Banner" style properties are used for setting their graphical aspects. Some of these properties can be found in both objects, while others can only found in one and not the other.

AutoScroll
This property is only available in the "Alarm Banner" object and consents existing alarms to be scrolled automatically. If this property is not enabled, the scroll will only work manually using the spin button provided. Activation of any new alarms will be automatically displayed even when scrolling is done manually.

Has Spin
This property is only available for the "Alarm Banner" and a Spin button can be associated to this object in order to scroll alarms manually. The manual scroll does not work continuously in a circle. When it arrives at the end of the list, the spin button deactivates and another button has to be used in order to return back to the beginning.

Horizontal Spin
This property is only available for the "Alarm Banner", and is used for setting the Spin Button vertically or horizontally.

Spin Size
This property is only available for the "Alarm Banner" and is used for selecting the Spin button size. The sizes to choose from are:

- small
- medium
- large

Show Date Time

This property is only available for the "Alarm Banner" and is used when wanting to show alarm activation dates and times in addition to the alarm text. In this case the date and time will be place before the alarm text. The date and time format can be customized afterwards in the "Time Format" property.

Show Higher Severity

This property is only available for the "Alarm Banner" and is used for defining the list of alarms to show in order of severity. When enabled, the alarms will be listed in order of severity, starting with the highest (1 = lowest serverity). Alarms with the same severity will be scrolled based on activation time from the most recent to the oldest. If this property is not enabled, the scroll sequence will be based on activation time only, starting with the most recent to the oldest.

Border

The **'Border'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Clickable

The **'Clickable'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Auto Layout

The **'Auto Layout'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Show Control Wnd

The **'Show Control Wnd'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Show Preview

This property allows you to activate the help to show for default for each alarm row. Otherwise the help will only show when the alarm row is double clicked on. This only works for those alarms which have a help string.

Ack Sel Button

This option enables the command button for acknowledging the alarms selected in the Alarm Window. One or more alarms have to selected in order to carry out this action in Runtime.

This button is made active only when an alarm is selected. When no alarm has been selected, this button will result disabled.

Ack All Button

This option enables the command button for acknowledging all the alarms existing in the Alarm Window, without having to select them all first.

When an Alarm Window from a Network Client project is connect to a Network Server, the "Ack All" command sends a acknowledge command to the Server for all alarms displayed in the Client window. In this way, if a filter has been applied to the Client's window area, only the alarms that belong to that area will be acknowledged.

Reset Sel Button

This option enables the command button for resetting the alarms selected in the Alarm Window. One or more alarms, previously acknowledged with the 'Ack sel' or 'Ack All' button, have to selected in order for this to work in Runtime.

This button is made active only when an alarm is selected. When no alarm has been selected, this button will result disabled.

Reset All Button

This option enables the command button for resetting all the alarms existing in the Alarm Window, without having to select them first and only if previously acknowledged with the 'Ack Sel' or 'Ack All' button.

When an Alarm Window from a Network Client project is connect to a Network Server, the "Reset All" command sends a reset command to the Server for all alarms displayed in the Client window. In this way, if a filter has been applied to the Client's window area, only the alarms that belong to that area will be reset.

Toggle Sound Button

This option makes the command button available for activating or deactivating the acoustic sounds associated to the unacknowledged alarm priorities. This button activated when pressed down and is retentive. Therefore user can see whether the acoustic sound has been activated or not by looking at the button's status graphically on screen (pressed or released). The button status can also be retentive so its settings will be retained when closing and reopening the project. The button's status is directly linked to the corresponding system "AlarmSoundState" variable. Therefore it is also possible to manage this variable with IL Logic, VBA or using a Variable command type (i.e. with the 'Toggle' action at 1) for enabling or disabling the alarm sounds. Changing the status on one will automatically change the status of there other and vice-versa. (For further information on managing alarm sounds relating to user levels please refer to the section on "Alarms Sound Management")

In conclusion, the Alarm Window's "Enable Sound" button or the "AlarmsSoundState" system variable enable the sounds of alarms according to the setting customized for each user, whereas the "Alarms - Enable sound" command (settable in the object's command list) or a double click on the blinking alarm in the Movicon status bar will silence the sound temporarily which will recommence upon a status change of a listed alarm or when a new alarm appears. This command's effect is therefore temporary and does not interact with the status of each user.

The Sound Button is also enabled in the Client project (or WebClient) Alarm window, and the consequent warning sound is managed in function with the user used for connecting to the Server (user inserted in the "Network Client Settings" from the Client project's "Network Services" resource or the user inserted in the "Default Log On User" property from the Server project's "Network Client" resource).

The sound which is reproduced by Movicon for default is a repetitive 'beep'. This sound is handled differently according to the operating system being used whether 32 bit or 64 bit as follows:

- **32 bit Operating System**: beep is executed for default using the PC buzzer. In this case the PC's audio card is not involved.
- **64 bit Operating System**: an operating system function executes a system sound to reproduce beep for default. This sound is reproduced using the PC's audio card, which should be enabled and in working condition, managed by the operating system and is not retrievable as a ".wav" file. In addition this sound is at low volumn and hard of hearing.

However, a custom ".wav" file can be used instead of the default beep. In this case the following two Windows registry keys must be set:

- **UsePCSpeaker**: this value is inserted in the Windows registry set at the "0" value to execute a ".wav" file to replace the beep. The name of the ".wav" file must be specified in the "AlarmSound" key
- **AlarmSound**: the name of the ".wav" file, which is to be executed instead of the beem when the "UsePCSpeaker" key is set at "0", is inserted in this value. The ".wav" file must then be copied to the Movicon installation folder.

Help Button

This selection provides the command button for opening the help file of the alarm selected. The alarm's help file is executed as explained in the section on **"Alarm Help in the Alarms Window"**.

This button is made active only when an alarm is selected. When no alarm is selected this button results disabled.

The Help Button is not enabled in Client (or WebClient) project Alarm Windows, but on in Server projects. The alarm Help is managed by the Alarm Window only for local project alarms and not for those alarms retrieved from Network Server projects.

Get History Button

This selection makes the command button available for displaying the selected alarm's history, being all of the "Alarms Historical", showing all of the status transactions which verified while the alarm was working.

This button is only activated when an alarm is selected. This button will remain disabled when no alarm has been selected.

The alarm's history can be retrieved by using this button or by pressing "Shift + Doppio Click" on the alarm or by selecting the alarm and pressing the "G" key. This functionality is also supported by the Alarm Window when connected to a Network Server project.

Comment Button

This option makes the command button available for entering a comment for the alarm selected in the window. This button is only gets enabled when one or more alarms are selected. A dialog window will open when pressing this button where you can set a comment to associate a comment to the selected alarm and which will be persistent in the retentive file. This comment will be inserted in all the alarms selected in a multi-alarm selection. The window used for inserting the comment has an "OK" button for confirming the text entered (Enter key can be used as well), a "Cancel" button to ignore the text just entered (Exit key also does the same job) and a "Pad" button to open a alphanumeric pad for editing. Alarm comments can be accessed through the "LastComment " basic script function.

The Comment Button is not enabled in client project (or WebClient) Alarm Windows, but only in Server projects. Alarm comments are managed by the Alarm Window only for local project alarms and not for those retrieved from Network Server projects.

Comment Button Text

The text to appear on the "Comment Button" is entered in this edit box. The default text will be used when left blank.

Button Size

The **'Button Size'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Align Buttons

The **'Align Buttons'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Ack Sel Button Text

The text which is to appear on the '**Ack Sel Button'** is entered in this edit box. The default text will be used if left blank.

Ack All Button Text

The text which is to appear on the **'Ack All Button'** is entered in this edit box. The default text will be used if left blank.

Reset Sel Button Text

The text which is to appear on the **'Reset Sel Button'** is entered in this edit box. The default text will be used if left blank.

Reset All Button Text

The text which is to appear on the **'Reset All Button'** is entered in this edit box. The default text will be used if left blank.

Toggle Sound Button Text

The text which is to appear on the **'Toggle Sound Button'** is entered in this edit box. The default text will be used if left blank.

Help Button Text
The text to appear on the **"Help Button"** is inserted in this edit box. The default text will be used if this field is left blank.

Get History Button Text
The text to appear in the "**Get History Button"** is inserted in this edit box. The default text will be used if this field is left blank.

Text Column Name
The text which is to appear as the **"Alarm Description"** column's name is entered in this edit box. The default text will be used if left blank.

Alarm On Column Name
The text which is to appear as the **"Time ON"** column's name is entered in this edit box. The default text will be used if left blank.

Alarm Ack Column Name
The text which is to appear as the **"Time ACK"** column's name is entered in this edit box. The default text will be used if left blank.

Alarm Off Column Name
The text which is to appear as the **"Time OFF"** column's name is entered in this edit box. The default text will be used if left blank.

Alarm Reset Column Name
The text which is to appear as the **"Time RESET"** column's name is entered in this edit box. The default text will be used if left blank.

Alarm Duration Column Name
The text which is to appear as the **"Duration"** column's name is entered in this edit box. The default text will be used if left blank.

Alarm Total Time ON Column Name
The text which is to appear as the **"Total Time ON"** column's name is entered in this edit box. The default text will be used if left blank.

Alarm Severity Column Name
The text which is to appear as the **"Severity"** column's name is entered in this edit box. The default text will be used if left blank.

Alarm Status Column Name
The text which is to appear as the **"Status"** column's name is entered in this edit box. The default text will be used if left blank.

Alarm Condition Column Name
The text which is to appear as the **"Condition"** column's name is entered in this edit box. The default text will be used if left blank.

Alarm Image Column Name
The text to appear as the **"Image"** column's name is inserted in this edit box. The default text will be used if left blank.

Date Format
The **"Data Format"** property is described in the paragraph on Design and Control **"Stile Properties"** .

Duration Time Format
The **"Duration Time Format"**property is described in the paragraph on Design and Control **"Stile Properties" .**

Include milliseconds
This "Include milliseconds" is described in the "Object Style Properties" paragraph from the Drawings and Controls section.

Area Filter
This entry box is used for inserting a filter for displaying alarms belonging to a certain area only. This filter can contain the following special characters:

'*' : the asterisk indicates one or more chars (*Area*).

'?' : the question mark indicates only one char (Area?).
'[xyz]' o '[x-y]' :[1-3] the square brackets indicate a char. set (Area or Area[13] or Area[A-D]).

Queries done with square brackets are not case-sensitive, therefore you will need to always use upper-case chars even when the chars to be searched for are in lower-case.

Alarm Text Filter

A filter for displaying alarms according to their texts can be entered in this field. The filter is applied to the "Desc. Column" column and may contain the following special chars:

'*' : the asterisk indicates one or more chars (*Motor*).
'?' : the question mark indicates only one char (Motor?).
'[xyz]' o '[x-y]' :the square brackets indicate a char. set (MotorArea or Area[13] or Area[A-D]).

Searches using square brackets are not case-sensitive therefore you will need to always insert upper-case chars even when chars to be searched for are in lower-case.

Alarm Severity Filter

A filter can be entered in this box for displaying the alarms based on their priorities. The value inserted must be a severity value (value "1" indicates the lowest severity) you wish to use for applying the filter. Once the severity value has been set you will need to also set the "Alarm Severity Filter Condition" with the condition type with which to apply the filter. Leaving this value at zero (default value), no filters will be applied based on the alarms' severities.

The filter by severity is also supported in cases where the "alarms Window" is used for retrieving alarms from a Network Server Project (therefore both in Networking and WebClient).

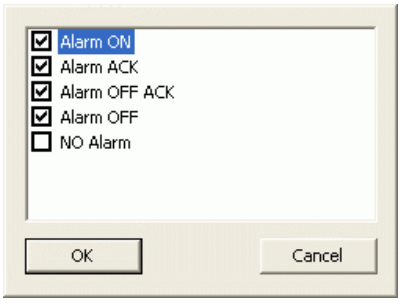
Alarm Severity Filter Condition

This property consents you to set the condition to be used by the alarm filter based on severity. When the " Alarm Severity Filter" is left at "0" value, this setting will be ignored. The options are:

- **equal: alarms with severity equal to the one set in the "Alarm Severity Filter" property will be displayed only**
- **minor-equal:** alarms with minor or equal severities set in their "Alarm Severity Filter" properties will only be displayed
- **major-equal:** alarms with major or equal severities set in their "Alarm Severity Filter" properties will only be displayed

Alarm Mask Filter

A filter based on the status of the alarms to be displayed in the window can be set in this property. Click on the '...' button on the far right of the property to open the following settings window:



The filters are:

- **Alarm ON: active alarms which have not yet been acknowledged will be displayed**
- **Alarm ACK:** active alarms which have been acknowledged but not yet reset will be displayed

- **Alarm OFF ACK:** inactive alarms which have been acknowledged but not reset will be displayed
- **Alarm OFF:** inactive alarms which have been either acknowledged or not acknowledged but not yet reset will be displayed
- **NO Alarm:** inactive alarms which have already been acknowledged and reset will be displayed

Historical Log Item Back Color

This property allows you to select the color to associate to the background of the alarm historical data display area. To view alarm historicals use the "Get History" button. Colors are selected using the standard selection procedures using the color palette.

Historical Log Item Text Color

This property allows you to select the color to associate to the text in the alarm historical data display area. To view alarm historicals use the "Get History" button. Colors are selected using the standard selection procedures using the color palette.

10.18.5. Alarm Window and Alarm Banner Execution Properties

The 'Alarm Window' and 'Alarm Banner' execution properties are used for setting execution times, the names of any Servers from which to get data to display, etc. Some of these properties are common to both objects, whereas others are only available for one and not the other.

Scroll Time

This property is only available in the "Alarm Banner" object and is used for setting a time in milliseconds for automatic alarm scrolling. This time represents the duration of which the alarm is displayed in the Banner before passing on to the next one.

Blink Time

This setting represents the blink time for alarms not yet acknowledged. The value is expressed in milliseconds.
The blink time can also be disabled by setting it with the zero value.

Max Rows Nr

This parameter is used only for limiting the number of rows to be displayed when the alarm history window is opened with the "Get History" button. This setting will have no effect on the number of alarms displayed. All active alarms or not acknowledged and reset will always display.

Network Server

See paragraph "Drawings and Controls common Execution Properties".

Network Backup Server

See paragraph "Drawings and Controls common Execution Properties".

Network Polling Time

This setting represents the network's polling time. The value is expressed in milliseconds.

OPC AE Server

The name of the eventual OPC AE Server, from which alarm notifications are to arrive and be displayed in the window, is entered in this edit box. In this way the alarm window will be configured so that it keeps track of a certain number of events in arrival from a OPC Server AE. In addition to this, the "OnOPCAEEvent" is available from the "AlarmWndCmdTarget" basic interface which consents you to intercept a new AE type message in arrival for the alarms window, and to eventually stop it from being displayed.

Max. OPC AE Events Nr.

The max. number value of OPC Server AE events that can be displayed in the Alarms window is entered in this field. When this set limit has been reached the oldest traces will be replaced with the newest ones.

10.19. Log Window

The Movicon **'Log Window'** is a configurable object designed to display log data recorded by the Project. Data from local projects and remote stations (Server) connected in net can also be displayed.
The Log Window object is available from the 'Special Objects' group in the **"Objects Window"**.

When a Log Window is inserted into a screen it will appear with its default size. After being inserted it can be resized as pleased by dragging the borders with the mouse.
The Log Window can display three different types of data: System Messages, Alarm Messages and Communication Driver Messages.

As many Log Window in as many screens can be inserted within the project according to your specific requirements.

The Event type associated to the Log Window can be dynamically changed during Runtime by using the object's appropriated Basic Script functions.

10.19.1. Log Window Fields

The fields which must be presented in the Log Window can be selected by the programmer from those available by means of using the **"Field Choice"** window.
The fields or columns which can be displayed are described below:

Event Text
The 'Event Text' column reports the description of the type of event which occurred. The event maybe a system message, a alarm text or a communication driver error, etc.

Event Time
The 'Event Time' column reports the date and time of the data recording. The time is always in the operating system's local time and will be displayed with the "YYYY-MM-GG HH-MM-SS" formation.

Event Id
The 'Event Id' Column reports the type of even which has been verified. For instance some event types are 'System, 'Driver', 'Alarm ON', 'Alarm OFF', etc. For further information please refer to the paragraph on "Log Window Fields".

User
The name of the user logged in project is recorded in this field only if the recorded event was prompted by the that user (i.e. by using a button, etc.)

Description
The "Description" column reports different information according to the type of event which occurred. For further information please refer to the paragraph on "Log Window Fields".

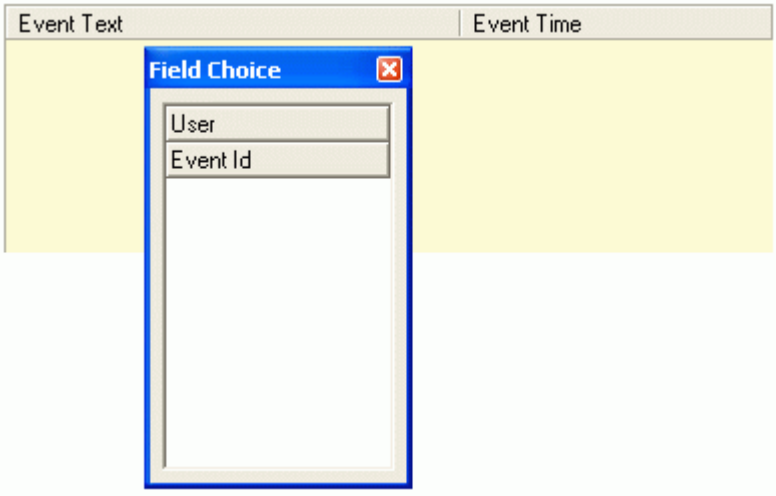
Duration
The "Duration" column reports the event's duration. This field is only significant to some events. For further information please refer to the paragraph on "Log Window Fields".

Event Num
The "Event Number" column reports the event's identification code number. For further information please refer to the paragraph on "Log Window Fields".

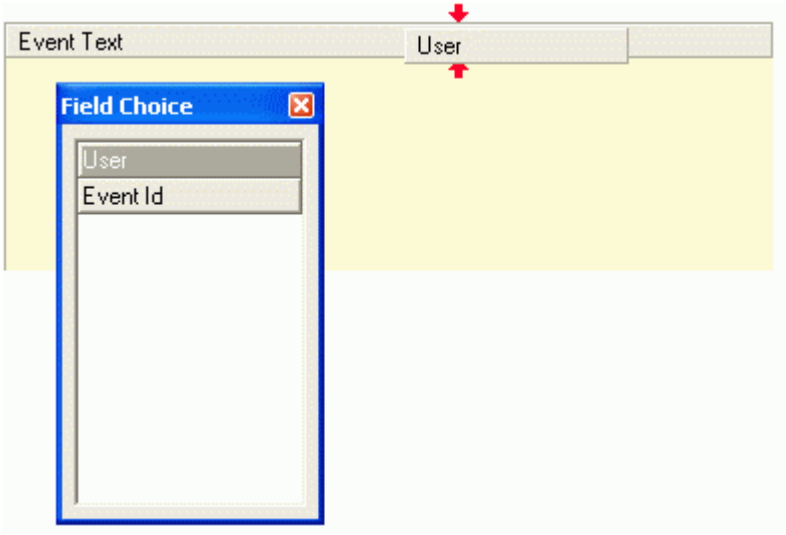
Comment
The "Comment" column reports different information according to the type of event which occurred. For further information please refer to the paragraph on "Log Window Fields".

10.19.2. Log Window Field choice

The Log Window object permits you to select the fields or columns to be displayed. In order to do this you need to open the **'Field Choice'** window by clicking on the **'Open'** button from the **'General'** group in the object's **'Properties Window'** or by double clicking and keeping the mouse button pressed on the object while pressing the **'SHIFT'** key at the same time.



The available fields which have not yet been inserted into the Log Window will be listed in the 'Field Choice' window. To move a field from the 'Field Choice' window to the Log Window just select the field with the mouse and drag it to the position desired in the Log Window. Note that the field can only be released at the beginning or end of an already positioned field, and that two red arrows should appear:



To move a field from the Log Window to the 'Field Choice' window just select the field with the mouse and drag it into the 'Field Choice' window.

When setting the window with the "Show Control Wnd" option during the Runtime you will be able to drag the columns out of the window where they will be deleted. You can, however, restore the initial configuration by using the "RecalcLayout" basic script method from the HisLogWndCmdTarget interface or when the page is reloaded.

10.19.3. DataBase Fields

The DataBase of the Historical Log is composed of a certain number of fields, and not all of them are displayed in the Historical Log window. These fields can, in certain cases, are very useful for creating statistics or other things. For example, they can create reports by extracting data from the Database. There are three tables in the Historical Log file, SysMsgs (system messages), Alarms (alarm messages) and Drivers (communication Driver messages), but all these have the same fields, even though they may obtain different meanings from time to time, as explained below:

TimeCol

This fields reports the date and time of the recording in GMT (Greenwich Mean Time). The GMT is used to calculate the time in the rest of the world. The time zones are calculated by starting from Greenwich 0.00 hrs. Italy is "+1" hour ahead in respect to the GMT and "+2" hours at certain times of the year when the legal hour is put into force.

LocalCol

This field report the date and time of the recording taking the local time as reference.

MSecCol

This field reports the milliseconds relating to the recording's time.

UserCol

The name of the user logged in the project will be recorded in this field only when the event recorded is prompted by that user (e.g. by means of using a button, etc.).

EventCol

This field reports the event type which identifies the recording. The event types changed according to the table being consulted. The values may be:

Events	Event Num.	Table	Description
System	3006	SysMsgs	System Messages such as project startup, the log on/off of a user, etc.
Trace	3008	SysMsgs	This event type records a variable change whose **"Trace"** property has been enabled, in addition to the **"Add Msg to SysLog"** property
Driver	3005	Drivers	Messages relating to Communication Driver, such as communication activations, communication errors, etc.
ALARM ON	(*)	Alarms	Event recorded when the alarm is activated
ALARM ACK	(*)	Alarms	Event recorded when the alarm is acknowledged
ALARM OFF	(*)	Alarms	Event recorded when the alarm is deactivated
ALARM RESET	(*)	Alarms	Event recorded when the alarm is reset

(*) alarm priority

EvNumCol

This field reports an ID number code of the event type. The codes in question are reported in the table above. However, the ID number of the priority level set for the alarm will be recorded instead where Alarm tables are concerned.

EvDescCol

This field reports the description of the event. Where Alarm Tables are concerned, this field reports the text associated to the alarm threshold intervention.
In cases where the SysMsgs table has the Variable Trace function and the "Add Msg in SysLog" property enabled, it will show the name of the changed variable, its previous value, current value, changing value and the user who carried out the changes. An example of a message would be:

The Variable 'VAR00001' (User '') has changed by ". Previous value '7'. Actual Value '8'. Changing value '8'

DescCol
In Alarm Tables, this field reports the name of the alarm threshold intervention and the variable associated to the alarm.
The operator's comment, entered with the appropriate window, will be saved in the SysMsgs table when the Variable Trace function and the "Add Msg in SysLog" property is enabled.

CommCol
In Alarm Tables, this field reports the alarm duration in text format.
The variable's description is saved in the SysMsgs table when the Variable Trace function and the "Add Msg in SysLog" property has been enabled.

DurCol
In the Alarm Tables, this field reports the alarm duration in numeric format (seconds).

UniID
This field shows the alarm's unique ID in the Alarms Table. This value is not shown in the "Historical Log Window", but is needed for managing the displaying of the "Alarms Historical" in the "Alarms Window" and in the "Historical Log Window".

TraID
This field shows the alarm's transaction ID in the Alarms table. This value is not displayed in the "Historical Log Window", but is needed for managing the displaying of the "Alarms Historical" in the "Alarms Window" and in the "Historical Log Window".

10.19.4. Log Window Style Properties

The Style properties of the Log Window are used for setting the object's graphical properties.
To modify the Style properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Border
The **'Border'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Clickable
The **'Clickable'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Auto Layout
The **'Auto Layout'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Show Control Wnd
The **'Show Control Wnd'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Event Type
The message type to be displayed in the Log Window is set in this option box. The options are:

- **System Messages:** only system messages will be displayed
- **Alarm Messages:** only alarm messages will be displayed
- **Communication Driver Messages:** only messages inherent to the Communication Drivers will be displayed
- **All:** All the three messages types, mentioned above, will be displayed

The event type to be displayed can be changed dynamically in the Log Window during Runtime by using the object's appropriated Basic Script functions.

When the Historical Log is set for recording in **IMDB**, the "All" option in the "Historical Log Window" object will no longer be selectable. This is due to the fact that the IMDB (InMemoryDB) does not support the UNION clause (for the data extraction query from a number of tables).

Refresh Button
The **'Refresh Button'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Filter Button
The **'Filter Button'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Print Button
The **'Print Button'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Report File
The **"Report File"** property is described in the "Style Proprieties" paragraph on Drawings and Controls.

Edit Report File
The **"Edit Report File"** property is described in the "Style Proprieties" paragraph on Drawings and Controls.

Button Size
The **'Button Size'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Align Buttons
The **'Align Buttons'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Refresh Button Text
The **'Refresh Button Text'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Filter Button Text
The **'Filter Button Text'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Print Button Text
The **'Print Button Text'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Text Column Name
The text which will appear as the name of the **"Event Text"** column is entered here. The default text will be used if this field is left empty.

Time Column Name
The text which will appear as the **"Event Time"** column's name is entered in this edit box. The default text will be used when this field is left empty.

User Column Name
The text which will appear as the **"User"** column's name is entered in this edit box. The default text will be used when this field is left empty.

Event Column Name
The text which is to appear as the name of the **"Event Id"** column is entered here. The default text will be used when this field is left empty.

Description Column Name
The text which is to appear as the name of the **"Description"** column is entered here. The default text will be used when this field is left empty.

Duration Column Name
The text which is to appear as the name of the **"Duration"** column is entered here. The default text will be used when this field is left empty.

Event Num. Column Name
The text which is to appear as the name of the **"Event Num"** column is entered here. The default text will be used when this field is left empty.

Comment Column Name
The text which is to appear as the name of the **"Comment"** column is entered here. The default text will be used when this field is left empty.

Time Format
This property is used for customizing the Log window's "Event Time" column format. For further information on format types please see the section on **"Time Format" described in the paragraph on Drawing and Control "Stile Properties" .**

Duration Format
This property is used for customizing the Log window's "Duration" column format. his properTramite questa proprietà è possibile personalizzare il formato della colonna "Durata" della finestra. For further information on format types please see the section on "Time Format" described in the paragraph on Drawing and Control "Stile Properties" .

Include milliseconds
The 'Include milliseconds' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

10.19.5. Log Window Execution Properties

The Execution properties of the Log Window are used for selecting from which project the data is to be taken.
To modify the Execution properties, select the object with the mouse and use the Movicon 'Properties Window'.

Project
The name of the child project from where data is to be taken is entered in this edit box. If this field is left empty the current project will be used.

Only the name of an eventual child project of the current project is entered in this property.

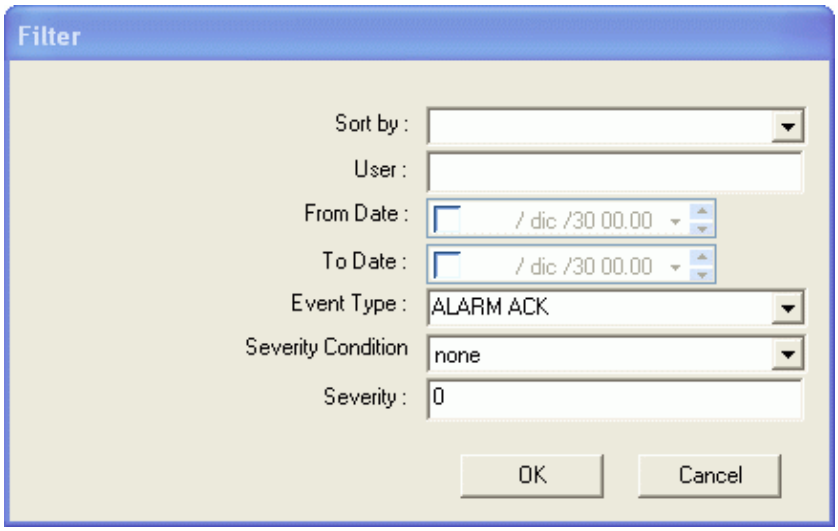
Max Rows
The highest number of rows which can be displayed in the Log Window is entered in this edit box.

Network Server
See paragraph "Drawings and Controls common Execution Properties".

Network Backup Server
See paragraph "Drawings and Controls common Execution Properties".

10.19.6. Log Window Data Filter

Filters for displaying data in the Historical Log window can be executed during a project runtime mode. These filters can be done by following different data selecting criteria. When the "Filter" button, in the Historical Log Window, is pressed the following window will open for setting the filter:



When applying more than one filter at the same time you have to put "AND" between each one in the extraction query, then the conditions will be added up together.

The dialog window's character font and size can be customized by using the appropriate registry keys:

DBFilterFont
DBFilterFontSize

Any modifications made to the font or its size will change the size of the dialog window.

Sort by:

This selection is used for putting data into order according to the DataBase column chosen. The data order can be done by simply clicking on the column desired in the Historical Log Window, but only a few of the columns in the database are actually displayed. Therefore, if you want a 'sort by' based on the columns not displayed, you will have to use the filter window.
For further information on fields recorded in the DataBase please refer to the section on "DataBase Fields".

User:

This entry field is used for specifying the name of the user who wants to execute the filter. By entering the user's name, only data recorded during their log on will be extracted.

The text to be entered in this field is not the "Name" of the user, but their "Description er Electronic Signature".

From Date:

The date with which the extractions are to start from is entered here.

To Date:

The date with which the extractions are to finish is entered here.

Event Type:

The selection is used for setting the event type the data must be extracted from. The items in the list may not have any meaning in certain cases. This depends on how the "Event Type" property from the Historical Log window has been set.
For further information on the event types available, please refer to the section on "DataBase Fields".

Severity Condition:

This field is used for setting a compare condition for the severity of the alarms. This, for example, will ensure that only alarms with a specific severity are selected. This setting has meaning only when a severity value has been entered in the "Severity" field.
The possible values are:

- **"none"**: no compare condition will be applied
- **"=" alarms with the same severity as the one entered in the "Severity" field will be extracted.**
- **">" alarms with severities higher than the one entered in the "Severity" field will be extracted**
- **"<" alarms with severities lower than the one entered in the "Severity" field will be extracted**

Severity:
This field is used for entering the severity value to used as a reference for extracting data. This setting only has meaning when a value different from "none" has been entered in the "Severity Condition" field.

10.20. DataLogger Window

The Movicon 'DataLogger Window' is a configurable object designed to display recorded data from the Project's DataLoggers or Recipes. Data from local projects and remote stations (Server) connected in net can also be displayed.
The DataLogger Window object is available from the 'Special Objects' group in the "Objects Window".

When a DataLogger Window is inserted into a screen it will appear with its default size. After being inserted it can be resized as pleased by dragging the borders with the mouse.
Each DataLogger Window can display data of only one DataLogger or Recipe which must be setup in the object's "Execution Properties".

As many DataLogger Window in as many screens can be inserted within the project according to your specific requirements.

The DataLogger or Recipe associated to the DataLogger Window can be dynamically changed during Runtime by using the object's appropriated Basic Script functions.

10.20.1. DataLogger Window Fields

The fields which must be presented in the DataLogger Window can be selected by the programmer from those available by means of using the "Field Choice" window.
The fields or columns which can be displayed are described below:

Event Time
The 'Event Time' column reports the date and time of the data recording. The time is always in the operating system's local time and will be displayed with the "YYYY-MM-GG HH-MM-SS" formation.

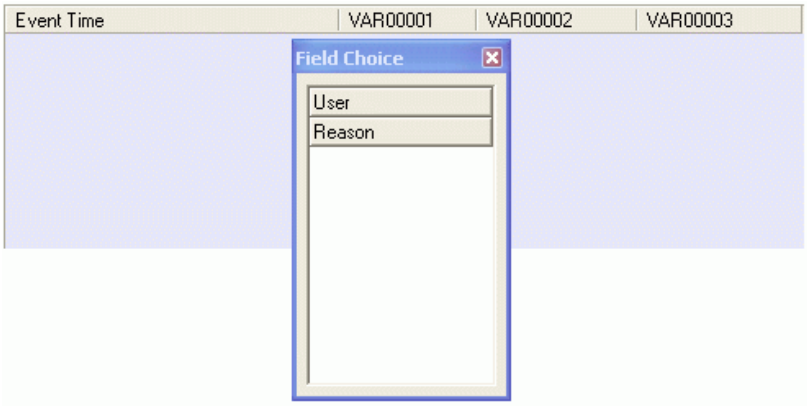
Reason
The 'Reason' column reports the cause which determined the recording. Recordings can take place on time, on change or on variable.

User
The name of the user logged in the project will be recorded in this filed only when the record command is prompted by that user (e.g. by means of using a button, watch window, etc.).

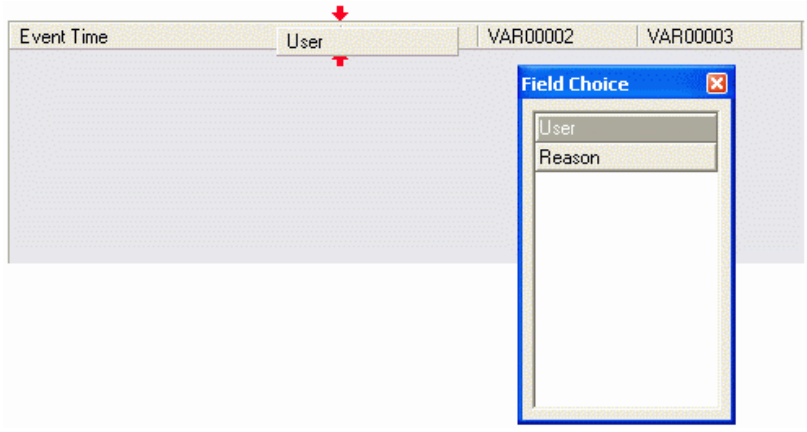
Variable
A column is created in the database for each variable associated to the DataLogger or Recipe with the same name set in the "Data Loggers and Recipes common Column General Properties".

10.20.2. DataLogger Window Field Choice

The DataLogger Window object permits you to select the fields and columns to be displayed. In order to do this you need to open the 'Field Choice' window by clicking on the 'Open' button from the 'General' group in the object's 'Properties Window' or by double clicking and keeping the mouse button pressed on the object while pressing the 'SHIFT' key at the same time.



The available fields which have not yet been inserted into the DataLogger Window will be listed in the 'Field Choice' window. To move a field from the 'Field Choice' window to the DataLogger Window just select the field with the mouse and drag it to the position desired in the DataLogger Window. Note that the field can only be released at the beginning or end of an already positioned field, and that two red arrows should appear:



To move a field from the DataLogger Window to the 'Field Choice' window just select the field with the mouse and drag it into the 'Field Choice' window.

When the window has been set with the "Show Control Wnd" option, the columns can be dragged out of the window and deleted during Runtime mode. However, the initial configuration can be restored by using the "RecalcLayout" basic script method from the DLRWndCmdTarget interface when the page is reloaded.

10.20.3. DataLogger Window Style Properties

The Style properties of the DataLogger Window are used for setting the object's graphical properties. To modify the Style properties, select the object with the mouse and use the Movicon 'Properties Window'.

Border
The 'Border' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Clickable
The 'Clickable' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Auto Layout
The 'Auto Layout' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Show Control Wnd
The 'Show Control Wnd' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Refresh Button
The 'Refresh Button' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Filter Button
The 'Filter Button' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Print Button
The 'Print Button' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Button Size
The 'Button Size' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Align Buttons
The 'Align Buttons' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Refresh Button Text
The 'Refresh Button Text' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Filter Button Text
The 'Filter Button Text' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Print Button Text
The 'Print Button Text' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

Time Column Name
The text which will appear as the "Event Time" column's name is entered in this edit box. The default text will be used when this field is left empty.

User Column Name
The text which will appear as the "User" column's name is entered in this edit box. The default text will be used when this field is left empty.

Reason Column Name
The text which will appear as the "Action" column's name is entered in this edit box. The default text will be used when this field is left empty.

Include milliseconds
The 'Include milliseconds' property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

10.20.4. DataLogger Window Execution Properties

The Execution properties of DataLogger Window are used for setting the DataLogger or Recipe to be displayed and the project it belongs to.
To modify the Execution property, select the object with the mouse and use the Movicon **'Properties Window'**.

Project
The name of the child project from where data is to be taken is entered in this edit box.
If this field is left empty the current project will be used.

Only the name of an eventual child project of the current project is entered in this property.

Data Logger-Recipe
The name of the DataLogger or Recipe to be displayed is to be entered in this edit box. The '...' browse button on the far right allows you to select the one needed from the project's list of 'DataLoggers & Recipes'. When the DataLogger or Recipe is not on the list because it belongs to another project, just simply enter the name using the keyboard.

Max. Rows
The highest number of rows which can be displayed in the DataLogger Window is entered in this edit box.

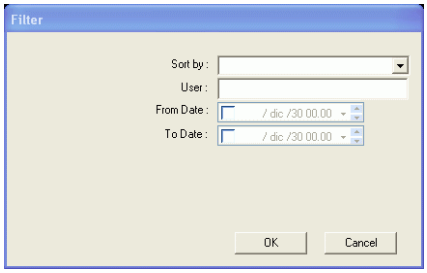
Network Server
See paragraph "Drawings and Controls common Execution Properties".

In order to display data from a Server it is necessary that the DataLogger/Recipe be also present in the Client project, to recuperate the Database structure. The DataLogger/Recipe can be created as a structure only and therefore without having to associate any variables to the columns.

Network Backup Server
See paragraph "Drawings and Controls common Execution Properties".

10.20.5. DataLogger Data Filter

Filters on displaying data in the DataLogger window can be executed during a project runtime mode. These filters can be done by following different data selecting criteria. When the **"Filter"** button, in the DataLogger Window, is pressed the following window will open for setting the filter:



When applying more than one filter at the same time you have to put "AND" between each one in the extraction query, then the conditions will be added up together.

You can customize the font and size of the Dialog window's characters by using the right registry key:

DBFilterFont
DBFilterFontSize

The size of the dialog window will also change when the font or its size is modified.

Sort by:
This selection is used for putting data into order according to the DataBase column chosen. The data order can be done by simply clicking on the column desired in the DataLogger Window.

User:
This entry field is used for specifying the name of the user who wants to execute the filter. By doing this, only the data recorded while the user was logged on will be extracted.

The text to be entered in this field is not the name of the user but their "Description or Electronic Signature".

From Date:
This field is used for entering the date with which the data extraction is to start from.

To Date:
This field is used for entering the date which the data extraction is to end with.

10.21. Recipe Manager Window

The Movicon **"Recipe Manager Window"** is a configurable object designed for displaying and modifying Project Recipe data. Local project data and remote station (Server) connected in net project data can be displayed and modified using this window.
The "Recipe Manager Window" object is available from the "Advanced shapes" category from the **"ToolBox Window"**.

The "Recipe Manager Window" consents managing recipes using a grid to load and set values of each single recipe component. There are four columns displayed on the grid; "Variable", "Description", "Value" and "Units" (see paragraph "Recipe Manager Window Field Choice" for further information) and a row will be inserted for each field defined in the Recipe. By using this window you can load the values from a recipe by selecting it from the combo box provided, after which you can modify the selected recipe's values by editing them directly in the grid's cells. By using the object's buttons you can activate commands for managing the recipe (see paragraph "Recipe Manager Window Commands").

When inserting a "Recipe Manager Window" on screen, it will appear with its default settings and can be sized as preferred once inserted by dragging its borders with the mouse.
Each "Recipe Manager Window" can display data of one recipe only, which must be set in the object's **"Recipe Manager Window Execution Properties"** .

Any number of "Recipe Manager Windows" can be inserted within any number of screens in the project as required.

You can also dynamically change the Recipe associated to the "Recipe Manager Window" during Runtime by using the object's appropriate Basic Script functions.

The "Recipe Manager Window" has a "RecipeWndCmdTarget" basic script interface, through which can be used for interacting with the object in runtime mode using the appropriated methods and properties.

The "Recipe Manager Window" does not use any temporary variables associated in the Recipe field properties ("Recipe column General Properties" property). Data is read directly from the database and loaded in the grid. When the recipe is activated the values currently display in the grid will be transferred to the recipe variables.

When an IMDB recipe is associated to a "Recipe Manager Window" object, it must be edited exclusively with this object and not with any other command external to this object. If otherwise, a write lock will be

applied to the table and any following "Save", "Delete" object commands will have no effect. In order to avoid this from happening an alert is shown when associating a IMDB recipe and the "Save" and "Delete" commands are automatically disabled when the IMDB recipe is set with variables in its execution properties.
When the "Recipe Manager Window" connects to a Server, the "Save" and "Delete" buttons will not be enabled if the recipe is IMDB type due to the reasons mentioned above.

10.21.1. The Recipe Manager Window Fields

The fields wished to be displayed in the "Recipe Manager Window" can be selected by the programmer from those available, using the **"Fields choice"** window.
The fields or columns that can be displayed are:

Variable
This field displays the name of the column relating to the Recipe field. It is in fact the name of the column of the Recipe table associated to the "Recipe Manager Window". This field is read only.

Description
This field displays the description of the variable associated to the Recipe column. The variable's description text ("Description Tag" property) can also be selected from those defined in the String Table and therefore supports the multilanguages. This filed is read only.

Value
This field displays the recipe parameter's current value This value corresponds to that read by the database the moment when the recipe was selected from the combo box and can be modified afterwards. This value will be displayed in the format (x, x.x, ecc.) set in the variable associated to the field ("Default Format" property). This value is editable by clicking the cell directly (one click for selecting it, one for editing) or the Numeric or Alphanumeric Pads can be used if enabled.
The minimum and maximum editing limits are taken from the "Engineering Data" property of the variable associated to the field ("Scale Min" and "Scale Max."). A control check is carried out on the value's validity after being edited. If not within the set limits, the previous value will be restored.

Units
This field displays any measure units set in the "Engineering Data" properties of the variable associated to the field ("Engineering unit"). This field is read only.

Minimum
This field displays the minimum value that the variable can be set with. This value is taken from the "Engineering Data" properties of the variable associated to the field ("Scale Min."). This field is read only.

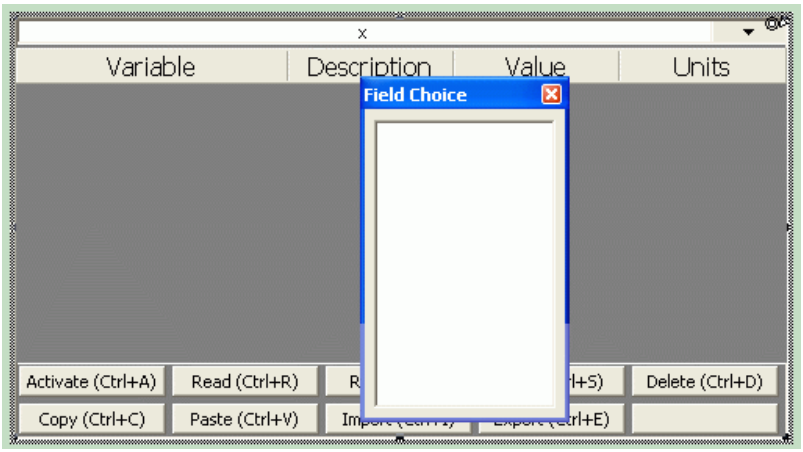
When the Recipe Manager is connected to a Network Server, the minimum value is retrieved from the Client project's variable settings and not from the Server settings. Therefore, make sure that the two variables on Client side and Server side are set with the same limits.

Maximum
This field displays the maximum value that the variable can be set with. This value is taken from the "Engineering Data" properties of the variable associated to the field ("Scale Max."). This field is read only.

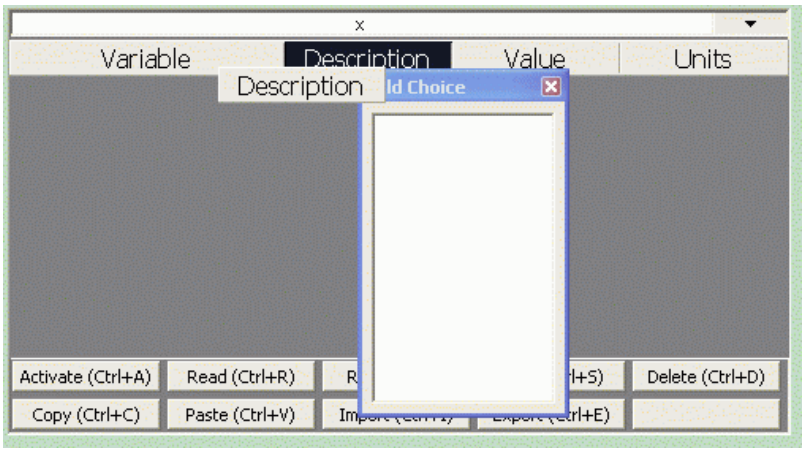
When the Recipe Manager is connected to a Network Server, the maximum value is retrieved from the Client project's variable settings and not from the Server settings. Therefore, make sure that the two variables on Client side and Server side are set with the same limits.

10.21.2. Recipe Manager Window Field Choice

The **fields and columns** you wish to show in the "Recipe Manager Window" can be chosen from the **"Field Choice"** which opens by clicking on the **"Open" button** from the object's **"Properties Window: General Group"**, or by double clicking on the object with **"SHIFT"** key pressed down.



The fields that have not yet been inserted in the "Recipe Manager Window" are available for selecting in the "Field Choice" window. This is done by selecting the chosen field from the 'Field choice' window and dragging it with the mouse to the point desired in the "Recipe Manager Window". The chosen field must be positioned at the beginning or the end of an already positioned field. Two red arrows should show and disappear when the field is released properly in the position desired:



To move a field from the "Recipe Manager Window" to the "Field Choice" window, just select and drag it with the mouse.

When setting the window with the "Show control window" option, these columns can be dragged out of the window for deleting during Runtime. However, the initial configuration can be restored by using the basic script method from the RecipeWndCmdTarget "RecalcLayout" interface or when the page is reloaded.

10.21.3. Recipe Manager Window Commands

The "Recipe Manager Window" provides a series of buttons with which can be used to carry out operations to manage the Recipe selected in the object's Combo Box.
The buttons that can be displayed in the object are as follows:

"Activate" Button
This button is used for activating the selected recipe by copying the grid's values to the recipe variables (temporary Recipe variables will not be used by the "Recipe Manager Window"). A message can also be added to request an activation confirm by using the "message on active" property.

"Read" Button
This button is used for transferring the values currently in the recipe variables on the grid. This consents the current recipe in use in the project to be loaded on the grid.

"Refresh" Button
This button is used for reloading the values from the database relating to the recipe selected in the Combo Box on the grid.

"Save" Button
This button is used for saving the recipe in the database. The values saved will be those present in the grid (any temporary recipe variables will not be used by the "Recipe Manager Window") and the recipe name will be the one set in the Combo Box. If a recipe already exits with the same name in the database, it will be updated with the new values, otherwise a new recipe will be inserted in the database. A message can also be added to request a save confirm by using the "message on save" property.

"Delete" Button
This button is used for deleting the recipe, selected in the Combo Box, from the database. A message can be added to request a delete confirm by using the "message on removes" property.

"Copy" Button
This button is used for copying all the values from the grid to the Windows clipboard. This command used together with the paste command is very useful for copying values from one recipe to another. For instance, you can select one recipe, click "Copy", select another and then click "Paste".

"Paste" Button
This button is used for copying data from the Windows clipboard. For obvious reasons, the data on the clipboard should coincide with the grid structure. This command used together with the copy command is very useful for copying values from one recipe to another.

"Import" Button
This button is used for importing values from a text file (default .csv) to the grid. The text file will be selected in runtime using the Windows browse window to select it.

"Export" Button
This button is used for exporting values from the grid to a text file (default .csv). The text file will be selected in runtime using the Windows browse window for saving files.

"Print" Button
This command is used for printing reports associated to the recipe object. This button is disabled if recipe object has no report associated and is not displayed in Web Client or Windows CE environments.

10.21.4. Recipe Manager Window Style Properties

The "Recipe Manger Window" Style properties are used for setting the object's graphical effects.
To modify the Style properties, select the object from the Movicon **"Properties window"**.

Border
The **"Border"** property is described in the paragraph dedicated to Drawings and Controls: **"Recipe Manager Window Style Properties"** .

Clickable
The **" Clickable"** property is described in the paragraph dedicated to Drawings and Controls: **"Recipe Manager Window Style Properties" .**

Auto Layout
The **"Auto Layout"** property is described in the paragraph dedicated to Drawings and Controls: **"Recipe Manager Window Style Properties" .**

Show Control Window
The **"Show Control Window"** property is described in the paragraph dedicated to Drawings and Controls: **"Recipe Manager Window Style Properties" .**

Prompt Pad
When enabled, this property allows the Numeric or Alphanumeric Pad when a recipe field value needs modifying.
For further information please refer to the "Prompt Pad" property found in the object "Style Properties" group.

Activate Button
When enabled, this property shows the button to execute the "Activate" command of the recipe in the "Recipe Manager Window".

Read Button
When enabled, this property shows the button to execute the "Read" command of the recipe in the "Recipe Manager Window".

Refresh Button
When enabled, this property shows the button to execute the "Refresh" command of the recipe in the "Recipe Manager Window".

Save Button
When enabled, this property shows the button to execute the "Save"command of the recipe in the "Recipe Manager Window".

Delete Button
When enabled, this property shows the button to execute the "Delete" command of the recipe in the "Recipe Manager Window".

Copy Button
When enabled, this property shows the button to execute the "Copy" command of the recipe in the "Recipe Manager Window".

Paste Button
When enabled, this property shows the button to execute the "Paste" command of the recipe in the "Recipe Manager Window".

Import Button
When enabled, this property shows the button to execute the "Import" command of the recipe in the "Recipe Manager Window".

Export Button
When enabled, this property shows the button to execute the "Export" command of the recipe in the "Recipe Manager Window".

Print Button
When enabled this property displays the Print button in the "Recipe Manager" window for activating the recipe "Print" command.

Import/Export Separator char
This property sets the separator for the ".csv" file when using the "Import" and "Export" commands. Movicon uses the ";" character for default.

Button Size
The **"Button Size"** property is described in the paragraph titled **"Recipe Manager Window Style Properties" from the Drawings and Controls section.**

Align Buttons
The **"Align Buttons"** property is described in the paragraph titled **"Recipe Manager Window Style Properties" from the Drawings and Controls section.**

Activate Button Text
The text to appear in the "Activate Button" is entered in this edit box. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Read Button Text
The text to appear in the "Read Button" is entered in this edit box. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Refresh Button Text
The text to appear in the "Refresh Button" is entered in this edit box. This text can also be selected from those defined in the String Table and supports multilanguages. The default text will be used, if this field is left blank.

Save Button Text
The text to appear in the "Save Button" is entered in this edit box. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Delete Button Text
The text to appear in the "Delete Button" is entered in this edit box. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Copy Button Text
The text to appear in the "Copy Button" is entered in this edit box. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Paste Button Text
The text to appear in the "Paste Button" is entered in this edit box. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Import Button Text
The text to appear in the "Import Button" is entered in this edit box. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Export Button Text
The text to appear in the "Export Button" is entered in this edit box. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Print Button Text
The text to appear on the "Print Button" is entered in this edit box. The text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used if left blank.

Confirm Recipe Activation Message
This edit box is used for entering confirm message text which is to appear when invoking the "Activate" command. When this command is invoked a dialog window will open immediately showing the message defined in this property. When closing this dialog window with 'Yes', the activation command will go ahead, otherwise activation will be annulled when clicking the 'No' button. The text can also be selected from those defined in the String Table and therefore supports multilanguages. If this field is left blank, the Activation command will be executed without requesting confirmation beforehand.

This confirm request is not managed by Web Client.

Confirm Saving Recipe Message
This edit box is used for entering confirm message text to appear when executing the "Save" command. When this command is invoked a dialog window will open immediately showing the message defined in this property. When closing this dialog window with 'Yes', the save command will go ahead, otherwise the save command will be annulled when clicking the 'No' button. The text can also be selected from those defined in the String Table and therefore supports multilanguages. If this field is left blank, the Save command will be executed without requesting confirmation beforehand.

This confirm request is not managed by Web Client.

Confirm Deleting Recipe Message

This edit box is used for entering confirm message text to appear when executing the "Delete" command. When this command is invoked a dialog window will open immediately showing the message defined in this property. When closing this dialog window with 'Yes', the delete command will go ahead, otherwise the delete command will be annulled when clicking the 'No' button. The text can also be selected from those defined in the String Table and therefore supports multilanguages. If this field is left blank, the Delete command will be executed without requesting confirmation beforehand.

This confirm request is not managed by Web Client.

Error String

The text to be displayed as the error string is inserted in this edit box. The error string will then display using this text every time an incorrect interval is inserted by the user when editing a field. This error message is therefore customizable as pleased allowing the use of Sting IDs as well. When entering an empty string a 'beep' will sound every time an incorrect interval is entered instead of error message. Minimum and maximum limits can also be displayed in the error string using the "%d" notation (or "%f" in cases where numbers are used with floating points) instead of a value. For instance a string like the one below can be inserted:

Warning! Enter a value from %d to %d.

In this case, when in runtime the first "%d" will be replaced with the minimum value and the second will be replaced with the maximum value to result as:

Warning! Enter a value from 0 to 100.

Variable Column Name

This edit box is used for entering the text to be shown as the **"Variable"** column's name. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Description Column Name

This edit box is used for entering the text to be shown as the **"Description"** column's name. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Value Column Name

This edit box is used for entering the text to be shown as the **"Value"** column's name. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Units Column Name

This edit box is used for entering the text to be shown as the **"Units"** column's name. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used, if this field is left blank.

Min Value Column Name

The text to appear as the "Min" column's name is inserted here. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used if this field is left empty.

Max Value Column Name

The text to appear as the "Max" column's name is inserted here. This text can also be selected from those defined in the String Table and therefore supports multilanguages. The default text will be used if this field is left empty.

10.21.5. Recipe Manager Window Execution Properties

The "Recipe Manager Window" execution properties are used for setting the Recipe to be displayed and the project it belongs to.
To modify the Execution properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Project
The name of the child project from which data is to be retrieved for displaying is entered here. If field is left empty, the current project will be used instead.

Only the name of a child project from the current project is entered in this property.

Recipe
The name of the Recipe to be displayed is entered in this edit box. The **"..."** browse button on the right can be used for selecting a recipe from project's "Data Logger and Recipe" list. If the Recipe desired is not in this list because it belongs to another project, just type in its name using the keyboard.

Network Server
See paragraph dedicated to Drawings and Controls " Execution Properties".

In order to be able to display data from a Server, you need to make sure the Recipe exists in the Client project to recover the Database structure. However, the Recipe can only be created in structure in the Client project without associating variables to the columns.

Network Backup Server
See paragraph dedicated to Drawings and Controls "Execution Properties".

10.22. Recipe Manager Window 'Variables' property group

The Variable properties of the 'Recipe Manager Window' are used for associating the Movicon RealTime DB variables to the object.
To modify the Variable properties, select this object with mouse and use the Movicon "Properties Window" automatically made available when doing so.

Current Recipe Variable
The name of the variable in which the name of the recipe, activated through the Recipe Manager Window (Active Command), is to be inserted is entered here or selected using the "..." browse button on the right. This variable may be string or numeric type. When using a string variable, it will be set with the recipe's name when the recipe is activated. When using a numeric variable, it will be set with the selected item's index number starting from the "0" value when the recipe is activated.

10.23. TraceDB Window

The Movicon **'TraceDB Window'** is a configurable object designed to display variable trace data. Not only can data from local projects be displayed but also data from remote stations (Server) connected in net.
The 'TraceDB Window' object is available from the 'Special Objects' group in the **"Objects Window".**

The TraceDB Window will appear with its default settings when inserted into a screen. After it has been inserted, it can be resized as pleased by dragging its borders with the mouse.
Each TraceDB Window can display the data one variable only which must be set in the object's **"Execution Properties"**.

As many TraceDB Window in as many screens can be inserted in the project as required.

The variable associated to the TraceDB Window can be dynamically changed during Runtime by using the object's appropriated Basic Script functions.

10.23.1. TraceDB Window Fields

The fields which must be presented in the TraceDB Window can be selected by the programmer from those available by means of using the **"Field Choice"** window.
The fields or columns which can be displayed are described below:

Event Time
The 'Event Time' column reports the date and time of the data recording. The time is always in the operating system's local time and will be displayed with the "YYYY-MM-GG HH-MM-SS" formation.

User
The name of the user logged in project is recorded in this field only if a variable has been modified by user (i.e. through a display, watch window etc.)

Action
The 'Action' column reports the reason causing the variable variation. For instance the variation may derive from a screen control, (display, button, etc), the communication driver, or from the Movicon Watch window, etc.

Value
The 'Value' column reports the requested value to be set on the variable. In certain cases there might not be the conditions needed to activate the value requested and therefore the final value may not be the one requested.

Before
The 'Before' column reports the value of the variable before changing.

After
The 'After' column reports the final value obtained after being changed. In certain cases this value might not correspond to the one requested, for instance if the writing is not executed properly.

Quality
The 'Quality' column reports the quality of the variable at the time of the recording.

TimeStamp
The "TimeStamp" Column shows the TimeStamp of the variable the moment it is recorded.

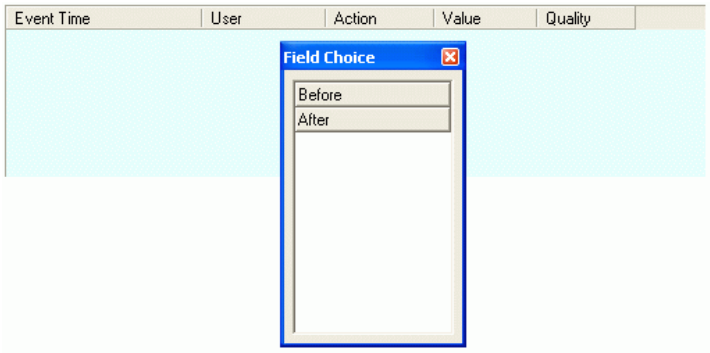
Variable Name
The "Variable Name" shows the name of the variable which was recorded. The variable name will however be added to the column only when text has been entered in the Trace "Table Name" variable property, for example for defining a customized table name or for sharing the same table with other variables in Trace (see "Variable Tracing(Audit Trail)" section).

Variable Group
The "Variable Group" shows the which Group the recorded variable belongs. This column will be populated only when the variable's trace "Add Variable Group Column" property has been enabled.

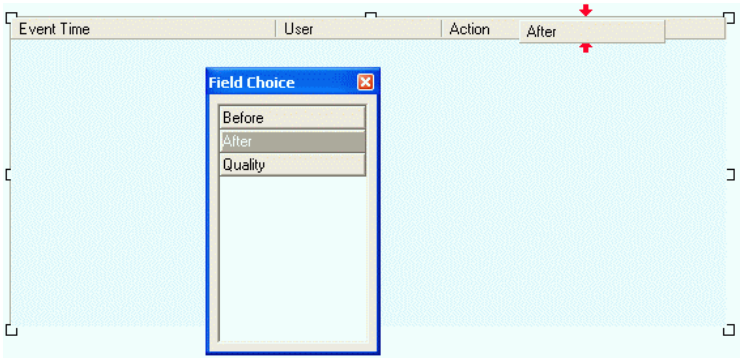
Variable Description
The "Variable Description" column shows the description of the variable that was recorded. this column will only be populated if the variable's "Add variable Group Column" property has been enabled.

10.23.2. TraceDB Window Field Choice

The TraceDB Window object permits you to select the fields or columns to be displayed. In order to do this you need to open the **'Field Choice'** window by clicking on the **'Open'** button from the 'General' group in the object's **'Properties Window'** or by double clicking and keeping the mouse button pressed on the object while pressing the **'SHIFT'** key at the same time.



The available fields which have not yet been inserted into the TraceDB Window will be listed in the 'Field Choice' window. To move a field from the 'Field Choice' window to the TraceDB Window just select the field with the mouse and drag it to the position desired in the TraceDB Window. Note that the field can only be released at the beginning or end of an already positioned field, and that two red arrows should appear:



To move a field from the TraceDB Window to the 'Field Choice' window just select the field with the mouse and drag it into the 'Field Choice' window.

When the window is set with the "Show Control Wnd" option, the columns can be dragged out of the window during Runtime where they will be deleted. You can, however, restore the initial configuration by using the "RecalcLayout" basic script method from the TraceDBWndCmdTarget interface or when the page is reloaded.

10.23.3. TraceDB Window Style Properties

The style properties of the TraceDB Window are used for setting the object's graphical properties. To modify the Style properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Border

The **'Border'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Clickable
The **'Clickable'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Auto Layout
The **'Auto Layout'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Show Control Wnd
The **'Show Control Wnd'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Refresh Button
The **'Refresh Button'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Filter Button
The **'Filter Button'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Print Button
The **'Print Button'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Report File
This property's description can be found in the paragraph on Drawing and Control's "Style Objects Proprieties".

Edit Report File
This property's description can be found in the paragraph on Drawing and Control's "Style Objects Proprieties".

Button Size
The **'Button Size'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Align Buttons
The **'Align Buttons'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Refresh Button Text
The **'Refresh Button Text'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Filter Button Text
The **'Filter Button Text'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Print Button Text
The **'Print Button Text'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Time Column Name
The text which will appear as the **"Event Time"** column's name is entered in this edit box. The default text will be used when this field is left empty.

User Column Name
The text which will appear as the **"User"** column's name is entered in this edit box. The default text will be used when this field is left empty.

Action Column Name
The text which will appear as the **"Action"** column's name is entered in this edit box. The default text will be used when this field is left empty.

Before Column Name
The text which will appear as the **"Before"** column's name is entered in this edit box. The default text will be used when this field is left empty.

After Column Name
The text which will appear as the **"After"** column's name is entered in this edit box. The default text will be used when this field is left empty.

Value Column Name
The text which will appear as the **"Value"** column's name is entered in this edit box. The default text will be used when this field is left empty.

Quality Column Name
The text which will appear as the **"Quality"** column's name is entered in this edit box. The default text will be used when this field is left empty.

Colonna TimeStamp
This editbox is used for entering the text which will appear as the **"TimeStamp"** column's name. The default text will be used if left blank.

Colonna Nome Tag
This editbox is used for entering the text which will appear as the "**Tag Name"** column's name. The default text will be used if left blank.

Colonna Gruppo Tag
This editbox is used for entering the text which will appear as the **" Tag Group"** column's name. The default text will be used if left blank.

Colonna Descrizione Tag
This editbox is used for entering the text which will appear as the "Tag Desciption" column's name. The default text will be used if left blank.

Include milliseconds
The **'Include milliseconds'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls".**

10.23.4. TraceDB Window Execution Properties

The Execution properties of the TraceDB Window are used for setting the table to be displayed and what project it belongs to.
To modify the Execution properties, select the object with the mouse and use the Movicon **'Property Window'**.

Project
The name of the child project from which variable's trace data is to be retrieved is entered in this edit box.
If this field is left empty the current project will be used.

Only the name of an eventual child project of the current project is entered in this property.

Variable Table
The name of the trace table to be displayed is to be entered in this edit box. The '...' browse button on the far right allows you to select one of the Real Time DB variables. This method is very handy when the name of the trace table is the same as the variable's. In cases where the table name has been customized through the **"Table Name"** settings from a variable's "Variable Trace Options Property" Movicon will however be able to find the table's name by searching it in the properted of the variable entered.

Caution! When a "TraceDB Window" is connected in Network to a Server project, you will need to insert the name of the Trace Database table in the Client's "TraceDB Window" > "Variable Table" property, and not the name of the associated Variable, in cases where the "Table Name" has been set with a different name to that of the Variable's

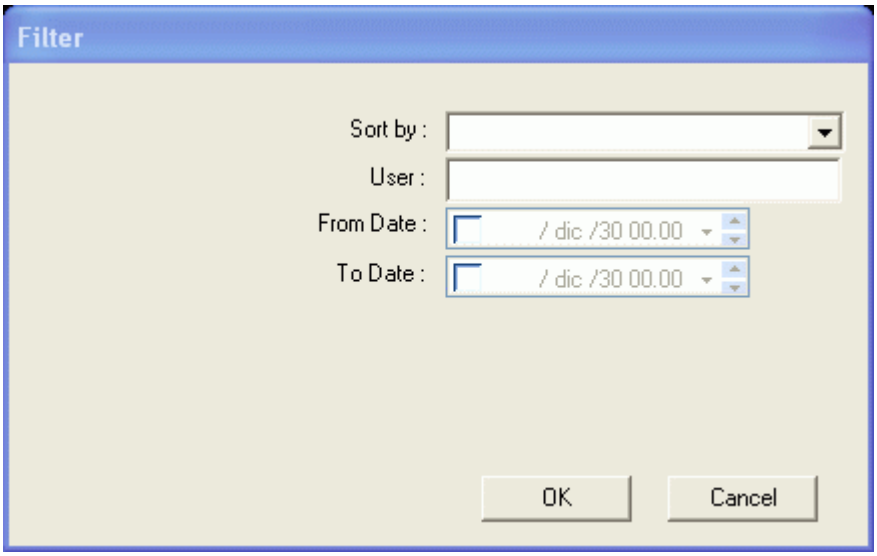
Max. Rows
The highest number of rows that can be displayed in the TraceDB Window is entered in this edit box.

Network Server
See paragraph "Drawings and Controls common Execution Properties".

Network Backup Server
See paragraph "Drawings and Controls common Execution Properties".

10.23.5. TraceDB Data Filter

Filters for displaying data in the Trace Log window can be executed during a project runtime mode. These filters can be done by following different data selecting criteria. When the **"Filter"** button in the Trace Window is pressed, the following window will open for setting the filter:



When applying more than one filter at the same time you have to put "AND" between each one in the extraction query, then the conditions will be added up together.

You can customize the font and size of the dialog window characters by using the appropriate registry keys:

DBFilterFont
DBFilterFontSize

The dialog window sizes will change when you modify the font and its size.

Sort by:
This selection is used for putting data into order according to the DataBase column chosen. The data order can be done by simply clicking on the column desired in the Trace Window.

User:
This entry field is used for specifying the name of the user who wants to execute the filter. By entering the user's name, only data recorded during their log on will be extracted.

The text to be entered in this field is not the "Name" of the user, but their "Description or Electronic Signature".

From Date:
The date with which the extractions are to start from is entered here.

To Date:
The date with which the extractions are to finish is entered here.

10.24. Hour Selector

The Movicon **"Hour Selector"** is a configurable object which is associated to an object from "Scheduler Object List" resource to be used for viewing and changing the Scheduler object's daily plans.
The "Hour Selector " object is found in the "Advanced Objects" group from the **"Objects Window"**.

When an "Hour Selector" is inserted on screen you will be able to view and change the times set in the Scheduler object's hour plan, it is associated to, in Runtime.

A "Hour Selector" can also display the daily plan of a Scheduler setup in a Network Server project by using the appropriate property.

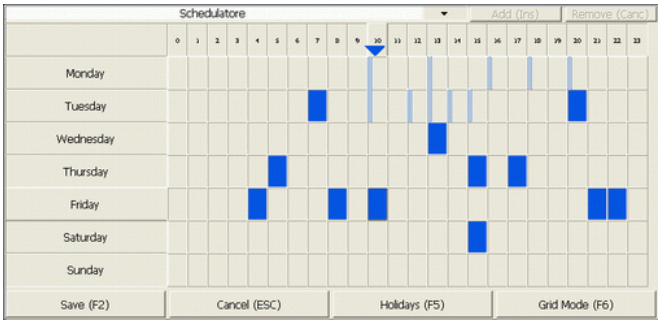
The "Scheduler Window" can manage activation hour entries in two different modes:

- **Time Table**
- **Grid**

Either one or both can be set for use in the designing phase. Keep into account that once a change has been made in the "Grid" mode, you will not be able to change the entered data in the "Time Table" mode.

Time Table

This type of display allows you to graphically view the times preset in the Scheduler selected using the list-box at the top. In this way you can modify the times set by clicking the mouse on the box, as described above, in 15 minute resolutions. Only activation times of commands can be changed and not the variables associated to them. The "scheduler Window" displays as below:



A Scheduler Window displayed in 'Time Table' mode

Modifying planned times
The commands used for setting the times in the scheduler window are as follows:

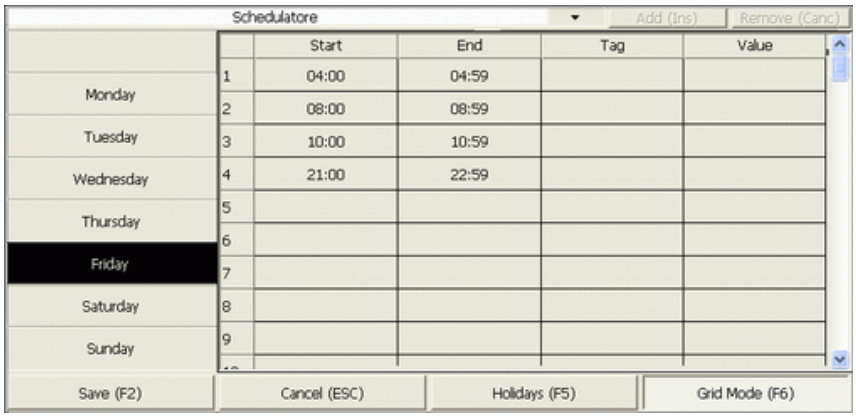
- Click on the day -> Set or delete all the 24 hours of that day of the week
- Click on the hour -> Set or delete that hour in all the days of the week
- Click on the hour and day intersection box - > Set or delete the 24 hours in all the days of the week

One click on an hour box will set the time by a quarter of an hour precisely. An hour is made up of four 15 minute resolutions. Each additional click will change the hour box according to the sequence below:

- one whole hour selection
- the first 15 minutes in the hour selection
- the first 30 minutes in the hour selection
- the first 45 minutes in the hour selection
- the last 15 minutes in the hour selection
- the last 30 minutes in the hour selection
- the last 45 minutes in the hour selection
- deselect the whole hour

Grid

This type of display allows you to view the planned times of the Scheduler selected using the list-box at the top in the form of a grid. In this case each row in the grid represents an command activation time. A maximum number of rows can be set using the object's 'Max. Nr. Grid Rows' property. Unlike the 'Time Table' you can set times with minute resolutions by entering the exact times you wish in hours and minutes for the activation command start and finish in the two respective 'Start'and 'End' columns directly. Furthermore, you can select the variable, on which the command is to act on, using the 'Tag' column (the command is the one set in selected Scheduler's 'Commands List' and should be a "Variable" command type). You can also set the value in the "Value" column to activate in the variable (ie. if a 'Set' command of a variable, the variable will be set to the value entered in this field).



A Scheduler Window displayed in 'Grid' mode

When you use the "Tag" and "Value" columns in the Scheduler window to insert variables for command executions, you will need to take into account that the Scheduler will behave in the following ways:

- when a variable has more than one command in the Scheduler's "Commands ON" list, only the first command in the variable list will be executed, applied to the new variable selected in the "Tag" column.
- When there are other commands in the Scheduler's "Commands ON" list (in addition to those in variables), they will not get executed. The variable action's set functionality replaces the command list with only one command applied to the variable specified.
- The variable action's set functionality is executed only in the Scheduler's "Commands ON" command list, while the "Commands OFF" command list is normally executed with the original planned settings.

Modifying planned times

To modify the grid just click on the field desired to switch into editing mode if the Scheduler selected allows this.

Runtime Schedulers

By using the "Add Scheduler" and "Remove Scheduler" commands you can add or remove new Scheduler objects during the runtime phase (only those Schedulers added in runtime can be removed afterwards). In this case you will be able to the Variable's Set command specified in the

"Tag" column with relating value in the "Value" column. You will not be able to insert runtime command list. When using the Runtime Schedulers you will not be able to manage "Commands OFF" command lists either, therefore any command OFF should be managed by inserting another Set command of the same variable with value set to "0".

Scheduler objects created in runtime are set to support holidays as well. In cases in when the "Holidays" button is not visible in the "Scheduler Window" object (because not enabled), the Runtime Schedulers are then added with the option to manage holidays base on Sunday Hour Plan.
When editing the values relating to the variable, the minimum and maximum value limits set in the variable's "Engineering Data" properties are referred to ('Scale Min.' and 'Scale Max.').
If the "Add Scheduler Button" is enabled, the Scheduler Selection combox will become editable in runtime mode as well.
The "Save" button is used for saving scheduler on ".shp" file in the project's "Data" subfolder. However, this file is only saved if the two "Start" and "End" fields have been inserted correctly with a valid format.

Security Options

Scheduler selections using the list-box and any of its modifications can be conditioned by the Access Level settings predefined in the Scheduler. Based on these settings the Scheduler can be set to display in the list-box, and therefore selected, modified or just viewed only. In addition to this, you must consider the variables' "Write Access Level" properties of the Scheduler's set planned times which can be modified. The settings in these properties will determine whether variables can be made available in the "Tag" column for selecting or not.
If the "Always Visible" property is enabled, available for both the Schedulers and Variables ("Access Level" propriety), the Access Level settings will then no longer be considered and the Scheduler and the Variable in question will always be available for selecting within the "Scheduler Window".
Scheduler objects which are added in runtime are set with a read and write Access Level equal to the access level of the user currently logged in at that moment. In this way the user will be able to edit the scheduler, while other users that do not have equal access levels won't be able to. Schedulers added without any users currently logged in, will be always editable due to the fact that their read and write access levels will be set at "FFFF".

When the project's Password management is disabled you will need to enable the "Always Visible" property for the Schedulers and Variables you wish to manage in the "Scheduler Window".

Scheduler On/Off Command Activation

The Schedulers have been designed for activating a command on the rising edge and a command on the falling edge of the condition or area enabled when selected as "hour plan" . When the project is launched within a pre-scheduled time range, the ON command will activate if not already done so within that current day. However, if this command has already been activated for that day it will not be reactivated again. This function is based on the fact that it may be necessary to activate commands only once within the pre-scheduled time range and not at every restart according to application and preset command types.
Command events are recorded in the "ProgjectName_SchedulerName.sst" file found in the project's DATA folder.
If commands need to be activated at each project restart you can use the object's enable variable as an alternative. If you insert a non retentive enabling variable in the object's "Scheduler Enable Variable" which when set to one in runtime mode thus enabling the scheduler, Movicon will activate any ON commands preset in the time range of that moment.
The enable variable can also be used for forcing the scheduler's OFF command activation. This is done by simply setting the variable value to zero.
When a variable is specified in the Scheduler window's 'Tag' column (which will replace the scheduler's original command variable), this command will become a scheduled command. These commands are not managed for ".sst" files for managing command activations and therefore these commands are activated at every application restart or each new scheduler programming save if found within the programmed time range (there is no retentivity management due to the fact that the commands have already been executed).

10.24.1. Hour Selector Execution Properties

The Execution properties of the "Hour Selector" are used for setting up the Scheduler from which the data to be displayed in the Hour Selector will be used.
To modify the Execution properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Project
The name of the child project, from which Scheduler objected are to be retrieved and displayed, is entered in this edit box. The current project name will be used when this field is left blank.

Only the name of any existing child project of the current project can be entered in this field.

Scheduler Linked
The Scheduler object's name is inserted in this edit box and which will be associated to the Hour Selector for displaying planned schedule data.

Link to a Network Server
See paragraph "Drawings and Controls common Execution Properties".

Network Backup Server
See paragraph "Drawings and Controls common Execution Properties".

Commands On Click
See paragraph on Design and Control "Execution Properties".

Configuration File
See paragraph on Design and Control "Execution Properties".

Generate Unique File Name
See paragraph on Design and Control "Execution Properties".

Load
See paragraph on Design and Control "Execution Properties".

Save
See paragraph on Design and Control "Execution Properties".

10.24.2. Hour Selector Style Properties

The Style properties from the "Hour Selector" are used for setting the object's graphics properties.
To modify the Style properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Scheduler Edit Mode
This selection allows you to set the mode with which to display and eventually modify the selected Schedulers time plan. The options are:

- **Time Table**: the scheduled times will be shown in a normal time table where the activation/deactivation ranges can be set graphically with 15 minute resolutions.
- **Grid**: the scheduled times will be shown in a Grid with the option to set activation/deactivation ranges with minute resolutions. In this case you can select the variable to be associated to the Scheduler's command.
- **Both**: in this case the button will be made available in the "scheduler Window" to allow you to switch back and forth from the "Grid" and "TimeTable" modes for maximum use of the time resolutions in order to set more precise time ranges.

Planning in Time Table mode may be less accurate and restricted when selecting 'Both' in the list-box if they work this way in runtime:
From "Time Table" display you can graphically view those areas containing the planned time ranges in "Grid" mode. However, in "Time Table" mode you can only plan those weekdays that do not yet

have time ranges set in "Grid" mode. Furthermore, planning in "Time Table" mode may only be done on one day of the week at a time, and only on the day selected in "Grid" mode before switching over to "Time Table" mode. As an alternative you can begin planning in "Time Table" mode then switch over to "Grid" mode to set more accurate time ranges for that day of the week.

Border

Please refer to **"Style Proprieties common to Drawings and Controls"** for this property's description.

Prompt Pad

Enabling this property opens the Numeric or Alphanumeric Pad each time a scheduler field value needs to be modified.
For further information please refer to the "Prompt Pad" property found in the object "Style Properties" group.

Save Button

This selection provides the command button for saving any modifications made to the Hour Selector data. Modifications must be made before this action can be executed in Runtime.

Cancel Button

This selection provides the command button for cancelling any data modifications done to the Hour Selector. This has effect only on data modified after the last save.

Holidays Button

This selection renders the command button available to allow you switch over from the normal plan to the holiday plan. For further information on "Holidays Planning" please see the appropriate section in Scheduler Chapter.

Scheduler Selection ComboBox

When enabled, this property, allows you to add a combo-box at the top of the "Scheduler Window" to use for selecting one of the project's schedulers. This list of Schedulers is populated with all those that have been defined in the project and which can be displayed based on their Access Level settings (see "Security Options" for further information), along with any others added in Runtime, if the "Add Scheduler Button" is enabled, the Scheduler selection Combox becomes editable in runtime mode as well.

When the combo-box is enabled for selecting scheduler to be displayed, each time a user logs on, the displayed scheduler will be "unloaded" and therefore will need to be selected again through the combo-box for programming.

Add Scheduler Button

When enabled, this property allows you to add a button at the top of the "Scheduler Window" to use for adding new Schedulers while in Runtime mode (also see "Runtime Schedulers"). This button only appears when the "Scheduler Selection ComBox" property has been enabled as well.

Remove Scheduler Button

when enabled, this property allows you to add a button at the top of the "Scheduler Window" to use for removing schedulers while in Runtime mode (also see "Runtime Schedulers"). This button only appears when the "Scheduler Selection ComBox" property has been enabled as well.

Only Schedulers previously added while in Runtime mode can be removed with the 'Remove' button. Schedulers defined in the project design phase cannot be removed.

Show Value Column

When enabled, this property allows a column in Grid mode for selecting the "Set" value to be used in the "Commands ON" of the selected Scheduler. You will then be able to set a different "Set" value for each time frame set in the "Grid". The value set will then replace the one defined in the first "Command on Variable" found in the selected Scheduler's "Commands ON" list. When no value is set, all of the Scheduler's "Commands ON" list will be executed using the settings defined when being planned. If the Scheduler's "Command on Condition ON" list does not contain a "command on variable", there is no need to define a value in the "Grid" columns.
The inserted value will be replaced in the "command on variable's" "Value" field and then used based on the "Action" type defined in the command (Set, Toggle, Increase, ecc.).

Show Variable (Tags) Column

When enabled, this property allows you to display a column, in Grid mode, for selecting the variable to be used in the "Commands ON" of the selected Scheduler. You can then set a different variable for each time frame set in the "Grid". The variable set will replace the one defined in the first "command on variable" and found in the selected Scheduler's "Commands ON" list. In cases where no variable has been set, all of the scheduler's "Commands ON" list will be executed using the settings defined in its planning stage. If the Scheduler's "Command on Condition ON" list does not contain a "command on variable", there is no need to select a variable in the "Grid" columns.
The list of Variables which can be selected will be populated with all those that have been defined in the project and which can be displayed based on their Access Level settings (see "Security Options" for further information).

If there are Array types on the variable list, they will be shown together with all their elements. This will allow you to select any one of the Array elements.
When the variables to be displayed on the list are structure type, you will need to enable the Access Level of each Structure member in order to display them.

Button Size

Please refer to **"Style Proprieties common to Drawings and Controls"** for this property's description.

Align Buttons

Please refer to **"Style Proprieties common to Drawings and Controls"** for this property's description on.

Save Button Text

The text be displayed on the Save button is inserted in this edit box. The default text will be used when left blank.

Cancel Button Text

The to be displayed on the Cancel button is inserted in this edit box. The default text will be used when left blank.

Holidays Button Text

The to be displayed on the Holidays button is inserted in this edit box. The default text will be used when left blank.

All Selection Text

The text to be displayed in the first top left cell in the window is inserted here. The default text will be used when left blank.

Sunday Text

The text to be displayed in the **'Sunday'** box is inserted here. The default text will be used when left blank.

Monday Text

The text to be displayed in the **'Monday'** box is inserted here. The default text will be used when left blank.

Tuesday Text

The text to be displayed in the **'Tuesday'** box is inserted here. The default text will be used when left blank.

Wednesday Text

The text to be displayed in the **'Wednesday'** box is inserted here. The default text will be used when left blank.

Thursday Text

The text to be displayed in the **'Thursday'** box is inserted here. The default text will be used when left blank.

Friday Text

The text to be displayed in the **'Friday'** box is inserted here. The default text will be used when left blank.

Saturday Text
The text to be displayed in the **'Saturday'** box is inserted here. The default text will be used when left blank.

Grid Mode Button Text
The text you wish to appear on the **"Grid Mode"** button is entered in this editbox. The default text will be used if left blank.

Add Scheduler Button Text
The text you wish to appear on the **"Add Scheduler"** button is entered in this editbox. The default text will be used if left blank.

Remove Scheduler Button Text
The text you wish to appear on the **"Remove Scheduler"** button is entered in this editbox. The default text will be used if left blank.

Start Time Column Text
The text you wish to appear in the first grid column is entered in this editbox, which is the one which will show the command's start time. The default text will be used if left blank.

End Time Column Text
The text you wish to appear in the second grid column is entered in this editbox, which is the one which will show the command's end time. The default text will be used if left blank.

Value Column Text
The text you wish to appear in the forth grid column is entered in this editbox, which is the one which will show the "Set" value for the variable. The default text will be used if left blank.

Variable Column Text
The text you wish to appear in the third grid column is entered in this editbox, which is the one which will show the variable selected for the command. The default text will be used if left blank.

Max. Nr. Grid Rows
This property is used for setting the maximum number of rows in the Grid which will correspond to number of time frames that can be set for each day of the week.

Error String
The text to appear as string error is entered in this editbox. If the user inserts a wrong interval while editing in "Grid" mode, an error message will show. This error message can therefore be customizes using this property. The default text will be used if left blank.

Selection Color
This property is used for setting color of the cells in the Hour Selector window for the normal planning.
For further information please refer to **"Color Selection".**

Holiday Selection Color
This property is used for setting color of the cells in the Hour Selector window for the holiday planning.
For further information please refer to **"Color Selection".**

Date Error String
The text to be displayed as the error string for the date entry field is entered in this edit box. An error message displays when the user enters an incorrect date value in "Grid" editing mode. This error message is customizable and a string ID can also be used. If an empty string is set in this property, a simple "Beep" sound will be generated instead.

Value Error String
The text to be displayed as the error string for the value entry field is entered in this property. This text will display in the error message which shows when the user inserts an incorrect value or one which is not within the preset limits when in "Grid" editing mode. This error message is customizable and a ID string can also be used. When setting this property with an empty string, a simple 'beep' will sound instead. Minimum and maximums can also be set in the error string for numeric values using the"%d" notation (or "%f" when using floating points) in stead of a value. For example, a string like this can be inserted:

Caution! Enter a value between %d and %d.

In this case the first "%d" will be replace with the minimum value and the second "%d" will be replaced with the maximum value in runtime to obtain this result:

Caution! Enter a value between 0 and 100.

10.25. IP Camera Viewer

The Movicon **"IP Camera Viewer"**, available from the "Advanced Shapes" in the **"ToolBox Window"**, is an object through which images taken by a IP camera can be viewed. This object therefore allows you view a sequence of images in realtime received from a IP camera. This type of camera supports current image downloading through http. Downloading is done using jpg images. Images downloaded from the IP Camera Viewer to Windows 32/64 bit platforms are stored in memory (therefore without using the disk), while temporary files are used when downloading to WinCe platforms (the Temp folder is usually loaded in memory).

The IP Camera Viewer is supported both by WinCE versions and WebClient.

URL Definitions

In order to download images from the IP camera you will need to know which URL to set in the "IP Camera Viewer". Each IP camera comes with its own syntax stated in its accompanying manual to obtain the URL to be used and for configuring it as desired. Normally the IP camera can be configured using an Internet Browser, by simply setting the camera's IP address. Therefore you will need to get the URL to be used in order to only display images in html pages. The URL is the same one which you will have to set in the Movicon IP Camera Viewer.

Examples of URLs for some video cameras you can find on the market today

Axis cameras and video servers:
http://<servername>/axis-cgi/jpg/image.cgi

StarDot cameras and video servers:
StarDot NetCam:

http://<servername>/netcam.jpg

StarDot Express 6 (video server)
http://<servername>/jpeg.cgi?<cameranumber>
http://<servername>/jpeg.cgi?3

PiXORD cameras:
http://<servername>/images<channel><resolution>
http://<servername>/images1sif

Panasonic cameras:
http://<servername>/SnapshotJPEG[?Resolution=<resolution>][&Quality=<quality>]
http://<servername>/SnapshotJPEG?Resolution=320x240&Quality=Standard

D-Link cameras:
http://<servername>/cgi-bin/video.jpg

gadget-spot.co.uk cameras:
http://<host>[:port]/Jpeg/CamImg.jpg

Trendnet - Model: TV-IP 110W/EU:
http://192.168.100.205/cgi/jpg/image.cgi

HTTP and Motion JPEG Protocol

The HTTP standard or Motion JPEG protocols can be used to communicate with the Movicon "IP Camera Viewer". The HTTP protocol closes the communication channel when each request has terminated, then re-opens it when another request needs to be made. This means that each time this object requires an image, the HTTP channel is opened and then closed (this solution has been adopted in order to get greater compactibility with the different tupes of IP Cameras on sale).
The "Motion JPEG" communication modality allows the HTTP communication channel to be left open to make a data reading noticeably much quicker but unfortunately this protocol does not support all IP cameras on the market.
The "IP Camera Viewer" object's " Ip CameraDownload Tipe" execution property can be used for selecting which protocol to use.

10.25.1. The IP Camera Viewer General Properties

The IP Camera Viewer" General properties are used for setting the URL to connect to the IP camera. To modify the General properties select the object with the mouse and use the Movicon **"Properties Window"**.

IP Camera URL
The static URL is entered in this property and will be used by the object for getting images from the IP camera. The images are updated according to the refresh time set in the "IP Camera Refresh" property. Usually URLs to be set for most IP cameras found on today's market should follow this syntax sequence type:

"http://<Server Name or IP Address>:[Port Number]/<Image>.jpg"

The URL's single parameters can be found in the IP camera's manual, or by verifying the IP Telecamera's configuration. Names of The name of the image to be inserted (Image.jpg) is usually the default name proposed when saving the image using the Internet Browser.
Please refer to the "URL Definitions" section for further information.

URL User
The name of the project user to be used for connecting to the IP Camera. Some IP Cameras may request for authentication in order to download images. In this case the user name and password to be used for authentication are those of the project user set in this field.

10.25.2. IP Camera Execution Properties

The "IP Camera Viewer" Execution properties are used for defining image update parameters.
To modify the Execution properties, select the viewer object with the mouse and use the Movicon **"Properties Window"**.

IP Camera URL Variable
You can enter (or select using the "..." browse button to the right) the name of a project string variable. This consents the URL, used for downloading images from the IP camera, to be changed in runtime by simply inserting the URL in the set variable.

IP Camera Refresh
The refresh time, in milliseconds, can be set in this field and which the object will use for updating the IP Telecamera images.

IP Camera Download Type
This field is used for selecting the image download type to be used. The options are:

Image: uses the HTTP protocol for reading the IP Camera's static images
Video - Motion JPEG: used the Motion JPEG video format. In order to use this mode you will need to use a IP Camera that supports it.

For further information please refer to the section on "HTTP and Motion JPEG Protocol".

IP Camera Refresh time variable
The name of a numeric project variable can be inserted in this edit box (or selected using the "..." browse button on the right). This will allow the refresh time in milliseconds to be changed in runtime for the object to use for updating the IP camera images. If the value inserted in the varialbe is equal to zero, the displayed images will freeze.

IP Camera Download Type Variable
This editbox is used for inserting (or selecting with the "..." browse buttons on the right) the name of a numeric project variable. This will allow the IP Camera image download type to be changed in runtime. The following values are accepted:

0 = Image
1 = Video - Motion JPEG

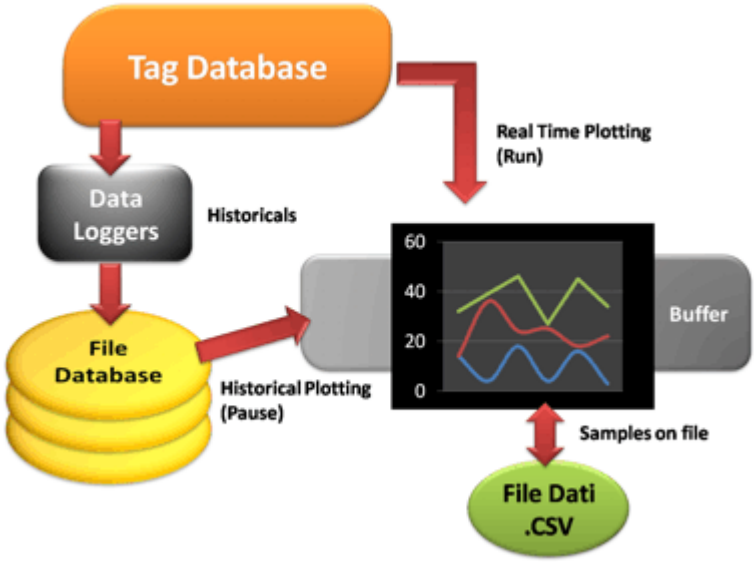
10.26. The Trends

The Trends graphically show curve representations of variable behaviour and analysis of data filed by the recording engine.

The Trends represent the most powerful tool for managing the displaying, analysis and logging of data contained on Movicon variables or on database files.
The Trends, in addition to their own intrinsic features and all the functional features of the Movicon drawings and vectorial symbols, are included with the Power Template© feature.
The Trend object is a tool which offers different ways of functioning, which not only display logged data independently but also permits the linking to database objects that have been inserted in the Data Logger. This allows logged data to be represented both on event or time.
The Trend belongs to the Movicon "Trend - Charts - Data Analysis" category and therefore can be inserted in screens through the **"Objects Window"**.

The Trend is a powerful tool for displaying data recorded by Data Loggers and can at the same time record data in standard .CSV format.

The trend has been designed to guarantee maximum flexibility in managing graphical displays of recorded data. This means that this object can be used not only for representing data graphically but also as a recording function in its own right.
The Trend usually graphically represents data recorded by the Data Loggers, which carry out the task of the recording engines for the Trend. The Trend, however can itself record data of the variables associated in ".CSV" text format and retrieve data of values recorded with the data importer function. When the trend is kept inside an always active screen, due to the fact that the screen's "Not destroyable" option has been enabled, it will act as a constantly active recording engine.

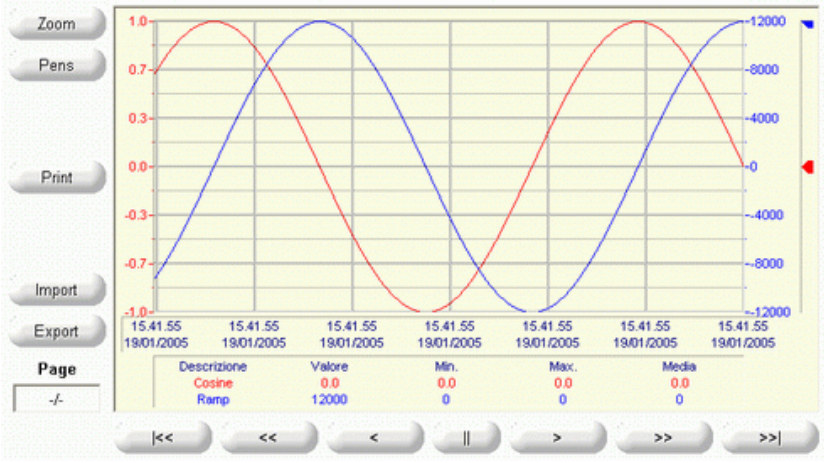


A flowchart of how the Trends work.

The Movicon Trends allow the behaviour of the plant's variables to be graphically displayed and recorded. The Trends are therefore the most efficient tool for filing, printing and analysing graphically the behaviour of variables which constitute the heart of the plant (usually analogic variables) such as temperatures, pressures, levels, scales, chemical measures or any other physical value can be converted into electronic signals.
Movicon also allows the managing of variable representations on Trend curve charts according to the different techniques which can be used.

Time Based Trends

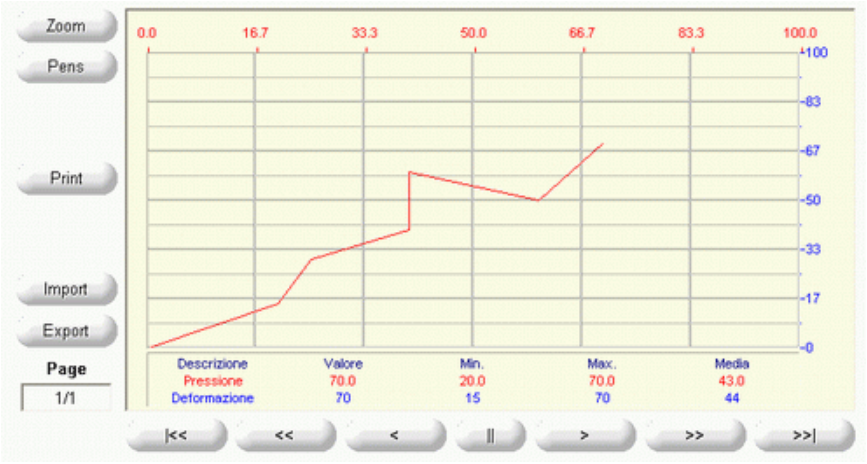
These types of trends are based on the Movicon vectorial drawings and allow a very advanced management of representing data and recording engines, as well as chart representations of database values recorded by Data Loggers.



This is an example of a template containing a symbol composed of a Trend object and other correlated button objects.

X/Y Trends

The trend can also be used for displaying the behaviour of a curve shown on an X and Y chart, where the X axis is no longer associated to time but to the first pen on the list and the Y axis is associated to the second pen on the list. This is done in such a way that the coordinates of the X and Y points are determined by the associated variables, and a trace line is generated by the trend for each sampling which links the previous XY point to the current one. More XY curves can be displayed in one-only trend when other pen couples are inserted.



10.27. Data Analysis

The Data Analysis is an object which derives from the Trend object, therefore it has many of the Trend's basic properties and also implements some new functionalities as well. The Data Analysis permits analysis to be executed exclusively on historical data, permitting you to have a powerful data analyzer graphics. The Data Analysis's new functionalities can used differently compared to those used in normal Trends. Trends work in two ways, displaying data in runtime and displaying historicals (run-pause), whereas the Data Analysis permits to you use more advanced functions to carry out a deeper and more thorough analysis on historical data.
The Data Analysis object belongs to the Movicon "Trend-Charts-Data Analysis" category, from where it can be inserted on screen through the **"ToolBox Window"**.

Data Analysis Functionality

The Data Analysis object is dedicated to analysing historical data consenting historical data to be viewed according to the different selectable date ranges, where the user can display data in different time scales. Data can be displayed in the following date ranges:

- minute range
- hour range
- day range
- month range
- year range

When this page is loaded for the first time, the object will show the date/time range set in the "Date Range" priority, or if set with the hour or min. range the Data Analysis will load data for the actual time in which the page is opened. The database can be scrolled back and forth for each prechosen tiime range by using the "<<", "<", ">" and ">>" buttons, which change their roles according to the chosen context. For example, when selecting to view data for the current month, the "<<" and

">>" buttons will scroll back and ahead one month at a time and the "<" e ">" will scroll back and ahead one day at a time.
Selecting a date range with the (min.), (hour), (day), (week), (month) and (year) buttons situated on the object's left side will prompt a requery by the database according to the actual data being pointed to by the cursor positioned in the Data Analysis's Trend Area.
This should make analysing data easier when wanting to select certain ranges at a time out of a whole years data range by simply pressing the desired button ('month', 'day', etc) in respect to the cursor's position on the data to analysed without continuously using the zoom.

After having activated the Zoom command for Data Analysis object "<<", "<", ">", ">>" button will result disabled. In order to reactivate them you will have to re-select the time range to be displayed.

Multiplier Factor

This Data Analysis provides four buttons (on the first three button rows available) for scrolling data from the database: "<<", "<", ">" and ">>". These buttons change meaning according to the time range selected and the move unit measures will appear in the button's text between brackets. For example, if you choose the minute time range, these texts will appear in the four buttons:

<<(min.)
<(sec.)
>(sec.)
>>(min.)

At this point, when clicking on the "<<(min.)" button, data from the minute previous to the current minute in time will be loaded.
These buttons can be set with a time scroll range "Multiplier Factor". To enable the "Multiplier Factor" just one of these buttons pressed down for a few seconds. The text within the button is changed by increasing or deceasing the numeric value that represents the "Multiplier Factor" The increasing "Multiplier Factor" is stopped by releasing the button. For example "<<(2 min.)", "<(2 sec.)" text, etc. indicates a "Multiplier Factor" equal to 2. The "Multiplier Factor" value is increased by keeping the 'Next' data time range buttons (i.e. ">(sec.)" or ">>(min.)", while you need to keep the "back" data range select buttons pressed to decrease (i.e. "<<(min.)" or "<(sec.)".
When inserting a "Multiplier Factor" the time range to be loaded will be multiplied by the factor. For example, if choosing one minute as the time range and 5 as the "Multiplier Factor", the <<(5 min.)" button will stop loading the previous minute but the value of 5 minutes before the current time.
Keep pressed either one of the two inner "<(sec.)" and ">(sec.)"buttons to increase or decrease secs one unit at a time (increase/decrease by 1)and Keep pressed either one of the outer "<<(min.)" and ">>(min.)" buttons to increase or decrease minutes by 10 units at a time (increase/decrease by 10).

"Multiplier Factor" can be set a value range from 1 to 100.

It is also possible to modify or read the "Multiplier Factor" value from Basic Script code using the "CurrentMultiplier" property from the "TrendCmdTarget" interface..

Moving the cursor around the chart

There are four button provided in the Data Analysis object that allow you to move the cursor forwards and backwards ahead and back which keeping the displayed time range still. When using these buttons the cursor will move between two chart points (being two values recorded on database). These buttons are positioned above those used for selecting the time ranges and are:

|<<:First Point Button. Moves the cursor on the first point to the left of the chart for the selected time range
<: Previous Point Button. Moves the cursor on the point (to the left) immediately before the one currently selected
>: Next Point Button. Moves the cursor on the point (to the right) immediately after the one currently selected
>>|: Last Point Button. Moves the cursor on to the last point to the Chart's right for the selected time range.

When the cursor is not displayed the scroll buttons are disabled. For example, this happens when a measure is activated (the "Measure" button).

When there are a great number of records display in the chart, it may not be possible to move from one point to another using the buttons in order to go from one record to the next consecutively due to the limit set in the display resolution. To make sure to scroll all the points currently viewed consecutively, you will need to enlarge the part of the curve desired or select the data tightly displayed together.

The functions of the above indicated buttons can also be executed using certain keys from the keyboard:

"Home" Key: equivalent to the "|<<" button and moves the cursor to the first point on the left of the chart for the time range selected.
"Shift + left or down arrow" Keys: equivalent to the "<" button and moves the cursor onto the point immediately before (to the left) the one currently selected.
"Shift + right or up arrow" Keys: equivalent to the ">" button and moves the cursor onto the point immediately after (to the right) the one currently selected.
"End" Key: equivalent to the ">>|" button and moves the cursor to the last point to the right of the chart for the selected time range

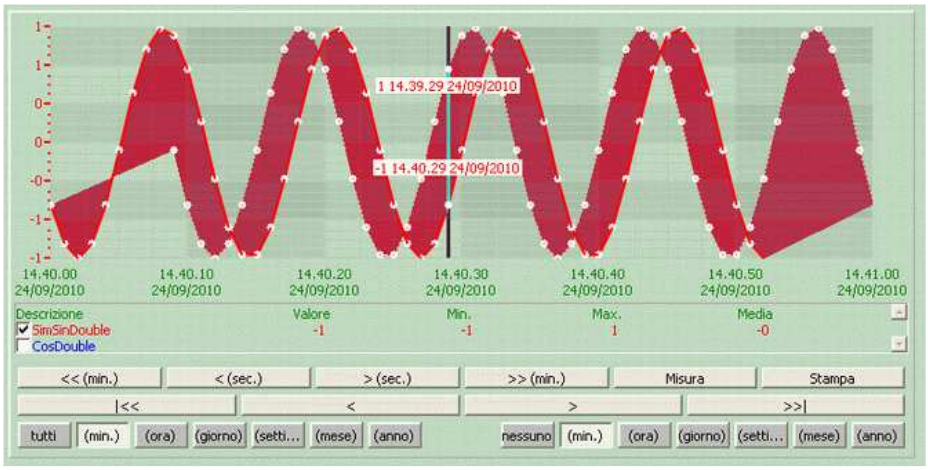
Curve comparisons

This object also consents you to execute comparisons of historical data being analysed graphically, by inserting a second curve for each pen using the last row of buttons on the right. The comparison curves will display the same time ranges (minute hour,etc.) but relate to the previous period selected using the appropriate comparison buttons. For instance, if you select the minute time range for the period to be viewed (using the last row of buttons on the left), you will get the following results based on the comparison buttons selected on the right:

"(min)" Selection Button: the minute time range is selected for viewing. By using the scroll buttons you can then select the minute you want to view. For instance, if "31-01-2008 10:15" is the data and time selected, the time range displayed will be "10:15:00 - 10:15:59".

"None" Comparison Button: no comparison will be activated.
"(min.)" Comparison Button: the minute prior to the one selected will be displayed on the comparison curve, therefore the "31-01-2008 10:14" minute.
("hour") Comparison Button: the same minute selected but relating to the previous hour will be displayed on the comparison curve, therefore the "31-01-2008 09:15" minute.
"(day") Comparison Button: the same minute selected but relating to the previous day will be displayed on the comparison curve, therefore the "30-01-2008 10:15" minute.
("Week") Comparison Button: the same minute selected but relating to the previous week will be displayed on the comparison curve, therefore the "24-01-2008 10:15" minute.
("month") Comparison Button: the same minute selected but relating to the previous month will be displayed on the comparison curve, therefore the "31-12-2007 10:15" minute. When the month day selected is not in the previous month (ie. only a few months have a 31st day) the comparison curve will not display.
("year") Comparison Button: the same minute selected but relating to the previous year will be displayed on the comparison curve, therefore the "31-01-2007 10:15" minute.

At this point, any differences between the two curves will be indicated by colouring in the area in question between them and by positioning the mouse cursor in this area, two labels will show reporting the two values and their date of recording. In this way you can confront one time range with the same previous time range or of an hour, day or week ago etc. To activate the compare function, as already mentioned, just click on one of the buttons from the "Compare Date Range Buttons" group.
The time range comparison selected must be consistent. If not data can be found to compare with this time range, the comparison curve will not display. For instance, when selecting the comparison curve for displaying data from the previous month that however has no data, the comparison curve will not display.



The above figure shows two curves, one displaying the selected minute range and the other comparing. The areas between the curves is coloured with a different colour and when positioning the cursor onto a sampling area, a label showing the corresponding values, recording date and time will show automatically for both curves. This type of comparison is simple and very immediate.

By using the "Measure" command you can get the X and Y difference of two points of one curve or of different curves (see the "Measure Button" property).

Furthermore, the Data Analysis consents to displaying only those values recorded by the Data Logger which have "good" qualities (this needs you to activate a specific option in the Data Logger column's "Add Quality" property).

Custom Data Filter

During the runtime mode you can select a custom time range to view (different from the selectable time ranges using the appropriated buttons). This will allow you to display data from time ranges which suit your needs better such as 10 minutes, 1 day and 6 hours. To customize the time ranges simply click on the Data Analysis's "Time Area" to open the "Filter" window for setting the time ranges you wish to display. The items available are:

From Date: represents the data extraction start date and time
To Date: represents the data extraction end date and time
From Date Compare: represents the data extraction date and time for the comparison curve
To Date Compare: represents the data extraction end date and time for the comparison curve

There are no controls on selecting time ranges to be viewed in respect to those of the comparison curve. Therefore, make sure that you set the comparison curve time ranges to match those of the normal curve's time ranges so that the filter can work correctly. This can be done by verifying these conditions:

To Date - From Date = To Date Compare - From Date Compare

10.27.1. Trend Functions

The Trend is a triple-functional tool:

1. Real-time variable curve viewer
2. Curve viewer of data recorded by Data Logger Data
3. Sampled output data recorder

The main job of the Trend it not just recording data files. This is usually done by the Data Logger (described in the appropriate section). The main job of the Trend is to represent data on a series of graphics by using the vast customizable function possibilities to make data clearer for the operator to understand.

The Trend can be used in recording data when it is desired to dispose data sampled by the object in output on file, typically readable by Ms. Excel or by any non database application. The ".CVS" format is used for data recorded in text format with separators which is interpreted by Excel and by many other applications.

The Trend, when enabled to record, files sampled data in standard ".CSV" format, but the recorded data is not automatically loaded into the Trend's buffer when opened. You can, however, consult this data by loading the saved file by using the appropriate Trend functions. The templates presented in the "Symbols Library" are already equipped with the "import" button in order for you to carry out this operation.

This type of recording is optional and must be enabled in the Trend object's configuration properties. It is important to remember that when the Trend object is enabled to send sampled data in output on file, this will happen only when the object is active in memory, meaning when the screen containing it is displayed or has not been unloaded or destroyed with a change page.

Recording samples carried out by the Trend on ".CSV" file is executed by the object only when this is active in memory. To keep the Trend constantly active you need to make sure that the screen containing it does not get destroyed or unloaded from memory when using the change page function by checking the "Not Destroyable" option in the screen window's general properties.

The recording on file carried out by the Trend object is simply to be considered as an "output on file" of sampled values, totally asynchronous and separate in respect to any Trend link to the Data Logger. Any effective written data is performed through the settable cache memory so that the disk is accessed only when required according to the type of sampling carried out.
If a file recorded with Excel is opened, the values recorded on file will use the following the data sequence format:

	A	B	C	D	E
1	Time	Date	Cosine	Ramp	
2	15.05.52	27/01/2005	0.7	2400	
3	15.05.53	27/01/2005	-0.4	6400	
4	15.05.54	27/01/2005	-1	-9800	
5	15.05.55	27/01/2005	-0.2	-5800	
6	15.05.56	27/01/2005	0.8	-2000	
7	15.05.57	27/01/2005	0.8	2000	
8	15.05.58	27/01/2005	-0.2	5800	
9	15.05.59	27/01/2005	-1	9800	
10	15.06.00	27/01/2005	-0.4	-6400	
11	15.06.01	27/01/2005	0.7	-2400	
12	15.06.02	27/01/2005	0.9	1400	
13	15.06.03	27/01/2005	-0.1	5400	
14	15.06.04	27/01/2005	-1	9400	
15	15.06.05	27/01/2005	-0.5	-6800	
16	15.06.06	27/01/2005	0.6	-3000	
17	15.06.07	27/01/2005	1	1000	
18	15.06.08	27/01/2005	0	5000	
19	15.06.09	27/01/2005	-0.9	8800	
20	15.06.10	27/01/2005	-0.6	-7200	
21					

The date and time values are recorded according the operating system' settings in the International Settings item in the Control Panel.
The date separation character can be set in the Trend's configuration by selecting either Tab or Comma to suit the type of application being used.

Trend Operability

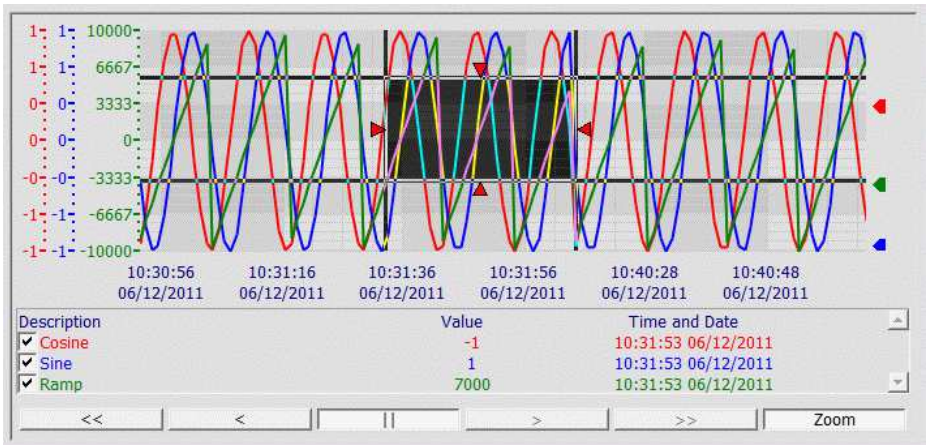
The trend has two operating states, Start and Stop. These states are established in function with a variable which has been appropriately set for this purpose and assigned through the Trend's "Variables" properties.
When the Trend is set at Start, the data will be sampled and displayed as set in the execution properties assigned to the Trend. The buffer of data managed by the Trend can be sized as pleased and has a maximum capacity of 10,000 samplings.

When the Trend's status is switched to stop, the buffer's contents will be displayed. If the Trend is associated with a Data Logger, the buffer's contents may be a result of a data extraction from the database. Otherwise the buffer's contents will be the samplings carried out by the Trend in Start status.
Remember that also during the Stop status the Trend will continue to do samplings, buffer and record data.
The values in the buffer can be displayed by using the scroll commands which can be set in the Trend's properties and can be associated to Movicon variables. This will enable the cursor to point to data as specified in the operating configuration as desired and which will be described in further detail in the Trend properties.

10.27.2. Zoom Management

The curves displayed by the Trend and the Data Analysis can be enlarged using the Zoom function to analyse them better. In order to use the Zoom in the Trend object, you must put the Trend into 'Pause' mode first.
When the Zoom is activated, a rectangle highlighted in bold will enclose the legend area with four small red ticks showing halfway along each side of the rectangle.

This rectangle represents the Zoom area and can be resized afterwards. When this area is resized smaller than the initial rectangle size, it will appear darker in color highlighting the portion to zoom:



The Zoom command can be activated with a corresponding button made available for both the Trend and Data Analysis objects by enabling the "Zoom Button" Style property or the "Z" key on the keyboard. The Zoom button is also available for templates in the Symbol Library using the basic script functions to activate the Zoom command.

The Trend object must be put into Pause mode before zooming it.

Once the Zoom mode has been activated, the Zoom area can be redefined using the different ways described below:

- Using the mouse to redefine a new Zoom area. This is done by clicking and keeping the right mouse button pressed on a point in the chart to then dragging it towards the bottom-right to resize new zoom area. Once the new desired zoom area size has been reached, release mouse button to maintain it. If the SHIFT key is kept pressed during this operation, the area's top and bottom limits will be reset to the maximum and minimum pen scale values. This is used for zooming a portion of the chart vertically.
- Moving Zoom area with mouse by clicking left button and keeping it pressed on area to move it. The Zoom area will move together with the mouse.
- Using the keyboard direction arrow keys to move Zoom area. Zoom area will move according to which direction arrow is being used.
- Clicking on red ticks and move them with mouse to move Zoom area's four sides.
- Using the four keyboard direction arrow keys with SHIFT key pressed down to resize Zoom area by its length or width only.
- Using mouse wheel to resize Zoom area's width and height at the same time. When turn mouse wheel backwards or forwards to increase or decrease Zoom area in size. This function is not supported in WebClient.
- Using mouse wheel together with SHIFT key pressed down to resize zoom area width only. By turning the mouse wheel backwards and forwards will increase or decease the zoom area width.

When the desired Zoom area has been defined click within area to activate enlarge it. At this point the Zoom area will expand enabling you to perform the following operations:

- Redefine another Zoom area to enlarge curve further. This type of operation can be done repeatedly until reaching the exact precision desired.
- Cancel applied Zoom. This operation can be done by left mouse clicking on a point in the chart and keep mouse button pressed to drag towards top-left. When releasing mouse button the applied zoom will be canceled and the curve will return back to how it was initially displayed.
- Disable Zoom mode to analyse data. This can be done by clicking the "Zoom" button or pressing the "Z" key which will in turn disable the Zoom leaving the curve enlarged. Upon disabling the zoom the cursor will automatically reactivate letting you scroll the various curve points to analyse as pleased.

After you have analysed data, press the "ESC" key to restore curve back to its initial unzoomed size.

In Window CE panels, that is Touch-Screen devices without keyboards, the "ESC" key cannot be used for restoring the unzoomed curve. In this case, after having terminated your Zoomed data analysis proceed as follows:

1. reactivate the Zoom using the "Zoom" button
2. left mouse click on a point of the chart and keep pressed to drag zoomed area to top-left. Release mouse key to cancel the applied Zoom and return curve back to its original display size
3. terminate Zoom mode by clicking on the Zoom button again.

The Symbol Library Templates do not have this problem as the Zoom button, which uses basic script functions, also provides the possibility to exist Zoom mode after having terminated data analysing.

The "TrendCmdTarget" basic script interface also provides some methods which return information about the applied Zoom, such as the Zoom area's start/end date and time, minimum and maximum scale values for pens in Zoom area, size of zoom area in pixels.

10.27.3. Linking Trends or Data Analysis to the Data Logger

The Trend and Data Analysis are pre-built to be linked to a recording engine of data managed in the project's Data Logger resource. The Data Analysis object is only capable of displaying data extracted from the Data Logger, whereas the Trend can manage two mode functions, Start and Stop. This makes it possible to manage Trend objects in 'Start' mode to view sampled data according to the modalities set, and in 'Stop' mode to view data extracted from the database, recorded by the Data Logger in function with the value extraction or order parameters associated to the query.
The trend, therefore can represent the extracted values, from the database file contents graphically, which is loaded when the Trend buffer switches to 'Stop' mode.

The Trend will be linked to the database by using the same link set for the Data Logger, and will execute the data order or filter by creating a RecordSet whose values will be automatically loaded in memory in the Trend's buffer when switched to Stop mode.

It is important to remember that unlike the Data Logger, the Default Query cannot extract values but can execute the SQL commands on them (Update or Insert). Extractions refer to the SQL "Select" commands managed from the "Default Filter" and "Default Order by".

10.27.4. Connecting different Data Loggers to a Data Analysis object

The Data Analysis object, different to the Trend, is capable of displaying pens belonging to different Data Loggers at the same time. The name of the Database which each Data Analysis pen belongs to can be specified in its "Data Logger Name" property. In cases where this property is not specified for each single pen, the Data Logger set in the Data Analysis style property will be used instead. If a Data Logger cannot be found during runtime due to a programming error or error in the datalogger name, an error message like the one below will show in the Historical Log and in the output window's "DBMS tab:

> Cannot link to 'VAR00001' pen inside 'DataAnalysisName' trend to the 'DataLoggerName' Data Logger!

When a Data Analysis displays pens deriving from different Data Loggers, the recording points of each pen will be placed along the X axis based on their recording time. If the Data Loggers differ in recording times, the Data Analysis will display each curve with the corresponding different number of points for the interval time selected.
In this situation the point by point scroll buttons, "First Point", "Last Point", "Previous Point" and "Next Point", can be used to move among the different points of the pen selected in the legend. If a pen has not been selected in the legend, the points of the first pen on the list will be scrolled instead when using these buttons.

10.27.5. Displaying Trend data

Displaying data, represented in trend curves, within the Trend object can be greatly customized therefore made more powerful. The Trend sampler displays data in "Start" mode according to its sampling settings, which may also be different from those set for any associated Data Logger. In this case, in Stop mode, the Trend will display the values recorded according to the linked Data Logger's sampling settings. When the Data Logger records data and events or on variable value changes, the data will be same displayed by the Trend in "Stop" mode, but in this case the Trend will show a series of continuous dots or lines separated by Break Lines (if this property has been enabled) instead of a continuos curve line.

10.27.6. Extended Functionality with Basic Script Interface

In addition to the usual animation functions Movicon allows a set of purposely preset commands to be associated to the Trend or Data Analysis object to be used in customizing functionalities in the

object. These commands are available from the ActiveX Automation Members window in the 'Data Type' box under the VBA™ command set called **"TrendCmdTarget"**, which is accessed when editing the object's code through the "Script Explorer" window.

A large number of Templates of pre-configured multifunctional Trend objects can be found in the Movicon "Symbols Library".

Expert programmers should refer to the sections on the Basic Script Language for further information.

10.27.7. Preconfigured Shortcut Keys

The Trend and Data Analysis objects are already preconfigured to manage some of the shortcut keys in automatic as described in the below table. When the Trend or Data Analysis has been selected with the mouse (clicking on object), thus receiving focus, pressing one of the shortcut keys will activate the relating command.

Keys	Command Description
0	Executes the "All" button function to display all available data (*).
1	Executes the "min." button function to display data for one single minute (*).
2	Executes the "hour" button function to display data for one single hour (*).
3	Executes the "day" command function to display data for one single day (*).
4	Executes the "week" button function to display data for one single week (*).
5	Executes the "month" button function to display data for one single month (*).
6	Executes the "year" button function to display data for one single year (*).
CTRL+ALT+0	Executes the "none" button function so that no data range is selected for the comparison curve (*).
CTRL+ALT+1	Executes the "min." button function for the comparison curve to select the comparison data for one single (*).
CTRL+ALT+2	Executes the "hour" button function for the comparison curve to select the comparison data for one single hour (*).
CTRL+ALT+3	Executes the "day" button function for the comparison curve to select comparison data for one single day (*).
CTRL+ALT+4	Executes the "week" button function for the comparison curve to select comparison data for one single week (*).
CTRL+ALT+5	Executes the "month" button function for the comparison curve to select data comparison data for one single month (*).
CTRL+ALT+6	Executes the "year" button function for the comparison curve to select comparison data for one single year (*).
Left/Right or Up/Down Direction Arrows	Move the cursor within the graphic. Note: the point values nearest the cursor's position are shown in the legend. Can also be used together with Shift key for moving or resizing the Zoom area when applied.
PagUp	Executes the "<<" button function. When the Trend object is in pause mode, this allows you to go to the next Trend page. As for the Data Analysis this depends on which time range view selected.
PagDown	Executes the ">>" button function.When the Trend object is in pause mode, this allows you to go to the next Trend page. As for the Data Analysis this depends on which time range view selected.

S	This is used for Run/Stop Trend types to switch over from one state to the other. Remember that the scroll and data analysis functions are enabled when in stop status (**).
P	This is used for printing out the page being displayed. A Windows interface opens for selecting the printer after which the print out operation can be confirmed
M	Executes the "Measure" button function. Enters and exits from the Measure mode (*).
Z	Executes the "Zoom" button function. Enters and exits from the Zoom mode.
ESC	This key has different functions according to the context in which it is used: 1. Exits from the Measure or Zoom mode when active 2. Resets the Zoom applied to the graphic when already exited from Zoom mode. 3. Cancels the data read operation and displays the graphic with data retrieved up to that moment.
F2	Used for displaying the object in expanded mode or for returing it to its normal display size.

(*) Functions available only for the Data Analysis object
(**) Functions available only for the Trend object

10.27.8. Mouse Executable Operations in RunTime

The Trend and Data Analysis provide commands in Runtime which can be activated with the Mouse to make data consulting operations much easier to carry out. These commands can also be managed through their respective "TrendCmdTarget" Basic script functions:

1. **Pen Configuration**: By double-clicking the mouse on a curve, legend pen or pen scale, the pen's configuration window will open (only if the pen has been set as editable in the design mode) in order for you to modify its name and variable properties. Modifications will be saved in the object's configuration file if predefined with one, otherwise they will be lost when the screen is closed.
2. **Curve Area**: By double-clicking the mouse on the area where the pen curves are traced, it will expand cutting off the parts showing the scales, legend and pens. The same command will restore the trend to its initial situation. This command is NOT available when the project is working in touch screen system or when the Trend/Data Analysis is in Zoom or data Measure mode
3. **Displaying Pens**: a single click on the check-box at the side of the legend pen's name will display or hide the curve of that pen. A CTRL+Click on this check-box will deselect all the pens presented and make only those clicked on visible.
4. **Scroll Trend**: keeping the right mouse key pressed down will able you to vertically pan the graphics (only in 'Stop' mode for Trends).
5. **Scroll individual Pens**: Pressing the "CTRL" key and the left mouse key will able you to pan each individual curve vertically. This is done by clicking on the curve of interest or clicking in the scale area of the pen desired.
6. **Selecting a Pen**: To select a pen to make the curve line thicker and highlight the pen in the legend, just "CTRL+Click" on the curve or click on the pen's name in the legend.
7. **Data filtering**: just clicking on the "Date-Time" area of a Data Analysis object will cause a "Filter" window to be loaded, allowing to set the time interval to show.

10.27.9. Change Language for Pens

The Trend or Data Analysis Pens can also have change languages by inserting a string ID with the same name as the pen. The Trend or Data Analysis will display the text contained in the ID string instead of the pen's name.

10.27.10. Interactive Legend Area

The Trend or Data Analysis object legend is interactive and is therefore possible to activate command by simply clicking or double clicking on the name of the pen. What happens when you click on pens:

The mouse **click** on the name of the pen (or on the pen's line) permits you to select the pen and get the following effects:

- Who whole pen line highlights within the legend
- The pen curve is highlighted in the chart. Corresponding curve is redrawn with a slightly thicker line in the chart compared to the others. Curves that are not "line" type are only displayed in the foreground and do not change thickness
- The scale associated to the pen is activated in cases where the pen is not visible. When the pen is no longer selected in the legend, the scale returns to its original state, therefore if originally invisible it will return to being invisible

Double clicking the mouse on the name of the pen (or on the pen's line) will open the pen's configuration window. This can also be done when double clicking on the pen's scale or curve. When a pen is set as "Not Visible" the pen's curve will no longer be displayed but the pen will remain on the legend's list in order to be made visible later on.

In addition to this you will find a checkbox on the left side of the pen's name which you can use to make the pen visible or invisible with a simple click, without having to revert to its configuration window every time needed. By keeping the "CTRL" pressed down while clicking on the pen's checkbox will de-select all the other pens except the one clicked on.
Date and time information belonging to the point selected along with pen minimum, maximum and average value statistics will display on the right side of the pen's name in Data analysis objects. It must be taken into consideration that the date and time column and the value column show information on the point which is nearest to the cursor which may happen to be positioned between two recording points. However, when moving the cursor within the legend area or when keeping the mouse key pressed down on a specific point, a tooltip will appear at the bottom of the cursor showing that point's date and time information including milliseconds. In this case the date and time will effectively be those of the cursor and not of the nearest point. Therefore, the value shown by the tooltip might be different to the one shown in the legend area.

10.27.11. Variable Quality Management

The Trend and Data Analysis objects obtain certain behaviours based on the qualities of the pens' variables associated to them. The function of these objects varies according to their type:

Trend Object

When a variable has a quality different from "good" the pen and the name of the pen in the legend appear in grey (as disabled). In addition to this, when the Trend has not been associated with Enable Recording, the object will automatically be disabled when at least one of its variables has a quality different from "good". When disabled the Trend will no longer carry out any samplings, therefore its curves will no longer get updated. Any how, if the Data Logger is connected to the Trend, data will be loaded from the Data Logger when the Trend is stopped, including data recorded when the variable did not have a "good" quality.

Data Analysis Object

This object gets data directly from the Data Logger connected. To manage data according to the variable's qualities you will need to enable the column in the DataLogger for recording the variable's qualities ("Add Quality" property). In this case the points that do not have 'good' qualities will not be joined in a line. When using a "rectangle" style for the pen, it will not be possible to check which are the points that do not have 'good' qualities graphically. On the other hand, when using an "area" or "line-area" style, the filling will be managed for all value, even those that do not have "good" qualities.

10.27.12. Antialiasing in Trends and Data Analysis

The "Use Antialiasing" option in screens where Trend or Data Analysis objects have been inserted has effect also on the curves drawn by each pen so that they look better by slightly giving them a more curved effect.

In cases where the pen scale is set with the logarithmic scale, the Antialiasing effect does not take place in drawing the pen's curve when the Y coordinate shows negative values. Therefore if the pen obtains values that are near 1 (logarithm with result near zero) or even <1 (logarithm with result less than zero), the curve will obtain a negative incline towards -∞, and in this case will not be drawn by the Trend or Data Analysis.

10.27.13. Trend and Data Analysis Progress Bar

When the "Execution -Load Data in separate thread" property is enabled for the 'Trend' and 'Data Analysis' objects, the Progress Bar appears indicating the progress state in percentages.
The progress bar appears when retrieving data from the Data Base using the quick selection buttons and when querying the referenced Database table.
Data extracting can be stopped at any moment by pressing the "ESC" key from the keyboard and the database interrogation procedures will not block the user interface which can still be used for user interaction with screen objects during the data extraction phase.
The character size of texts shown in the Progress Bar can be set through the "Fonts - Text Fonts" property.
The progress bar will appear each time the database is interrogated for Client application 'Trend' or 'Data Analysis' objects connected to a network server.
In addition, the Progress Bar can also be displayed in the Web Client directly in the Browser window that displays the Trend and Data Analysis objects.

10.27.14. Trend and Data Analysis Settings

The Trends and Data Analysis are objects belonging to the Movicon vectorial drawings and therefore have the same properties of vectorial drawings. In addition to the normal "Drawings and Controls Common Properties" forms, dealt with in the appropriate sections dedicated to them, The Trends and Data Analysis have a series of properties through which you can access specific settings of the Trend object. As the Data Analysis derives from the Trend object you will find that they have many of the same properties and some of their own which won't be available in the other.

10.27.15. Trend and Data Analysis Style Properties

The Trend/Data Analysis Style properties are used to set the main style configurations of the window, whether graphical or functional.
To change the Style properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Border
The **"Border"** property is described in the paragraph headed **"Style properties common to Draws and Controls"**.

Trend/Data Analysis Area Gap
The **"Gap"** property is used to customize, in pixels, the gap between the data and its border.

Trend Type
This selection box allows you to set the trace scroll type:

- **Horizontal**: the values are scrolled horizontally in the Trend

- **Vertical**: the values are scrolled vertically in the Trend as a printout recording on paper
- **X/Y**: permits you to use the Trend as a XY chart The X axis is no longer associated to time but to the first pen on the list. The Y axis is associated to the second pen on the list in such a way that the coordinates of the X and Y points are determined by the associated variables, and each sample creates a trace which links the previous XY to the current one. Other XY curves can be displayed in the same Trend object by inserting other pairs of pens
- **Chart:** this option is set exclusively when a trend object is inserted in a Movicon "Embedded Report" using the Report's "Toolbox Window". In this case the Trend is used for displaying a chart within the Report where the X axis may be based on either time (date and time of table's "LocalCol"column) or a selected database column using the "Label Data Source" property

Trend/Data Analysis Title

This check box permits you to display or hide the object's title which can be written in the objects "Title" property. The title is displayed on the Trend/Data Analysis top border.

Show Break Lines Values Area

This enabling box allows any zones of interrupted data recordings to be displayed. By doing this you will be able to see when and for how long the Data Logger did not record. When this property is disabled the data will be displayed without empty spaces even though in reality the curves show discontinuity.

These Break lines are never visible in the Trend in run because the Break Line Area's position and size can only be calculated with precision when the Trend loads the data from the Data Logger, therefore only when switching from run to stop mode, and not the other way round.

The Break Lines are visible only when the Trend is in "Stop" mode.

Trend Mode

This selection box is used for setting the Trends operating modality type:

- **Run-Pause**: this sets the Trend's operating modality to work on command or on event, in function with the state of the relating variable set in the "Variables" property group
- **Only Run**: this sets the Trend's operating modality to work in "Run" only, therefore the "Stop" (or Pause) analysis mode is not permitted. In this mode the Trend's values can represent the values only dynamically
- **Only Pause**: this sets the Trend's operating modality to work in "Pause" (or Stop), where it is not permitted to display data sampled in real-time but only representations of values loaded into the buffer by the query or the Basic Script commands

Edit Pens

When this command is activated a settings window of the **"Pen Properties"** assigned to the Trend/Data Analysis will open.

Border

This check box is used to enable the border relating to the Trend/Data Analysis's area to be displayed. This applies to the area displaying the curves only.

Raised Border

This check box is used to enable the border relating to the Trend/Data Analysis area, displaying the curves only, to be displayed with a raised 3D effect instead of sunken.

Brush Style

This property allows you to select the brush style to apply to the background of the Trend/Data Analysis's area displaying the curves only. The list shows various 'hatched' designs.

Color

This property allows you to select the background color to apply to the Trend/Data Analysis area displaying the curves only.

For further information on selecting colors please refer to the paragraph headed "Color Selections".

Data Logger Link

This selection box is used for specifying which Data Logger object the Trend/Data Analysis is to be linked to. This can be done by selecting one from the proposed list of Data Loggers inserted in the project.

After having selected the DataLogger from the list and confirmed this setting, Movicon will automatically add the pens to the Trend in function with the variables associated to the DataLogger.

Refresh Pens from DataLogger Link

This refreshes the trend's pen list by retrieving them from the linked DataLogger.

Label Data Source

This property is available when a 'Basic Chart' or 'Advanced Chart' from the "Toolbox Window" is inserted into a Movicon "Embedded Report". In this case the Trend's X axis can be selected from any recordset column resulted from the applied data extraction query. In this way, the X axis my represent a time base or any discrete value set. If this field is left empty, the"LocalCol" column, being the Date and Time column from the table linked to the Trend, will be used for the X axis for default with milliseconds as well. The list of selectable fields for this property will be the list of fields resulted by the applied data extraction "query" associated to the Report. If no query has been defined in the Report, this list will be populated with a list of columns from the linked table. Any eventual query set in the Trend's "Query Default" property will not have any effect on generating the list of fields shown in the X Axis Data Source property.

Page Prev. Button

This selection provides the command button for scrolling the previous Trend page. The command is only available when the Trend is in Pause mode.
This command changes its significance in the Data Analysis object according to the display interval type selected.
The same command can be executed with the "PagDown" key.

Prev. Button

This selection provides the command button for scrolling the previous Trend's recording.
This command changes its significance in the Data Analysis object according to the display interval type selected.
This command is only available when the Trend is in Pause mode.

Pause-Run Button

This selection provides the command button for switching over from Run status into Pause status and viceversa.
The same command can be executed with the "S" key.

Next Button

This selection provides the command button for scrolling the Trend's next recording.
This command changes its significance in the Data Analysis object according to the displayed range type selected.
This command is only available when the Trend is in Pause mode.

Page Next Button

This selection provides the command button for scrolling the Trend's next page. This command is only available when the Trend is in Pause mode.
This command changes its significance in the Data Analysis object according to the displayed range type selected.
The same command can be executed with the "PagUp" key.

Expand Button

This selection provides the command button for expanding the Trend/Data Analysis area to its maximum size. This command hides the scale, the pen area, the legend area, the buttons etc. and expands the display area of the curves to its maximum size. To return back to the previous mode use the "F2" key or double click the mouse on the Trend/Data Analysis area. The same command can be executed with the "F" key.

The Trend area can also be expanded/compressed by double clicking on it. This command is NOT avaliable when project is running in touch screen systems or when the Trend/Data Analysis is in lZoom or data Measuring mode.

Zoom Button

This selection renders the Zoom command button available for zooming in and out of the Trend/Data Analysis area. You can use the "Z" key to do the same thing as well.
The Zoom command works in the same way:
Once pressing the button, the mouse can be used together with the arrow keys to enlarging the Trend/Data Analysis area. If at this point you wish to enlarge the curve even further, just select the

part to be enlarged again. To exist from Zoom mode in order to analyse data using the cursor, just press the Zoom button again, or press the "ESC" key. In this situation, where the zoom is no longer active, by pressing "ESC" key the curve will be restored to its original size. The following functions are active in Zoom mode:
For further information about the Zoom functionality and the commands which can be used for zooming please refer to the paragraph on the "Zoom Management".

Activating the zoom command for the Data Analysis object will automatically deactivate the "<<", "<", ">", ">>" buttons. To reactivate these buttons, select the time range to be displayed again.

Measure Button

This selection makes the Measure Button available for carrying out measuring operations in the Data Analysis object. This command can also be carried out with the "M" key.
The measure mode consents to selecting a pair of points in the same curve, or different curves, and view the delta X delta and delta Y values on a ruler. The delta X value corresponds to the time ratio/difference between one point and the next, while the Y delta corresponds to value difference of the two points.
In order to select the two points after having activated the measure function, you must left mouse click on first point of the curve and by keeping the mouse key pressed down move to the second point and then release. The two horizontal and vertical lines will remain visible showing the horizontal and vertical delta ratios between the two points.

First Point Button

This option makes the command button move the Data Analysis object's cursor to the first point of the selected time range.
For further information please refer to pargraph: "Moving The Cursor Around The Chart".

Last Point Button

This option makes the command button move the Data Analysis object's cursor to the last point of the selected time range.
For further information please refer to pargraph: "Moving The Cursor Around The Chart".

Next Point Button

This option makes the command button move the Data Analysis object's cursor to the next point in respect to the one selected.
For further information please refer to pargraph: "Moving The Cursor Around The Chart".

Previous Point Button

This option makes the command button move the Data Analysis object's cursor to the previous point in respect to the one selected.
For further information please refer to paragraph: "Moving The Cursor Around The Chart".

Print Button

This selection provides the command button for executing a printout of the Trend/Data Analysis area. The same command can be executed with the "P" key.

Show Date Range Buttons

This selection renders the command buttons available for selecting the time ranges to be displayed in the Data Analysis object. These buttons are: all, (min.), (hour), (day), (week), (month), (year).

Date Range Button Color

This property consents you to select the color to be applied to the Data Analysis object's Date Range Buttons.
For further information on the color selections please refer to the "Color Selection" paragraph.

Show Compare Date Range Buttons

This selection renders the command buttons available for selecting the date ranges to be compared in the Data Analysis object. Thise buttons are: none, (min.), (hour), (day), (week), (month), (year).

Compare Date Range Button Color

This property consents you to select the color to be applied to the Compare Data Range buttons in the Data Analysis object.
For further information on color selections please refer to the "Color Selection" paragraph.

Measure Text Color

This property allows you to assign a color to the text that indicates the measure value once this feature has been enabled through the "Measure" button.

Take note that by using the "Preserve Colors" property from the "General" properties group, the measure text color settings can be retained during public symbol updating.

Date Range
This property consents to selecting a data range to be displayed for default when loading the Data Analysis object. The possible selections are: all, (min.), (hour), (day), (week), (month), (year).

Button Size
The **'Button Size'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Align Buttons
The **'Align Buttons'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Pause-Run Button Text
The text which is to appear on the **'Pause-Run Button Text'** is entered in this edit box. The default text will be used if left blank.

None Button Text
This edit box is used for inserting the text to show on the **"None Button"** on the bar of buttons for selecting the comparison time range. If this field is left empty, the text for default will be used instead.

All Button Text
This edit box is used for inserting the text to show on the "**All Button"** on the bar of buttons for selecting the comparison time range. If this field is left empty, the text for default will be used instead.

Sec. Button Text
This edit box is used for inserting the text which is to appear on the scroll buttons when selecting the Minute is selected as the time range to be displayed. If this field is left empty, the text for default will be used instead.

Min. Button Text
This edit box is used for inserting the text to show on the "**Min. Button"** on the bar of buttons for selecting the comparison time range. If this field is left empty, the text for default will be used instead.

Hour Button Text
This edit box is used for inserting the text to show on the "**Hour Button "** on the bar of buttons for selecting the comparison time range. If this field is left empty, the text for default will be used instead.

Day Button Text
This edit box is used for inserting the text to show on the **"Day Button "** on the bar of buttons for selecting the comparison time range. If this field is left empty, the text for default will be used instead.

Week Button Text
This edit box is used for inserting the text to show on the "**Week Button "** on the bar of buttons for selecting the comparison time range. If this field is left empty, the text for default will be used instead.

Month Button Text
This edit box is used for inserting the text to show on the "**Month Button "** on the bar of buttons for selecting the comparison time range. If this field is left empty, the text for default will be used instead.

Year Button Text
This edit box is used for inserting the text to show on the **"Year Button "** on the bar of buttons for selecting the comparison time range. If this field is left empty, the text for default will be used instead.

Page Prev. Button Text
The text which is to appear on the **'Page Prev. Button Text'** is entered in this edit box. The default text will be used if left blank.

When the Data Analysis is being used, the text of this button changes according to the time range selected. If nothing is inserted in this property, Movicon will use any string ID that has been inserted in the time range selection button texts properties ("Second Button Text", "Minute Button Text", "Hour Button Text", etc.) to show as this button's text which will change automatically according to time range selected. If you wish to used custom text for this button, you can insert text composed of two parts in this property: the custom text and the "%s" parameter which is needed for automatically adding the time base to be displayed according to the time ranged selected on the chart. The "%s" parameter can be inserted either before or after the custom text, depending on where you want it to be positioned. If the custom text must support change language as well you will need to insert the text in a String ID. In this case, the "%s" parameter will have to also be inserted within the strng of each language.
For instance, when inserting the following texts into these properties:

Minute Button Text = Minute
Hour Button Text = Hour
Prev. Page Button Text = Prev. %s

and then in runtime the "minute", time range is selected using the predisposed button , the texts that will display on the "Minute Button", "Hour Button", and "Prev. Page Button" are:

Minute Button Text = Minute
Hour Button Text = Hour
Prev. Page Button Text = Prev. Minute

and then selecing the "hour" range using the predisposed button in runtime, the texts that will display on the "Minute Button", "Hour Button", and "Prev. Page Button" are:

Minute Button Text = Minute
Hour Button Text = Hour
Prev. Page Button Text = Prev. Hour

When a "Multiplier Factor" is applied to the scroll buttons, this will automatically add the %dx syntax at the end of the buttons' texts. For example, if a multiple of 5 factor is applied in the example above, the Prev. Page Button's text will become:

Prev. Page Button Text = Prev. Hour 5x

Prev. Button Text

The text which is to appear on the **'Prev. Button Text'** is entered in this edit box. The default text will be used if left blank.
When the Data Analysis is being used, the text of this button changes according to the time range selected. If nothing is inserted in this property, Movicon will use any string ID that has been inserted in the time range selection button texts properties ("Second Button Text", "Minute Button Text", "Hour Button Text", etc.) to show as this button's text which will change automatically according to time range selected. If you wish to used custom text for this button, you can insert text composed of two parts in this property: the custom text and the "%s" parameter which is needed for automatically adding the time base to be displayed according to the time ranged selected on the chart. The "%s" parameter can be inserted either before or after the custom text, depending on where you want it to be positioned. If the custom text must support change language as well you will need to insert the text in a String ID. In this case, the "%s" parameter will have to also be inserted within the strng of each language.
For instance, when inserting the following texts into these properties:

Minute Button Text = Minute
Hour Button Text = Hour
Prev. Page Button Text = Prev. %s

and then in runtime the "minute", time range is selected using the predisposed button , the texts that will display on the "Minute Button" and "Prev. Page Button" are:

Minute Button Text = Minute
Prev. Page Button Text = Prev. Second

and then selecing the "hour" range using the predisposed button in runtime, the texts that will display on the "Minute Button", and "Prev. Page Button" are:

Minute Button Text = Minute
Prev. Page Button Text = Prev. Minute

When a "Multiplier Factor" is applied to the scroll buttons, this will automatically add the %dx syntax at the end of the buttons' texts. For example, if a multiple of 5 factor is applied in the example above, the Prev. Page Button's text will become:

Prev. Page Button Text = Prev. Minute 5x

Next Button Text

The text which is to appear on the **'Next Button Text'** is entered in this edit box. The default text will be used if left blank.
When the Data Analysis is being used, the text of this button changes according to the time range selected. If nothing is inserted in this property, Movicon will use any string ID that has been inserted in the time range selection button texts properties ("Second Button Text", "Minute Button Text", "Hour Button Text", etc.) to show as this button's text which will change automatically according to time range selected. If you wish to used custom text for this button, you can insert text composed of two parts in this property: the custom text and the "%s" parameter which is needed for automatically adding the time base to be displayed according to the time ranged selected on the chart. The "%s" parameter can be inserted either before or after the custom text, depending on where you want it to be positioned. If the custom text must support change language as well you will need to insert the text in a String ID. In this case, the "%s" parameter will have to also be inserted within the strng of each language.
For instance, when inserting the following texts into these properties:

Second Button Text = Second
Minute Button Text = Minute
Next Button Text = Next %s

and then in runtime the "minute", time range is selected using the predisposed button , the texts that will display on the "Minute Button" and "Next Button" are:

Minute Button Text = Minute
Next Button Text = Next Second

and then in runtime the "hour", time range is selected using the predisposed button , the texts that will display on the "Minute Button" and "Next Button" are:

Minute Button Text = Minute
Next Button Text = Next Minute

When a "Multiplier Factor" is applied to the scroll buttons, this will automatically add the %dx syntax at the end of the buttons' texts. For example, if a multiple of 5 factor is applied in the example above, the "Next Button" text will become:

Next Button Text = Next Minute 5x

Page Next Button Text

The text which is to appear on the **'Page Next Button Text'** is entered in this edit box. The default text will be used if left blank.
When the Data Analysis is being used, the text of this button changes according to the time range selected. If nothing is inserted in this property, Movicon will use any string ID that has been inserted in the time range selection button texts properties ("Second Button Text", "Minute Button Text", "Hour Button Text", etc.) to show as this button's text which will change automatically according to time range selected. If you wish to used custom text for this button, you can insert text composed of two parts in this property: the custom text and the "%s" parameter which is needed for automatically adding the time base to be displayed according to the time ranged selected on the chart. The "%s" parameter can be inserted either before or after the custom text, depending on where you want it to be positioned. If the custom text must support change language as well you will need to insert the text in a String ID. In this case, the "%s" parameter will have to also be inserted within the strng of each language.
For instance, when inserting the following texts into these properties:

Minute Button Text = Minute
Hour Button Text = Hour
Page Next Button Text = Next %s

and then in runtime the "minute", time range is selected using the predisposed button , the texts that will display on the "Minute Button", "Hour Button" and "Page Next Button":

Minute Button Text = Minute
Hour Button Text = Hour
Page Next Button Text = Next Minute

and then in runtime the "hour", time range is selected using the predisposed button , the texts that will display on the "Minute Button", "Hour Button" and "Page Next Button":

Minute Button Text = Minute
Hour Button Text = Hour
Page Next Button Text = Next Hour

When a "Multiplier Factor" is applied to the scroll buttons, this will automatically add the %dx syntax at the end of the buttons' texts. For example, if a multiple of 5 factor is applied in the example above, the "Page Next Button" text will become:

Page Next Button Text = Next Hour 5x

Expand Button Text
The text which is to appear on the **'Expand Button Text'** is entered in this edit box. The default text will be used if left blank.

Zoom Button Text
The text to appear on the **"Zoom Button"** is entered in this edit box. The default text is used when this field is left blank.

Measure Button Text
The text to appear on the **"Measure Button"** is entered in this edit box. The default text is used when this field is left blank.

Print Button Text
The text which is to appear on the **'Print Button Text'** is entered in this edit box. The default text will be used if left blank.

First Point Button Text
The text to show in the **"First Point Button"** is insert in this editbox. The default text will be used if this field is left empty.

Last Point Button Text
The text to show in the **"Last Point Button"** is insert in this editbox. The default text will be used if this field is left empty.

Next Point Button Text
The text to show in the **"Next Point Button"** is insert in this editbox. The default text will be used if this field is left empty

Previous Point Button Text
The text to show in the **"Previous Point Button"** is insert in this editbox. The default text will be used if this field is left empty

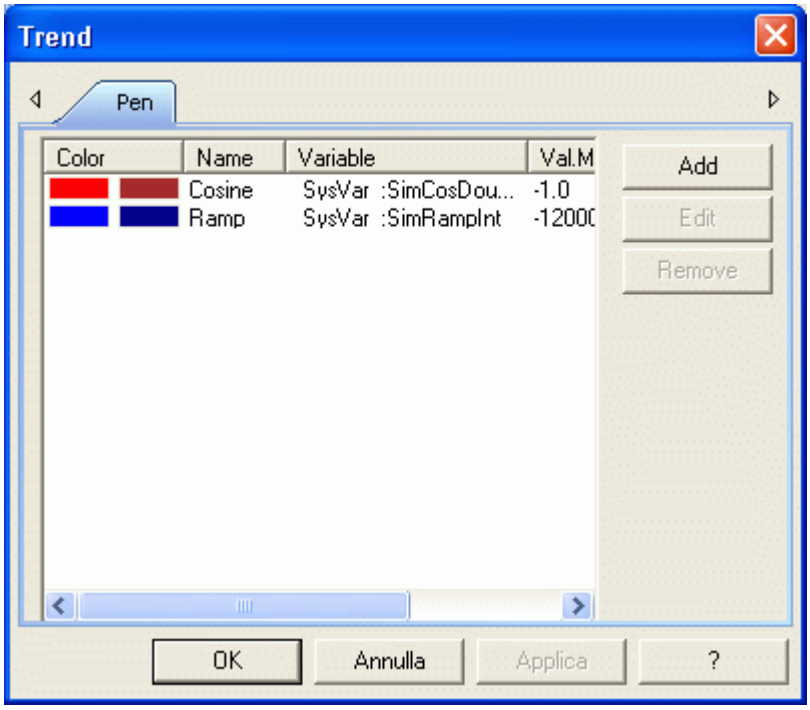
Default Filter
This edit box is used for entering a text string containing the filter function in standard **SQL** language in data to be selected from the Database. For further information please refer to the section on "Default Filter".

Default Sort
This edit box is used for entering a text string containing the sort function in standard **SQL** language in data to be selected from the Database. For further information please refer to the section on "Default Filter".

Default Query
This edit box is used for entering a text string containing the query in standard **SQL** language in data to be selected from the Database. For further information please refer to the section on "Default Filter".

10.27.16. Trend and Data Analysis Pen Properties

The Pen properties are used for setting associations between the curves displayed in the Trend/Data Analysis and the Movicon variables, being the same variables of the associated Data Logger.
Each pen accesses to a following window for setting the complete chart style desired.



This window shows the pen table inserted in the objects, indicating the colors, names and database variables associated.
To insert new pens you need to press the **Add** button on the right hand border, through which the setting window, as shown below, is activated.
To change the pen settings previously inserted you need to activate the **Edit** button after having selected the pen desired.
To delete a pen from the object, you have to select it first, then press the **Remove** button.

The Trend and Data Analysis allow you to modify the order in which pens are displayed in the legend. This option is managed in the pen edit window, which is a window showing a list of all the pens associated to the Trend or Data Analysis object. In this window you can change around the pens from one position to another in the list by simply selecting one and moving to the top or bottom with the mouse pressed down.

Pen Configurations

The **Edit Pen Properties** window is accessed when the **Add** or **Edit** commands are used. This window can also be accessed in RunTime by double-clicking on the pen line you wish to change. However, the pen's name of the variable associated to it cannot be changed when accessed in this way. Furthermore, if a configuration file has not been associated to the object, any changes made will only be kept until the Trend remains active and will be lost when the screen is closed.

The Edit Pen Properties are subdivided in groups for graphic reasons only.

General

Name
The name you wish to assign to the pen is entered in this box. The name can also be different from the variable's and will be represented in the Trend/Data Analysis window's legend and recorded on file as the name of the assigned values.

The text string which can be associated to the pen supports all the special and space characters, leaving it to the programmer's discretion to use the separation characters (tabulations or commas).

The Trend/Data Analysis's pens can also have the change language function by inserting a string ID with the same name as the pen's.

Variable

The name of the variable to be associated to the Trend/Data Analysis's pen is entered in this edit box (or selected with the "..." browse button on the right). The selected variables will be sampled by the Trend according to the modalities set.
New variables can be entered into the Real-Time DB if needed by double-clicking on the option box.
In cases in which the Trend/Data Analysis is linked to a DataLogger, Movicon will search the Table for a column with the same name as the variable entered in the "Variable Pen" field. If the name of the variable and column names are different you will need to specify the name of the column in the "Data Logger Column' field.
When using the Movicon Embedded Reports you can also select the database in addition to a variable in the Trend or Chart object's "Variable Pen"' property. Selecting a field from the database, which returns a specific syntax, it will then be necessary to set the "Data Logger Column" with the correct column name as well.

Data Logger Name

This property, which is only available for the Data Analysis object, is used for entering the name of the DataLogger which the pen belongs to. Curves of pens deriving from different dataLoggers can be displayed by the Data Analysis as described in the paragraph on "Connecting different Data Loggers to a Data Analysis object". In cases where a dataLogger name is not specified for the pen in this property, the Data Logger set in the Data Analysis style properties will be used.

Data Logger Col.

The variable name (or the DB field name when using a Movicon Embedded Report) inserted in the "Variable Pen" property may be different from the Data Logger column name to which the Tredn/DataAnalysis is linked. the "Data Logger Column" property allows the reference column to be set for the pen when the name of the variable linked to the pen ("Variable Pen" property) is not the same as the column's name. When left empty, the name of the variable will be considered as column's name.

Visible (Pen)

This selection box permits the trace visibility to be set in the Trend/Data Analysis window, allowing data to be sampled without displaying the values in the Trend. The Pen name will however remain visible in the Legend even when the curve is not displayed in the Trend/Data Analysis.

Visible in Legend

This option allows the pen to be displayed or not to be displayed in the Trend/Data Analysis legend.

Editable

This property allows you to make the pen editable during Runtime mode. A pen can be edited during Runtime by double clicking on the curve or the pen's name in the Legend or on the pen's scale.

Use TimeStamp

When enabled, this option allows the pen points to display in order according to the 'timestamp' column and not the 'Time' column with which data has been recorded in the associated Data Logger. In order for this to work, you must enable variable's timestamp for recording in the Datalogger, therefore enabling the Datalogger's column "Add TimeStamp Column" property.

Please remember that for a pen whose points are displayed according to the "timestamp" column, the data will be filtered respecting the "Time" column with which data is recorded by the Data Logger. l

When the TimeStamp is enabled, data will be displayed without calculating the time zone and local legal time of the PC in which it was plotted therefore in cases where being displayed from a Networking client or Web client it will be plotted with the same time displayed on the Server.

Scale

Pen scale major tick values can be customized using the string table. By inserting a string identifier in the string table with this format: "_<PenName>_<Tick Number>_" (where the tick number starts from '1'), the value represented in a pen scale tick can be replaced by the text desired.

Auto

When this property is enabled the pen's scale will automatically adapt according to the value obtained by the pen so that the highest value obtained by the pen is displayed at the top of the scale.
The automatic scale is managed in this way to guarantee that the first and last ticks are always set with the integer values without decimals.

Min. Value

The lowest value which the variable in the Trend/Data Analysis may obtain is set in this edit box and which will be returned on the variable's scale situated on the Trend/Data Analysis's border at the side.
When the variable linked to the Trend/Data analysis has its "Enable Scaling" property enabled, the minimum value used will be the one set in the variable's "Scale Min." property.

Max.Value

The highest value which the variable in the Trend/Data Analysis may obtain is set in this edit box will be returned on the variable' s scale situated on the Trend/Data Analysis's border at the side.
When the variable linked to the Trend/Data Analysis has its "Enable Scaling" property enabled the minimum value used will the one set in the variable's "Scale Max." property.

Pen Values Format

By using this option box you can set how the numeric format of the variable associated to the Trend is to be displayed.
The format types available are only those listed in the "Predefined Movicon Formats" paragraph in the "Data Formats" section.

In case where this property has not been set (left blank) the Trend/Data Analysis will inherit any format defined in the associated variable's "Default Format" property.

Visible (Scale)

When checking this box the scale of values will be enabled on the border at the side of the Trend/Data Analysis window. If left unchecked, the scale will not be displayed for pen being configured.

Right-Bottom

When this property is enabled the pen's scale will be displayed at the bottom or on the right of the Trend/Data Analysis area.

Log. scale

When this property is enabled, the scale displayed for the pen will assume the logarithmic values instead of the linear values for default.

Eng. Unit

This edit box is used for inserting a text for identifying the Trend/Data Analysis's variable's engineering units to be represented. In instances where a text is not entered, the one in the variable will be used instead. The engineering unit will be displayed in the legend after the pen's description.

Style

Plot Type

The pen configuration provides the possibility to select the type of trace to be assigned to the variable, by choosing one of the four options offered by the system on the list available.
The curve graphic possibilities are:

- **Line**: the trace is represented by one simple line
- **Rectangle**: the trace is represented by a series of vertical bars (bargraph)
- **Area**: in this case the area subtended by the chart's curve is flood filled by a color
- **Line-Area**: in this case the area subtended by the chart's curve is filled with a series of vertical bars
- **Line-Step**: the trace is represented by a simple line, but the curve is drawn with a straight line, parallel to the X axis in function with the Y value. This line is kept straight until the next Y value variation and eventually instead of looking like a curve will look like steps.

Pen Color

By using the "Color" selection button you can set the color for the pen, its trace in the Trend/Data Analysis and any correlated data.
For further information on selecting colors please refer to the paragraph on "Color Selection".

Pen Size

This edit box permits you to size the line (in pixels) associated to the variable.

Pen Style

This is used to set the trace's graphical property. By means of using the list you can select the type of line to be displayed which may be a continuous solid line, dashes or other.

Brush Style

This is used for setting the graphic style for the area subtended by the trace in the Trend/Data Analysis, when a non standard line type has been selected.

Brush Color

This is used for setting the color for the Trend/Data Analysis trace's floodfill, when as non standard line type has been selected.
For further information on selecting colors please refer to the paragraph on "Color Selection".

Points

This setting highlights the points along the Trend/Data Analysis curve.

Labels

This setting permits the pen's values to be displayed in correspondence to each point in the graphic. Labels are only controlled in the Trend object and which are displayed near each point only if these points are not too near to each other.
The labels are also displayed in XY trends. Two pairs of values corresponding to the X axis value and the Y axis value appear separated by a comma.

Saved Values

This setting allows the curve to be frozen upon enabling this property. The frozen curve is then displayed in the Trend with a dashed line while the actual curve will continue running in the Trend. Therefore, two curves will be obtained for the same pen, one in realtime and the other one saved the movement this property was enabled. This function is used for comparing curve values in realtime with those from a moment ago. When this property is disabled again, the frozen curve will cancelled and on the one in realtime will remain in the Trend.
Enabling/disabling this property only has significance in runtime mode only.

Statistic

Minimum Pen / Maximum Pen / Average Pen

When these properties are enables, an additional trace will be displayed in the Trend/Data Analysis window, set with a standard horizontal line representing the Minimum value, the Maximum value and the Average value assumed by the variables associated to the pen, among those sampled and filed in the Trend's buffer.
When enabled, these traces can be set with a color, size and style as described below.

Minimum / Maximum / Average Pen Color

The colors of the traces representing the Minimum, Maximum and Average values assumed by the variable associated to the pen are set by using the 'Color' selection button.
For further information on selecting colors please refer to the paragraph on "Color Selection".

Minimum / Maximum / Average Pen Size
This edit box is used for setting the size of the trace representing the Minimum, Maximum and Average values assumed by the variable associated to the pen.

Minimum / Maximum / Average Pen Style
This is used to set the graphical property of the traces representing the Minimum, Maximum and Average values assumed by the variable associated to the pen. By means of using the list you can select the type of line to be displayed which may be a solid line, dashes or other.

10.27.17. Trends Pen Area Properties

The Pen Area Properties of the Trend are used for setting up the main configurations of the area in which the pens, indicating the real-time values of the variables associated to the Trend, are displayed.
To change the Pen Area properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Visible
The **"Visible"** property allows the Trend's "Pen Area" to be displayed or hidden.

Border
The **"Border"** property allows the border relating to the Trend's "Pen Area" to be displayed. This applies to the display area of the pens only.

Raised Border
The **"Raised Border"** property allows the border relating to Trend's "Pen Area" to be displayed with a raised 3D effect instead of sunken. This applies to the display area of the pens only.

Size
This property is used for setting the size of the Trend's "Pen Area" in pixels. This applies to the display area of the pens only.

Brush Style
This property allows you to select the type of brush stroke (hatched) from the list of the various styles available, to be applied to the Trend's "Pen Area", being the display area of the pens only.

Color
This property allows you to select the background color to be applied to the Trend's "Pen Area", being the display area of the pens only.
For further information on the color selection please refer to the paragraph on "Color Selection".

10.27.18. Trend and Data Analysis Legend Area Properties

The Trend/Data Analysis Legend Area properties determine the main configurations of the area in which the legend of the Trend/Data Analysis's pens are displayed.
To change the Legend Area properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Visible
The **"Visible"** property consents the Trend/Data Analysis's "Legend Area" to be hidden or displayed.

Max. Nr. Visible Pens
This property allows a limit to be set on the number of pens displayed in the legend so that it will not get oversized. Small Scroll buttons will appear to the right of the legend to scroll the legend's pen list. This property has been preset with the value '4'.

The Trend objects will displayed with these characteristics when opening projects created with the previous Movicon version.

The "MaxLegendVisiblePen" property from "TrendCmdTarget" basic interface allows this parameter to be read/changed in runtime. In this case, when modified a "Refresh" will need to be carried out to update the Trend/Data Analysis graphically with the new settings.

Border
The **"Border"** property consents the border relating to the Trend/Data Analysis's "Legend Area" to be displayed. This applies to the display area of the legend only.

Raised Border
The "Raised Border" property allows the border relating to the Trend/Data Analysis's "Legend Area" to be displayed with a risen border instead of a flat one. This applies to the display area of the legend only.

Brush Style
This property allows you to select the type of brush stroke (hatched) to be applied to the Trend/Data Analysis's "Legend Area". This applies to the display area of the legend only.

Color
This property allows you to select the background color to be applied to the Trend/Data Analysis's "Legend Area". This applies to the display area of the legend only.
For further information on the color selection please refer to the paragraph on "Color Selection".

Font
A window will activate by using the **"..."** button on the right hand of the box where you can select the font to be associated to the texts representing the Trend/Data Analysis's legend. The selection is done by using the Windows standard modalities.

10.27.19. Trend and Data Analysis Time Area Properties

The Trend/Data Analysis's Time Area properties determine the main configurations of the area in which the data and time, corresponding to the major divisions of X axis, will be displayed.
To change the Time Area properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Visible
The **"Visible"** property allows the Trend's "Time Area" to be displayed or hidden.

Automatic Scale
When enabled this option consents the date range scale axis to adapt to the data loaded in the Data Analysis object accordingly. When enabling this option, the buttons for scrolling data ("<", "<<", ">>" and ">") and inserting comparison curves become no longer usable.

Border
The **"Border"** property allows the border relating to the Trend/Data Analysis's "Time Area" to be displayed. This applies to the display area of the date and time only.

Raised Border
The **"Raised Border"** property allows the border relating to Trend/Data Analysis's "Time Area" to be displayed with a raised effect instead of flat one. This applies to the display area of the date and time only.

Brush Style
This property allows you to select the type of brush stroke (hatched) from the list of the various styles available, to be applied to the Trend/Data Analysis's "Time Area", being the display area of the data and time only.

Color
This property allows you to select the background color to be applied to the Trend/Data Analysis's "Time Area", being the display area of the time and date only. For further information on the color selection please refer to the paragraph on "Color Selection".

Text Color
A window will activate by using the **"..."** button on the right hand of the box where you can select the color to be associated to the texts representing the Trend/Data Analysis's time area.

For further information on the color selection please refer to the paragraph on "Color Selection".

Font

A window will activate by using the **"..."** button on the right hand of the box where you can select the font to be associated to the texts representing the Trend/Data Analysis's time area. The selection is done by using the Windows standard modalities.

Font Orientation

This property tilts the display of the strings which represents the recording's date and time. The maximum tilt is 45 degrees. This allows the number of vertical label to be increased without superimposing any texts.

Show Ms

This property permits the values (in milliseconds), in recording time of the Trend/Data Analysis's"Time Area", to be displayed or hidden.
As the Data Analysis object is concerned, enabling this property will display the milliseond values in the curve's point labels when the cursor positions on top.
In addition this option permits the values to be plotted correctly in the 'Trend/Data Analysis Grid' area based on the millisecond values of historically logged samples in the Data Base.
Ultimately, the 'Show Ms' is automatically activated when a Data Logger is associated to the Data Analysis object to record by time.

Show Date

This property permits the recording date, displayed in the Trend/Data Analysis's"Time Area", to be displayed or hidden.

Time Format

This property consents to formatting dates and times with which the data is to be displayed in the Trend/Data Analysis time area. The **"Show Ms"** property will remain unchanged and continue to add milliseconds. The **"Show Date"** property however, does not have any effect in cases where this custom format is used.

When the date and time format has been customized, it will be shown on one line only.

The format types available are only those listed in the "Formats for Date and Time values" paragraph from the "Data Formats" section.

Time Scale

This property allows you to enable the time scale's axis in function with the data loaded for the Data Analysis object. This option is available in three modes:

Adjust to Values:
Adjusts the Time Area according to the start and end date referred to by the cursor's position for the query to recover data. For example, when selecting a day range, the data recovered for this range will be displayed starting from the first available data to the last available data within the 24 hours of the day selected by the cursor.
If a data filter is applied by using the time range buttons (minute), (hour), (day), (month) and (year),data will be selected staring from the date and time indicated by the cursor's position.

Absolute Ranges:
Adjusts the time area according to start and final date specified in the query or the cursor's position in combination to the date range selected with the (min.), (hour), (day), (week), (month and (year)buttons. When respecting the date and time indicated by the cursor, and selecting an (hour) range using the time range buttons, the Time Area will adjust starting from the beginning or the selected hour. When selecting a (day) range, the Time Area will adjust starting from midnight and continue throughout the following 24 hours in relation to the day indicated by the cursor's position.

Relative Ranges:
Uses the PC's current date and time as final date and time for selected data by adjusting the period to the time range selected. For example, when selecting a (day) range, data from the last 24 hours will be recovered starting from the current time.

Show Item Side by Side

This property is available only when a "Chart" object has been inserted in a Movicon "Embedded Reports" from the "ToolBox Objects for Reports"per i report. When this option is checked and if there are two or more pens, the object will be displayed with bars side by side for each X axis value instead of being overlapped. This option only has effect if the "Tipo di Penna" has been set to "rectangle".

Show Labels
This property is available only when a "Chart" object has been inserted in a Movicon "Embedded Reports" from the "ToolBox Objects for Reports" per i report. When this option is checked, the text corresponding to the field values chosen for the X axis will be shown in correlation to the X axis vertical ticks.

Show Labels every
This property is available only when a "Chart" object has been inserted in a Movicon "Embedded Reports" from the "ToolBox Objects for Reports" per i report. This property is only considered when the "Show Labels every" option has been enabled. When enabled, the set value indicates the frequency of ticks the labels are to be associated to along the vertical X axis. For example, when setting the value 3, the labels are written every three ticks along the X axis.

10.27.20. Trend and Data Analysis Grid Properties

The Trend/Data Analysis Grid properties are used to configure the identical styles of the Trend/Data Analysis's X and Y axis.
To change the Grid properties, select the object with the mouse and use the Movicon **"Properties Window"**.

The grid is subdivided into two subdivision types, Major and Minor, meaning the thickness of the lines subdividing the grid fields.

The grid is represented with double colour semi-transparency. This allows you to quickly single out areas between two major ticks. To deactivate the double colour transparency effect, set the option for displaying the grid in normal mode ("Normal X/Y Grid" options).

The transparency effect is not managed by runtime for Windows CE.

XY Grid Visible
These option boxes permit the grid's major lines to be displayed or hidden for the X axis (horizontal axis) or for the Y axis (vertical axis).

X/Y Minor Grid Visible
These option boxes permit the Grid's Minor lines to be displayed or hidden for the X axis (horizontal axis) or for the Y axis (vertical axis). Only has effect with the grid's Major lines enabled.

Nr. Major X/Y Ticks
This edit box is used for customizing the number of Major lines, by entering a value from 1 to 100, to be displayed for the grid in the Trend/Data Analysis window whether for the Grid X (horizontal axis) or the Y Grid card (vertical axis).

The pen scale major tick values can be customized using the string table. You can actually insert an identifier string in the string table with this format: "_<Pen Name >_<Tick Number>_" (where tick number starts from "1"), you can replace the value represented in a pen scale pen with any other text.

Nr. Minor X/Y Ticks
This edit box is used for customizing the number of Minor lines, by entering a value from 1 to 100, to be displayed for the grid in the Trend/Data Analysis window whether for the Grid X (horizontal axis) or the Y Grid card (vertical axis).

Logarithmic X/Y Grid
When enabling this check box, the X or Y grid will be displayed according to the logarithmic functions, instead of in linear mode as for default.

Normal X/Y Grid
When enabling this check box, the lines in the X or Y grid will be displayed with a straight line instead of a dashed line as for default.

X/Y Grid Color

By using the standard color selection, you can assign the colors desired to the grid's lines whether being for the X Grid card or (horizontal axis) or for the Y Grid card (vertical axis).
For further information about color selections please refer to the paragraph on "Color Selection".

Grid Overlap

When enabling this check box the Trend's grid will overlap to the curves.

Grid Shifting

When this check box is enabled the grid will move in the Trend area together with the variable curve lines during runtime. When this box is left unchecked only the curves will move while the grid remains still.
The grid's shift is not active with XY charts.

10.27.21. Trend and Data Analysis Execution Properties

The Execution properties are used for setting Trend/Data Analysis's data samplings.
To change the Execution properties, select the object with the mouse and use the Movicon **"Properties Window"**.

 # Samples

This edit box allows you to set the highest number of samples to be managed by the Trend's sampler and therefore establishing the buffer's memory capacity of the object. When this value is reached while sampling, the oldest data exists from the buffer to make place for new data (FIFO).

The max number of samples manageable is 10,000 for Trends when configured as "Horizontal", "Vertical" or "XY".

This value is also used for the memory capacity for loading values of any query executed when the Trend is put into Pause (stop) mode. Extracted values exceeding this limit will not be managed.

When the Data Analysis object is used this value defines the maximum point number limit that can be displayed. The set value represents the maximum number of values that will be retrieved from the database (default = 36000). This limit is needed for containing memory use and must be set to a value adequate for the computer's memory capacity.

If a very high value is set, a "Out of memory" or "Insufficient memory for executing operation" error may appear when recovering data from the database.

This value is also used by Web Client for recovering data from the Server application.

Record Every

This property is used for setting the sampling time desired for the Trend. The values can be set in Hour, Minute, and Second time units.
The resulting value will be the one used for sampling data which is buffered in memory and displayed according to the modalities set.

Record Every (ms)

This property is used for setting the sampling time in milliseconds.

As you can see, Movicon also allows sampling times to be set in milliseconds, which will required a more demanding CPU performance of the PC which is the programmer's responsibility to evaluate.

 # Update Every

This edit box is used for setting the Trend object's video refresh time of data sampled by the Trend. The number set corresponds to the number of samples executed before the video refresh of sample values is carried out.

The difference between the values being acquired and the values being displayed may be useful to optimize the resource's task without effecting high precision sampling performances.

View Timeframe

This edit box is used for setting the timeframes to be viewed in the Trend area, whether in Start of Stop mode.
The timeframe set will determine the number of samples, indicated in the "# Visible Samples" box, to be viewed.

The is no limit on the amount of time that can be set and that the Trend can display on any one page. Therefore any time can be set in "dd:hh:mm:ss" which will be used by the Trend in runtime to view each of its pages. Any recording "holes" on the data logger will be represented with grey zones (without data), and not with lines. In this way a Trend page will always display a data interval equal to the time set in the "View Timeframe" property.
The Trend used its specific algorithm to display a lot of data in one page only where curves will be represented without altering their appearance with approximations.

 # Visible Samples

This read only property shows the number of samplings to be displayed in the Trend area. This value depends on the Trend's window size in pixels and the "View Timeframe" settings.

Record On File

The Trend's data recording function is activated when this selection is enabled. In this case, the object will record the data it has sampled on file in ".CSV" format according to the sampling modalities set.

The recording of samples executed by the Trend on ".CSV" files is executed by the object only when this is active in memory. In order to keep the Trend object always active, you have to make sure the screen, it is contained in, does not get destroyed and unloaded from memory with a change page by checking the "Not Destroyable" option in the screen's general properties.

If this property is enabled when a Trend is opened, the data is read from a linked text file each time the Trend is paused.
A Trend set for recording on file is capable of retrieving the historical part of data from the text file to which it is linked. Unlike before, cached historical data is now unloaded onto text files when stopping the project while in runtime mode so that the Trend can be loaded and displayed.

When record on file is activated with the "Create New File" left disabled, the Trend will record data in one unique ".csv". file. However, in this case as no file size controls are made, the file will increase every time Movicon adds records to it. Therefore the programmer will have to make sure this file doesn't get too big by cancelling those records no longer needed and making regular backups. If the file gets too big while loading a "Insffuicient Memory" message will appear.
As an alternative to recording ".csv" files using the Trend, you can insert a new DataLogger for recording in IMDB format to record variable value data which will be saved in text files with the advantage of setting a maximum data life span limit after which Movicon will automatically recycle the oldest data when expired.

File Name Suffix

The name you wish to use for recording the output of data sampled by the Trend object must be declared here. The data will be recorded on file in standard .CSV format only if the "Record On File" has been enabled as described above. The date and time of the recording will be added to the suffix if the 'New File' property is enabled.

 # events cache

This edit box is used to configure the number of samples to be buffered in memory before being unloaded on file. This value can be set in function with the sampling time, and is needed to avoid over-accessing the RAM disk with high-frequency samplings.
When the number of samplings indicated in the box has been reached, the system will save the recordings from the disk memory cache.

Max. File Length

This property is used to set the file's maximum length in KBytes. When this size is reached the data will be recycled or a new file will be created according to the settings carried out.

Max. # Files

This property is used for setting the number of files to be created when the "New File" property is enabled. When this number has been reached the data will be recycled starting with the oldest file.

New File

This selection determines the behaviour of output recordings on file of sampled data at the recording's startup. Recording starts when the trend object (or display screen or project startup) is reloaded in memory. At the start of the project process with this box enabled, a new file will be created and the previous data will be cancelled by being rewritten on the old file. When this function is disabled, the data will be recorded in line with the old data on the same file. When a number higher than one has been set in the "Max. # Files" property, a new file will be created at the start of the object's process.

Separator

This field is used for inserting a separator character to be used by the Trend for recording data on ".csv" files. When this field is left empty, the default "TAB" character will be used instead.

Network Server

This property allows you to insert the name of the Movicon network server. In this way the Trend/Data Analysis can ask the Movicon Server for any historical data is has to retrieve and not by using the local project Data Logger's DBMS connection. Historical data from a remote Data Logger will then be displayed on the PC in Trend/Data Analysis form.
Seeing that the Trend/Data Analysis is a able to retrieve historical data from a remote Data Logger, the following properties will need to be set in the Trend object:

- Execution -> Network Server
- Execution -> Max Rows
- Style -> Data Logger Link

The data logger connected to the Trend/Data Analysis must also be configured in the local project. However, its "Enable" property can be disabled to prevent any recordings taking place in local database.

Network Backup Server

See paragraph "Drawings and Controls common Execution Properties".

Max Rows

This property is used for setting the number of records to be loaded from the remote Data Logger when the "Network Server" property is active.

In Web Clients the value entered in the "Samples" property is considered instead.

Load Data in separate thread

This property allows the user interface to be completely free to use as normal in order to interact with other objects in the same screen while data is loaded in the Trend or Data Analysis object.
The progress bar shows when the Separate Thread goes into action to keep user updated. In addition, some Basic Script events of the Trend or Data Analysis which notify data loading or query executions and moves from one record to another in the referenced object's recordset. These Events are:

OnImportStart
OnImportNext
OnImportEnd
OnErrorRecordset
OnRecordsetQueryStart
OnRecordsetMoveNext
OnRecordsetQueryEnd

Commands on Click

See paragraph "Execution Properties" in Drawings and Controls.

Ext. File Settings

Name of "Symbol Configuration Files" in which the Trend/Data Analysis's configuration settings are saved or loaded during RunTime.

The configuration file, set in this property, is automatically loaded when the Trend/Data Analysis is displayed, and automatically saved when any modifications are done to its pen's properties through the appropriate window.
See paragraph "Execution Properties" for Drawings and Controls.

Generate Unique File Name
See paragraph "Execution Properties" for Drawings and Controls.

Load
By using this command the configuration file settings selected in the "Configuration File" property will be loaded and applied to the Trend/Data Analysis object.
See paragraph "Execution Properties" for Drawings and Controls.

Save
By using this command all the Trend/Data Analysis object's settings in the configuration file selected in the "Configuration File" property will be saved.
See paragraph "Execution Properties" for Drawings and Controls.

10.27.22. Trend Variables Properties

The Variables property form is used for configuring the variables for the Trend's operation commands.
Be reminded that the Trend's buffer contents, when switched to Pause (Stop), are determined by the result of a query in the Data Logger (if present), or from data sampled by the Trend's engine.
To change the Variable properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Enable Recording
The name of the variable to be associated for enabling and disabling the sampling of data associated to the Trend pens, is entered in this edit box (variable name can also be selected with the "..." browse button on the right).
Enabling the sampling (and recording) of values is independent of the Trend's operating status.
The "0" value of the variable associated (which may be in bit, byte, word, etc.) will temporarily suspend the sampling = disable. While a value different from "0" will enable the sampling.

Run-Pause
The name of the variable to be associated for setting the Trend's operating status is entered in this edit box (variable name can also be selected with the "..." browse button on the right). The operating status may be Run or Pause (Stop), unless the Trend has been configured to be managed in "Only Run" or Only Pause": for which the variable has no influence.
The transition from "0" value to a different value of the associated variable (which may be in bit, byte, word etc.) changes the Trend's operating status. The variable will be put back to "0" by Movicon automatically.

- **Run Mode**: The Trend samples and represents the values of the current samples
- **Pause Mode**: The Trend continues to sample but displays historical data, by executing any queries in the associated Data Logger (if present) or if otherwise, displays the samples presently contained in the buffer

Cursor In
The name of the variable to be associated to the position where you wish to set the cursor for pointing sampled data displayed in Pause mode is entered in this box (or selected with the "..." browse button on the right). The cursor is represented by a vertical line in the centre of the Trend window.
The word type variable sets the desired number of samples to be pointed, with a value between 1 and the maximum number of samples value (buffer capacity) set.

Cursor Out
The name of the variable to be associated to the position obtained by cursor and returned by the Trend in Pause mode is entered in this edit box (variable name can also be selected with the "..." browse button on the right).
The cursor is represented by a vertical line in the centre of the Trend window.
The word type variable sets the desired number of samples to be pointed, with a value between 1 and the maximum number of samples value (buffer capacity) set.

Scroll Next

The name of the variable for executing the 'next value' command for the value pointed by the Trend's cursor in Pause mode is inserted in this edit box (variable name can also be selected with the "..." browse button on the right).

The change over from the associated variable's value from "0" to a different value (which may be in bit, byte word etc.) will bring forward the next sample, displaying a new value following the one pointed in the Trend's buffer.

Scroll Prev.

As for the "Scroll Next" variable, but for displaying a new value preceding the one pointed by the cursor in the Trend's buffer.

Scroll Begin.

The name of the variable for executing the command for displaying the first sampled value or contents in the Trend's buffer in Pause mode is entered in this edit box (variable name can also be selected with the "..." browse button on the right).

The change over of the associated variable's value from "0" to a different one (which may be in bit, byte word etc.) determines the pointing to the first value in the buffer and of its display in the Trend.

Scroll End.

As for the "Scroll Begin" variable, but for pointing and displaying the last sampling or value in the Trend's Buffer.

Next Page

The name of the variable for executing the "change page" command for the values displayed by the Trend in Pause mode is entered in this edit box (variable name can also be selected with the "..." browse button on the right).

The change over of the associated variable's value from "0" to a different one (which may be in bit, byte word etc.) determines the change page by displaying a new page of values following the value pointed in the Trend's Buffer.

Prev. Page

As for the "Next Page" variable, but for displaying a new page of the values preceding the value pointed in the Trend's buffer.

Add Value

The name of the variable for executing the recording of data on command is entered in this edit box (variable name can also be selected with the "..." browse button on the right). When this variable is set at "1" the Trend will execute a sampling and return the variable to "0". When the "Add Value" variable is inserted, the Trend will no longer record on time but on command only.

Reset Values

The name of the variable for executing the deleting of data in the Trend's buffer is entered in this edit box (variable name can also be selected with the "..." browse button on the right). When setting this variable at "1", the Trend will execute the deleting of data recorded up till that moment and return the variable to "0".

10.27.23. Templates with Trends and Data Analysis

Templates are one of the most useful functionalities for the programmer to have to keep work safeguarded when working in a development environment. The Template philosophy is about allowing symbols from the Movicon library to keep their execution characteristics intact and which can also be applied to Trends and Data Analysis.

This argument has already been dealt with in the previous chapters relating to alarms, graphic animation, Data Loggers and the Movicon libraries and which we will also talk about here to include the Trends. These can receive rather articulated configurations and can also exploit this technology to the aim of being of kept as templates in the symbols library under the Trends category.

The "Template" feature permits you to accelerate work on introducing and configuring the project's recording and displaying objects, permitting other "Database-Symbols-Trend" associations.

Let's suppose we need to realize a recording engine in a project which exploits the database technology and whose values have to be linked to a Trend object comprising of a chart symbol with trend related buttons and controls in order to carry out the selecting or custom analysis of data.

By using the Power Template technology we can realize the chart object with the Movicon graphics editor to build the Trends object and the command objects correlated to it, then configure the recording functions desired placed in relation to a database object inserted and configured in the Data Logger. The chart symbol can then be saved in the Symbols library and receive in association a DataLogger. It can then be inserted whenever needed, and Movicon will create the variables and databases related to the new Trend introduced into the screen and the project.

To apply the Template concept to Trends and the Data Loggers, you need to select the Trend object realized and saved in the Symbols library and use the **"Associate a DataLogger/Recipe"** command, which is accessed with the right mouse key, then select the DataLogger desired.

10.28. The Grid

The Grid object allows table representations of data archived on DataBase files or text files.

The Grid object allows the data contents of DataBase tables to be displayed in table format. The data to be displayed can be part or totally extracted according to the set query.
The Grid object belongs to the Movicon "Advanced Shapes" class and therefore can be inserted on screen by using the **"Objects Window"**.

The Grid is a powerful display tool of data in DataBase format which also allows values to be changed on DataBase Tables.

	VAR00001	VAR00002	VAR00003
1	45	44	5
2	45	6	5
3	34	6	5
4	34	6	5
5	34	6	5
6	34	6	5
7	12	33	5
8	56	43	43

Update (Ctrl+U) | Save (Ctrl+S) | Select All (Ctrl+A) | Copy (Ctrl+C) | Insert (Ins) | Delete (Del)

This is an example of a Grid displaying the contents of a DataBase.

When the Grid's "Clickable" style property is set you can edit the Grid boxes and save changes on DataBase.

In addition to the files in Database format, the Grid is also capable of displaying the data contained in text files (UNICODE format) providing that the data is separated by a preset character. The comma (",") is the character used for default a different one can be setup through the appropriate properties.

The Grid object connects to a database using the ODBC. In order for this to happen you must have a ODBC connection to database to be associated to the Grid. If you are using Windows CE which does not support the ODBC, Movicon CE will use a ADOCE connection.
However, you must take into account that it will not be possible to use a database with the Grid object (Historical Log, DataLogger/Recipe or a variable Trace) if the IMDB as been selected as database. The IMDB does not use ODBC connections and therefore not compatible with the Grid object.

10.28.1. The Grid Buttons

The Grid object allows you to execute some commands during the Runtime phase by using the buttons described below.

Refresh (F5)
This command updates the grid by reloading data from the linked file.

Update (Ctrl+U)
This command executes an update of variables that have the same name of the table columns with record values selected in the Grid. This functionality will only result active if the Grid's "Update Variable" Style property has been enabled as well.

Save (Ctrl+S)
This command saves the table's data on DataBase. For example, any field changes are recorded on DataBase files.

Select All (Ctrl+A)
This command selects all the table's data.

Copy (Ctrl+C)
This command copies of all the data selected in the table onto the Windows clipboard.

Insert (Ins)
This command inserts a new line in the table.

Delete (Del)
This command deletes the line or lines selected in the table.

10.28.2. Grid Style Properties

The Grid Style properties are used for setting up the object's graphic properties.
To edit the Style properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Border
The **"Border"** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Prompt Pad
This property allows the Movicon Alphanumeric Pad to be shown each time a Movicon Grid cellis selected for editing its alphanumeric value.
For further information please refer to the object's "Prompt Pad" property found in the "Style Properties" group.

Events:
The Movicon Grid offers advanced functionalities that can be accessed and configured through its GridWndCmdTarget interface which provides Basic Script functions, Properties and Events for programming it. The 'OnTextChanging' and 'OnTextChanged' events can be exploited for intercepting the previously edited instance or the one immediately after according to the following modes:

a) With the "Prompt Pad" disabled, the 'OnTextChanging' event is notified before the cell enters into edit mode. When set at false, the bRet parameter will impede this from happening by changing the cell's value. However, the 'OnTextChanged' event is only notified when the entered valued has been confirmed with Enter, and the 'ChangedText' reports the new value entered in the cell. The editing operations and relative events can be aborted with the Escape button.
b) With the "Prompt Pad" enabled, the 'OnTextChanging' event is notified before the Alphanumeric Pad appears, and by setting bRet = False will impede any following editing in the cell therefore impeding the appearance of the Alphanumeric Pad. However, the 'OnTextChanged' event is only notified when existing with OK or Enter from the Alphnumeric Pad, and the 'ChangedText' event

reports the new value entered. Editing is aborted by using the Pad's Cancel button or Escape key from the Keyboard.

For further information on the Movicon Grid's VBA interface please refer to the chapter on 'API Interfacce Basic' from the 'VBA Language" topic.

System Registry:
A "General" registry key value called 'ShowPad' is available set at zero for default and usable in Windows CE as well. You will be able to obtain the following combinations by using this value together with the "Prompt Pad" properties:

a) 'ShowPad=0' and 'Prompt Pad=false': Alphanumeric pad will not open.
b) 'ShowPad=0' and ''Prompt Pad=true': Opens the alphanumeric pad.
c) 'ShowPad=1' and 'Prompt Pad=false': Opens the alphanumeric pad.
c) 'ShowPad=1' and ''Prompt Pad=true': Opens the alphanumeric pad.

Clickable
The **"Clickable"** is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Show Control Wnd
The **"Show Control Wnd"** is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Auto Layout
The **"Auto Layout"** is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Refresh Button
This property enables or disables the displaying of the Refresh button.

Update Button
This property enables or disables the displaying of the Update button.

Save Button
This property enables or disables the displaying of the Save button.

Select All Button
This property enables or disables the displaying of the Select All button.

Copy Button
This property enables or disables the displaying of the Copy button.

Insert Button
This property enables or disables the displaying of the Insert button.

Delete Button
This property enables or disables the displaying of the Delete button.

Widths of Grid Columns
This property is used for specifying the widths of each Grid column in pixels. This property is a string where each value indicating each column size is separated by the pipe char. (|). Each value will be associated to each column in order of succession. For instance, If there are three columns in the grid, Col1, Col2 and Col3, and the values "10|20|30" are inserted in this property, the columns will be sized as follows: Col1=10, Col2=20 e Col3=30.
When specifying the column's size with a '0' or negative number, the column will adapt according to the width of its contents. Furthermore, it is not necessary to insert all the columns' widths. Those that are not specified with a value will also automatically adapt according to the width of their contents.

Button Size
The **"Button Size"** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Align Buttons
The **"Align Buttons"** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

Refresh Button Text
This edit box allows you to insert the text to be associated to the Refresh button. When this field is left empty the default text will be used instead.

Update Button Text
This edit box allows you to insert the text to be associated to the Update button. When this field is left empty the default text will be used instead.

Save Button Text
This edit box allows you to insert the text to be associated to the Save Button. When this field is left empty the default text will be used instead.

Select All Button Text
This edit box allows you to insert the text to be associated to the Select All Button. When this field is left empty the default text will be used instead.

Copy Button Text
This edit box allows you to insert the text to be associated to the Copy Button. When this field is left empty the default text will be used instead.

Insert Button Text
This edit box allows you to insert the text to be associated to the Insert Button. When this field is left empty the default text will be used instead.

Delete Button Text
This edit box allows you to insert the text to be associated to the Delete Button. When this field is left empty the default text will be used instead.

Update Variable
This property allows you to enable the possibility to update the variables which have the same names as the Table columns with the record values of the selected grid. Updating is done on the Update button's command.

10.28.3. Grid Execution Properties

The Grid execution properties are used for setting up file connections for display data.
To edit the Execution properties, select the object with the mouse and use the Movicon **"Properties Window"**.

ODBC DSN
This property allows you to insert or create the ODBC DSN connection to be used for accessing the Database to be displayed in the Grid.

The ODBC is not supported in WinCE for the time being and therefore the Database file DSN link cannot be exploited and the Grid's "ODBC DSN" property has to be changed during its configuration phase. This setting will then be different according to whether the Grid has to be linked to a DataLogger/Recipe or to any Database file. In the first case, Movicon will have already opened connections to the file and therefore the Grid should be able to exploit them. In the second case, however, the Grid will have to open a new connection to the DataBase file. As a consequence of this, the "ODBC DSN" property should be set as follows:

- **Connection to DataLogger/Recipe**: the DSN name in the "ODBC DSN" property is replaced with the name of the DataLogger/Recipe
- **Connection to DataBase**: The DSN name in the "ODBC DSN" property is replaced with the DataBase file name to be connected to, without specifying the extension. The DataBase file, in this case, must be found in the project's DLOGGERS folder or one of its sub folders

ODBC DSN User
This property specifies the users name to be used for the ODBC connection.

Query

The extraction query of data from the selected database table is inserted in this edit box. Only data extracted according to the query's parameters is displayed in the Grid.

Text FileName

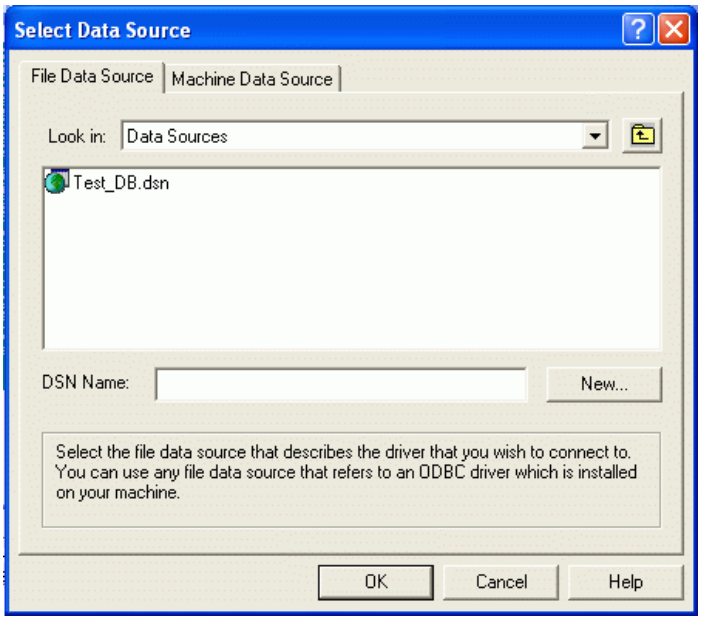
This property allows you to insert or select the name of the text file to be displayed in the Grid instead of a Database file.

Text Separator

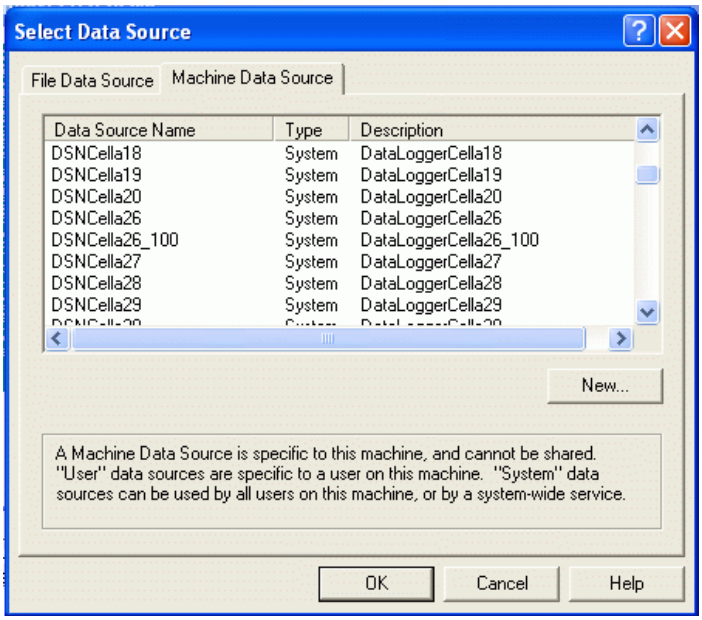
This property allows you to set the separators to be use for separating data in the selected text file to be displayed in the Grid. When this field is left empty the "," default separator character will be used.

10.28.4. Data Source Selection (DSN)

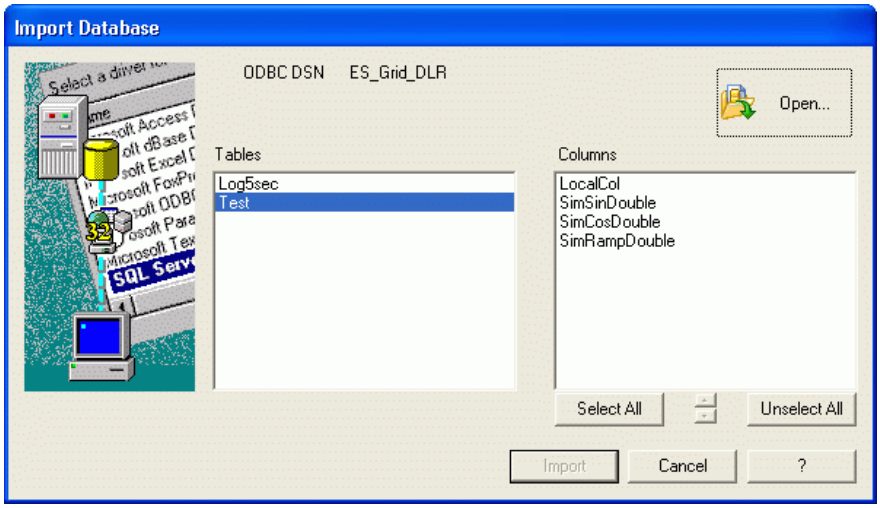
The object Grid allows a Database file to be displayed by exploiting its ODBC DSN connection. It is necessary that there be a DSN Data source for the Database file which you wish to display. To select the data source to be associated to the Grid object you can use the "Open" command from the object's General properties or double click on the object while keeping the SHIFT key pressed down. The following window will appear:



You can select or create a file data source by using the "New..." from this window. If you select the other tab you will be able to select the machine data source:



Once the data source has been selected a window will appear with a list of tables available in the Database, and by selecting the table of interest you will get a list of its fields on the right hand side.



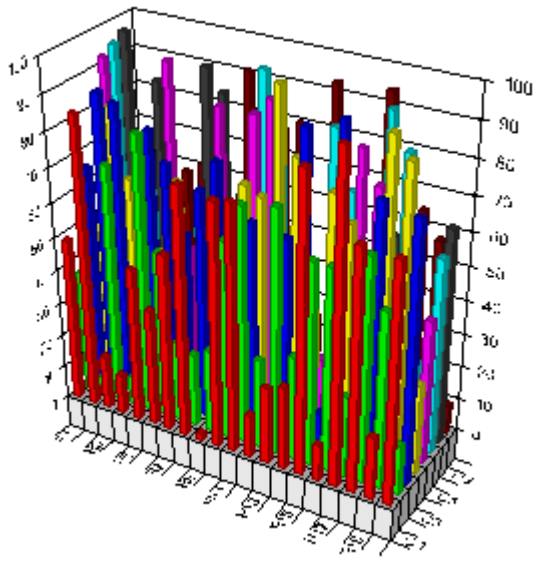
You can select or deselect the table's fields to import the table columns need. A SELECT query will be generated based on the selection made to extract the data to be displayed on the Grid.
The "Open" button allows you to select a new data source, by re-showing the previous window.
The "Import" button ends the data source selection procedure by creating a select query which will then be returned to the **"Query"** property of the **"Grid Execution Properties"** group.

The recognized order in which the data is extracted is the one set by the select query. If the query is changed manually there may no longer be any coherence between the Grid's column titles and the data displayed in those columns. In order to change the Grid's structure as pleased it would be best to use the Basic Script functions for inserting and putting the columns into the order your desire. If you wish to change the columns during the programming phase you can interact on the object's XML codes as usual.

10.29. Chart Objects

Movicon has integrated a very powerful tool for representing project variables on two-dimensional and three-dimensional charts.

Movicon has object windows which can be configured as pleased to create different kinds of charts in relation to the Movicon variables. These objects can be inserted in any Movicon screen by using the "chart" command from the "Trend-Charts-Analisi Dati". ToolBox.
The charts are made up of objects have different style characters from the other Movicon objects seen so far which allow more powerful and sophisticated configurations.



Charts use "Array" type variables. Therefore you need to be careful to the tips reporting the use of the variables in the charts.

A Chart object can represent a series of historical curves, being retrieved data from a Data Logger, or dynamic curves which are data retrieved from a array of data. The curves which represent historical values retrieved from a Data Logger, must not be set with any variable and must have the same name as the Data Logger column where they are to be represented.

For further information on charts and their configurations, please consult the "First Impression 5.0 On-Line documentation" (VCFI5.HLP) online guide, available in the Movicon's installation folder.

The "Chart" object can be used in a screen opened in a separate thread ("Spawn Thread Execution" screen background property). Otherwise the "chart" object will not appear on screen and the following error message will appear in the output window:

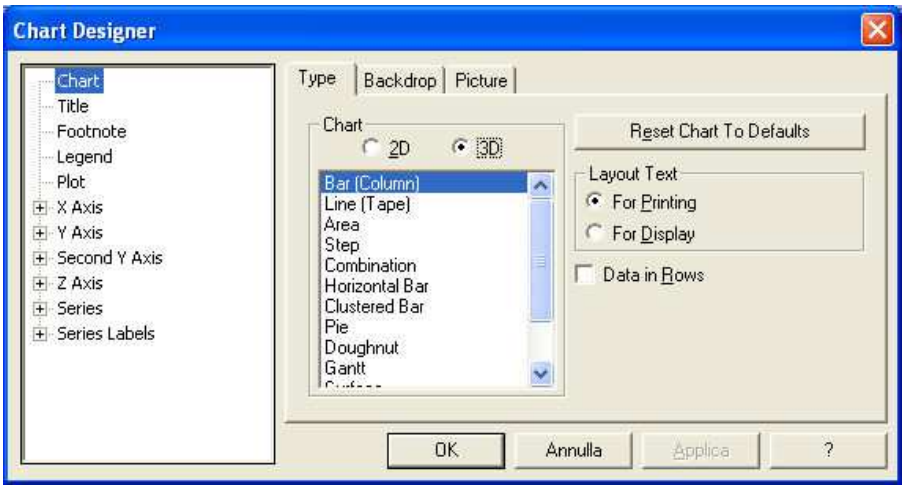
Failed to create chart. Make sure the object isn't inside a synoptic with the separate thread option

10.29.1. Chart Designer

The chart's job is to represent value arrays of the associated variables when placed in a screen.
A chart can contain up to eight variables, configured as "byte Array" types of the same length.

- For example, if the VAR0001 variable is associated to a chart's Curve 1, previously inserted with a fixed length byte array (eg. with sizes of 10 bytes), you will get a 10 value chart representation (chart set with values in bytes). These values will be represented individually by each single byte contents from the array type VAR0001 variable.

The style settings of the chart objects provide numerous possibilities.
This chapter is aimed at describing the configuration applications most commonly used only, by taking into account two different types of charts. The user can use with the numerous style configuration properties to customize his/her chart as pleased.



Configuring the Chart Styles

The charts' general styles and configurations can be setup through their setup windows.

The settings can be done in programming or in runtime mode (on condition that this has been provided by the programmer), by carrying out the very precise techniques as described below.

- During the programming phase, the chart's configuration is accessed through the "Open" button from the general properties window of the Chart properties.
- In Runtime mode, if enabled in the style property, the user can access the general style settings in two distinct ways:
    1. Right mouse clicking in the chart's proximity to access the setting command.
    2. Click to select the part of interest and then double-click.

General Chart Configurations

The general configurations consent to further settings to be done to the chart's style. Access to the General configurations can be obtained by activating the open button from the Chart's General property during the Movicon programming stage.

Apart from this, the General configurations can also be activated in runtime mode, if consented by the programmer, by using the right mouse key.

The general configurations provide numerous custom chart possibilities. In this chapter we will only describe those which are most important and commonly used.

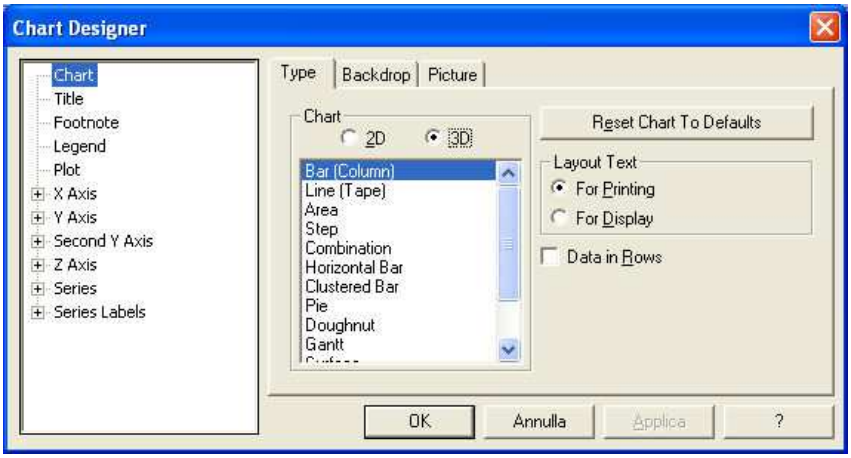


Chart Editing

You can configure and customize the chart completely by using its general properties.
The chart's design can also be adapted in runtime. To access to these features, some of which can only be edited by using the following modalities and using the mouse appropriately:

1. Click on the chart element to be edited (line, scale, grid, etc.). The element will appear highlighted with small squares
2. Double-click. The window for editing the settings will display

Variable Format (series)

Pointing and double-click the chart's variables to active the variable style settings window.
You can edit the colors, sizes or styles of the variables representations in the chart by using these options.

Axis format

Point and double-click the chart grid to activate the variable scale style setting window.
These options allow you to change the color, size and style of the chart's variable scale
This option is important for setting the two operating modes of the scale

1. Automatic, with resizing of scale and chart as the variables change
2. Manual, with scale values whose sizes remain fixed as the variables change. In this case the sizes must be set manually.

Axis Title Format

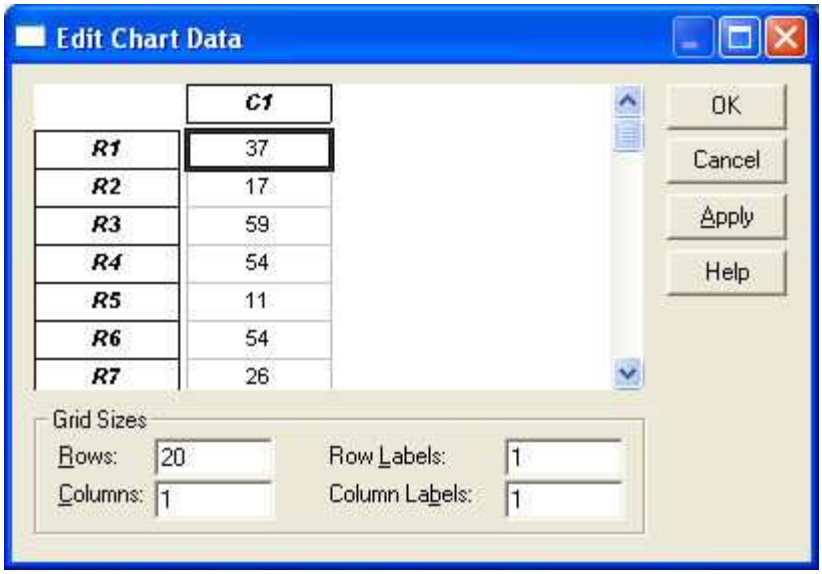
Point and double-click the titles at the side of the chart's axis scales to activate the window for the settings the axis titles.
You can edit the texts, fonts and colors of the titles displayed at the side of the axes in the chart.

Plot Format

Point and double-click the chart's background to activate the window for the chart's style settings, which can also be done through the general configurations.

10.29.2. Editing Data and Labels

By using the "Edit Data and Labels", button found in the General Chart properties, you can access the window for setting the chart's label data during Runtime mode.
This window allows the texts and default values associated to the chart labels to be edited. To edit a label or a value you need to select the data desired, overwrite the new text and confirm with OK.

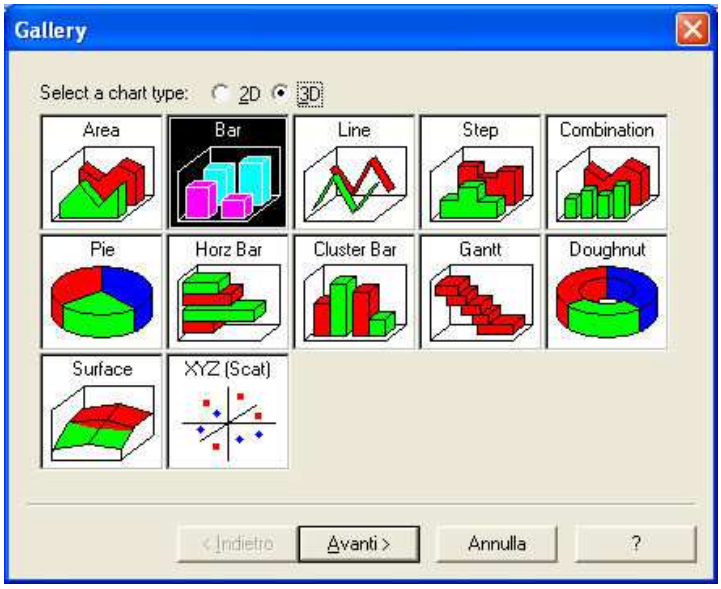


The data entered will replace the default labels displayed in the chart.

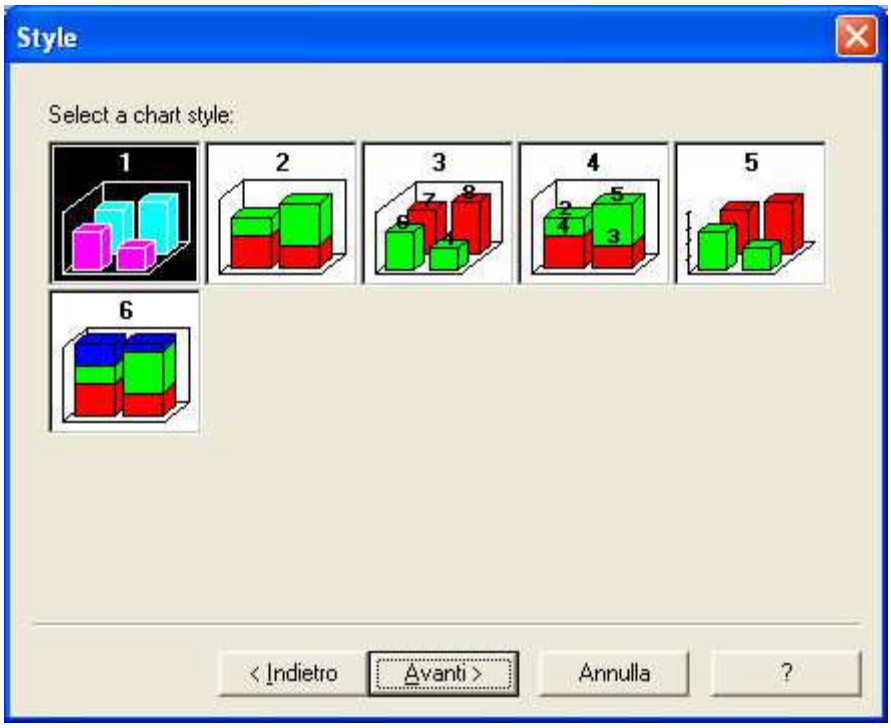
10.29.3. Chart Wizard

When entering a chart object on screen a Gallery window will appear with a simplified display of the style configurations with the use of a wizard to assist you in configuring the chart's style by carrying out four simple guided steps.
When having selected one of the options use the 'Next' button to continue on with the chart's settings which will display instantly.

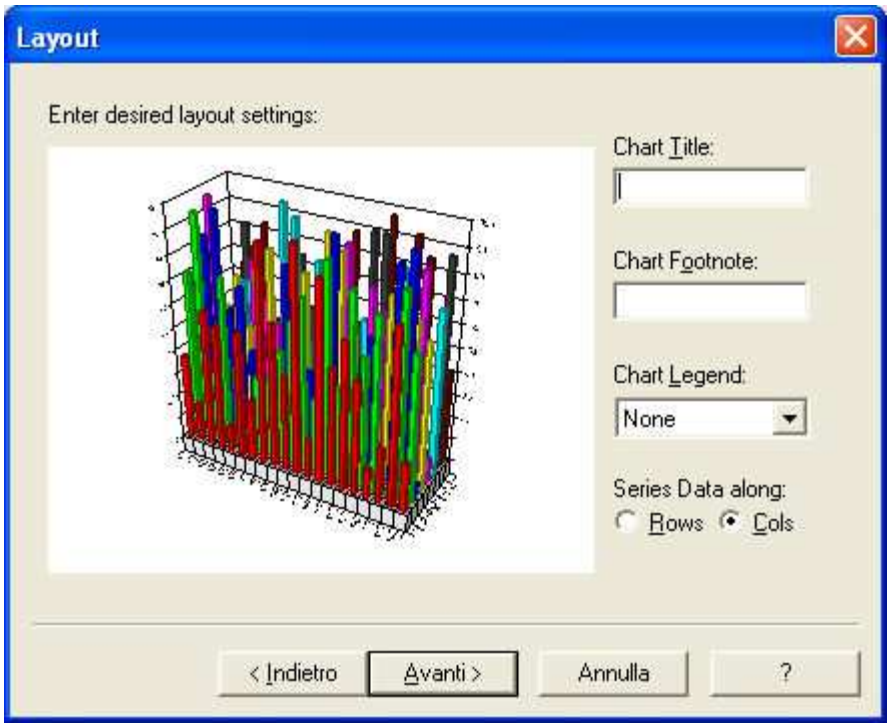
Select either the 2D (two-dimensional) or the 3D (three-dimensional) chart type option. Select the one of the icons representing the different chart aspects.



Note: remember that if you wish to have chart variables both on the X axis and Y axis, you need to select the 2D option and the XY chart type (or XYZ when choosing the 3D option). The associated variable arrays (max. 2/3, in this case), can be represented with their variations both in X and in Y (or in Z when in 3D).



The chart's style becomes easier and intuitive to set up through these type of configurations by directly selecting the chart desired from the corresponding images.
By using the **Next** button you can continue on further with the style configuration by using the settings proposed.



Finally, a title can be assigned to the chart which will appear in the object according to any further settings which might be or may have been carried out in the General configurations.
The chart's layout can also be set to represent data either in Rows or in Columns.

10.29.4. Chart Properties

The Chart objects which are inserted on screen can be completely customized in their properties. This can easily be done by selecting the Chart desired and then change its settings through the Movicon **"Properties Window"**.

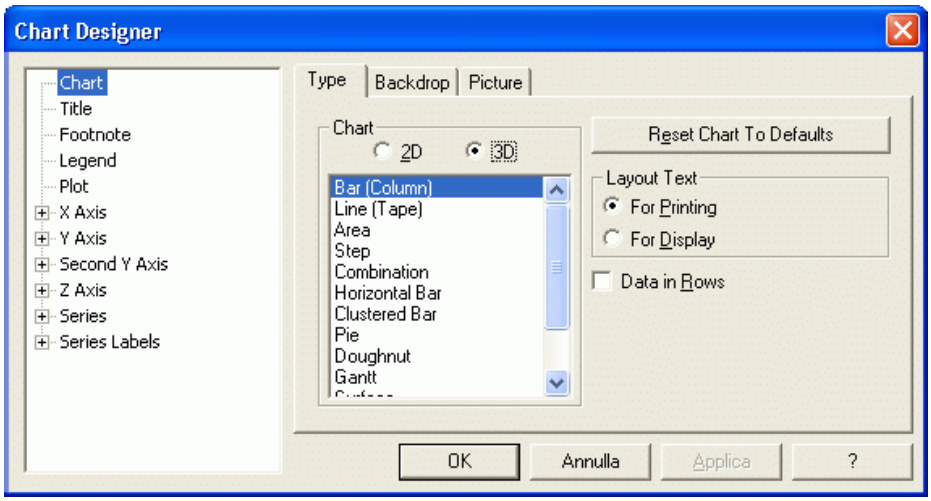
The chart objects have two different types of properties. The Movicon functional properties, which can be set only in programming mode as for all the other objects, and the chart style properties which can be set through an appropriate window whether in programming or runtime mode.

10.29.5. Chart General Properties

As well as all the properties common to all the other Movicon drawings, you can also get access to the "Open" button for the chart's specific properties.

Open

The "Open" button gives you access to the chart's configuration form. The configuration properties are documented with the relating Object's Help Online which can be activated with the Help button situated in each single form.



10.29.6. Chart Execution Properties

By using the Execution properties of a Chart you can associate it with variables and modalities of functioning. In order to do this, select the Chart object on the screen and then change its settings through the Movicon **"Properties Window"**.

Curve Variables

The chart can be managed with the maximum of 8 graphically represented values. These values have to be associated through the project's variables by using the execution properties' Curve Var. <n> boxes. The names of the variables you wish to insert into the chart have to be written in these boxes by selecting them from those existing in the Real Time DataBase.

You must keep in mind that the curves represent arrays of data therefore you must take note of the array length specified in the Num. Samples box when addressing the successive curves.

Important: The Charts use exclusively "Array" type variables for data for which the associated variables have to be configured appropriately in their properties as "Fixed Length Array"Remember that the array's "Fixed

Length" must always be specified in the variable's properties in the "Address" box by setting the number of bytes desired between the brackets after the address.

When a XY chart is being used the two variable arrays indicate the scale for the chart's X axis and for the Y axis. This concept will be further dealt with ahead.

Rotation Variable

A variable can be set in this property for rotating the chart three-dimensionally. The visual rotation angle of the 3D chart will then be influenced by the value of the associated value in runtime.

Elevation Variable

A variable can be set in this property to rotate the 3D chart vertically. The visual rotation angle of the 3D chart will then be influenced be influenced by the value of the associated value in runtime.

Push Value Variable

The current Chart displays all the values of the assigned array variables. A "Push" variable is being designed for updating the chart's values upon the status change of that variable and will be available in the near future.

Reset Value Variable

A variable can be specified for executing the reset of the Chart's data. The command will activate when this variable is set at a value different from zero, after which it will be reset to zero by Movicon.

Num. Samples

This edit box is used for setting the number of values (samples) to be represented on the chart. The default value (20) means that the chart displays 20 values in function with the data type set, independently of the size of the array which is expressed in bytes and refers to the variable.

Editable

When this selection is enabled, the chart will become editable for the operator during Runtime. This also means that the chart's assigned style settings can be changed in its style properties during runtime.

Array Type

This edit box is used to indicate to the chart how to use the values of the associated Array variables. The Array variables are always expressed in bytes. When the value contents are to be represented on the chart in word, dword or other, you need to select the data type desired, independently of the array's unit measures in bytes.

Network Server

This edit box allows you to specify the name of any eventual Network Server from where data is to be retrieved. In this way the Chart control will be able to ask the Movicon server when retrieving data instead of getting data from the local Data Logger's DBMS link to the project. This allows historical data from a remote Data Logger to be displayed on a remote PC in chart format.
To get the Chart control to retrieve historical data from a remote Data Logger, you need to set the following properties in the Chart object:

- Execution -> Network Server
- Execution -> Max. Rows
- Style -> Data Logger Link

In addition to this, the Data Logger linked to the Chart must also be configured in the local project. However, you can disable its 'Enable' property to avoid that recordings on Database, also local, are carried out.

Network Backup Server

See paragraph "Drawings and Controls common Execution Properties".

Max Rows

This edit box allows you to insert the maximum number of records to be retrieved from the Server's Data Logger.

10.29.7. Chart Style Properties

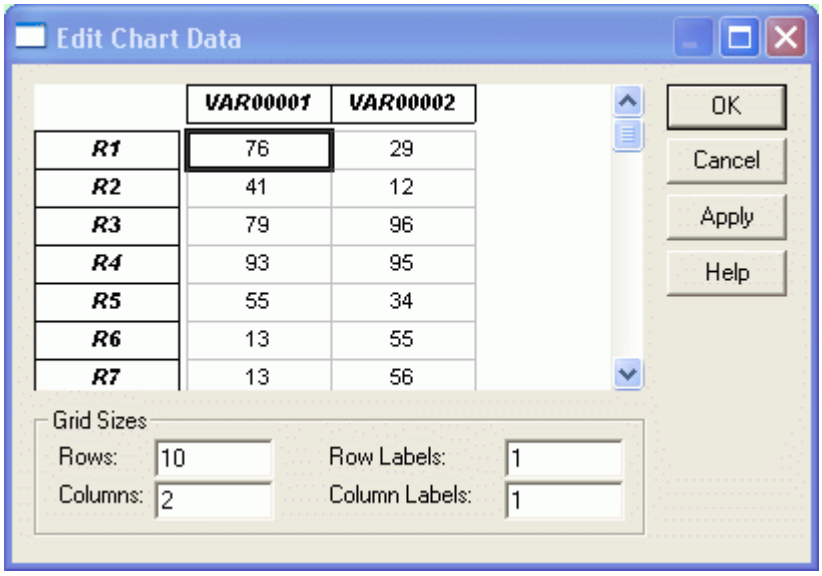
The Chart Style properties allow name associations to the values of the chart.
Therefore you can replace the default name by specifying another name which will be displayed in the title of the chart's value.

Curve Title
This property allows you to associate a name to the chart's curves.

Data Logger Linked
This property allows you to specify the name of the Data Logger to be associated to the Chart.

Refresh Pens from Data Logger Linked
This button allows the curves to be refreshed according to the linked Data Logger's structure. This command simply sets the "Curve Name" property with the same name of the linked Data Logger's columns.

Edit Chart Data
This button allows you to open a dialog window through which you can edit the labels which identify the chart's rows and column:

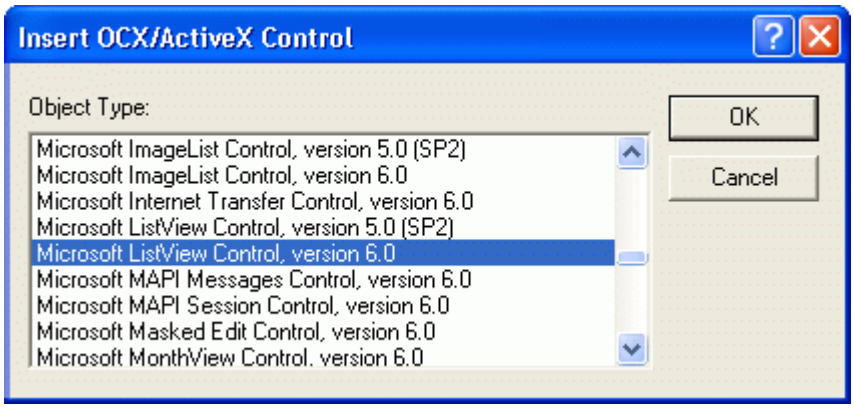


Border
The **"Border"** is described in the paragraph titled **"Style Proprieties common to Drawings and Controls"**.

10.30. ActiveX/OCX Objects

The ActiveX/OCX objects are components which can be inserted into any point of the screen and are used for executing operations and functions that are not available in the Movicon system. These objects are actually components of third parties which can be run inside any application that is compatible with the ActiveX/OCX technology.
The ActiveX/OCX are available from the "Special Objects" group found in the **"Objects Window"**.

When selecting the "ActiveX" item the window below will open where a list of the ActiveX/OCX available in the system.

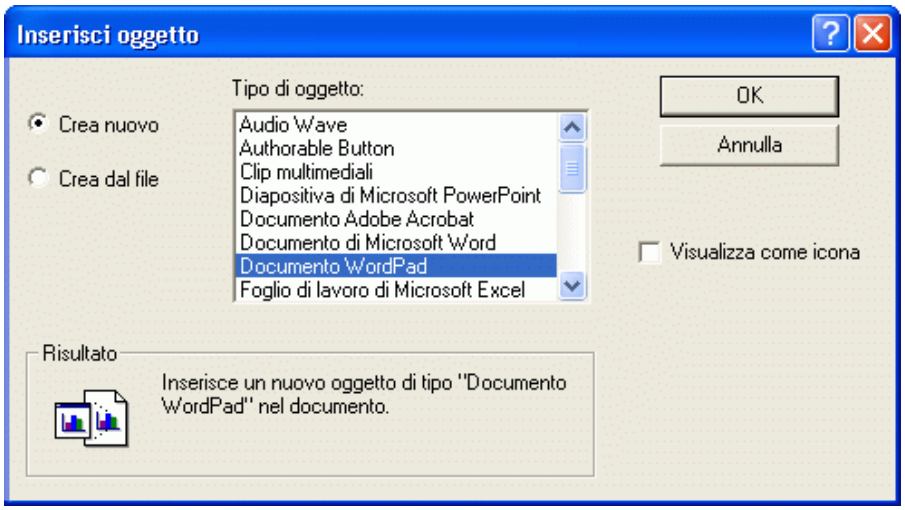


This technique renders the Movicon application open to external object integration where they will be treated as Movicon objects.
For further information of how to use Active/OCX and their usages please refer to the section titled **"ActiveX Objects"**.

10.31. OLE Objects

The OLE are objects deriving from other applications dynamically linked to Movicon which can be inserted into any point of the screen and are used for executing operations and functions which are not available in the Movicon system.
The OLE objects are available from the "Special Objects" group from the **"Objects Window"**.

When the "OLE" item is selected, the window below will open showing the list of applications available in the system.



This technique renders the Movicon application open for integrating with external applications which will be treated as Movicon objects.
For further information on how to use OLE and its usages, please refer to the section on **"OLE"**.

10.32. Drawings and Controls Common Properties

The Movicon Drawings and Controls, which are available in the **"Object Window"**, can be inserted into Screen windows and can be configured and customized through the Movicon **'Properties Window'.**
All Drawings and Controls are vectorial objects and present a variety of different operation analogies, especially concerning Animation properties. Some of their properties are common to all these components.

10.32.1. Object Style Properties

The Style properties of drawing or control elements are used for setting some of their graphical characteristics.
To edit the Style properties, select the object with the mouse and use the Movicon **'Properties Window'**.
Below are described only the style properties common to nearly all of the drawings and controls. Please refer to the appropriate sections for components predisposed with specific properties.

Clickable (Buttons)
Enabling this check-box will make the selected component clickable. This property is available only in controls such as Buttons, Selection Buttons (Check-box), Option Buttons (Radio Buttons) etc, being those controls already predefined to execute commands when clicked with the mouse.

Clickable (Windows)
This check box is used to define whether the operator can interact with the Viewer window. When this property is not checked means that the control cannot be manages with the mouse or from the keyboard. In this case, for example, it will be impossible to put columns into order, see any help, execute commands displayed in the window.
This property is only available in Viewer type controls such as the "Alarm Window", "Log Window", "DataLogger Window", "TraceDB Window".

Auto Layout
When enabling this list layout will be set automatically. This means that the table columns will be resized automatically that all of them can be seen in the Viewer window area. However when disabling this option the window will open displaying the columns with the sizes set when programmed and therefore the horizontal scroll bar may have to be used for viewing the ones on the right not showing in the window.
This property is only available in Viewer type controls such as the "Alarm Window", "Log Window", "DataLogger Window", "TraceDB Window".

Prompt Pad
This option consents the Numeric or Alphanumeric Pad to show when the user clicks mouse on the entry field. The Numeric Pad shows if the variable is numeric type, otherwise the Alphanumeric Pad will show. The Pad is always opened in the center of the screen showing the variable's current value with the minimum and maximum limits as set in the object (i.e. displays) or in the variable's properties. In addition, these values are formatted using the format set in the object (i.e. display) or in the variable's properties.
This property is therefore very handy in cases using devices without the use of keyboards.

This option can be enabled automatically by Movicon if the system being used has a Touch-Screen. Movicon will control whether the operating system has a mouse or not or one with just one button to determine the existence of a Touch-Screen.

This property can be set for the following Movicon objects:
Display
Grid
Window Selector
Window recipe manager

Numeric and Alphanumeric pads can nevertheless be used in systems with keyboards and may be easier to use for entering data directly on screen by moving the mouse pointer from one cell to the next in a "Window" object, activating the Pad by using the keyboard's Enter, Space Bar or any other key except for the F1 key or any other used as an accelerator command.

Events:
The above listed Movicon objects offer advanced functionalities that can be attained through their basic script interfaces (DisplayEditCmdTarget, GridWndCmdTarget, HourSelectorCmdTarget e RecipeWndCmdTarget), which provide Basic Script Functions, Properties and Events for programming. The "OnTextChanging" and "OnTextChanged" events can be exploited for intercepting the instance prior to editing or the one immediately after by:

- When the "Prompt Pad" option is disabled, the "OnTextChanging" event is notified before the cells enter into edit mode. When set at False, the bRet parameter will impede cell value modifications from having effect. The "ChangedText" parameter reports the new value entered in the cell. Editing operation and any relative events can be aborted by using the Escape Button.
- When the "Prompt Pad" option is enabled, the "OnTextChanging" event is notified before the Alphanumeric pad shows, and setting bRet = False will impede following cell editing operations and therefore will stop the Alphanumeric Pad from showing. The "OnTextChanged" event is notified only when exiting with OK or Enter from the Alphanumeric Pad, and the "ChangedText" parameter shows the new value entered in the cell. These editing operations can be aborted by using the Pad's Cancel button or the Escape key from the Keyboard.

For further information on Movicon object VBA interfaces please consult the chapter dedicated to "API Interfacce Basic" from the topic on "VBA Language".

System Registry:
A "ShowPad" value set at "1" for default is available in the "General" registry key. This value is also usable in Windows CE. This key is only used in Touch-Screen systems and is managed together with the "Prompt Pad" property in the following ways:

"ShowPad=0" and "Prompt Pad=false": Alphanumeric pad will not open
"ShowPad=0" and "Prompt Pad=true": Alphanumeric pad will open
"ShowPad=1 and "Prompt Pad=false": Alphanumeric pad will open
"ShowPad=1" and "Prompt Pad=true": Alphanumeric pad will open

Caution: If the "ShowPad" key is set to "1" in Touch-Screen systems, the "Prompt Pad" property will automatically be set to "True" when the object is loaded so that the Pad is enabled and ready for use when needed. At this point, however, you can disable the "Prompt Pad" again by using the object's appropriate "PromptPad" basic script property.

Show Control Wnd
This property is available only on the objects define as "viewers", such as "Alarm Window", "Log Window", "DataLogger Window", "TraceDB Window" and any "List" object.
Enabling this property you will be able to manage the resizing of the object's columns. Furthermore, in Developing mode, the viewer will becomes an active window, just like in Runtime mode, so in this case you cannot move it but only resize it.

The "Show Control Wnd" option will always activate automatically when project runs on the Window CE platform, independently from the settings defined in design mode. The Grid object is the only Movicon object that recognizes this option in Window CE. In this case, the "Show Control Wnd" option is used for choosing whether to make column resizing possible in runtime or not. When this option is disable, it will be impossible to resize columns in runtime.

Refresh Button
This selection makes the command button operative for refreshing data in the Display window in question. The refresh is carried out according the active filter's settings.

Filter Button
This selection makes the command button operative for filtering data to be displayed in the Display window in question. For further information on filter settings, please refer to the following sections:

"Log Window Data Filter"
"TraceDB Data Filter"

Print Button
This selection makes the command button operative for printing data displayed in the Display window in question. he print is executed using the report field which should be specified in the "Report File" property. Movicon passes the same filter settings to the report for printing data which coincide with the data shown in the window in question.

Report File
Enter the report file name to be used for printing the data displayed in the Viewer window in question. The Report files, containing the print matrix, can be created with Report Designer or Crystal Reports©. When this field is left blank, Movicon will use the default Report file created by the project.

Edit Report File
This command runs the Report Designer for creating or modifying the report to be associated to the viewer window.

Refresh Button Text
The text to appear on the **"Refresh Button"** is enter in this edit box. When this field is left blank, the default text will be used instead.

Filter Button Text
The text to appear on the **"Filter Button"** is enter in this edit box. When this field is left blank, the default text will be used instead.

Print Button Text
The text to appear on the **"Print Button"** is enter in this edit box. When this field is left blank, the default text will be used instead.

Include Milliseconds
By enabling this option box milliseconds will also be included in the 'Time' format in the column of the window which supports this type of data.
This property is only available in Viewer type controls such as the "Alarm Window", "Log Window", "DataLogger Window", "TraceDB Window".

Preserve Aspect Ratio
This selection allows the proportional dimensions of the object to kept constant. By doing this you will get square geometric shapes instead of rectangle and circular shapes instead of elliptic.

Button Size
This setting allows you to select the size of the buttons which are to be displayed in the Alarm Window. The choices are:

- **small**
- **medium**
- **big**

This property is also available for the "Option Buttons" and "Selector Buttons" and an be used for re-proportioning the text size on the control when necessary.

Align Buttons
This setting allows you to select the position where the buttons are to be displayed within the Alarm Window. The choices are:

- **left**
- **top**
- **right**
- **bottom**

Arrow type
This property is available only for the "Line" and "Connector" object types and allows to define if an arrow should be drawn at the line end. If yes, you can define its placement (left-top, right bottom, both).

Arrow Height
This property is available only for the "Line" and "Connector" object types and allows to define the length of the arrow shown if the "Arrow type" property is set.

Border
This selection enables the component with a border frame according to the style selected. The border frame will always be in rectangle shape no matter what the shape the object is.
The options are:

- **none**
- **bump**
- **etched**
- **raised**
- **sunken**

Style
This selection allows you to set the control button's display style. A button can in fact be configured with different types of displays, ie. lights or selectors. Keep in mind that this setting is only of a graphic nature.
The Style property is only available for the Button components.

Rounded Style
This selection permits the gives a rounded look in 3D for Button objects.
This Rounded Style is only available for **Button** type objects.

Look 3D
This setting allows the component to be displayed in 3D. This property is only available for "Rectangle" objects and makes the Rectangle look like a real button.

Look 3D Pressed
This setting allows the component to be displayed in 3D pressed down look. This property is only available for "Rectangle" objects and makes the Rectangle look like a real button.

Time Format
This property can be used by the Movicon "Alarm Window", "Alarm Banner" and "Historical Log Window", objects and "Report" resources, and allows you to set a customized format for displaying ate and time fields. When this property concerns the "Alarm Window' and "Alarm Banner"and "Historical Log Window" objects you will be allowed to define a date and time format to be displayed in the "On Time ", "Ack Time", "Off Time " and "Reset Time" and "Event Time". when this property concerns the "Report" resource, you will be able to define the format to be displayed in the Report's Date and Time fields.
For example, this custom format could be set:

%d-%m-%Y %H:%M:%S
If a customized format is not set for the "Report" resource, the following fixed format will be used instead:

%04d-%02d-%02dT%02d:%02d:%02d.%03uZ

All the format codes that can be used in this property are listed in the "Data Formats" paragraph from the "Data Format" Section.

Duration Format
This property can be used both by the Movicon "Alarm window"and "Historical Log Window" objects and "Report" resource, and allows you to set a customized format to be displayed in the "Duration" field. When dealing with the "Alarm window" and "Historical Log Window" objectx the duration format can be defined to display times in the "Duration" and "Total Time ON" columns. The field in this case will only be updated on an "Alarm Off" event. When dealing with the 'Report' resources, a format and be defined to be used in the Report fields which express durations.
This format can only include the following special codes:

- **%D** = Day of event duration
- **%H** = Hour of event duration
- **%M** = Minutes of even duration
- **%S** = Seconds of event duration

If this entry field is left empty, Movion will automatically insert the total event duration in the following format:

%D,%H:%M:%S

which will display as "0,00:00:00" indicating the even duration in days, hours, minutes and seconds.

10.32.2. Object Execution Properties

The drawing and Control execution properties allow you to setup their working characteristics.
To edit the Execution properties, select the object with the mouse and use the Movicon **"Properties Window"**.
Only the Execution properties common to drawings and controls have been described. For those components with special properties pleas refer to the relevant sections dedicated to them:

Project

In this edit box, which is available only for Display type windows (Historical Log window, Data Logger/Recipe Window, etc.) you can specify the name of the child project from which data is to be retrieved for viewing. If this field is left blank, the current project will be used.
Only the name of an eventual child project belonging to the current project can be entered here.

Max Rows Nr

The Window objects can be set with a maximum number of rows to display by using this edit box. Then the object is an "Alarm Window" this parameter is only used for limiting the number of rows in the alarm's historical log when opened with the "Get History" button. It will not have any affect on the number of alarms displayed. All active or not acknowledged and reset alarms will always be displayed.

Network Server

The name or the IP address of the Network Server, where data is to be fetched from and displayed in the window, is entered in this edit box.

When an "Alarm Window" or "Alarm Banner" object is connected to a Network Server, the blink and colour management of alarms on Client side will be executed based on the settings defined in the appropriate alarm threshold properties in the Server project. The default colours will be used for automatic colours.

Network Backup Server

The name or the IP address of the Network Backup Server, where data is to be fetched from and displayed in the window when the primary server is not available, is entered in this edit box.
Connections for Viewers take place after a refresh has been requested and when the Primary Server is not available. When loading pages you need to wait for the connection timeout towards the Main Server to expire before executing a refresh to re-try Backup Server connection.
Each refresh control is commanded as follows:

Data Logger/Recipe Window, DB Trace window,Historical Log Window: "Refresh" button
Alarms Window: "Refresh" method of the "AlarmWndCmdTarget" interface
Graphics: "RecalcLayout" method of the "ChartWndCmdTarget" interface
Trend: Trend's Pause button
Scheduler Window: "Cancel" method of the "HourSelectorCmdTarget" interface

The Backup Server has not been inserted in the child project's properties because, in this case, the Network Server of the variables works as if they were dynamic network variables. The dynamic network variables do not actually manage a Backup Server.

Commands on Click

This button opens the Movicon **"Commands List"** through which you can define a list of one or more commands to be executed with a lift mouse click on the object (upon releasing the mouse key) or by pressing the "SPACE" or "RETURN" keys when the object is focused on.
For further information about available commands please refer to the paragraph on **"Command List".**

Ext. File Settings

In this editbox you can specify the name of the "Symbol Configuration Files" to be associated to the object. The object's settings will be saved in the "Symbol Configuration Files". You can also use the [...] button to the right of this field to open a window for selecting the file (If file does not exist, it can be created by using the "Save" command). If only the file name is entered without path, Movicon will save the file in the project's "DATA" folder (default Configuration File search path). The file will be save for default with the ".sxml" (or ".tsxml" when dealing with Trends). The file is saved with the ".sxml" extension. The file name can be defined as pleased or you can use the "Generate Unique File name" command to automatically create a unique name to identity the file for you.

It would be wise to insert the Configuration File into the project's "DATA" folder (default path). When inserting Configuration Files in different folders Movicon will use absolute paths that may cause errors to arise when loading files.

After having inserted the object's Configuration File name, you will need to use the "Save command for creating the file. Otherwise, when starting up the project in runtime a "not found" error may arise:

"C:\TestProject\DATA\Config.sxml not found."

Symbol size and position settings are never loaded while the Configuration File is being loaded and remains with its original settings. The Configuration File can be loaded using the "Load" command in design or runtime mode if the "Auto Load File Settings" has been enabled or by using the "LoadExtSettings" function.

Auto Load File Settings

This property, enabled for default, executes the loading of the settings from the "Symbol Configuration Files" associated to the object creation, which normally happens when the screen is opened.

Auto Save File Settings

This property is disabled for default and executes the save of the settings in the "Symbol Configuration Files" associated to the object's destruction that normally happens when the screen is unloaded from memory. In this way any modifications done in runtime to the object are made persistent by exploiting the settings file.

Generate Unique File name

When this button is pressed, a unique name for the "Configuration File" will be generated automatically in GUID analog format (number in 128 bit) i.e. 0A8DEC92-9213-4DBA-A7E6-C4157ECA8883.sxml. This name will only be generated if another name has not yet been entered in the "Symbol Configuration Files" property.

This command generates only the file name. In this way the file will be created in the project's "DATA" folder with the "sxml" extension. These settings can be modified through the "Symbol Configuration Files" property.

Load

This command loads all the configuration file's settings selected in the "Symbol Configuration Files" property and applied to the object.

Save

This command saves the object's settings in the Configuration File selected in the "Symbol Configuration Files" property.

10.32.3. General Object Properties

The General properties of drawing and control elements allow you to set a few useful properties for identifying the object.

To edit the General properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Object Name

This edit box is used for inserting a text string which can be associated as the object's name. Assigning names to objects is useful for various reasons such as the component's description.

It is essential that the object has a name for referential purposes when the Basic Script functions are being used. In this case all the Screen's internal objects must have an unique name.

Object Title

This edit box is used for inserting a text string to be associated as the object's title. The typed text is also visible in the symbol during Runtime.

When enabling the "Text Properties common to Drawings and Controls" the object's title will be replaced by the variable's contents during Runtime. You can also edit the Title by using the appropriate Basic functions.

Global Name

This edit box is used for declaring the element's name as a global name on the screen and therefore making it accessible from basic logics from any other drawing by using the "objectname.property" or "objectname.method" syntax.
When this selection is not used, the assigned name will only be acknowledged locally within the symbol.
The name may be used in any eventual basic script logic in the templates management.

When an object's Global Name property is enabled, the object must have a univocal name within the screen otherwise it will not work correctly.
In addition, Global Names cannot be used for objects contained in Embedded Screens.

Object Public Name

This edit box is used for assigning a name which will be managed as a Public Name (for the Screen or the project) through which all the inherent characteristic settings of Drawings/Symbols and Controls will be referred to. These functionalities, described in the appropriate paragraph **"Public Symbols"** permit the automatic editing of all the symbols' properties belonging to a predefined Public Name.

The symbols' inheritance function lets predefined symbol categories be set in order that their properties can be edited in a certain point of the project. For further information on this potentiality please consult the appropriate paragraph on "**Public Symbols".**

Preserve Size

When this check-box is enabled the sizes assigned to the component in question will remain unaltered during the Public Symbols updating phase. If this is not selected the component's sizes will be adapted to the parent public symbol, being the one contained in the base Screen which can be selected through the **"Public Source Container"** property from the "**Screen Execution Properties**".

Preserve Dynamics

When this check-box is enabled the animation dynamic properties assigned to the component in question, will remain unaltered during the Public Symbols updating phase. If this is not checked the component's animation dynamic properties will adapt to the base public symbol, being the one contained in the base reference Screen, which can be selected through the **"Public Source Container"** property from the "**Screen Execution Properties**".

When you enable the "Preserve Dynamics" property, all the "Props" which have been set through the public symbol's "Dropping Code" will also be preserved. In this way, each symbol will maintain their "Props" without having to inherit them from the reference symbol.

Once the public symbol has been created, the dynamic properties are only inherited by the property's intervention thresholds, but not when these properties are enabled or disabled. Then the public symbol is created for the first time, it will be the same as its reference symbol including the dynamic property settings. At this point, however, if the dynamic reference symbol's properties are modified, only the dynamic property thresholds will be propagated to allocated symbols not the properties enabling. This will allow public symbol animations to be enabled or disabled independently.

Preserve Code

When this check-box is enabled, any Basic Script code associated to the component in question will remain unaltered during the Public Symbols updating phase. If this is not checked the component's Basic Script code will be updated with the one from the base public symbol, which is the one contained in the base Screen that can be selected by means of the **"Public Source Container"** property from the "**Screen Execution Properties**".

Preserve Text

When this check-box is enabled the text (title, name) of the component in question, will remain unaltered during the Public Symbols updating phase. If this box is not checked the text (title, name) of the component will be updated with that of the base public symbol, being the one contained in the base Screen, which can be selected by means of the **"Public Source Container"** property from the "**Screen Execution Properties**".

Preserve Colors

When this check-box is enabled the colours of the component in question, will remain unaltered during the Public Symbols updating phase. If this box is not checked the colours of the component will be updated with that of the base public symbol, being the one contained in the base Screen, which can be selected by means of the **"Public Source Container"** property from the "**Screen Execution Properties**".

Preserve Commands

When enabling this check-box, the Command List associated to the component in question will remain unaltered during the Public Symbol updating phase. These include the "Commands On Release", "Commands on Pressed" and "Commands While Down" command for button objects and "Commands on Click" for all the other objects. If this box is not checked, the component's Command List will adapt to the referenced public symbol contained in the Public Source Container screen which can be selected using the **"Public Source Container"** from the Screen Execution Properties.

Preserve Variables

Enabling this check-box, during Public Symbol updating phase, will keep any variables associated to the component in question unaltered. If this property is not selected, the variables used in the object's properties will get inherited by the referenced public symbol, which is the one contained in the referenced screen, selectable through the à **"Public Source Container"** properties from the Screen Execution properties. Also in this case, the object's variable fields will not be displayed (the variables are in fact retreived from the reference symbol). Only the "Default Structure" field remains visible and editable. If however the property is left enabled, the component will keep its variables which will remain independent form the reference symbol.

Normally disabling this "Preserve Variables" property has meaning when using Aliases instead of variables. In this way the Aliases are propagated to all the public symbols for which their Alias Tables should then be edited (see paragraph "Aliases in Objects").

Update Public Sub objects

When enabling this check-box, any elements of symbols or sub-symbols associated a public name will be updated according to their referenced symbol and not with the whole referenced symbol. This permits symbols to be composed of one or more sub-symbols where each one will be updated based on their referenced symbol. When this option is not selected, the symbol will be updated as a whole as if its sub-symbols had not been associated to any specific public symbol.

For further information please refer to the paragraph on "Public Symbols".

Style Source Back Color

When enabling this property, during the runtime phase, the object will inherit the back color from the Style Source Container for the active styles. For further information about this property please refer to "Style Sources in Symbols".

Style Source Text-Edge Color

When enabling this property, during the runtime phase, the object will inherit the text-edge color from the Style Source Container for the active styles. For further information about this property please refer to "Style Sources in Symbols".

Style Source Font

When enabling this property, during the runtime phase, the object will inherit the font for the test from the Style Source Container for the active styles. For further information about this property please refer to "Style Sources in Symbols".

Show Tooltip

A string text which is to be used as Tooltip during Runtime can be entered in this edit box. The Tooltip, containing the text string, will show when the mouse passes over the component. The tooltip will display for about 5 seconds before disappearing automatically.

Show Dynamic Tooltip

When this check-box is enabled the tooltip containing information inherent to the that component, will show when passing the mouse over the component, for instance it's name, title, the variables collated to animations and their values etc.

The **"Show Dynamic Tooltip"** function only works when the 'Tooltip' property is not enabled otherwise the tooltip string defined by the programmer will show.

Rotation Angle

This functionality rotates the object selected. The desired values can be inserted into the edit box or the spin buttons can be used on the right hand side. The rotation is executed on 360° turn and therefore the significant values will be from '0' to 360.
The rotation will be executed clockwise for positive values and anti-clockwise for negative values. The rotation uses the object's baricenter which is selected by means of using the '**Baricenter**' selection box described below.

Baricenter

This functionality allows you to establish which of the object's baricenter the desired rotation is to be executed. The rotation's baricenter can be selected on the perimeter's fixed positions, considering the perimeter of a hypothetical rectangle which circumscribes to the component when it is a different shape, or it can be set manually by activating the 'Custom' selection which enables the manual settings of the object's X and Y coordinates on which the rotation's baricenter is taken into consideration. These coordinates can be inserted in the **'Baricenter Custom X Pos.'** and the **'Baricenter Custom Y Pos.'** described below. When selecting the baricenter , a little black square will appear in the object indicating its position.

Baricenter Custom X Pos.

This edit box is used for inserting the X coordinate values of the object's baricenter when the **'Custom'** option has been selected in the **'Baricenter'** property.

Baricenter Custom Y Pos.

This edit box is used for inserting the Y coordinate values of the object's baricenter when the **'Custom'** option has been selected in the **'Baricenter'** property.

Open

This button opens the configuration window for controls which have particular functions. For instance the **'Button'** control opens the '**Command List**' window, while a window for selecting the columns to be displayed shows for the "Viewer window" objects.

Dynamic Property Inspector

This button opens the selected symbol or object's "Dynamic Property Inspector" wndow. This window will only open if the object has been set with dynamic properties (animation, etc).

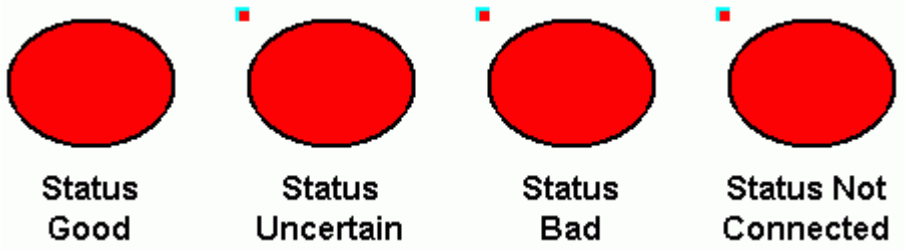
Object Alias Editor

The "Object Alias Editor" opens the selected object's alias table. The same command is also available from the menu which appears right clicking on the actual object for from the "Symbol" menu.
For further information about using aliases please refer to paragraph "Aliases in Objects".

Show Status Mark

When this property is enabled, the graphical display of the "Status Variable" associated to a symbol will be managed differently to that described for the "Variable Status" property. A red dot will

appear in the top left vertex when its "Status Variable" changes to quality that is different from "good" as follows:



The graphic management shown above is only active when the "Show Status Mark" property is enabled.

Symbol Description

This edit box is used for inserting the text string which can be used as a description of the selected symbol.
The 'Description' property is only available for composed Symbols and not for simple drawings and controls.

Taken from library

This field indicated the name of the library from which the symbol was taken. This property will only be available for symbols inserted in the Symbols Library and will not show when muilti-selecting symbols/objects.

Library Date

This field indicates when the symbol was created. This property will only be available for symbols inserted in the Symbols Library and will not show when muilti-selecting symbols/objects.

Reference Build

This field indicated the Movicon build with which the symbol was created. This property will only be available for symbols inserted in the Symbols Library and will not show when muilti-selecting symbols/objects.

Check for Updates

This command checks where there are any updates available for the symbol in question (name search is not case sensitive). This property will only be available for symbols inserted in the Symbols Library and will not show when muilti-selecting symbols/objects.

Cache Image

This property consents to enabling or disabling the cache management for composed symbols. When the property is enabled an image of the symbol will be created in the cache, to guarantee the best loading performances. You must, however, keep in mind that this management can only be used for static symbols which do not have any graphical animation. In addition to this, to avoid consuming too much RAM the Windows registry key **"MaxSymbolCache"** can used to limit the maximum number of symbols whose images can be created in the cache.
The 'Cache Image' is only available for composed Symbols and not for simple drawings and controls.

Automatic Enable and Status on Quality

Movicon consents the automatic enabling or disabling management of objects in screens and their graphical representations using the qualities of the variables associated to them without having to use the "Enable Var." and "Status Var." properties. The **Automatic Enable and Status on Quality Management** allows you to enable/disable this functionality (enabled for default).
The automatic managing of variable qualities associated to controls works in two ways:

Automatic Status Variable Management

When no variable has been defined in the object's "Status Var." property, Movicon will search through the variables associated to the object and the first one it finds with a valid dynamic part (Fixed I/O address) will be used as the Status Variable to manage the objects coloring based on the variable's quality. When the variable's quality is not set at "Good", the object will change its graphical aspect.

Automatic Enabling Variable Management

When no variable has been defined in the object's "Enable Var." property, Movicon will search for the first one of the objects associated variables with a valid dynamic part ("Fixed I/O address) and use it as the Enabling Variable. In this case the object's enabling will be managed based on the variable's quality, meaning that it will be enabled when the variable's quality is "Good".

10.32.4. Variable Properties

The Variables properties of drawing and control objects allow you to associate some of the object's variables for managing its animation and status.

To modify the Variables properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Default Struct

By using this property you can associate a default structure variable for the symbol.

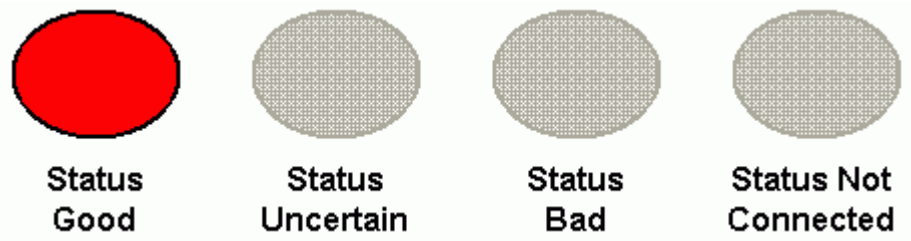
Enable Var.

This edit box is used for inserting the name of the variable (you can also use the **"..."** browse button on the right hand side to select the variable) to be used for enabling or disabling the component's command functions. When the variable is entered the component will be enabled when the variable's value is different from zero.

The graphic animation functions will also remain active along with IL Logic or script events not User commanded (ie, Events in Variables, SymbolLoading, etc). However, commands that can be evoked by the User will be disabled, being any Command Lists associated to the object of Basic Script code events such as Click, MouseUp, MouseDown, etc.

Status Var.

This edit box is used for inserting the name of the variable (you can also use the **"..."** browse button on the right hand side to select the variable) whose status (quality) must be displayed graphically by the symbol. The symbol will assume a different graphic state according to the variable's status quality so that an immediate visual understanding of the variable's status can be obtained. For instance, an Elypse inserted with a red background will change as follows according to the variable's status quality:



Only when the quality of the Variable's status is "Good" will the object display normally but differently in all the other cases, generally with a greyish mesh effect colour.

Please keep in mind that the graphical effect may be difference according to the object inserted and the background color it has been setup with.

The graphic management shown above is only active when the "Show Status Mark" property is disabled.

The same effect obtained by using Windows 32/64 bit systems cannot be obtained with WinCE devices, therefore the status variable graphical animation in symbols is not supported in WinCE.

However, the "Show Status Mark" property can be used to know whether the status variable quality is Good or not. This function is also supported in WinCE.

10.32.5. Visible Animation Properties

The Visible properties permit you to display components on screen in function with the value contained (based on the condition set) in the associated variable.
This property is part of the Drawings and Controls '**Animation**' Properties group.
To edit the Visible properties, select the object with the mouse and use the Movicon '**Properties Window**'.

Blink
This option is used for making the object blink slowly, normal or fast when visible. The blink times can be modified with Windows configuration registry "BlinkTypeSlow", "BlinkTypeMedium" e "BlinkTypeFast" keys.

The options are:
- None
- Slow (2 sec.)
- Medium 1 sec.)
- Fast (0,5sec.)

Enable
Enabling this check-box will activate the Visible function in the selected component. By doing this the component is displayed or hidden during Runtime in function with the associated Variable's value and the Condition selected.

Variable
The name of the variable which will determine the components visibility on screen is entered in this edit box (or selected with the "..." browse button on the right hand side).

Value
The desired value which will then be confronted with the value contained in the Variable to determine the component's visibility is entered in this edit box.

Tolerance
The tolerance can also be set when a 'equal to' Condition has been selected, being an offset value for the 'equal to' condition. For instance you want to make the component visible when the Value is equal to '5'. If you set the tolerance at '1', in reality the component will become visible when the Variable obtains values 4, 5 and 6.

Condition
This selection permits you to set the conditions between the Variable and the base Value to determine the component's visibility. The conditions can be:

- **<**: the component will be visible when the Variable's value is less than the base Value
- **>**: the component will be visible when the Variable's value is more than the base Value
- **=**: the component will be visible when the Variable's value is equal to the base Value

10.32.6. Animation Transparency Property

The Transparency property allows the transparency of objects on screen to be managed according to the values contained in their associated variables, allowing their transparency to be modified in runtime as well.
This property belongs to the Drawing and Control **"Animation"** group properties.
To modify the Transparency property, select the object with the mouse and use the Movicon **"Properties Window"**.

Transparency animation is NOT supported in WinCE.
The Transparency property does not have any effect on "Dundas Gauges" and "Chart" object.
The "Dundas Gauges" have their own transparencies set in their wizard. The "chart" has is own background management which can be set in gradients and does not support transparency.
In addition, animation transparency is not managed in rotated object types. ("General - Rotation Angle" property "Animation - Rotation" property)

except in cases where the object is a Polygon (in which the "Rotate" command has been applied), or in particular case where the object has been enable with "Animation - Rotation" and contained in a Symbol with activated Animation - Transparency.

Enable Transparency

Enabling this check-box will activate the Transparency management in the selected object. In this way the object will obtain the transparency level according to the associated variable value in Runtime mode.

Variable Transparency

The name of the variable is entered (or selected using the"..." browse button to the right) in this editbox to determine the object's transparency level. The values include 0 to 255 (0 = completely invisible, 255 completely visible).

10.32.7. Composed Movement Animation

Movicon offers a very handy graphic animation tool to move objects along on not linear trajectories, but composed of two or more straight line segments: **Composed Movement.**

The **Composed Movement (XY)** permits a variable to be associated to the movement of the component in the Screen, in function with a path composed of straight line segments which can be freely edited with the mouse.

This kind of editing lets you easily trace out the path which the component will follow in proportion to the associated variable's value by automatically executing interpolations on the X and Y coordinates.

This property is part of the **'Animations'** properties of Drawings and Controls group.

To modify the Composted Movement (XY) properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Enable

Enabling this check-box will activate the selected component's Composed Movement. By doing this the component will assume the position on the Screen according to the associated Variable's values and the predefined movement trajectory during Runtime.

Variable

The name of the variable which determines the component's position along the predefined trajectory is entered in this edit box (or selected by means of using the **"..."** browse button on the right hand side).

When the variable obtains the maximum value the symbol will go to the end position traced in the trajectory settings. When the variable obtains the minimum value the symbol will go to the start position. The variable's intermediate values will correspond proportionally to the path traced out for the movement.

Start

The minimum value that the variable can obtain is entered in this edit box, and will correspond to the traced trajectory's start position. The object will remain at the start position when any Variable values inferior to the minimum Threshold have been obtained.

End Threshold

The maximum value that the variable can obtain is entered in this edit box and will correspond to the traced trajectory's end position. The object will remain at the end position when any Variable values superior to the Maximum Threshold have been obtained.

Edit

This command allows you to activate and start the component's composed movement editing.

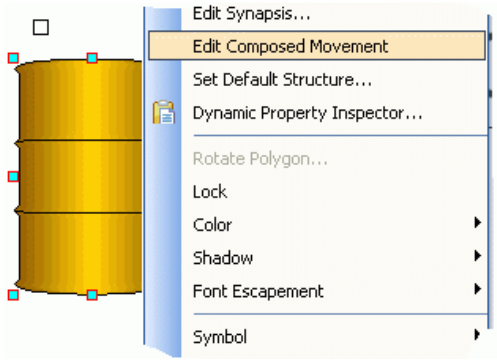
Reset

This command resets any composed movements associated to the component. By executing this command any movement trajectories associated to the component will be cancelled.

Composed Movement Editing

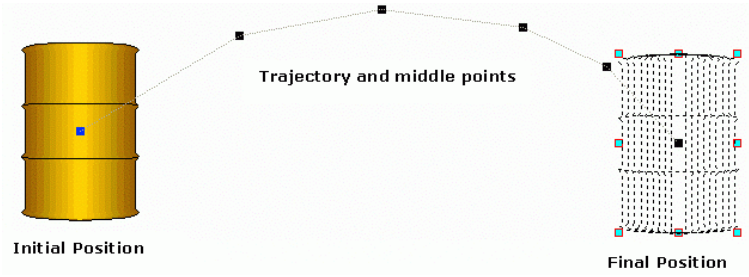
The editing of the Composed Movement involves two phases: the first requires the enabling of the function in the symbol's or control's property described above, specifying the desired variable.

The second phase requires the setting up of the trajectory. To edit the trajectory's settings you need to use the "Edit" command or the **"Edit Composed Movement"** command which can be accessed from the 'Symbol' menu or clicking with the mouse's right button on the component:



After having activated the command a trajectory symbol will appear ready to be positioned on the end point. The procedure is as follows:

1. Position the trajectory symbol on the trajectory's end point
2. Insert the intermediate points by double clicking on the point desired in the Screen. The inserted point will be the second one in respect to the starting position. The following points inserted will follow suit
3. Double click on the third and on all the other additional points which make up the trajectory to be executed. Each point inserted will succeed the previous one
4. Press EXIT to interrupt the composed movement editing



The composed movement permits a composed trajectory to be created for the symbol. The points are inserted one after the other beginning with the starting point and finishing with the ending point. The EXIT key aborts the editing procedure.

Once the 'Composed Movement' has been setup, the set trajectory can be cancelled by simply activating the 'Edit Composed Movement' command again by keeping the 'CTRL' key pressed down.

10.32.8. Move X Properties Animation

The Move X property permits the selected components to move across the screen along the X axis in function with the values contained in the associated variable (in pixel).
This property is part of the Drawings and Controls **'Animations**' property.
To edit the Move X properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Enable X Movement

Enabling this check-box will activated the Move X function in the selected component. By doing this the component will assume the positions along the X axis in the Screen according to the associated Variable's values in Runtime.

Invert X Direction

Enabling this check-box will activate the function to invert the horizontal movement. By doing this, the component will obtain the position according the below formula in Runtime:

Xpos = "End Value X" - "Variable for Move X" Value

Variable for Move X

The name of the variable which will determine the component's position in the X axis is entered in this edit box (or select it by using the "..." browse button on the right hand side).
The value contained in the Variable expresses the component's position on the screen in pixels. When the variable has a minimum value the symbol will be positioned to the point according to the total amount taken from the starting point and the **Start** value. When the variable has a maximum value, the symbol will be positioned to a point according to the quoted sum taken from the starting point and the **End** value.

The position values contained in the base Variable are expressed in pixels, therefore when inserting values higher than the adopted screen resolution, the selected object may exit from the area displayed on the screen.

Start Value X

The Starting position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's X axis' '0' coordinates, but the position relating to the coordinates of the component's top left apex concerning the component's start position in the Screen. When the **Variable** values are lower than the **Start** value the object will be positioned to the point relating to the quota taken from the total amount of the **Start** value and the **Start Offset** value.

End Value X

The End position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's X axis' '0' coordinates, but the position relating to the coordinates of the component's top left apex concerning the component's starting position in the Screen. When the Variable values are higher than the End value the object will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

Offset for the Start Value X

The position Offset value, which the component is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object will be positioned to the point relating to the quota taken from the total amount of the **Start** value and the **Start Offset** value.

Offset for the End Value X

The position Offset value, which the component is to assume when the **Variable** is set with values higher than the End value, is entered in this edit box. In this case the object will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

10.32.9. Move Y Properties Animation

The Move Y properties allow you to move the selected component on the screen along the Y axis according to the values contained in the associated variable (in pixels).
This property is part of the Drawings and Controls **'Animation'** property.
To edit the Move Y property, select the object with the mouse and use the Movicon **'Properties Window'**.

Enable Y Movement

When enabling this check-box the Move Y function will be activated in the selected component. In this way the component will obtain the position along the Y axis in the Screen in function with the values of the associated Variable in Runtime.

Invert Y Direction

enabling this check-box will activate the function to invert the vertical movement. Therefore the component will obtain the position according to the formula below in Runtime:

Ypos = "End Value Y" - "Variable for Move Y" value

Variable for Move Y

The name of the variable which will determine the component's position in the Y axis is entered in this edit box (or select it by using the "..." browse button on the right hand side).
The value contained in the Variable expresses the component's position on the screen in pixels. When the variable has a minimum value the symbol will be positioned to the point according to the total amount taken from the starting point and the **Start** value. When the variable has a maximum value, the symbol will be positioned to a point according to the quoted sum taken from the starting point and the **End** value.

The position values contained in the base Variable are expressed in pixels, therefore when inserting values higher than the adopted screen resolution, the selected object may exit from the area displayed on the screen.

Start Value Y

The Starting position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's Y axis' '0' coordinates, but the position relating to the coordinates of the component's top left apex relating to the component's start position in the Screen. When the **Variable** values are lower than the **Start** value the object will be positioned to the point relating to the quota taken from the total amount of the **Start** value and the **Start Offset** value.

End Value Y

The End position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's Y axis' '0' coordinates, but the position relating to the coordinates of the component's top left apex relating to the component's starting position in the Screen. When the Variable values are higher than the End value the object will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

Offset for the Start Value Y

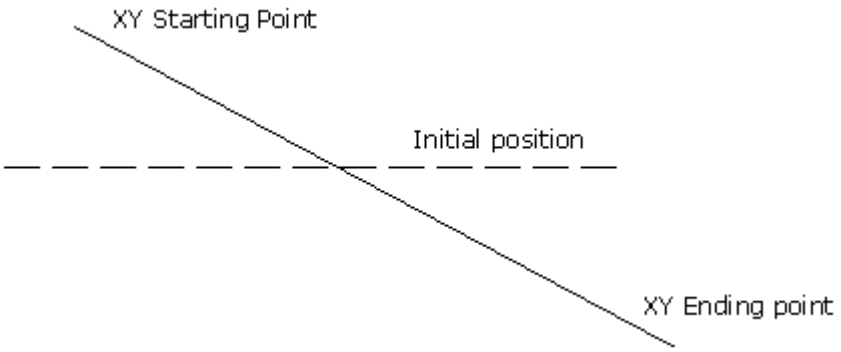
The position Offset value, which the component is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object will be positioned to the point relating to the quota taken from the total amount of the **Start** value and the **Start Offset** value.

Offset for the End Value Y

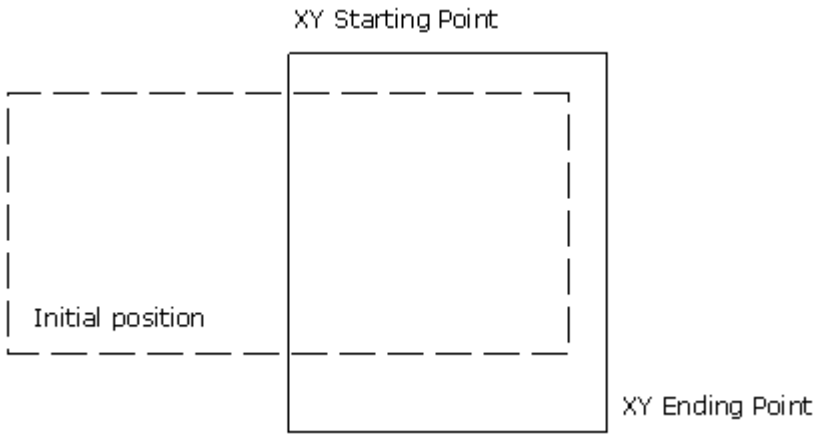
The position Offset value, which the component is to assume when the **Variable** is set with values higher than the End value, is entered in this edit box. In this case the object will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

10.32.10. Points Properties Animation

This function allows you to create animations dedicated to dynamically sizing drawings and controls free hand. The objects can receive the XY starting points and XY ending points directly from the Movicon variables. This enables the animation functionalities to be used for determining non linear sizing (therefore different from the '**Scale**' properties) for any kind of necessity. Above all this type of animation can be applied to 'Lines', which become elastically animated.



An example of a line animation: The trajectory line illustrates the line before being moved to the coordinates given by the variable.
When the object is not in line form, the starting point is the top left corner and the ending point is the bottom right corner.



To set the properties concerning points refer to the appropriate sections:

Start X Point Properties common to Drawings and Controls
Start Y Point Properties common to Drawings and Controls
End X Point Property common to Drawings and Controls
End Y Point Properties common to Drawings and Controls

10.32.11. Start X Point Properties Animation

The Start X Point properties allow the component's start X coordinate to move in function with the value contained in the associated variable (in pixels).
The Start X Point is the X coordinate at the start of the line for line type drawings and the coordinate of the far left corner on the screen for flat shapes such as rectangles.
This property is part of the Drawings and Controls '**Animation'** properties group.
To modify the Start X Point property, select the object with the mouse and use the Movicon **'Properties Window**'.

Enable
When enabling this check-box the Start X Point function will be activated in the selected component. By doing this the component will change the Start X Point in the Screen according to the value of the associated Variable during Runtime.

Variable
The name of the variable which determines the Start X Point position is entered in this edit box. (or select it by using the "..." browse button).
The value contained in the Variable expresses the Start X Point position in pixels on the screen. When the variable obtains a minimum variable, the symbol's Start X Point is positioned according to the total amount taken from the starting point and the **Start** value. When the variable obtains a maximum value, the symbol's Start X Point will be positioned to a point according to the quoted sum taken from the starting point and the **End** value.

The position values contained in the base Variable are expressed in pixels, therefore when inserting values higher than the adopted screen resolution, the selected object's Start X Point may exit from the area displayed on the screen.

Start
The Starting position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's X axis' '0' coordinates, but the

position relating to the coordinates of the component's far left apex relating to the component's start position in the Screen. When the **Variable** values are lower than the **Start** value the object's Start X Point will be positioned to the point relating to the difference taken from the total amounts of the **Start** value and the **Start Offset** value.

End
The End position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's X axis' '0' coordinates, but the position relating to the coordinates of the far left apex relating to the component's starting position in the Screen. When the **Variable** values are higher than the **End** value the object's Start X Point will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

Start Offset
The position Offset value, which the component's Start X Point is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object's Start X Point will be positioned to the point relating to the quota taken from the difference of the total amounts of the **Start** value and the **Start Offset** value.

End Offset
The position Offset value, which the component's Start X Point is to assume when the **Variable** is set with values higher than the End value, is entered in this edit box. In this case the object's Start X Point will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

10.32.12. Start Y Point Properties Animation

The Start Y Point properties allow the component's Start Y coordinate to move in function with the value contained in the associated variable (in pixels).
The Start Y Point is the Y coordinate at the start of the line for line type drawings and the coordinate of the highest apex on the screen for flat shapes such as rectangles.
This property is part of the Drawings and Controls '**Animation**' properties group.
To modify the Start Y Point property, select the object with the mouse and use the Movicon '**Properties Window**'.

Enable
When enabling this check-box the Start Y Point function will be activated in the selected component. By doing this the component will change the Start Y Point in the Screen according to the value of the associated Variable during Runtime.

Variable
The name of the variable which determines the Start Y Point position is entered in this edit box. (or select it by using the "..." browse button).
The value contained in the Variable expresses the Start Y Point position in pixels on the screen. When the variable obtains a minimum value, the symbol's Start Y Point is positioned according to the total amount taken from the starting point and the **Start** value. When the variable obtains a maximum value, the symbol's Start Y Point will be positioned to a point according to the quoted sum taken from the starting point and the **End** value.

The position values contained in the base Variable are expressed in pixels, therefore when inserting values higher than the adopted screen resolution, the selected object's Start Y Point may exit from the area displayed on the screen.

Start
The Starting position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's Y axis' '0' coordinates, but the position relating to the coordinates of the component's highest apex relating to the component's start position in the Screen. When the **Variable** values are lower than the **Start** value the object's Start Y Point will be positioned to the point relating to the difference taken from the total amounts of the **Start** value and the **Start Offset** value.

End
The End position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's Y axis' '0' coordinates, but the position

relating to the coordinates of the highest apex relating to the component's starting position in the Screen. When the **Variable** values are higher than the **End** value the object's Start Y Point will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

Start Offset

The position Offset value, which the component's Start Y Point is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object's Start Y Point will be positioned to the point relating to the quota taken from the difference of the total amounts of the **Start** value and the **Start Offset** value.

End Offset

The position Offset value, which the component's Start Y Point is to assume when the **Variable** is set with values higher than the End value, is entered in this edit box. In this case the object's Start Y Point will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

10.32.13. End X Point Properties Animation

The End X Point properties allow the component's End X coordinate to move in function with the value contained in the associated variable (in pixel).
The End X Point is the X coordinate at the end of the line for line type drawings and the coordinate of the far right corner on the screen for flat shapes such as rectangles.
This property is part of the Drawings and Controls '**Animation**' properties group.
To modify the End X Point property, select the object with the mouse and use the Movicon '**Properties Window**'.

Enable

When enabling this check-box the End X Point function will be activated in the selected component. By doing this the component will change the End X Point in the Screen according to the value of the associated Variable during Runtime.

Variable

The name of the variable which determines the End X Point position is entered in this edit box. (or select it by using the "..." browse button).
The value contained in the Variable expresses the End X Point position in pixels on the screen. When the variable obtains a minimum value, the symbol's End X Point is positioned according to the total amount taken from the starting point and the **Start** value. When the variable obtains a maximum value, the symbol's End X Point will be positioned to a point according to the quoted sum taken from the starting point and the **End** value.

The position values contained in the base Variable are expressed in pixels, therefore when inserting values higher than the adopted screen resolution, the selected object's End X Point may exit from the area displayed on the screen.

Start

The Starting position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's X axis' '0' coordinates, but the position relating to the coordinates of the component's far right apex relating to the component's start position in the Screen. When the **Variable** values are lower than the **Start** value the object's End X Point will be positioned to the point relating to the difference taken from the total amounts of the **Start** value and the **Start Offset** value.

End

The End position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's X axis' '0' coordinates, but the position relating to the coordinates of the far right apex relating to the component's starting position in the Screen. When the **Variable** values are higher than the **End** value the object's End X Point will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

Start Offset
The position Offset value, which the component's End X Point is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object's End X Point will be positioned to the point relating to the quota taken from the difference of the total amounts of the **Start** value and the **Start Offset** value.

End Offset
The position Offset value, which the component's End X Point is to assume when the **Variable** is set with values higher than the End value, is entered in this edit box. In this case the object's End X Point will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

10.32.14. End Y Point Properties Animation

The End Y Point properties allow the component's End Y coordinate to move in function with the value contained in the associated variable (in pixel).
The End Y Point is the Y coordinate at the end of the line for line type drawings and the coordinate of the lowest corner on the screen for flat shapes such as rectangles.
This property is part of the Drawings and Controls '**Animation**' properties group.
To modify the End Y Point property, select the object with the mouse and use the Movicon '**Properties Window**'.

Enable
When enabling this check-box the End Y Point function will be activated in the selected component. By doing this the component will change the End Y Point in the Screen according to the value of the associated Variable during Runtime.

Variable
The name of the variable which determines the End Y Point position is entered in this edit box. (or select it by using the "..." browse button).
The value contained in the Variable expresses the End Y Point position in pixels on the screen. When the variable obtains a minimum value, the symbol's End Y Point is positioned according to the total amount taken from the starting point and the **Start** value. When the variable obtains a maximum value, the symbol's End Y Point will be positioned to a point according to the quoted sum taken from the starting point and the **End** value.

The position values contained in the base Variable are expressed in pixels, therefore when inserting values higher than the adopted screen resolution, the selected object's End Y Point may exit from the area displayed on the screen.

Start
The Starting position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's Y axis' '0' coordinates, but the position relating to the coordinates of the component's lowest apex relating to the component's start position in the Screen. When the **Variable** values are lower than the **Start** value the object's End Y Point will be positioned to the point relating to the difference taken from the total amounts of the **Start** value and the **Start Offset** value.

End
The End position value, to be obtained by the variable, is entered in this edit box. This value does not represent the absolute position regarding the screen's Y axis' '0' coordinates, but the position relating to the coordinates of the lowest apex relating to the component's starting position in the Screen. When the **Variable** values are higher than the **End** value the object's End Y Point will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

Start Offset
The position Offset value, which the component's End Y Point is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object's End Y Point will be positioned to the point relating to the quota taken from the difference of the total amounts of the **Start** value and the **Start Offset** value.

End Offset
The position Offset value, which the component's End Y Point is to assume when the **Variable** is set with values higher than the End value, is entered in this edit box. In this case the object's End Y

Point will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

10.32.15. Scaling Properties Animation

The Scaling properties allow the drawing or control to be sized in the screen according to the values contained (in percentages) in the associated animation variable.
This property is part of the Drawings and Controls '**Animation**' properties group.
To edit the Scaling properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Enable
When enabling this check-box the Scaling function in the selected component will be activated. In this way the component can be resized according to the values of the associated **Variable** during Runtime.

The object can be resized in percentages in respect to the original size set in the programming stage. When the 0% value is reached the object will disappear, as the result of not having any sizes, while the 100% value corresponds to the size with which the object was created in the programming stage. When setting percentages higher than 100% you will get an enlarged object.

Variable
The name of the variable whose value will be used for changing the component's size is entered in this edit box (or use the "..." browse button on the right hand side to select it). The variable's value will be converted into a percentage value resulted from the scaling between the **Start/End** values and the **Start/End Percentage** value described below.

Start
The Variable's value corresponding to the object's scaling **Start Percentage** is entered in this edit box. When the Variable obtains a value lower than this value the object will remain sized with the **Start Percentage**.

End
The Variable's value corresponding to the object's scaling **End Percentage** is entered in this edit box. When the Variable obtains a value higher than this value the object will remain sized at **Start Percentage**.

Start Percentage
The Scale's Minimum percentage value which the object may reach is entered in this edit box. It will not be possible to make the object smaller than the percentage value set in this property.

End Percentage
The Scale's Maximum percentage value which the object may reach is entered in this edit box. It will not be possible to make the object bigger than the percentage value set in this property.

Type
This option box permits you to define the object's size Direction. In this way the drawing can modify its own scale by expanding or shrinking itself in relation to its fixed reference point.
Therefore a symbol indicating the size direction has to be selected.
There can be more than one direction, and the arrows reported in the drop-down list indicate the direction in which the symbol will be resized.

When choosing the second Direction group, that is the symbols represented with a red circle and titled 'intersection', the object will not be resized but made partly visible based on the set scale factors.

10.32.16. Rotation Properties Animation

The Rotation property allows the drawing or control to rotate on its own axis in the screen in function with the value contained in the associated animation variable (in rotation angle degrees).
This property is part of the Drawings and Controls **'Animation'** properties group.
To edit the Rotation properties, select the object with the mouse and use the Movicon **'Properties Window'.**

Enable
When enabling this check-box the Rotation function in the selected component will be activated. By doing this the component can be rotated on its own baricenter in function with the associated **Variable**.

The object's baricenter is set up through the "Baricenter" property in the **"Drawings and Controls common General Properties"** settings. The position of the baricenter can be managed dynamically by enabling the **Enable X point rotation** and **Enable Y point rotation** properties as described below.

Variable
The name of the variable whose value will be used for executing the component's rotation is entered in this edit box (or selected by using the "..." browse button on the right hand side). The object is rotated on angles of 60 degrees, therefore the variable can assume an interval of values ranging from 0 to 360, being angles of 60 degree turns. Values higher or lower than this range will be executed on a further rotation of the object. For instance the 720 value will take the object to the start position after having completed two turns.

Start
The minimum value of the **Variable** which will correspond to the object's rotation start is entered in this edit box. When the Variable obtains values lower than this value the object will rotate in the position obtained by subtracting the **Start** and **Start Angle** values.

End
The maximum value of the **Variable** which will correspond to the end of the object's rotation end is entered in this edit box. When the Variable obtains values higher than this value the object will rotate on the position obtained by the total amount taken from the **End** and **End Angle** values.

Start Angle
The rotation value which the component must obtain when the **Variable** is set with values lower than the **Start** value is entered in this edit box. In this case the object will be rotated in the position obtained by subtracting the **Start** and **Start Angle** values.

End Angle
The maximum value which the component must obtain when the **Variable** is set with values higher than the **End** value is entered in this edit box. In this case the object will be rotated in the position obtained by the total amount taken from the **End** and **End** Angle values.

Enable X point rotation
This check-box has to be enabled in order to dynamically define the X position of the object's baricenter where the rotation is to take place. This position is given by the value contained in the **X point Variable**.

X point Variable
The name of the variable in which the value identifies the X position of the object's baricenter where the rotation is to take place is entered in this edit box (or selected with the "..." browse button on the right hand side). This value is expressed in pixels and does not represent the absolute point concerning the '0' coordinates of the screen's X axis, but the point relating to the component's furthest left apex, and therefore the components start position in the Screen. If the variable's value is higher than the object's maximum width the object's will be considered as the X Baricenter the end X coordinate of the object.

Enable Y point rotation
This check-box has to be enabled in order to dynamically define the Y position of the object's baricenter to where the rotation is to take place. This position is given by the value contained in the **Y point Variable.**

Y point Variable

The name of the variable in which the value identifies the Y position of the object's baricenter where the rotation is to take place is entered in this edit box (or selected with the "..." browse button on the right hand side). This value is expressed in pixels and does not represent the absolute point concerning the '0' coordinates of the screen's Y axis, but the point relating to the component's highest apex, and therefore the components start position in the Screen. If the variable's value is higher than the object's maximum length the object's will be considered as the Y Baricenter the end Y coordinate of the object.

10.32.17. Text Animation Properties

The Text properties allow the associated variable's value to be displayed in the component, replacing the title, whether being text or numeric type.
This property is part of the Drawings and Controls **'Animation'** properties group.
To edit the Text properties, select the object with the mouse and use the Movicon '**Properties Window**'.

Enable

Enabling this check-box will activate the Text function in the selected component. In this way the component will display the associated Variable's value replacing its title during Runtime. This functionality is similar to that of the '**Display (Edit box)**' controls existing in the **'Controls'** class in the **"Object Window"**.

Drawing Text properties, and in particular those of Rectangles, can be used for creating 'read only' Display objects.

Search Value in Strings Table

This property invokes the search for the value of the variable, associated to the "Text - Display Value" through the "Tag to Display" property, in the strings listed in the string table and displayed in the object's title. In cases where table has no string ID, the variable's value will displayed.

Variable

The name of the variable whose value is to be displayed by the component is entered in this edit box (or selected with the "..." browse button on the right hand side).

Value Format

The format, with which the numeric values presented in the **Variable** are to be displayed, is specified in this edit box. All the format codes that can be used in this property are those listed in "Predefined Movicon Formats" and "Formats for Numerical values and strings" paragraphs from the "Data Formats" section.

When using basic expression in symbols Text Animation Property, it must be set the format "%f".

Format Variable

The name of the variable whose value will be used to determine the display format of the variable associated to the Display is entered in this editbox (or selected using the **"..."** browse button on the right). The displayed value format can also be modified during runtime using this variable. When this field is left empty, the format defined in the "Format Value" property will be used, otherwise the variable's contents will be used.
Numeric variables or string variables can be entered in this field:

- **Numeric Variable:** if the variable is numeric type, the number set will represent the number of decimal figures after the point. For example, when entering the '2' value in this field, the "x.xx" format will be used. If the set value is negative, the absolute value will be taken, therefore when entering "2" or "-2" the same result will be obtained. If the value is in floating type with decimal figures, the value will be rounded off, for example; an entered "1.4" will be taken as "1" and an entered "1.6" will be taken as "2".
- **String Variable:** if the variable is string type, its format must be one of those provided by the control system which are listed in the paragraph headed "Predefinided Movicon Format" from the section on "Data Formats" (i.e. "x.xx", "%s", etc.).

Caution! When using a string variable type make sure that you insert a correctly supported format. If the string inserted is not in a valid string format, the value will not get displayed correctly.

"Byte Array" or "Structure" variable types (inserted as global variables without using a single member) are not supported. In this case the value will be displayed with the format defined in the "Format Value". property.

10.32.18. Back Color Properties Animation

The Back Color Properties allow you to vary the selected component's background colour in function with the changes of the associated variable.
This property is part of the Drawings and Controls **'Animation'** properties group.
To Edit the Back Color properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Enable
Enabling this check-box will activate the Back Color function in the selected component. By doing this the background colour will change in function with the associated Variable's value during Runtime.

Variable
The name of the variable, whose value is to be used for the background color change in function with the 'Threshold Color' set, is inserted in this edit box.

Variable Is Alarm Group
The enabling of this property allows you to set the variable used for the animation as the name of the alarm area to be monitored. In this case the name of the Alarm Area is entered in the "Variable" field instead of the variable. In this way the intervention thresholds will result as:

0 = No Alarm
1 = At least one alarm active
2 = At least one alarm ON

This will allow the status of each alarm area to be monitored graphically by setting the 0,1,2 in the back animation properties.
Furthermore, when this option is enabled with a string type variable entered in the "Variable" field, the contents of this string will be used as the name of the Alarm Area to be monitored.

This property is not supported in Network Client projects or projects set as Redundancy "Secondary Server" when the Primary Server is active. In both cases these projects will not have the alarm management active locally, but will receive alarm notifications directly from the Server.

Edit Back Color List
By using this property you can assign the desired colours for the component's background to the numeric values obtained by the Variable. Click on the **"..."** button to open the Color Threshold configuration window. To get further information please refer to the paragraph on **"Colour Threshold Settings in Drawings and Controls".**

Analog Color
This property enables a gradual change over from one colour to another involving an 'analog' mixture of the two colours where they change over. This gradual change over of color shades can only be carried out when the Variable's two threshold values have been inserted with intermediate values.

10.32.19. Edge Color - Dynamic Text Animation

The Edge-Text Color properties allow you to vary the colours of edges and any texts (title) of the component selected in function with the changes of the variable associated.

This property is part of the Drawings and Controls **'Animation**' properties group.
To edit the Edge-Text Color properties, select the object with the mouse and use the Movicon **'Properties Window'.**

Enable
When enabling this check-box the Edge-Text Color function will be activated in the component selected. By doing this the component will change the colours of the edges and any displayed texts in function with the values of the associated variable during Runtime.

Variable Color
The name of the variable, whose value will be used for changing the colours of the edges and any texts in function with the set '**Threshold Colours'**, is entered in this edit box.

Variable Is Alarm Group
The enabling of this property allows you to set the variable used for the animation as the name of the alarm area to be monitored. In this case the name of the Alarm Area is entered in the "Variable" field instead of the variable. In this way the intervention thresholds will result as:

0 = No Alarm
1 = At least one alarm active
2 = At least one alarm ON

This will allow the status of each alarm area to be monitored graphically by setting the 0,1,2 in the back animation properties.
Furthermore, when this option is enabled with a string type variable entered in the "Variable" field, the contents of this string will be used as the name of the Alarm Area to be monitored.

This property is not supported in Network Client projects or in projects set as Redundancy "Secondary Server" when the Primary Server is active. In both cases the projects will not have their alarm management active locally, but will receive alarm notifications directly from the Server.

Edit Edge-Text Color List
This property is used for assigning colours desired for the component's edges and text of the numeric values obtained by the Variable. Click on the **"..."** button to open the Color Threshold configuration window.
To get further information please refer to the paragraph on **"Colour Threshold Settings in Drawings and Controls".**

Analog Colors
This property enables a gradual change over from one colour to another involving an 'analog' mixture of the two colours where they change over. This gradual change over of color shades can only be carried out when the Variable's two threshold values have been inserted with intermediate values.

10.32.20. Filling Properties Animation

The Filling properties allow the a coloured filling in proportion to the selected variable's contents in drawings and controls.
This property is part of the Drawings and Controls '**Animation**' properties group.
To edit the Filling properties, select the object with the mouse and use the Movicon '**Properties Window**'.

Enable
When enabling this check-box the Filling function will be activated in the selected component. By doing this the component will change its filling percentage in function with the **Filling Variable** associated during Runtime.

Variable
The name of the variable, whose value will be used for changing the component's filling colour in function with the **'Colour Threshold'** set, is entered in this edit box (or selected with the "..." browse button on the right hand side). By doing this the object's filling colour can be changed in function with the value of this variable to have a different colour based on the filling percentage

reached (in this case the same variable is to be set both in the **Variable** field and in the **Variable Filling** field).

Edit Filling Colour List...
By means of this property the numerics obtained by the **Variable,** described above can be assigned with the chosen colours for the component's filling. To open the Colour Threshold's configuration window click on the "..." button. For further information please refer to the paragraph on **"Colour Threshold Settings in Drawings and Controls".**

Analog Color
When enabling this property you will get a gradual change of one colour to the next obtaining an 'analog' mix of the two colours nearing the changeover from one colour threshold to another. To get the different shades of colour changes you will have to insert intermediate values between the two threshold values in the variable.

Variable Filling
The name of the variable whose value is need to set the object's filling percentage is inserted in this edit box (or selected by using the "..." browse button on the right).

The minimum and maximum values that the variable can have, described below, are automatically scaled by Movicon to get a filling from 0% to 100% (completely empty, completely full).

Start
The value of the variable which is to correspond to the 0% filling, meaning no filling, is entered in this edit box.

End
The value of the variable which is to correspond to the 100% filling, meaning no filling, is entered in this edit box.

Start Offset
The filling Offset value, which the components must assume when the **Variable Filling** is set with values lower than the one entered in the **Start** property, is entered in this edit box. In this case the object will be filled with a percentage in proportion to the difference between the **Start** value and **Start Offset** value.

End Offset
The filling Offset value, which the components must assume when the **Variable Filling** is set with values higher than the one entered in the **End** property, is entered in this edit box. In this case the object will be filled with a percentage in proportion to the difference between the **End** value and **End Offset** value.

Type
This option box is used for setting which direction the filling is to take when applied. The choices are:

- **none**
- **left-right**
- **right-left**
- **bottom-top**
- **top-bottom**

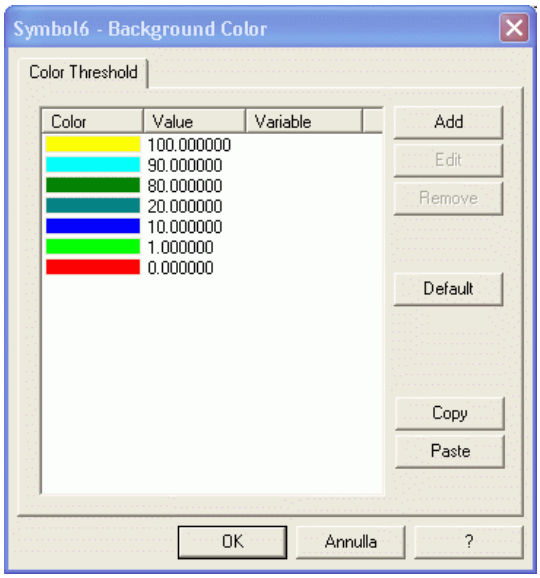
The **"none"** option means that no filling will take place.

Start Variable
The name of the variable to be used as a dynamic Start value is inserted in this edit box (or selected with the "..." browse button on the far right). When a variable is entered here, the **Start** property will be ignored and the value contained in the selected variable will take its place.

End Variable
The name of the variable to be used as a dynamic End value is inserted in this edit box (or selected with the "..." browse button on the far right). When a variable is entered here, the **End** property will be ignored and the value contained in the selected variable will take its place.

10.32.21. Colour Threshold Settings

The Threshold Settings in Drawings and Controls must be configured when the **"Back Color Properties common to Drawings and Controls"** or **"Edge - Text Color Properties common to Drawings and Controls"** or **"Filling Properties common to Drawings and Controls"** properties are enabled. In this case it is necessary to execute the association of colours to values that the variables, defined for animation, can obtain. The colour thresholds that can be inserted are virtually unlimited.
The associated colour will be activated when the value of the variable obtains the same value defined for the threshold. When the value of the variable exceeds the value defined for the threshold, the colour associated to the next threshold will be activated and so on.



For instance, taking into consideration the settings reported in the above figure we should get:

Variable Value	Colour
0	Red
1	Green
10	Blue
...	...
90	Cyan
100	Yellow
...	...

If the '**Analog Colours**' option has been selected the pass over from one colour threshold to another will be gradual, and therefore a series of intermediate colours managed by Movicon will be displayed during Runtime.

By using the **"Copy"** and **"Paste"** commands described below you can copy the defined color threshold list from one object and paste it in other different objects. This allows you transfer color thresholds from one object to another quickly for all types of dynamic animations: **"Background color", "dynamic Text"** and **"Text & Edge Colors"** and **"Gradual Filling"**.

The buttons positioned on the right hand side of the dialog window allow you to edit the colour thresholds. Their functions are:

- **Add**: adds a new Colour Threshold. A 'Edit Colour Threshold' window opens
- **Edit**: after having selected a threshold from the list it's settings can be edited. A ' Edit Colour Threshold' window opens
- **Remove**: after having selected a threshold from the list it can be deleted
- **Default**: when pressing this button the threshold list will be cancelled and the 7 default thresholds will be inserted by Movicon

- **Copy**: consents you to copy the color threshold list to the Windows Clipboard. The color threshold data is copied to the Window clipboard in xml format
- **Paste**: consents you to paste the color threshold list, previously copied to the Windows Clipboard with the "copy" command, to the selected object

You are required to enter at least two threshold when editing thresholds. However, it is possible to delete all the color thresholds from the list. In this case Movicon will use the default threshold list, and the nest time the threshold edit window is opened all the default thresholds will show again.

Edit Threshold Colour

When you press the Add or Edit buttons in the window listing the inserted thresholds, a dialog window will open to configure the parameters of each threshold:

Value

In this edit box the value desired is entered which then be confronted with the value contained in the animation **variable** to determine when the threshold in question must be activated.

Variable

In this edit box the name of the variable to be used in place of the **Value** property is to be entered (or select with the **"..."** browse button on the right). By doing this the threshold's value can be made dynamic, as the contents of the variable will be used and which can be edited during Runtime.

Be careful not to confuse the **Threshold Variable** with the Animation **Variable** inserted for Colour Threshold management. The **Threshold Variable** is only needed to make the value of each single threshold dynamic. This means that if the same variable is inserted, in the **Threshold Variable** field and in the **Variable** field by mistake, the animation will stop working and the components will keep the same colour as the reference variable and the threshold value will remain the same.

Mode

The mode option allows you to select the animation's behaviour when the threshold has been reached. The following actions, which will be executed when the value has been reached, can be selected:

- **Normal**: when the threshold has been reached the colour, selected by means of the **Color** property described below, will be displayed
- **Invisible**: when the threshold has been reached the colour will become invisible, as if transparent
- **Slow Blinking**: when the threshold has been reached the slow blinking will be executed with the colour defined in the **Color** and **Blinking Color** properties as described below. The blinking time is 2000 msecs. for default. This value can be customized using the appropriate "BlinkTypeSlow" registry key.
- **Average Blinking**: when the threshold has been reached the normal blinking will be executed with the colour defined in the **Color** and **Blinking Color** properties as described below. The blinking time is 1000 msecs for default. This values can be customized using the appropriate "BlinkTypeMedium" registry key.
- **Fast Blinking**: when the threshold has been reached the fast blinking will be executed with the colour defined in the **Color** and **Blinking Color** properties as described below. The blinking time is 500 msecs. for default. This value can be customized using the appropriate "BlinkTypeFast registry key.
- **Custom Blinking**: when the threshold has been reached the blinker will be executed with the colour defined in the **Color** and **Blinking Color** properties as described below, using the value specified in the **Blink Time**, described below, as blinking frequency

Blink Time

The blink time is entered in this box which will be used when the **Customized Blinking** item has been selected in the **Mode** property. The time is expressed in milliseconds.

Text

The text string is entered in this edit box. The string will be displayed inside the component together with any animations that have been set when the preset threshold has been reached. This option allows you to create dynamic texts. This property is only available for the **"Edge - Text Color Properties common to Drawings and Controls"** function.

Color

This setting is used for selecting the colour to be associated to the Threshold.
For further information on selecting colours please refer to the paragraph on "Color Selection".

Blink Colour

This permits you to select the blink colour to be used together with the threshold's **Color** when the **Customized Blink** in the **Mode** property has been selected.
For further information on selecting colours please refer to the paragraph on "Color Selection".

10.32.22. Image Animation Properties

The image properties permit one or more images to be displayed in the component based on the value of the variable connected.
This property is part of the Drawings and Controls **'Animations'** property group.
To edit the Image properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Enable Image Animations

When enabling this check-box the Image function on the selected component will be activated. This will display the image associated to the value of the selected Variable during Runtime.

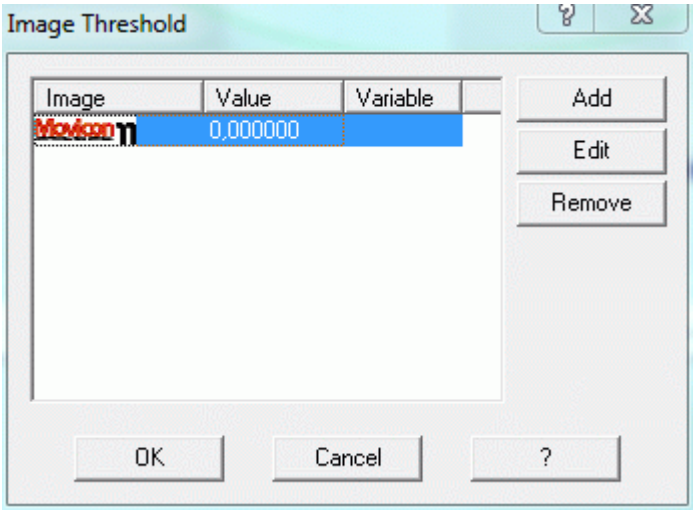
Variable

The name of the variable, whose value must be associated to the image to be displayed in the component, is entered in this edit box. (or selected with the '...' browse button on the right

The associated variable can be either numeric or string type. When using String type variables, the displayed image in the object will be indicated by the file name loaded in the variable and therefore independent from the list of Images set using the Image List Editor. If the name of the file in the String variable does not contain an absolute path, the file to be displayed will be searched for in the project's IMAGES folder.

Edit Images...

By using this command you can edit the image list which is to be displayed based on the value of the **Variable.**
The first window to be opened for editing the images shows the list of images already inserted and the corresponding values of the Variable:



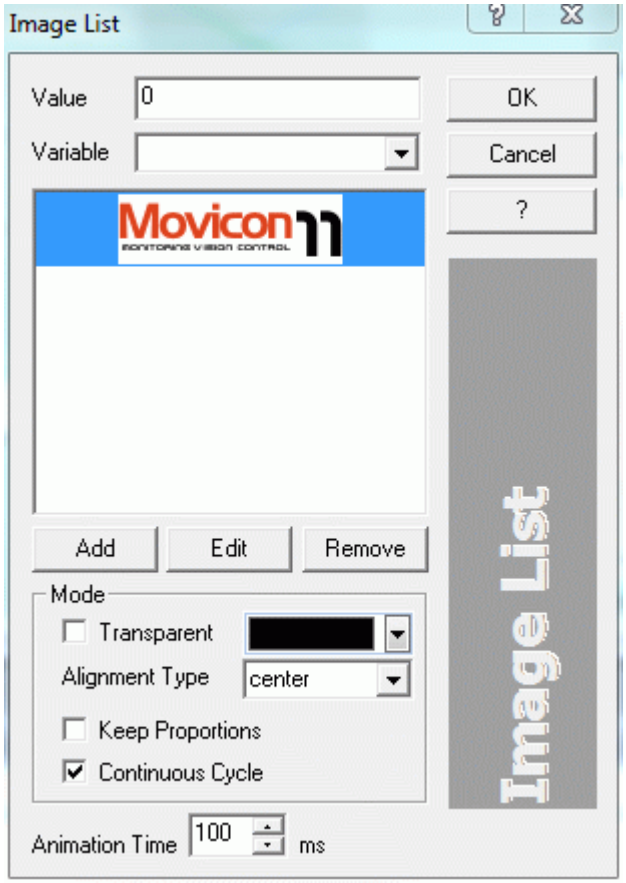
When the Variable assumes the value associated to the image, it will be displayed in the component.
The buttons available for editing the list are:

- **Add**: consents the entry of a new animation on the list (image associated to the Variable's value)

- **Edit**: consents the editing of an animation already inserted on the list. The image to be modified must first be selected.
- **Remove**: consents you to delete the selected image from the list.

At least two thresholds must be set to animate images.

When pressing the **'Add'** and **'Edit'** keys another window will open where the images can be selected and associated with the value of the variable:



This window, called the Image list, permits you to set the image display conditions. This window is used for setting the **Threshold value** referring to the associated **Variable.** The threshold value determines the activation and appearance of the image (or sequence of images), and can be set in fixed constant, 'Value' field, or dynamic value, 'Variable' field.
The buttons used for managing the images have the following functions:

- **Add**: used for selecting a new image
- **Edit**: used for editing images already inserted on the list. The image must first be selected then edited.
- **Remove**: deletes the selected image from the list.

You can associate more than one image to each threshold value. In this case, when the threshold is activated the images are displayed in sequence, in time intervals specified in the **'Animation Time'** field.

The possibility to enter more than one image for each threshold consents the different images to appear in sequence within the symbol by simply creating graphic animation in single sequences or continuous cycle.

When adding the preset threshold, the image of sequence of images will be displayed according to the set mode selected from the following options:

- **Transparent**: the image's colour selected through the **"Transparent"** property from the Fill Attributes Properties common to Drawings and Controls' group will appear transparent in the object
- **Stretch**: the image will be adapted to the preset sizes of the object containing it.
- **Continuous Cycle**: the images will be cycled by overlapping each other continuously until no longer permitted by the activation conditions. Otherwise, the sequence of images will be carried out once only upon the rising edge of the threshold's condition.
- **Animation Time**: if more images have been added in this window, they will be made to automatically appear by Movicon in sequence of entry order, with time intervals (in milliseconds) set in this edit box.

10.32.23. Visibility Properties

The Visibility properties consent the component to be visible on screen in function with the layer activated in the Screen.
To edit the Visibility properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Layer
When enabling this check-box the Visibility function of the selected component will be activated. By doing this the component will be visible or hidden during Runtime in function with the layer activated in the Screen.

Enable Zoom
When enabling this property the visibility of the object will automatically be managed when a zoom takes place. When zooming out to reduce the Screen's sizes, the object when reaching a size lower than the percentage expressed in the **'Zoom-size Percent level'** property, will become completely invisible.

Enable Size
When enabling this property, the object's visibility will automatically be managed when it is being resized. When reaching a size lower than the percentage expressed in the **'Zoom-size Percent level'**, while being reduced, it will become completely invisible.

Zoom-size Percent level
The percentage taken from the object's original sizes. When the object's size goes below this percentage, it will be made invisible when the conditions enabled by the **'Enable Zoom'** and **'Enable Size'** activate.

Visible on Web Client
The component will also be made visible on the WebClient when this check-box is enabled with a check mark . When this property is disabled not only will the control not be visible on the WebClient but its basic script code will not be initialized when loaded in a WebClient session as well.

Visible on CE Platform
When this check-box is checked the component will also be made visible on WinCe platform. When this property is disabled the control, apart from not being visible in WinCE, will not initialize its basic script code when the container screen is loaded.

This property will only be visible when the project is NOT set as "WinCE" in the project's "Platform" property.

Focus Hilite
When this check-box is enabled the object will invert its background and foreground colors when focused on.

TAB Selectable
When this check-box is enabled, the object can be selected by using the TAB key during Runtime mode.

Invert Color
This property inverts the object's back colors and border colours.

Show Focus
This property is used for enabling the display of the control's outline when focused on.

Show Hilite
This property is used for enabling the control's inside border to highlight when the mouse pointer is on top of it.

10.32.24. Position Properties

The Position properties allow you to read/write the component's position and size on screen.
To edit the Position properties, select the object with the mouse and use the Movicon **'Properties Window'.**

X
This property expresses the X coordinate of the component's furthest left corner edge. The value is expressed in pixels and relates to the Screen window's 0 point (the top left corner edge) which contains the component. The value of this property will be automatically modified each time the component is moved in the Screen and vice-versa by modifying this value the component will graphically change its position.

Y
This property expresses the Y coordinate of the component's highest corner edge. The value is expressed in pixels and relates to the Screen window's 0 point (the top left corner edge) which contains the component. The value of this property will be automatically modified each time the component is moved in the Screen and vice-versa by modifying this value the component will graphically change its position.

Width
This property expressed the component's width. The value is expressed in pixels. The value of this property is automatically modified each time the component is resized in width and vice-versa by modifying this value the component will graphically change is size.

Height
This property expresses the component's height. The value is expressed in pixels. The value of this property is modified each time the component is resized in height and vice-versa by modifying this value the component will graphically change its size.

10.32.25. Stroke Attributes Properties

The Stroke Attributes Properties allow you to set the colour and sizes of the components' edges and texts.
To modify the Strokes Attributes property, select the object with the mouse and use the Movicon 'Properties Window'.

Color
This property allows you to select the colour to be associated to the edges and any text displayed by the component.
For further information on selecting colors, please refer to the paragraph on "Color Selection".

Pen Size
This property allows you to select the size of the component's border lines.

Pen Style
This property lets you select the component's borderline style.

10.32.26. Background Attributes Properties

The Fill Attributes properties allow you to set the background colours of components.
To edit the Rill Attributes Properties, select the object with the mouse and use the Movicon **'Properties Window'.**

Brush Style

This property allows you to select the brush style to be applied to the component's background. The list shows a variety of brush style designs available.

Back Color

This property allows you to select the background color to be applied to the component.
For further information on selecting colours please refer to the paragraph on "Color Selection".

Gradient Type

This property allows you to select the type of gradient for the background colour to be applied to the component. You can keep the colour uniform by selecting the **'none'** option, and you can also create colour graduations by selecting one of the other options available. The Gradient, when activated, will be a mixture of two colours chosen in the **'Back'** and **'Gradient Color'** properties.

Gradient Color

This property allows you to select the second colour with Movicon will use to create the components background gradient.
For further information on selecting colours please refer to the paragraph on "Color Selection".

Filling Color

This property allows you to select the filling's colour to be used when the **"Filling Properties common to Drawings and Controls"** has been used. In this case the colour selected for executing the component's filling will be used only when a **"Variable"** has not been selected in the **"Filling Properties common to Drawings and Controls"**.
For further information on selecting colours please refer to the paragraph on "Color Selection".

Static Image

By using this box you can associate a static BMP, JPG, GIF, WMF, etc. design type as the object's background. As alternative to typing in the path and name, you can select the file using the browse ("...") button to the right of the editbox.

Pressing the "CRTL + (...)" keys will allow you edit the selected background image, when opening the preset application associated to that image in a new window.

To avoid getting any problems with the images' absolute paths, it is advised to insert all the images used in the project inside the 'IMAGES' folder within the project folder.

Image Alignment

This selection is used for setting the background image's alignment in the object. The image's position can also be modified by adding a horizontal or vertical offset in the "Image Margin X" and "Image Margin Y" properties. The table below lists the different types of alignment that can be used and those which offsets can be applied to:

ALIGNMENT	MARGIN X	MARGIN Y
Stretched	Applicable	Applicable
top-left	Applicable	Applicable
top-center	Not Applicable	Applicable
top-right	Applicable	Applicable
center-left	Applicable	Not Applicable
center	Not Applicable	Not Applicable
center-right	Applicable	Not Applicable
bottom-left	Applicable	Applicable
bottom-center	Not Applicable	Applicable
bottom-right	Applicable	Applicable

The "Stretched" option will adapt the image to the sizes of the object containing it taking into consideration any set offsets.

Image Margin X

An offset value can be entered in this editbox to be used for moving the object's image horizontally. This offset will be applied between the object's borders and the image moving them according to the set alignment type. For instance, when setting the offset value to 10 with the alignment set at "center-left", the offset will be inserted between object's left border and the image, or between object's right border and the image with the alignment set at "center-right".
The offset can also obtain negative values which will move the image outside the object's borders.

Image Margin Y

An offset value can be entered in this editbox to be used for moving the object's image vertically. This offset will be applied between the object's borders and the image moving them according to the set alignment type. For instance, when setting the offset value to 10 with the alignment set at "top-center", the offset will be inserted between the object's top border and the image, or between the object's bottom border and the image with the alignment set at "bottom-center".
The offset can also obtain negative values which will move the image outside the object's borders.

Keep Proportions

This option box is only considered if the "stretched" option has been chosen for image alignment. When the "Keep Proportions" property is enabled, the image having been stretched to the object's sizes will keep the X and Y proportions respecting the original sizes. Otherwise the image will be completely stretched to the object's size.

Stretch Image

This property is used for setting the sizes of the associated image to fit in the object containing it. Keep in mind, however, that when changing the image's sizes it's graphical look may be effected.

Image Transparent Color

This property allows you to select a colour which will become transparent in the image associated to the control. The '-1' value consents the colour transparency to be used for those image formats supporting this property.
For further information on selecting colours please refer to the paragraph on "Color Selection".

Transparency Level

This property allows you to set the selected object's transparency level. The values which can be used start from 0 to 255 (0 = completely invisible, 255 = completely visible).

The settings of this property will be ignored if the "Transparency" Animation property has been enabled which consents to managing the transparency dynamically based on variable values.

Transparency animation is NOT supported in WinCE.
In addition to this, the transparency property has no effect in "Dundas Meter" and "Chart" objects. The "Dundas Gauges" transparency is set in the object's wizard. The "Chart" has a background attribute management where can be set with a gradient type and color but does not support transparency.

10.32.27. Access Levels Properties

The Access Levels properties allow you to associate the components with access and user levels so that only the users with the necessary rights can use them.
To edit the Access Levels Properties, select the object with the mouse and use the Movicon '**Property Window**'.

The Access Levels properties are active only when the "Enable Password Manager" property from the '**Users and User Groups General Properties**' has been in enabled in the project.

Write Access Level

By means of this property you can define the Access Level mask needed to execute, for example, the command list associated to the control. If the access level mask of the user logged on at that moment does not correspond to the control's settings, the user will not be able to execute any command operations associated to that control.
For further information see the paragraph on **"User Levels and Access Levels".**

Read Access Level

By means of this property you can define the Access Level mask needed for reading the control. If the access level mask of the user logged on at that moment does not correspond to the control's settings, the user will not be able to see the control which becomes invisible.
For further information see the paragraph on **"User Levels and Access Levels".**

User Level

By means of this property you can define the User Password level needed for example to execute the commands associated to the control. When the control in question is used by a user, Movicon will request activation of a user with a User Password level the same or higher than the one defined in the control itself. If the user who executed the Log on has the necessary access rights they will be authentically acknowledged, otherwise the Log on will fail and it will not be possible to carry out the operations requested by the user.
For further information see the paragraph on **"User Levels and Access Levels".**

10.32.28. Font Properties

The Text properties allow you to display the associated variable's value, numeric or text, replacing the title of the object.
This property is part of the Drawings and Controls **'Animation'** properties group.
To edit the text properties, select the object with the mouse and use the Movicon **'Properties Window'.**

List Font

By pressing the **'...'** button on the right hand side of the box a window will be activated for selecting the font to be associated to the texts presented in the 'Viewer' window. The selection is carried out according to the Windows modality standards.

This property is only available for some components, in particular for the display windows such as the Alarm Window, Log Window, etc.

Scale Font

By pressing the **'...'** button on the right of the box a window will be activated for selecting the font to be associated to the texts which represent the scale display of components such as Gauges, Trends, Data Analysis. The select is carried out according to the Windows modality standards.

This property is only available for some components, in particular those representing volume amounts on scales, such as Gauges, Trends, Data Analysis.

Grid Font

By pressing the **'...'** button on the right of the box a window will be activated for selecting the font to be associated to the texts which represent the columns of the "Grid" object. The selection is carried out according to the Windows modality standards.

Adapt Font

When this check-box is enabled the text in the selected component will be activated. By doing this the component will display the values of the associated variable, where the title is, during Runtime. This functionality is very similar to the controls' '**Display (Edit box)**' residing in the '**Controls**' class of the **"Object Window"**.

The drawing's Text property, and in particular the Rectangle's, can be used for creating Display objects for reading only.

3D Font

This box is used for selecting the type of three-dimensional effect to be associated to eventual texts entered in the title by using the 'General' properties.
The options are:

- **None**
- **Raised**
- **Embossed**

The default value is "None".

Text Align

This box is used for selecting the type of alignment for the eventual text entered in the title using the 'General' properties.
The options are:

- **Center**
- **Top**
- **Bottom**
- **Left**
- **Right**
- **Center-Left**
- **Center-Right**

In addion to the " X Offset" and "Y Offset" properties the text can also be moved horizontally and vertically in relation to the available Alignment settings:

Alignment	X Offset	Y Offset
Center	No	No
Top	No	Yes
Bottom	No	Yes
Left	Yes	Yes
Right	Yes	Yes
Center-Left	Yes	No
Center-Right	Yes	No

These text alignment settings are also valid for multi line strings in object that support them.

Only some of the objects are managed with the alignment in multi-lines for all types of alignment (including central alignment) when the text exceeds the width of the object. The Objects which support multilines are:

- **Basic Shapes (rectangles, ellipse, polygon, etc)**
- **Buttons**
- **Group Boxes**

X Offset

An offset value can be inserted in this editbox to be used for moving the object's text horizontally. This offset will be applied between the object's border and text moving the text according to the alignment type set. For example, when setting the 10 offset value with an "left" alignment setting, the offset will be inserted between the object's left border and the text. If a "right" alignment setting is used, the offset will be applied between the object's right border and the text.

Y Offset

An offset value can be inserted in this editbox to be used for moving the object's text vertically. This offset will be applied between the object's border and text moving the text according to the alignment type set. For example, when setting the 10 offset value with an "top" alignment setting, the offset will be inserted between the object's top border and the text. If a "Bottom" alignment setting is used, the offset will be applied between the object's bottom border and the text.

Title Font

The name of variable whose value is to be displayed by the component is entered in this edit box (or select name by using the "..." browse button on the right hand side).
The default settings are:

Char type: Tahoma
Style: Normal
Points: 8

10.32.29. Script Debug Output Properties

The Script Debug Output properties allow the texts inserted in the Basic Script's 'Debug.Print' instructions to be written on log files or printed.

This group of properties is only available if the Drawings and Controls have been associated with the Basic Script codes.

To edit the Script Debug Ouput properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Status Bar
When this property is enabled, the indications from the Basic Script 'Debug.Print' function will be shown on the Movicon status bar and in the project's 'Output Window'.

App.Log
When enabling this property, the indications from the Basic Script 'Debug.Print' function will be reported in the projects historical log.

Spooler
When enabling this property, the Basic Script 'Debug.Print' function will be sent to the system's print spooler.

10.32.30. Dragging Properties

The Dragging properties allow you to move or resize symbols using the mouse during the runtime phase. The relative positioning and sizing values will be placed in the associated variables.
This property is part of the "Animation" properties for drawings and controls.
To modify the Dragging properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Object Dragging is not supported by WinCE or Web Client and when objects are in Embedded Screens.

Move
The enabling of this property allows object and symbol to be dragged within the screen area during runtime mode. The position will determine the dynamic adaptation of the drawings coordinates in the associated variables.
The coordinates are always in X0 and Y0 pixels coinciding with the top left border of the object, or the rectangle which circumscribes it, in respect the point on the top left of the screen.

Resize
The enabling of this property allows the object or symbol to be resided by having its borders dragged within the screen area during runtime mode. The resizing will determine the dynamic adaptation of the object's size coordinates in the associated variables.

X Variable
The name of the variable, where the value is to be kept updated by Movicon according to the X coordinate (expressed in pixels) of the symbol's position, is entered in this edit box (or selected by using the "..." browse button.

CX Variable
The name of the variable, where the value is to be kept updated by Movicon according to the symbol's width value (expressed in pixels), is entered in this edit box (or selected by using the "..." browse button.

Y Variable
The name of the variable, where the value is to be kept updated by Movicon according to the Y coordinate (expressed in pixels) of the symbol's position, is entered in this edit box (or selected by using the "..." browse button.

CY Variable
The name of the variable, where the value is to be kept updated by Movicon according to the symbol's height value (expressed in pixels), is entered in this edit box (or selected by using the "..." browse button.

X Min.
This edit box is used for entering the X coordinate's minimum value (in pixels) within which the operator can move the object or symbol.

X Max.
This edit box is used for entering the X coordinate's maximum value (in pixels) within which the operator can move the object or symbol.

CX Min.
This edit box is used for entering the minimum value of the X size (in pixels) within which the operator can resize the object or symbol.

CX Max.
This edit box is used for entering the maximum value of the X size (in pixels) within which the operator can resize the object or symbol.

Y Min.
This edit box is used for entering the Y coordinate's minimum value (in pixels) within which the operator can move the object or symbol.

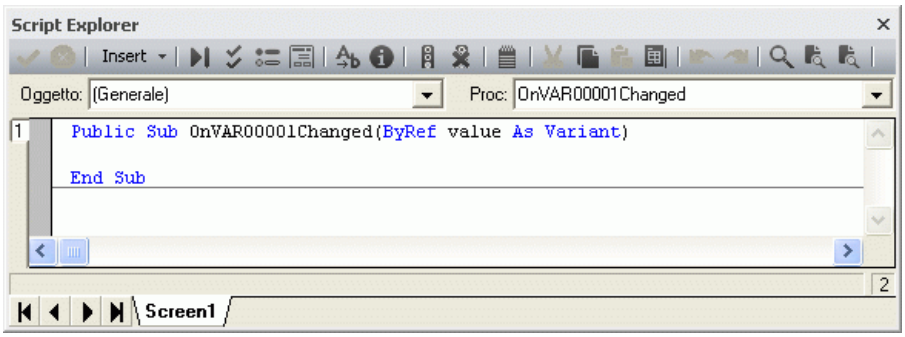
Y Max.
This edit box is used for entering the Y coordinate's maximum value (in pixels) within which the operator can move the object or symbol.

CY Min.
This edit box is used for entering the minimum value of the Y size (in pixels) within which the operator can resize the object or symbol.

CY Max.
This edit box is used for entering the maximum value of the Y size (in pixels) within which the operator can resize the object or symbol.

10.33. Associating Variable Script Events to Symbols

You can insert customized events, associated to the variations of variables from the Movicon Real Time DB, in addition to the standard ones made available to you by Movicon (Click, DblClick, KeyDown, etc.) internal Symbols' Script Codes (Drawings or Controls). An event can be added to be executed every time the selected variable changes state. Therefore the programmer can decide which code to insert internal the event as deemed necessary. The inserted event will then be active and processed when the Symbol is active, due to it being loaded in Ram.
The association of a Variable Script event to a Symbol can be done by selecting the Symbol and activating the "Add New Variable Script Event' command which can also be found in the Project Explorer's 'Commands' window.
The request for associating a Variable Script Event to a Symbol will open up another window containing the list of available variables from the Real Time DB. Once the variable has been selected, the new event with the "OnNomeVariabileChanged" syntax will automatically be inserted internal the symbol's script code:



10.34. Public Symbols

Movicon has a extremely interesting potentiality in the symbol management: the public symbols. By using the public symbols management you can setup a direct link between different symbol properties, used in different Screens throughout the entire project. The management of this linkage gives you the possibility to automatically set, for all the symbols linked up to each other, the same property or code of the reference symbol.

A typical example of using this type of function would be to create different Screens which all use the same symbol. Let's take a plant valve used in all the project's Screens as an example where, after project completion, the valve's symbol must be edited. By modifying the symbol you are left with the possibility to apply the same changes to all the project's symbols with just one operation.

Movicon permits you to manage any editing needed for updating all the project's drawings or symbols declared as Public Symbols.

In order that a drawing or symbol to become 'public' and subject to global changes, it needs to receive a name in the "Public Name" property of the **'General Properties common to Drawings and Controls'** of the symbol/drawing itself.

It is advised to assign the **"Public Name"** to the symbol's or drawing's property when editing the template (or initial symbol). The name will always be kept associated to the symbol's property, whether it is copied and pastes, saved in the library or taken out later.
All the copied symbols will therefore have the same Public Name, making any eventual global editing easier.

Public Symbols Global Editing

The following condition must be preset in order to execute the updating functionalities of Public Symbols:

1. All the public symbols of the same group must have the same **"Public Name"**
2. A reference symbol must be set up from which all the others will get their properties
3. Each symbol has to be established with properties which will remain unaltered and properties which will be updated in accordance with the reference symbol

The properties to be kept unaltered and those to be updated in accordance to the reference symbol can be set for each symbol singularly through the **"Drawings and Controls common General Properties"**. The properties involved are as follows:

- **Preserve Size:** the sizes assigned to the component in question will be kept unaltered during the updating phase of the Public Symbols. If the check-box is not selected with a tick, the component's sizes will be adapted to the those of the reference public symbol
- **Preserve Dynamics:** the dynamic animation properties assigned to the component in question will be kept unaltered during the updating phase of the Public Symbols. If the check-

box is not selected with a tick, the components dynamic animation properties will be adapted to those of the reference public symbol

- **Preserve Code:** the Basic Script code associated to the component in question will be kept unaltered during the updating phase of the Public Symbols. If the check-box is not selected with a tick, the component's Basic Script code will be updated with that of reference public symbol's
- **Preserve Text:** the text (caption, name) of the component in question will be kept unaltered during the updating phase of the Public Symbols. If the check-box is not selected with a tick, it will be updated with that of the reference public symbol's
- **Preserve Colors:** the colours of the component in question will be kept unaltered during the updating phase of the Public Symbols. If the check-box is not selected with a tick, it will be updated with those of the reference public symbol'
- **Preserve Commands:** the Command list associated to the component in question will not be altered and will remain the same during the Public Symbol update phase. If this checkbox is left unchecked, the component's Command List will be updated with its referenced public symbol.

In cases with public symbols composed with numerous components, updating will take effect in each of the symbol's components and for each component you can choose what to preserve and what not to preserve. To manage updates of this type in various levels, each public symbol component must be set with a different and unique name in respect to the others. On the contrary, the public symbol will be updated only at public source container level and all sub components will be made equivalent in their entirety to this update. Movicon facilitates the process of creating symbols by giving them unique names when the group command is used for those objects that haven't already been given one.

Updating Public symbols using the "Public Source Container" screen

The Symbols to be subjected to any editing through the Public Symbols must be assigned a **"Public Name"** which is to be the same for all the symbols belonging to the same group. At this point, in order to establish the reference symbol it is necessary to set which is the Screen Containing the reference symbol in the "Public Source Container" property of the 'Screen Execution Properties' group. By doing this the public symbols will be updated with the characteristics of the symbol with the same public name presented in the specified "Public Source Container".
A public symbol updates with its referenced symbol in design mode as well. Public symbol updates occur each time the screen is opened in edit mode or every time a property is modified requiring a consequential update. The user can then check and see the public symbol's aspects after undergone any updates while still in design mode.

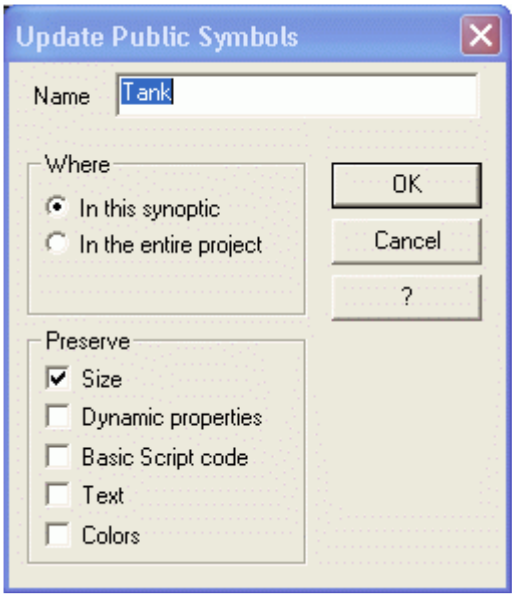
Once the symbol has been updated, its modified xml code is saved making it impossible to return back and recover the original.

However, you can opt to manage public symbol updating in Runtime mode only, therefore those symbols defined as public in design mode will be displayed with their native properties and features and only in Movicon Runtime mode can they be modified. This allows deactivation of a public symbol's component function to then return back to its original configuration. This type of management can be obtained by using the "DisablePublicSymOnDesign" configuration key. By setting this value to "1", updates to public symbols will only take place during runtime only.

The property windows of a symbol, linked to a referenced public symbol, automatically displays only those parameters that can be modified, which hiding all the others which are updated by the linked public source container's reference symbol.

Updating Public Symbols using the "Update Public Symbols" command

Public Symbol updates can be done using the "Refresh Public Symbols " command from the "Edit" and "symbols" menus, or from the menu which pops up when right clicking on the object. This command takes the selected symbol as the reference symbol and updates all the symbols that have the same public name on the screen and or in the project. You can indicate where the public symbols must be searched for, in screen only or all of the project, in the editbox that appears, and what to preserve while public symbol updating is taking place.



This command requires user confirmation each time a public symbol is found on screen or in the project with the same name set for searching. The user also has the option to continue the search without updating the symbol found, cancel the remaining search, or not be asked to confirm again and updated remaining public symbols automatically.

This second method, compared to those previously described, enables the application to offer the developer another way of managing public symbols in design mode with commands provided by the programmer.

Public Symbol heredity in sub-objects

In certain situations it may be necessary to create symbols with complex formats consisting of different independent sub-symbols or sub-objects. In this case, each individual sub-symbol can be referred to an individual public symbol with which it will be updated instead of the one associated to the symbol as a whole. This Public Symbol heredity in symbol sub-objects can be obtained by enabling the "Update Public Sub Objects" property. If this property is not enabled, the symbol will be updated with the reference public symbol associated to the symbol as a whole (as if the sub-objects had not been individually associated a specific public symbol).

10.35. Style Sources in Symbols

The Style Sources in Symbols consent you to activate a certain graphical style for objects in screens based on one style reference (source). In this way, independently from the style associated to objects in design mode, these objects can inherit a style, defined by the programmer, during runtime. The Style Source Container can be activated by the user logged in, from the active language or from a style source screen. This management therefore allows certain graphical aspects of screens and their object contents to be changed during the project runtime mode. The properties which can be edited are:

- **background color**
- **text and edge color**
- **font**

The style sources are acquired by the screen and by the objects it contains and acts as a style container which is not usually displayed in runtime principally because it is only a source container. The controls inserted in this screen work as stile generators. Each object from the style source screen is a style source for the objects belonging to the same category. Only the first control in tabulation order for each object type will be examined and become the style source. For example,

when inserting many display objects in the style container screen, only the first tabulation order will act as the style reference.
Some objects, even though graphically different, belong to the same category, therefore inherit all the styles of the same object source.
The table below shows which categories the objects are grouped in:

Reference Category	Object
basic	"Basic Shapes" Category: • Line • Rectangle • Rounded Circle • Ellipse • Arc • Chord • Pie • Text • Square • Circle
poly	"Basic Shapes" Category: • Polygon • Polyline • Pipe • Polybezier
Button	"Buttons-Lights-Switches" Category: • All the objects "Advanced shapes": • Group
Gauge	"Sliders-Gauges-Meters-Displays": • All the objects apart from the "Editbox-Display"object
Trend	"Trends-Charts-Data Analysis" Category: • Horiz. Plotter • Vert. Plotter • Horiz. Trend • Vert. Trend • XY Trend • Data Analysis
Chart	"Trends-Charts-Data Analysis" Category: • Chart
GridBox	"Advanced Shapes" Category: • Grid
ListBox	"Advanced Shapes" Category • Listbox
EmbView	"Advanced Shapes" Category:

	• Embedded Screen
Edit	"Advanced Shapes" Category: • Horizontal Spin • Vertical Spin • Editbox-Display • Combo Box
TabObj	"Advanced Shapes" Category • Tab Group
AlarmWnd	"Advanced Shapes" Category: • Alarm Window
HisLogWnd	"Advanced Shapes" Category: • Log Window
DLRWnd	"Advanced Shapes" Category: • DataLogger/Recipe Window
TraceDBWnd	"Advanced Shapes" Category: • TraceDB window
HourSelector	"Advanced Shapes" Category: • Scheduler Window
IPCamera	"Advanced Shapes" Category: • IP Camera Viewer

Style updating is only done in the Runtime phase. therefore the symbols whose styles are edited will show with their original properties during design mode. Movicon will only apply the modifications during the Runtime phase.

Using Style References

In order to manage the style references in symbols you will need to follow the below four points when in design mode:

1. create one or more style source screens for placing shape references in
2. the properties of style source references ("background Color", "Edge-Text Color ", "Text Font") and screen ("Back Color") are set as required. These properties are those which will be propagated as style references for the other project symbols
3. the style source screen name must be inserted in the screen, user, user group or string table language column's "Style Source Container" property. By doing this, the style source of the resource active at that moment will activate according to the priorities described below
4. the properties of the project objects (shapes) ("Style Source Back Color", Style Source Edge-Text Color" Style Source Font) and any of the screens ("Back Color") will be enabled based on the fact that these objects or screens have got to inherit the styles in question from the style source screen

For instance the three properties below are available for each object that can be inserted on screen. When these properties are enabled, they will consent the object to inherit the style from the style source screen:

- Style Source Back Color
- Style Source Edge-Text Color
- Style Source Font

However, a screen can only inherit a back color style due to the one property available to enable this:

- Style Source Back Color

Activating Style Sources

When the style container source is active in runtime mode all screens loaded will be controlled and any object with enabled style properties will be modified to match the styles set in the source object. The Style container source can be activated in different modes. The style source activation procedure, in order of priority, is as follows: when a screen is loaded it is controlled for any style source container screen associations to the active user. If there are no associations the same control is carried out in the user group which the active user belongs to. If not found another control will take place in the current language being used for one. If this results futile, a final control will be made to see if a style source container screen has been associated to the loaded screen, itself.

The association of the style source container to users, a user groups, languages or screens is carried out through the **"Style Container Source"** available in each one of these resources.

When more than one resource has been associated with a Style Resource Container screen, the active style source will be considered by the priorities described above. If, for instance, an user is active and has been associated a style resource container screen, this screen will be used as the style's source. When the user logs off, the style source container screen will then be used by the active language if enabled to do so otherwise it will be used by the active screen if enabled to do so. If no other style resource screen is activated, the last style loaded will remain active.
The style source is acquired by screens and the objects they contain not only in the screen loading phase but also after they have been loaded. Therefore, when opening a screen its objects may have one a certain graphical aspect which may change to another type if a user, who has been associated with a different style source container screen, logs in.

Once the project is in runtime mode the styles of the objects in the style source container window can be modified using the "DrawCmdTarget" basic script functions. By doing this, all the modifications will be inherited by the objects which used the style source container window in the project.

Associating the screen itself as its "Style Source Container" in the project design phase will generate the following error in the log file:
"Cannot find the Style Symbols resource container 'Screen1"

Only the colors from the back ("Back" property) and edge-text (Edge-Text property) are inherited. The colors inherent to other properties, such as the Alarm Window Log colors or the Gauge Warning Zone, etc are not inherited by the styles management.

11. ActiveX, OCX, OLE

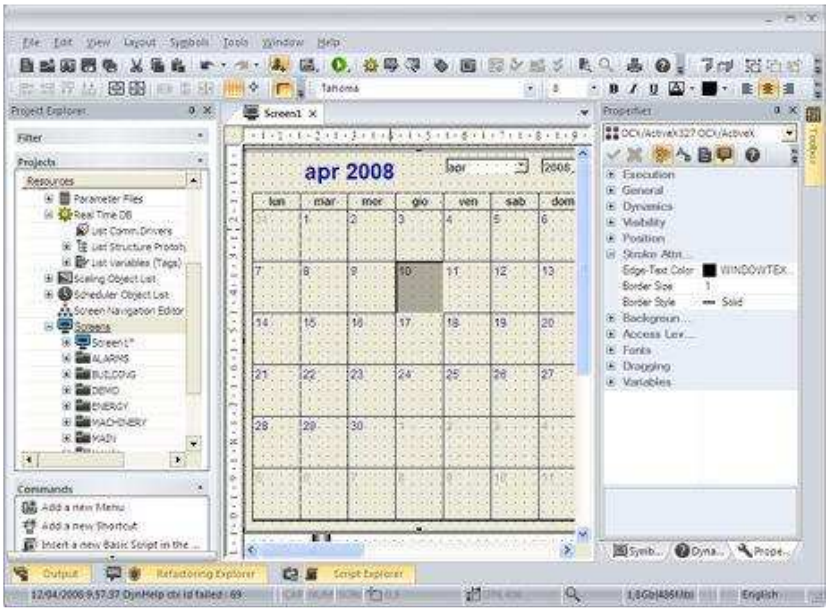
Movicon fully supports the Active X, OCX and OLE2 standards to allow you to integrate external applications into your project, whether as objects or as Basic Script support for event, method and property management of custom software components.

Custom software components can be inserted within Movicon projects and used according to the principles and methods of the Microsoft OLE2, ActiveX and OCX standards.

11.1. ActiveX Objects

Movicon completely supports the new Microsoft ActiveX standard which allows response to events generated from objects which can be inserted in Movicon screens that have been created externally and not from within the system. This standard, known as ActiveX or OCX, allows you to enhance the operating possibilities of an Movicon application enormously, by letting the integration of any object created by third parties with any compiler or environment which supports this technology.
The ActiveX technology can be considered as an evolution of the OLE technology in the sense that an OLE object can be hosted, used and commanded by a container application which imparts orders and requests. An ActiveX object, however, in addition to this can take actions and generate events which the container application can respond to.
In general, the ActiveX objects are applications with .OCX extensions created by third parties based on Microsoft COM technology (Component Object Model).

Be able to dispose objects independently from applications, has its enormous advantages in terms of the re-usability of work carried out. In addition to this, there are companies who specialize in supplying specific objects as solutions to specific problems. This also adds a new element in the way of producing software. In the future it will be possible to get ready-made objects for inserting into personal applications, or sell parts of applications as ActiveX objects, independently from the language being used or from the type of application which the object is to be used by.

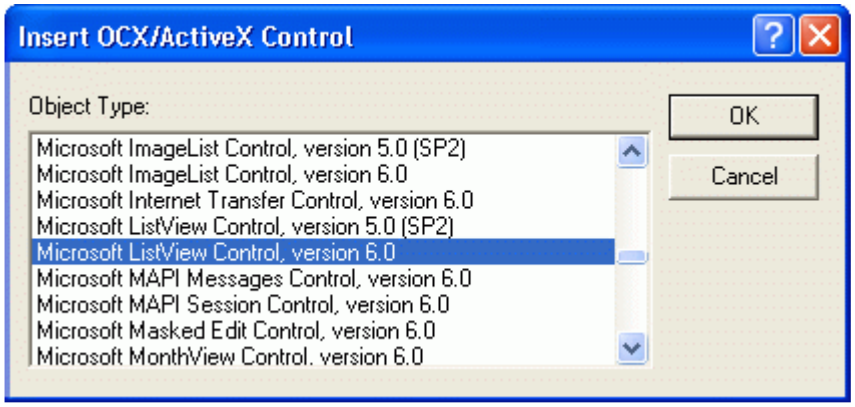


This illustration shows a screen containing the "Calendar Control 8.0 from Microsoft Access™" ActiveX object. This object provides its properties and methods to the application containing it (Movicon) through the window illustrated.

11.2. Inserting an ActiveX

An ActiveX object can be inserted into to a Movicon screen by using the **ActiveX** command from the "Special Objects" in the **"Objects Window"**. The command will activate a standard window for selecting the object type to be inserted.

The list of ActiveX object types varies according to the applications installed on the PC which support this standard or by the objects installed and recordered in the Windows register.



Movicon will propose an object, such as a Control, to be inserted for default during the insertion phase.
During the insertion phase the ActiveX object can be inserted as a new object created by the application of origin or can be built from the contents of the specified file by selecting the file's Create option.

The Add Control button allows new ActiveX controls to be inserted and registered in the operating system. In this case, the files of origin need to be selected by means of the standard file selection window.

When an ActiveX object is inserted into a screen, if is in fact inserted in the ActiveX object container. This container object is to be considered a s a simple rectangle object. All the animation properties, available in the Movicon "Property Windows" when the ActiveX object is selected, all refer to this container.

11.3. ActiveX Editing

An ActiveX object inserted into a Movicon screen can be sized as pleased by dragging its borders with the mouse or dragged to any position in the screen area by the mouse.
Any changes made to ActiveX/OCX objects are based on how they have been predisposed by those who created them. Each object therefore can provide property setting windows to setup their features. Their features are generally style, graphics which can vary a lot from one object to the next, according to the purpose for which it was designed for.
To access the object's settings, you need to use the ActiveX button in the Movicon "Properties Window".

TAKE NOTE: It is not always possible to display the object' properties window when inserting an ActiveX. This is often due to incompatibility reasons as ActiveX are sometimes created in Visual Basic, whereas Movicon is created in C++. Movicon will make request to display the ActiveX properties, but if the ActiveX does not interpret this request correctly the window will not display. As a remedy, the ActiveX properties can always be accessed through its Basic Script functions. By means of using the "Script Explorer" window you can access the ActiveX's edit code window, where its events, functions and properties are found.

11.4. Editing ActiveX using VBA

ActiveX controls can also be edited on event in function with the properties provided by the control itself. The same object's method and property browser can be activated from the object's "Script Explorer". Based on how the object has been created, the code can set the properties according to the normal VBA™ comp. programming procedures described in the section dedicated to the Movicon VBA programming. As previously mentioned, it is not often possible to change ActiveX object properties through the Properties Window, therefore the object must be configured by using Basic Script codes.

Note! The ActiveX is entered as 'ActiveXInterface'. Therefore the methods and properties are called by using this interface (ActiveXInterface.<propriety or method>). The ActiveX events are also available from within the 'ActiveXInterface' interface.

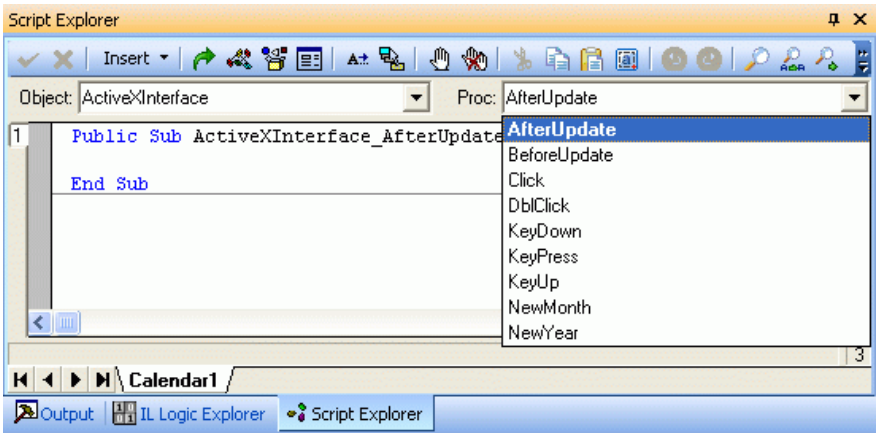
For instance, let's presume that we have to access the "Day" property of an ActiveX "Calendar" from the object's script code we would then have to write:

```
Option Explicit
Public Sub ActiveXInterface_Click()
        Debug.Print ActiveXInterface.Day
End Sub
```

ActiveX object event management

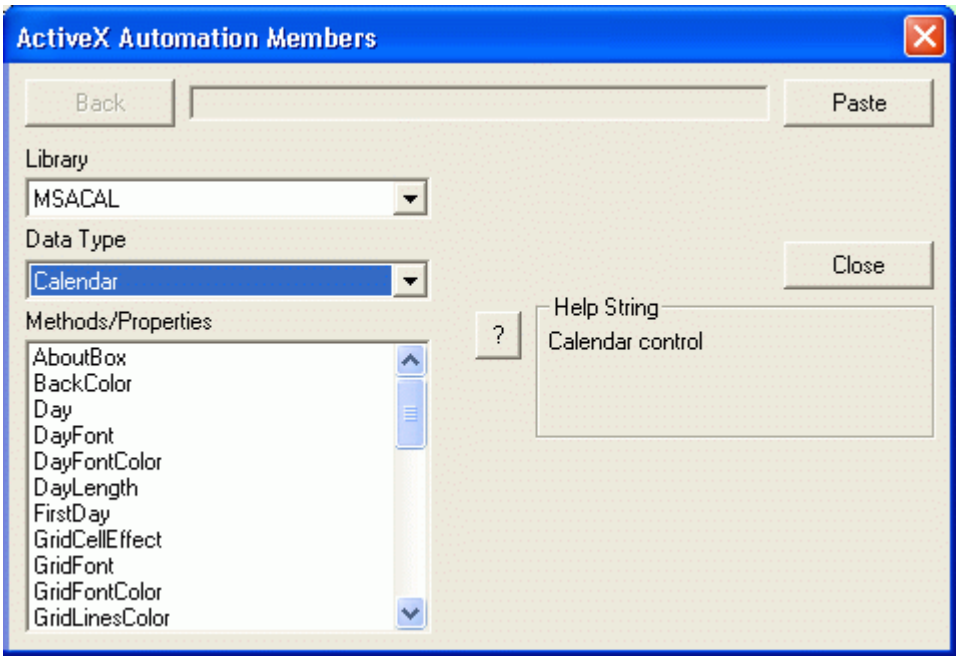
The purpose of an ActiveX object inserted in a Movicon screen is to create events in function with the methods predisposed in the object itself. The Movicon programmer can insert Basic Script codes (VBA™ comp.) to execute the application's management and control logic to verify the event

desired, provided by the ActiveX control. Code editing is done through the "Script Explorer" window after the object has been selected:



By means of the "Script Explorer" window you can select the event (or procedure) from those provided by the object. In order to do this you must first select the **"ActiveXInterface"** item from the list box called **"Object"**: and then select the desired event from the list box call **"Proc.".** The code can be then entered and will be executed in runtime when the ActiveX generated the event.

The events provided are determined by how the object has been predisposed by those who created it. For further information on the operative modalities of the Basic Script codes, please consult the appropriate section dedicated to programming Movicon Basic Scripts.



In response to the events you can also change the object according to the properties and methods provided by the object's creator.
ActiveX object properties and methods, if available, can be viewed by using the function browser. The browser is activated by using the Browse command found in the "Script Explorer's" tool bar.

How to reference an Active from a screen's symbol

It is often found necessary to give commands to the ActiveX object from objects contained on screen, such as buttons. In order to do this you need to create an object from the button's code to refer to the ActiveX. It will then be possible to use the methods and properties of that ActiveX

through this object. In order to do this you will need to use some of the specific Basic Script functions. The example below shows you the necessary steps to take:

Example: Let's suppose that a Calendar ActiveX type has been inserted on screen in which a button is to be used for displaying the days selected in the Calendar. The basic code for this button would be:

```
Option Explicit
Public Sub Click()
        Dim objContainer As Object
        Dim objCalendar As Object

        Set objContainer = GetSynopticObject.GetSubObject("Calendar1")
        Set objCalendar = objContainer.GetActiveXObject
        ' properties depend on the object type
        MsgBox "Selected Day = " & CStr(objCalendar.Day), vbInformation, GetProjectTitle
        Set objContainer =Nothing
        Set objCalendar =Nothing
End Sub
```

The "objCalendar" object is the Calendar object, therefore provides all the methods and properties belonging to the ActiveX.

11.5. Active X properties

The ActiveX object can receive some properties, including those of animation, independently from the object type and which can be set through the Movicon "Properties Window". A major part of these properties refer to the Active X object container, and are all generic properties available to each Movicon control.

11.5.1. ActiveX General Properties

The ActiveX General Properties allow you to open the ActiveX Properties Window. All the other properties of this group are used for configuring the ActiveX container object and are the same properties available to any other Movicon object.
To edit the ActiveX General settings, select the object with the mouse and use the Movicon **"Properties Window"**.

ActiveX Properties
This command is used for opening the ActiveX properties window.

TAKE NOTE: It is not always possible to display the object' properties window when inserting an ActiveX. This is often due to incompatibility reasons as ActiveX are sometimes created in Visual Basic, whereas Movicon is created in C++. Movicon will make request to display the ActiveX properties, but if the ActiveX does not interpret this request correctly the window will not display. As a remedy, the ActiveX properties can always be accessed through its Basic Script functions. By means of using the "Script Explorer" window you can access the ActiveX's edit code window, where its events, functions and properties are found.

11.5.2. Active X Execution Properties

The ActiveX execution properties allow you to manage its the license. The Active X objects have always had a license which may come free of charge or must be purchased according to each certain case. The licenses of some ActiveX objects, or ActiveX objects themselves, are installed with a developer software packet, such as MS Office, Visual Basic, etc.
To change the Execution settings of an ActiveX object, select the object with the mouse and use the Movicon **"Properties Window"**.

License

After the Active X license code has been inserted with the **"Get License"** command, it is displayed in this box.

Get License

This command allows you to get the license code of the selected ActiveX. When the command does not return any code, this means that the ActiveX license has not been installed and therefore the ActiveX will not be able to work. In certain cases the ActiveX Runtime license may be inserted only. This happens for some Microsoft ActiveX which are installed with the Runtime only license with the operating system. The development license, however, is installed with supplementary software such as MS Office, Visual Basic, etc.. In this circumstances the project can be executed in Runtime, but no editing can be done to the ActiveX object.

11.6. OLE Objects

Movicon completely supports the Microsoft standard for inserting objects into the project which come from other dynamically linked applications.
This standard, largely diffused in applications for Windows, is called O.L.E. (Object Linking and Embedded vers.2.x).
The OLE is a unification of services in the form of objects which allow customized software architectures to be created by deeply integrating software components of different applications. In short, the OLE offers a coherent standard that allows objects and applications to communicate with one another by using each others code.

Movicon is a OLE2 container application and a OLE2 Automation Server application.

The OLE objects can be inserted into any Movicon screen.

A typical example of OLE object usage would be to build on a EXCEL™ spreadsheet inserted into a Movicon screen. This inserted object would be linked to the Microsoft EXCEL™ application to work as it normally would even though inserted in a Movicon project.

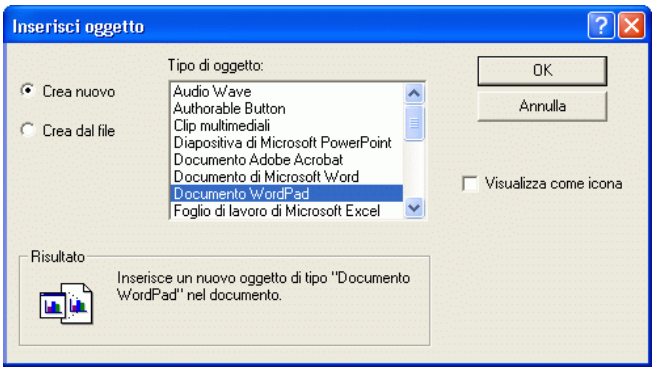
The type of OLE objects, which can be inserted into Movicon projects, depend on whether the applications installed on the hardware platform are capable of supporting this standard.

11.6.1. Inserting OLE objects

OLE objects can be inserted into Movicon screens by using the **OLE** command found in the "Special Objects" group from the **"Objects Window"**. The command activates a standard window for selecting the application type from which the object, to be inserted, is taken from.

The list of OLE objects varies according to the applications installed on the PC which support the OLE standard.

The OLE objects can be inserted into any Movicon screen.



The OLE object which can be inserted in to Movicon projects depend on the applications installed on the hardware platform capable of supporting this standard. During the insertion phase the OLE object can be a new object created from the application of origin or it can be built by the contents of the specified file by selecting this file's create option.

11.6.2. Editing OLE objects

Once inserted into a Movicon Screen, the OLE object can be sized as pleased by dragging its borders with the mouse or dragged to any position of the screen area.

The OLE objects are edited by means of **using the verbs,** these are purpose-built commands from the application of the inserted OLE object (these verbs are usually **Edit**, **Open** and **Convert**, but may vary from one application to the next).
The verbs for executing commands or manoeuvres on the object are always available in the programming mode by using the command referring to the Object from the Edit menu or by using the right mouse key with the OLE object selected.
The OLE object's edit command can also be executed straight away by double-clicking the left mouse key on the object.

During runtime mode, the use of the verbs (Open, Edit,...) for executing commands or manoeuvres on the object is established by the programmer, in function with how the properties of the OLE object were configured in merit of using verbs.

The commands related to editing the object bring about a change in the functioning of the Movicon menu. The menu actually adapts its items by inserting the command itsm of the application deriving from the inserted OLE object.
This all makes it possible to work with the object as if in the object's own application, but within the Movicon environment.

Since there are so many applications which support the OLE and OLE2 standards, it is impossible to describe all the relative commands and options. Therefore you should refer to the manuals of the respective applications for get details on how these operative commands and options are used in the objects.

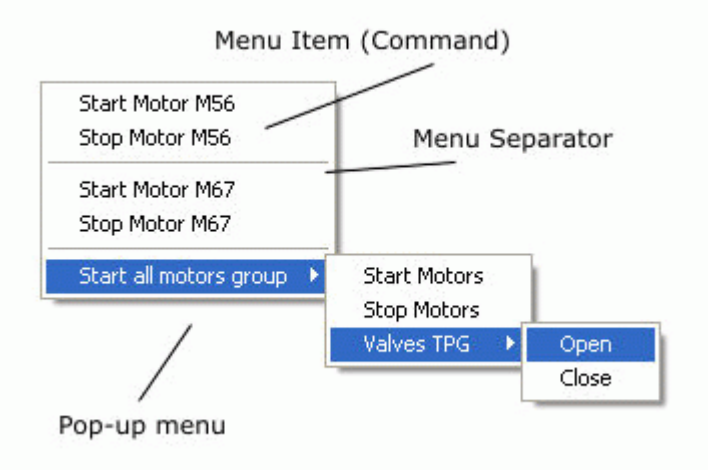
12. Menu Resources

The Movicon graphic interface permits pop-up Menus to be created and activated with the mouse, or menu bars to be customized and associated to the video screen pages.

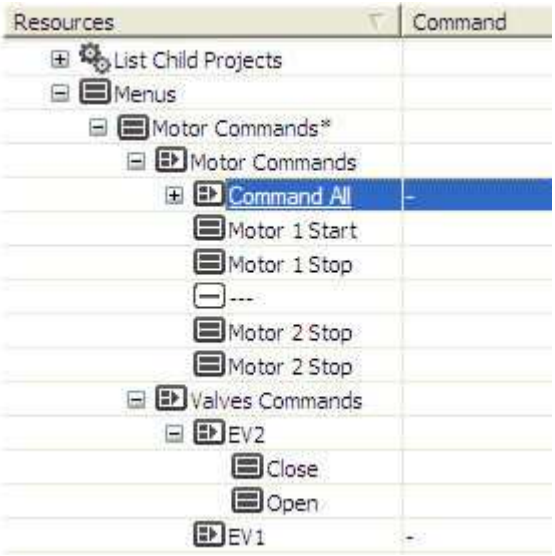
The Movicon Menus are very useful in projects for creating a complete man-machine interface.

Pop-up Menus can be created with Movicon which can organized be in sub-menus in a tree structure, or created as customized menu bars in screen pages.

By means of the Movicon Menus you can set commands within the project or the plant, and verify if their execution took place with a check sign (√) displayed at the side.



The above figure illustrates an example of a pop-up sub menu structure. The figure below shows the relating tree structure in the project.



The Menu resource offers numerous operating options in any application.
For example, you can activate as many menus as there are as many actuators in a Screen page, which can be activated by means of 'Hot Regions' for setting manual ON-OFF commands on the same actuators. You can also display a guide string to each menu item on the Movicon Status Bar.

12.1. Inserting Menus

When inserting a Menu in the project the procedures for inserting new objects in the "Menu" group in the 'Project Explorer' window have to be carried out. This can be done by either right mouse clicking on the "Menu" group in the 'Project Explorer' window and then selecting the 'New Menu' command, or by using the purpose built icon in the Movicon toolbar. When using the icon keep the right mouse button pressed on it for about a second to open a pop-up window where you can select the resource to be inserted being the Menu resource in this case.
When confirming the operation the new menu will appear in the group or the point selected in the project's tree structure. From this point the procedures for setting the menu's properties can be carried out as described in the document about the **"Menu Properties"**.

The Menu resource can subsequently be assigned a Name by either clicking the resource and entering the name replacing the one for default, or select the resource and press the F2 key and proceed with inserting a new name.

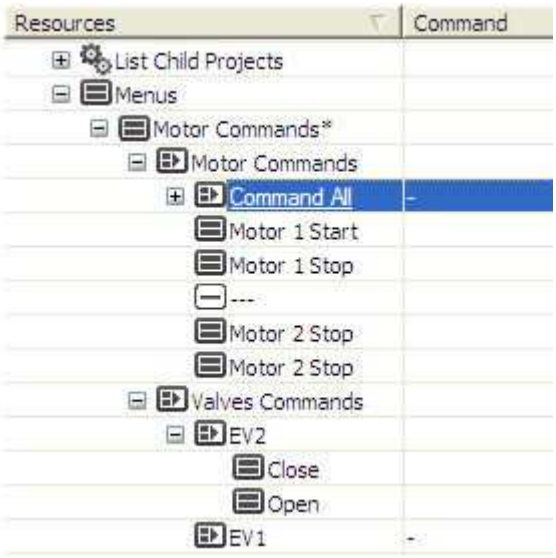
Importing Menus from other Projects

Movicon allows one or more Menus to be copies form one project to another. In order to do this you must first open both projects, the select the menu from the source project's Project Explorer window, execute the Copy command, then position the mouse pointer in the destination project's "Menu" group of the Project Explorer window and execute the Paste command. The copied Menus will then also be available in the destination project.
The Drag & Drop techniques can also be used with the following procedure: select the Menu from the source project and by keeping the left mouse key pressed drag it to the point desired in the destination project, then release the mouse key.

12.2. Menu Items

Each project menu is composed of one or more Items, which are components belonging to the menu. The Items are displayed in a tree structure within the **'Project Explorer'** window.

From this window the items, which are to compose the menu, can be inserted, configured and be structured as sub-menus. To add new item use the right mouse button or the **"Command"** window from the **'Project Explorer'**.



There are three types of items used for composing menus:

- **Normal:** menu items though which operating commands are set
- **Separator:** menu items which represent separator lines between each menu item. These items are only graphical and do not have any execution properties
- **Pop-up:** menu items which branch off items in submenus. These items are only used for structural purposes and do not have execution properties.

The right mouse button is used for inserting item into menus after having selected the Menu or the position required, or by using the **"Command"** window from the **'Project Explorer'**.

To edit or modify the items use the Movicon **'Properties Window'**.
To delete one or more items from the menu, select and activate the Delete command by using the DEL key or the 'Edit' system menu.
Any editing can be cancelled or restored with the **Undo** and **Redo** commands.
The techniques used for working on a menu structure are equivalent to the ones used for project tree structures.

Change Item Order

Items are inserted by Movicon at the end of those already on the menu. You can however change the order of these items by using the **"Change Menu Item Order..."** command which opens the following dialog window:

To change the Item order just select, drag and drop them with the mouse in the position desired.

12.2.1. Test Menus

Tests can be carried out on menus during the editing phase to check the menu's graphical outcome straight away.
The 'Test Menu' command can be accessed by using the right mouse key or the **"Command"** window from the **'Project Explorer'** to immediately display the Items as they will appear in the Menu during Movicon Runtime.

If a menu has been assigned with the same name as a Screen, it will be displayed as a **'Menu Bar'** in the window in question during runtime mode.

12.3. Customizing Menu Bars

Movicon allows you to created custom **"Menu Bars"** to associate to video screen pages.
To associate the Movicon bar menu to a certain Screen simply assign the menu required (created with the normal creating menu procedures) with the same name of the Screen through which the Menu bar is to be displayed.

The menu associated to the "Startup Screen" will be displayed as a default menu for all the other Screens unless menu resources with the same Screen names already exist.

In cases where the project has not been defined a "Startup Screen" but has a "Main" menu , this menu will be automatically loaded at the project startup instead.

If a specific menu is created for a screen inserted in a folder, it is necessary to create a folder with the same screen name within the "Menù" resource group.

12.4. Menu Example

Let's suppose you want to configure your project so that when clicking with the mouse on an area in the Screen representing a pump called 'P1', a menu is displayed indicating the 'Manual' and 'Automatic' items.
The 'Manual' item must contain the 'ON' and 'OFF' items.
First of all the menu has to be edited (which will be called 'P1 Pump menu').
Then we will proceed to call up the menu by using the Hot Region control purposely located in the Screen.
Proceed with editing the Movicon Menu as follows:

1. Create a new Menu Resource from the 'Project Explorer' window
2. Then execute the command for inserting a new Item into the menu
3. The menu's new item has to be configured to contain the 'Manual' text title and set as 'Pop-up' type
4. When you have configured the Pop-up 'Manual' item, you can then insert a new item which will branch off from the previous one. Configure the new item as 'normal' type and assign the 'ON' title (with execution command "Set" at '1' value for the start pump variable)
5. Insert a new 'normal' item which will belong to the same branch. Configure the new item and assign the 'OFF' (with execution command "Set" at '0' value for the start pump variable)
6. At this point select the icon representing the root of the menu with the mouse (usually called 'Menu1' by the system) then insert a new 'normal' item which will be added underneath the 'Manual' item in the menu. Assign the 'Automatic' title to the new Item and specify the command type to be executed (eg. set the automatic cycle to value '1')
7. To verify the menu just edited, use the 'Test Menu' command. The menu will display exactly as it will when activated in Runtime mode
8. The new menu will be added to the resource's tree structure still with the provisional name assigned by the system (usually 'menu1')
9. Select the news menu and assign it with the name 'Pump P1 Menu' by means of the 'Properties Window'

You have now completed the menu and can now activate the Screen resource representing the pump P1 drawing.
Insert the Hot Region object, after which you can position and size it as required then configure it by assigning it with the Menu activation command in the execution properties.
When specifying this command you can select the menu you have just edited and named 'Pump P1 Menu' from the 'Menu' list.
Run the project and click on the pump P1 drawing to display the 'Pump P1 Menu'.

12.5. Menu Properties

The menus inserted in the 'Project Explorer' window's **"Menu"** folder can be completely customized in the properties. In order to do this just select the Menu or Item required and then edit their settings by using the Movicon **'Properties Window'**.

12.5.1. Menu General Properties

The General properties are used for setting the positions where the Pop-up menu is to appear. In order to do this just simply select the Menu required and then edit its settings through the Movicon '**Properties Window**'.

Name
This edit box permits you to define the Menu object's name which is to be configured.

X Pos
This edit box is used for entering the X coordinates in pixels of the position where the Menu window is to appear within the workspace. The coordinates refer to the position of the Menu's top left corner in respect to the screen's top left corner (being X0)

To make the menu appear where the mouse pointer is positioned, set (or leave set) the default value at "-1".
The menu's coordinates in the workspace can be checked out by carrying out a 'Test Menu' with the appropriate command.

Y Pos
This edit box is used for entering the Y coordinates in pixels of the position where the Menu window is to appear in the workspace. The coordinates refer to the Menu's top left corner in respect to the screen's top left corner (being Y0).
To make the menu appear where the mouse pointer is positioned, set (or leave set) the default value at "-1".
The menu's coordinates in the workspace can be checked out by carrying out a 'Menu Test' with the appropriate command.

12.5.2. Item Menu General Properties

The Menu Item's main features are setup through its General properties. In order to do this simply select the Item required and edit the settings through the Movicon **'Properties Window'**.

Type
This option box is used for defining the Item type to be included in the menu. The Item's characteristics have to be set according to the type of Item selected as described below:

- **Normal**: activating this selection will display the item as a normal menu item. The item has to be associated with a text description which will appear as the menu item, to which a command execution will be associated from the **"Menu Item Execution Properties"**
- **Pop-up**: activating this option, means that the menu item is to display a further list of items. The 'pop-up item will be marked by a "▶" symbol and if activated will display the items appropriately inserted in the menu's tree structure.
- **Separator**: activating this option means that line separator will be displayed between each menu item. A separator is usually used when a division between two items needs to be highlighted. A separator item can not be executed and therefore does not have any execution properties.

The number of items (pop-up, normal or separator) that can be inserted into each menu is virtually unlimited.

Caption
The text used as the item's title is entered in this edit box. The text will be displayed in the menu as an item which can be associated with an execution command or a pop-up submenu.
The caption is not available when the separator item is being used.

Prompt
The text string, which is displayed in the status bar when the menu item is selected is entered in this edit box.

The status bar, (found at the bottom of the workspace) can serve as an information guide for the Movicon menu items.

Image
This property is used for selecting the image to be displayed in menu in the place of the title.

User Level
The Password User Level is entered in this property which is needed for executing, for instance, the command lists associated to the Menu Item. When the Menu in question is to be used by a user, Movicon will request activation of a user who has a Password User Level equal to or higher to that set in the Item itself. If the user, logging on, has the necessary access rights they will be given correct authentication, otherwise they will be denied Logon and it will not be possible to execute the operations requested.
For further information see paragraph **"User Level and Access Level".**

12.5.3. Menu Item Execution Properties

By using the Item Execution properties you can associate the required command to be evoked when it is selected and activated from the menu. In order to do this just select the item required and then edit its settings through the Movicon '**Properties Window**'.

Enable

This edit box is used for inserting the name of the variable (or select it with the '...' browse button on the right) which will activate the item from the menu. When the variable obtains the 'zero' value, the menu item will appear active and then available for command execution. When nothing has been specified in this box by being left empty, Movicon will consider this item as being enabled.

Check

The name of the variable which determines the displaying of the tick or check sign (√) at the side of the menu item (or select it with the '...' browse button on the right). If nothing is specified in this option, the check sign will not display.

The check can be used for indicating the status of the command associated to the item.

Commands

This button opens the Movicon **'Command List'** window where a list of one or more commands, which are to be executed when the Menu Item is activated, if defined.
For further information on the available commands please consult the **"Command List"** paragraph.

13. Shortcut Resources

The Movicon graphical interface permits complete and easy keyboard usage, by associating commands to keys or combination keys in function with the active Screen.

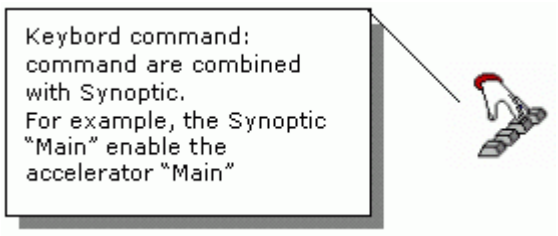
This section describes how to use and set the Movicon Shortcut Resources in projects. The Movicon Shortcuts (or keyboard commands) can be extremely useful in projects for using the PC keyboard to execute commands on the plant or operational commands in the project itself.
Each Movicon Shortcut resource can be considered as a set composed of one or more keyboard commands.
Each command set is obligatorily associated to an Screen by Movicon, therefore allowing command sets (Shortcuts) to be assigned in function with the active screen page.

The name assigned to each Shortcut Resource is very important as the Shortcuts are associated to their Screens according to their name. The Shortcut must have the same name as the Screen's in which they are to be active.

The Shortcut associated to the "Startup Screen" will automatically be activated by the system upon starting up the project. In addition to this the Shortcut associated to the "Startup" will also be activated each time a Screen, which has not been associated any Shortcuts, is loaded.

If a Shortcut is specifically created for a Screen inserted in a folder, a folder will need to be created with the same name used by that screen within the "Shortcuts" resource group.

By means of the Movicon Shortcuts keys or combination keys can be used for executing commands on the plant, for setting variables or executing any command type included in the **"Command List"** offered by Movicon.
Using keyboard commands are essentially necessary in plants where the mouse or other such devices cannot be used.



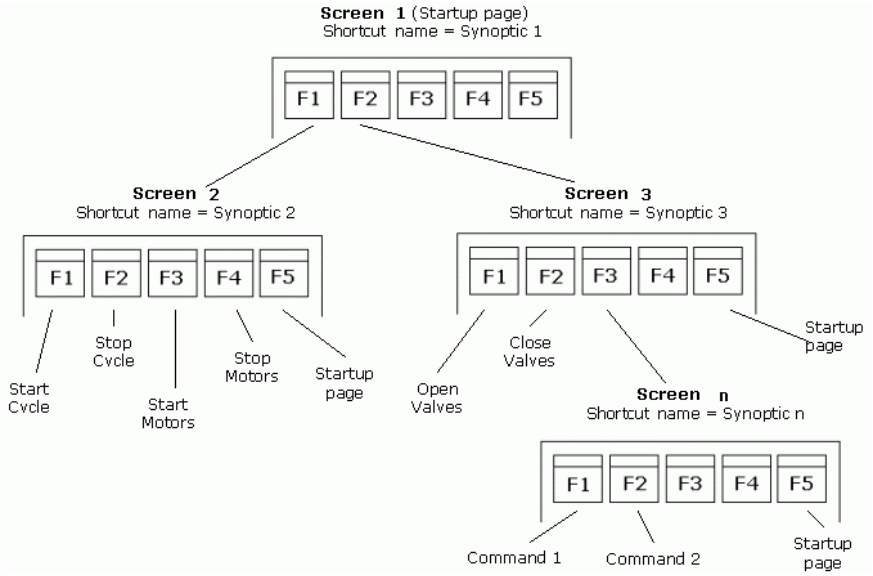
The Movicon Shortcut keyboard commands, when active, always have top priority over the same keys or combination keys used by Windows for operating system commands as the Shortcut provides command activation upon being pressed and not released.
Example: If the Windows system provides the F1 key for activating the guide and the Movicon Shortcut is active which has the same command for executing upon pressing the F1 key, the command associated in the Shortcut will be given priority.

13.1. Shortcut Activation

Movicon is predisposed in order that an Shortcut associated to the **"Startup Screen"** is activated at its start up together with the "Startup Screen". If there is no Shortcut associated to the "Startup Screen", no Shortcut will be activated for the present time.
When a Screen is activated in the project in Runtime Mode, Movicon will also check whether there is an Shortcut resource with the same name as the active Screen. If one is found it will also be activated otherwise the main Shortcut will be activated for default being the one associated to the "Startup Screen".
When the Shortcut associated to the "Startup Screen" is not present no other will be activated until a Screen, with one associated to it, is opened.

The Screen Windows and the Shortcuts are therefore closely related.

The association of Shortcuts to Screens permit the same keys to be associated to different functions relating to the screen page displayed.
This illustration shows an example of how Screens and Shortcuts are related:



Relation between Screens and Shortcuts. A set of keyboard commands is always disposed in relation to a screen page or Screens.

13.2. Inserting Shortcuts

In order to insert Shortcuts in to the project you need to carry out the procedures for inserting a new object into the "Shortcut" group in the 'Project Explorer' window. Inserting a new Shortcut can be done by right clicking the mouse on the on the "Shortcut" group in the 'Project Explorer' window and selecting the 'New Shortcut' command, or by using the appropriate icon from the Movicon tool bar. In this case by keeping the left mouse button pressed for about a second a drop-down window will display where the resource to be inserted can be selected.

The new Shortcut will appear in the group on the point selected in the project structure when the operation is confirmed. At this stage you can proceed with setting the Shortcut's properties as described in the documents about **"Inserting Shortcuts**.

A name can then be assigned to the Shortcut resource replacing the one proposed for default or after having selected the resource press the F2 key and proceed with entering a new name.

Importing Shortcuts from other Projects

Movicon allows the copying of one or more Shortcuts from one project to another. To carry out this procedure both projects need to be opened first, then after having selected the Shortcuts from the Project Explorer window of the source project execute the Copy command. Next position cursor in the "Shortcut" group of the project Explorer window of the destination project and execute the Paste command. The copied Shortcuts should then be available also in the destination project.
The Drag & Drop technique can also be used with the following procedure: select the Shortcut from the source project and keep the left mouse key pressed drag it to the point desired in the destination project then release.

13.3. Shortcut Keyboard Commands

Each project Shortcut consists of one or more keyboard commands activated by the relevant associated keys.
In addition to an activation key the virtually unlimited commands that can be inserted in each single Shortcut resource can be associated to keys called 'Modifiers', being those key Combinations multiplying the operating possibilities on the keyboard. The Modifiers keys are ALT, CTRL and SHIFT.
The Shortcut commands can be viewed through the **"Command List"** window, which can be accessed from the **'Shortcut Execution Properties'** window. This window is used to enter and configure the Shortcut commands.
New keyboard commands can be entered by using the 'New Shortcut Command' when selecting an Shortcut by means of the 'Project Explorer' window, which is made available by using the right mouse key or the 'Commands Window'.
Select and activate the CANC button to delete one or more commands from the Shortcut.
The Shortcut command properties can be set by using the Movicon 'Properties Window'.

Identical key combinations associated with different commands will execute the first command taken into consideration.
Any active Movicon Shortcut keyboard commands will always have priority over the same keys or combination keys used by Windows for system operating commands, as the Shortcut provides command activation upon pressing the key and not upon releasing it.

13.4. Speech Recognition

Movicon provides a very handy feature which is a function that recognises spoken texts associated to the Shortcuts resource for activating commands vocally.

Only the "Microsoft English Recognizer v5.1" speech recognition engine is available at the moment. The Speech Recognition function can not be used for the Italian language.

In order to use the speech recognition function for activating commands you need to first check whether your PC has been fitted with a microphone for giving vocal commands. Your PC will also need an audio card to allow the system to enounce request and confirm messages.

Having done this, you will need to verify that you have Windows SAP 5.1 and that it is configured correctly. This can be done by going to 'Speech' found on the control panel. We strongly advice you follow the guidelines on microphone configurations procedures and speech profile regulations.

At this point, enter the Movicon development environment and add a new shortcut resource using the Project Explorer window. Then go to its "Shortcut General Properties" and "Shortcut Command Execution Properties" to define the parameters for defining speech command recognitions. Once the configurations have been completed and the Shortcuts activated for managing the spoken command recognitions you should be able to activate commands by pressing relative assigned buttons or by simply enouncing the texts assigned to the vocal commands.

The speech recognition can also be managed in multilingual. All the texts that can be associated to a Shortcut's speech recognition properties can be inserted using Sting IDs from the String Table. **However, as mentioned above, the speech recognition engine is only available in English and therefore texts associated in these properties must always be in English no matter what language has been activated in the project**.

System Variables

During the runtime phase you can use some System Variables for verifying which Shortcut is active and the working status of the speech recognition. These variables, whose meanings are described in the relating "System Variables" section, are as follows:

SysVar:SRActiveShortcut
SysVar:SRListening
SysVar:SRIsActive
SysVar:SRLastUnderstood

Example:

Below you will see how to use the Shortcut properties to configure a command for exiting from the application. Those properties not mentioned can be left set with their default values.

Shortcut General Properties:

- Don't understand Text: "Don't understand Text"

Shortcut Command Execution Properties:

- Enable Speech Recognition: Enabled
- Text Command: "Exit"
- Require Confirm: Enabled
- Prompt Confirm: "Confirm"
- Confirm Text: "Yes"

At this point conversation between User and System during project Runtime will be as follows:

- User: "Exit"
- System: "Confirm Exit?"
- User: "Yes"
- At this point the application's exit command will be activated.

Speech Recognition for Numeric and Alphanumeric pads

When a Shortcut is associated to a command requiring "Numeric Pad" or "Alphanumeric Pad" to set a variable value and the "Enable Speech Recognition" property is active, the pronunciation of the "Text Command" for Shortcut vocal activation will not open the "Pad" window, but will set the system in listening mode to acquire the value to be set for the variable. At this point just pronounce the value to be set for the variable. Please consider the following notes:

- When a vocal command aims to set a variable value, as if a "Numeric Pad" is used, you should always start the value pronunciation adding "zero", in order to allow the SR (Speech Recognition) engine to convert the vocal text in a number and not in a string.

  Examples:
  - 'zero one point two' corresponds to the '1.2' value to set
  - 'zero five zero' corresponds to the '50' value to set
  - 'zero twenty' corresponds to the '20' value to set

- When the command is "Numeric Pad"-like, the pronounced value will not be accepted if out of the ranges defined for the command, or if does not correspond to a number. When the command is "Alphanumeric Pad"-like, the pronounced text will not be accepted if containing a number of chars higher than the one specified in the command. In both cases you can define an "Invalid Value Text" message.
- When a vocal command aims to set a variable value through the"Numeric Pad or "Alphanumeric Pad", if the "Require Confirm" option has been enabled, the vocal confirmation

should be given twice: the first time to confirm the command execution, the second time to confirm the pronounced set value.

Example:

Please find below an example of how to configure a Shortcut properties to obtain a command for a numeric variable value set using a "Numeric Pad". The properties not specified here can be left with the default values:

General-Speech recognition Shortcut properties:

- Don't understand Text: "Don't understand"

Execution-Speech Recognition properties of a Shortcut command:

- Enable Speech Recognition:Enabled
- Text Command: "Numeric"
- Require Confirm: Disabled
- Value Prompt Text: "Insert Value"
- Invalid Value text: "Value not valid"

At Runtime, a possible conversation between the operator and the system could be as follows:

- Operator: "Numeric"
- System: "Insert Value"
- Operator: "zero one point five"
At this point the value "1.5" will be set for the variable

13.5. Shortcut Example

How to configure your project so that the plant operator can view the following screen pages in Movicon Screens:

- Plant Lay-out represented in the "Main" Screen
- Storage Silos represented in a Screen called 'Silos'
- Working Area represented in a Screen called 'Working Area'

Preset the keyboard commands or Shortcuts so that:

the last two above mentioned Screens are called up by using the F1 and F2 keys from the 'Main' Screen
the Lay-out page can be returned to by using the ESC key
in addition to returning back to the 'Working Area' Screen with the ESC key an modal Screen window is activated for setting parameters by pressing the F1 key

Proceed with Editing the Movicon Shortcuts as follows:

1. Create a new Shortcut resource from the 'Project Explorer' window and call it 'Main'. This Shortcut resource will always be activated whenever the 'Main' Screen is loaded (by setting up the 'Main' Screen as the project's startup Screen, the 'Main' Shortcut will consequently become the project's default Shortcut). Edit the new Shortcut by adding the commands for calling up the 'Silos' Screen by pressing the F1 key and calling up the 'Working Area' Screen by pressing the F2 key.
2. Create a new Shortcut resource from the 'Project Explorer' Window and call it 'Silos'. This Shortcut resource will always activate whenever the 'Silos' Screen is loaded. Edit the new Shortcut by adding the command for calling up the 'Main' Screen by pressing the ESC key.
3. Create a new Shortcut resource from the 'Project Explorer' window and call it 'Working Area'. This Shortcut resource will always be activated whenever the 'Working Area' Screen is loaded.
4. Edit the new Shortcut by adding the command for calling up the 'Main' Screen by pressing the ESC key and the command for calling up the modal Screen for setting the plant parameters (the modal Screen must be created beforehand) by pressing the F1 key.

The example project described above can also be set up in another way:

Associate the Shortcut commands so that each key carries out its own function independently of the active Screen.
The following needs to be achieved, as in the example above:

- The F1 key must always call up the 'Silos' Screen
- The F2 key must always call up the 'Working Area' Screen
- The ESC key must always call up the 'Main' Screen
- The F3 key must always call up the modal Screen for setting the plant parameters from any page

Proceed as follows:

1. Create a new Shortcut resource from the 'Project Explorer' window and call it 'Main'. This Shortcut resource will always be activated whenever the 'Main' Screen is loaded (by setting the 'Main' Screen as the project's startup Screen, the 'Main' Shortcut will consequently become the project's default Shortcut). The project will not contain other Shortcuts, therefore the 'Main' Shortcut will remain active independently of the Screen currently active.
2. Edit the new Shortcut by adding the commands for:
    - calling up the 'Silos' Screen by pressing the F1 key
    - calling up the ''Working Area' Screen by pressing the F2 key
    - calling up the 'Main' Screen by pressing the ESC key
    - calling up the modal Screen for setting the plant parameters (created beforehand) by pressing the F3 key

13.6. Shortcut Properties

Shortcuts inserted into the 'Project Explorer' window's **"Shortcuts"** folder can be completely customized in the properties. In order to do this just select the Shortcut or Command required and then edit their settings through the Movicon **'Properties Window'**.

13.6.1. Shortcut General Properties

The Shortcut General Properties are used for setting the Shortcut to be active also during the opening of a modal Screen.
In order to do this just select the Shortcut and then edit its settings through the Movicon **'Properties Window'**.

Name
This edit box permits you to define the Shortcut object's name which is to be configured.

Active On Modal
By enabling this property the Shortcut will be made active also during the opening of a modal Screen. In this case if an Shortcut has been associated to the modal Screen this will be active but if one has not the one associated to the Screen in background will become active. If this does not also have one the startup Shortcut will be made active.

Wait Speeching Time
Interval time in milliseconds in which the system waits for a vocal input.

Go to Sleep Command Text
The word or phrase which the user must pronounce for temporarily deactivating the speech recognition function. The system will reactivate only when the word or phrase entered in the 'Wake Up Command Text' property is pronounced.

Go to Sleep Ack. Text
Word or phrase the system will pronounce, using the PC speakers or a predefined audio output, for confirming temporary deactivation of the speech recognition function.

Wake up Command Text
The word or phrase which the user must pronounce for reactivating the speech recognition function.

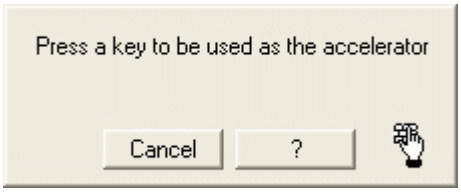
Wake up Ack. Text
The word or phase which the system must pronounce to confirm that the speech recognition function has been reactivated.

Don't understand Text
The word and phase which the system pronounces for indicating that it hasn't understood the spoken word/phrase. The word or phase is followed by the word or phase which the system is thought to have heard.

13.6.2. Shortcut Command General Properties

The Shortcut Command General Properties are used to define whether the Shortcut must also be active during the opening of a modal Screen.
In order to do this just select the Shortcut and then edit its settings through the Movicon '**Properties Window**'.

Shortcut Key
This edit box is used for entering the key (or combination keys) to which the command is to be associated to. Movicon offers the possibility to enter the key to be associated by pressing the key directly from the keyboard. In order to do this press the **"..."** button on the right of the edit box which will display the following window:



Then just press any one of the keyboard keys or a combination of keys which also incudes the 'modifier', as this is recorded in the 'Shortcut Key' box.
The operation can be cancelled with the Cancel button.

User Level
This property is used for setting the Password User Level necessary for executing, for example, the command list associated to the Shortcut command. When the Shortcut in question is to be used by a user, Movicon will request activation of a user with a Password User Level equal or higher than that set in the command itself. When the user executes Logon with correct authentication they will have all the access rights necessary, otherwise if Logon fails and access is denied they will not be able to execute the operations they require.
For further information please refer to the paragraph on **"User Levels and Access Levels".**

13.6.3. Shortcut Command Execution Properties

The Shortcut Execution properties are used to determine whether the Shortcut should also be active or not during the opening of a modal Screen.
In order to do this just select the Shortcut and then edit the settings through Movicon **"Properties Window".**

On Release
This property is used to establish whether the command should be activated upon pressing or releasing the key. When the required key in programming stage has already been associated with the Windows standard functions (eg. F1 for the Guide), always leave this property unchecked.

Enable

The name of the variable which determines the activation of the Shortcut command is entered in this edit box (or selected with the browse **'...'** button on the right). When the selected variable obtains a 'zero' value, the Shortcut command will not be available. When the selected variable obtains another value apart from 'zero', the Shortcut command will be available for execution. If nothing is specified in this option by leaving it empty, Movicon will consider the Shortcut command as being enabled.

Commands

The Movicon **'Command List'** window is opened by means of this button, through which a list of one or more commands, to be executed when the Shortcut command is activated, is set. For further information about the commands available please consult the paragraph on **"Command List"**.

Enable Speech Recognition

Enabling this option will activate the shortcut command speech recognition function.

Text Command

The word of phrase that the user must say for activating the command (or commands) associated to the Shortcut.

Require Confirm

Enabling this option will activate the confirm request, by the system, before the command (or commands), associated to the Shortcut, is activated.

Prompt Confirm

The word of the phrase which the system must say, through the PC's speakers or a predefined audio output, for requesting a confirm to activate the command (or commands) associated to the Shortcut. This word or phrase is followed by the word or phrase entered in the "Text Command" field.

Confirm Text

The word or phrase the user must say for confirming the activation of the command (or commands) associated to the Shortcut.

Value Prompt Text

The word or phrase which the system says when waiting for input value. This is used in case when the command associated to the Shortcut is"Numeric Pad" or "Alphanumeric Pad" type. When the speech recognition is active, the system will prompt a vocal input instead of displaying the numeric or alphanumeric keypad for receiving inputs from the user.

Invalid Value Text

The word or phrase enounced by the system for indicating that the vocal input it received was incorrect (ie. when waiting for a numeric input and the word pronounced is the wrong number).

14. String Table

The Strings Resource contains all the texts which have to be handled in dynamic mode in the project.

The Movicon strings allow the project to make use of any kind of text in a simple manner. By grouping together a number of texts under a single identifier the resource can handle **Multi-language** functions.
The text strings are needed for handling alarms and messages, for displaying dynamic texts in the screens, and for handling customized popup type windows. When there is the possibility of representing a text dynamically, this text must almost always be contained in the Strings Resource. All the texts typed directly into the drawings or the Movicon objects (i.e. not inserted in the Strings resource) are represented statically in the resource that represents them.

Examples:

1. The text title of an object or symbol can represent a text string which is considered static when typed in directly using the properties window, or can be specified using the Identifier of a text from the String Table. In this case the text will change in accord with the Column (Language) selected.
2. An Alarm or Message, a dynamic text or a pop-up text can be referred to identifiers of strings from the Strings Table.

The String Table can contain a virtually unlimited number of Strings divided up according to columns, whose text can be entered directly in the table fields, or copied or imported from other text applications. String will be saved into a XML file, each one for any language inserted.

Management of text strings as a Movicon Resource makes for an extremely flexible project capable of handling the widest range of applications. One of the main functions of the Strings resource is to contain Alarm and Message texts. When you set an alarm, you will be asked to select a text string from the associated strings resource. Text strings can also be used for displaying information inside pop-up windows. If a pop-up window is associated, it will be formatted according to the length of the text within the workspace.

14.1. String Table Filter

A new function has been added within the string editor to filter all the table's strings based on the text contents in "StringID" column.
This functionality is available in both the string table working modes:
The Movicon MDI (being the string editor opened from the "View" menu)
Popup Menu (being the window that appears when modifying the properties linked to the strings of the objects on screen. e.g. an object's 'Title' property).
The filter bar is composed of a text box within which you can inserted the desired text, an 'Apply filter' button for applying a filter, and a 'Remove filter' button for removing all the filters set.

Filter settings

To set a filter to be applied to the project string list, you need to first insert the text desired in the text box identified with the 'Filter by StingID' label, after which you need to click on the "Apply filter' or press 'Enter' on the keyboard.
The inserted test will then be searched for in 'StringID' column, considering the following generic conditions: if an 'abcd' format has been inserted, the filter will search for the StringID containing the exact text inserted. If none of the StringIDs correspond to the filter's text, Movicon will return an empty list.

For this reason there exists a possibility to carry out an advance test search by using the '*' jolly character. This character may appear many times in the filter's text box, and in various positions. Here are some examples:
'*abc', 'abc*', 'a*b', '*abc*

You will need to press the 'Apply Filter' key in the 'Popup Menu' mode to apply the filter: the 'Enter' key closes the popup window assigning the string, selected at that moment, to the object.

Removing filters

To remove a previously set filter just press the "Remove filter" key found in the filter bar.
As an alternative other possibilities exist to display all the project strings:
Enter the '*' jolly character only;
Remove the text (if any) from the filter's editor box and click 'Apply filter' or press the 'Enter' key on the keyboard.

After having applied a filter to the string table and closing it, Movicon will remember the last filter set when that table is reopened afterwards. In order to view all the strings you must therefore remove the applied filter.

14.2. Inserting Strings

Inserting text strings in the Movicon String Table is done through an appropriated window which is accessed with the **'Edit String Table'** command from the Project Explorer's **"Commands"** window.
The window can then be closed by using the Windows standard techniques such as the () box from the control panel or the CTRL+F4 combo keys.

By using the appropriate commands it will be possible to insert, modify or delete strings as well as columns from the table representing the different languages to be used. The first time that the String Table is opened, Movicon will request that a column be inserted so that at least one language can be used. Once the first column has been inserted, it will then be possible to add others by pressing the right mouse button within the area of the table, and then selecting the **"New Language Column...".** To change the column name afterwards (therefore the language) right click on one of the rows of the column in question and select the **"Cancel this column!"** command.

New strings are inserted by right clicking withing the table area and then selecting the **"New String" command**. At this point a new String ID will be added with a progressive name. The editing or writing of string texts or string IDs is done by clicking the mouse directly in the box of the table which you wish to edit. The "F2" key can be used for enabling the modifications of the field selected. The TAB key is used for scrolling the different cloumns in edit mode and when reaching the last column passes to the beginning of the next line. This process can be reversed by pressing the SHIFT key.
In addition to this, by clicking with the right mouse key on the string, a menu will appear with the **"Edit Multiline String..."** item.
When selecting this item a window will open where you can type in the text using more than one line. Movicon will then insert the right start and end line characters:

The edit window will open on more lines if you click on the string field while keeping the "ALT2 key pressed down at the same time the pressed.

The "\n" character can be inserted at the point where you wish the string to start from the beginning without having to open the "Edit Multiline String" window.

Text in 'Basic Shapes' will be displayed on more than one line only if the "Fonts - Test Align" property has been set with the "Top", "Left" or "Right" option. Otherwise the string will however be displayed on one line only.

The String Table fully supports the Windows copy & paste command standards using the Windows clipboard. Therefore you can copy the strings from one project to another or paste them in another editor such as Word or Excel. You can also do the reverse in the same way by copying the strings from an editor such as Excel into the Movicon String Table.

The Copy/Paste functions of strings from Movicon to other text editors is carried out with the insertion of separation characters between the various columns (String ID, Language1, Language2, etc.,). Movicon inserts the 'TAB' character for default but a different character can be specified (i.e. the "," character) by setting the **"StringSep"** register key.

The String Tables are saved on files in XML format inside the Project folder. These files can then be accessed through ordinary text editors for any eventual editing. Movicon will create a file for each language inserted.

Special characters

The '&' character works in a certain way, and is not always acknowledged as a simple character by Movicon. When it has to be used in a string, or inserted in the title of an object, or whenever you wish to make it appear, it may not be enough to write is once only like all the other characters: Movicon acknowledges and interprets it as a special Shortcut command, whereas Windows uses the '&' symbol placed before a letter to use it as an Shortcut. Therefore in order to write a string with the '&' character you will need to type it twice consecutively. For instance, in order to make the "Start & Go" text appear you will need to type the "Start && Go" string:

String: Start && Go
Text displayed: Start & Go

14.2.1. Inserting Missing Strings

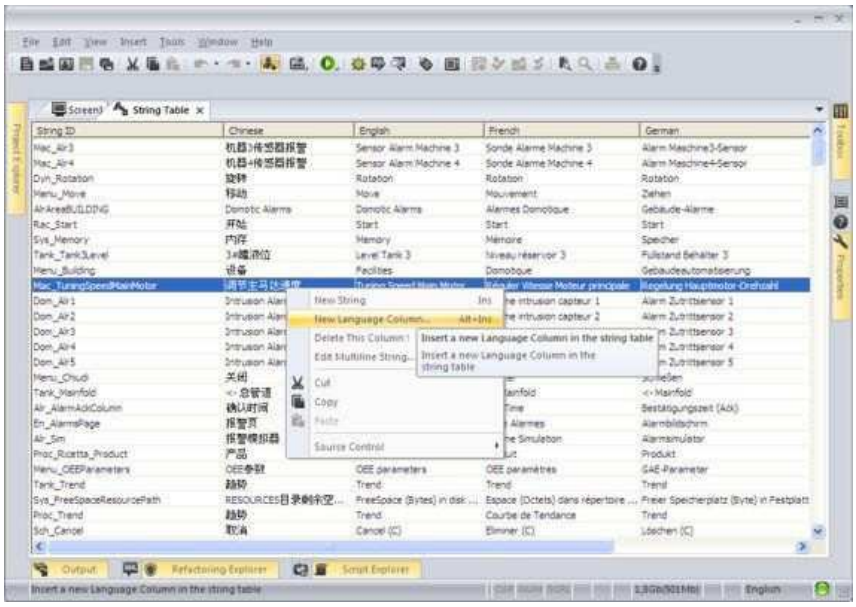
Movicon provides you with a command to find all the used and missing strings in the different project resources, such as IDs in the String Table. This command, provided for all the project's resources, when executed automatically opens the string editor and adds the missing strings. As normal, only the String IDs will be added leaving the programmer to insert the texts for the different set languages. This allows you to add string IDs to object or resource properties without having to predefine them and then add them to the string table automatically using this command.

This command, **"Check Missing Strings"**, is available as an item from the 'Edit' and 'View' menus and can be found in icon form on the tool bar.

This command only has effect in those resources that are currently selected in the Project Explorer window or screen (and the objects it contains) currently opened in the workspace. This command supports multi-selections, therefore more than one resource can be selected at the same time (even consisting of a mixture of different resources such as alarms and screens) before executing this command. If the project name is slsected in the Project Explorer window before executing the command, the strings will be searched for in all the project resources that support this command.

14.3. String Selection Window

Each time a text can be inserted into a project resource or object's property you can also select a string from the String table. In order to do this, just click on the (...) browse button to the right of the property field to open a modal window showing the String Table. This window can be used for selecting, modifying or cancelling or inserting a new string or for cancelling or adding a new column.



To modify a string you will need to enter into edit mode in the field of interest with the usual mouse click, F2 key or TAB key. To add a new string or column right mouse click on the table to open a menu.
You cannot use this window to access the columns' properties.

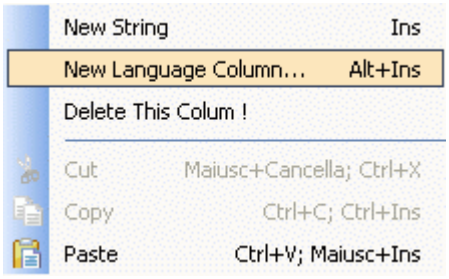
Column properties cannot be accessed from this string selection window.

14.4. Changing Languages

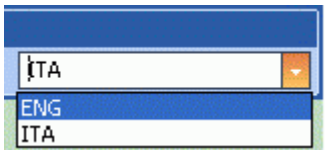
The String Table is the container of all the texts in the project which are used to fit any animation requirements. Texts which are typed in directly as titles for the components or drawings, therefore not contained in the String Table, will be presented as permanent fixtures.
The String Table is a container that can be subdivided into columns, if desired, where each one represents a language. When columns are not inserted the resource will be formed by one identifier only and the relative string.
As the columns grow in number, the identifier will refer to different strings according to the column selected as active language.

The following table shows how the columns are divided, where an ID refers to columns with strings in different languages. The enabled column (active selection in the combo.box) will be the one to show the text in the desired language.

To insert a new column press the right mouse button in the area of the table, then select the **'New Language Column...'.** An input-box for inserting the column's name will appear. To change the name of a column (and therefore the language) right click on it's name. To cancel a column right click on one of the column's lines and select the **'Delete this Column!'.**

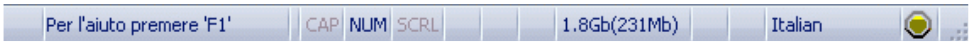


The language to be activated is selected directly from those available in the purpose-built combo-box:

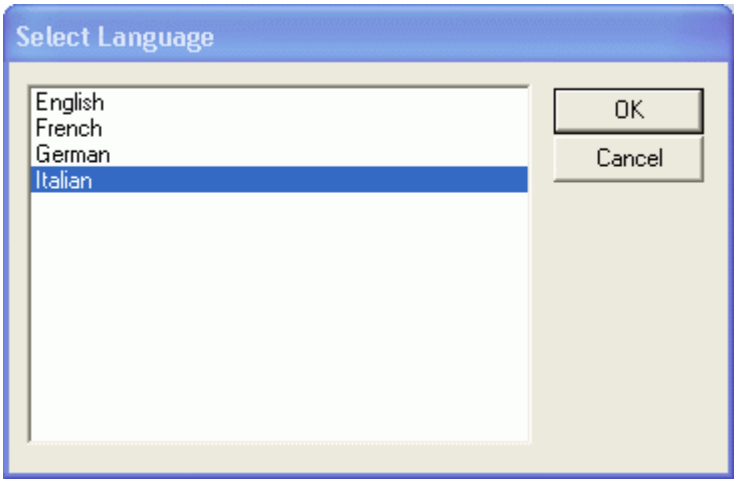


Project Language Activation

The Movicon Status Bar, whether in design or Runtime mode, shows on the right hand side which language is currently active.



By double-clicking the mouse on the active language field a dialog window will open showing the list of the project's set languages. Here you can select another language and confirm it with OK to activate it.



Selecting a column in Runtime mode, to activate the language desired, can also be done by using the change language' command button from the Movicon "Commands List.

Caution! if you modify the name of the language column while in Design mode, and this language is active, Movicon will not reload the new column name but will keep the old one. Therefore as a consequence, String ID will be displayed in texts due to the fact that set column no longer exists. In this case you will need to perform a language change by selecting the new name of the language to activate.

14.5. String formatting through String IDs

The String ID management also allows you to link together more than one string ID within a text field. When text is inserted into a field subjected to multilingual, the string ID is searched for in the String Table and replaced with the one relating to the language active. However, if you insert **@(ID)** in the text field, a string with the same ID specified in the brackets will be search for. This will enable you to link together more than one ID string in the same text field.

Example: the following ID strings have been defined in the String Table:

String ID	English	Italian
Alarm	Alarm Active:	Allarme Attivo:
MaxLevel	Tank Max Level!	Livello Max Serbatoio!
MotorOverload	Motor Overload!	Scatto Termico Motore!

By inserting the following syntax in the "Title" property of a rectangle:

@(Alarm) @(MotorOverload)

the following text will be displayed:

Alarm Active: Motor Overload!

Naturally a "@(Alarm) @(MotorOverload)" String ID should not exist in the String Table, otherwise the string associated to that ID will be retrieved redirectly instead of the text format desired.

14.5.1. Change System Language

Movicon has certain dialog windows which are used for customizing texts.
To guarantee the complete support of the multilingual function, Movicon has provided you with a function purposely built for replacing window system texts with customized texts contained in the string resource. In order for this to work you need to insert the customized test, which have been preset with an "key" ID code as described in the table below, into the string resource. When Movicon comes across these special identifiers in the project, it will replace the system's text with the text contained in the string resource according to the language which has been activated.

During installation mode Movicon will add the "CustomStringID_UNICODE.csv" file to the public documents folder (i.e. for Windows 7: C:\Users\Public\Documents\Progea\Movicon) within which all the special String ID have been inserted with all Movicon installation language columns and relating translations with default text. This file is in compatible '.csv' format for direct importing using the "StringImpExp.exe" tool.

Virtual Keypad for Touch screens

Special ID	Description
_CANCEL_PADTEXT_	Text for CANCEL key
_DELETE_PADTEXT_	Text for DELETE key
_OK_PADTEXT_	Text for ENTER key
_TITLE_PADTEXT_	Text for virtual keyboard title. Movicion for default sets the title with the name of the variable to be modified. When inserting the custom string ID, the variable name will nolonger be displayed.

_VALUE_PADTEXT_	Text to replace the "Value" string: on alphanumeric pads.
_LOW_PADTEXT_	Text to replace the "Low limit" string: on numeric pads
_HIGH_PADTEXT_	Text to replace the "High limit" string: on numeric pads.
_CAPSLOCK_PADTEXT_	Text for CAPS LOCK key
_OUTOFRANGE_PADTEXT_	Out of range value error message text. Special chars can be used in the message text to display limit values, such as %f, %1, %2. For example, when defining text as "Enter a value between %f and %f", the first %f will be replaced with the minimum value and the second with the maximum value. When using the %f special character, the number will be displayed with a floating point and even thought the number is integer, i.e. 100, it will be displayed with 6 zeros like this: 100.000000. To display a number without decimal figures use the %1 and %2 characters or the %.0f character. For instance, if set limits are 0 and 100 the following possibilities can be used: "Enter a value between %f and %f" becomes "Enter a vaue between 0.000000 and 100.000000" "Enter a value between %.0f and %.0f" becomes "Enter a value between 0 and 100" "Enter a value between %1 and %2" becomes "Enter a value between 0 and 100"
_MAXCHAR_PADTEXT_	Test for the maximum character number error message. The %d and %f special characters can be used in the text for displaying the maximum number of characters. For example, a text defined as "The maximum number of characters allowed is %d".
_NOTNUMERIC_PADTEXT_	Text for "Enter a number" error message generated when an alphanumeric value is entered on Numeric Pad.

Password Request Window

Special ID	Description
_OK_GETPTEXT_	Text desired for OK command
_CANCEL_GETPTEXT_	Text desired for Cancel command
_USER_GETPTEXT_	Text desired for user name request
_PASS_GETPTEXT_	Text desired for password request
_TITLE_GETPTEXT_	Text desired for user Log On window title. Movicon also inserts requested password level for logon for default. When inserting custom string ID, the custom string ID will not be displayed. In this case the requested level can be inserted using the "**_LEVEL_GETPTEXT_**" ID.
_TITLE_EXP_GETPTEXT_	Text desired for "Expired Password" window title.
_LEVEL_GETPTEXT_	Test desired for defining password level in the user Log On window. **Warning**, to display the password level request you need to put the %u character after the text specified, ie: Password Level = %u
_LEVEL_EXP_GETPTEXT_	Text desired for defining password level in the "Expired Password" window.

_RESET_GETPTEXT_	Text desired for check-box requesting password change after login.
_RPASS_GETPTEXT_	Text desired for re-enter password request in the window which appears when password has expired.

Trend Legend

Special ID	Description
_TLEGEND_DESC_	"Description" Text
_TLEGEND_VALUE_	"Value" Text
_TLEGEND_MINVALUE_	"Min." Text
_TLEGEND_MAXVALUE_	"Max." Text
_TLEGEND_AVERAGE_	"Average" Text
_TLEGEND_TIME_	"Date and Time" text which appears in the legend when Trend is stopped.

The change language function also works with the Trend pens by inserting a string ID with the same name as the pen's. In Runtime the Trend will display the text contained in the string ID instead of the name of the pen.

Dialog Box for Filter Command in the Viewer Windows (His Log, Trace DB, DataLogger/Recipes)

Special ID	Description
_OK_DBFILTER_	Text desired for OK command
_CANCEL_DBFILTER_	Text desired for Cancel command
_USER_DBFILTER_	Text to replace the "User:" string
_TITLE_DBFILTER_	Text for the title of the Dialog Box
_SORTBY_DBFILTER_	Text to replace the "Sort by:" string
_EVENTTYPE_DBFILTER_	Text to replace the "Event Type:" string
_FROMDATE_DBFILTER_	Text to replace the "From Date:" string
_FROMDATE_COMP_DBFILTER_	Text to replace the "From Date Compare:" string
_TODATE_DBFILTER_	Text to replace the "To Date:" string
_TODATE_COMP_DBFILTER_	Text to replace "To Date Cokmpare:" string
_SEVCOND_DBFILTER_	Text to replace the "Severity Condition:" string

_SEVERITY_DBFILTER_	Text to replace the "Severity:" string

Dialog Box for insert Trace Comment for a variable

Special ID	Description
_OK_TRACECOMMENT_	Text desired for OK command
_CANCEL_TRACECOMMENT_	Text desired for Cancel command
_NAME_TRACECOMMENT_	Text to replace the "Name:" string
_VALUE_TRACECOMMENT_	Text to replace the "Current Value:" string
_CHANGING_TRACECOMMENT_	Text to replace the "Changing Value:" string
_OBJECT_TRACECOMMENT_	Text to replace the "Changing Object:" string
_COMMENT_TRACECOMMENT_	Text to replace the "Comment:" string
_TITLE_TRACECOMMENT_	Text for the title of the Dialog Box

Special ID strings for customizing texts when using multilanguage projects.

Special ID	Description
_TITLE_COMMENTACK_	Text for window title.
_ALARMNAME_COMMENTACK_	Text to replace "Alarm Name:" string.
_STATE_COMMENTACK_	Text to replace "State:" string.
_TIMEON_COMMENTACK_	Text to replace "Tempe ON:" string.
_TIMEOFF_COMMENTACK_	Text to replace "Tempe OFF:" string.
_HELP_COMMENTACK_	Text to replace "Help:" string.
_COMMENT_COMMENTACK_	Text to replace "Comment:" string.
_USEFORALL_COMMENTACK_	Text to use for the "Use for All" option.
_OK_COMMENTACK_	Window's "OK" button text.
_CANCEL_COMMENTACK_	Window's "Cancel" button text.

14.6. Language Column Properties

The properties which can be associated to each language (String Table columns) allow you to defined certain settings which will be used in the runtime phase when the language is activated. These setting are then used by the Alarm Dispatcher to send messages.
To display the column properties just select a string in the desired column and the Properties Window will get updated with the column's properties.

14.6.1. General Language Column Properties

The General properties allow you to define settings to do with the Style References for objects and TTS setups for the speech functions.
To change the General properties, click on a string in the column desired and use the Movicon **"Properties Window"**.

Language
Read only property which shows the name of the selected column.

Style Source Container
This is used for selecting the reference screen for the style management. For further information on how these properties work please see "Style Sources in Symbols".

TTS Engine
This property is used for selecting the item to be used for the text speech. The items which can be selected are the same ones provided in the operating system which can be verified in its "Control Panel - Speech". The moment the language is activated the voice associated to it is automatically loaded to enounce texts.
This setting is used also for sending messages through the alarm Dispatcher based on the language associated to the message recipient user.

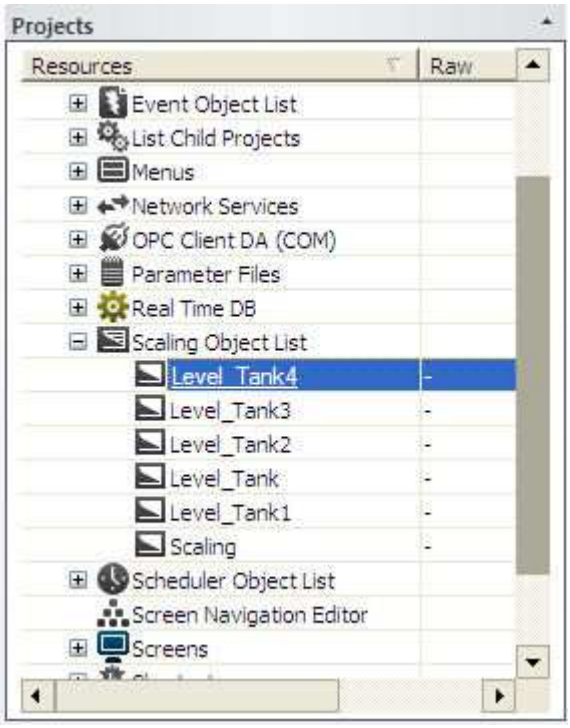
TTS Volume
This property is used for setting the speech volume percentage. This percentage will be applied to the volume level set in the PC. The end volume level will depend on different factors, speaker volumes, volume set in the Control Panel, TSS Volume property settings.
This setting will also be used for sending messages with Alarm Dispatcher based on the language associated to the message recipient user.

TTS Rate
This property is used for setting the speech speed. The 0 to 10 value will make the speech faster, while the 0 to -10 value will slow it down.
This setting will also be used for sending messages with Alarm Dispatcher based on the language associated to the message recipient user.

15. Variable Scaling

The Variable Scaling resource tool is needed when carrying out automatic scaling of data, which entails converting numerical values into engineering units.

Variables are very often acquired in a project from the plant which correspond exactly to the digitally converted raw values of measured physical quantities.
This value must be converted or 'scaled' in 'engineering units', which is a value corresponding to the measured physical quantity. This involves carrying out calculations for transforming, nearly always linear, from a minimum and a maximum of the digital value to a minimum and maximum scaled value.
Movicon allows these conversions to be done directly through the **"Variable Engineering Data Properties"**, so that the variable directly gets the scaled value arriving from the field.
It may also be necessary at times to carry out the scaling between two variables within the project, or to do NON linear conversions which entails the use of the 'Variable Scaling' resource through which the two variables can be specified, the one to be scaled and the scaled one, to get NON linear conversions.
This resource is available in the Movicon 'Project Explorer:



A virtually unlimited number of objects can be inserted into the Variable Scaling resource, each one will be scaled between two variables.
To add, copy or cancel Scaling objects use the standard techniques described in the paragraph on **"The Resources"**.

The main properties of Scaling objects can also be edited in the Runtime phase through the appropriate Basic Script functions.

15.1. Variable Scaling Properties

The Variable Scaling Properties are used to determine the input variables to be scaled and the scaled output ones, by associating the conversion or linear or non linear scaling factors.
To edit the properties of Variable Scaling objects, select the object with the mouse and use the Movicon **'Properties Window'.**

Scaling is **bidirectional**: in normal operations, the variable to be scaled is scaled on the output variable, and scaled on the input variable in inverse operations. Movicon executes inverse operations only when the scaled output variable undergoes a change.

15.1.1. Variable Scaling General Properties

The General properties are used to determine the input variables to be scaled and the scaled output ones, by associating the conversion linear or non linear scaling factors.
To edit the property of Variable Scaling objects, select the object with the mouse and use the Movicon '**Properties Window**'.

Name
The name to be assigned to the scaling object is entered in this edit box. Each object must have a unique name within the list so that they can be referred to through the Basic Script functions in order to be used during Runtime.

Enable
This selection box has to be enabled to activate the scaling object in question otherwise the conversion operations will not be executed.

Raw Variable
The name of the variable containing the value to be scaled is entered in this edit box (or selected with the '...' browse button on the right).

Scale to Variable
The name of the variable containing the scaled value, being the calculated result of the conversion based on conversion factors set in the property described below, is entered in this edit box (or selected with the '...' browse button on the right).

Dead Band
This edit box is used to establish a dead band in the conversion factors. The dead band establishes the value to which the scaled variable is to be set when the non raw variable value goes over the set conversion limit. The default value set by Movicon is '-1'.

Raw Min.
The minimum value of the raw variable is specified in this box, being the input value. The minimum and maximum linear scaled output value will be calculated based on the minimum and maximum input value.

Raw Max.
The maximum value of the Raw variable is specified in this edit box, being the input value. The minimum and maximum linear scaled output value will be calculated based on the minimum and maximum input value.
This value will represent the first non linear segment when non linear scaling is being used. The next segments are entered through the **"Non Linear Scaling"** window.

Scale to Min.
The minimum value of the scaled variable is specified in this box, being the output value corresponding to the real physical quantity.

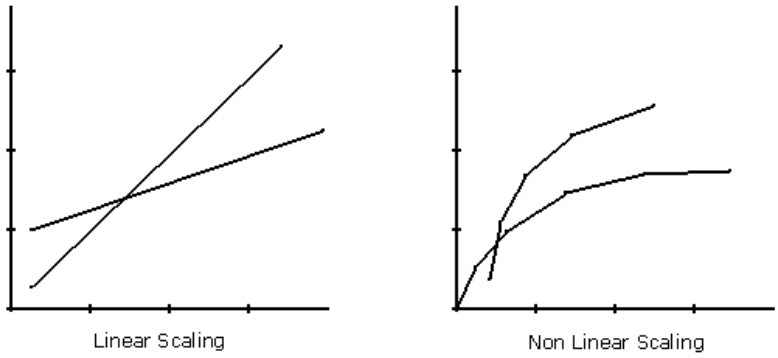
Scale to Max.
The maximum value of the scaled variable is specified in this box, being the output value corresponding to the real physical quantity.
This value will represent the first non linear segment when non linear scaling is being used. The next segments are entered through the **"Non Linear Scaling"** window.

Non Linear Scaling

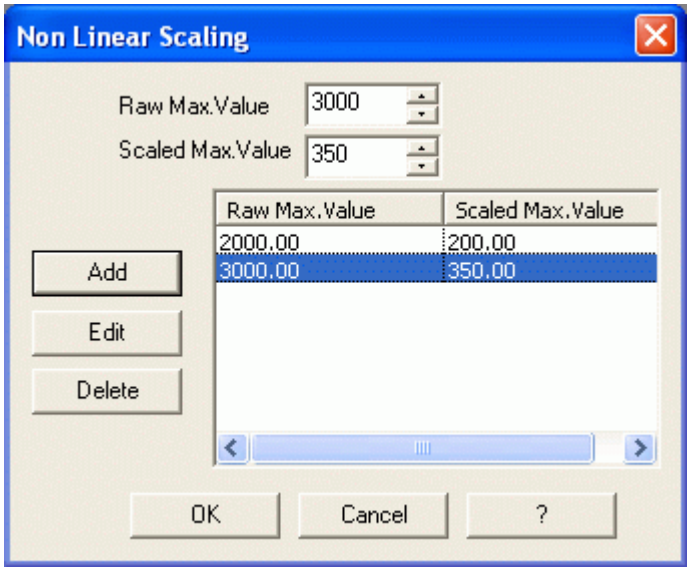
Non Linear Scaling can also be used if required. The segment settings are accessed through this button where they can be established between the min. and max. values. This will create a theoretic line broken up into a number of segments.
For further information refer to the paragraph **"Non Linear Scaling".**

15.2. Non Linear Scaling

Movicon consents the scaling of non linear values, which are those whose behaviour does not follow an exact straight line between the minimum and maximum values.



To insert non linear conversions, access the values settings by using the **"Non Linear Scaling"** button from the **"Variable Scaling General Properties'.**
In this case, the maximum values set previously assume the first segment of the non-linear curve. The proceeding segments are set through the window as illustrated below:



After establishing the first segment from the maximum values set in the **"Value"** property in the **"Variable Scaling General Properties'**, the other segments can be added by entering the following maximum values and clicking the **'Add'** button. This will establish an equivalence between the two segments.
The 'Edit' button is used for changing the previous entered. The 'Delete' button is used for deleting a previous entered value.

The values comprised in one single segment will be scaled in linear mode, therefore the more segments inserted the more the line will become curved.

16. Command Scheduler

The Command Scheduler resource tool is used for configuring timed command executions.

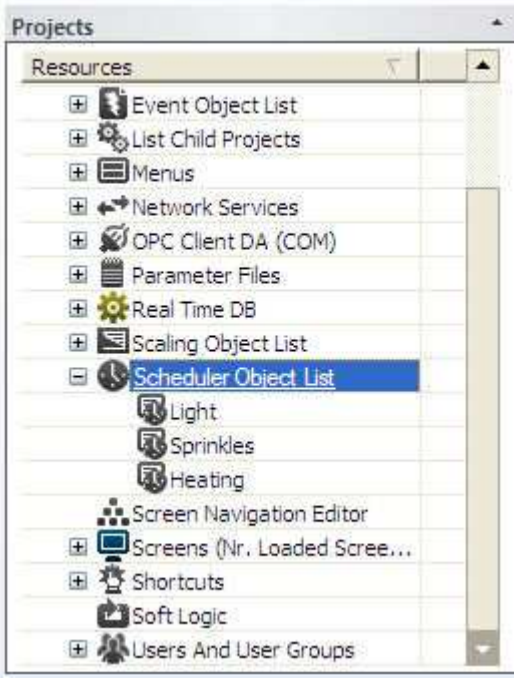
The scheduler is a very handy tool to have in projects when commands need to be activated on preset times, especially on plants where commands must be activated at a certain time and for a certain period.
Time is also noticeably reduced when creating projects where commands have to be repeatedly activated on the plant at preset time intervals.

The scheduler's job is to execute commands or list of commands based on preset times respecting the PC system's clock.

This resource is available in the Movicon 'Project Explorer' window:

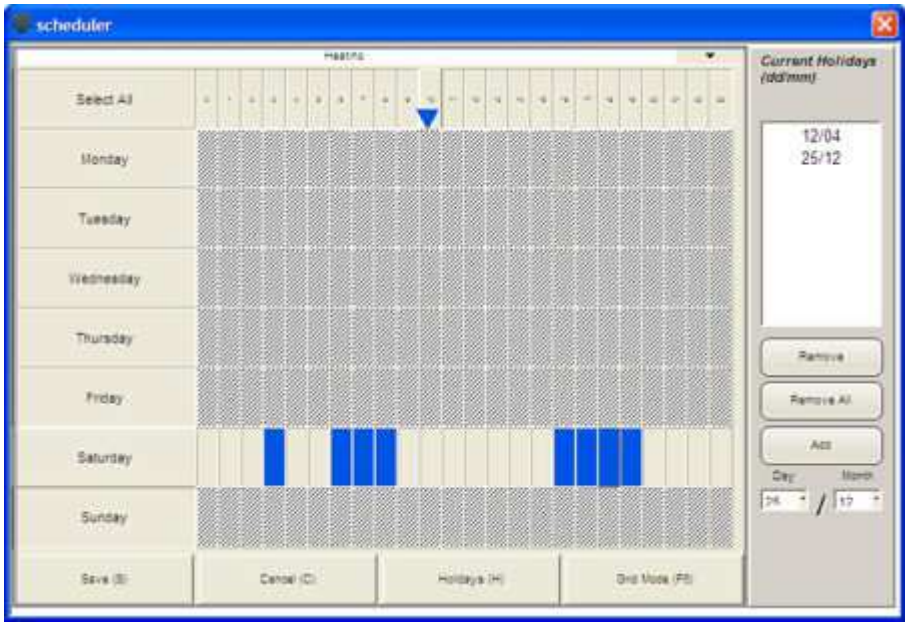
This resource can contain a virtually unlimited number or commands which can be executed according to preset times or preset weekly schedules, which are edited through the '**Properties Window**'.

The Command Scheduler resource offers great operating advantages in any application, especially in those sectors (ie. Building Automation) which normally require commands to be automatically executed on preset times.
A few of the most common uses would be for example the commands for turning on/off of lights, central heating, etc.
These simple operations can therefore be realized through this purposely built resource which has the job of slimming down and speeding up the procedures for setting these type of commands.
To add, copy or cancel a Scheduler object use the standard techniques described in the paragraph on **"The Resources"**.



Adding new Schedulers at runtime

The Hour Selector object allows, during runtime, to add new Schedulers and to remove them, if required, using the dedicated command buttons ("Add Scheduler Button", "Remove Scheduler Button"). Please note that the Schedulers created at runtime can manage only the "Commands On": if used to manage the set of a variable, you should also add the time intervals when the variable should be reset.



Schedulers retentivity files

Schedulers set as "Daily Plan" create during runtime a retentivity file named "<ProjectName>_<SchedulerName>.sst" in the "DATA" project folder. The retentivity file purpose is avoiding to repeat the ON command, if this command has already been executed once. If, while the project is starting, the ON command is modified by a time interval of the Scheduler, which sets the value or the name of the variable associated to command, the ON command will be executed anyway.

16.1.1. Holiday Planning

The Scheduler objects can be set to manage holidays as well. When a Scheduler is enabled through the relating property to do this, it will be able to memorize, internally, the dates set as holidays. Therefore two types of planning, one for normal planning and one for holiday planning, can be set by means of using the "Scheduler Window" graphic object.
The holidays are controlled only when the Scheduler is a 'Date' type or 'Daily plan' type and only the day and month of the holiday date are controlled (if they correspond with the current day and month), while the rest of the date field is not valuated.

The holidays are only managed when the Scheduler is 'Date' type or 'Daily plan' type in the two following modes:

- **Daily Plan**: By means of using the "Scheduler Window" object you can set two different daily plans: normal and holidays. The Scheduler object's "Holiday Button" to switch from one daily plan to the other. The hours in both of the two plans are composed of a 7 day by 24 hour grid. The holiday daily plan settings are in periods of 15 minutes. The periods selected in the holiday daily plan are represented in the default grey colour; while the normal ones are in blue. At this point the Scheduler will us the appropriate daily plan according to whether the day has been set as a holiday or not
- **Date**: The scheduler will execute the preset command, not only for the specified date but also for the date set as a holiday

Setting Holidays

In order to set holidays you need to use the some of the VBA methods from the "SchedulerCmdTarget" interface. The methods available for managing holidays are as follows:

AddHoliday: allows a holiday to be added to the scheduler object
RemoveHoliday: allows a holiday to be deleted from the scheduler object
HasHolidays: lets you know in write whether the scheduler object has been set for managing holidays
IsHoliday: allows you to verify whether a date has been set as a holiday in the scheduler object
GetHolidaysString: returns a string divided by a pre-chosen separator character (parameter from function) with the list of all the holiday dates set in the scheduler object
HolidaysPlan: allows you or read the current weekly daily plan from a "Daily plan" scheduler
SaveRetentive: allows you to save the daily plans (normal or holiday) and the days of the holidays on external files to be retained even after an application re-startup

You can however set a list of holiday dates also through editing XML files. These files must be saved in the project folder, with the same name of the project and with the "defhol" extension. All the "fixed Date" type schedulers, which do not have holiday lists, will use those defined with the XML file with the ".defhol" extension as their holidays.
When a ".defhol" file cannot be found in the project folder, it will be searched for in the Movicon installation with the "Holidays.defhol" fixed name.

the XML file with the holidays list is read only at the project startup and therefore modification to the file will not be managed until the project is started up again.

The Holiday XML file structure must be in the same way as:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<DefaultHolidays>
<HolidaysDates
n0="2000-01-01T00:00:00Z"
n1="2000-01-06T00:00:00Z"
n2="2000-04-25T00:00:00Z"
n3="2000-05-01T00:00:00Z"
n4="2000-06-02T00:00:00Z"
n5="2000-08-15T00:00:00Z"
n6="2000-11-01T00:00:00Z"
n7="2000-12-08T00:00:00Z"
n8="2000-12-25T00:00:00Z"
n9="2000-12-26T00:00:00Z"
/>
</DefaultHolidays>
```

This example shows the Italian national holidays.

16.2. Command Scheduler Proprieties

The Command Scheduler Properties allow you to select the execution times and commands to be activated.
To edit the Scheduler object properties, select the object with the mouse and use the Movicon '**Properties Window**'.

16.2.1. Command Scheduler General Properties

The General properties allow you to select the execution times and commands to be activated.

To edit the General properties, select the object with the mouse and use the Movicon **'Properties Window'**.

Name

The name of the scheduler object is entered in this edit box. Each object must have its own name within the list. This is very essential when each object must be referred to singularly through the Basic Script functions so it can be used during Runtime.

Enable

When enabling this selection box the Scheduler object in question will be activated. If this box is left disabled any eventual commands will not be executed.

Support Holidays

You can activate the "Holidays Planning" management for the Scheduler object in question by using this selection box. For further information about "Holidays Planning" please refer to section with the same title.

Treat Holidays as Sunday

This option box, if enabled, consents the normal Sunday hour plan be used for managing the days set as Holidays, being the ones set in the scheduler's holiday list. This option does not oblige the user to set a seven day hour plan for the holidays but helps in simplifying work when all the holidays of one scheduler must be managed in the same way, independently from the day of the week.

Enable Variable

This edit box allows you set a variable for enabling the Scheduler. The Scheduler object must, however, be enabled in development mode with the appropriate **"Enable"** property, otherwise it will always be disabled in runtime.

Type

The Scheduler object's purpose is to execute one or more Movicon commands on preset time periods.

The "Type" selection box permits you to select in which moment the command must be executed. Other fields may have to be set according to the item selected in order to complete this type of programming. For instance, when selecting the **'Every Minute'** or **'Every Hour'** item it is not necessary to specify anything else, as it is quite explicit that the onset of each new preset period the associated event will be automatically executed.

However when selecting a day or a month, it is then necessary to indicate, inside that period, at what precise time the command must be executed. The time must therefore be set in the **'Time'** property.

Amongst the scheduled time settings to be assigned you will find the **'Date'** setting. This selection allows the activation of a virtual calendar, through which you can select a date up to the year 9999. The moment the selected date is verified (after midnight of the previous day) the event will be executed. The date in question must be set in the **'Time'** property.

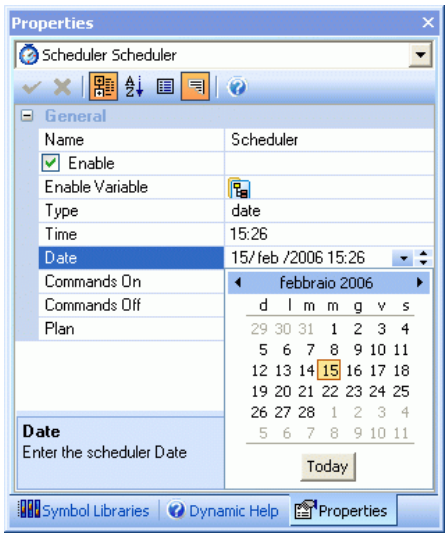
The '**Daily Plan**' setting activates a weekly plan. When selecting this setting it will be necessary to access the weekly plan scheduler setting through the '**Plan**' property.

Time

The command activation time is entered in this edit box.

Date

This field is enabled only when the "date" item has been selected in the **"Type"** property. In this case, when clicking on this box a window will open for selecting the day when the command is to be activated.



The presence of the "Date" field distinguished by the "Time" field permits two things:

- To set the command execution time in "Date" type schedulers
- To make sure that the command is executed on a certain day in each year. Movicon only controls the month and day and not the year set

Commands On

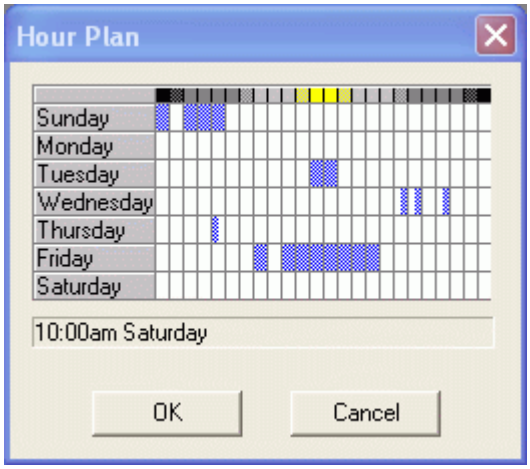
This button opens a Movicon 'Command List' through which you can set a list of one or more commands to be executed by the scheduler when the time goes On.
For further information on the commands available please consult the paragraph on **"Command List"**.

Commands Off

This button opens a Movicon 'Command List' through which you can set a list of one or more commands to be executed by the scheduler when the time goes Off.
For further information on the commands available please consult the paragraph on **"Command List"**.

Plan

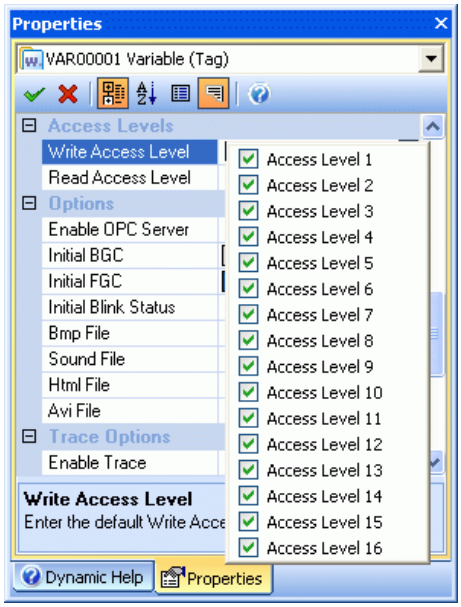
The daily plan window allows you to configure the time ranges in which the command associated to the Scheduler must be executed.
The table provides seven lines corresponding to the days of the week, and 24 columns corresponding to the hours in a day.
Left click on the squares to select the day and hour required. Click on the square again to deselect.
Right click to select the precise time of each hour, each click equals 15 minute resolutions.
Click on the day to select the whole 24 hours for that day.



16.2.2. Scheduler Access Level Properties

By using this Access Level properties you can enable which are the default write access levels for the selected Scheduler.
To modify the Access Levels of a Scheduler, select the object with the mouse and use the Movicon "**Propery Windows**".

There are 16 access levels available and they can be selected individually one by one:



Write Access Level

By using this property you can define the Access Level mask for modifying the Scheduler through the "Scheduler Window". By using the "Scheduler Window" you can in fact select a Scheduler and display or modifying its plan. However, if the password management has been enabled and the "Always Visible" property disabled, the modifications to the Scheduler's plan will only be applied if the active user has the right Access Level requested by the Scheduler's "Write Access Level" mask. Otherwise the "Scheduler Window" will remain disabled as far as the plan editing commands are concerned.
For further information on 'Access Levels' please refer to **"User Levels and Access Levels"**.

Read Access Level

By using this property you can define the Access Level mask for selecting the Scheduler the "Scheduler Window". By using the "Scheduler Window" you can select a Scheduler through an appropriate list-box and display or modify its plan. However, if the password management is enabled and the "Always Visible" property disabled, the Scheduler can only be selected if the active user has the right Access Level requested by the Scheduler's "Read Access Level" mask. Otherwise the Scheduler will not be listed in the selection listbox and therefore will not be available for selecting.
For further information on 'Access Levels, please refer to the paragraph on **"User Levels and Access Levels"**.

Always Visible

When enabled, this property allows the Scheduler to be selected and modified through the "Scheduler Window" independently from the active User. In cased where the Password management has been disabled, it will be necessary to enable this property in order to view the Scheduler in the "Scheduler Window" (therefore selectable and modifiable).
For further information on 'Access Levels, please refer to the paragraph on **"User Levels and Access Levels"**.

16.3. Command Scheduler Example

Let's suppose you need to configure your project so that every evening at 21.00 all the plant's lighting is automatically turned on (subject to the 'ILLU1 variable) managed by the supervision, and automatically turned off in the morning at 6.30.
First of all you need to proceed with editing the scheduler objects by selecting the 'Scheduler object list' resource from the 'Project Explorer' window to add the scheduler command. Go ahead and edit the Movicon scheduler objects as follows:

1. Select the 'Scheduler object list' from the 'Project Explorer' window
2. Use the right mouse button to insert a new object in the Scheduler resource using 'Add New Scheduler Object' command
3. From the object's General Properties window set the 'Type' property with 'Every Day' and set the time at '21.00' in the 'Time' box. Then enter 'Turn On' as name
4. By using the 'Command' property open the 'Command List' window and select the 'Variable command'. Enter the variable required, in our example we will use the 'ILLU1' variable, and enter 'Set' as Action and enter '1' in the 'value' property
5. Confirm with OK to enter the first scheduler object called 'Turn On'. Now continue with entering the second one which will be called 'Turn Off'
6. Right mouse click on the 'Scheduler Object List' resource and insert a new object using the 'Add New Scheduler' command
7. From the object's General 'Properties Window' set the 'Type' property to 'Every Day' and set '06.30' in the 'Time' box. Then assign the object with the name 'Turn Off'
8. Click the 'Command' property to open the 'Command List' window and select 'Variable Command'. Insert the variable required, in our example we will use the 'ILLU1' variable, and set the 'Set' value to '0'
9. Confirm with OK to enter the second and last Scheduler object

At this point the plant's light management has been completed.
When running the project the scheduler will execute the corresponding command automatically when the set time has been reached and verified.
The time set in the scheduler refers to the PC system's clock.

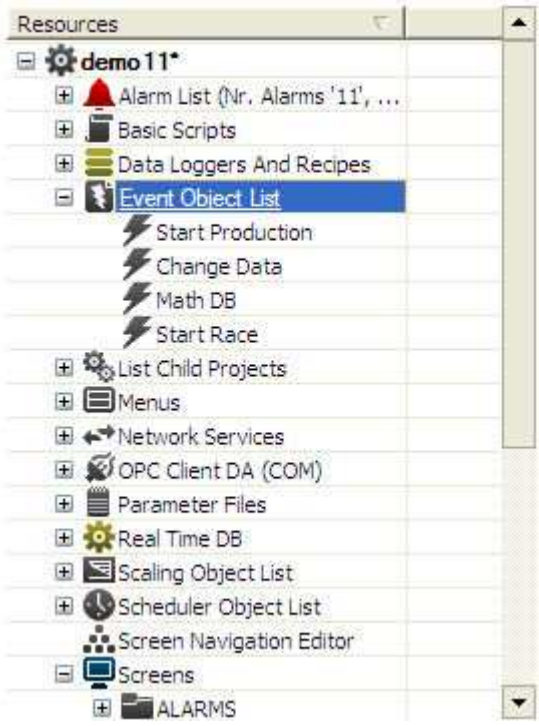
17. Commands on Event

The Event Objects resource is the tool which allows commands to be executed according to Movicon variable changes.

The Commands on Event are very handy when values of one or more variables must be kept monitored in the project on which command executions are to be based.

The Event Objects therefore have the job of executing the command or list of commands according to the value obtained by a certain variable.

This resource is available in the Movicon 'Project Explorer' window.



This resource can contain a virtually unlimited number of Event Objects, each one of which is associated to a different variable, which can be edited by means of the **'Properties Window'**.

The Event Object resource offers great operating advantages in any application where variable values need to be controlled to execute one or more commands upon value changes. This enables the programmer to avoid writing codes need for the controls of the variables in question. To add, copy or cancel an Event Object use the standard techniques described in the paragraph titled **"The Resource"**.

17.1. Event Object Properties

The Event Object properties are used for selecting the variables to be monitored and commands to be activated.
To edit the Event Objects' properties, select the object the mouse and use the Movicon **'Properties Window'.**

17.1.1. Event Objects General Properties

The General properties are used for selecting the variables to be monitored and the commands to be activated.
To edit the General properties, select the object with the mouse and use the Movicon '**Properties Window**'.

Name
This edit box is used for assigning a name to the Event Object. Each object must be given a unique name in the list. This is essential for referring to each object through the Basic Script functions so that they can be used during Runtime.

Enable
Checking this selection box will activate the Event Object in question.

Variable
The name of the variable which is to be monitored is entered in this edit box (or selected with the **'...'** browse button on the right). When the variable's value changes, if requested by the 'Condition' property settings, the associated '**Command**' will be executed.

Enable Variable
The name of the variable which determines the dynamic enabling of the Event Object is entered in this edit box (or selected with the **'...'** browse button on the right). When this variable's value is equal to 'zero' during Runtime, the Event Object's '**Command'** will not be executed. When its value is different from 'zero' the Event Object's 'Command' will be executed according to the set conditions.

This functionality is managed by Movicon only when the **'Enable'** property has been activated. If otherwise the Event Object will not execute any commands whatever the **'Enable Variable'** state if the 'Enable' property has not been activated.

Condition
This property is used for establishing which type of variable value's change executes the command. The possibilities are:

- **Change:** the command will be executed every time the variables changes value
- **Major:** the command will be executed every time the variable's contents passes from a low or the same value specified in the **'Value'** property to a higher value
- **Minor:** the command will be executed every time the variable's contents passes from a high or the same value specified in the **'Value'** property to a lower value
- **Equal:** the command will be executed every time the variable's contents pass from different value to that specified in the **'Value'** property to one with the same value

Value
This edit box is used for specifying which threshold value is to be referred to by the '**Condition**' property. This setting is insignificant when the **'Change'** option has been selected in the **'Condition'** property.

Commands
This button opens the **'Command list'** to setup the list of one or more commands which are to be executed by the Event.
For further information on the available commands please consult the paragraph titled **"Command List"**.

Run At Server

When the Event is run on command, by means of the Command List, in a Client project, with this option enabled (default), the Event object's commands will only be run in the Server project. If this option is enabled, the commands will only be run in the Client project. This option only has meaning when used in a Client project created with the child project techniques or in Redundancy.

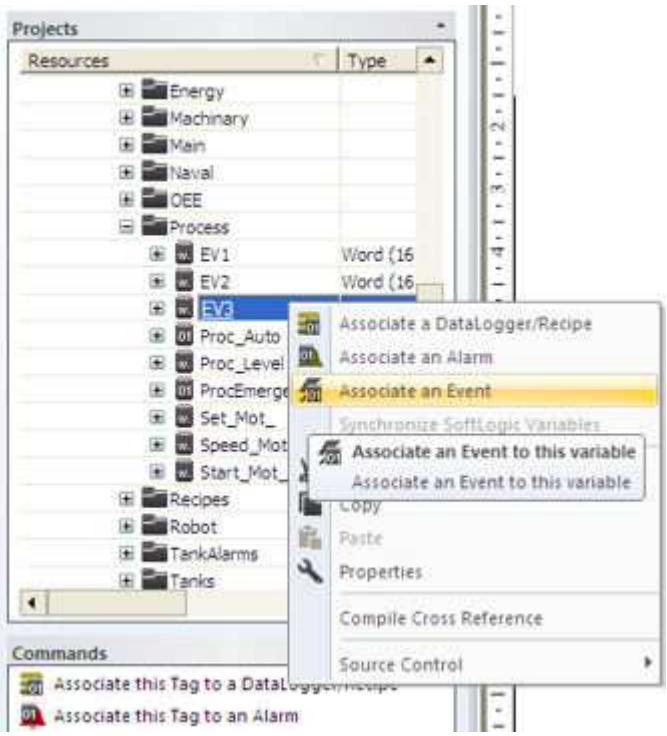
17.2. Events as Templates

Movicon has a extremely useful function when needing to set many repetitive Event objects in the project, which record and sample series of different variables in the same way.

- **A practical example would be:** we have to get our project to manage 50 data recordings with the same sampling time and recording modes. The RealTime Database has declared the 50 variables exchanged with the field and relating to the process information. These variables must generate the same type of event, set in an event object.

In a case such as this, we need a tool which to quicken the process of assigning Tags to the Event object, one which provides you with the possibility to set up the event object **only once** and associate it to the 50 variables, of the example above, all at once.
A tool such as this exists in Movicon and is called "**Event Template**".

To get this function you have to set the Event as "Template" type in the Event Object Resource along with the activation modalities and command desired. Then you can select the variables needed from the Variables List from the RealTime Database and use the "Associate an Event" command with the right mouse key and select the event window desired from the window that pops up. The variables (in our example this would be the 50 process variables) will then be linked to the Event Template. Technically Movicon has set 50 different variables linked to the same Event in its project on receiving just one click. of the mouse.



The request to associate an Event will open a another window containing a list of Events, which should have been inserted beforehand.

CAUTION: there shouldn't be any reference variable specified in the properties of the event to be associated but only the activation condition and command list.

18. Objects Command List

Movicon provides a list of commands which can be executed during Runtime from both the resources and controls.

The Movicon resources and controls predisposed for executing commands are set up through the **'Command'** property found in the **'Properties Window'** of the object selected.
By activating the **'Command'** property the **'Command List'** will open through which the required commands can be inserted, edited or cancelled.

The command objects usually provide the possibility to permit or deny the operator command execution by means of associating the object with a password and access level variable.

The execution of any command can only take place during Project Runtime mode.

Command List Window

The **"Command List"** window lists the commands that are already inserted in the selected resource or control.
There are some buttons available in the Window which execute the following functionalites:

New Command...: consents to adding a new command to the list. The "Command Type" selection window will open to select and configure a new command.
Edit: consents to editing an already inserted command on the list. In this case just select the command to be edited with the mouse and click on the button to open the "Command Type" selectin window.
Remove: consents you to remove the command selected with the mouse from the list
Add Wait time: consents a wait time command to be instantly inserted on the Command List. This command will be inserted as a System Command (also see the "Wait Time" system command) with a default timeout value of 1000 msecs.
Copy: this button allows you to copy the displayed Command List to the Windows Clipboard to then past it in another object or resource.
Paste: this button allows you to paste a previously copied Command List. The Command List, once copied to the Windows clipboard, can be copied to any other project object or resource or even to another project.
Cut: this button allows you to remove displayed Command List by copying it to the Windows clipboard, allowing it to be then pasted in the same object again later or in another project resource or object or in another project entirely.

The Command List Window's "Copy" and "Cut" buttons copy the command list to the Windows clipboard. However when using Windows "Copy" command for any other project object or even an object from any other application (i.e. for copying a file from the Windows Resource Explorer), whatever was copied previously to the clipboard, in this case the Command list, will be overwritten and lost. .

18.1.1. Alarm Commands

This group of commands are used for carrying out the acknowledge and reset operations of the Movicon alarms.

The 'Period', 'Duration' and 'Date' parameters are optional. If one or all of these parameters are not inserted they will be requested through an appropriate dialog window configured in the Report when doing a preview or a direct print. Otherwise all the commands will be indicated without showing a dialog window and the Report will use these parameters to filter the data.

The Alarm Statistics is not supported if the database engine being used for the Historical Log is "InMemoryDB". In addition, the ODBC driver used must support the following commands in the SELECT SQL syntax: "SUM", "COUNT", "GROUP BY" and "ORDER BY". If these commands are not supported by the database being used it will not be possible to use the Alarm Statistics Reports.

Action

The command or action type to be executed on the Movicon alarms is selected through this property. The choices are:

Action	Description
Ack All	This command executes the acknowledgement of all the active alarms.
Reset All	This command executes the reset of all the active alarms.
Toggle Sound	This command enables or disables the management of the acoustic signal which will be activated for unacknowledged alarms,according to user activated. This command only has effect when the sound has been enabled in the Alarms Window. This command does not disable the Sound functionality as, for example, the Alarm Window button or the "AlarmsSoundState" system variable does, but only limits silencing the siren.
Show Report	This command shows a preview of the report selected, in Crystal report format, for the Alarm Statistics. This command is only available when the "Alarm Statistics" option has been enabled on the license. For further information see section on "Alarm Statistics".
Print Report	This command directly sends the selected report for the Alarm Statistics, in Crystal report format, for printing without opening a print preview window. This command is only available when the "Alarm Statistics" option has been enabled on the license. For further information see section on "Alarm Statistics".
Export Report	This command exports the selected report for the Alarm Statistics in Crystal report format, in a html file. The exported file is saved in the project's "DLOGGERS" folder in the name of "<Report Name >_<gg/mm/yy>.html". This command is only available when the "Alarm Statistics" option has been enabled on the license. For further information see section on "Alarm Statistics".
View Textual Report	This command opens a window to view the textual report. For further information see the section on "Textual Report Commands and Parameters".
Print Textual Report	This command sends the textual report directly to the predefined printer for printing. For further information see the section on "Textual Report Commands and Parameters".
Save Textual Report	This command creates and saves a new textual report file. For further information see the section on "Textual Report

	Commands and Parameters".
Append Textual Report	This command adds a new page to textual report file set in the "Textual Report - Destination File" parameter. For further information see the section on "Textual Report Commands and Parameters".
Export and Send Email	This command exports and sends the selected alarm statistics report via email. The email is sent according to the settings defined in the SMTP Plug-in using the "SMTP Settings" button located in the project's General properties, and for which the editor generates a file called "smtp_direct.settings" in the "ProjectName\DATA" folder. The report export file, saved in the "ProjectName\DLOGGERS" folder with the Report's name, is attached to the email. The email recipient is the User of User Group defined in the "Recipient" property.  The Timeout time for executing this command, generating the report and sending email can be changed using the "GeneralTimeout" registry key. The value in this key for Timeout interventions can be increased from its default value of 10 seconds to a higher value. This command is not available for "Textual Reports".
Show Embedded Report	This command shows a preview of the selected Alarm Statistics Embedded Report. For further information, please also refer to the sections on "Embedded Report Generation Commands" and "Alarm Statistics". This command is only available when the license "Alarm Statistics" option has been enabled.
Print Embedded Report	This command prints the selected Alarm Statistics Embedded Report. For further information please refer to the sections on "Embedded Report Generation Commands" and "Alarm Statistics". This command is only available when the license "Alarm Statistics" option has been enabled.
Save Embedded Report	This command saves the selected Alarm Statistics Embedded Report on pdf file. For further information please refer to the sections on "Embedded Report Generation Commands" and "Alarm Statistics". This command is only available when the license "Alarm Statistics" option has been enabled.
Send Embedded Report	This command /saves the selected Alarm Statistics Embedded Report on pdf file and sends it by email. For further information please refer to the sections on "Embedded Report Generation Commands" and "Alarm Statistics". This command is only available when the license "Alarm Statistics" option has been enabled.
Reset Statistics	When this command is executed the statical data of all the alarms, or those in one individual area, specified in the " Alarm Area" parameter, will get reset. For further information please refer to the section on "Alarm Statistics".

Alarm Area

The alarm area name can be entered in this field for which the "Ack All" or "Reset All" command will be executed. In this way the ack or reset commands are only executed in the area specified and not in all the alarm areas. The (*, ?, etc.) special characters can also be used as described in the Alarm Window's "Filtro per Area" property.

Report File

This field is used for selecting the report file for the "Alarm Statistics". The Alarm Statistic Report files are available in both "Crystal Report" and Movicon "Embedded Report" formats. According to the command type selected in the "Action" field, four report files in "Crystal Report"(f".rpt" file extension) format or Movicon "Embedded Report" (".movrep file extension) format will be shown in the drop down list. These report files already exist in the Movicon installation folder and they are:

> **Cristal Report File**: OrderByDate.rpt, OrderByDuration.rpt, GroupByThreshold.rpt, GroupByFrequency.rpt
> **Movicon Embedded Report File**: OrderByDate.movrep, OrderByDuration.movrep, GroupByThreshold.movrep, GroupByFrequency.movrep

As you can see the Crystal Report and Movicon Report file name are the same but have different extensions. All these file names are shown in the drop-down list without extensions. When command is executed, Movicon will load report type, ".rpt" o ".movrep", based on the command selected from the "Action" field.
If you wish to use a custom report, therefore different from the one proposed for default, you can enter its file name and path in the drop-down list. If the custom report to be used already exists in the Movicon installation folder you will only need to enter the name of the report without extension (ie. MyReport), otherwise you will have to enter the complete path including its extension (ie. C:\Temp\MyReport.rpt o C:\Temp\MyReport.movrep).

The four types of default Reports interface with project's Historical Log "Alarms" table and show the following information:

1. **OrderByDate:** Report of alarms ordered by date. For further information please see section on "Alarm Statistics".
2. **OrderByDuration:** Report of alarms ordered by duration (starting from the longest to the shortest). For further information please see section on "Alarm Statistics".
3. **GroupByThreshold:** Report of alarms grouped by threshold. For further information please see section on "Alarm Statistics".
4. **GroupByFrequency:** Report of alarms grouped by frequency. For further information please see section on "Alarm Statistics".

ToolBar

This property permits the toolbar to be displayed or hidden in the report preview window.
This option is only managed if the report is in Crystal Report format, otherwise it will have no effect.

Group Tree

This property permits the group in tree structure to be displayed or hidden in the report preview window.
This option is only managed if the report is in Crystal Report format, otherwise it will have no effect.

Period

This property permits a temporal filter to be set for extracting data from the database. The possible values are:

Selected date time

- Today
- Yesterday or today
- Current week
- Current month
- Current year
- Last 7 days
- Last 30 days
- Last 60 days
- Last 90 days
- Last 1 years

- Last 2 years
- Last 5 years
- Last 10 years

The filter is carried out according to the activation date of each alarm.

Duration

This property permits a filter to be set on the duration of each alarm. The default value is '00:00:00' but the filter can be set so that only the alarms which last longer than a certain set time in 'hour:minutes:seconds' are retrieved from the database.

Date

This property permits a filter to be set on the date. This setting is only valid when the 'Period' parameters have been set in the 'Select date time'. Two dates can be inserted here for representing the start and end date for retrieving data. The format is: "dd/mm/yyyy hh:mm:ss dd/mm/yyyy hh:mm:ss".

Report Template File

For further information see the section on "Textual Report Commands and Parameters".

Report Destination File

For further information see the section on "Textual Report Commands and Parameters".

Report Query

This field is used for entering the query to be used for extracting Historical Log data to be displayed in the report. This property is only enabled if the "Textual Report" command has been selected in the "Action" field. Data will be extracted from the Historical Log "Alarms" table for default. However, a different table from which to extract data (Drivers or SysMsgs) can also be specified. In cases where no query has been set, all the database data will extracted starting from the most recent to the oldest data based on the date and time of the recording.

The query text is entered in this field but variable names cannot be entered to make query the dynamic. In order to make the query dynamic you will need to use the "ExecuteCommand()" script function from the "UIInterface" interface or the "TextualRptSQLQuery" property from the "CommandAlarmCmdTarget" interface.

Report Max Pages

Maximum number of printed pages on one single Textual Report command ("View Textual Report", "Print Textual Report", "Save Textual Report" and "Append Textual Report) or Embedded Report command ("View Embedded Repor, "Print Embedded Report", "Save Embedded Report" and "Send Embedded Report"). The '0' value does not impose a limit on the number of pages that can be printed (it is advised not to use the '0' value setting to avoid memory or printer overuse in cases when errors occur in the data extraction query formulation).

The maximum number of pages should be taken into consideration only for commands that have been set a Data Logger from which data is to be obtained or for report commands in the Historical Log.

In cases with "Embedded Reports" that contain "Chart" objects in the "Report Header" or "Report Footer" band, the first and last pages will be used for printing the "Chart". The number of pages to be printed indicated in the "Report Max Pages" parameter will relate to the number of paged from the "Details" section only.

Report Page Width

This command is used for setting the print page Width. Values are in millimeters and the -1 value (default value) uses the printer's print page sizes.

This parameter is only taken into consideration if the "Print Embedded Report" command has been selected from the "Action" field and if the report's "Use Paper Settings" property is disabled.

Report Page Height

This command is used for setting the print page Heigth. Values are in millimeters and the -1 value (default value) uses the printer's print page sizes.

This parameter is only taken into consideration if the "Print Embedded Report" command has been selected from the "Action" field and if the report's "Use Paper Settings" property is disabled.

Report Left Margin (mm)

This command is used for setting the left print margin which will be added to the printer's default margin. This margin is set in millimeters and the -1 value (default value) allows you to use any default print margins retrieved through the driver of the printer being used.
This parameter is only considered when the "Print Textual Report" or "Print Embedded Report" has been selected in the "Action" field.

Report Right Margin (mm)

This command is used for setting the right print margin which will be added to the printer's default margin. This margin is set in millimeters and the -1 value (default value) allows you to use any default print margins retrieved through the driver of the printer being used.
This parameter is only considered when the "Print Textual Report" or "Print Embedded Report" has been selected in the "Action" field.

Report Top Margin (mm)

This command is used for setting the top print margin which will be added to the printer's default margin. This margin is set in millimeters and the -1 value (default value) allows you to use any default print margins retrieved through the driver of the printer being used.
This parameter is only considered when the "Print Textual Report" or "Print Embedded Report" has been selected in the "Action" field.

Report bottom margin (mm)

This command is used for setting the bottom print margin which will be added to the printer's default margin. This margin is set in millimeters and the -1 value (default value) allows you to use any default print margins retrieved through the driver of the printer being used.
This parameter is only considered when the "Print Textual Report" or "Print Embedded Report" has been selected in the "Action" field.

Show Print Dialog

When enabling this option a dialog window will show before printing the report to allow you to select a printer from those installed on the PC.
This parameter is only considered when the "Print Textual Report" or "Print Embedded Report" has been selected in the "Action" field.

Printer

This field is used for choosing which printer the report should be send to. The printer can be selected from the PC's local printers. If no printer is specified in this parameter, the Windows default printer will be used instead. The "Show Print Dialog" option will however have priority over this setting.
In cases where the project has been set for the Windows CE platform, the list of printers is fixed showing those supported by the "PrintCE.dll" tool, which are:

- HP PCL 3
- Epson ESC/P 2
- Epson Stylus COLOR
- PocketJet II
- PocketJet 200
- Canon BJ (300 dpi)
- Canon BJ (360 dpi)
- Amtech
- Epson LX (9-pin)
- Adobe PDF file
- MTE W40
- Canon IP90
- Partner M1POS
- SP-T8
- Canon IP100
- Zebra
- MP-300
- O'Neil 4 inch
- O'Neil 3 inch
- HP PCL 5e

These parameters are only considered if the the "Print Textual Report" or "Print Embedded Report" has been selected in the "Action" field.

Landscape

When enabled this property allows you to set the Report page horizontally instead of vertically.
This parameter is only considered when the "Print Textual Report", "View Embedded Report", "Save Embedded Report", "Print Embedded Report" or "Send Embedded Report" have been selected in the "Action" field and if the report's "Use Paper Settings" property is disabled.

Printer Port

This field is used for selecting the port to be used for printing. The list below shows shows the possible choices and cannot be modified:

- Infrared
- COM1
- COM2
- COM3
- COM4
- COM5
- COM6
- COM7
- COM8
- File
- Network Printer
- COM9
- COM10
- COM11
- COM12
- Broadcom Bluetooth
- Microsoft Bluetooth
- LPT1
- USB

This parameter is only considered if printing is done in Windows CE and if the "Print Embedded Report" command has been selected from the "Action" field. If the "Windows CE" platform has not been selected in the project, the "Printer Port" field will remain disabled.

Port Setting

This field is used for inserting a print port configuration string. This setting is used only when one of the "File". "Network Printer", "Broadcom Bluetooth" or "Microsoft Bluetooth" options has been selected in the "Printer Port" parameter:

File: the file's path and name to be used by the printer's driver for saving print output (i.e. "\FlashDrv\Output.prn") must be entered
Network Printer: the network printer's path (i.e. "\\ServerName\PrinterName") must be entered
Broadcom Bluetooth: three values devided by the ('|') pipe character must entered here. The first value represents the bluetooth card address (i.e. 00:0A:D9:EB:66:C7), the second value represents the name of the service to be used and the third value represents the channel number.
Microsoft Bluetooth: the bluetooth chard address must be entered here (i.e. 00:0A:D9:EB:66:C7)

This parameter is only considered if printing is done in Windows CE and if the "Print Embedded Report" command has been selected in the "Action" field. If the "Windows CE" platform has not been selected in the project, the "Printer Port" field will remain disabled.

Recipient

The name of the user or user group to send email with attached report file is entered in this field.
This parameter is only accepted if the "Export and Send Email" or "Send Embedded Report"commands have been selected in the "Action" field.

18.1.2. Event Commands

This group of commands consents Events to be executed no matter what their activation conditions are. This functionality consents the project's Events resource to be used as a container for commands to be used in the project. By keeping the commands list in one unique point, will make it possible to edit just one command list of one Event object in order to automatically modify the command lists of all the object referring to that Event object.
Any activation conditions associated to Event objects will remain valid.

Event
The event to be executed can be selected in this property. All the Event objects in the project's "Event Object List" will be included in the list.

18.1.3. Help Command

This group of commands are used to execute the display of help or text message files.

Action
This property is used for selecting the command or action type to be executed. The choices are:

Action	Description
Topic	This command executes the opening of the topic specified in the **'Topic'** property. The topic will be searched for in the help file associated to the project, by means of the **"HTML Help File"** property available in the **'Project Work Folder Path Settings'**.
Tooltip Popup	This command displays a pop-up message. The text has to be inserted in the **'Topic'** property and can also be as string ID existing in the project's String Table.

Topic
The topic name or the pop-up text to be displayed is entered in this edit box. This property changes according to the selection made in the **'Action'** property.

18.1.4. Language Commands

This group of commands are used for carrying out operations to change languages in Movicon texts.

Language
The language to be activated is selected through this property. The languages set in the **Strings Table** are listed. If this field is left blank, therefore without a selected language, the list of available languages in the project will open up in a dialog window when executing the command. Select the language desired from this list and activate it by confirming with OK.

18.1.5. Menu Commands

This group of commands is used for carrying out operations for displaying Movicon Menus.

Menu
The name of the Menu to be displayed is entered in this edit box (or selected with the '...' browse button on the right).

When selecting a child project Menu the syntax is:

ChildProjectName\MenuName

When selecting a parent project Menu from a child project the syntax is:

..\MenuName

X Pos
This property is used for entering the horizontal position of the Menu window's origin. The value is expressed in pixels (the '-1' value takes the position of the mouse).

Y Pos
This property is used for entering the vertical position of the Menu window's origin. The value is expressed in pixels (the ' - 1 ' value takes the position of the mouse).

18.1.6. Report-Recipe Commands

This group of commands allows command operations to be executed in the Movicon DataLoggers and Recipes.

Data Logger/Recipe
The name of the Data Logger or Recipe, where the command selected in the "Action" field is to be executed, is entered in this edit box (or selected by using the **"..."** browse button on the right).
When using "Textual Reports" this field is optional and is entered only in cases where the Textual Report must extract data from a Data Logger. In cases where a "Embedded report" is being used, this property results disabled and therefore will be ignored by the set command.

Report
This editBox is used for inserting (or selecting by means of using the "**...**" browse button to the right) the name of the Movicon "Report" for which the command selected in the "Action" field will be executed. This property is only enabled for the Movicon "Embedded Reports".
A report list can also be inserted in this field, where each name will be separated with the ";" character. In this way, one report will be generated composed with all the pre-selected reports which will be printed or saved one after the other in one unique ".pdf" file according to the order they were inserted in. In this case the "Report Title" band will only be printed in the first report on the list. Therefore, the first report's "Report Title" band can be used as the main title for all the reports, while the "Report Header" bands can be used to give each record, included in the main report, a specific heading. In addition, the special field "Page nr1 of n2" does not take into account the total number of pages but only the progressive number (i.e. Page 12 of ?), which not be zeroed until all the report pages have been printed in sequence.

Action
The command or action type to be executed for the selected report or recipe. Some of the commands allow reports, which have been previously associated to the DataLogger/Recipe, to be viewed or printed. In this case the report files supported by Movicon must be created with the appropriate **"Report Designer"** editor integrated in Movicon or with **"Crystal Reports©"** version 10.0. When using the Movicon "Embedded Reports", the name of the "Report" to be used is specified Instead of selecting a Datalogger or Recipe.

Action	Description
View Synchronous	This command executes the opening of a window containing the preview of the Report associated to the DataLogger/Recipe. The Report can also be printed by using the appropriate commands in this window. This command has effect in reports created with "Report Designer" or "Crystal Report".
Print Synchronous	This command executes the direct printout of the Report file associated to the DataLogger/Recipe without showing any previews. This command has effect in reports created with "Report Designer" or "Crystal Report".

View Report	This command executes the opening of the window containing the preview of the Report associated to the DataLogger/Recipe in safe mode by creating a new process instance. The Report can also be printed from this window by using the appropriate commands. This command has effect in reports created with "Report Designer" or "Crystal Report".
Print Report	This command executes the direct printout of the Report file associated to the DataLogger/Recipe in safe mode, without showing any previews, by creating a new process instance. This command has effect in reports created with "Report Designer" or "Crystal Report".
Move First	This command is only available when a Recipe has been selected in the "DataLogger/Recipe" field. This command allows the values of the first database record to be loaded in the recipe's variable. This is equivalent to the "Move First Variable" variable's function which can be set in the Recipe's " Execution Properties".
Move Last	This command is only available when a Recipe has been selected in the "DataLogger/Recipe" field. This command allows the values of the last database record to be loaded in the recipe's variable. This is equivalent to the "Move Last Variable" variable's function which can be set in the Recipe's " Execution Properties".
Move Prev	This command is only available when a Recipe has been selected in the "DataLogger/Recipe" field. This command allows the values of the previous database record to be loaded in the recipe's variable. This is equivalent to the "Move Prev Variable" variable's function which can be set in the Recipe's " Execution Properties".
Move Next	This command is only available when a Recipe has been selected in the "DataLogger/Recipe" field. This command allows the values of the next database record to be loaded in the recipe's variable. This is equivalent to the "Move Next Variable" variable's function which can be set in the Recipe's " Execution Properties".
Activate	This command is available only when a Recipe has been selected in the "DataLogger/Recipe" field. This command executes the activation of the selected recipe. This is equivalent to the "Activate Variable" function which can be set in the Recipe's "Execution Properties".
Save	This command is available only when a Recipe has been selected in the "DataLogger/Recipe" field. This command executes the save of the selected recipe. This is equivalent to the "Save Variable" function which can be set in the Recipe's "Execution Properties".
Delete	This command is available only when a Recipe has been selected in the "DataLogger/Recipe" field. This command executes the delete of the selected recipe. This is equivalent to the "Delete Variable" function which can be set in the Recipe's "Execution Properties".

Requery	This command is available only when a Recipe has been selected in the "DataLogger/Recipe" field. This command executes the requery of the recordset of the selected recipe. This is equivalent to the "ReQuery Variable" function which can be set in the Recipe's "Execution Properties".
Execute Query	This command is available only when a Recipe has been selected in the "DataLogger/Recipe" field. This command executes a query in SQL standard language on data to be selected from the Database. This is equivalent to the "Query Variable" function which can be set in the Recipe's "Execution Properties".
Export Report	This command is used for exporting the indicated report in a file (format can be selected from the "Export Format" property). The exported report is saved in the project's "DLOGGERS" folder with the name "<ReportName >.<extension>". This command has effect in reports created with "Report Designer" or "Crystal Report".
Data Analysis	This command calls the DatChart.exe application, residing in the Movicon installation folder, which allows the you to display the selected DataLogger/Recipe data in tables and graphics.
View Textual Report	This command opens a window to view the textual report. For further information see the section on "Textual Report Commands and Parameters".
Print Textual Report	This command sends the textual report directly to the printer for printing. For further information see the section on "Textual Report Commands and Parameters".
Save Textual Report	This command creates and saves a new textual report file. For further information see the section on "Textual Report Commands and Parameters".
Append Textual Report	This command adds a new page to textual report file set in the "Textual Report - Destination File" parameter. For further information see the section on "Textual Report Commands and Parameters".
Export Recipe	This command exports values currently existing in the temporary variables of the Recipe selected in the "Data Logger/Recipe" field in "csv" format, using the character set in the " Separator Import/Export Recipe" field as the separator. Therefore temporary variables should have previously been associated to the Recipe fields and the desired recipe should have been loaded before going ahead with the exportation procedures.
Import Recipe	This command imports a recipe from the "csv" file to the temporary variables of the Recipe selected in the "Data Logger/Recipe" field, using the character set in the " Separator Import/Export Recipe" field as the separator. Therefore temporary variables should have previously been associated to the Recipe fields. The file must be formatted correctly by providing all the fields belonging to the Recipe selected in the "Data Logger/Recipe" field.

Export and send mail	This command allows you to export or e-mail the report associated to the selected DataLogger/Recipe. The e-mail is sent according to the settings entered in the Plug-In SMTP using the "SMTP settings" button, from the project's General properties, where the ediitor will generate a "smtp_direct.settings" file name in the "NomeProgetto\DATA" folder. The Report export file, created in the pre-chosen format using the "Export Format" property, is attached to the email and saved in the "ProjectName\DLOGGERS" folder with the name of the Data Logger in which the report was created. The e-mail recipient will be the user or user group defined in the "recipient" property.  the Timeout for command execution, creating reports and sending emails, can be modified in the "GeneralTimeout" registry key. In cases of Timeout intervention, the value of this key which is set at 10 seconds for default, can be increased. This command has effect in reports created with "Report Designer" or "Crystal Report".
View Embedded Report	This command consents a viewing of the selected Embedded Report preview. For further information please refer to the section on "Embedded Report Generation Commands".
Print Embedded Report	This command sends the selected Embedded Report to be printed. For further information please refer to the section on "Embedded Report Generation Commands".
Save Embedded Report	This command consents the selected Embedded Report pdf file to be saved. For further information please refer to the section on "Embedded Report Generation Commands".
Send Embedded Report	This command consents the selected Embedded Report to be saved on pdf and sent by e-mail. For further information please refer to the section on "Embedded Report Generation Commands".
Read	This command is only available when a Recipe is selected in the "DataLogger/Recipe" field. This command is used for reading recipe values form the filed and updating values read with the selected recipe's temporary variables. Equivalent to the "Tag.Read" variable functionality settable in the recipe "Execution Properties".

X Pos

This property is used for entering the horizontal position of Report preview window's origin. The value is expressed in pixels ('-1' value is the default position).
This option will only be managed when the report is in Crystal Report format otherwise it will be ignored.

Y Pos

This property is used for entering the vertical position of the Report preview window's origin. The value is expressed in pixels ('- 1 ' value is the default position).
This option will only be managed when the report is in Crystal Report format otherwise it will be ignored.

Width

This property is used for setting the Report preview window's width. The value is expressed in pixels ('0' value is the default size).
This option will only be managed when the report is in Crystal Report format otherwise it will be ignored.

Height
This property is used for setting the Report preview window's length. The value is expressed in pixels (' 0 ' value is the default size).
This option will only be managed when the report is in Crystal Report format otherwise it will be ignored.

Toolbar
This check box is used for displaying or hiding the toolbar in the report preview window.
This option will only be managed when the report is in Crystal Report format otherwise it will be ignored.

Group Tree
This check box is used for displaying or hiding the group Tree in the report preview window.
This option will only be managed when the report is in Crystal Report format otherwise it will be ignored.

Report Template File
For further information see the section on "Textual Report Commands and Parameters".

Report Destination File
For further information see the section on "Textual Report Commands and Parameters".

Report Query
This field is used for inserting the query to be used for extracting data from the Data Logger or Historical Log for displaying in the report. This property is only enabled if the "Embedded Report" or Textual Report" command has been selected in the "Action" field.

- **Textual Report**: queries in textual reports are only used when the"Data Logger/Recipes" field has been specified as well. In cases where no query has been set, all the data in the database will be extracted by date and time order starting with the most recent.
- **Embedded Report**: queries in embedded reports are used for extracting data from the database table associated to the Embedded Report. If no query is specified in this property, the one set in the Embedded Report's "Query Report" property will be used. If no query has been specified in this property as well, the default query will be used instead which will extract all values from the table by date and time order staring with the most recent.

The query's text is entered in this field and it is not possible to insert the name of a variable to make query dynamic. In order to create the query dynamically you will need to use the "ExecuteCommand()" script function from the "UIInterface" interface or the "TextualRptSQLQuery" property from the "CommandReportCmdTarget" interface.

Report Max Pages
The maximum number of printed pages with one single Textual Report command ("View Textual Report", "Print Textual Report", "Save Textual Report" and "Append Textual Report") or Embedded Report command ("View Embedded Report", "Print Embedded Report", "Save Embedded Report" and "Send Embedded Report"). The "0" value is used for setting an unlimited number of printed pages, (it is advised not to use the '0' value to avoid occupying too much memory and printer use in cases where errors occur in the data extraction query formulation).

The maximum number of pages is evaluated only for those commands which have also been set with a Data Logger fro where to extract data or for report command in the Historical Log.

When using an "Embedded Report" command with a Report containing a "Chart" object in the "Report Header" band or in the "Report Footer", the first and last pages will be used for printing the "Chart". The number of the page to be printed indiicted in the "Maximum Page Number" parameter concerns the page number for the "Details" band only. In addition, when generating a multiple report, being a list of a various number of report, thise parameter will only be considered individually for each report and will not be applied to total number of pages of all the reports listed.

Reference Period
The time ranges for extracting data to be displayed on the Report can be selected in this field. The possible selections are:

- Nessuno
- Today
- Yesterday and Today
- Current Week
- Current Month
- Current Year
- Last 7 Days
- Last 30 Days
- Last 60 Days
- Last 90 Days
- Last Year
- Last 2 Years
- Last 5 Years
- Last 10 Years

This parameter is only considered if one of the following commands has been selected in the Action field: "View Report", "Print Report", "Export Report", "View Embedded Report", "Print Embedded Report", "Save Embedded Report"and "Send Embedded Report"

Export Format

This parameter is used for selecting the file format in which to export the Report using the "Export Report" command. The possible selections are:

- Pdf
- Html
- Txt
- Csv
- Xls
- Mht
- Rtf
- Jpeg

This parameter only considered if the "Export Report" command has been selected in the Action field.

Select Date

When enabling this check box a dialog window will display when the Report is opened for the user to enter the data and time for the selection query of the data to be displayed on the Report.
This parameter is only considered if one of the following commands has been selected in the Action field: "View Report", "Print Report" and "Export Report".

Separator Import/Export Recipe

This field is used for setting a separator for the ".csv" file when using the **"Import Recipe"** and **"Export Recipe"** commands. ";" is the default character.

Report Page Width

This command is used for setting the Width of the printed Report page. Values are set in millimeters and the -1 value for default uses the printer's sizes.
This parameter is only considered when the "Print Embedded Report" command has been selected from the "Action" field and if the report's "Use Paper Settings" property has been enabled.

Report Page Height

This command is used for setting the Height of the printed Report page. Values are set in millimeters and the -1 value for default uses the printer's sizes.
This parameter is only considered when the "Print Embedded Report" command has been selected from the "Action" field and if the report's "Use Paper Settings" property has been enabled.

Report Left Margin (mm)

This command is used for setting the left print margin which will be added to the one used by the printer for default. This margin is set in millimeters and the -1 value (default value) allows you to use any default print margins retrieved through the driver of the printer being used.

This parameter is only considered when the "Print Textual Report" or "Print Embedded report" has been selected in the "Action" field.

Report Right Margin (mm)

This command is used for setting the right print margin which will be added to the one used by the printer for default. This margin is set in millimeters and the -1 value (default value) allows you to use any default print margins retrieved through the driver of the printer being used.

This parameter is only considered when the "Print Textual Report" or "Print Embedded report" has been selected in the "Action" field.

Report Top Margin (mm)

A**T**his command is used for setting the top print margin which will be added to the one used by the printer for default.This margin is set in millimeters and the -1 value (default value) allows you to use any default print margins retrieved through the driver of the printer being used.

This parameter is only considered when the "Print Textual Report" or "Print Embedded report" has been selected in the "Action" field.

Report bottom margin (mm)

This command is used for setting the bottom print margin which will be added to the one used by the printer for default. This margin is set in millimeters and the -1 value (default value) allows you to use any default print margins retrieved through the driver of the printer being used.

This parameter is only considered when the "Print Textual Report" or "Print Embedded report" has been selected in the "Action" field.

Show Print Dialog

When this option is enabled, a dialog window will open for setting the setting of the printer to be used before printing the report. Therefore it will be possible to choose which printer to use among those available in the PC.

This parameter is only considered when the "Print Textual Report" or "Print Embedded Report"command has been selected from the "Action" field.

Printer

This field is used for choosing the printer to send the report to. The printer can be selected from the PC's local printer. If a printer is not specified in this field, the Windows default printer will be used instead. The "Chose Printer" option always has priority in this setting.

In cases in which the project has been setup for the Windows CE platform, the list of printers is fixed and will show those supported by the "PrintCE.dll" tool as follows:

- HP PCL 3
- Epson ESC/P 2
- Epson Stylus COLOR
- PocketJet II
- PocketJet 200
- Canon BJ (300 dpi)
- Canon BJ (360 dpi)
- Amtech
- Epson LX (9-pin)
- Adobe PDF file
- MTE W40
- Canon IP90
- Partner M1POS
- SP-T8
- Canon IP100
- Zebra
- MP-300
- O'Neil 4 inch
- O'Neil 3 inch
- HP PCL 5e

This parameter is only considered when the "Print Textual Report" or "Print Embedded Report"command has been selected from the "Action" field.

Landscape

When enabling this setting the Report page will be printed horizontally instead of vertically.

This parameter will only be considered when the "Print Textual report", "View Embedded Report", "Save Embedded Report", "Print Embedded Report" or "Send Embedded Report" have been selected from the "Action" field.

Printer Port

This field is used for choosing the port to be used for printing. The choices are listed below and cannot be changed:

- Infrared
- COM1
- COM2
- COM3
- COM4
- COM5
- COM6
- COM7
- COM8
- File
- Network Printer
- COM9
- COM10
- COM11
- COM12
- Broadcom Bluetooth
- Microsoft Bluetooth
- LPT1
- USB

This parameter will only be considered if printing is executed in Windows CE and when the "Print Embedded Report" command has been selected in the "Action" field. In projects where the "Windows CE" platform has not been selected, the "Printer Port" will remain disabled.

Port Settings

This field is used for inserting a printer port configuration string. This setting is only used in cases when one of the "File", "Network Printer", "Broadcom Bluetooth" or "Microsoft Bluetooth" options has been selected in the "Printer Port" parameter:

File: the file name and path as well as the printer driver to be used for saving print out put must be set (i.e. "\FlashDrv\Output.prn")
Network Printer: the printer's network path must be set (i.e. "\\ServerName\PrinterName")
Broadcom Bluetooth: the three delimited values separated by the pipe ('|') character must be set. The first value represents the bluetooth card address (i.e. 00:0A:D9:EB:66:C7), the second value represents the service to be sued and the third value represents the channel number.
Microsoft Bluetooth: the bluetooth card address must be set (i.e. 00:0A:D9:EB:66:C7)

This parameter will only be considered if printing is executed in Windows CE and when the "Print Embedded Report" command has been selected in the "Action" field. In projects where the "Windows CE" platform has not been selected, the "Printer Port" will remain disabled.

Recipient

This field is used for inserting the name of the user or user group to be sent the email with attached report file.
This parameter is only considered when the "Export and End Email" or "Send Embedded Report" command has been selected from the "Action" field.

18.1.7. Script Command

This group of commands are used for carrying out operations of the Movicon VBA Script.

Script

The name of the Script VBA to be run or stopped is entered in this edit box (or selected with the **'...'** browse button on the right).

When you need to select a script from a child project the following syntax should be used:

ChildProjectName\ScriptName

When you need to select a script from a Parent project the following syntax should be used:

..\ScriptName

Action

This property allows you to select the action that has to be executed for the selected VBA Script. The choices are:

Action	Description
Run Normal	Run the script in normal mode
Run Synchro	The Basic Script is run synchronized with the component or interface that put it into execution. In this case the object in question will remain blocked until the Basic Script has stopped running.
Run Safe	Runs the script in Safe mode. In this case the script will be executed in a new Movicon process, allowing the Movicon application to be saved if the script causes a crash. Please keep in mind that script loading/unloading is rather slow.
Stop	Stop the execution of the script, but don't unload it from memory.
Unload	Unload the script from memory The unload command of a basic script resource unloads only those basic resources which are being run in separate threads from memory. The other basic script resources being run in the same thread are only stopped. As a consequence of this, the "Unloading" event is no longer executed following an unload command for those basic script resources which are not in separate threads. In addition to this the variables used by the basic script always remain in use once the basic script has been run at least once.

Parameters

Allows you to set the eventual script parameters. Each parameter must be separated by the "," (comma) character.

Start,1,500

The example above is considered as three parameters "Start", "1" and "500". The "GetParameter()" function from the "ScriptMEInterface" should then be used within the Basic Script routine for retrieving the parameters.

New Instance allowed

This property allows you to run more instances from the same Basic Script at the same time. In order for this to work property you must, however, specify a number higher than one in the Basic Script's "Maximum Instances" property.

Timeout

This property allows you to insert a timeout by taking into account when the Basic Script is run in synchronized mode. In any case, the Basic Script will release the interface which called it when the timeout expires.

18.1.8. Screen Commands

This group of commands are used for carrying out opening operations of the Movicon Screen windows.

Screen (Page)

The name of the Screen required to be opened, printed or closed is entered in this edit box (or selected with the **'...'** browse button on the right).

When selecting a child project screen the syntax is:

ChildProjectName\ScreenName

When selecting a parent project screen from a child project the syntax is:

..\ScreenName

Action

The type of command or action to be executed on the selected Screen is selected through this property. The options are:

Action	Description
Open Normal (scree change)	This command consents a Screen window to be opened in the more classic mode being a window within the Movicon Main frame. Opening the Screen in this way will automatically close the previous Screen (which is loaded in the system's RAM), unless the **"Not Destroyable"** option has not been enabled in the **'Screen Style Properties'**.
Open Modal (pop-up screen)	This command consents the opening and displaying of Screen as a 'Modal Window', meaning that it will be managed in the same way as a Dialog Box. There it will open on top of the Screen window from which it was called up. The Modal Screen is a secondary window which captures all the input from the user until it is closed.
Open Frame (multi-monitor)	This command opens and displays a Screen by opening a new window different from Movicon's main window. This command can also be used for opening screens in another Monitor that is not for default to allow you to manage projects in a Multi-Monitor system. When using the Open Frame command to open a screen in another monitor (different from the one in which the project was started up), the screen in question may be sized using the "Width" and "Height" parameters. If the '0' value is set in either one of these parameters, the screen in question will always be opened within a window and maximized to the sizes of this second monitor.
Open in other process (Safe Mode)	This command allows the opening and displaying of a Screen executing another instance. (therefore a process in a different memory area). This is useful when Screens using ActiveX might cause an error in the main application.

	Using this mode however consumes more overall resources whether for the Screen in 'Safe Mode' (which acts as client) and for the one loading it (which acts as server).
Print	This command consents to direct printing (in the printer set as the operating system's default printer) of the selected Screen. In order to get more print options, such as the window used for selecting the printer or print preview, you will need to use the "PrintSynoptic" function from the "ScreenCmdTarget" basic interface.
Close and Return Back	This command closes the selected Screen. If the Screen has been opened in 'Normal' mode, the current Screen will be closed and the previously displayed screen loaded. This happens only when the screen to be closed is the same one displayed on video screen or when nothing has been specified in the "Close" command's "Screen" parameter.  When the "Close" command is executed leaving the "Screen" field empty to return to the previous screen, it will only work if invoked from a screen object, such as a Button , a Hot Region, etc., and will not work for all those resources outside the screen's context, such as Menus, Accelerators, Basic Scripts, Event Objects, Alarms, etc. In this case a messaged will be generated in the Historical Log stating "Cannot find the screen":
Execute Synapses	This command type activates the Synapses logic contained in the specified Screen. The logic will always be executed in 'asynchronous' mode. The command can also be executed by Basic Script, where is can be executed in 'synchronous' or 'asynchronous' mode.
Open Next (open as normal next ID screen)	This command opens the next screen to the one already opened, based on a map determined by the value set in the ID property of each screen. The next screen will open in "Normal" mode. For further information on how to used this command see "Screen Change commands based on Screen IDs".
Open Prev. (open as normal prev. ID screen)	This command permits you to open previous screen to the one already open,based on a map determined by the value set in the ID property of each screen. The previous screen will open in "Normal" mode. For further information on how to used this command see "Screen Change commands based on Screen IDs".
Capture and Print	This command consents to capture the desired screen and sending it to the printer predefined in the operating system being used. This screen can be either be the one already opened or another one. When the screen to be printed is not the one currently opened, its name must be specified in the "Screen" parameter. Movicon will then open

	this screen in Background and send it to the printer. this command used the "PrnWnd.exe" (PrnWndCE.exe per Windows CE) tool, which is installed in the same folder where Movicon is installed. This tool is called automatically by Movicon when the command is executed, by passing it the handle of the window to be printed. This command can also be used for defining the print page sizes and margins using the parameters described below. For further information on how to use the "PrnWnd.exe" tool see the appropriate "Tools" section.
Capture and Save	This command allows you to create a bitmap image for the specified screen. This image will be saved in the project's DLOGGERS folder with the same name used by the screen. The screen for which the image is to be created for doesn't have to be the one currently opened. In this case the name of the screen must be specified in the command's "Screen" parameter. If the screen is not already loaded in memory when the commanded is executed, Movicon will open the screen in background and save the file in ".bmp" format, with the same name of the screen's, in the DLOGGERS folder. You can also use this command to defined the sizes of the image to be saved using the appropriated parameters described as follows. Setting sizes with the default -1 value will resize the image, when possible, with the same screen sizes. If the image sizes are larger than the screen resolution sizes, the image will be created with the same same resolution sizes.  Repeating command execution for the same scree, will overwirte the file in bitmap format losing the image previously saved.

For further information refer to the paragraph on **"Opening Screen Modalities"**.

Monitor

The Monitor where the Screen is to be opened is specified in this parameter. Therefore the system must be correctly configured to manage the Multi-Monitor beforehand.
The '0' value opens the window on the Monitor set for 'default' in the operating system.

When 'Open Normal (Movicon MDI) has been selected as **'Action'** the window will be opened on the default Monitor independently of the value set in the **'Monitor'** property.

Parameter File

The name, and eventually the path, of the parameter file is entered in this edit box when it is required to open the Screen with parameters.
For further information on Screens with parameters refer to the paragraph on **"Screens with Parameters"**.

When the file name is entered only and not the path, Movicon will search for the file in the current folder, then in the folder where the Screen is found, and finally in the folder defined for the Images through the

"Images Path" property which can be accessed from the **'Project Path' settings.**

ATTENTION! Movicon is a **Unicode** application, therefore the Parameter file must be saved in **Unicode** version.

X Pos

The window's origin position (left side) for the X axis is set in this property. The value is expressed in pixels, and the zero point represents the zero point of the monitor's horizontal axis (left side).

"Frame". Value is expressed in pixels, and the zero point of the Movicon main window is considered as zero point.
All of the Movicon application's window including the Movicon title bar and side borders. This means that when setting the X coordinate value to 0, the Pop-up window or Frame may result slightly hidden on the left side when the Movicon main window is opened at full screen. The following special values can also be entered in the "X Pos":

- **-1value**: when setting the X Pos. with the -1 value, the Pop-up window or Frame will open in the central horizontal position within the Movicon Main window.
- **-2 value**: when setting the X Pos. with the -2 value, the Pop-Up window will open 0 coordinate horizontal position within the main screen and not within the Movicon window. In this way, if Movicon is opened at maximized screen size, the Pop-up screen will display in full. This parameter is only managed if the "Open Modal (pop-up screen)" command is used.

When the **'Open Normal (MDI Child)** has been selected as **'Action'** the window will be opened on the Monitor's zero origin point.

Y Pos

The window's position of origin (top side) for the Y axis is set in this property. The value is expressed in pixels, the zero point refers to the Monitor's vertical axis (top side).

This value is expressed in pixels, and its zero point refers to the Movicon main window's zero point. The whole Movicon application window includes the Movicon title bars and side borders. This means that when setting the Y coordinate value to 0, the Pop-up or Frame may be slightly hidden at the top when the Movicon main window is opened at full screen. The following special values can be inserted in the "Y Pos.":

- **-1value**:when setting the Y Pos. with the -1 value, the Pop-up window or Frame will open in the central horizontal position within the Movicon Main window.
- **-2 value**:when setting the Y Pos. with the -2 value, the Pop-Up window will open 0 coordinate vertical position within the main screen and not within the Movicon window. In this way, if Movicon is opened at maximized screen size, the Pop-up screen will display in full. This parameter is only managed if the "Open Modal (pop-up screen)" command is used.

When the **'Open Normal (MDI Child)'** has been selected as **'Action'** the window will open on the Monitor's zero point origin.

Width

The size of the window's width is set in this property. The value is expressed in pixels.

When the **'Open Normal (Movicon MDI)'** has been selected as **'Action'** the window will open with the sizes set in programming mode.

Height

The widow's height is set in this property. The value is expressed in pixels.

When the **'Open Normal (Movicon MDI)'** has been selected as **'Action'** the window will open with the sizes set in programming mode.

Caption

When enabled, this property consent the displaying of the title bar for the selected Screen.

Border

When enabled, this property gives more highlight to the selected Screen's outer border.

Resize Border

When enabled, this property allows the selected Screen to be resized during Runtime. This can be done by using the mouse and the usual **Windows** techniques.

Sys Menu

When enabled, this property allows the System Menu to be displayed on the selected Screen's title bar. This setting will have not effect If the **'Title'** bar has not been enabled. The System Menu can be accessed through the icon on the top left in the title bar.

Also when enabling this property, the button for closing the window will be made available and displayed on the top right of the title bar ().

Maximized Box

When enabled, this property allows the button for enlarging the window to be displayed on the top right in the title bar (). If the **'System Menu'** has not been enabled, this setting will have no effect.

Minimized Box

When enabled, this property allows the button for reducing the window to be displayed on the top right in the title bar (). If the **'System Menu'** has not been enabled, this setting will have no effect.

Keep Print Proportions

This property, when enabled, prints the screen as you see in keeping to the same proportions. When disabled (therefore for default), the height and width sizes are adapted to the page size. This parameter has effect on both the "Print" and "Capture and Print" commands.

Print Page Width

This property permits you to set the width of the print or image to be saved. This value is expressed in mm for the print and in pixels for the image. Setting this value to "-1", according to command type, the print default size will be used or the image will be created with the origin screen sizes. This parameter only has effect on **"Capture & Print"** and **"Capture & Save".**

Print Page Height

This property permits you to set the height of the print or image to be saved. This value is expressed in mm for the print and in pixels for the image. Setting this value to "-1", according to command type, the print default size will be used or the image will be created with the origin screen sizes. This parameter only has effect on **"Capture & Print"** and **"Capture & Save".**

Top Margin

This property is used for setting the print page's top margin. Value is expressed in mms where the "-1" value uses the default print page size. This parameter has effect only for the "Capture & Print".

Bottom Margin

This property is used for setting the print page's bottom margin. Value is expressed in mms where the "-1" value uses the default print page size. This parameter has effect only for the "Capture & Print".

Left Margin

This property is used for setting the print page's left margin. Value is expressed in mms where the "-1" value uses the default print page size. This parameter has effect only for the "Capture & Print".

Right Margin

This property is used for setting the print page's right margin. Value is expressed in mms where the "-1" value uses the default print page size. This parameter has effect only for the "Capture & Print".

18.1.9. System Commands

This command group allows operations to be executed for closing Movicon or starting up external applications.

Action

The command type or action to be executed is selected through this property. The options are:

Action	Description
Shut Down OS	This command executes the shut down of Movicon and the Operating System.
Shut Down App	This command executes the shut down of Movicon.
Launch App	This command launches a Windows application, which must then be specified in the **'Command Line'** property. If allowed by application, the "Work Folder" to be used by the applicationcan also be specified.
Launch App and Wait	This command launches a Windows application, which must then be specified in the **'Command Line'** property. If allowed by application, the "Work Folder" to be used by the applicationcan also be specified. In this case the Movicon user interface will be put on hold for the time specified in the "Timeout" parameter. This will stop further operations from being performed while the specified application is being started up.
Play Sound File (Parameter is the Sound file)	allows a wav. sound file to be reproduced by exploiting the preset audio card. The name of the sound file to be reproduced must be entered in the **'Command Line'** parameter. If only the file path is shown and not its name, Movicon will search for it within the project's "Recources/ProgjectName" folder.
Beep (Parameter is the frequency of the sound)	Allows a beep sound to be made by using the computer's speaker. The sound frequency must be entered in the **'Command Line'** parameter (ex. values from '37' to '37767' are permitted)The beep duration time is entered in the "Timeout" parameter in milliseconds. Only one sound can be used in WinCE. This command is not supported in 64 bit operating systems. In this case you will need to use the "Run Audio File" command for activating ".wav" files.
Speak (Parameter is text to speak, not available for WinCE)	Allows the text, set in the **'Command Line',** to be executed in text-to-speech mode. This command supports multilingual for which you can also set string IDs from the project string table: Not available on WinCE.
Reboot OS (not available for WinCE)	Allows you to command a reboot of the operating system. However, to monitor the status of an application it would be best to use the service and the "Recovery" (Service Property, recovery folder) just in case you have to intervene and take action when errors occur. Not available in WinCE.
Show or Hide Output Window (not available for WinCE)	This command consents to hiding or showing the Output window during runtime. This command works as a toggle, meaning that if the window is showing the command will hide it and viceversa.
Timeout	This command allows you to insert a timeout between two commands on the Command List. In this way the command entered before Timeout will be executed with a delayed time equal to the one entered in the "Timeout" parameter. A timeout can also be entered using the "Add Wait Time" button in the "Command

	List Window" . In this case a new System Timeout Command will be added with the 1000 msec. default settings which can be changed later when editing the new inserted command. Note: This command is in synchro. with the User Interface, therefore when the command is being executed the interface's graphics will freeze. The user interface will not freeze if the command is executed through an "Event" object in a separate Thread.

Command Line

The value which is inserted in this editbox changed according to the command type selected. Those commands which require this parameter are:

Launch Application: the application file path and name to be run is entered here (i.e. Windows application). If no executable file path is specified , Movicon will search for file in the Windows folder.

Launch Application and Wait: the application file path and name to be run is entered here (i.e. a Windows application). If no executable file path is specified , Movicon will search for file in the Windows folder.
Play Sound File: the ".wav" audio file name and path is entered here that is to be run from the audio card. If file name is entered without path, Movicon will search for it inside the "Recources/ProjectName".
Beep: the beep frequency time value is entered here. Values allowed are from "37" to "37767" Hz
Speak: insert text to be spoken. This command supports multilanguages so it is also possible to set String IDs from the project's String Table. In this case ID cannot be selected from the "String Table Window" and must be entered manually.

Work folder

The complete path of the work folder to be passed to the application when the "Launch Application" or "Launch command and Wait" is entered in this field. In this way, the application to be launched will be passed this parameter as the initial work folder.

Caution! Not all application support the use of the initial Work Folder, therefore check whether the application in question can manage it before using this parameter.

Caution! initial Work Folder utility is not supported in Window CE

Timeout

The value inserted in this editbox changes accroding to the command type selected. Commands that require this parameter are:ametro sono:

Launch Application and Wait: timeout is entered in milliseconds here during which the Movicon user interface will freeze while the requested application is being launched.
Beep: Beep duration time in milliseconds is entered here.
Wait time: Timeout in milliseconds is entered here

18.1.10. User Commands

This group of commands allow the operations for Logging on and Logging off Movicon users to be executed.

Action

The command type or action to be executed or the Basic Script selected is selected through this property. The options are:

Action	Description
Logon	This command opens the window for executing the log on of a user.
Logoff	This commands executes the log off of the user currently active.
Edit Users List	This command allows the editing of users during Runtime to be executed. In this case a executable file is used for editing the XML file containing the **"Runtime Users"**. The default executable file must be called **'EditUsr.exe'**, but the name can be changed by means of the **'EditUsersExe'** registry key. The application name which Movicon must execute upon the edit users in runtime command is saved in this key. When the file name is specified only, Movicon will first search for it in its installation folder then in the Windows list of PATHS.

The Logon and Logoff commands are also available in the Movicon Status Bar:

The icon which represents the user on the bottom right can be in colour or in just grey. Grey means that no users are logged on therefore simply double-click on the icon to display the User logon window where a '0' level authentication will be requested. When the icon is in colour, this means that a user is active and therefore simply double-click on the icon to deactivate the user.

Level

This edit box is used for setting the lowest level to be associated to the user logging on. If the user does not have any rights for the level specified they will not be authenticated.
This property is only significant when **'Log on'** has been selected in the **'Action'** property.

18.1.11. Variable Commands

This group of commands is used for carry out operations on the Movicon Real Time DB variables.

Variable

The variable name on which the required command is to be activated is enter in this edit box (or selected with the **'...'** browse button on the right).

When selecting a child project variable the syntax is:

ChildProjectName\VariableName

When selecting a parent project variable from a child project the syntax is:

..\VariableName

Screen Alias

The Alias name (entered without angled brackets) to be set using the "set screen alias" command is inserted in this box. You can click on the browse button to open the Alias Table to add/select the Alias name.
For further information about using Aliases please refer to "Aliases in Objects".

Action

The command type or action to be executed on the variable, is selected through this property. The options are:

Action	Description
set	This command sets the variable to the value specified in the **'Value**' property. When the variable is string type, any numeric values will automatically be converted in string. When the **'Value'** field is left empty, the **'set'** command will have no effect on numeric type variables, while an empty string will be inserted if the variable is string type.
reset	This commands sets the variable to '0' value (zero) independently of the **'Value'** field's contents. When the variable is string type, an empty string will be inserted. In addition to this, this command also sets the "append decimal mode" to OFF (ON-OFF decimal append values). In this way the next command used for appending a new value will always insert the value before the decimal point. This change makes it easier to use Numeric Pads created with Screens (Numeric and Alphanumeric Screens).
toggle	This command, changes the variable's value upon each execution according to the previous state. The two alternating values are the '0' value and the value set in the **'Value'** property. When the variable is string type, an empty string will be inserted instead of the '0' value.
strobe	This command sets the variable to the value contained in the **'Value'** property, and is kept for the time specified in the **'Strobe Time'** property. When this time runs out the previous variable value will be restored.
increase	This command increases the variable specified in the **"Variable"** property by one value which is specified in the "**Value"** property. When the variable is string type a chain of strings will be executed instead, adding in line to the **'Value'** field's contents. The increasing of the variable will only have effect up to the maximum value, set in the **'Max. Value'** property for numerics and **'Max. Chars'** property for strings. When the **'Value'** field is left empty, the **'increase'** command will have no effect on the variable. In order to add characters to string type variables you should use the "Append Value" and not the "Increase" command.
decrease	This command decreases the variable specified in the **'Variable'** property by one value which is specified in the **'Value'** property. The variable decrease will only have effect until the minimum value set in the **'Min. Value'** property has been reached. A null string will be inserted when the variable is string type. In order to remove characters from string type variables you should us the "Remove Value" command and not the "Decrease" command.
alphanumeric pad	This command opens a alphanumeric pad where values can be entered without using the keyboard. The value will return to the variable after being confirmed with the 'Ok' key as usual. This is fundamentally used with Touch-Screens. If the name of a screen has been specified in the project's "Alphanumeric Screen" execution property this screen will be opened instead of the default Alphanumeric Pad. In this way the Alphanumeric Pad can be customized. For further information please refer to the section on "Numeric and Alphanumeric".

numeric pad	This command opens a numeric pad where characters can be entered without using the keyboard. The value returns back to the variable after being confirmed with the 'OK' key as usual. This is fundamentally used with Touch-Screens. If the name of a screen has been specified in the project's "Numeric Screen" execution property this screen will be opened instead of the default Numeric Pad. In this way the Alphanumeric Pad can be customized. For further information please refer to the section on "Numeric and Alphanumeric".
Append Value	This command appends the value specified in the "Value" field to the selected variable. This command does not execute a adds up the values but adds the specified value to the end of the current value. If, for instance, the variable has a "10" value and the "1" value is to be appended the result will not be "11" but "101". Naturally the value to be appended must be a numeric figure if the variable type is numeric, or otherwise a alphanumeric figure if the variable is string type. If a value has not been specified in the "Value" field Movicon will append the value which has been set in the "Title" of the object which executed the command (eg. the button's title).
Remove Value	This command removes the last figure from the selected variable. If, for instance, the variable's value is "101" it will then become "10" when this command is executed.
Swap Plus-Minus	This command allows the variables value to swap over from positive to negative and viceversa. This command has effect only when the variable type is numeric. This command it toggle type, meaning that the variable's current sign is inverted with the other sign each time it is executed.
Append Decimal Mode ON-OFF	This command allows you to specify whether the "Append Value" or "Remove Value" command must be executed on the variable in integer part or fractional part. This command has meaning only when the variable is floating point type. This command is toggle type, meaning that it inverts current position to the other each time it is executed.
Move Value	Allows a value from one variable to be moved to anther variable. In this case the source variable is the one specified in the "Variable" parameter, while the target variable is the one specified in the "Move to Variable" parameter. Different variable types can also be used. In this case Movicon will execute the necessary conversions according to each variable type. For instance, you can move the value of a string value to a numeric value and viceversa.
Reset Statistic	This command will reset all the statistic data of the variable set in the "Variable" parameter. This operation can also be executed with VBA.
Move Min.Value	This command copies the minimum value statistic of the variable indicated in the "Variable " parameter to the variable indicated in the "Move to Variable" parameter. Therefore the destination variable will get the minimum value that the source variable has obtained during the project run.

Move Max. Value	This command copies the maximum value statistic of the variable indicated in the "Variable" parameter to the variable indicated in the "Move to Variable". Therefore the destination variable will get the maximum value obtained by the source variable during the project run.
Move Average value	This command copies the average value statistic of the variable indicated in the "Variable" parameter to the variable indicated in the "Move to Variable" parameter. Therefore the destination variable will get the average value obtained by the source variable during the project run.
Set da ID di Stringa	This command searches the string table for an identifier with the text set in the "Value" field. Then sets the variable with the identifiers contents based on the activated language. If the identifier is not found, the variable is set with the same text set in the "Value" field. In this case the variable should therefore be string type.
Set Screen Alias	This command consents screen Alias values to be modified. The Alias to be modified will be the one selected in the **"Screen Alias"** property and it new value will be the one inserted in the "Value" property. This command also allows you to insert a new Alias in the screen. If the Alas selected in the "**Screen Alias**" property does not exist in the screen's Alias Table, it will be added as a new Alias. In this case, however, this change will not be retained when the page is unloaded from memory. For further information on using aliases please refer to the paragraph entitled "Aliases in Objects".

Move to Variable

The name of the destination variable is entered in this edit box (or selected with the browse button on the right) when selecting a "**Move Value**" command. This is the variable on which the value of the source variable specified in the "Variable" property, will be moved to according to command type.

When selecting a child project variable the syntax is:

ChildProjectName\VariableName

When selecting a parent project variable from a child project the syntax is:

..\VariableName

Value

The value to be obtained by the variable when the command is executed is entered in this edit box. Its significance changes according to the type of **'Action'** the variable is associated with. In cases using the "Set Screen Alias" command it may be a value or the name of a variable.
In cases where the "Increase" or "Decrease" command has been selected in the "Action" field, the name of the Real Time DB variable can also be inserted in the value field. In this way the increase or decrease will be executed with a value equal to the variable's value, allowing the increase or decrease step to vary during runtime.

Strobe Time

This property is only valid when **'Strobe'** has been selected in the **'Action'** property. In this case the time, expressed in milliseconds, in which the variable will remain set with the value entered in the **'Value'** property. When this time runs out the variable will go back to previous value again.

Max. Value

This property is only valid when the following items have been selected in the **'Action'** property:

- **Increase**

- **Numeric Pad**

The specified value is the maximum limit that the variable can assume during increase operations or Numeric Pad entries.
The name of the variable from the RealTimeDB can also be inserted in this field whose contents will be taken as the value limit rendering the value limit dynamic and can be entered using the numeric pad.

Min. Value

This property is only valid for numeric type variables and when the following items have been selected in the 'Action' property:

- **Decrease**
- **Numeric Pad**

The specified value will be the minimum limit which the variable can assume during decrease operations or Numeric Pad entries.
The name of the variable from the RealTime DB can also be inserted in this field whose contents will be taken as the value limit rendering the value limit dynamic and can be entered using the numeric pad.

Max. Chars

This property is only valid for string type variables and when the following items have been selected in the **'Action'** property:

- **Increase**
- **Alphanumeric Pad**

The value specified will be the maximum number of characters which can be entered in the variable during increase operations or Alphanumeric Pad entries.

Password Style

This property only has meaning for string variables selected with the "Alphanumeric Pad" item as "Action" type. In this case, if this property is checked, the value inserted in the Alphanumeric Pad will be crypted displaying the inserted characters as asterisks. Usually used when text to be inserted is a password.

19. Alarms Management

19.1. Alarms

The Movicon Alarms resource consents the managing of diagnostics and messages in projects.

The diagnostics is one of the fundamental elements on which any supervision application project is based. Basically, the system's task is to generate alarms in relation to variable or logic intervention thresholds.
The Movicon management complies with the ISA (S-18) normative, but is completely configurable to adapt to any application requirement. The project alarms are grouped in objects which are then grouped into thresholds.
Alarm activation can be evoked by a fixed threshold value or by another tag.
The Acknowledge or reset operations on each alarm can be configured, just like the style and functioning modalities can be. The priority levels, which can be assigned to each alarm by the programmer, are virtually unlimited. The Alarms can be grouped into 'Areas' to obtain display filters for the operator or Alarm Window dedicated to each plant sector. The time-stamping is precise and accurate to the millisecond. Movicon also integrates calculated statistics of the alarms with the highest frequency and/or duration in the specified period. Managing alarms in network architectures has been extremely simplified by connecting alarm windows to network stations, or to OPC AE servers.
The alarms also support tag-linked texts, therefore the real values measured at alarm interventions can be displayed and recorded. The alarms also manage SMS, Fax, Email, Speech notifications, through customizable sound files and any kind of intervention, acknowledgement and reset customizing can also be done through the VBA script in response to each alarm event.

The Movicon alarms can be configured so that they can be acknowledged and reset by the operator before disappearing or they can be linked to the status of a variable only, becoming just simple notification messages.

The **"Alarm Window"** window, which can be inserted in any of the project's Screens, is used for viewing the Alarms' situation. The operator can verify and interact with the alarms' situation through this window, evoking the acknowledge or reset commands according to the ISA level 2 norms.

The Alarms can be grouped in one certain area, to allow the Alarm Window to display the alarms relating to a specific logic area of the plant only.

An Alarm Window can be dedicated to display the remote alarms of a station (Server) connect in net. through the Networking functionalities.

The displaying of Alarm Window is setup by the project's developer by configuring the window in order to adapt the project to the plant's graphical or functional requirements.

Alarms List Resource

Movicon has a powerful tool for configuring the alarm objects to be managed in the project. The **'Alarms List'** is the tool for generating the events which will be represented in the appropriate display windows placed in the Screens.
Each single alarm is considered as an object, which can be completely configured through the **'Properties window'**. The property of each single alarm allows you to completely customize both the thresholds and execution functionalities.
An alarm can be associated to a symbol from the "Symbol Library", only if the alarm has not been defined as a "Template", this means that the alarm needs to have been associated to a variable in its "alarm variable" property.
The **'Alarms List'** resource is available in the Movicon **'Project Explorer'** window.

Scroll Lock Led Key

The **"BlinkLedKeyboard"** register key can be configured so that any alarm presence still not acknowledged causes the **'Scroll Lock**' key to blink on the keyboard. This enables the presence of new alarms to also be seen at a distance.

Alarm Printout Spooler

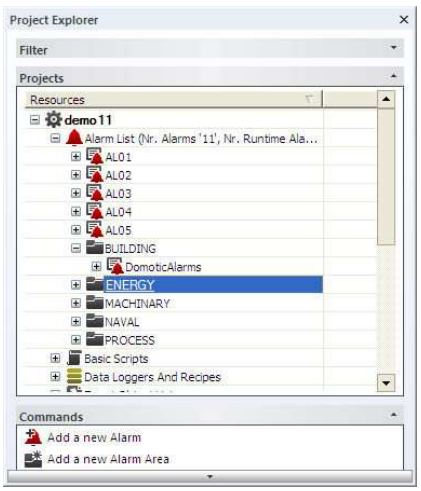
Movicon manages the printout of alarms and events directly to the printer as they occurs. Please refers to the Project Spooler Manager Settings properties.

Script Code in Alarms

Script code can be associated to each of the alarm's thresholds. For further information please refer to the section on "VBA™ Basic Script in Object and Alarm Code ".

19.2. Inserting Alarms

To insert an Alarm into the project, you need to start this procedure by inserting a new object into the 'Alarms List' group in the 'Project Explorer' window. To do this you can either right mouse click on the 'Alarms List' group in the 'Project Explorer' window and select the 'New Alarm' command, or use the same command also found in the Project Explorer's 'Commands' window.



When confirming this operation, the new alarm will appear in the group or in the point selected in the project's structure. At this point you can go on and carry out the Alarm property settings as described in the documents on **"Alarm Properties"**.

Afterwards the Alarm object can be assigned a Name by clicking on the resource and entering the name replacing the one for default, or after having selected the object, press the F2 key and carry out inserting the new name procedure.
New Alarms can be entered by copying the data from the resource, from the same or other projects. In order to do this, select the alarm or the alarms you wish to copy, then use the Copy/Paste function from the Edit menu (or with the equivalent keyboard keys, tool bar or right mouse key techniques).
To delete one or more alarms from the project first select them then activate the 'CANC' key or 'DELETE' key from the keyboard.
The setting or editing of alarms is done through the Movicon 'Properties Window'.

Each entered alarm must then be associated with one or more intervention thresholds To add an intervention threshold to an alarm, first select the alarm then right mouse click and select the 'New Alarm Threshold' command, or use the same command which can also be found in the Project Explorer's 'Commands' window. When confirming this operation, the new threshold will appear in the Alarm's structure. At this point you can proceed with setting the threshold's properties as described in the document about **"Alarm Properties".**

Messages

The only difference between alarms and messages are the "Support ACK" and "Support RESET" ' property settings of the alarm threshold. If these two properties are both disabled, the alarm will not need acknowledging and resetting by the user and therefore will only be displayed according to the status of the associated variable, thus making it a simple display message.
In the Project's Explorer Window 'Alarms List' the image displayed for the alarm thresholds will differ according to whether they have been configured as alarms or as messages. During runtime the image shown in the Alarms Window, next to the text, will also differ according to whether an alarm or message is being dealt with. This function is valid for local alarms only. Different icons, to represent whether an alarm or message, are not supported for alarms and messages displayed by Client projects. In addtion to this, "MESSAGE ON" and "MESSAGE OFF " instead of "ALARM ON" and "ALARM OFF" texts will display as the event identifier in the "Historical Log Window". Therefore the MESSAGE ON" and "MESSAGE OFF " events can be filtered in the Historical Log's message filter window.

Alarm Areas

The alarms can be grouped in different areas so that they can be displayed in the **"Alarm Window"** window based on their on the area they belong to. This may be helpful to enable you to divide the alarms according to the different plant zones they come from. The are two methods to use for associating an alarm to a certain area:

1. insert the name of the area in the **"Area"** property in the "Alarm Threshold General Properties". This will associated the Area name to the alarm threshold.
2. create Areas in the "Alarm List" resource by using the "Add new Alarm Area..." command. This command allows you to add folders to the "Alarm List" resource. Each folder represents an area, and all the alarms which are moved to this folder will then belong to that specified area. The name of the Area will also be associated to the alarm object.

Warning! When both of the above listed methods are applied to the same alarm, priority will be given to the Area set in the "Alarm Threshold General Settings".

3. Create "implicit" alarm areas using a Variable Group: if the alarm is associated as a Template to a Variable Group, the name of this Variable Group can be used as the Alarm Area name. This method is very handy when needing to create nested alarm areas. A sub-group of variables is a sub-area in a way that the name of the area by identified by the linking of Variable Group names separated by the "." char. For instance, if the "Group01" variable group contains the "Group02" sub-group, the Alarm Area of Alarm Templates can be distinguished by then being called "Group01.Group02".

Areas created as Folders or as Alarm threshold properties are XML Attributes of the Alarm object or threshold, and are not File System folders.

The create Alarm Area can be deleted from the Alarm resource by selecting it then pressing the keyboard "Canc" key. However in order to cancel an Alarm Area, it must not contain any alarm objects. Alarm Areas can also be deleted by simply moving or deleting the alarms contained within until it is completely empty. The Alarm Area will then become non-existent when the project is saved, closed and then re-opened afterwards.

Importing Alarms from other Projects

Movicon allows you to copy one or more Alarms from one project to another. To do this, both projects must first be opened, then the Alarms selected and copied using the Copy command from the 'Project Explorer' window of the source project. Then position mouse pointer in 'Project Explorer' window of the destination project and execute the Paste command. The copied Alarms should then also be available in the destination project.
The Drag & Drop techniques can also be used with the following procedure: select the Alarms from the source project and keep the left mouse key pressed and drag them to the point desired in the destination project, then release the mouse key.

Enabling Alarms

The Movicon Alarms predisposed with a useful enabling property, to allow the programmer to temporary deactivate the working of each single alarm.
This setting can be done by accessing the **"Enable"** item through the **'Alarms General Properties'** of the Alarms' 'Properties Window'.
Alarm groups or the all the contents of the Alarms Editor can also be enabled or disabled at the same time. In this case simply select all the alarms required from the 'Alarms List' and set the **"Enable"** property from the **'Alarms General Properties'**. In this way the setting will be propagated to all the alarms selected.

19.3. Alarms Historical

The alarms have two pieces of useful information to give them more detail, a **Unique ID** and a **Transaction ID**. The Unique ID is created the once the project is put into runtime mode for the first time, and is a number between 1 and 2147483647, being a Long number. This value is unique for all the alarms, meaning that each alarm has its own Unique ID, which is saved in the alarms' status file in the project's ALARM folder. Once this ID has been created it will remain so until the alarm's status file is cancelled after which it will be assigned a new Unique ID which may be different from its last one. The Transaction ID, however, is increased each time the alarm turns ON and remains at this value until the alarm turns ON again. Therefore all the ON,ACK, RESET and OFF events are recorded with the same Transaction ID. The Transaction ID's initial value is zero. Its value is saved in the alarm's status file and is loaded at the project startup. The value limit is 2147483647, long number type value that once reached restarts from the 1 value. The Transaction ID restarts from zero when the alarm's status file is cancelled.

These two ID values are recorded in the Historical Log table as well and where two new columns have been inserted, "UniID" and "TraID" for this purpose. The values of these two columns only have meaning for the Historical Log "Alarm" table and not the "SysMsgs" and "Drivers" table.

After entering these new features, in a Client-Server configuration all the applications must be aligned with the same Movicon 11 version. In fact an Alarm Window or a Historical Log window will not be able to retrieve logged alarms or events from a project run with an earlier Movicon version.

Each time an alarm event is recorded, it will be identified with an Unique ID and a Transaction ID. This consents to a more structured and detailed alarm information in the "Alarms Window and in the "Historical Log Window":

Historical Log Window

The alarm events are displayed in groups according to the Transaction ID. For instance, the "ON", "ACK", "OFF" and "RESET" events recorded for the same alarm event will have the same Transaction

ID, and the one same Unique ID, and will be displayed as an Alarm subgroup. There is a "+" symbol next to the alarm's text that when clicked on opens a tree structure showing all the events of that alarm.

Alarms Window

The alarms are listed in the window in the usual way. However, when selecting an alarm and clicking on the "Get History" button, all the history for that alarm will be retrieved, which included all the times the alarm was activated and the events generated for each activation ("ON", "ACK", "OFF"and "RESET"). A "+" symbol will appear on the left of the alarm's text which will open a tree of the alarm's chronology when clicked on.

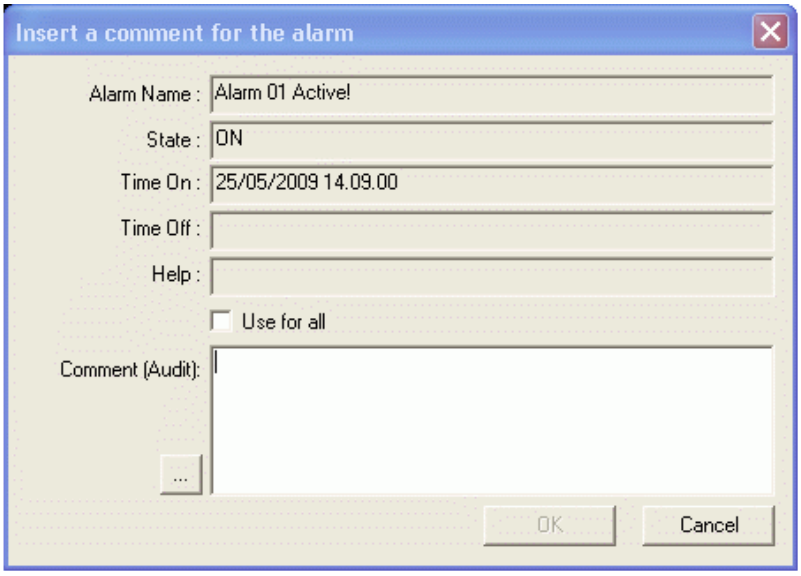
Alarm Statistics

There has also been a series of function added to the "AlarmThresholdCmdTarget" interface which allow you to get statistical information on alarms. This information is always saved in the alarm's status file:

TotalTimeOn: returns the alarm's total on time
LastTotalTimeOn:returns the date and time of the alarm's last ON transaction
LastComment: Sets or returns an alarm comment
GetTotNumOn: returns the total number of times the alarm went ON
GetTotNumAck:returns the total number of times the alarm was acknowledged
GetTotNumReset: returns the total number of times the alarm was reset
GetUniqueID: returns the alarm's Unique ID
GetTransactionID: returns the alarm's transaction ID

19.4. Alarm Acknowledgement Comment

In the alarm threshold properties you have the option to enable "Comments on ACK (Audit Trail)". When the alarm is acknowledged with this option enabled, a widow will appear showing information relating to this alarm including an editing space in which the user can insert a comment. The edited comment will then be recorded in the historical log's alarm table "CommCol" column.



The alarm is only acknowledged after the operator has existed from the comment window with the "OK" key, while pressing the "Cancel" key will annul the alarm acknowledgement. The comment window is also managed in client network projects, or when the command is invoked in a multi alarm selection, or using the basic script interface functions, or with the commands from the command list.

The comment window is not managed with Web Client. In this case the acknowledge command invoked from the Web Client will be activate the alarm's acknowledgement without requesting user to enter a comment.

The font and font size of the dialog window used for entering comments can be edited using the appropriate Movicon "AlarmCommentFont" and "AlarmCommentFontSize" registry keys. The window will adapt adequately to any font modifications. Texts that appear in the window can also be customized using special String IDs listed in the "Cambio Lingua di Sistema" section.

Numerous Alarm Acknowledgements

In cases where many alarms need acknowledging at the same time, a comment window will appear for each alarm enabled with the "Comments on ACK (Audit Trail)" option. The comment windows will appear in sequence, one at a time for each alarm. Therefore when existing with "OK" the next alarm's comment window will appear. However when pressing the "Cancel" key, this will cancel not only that alarm's ackknowledgement but all the others still to be acknowledged.
The "Use for All" option consents all other alarms still to be acknowledged to use the comment entered in the window. This option therefore is to be used for entering just one comment for all alarm acknowledges in a multi alarm selection.

19.5. Alarms as Templates

Movicon has a very handy functionality which can be used when the project has many alarms with similar text messages and are of the same type associated to a series of different variables.

- **A common example:** A project must manage 200 motors which all have "Motor Overload" alarm conditions. The RealTime Database has 200 variables exchanged with the field relating to the motors' status. These variables have to generate 200 different alarms, one for each motor, but the alarms are actually all of the same type except for the name of the motor on each alarm and the associated variable.

In cases such as above, you need to have a tool which parameterizes the generation of the alarms, providing you with the possibility to **setup the alarm only once** and quickly associate it to the 200 variables, such as in the case above.
In Movicon, this functionality is called **"Alarm Template"**.

To obtain this useful function you need to define the alarm 'type' (Template) in the Alarms Resource. Associate the desired intervention threshold (or thresholds) and the relating "standard" text (the text used in the above example is "Motor Overload").
Then you can select the variables from the RealTime Database's Variable List and use the 'Associate an Alarm' command with the right mouse key to select the desired alarms from the alarm list. This will link the variables (in our example this would be the 200 motor variables) to the alarm 'Template'. Therefore with one click on the alarm Template Movicon will automatically setup 200 different alarms in the project. Each variable will be monitored to activate an alarm whenever any threshold is exceeded. The displayed alarm text will show the standard text (in our example above this would be "Motor Overload") and the name of the associated variable.

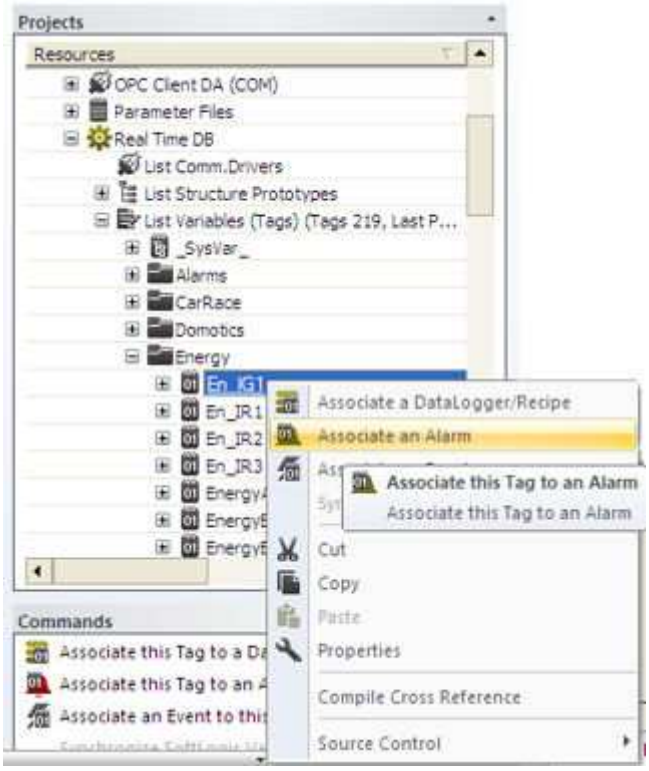
When an alarm is used as a template: if the Alarm's "Alarm Area" property is left empty and the variable associated belongs to a variable group, the alarm will be created belonging to the area with the same variable group name. For instance, associating an digital alarm as template to the "VAR00001" variable inserted in "Group1", the alarm will be created belonging to the "Group1" area.
In addtion, if the variable is inserted in a sub-group, the alarm area will obtain the group's name separated with the ".". For example, if the "VAR00001" variable belonging to "Group1" is inserted in "Group2", the alarm will then belong to the "Group1.Group2" area.

Example:

1. Create a new alarm object with a standard alarm text with "Motor Overload". Set an intervention threshold.
2. Associate the alarm created as a Template to 200 variables existing in the project with names from MT1 to MT200. This association is done by selecting the group of variables indicated (Shift + click or CTRL + click) and using the right mouse key with the "Associate an Alarm" command.
3. The assigned alarm icon will appear in all the variables from MT1 to MT200.
4. When a threshold is exceeded during runtime, for instance the MT33 variable threshold, an alarm will appear indicating "MT33 - Motor Overload".

The name of the variable inserted as "standard" text can be replaced with a customized text. To do this, just insert a string in the "String Table" with an ID in the same name of the variable. When the alarm is activated, it's name will be replace with the text contained in the string.

You can associate an Alarm to a Variable by right clicking on the Variable in the "Variable Group" list presented in the "Project Explorer" window and then select the "Associate an Alarm" command, or use the same command also found in the Project Explorer's "Command window".



The request to associate and alarm opens another window containing the list of alarms which were inserted beforehand and are now available for use.

In the properties of the Alarm to be associated to a variable, you should not specify any reference variable but only the text and activation condition.

Alarms as templates can also be associated to individual structure variable members. In this case, it will be necessary to enable the member's "Enable Member Properties" and then associate the alarm Template to the members by right mouse clicking directly on the member's name. It will then become possible to generate an alarm of each bit of the variable member as described in the next paragraph headed 'Creating alarms for each variable bit".

Creating Alarms for each variable bit

When variables are not 'bit" type but of another type such as 'word' and one alarm must be managed for each variable bit in Word type, you can associate an alarm template to a word type variable to then generate 16 Alarms each one for each bit. To do this:

- create an alarm with relative digital threshold without setting the "Alarm Variable' property
- associate the alarm template, previously created in above point, to the variable
- insert one or more ID Strings using the "<Variable>.<Bit>" syntax in the String Table.

Movicon will then create an alarm for each bit of the variable whose ID has been found in the String Table found.
For instance, when associating an alarm template to the "VAR00001" word type variable and then inserting the following String IDs in the String Table:

VAR00001.0
VAR00001.1
...
VAR00001.15

Movicon will create 16 alarms at project startup, each one will be activated in each single variable bit.
The string ID for the single bits will then be used for managing the template's text as well. If String ID is not inserted for each single bit, only one alarm will be created and managed in the Word variable (or defined variable type).

This same mechanism can also be applied to Structure variable members. For instance, if needing to generate 16 alarms in each bit of a Structure variable Word type member, "StructVar1:Member1", you will only need to enable the member's properties, associated the alarm template to the member and add the following ID String to the String Table:

StructVar1:Member1.0
StructVar1:Member1.1
...
StructVar1:Member1.15

19.6. Alarms activated by homonymous Variables

When an alarm is not associated to an activation variable, "Alarm Variable" property, Movicon will control if a variable exists in the Real Time DB with the same alarm name in runtime. If a variable does exists with the same name, it will be used as the alarm's activation variable and therefore its value will be used for activating the alarm based on its threshold activation settings.
For instance, if an alarm has been defined as "Alarm01" without an activation variable associated to it and a variable called "Alarm01" exists in the Real Time DB, this variable will be used by the alarm as its activation variable.
In this case the alarm can also be associated as a template to other variables and result as a different alarm for each variable, one for the variable which has the same alarm name and one for each variable to which the alarm has been associated as a template.

When using alarms as templates, therefore without any associated activation variable, be careful not to define variables in the Real Time DB with the same name as the alarm's, otherwise a link to the variable with the same name of the alarm will be created in addition to the alarms as templates as well.

19.7. Alarm Status File

Each alarm defined in the project will create a Status File in XML format in the "ALARM" folder during runtime mode. This file is normally created with a syntax of this type:

ProjectName_ThresholdNameSoglia_VariableName.alr

The reason for having this file, as for the variable retentivity file, is to keep saved certain information inherent to the alarms when the project is closed. The saved information gives details on the following:

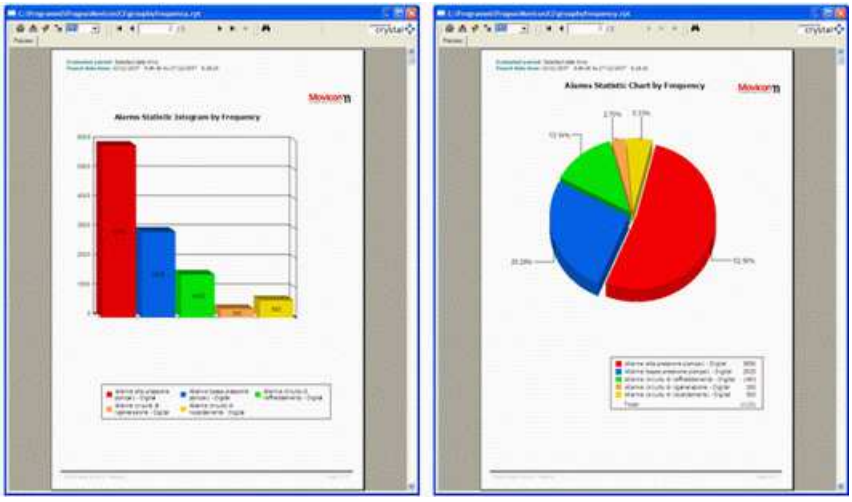
- **Alarm Status**: this lets you know at the project startup which status, ON, OFF, ACK etc, the Alarm was when the project was last terminated. This serves for restoring the present situation back to how it was before the project was last terminated
- **Total Time ON**: shows the total time in which the alarm remained in the ON status
- **Last Time ON**: shows the date and time of the alarm's last ON transaction
- **Comment**: shows any comments associated to the alarm by users by using the appropriate script functions
- **Number of ON Events**: shows how many times the alarm turned ON
- **Number of ACK Events**: shows how many times the alarm was acknowledged
- **Number of RESET Events**: shows how many times the alarm was reset
- **Unique ID**: shows the alarm's unique ID
- **Transaction ID**: shows the alarm's transaction ID

Some of this information such as the Unique ID and the Transaction ID is important for identifying that particular alarm for managing the "Alarms History" in the "Alarms Window" and in the" Historical Log Window". The other information is just for statistical purposes.

Cancelling an alarm Status File will loose all the statistical information and identifiers for that alarm. A new file will, however be automatically recreated by Movicon again.

19.8. Alarm Statistics

Movicon has an in-built feature that manages calculations and analysis on system downtimes and alarm occurrences. This feature analytically works with the Event Log from the historical archive to generate Reports with Tables and Graphs showing alarm classifications and total number of occurrences and durations overall.
This feature is completely integrated in the system and does not need additional installations or configurations. This feature comes as a license option to be enabled on request.



The commands for opening, saving or printing Alarm Statistics reports can be activated from the "Alarm Commands" from the Movicon "Commands List".
The report files have been created both in "Crystal Report" format and using the Movicon "Embedded Reports" resource. You can decide which format to use based on the open report command selection using the "Action" parameter from the "Alarm Command List".
These reports allow access to the historical data archive database ('Alarms' table), independently from the DB format being used.

The analysis is carried out on the 'Alarms' table, creating a table, histogram and pie chart to display the alarms classified by duration (total time ON) or for intervention frequency. Reports can be applied filters for different time periods and can be open in preview mode or printed out directly. Furthermore, custom reports can be created to open in substitution to those proposed by Movicon for default.

Alarm Statistics are not supported if the "InMemoryDB" database engine is being used for the Historical Log. In addition, the ODBC driver being used must support the following commands in the SELECT SQL syntax:: "SUM", "COUNT", "GROUP BY" and "ORDER BY". It will be impossible to use the Alarm Statistics Reports if these commands are not supported by the database being used.

The report files in question are already in the Movicon installation folder. Four types of Report files created with the Crystal Reports 10 version are available (OrderByDate.rpt, OrderByDuration.rpt, GroupByThreshold.rpt, GroupByFrequency.rpt) along with another four files created with the Movicon "Embedded Reports" resource (OrderByDate.movrep, OrderByDuration.movrep, GroupByThreshold.movrep, GroupByFrequency.movrep). Even though the "Crystal Report" and Movicon "Embedded Report" files display the same information and have the same names, they have different extensions. Each report file provides the possibility to obtain the following statistical data:

- **OrderByDate.rpt (Crystal Reports)**: Report of alarms ordered by activation date. Each alarm is reported with a activation date and time, Off time and date, description and duration. The overall duration total for each selected day and period are also reported.
- **OrderByDate.movrep (Embedded Reports)**: Report of alarms ordered by deactivation date. Each alarm is reported with an activation date and time, Off time and date, description and duration.
- **OrderByDuration.rpt (Crystal Reports)**: Report of alarms orders by duration (starting from the longest to the shortest length of time). Each alarm is reported with a activation date and time, Off time and date, description and duration. The overall duration time of period selected is also shown.
- **OrderByDuration.movrep (Embedded Reports)**: Report or alarms orders by duration (starting from the longest to the shortest length of time).Each alarm is reported with a activation date and time, Off time and date, description and duration.
- **GroupByThreshold.rpt (Crystal Report)**: Report on alarms grouped by alarm text. Activation ON/OFF times and dates, duration and description are reported for each alarm. Total durations for the period selected are also shown for each alarm and all the alarms as a whole. The last page shows a pie chart with duration in percentages of each single alarm for the period selected.
- **GroupByThreshold.movrep (Embedded Reports)**: Report of alarms grouped by threshold and ordered by duration. Each alarm is reported with a description, duration and number of ON, ACK and RESET events. The last page shows a bar graph which displays durations in seconds for each single alarm for the period selected.
- **GroupByFrequency.rpt (Crystal Reports)**: Report of alarms grouped by frequency. Each alarm is reported with a description, activation time and the how many times they came ON for the period selected. Alarms are also classified by the most frequent for the period selected. The last two pages show a bar graph showing the frequences for each single alarm for the period selected and a pie chart with frequences expressed in percentages for each alarm for the period selected.
- **GroupByFrequency.movrep (Embedded Reports)**: Report of alarms grouped and ordered by frequency. Each alarm is reported with a description, how many times it came on for the period selected and number of ON, ACK and RESET events. A bar graph is shown on the last page reporting frequencies for each alarm for the time selected.

In addition, default reports can be modified or new customized ones can be created to open instead of those proposed by Movicon. In this case, to modify or create a new report in the "Crystal Report" format, you will need to have the "Crystal Report" developer tool. The Movicon "Embedded Reports" can be modified or created using the project's "Report" resource. In this case, when needing to modify one of the four default "Reports"only the following procedures need to be performed:

1. copy the ".movrep" report file to be modified from the Movicon installation folder to the project's resource folder
2. open the project in development mode and modify the report, which will be found in the "Report" resource in the Project's Explorer Window
3. after completing modifications, copy the ".movrep" report file from the project's resource folder to the Movicon installation folder, overwriting the one already existing within.

When needing to create a new report file in the Movicon format, perform these procedures below:

1. open a Movicon project in development mode and add a new "Report" resource with the desired name
2. edit the report by customizing it as pleased
3. when completing all modifications, copy the ".movrep" report file from the project resource folder to the Movicon installation folder
4. enter the report name manually in the create report command from the "Alarm Commands" without specifying its extension in the "Report File" parameter

The statistical alarm reports created with the Movicon Embedded Reports can also be left within the project resource folder. The first thing Movicon does is search for report files within the project's resource folder (and any existing sub-folders) and if the file is not found, a search is made in the Movicon Installation folder.

When editing a Movicon "Embedded Reports" , the "Alarm Statistic" option is available in the report's properties that once enabled will provide the alarm statistical values in the list of fields that can be inserted on the report. These fields are:

TotalNumOn: statistical information representing the total number of times the alarm turned ON.
TotalNumAck: statistical information representing the total number of times the alarm was acknowledged.
TotalNumReset: statistical information representing the total number of times the alarm was reset.
TotalTimeOn: statistical information representing the total time the alarm remained in the ON status.
ProgressiveId: statistical information representing the alarm's progressive Id number. This value is used as the chart's X axis in default Alarm Statistic Reports.
DateTimeOn: this field is used for displaying the alarm's activation date and time. This value is calculated for each record, during the report generation phase by Movicon, based on the alarm's OFF date and time and duration.
Some of the statistical values described above are saved by Movicon in the "Alarm Status File" and can be reset during runtime using the "Reset Statistic" command from the Alarm Command list.

The statistical alarm reports created with the Movicon Embedded Reports manages any Alarm table or column name customizing automatically. Therefore Alarm table and column names can be customized as pleased without having to repeat same operation in the statistical alarm reports as well. However, this functionality is not available for reports created with Crystal Report which will need to be modified as well.

19.9. Alarm Sound Management

Each User can customize alarm sounds and save their preferences in the Alarm Window's "Enable Sound" command. The enabling status type is memorized for each project user or for each runitme user so that when user logs in the enabling status will be restore to how it was when user last logged off.
By comparing the logged on Users "Access Level" with the active alarm threshold's "Read Access Area level" will determine the alarm to show in the Alarm Window. If the active user does not have the sufficient access rights, the alarm will not show in the window automatically disabling its sound.

After the user logs off the 'Enable Sound' button will be restored back to the previous status before user logged on. If, for example, the sound was enabled before user logged on, and then disabled after user logged on, once the user has logged off with alarm still active, it will obtain the condition it had by being restored with the alarm sound.
In cases where the alarm is set with "Read Access Levels" different to those for default, when no users are logged on this alarm will not be displayed in the alarm window but its sound will still be activated based on the enable button's status.

Networking

In regards to applications in networking, a Client application that uses the Alarm window is capable of enabling or disabling the Client machine locally the warning sound when alarm notifications arrive from the Server application. Also in this case the status of the "Enable Sound" button setting for the warning sound will be retained after screen closes and reopens, independently for each user to whom the Alarm Window has given access towards the Server application. Therefore, in this case, alarms that display in the Client Alarm Window and the consequent warning sound are managed in function with the user used for connecting to the Server (user inserted in the "Network Client Settings" from the Client project's "Network Services" resource or the user inserted in the "Default Logon User" property from the Server project's "Network Client" resource).
If the "Password Management" has been enabled in the client application as well, the Cllient user's Access level defined for the same user in the Server application will be considered (and not the one defined in the Client) and compared with the active alarm threshold's Read Access Area Level, and only if they match will the alarm be displayed in the Alarm Window.

The warning sound stops ringing when the Client's Alarm Window disconnects from the Server. This may happen for different reasons: timeout with Server, screen change, etc. If you wish that the warning sound of a new alarm sounds independently form the fact that the Alarm Window screen is displayed or not, you will need to set the client screen with the "Keep in Memory" option and enable the "Pre-load Screens" property situated in the Client project's "Execution" property group.

It is also possible to set more then one Alarm Window on the same screen, each one connected to different Servers with the each single Alarm Window's activated alarm Ack/Reset command received by the relative Server.
Once again, the "_SysVar_:AlarmsSoundState" system variable and the "Alarm - Enable Sound" command have the same behaviour as described above for the Alarm Windows. Even if the "Enable sound" button is disabled in only one of the Alarm Windows, the general alarm sound status will be disabled for all the windows. Likewise, if a "Enable Sound" button is re-enabled, the general alarm sound status will be re-enabled for all the windows.

Web Client

When there are active alarms in the project, a warning sound is given by the Web Client independently from the screen page opened. In addition, these warning sound can be acknowledged using the icon placed on the applet status bar. The warning sound is set through applet's "PlaySoundOnAlarm" (default "false") parameter. This parameter gets inserted automatically upon creation html files but can also be created manually for html files created by previous Movicon versions. You can also customize the sound produced by adding the optional "FileToPlayOnAlarm" parameter in the html file with the desired WAV file to be played. This parameter is also inserted by default upon creating htlm files. The audio file must be place on the Web server in the same folder where the Movicon "MovWebClientX.jar" applet resides, usually found in the project's resource folder.
For further information on the syntax used for the two parameters described above please refer to the section on "HTML creation pages" in the WebClient manual.

Restrictions

Statuses for warning sound users cannot be saved in Windows CE independently from the fact that the password management is enabled or not.
On ".wav" type audio files can be reproduced on Web Client.

19.10. Alarm Properties

The alarms and messages inserted in the 'Alarms List' can be completely customized in the properties. The alarms and messaged are built from intervention thresholds, each one composes the alarm structure whose settings can be edited in the **'Properties window'**.

19.10.1. Alarm General Properties

The moment an alarm or message is inserted it can be configured in the general properties as described below. The general properties allow you to associate the variable which determines the alarm's intervention.
To modify an alarm's general settings, select it with the mouse and use the 'Movicon **'Properties window'**.

Name

This edit box permits you to define the Alarm or message object's name which is to be configured.
The object's name only identifies the alarm or message in the **'Alarms List'** and identifies the object if inserted into the Template library.

Device Name

This edit box allows you to define the device's name that the Alarm or Message refers to.
The device's name will be displayed in the alarms window, before the alarms' text. This will allow you to manage the alarms as Templates, keeping the same alarms text referred to different devices.
For instance, the 'Overheating' alarm text can be referred to the device of interest, by modifying it each time the template is inserted (eg. Mot.1, Mot.2 etc.,). The text which appears will then be determined by <threshold name> - <device name> : <alarm text>.

The variable value can be displayed in the text by inserting the following syntax:
%(Variable Name)
For instance, if you want to insert the VAR00001 value in the text, the string should be:
"Device Name %(VAR00001)
By doing this the variable's value will be displayed dynamically. The value displayed in the Alarm Window will be the value read the exact moment the alarm was turned ON.

Alarm Variable

This box is used to select the variable from those presented in the Movicon 'Variables List' which generate the alarm or alarms (or messages) in function with event thresholds, defined through the relevant properties. You can use the syntaxes relating to the bit pointing within a variable or structure variables (eg. VAR0001.5, or STR0001:ALL_01).

If this field is left blank, in runtime Movicon will control if there is an existing variable with the same name of the alarm in the Real Time DB. If one does exist it will be used as the activation variable for that alarm (see the section on "Alarms activated by homonymous Variables").

Var. Duration

Enabling this property will make the alarm work with the usual threshold, but the confrontation will be referred to the "Total Time ON" instead of variable's value. The time is the total duration expressed in seconds that the variable was at a value different from zero. By using a new variable statistics (see "Retentive Variables and Statistical Data") you will be able to find out how long the variable has been at a value that is not zero. This function can be very handy in managing programmed maintenance. In order to use this function you will need to enable the "Retentive not Shared" and "Enable Statistic Data" properties for the variable in question.
When the variable's "Total Time ON" exceeds the value set in the alarm's threshold, the alarm will be activated. After which by resetting the variable's statistics, its "Total Time ON" will be zeroed and the alarm will turn to OFF.

Enable Alarm Variable

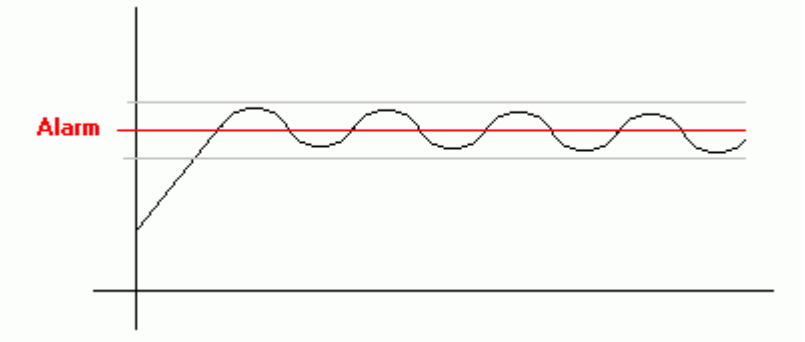
This box is used for selecting a variable which consents the alarm intervention. When the selected variable has a value other than zero (><0), when conditions subsist, the alarm will be notified regularly. When the variable has a 0 value, even though there maybe alarm conditions present, this will not be activated.
When this box is not selected, the alarm will always be enabled if the **'Enable'** property is set at 'True' value.

Enable Dispatching Messages Var.

This selection box is used for selecting a variable to consent the sending of messages to the Alarm Dispatcher. The sending of sms, email,etc. messages to the Alarm Dispatcher will be enabled when the selected variable is set with a value other than zero (><0). On the other hand, when the variable is set at zero value the sending of messages to the Alarm Dispatcher will be disabled.

Hysteresis Alarm Value

The alarm's hysteresis allows you to insert a control on the alarms effective re-entry when the threshold value is oscillating, in order to provoke an over-intervention (ON) and re-entry (OFF) of the alarm itself.



The hysteresis is an absolute value which is dealt differently according to how the condition of the alarm's intervention is set:

Condition "="

The alarm intervenes when the variable assumes a value equal to the value set for the alarm's threshold. The alarm re-enters when the value of the variable is higher or lower than the threshold value +/- half of the hysteresis value.

Condition ">="

The alaarm intervenes when the variable assumes a value higher or equal to that of the alarm's threshold. The alarm re-enters when the variable is lower than the threshold value less the hysteresis value.

Condition "<="

The alarm intervenes when the variable assumes a value less or equal to the that of the alarm's threshold. The alarm re-enters when the variable is higher than the threshold value plus the hysteresis value.

Exclusive Threshold

When there are more than one threshold present, the enabling of this property will evoke the disappearance of a alarm referred to one threshold when the alarm referring to the next threshold appears. Otherwise both alarms will both remain active.

Enable Alarm Variable

This selection box is used to enable or disable the alarm intervention.

The **'Enable'** property has priority over the **'Enable Variable'**.

Enable only if Quality Good

This selection box is used for enabling the alarms management only when the quality of the its connected variable is good. This means for example that the alarms associated to the variables directly arriving from the PLC or from any other field device, will automatically be disabled when there are any communication interruptions.

19.10.2. Alarm Threshold General Properties

The alarms and messages inserted into the 'Alarms List' are equipped to have one or more intervention thresholds according to the functions to be carried out. The threshold interventions

determine the alarm's or message's behaviour when the defined threshold values are reached or exceeded. The Threshold properties can be activated in the editor through the tree structure of each single Alarm.
To modify the general settings of the alarm's thresholds, select the threshold with the mouse and use the Movicon **'Properties Window'**.

Threshold Name

The name of the threshold to be configured is defined in this edit box. The threshold's name will be displayed in the alarms window, preceding the alarm's text.
This allows you to manage the alarms as Templates keeping the same text referred to different devices.
For instance, the 'Overheating' alarm text can be referred to the device of interest, by modifying it each time the template is inserted (eg. Mot.1, Mot.2 etc.,). The text which appears will then be determined by <threshold name> - <device name> : <alarm text>.

Alarm Area

This editbox allows you to associate the Alarm or Message in question its own area if necessary.
The alarm will then be displayed for viewing by activating the chosen area in the "Alarm Window".

When an alarm is used as a template: if the Alarm's "Alarm Area" property is left empty and the variable associated belongs to a variable group, the alarm will be created belonging to the area with the same variable group name. For instance, associating an digital alarm as template to the "VAR00001" variable inserted in "Group1", the alarm will be created belonging to the "Group1" area.
Further more if the variable is inserted in a sub-grop, the alarm area will obtain the name composed by those in the group separated by the "." .
For example if the "VAR00001" variable belonging to "Group1" is inserted in "Group2" , the alarm will then belong to the "Group1.Group2" area.

Alarm Text

The threshold's Title string is typed in this box which will constitute the alarm's text. You can select the text among those inserted in the project's String resource. In this case the text may be subject to the Language Change functionalities.
The text which appears in the Alarms or Messages window will be determined by <threshold name> - <device name> : <alarm text>

The variable value can be displayed in the text by inserting the following syntax:
%(Variable Name)
For instance, if you want to insert the VAR00001 value in the text, the string should be:
"Alarm Title %(VAR00001)
By doing this the variable's value will be displayed dynamically. The value displayed in the Alarm Window will be the value read the exact moment the alarm was turned ON.
In cases where a String ID has been associated in the "Alarm Text" property, the %(VariableName) syntax will be inserted within the string's text in the table.

Alarm Help

This box, whose use is not obligatory, allows you to type the text string which will constitute the eventual alarms help guide. The Help guide will be available to the operator during runtime by double-clicking on the alarm or activating the appropriated information button. The box allows you to select the text from those inserted in the project's string resource. In this case the text may be subject to the Language Change functionalities.

Duration Message Format

The message to be filed in the 'CommCol' column of the Historical Log's 'Alarms' table is entered in this property. The message is recorded only on an event of 'Alarms Off'.
The message may only include the following special codes:

- **%D** = Duration of alarm in days
- **%H** = Duration of alarm in hours

- **%M** = Duration of alarm in minutes
- **%S** = Duration of alarm in seconds

If this property is left empty, Movicon will automatically insert the total alarm duration with the following string:

Total Duration 0,00:00:00

where 00:00:00 indicates the alarm's duration in days, hours, minutes and seconds.

Read Access Area Level

By using this property you can setup the Access Level mask needed for displaying the alarm in the "Alarm Window". When the Access Level mask of the user currently logged on does not correspond to the control's settings, the user will not be able to see the alarms. The "0000" and "FFFF" settings make the object accessible in read to any user.
The historical logging operations of the alarms are carried out independently of the access rights of the user logged on at that moment.
For further details on 'Access Masks' please refer to the **"User Levels and Access Levels"** paragraph.

Write Access Area Level

By using this property you can set the Access Level mask needed for executing, for instance, an alarm acknowledgement and reset. When the Access Level mask of the user currently logged on does not correspond to the control's settings, the user will not be able to execute any command operations associated to the alarms. The "FFFF" level makes the object accessible in write to any user.
For further details on 'Access Masks' please refer to the **"User Levels and Access Levels"** paragraph.

19.10.3. Alarm Threshold Execution Properties

The alarm's value and intervention condition are defined in the Alarm Threshold's Execution property.
To edit the alarm threshold's executions select the threshold with the mouse and use the Movicon **'Properties Window'**.

Activation Value

This edit box allows you to set the threshold value to be reached so that the relative alarm be activated effectively. The maximum value permitted depends on the variable type associated to the alarm. You can also associate a Real Time DB variable to this property to make the intervention threshold dynamic during the project run.

The intervention threshold can be made dynamic during the project run by associated a Real Time DB variable in the "Dynamic Threshold" property.

Activation Low Value

This editbox permits you to set the minimum threshold value for activating the alarm. This value is only considered when the "Between" has been selected as the "Activation Condition". This value has no effect in other cases.

The intervention threshold can be made dynamic during the project run by associating a Real Time DB variable in the "Threshold Variable Low Value" property.

Threshold Variable Value

In this editbox you can insert ((or selecting by using the "..." browse button on the right) the name of the variable whose value will be used instead on the one in the "Low Value" property. This will make the threshold's low value dynamic for the "Between" activation condition, so that the variable's contents can be modified during Runtime.

Threshold Variable Low Value

This edit box is used for inserting (or selecting by using the "..." browse button on the right) the name of the variable whose value will be used instead of the **"Activation Low Value"** property.

This will make the threshold value dynamic so that the variable's contents can be taken and modified during Runtime.
The fixed contents in the **"Activation Low Value"** property will be considered if this filed is left blank.

When this field is left empty, the contents in the **"Low Value"** property will be considered as the fixed low threshold.

Command-Status Variable

This editbox is used for entering (or selecting with the "..." browse button on the right) the name of a variable for managing the Command or Status of an Alarm. Each variable bit has a precise meaning as described below:

- Bit 0 : Strobe command for acknowledging alarm (bit returns to zero once the alarm has been acknowledged)
- Bit 1 : Strobe command for resetting alarm (bit returns to zero once the alarm has been reset)
- Bit 2 : Reserved
- Bit 3 : Reserved
- Bit 4 : Alarm is active in the Off status
- Bit 5 : Alarm is active in the Off status but has already been acknowledged (OFF ACK)
- Bit 6 : Alarm is active in the On status
- Bit 7 : Alarm is active in the On status but has already been acknowledged (ON ACK)

Only the alarm's Acknowledge command can be used In cases where the set variable is bit type.

In order to program and manage this functionality properly, each alarm must use a command-status variable that is not already being used by the other thresholds.

Severity Variable

The name of a variable can be inserted (or selected with the "..." browse button on the right) to make the alarm Priority value dynamic in Runtime. However if you set a RealTimeDB variable in the "Severity Variable" property, any value set in the "Severity" property will be ignored.

Activation Condition

This property determines on what condition the alarm is to activate:

- Major-equal (**'>='** means that the alarm activated when the variable value is equal or higher than the 'Value' property setting
- Minor-equal (**'<='** means that alarm activates when the variable value is equal or lower than the 'Value' property setting
- Equal (**'='** means that the alarm activates when the variable value is the same as the 'Value' property setting
- **"Rate Change Decrease"**: means that the alarm is active when the associated variable's value does not change to the quantity desired ("Activation Value" property) within the time set ("Delay (sec.)" property). The time count starts the moment the alarm is enabled with the "Enable Alarm Variable"
- **"Rate Change Increase"**: means that the alarm activates when the associated variable's variable does not change to the quantity desired (Activation Value" property) within the time set ("Delay (sec.)" property). The time count starts the moment the alarm is enabled with the "Enable Alarm Variable"
- **"Different** (<>)": means that the alarm activated when the variable value is different from the one set in the "Activation value" (or "Threshold Variable Value") property
- **"Between"**: means that the alarm activates when the variable value is higher or equal to the value set in the "Activation low value" (or "Threshold Variable low Value") property, and less or equal to the value set in the "Activation value" (or "Threshold Variable Value") property.

Rate change increase/decrease conditions

These two alarm activation conditions can be used for generating an alarm if the associated variable's value does not change to a greater or smaller value within a certain time compared to the one set. These conditions must be used together with the "Delay (sec.)" and "Enable Alarm variable"

properties. The function of these conditions is: the moment an alarm is enabled with the "Enable Alarm Variable" the variable's value is recorded. At this point onwards a confrontation takes place with the variable's recorded value and its current one and if the current value has not increased (or decreased) by a greater (or smaller) quantity of the threshold value within the delayed time set, the alarm will activate. Each time the difference between the value saved for the comparison and the actual value of the variable exceeds the set threshold, the comparison value is updated with the current value and the delay time is zeroed and restarts counting from the beginning.

For instance, let's suppose that we have an alarm configured in this way:

Alarm Variable = VAR00001
Enable Alarm Variable = EnableAlarm
Activation Value = 5
Activation Condition = Rate change increase
Delay (sec.) = 10

At this point when an alarm is enabled by setting the "EnableAlarm" variable to the value '1', the current variable's value is saved as the reference value and the time count starts. If the value of the variable associated to the "VAR00001" alarm does not increase to a value higher than the set threshold (5) compared to the saved reference value within 10 seconds (Delay (sec.)), the alarm will activate. If the variable increases to a value higher than 5 before the 10 seconds are up, this value is saved as the new reference value and the count is zeroed, after which the control starts from the beginning, meaning that the variable's set value will have to increase above the new reference value before the delay time expires.
This works in the same way when the "Activation Condition" is set with "Rate change decrease": in this case the variable decrease in value is controlled and not its increase.

Severity

This box allows you to select the alarm priority required. The priority will be displayed and recorded in the appropriate field reserved for the alarm.
Is possible to assign a number comprised between 0 and 65535. The alarm window and the Log will record the number of priorities assigned.

Delay (sec)

You can enter a numeric value comprised between 0 and 65535 in this edit box. The value entered, expressed in seconds, will establish the alarm's intervention delay time, thus creating a filter in the threshold.
The default value is zero (no delay).

Commands on CTRL + Dbl Click

This command opens the Movicon **"Command List"** window through which you can set a list of one or more commands to be executed on operator request when the alarm is active. The Command List can be executed, when the alarm is active and displayed in the Alarm Window, by double clicking the alarm while keeping the CTRL key pressed down at the same time.
For further information on the commands available please refer to the paragraph on **"Command List"**.

Commands when Alarm ON/ACK/RESET/OFF

This button opens the Movicon **"Command List"** window, through which you can set a list of one or more commands which will be executed by Movicon when the alarms generate the specified event (Alarm ON, Alarm OFF, etc.).
For further information about available commands please consult the paragraph on **"Command List"**.

19.10.4. Alarm Threshold Style Properties

The Alarm Threshold Style Properties allow you to define the graphic and operating styles.
To modify the Alarm Threshold Style settings, select the threshold the mouse and use the Movicon **'Properties Window'**.

By means of the 'Support ACK' and 'Support RESET' properties you can define whether the operator is needed to acknowledge and reset the alarms. When these two properties are disabled the alarms will be displayed according to the associated variable status only, and therefore a simple display Message.

Support ACK

This selection box permits you to determine whether you want the alarm acknowledgement (ACK) activated or not.

When the "Support ACK" property is enabled with the "Support RESET" property disabled, once the alarm has been acknowledged it will disappear from the Alarm Window even though its status is still active.

Comment on ACK (Audit Trail)

When this option is active while the alarm is acknowledged, a window will appear showing information relating to that alarm with editable space at the bottom for the user to enter a comment. (for further information please refer to "Comments on Alarm Acknowledged").

Support RESET

This selection box permits you to determine whether you want the alarm reset (RESET) activated or not.

If you disable an Alarm threshold's "Support Reset" option, the alarm will remain on screen active until conditions from the field satisfy the threshold Execution properties (Activation Value and Activation Condition) even when Acknowledged. As soon as the threshold's activation conditions are no longer true, the "Alarm Off" event will be historically logged and the Alarm will disappear from screen once acknowledged or straight away if already acknowledged.
This function is determined by the "NoAlarmStatusOnACK" DWord value in the system registry's "General" key (or Movicon.ini file) which is set the False value (0) for default . When this value is set to the True Value (1), the Alarm will disappear from the Alarm window once Acknowledged even though the conditions from the field are still keeping the threshold active.

Use Variable TimeStamp

When this property is enabled the alarm ON and OFF times will include a TimeStamp (date and time of last modification executed) of the variable that generated it. The Variable's TimStamp is set from the communication driver and the OPC management.
In additon to this and as usual the event in question will be recorded in the Historical Log with the TimeStamp of the variable that generated it.
This function could be handy in situations where the variable's value is notified to Movicon with a delay time in respect to its effective variation. For instance, in a OPC communication, the Server may happen to be in Client refresh mode for a few seconds. In this case the variable TimeStamp will nevertheless be received by the Server indicating the actual time in which the variable effectively changed in the Server.

The "Use Variable TimeStamp" can be also read and modified in runtime using the "DateTimeFromTimeStamp" property from the "AlarmThresholdCmdTarget".

Allow Reset with Condition ON

This property can be disabled to prevent alarms from being reset when their status is still ON.

Blink

This selection box permits you to determine whether or not to active the alarm blinking function the moment the alarm activates.

Print

This property is not currently in use. To print alarms you need to use the report functions which can be activated with the **"Alarm Commands"** from the **"Command List"**.

Record on Historical Log

This selection box permits you to determine whether or not to activate the recording in the Historical Log of alarms or messages upon the relative ON, OFF, ACK, RESET events. These recordings will be contained in the "Alarms" table of the Historical Log Database created by Movicon in the defined format or in the Alarms.dat file,depending on the data source you are using (ODBC or IMDB)

If you are using the ODBC connection, the Historical Log is created with the Movicon default settings, but the Historical Log file can be customized when put into use, where you can create a personalized ODBC link and define a different table name. These functionalities can be carried out from the Project's "Historical Log Settings".

Beep

This property allows you to decide whether the alarm threshold should make a beep sound when the alarm is activated.

Bmp File

This property allows you to set an alarm image. The image will be displayed as an icon in one of the alarm window's columns. The image set in the alarm threshold has priority over the one set in the variable. This property cannot be modified using VBA language.

Sound File

This property allows you to set a alarm sound wav. file which will activate when the alarm activates. The sound set in the alarm threshold has priority over any one set in the variable. This property cannot be modified using VBA language.

When more than one alarm have been associated an audio file to be executed when the alarm turns ON, this file is executed according to the alarm priorities. For example, when an alarm turns ON, when other alarms associated with audio files, are already ON, the new alarm will executed the audio file only when its priority is greater than those already present. Note that the "1" priority is the lowest.

Repeat Alarm Sound

This check box permits you to define the behaviour of the sound files associated to the alarms. By activating the property the file will be executed continuously until it is acknowledged. Otherwise the file will only be executed once when the alarm appears.

Speech Alarm Text

This property allows you to enable the speeching functions for vocal synthesis of the text string which builds the alarm. The alarm's text will then be pronounced by Movicon when it occurs if the PC being used has been equipped with an audio card and speakers. You will also need to ensure that the phonemes, to be used in pronouncing the text, have been installed with language desired. The phonemes are used to pronounce the text by interpreting the pronunciation of the language selected. The phonemes are normally supplied separately and therefore it is the user's responsibility to get and install the ones desired. However, by using Movicon's customized installation you can select some of the most commonly used phonemes.

Repeat Speech

This property allows you to set the repeat time of the alarm's Speech. When setting this property with a '0' value the alarm's speech will be repeated once only. This time must also be set allowing enough time for the alarm's speech to be executed.

Enabling Speech Variable

This selection box is used for selecting a variable which will determine the activation of the alarm's speech. When the selected variable obtains a value different from (><0), the alarm's text will be spoken when the alarm is activated. When the variable obtains a '0' value the Speech will result disabled.

BackColor

This property is dedicated to selecting the colour to be associated to background relating to the alarms or messaged display in the appropriated window.

Selecting colours is done according to the standard selection modes using the colour palette.

You can reset the set colours (restoring those of default) by selecting the 'Automatic' option found on the colour palette.

TextColor

This property is dedicated to selecting the colours to be associated to the texts relating to the alarms or messages displayed in the appropriated window.

Selecting colours is done according to the standard selection modes using the colour palette.

You can reset the set colours (restoring those of default) by selecting the 'Automatic' option found on the colour palette.

Blink BackColor

This property is dedicated to selecting the colour to be associated to the background relating to the alarms or messages displayed in the appropriated window during the blinking phase.

Selecting colours is done according to the standard selection modes using the colour palette.

You can reset the set colours (restoring those of default) by selecting the 'Automatic' option found on the colour palette.

Blink TextColor

This property is dedicated to selecting the colour to be associated to the text relating to the alarms or messages displayed in the appropriated window during the blinking phase.

Selecting colours is done according to the standard selection modes using the colour palette.
You can reset the set colours (restoring those of default) by selecting the 'Automatic' option found on the colour palette.

19.10.5. Alarm Threshold Event Notification Properties

The Alarm Threshold Events Notification properties allow you to define the managing of messages on event with the aim of sending Email (by means of the MAPI functions), Vocal Messages, SMS, Fax etc. (by means of the TAPI functions).
To modify the Alarm Threshold Events Notification's settings, select the threshold with the mouse and use the Movicon **'Properties Window'**.
Note: This is an optional feature: check your dongle options.

Movicon supports the MAPI (Messaging Application Program Interface) by means of any management tool of the electronic post, whether in Client of Server mode. For example, Windows has been installed with the post Client Outlook Express, which can be exploited for your specific aims. If you have a post Server (eg. Microsoft Exchange), the operating possibilities can be customized. Installation and configuration of the post tools the modem and access to Internet are to be taken care by the PC's post administrator.

Movicon supports TAPI (Telephonic Application Program Interface) for managing telephone lines. Sending SMS messages, faxes or vocal messages requires the configuring of the appropriated optional functions. In addition to this it will be necessary to configure the relevant tools such as modem or other in function the management being used.

Recipients

Through this property you can select or type the recipient user of recipient user group to which the message, SMS, E-mail etc., is to be sent.
The user profile, which is defined through the **'Users & User Groups'** settings, must contain a telephone number or E-Mail, needed for sending messages.

Text to Send

This property allows you to set a custom text which will then be used for SMS, Voice, Email and Fax notifications. When this property is left without a value, the sent string will be composed in the usual way by Movicon. This property cannot be modified using VBA language.

E-Mail

When enabling the E-Mail Alarm event notification via Alarm Dispatcher, an e-mail text will be sent containing the alarm text , while the object's email text will show the following information:

Alarm Area Name - Alarm Object or Device Name - Event Type

Attachment

In this selection box you can specify one or more files to be attached to the message to be sent to the recipient when needed. If there are more than one file to be sent use the ";" character as a separator (eg. File1.zip;File2.zip;File3.zip).
If is not specified the absolute files path, Movicon will search for these files within the setting folder for the Alarm Dispatcher (.dspt).
Note that this function is available starting from Build 956.

Send Email ON

This property activates or deactivates the sending of E-mail messages management. This management requires the E-mail Client and Server management tool installation, as well as the necessary modem and Internet connections.
The message will be sent upon the Alarm's intervention (ON).

Send Email ACK

This property activated of deactivates the send E-mail message management. This management requires the E-mail Client and Server management tool installation, as well as the necessary modem and Internet connections.
The message will be sent the moment in which the alarm is acknowledged (ACK).

Send Email RESET

This property activated or deactivates the send E-mail message management. This management requires the E-mail Client and Server management tool installation, as well as the necessary modem and Internet connections.
The message will be sent the moment in which the alarm is reset (RESET).

Send Email OFF

This property activated or deactivates the send E-mail message management. This management requires the E-mail Client and Server management tool installation, as well as the necessary modem and Internet connections.
The message will be sent the moment the alarm stops ringing, independently from the acknowledge or reset status.

Voice

Send Voice ON

This property activates or deactivates the voice message management. This management requires the enabling and configuring of the appropriate functions for sending voice messages (TAPI), and the installation of any other tools required as well as the configuring of any modem needed.
The message will be sent upon the Alarm's intervention (ON).

Send Voice ACK

This property activates or deactivates the send voice messages management. This management requires the enabling and configuring of the appropriate functions for sending voice messages (TAPI), and the installation of any other tools required as well as the configuring of any modem needed.
The message will be sent the moment in which the alarm is acknowledged (ACK).

Send Voice RESET

This property activates or deactivates the send voice messages management. This management requires the enabling and configuring of the appropriate functions for sending voice messages (TAPI), and the installation of any other tools required as well as the configuring of any modem needed.
The message will be sent the moment in which the alarm is reset (RESET).

Send Voice OFF

This property activates or deactivates the send voice messages management. This management requires the enabling and configuring of the appropriate functions for sending voice messages (TAPI), and the installation of any other tools required as well as the configuring of any modem needed.
The message will be sent the moment the alarm stops ringing, independently from the acknowledge or reset status.

SMS

Send SMS ON

This property activates or deactivates the send SMS management. This management requires the enabling and configuring of the appropriate functions for sending SMS messages and the eventual modem to be configured.
The message will be sent upon the Alarm's intervention (ON).

Send SMS ACK

This property activates or deactivates the send SMS management. This management requires the enabling and configuring of the appropriate functions for sending SMS messages and the eventual modem to be configured.
The message will be sent the moment in which the alarm is acknowledged (ACK).

Send SMS RESET

This property activates or deactivates the send SMS management. This management requires the enabling and configuring of the appropriate functions for sending SMS messages and the eventual modem to be configured.

The message will be sent the moment in which the alarm is reset (RESET).

Send SMS OFF

This property activates or deactivates the send SMS management. This management requires the enabling and configuring of the appropriate functions for sending SMS messages and the eventual modem to be configured.
The message will be sent the moment the alarm stops ringing, independently from the acknowledge or reset status.

Fax

Send FAX ON

This property activates or deactivates the send FAX management. This management requires the enabling and configuring of the appropriate functions for sending FAXES and the eventual modem to be configured.
The message will be sent upon the Alarm's intervention (ON).

Send FAX ACK

This property activated or deactivates the send FAX management. This management requires the enabling and configuring of the appropriate functions for sending FAXES and the eventual modem to be configured.
The message will be sent the moment in which the alarm is acknowledged (ACK).

Send FAX RESET

This property activates or deactivates the send FAX management. This management requires the enabling and configuring of the appropriate functions for sending FAXES and the eventual modem to be configured.
The message will be sent the moment in which the alarm is reset (RESET).

Send FAX OFF

This property activates or deactivates the send FAX management. This management requires the enabling and configuring of the appropriate functions for sending FAXES and the eventual modem to be configured.
The message will be sent the moment the alarm stops ringing, independently from the acknowledge or reset status.

19.11. Alarm Dispatcher

The **Alarm Dispatcher** is a software program for sending message and alarm notifications by using the various configured communication methods (PlugIn). The available communication technologies are:

- **SMS messages using SMPP protocol**
- **SMS messages using GSM**
- **Faxes**
- **Voice Messages (Vocal Synthesis)**
- **E-mails using SMTP protocol**
- **E-mail using MAPI**

The **Alarm Dispatcher** is accessed through the Movicon "Tools Menu". For further information on configuring the **Alarm Dispatcher** please refer to the specific program's Help (Appendix).

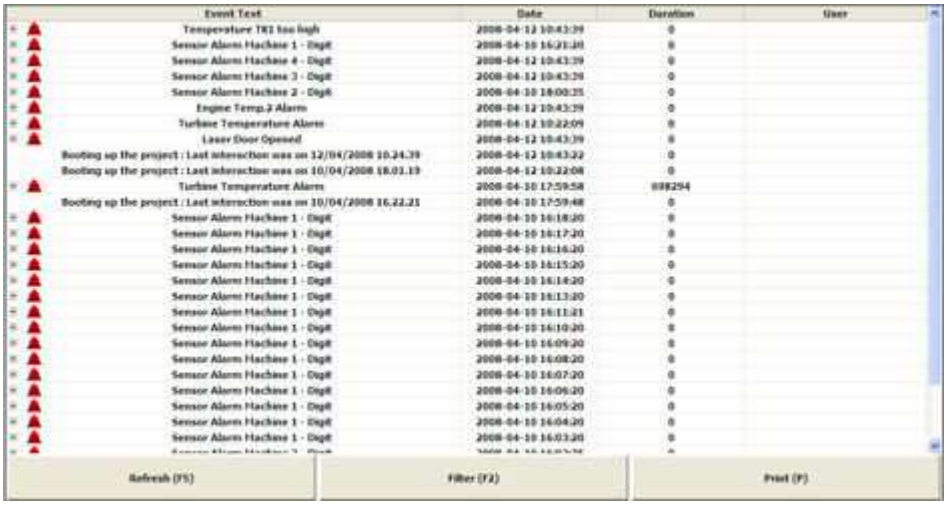
The dispatcher can manage message notifications with programmed delays, according to the severity of the alarm ("Settings->General"). All the pending messages, which therefore have not been sent, are rendered persistent by Movicon in the "ADPending.xml" file saved in the project's DATA sub-folder. In cases where Movicon is started up with messages still pending, the Alarm Dispatcher will also automatically start up to allow these pending messages to be sent.

The above described pending message manager is NOT supported on WinCE.

20. Historical Log

A project's Historical Log automatically manages the recording of plant alarms or events on archive files in database or text format.

In every supervision system the sequence of all significant events (Alarms, Messages) which verify during a project run must be recorded. Event recordings is therefore a basic functionality, and permits historical analysis of everything that happened while the plant was working. The Movicon function which records events on Log files is called the **Historical Log**.
The Historical Log's task is to record chronologically all the project events (Alarms, System Messages, Drivers Messages) which happened during the applied progress runtime process.
Recording takes place, according to the modalities described in the "**Historical Log Management**" chapter, which Movicon writes in appropriate files and displays logged information in the Log Window, one of the graphic objects which can be inserted from the toolbox into project screens.



The events which can be recorded in the Historical Log archive are:

- System operations (operator moves on system)
- System diagnostics (auto-diagnosis, Driver diagnosis)
- All the project Alarms considered important by the programmer
- Log On and Log Off of users
- Status change of variables associated to the Trace function
- The contents of plant variables associated to project strings on event established by the programmer
- Basic script logic messages coming from the "Debug.Print" function
- Basic script logic messages coming from the Trace functions
- Messages deriving from other applications established by the programmer

All the project alarms, if not specified otherwise in the properties, are recorded in the Historical Log. The programmer can then configure the alarm properties not to record in the historical log if desired.
The System and Driver Events are always recorded in the appropriate Log files. If you don't wish them to be displayed, set the log data display in the log window appropriately.

The recording of events and the database format must be configured in the **"Project Historical Log Settings"**.

The log data can be displayed through the appropriated **"Log Window"** and **"TraceDB Window"** windows which can be inserted into any project screen.

20.1. Log File Management

Movicon provides the possibility to use two different types of historical logs in managing files on disk:

- Standard ODBC
- IMDB

When using the standard ODBC, Movicon will use relational database tables and files as log files. Normally, files in this case are MsSQL Server or MsAccess type, but the ODBC formats of any Relational DB can be used (ie. Oracle or other).
The two different technologies are described in the corresponding chapters.

The type of archive choice does not change the fundamental way the Historical Log is used. In both cases Movicon will record events on files, and their contents will be automatically displayed in log windows.

- Nevertheless, it would be handy to remember that the use of standard ODBC offers you the advantage of managing a database in Relational DB, with many potentialities in terms of analysis and statistics with the use of the SQL language. However, in some cases the ODBC technology may be too much in terms of performances and resources required in reduced hardware devices such as embedded systems or those based on Windows CE (HMI or Mobile).

In conclusion the historical log format choice is, of course, in the hands of the programmer. Movicon, for default, will use the ODBC in desktop systems based on Wikn32 and IMDB in embedded systems based on Windows CE. The programmer may decide whether to use IMDB on desktop or force the use of ODBC in WinCE which requires ADOCE pre-installation to convert the ODBC links automatically in ADOCE in the devise. (ODBC is not supported by Window CE).

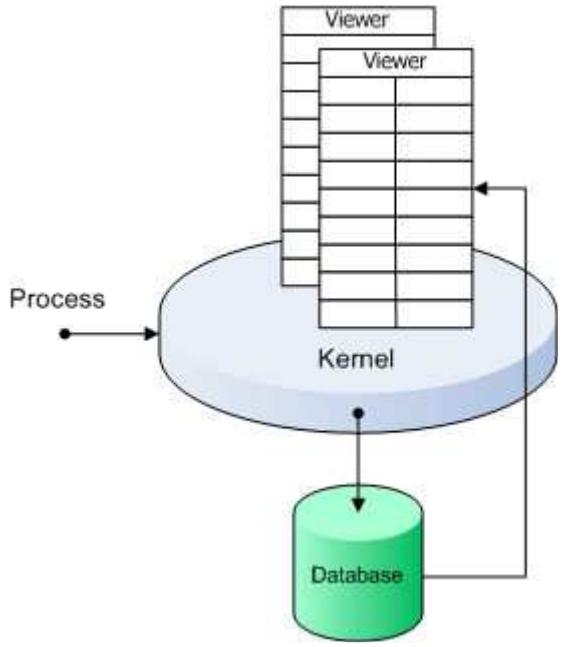
Note that with creating projects for Windows 32/64 bit, Movicon permits activation of automatic ODBC link creation to historical logs. IMDB use is not selected for default. When nothing has been selected, Movicon will use the ODBC links with historical logs based on SQL Server where possible, otherwise it will use MsAccess.
When creating projects for WinCE, Movicon will select the historicals based on IMDB for default.
All the default settings can be modified as pleased.

Log File Size

The size of the log files is set in the **"Project Historical Log Settings"** item in the project settings. The size or age is expressed in days and has been set at 180 days for default. This value can be set as desired.
The file size therefore depend on the data format used and by the number of events to be recorded by the system in the reset period.

20.1.1. Database Log File

The Database file containing Log information will be created by Movicon automatically in the project's 'LOGS' folder. Based on the file type chosen, the data available will be as indicated below.
In any case, the Log display windows access the files to show logged events on screen, independently from the type of file being used.



ODBC

Normally, in the Windows 32/64 bit environment, the use of logs based on Relational DB offers many advantages in terms of managing files, openness, analysis and statistics. Movicon, if not specified otherwise, will use the ODBC links for managing Log files on Windows 32/64 bit systems.
The Log file names, if not specified otherwise, will be "ProjectName_hisLog" in the project's "LOGS" folder. However, you can customize the file name and the **ODBC** links through the **"Project Historical Log Settings"** properties. Three different tables will then be created in the Database, each one will contain the data relating to a certain type of event.

Movicon, if not specified otherwise, will use ODBC in Windows 32/64 bit environments. The format it will use is MsSQL Server or MsAccess as an alternative. When unable to create files and connections automatically, Movicon will alert with a message where you may then need to use the ODBC link manually of use the IMDB.

IMDB

The log file management in **IMDB** (InMemory DB) is a valid alternative to Relational DB, which is ideal for embedded systems with limited recourses or based on Windows CE or Pocket PC.
The IMDB does not use ODBC and managed log files in text mode, by managing data in memory and unloading it on files at preset time interval. Filed data can be based on XML, on simple text or crypted.
The advantaged of using this management as an alternative to the potentialities used by the ODBC are:

1. Increased performances
2. Minimum resources required
3. Date base can be crypted against unauthorized access.

Movicon, if not specified differently, will use IMDB in WinCE environments. When the programmer is obliged to setup the ODBC management, Movicon will automatically to convert the project's ODBC links to ADOCE links in the device. This however, requires the implementation of the ADOCE components on the device.

Data Tables

The Log file archive tables are:

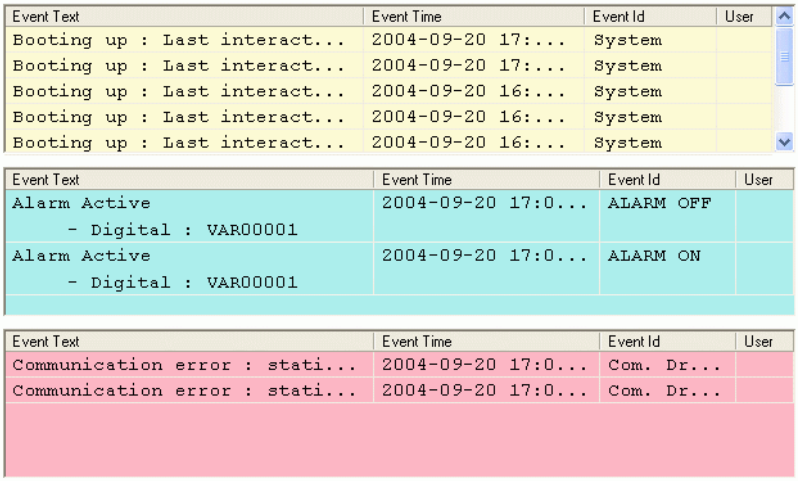
- **Alarms:** contains the project's alarm messages
- **Drivers:** contains messages coming from the project's Communication Drivers
- **SysMsgs:** contains the project's system messages

Each one of these tables has the following structure:

- **Time Column (TimeCol):** reports the date and time of the recording in GMT (Greenwich Mean Time)
- **Local Time Column (LocalCol):** reports the date and time of the recording in local time
- **MSec Column (MSecCol):** reports the milliseconds relating to the time of the recording
- **User Column (UserCol):** the name of the user logged in the project will be recorded in this field only if the recorded event was prompted by that user (e.g. by a button, etc.)
- **Event Column (EventCol):** reports the event type recorded (E.g. Alarm ON, Alarm OFF, System, etc)
- **Event Number Column (EvNumCol):** reports an ID number of the event recorded
- **Event Description Column (EvDescCol):** reports the event description
- **Description Column (DescCol):** reports information about the event type
- **Comment Column (CommCol):** reports information about the event type
- **Duration Column (DurCol):** reports the duration time of the event in question
- **Unique ID Column (UniID):** reports the alarm's unique ID (value valid for the "Alarms" table only)
- **Transaction ID Column (TraID):** reports the alarm's transaction ID (value valid for the "Alarms" table only)

The active user name is recorded in the Table's User column only when the event recorded was prompted by that user. For instance in the Alarms Table, the active user will only be recorded for the "Alarm ACK" and Alarm RESET" events but not for the "Alarm ON" and "Alarm OFF" events.

However the names of the database columns can be customized through the **"Project Historical Log Settings"**.



Event Text	Event Time	Event Id	User
Booting up : Last interact...	2004-09-20 17:...	System	
Booting up : Last interact...	2004-09-20 17:...	System	
Booting up : Last interact...	2004-09-20 16:...	System	
Booting up : Last interact...	2004-09-20 16:...	System	
Booting up : Last interact...	2004-09-20 16:...	System	

Event Text	Event Time	Event Id	User
Alarm Active - Digital : VAR00001	2004-09-20 17:0...	ALARM OFF	
Alarm Active - Digital : VAR00001	2004-09-20 17:0...	ALARM ON	

Event Text	Event Time	Event Id	User
Communication error : stati...	2004-09-20 17:0...	Com. Dr...	
Communication error : stati...	2004-09-20 17:0...	Com. Dr...	

An Example of a Log Window containing data taken from the three log tables.

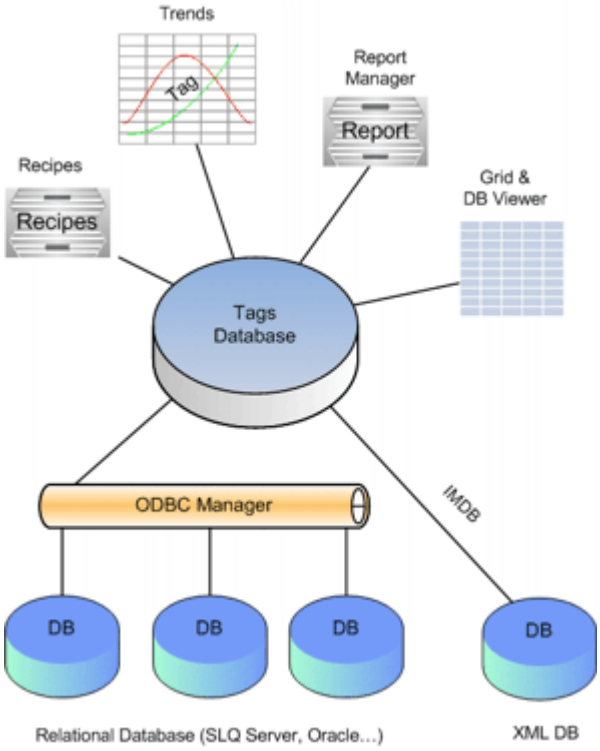
21. Historical Files Management

The Movicon recording engines allow process data to historically logged in two alternative modes. You can either use the ODBC standard or the IMDB technology.

Usually, a supervision project has, among other tasks, to record and log process data on files, whether this be significant events or messages, process information (variables/tags) which are traced and recorded at timed intervals on event or change.
Movicon provides you with the possibility to use two different types of management for recording historical data on files:

- Standard ODBC (Open Database Connectivity)
- IMDB (InMemory DB)

When using the standard ODBC, Movicon will use relational database tables and files as log files. Normally, the files in this case are MsSQL Server type or MsAccess, but ODBC formats from any Relational DB can be used (ie. Oracle or other).
When using the IMDB, Movicon will record historical log data in text mode, which can be structured in XML or crypt.
These two different technologies are described in the corresponding chapters.



A system structure for the historical log management.

The type of archive choice does not change the fundamental way the Historical Log is used. In both cases Movicon will record events on files, and their contents will be automatically displayed in log windows.

- Nevertheless, it would be handy to remember that the use of standard ODBC offers you the advantage of managing a database in Relational DB, with many potentialities in terms of analysis and statistics with the use of the SQL language. However, in some cases the ODBC technology may be too much in terms of performances and resources required in reduced hardware devices such as embedded systems or those based on Windows CE (HMI or Mobile).

In conclusion the historical log format choice is, of course, in the hands of the programmer. Movicon, for default, will use the ODBC in desktop systems based on Wikn32 and IMDB in embedded systems based on Windows CE. The programmer may decide whether to use IMDB on desktop or force the use of ODBC in WinCE which requires ADOCE pre-installation to convert the ODBC links automatically in ADOCE in the devise (ODBC is not supported by Window CE).

Note that with creating projects for Windows 32/64 bit, Movicon permits activation of automatic ODBC link creation to historical logs. IMDB use is not selected for default. When nothing has been selected, Movicon will use the ODBC links with historical logs based on SQL Server where possible, otherwise it will use MsAccess.
When creating projects for WinCE, Movicon will select the historicals based on IMDB for default.
All the default settings can be modified as pleased.

WARNING: Data Loggers or Recipes based on IMDB do not support reports created with the "Report Designer" and "Crystal Reports". If the case need be use historicals in the ODBC.

Archive sizes

The file size is set in the **"Project Historical Log Settings"** item in the project settings for the Historical Log and is set in the respective Data Logger Recording Time Properties or the DB trace objects. The size or age is expressed in days and has been set at 180 days for default. This value can be set as desired.
The file size therefore depend on the data format used and by the number of events to be recorded by the system in the reset period.

Recording and life span of historically logged data in the database from project rescources are subject to continuous recycling and updating during the project execution in runtime mode. The frequency with which the DELETE queries will be executed towards the historical log database is represented in minimum time units relating to the set maximum duration. Meaning that the DELETE querywill be executed:

- every minute, if the historical log age is higher tha a minute but lower that an hour
- every hour, if the historical log age is higher than an hour but lower than one day
- every day, if the historical log age is more than one day.

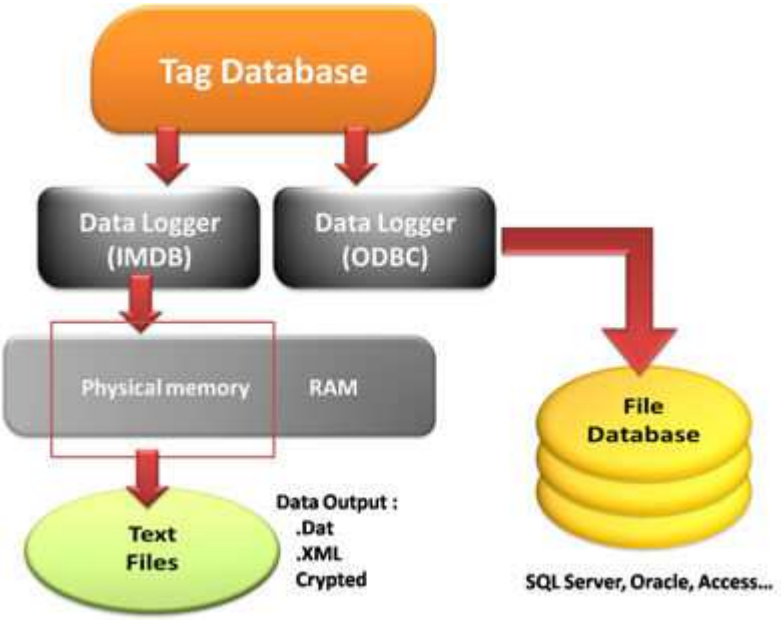
The DELETE query will always be executed before putting into effect the INSERT query relating to new data to be recorded.

21.1. ODBC Standard

Movicon fully supports the Open Data Base Connectivity standard allowing data to be saved in standard format and real-time links to external databases.

The Open Data Base Connectivity (ODBC) is the Microsoft standard which consents applications to organize data in database files in the specific format of any other application enabled to support this standard.
By using this technique you can knock down the data exchange barriers between different formats.

For example with the ODBC you can record data from the Historical Log or record with the Data Logger and Recipe tables data containing Movicon variables.
The data can be archived, by using the ODBC link, in the user's preferred format. If the user has a management system based on MsAccess™ or SQL Server, s/he can read and manipulate the data recorded by Movicon according to their own requirements.



Movicon carries out data recordings by using the ODBC standard. The ODBC link interprets the data to be recorded according to how it has been configured and carries out the recording in the corresponding format through the ODBC driver of the preferred database application. The file or files will therefore contain Movicon data, which will actually be recorded in the format requested by the ODBC system.

Movicon is independent from the data format used, seeing as the driver is property of the database and the operating system's ODBC manager being the means of putting the writing of data into effect.
ODBC is a Microsoft standard and the ODBC manager files (drivers) are property of the respective owner of each single Database application. For further information please refer to the ODBC online guide or to the current bibliography available from Microsoft or the makers of the database being used.

21.1.1. ODBC Drivers

In order for Movicon to log historical data on files in standard ODBC format, the Windows OS needs to be equipped with the appropriate ODBC drivers for the chosen database product.
During a normal installation Movicon sees to it that the necessary files are installed for the ODBC management and drivers forMsAccess™. To install the SQL Server™ driver you will need to install "SQL Server 2005 Express" which can be found on the Movicon installation DVD. In this way Movicion will install the "SQL Server 2005 Express" kit which integrates the Runtime management of the SQL Server database only.

Movicon is predisposed for installing ODBC drivers from Microsoft Access and SQL Server 2005 Express products.
When using other database products you will need to check whether the relevant ODBC driver supplied by the manufactures has been installed.

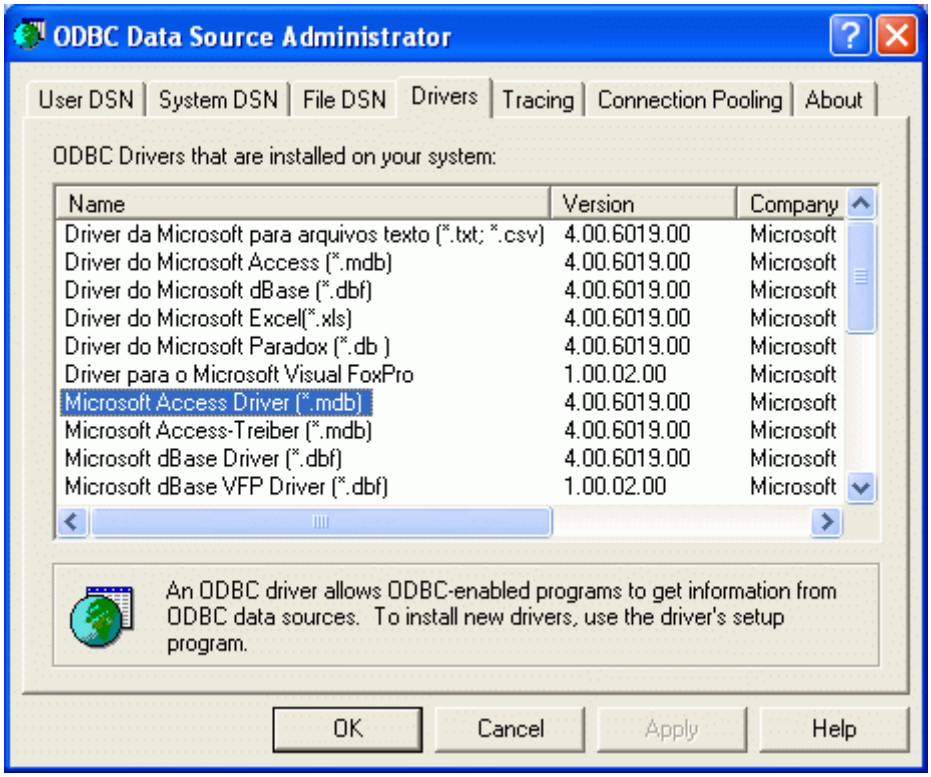
The operating system, however, provides a series of ODBC drivers already available in different formats (Paradox, FoxPro, dBase, ecc.), which can be accessed just like all the other ODBC settings from the **'Administrator Tools - ODBC Data Source'** item on the **'Control Panel'.**

21.1.2. ODBC Links

In order for an application to record data by means of the ODBC standard, as well as to dispose the chosen data format of the ODBC driver, you will need to create a **'Link'** between the Server application, the table and the destination file, in which the values from the ODBC driver will be written.

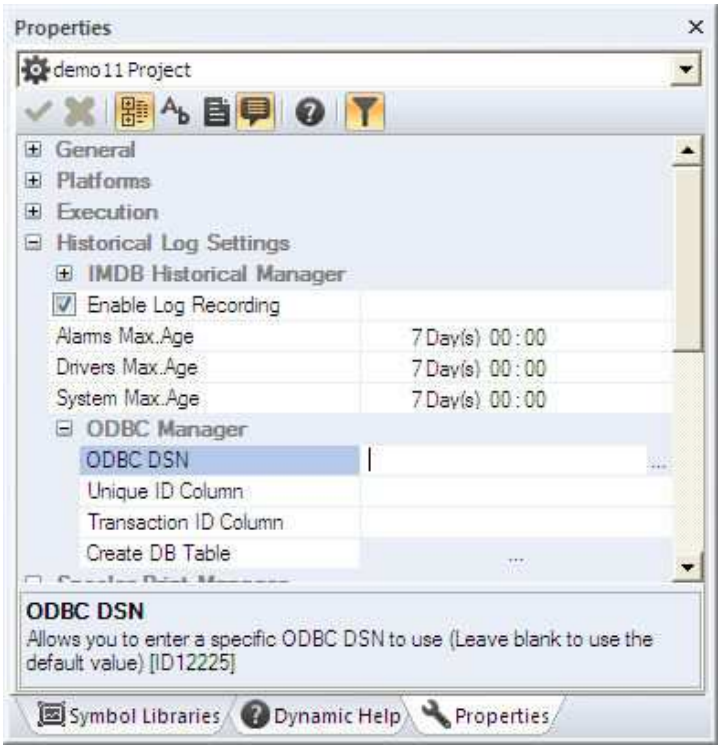
It is through this 'Link with the ODBC driver that enables a resource from a Movicon project application to record data on file. The ODBC links must all be registered in the operating system through the appropriate ODBC system settings from the **'Administrator Tools - ODBC Data Source'** item on the **'Control Panel'**. However, Movicon is provided with a guide tool (Auto-configure) to create ODBC links for all the resources or functionalities permitting their use.

The ODBC link is the tool through which an application is linked to the ODBC driver so that it can write or read data using an external format. The ODBC driver standard is based on the specifications defined by Microsoft.



This window shows the list of ODBC drivers usually currently existing in the Windows OS, according to the installation standards. Other drivers can be added when installing other compatible ODBC applications.

ODBC link can be configured by setting the data manually, by activating he ODBC system from Movicon or from the Windows' 'Control Panel, by activating the icon as shown in the above figure.
To make the configuring operation easier, Movicon automatically creates the ODBC links and the database files relating to the most commonly used components being Data Loggers, Recipes, Historical Log, Variable Tracer, etc.
These links and files created for default by Movicon naturally have a predefined name which also includes the project's name. The automatic creation consents you to create links (eg, file and/or table if required) in MsAccess™ or in the format set in the project's "Plugin ODBC Default" property.
However, you can execute the create a customized ODBC link and relating database file by exploiting a **Wizard** left at your disposition by Movicon to make this operation easier, so you don't have to enter the configuration through the Operating System's 'Control Panel'. The resources which can interact with the database through ODBC links have a field in their 'Properties Windows' for creating customized ODBC links. The Wizard procedure, for creating the links, is started by clicking the **"..."** button positioned on the right hand side of the edit box:



ATTENTION! Even though Microsoft also provides a ODBC driver for Excel™ it is not a Database, but an electronic sheet. It is for this reason that Excel™ does not support all the SQL commands compatible with the most common Databases
and therefore Excel™ cannot be used as if it were a database. The Movicon resources, such as the Data Loggers, Recipes, Historical Log, Variable Tracer, etc., cannot therefore be managed through ODBC links to Excel™ files.

The ORACLE's ODBC driver has some special requirements that force the programmer to observe some specific rules creating the project links. These rules are:

a. All the column's names **must be written with upper case**. Due to this, it's necessary to change the standard column name of any historical table, using the related properties. For instance, the column TimeCol must become TIMECOL.
b. Spaces inside columns and tables name are not allowed.
c. Columns and Tables names cannot begin with a number.
d. Some data types are not supported, and the Oracle ODBC driver uses NVARCHAR also for numeric types (byte, word, integer). This is not a problem when data are displayed using the standard Movicon object windows.

21.1.3. Saving data on file in the event of ODBC error

If a Log (historical Log, DataLogger or Variable TraceDB) ODBC connection error should occur while running a project thus disabling Movicon to record data on database, this data will be buffered and loaded onto text files as a safety measure. When the ODBC connection is restored, Movicon will also restore the data saved on text file in the relative database using the "RestoreFlushedData.exe" tool. The text files, or Flash files, that Movicon creates when a ODBC connection occurs, will be given a name and location according to log type. The possibilities are as follows:

Historical Log
When an ODBC error occurs, Flash files relating to the three Historical Log tables will be created in the project's "LOGS" folder with the same name of the relating table and "HisLogEx" extension:

- **SysMsgs.HisLogEx**: system messages "SysMsgs" table Flush file
- **Alarms.HisLogEx**: alarm messages "Alarms" table Flush file
- **Drivers.HisLogEx**: communication driver messages "Drivers" Flush file

DataLogger
When an ODBC error occurs, Flash files relating to the project's DataLoggers will be created in the "DLOGGERS" folder. A Flush file will be created for each DataLogger defined in the project with the same DataLogger table name and "DataLoggerEx" extension:

- **DataLogger1.DataLoggerEx**: Flush file relatiing to DataLogger1
- **DataLogger2.DataLoggerEx**: Flush file relating to DataLogger2
- .....

Variable TraceDB
When an ODBC connection error occurs, Flash files relating to the variables in the project's TraceDB will be created in the project's "DATA" folder. A Flush file will be created for each varialbe in the TraceDB defined in the project with the same name of the relating variable table and "TraceDBEx" extension:

- **VAR00001.TraceDBEx**: Flush file relating to the VAR00001 variable
- **VAR00002.TraceDBEx**: Flush file relating to the VAR00002 variable

The names of data Flush files will be created with the same names relating to the tables they refer to. Therefore, if customized names have been given to the Historical Log, DataLogger or Variable TraceDB tables, the Flush files will be created with these customized names.

When an ODBC error is verified, data is buffered in memory and unloaded into Flush files a bit at a time. Therefore, when stopping the project, the last data bufferized and not yet unloaded onto file will be lost.

Restoring Flush Files

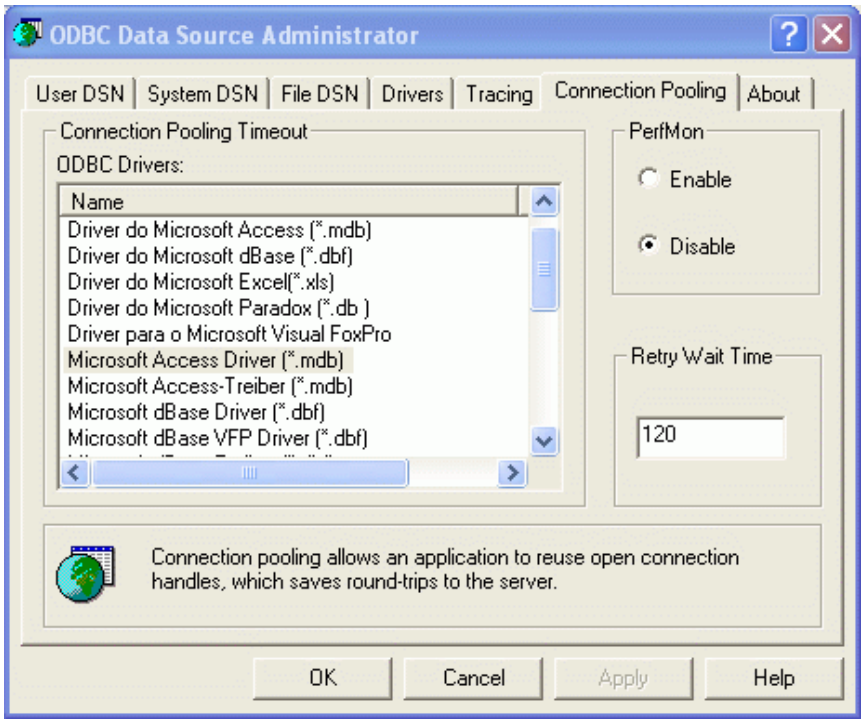
Flush files are restored within the database tables when the ODBC connection reactivates back to normal, after which these files are then deleted. If Flush Files are also found by Movicon at project startup, they will be restored if the ODBC connection is active as well.

In circumstances where a Flush file is damaged and Movicon cannot interpret it correctly, the file's extension will be renamed with the "_oldformat" suffix (".HisLogEx_oldformat", "DataLoggerEx_oldformat", "TraceDBEx_oldformat") and not deleted. In cases like this, the "RestoreFlushedData.exe" tool will not be able to restore such files back to the database.

Flush files in the "LOGS", "DLOGGERS" and "DATA" folders may be found when importing projects from versions prior to 11.2.1085. These Flash files will not be restored in the database if their format is different from the one required by the "RestoreFlushedData.exe" tool.

21.1.4. Connection Pooling

Starting from the 3.5 version of the Windows ODBC manager a **'Connection Pooling'** tab has been added in which you can enable the pool management for each single ODBC driver.



The connection pooling consents the user's application to use one of the available connections in a pool so it does not have to be restored each time it is used. This is because the moment a connection has been created, it is placed in a pool to be re-used by the application to avoid having to carry out the whole connection procedure again hence improved performances.

Always check whether the ODBC driver supports the pool management before enabling it.

21.1.5. Project ODBC Plugins

Movicon manages ODBC connection creations using the plugins contained in a Movicon installation subfolder called "ODBCMgr".
When in the process of creating a new project using the wizard ("DataBase Settings (ODBC)"), you will be asked to choose which database format to use for default. The options are:

- **MSAccess**: MS Access (uses the "Microsoft Access Driver (*.mdb)" driver. This is the predefined default choice)
- **MySQL**: MySQL 5.1 (uses the driver installed with this version of MySQL)
- **OracleEx10**: Oracle Express (uses the client-less driver installed with this version of Oracle)
- **SQLServer2000**: MS SQL Server 2000 (uses the "SQL Server" driver)
- **SQLServer2005**: MS SQL Server 2005 (uses the "SQL Native Client" driver)
- **SQLServer2008**: MS SQL Server 2008 (uses the "SQL Native Client 10.0" driver)
- **SQLServerExp2000**: MS SQL Express 2005 (uses the "SQL Native Client" driver)
- **SQLServerExp2008**: MS SQL Express 2008 (uses the "SQL Native Client 10.0" driver)

Once the project has been created with wizard, the chosen default plugin (using the " DataBase Settings (ODBC)" window) will be indicated in the project's "Plugin ODBC Default" property and can be changed afterwards if need be. The "Settings ODBC" command in the project's General properties allow you to modify the connection parameters, in the same way as the wizard's "Customize ODBC Settings" command. these parameters are saved in the "pluginname.settings" configuration file (i.e. SQLExpress2005.settings) in the ODBCMgr. folder. The configuration xml file structure type will be:

```
<?xml version="1.0" encoding="UTF-16"?>
<parameters>
   <ID text="Driver">SQL Server</ID>
   <ID text="SERVER">PCTEST\SQL2000</ID>
   <ID text="DATABASE">prjSql2000</ID>
   <ID text="Trusted_Connection">yes</ID>
   <ID text="Description"></ID>
   </parameters>
```

The settings file gets saved in the project's "DATA" folder when it is run for the first time so that the parameters become specific to that project only.
The default ODBC plugin will be used by Movicon each time a new ODBC DSN connection needs to be created.
The MSAccess default value is used for projects created with the "Template" or "Empty project" wizards or pre-existing projects that do not have the "Plugin ODBC Default" property.

21.1.6. ODBC Plugin List

ODBC connections are created by using plugins found in the "ODBCMgr" folder. Movicon installs some predefined plugins but other customized ones can be added in order to be used with different databases.
The meanings of the different parameters which must be configured using the "for the different plugins are briefly described below and are configured using the "Customize ODBC Settings" or "ODBC Settings" command for the different plugins.

MS Access
Driver: this is the ODBC driver used by Movicon for connecting to the database. Default value: "Microsoft Access Driver (*.mdb)" (driver preinstalled by Movicon).
Database: this is the name of the .mdb database which will be created in the project's "DLOGGERS" subfolder and which the created ODBC connections is referred to. If this field is left empty, the database's name will be the same as the project's name.

MS SQL Server 2000, 2005, 2005 Express, 2008 and 2008 Express
Driver: this is the ODBC driver used by Movicon for connecting with the database. The default values are:
MS SQL Server 2000->"SQL Server"
MS SQL Server 2005->"SQL Native Client"
MS SQL Server 2008 and 2008 Express->"SQL Server Native Client 10.0"
Server: this is the name of the SQL Server instance to connect to. This can be local or on a network pc. In this case the parameter will have the
PCName\InstanceName format. Default value: (local). Default value for MS SQL Server 2005 Express: .\SQLEXPRESS.
Database: this is the name of the database which will be created in relation to the instance specified in the "server" parameter. If this field is left empty, the database's name will be the same as the project's name.

The plugin uses a "Trusted connection", meaning that it uses Windows authentication. If you wish to use another authentication type, you can modify the ODBC connection manually once created.

MySQL 5.1
Driver: this is the ODBC driver used by Movicon for connecting to the database. Default value: "MySQL ODBC 5.1 Driver".

Server: this is the name of the MySQL instance which to connect to. It can be local or on a network pc. Default value: localhost.
Database: this is the name of the database which will be created in relation to the instance specified in the "server" parameter. If this field is left empty, the database's name will be the same as the project's name.
User and **Password**: are the name of the user and their password respectively which are used for connecting to the MySQL instance. This data is saved in the settings file without being encrypted. In order to keep passwords secret, they can be inserted using the"Administration tools - Source ODBC" "Control Panel" item after the ODBC has been created.

Oracle Express
Driver:this is the ODBC driver used by Movicon for connecting to the database. Default value: "ORACLE in XE".
Server: this is the name of the Oracle instance which to connect to. It can be local or on a network pc. Default value: XE.
Database: warning: in Oracle the entity underneath where the Movicon data tables will be created it not a database but a "Database user" or "schema" that is created with the name set here relating to the instance specified in the "server" parameter. If this field is left empty, the database's name will be the same as the project's name.
User and **Password**: are the name of the user and their password respectively which are used for connecting to the Oracle instance. This data is saved in the settings file without being encrypted. In order to keep passwords secret, they can be inserted using the"Administration tools - Source ODBC"" "Control Panel" item after the ODBC has been created.

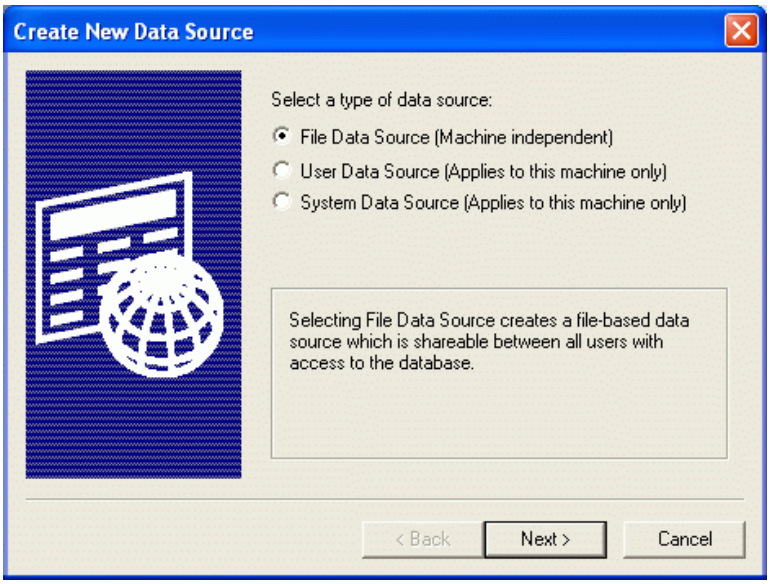
21.1.7. Creating ODBC links automatically

The first thing Movicon does at Startup is check for any existing ODBC links and only when none exist does it create one by using the provider set in the project's "Plugin ODBC Default" property. An exception is made for the 'Recreate All' command in the properties of the resources which use ODBC. In this case the link is created (using the default provider MSAccess), when the existing one does not allow database connectivity.

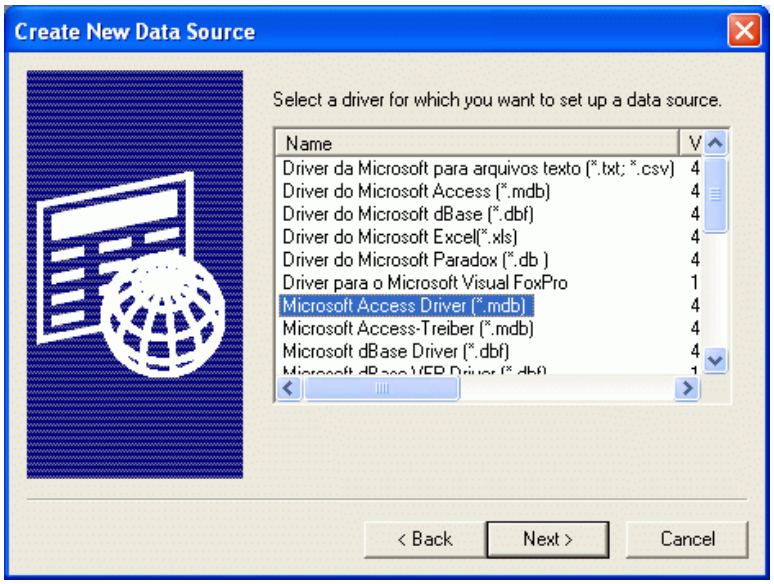
21.1.8. Creating ODBC Links Manually

By selecting the customized create ODBC Manual Link, you will need to configure the necessary data to get an ODBC link. The procedure, as already seen, is a Movicon Wizard, therefore the programmer will be guided through each step. When clicking on the **"..."** button found on the right hand side of the **"ODBC DSN"** property introduction field of the resources which support the ODBC links, the following procedure will display:

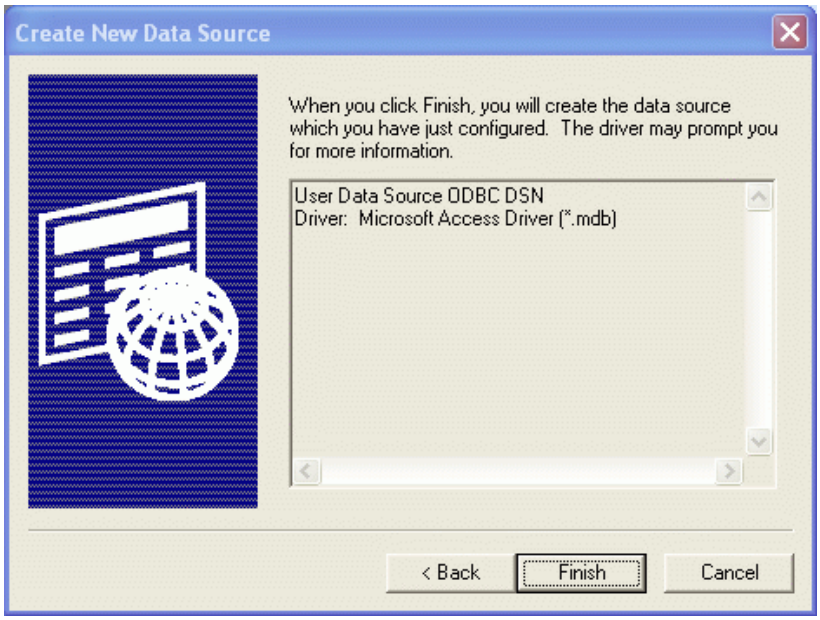
1. The first thing you will be asked is to select the type of ODBC data source. The most common selections are usually 'User Data Source' or 'System Data Source':



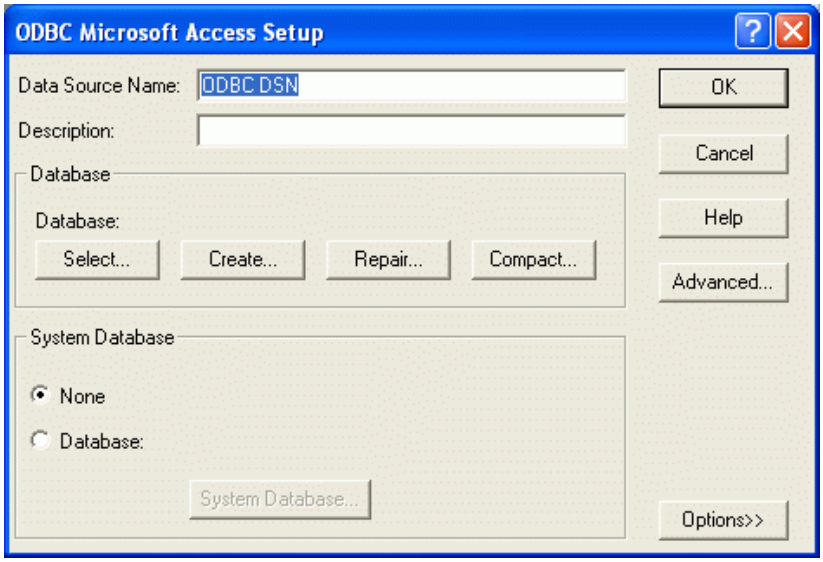
2. At this point you will need to select the ODBC driver you intend to use:



3. **From this moment onwards the configuration windows which will be proposed depend upon the type of driver you selected. Therefore we suggest you consult either the application's manual or the Microsoft ODBC guide or the Database application to be linked.** To continue our demonstration we will select the Microsoft Access driver as an example, seeing that it is the most used, to display the following window:



4. The last proposed window will permit you to define the name of the ODBC link (data source name) and the associated Database file:



If the Database file already exists in the PC, you only need to use the **'Select...'** button to select it. On the other-hand if the file has not yet been created you will have to create it by using the **'Create...'** button.
Confirm and terminate the create ODBC Link procedure with the 'OK' button.

21.1.9. Using the SQL Server

If you decide to use the SQL Server format, you can install the "SQL Server Express" version found in the Movicon installation DVD. However you can use all the different versions of SQL Server, MSDE 2000, SQL Server 2008 Express, SQL Server 2000, SQL Server 2005 e SQL Server 2008. In this case, the programmer must decide which version to used and install it on the PC.
Before connecting with ODBC with SQL server data formatting, you will need to make sure that the Microsoft SQL Server service is already running by checking the Control Panel - Administrative tools - services to see if this service is active.

The tables created in MS SQL Server are created with a "clustered" index in the "TimeCol" column. this allows the highest performances to be obtained when retrieving data sorted out according to that column, being operations which Movicon objects usually do.

21.1.10. Using the ORACLE

Movicon consents to recording data in ORACLE databases requiring that the ORACLE ODBC driver be installed.
The ORACLE ODBC driver however has certain characteristics that obliges the user to observe a few regulations when creating projects. These regulations are:

1. All the column names must be written with capital letters (uppercase). Therefore this requires that the standard column names of the project's historicals be changed through their appropriate properties. For instance, TimeCol would become TIMECOL (or with a custom name but in capitals)
2. Spaces are not allowed in the table and column names
3. Table and column names cannot begin with a number
4. Many data types are not supported, and the Oracle ODBC driver also uses NVARCHAR for numeric types (byte, word, integer). However, this will not cause any problems when data is displayed in the standard Movicon windows

Creating the ODBC connection towards the ORACLE database in the Movicon project can be done by using the appropriate plug-in available in the project's "Project ODBC Plugins" general properties. However, this task can always be done manually by inserting a custom DSN in the historical log's "ODBC DSN" property. In this case, it will also be necessary to create a user with same name and password belonging to the user defined in the ORACLE database. This Movicon user must then be inserted in the historical log "ODBC DSN User" property.

When using recipes in the project, you will need to define the name of each of the "TimeCol", "LocalCol"and "RecipeIndex" columns so that they are unique in respect to the other project table column names. These three columns cannot have the same names as those already assigned to the other Recipes, Data Loggers or historicals (Historical Log, TraceDB, etc.) in the project (or of any other project using the same ORACLE database). This restriction was made evident due to the fact that ORACLE uses unique column index names, thereby two indexes with the same names are not acceptable even when belonging to different tables. Seeing that Movicon indexes tables with these three columns ("TimeCol", "LocalCol"and "RecipeIndex"), in respect to record uniqueness for a same recipe key, you will need to carry out the above described procedures. Otherwise, ORACLE will not create indexes for these tables and each time an already existing recipe is saved, it will not get updated but inserted as a new record with the same "Recipe Index" instead (resulting as a duplication of the same record).
It is for this reason that Historical Log tables (SysMsgs, Alarms and Drivers) cannot be indexed as, in this case, it will not be possible to customize the "TimeCol" and "LocalCol" column names for all three tables (the settings are unique for all three tables). This would simply slow down data accessing performances due to too much data. This can be avoided by inserting the indexes in the database tables manually.

21.1.11. Caution when using different DataBases

When using the ODBC Drivers, Movicon allows you to choose which database to use for recording historical data (Historical Log, Data Logger, Recipes, Variable Trace, etc.). However, especially when creating projects, you must take into complete consideration which limits and restrictions your chosen database have. The first thing to do is check whether the database you plan to use provides ODBC drivers that are compatible with the operating system in use, then you will need to take into consideration any existing restrictions while creating your project. The Movicon database management has been optimized for "SQL Server" use but it easily adapts to using many other databases as well. By using the "Plugin ODBC del Progetto" you can select a database to use from among the most popular ones currently available or manually create a ODBC (DSN) link towards any Plugin not listed.
Another thing is to remember is that Movicon is "case-sensitive" when managing names of database tables and columns as well as user names. Furthermore, Movicon also supports spaces in names which can also begin with a number. However, this kind of syntax management is not supported by

all databases. For instance when using "ORACLE", names of columns, table and users must always begin with a capital letter in contrast to the "PostreSQL" database where all table and column names must all be in lowercase. If you use databases such as these, you must make sure you structure the database tables in your project according to their imposed restrictions.
In addition, the use of spaces in DataBase table and column names may vary from DataBase to DataBase. Infact, in table creation queries or table access queries, certain syntax must be used according to the Database in question. In this case, names containing spaces are enclosed between specific characters. To remedy this problem you can use the "ODBCTokenForSpaces" registry key to define which character must be used for default in cases where table and column names contain spaces.

To avoid problems of this sort we suggest you use texts in table and column names as indicated below:

names should not start with a number or a "_" character
names should not contain spaces. Any spaces in names would be best replaced with the "_" character.

The most used databases require the following syntax as listed below:

SQL Server, SQL Server CE and MS Access

These databases require the use of squared brackets when table and column names contain spaces. For example, sql code for creating these types of database tables would be:

```
CREATE TABLE [dbo].[ALARMS TAB](
[TIME COL] [datetime] NULL,
[MSEC COL] [smallint] NULL,
[LOCAL COL] [datetime] NULL,
[USER COL] [nvarchar](255) NULL,
[EVENT COL] [nvarchar](24) NULL,
[EVNUM COL] [smallint] NULL,
[DESC COL] [nvarchar](255) NULL,
[EVDESC COL] [nvarchar](255) NULL,
[COMM COL] [nvarchar](255) NULL,
[DUR COL] [int] NULL,
[UNIID COL] [int] NULL,
[TRAID COL] [int] NULL)
```

ORACLE

ORACLE requires the use of double speech marks when table or column names contain spaces. For example, sql code for creating a database table of this type would be:

```
CREATE TABLE "DA0760"."ALARMS TAB"
("TIME COL" TIMESTAMP (6),
"MSEC COL" NVARCHAR2(24),
"LOCAL COL" TIMESTAMP (6),
"USER COL" NVARCHAR2(255),
"EVENT COL" NVARCHAR2(24),
"EVNUM COL" NVARCHAR2(24),
"EVDESC COL" NVARCHAR2(255),
"DESC COL" NVARCHAR2(255),
"COMM COL" NVARCHAR2(255),
"DUR COL" NVARCHAR2(24),
"UNIID COL" NVARCHAR2(24),
"TRAID COL" NVARCHAR2(24)
) SEGMENT CREATION DEFERRED
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
TABLESPACE "USERS" ;
```

MySQL

MySQL requires the use of the [`] character, ASCII 96 (60 HEX) code, when table or columns names contain spaces. For example, sql code for creating a database table or column of this type would be:

```
CREATE TABLE `da0760`.`ALARMS TAB` (
`TIME COL` datetime DEFAULT NULL,
`MSEC COL` smallint(6) DEFAULT NULL,
`LOCAL COL` datetime DEFAULT NULL,
```

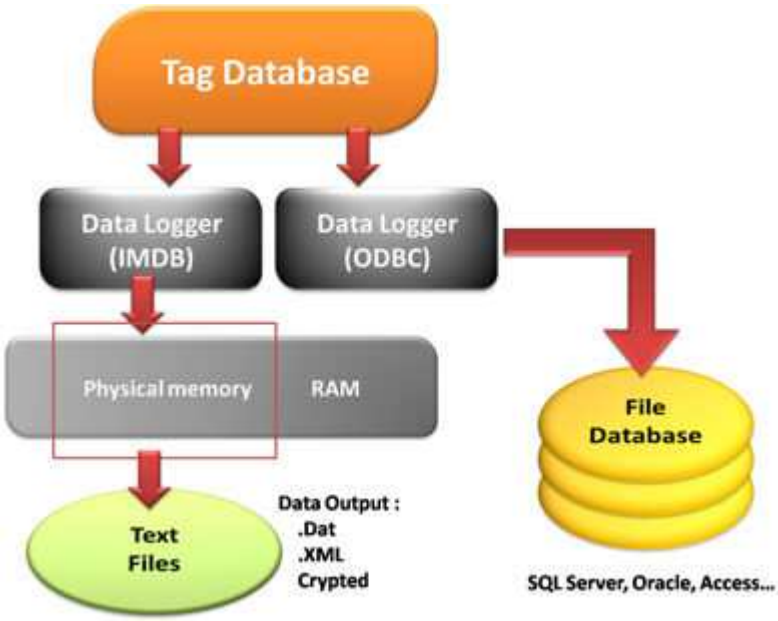
```
`USER COL` varchar(255) DEFAULT NULL,
`EVENT COL` varchar(24) DEFAULT NULL,
`EVNUM COL` smallint(6) DEFAULT NULL,
`EVDESC COL` varchar(255) DEFAULT NULL,
`DESC COL` varchar(255) DEFAULT NULL,
`COMM COL` varchar(255) DEFAULT NULL,
`DUR COL` int(11) DEFAULT NULL,
`UNIID COL` int(11) DEFAULT NULL,
`TRAID COL` int(11) DEFAULT NULL);
```

21.2. IMDB (In Memory DB)

The IMDB manager (In Memory DB) of historicals allows data to be saved in text and xml format.

The Movicon historicals management can be executed through the IMDB manager which allows data to be saved in text and XML format. This functionality can be used as an interesting alternative to the using the ODBC Manager, to allow you to obtain historical archives in text format (file ".dat"), in clear or crypted as well as XML format (file ".xml"). By doing this you get the advantage of getting better performances by avoiding the 'layer' of ODBC software and the possibility to cript data in proprietor format, even if you give up using relational Databases formats.

Only ".dat" text format files can be encrypted by selecting the appropriate property, while files in xml format, if enabled, will result always in clear.



By using the IMDB in devices based on Windows CE, there is no longer the need to convert the ODBC links to ADOCE, thus the ADOCE component and the SQL Server CE installed on the devise are no longer needed which will improve the device performances.

The IMDB manager, with the exclusive Progea technology, manages a memory buffer in which data is placed and then unloaded on file at fixed time intervals The unloading data on file time can be configured through the appropriate properties of the log engine (ie. Data Logger, Log).
All the data query functions are supported as if managed by a database manager. This function can be activated with a specific option in the historical log, data logger and in the db trace. It is not

possible to use this technology in the "Real Time DBMS" as it wouldn't be necessary to use it in that context.
Data is recorded on text files with the ".dat" extension. When the project is started up, Movicon will create table in memory by loading data from these back-u' files. The files can also be saved in XML format.

The"UNION" clause for the data extraction query is not support by the IMDB. Therefore the "Historical Log Window" will only display system messages even when set to view all message types.

WARNING: Data Loggers or Recipes based on IMDB do not support reports created with the "Report Designer" and "Crystal Reports". If the case need be use historicals in the ODBC.

21.2.1. IMDB Settings for Recording data

Some of the parameters which are used for the IMDB parameters are the same ones used whether recording a historical Log, a Data Logger or a variable trace, etc. The significance of these parameters are described Below:

Use IMDB Manager

Enables the use of the IMDB manager to record data. In this case data will not be recorded in DataBase format through the ODBC drivers.

The"UNION" clause for the data extraction query is not support by the IMDB. Therefore the "Historical Log Window" will only display system messages even when set to view all message types.

A "The table <Table Name> has been created" message will be shown in the output window upon each project startup. The difference in messages when recording with IMDB and not ODBC is that messages for IMDB do not indicate table creations in physical databases but indicate that virtual tables have been created in RAM by taking data from the ".dat" file.

Shared Tables

When this property is enabled, the system's global memory will be used for saving data and not that of the process. This option is especially indicated when using WinCE as operating system because the Movicon CE process memory has a limit of 32 Mbytes.
Further more this option is needed also when wanting to access data through external ActiveXs or libraries. In this way the IMDB tables are made available in ram and can be accessed using appropriated ActiveX or library functions.

Save XML File

Data is always saved in text files with the ".dat" extension and by enabling this option will also allow data to be saved in files in XML format.

Save CSV File

Data is always saved in a text file with the ".dat" extension. When activating this option you will be able to save data in a CSV file which also includes the field names in the first row.
You can also customize the field delimitor character (Tab used for default) by editing the "XMLcIMDBDelimiter" tag directly in the project files. The ".movprj" project files must be modified for the Historical Log, the ".movrealtimedb" file must be modified for the Variable Trace and the ".movdlrec" file for the DataLoggers or Recipes. In this last case, it will also be possible to modify the xml tag through the XML Code Explorer window and possible to specify a different separator for each inserted DataLogger or Recipe object.

Crypt File

The ".dat" file used for recording data is crypted with a Progea proprietary algorithm and with the public domain algorithm. XML files are not crypted.

Write Behind Delay

This setting represents the time, in seconds, when the data is unloaded from memory to files.

Max Nr. Records

This setting allows you to define the maximum number of records the Historical Log can execute. Once this limit had been reached, the data will start recycling. However, data with ages older than the maximum age set will be deleted even when the max. number of records has not yet been reached. This function is disabled when set at the '0' value which means that there are no restrictions to the number of records that can be executed.

21.2.2. IMDB Database Limitations

When using the IMDB manager for recording historical data you will need to keep in mind that there are some limitations that a more conventional database would not have using ODBC drivers. Below you will find a list of the main SQL commands supported by IMDB and its restrictions:

SQL Language

The IMDB manager supports a significant subset of SQL database language functions. The following instructions are particularly supported:

SELECT, UPDATE, INSERT, DELETE
CREATE TABLE...[PRIMARY KEY...]
DROP [TABLE]
SELECT qualifiers: DISTINCT, TOP n
SELECT clauses FROM, WHERE, GROUP BY, HAVING, ORDER BY
WHERE expressions: AND, OR, NOT, LIKE, BETWEEN, + - * /, IS [NOT] NULL, <, >, =, < >, <=, >=, Constants, Parameters, ColumnNames
SELECT list expressions: MAX, MIN, AVG, SUM, COUNT, +, -, *, /, Constants, Parameters, ColumnNames
Value list qualifiers: ANY, ALL, SOME, IN
UPDATE expressions: +, -, *, /, Constants, Parameters, ColumnNames
INSERT values expressions: Constants, Parameters
INSERT ... SELECT
Subqueries within SELECT statements

Limitations

The following limitations must also be taken into consideration:

- Table and Column names cannot contain spaces or any punctuation characters and must start with an alpha character (names cannot start with numbers)
- Views are not supported
- Select list field aliases names are not supported
- Security statements such as COMMIT, GRANT and LOCK are not supported
- The LIMIT TO nn ROWS cause used to limit the number of rows returned by a query is not supported. Use TOP instead to return the top nn rows of a query
- Outer Joins are not supported
- No indexes create and drop statements. Indexes must be created when creating tables

Data Types

The IMDB manager supports the following types of data for table columns:

Numeric	4/8 bytes (32/64 bit value) INT, INTEGER, SHORT, LONG, SMALLINT
Decimal	8 bytes (DOUBLE) REAL, FLOAT, DOUBLE, SINGLE, CURRENCY
Bool	1 bit BOOL, BOOLEAN, YES/NO
Counter	8 bytes Auto-Increment value COUNTER
Character	1 byte per character (2 bytes for UNICODE)

	Zero to a maximum of 256 MB/row CHAR(n), VARCHAR(n), CHARACTER(n), TEXT
Date/Time	8 bytes 0 to year 20.000, Time 00:00:00.000.000.0 to 24:59:59.999.999.999 100 nano-seconds resolution DATE, TIME, DATETIME
Binary	Zero to a maximum of 256 MB/row BLOB, LONGBINARY
GUID	For storing Guid values

Database Default Limits

The IMDB manager has the following default limits:

Maximum data store size	~ 2 GB
Maximum number of tables	65535
Maximum number of columns on table	127 for Windows 32/64 bit, 90 for WinCE
Maximum number of indexes on table	64
Maximum length of table names	64
Maximum length of column names	64
Maximum number of rows in a table	2 Billion (2*10^9)
Maximum length of fixed-length column	4096
Maximum length of variable-length column	256 MB
Maximum size for binary columns	256 MB
Maximum number of cursors opened simultaneously	Unlimited (memory depending)
Maximum number of columns in an index	1
Maximum number of XML nodes in a table	2 Billion (2*10^9)
Maximum number of simultaneously active IMDB objects	Unlimited (memory depending)

21.2.3. DBMS Settings for Recording data on DataBase

Some parameters which are used for DBMS links are always the same ones used, independently whether recording a Historical Log, a Data Logger, variable tracing, etc. These parameters are described below:

Keep the DB Connection open

This property, when enabled, allows the **ODBC** connection to be kept open and used for all the transactions to be executed. When the property is disabled, the **ODBC** connection will be opened when a transaction is requested and then closed again.

We suggest you disable the 'Recycle DB Connection' property only when recording is less frequent.

Max. Error Number
The highest number of DBMS errors allowed after which the connection is considered not valid and data is saved on files in ASCII format ("DLOGGERS", "LOGS", "DATA").

Max. Transitions
Maximum number of transitions per cycle to be updated before closing.

Max. Cache Size
This setting allows you to set the Cache's maximum size before they system loads data on file. The number is set in Bytes.

Max. VarChar Precision
This setting allows the maximum precision to be set for the string type columns. The set number represents the number of string characters.

ODBC DSN
This setting allows you to set a customized **ODBC** connection. Movicon will create a file in Access2000 format in the project's 'LOGS' folder for default with the name:

ProjectName_HisLog.mdb

However you can also customize the **ODBC** connection through this property, creating a different data base from that of Access2000 with a different name.

Unfortunately the ODBC Manager does not pass on any information about the name of the any created connections. Therefore the procedure requires that the name of the connection be inserted first so that Movicon can pass it over to the ODBC Manager. The name of the connection can also be inserted after it has been created. In any case the name of the connection has to be typed in the box manually.

ODBC DSN User
This property specifies the users name to be used for the **ODBC** connection.

21.2.4. DataBase Filter Settings

The Recipe resources and the Trend and DataAnalysis objects provide some properties for applying queries, filters or sort bys on data to be extracted from the Data Base. In this way the resulting query for extracting data can be customized when the default query is not suitable for the task at hand. The three properties described below are available in the Recipe "Recipe Database Settings Properties" properties and in the Trend/DataAnalysis object's "Stile" properties.

Default Filter
This edit box permits you to enter a text string containing the filter function in SQL standard language on data to be selected from the Database. The filter functions automatically by showing the WHERE suffix in a drop-down window, to allow you to simply indicate the filter parameters. For example, let's suppose a "Temperature1" column has been defined in the database table" and we need to apply a filter for extracting records where the "Temperature1" value is more than 100 only, in this field we will have to enter:

Temperature1 > 100

This text string is static and cannot be changed in runtime.
When the object is a Recipe and you wish to use a dynamic filter function in the database object, you will need to use the "Tag Query" which can be setup in the "Recipe Execution Properties".

Default Sort
This edit box allows you to enter a text string containing the sort function in SQL standard language in data to be selected from the Database. The sort functions automatically drops down a window with the ORDER BY suffix in it, allowing you to simply indicate the data sort parameters. For example, let's suppose a "Temperature1" column has been defined in the database table" and we need to apply a filter for extracting records in sort by increase mode based on the "Temperature1" column, we should enter:

Temperature1 ASC

This text string is static and cannot be changed in runtime.
When the object is a Recipe and you wish to use to dynamic Sort function in the database object, you will need to use the "Tag Query" which can be setup in the "Recipe Execution Properties".

Default Query

This edit box allows you to enter a text string containing the query in SQL standard language in data to be selected from the Database.

The text string is static and cannot be changed in runtime.
When the object is a Recipe and you wish to use to dynamic query function in the database object, you will need to use the "Tag Query" which can be setup in the "Recipe Execution Properties".

When this property is set in a Trend/DataAnalysis object, it will be necessary that all the columns to be selected for the Trend be specified correctly in the query. For instance, let's suppose that these three "Value1", "Value2" and "Value3" columns have been defined in the DataLogger, and that they have also been selected for displaying in the Trend, the query would be customized as:

Select LocalCol, Value1, Value2, Value3 From DataLogger Where Value1 > 100 Order By LocalCol DESC

if the "Show msecs." option had been enabled in the Trend/DataAnalysis the query should then be :

Select LocalCol, MSecCol, Value1, Value2, Value3 From DataLogger Where Value1 > 100 Order By LocalCol DESC

However a query like the one shown below would result as being incorrect because it includes columns that the Trend does not have:

Select * From DataLogger Where Value1 > 100 Order By LocalCol DESC

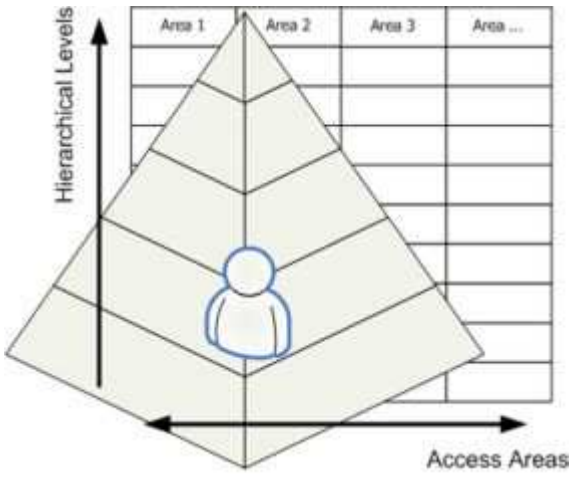
22. User and Password Management

Using the Users and Passwords management in projects allows access to protected functions be managed. The project Users can also be used for sending SMS, Voice and Fax messages.

When using supervision projects it is often necessary to protect the managing of the plant's conditions against unauthorized persons by granting access to the system's functions only after the user's authentication has been verified and confirmed.
Plants can be protected by using the Users and Passwords management.
The Users and Passwords management is a supervision project to allow the possibility to manage supervisor access security, by declaring identification of users enabled to work in the system, by entrusting them with an exclusive password and access level. The access privileges (hierarchical levels and Areas) can be issued normally or by group.

- **there are 1024 hierarchical levels and 16 area levels**
- **Log On will not be requested when the objects have been left with the default value (level 0)**

The project must request Log On for each command and function to be protected from unauthorized access. **The hierarchical level must be declared** in the properties of "sensitive" objects to be able to execute the command and the **area it belongs to**.
The execution of these objects will therefore be subject to a Log On to verify the access privileges of the user executing the command.
In this way, any supervisor function can be protected with this type of user level and user password settings verification, according to the modalities and settings described in this chapter.



Movicon allows complete password management, with a unlimited number of users and user groups each one can be set with a level (1-1024) and area (1-16).

22.1. Change Password after User Login

There is a "Change Password after Login" checkbox in the Movicon user and password login window which when checked allows the user to change their password in runtime that was initially assigned to them in design mode. The user can change their password straight after logging in.
Both Developer Users and runtime users can change their Passwords in runtime.
If an error is made while changing passwords, a modal window will appear showing a "Incorrect Password" error message. This window must be closed by the user to enable to continue.

Passwords can be changed in runtime when at least one of the following conditions exists:

- "Must Change Password" option enabled
- "Cannot Change Password" option disabled
- "Expiring Password (Day)"option more than 0

Passwords cannot be changed if al the following conditions exist at the same time:

- "Must Change Password" option disabled
- "Cannot Change Password" option enabled
- "Expiring Password (Day)" option equal to 0

The possibility for users to change passwords in runtime is not available for Web Client users, but it does open various prospects to do with Client-Server Network projects. In each Client and Server project development and runtime users can change their password independently from one project to another or only those of development by centralizing the runtime user management in one database for each proeject (see "General - Runtime Users File" from the "Users and User Groups" resource. .

22.2. User Levels and Access Levels

Each user is assigned a User Password Level for user authentication and a Access Level, which determines which read and write rights the user has on the various project controls, in the Movicon user management.

User Password Levels

The User Password Levels are needed for user authentication. When a user has logged on their Password level is activated enabling the user to execute all the commands protected by a password levels the same as or lower than theirs. The User Password Levels are:

- **User Level 0 (0)** = no password level required
- **User Levels (1-1022)** = password levels required from 1 to 1022. These password levels are assigned to normal project users.
- **Administrator User Level (1023)** = password level for Administrator or System users. System operations can also be executed With this password level such as closing the project, etc.
- **Developer User Level (1024)** = password level for Developer users. The project can also be developed with this password level.

The User Password Levels are hierarchical meaning that each User of a certain Level can also execute operations of lower levels. Level i is the lowest User Level , while the Developer Level is the highest.

User Level

This property can be set in various points and in various components of a Movicon project. For example, in the **"Users General Properties"** this setting permits each user to be associated with a Password Level.
Where the project's controls and resources are concerned the 'User Level' property is used for defining which User Password Level is necessary for executing the command list associated to that

control. For further information please refer to the **'User Levels'** property of the component or resource of interest:

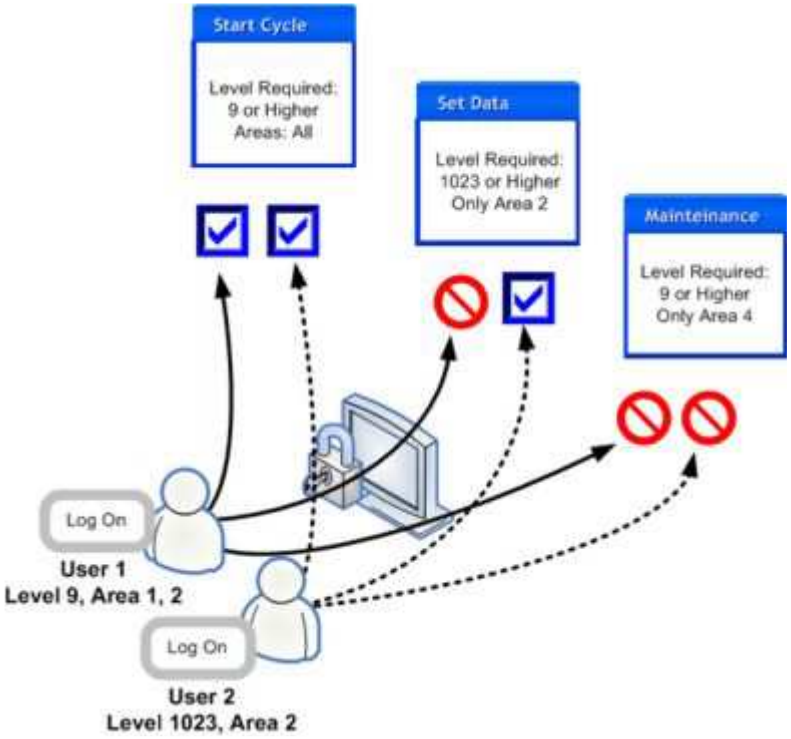
Object "User Level" property (paragraph: "Access Levels Properties common to Drawings and Controls")
Menu "User Level" property (paragraph: "Item Menu General Properties")
Shortcut "User Level" property (paragraph: "Shortcut Command General Properties")

Access Levels (Areas)

When log on has been executed correctly by verifying the Users authentication it is possible to set a limit to User intervention on various project controls or components by using the **'Access Levels'**. There are 16 distinct levels, from 'Access Level 1' to 'Access Level 16'. In this case each Access Level, which can be activated by using a Check-Box, is independent of the others. For example, by enabling 'Access Level 5' on a Button control means that only the Users that have 'Access Level 5' checked on their 'Access Level' Masks can access this Button. The Access Mask setup for various Users must therefore have a correspondence with the Access Mask setup for the project's controls or components to be able to grant access, in read/write, to them.

The Access Levels are not managed hierarchically, therefore the high levels (i.e. Level 16) do not acquire the access rights of lower Levels (i.e. Level 1).

You must keep in mind that the **User Password Levels** have priority over the 'Access Levels', which means that the users must first logon and have their Password Level verified for authentication before the Access Levels assigned to the user are verified.



The figure illustrates an example of user access control at Log On.

Based on the access level and area required to execute the command, the users 1 & 2 are permitted or denied not access based on their privileges.

Write Access Levels

This property, which is found in various controls and components of Movicon projects, defines which is the control's Write Access Level. If the User has been authenticated but their Access Level does not correspond with the control's, the user will not be able to write in that control.

You must also consider that a project's control's or component's write access assumes different meanings according to the object itself. For further information please refer to the **'Write Access Level'** property of the component of interest:

Variable "Write Access Level" property (paragraph: "Variable Access Level Properties")
Alarm Threshold "Write Access Level" property (paragraph: "Alarm Threshold General Properties")
Object "Write Access Level" property (paragraph: "Access Levels Properties common to Drawings and Controls")
Scheduler "Write Access Level" property (paragraph: "Scheduler Access Level Properties")

Read Access Levels

This property, found in various Movicon project controls and components, defines which is the control's Read Access Level. If the User has been authenticated but their Access Level does not correspond with the control's, the user will not be able to read that control.
You must also consider that a project's control's or component's write access assumes different meanings according to the object itself. For further information please refer to the **'Read Access Level'** property of the component of interest:

Variable "Read Access Level" property (paragraph: "Variable Access Level Properties")
Alarm Threshold "Read Access Level" property (paragraph: "Alarm Threshold General Properties")
Object "Read Access Level" property (paragraph: "Access Levels Properties common to Drawings and Controls")
Scheduler "Read Access Level" property (paragraph: "Scheduler Access Level Properties")

Always Visible

This property is only available for the "Scheduler" object and Real Time DB variable resources. This property allows you to keep these resources always available in the project's "Scheduler Window" selection list. By enabling this property the scheduler or variable can be made available and selected in the "Scheduler Window" independently from the Access Level of the user logged in. For further information please refer to the desired component's **"Read Access Level"** property:

Variable "Always Visible" property (paragraph: "Variable Access Level Properties")
Scheduler "Always Visible" property (paragraph: "Scheduler Access Level Properties")

Invalid Authentication

Movicon has an mechanism to deter repeated invalid access attempts where after the third invalid logon attempt the time to re-display the logon window will take longer. In addition, after the third invalid attempt a message will be recorded in the log reporting: "Login Failed. User 'xxx'".

22.3. Custom Password Dialog Windows

Movicon consents custom Password Dialog Windows which open when user authentication is requested or when needing to re-enter an expired user password. Custom panels can actually be created by using the Movicon screens and symbols. The custom panel can be created with a screen within which a "Editable Display" can be positioned with a series of "Buttons". The screen, in order to be managed by Movicon instead of the one for default, must be inserted in the project's "Get Password Screen" or "Expired Password Screen" general properties. This will ensure that the customized screen will open instead of that for default when user authentication is required. The screen will open in modal mode. In addition to the two screens, 'Get Password Screen' and 'Expired Password Screen', manage some local system variables which are needed so that user authentication works correctly. These variables are:

For user authentication, "Password Screen", the local screen variables used are:

user_ = variable in which the name of the user must be written and used for requesting authentication. The user_ variable must be declared string type
password_ = variable in which the password must be written for user authentication. The password_ variable must be declared string type
OK_ = this variable is needed in the screen's closing phase. When its value is different from zero, the screen will execute the authentication of the user entered when closing. When its

value is set at zero, the user will not get logged in when the screen closes. The OK_ variable must be declared Bit type
title_ = when Movicon opens the Screen the local title_ variable is set with the requested user level value. the title_ variable must be declared string type
reset_ = when this variable obtains a value that is not zero, it forces the password renewal of the user logged on. This variable can be associated to an object such as the Checkbox in the custom Password Dialog Window which resets the local variable when different from zero.

For entering expired passwords, "Expired Password Screen", the local screen variables used are:

nMinimunPasswordLength_ = when Movicon opens the Screen, the nMinimunPasswordLength_ is set with the password's minimum length value. This values is the same set in the users "Min. Password Length" property. The nMinimunPasswordLength_ variable must be declared integer type
password_ = variable in which the new password, to be associated to the user, is written. The password_ variable must be declared string type
OK_ = this variable is needed in the screen's closure phase. When its value is different from zero, the new password will get associated to the user when the screen closes. However, when the value is set at zero, the new password will not get associated to the user when the screen closes. The OK_ variable must be declared Bit type
title_ = when Movicon opens the screen the local title_ variable is set with the name of the user changing their password. The title_ variable must be declared string type

The above describe local variables must be created by the programmer when needed respecting the exact syntaxes. When using Templates from the Movicon Symbol Library, the local variables will be created automatically when inserted on screen.

22.4. General Properties common to Users and User Groups

Some properties are available for both User Groups and single User levels. This allows the same properties to be easily propagated to all the users of one group which can then be eventually diversified to differentiate these users. The management of these properties, presented in more than one hierarchy level, provides that the priority starts from the lowest. For example if one of these properties has been defined with single user level settings, these settings will be counted as valid. If, however, nothing has been set for the single user, this property will be inherited by the Group to which that user belongs.
To change the User Group General properties, select the Group from the Project Explorer window with the mouse and use the Movicon **'Properties Window'**.
To check the General properties specifications for each single category please refer to the following paragraphs: "Users and User Groups General Properties", "User Group General Properties", "Users General Properties".

Style Source Container
You can select the screen to be used as the style source container through this property for managing styles. For further information on the functionality please refer to "Style Sources in Symbols".

Enable Auto Logoff
A password request will involves the activation of a user in Runtime mode. The activated user will remain active until deactivated in one of the following ways:

1. Deactivate User command (LogOff)
2. Timed Deactivation (Auto LogOff)
3. Activation of a different user

The LogOff commands can be executed by commands associated to the objects or from the project logic.

When this 'Enable Auto Logoff' is activated, the automatic logoff will be executed by Movicon after the time set in the "Auto Logoff Timeout (sec)" property. Countdown will start the moment in which the user discontinues performing operations on the keyboard or with the mouse.

When the 'Enable Auto Logoff' property is disabled, the user who logged on will remain active until the deactivation command is executed (established by the project programmer) or the substituted by a different user.

Movicon allows user activation and deactivation commands to be setup in the project by means of using the command which can be associated to objects or to the functions available in the project's Basic Scripts Logic.

The "Users and User Groups" resource has a tree structure which can be composed of three levels:

Users and User Groups
User Groups
Users

The 'Auto Logoff' property can be enabled for each one of these groups. In this case the property will be propagated from the high hierarchical level to those below. For example, if the "Auto Logoff" property is enabled at "Users and User Groups" level this will also be propagated to all the users of all the groups, independently of its group or user level setting. If, however, the "Auto Logoff" is disabled at "Users and User Groups" level, each user will acquire the settings of its own group, and even when it is disabled in its group each single user setting will then be considered.

When "Windows Users" have been enabled in the project, the Auto LogOff of these users will only be managed based on the "Users and User Groups" resource's "Enable Auto Log Off" property. In this case it will not be possible to specify this option for individual users or groups.

Auto Logoff Timeout (sec)

This property is used for setting the time after which Movicon will execute an Automatic Logoff of the active user. This setting is only significant when the "Enable Auto Logoff" has been activated. The countdown will start the moment in which the user no longer performs operations on the keyboard or with the mouse.

The "Users and User Groups" resource has a tree structure which can be composed of three levels:

Users and User Groups
User Groups
Users

A value can be assigned to the "Auto Logoff Time (sec)" of each one of these levels. In this case the value associated to the lowest hierarchical level to which the "Auto Logoff" property has been enabled will be considered. For example, if the "Auto Logoff" property has been enabled on all three levels, the Logoff time for each user will be the one specified in the property of each single user.

Web Client Auto Logoff (sec.)

Web Client users can exploit this property which consents to setting the inactive value seconds with which the user will automatically be disconnected from the project Server. In this case the Movicon applet window will re-appear in the Browser requesting a new login.
The "Web Client Auto Logoff (sec.)" property exists at User level, Group level and "Users and User Groups" general resource level and managed with the modality set in the user management.
If the "Enable Password Management" general property of the "Users and User Groups" resource is enabled, the first time value set other than 0 in the "Web Client Auto Logoff (sec.)" property will be used for disconnecting Client, starting with the user and then any group user may belong to until reaching the value set in the "Users and User Groups". For instance, the value set in the user's "Web Client Auto Logoff (sec.)" property will be used if higher than zero, otherwise the value set in the group user belongs to will be considered. If this value is also set at zero, the value entered in the "Web Client Auto Logoff (sec.)" property in the "Users and User Group" resource.
If, however, the "Users and User Groups" resource's "Enable Password Management" general property is not enabled, the auto logoff time of a Web Client user connected to a Server project will be taken from the one set in the "Users and User Groups" resource's "Web Client Auto Logoff (sec.)" general property.

User Level Resizing

This property is used for defining the user level required for system resizing operations or reducing the Movicon window to an icon.
When set with the "0" level, user authentication for operations to reduce to an iron or resize the Movicon window will be asked. However attempts to close the window will always require an Administrator level (1023), independently from the value set in this property.

Logon Script

This selection allows you to choose a Basic Script routine to be executed during the User Logon stage. When this setting is executed in the User's properties, the Basic Script routine will only be executed when the specified user logs on. When, however, the setting is executed in the property of a User group, the Basic Script routine will be executed when all the users belonging to that group log on.

Logoff Script

This selection allows you to choose a Basic Script routine to be executed during the User Logoff stage. When this setting is executed in the User's properties, the Basic Script routine will only be executed when the specified user logs off. When, however, the setting is executed in the property of a User group, the Basic Script routine will be executed when all the users belonging to that group log off.

Logon Commands

This selection allows you set a "Commands List" to be executed during the User Logon phase. When this setting is executed in the User property, the "Commands List" will be executed only when the specified User Logs on. When the setting is executed in the Users Group property, the "Commands List" will be executed when al the Users belonging to the Group log on.

Logoff Commands

This selection allows you to choose a "Commands List" to be executed during the User Logoff phase. When this setting is executed in the User property, the "Commands List" will be executed only when the specified User Logs off. When the setting is executed in the Users Group property, the "Commands List" will be executed when al the Users belonging to the Group log off.

Expiring Password (Days)

This property is used for setting the number of days after which the User's Password will expire and will no longer be usable. Once expired a new pass will be requested for the next user authentication. When this value is left at zero on the User's property then will be considered the Group's property value. When this value is left at zero in both the two properties then the password will not expire.

Language

This property allows you set a default language for the User. When this setting is executed in the User properties, this default "language will only be valid for that User. However, if set in the User Group properties, the default "Language" will be valid for all those users belonging to that User group and which don't have the same property set.
When inserting a language in this property, it will automatically activate when the User logs on. This consents to you to have a multilanguage system where each user can be associated a different language for default as desired.

22.5. Users and User Groups Properties

You can setup Users and User Groups in projects, which are needed for either sending messages on event or alarm, or for managing access security to project functionalities. Each command which can be setup by Movicon in the project can be associated with a password request, in relation to user level or a specific user. In addition to this the Movicon system commands require (if the password management is active) an access level equal to or higher than the "Administrator" level 1023.
By using the **"Users & User Groups"** resource you can set the project's security properties, such as activating the password management in the project, installing users so they can access the operation and system performances in function with the password level they have been associated with, etc.

The password will be requested only during the project Runtime when the "Enable Password Manager" property is enabled before its startup. The password with Developer level will be also requested when opening the project in programming mode where the "Password Protected Project" property has been enabled. Therefore it is strongly advised to safeguard the "Developer" level password and not forget it.

The project Users can also be inserted (or edited) during the project runtime, by using the purpose built RunTime Users editing functions, if the Project's "Enable Runtime users" property has been enabled.

The Users which can be inserted during the RunTime cannot receive in associated the "Developer" level (level 1024), reserved for the programmer.

22.5.1. Users and User Groups General Properties

By using the Users and User Groups General properties you can define how to manage project protection. For instance, you can enable the protection on project editing, active the password management in Runtime, etc.
To modify the Users and User Groups General properties, select "Users & User Groups" from the Project Explorer window with the mouse and use the Movicon **"Properties Window"**.
To verify the General properties common to Users and User Groups please refer to the "Users and User Groups General Properties" paragraph.

Enable Runtime users

This selection allows you to activate the Runtime Users management so that new users can be added, changed, deleted during project runtime. In order to execute these functions the appropriate commands in the Commands list of the Movicon controls or the dedicated Basic Script function must be used.

This property is only managed when the "**Enable Password Manager**" property has been activated. Otherwise the Runtime users will not be managed by Movicon.

User Level Editable

This property allows you to define the User Level where the ones above will not be able to carry out any editing in Runtime. For example, if "User Level 5" is set, this means only users up to the fifth level can carry out any editing during Runtime.

Runtime Users File

This property is used for specifying the path and Runtime users definition file name. The file name can be specified with or without the ".rtusers" extension. In addition, if a path is not specified, the local project folder file will be considered.
It is also possible to specify a network path to allow the same runtime user file to be shared among other applications, such as in a Client-Server configuration.
The network path can be specified in various ways:

"\\Nome_PCServer\FolderName\RTUsers.rtusersFileNome" (i.e.: "\\Server1\SharedFolder\RTUsersDB.rtusers")
"\\IP_PCServer\FolderName\RTUsers.rtusersFileNome' (i.e.: "\\192.168.22.44\SharedFolder\RTUsersDB.rtusers")
"UnitàDiRete:\FolderName\RTUsers.rtusersFileNome" (i.e.: "Z:\SharedFolder\RTUsersDB.rtusers")

or when using Window CE systems:

"\NET\RTUsers.rtusers"FileName"(i.e.: "\\NET\RTUsersDB.rtusers")

Therefore, in cases of a pure Client project, only the ".rtusers" file path needs to be set as described above, whereas Client-Server projects with Parent-Child technology with one or more Server projects (Child projects) sharing the same runtime users file resource, being Client project users (Parent-Child) managed through the Parent project users, the Parent project will have to be set with the same Parent projects' (Server projects) runtime users file network path. In cases where the Parent project is not specified with a file or another runtime users file name, this management will always use the Parent project's file without considering those defined at Child project level.

Run Commands after Login

This option can be used in objects set with "Password Levels" to run command/s associated to the object once user has logged in, with having to re-click object again.

In cases running Parent-Child network Client projects, the "Run Commands after Login" property is only considered by the Father project "Users and User Groups" level settings.

Password Protected Project

This selection permits you to activate project protection by using passwords. When the protection is enabled only users with Developer rights (level 1024) can open the project in development mode.

Keep in mind that a project with active protection will not request any passwords at the system startup in Runtime, but the Developer password will be required (Level 1024) for entering in programming mode or for opening the project in programming mode.
Before activating the password protection, the system will ask that there be at least one user with Developer password (level 1024) present.
WARNING! If the User Name of Developer Password is forgotten, it will not be possible to open the project in programming mode.

Enable Password Manager

This selection permits you to activate the project's password manager during Runtime phase. By doing this you can associate different password levels to the project commands according to their requirements.

When the project's password management is enabled the System's operations (or Administrator) such as closing the project, can only be done by Users with **Administrator** rights.

Enable CRF21- Part 11 Settings

This selection permits you to set User's Description like Electronic Signature in conformity with the **"FDA21 CFR Part 11"** normative.

Set CFR21-Part 11 Settings

This selection permits activation of User settings editing in conformity with the **"FDA21 CFR Part 11"** normative.

Min. User Name length

This property is used for setting the minimum number of characters which must be used for composing the Name of Users setup in the project.

Four characters is the minimum length set by Movicon for default. We suggest you don't use less than this for normative and security reasons.

Min. Password Length

This property is used for setting the minimum number of characters which must be used for composing the Password of users setup in the project.

Six characters is the minimum length set by Movicon for default. We suggest you don't use less than this for normative and security reasons.

22.5.2. Users and User Groups Windows User Properties

By using the Windows User properties you can enable the option to use Operating System users inside your Movicon project. This will also allow you to associate user levels to the O.S. user groups. To change the Windows Users properties, select the "Users And User Groups" group from the Project Explorer window with the mouse and use the Movicon **"Properties Window"**.

When enabling Windows Users in the project with the "Guest" user in the PC's local protection settings enabled, users that do not belong to the dominion will be granted access with "Guest" user credentials within Movicon. However, in certain cases User and Password entry is not requested when logging on from WebClient to a Server as logon is done automatically using the Guest user rights. This also applies to Network Client logons. Project commands protected by passwords are also subject to this functionality, therefore if user logon is invalid , Movicon will nevertheless grant access with Guest user rights.
For further information about this Windows feature go to link

http://support.microsoft.com/?scid=kb;en-us;180548&x=13&y=10

Enable Windows Users

Movicon provides you with the possibility to share users from the O.S. domain or from a Windows Server in the applied project.
In this way, when the password management is activated, the project will acknowledge and grant access to users inserted and activated from the O.S. domain installed or a Windows server.
Movicon accepts mixed applications, such as users inserted in the project list and users deriving from the domain.

The users from the project list can receive in association a customized user level. The users deriving from a domain of a Windows station can receive a customized user level only if they have been inserted in the users list, otherwise they will be associated the same password level specified for the group they belong to (Administrators, Users, Guests).

Warning! Movicon is "case sensitive" when managing user names whereas Windows is not. This means that if you insert a user with the same name of a Windows user to allow them to have a custom user level, you must be careful to insert their name by using the right Upper/Lower case chars. For instance, if you insert a user name as "User1" or "user1", Windows accepts both as being the same user, but Movicon will consider them as being two different users.

The "Enable Windows Users" is only needed for remapping dominion users within the project with levels and preset access levels according to user type. If the dominion user's name has been inserted in the project user list without a password (as explained above), the user will be automatically given authentication by using their dominion password even though the "Enable Windows Users" option has been disabled.

Different password levels can be assigned to domain users. This function is available when adding users who have the same userID configured in the primary domain controller, to the Movicon users list. The authentication of a user who has been configured in this way, is carried out by the primary domain controller which controls the validity of the password.
For instance, if a user exists with UserID = "guest" inside the primary domain controller, the user should then be configured in the Movicon project's user list with the same UserID, 'guest' with the password left empty so that the user can be assigned with the level desired. In runtime the user name and password inserted in the Movicon Authentication window are validated by the primary domain controller. This also permits the password expiration to be used with Windows users.
This mechanism is also valid for users configured directly in runtime with the Movicon users editor window.

Windows Admins Level

This property is used for selecting the Password level to assign to the Operating System Users belonging to the Administrators group.

Windows Users Level

This property is used for selecting the Password level to assign to the Operating System Users belonging to the Users group.

Windows Guests Level

This property is used for selecting the Password level to assign to the Operating System Users belonging to the Guests group.

Windows Admins Access Level

This property is used for selecting the Access level to assign to the Operating System Users belonging to the Administrators group.

Windows Users Access Level

This property is used for selecting the Access level to assign to the Operating System Users belonging to the Users group.

Windows Guests Access Level

This property is used for selecting the access level to assign to the Operating System Users belonging to the Guests group.

22.5.3. Users and User Groups Child Project Option Properties

By using the Child Project Option properties you can enable the possibility to use eventual declared Child Projects internal the Movicon project.
To edit the Child Project Option properties, select the "Users and User Groups" group from the Project Explorer window with the mouse and use the Movicon **"Properties Window"**.

Include Child Project Users
When this property is enabled users of eventual Child Projects setup in the Project will be inherited. This makes it possible to enable and use child project users in the parent project according to their password and access levels.

This property will only be managed when the "**Enable Password Manager"** property has been activated. Otherwise child project users WILL NOT be inherited from the parent project.

Child Project User Max Level
This property permits you to set the maximum password level which can be inherited by a child project. The users in the child project who have a higher level to that set in this property will not be inherited and therefore cannot be used by the parent project.

22.6. User Group Properties

The Movicon User management provides the possibility to put project users into groups. Not only does the User Group setup clearly organize the plant's users, but also gives you the great advantage of being able to send SMS, Fax or voice messages automatically to preset user groups on the list. When creating a new project with the "Create Default User Groups" option enabled, Movicon will insert four default groups, **"Developers", "Administrators"**, **"Users"** and **"Guests"**. Apart from the "Developers" group, all the other three reflect the classic O.S. groupings. You can then create customized groups where the project Users can be inserted and then edited. Each User Group can be associated with properties, such as password levels, which can be propagated to all the users belonging to the same group. You can also customize further each single user of the Group. To modify the User Group Properties by selecting the Group in question from the Project's Explorer Window with the mouse and using the Movicon **"Properties Window"**.

22.6.1. User Group General Properties

The User Group General Properties are used for associating each group with the main characteristics concerning the password and access levels for the group's users.
To modify the User Group General Properties, select the Group from the Project Explorer window with the mouse and use the Movicon **"Properties Window"**.
To check the General properties common to Users and User Groups please refer to the paragraph on "General Properties common to Users and User Groups".

Name
The name of the group you wish to create is entered in this edit box.

When creating a new project Movicon will insert four default groups: **"Developers"**, "**Administrators"**, **"Users"** and **"Guests"** if the "Create Default User Groups" option has been enabled. Apart from the "Developers" Group, the other three reflect the classic O.S. groupings.

Description
The Group's description is entered in this edit box. The description is only used as a reminder for the programmer and appears in the Group's **"Properties Window"** only.

Default Level

The Password Level to be associated to the Group is set in this property. This property will also be propagated automatically to all the Users created within this group, until any later modifications are made through these Users' properties. The password levels associated to groups created for default by Movicon are:

- **Developers**: Developer Level (Level 1024)
- **Administrator**: Administrator Level (Level 1023)
- **Users**: User Level 5 (Level 5)
- **Guests**: User Level 0 (Level 0)

Default Access Level

The Access Level mask to be associated to the Group is set in this property. This property will also be programmed automatically to the Users created within this group until any later modifications are made through these Users' properties. The Access Levels associated to the groups created for default by Movicon are:

- **Developers**: FFFF (Access Levels 1-16)
- **Administrators**: FFFF (Access Levels 1-16)
- **Users**: 0010 (Access Levels 5)
- **Guests**: 0000 (Access Levels 0)

22.7. Users Properties

The Movicon Users management, in addition to running projects with security, gives you the great advantage of sending SMS, Fax or voice messages automatically to one or more preset users in the list. This is due to possibility of associating each client with a customizable telephone, e-mail and FAX number etc. When a new project is being created Movicon will insert the users belonging to the Operating System's domain if the "Create Users from Windows Users -> Server Name" is enabled. These Users will automatically be inserted into the relative "**Administrators**", "**Users**" and "**Guests**" groups if the "Create Default User Groups" has also been enabled or otherwise inserted in one single group for default.
To edit the Users General properties, select the User in question from the Project Explorer window with the mouse and use the Movicon **"Properties Window"**.

22.7.1. Users General Properties

The Users General Properties are used for associating each user with the main characteristics concerning the password and access levels for those users.
To edit the Users General properties, select the User from the Project Explorer window with the mouse and use the Movicon **"Properties Window"**.
To check the General properties common to Users and User Groups please refer the paragraph on "General Properties common to Users and User Groups".

Name

The user's name (User ID) is assigned in this edit box. The name will be the first information requested as soon as the command dealing with the password is executed in Runtime. Alphanumeric and case sensitive characters, discrimination between upper/lowercase keys, can be inserted in this field.
The user name must be unique and obligatory.

Four characters is the minimum length, imposed by Movicon for default, for the User's Name. We suggest that you do not use less characters for normatives and security reasons.

When creating a new project with the "Create Users from Windows Users -> Server Name", option enabled, Movicon will insert the users belonging to the Operating System's domain. These Users will automatically be inserted in the relative "**Administrators**", "**Users**" and "**Guests**" groups if the "Create Default User Groups" option has also been enabled, otherwise they will all be inserted in one group only for default.

Description

A descriptive text of the user's profile can be associated to the user's name in this edit box.
The user's description will be used by the system to identify the active User, and then registered where needed when the electronic signature is required.
The description is unique and obligatory.

Password

This property is used for entering the Password relating to the User. Alphanumeric and case sensitive characters, discrimination between upper/lowercase keys, can be inserted in this field.
Password declaration is obligatory.

Six characters is the minimum length, imposed by Movicon for default, for the User's Name. We suggest that you do not use less characters for normatives and security reasons.

Numeric Password

This property allows you to insert a numeric Password which can be used as an alternative to the alphanumeric one.

User Level

This property is used for setting a Password level to be associated to the User. The field is set at **"Get Group Level (-1)"** for default, which means that the User automatically acquires the Level from the Group it belongs to. However a customized level can be selected for the User, independently of the Group it belongs to.
Movicon provides up to 1024 password levels, where the first 1022 levels are inferior type (for users), level 1023 or "Administrators" also authorize commands in the operating system, level 1024 or "Developer" is the highest and authorizes access to the project being programmed.
Level declaration is obligatory.

User Access

This property is used for setting the Access Level Mask to be associated to the User. When creating the User this property is set automatically to the same value of the **"Default Access Level"** of the owner group.
For further information on "Access Levels" see paragraph **"User Levels and Access Levels"**.

Disabled

This property is used for disabling the User. This means the user will not be managed in the runtime phase.

Locked

This property locks the User out. the 'Locked' user is one who cannot be substituted with a runtime user who has the same name. This means that any runtime user with the same name will not be managed. For further information please refer to the section on **"Runtime Users"**.

Must Change Password

When this property is enabled the new created user will be asked to change their password when logging on for the first time. This will allow the user to change the password, inserted by the programmer, with their own.

Cannot Change Password

This property is only active when the "Expiring Password (Days)" property, of the same user and the group the user belongs to, is set to zero and impedes the user's password to be renewed in runtime if the "Change password after Login" checkbox has been checked.
If the user's "Expiring Password (Days)" property is set to zero, the one set in the Group to which the user belongs to will be considered instead.

For users set with "Administrator Level (1023)" with their "Expiring Password (Days)" property set at zero, the "Change Password after Login" property will always result enabled even when the Group "Expiring Password (Days)" property that the user belongs to is set with a value different to zero.

22.7.2. User Data Properties

The User Data properties are used for associating each user with a different telephone number or e-mail address to which SMS, FAX, e-mail, etc., can be sent.
To change the User Data properties, select the User from the Project Explorer window with the mouse and use the Movicon **"Properties Window"**.
Note: This is an optional feature: check your dongle options.

Mobile Country Code
The country code relating to the User's mobile number is entered in this box.

Mobile Area Code
The area code of the User's mobile number is entered in this box.

Mobile Phone Number
The User's mobile phone number is entered in this box.

Voice County Code
The country code relating to the User's voice message number is entered in this box.

Voice Area Code
The area code relating to the User's voice message number is entered in this box.

Voice Phone Number
The User's voice message number is entered in this box.

Fax Country code
The country code relating to the User's Fax number is entered in this box.

Fax Area Code
The area code relating to the User's Fax number is entered in this box.

Fax phone Number
The User's Fax number is entered in this box.

Messenger Recipient
In this edit box you can enter the name or address of the user's Messenger recipient.

Sending Messages with the Microsoft MSN Messenger is not yet possible.

E-mail
The User's E-mail address for sending e-mails is entered in this box.

22.8. RunTime Users Manager

The Movicon Users management also provides the possibility to edit, change or add users during the project Runtime mode. The "EditUsr.exe' tool is used for this purpose which is installed with Movicon and resides in the Movicon installation folder. This tool can be executed by using the **"Edit User List"** command found in the Movicon **"Command List"**.
The Users created in Runtime are saved in the ProjectName.rtusers" file which is saved in the project folder. If the project is enabled with the "Crypted Project" property, the Runtime Users file will also be in crypted format.

Starting from the "EditUsr.exe" tool's 1.0.0.8 version, runtime users are saved in crypt mode, according to the "Crypted Project" settings. When the Runtime Users file has crypted, its information cannot be read by external programs, due to the fact that the application crypt key is used. This new version of the runtime users editor can be used with any Movicon version.

You can, however, use a non-crypted version of the ".rtuser" file even when the "Crypted Project" property has been enabled due to the fact that Movicon is capable of reading this file even when crypted. In this case, you will need to create a customized user edit window for saving data on file using basic script codes. When writing the file you will need to keep to the following XML structure:

```
<?xml version="1.0" encoding="UTF-16" ?>
<UserAndGroupSettings>
<UserGroupsList>
<UserGroup>
<Name Description="Description Group00001" DefAccLevel="0" DefLevel="5"
LogonScript="" LogoffScript="" EnableAutoLogoff="true" AutoLogoffSecsTimeout="60"
ExpiringDaysPassword="0">Gruppo00001</Name>
<UsersList>
<User>
<Name Password="Utente00001" NumericPassword="" Description="Description
Utente00001" ExpDaysPassw="50" AccessLevel="4294967295" Level="4294967295"
MobileCountryCode="0123" MobileAreaCode="0123" MobilePhoneNumber="0123456"
VoiceCountryCode="0123" VoiceAreaCode="0123" VoicePhoneNumber="0123456"
FaxCountryCode="0123" FaxAreaCode="0123" FaxPhoneNumber="0123456"
MessengerRecipient="" Email="Utente00001@email.e" AccDisabled="false"
CannotBeChanged="false" LogonScript="" LogoffScript="" EnableAutoLogoff="true"
AutoLogoffSecsTimeout="60" TimePassword=""
MustChangePassword="false">Utente00001</Name>
</User>
</UsersList>
</UserGroup>
</UserGroupsList>
</UserAndGroupSettings>
```

Loading Runtime Users

If the Runtime Users file is present, Movicon will also load the Runtime users in this file at the project startup. In addition to this, this file will be reloaded during Runtime each time it is changed with the "EditUsr.exe" tool.

The Runtime Users are therefore Users who can be used within the project like the user created in the Development mode are. However you need to take into account the following rules when managing runtime users:

1. The loading Runtime users will be only be executed when the **"Enable Runtime User"** property from the **"Users and User Groups"** resource has been selected.
2. Movicon, when loading the file containing the runtime users, will only activate those users with a level not higher than the one set in the programming mode in the **"User Level Editable"** property from the **"Users and User Groups"** resource. A warning message will be generated in the Output and Historical Log Window for those users with a higher level who will not be activated
3. Movicon, when loading the file containing the runtime users, will not activate those users who have the same **"Description or Digital Signature"** of a already existing user. In this case a warning messaged will be generated in the Output and Historical Log window
4. When a runtime user is created with the same name of user declared in the programming phase, they will be replaced by the runtime user. In this way the properties of the user created in the programming mode can be changed during runtime. The settings of the user created in the programming mode will not be actually changed just simply those settings of the runtime user will be loaded. This mechanism can be executed only when the **"Locked"** property of the user, created in the programming mode, has not been enabled. Otherwise the runtime user will be refused generating a warning message in the Output and Historical Log window

The "EditUsr.exe" tool can also be executed independently of Movicon. For further information on how the "EditUsr.exe" tool works, please refer to the application's help.

Virtual Keyboard Use

The Runtime Users Editor provides the option to use an alphanumeric pad with the same look as the standard one used in the Movicon application. A button has been purposely placed at the side of each edit box so that it can be called whenever needing to edit values for systems with touch screens.
This function has been inserted both in the desktop version and that for Windows CE. The difference between the two is that the Windows CE version still has the option for you to use the operating system virual keyboard (SIP) by simply clicking on the editbox. In addition to this some of the "General" key values are managed in the Windows CE version as well:

- "AlphaNumericPadFont" and "AlphaNumericPadFontSize" to choose the font type and font text size for the alphanumeric pad. This will change the size of the pad window as well according to the options chosen.
- "ShowSIP" to enable or disable the appearance of the Windows CE virtual keyboard with a click on the runtime user editor' editable controls.

Attention: the runtime user editor is no longer supported and installed for PocketPC platforms.
It is only available for Windows 32/64 bit and Windows CE in SSDK devices.

22.9. CFR21 Part 11 General Concepts

The aim of the CFR21 Part 11 regulations, written up by the FDA (Food & Drug Administration), is to obtain a legal equivalence between electronic documents (digital records and electronic signatures) and traditional paper documents. This has evolved due to the increasingly frequent use of automatic systems in managing production processes in systems that operate under FDA approval. In order that automation and control systems are realised in conformance with the CFR21 Part 11 regulations it is necessary that all recorded data is made referable to the operator in charge (Electronic signature), furthermore certain regulations regarding any precautions must be adapted to safeguard against forgery and mishandling of electronically recorded data, or to allow easy identification of any misuses, whether intentionally or unintentionally, of electronic devices which generate electronic records. Many pharmaceutical industries have especially benefited from using electronic records where untold amounts of paper documentation, archived over many years of research, has been transferred into electronic records which not only has reduced space but also precious time in acquiring and reviewing important information before releasing medicine on the market for sale.
It is absolutely crucial that these types of industries have the devices with the right protection mechanisms to safeguard against any intentional or unintentional data errors in electronic format.

General Concepts for supporting these regulations

The concepts described below define how to use Movicon to develop applied projects with compatibility with the act and its regulations discussed in this document.
A list of the main concepts has been put together by Progea to give a clearer picture on the indications explained henceforth and which are based on the understanding that it remains the user's responsibility to ensure that the application, developed with Movicon, is compliant with these requirements.

Security

- The Movicon project must be encripted (Movicon uses a 128 bit encoding) so that all the configurations and passwords used in the project are accessible from the outside.
- Movicon guarantees unique user password entries in the project. Each user is identified in the project with a UserID, Password, printable Description or Name (Electronic Signature). Movicon does not accept Users with the same electronic signature name (unique identity

control) of another individual. The names must be made up with not less than 4 characters and not more than 64 characters.

- To guarantee data integrity and safeguard against any tampering of data, the Movicon application should be run as Service of the Windows operating systems. This will require identification of users registered in the system's domain according to the security requirements stipulated in order to access the operating system and its files.
- Movicon supports Windows OS domain sharing so that the user passwords, set up by the system administrator, can be used.
- Users who manage the recording of data by using the Data Loggers must take the right measures to prevent any unauthorized access, undesired modifications and tampering to database records. The IMDB archives (InMemory DB) allow users to manage encrypted historical log files or secure databases can be used, such as Microsoft SQL Server or Oracle with the appropriate administering of the Windows 32/64 bit operating system, which only permit the system administrator or developer access to records.
- To put an access limit on the developed application's functions and controls, the Movicon project must use the User Password Profile management correctly, which involves the entering of a Password, UserID, User Name and Access Level. Movicon provides 1024 access levels and 16 areas.
- Users must manage their passwords with great care and integrity. New users, inserted by the administrator, can replace their password with a more personal one on their next Log On.
- All passwords can be set with an expiry time to make the user to issue a new password periodically, which will contribute to increasing system security.
- To fully comply with the regulations, the Auto LogOff (timeout of enabled access) must be appropriately used in the Movicon password management in order to prevent unauthorized access to the system after a certain period of user inactivity.
- To ensure validity and the correct entering of data, users must make sure that the Movicon operating stations are allocated in safe places and that they are accessible to authorized personnel only.
- The Movicon AutoLogoff function must be used in systems in continuous use.
- Movicon has tools and procedures that can be used for discouraging any unauthorized access attempts and are the same as those used in the Windows 32/64 bit operating system as required by the regulations. After the third failed attempt to access, Movicon will purposely take longer to respond to the re-entry of the password to discourage the intruder.
- Any further attempts to violate the system (Upon the fifth unauthorized Log On attempt) Movicon will display and record the event in the Historical Log in order to safeguard against and control any further system violations.

Digital Recording/Electronic Signatures

- Movicon returns the descriptive name of the registered user to identify and individualize the active operator.
- The applied program must be configured to record electronic signatures each time a digital recording is carried out (creating a record in the database) as required by the regulations. The user must execute LogOn in the project by linking two combined data (UserID and Password), and the electronic signature must be the genuine name of the user, the date, time and reason for the recording. The Movicon Data Logger allows the recording of all necessary data on the Database.
- For reasons of legal responsibility relating to the Electronic Recording, the operator must always be acknowledged every time data is recorded or when accessing the system. The User's ID is unique and belongs to that user only in Movicon and no other individuals are allowed the same ID.
- To satisfy the Electronic Recording requirements, the recording of events must be configured appropriately by using the IMDB archives (InMemory DB) where crypted historical log files can be managed or if ODBC archives, such as the Microsoft SQL Server or Oracle, secure databases must be used with the correct security management administered. Furthermore the user must configure applications to acquire and record electronic signatures on record of any operator undertaking actions. The user must also prevent any data from being lost by configuring the application to execute backups of all data recorded, or by using the Movicon redundancy functions. The user can also eventually configure the system so that it uses the Data Logger resource to record crypted data on IMDB or on relational ODBC database files. If needed, new data files can be created with prefixed timeframes (eg. Every 4, 8 or 24 hours) by using the Basic Script functions.
- The user can configure the system to copy recorded data in a safe and secure location by using procedures appropriately written with Basic Script codes. The Windows OS security

functions protect files and their data from any unauthorized access. When multiple files are created the user must control whether the right code is entered to prevent saturating free space on the hard disk where the oldest files may need to be deleted.

- The user may have to synchronize the system's time in real time or to that of another system's (Microsoft or third parties) so that recorded data relate to the true date and time, or they may have to manage data synchronization between Client and Server so recording becomes coherent. Synchronization of this type can be managed directly with the Windows OS functions or with the Basic Script codes for third party products.

Validation and Documentation

- Some of the requirements stipulated in the regulations are not altogether implemented in software applications. These Part 11 requirements can be satisfied if the client validates their application to guarantee accuracy, reliability and security when recording data, as well as the capacity to prevent unauthorized editing, errors and data deletions. The Movicon users must validate their application in order to comply with the FDA act. The users can develop and/or execute the validation of programs and protocol themselves or delegate this task to others. The validation must follow a methodology established from system's life cycle (SLC).
- In order to meet the controls requested by the regulations in this act, the client must adopt adequate procedures to verify the identity of the individuals who have been assigned an electronic signature.
- The client must enter and set up the operator and their operating responsibilities executed under their electronic signature, to impede any forgeries or tampering of signatures or recordings, in compliance to the regulations of this act.
- The client must always be certain on the identity of the individual assigned an electronic signature. Further more the client is held responsible that the enrolled operator is fully aware of the regulations stipulated by the FDA agency and that they intend to use their electronic signature as a substitution and an equivalent of their own handwritten signature used on traditional paper and, when necessary, produce certification of their true identity, being legally binding to their handwritten signature, when under FDA inspection.
- The client is responsible for producing documentation on system use or on the application realized, on its distribution and updates, and also the details on personnel training. However, the client is not responsible for documentation on the platforms being used (Movicon, Windows).

Other

- All the data must be stored in a relational database, which fully meets the necessary security requirements (ie. IMDB crypted data, SQL Server or Oracle with the relevant protection) and protected from any violation to or tampering of the security functions belonging to the Windows 32/64 bit OS. Data must be filed and kept available for an adequate period of time according to the operating requirements.
- To further enforce the safeguard of data, project, images and recipes the user should use a third party software type, which can guarantee version maintenance and management (eg. Microsoft Source Safe can be used for controlling the versions).

22.10. Validation Configuring Techniques

To get a Movicon project 21CFR Part 11 ready, you need to configure it appropriately so that it is compliant with the FDA validation criteria. The necessary measures to take in doing this are indicated below:

Security

- The project must be configured in its General Properties by selecting "Crypted Project" and "Crypted Project Resources". In this case all the project's XML information can be accessed by using a 128 bit encoding.
- To prevent unauthorized system access, select all the project's Execution Properties which deny Operating System and Desktop access. The following can be denied:

1. Windows Desktop
2. The Start button form the Windows' Task bar
3. Windows Task Bar
4. Windows task Options
5. Windows Task Manager
6. Windows CTRL+ALT+DEL

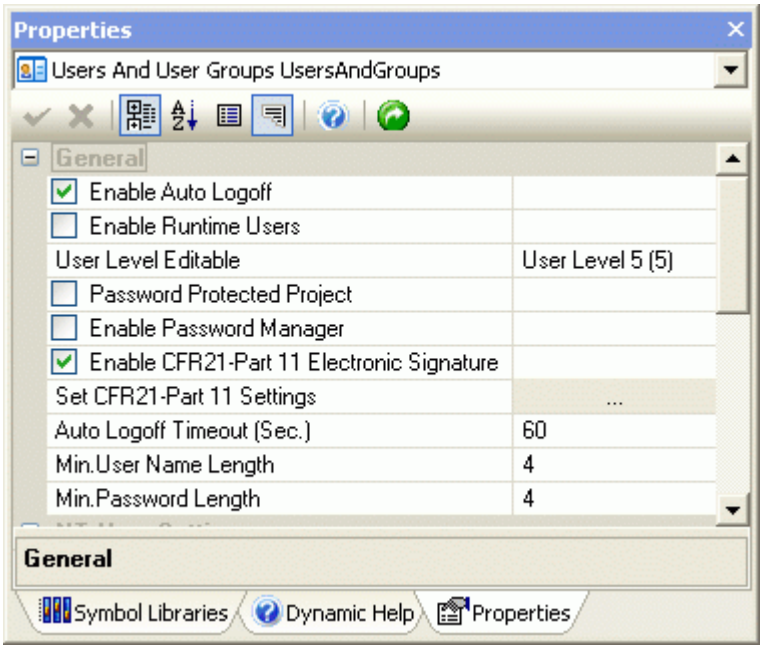
- As an alternative, Movicon can be run as "Service" of the operating system, as described in more detail ahead. When Movicon is run as service, it does not manage the project's properties that deny operating system access and which are listed above.

Passwords

- All the application commands that can be executed by operators to interact on the process must be protected by passwords.
- The password management must be enabled in the project's User Passwords resource Properties:

1. Project Protected with Password: the password will be requested only for entering in "Development" mode
2. Enable Password Management: the passwords will be activated according to the levels and access modalities to the preset commands
3. Enable Electronic Signature: the unique user Description of the user whose name is to be used as an Electronic Signature will be managed
4. Auto Log Off: determines the time (sec.) for automatically deactivating the active user after a period of inactivity
5. Minimum Length (user name and password): set for default at 4 and 6 characters respectively, as suggested by the regulations

- Secondary parameters relating to the password management need to be set according to the general properties illustrated below



Windows Security Synchronization

Movicon provides the possibility to share, in applied applications, users from the operating system domain or from a Windows server.
Therefore, when activating the password management, the project will acknowledge and accept users inserted and activated from the domain of the installed operating or from a server station.

Movicon accepts mixed configurations, whether being users inserted on the project list, or users deriving from the Windows domain.
Users on the project list can be associated with a customized user level. Users deriving from a Windows station domain can receive a customized user level when inserted on the user list, otherwise they will be associated the same password level specified for the group they belong to (Administrators, Users, Guests).
Different password levels can be assigned to domain users. This function is made available by adding users to the Movicon user list who have the same UserID configured in the primary domain controller. Password authentication and validity are carried out by the primary domain controller for those users configured in this way.
For instance if a user with UserID = "guest" exists in the primary domain controller, a user can be configured with the same UserID, in this case "guest", and the password can be left blank in the Movicon project's user list. By doing this the user can be assigned the appropriated level desired. In runtime, the user's name and password, which are inserted in the Movicon user authentication window for logging on, are validated by the primary domain controller. This permits expiry passwords to also be used for Windows users.
This feature is also valid for users configured directly in runtime with the Movicon edit users window.

User Passwords

- Each user or user group who has access to commands or process interaction, must be inserted and configured in the project appropriately.
- Users are inserted in the project's User Password Resource where they can be configured in their properties. These properties include those which involve the requirements stipulated in the FDA act:

    1. Name (ID) and Password: These are assigned to the user and are used for identification by the system
    2. Electronic Signature: This is a unique text which corresponds to the user's electronic signature and is recorded as absolute user identification (the Electronic Signature management must be enabled in the User Password Resource)
    3. Auto Log Off: This can be specified singularly for each individual user
    4. Expiring Password: The act stipulates that the user password expires after a certain preset time so that the user is obliged to change it periodically to increase system security
    5. Must Change Password: For identification certainty this obliges the user to enter their own personal password on the next Log On so it is only known to themselves and no one else including the administrator who logged them on the first time

Command Access

- Each command, change or setting influencing the process must be given protected access by requesting user identification.
- The User Level in a hierarchical scale structure must be set in the "Access Level" property of each object. The Levels in Movicon start from 1023 (reserved for the system administrator) to level 1 (the lowest operating level). The 1024 level is reserved for the programmer.
- The command objects can also be provided with a Access Level (Area) in read or write, permitting users to access commands not only on a hierarchy scale but also by area of competence.

Operating System Access

Movicon provide the possibility to block and deny operating system access. The follow two modalities can be used:

- Lockout Windows access from Movicon: to prevent unauthorized access in the system you need to select all the project's Execution Properties which deny access to the Operating System and Desktop. When Movicon is started up these will deny access to Windows according to the settings, which have been activated (described above).
- Using Windows services: you can configure the project to be installed as the operating system's Service, therefore it will be started up automatically before the Windows operating System's Log On procedure. By doing this, as an alternative to the above indications, only the system administrator can access the operating system.

Biometric Systems

Using Biometric Systems is highly recommended in application validity according to the regulations.
In this case you need to choose the right recognition system among those available on the market that can be easily integrated into your application.
The most popular biometrics systems are ultimately those that use digital fingerprints. These systems are simple to use and integrate perfectly with operating systems and software applications.
Examples:

- Progea has run tests on the Toca Fkey product (digital fingerprint scanner). This device can be plugged in to a USB port and has its own user profile management where the Movicon project users can be associated by using the appropriate VBA script module provided by Progea. This biometric system can be completely integrated into the project using the Movicon "User Password –Fingerprint" association.
- Progea has also run tests on the Microsoft Fingerprint product, a simple and reasonably priced device that can be plugged into any USB port with Windows. This system runs its own software as service and provides files where users are inserted and recognised by their biometrics every time a password entry request is made. A tool, such as this one, does not require any project modifications or any particular interfacing or configuration. However, authentication of the operating system's users (Windows 32/64 bit only) is only allowed when the PC users do not belong to a Domain.

Any type of biometrics recognition system can easily be used if the operating system has been predisposed to support one as described above, otherwise it can be integrated into the Movicon application by using the appropriate Basic Script interface.

Recording Data (Audit Trail or Tracing)

Movicon provides the possibility to trace all the status changes of each variable which has significant relevance to or influence on the process: Usually all the set-point or process command changes need to be traced.

- Note the difference between the Trace and Data Logger files: The Trace records each data value change in the appropriate database along with all the relevant information, while the historical value recordings refer to the historical logging activity executed by the Data Logger resource.

In certain cases, it is sufficient enough to carry out the following procedures to sensitive data:

1. Request user identification before accessing to commando
2. Identify user and validate them (password management)
3. The user carries out the changes. The variable (Tag) is traced
4. The value change is recorded in the appropriate Trace DB, reporting the date, the previous value, the current one and electronic signature

All the historical information inherent to each change that took place in the process can be obtained from the appropriate Trace viewer so it can be easily traced back to what caused it.
The Tracing function is one of the properties belonging to each single Variable (Tag) and must be activated and configured by clicking on the "Trace Options" property in each Tag (variable).

Audit Trail

In many cases, before the user can proceed in making any process variable changes (eg. Set points), confirmation may be requested before the change can be put into action, together with a comment to explain the reason why this change has been made (text string). In order to enter this comment the "Trace Comment" item needs to be ticked/checked in the Trace Property beforehand.

Movicon will display the window shown above after each manual Tag change occurs and authenticated by the user, indicating the change and requesting the user to state the reason this change was made. The comment inserted by the user is recorded:

- In the 'ActionCol' column of the Tracing DB table referring to variable which was changed
- If the 'Add Msg to SysLog' check box has been checked, the event and the comment are also recorded in the main historical Log DB, in the 'DescCol' of the Historical Log's 'SysMsgs' table
- Note: When the 'Trace Comment' window is open on screen, the variable's value is frozen. Any other process, such as the drivers, the IL logic, basic scripts, cannot change it

Audit Trail with Process Manager Validation

There maybe times when the above described operations need not only the operator user's authentication but also validation from the Process Manager before a Tag change can be made effective. However, authentication must only be requested from Process Managers with the same level or higher.
As each process has different needs from the next, Movicon does not manage this function automatically the user must provide a Template being a graphic object that can be called up every time an edit request is made. This object allows access, user identification and data settings (Tag variables), which can be linked to both Tracing function and a Data Logger which have been configured to record the values relating to each status change.

Electronic Records

Electronic Records contain all the process information (dates, values, events) recorded electronically on files that must guarantee data integrity and prevent any unlawful handling from unauthorized persons.
All the information recorded on file by Movicon is called "Electronic Records".
In order to get the Movicon Electronic Records standard ready, the following indications and the guidelines contained in this document need to be followed to guarantee security in data integrity and prevention against any unauthorized access and data tampering.

Data Security

Guaranteed Electronic Record security is absolutely fundamental in obtaining valid applications. The data recorded by Movicon (Data Loggers, Log, Tracing) are physically built by:

- IMDB: criptable XML text files with an algorithm in 128 bits. To use this format you need to check the "Crypt File" option to guarantee inaccessibility to external manipulation of historically logged data.
- ODBC: Relational Databases by means of the integrated ODBC manager. The data, therefore, physically resides in data files and tables that can be recorded on hard disk locally or on mass files residing physically in diverse servers. Thanks to the use of "safe" relational databases such as SQL Server, Oracle or others, Movicon uses protected accounts for accessing files. It is the user's responsibility to configure the system so that no one can access files, by removing access rights to file both in the database itself and in the operating system folders access rights (Movicon run as service). Data security must be guaranteed by means of using the following procedures:

    1. Always use a data format based on relational databases that provide access protection, such as Microsoft SQL or Oracle
    2. To avoid unauthorized access to files, User Account protection will need to be setup by using the access criteria explicitly for system administrators or program designers only (eg. With the same project protection password). This will impede access to data tables where authorization has not been provided.
    3. Use the operating system's access lock (Locked by Movicon) or access rights to operating system by using Movicon as Service. By doing this, file access through the operating system will be physically denied
    4. Do not share folders or disks when the station is operating in net, except for system administrator access
    5. Remove all rights to modify database records (Updates). Movicon lets new records to be inserted whose data cannot be accessed for altering no matter what the reason is

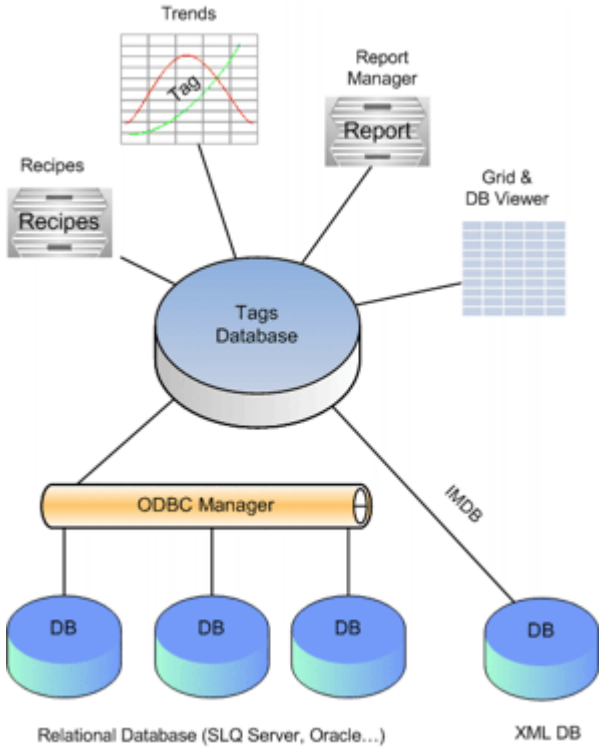
A special document describing this normative and its regulations in relation to Movicon projects has been published by Progea. Please contact the Progea Support Center if you need this document.

23. Data Loggers and Recipes

The Data Logger is a powerful tool for recording and simplifying the managing of data in databases, both ODBC and XML text. The Reports, Trends and Recipes functions can all be linked to the Data Logger.

This section describes the **Data Loggers & Recipe** resource, which is the main tool for recording process data (Variables or Tags) on archive files, with the aim of creating and managing historicals which can be used for executing analysis in the project.
The project's Data Loggers and Recipe resource can contain an unlimited number of Data Logger and/or Recipe objects, which have the task to sample associated variables (Columns) and record data on file according to the recording modes setup in the project's properties.

The archive management and input/write modalities of the file structures are described in the "Historical Log Management" section where the possibility to use ODBC files in a relational database, and use IMDB files in XML test.
All the data managed by Data Loggers will be available in the project in Reports, Recipes, Charts or in any other display functionlality, as well as analysis on stored process data as illustrated below:



Before using a report or data table, you will need to configure the database according to your requirements.
You can access the Movicon database engine settings through the **"Data Loggers & Recipes"** resource which can be selected from the **"Project Explorer"** window.
The Movicon Data Loggers and Recipes can access Database files through **ODBC** or **IMDB** links, where the user can get production data in the format they prefer best guaranteeing system openness to external managers and integration of factory data to the highest production hierarchy levels.

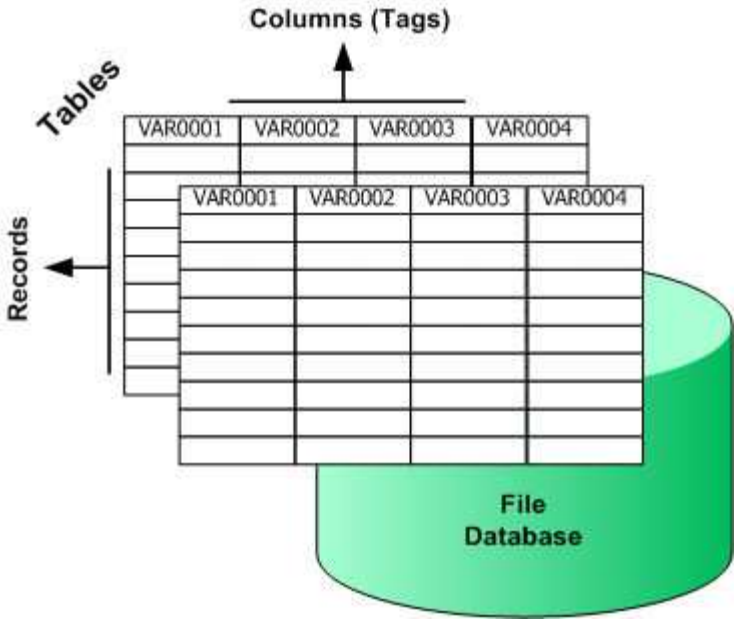
The Data Loggers are easy and simple to use to solve any real-time data storing requirements where all the integrated project tools can be used for obtaining recorded data for viewing, displaying, analysing, formatting, presentation or printing out production reports.

Note that the "Recipes" functionality from the Data Loggers & Recipes resource is always enabled in any purchased product license type. However, the "Data Logger" is optional and therefore not included in the ordinary license version.

WARNING: Data Loggers or Recipes based on IMDB do not support Reports from "Report Designer" and "Crystal Reports". If case need be, use historicals in ODBC.

23.1.1. The DataBase

The Data Loggers and Recipes record data on log files known as a database, whether ODBC or IMDB. These Databases are created automatically by Movicon according to the description in the Historical Log Management section.
However, it is necessary to first configure these Databases' characteristics, which are nothing more but properties of the same Data Loggers or Recipes, being the Database name, the Table name, the quantity of data to be recorded (records) and columns. These are the minimum requirements the Database must know before being created by Movicon.
Databases contain data in tables (A linked ODBC Database file may contain diverse tables), which are organized in records, being the line and column numbers representing the variables.
With the IMBD, each column is built from a XML text file.



Organization of data in a normal database

Every time the recording command is evoked, the Movicon Data Logger records in the Database records the variables associated to the columns in order of progression. When the set maximum recorded time has elapsed the recording will recycle on the oldest values.

Log File Sizes

The size of the files is set in the project's properties for the Historical Log, in the Project Historical Log Settings item and is set in the respective Data Logger Recording Time Properties or those of the DB Trace objects. The file sizes are expressed in days with 180 days preset for default. This value can be set as pleased.

The file sizes therefore will depend on the data format being used and on the number of events to be recorded by the system in prefixed time periods.

23.1.2. DataBase Structure

Data Loggers or Recipes are presented with tree structure in the **"Data Loggers & Recipe"** source found in the 'Project Explorer' window. By using this structure you can view the Data Logger or Recipe components which will represent the Database columns. Each element of the structure which composes the Data Logger or Recipe can be configured through the **"Properties Window".**

The Data Logger or Recipe structure displayed graphically indicates the Database's components, which can be edited not only in the property but also in the structure itself. The represented order of the columns can be changed as pleased by using the Window's drag functions. For example, select a Data Logger item column) and drag it towards the top or bottom according to where you wish to place it.

In the Database, which is created by Movicon, some system columns will always be inserted by Movicon in addition to the data columns defined by the user. These columns, whose name can be customized through the "Data Loggers and Recipes Common Database Settings Properties" are as follows:

- **Time Column**
- **Local Time Column**
- **MSec Column**
- **User Column**
- **Reason Column**

The active user's name is recorded in the Table's User column only when the record command is prompted by that user. For instance, when choosing "Record on Command" and the userer sets the "Recording Variable", using a button or another control, their name will be recorded. However, if "Record on Time" is chosen, the active user will not be logged down.

WARNING! If a Data Logger or a Recipe use the InMemoryDB (IMDB) for data recording, the table can not include more than 127 columns. Otherwise the Data Logger or the Recipe will not be initialized at the project startup and a message will appear in the log, asking to reduce the columns number. The IMDB has a maximum limit of 127 columns.

If any ODBC errors are generated at project startup (also shown in the DBMS Log) the tables managed directly by Movicon (Historical Log, Data Logger, Recipes, Trace, Realtime ODBC) will get recreated only when their structure is not compatible with the one provided by Movicon. Tables will not get regenerated if other ODBC error types are generated and detected when tables are in the process of being checked thru.
In both these cases an error message is printed in the "Log DMBS" output window. In the first case the 'DROPPED' table is alerted with a message reporting the missing column's name following by notification of its creation. In the second case, for example if the error was caused by an inactive SQL Server service, the tables will not get recreated when restoring this error type.

The "Create DB Table" command in historicals (Log Storico, Data Logger, etc.) will attempt to use the existing connection for opening a link towards the database, if this fails to work a new connection will be created using the ODBC pluging default settings selected in the Project's General properties.

23.1.3. Database Link to Report Files

Even though Reports can be managed according to the different programming techniques, as described in the respective sections, the Data Loggers and Recipe Databases are predisposed to connect to **Report Designer"**, in .repx format, or a **"Crystal Reports™"** file in .rpt format.

The association of the .repx or .rpt file to Data Loggers or Recipes and variable definitions for automatic print on event, are done through the properties "Data Loggers and Recipes Common General Properties". The print or view report commands can be executed from any of the project's controls or resources.

WARNING: Data Loggers or Recipes based on IMDB do not support Reports from "Report Designer" and "Crystal Reports". If case need be, use historicals in ODBC.

23.1.4. Displaying Database Data

Although the displaying of data of Databases linked to Data Loggers or Recipe can be done with different programming techniques, Movicon has a purpose built object for doing this which is available in the Advanced Shapes library and can be inserted into the project's Screens.
The **"DataLoggers/Recipes Window"** permits you to display components inside the Screen which are linked to the Database created by the Data Loggers and Recipes (appear as windows containing tables).
The **"DataLoggers/Recipes Window"** permits you to represent data contained in the Databases in table format, showing the Database columns and records. The object provides a few simple functions which are the Default Query or Dynamic Query, allowing the operator to carry out operating maneuvers in the window such as putting into order, filtering by customizing the SQL queries for DBMS Database.
The **"DataLoggers/Recipes Window"** is described in the respective section.

23.2. Data Loggers as Templates

Movicon has a extremely useful function when needing to set many repetitive Data Loggers in the project, which record and sample series of different variables in the same way.

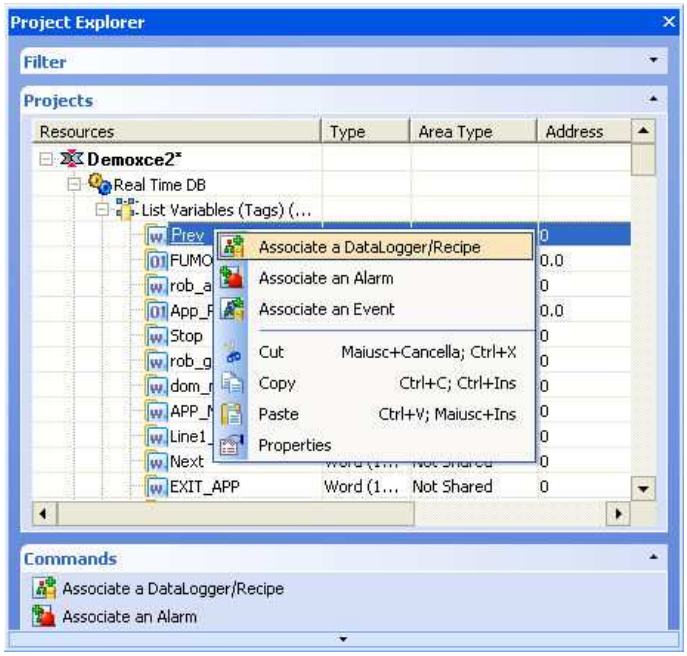
- **A practical example would be:** we have to get our project to manage 50 data recordings with the same sampling time and recording modes. The RealTime Database has declared the 50 variables exchanged with the field and relating to the process information. These variables must generate 50 different columns, one for each piece of data, in a database.

In a case such as this, we need a tool which to quicken the process of assigning Tags to the Data Logger, one which provides you with the possibility to set up the data logger **only once** and associate it to the 50 variables, of the example above, all at once.
A tool such as this exists in Movicon and is called "**Data Logger Template**".

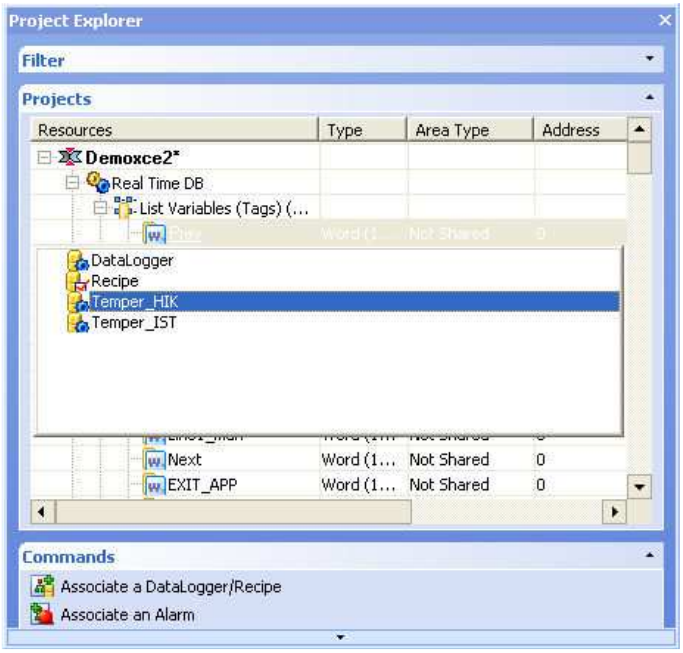
To get this function you have to set the Data Logger as "Template" type in the Data Loggers Resource with the recording mode desired. Then you can select the variables needed from the Variables List from the RealTime Database and use the "Associate a Data Logger" command with the right mouse key and select the Datalogger desired from the window that pops up. The variables (in our example this would be the 50 process variables) will then be linked to the Data Logger Template. Technically Movicon has set 50 different variables linked to the Datalogger in its project on receiving just one click. of the mouse.

This procedure is very handy to have during application development mode when variables that have to be recorded in DataLoggers/Recipes are added to the project at different times.

Data Loggers can be associated to Variables by clicking the right mouse key on the Variable in the "Variable List" group found in the "Project Explorer" window and by selecting the "Associate a DataLogger/Recipe" command, or by using the same command which can also be found in the "Commands" window at the bottom of the "Project Explorer" window.



The request to associate a Data Logger/Recipe will open a another window containing a list of Data Loggers/Recipes available, which should have been inserted beforehand:



DataLogger/Recipe associations to variables can also be done with objects already containing variables to be recorded. Furthermore, if the DataBase already contains data, it will be stored and simply inserted in a new column within the DataBase structure.

CAUTION: managing DataLoggers/Recipes as Templates can also be done with the Recipes, but variable associations can only be handled with "Working Variables" and not "Temporary Variables". This means that a Recipe can be used as a Template only in cases where it is necessary to use working variables only and not temporary variables.

23.3. Data Loggers and Recipes Editor

Movicon has a powerful tool to configure registration engines managed by projects. The **"Data Loggers & Recipes"** resource is the main tool for generating data files in standard format which can be used for managing reports, recipes, graphics or any other viewing functions, printing or analysing filed data.
The advantage offered by the Data Loggers and Recipes is that each single Database is considered as a an object, completely configurable through the **"Properties Window"**. The property of each single Data Logger or Recipe consents complete customization, whether in recording or visual display unit connecting.
The Data Logger and Recipe objects, after been configured, can be saved in the Symbols library, as Templates. Each single Data Logger or Recipe can be saved in the library individually or associated to a symbol as desired.
This technology, defined **Power Template**, permits the programmer to drastically reduce project developing time allowing the automatic insertion of variables and other correlated Templates, if any, to the symbol being inserted.
The **"Data Loggers & Recipes"** tool is a project resource which can be accessed from the Movicon **"Project Explorer"** window.

23.4. Inserting Data Loggers and Recipes

The insertion of Database objects in the Movicon **"Data Loggers & Recipe"** resource is done through the **"Project Explorer"** window. This resource, even when empty, is always present in any Movicon project application.
The Data Logger and Recipe objects can be inserted, modified, deleted and associated with data by using the usual Windows' commands and the Movicon "Properties Windows". The name, number of columns and records and recording mode of the Data Logger or Recipe object are all defined in the "Property Window".

The insertion of a new Data Logger object or Recipe is done in the 'Data Loggers & Recipe' resource from the 'Project Explorer' window. The recording mode and the Data Logger or Recipe data are specified through the 'Property Window'. Each Data Logger or Recipe object has a tree structure, whose branches are a distribution of Database columns.

To insert a new Data Logger or Recipe object you need to select the **'Data Loggers & Recipe'** resource with the mouse and then execute **'New Data Logger'** or **'New Recipe'** from the **'Command'** selection of the **'Project Explorer'** window. These same commands are also made available by clicking the right mouse button on the **'Data Loggers & Recipes'** resource.
New Data Loggers or Recipes can be entered by copying the data from the resource of the same or other projects. In order to do this select the Data Logger or Recipe objects you require for copying, then use the Windows' Copy and Paste standard functions (CTRL+C and CTRL+V command keys, mouse right button).
To delete one or more Data Loggers or Recipes from the project, select them first then activate the 'DELETE' button or 'CANC' on the keyboard or use the mouse right button.
Data Logger or Recipe settings or modification are done through the Movicon 'Properties Window'.
Every Data Logger or Recipe entered will be correlated with one or more columns relating to the data to be recorded. The 'Properties Window' allows the recording mode for the columns to be configured, as illustrated further along

> Note: To carry out the Multi Selection of Data Loggers or Recipes, proceed according to the Windows stands by using the mouse together with the SHIFT or CTRL keys, or the SHIFT key together with the UP and DOWN arrows.

23.4.1. Data Loggers and Recipe ODBC Link

Apart from setting the ODBC with the chosen format you also have to create a link between the application Server, the table and destination file, in which values will be written by Movicon through the ODBC driver, so that the Data Logger or Recipe can record data using the **ODBC** standard.

It is through this link with the ODBC driver that the Movicon **"Data Loggers & Recipes"** resource is able to record data on file.
The ODBC links have to be registered in the Operating System by using the appropriate ODBC system settings found in the "Data Source ODBC" item from the "Administrative Tools" group on the Control Panel. Movicon also has a guide tool (Wizard) to create ODBC links for all the resources and functionalities that allow its use.
Movicon creates Database files in Access format for default in which all the project's Data Loggers and Recipes will be inserted. Each Data Logger or Recipe is identified by a table within the Database.
The Database file created by Movicon will be inserted in the project's **'DLOGGERS'** folder with the project's name plus the "_DLR" suffix. For instance, if the project is called 'Project1' the Database file name will then be **"Project1_DLR.mdb"**.

The ODBC link can be customized, by defining the position, the name and Database file format to be used, by using the "ODBC_DSN" and "User ODBC DSN" properties which can be accessed from the **"Data Loggers and Recipes Common Database Settings Properties"** of each Data Logger or Recipe object.

Each Data Logger or Recipe object will be represented within the Database by a Table with the same name or with a name defined by the programmer by using the appropriate **"Table Name"** property accessed through the **"Data Loggers and Recipes common General Properties"**.

23.4.2. Importing Data Loggers and Recipes from other Recipes

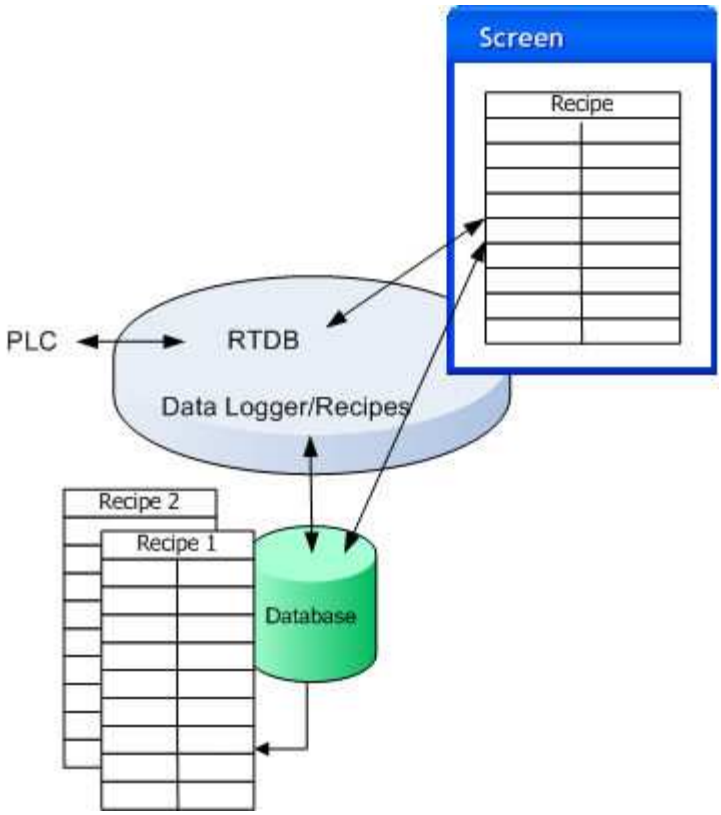
Movicon allows one or more Data Loggers or Recipes to be copies or moved from one project to another. In order to do this just open the two projects at the same time, so that both are displayed in the 'Project Explorer' window. After having done this one or more Data Loggers or Recipes, or only a few individual columns can be copied or moved from one project to the other by using Window's Copy, Paste or Dragging standard techniques.

The 'Data Loggers & Recipes' resource is saved by Movicon in the "NameProject.movdlrec" file inside the project folder in XML format. The "NameProject.movdlrec" file can also be copied directly when having to copy all the 'Data Loggers & Recipes' resource from one project to another.

23.5. Recipes on Database

Often production plants need to record parameters and set-points of a certain product type on file to be kept in archives so that it can be later edited in order to activate the production of a different product. The previous product can be taken from the archives and reactivated in the plant according to the production requirements.
This is usually known as 'production recipe management'. For instance, in a production process where the final product is the result of a mixture of different components specified in percentages, it is evidently necessary to establish which components these are and their percentages in the production recipe to then be activated in function with the final product type you require.
This concept can be applied whenever it necessary to insert, archive, print and activate data whenever required.
Movicon provides you with a **'Data Loggers & Recipes'** resource, a powerful tool for manipulating databases and using them for managing recipes by means of the purpose built functions in the Recipe properties or by means of the Basic Script function.

Movicon can use ODBC or IMDB to record Recipe data on log files. Consult the appropriate chapters on Historical Log Management to evaluate and choose the file format type which suits you best.



A block diagram of how a recipe works: The variables are linked to a Recipe object from the DataLoggers/Recipe resource, which are set to record data in function with the operating commands , which also allows the handling of files.

How Recipe objects work

Even though the Recipe objects are in the same resource as the Data Loggers and share the same functional technology, they have a different way of working. While the Data Logger records data, at preset times or on event, on files with data recycle management, different operating commands are needed as explained below.

Recipe DB table structure:

Index	VAR0001	VAR0002	VAR0003
Recipe 1	234	234	12
Recipe 2	123	450	34
Recipe 3	321	230	44
Recipe 4	085	450	21
Recipe ...	061	450	13

This table shows an example of data organized in a recipe log file. The table columns are associated to the process variables. The column indicating the recipe index is obligatory.

The techniques used for creating project recipe objects are explained in the next section, Creating Recipes.
However, the basic concept is:

1. The Recipe object, in the Data Logger & Recipe Resource, is defined with its working criteria in its properties
2. The Recipe object's components are the index and Process Variables which are represented by the columns in the table

3. The operating commands in the recipe are "Save", "Activate" and "Delete" as well as the selecting the recipe on file by means of its index. These operating commands become executable by associating the variables to the respective commands in the recipe properties
4. The last operation to carry out involves creating the recipe's graphical interface which can also be done by using the"Creting Recipes"." command. Movicon will automatically create a new screen containing all the controls needed for managing the recipe,as described in the paragraph on "Creting Recipe".

23.5.1. Creating Recipes

By using the "DataLogger/Recipe" resource, Movicon permits you to create Recipe objects in the Database to consent recipe and data archive management based on archive files, exploiting the screen graphics potentialities for user interfacing.
The recipe file management is completely **automatic and object orientated.**

To create a recipe follow the steps described below:

Setting the Variables

The first thing to do is to create the necessary variables, if not already done so, in the project. Apart from the recipe process variables (Set Points), there should also be variables, which are those that determine how the recipe works.
These variables should at the minimum be:

1. Index Variable
2. Variable for the Save command
3. Variable for the Activate command
4. Variable for the Delete command

Creating the Recipe object

After having identified the necessary variables, you will now need to select the project's "Data Logger & Recipe" resource. From here, use the "New Recipe " command to create a new recipe in the project. The object will be added to the resource's tree structure.
After having created the Recipe object use the "New Column" command to add **columns** in correspondence with to the process variables (Set Points). You can also drag the variables from the Recipe with the drag & Drop technique.

Configuring the Recipe object

After having inserted the Recipe object and create its data process structure, you need to configure the recipe's operability. Select the Recipe object and access to the "Recipe Execution Properties". Here you will be able assign the variables for the Save, Activate and Delete commands. There are also other operative command types available and which are described in the section about the Recipe Execution Properties.

The recipe Save, Delete, Move Next, etc., commands can be executed by using the appropriate variables which can be associated to the recipe ("Recipe Execution Properties"), and by using the appropriate commands from the object Command List ("Report Commands"). When using the "Report Commands" you will not need to create any variables.

Creating Recipe screens

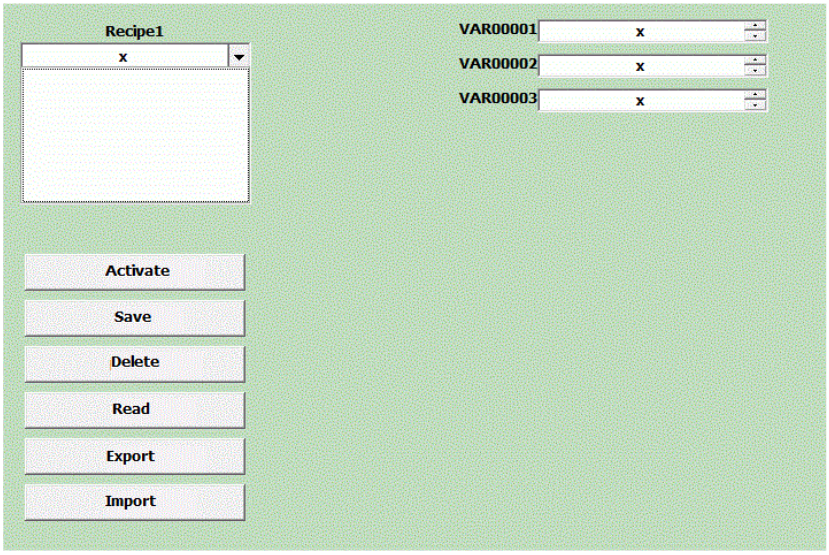
When you have finished configuring your recipe the next and last thing to do is to set its graphic interface which will be the screen and the objects which display and act on the recipe's values.
Movicon has a very simple but powerful command which allows you to **automatically create the recipe screen** with just one click of the mouse. All you have to do is to select the Recipe object and use the "Create Recipe Editor" command. In this case, Movicon will automatically create a screen containing all the graphic controls and objects that the selected recipe needs. All the graphic objects will be already linked to the recipe's variables and the operating commands, leaving you nothing else to do but run the project.

The wizard will create a screen with the following components:

- 1 combo-box to which the "Recipe Index" temporary variable and the "Recipe List" variable will be associated. If the "Recipe List" variable and "Recipe Index" temporary variable have not yet been created and associated to the Recipe, Movicon will create them in the RealTimeDB and then associate them automatically to both the screen's Recipe and combo-box object.
- 1 editable display for each one of the recipe fields to which will also be associated a temporary variable. If temporary variables have not yet been created and associated to the Recipe, Movicon will create them in the RealTimeDB and associate them automatically to both the screen's Recipe and displays.
- 1 "Activate" button for activating the selected Recipe
- 1 "Save" button for saveing the selected Recipe
- 1 "Delete" button for deleting the selected Recipe
- 1 "Read" button for loading field values in the selected Recipe's temporary variables
- 1 "Export" button for exporting the selected Recipe values in cvs files
- 1 "Import" button for importing values from csv file to the selected Recipe's temporary variables

The "Activate", "Save", "Delete" and "Read" buttons will be set as "ON-OFF" type and automatically associated with the Recipe's execution variables if specified in the "Recipe Execution Properties". If these variables have not been specified, "Command Execution" type buttons will be created and associated to the corresponding " Report - Recipes Commands" (Activate, Save, etc.).
The "Import" and "Export" buttons will be set as "Command Execution" type and associated with the corresponding " Report - Recipes Commands" (Import and Export).

Below is an example of a graphical result of a simple Recipe:



23.5.2. SQL Commands for Recipes in the Database

The Recipes memorized with **ODBC** connection can be done selecting the Database chosen format, with the advantage of being viewed and accessible from other applications supporting the same chosen database format.

The SQL standard language commands, supported by all relational databases, must be used so that Movicon can manage and manipulate the recipes according to the database's technology.
The commands needed to: UPDATE, DELETE and INSERT; their syntaxes below are:

UPDATE *NameTable*
SET *NameColumn1* = {value1 | **NULL**}

[,NameColumn2 = {value2 | **NULL**}]
[**WHERE** condition-filter]

DELETE FROM *NameTable* [**WHERE** condition-filter]

INSERT INTO *NameTable* [(*NameColumn1* [,*NameColumn2*]…)]
{query | **VALUES** (value1 [,value2]…)}

In order to use these SQL commands in the project's recipe management you have to use the appropriate variables predisposed for this purpose, described in the **"Recipe Execution Properties"** which can edit the query (default query, filter or order) for extracting data from the Recipe Database.
Below are SQL query examples for the three commands seen above:

Data Update for existing recipe

UPDATE *TRecipe* **SET** *Value01* = 10, *Value02* = 20, *Value03* = 30, *Value04* = 40, *Value05* = 50
WHERE *IdRecipe* = 'Recipe001'

Where:
TRecipe = name of the Recipe Table contained in the Database
Value01, 02, etc. = name of table column, corresponding to the Recipe's data
IdRecipe = column name 'Recipe Index'

Delete Recipe Data

DELETE FROM *TRecipe* **WHERE** *IdRecipe* = 'Recipe001'

Where:
TRecipe = Recipe Table name contained in the Database
IdRecipe = column name 'Recipe Index'

Insert new recipe

INSERT INTO *TRecipe* (*IdRecipe*, *Value01*, *Value02*, *Value03*, *Value04*, *Value05*)
VALUES ('Recipe001',1,2,3,4,5)

Where:
TRecipe = name of Recipe Table contained in the Database
Value01, 02, etc = Table column name, corresponding to the Recipe's data
IdRecipe = column name 'Recipe Index'

23.5.3. The Query in Recipes

The Recipes are predisposed for extracting data from records registered in the tables by the Movicon registration engine.
Data extraction, defined **Query**, **Ordering** or **Filter**, permit the selecting, filtering or putting the Database contents into order according to the parameters desired, by using the Structured Query Language functions, the standard language of all the databases and is independent from the **ODBC** data format chosen. The Query also permits commands to be executed in the corresponding Database in order to edit or insert its records.
When a Query is executed it creates a **RecordSet**, which is a group of data in memory extracted by the Query which can be used and viewed according to the requirements imposed.
The command query, ordering and filter are set by using the variables that can be inserted in **"Recipe Execution Properties"**. If this variables are not declared, Movicon will use the default query, if specified, available in **"Recipe Database Settings Properties"**.

Property	SQL Command
Default Query	The default Query, corresponding to a text string in SQL language, supports all the SQL commands but does not create RecordSets. As these commands do not generate RecordSets they can be used for editing or adding records in the database (INSERT or UPDATE are the usual commands).
Default Order	The ordering, corresponding to a text string in SQL language, consents you to set the criteria for putting the extracted fields into order by generating a RecordSet in which the database records are loaded in memory in the order according to the parameters set. Corresponds to the SQL 'ORDER BY' command.
Default Filter	The Filter, corresponding to the text string in SQL language, consents you to define a criteria for extracting data that correspond to specific conditions (ie. Value > 100), by creating a RecordSet according to the criteria selected. Corresponds to the SQL 'WHERE' command.

This functionality's use can be configured through a Recipe property which can be assigned a command, filter or ordering Query, then point to the record from the RecordSet, automatically created by the Query execution, to represent, in the variables associated to the Data Logger or Recipe columns, the values extracted by the Query.
In addition to this Movicon also allows you to use the appropriate Basic Script functions to get complete management of the SQL commands in the queries or Recordsets, making this functionality very powerful and open. Please refer to the section dedicated to the Basic Script for further details on the Basic Script instructions regarding Databases.

23.6. Data Loggers and Recipes common Properties

The Data Logger and Recipe objects inserted into the project can be completely customized in the properties. The Data Logger and Recipe objects are built with Tables, Records, recording events, each one structuring the Databases to be generated, and whose properties are accessible from the Movicon 'Properties Window'.
The Data Loggers and Recipes present different operation analogies, some of whose properties are common to both the resources.

23.6.1. Data Loggers and Recipes Common General Properties

Each Data Logger or Recipe object, from the moment it is inserted, can be configured in the General properties described as follows. The General properties are used to determine the Data logger's or Recipe's name, their enabling and any associated report file.
To modify the General properties of a Data Logger or Recipe select the object with the mouse and use the Movicon **'Properties Window'**.

Name
This property allows you to insert the Data Logger's or Recipe's name which has been inserted. The name entered identifies the Data Logger or Recipe object in the "**Data Loggers & Recipes**" resource. If a name is not specified in the **"Table Name"** property, the name of the Data Logger or Recipe will be also used as the table's name.

Enable Data Logger / Recipe
This property permits you to enable or disable the Data Logger or Recipe. This command consents the programmer to temporary deactivate the recording and running of each single Data Logger or Recipe.

Objects will not get created in runtime mode with the Data Logger or Recipes disabled and therefore will not be accessible through the basic script functions. In addition to this, other viewer objects displayed as Data Logger windows or Trends linked to them will not be capable of retrieving the associated database structure.

Always in Use

When setting this option to "false" the variables used in the recipe fields will not go into use when the recipe is initialized. As a consequence these variables will not get counted on the license if not on recipe activation command and for the time needed for transferring recipe values to the field (through the opc client or communication driver).

When a recipe is managed using a screen window, it will need to use temporary variables. Otherwise disabling the 'always in use' option will not consent recipe editing. However, if you use the "Recipe Manager" window, it will not be necessary for the recipe to have temporary variables.

The recipe variables must be connected to the field using "Exception Output" tasks when using a communication driver.

Warning! In occurrence of communication errors and a recipe is activated, the recipe's variables will remain in use when the driver is unable to perform the "Exception Output" task correctly relating to the recipe. This means that if the communication error persists for more than two hours and the recipe variables have been put into use using the activation command provoking major use of license bytes, the project will go into demo mode and close after the two hours have expired.

Report File

Each Data Logger or Recipe can be linked to a Report file to display and print documents with formatted texts and graphics. The Report files, containing the print matrix, can be created with **Report Designer** or **Crystal Reports©.** The Report file can be linked to the Database through direct file access or by using the ODBC link created by Movicon.
The Report file can be predisposed to link up to variables recorded in the Database table records.
You can select a "Report Designer" format report by using the browse button on the right hand side of the field. If you need to insert a "Crystal Report" file you will have to enter its name manually.

Edit Report File

This command executes the Report Designer for creating or modifying reports to be associated to DataLoggers or Recipes. While a report is being created, Movicon will associate the report with a DSN, relating to the DataLogger or Recipe, to be used. Before opening the report in eidt mode a dialog window will show with the following message:

Do you want to recreate the table and update this in the report ?

You should answer "Yes" to this question for the following reasons:

1. The report does not yet exist and will be created for the first time
2. The report has been created but the structure or the DataLogger's name has been changed.

When using a DataLogger or Recipe as Template the table structure will be created only after the project has been launched into runtime at least once. In this case, the report should be created with the Movicon command after the table has been created, and therefore after having run the project at least once. In the same way, if the DataLogger or Recipe structure is modified it will be necessary to re-launch the project in runtime to update the table structure.

Printer name

This property allows you to insert the printer's name where eventual reports associated to Data Logger or Recipe are to be printed. The printer predefined by the system will be used if the printer's name is not specified.

Table Name

This property allows you to insert the name of the table associated to the Data Logger or Recipe. Each Data Logger or Recipe contains its data in tables composed of records and columns. The table has to have a name in the database because database files linked through the **ODBC** may contain more than one table.

If the table name is not specified, it will be created with the same **"Name"** of the Data Logger or Recipe.

23.6.2. Data Loggers and Recipes common Execution Properties

The common Execution properties of a Data Logger or Recipe allow variables to be defined for the print or reset command executions of the database associated to the Data Logger or the Recipe.
To modify the a Data Logger's Execution property, select the object with the mouse and use the Movicon **'Properties Window'**.
To verify the Execution properties' specifications for Data Loggers refer to the **"Data Logger Execution Properties"** paragraph.
To verify the Execution properties' specifications for Recipes refer to the **"Recipe Execution Properties"** paragraph.

Print Variable
The 'Print Variable' selection box allows a variable from the Movicon Real Time DB to be associated which will carry out a recorded data print out when it changes to a logical state different from zero. The variable will therefore be set at 'zero' value by Movicon once the operation has been executed. The printer always refers to the Report specified in the Data Logger's "Report File" property.
For further details on Reports management and printing reports please consult the 'Reports' chapter in this document.

Reset Variable
The 'Reset Variables' selection box allows a variable from the Movicon Real Time DB to be associated, so that when it changes to a logical state different from zero all the values recorded in the table up to that moment will be cancelled to then restart a new set of recordings. The variable will then be set to 'zero' value by Movicon once the operation has be executed.
The next recording command will write data on the first record of an empty table.

Status Variable
A variable from the Movicon RealTime DB can be selected in this field to show information on the DataLogger or Recipe's status. This information will differ according to the object in question:

DataLogger Object
Here the variable will indicate the DataLogger's ODBC connection status. The "0" value means that the ODBC connection is working correctly and the "1" value, or non '0' values means there is a connection error.

Recipe Object
Here the variable will indicate the status of the query executions and ODBC connections.
Once a query is executed, Movicon informs logic on the set query's execution state, by notifying the status using the following bits in the set variable:

Bit 0 = 1: query being executed
Bit 1 = 1: BOF
Bit 2 = 1: EOF
Bit 3 = 1: Record Cancelled
Bit 4 = 1: query execution error or ODBC connection error

23.6.3. Data Loggers and Recipes common Database Settings Properties

The Data Logger or Recipe Database Settings property allow you to customize the settings of the database to be created.
To edit the Database settings property of a Data Logger or recipe select the object with the mouse and use the Movicon 'Properties Window'.
To verify the Data base Settings property for Recipes please refer to **"Recipe Database Settings Properties"** paragraph.

Use IMDB Manager
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Shared Tables
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Save XML File
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Save CSV Format
Please refer to the paragraph on **"IMDB Settings for Recording data"** from the **"IMDB"** section.

Crypt File
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Write Behind Delay
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Max Nr. Records
See paragraph **"IMDB Settings for Recording data"** in the section on **"IMDB"**.

Keep the DB Connection open
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. Error Number
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. Transactions
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. Cache Size
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Max. VarChar Precision
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

ODBC DSN
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

ODBC DSN User
See paragraph **"DBMS Settings for Recording data on DataBase"** in the section on **"Historical Log Management".**

Time Column
This setting permits you to insert the name of the Data Logger table's Time Column. The default name will be used if one is not inserted. The Time Column indicates the date and time of the recording in GMT (Greenwich Mean Time) which is universally used as time reference. Time zones are calculated by starting from Greenwich 00 hrs.

Local Time Column
This setting allows you to enter the name of the Local Time Column of the Data Logger table. If you do not enter a name here the default name will be used instead. The Local Time Column indicates the data and local time the recording took place.

MSec Column
This setting allows you to enter the name of the MSec Column of the Data Logger table. If you do not enter a name here the default name will be used instead. The MSec Column indicates the milliseconds relating to the recording time.

User Column

This setting allows you to enter the name of the User Column of the Data Logger table. If you do not enter a name here the default name will be used instead. The User Column indicates the user name which was active when the recording took place.

Reason Column

This setting allows you to enter the name of the Reason Column of the Data Logger table. If you do not enter a name here the default name will be used instead. The Reason Column indicates which event triggered the recording (command, change or time).

Create DB Table

This command executes the creation of the Data Logger table in the database. If the table is already present the command's execution will cancel the table and recreate it without any data. This means that any data previously recorded will be lost.

23.6.4. Data Loggers and Recipes common Column General Properties

Each Data Logger or Recipe object has been conceived to manage any required number of values to be recorded which are therefore Database columns. If an ODBC link is used, the maximum number of columns that can be managed depends on the type of Database format being used and the relative **ODBC** links.
Each database column must be associated to a variable from the project through the General properties of a column.
To modify the General properties of a Data Logger or Recipe Column you have to select the object with the mouse and use the Movicon **'Properties Window'**.
To verify the General properties' specifications of a Column for Data Loggers please refer to the "Data Logger Column General Properties".
To verify the General properties' specifications of a Column for a Recipe please refer to the "Recipe column General Properties".

Name

This edit box permits you to assign a name to the Database column.
The name is to be built from a text string which will also be used to identify that same column.

Variable

This selection box allows you to associate the required variables, selected among those inserted in the project, to the column.
If an ODBC link is used the data type supported by the column depends on the selected database format and the ODBC link.

When dealing with a **Data Logger,** the variable contents will be the value recorded in the records with the recording command.
When dealing with a **Recipe,** the variable in question will be the one where the recipe data will end up when the activation command is executed.

Caution! The <Variable.bit> syntax cannot be used in this field. If used, a DBMS error will be generated during runtime blocking all further database recordings.

23.7. Data Logger Properties

The Data Logger objects inserted into the project can be completely customized in their properties. The Data Logger objects are formed up of Tables, Records, recording events, some of which form the structure of the Database to be generated and whose properties can be accessed from the Movicon **'Property Window'**.

23.7.1. Data Logger Style Properties

The Style Properties of a Data Logger allow you to define how the data recording modes are to be managed.
Movicon allows data recording to be done on event, on change and on time or with more than one mode at the same time. To modify the Data Logger's Style property, select the object with the mouse and use the Movicon **'Properties Window'.**

Quality Good Only
This property allows you to enable the recording of data only when all the variables associated to the Data Logger columns have Good 'Quality' properties. When the setting is left at False the recording will take place independently from variables' quality.

On Change
This selection allows you to enable recording on the variable's status change. Recording on status change will not influence the recording on command or on time, as all these modes can co-exist.
Movicon will carry out a recording upon every value change of the variables (columns) associated to the Data Logger object, which will be added to those carried out on command or on time when managed.

Recording will take place each time any one of the variable changed and only in the following conditions:

- the **"Records On Change"** property must be enabled
- if the **"Enable Recording Variable"** has been inserted, the variable must be other than zero
- if the **"Quality Good Only"** property has been enabled, a control is carried out on the quality of the variable assoicated to the columns which must all have the "Good" quality status
- if the **"Enable Day Timeframe"** property has been enabled, a control is carried out if re-entered within the set timeframe ("Timeframe from" - "Timeframe to")

If the Data Logger's "Recording Variable" has been inserted some considerations have to be added to the recording on change operation.
In this case the operation is as follows:

- Movicon records on the rising edge of the "Enable recording Variable", if a variable associated to a Data Logger column has changed value since the last recording carried out
- Movicon DOES NOT record on the rising edge of the "Enable recording Variable" if all the variables associated to the Data Logger columns have remained unchanged since the last recording carried out. This also goes for all those variables which changed during the period in which the "Enabling recording Variable" remained at zero, but returned back to values last recorded before the "Enable recording Variable" changed to a different value other than zero

If the "Notify Timestamp Changes" property has been enabled in the RealTimeDB "In Use Variable Manager" property group, the DataLogger will also insert a new record only if the variable's TimeStamp changes and not its value.

Enable Dead Band
This selection allows the use of a dead band to be enabled for recording on Change. In this case the recording will be executed only when the variable change exceeds the dead band's set value.

Dead Band
This edit box is used for inserting the dead band value within which the DataLogger will not record on any variable change. This value may be an absolute value or a percentage value according to whether the "Dead Band Percent" has been enabled or not.

Dead Band Percent
This selection allows the use of the "Dead Band Percent" to be enabled in respect to the variable's value. The percent value will be the one specified in the "Dead Band" property.

On Variable

This selection allows you to enable record on command, meaning that when a determined variable from the Movicon Real Time DB, defined by the programmer, changes its value from 'zero' to a value 'different from zero'. The variable in question must be selected through the Data Logger's "Recording Variable" property and can be declared any type (bit, byte, word, etc.), as Movicon carries out the recording when the value contained in the variable is different from zero. When the recording has finished, Movicon will force the value in the recording variable to zero.
The data recording sequence is therefore as follows:

1. Set the recording variable to >< 0 value when you want to carry out a recording
2. Movicon buffers the data in its cache memory
3. Movicon sets the recording variable's value = 0
4. Movicon notifies the DBMS of the data in the cache, while it is ready for a new recording

Recording on command does not influence recording on change or on time, as all modes can co-exist at the same time.

Recordings are only executed when the following conditions have been applied:

- the **"Record On Command"** property must be enabled
- the variable associated to the **"Recording Variable"** property must be other than zero (once recording has finished Movicon will reset to zero)

Record on Command is done independently from the **"Quality Good Only"**, **"Enable Recording Variable"** and **"Enable Day Timeframe"** property settings. Meaning that, independently from these settings, the Data Logger will record each time the "Recording Variable" is set at a value other than zero.

When data are recorded with ODBC, the recordings are done according to the ODBC modality characteristics. The data sampled from the Data Logger is managed by a cache memory as well as passed over to the Windows ODBC administrator. This may cause a display delay between the sample being effected and the availability of values in the external database file values availability. The ODBC buffer's size can be modified from the operating system's property. Cache unloading can also be forced from the appropriated Basic Script functions.

On Time

This selection permits you enable the recording cause on a time basis. The recording on time will not influence recording on command or on change, as all modes can co-exist at the same time.
By selecting the recording on time, you will have to specify the time interval within which the recording is to be done by entering the recording frequency, (Hour, Minutes, Seconds and Milliseconds), in the "Data Logger Recording Time Properties".
At each specified time interval Movicon will invoke a recording, which will be added to those done on command or on change whenever they are managed.

Recording takes place at each time interval set only if the following conditions have been applied as well:

- the **"Record On Time"** property must be enabled
- if the **"Enable Recording Variable"** has been inserted, it must be set other than zero
- if the **"Quality Good Only"** had been enabled, the quality of all the variables associated to the columns are controlled to see if they all have the "Good" quality status
- if the **"Enable Day Timeframe"** property has been enabled, a control is carried if re-entered within the timeframe set ("Timeframe from" - "Timeframe to")

23.7.2. Data Logger Recording Time Properties

The Data Logger's Recording Time properties permit you to define the time intervals where the data recordings are to take place when the "Record on Time" item has been selected in the Data Logger's Style.

To modify the Data Logger's Recording Time property, select the object with the mouse and use the Movicon **'Properties Window'**.

Hour Frequence
This value represents the Data Logger's sampling time in hours. This value is only of significance if the "Record on Time" property has been enabled.

Minutes Frequence
This value represents the Data Logger's sampling time in minutes. This value is only of significance if the "Record on Time" property has been enabled.

Seconds Frequence
This value represents the Data Logger's sampling time in seconds. This value is only of significance if the "Record on Time" property has been enabled.

MilliSeconds Frequence
This value represents the Data Logger's sampling time in milliseconds. This value is only of significance if the "Record on Time" property has been enabled.

Enable Day Timeframe
This setting permits you to enable a data recording day timeframe. When you activate this function, you will need to specify in which day timeframe the data recording is to be carried out (apart from the recording consented by "Recording Variable"). All the Data Logger recording commands evoked outside the established timeframe will be ignored accept for the recording executed with the "Record on Command" variable which remains active.

The recording of data in the timeframe, especially if they are variables, can also be executed using "Recording Variable".

Timeframe from
Setting of the starting time of the Data Logger's data recording when the 'Enable Day Timeframe' is enabled.

Timeframe to
Setting of the finishing time of the Data Logger's data recording when the 'Enable Day Timeframe' is enabled.

Data Max.Age
This field defines how long the data is to be memorized before being recycled. The time entered here must take into consideration how frequently you intend to carry out data recordings so as to avoid creating tables containing too much data. Practically, more the recording frequencies means more the maximum recording time has to be reduced for each Data Logger.
For further information please refer to the paragraph on "Archive Sizes".

The maximum recording time to be inserted should be based on your requirements, but you also need to keep in mind both the recording frequency and the type of database to be used. For instance if you use a Access2000 database you will be more limited in the number of data recordings in respect to a SQL Server database.

23.7.3. Data Logger Execution Properties

The Execution properties of a Data Logger allow you to define the variables with which commands will be executed in the Data Logger such as recording on command, enabling Data Logger, etc.
To modify the Execution property of a Data Logger, select the object with the mouse and use the Movicon **'Property Window'**.
To verify the Recipes and Data Loggers common Execution properties refer to the "Data Loggers and Recipes common Execution Properties" paragraph.

Recording Variable
In this edit box you can select a variable from the Movicon Real Time DB to be used to execute the Data Logger's record on command. This selection only works if the "Record on Command" property

has been enabled. The variable can be declared any type (bit, byte, word, etc.), as Movicon executes the recording when the value contained in the variable is different from zero. When the recording has taken place, Movicon will force the value in the recording variable back to zero.

Enable Recording Variable

The "Enable Recording Variable" field permits you to associate a Movicon Real Time DB variable which determines recording data on time frequency (Record On Time Frequency).
This is handy in situations where you may have to impede value recordings due to various reasons, one being that such recordings would be insignificant, and another would be that such recordings are not needed in certain phases of the process. If such situations arise, you can then enter a variable that when set with "different from zero" logic state will consent to recording data associated to the Data Logger. Note that this variable only effects data recorded on time frequencies (Record On Time Frequency) and not for data recorded on change (Record On Change) or on command (Record On Command).

The recording of data can also be set in timeframes, by enabling the appropriate Data Logger's "Enable Day Timeframe" property.
By leaving the selection empty, as proposed for default, the recording will always be enabled, apart from any time range disabling.

23.7.4. Data Logger Column General Properties

Each Data Logger object had been created to manage the required number of columns. If an ODBC link is used, the maximum number of columns which can be managed depends on the type of database format being use and the relating **ODBC** links.
Each database column must be associated to a project variable through the Column's General property.
To modify the DataLogger column's General property, select the object with the mouse and use the Movicon **'Properties Window'.**
To verify the Recipe and Data Logger common Column General properties please refer the "Data Loggers and Recipes common Column General Properties" paragraph.

Type

Through this property you can select which value from the variable must be recorded in the database. The choices are:

- **Instantaneous:** the variable's instantaneous value will be recorded, which is the value contained in the variable at the moment of recording
- **Minimum:** the variable's minimum value obtained in the time interval, that elapses between one recording and the next, will be recorded
- **Maximum:** the variable's maximum value obtained in the time interval, which elapses between one recording and the next, will be recorded
- **Average:** the variable's average value obtained in the time interval which elapses between one recording and the next, will be recorded

As regards to recording the "minimum", "maximum" and "average" values you will need to take into account that the statistics are reset at each recording, therefore the initial values of these variables will not be considered in the statistic calculations between one recording and the next.

Add Quality

This property, when enabled, allows you to add a column to the Database table which will refer to the variable which reports the Quality Status of the same variable at the moment the recording is executed.

Quality Column Name

This property allows you to define a customised name for the Quality column when the "Add Quality" property is enabled. If the field is left empty the default name will be used instead (NomeColumn_Quality).

Add Timestamp

This property, when enabled, allows you to add a column to the Database table which will refer to the variable that reports the date and time of the last variation it underwent.

Timestamp Column Name
This property allows you to define a customised name of the Timestamp Column when the "Add Timestamp" property is enabled. If the field is left empty the default name will be used instead (NameColumn_Timestamp).

Add Num.Updates Column
This property, when enabled, allows you to add a column to the Database table which will refer to the variable that reports the number of variations it underwent in the time interval which elapses between one recording and the next.

Num.Updates Column Name
This property allows you to define a customized name for tbe Num.Updates Column when the "Add Num.Updates Column" property is enabled. If the field is left empty the default name will be used instead (NameColumn_NumUpdates).

23.8. Recipe Properties

The Recipe objects inserted into the project can be completely customized in the properties. The Recipe objects are built with Tables, Records, recording events, each one composes the structure of the Database to be generated, and whose properties can be accessed from the Movicon **'Properties Window'**.

23.8.1. Recipe Execution Properties

The Recipe Execution properties allow you to define the variables to execute commands in the same Recipe such as save, activate, cancel, etc.
In order to modify the Recipe's Execution properties select the object with the mouse and use the Movicon **'Properties Window'**.
To verify the Recipes and Data Loggers common Execution properties please refer to the "Data Loggers and Recipes common Execution Properties".

Execute Variable
In this edit box you can select a variable from the Movicon Real Time DB to use for executing any queries setup for the Recipe. The query to be executed must be contained in the **Query Variable**.
The variable will be then set at 'zero' value by Movicon once the operation has been executed.

It may be necessary to establish the Recipe's data management with an event which will determine the activation of the Query's Selection, Filter and Order, for extracting data contained in the Database according to the search criteria, which can be setup in the properties listed below.
The 'Execute Variable' selection box permits you to select a variable among those contained in the Movicon Variable's Real Time DB to be used for executing any queries setup for the Recipe.
The variable can be declared any type (bit, byte, word, etc.), as Movicon will execute the query when the value contained in the variable is different from zero. After the execution has taken place Movicon will force the execution variable's value to zero.
The query execution sequence therefore results as follows:

1. Set the execution variable to value >< 0 the moment the query is needed
2. Movicon launches the query execution in the database and manages the execution status variable being run
3. Movicon sets the execution variable value = 0
4. Movicon notifies the query execution completion by resetting the status variable = 0

In order to execute the query successfully check the status of the query execution being run before executing another.
When a variable is introduced in the 'Execute Variable' property, the project will load the values of the data file's first record into the variables associated to the columns upon startup of the project in runtime.

Move First Variable

The execution of a query, filter or data order determines a **RecordSet**, which is a group of data extracted from the database and kept in the PC's memory. The 'Move First Variable' edit box allows you to select a variable from the Movicon Real Time DB to be used for executing moves to the first record of the eventual **RecordSet** of the selected data.
The rising edge of this variable will permit the extracted values in the **RecordSet** to be represented in the variables associated to the database columns.
For instance, by filtering a data group from the database by executing the Filter command, a **RecordSet** will be generated in the memory containing filtered data. When activating the 'Move First Variable' with a value different from zero, all the extracted values in the RecordSet relating to the first record will be written in the variables associated to the database columns.
The variable will then be reset to 'zero' value by Movicon once the operation has been executed.

Move Last Variable

The execution of a query, filter or data order determines a **RecordSet,** which is a group of extracted data from the database and kept in the PC's memory. The 'Move Last Variable' edit box allows you to select a variable from the Movicon Real Time DB to be used for executing moves to the last record of the eventual **RecordSet** of selected data.
The rising edge of this variable will permit the extracted values in the **RecordSet** to be represented in the variables associated to the database columns.
For instance, by filtering a data group from the database by executing the Filter command, a **RecordSet** will be generated in the memory containing filtered data. When activating the 'Move Last Variable' with a value different from zero, all the extracted values in the **RecordSet** relating to the last record will be written in the variables associated to the database columns.
The variable will then be reset to 'zero' value by Movicon once the operation has been executed.

Move Prev Variable

The execution of a query, filter or data order determines a **RecordSet,** which is a group of extracted data from the database and kept in the PC's memory. The 'Move Prev Variable' edit box allows you to select a variable from the Movicon Real Time DB to be used for executing moves to the record before the current one being used in the eventual **RecordSet** of selected data.
The rising edge of this variable will permit the extracted values in the **RecordSet** to be represented in the variables associated to the database Columns.
For instance, by filtering a data group from the database by executing the Filter command, a **RecordSet** will be generated in the memory containing filtered data. When activating the 'Move Last Variable' with a value different from zero, all the extracted values in the **RecordSet** relating to the record before the current one will be written in the variables associated to the database columns.
The variable will then be reset to 'zero' value by Movicon once the operation has been executed.

Move Next Variable

The execution of a query, filter or data order determines a **RecordSet,** which is a group of extracted data from the database and kept in the PC's memory. The 'Move Next Variable' edit box allows you to select a variable from the Movicon Real Time DB to be used for executing moves to the record after the current one being used in the eventual **RecordSet** of selected data (Each record corresponds to a recipe).
The rising edge of this variable will permit the extracted values in the **RecordSet** to be represented in the variables associated to the database Columns.
For instance, by filtering a data group from the database by executing the Filter command, a **RecordSet** will be generated in the memory containing filtered data. When activating the 'Move Next Variable' with a value different from zero, all the extracted values in the **RecordSet** relating to the record before the current one will be written in the variables associated to the database columns.
The variable will then be reset to 'zero' value by Movicon once the operation has been executed.

Activate Variable

In this edit box you can select a variable from the Movicon Real Time DB to be used for executing the activation of the selected recipe. The recipe data temporary loaded into the variable will also be activated in the recipe's own variables with this command.
The variable will then be set to 'zero' value by Movicon once the operation has been executed.

Save Variable

In this edit box you can select a Variable from the Movicon Real Time DB to be used for executing the selected recipe save. The recipe data temporary loaded into the variable will also be saved in the Database with this command.
The variable will then be set to ' zero' value by Movicon once the operation has been executed.

Delete Variable
In this edit box you can select a Variable from the Movicon Real Time DB to be used for executing the elimination of the selected recipe. The selected recipe will also be eliminated from the Database with this command.
The variable will then be set to ' zero' value by Movicon once the operation has been executed.

ReQuery Variable
In this edit box you can select a variable from the Movicon Real Time DB to be used for executing a refresh of the recipe recordset.

List Recipes Variable
In this edit box you can select a variable from the Movicon Real Time DB to be used for displaying the list of recipes. When a variable is entered in this field a ComboBox component will be inserted instead of a simple Display in the Recipe Index field when the synoptic is created with the Create Recipe Editor command.

Filter Variable
In this edit box you can select a variable from the Movicon Real Time DB to be used for executing a filter of the recipe data (WHERE clause).

Sort Variable
In this edit box you can select a variable from the Movicon Real Time DB to be used for sorting out the recipe data (ORDER BY clause).

Query Variable
In this edit box you can select a variable from the Movicon Real Time DB to be used for executing a query in **SQL** standard language in data to be selected from the Database.

Read Variable
This field is used for selecting a Movicon RealTime DB variable to used for reading Recipe values from the field. The values read from the field will be loaded in the Recipe's temporary variables, therefore will overwrite the Recipe's current values selected through the "Recipe Index" (which is the recipe loaded for example by using the recipe selection combo-box found in the screen created by using the "Create Recipe Screen" wizard command). Once data has been read from the field and therefore updating the temporary variables, when activating the command to save the recipe, this data will be recorded on database overwriting the previous values of the Recipe displayed. This command only updates the Recipe's temporary variables and will have no effect if recipe is without.

23.8.2. Recipe Database Settings Properties

The Recipe Database property settings allow you to customize queries for extracting data from the linked database.
To modify the Recipe Database Settings property, select the object with the mouse and use the Movicon **'Properties Window'**.
To verify the Recipes and Data Loggers common Database Settings Properties please refer to the "Data Loggers and Recipes Common Database Settings Properties" paragraph.

Default Filter
This edit box permits you to enter a text string containing the filter function in SQL standard language on data to be selected from the Database. For further information please refer to the section on "Default Filter".

Default Sort
This edit box allows you to enter a text string containing the sort function in SQL standard language in data to be selected from the Database. For further information please refer to the section on "Default Filter".

Default Query
This edit box allows you to enter a text string containing the query in **SQL** standard language in data to be selected from the Database. For further information please refer to the section on "Default Filter".

23.8.3. Recipe column General Properties

Each Recipe object has been created to manage any required number of values to be recorded and therefore Database columns. If an ODBC link is used, the maximum number of manageable columns depends on the type of database format being used and the relative **ODBC** links.
Each database column has to be associated to a project variable through the column's General property.
To modify a Recipe's Column's general property, select the object with the mouse and use the Movicon **'Properties Window'.**
To verify Recipe and Data Logger common Column General Properties please refer to the "Data Loggers and Recipes common Column General Properties" paragraph.

Recipe Index

By using this property you can indicate whether the column in question is to have a recipe index, being that which identifies the recipe. Only one recipe index can be defined for each recipe.

Even though the column has been enabled as "Recipe Index" you can still use a numeric index type variable and not necessarily a string type variable. In this case the recipe index field in the database will created as string type but only numeric values will be accepted as recipe name in Movicon. In cases using numeric indexes, the command that generates the recipe editing screen, "Create Recipe Screen", will create a "Display" control for inserting the recipe's name. The use of numeric indexes consents recipes with numeric indexes to be activated by variables which are read externally through the communication driver or OPC.

Recipe Temp. Variable

The name of the Variable from the Movicon Real Time DB, which will be used as a temporary variable for holding the recipe's data, is specified in this edit box. The values contained in the 'Temp. Variable' are copied into the recipes output variable only when the recipe's activation command is executed.

24. Reports

The Movicon Report management can be used by exploiting the Movicon native tools (Embedded Reports and Textual Reports) or by exploiting the Report Designer and Crystal Report™ tools.

The Reports are tools for displaying or printing filed process data according to preset time ranges. Thanks to Movicon, the Report management is extremely easy to use, guaranteeing openness in obtaining Report printouts adaptable to end user needs. In fact, in addition to accessing historical data recorded by the Data Loggers, the Reports must guarantee visualization of calculated amounts, totals, averages, variances, selecting time ranges, product batches, operators, shift etc criteria.
In order for this to happen Movicon has integrated a "Report" resource called "Embedded Report", through which reports can be autonomously created for displaying data recorded on database, using the Historical Log and Dataloggers, or for simply just displaying project variables. When needing to create reports without graphics it is easier to create Textual Reports which are simple to use. Both the Movicon "Internal Reports" and " Textual Report" are compatible with the Windows CE environment as well. In additon to the navtive reports, Movicon has also included the "Report Designer" for free to give users the possibility to create more complex reports by using a purposely designed ".NET" tool. Movicon is still compatible with the "Crystal Report™" report engine which is not integrated but needs to be purchased separately to create the reports desired.

When creating reports in projects, it is necessary to evaluate whether the Movicon Embedded Reports should be used or the "Report Designer" or "Crystal Report" external libraries. The choice should be made based on the type of report to be realized, as each solution has its pros and cons. For further information about the pros and cons please refer to the section on "Advantages and Disadvantages of using Movicon Embedded Reports ".

The Movicon native report files have the ".movrep" extension and are saved in the project's resource folder. The report files created with the "Report Designer" have the ".repx" extension, whereas those created with "Crystal Report™" have the "rpt" extension.
Report files created with the Report Designer Crystal Report can be associated to "DataLogger/Recipe" resources, "Historical Log Window" and "TraceDB Window" objects. When a report file is inserted in the "Report File" property of one of these objects, the "Print" command available in the "DataLogger/Recipe window", "Historical Log Window" and "TraceDB.
Window" objects will send the report to be printed. If this report file has a ".repx" extension, Movicon will execute this operation using the "Report Designer" libraries, if the file has a ".rpt" extension, Movicon will use the "Crystal Report™" libraries.

It is not possible to associate the "Embedded Reports" and "Textual Reports" to the "Report File" property of a "DataLogger/Recipe" resource and the "Historical Log Window" and "TraceDB Window" objects. The "Embedded Reports" or "Textual Reports" can only be executed through the "Command List - Report-Recipe" or the "ExecuteCommand()" script function.

You can perform various operations in the reports such as displaying, printing and saving data on file by using the "Commands List - Report/Recipe" and "Commands List - Alarm" commands.

Reports from Web Client

This Report generation commands which can be invoked from Web Client are always executed on the Server. It is for this reason the "View Report" command is not enabled on Web Client to avoid opening Report display windows on the Server. The "View Report" command cannot be enabled by Web Client whether report be an Embedded Report, Text Report or a Report created with "Crystal Report" or "Report Designer". However, the 'Save Report", Print Report and "Send Report

commands are available from Web Client (keeping in mind that they will also be executed on Server side).

24.1. Embedded Reports

Movicon provides an Embedded Report resource through which reports can be created for displaying historical data or project variables. A Movicon Embedded report object is represented as a Screen object divided into five predefined sections called bands. Objects and symbols can be inserted to become part of the Report's features such as displays, charts etc.

Your license must be enabled with the "Data Logger" option in order to use the Movicon Embedded Reports. Likewise when using Reports for Alarm Statistics you must enable your license with the "Alarm Statistics" option.

Embedded Report Resource

New "Textual Reports" or "Embedded Reports" can be inserted by using the follwoing commands:

- "Add a new Report" command from contextual menu which appears when right clicking on "Embedded Report" group from the Project Explorer window.
- "New Report" command available from the "Commands" section located at the bottom left of Project Explorer Window.
- "Add a new Report layout in the project" available as an icon form the Movicon Toolbar.

When inserting a new Report object, it will appear as a screen and will open within the Movicon workspace. The Report will be created with A4 paper sizes (sizes will be expressed in pixels and calculated by Movicon based on screen resolutions), with a white background (color can be changed afterwards) and divided into seven Bands. These bands also have their own default sizes which can be modified as pleased. Each Band has a different role to play within the Report layout and will only be accepted for final printout if it contains objects. The Bands are sectioned off with a separation line only in design mode to determine how much space can be used for inserting objects and they will not show in the final report. The seven Bands in question are:

- **Page Header (one per page):** represents the area for the page header. This band will be repeated on all pages.
- **Report Title (one per report)**: represents the area for inserting the report title. This band will be printed once only on the first report page. When this band is printed as a single page (enabled "Keep in Separate Page" option the "Page Header" will not be printed on the paged dedicated to the report' title. The use of the Report Title band may result useful above all in cases when generating a multiple report, being many reports together with one command, to get one print showing one report after another (see section on "Report-Recipes Commands"). In this case the Report Title will be repeated on once on the first page of the first report on the list, while the "Report Header" band will be printed for all the reports listed.
- **Report Header (one per report)**: represents the area for the Report Header and is also a container for any graphs that need to be placed at the beginning of the Report. This band will be displayed on the first Report page only, after the "Report Title" band.
- **Details Header**: represents the are for the "Details" band. If data in the Details area occupies more than one page, the "Details Header" band will be repeated on all the pages containing "Details" and will be displayed before the "Details".
- **Details**: represents the area in which objects are inserted (i.e. displays) to display variable values and historical log values extracted from the database by queries. This band, and the objects it contains, can be duplicated on the page and distributed to other pages if needed in order to display all recordset information obtained by the query from the database. If the Report has not been associated with a Database because if is being used for displaying RealTimeDB variable values, the Details band will not be show when creating the report. As a consequence, any objects inserted in this band will not be shown either.
- **Report Footer (one per report)**: represents the area in which Graph type objects (i.e. Trends) are arranged and shown on the last report page. This band will only show on the last Report page.
- **Page Footer (one per page)**: represents the area of the Page Footer. This band displays on all Report pages.

The Report Bands have a minimum size of 1 pixel and cannot be deleted or new ones added. Those Band/s you wish not to display/print on your Report Just leave empty.

Each Band can be configured through their "Height" and "Keep in Separate Page" properties, as described in corresponding paragraphs.

Report Objects and Displayed Data

Different object types can be inserted in Reports for displaying data. These objects are those contained in the "Toolbox Object" for Reports,made available when the Movicon Embedded report is opened in edit mode in the project's workspace. These objects are a subset of those objects that can be inserted on Screen and are provided with a subset of properties.

Objects can also be Copy&Pasted from screens to Reports and viceversa. During this operation Movicon will convert the object to make it compatible with the new container in which it is inserted. For example, if a "Button", that is not available for Reports, is copied from a Screen and pasted onto a Report, it will be converted into a 'Radio button'. Some objects such as the "List Box", "Alarm Window" etc., cannot be inserted in a Report. Copying and pasting these objects in Reports will fail issuing a a message in the output window as follows:

```
Cannot understand object type "ListBox"
Nothing to Paste
```

Also those objects that can be inserted in reports such as Screens, can be grouped into composed Symbols then inserted into the "Symbol Library".

The following type of data can be associated and displayed in Report objects:

- Project's RealTimeDb variables (or child project)
- Fields containing data extracted by queries from tables associated to the Report
- Alarm statistical values (only when "Alarm Statistic" has been enabled)
- Report or system information, displayable exclusively through predisposed objects such as "Data Ora", "Utente", "Query", etc.

Values to be displayed in the Report objects can be inserted by editing the data entry fields manually or by simply selecting values from the "Tag Browser Window" window. In addition to selecting variables there is also a "DB Field" tab in this window where database fields can also be selected.

It is also possble to manage some animation graphics for objects insertable in the reports, such as Visibility, Transparency, background color, etc. In this way it will be possible to animate certain objects in different ways based on the project's variable values. Object animations are only modifiable in report generation phrase and once displayed or printed can no longer be edited. The following animations can be used:

- Visibility (object may be made visible or invisible but cannot blink
- Transparency (this functionality is not supported in Windows CE)
- Scale
- Rotation (this functionality is not supported in Windows CE)
- Text - Display Value
- Background Color
- Dynamic Text and Text and Edge Color
- Gradual Filling (available only for objects from the "Basic Shapes" category)
- Dynamic Images (object and display an image but cannot be managed with an automatic scroll of diverse images)

The animations above listed can also be used for objects for the "Details" section. In this case, the DataBase field can be used as an animation variable instead of a variable so that the object will animate with the current record value for each row displayed in the report. For example, let's suppose a display object has been inserted in the "Details" band which displays a DataLogger field associated with the same Background Color animation as the DataLogger field. At this point, when

the Report is generated, for example by extracting the last 10 records from the datalogger table, the ten display objects displayed in the Report will obtain a different set background colour based on the value to be shown.

Basic Expressions in objects

Basic expressions can also be inserted in object fields where variables are inserted. In this case, however, it is not possible to use expressions in database fields (DB fields, i.e. DF:VAR00001]) or special fields (SP fields, i.e. [SP:time]), where only variables from the RealTimeDB can be used.

Report and Alarm Statistics

By using the Movicon "Embedded Reports" you can create reports for displaying data recorded by the project's DataLoggers and Historical Log. Report's made on project "Alarms" tables also allow reports to be created on alarm statistics, as described in the paragraph on "Alarm Statistic". There are already some reports on alarm statistics available in the Movicon installation folder which can be customized or new ones creates.

In certain cases it is also possible to generate reports on variable trace tables. In this case, the variable Trace must be set with the same DSN used by the DataLogger (or Historical Log). In this way the variable table will be created within the same DataLogger database (or Historical Log). As regards to Embedded Reports, the "DataLogger/Recipe" (or Historical Log) item must be set as "Data Source Type", then the name of the DataLogger must be selected in the "Data Logger/Recipe" field (or a table in the "Event Log Type" field). At this point, it is fundamental that a customized "Query Report" be inserted for extracting data from the variable trace table and not from the DataLogger table (or Historical Log). For example, if the variable being traced is called "VAR00001",and the table has the same name as the variable, the query will be:

```
Select * From VAR00001 Order By LocalCol DESC
```

Caution! Using the SQL Server CE, therefore in a device with Windows CE, it is not possible to create reports on variable trace tables, due to the fact that the database file created for variable trace is different to both the DataLogger database file and the Historical Log database file.

Operations for editing Reports and multi-object selecting

While editing Report certain operations can be done using the SHIFT key:

Selecting Report Properties: to display properties belonging to the Embedded Report resource in the Properties Window just click on the Embedded Report's name in the Project Explorer window or click on any Report band, in an area not containing objects, while keeping the SHIFT key pressed down.
Selecting Report Band Properties: to display properties belonging to the Embedded Report's Band just click on the band in an area not containing objects.
Multi-object Selecting: to select a number of objects contained in an Embedded report, as well as those belonging to different bands, just click on each object while keeping the CTRL key pressed down or by dragging the mouse keeping the SHIFT key pressed down.
Modifying Band sizes: to modify the band's height size:

- modify its "Height" property located in the Properties Window
- select the interested band with mouse, click on the small square located in the center of the bands bottom separation line and drag it further down to enlarge or up to reduce it
- select the next band to the one you wish to change, click on it with the mouse and drag it down to enlarge the one above. This method cannot be used for enlarging the "Page Fotter" band being the last one on the Report.

Functionalities which are not available in Reports

The Reports are used for displaying values of a range of historical logs for a determined range of time to be then printed of saved as a document. This means that once the Report has been created it can no longer be modified. It is for this reason that functions and properties made available when editing the Screen resource are not available when editing the Embedded report resource and included objects.
Procedures which cannot be performed and function that are not for use in the Embedded Report resourse are as follows:

- it is not possible to edit Basic Script code within the Report resource or its object content
- it is not possbile to edit IL Logic within the Report resource or its object content
- it is not possible to use the Report resourse's local variables
- objects inserted in Reports cannot be edited, therefore all the properties used for inserting data or for executing commands are not available for use

Advantages and Disadvantages of using Movicon Embedded Reports

When reports have to be created within the project, it will be necessary to evaluate whether to use the Movicon Embedded Reports or the "Report Designer" or "Crystal Report" external libraries based on the type of report to be created. Below are listed the advantages and disadvantages of using the "Embedded Reports" compared to the "Report Designer" or "Crystal Reports":

Advantages:

- The Movicon Embedded Reports are compatible with Windows CE
- The Movicon Embedded Reports also support the "InMemoryDB" database format (along with any database limits)
- Multilanguage reports can be created with the Movicon Embedded Reports by using the ready to use integrated change language management
- Vectorial graphics from the Movicon Symbol Libraries can be used in the Movicon Embedded Reports
- Variable values within the project can be displayed in the Movicon Embedded Reports without having to write script code
- Certain types of graphical animations, such as Visibility, Transparency, Background Color, etc., can be used within Embedded Reports which are evaluated during the Report generation phase
- The Movicon Embedded Reports integrate the advantages of using the Movicon editor while creating reports: Cross Reference, Refactoring, Renaming Management, Check for Missing Strings, XML Structure, etc.
- The Movicon Embedded Reports for alarm statistics must not be modified when customizing the names of the Historical Data Log columns (Movicon will take this into account during report generation phase)
- The Movicon Embedded Reports show statistical information for each single alarm for alarm statistics (Total Time ON, number of ON/ACK/RESET events)

Disadvantages:

- The ToolBox used in the Movicon Embedded Reports contains a limited number of objects
- Sub-reports and automatic data groupings cannot be managed in the Movicon Embedded Reports
- Simple data calculations to be printed cannot be done in the Movicon Embedded Reports (calculations must be first done using the Movicon logic with results then applied to the variable before generating a report)
- Reports can only be saved or exported in "PDF" format when using the Movicon Embedded Reports
- Basic Script code ("wwb.com" or "wwb.net") cannot be used in the Movicon Embedded Reports for managing reports in advanced mode.
- Reports cannot be displayed on Web pages using the Movicon Embedded Reports
- Sub-reports cannot be used for alarm statistics with the Movicon Embedded Reports and as a consequence detailed alarm information cannot be accessed through report display windows.

24.1.1. Embedded Report Generation Commands

To support the Movicon Embedded Reports a series of commands have been made available in the Command List under the "Report/Recipes" e "Alarm" categories. This commands can be selected from the "Action" field.
Reports defined through the Movicon "Reports" resource can be generated using the "Report/Recipes" commands category. By using the "Alarm" commands category reports can be generated for "Alarm Statistic". In this case the report file that can be selected are already included in the Movicon installation folder, however these reported can be modified or new ones can be edited as explained in the paragraph entitled "Alarm Statistic".

Independently whether a project report or alarm statistic report is selected or not, the commands provided for generating Embedded Reports rest the same:

Action	Description
View Embedded Report	This command allows you to open a window for viewing the report, generating a print preview and creating a temporary pdf file and opening it in the pdf viewer in the PC/device. The PDF printer is used in Win32/64 bit PCs, installed by the Movicon SetUp with the name of "Movicon PDF Writer". This default printer can be changed using the "PdfPrinter" registry key. The executable predefined for opening the PDF file in WinCE devices is: "\\Windows\\wt6explr.exe". This default application can be changed using the "PdfViewer" registry key. Please also refer to the "Internal Report" section.
Print Embedded Report	This command sends the selected Embedded Report to be printed. You can either use the Windows default printer or specify the use of a predefined one through the " Report-Recipes Commands- Printer" or "Alarm Commands - Printer" properties or request the opening of the printer selection window by enabling the "Report-Recipes Commands- Chose Printer" or "Alarm Commands -Chose Printer" option.  When project is run on the Windows CE platform, it is important to specify which printer is to used and above all which print port to be used. The print port can be selected using the "Report-Recipes Commands- Printer Port" or "Alarm Commands - Printer Port" parameters.
Save Embedded Report	This command creates and saved a new report file in pdf format. The report file will have the same report name with a suffix showing the system date and time when this command was executed. The data and time are always added using the "DDMMYY_HHMMSS" format. The final pdf file name will result as: "EmbeddedReportName_DDMMYY_HHMMSS.pdf". The saved file will then be inserted into the project's "DLOGGERS" folder when created using a "Report-Recipe" command and inserted in project's "LOGS" folder when created using an "Alarm" command. Please also refer to the "Internal report" section.
Send Embedded Report	This command creates a pdf file of the selected Embedded Report and sends it via email. The email is send according to the settings defined in the SMTP Plug-In using the " SMTP Settings" button found in the project's General properties, and whose editor generates a file named "smtp_direct.settings" in the "ProjectName\DATA" folder. The report pdf file is attached to the email and is saved in the "ProjectNameProgetto\DLOGGERS" folder with the Report's name. The email recipient is the user of user group defined in the "Recipient" property.  The Timeout for executing this command, generating the report and sending it by email, can be modified using the "GeneralTimeout" registry key. The default timeout intervention value of 10 seconds can be increased using this key.  The Embedded Report send e-mail command is not currently supported in the Windows CE platform. Please also refer to the "Internal Report" section.

24.1.2. Possible Embedded Report Generation Errors

When generating a Movicon Embedded Report, some errors might occur which could compromise the correct displaying of the Report. These errors are mainly due to an incorrect Report configuration. When a problems happens while generating the Report, apart from having a result which is not the one initially desired, a warming message is printed both in the Output Window and Historical Log. Always check for messages in both the "System" and "Log DBMS" Tabs in the Output window or Historical Log if Report generation errors occur.

Report generation error messages are reported in the Output Window's "System" and "Log DBMS" Tabs accordingly. If problems do arise you must always check to see if there are any relating error messages in this window. The same error messages are also reported in the same way in the project's Historical Log files: "Sistema.log" and "Log DBMS.log" files.

Below are described possible errors which may occur. According to the situation, the error text may be slightly different to the text reported in this paragraph (for example, the name of the band or objects concerned may be different).

Warning! The Report header exceeds the page size!

This error is generated when one of the Report bands is too big to fit on the printed page. In this case, only the part of the report page which fits on the printed page will be printed leaving out the remaining part which exceeds print page sizes. To remedy this problem, the Report will need to be edited to reduce the height sizes of the band indicated in the message so that its contents can completely fit in the print page.

Failed to print embedded report 'Report1.movrep'!

This error occurs for one of the following causes:

- the "DataLogger/Recipe" value has been selected as the report's "Data Source Type" but an invalid DataLogger/Recipe has been selected in the "DataLogger/Recipe" field. To remedy this problem, check whether the DataLogger/Recipe associated to the Report is valid (check if name syntax is correct, check to see if the DataLogger/Recipe's DSN has been configured correctly, etc.)
- The Report's data selection query is invalid. To remedy this problem, check all customized queries associated to the Report, check to see if the DataLogger/Recipe's DSN has been configured correctly, etc. In this case you must check whether the query has been set in the Report conforms with the DataBase type being used. For example, when inserting a query that includes the TOP clause, even though written correctly, an error will rise if the "MySQL" or "Oracle" database has been selected as both these databases do not support the TOP clause.

Cannot find the variable '[[DF:VAR00001]', action 'Check Button', object 'Check Box36', Screen 'Report1.movrep'

This error occurs when an object, that displays a database fields such as the Display and Option Button objects, is not inserted in the 'Details? band but in another one. In this case the object will not display any values. To remedy this problem, the Report will need to be edited in order to move the object/s causing the error to the "Details" band, or associate objects with RealTimeDB variables and not DataBase fields.

24.2. Embedded Report Properties

The Reports inserted in the **"Embedded Report"** folder in the "Project Explorer" window can be customized through their properties. In order to do this, select and open the Report desired and then edit its settings through the Movicon **"Properties Window"**.

24.2.1. General Report Properties

The General Report Properties are used for settings the desired Embedded Report page sizes. Some of these properties are the same as those for normal Screens. In order to access the General Report Properties, select and open the desired Embedded Report and then change its settings using the Movicon **"Properties Window"**
When a new Embedded Report object is inserted, it is created with the A4 paper sizes 210x297 mm. The relating sizes in pixels are calculated together with the video screen resolution automatically.

Name
This property is used for reading or changing the name of the Embedded Report.

Width
This edit box is used for setting the Embedded Report window display width in pixels. Modifying this value will automatically modify the value in mms in the "Report Page Width" property. When the enabling the "Landscape" property, the Report's width in pixels will be recalculated automatically using the value in mms from the "Report Page Height" property and not the value from the "Report Page Width" property.

Height
This edit box is used for setting the Embedded Report window display height in pixels. Modifying this value will not cause any changes to the value in mm in the "Report Page Height" property. The Report page height setting in pixels will only be acknowledged in design mode and will depend on the sizes of each individual band. When in report is opened or printed, the page height will be set to the print page height. In addition, when being opened or printed, the number of report pages will depend on the various bands used in the report, considering that the "Details" band will have a variable size based on the data extracted by the query.

Report Page Width
This edit box is used for setting the width in mm with which the Embedded Report window will display with. Changing this value will automatically change the "Width" property value in pixels as well. When the enabling the "Landscape" property, the Report's width in pixels will be recalculated automatically using the value in mms from the "Report Page Height" property and not the value from the "Report Page Width" property.

Report Page Height
This edit box is used for setting the height in mms with which the Embedded Report window will display with. Modifying this value will not cause any changes to the value in mm in the "Report Page Height" property. When the enabling the "Landscape" property, the Report's height in pixels will be recalculated automatically using the value in mms from the "Report Page Height" property and not the value from the "Report Page Width" property.

Landscape
Enabling this property will set the page to be printed horizontally instead of vertically. Be reminded that when the page print is set to vertical, the Report page's width size in pixels will be calculated based on the value set in the "Report Page Width" property. When the print layout is set to horizontal, the Report page's width size in pixels will be calculated based on the value set in the "Report Page Height" property.

Use Paper Settings
Enabling this property in report generation mode, will force the print page sizes with the width, height and landscape values set in the "Report Page Width", "Report Page Height" and "Landscape" properties. However, if this property is disabled the print page settings set in the report generation command will be used instead. If the report generation command "Report Page Width", "Report Page Height" and "Landscape" parameters have been left set with their default values, the page print sizes set in the printer will be used. In this case, the report page will automatically adapt to the print page sizes.

Screen Alias Editor
The "Screen Alias Editor" command opens the table of aliases relating to the Embedded Report. The Aliases defined in the Report will then be used by the Report objects in which these Aliases have been inserted by not defined at object level.
For further information on using aliases please refer to the paragraph on "Aliases in Object".

24.2.2. Embedded Report Style Properties

The Embedded Report's graphics are defined through its Style properties. These properties are accessed through the Movicon **"Properties Window"** which opens by selecting the Embedded Report from the Explorer window.

Show Bands Title
This option box is used for making the titles of each individual Band visible/invisible. However the Band titles are visible when designing the Embedded Report and are helpful for identifying each Embedded Report Band.

24.2.3. Embedded Report Background Properties

The Movicon Embedded Report Background properties are a subset of Screen Background properties. To get details on these properties please refer to the paragraph on "Screen Background Properties".

24.2.4. Embedded Report Data Properties

The Report Data properties are used to define the data source type and query to extract data to be shown in the Report. The settings of these properties are made available in the Movicon **"Properties Window"** which automatically appears when selecting the Embedded Report resource from the Project's Explorer window.

Data Source Type
This field is used for defining the Report's data source by selecting which DataLogger/Recipe or Historical Log table the report must connect to. The items that can be selected are:

Data Logger/Recipe
Historical Log

Based on the selection made, only one of the two "Data Logger/Recipes" or "HisLog Event Type" properties will enable allowing you then to select a reference table for the Report.

Data Logger/Recipe
This property will only enable when the "Data Logger/Recipe" option has been selected in the "Data Source Type" property. When enabled, you will be able to select which Data Logger or Recipe, defined in the project, to use as the Report's data source.

HisLog Event Type
This property enables only if the "Historical Log" option has been selected from the "Data Source Type" property and is used for selecting which Historical Log table is to be used as the Report's data source. The possible options are:

System Messages
Alarm Messages
Comm. Driver Messages
All

Report Query
A customized query can be specified in this field which will then be used by the Report for extracting data from the connected database table. You can also insert one query for extracting data from various tables at the same time (i.e. JOIN clause) providing that these tables all belong to the same database. In this case you will need to specify a "Data Logger/Recipe" or a "HistLog Event Type" which is needed to acquire data for connecting to the database (DSN, User and Password). The "DB Fields" tab from the "Tag Browser" window will show the fields in the recordset obtained when the query is applied.

Caution! when inserting a customized query you will need to take into account the connected database's limitations. For example, if the IMDB database has been selected it will not be possible to perform the UNION or JOIN query among the various tables. Therefore you will need to insert a query that can be applied correctly to the referenced database.

Also take into account that a data extraction query can also be specified in the "Report-Recipe Command List" > "Report - Query" property. When a customized query is specified in the Report's generation commands, this query will have priority over those set in the actual Report. When no customized query has been set in either the Report or its generation commands, Movicon will use the following default query for extracting all the data from the table:

```
SELECT * FROM TableName ORDER BY TimeCol DESC
```

WinCE Report Query

A customized query can be specified in this field which will be used by the Report for extracting data from the connected database table. This query will be applied instead of any query specified in the "Query Report" property when the project is run on the Windows CE platform. Therefore Two different queries can be defined and applied according to the operating system in question. If the "WinCE Report Query" property is left empty, the one set in the "Report Query" property will be applied even if the project is running on the Windows CE platform.
Also in this case, a data extraction query can also be specified in the "Report-Recipe Command List" > "Report - Query" property. When a customized query is specified in the Report's generation commands, this query will have priority over those set in the actual Report. When no customized query has been set in either the Report or its generation commands, Movicon will use the following default query for extracting all the data from the table:

```
SELECT * FROM NomeTabella ORDER BY TimeCol DESC
```

The "Query Report WinCE" field will only display in the Properties Window if the project' "Platform - Windows CE" has been enabled.

Max Records

The maximum number of records that must be returned by the query applied by the Report can be defined in this field by entering a value other than '0'. This parameter corresponds to the TOP clause in Windows 32/64 systems if the IMDB is not used. For instance, if this parameter is set with the value '10', the default query applied by the Report will result as:

```
SELECT TOP 10 * FROM TableName ORDER BY TimeCol DESC
```

In cases where a customized query is entered with the TOP clause already entered, this query will be used for extracting data but the number of records displayed/printed in the Report will not exceed the one defined in the "Max Records" field. For instance, by setting a customized query as "SELECT TOP 20 * FROM TableName" with the "Max Records" set with the value 5, only the first five of the of the 20 records extracted by the query will be displayed/printed in the Report.
In WinCE systems, where the TOP clause is not valid, a query extracting all data will be applied ("SELECT * FROM...") but Movicon will only consider the first number of record indicated by the parameter. This same mechanism is also applied to IMDBs independently from platform type being used.

If the "Max Records" property value is left at zero, the number of records displayed/printed in the report will correspond to those extracted by the customized or default query (default query = SELECT * FROM TableName ORDER BY TimeCol DESC).

Alarm Statistics

This field will only enable when the historical log is used as data source type, which means that the "Historical Log" item has been selected in the "Data Source Type" property. When the Alarm Statistics is enabled, additional fields which show the alarm statistics or each individual alarm read by the database will automatically become available in the "Tag Browser" window. These fields can then be inserted in the Report as fields relating to the connected table columns. For further information please refer to the paragraph relating to " Alarm Statistic".

Time Format

Please refer to the "Time Format" property described in the **"Stile propertiesTime Format " paragraph from the Drawings and Controls section.**

Duration Time Format

Please refer to the "Duration Time Format" property described in the **"Stile properties Duration Time Format " paragraph from the Drawings and Controls section.**

24.2.5. Embedded Report Band Size Properties

The sizes of Embedded Report Sections can be set through the corresponding Size properties. In order to do this, open the desired Embedded Report and select the Band desired and then edit its settings through the Movicon "Properties Window".

Height

This edit box is used for defining the Height in pixels with which the selected embedded report band will be displayed. This size is only significant in the design phase. When displaying or reporting the Report, the various band size's will depend on different factors. For example, the "Details" band will expand according to the amount of data to be displayed, while the "Report Header (one per report)" may have the first page to itself based on the "Keep in separate page" property setting. The size of the print page will also influence the Band sizes.

24.2.6. Embedded Report Band Paging Properties

The Paging Properties are used for defining the displaying of a Report Band. This can be done by simply opening the Embedded Report and selecting the desired Band to edit its settings through the Movicon "Properties Window".

Keep in Separate Page

This property is only valid for the"Report Title (one per report)", "Report Header (one per report)" and "Report Footer (one per report)".

For the "Report Title (one per report)" Band, with the "Keep on Separate Page" property selected, only the contents from the "Report Title (one per report)" will be printed on the first page and any text in the "Page Header (one per page)" will not be inserted. However, if the "Keep on Separate Page" property is not selected, the objects in the next band will be lined up in the same page, after the "Report Title (one per page)" band's contents. In this case, the page will also show "Page Header (one per page)" text if any.

The "Report Header (one per report)" Band will always be printed after the "Report Title (one per report)". This means that depending on how the "Report Title (one per report)" Band is set, the Report Header" might be inserted in the first or in the second Report page. At this point if the "Keep in Separate Page" property belonging to the "Report Header (one per report)" is selected the objects from the "Details" band will be shown on the same page after the "Report Header (one per report)" band's contents.

The"Keep in Separate Page" option is always selected for the "Report Footer (one per report)" Bands and any objects contained in this Ban will be printed in the last page to avoid splitting up the graphics onto different pages.

Repeat Details

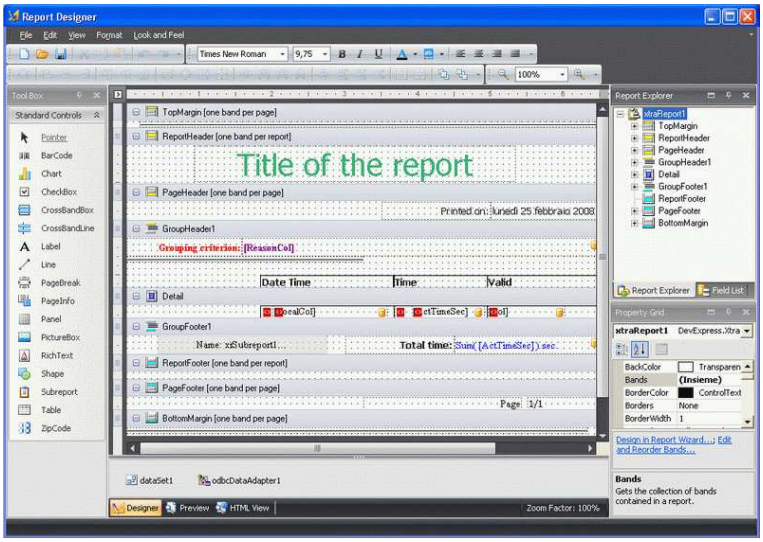
This property is only valid for the "Details" band and permits you to choose whether to duplicate the objects within the page (i.e. to created data tables) or create as many pages as there are records returned by the data extraction query. In this case, each page will contain a copy of the objects contained in the "Details" band.

24.3. Report Designer

The Report Designer is an extremely powerful tool that has been integrated in Movicon for give users the possibility to automatically create reports relating to the Movicon databases, without having to purchase supplementary software packs. The Report Designer Libraries are therefore installed with Movicon totally free without needing you to enable any license options in order to use them.

The basic steps in creating a minimal report are briefly described below:

The Report Designer can be called through "Edit Report File" command found in the Data Logger or recipe properties of "Historical Log Windows" or "TraceDB Windows". In this case the Report Designer will open in edit mode:



The Report Designer opens showing its "Tool Box" on the left and the "Report Explorer", "Field List" and "Grid Property" on the right. The report Layout is in the centre.
By using the Movicon commands the report will open with the database connection already configured with the original object's data table fields listed in the "Field List" for reference (DataLogger/Recipe table variable TraceDB or Historical Log).
The report is composed of "Band" objects, which are inserted using the "Insert Band" command accessible with a right click on the report layout area. The Bands are:

- Top Margin: one per page only. Represents the top limit of the report page.
- Report Header: one per report only. The first thing printed and only on the first report page.
- Page Header: page header and is printed at the top of every page.
- Group Header: you can use more than one group header per report to represent the beginning of a data group.
- Detail: contains the data to be shown.
- Group Footer: closes a data group and always corresponds to a Group Header.
- Report Footer: printed at the end of the report on the last page.
- Page Footer: closes each report page.
- Bottom Margin: one only per page. Represents the report page's bottom limit.

Only the Detail Band is needed to build a simple report. The fields you wish to display can be dragged from the "Field List" and when the report is executed these fields will show with all the records exiting in the table.

Filters

You can use the xtraReport object's Grid "FilterString" property (select the xtraReport in the Report Explorer Window). This property must contain the expression criteria (WHERE (Es. [col] > 0, where "col" is the name of a data table column).

Groups

You will need to insert a Group Header Band and use the "GroupFields" property for setting the second field to group data. You can also specify the data order in the same property.

Data Summary

The report can execute summaries (totals, counts, averages,..) on data groups. This is done by inserting a "Label" band, linked to a field from the Field List. The "Label's" **"Summary" property** allows you to set the summary type you wish to create using the dialog window which contains:

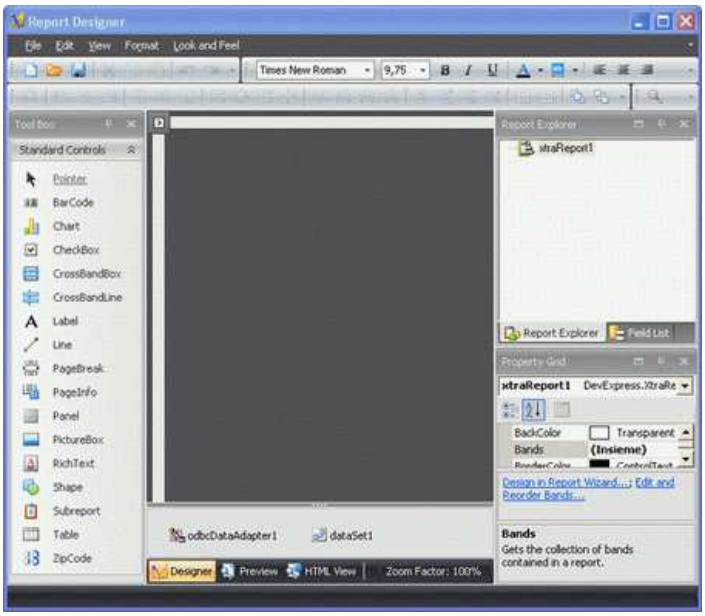
- Bound field: name of field in which operation is to be executed

- Summary function: operation type to be executed
- Format string: format type for results where you can add measure units as text
- Ignore NULL values: specifies whether or not to ignore NULL field value records
- Summary Running: defines the environment in which to execute the operation. Obtains these values:
    - None = no calculation
    - Group = executed for all group members. This value resets at the beginning of the next group
    - Page = executed for the values presented on one page
    - Report = executed for all the values in the report

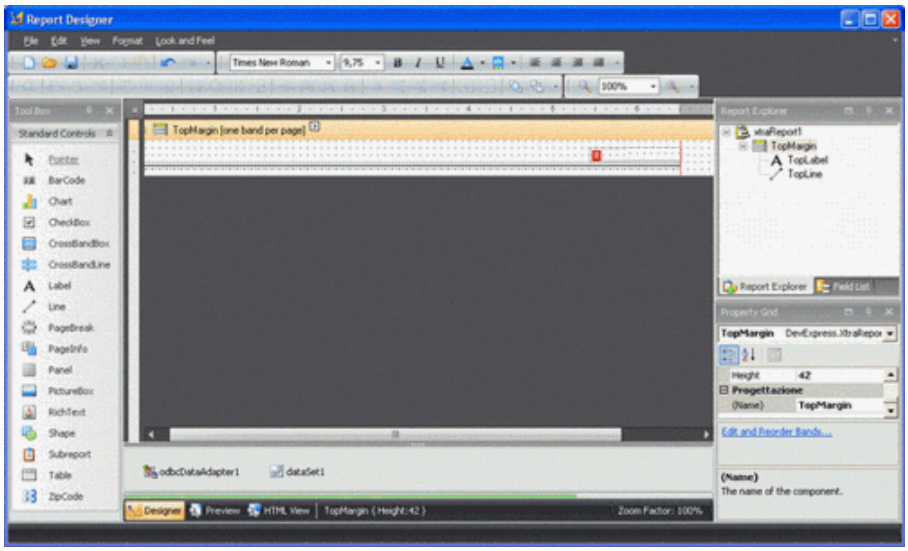
24.3.1. How to create a Report

This is an example to show you how to create a report using the Report Designer for displaying data recorded by a Data Logger:

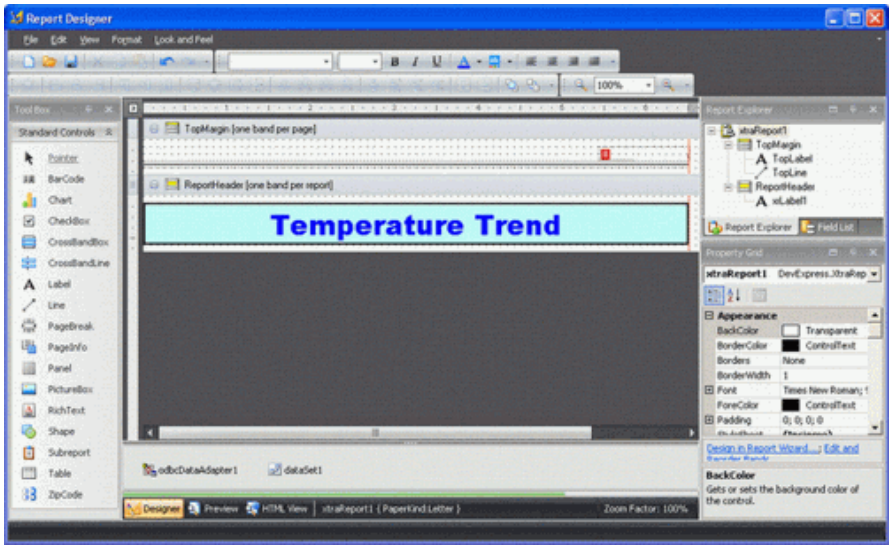
1. First create a new project and insert a Data Logger for recording three temperatures. Set three Float variables and call them "Temp_A", "Temp_B" and "Temp_C". Then add three columns to the Data Logger, set a 1 minute recording time and generate the table using the "Create Table" command from the Data Logger's "Database Options".
2. Now proceed with creating the Report. Click on the "Edit Report File" command from the Data Logger's General properties to open the Report Designer window. The ODBC link to be used will automatically be passed to the Report Designer and therefore the Data Logger table structure with relating fields should be ready and available in the "Field List" window.
3. The window's center pain is the workspace and will appear completely empty. Here you will need to add the different report sections one at a time.



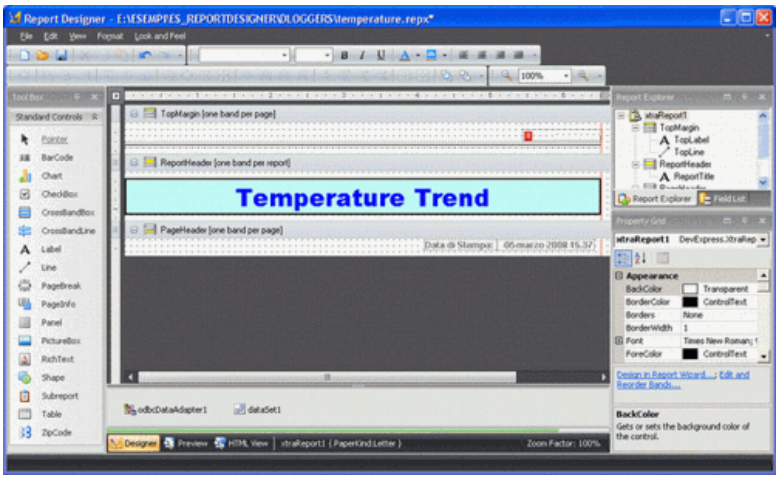
4. First start with inserting the sections, or Bands, to be displayed in the report. Normally the "detail" band is the most important one because this is where the data to be displayed is inserted. To insert a Band right click on the report workspace and select the "Insert Band" item and add the "TopMargin" Band. Only one Band per page can be inserted and represents the pages top limit. Now add a horizontal line and a label, with Movicon written inside, within the Band by selecting and inserting the "Line" object from the "Standards Controls" window located to the right of the editor window and drag it horizontally across Band. Then select and insert the "Label" object in the Band, right click it to open its "Property Grid" window, or click on the arrow which appears on the top right of the control to access its main properties, and insert "Movicon" in its "Text" property.



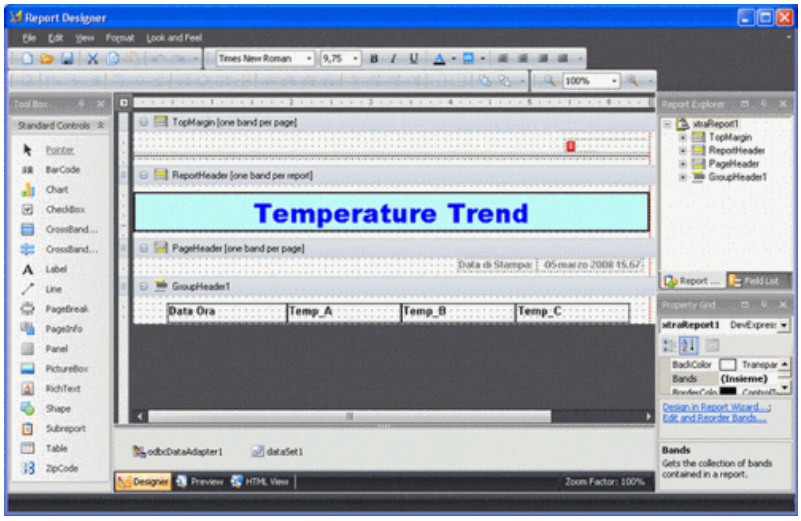
5. Now insert the "ReportHeader" Band. This Band represents the report's heading and will be printed at the beginning of the report on the first page only. To insert the heading select and insert another label into the "ReportHeader" band, size it and through its properties give it a color and insert the "Temperature Trend" heading in the text property. Then apply bold and change the heading font size and center it within the label.



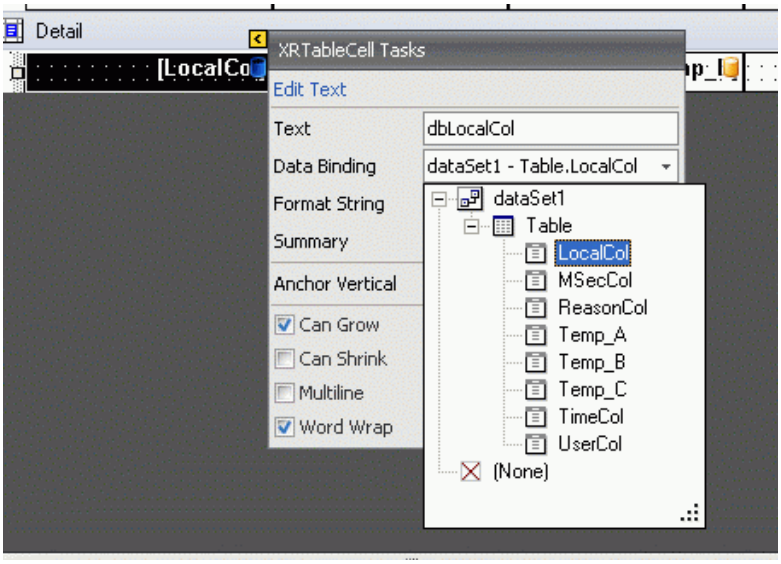
6. Insert the "PageHeader" Band. This Band represents the page heading and is printed at the top of every page. Insert a "Label" in this Pageheader band with text as "Print Date". Then insert an "PageInfo" object with the Label and select the "DateTime" item in its PageInfo property field. After which click on arrow, to the top right, to open the "XRPageInfoTasks" window edit the data and time format through the "Format" field as desired.



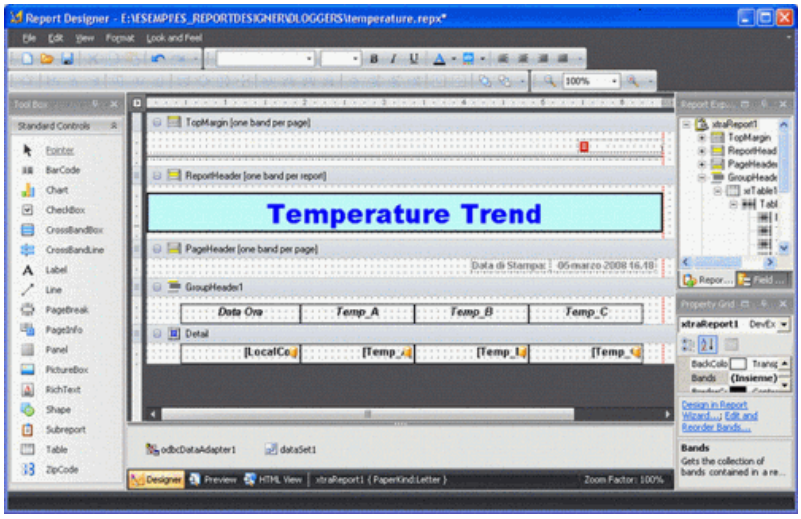
7. The aim of this report is to create and display a table with date retrieved from the database. In order to do this, insert the "GroupHeader" Band. This Band is used for showing a group heading and there can be more than one in a report. This group header will represent the beginning of a data group and you will only need to insert one group to achieve the aim of our project. In this band a line is to be inserted with the headings of the table columns. Therefore add a "Table" object from the "Standard Controls" window. The Table object is inserted with three columns for default but you will need four, so select the object and right click to add another column using the "Insert - Column To Left" command. Now size the columns to fit across the page and insert headings to be displayed in each cell's tasks properties done by clicking top right arrow to open each cell's tasks window. The texts for the four columns are "DateTime", "Temp_A", "Temp_B" and "Temp_C".



8. Insert the "Detail" Band. This Band will contain the data to be displayed for the data group. Here you must create a table with the same sizes inserted for the "GroupHeader" or copy&paste the table to save time. After you have done this, associate each table cell with the database field from which data is be retrieved. First start by selecting the first cell on the left and open its task window. Then select the "LocalCol" table column from the "Data Binding" field.

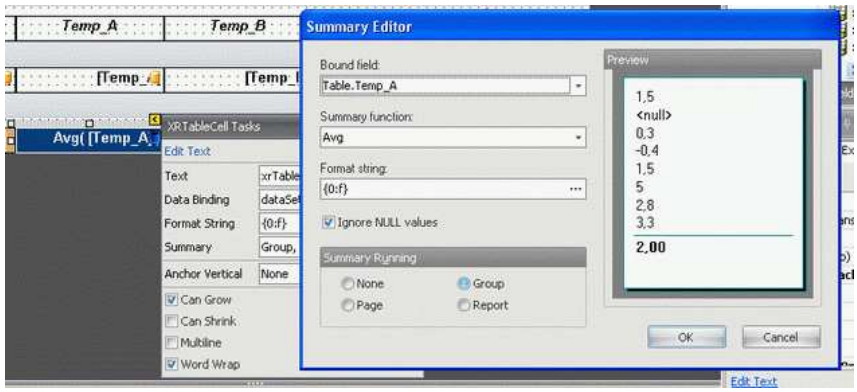


Perform this operation for the other three columns by associating the "Temp_A", "Temp_B" and "Temp_C" field respectively. Also set each cell with a data format where the "LocalCol" column will be in "Date" format and the other remaining three will be "Float" type.

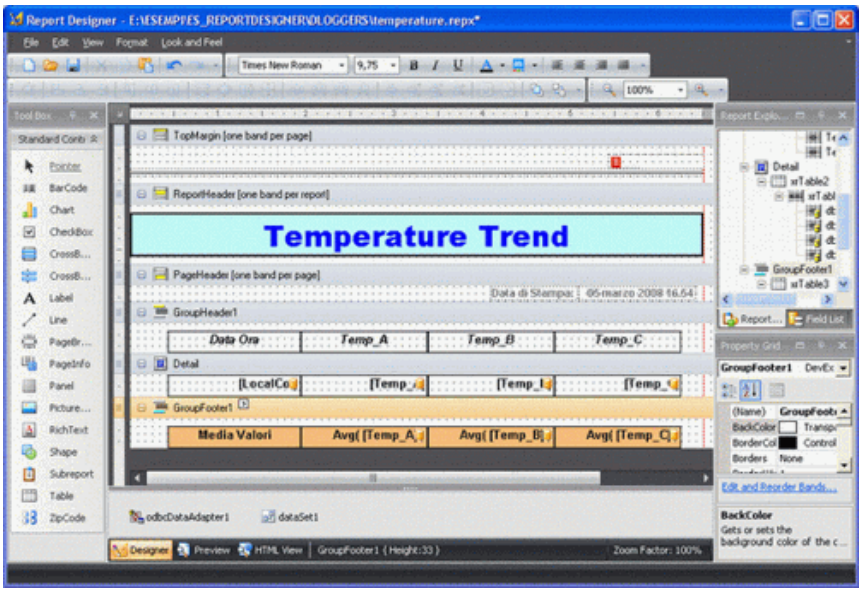


8. Insert the "GroupFooter" Band. This Band closes the group and always corresponds to the "GroupHeader". This Band will show the average values extracted for the three temperature columns. Insert another table with four fields columns as before. The first field just add "Average Values" as text. Select the second field, open its tasks window and click on the "Summary" field to open another window where you can define the formula to apply to the field. The window items must be compiled as follows:

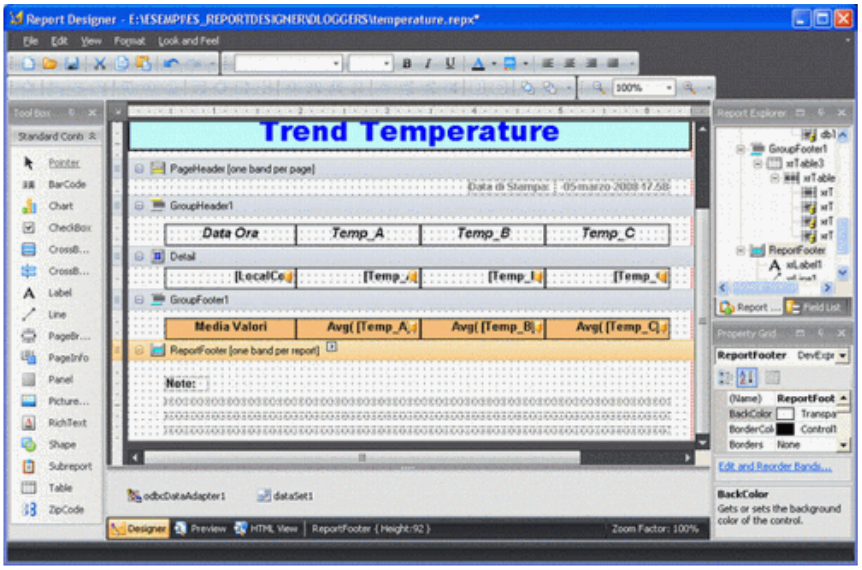
   - **Bound field**: select the table field in which to apply the formula, in our case "Temp_A"
   - **Summary function**: select the function type to apply, in our case "Avg"
   - **Format string**: define the data format type, in our case "Float"
   - **Ignore NULL values**: enable this check box when wishing to ignore null values
   - **Summary Running**: select which environment to run operation, in our the case "Group"



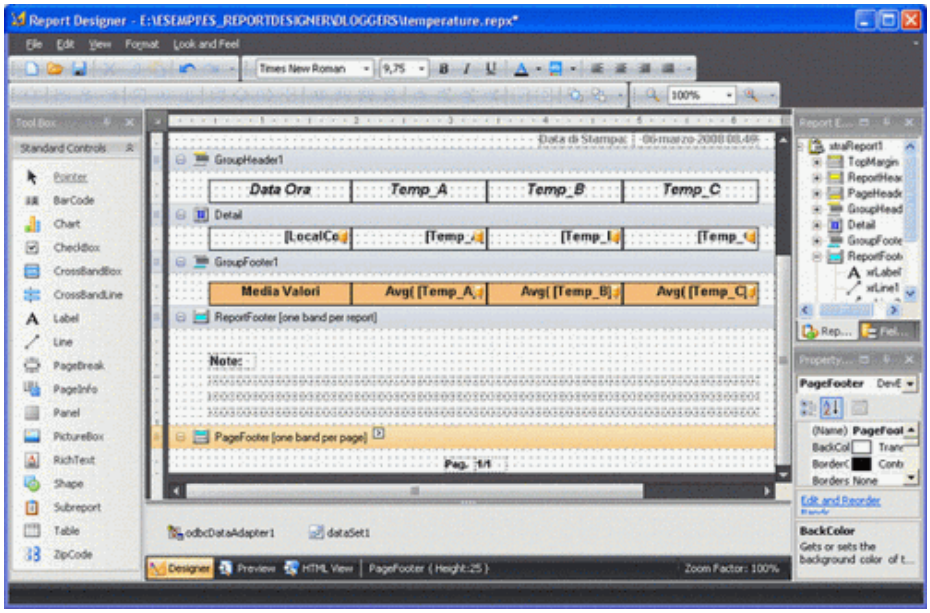
Repeat the same procedure for the other two "Temp_B" and "Temp_C" table fields. Apply a background color to average values table.



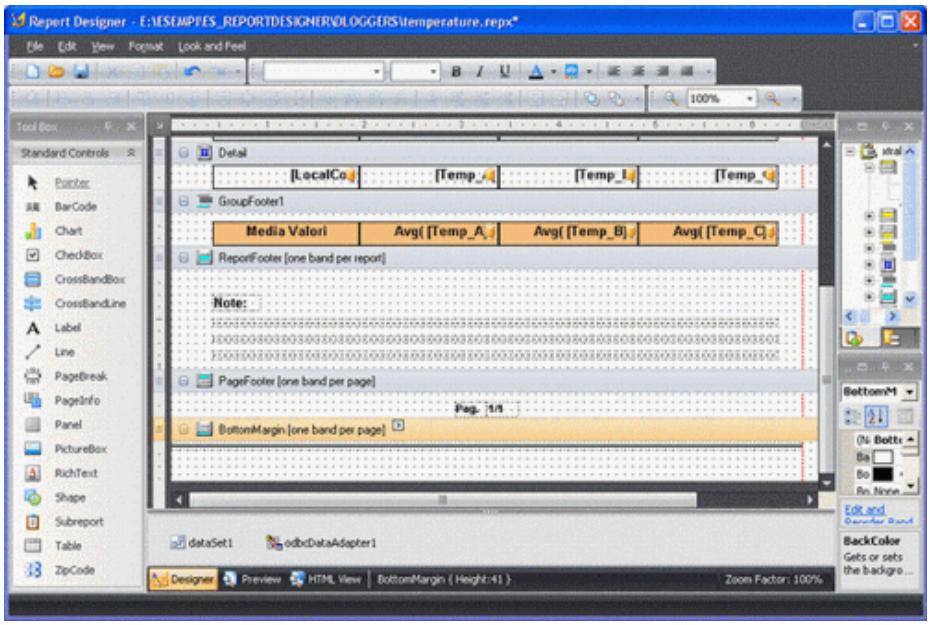
9. Insert the "ReportFooter" Band. This Band will printed at the end of the report at the last page. This Band is will be inserted with a field so that the operator can enter notes. Simply insert a "Label" and three lines and modify them into dotted lines.



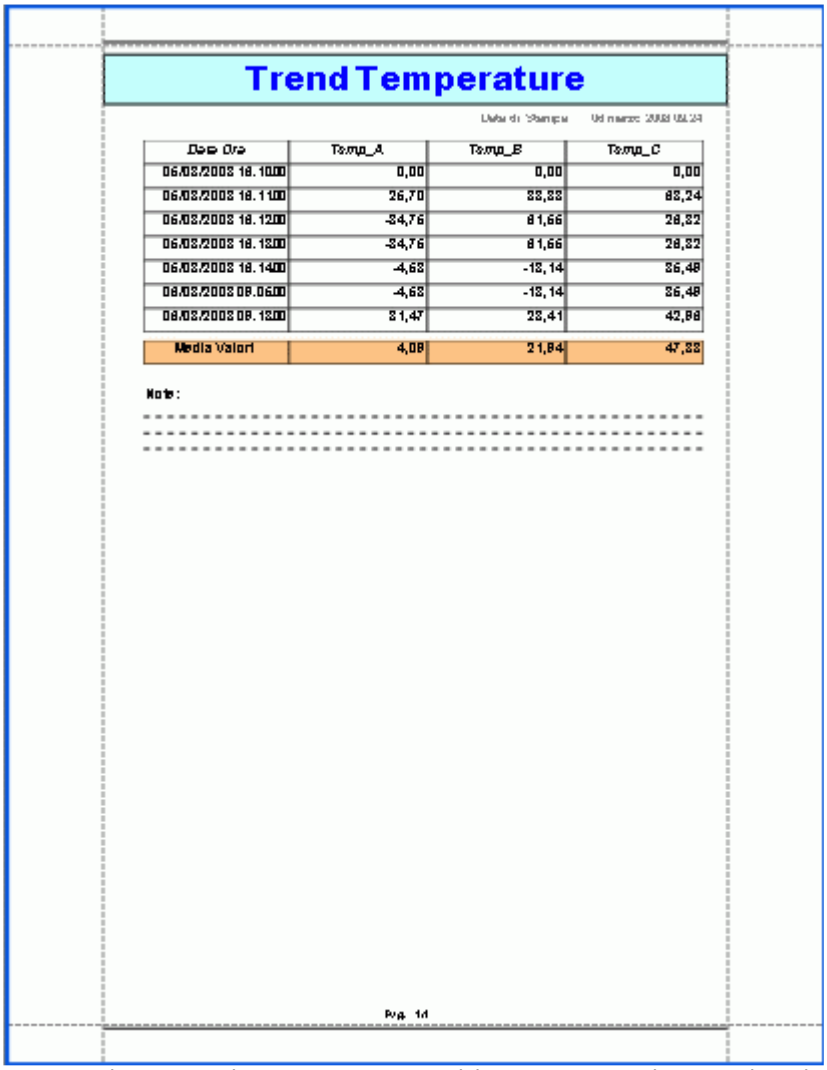
10. Insert the "PageFooter" Band. This Band closes each report page. In this Band you are going to insert a field for display the page number. Therefore add a "Label" with the "Pag." text and a "PageInfo" field and select the data type to be displayed, ie. "NumberOfTotal" (displays the current page and the total number of pages).



11. Insert The "ButtomMargin" Band. Only one of these a page can be inserted and represents the page's bottom limit. Add a horizontal line in the Band just like the one inserted in the "TopMargin" Band.



12. This ends the report and if you have data already in the database you can see how it will look by clicking on the "Preview" tab on the bottom Report Designer Bar to get a report preview.



You can also preview the report at any time while creating it in order to see how the report is coming along and if it needs changing or adding to.

13. Save the report and close the Report Designer to return back to the Movicon project. At this point insert a new screen in the project and insert the following objects into it:

    - a "Data Logger-Recipe" window, to which the previously created Data Logger will be associated, for displaying recorded data. By using the window's "Print" button you can get a direct printout without previewing the report first (the printer preset in the OS will be used)
    - three meters or Displays for modifying the three "Temp_A", "Temp_B" and "Temp_C" temperature variables.
    - A Button to which the "Report-Recipe" command shall be associated to. Select the previously created Data Logger in this command and in the "Action" field select the "View" item. This button will be used for opening the report in preview mode.

    Now you can run the project and after having recorded data, test the report out.

Not all the Bands provided have been used in this example, but as mentioned at the beginning this is just an example and there are no set rules as to which ones to use and therefore it is the programmer's discretion to choose those most suited.

24.3.2. Reports and Viewing Data via WEB

Movicon allows you to use the Web to view data recorded by Data Loggers and Recipes. This is easily done by using the two commands available from a menu which appears with a right click on the Data Logger or Recipe object:

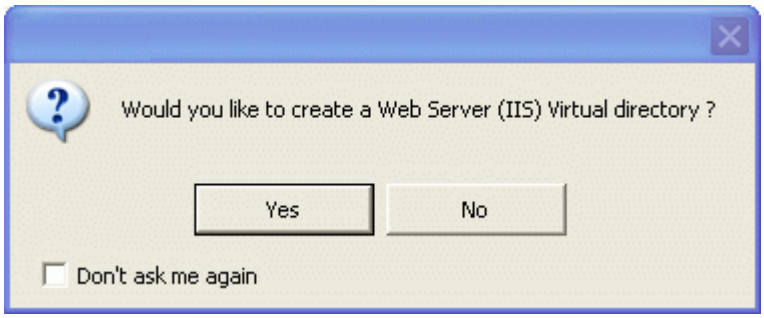
- **Create Web Report Page**: This command creates the Web page for displaying Reports asscoiated to Data Loggers or Recipes. In this case you will need to create and associate a Report to the data Logger/Recipe of interest beforehand using the Report Designer ("Report File" property).
- **Create Web Dataview Page**: This command creates the Web page for displaying Data Logger or Recipe data through the web. In this case, data will be displayed in table format and therefore you will not need to associate a Report to the DataLogger or Recipe.

As for the Web Client, Reports via Web are also published using the Web Server (i.e. Internet Information Services). All the files needed are created by Movicon for default in the project's "DLOGGERS" subfolder, and more precisely in:

..\ProjectName\DLOGGERS\DataLoggerName\REPORT\
..\ProjectName\DLOGGERS\DataLoggerName\DATAVIEW\

Creating WEB pages

Right Click on the name of the Data Logger/Recipe of interest directly in the Movicon programming environment (Design Mode), then use the "Create Web Report Page" or "Create Web Dataview Page" command. The window used for enabling the Virtual Directory for the Web Server will appear upon confirming the command chosen:

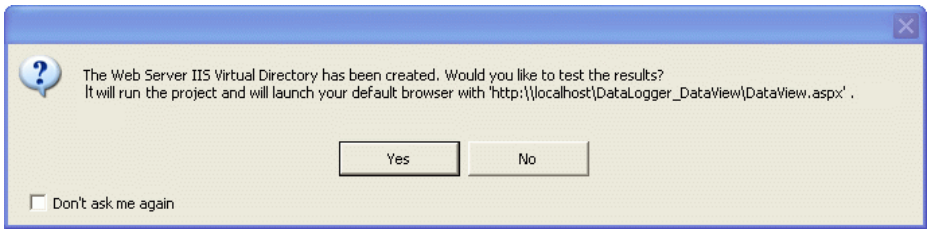


If you confirm the creation of the Virtual Directory, the following window will appear only if you are using Windows XP and NOT Windows Vista/7:

This window belongs to the operating system and is the same one which appears when running applications using the "Run as.." command. Therefore the application can be run using the user specified, and not the user active in the operating system at that very moment. The user you select for creating the virtual directory with must have Administrator rights.

PAY ATTENTION! To make Movicon creates the virtual directory automatically you must disable the "Protect my computer and data from unauthorized program activity" option. If you leave this option marked, the virtual directory will not get created leaving you to do it manually by means of using the IIS. This is due to the fact that the application is run with user right restrictions making it impossible to create virtual directories. Therefore you either disable this option by unmarking it or you run the application by selecting the 'The following User:' option.

When confirming the procedures you have selected, Movicon will ask whether you wish to test the results.



When answering with 'Yes' the system's default browser will open with the specified URL in function with the local path for pointing to the report page created (page aspx). Answer No if you wish to carry out this test later on.

At this point, the browser functionality for accessing the report page should be working correctly. The same aspx page can be pointed to by using other browsers by simply replacing "Http:\\localhost" with the IP address or the name of the server recognized on the net.

Recurring Errors

After having created Web pages you may find that you have problems trying to display them even though created correctly, i.e. with IIS. If any errors should occur please verify the following:

1. The Virtual Directory must be positioned outside the "Documents & Settings" folder (if using Windows XP) or the "Users" folder (if using Windows Vista/7). Otherwise the ASP.NET user

may be denied the right to read the virtual directory. Therefore, the project, or at least the aspx file, should be moved to another folder, such as the "C:\Inetpub\wwwroot" folder, that is not linked to any specified user.

2. "ASPNET" is the default user used by the ASP.NET for accessing the virtual directory. If any problems occur when accessing, check for users and their credentials.
3. The .NET2 Framework must be installed.

If you have to install .NET Framework 1 after having installed .NET Framework 2, you must first remove .NET Framework 2, then install .NET Framework 1 and then reinstall .NET Framework 2. If you do not follow this procedure, you may have problems running applications that use .NET framework 1.

Some of the most frequent errors are:

Access is denied

Description: An error occurred while accessing the resources required to serve this request. You might not have permission to view the requested resources.
Error message 401.3: You do not have permission to view this directory or page using the credentials you supplied (access denied due to Access Control Lists)...

Solution: this may have been caused by the fact that the Movicon project had been saved in a folder that the user used by ASP.NET does not have access to. For instance, an operating system or desktop user's "Documents" folder. In this case the "Create Web Report Page" and "Create Web Dataview Page" also create and publish all the necessary files in a project subfolder, and therefore the user used by ASP.NET may not be able to execute the aspx code within this folder. The best solution would be to move the project, or at least the aspx files, to another folder that is not read by just one specific user, such as the "C:\Inetpub\wwwroot" folder for instance.

Failed to access IIS metabase

Details: System.Web.Hosting.HostingEnvironmentException: Failed to access IIS metabase.

The process account used to run ASP.NET must have read access to the IIS metabase (e.g. IIS://servername/W3SVC). For information on modifying metabase permissions, please see http://support.microsoft.com/?kbid=267904.

Solution: this may have been caused by the fact that the IIS and .NET Framework had not been installed in the right order. The IIS must be installed first, then the .NET Framework. If you do this in the reverse, the IIS configuration for managing .NET pages will not install everything correctly (ie. the "ASPNET" user may not get created), generating the error indicated above.

To solve this problem, you will need to go to the Framework installation folder (usually windows\microsoft.net\framework\frameworkversion) and launch this command:

```
aspnet_regiis.exe -i
```

this command installs the Framework version updating the metabase etc.

24.4. Crystal Report™

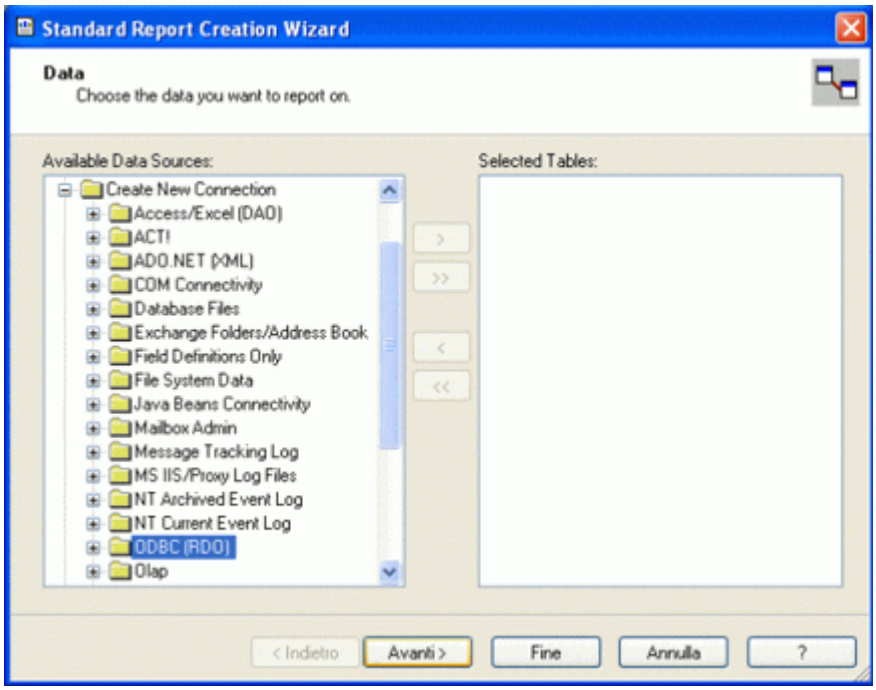
Crystal Report™ is a very userfriendly and powerful tool for creating basic graphics dedicated to data lists, tables, reports and any other graphical format formats for presenting database data tables created with the Movicon recording tools.
Report pages created with Crystal Report™ will have the ".rpt" extension. These reports must be generated using this tool, purchased separately, and they will be linked to the data table generated by Movicon.
Movicon supports Crystal Report™ version 10.0.

24.4.1. Creating Reports with Crystal Report

The procedures for creating data reports using the integrated Crystal Report with Movicon are described below. In order for these procedures to work properly you will need to use the Crystal Report version 10.0 .
Let's suppose we want to create a project containing a DataLogger which records three Movicon system variables, in order to simulate a random distribution of values recorded in intervals of five seconds between each one. The project must be started up at least once (with ALT-F12 or with the run button) to allow Movicon to create the database.
The next step involves the use of the Crystal Report for creating the report required. When the program is started up a screen is displayed showing a dialog window asking you to choose a report type: select the "Standard" type and click the "OK" button to continue.

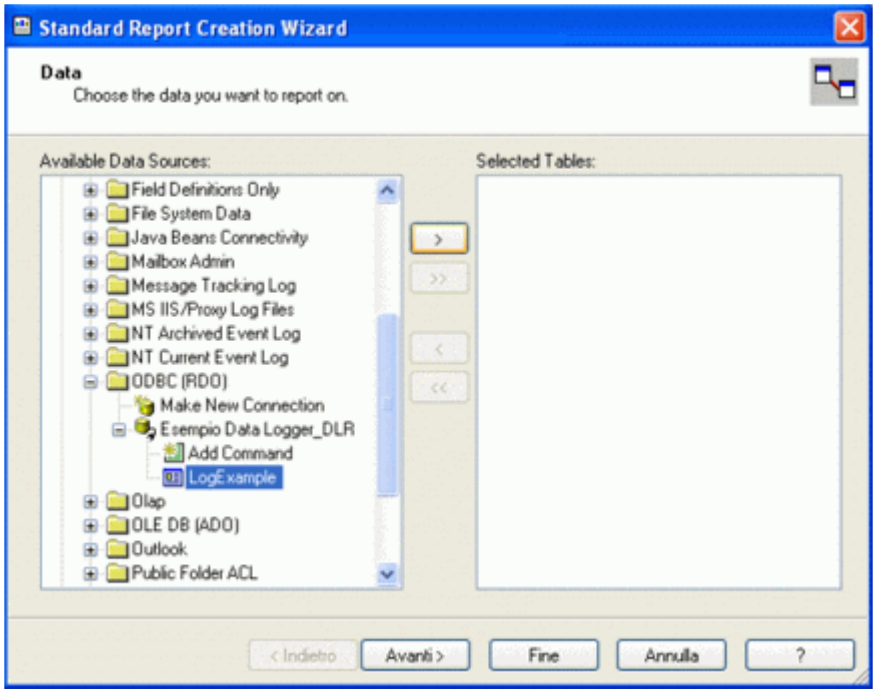
Crystal Report: New Project

Now a list of the types of database connections will be displayed in a tree structure: click to extend the "Create New Connection" node and select "ODBC (RDO)". A list of already existing connections will appear among which you should find the one created previously by the project, with the name defined as "ProjectName_DLR". By clicking on "Next" a request to enter User Name and Password for the database will appear: leave these fields blank and click on "End".



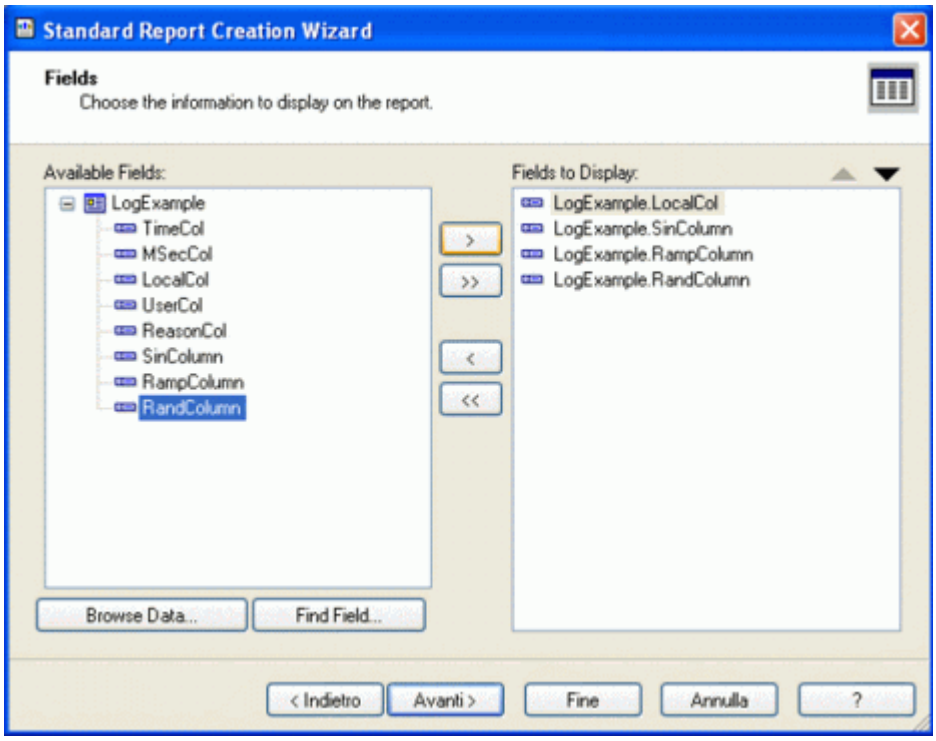
Crystal Report: Create a new ODBC Connection

At this point select the chosen ODBC connection to get the list of its table names (in the example shown the table is called "LogExample" like the DataLogger's name). Click on the button with the arrows pointing towards the right to add the item to the list of selected tables and click on "Next".



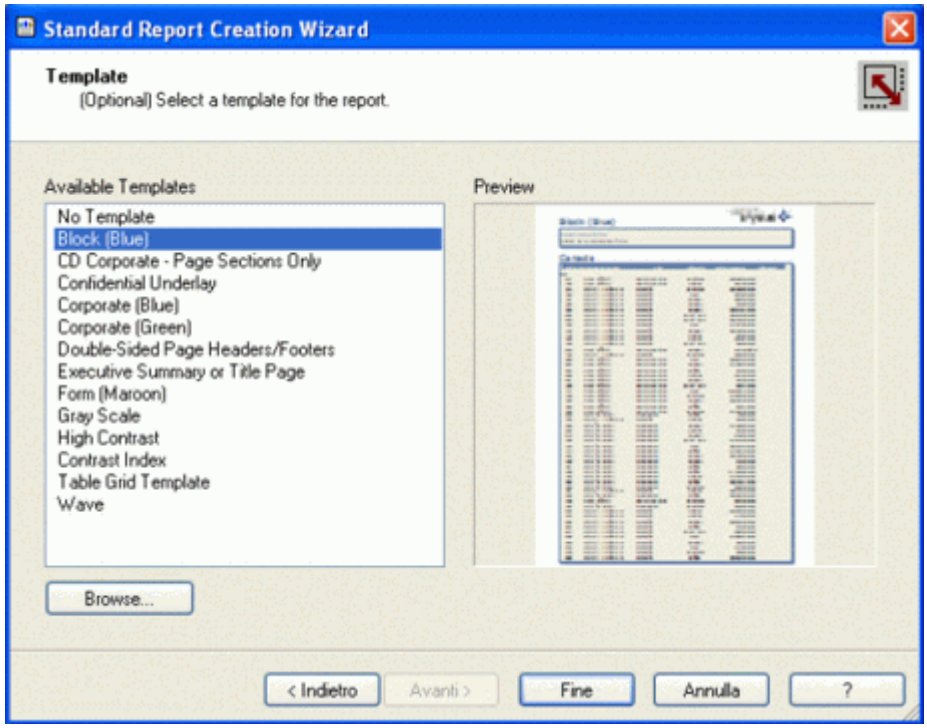
Crystal Report: Add Table

On the next page you will find the fields in the previous selected table listed on the left; double left click on the fields or select them and click on the arrows pointing right to add the fields to the list on the right which contains the database fields which are to be shown on the report.



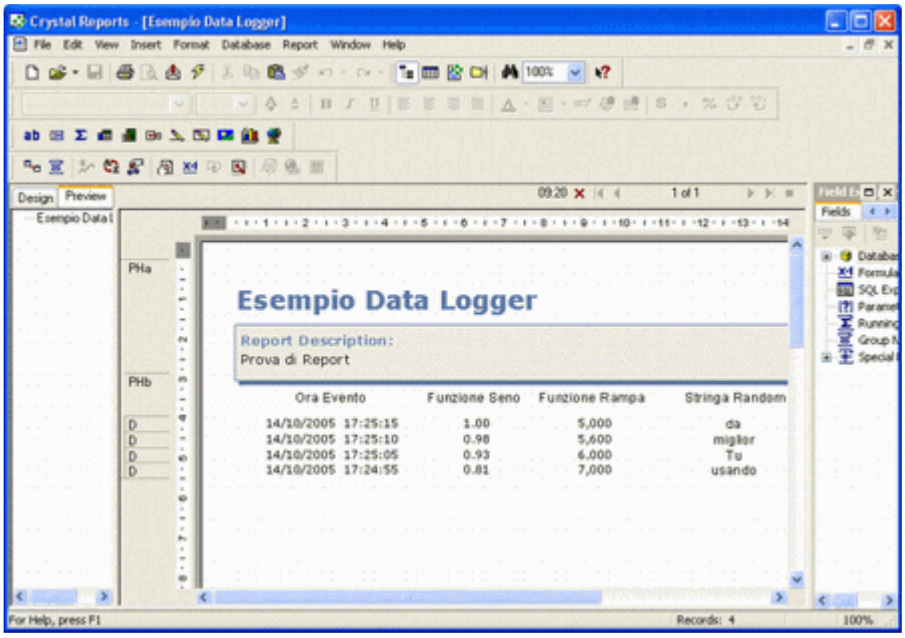
Crystal Report: Add the fields to be displayed

Click on "Next" to group the gathered data into one or more columns and, on the next page, set the data filters. To conclude, choose a template for displaying the data from the last page. If you want to create a simple list without any graphic items just select 'No Template' from the list.



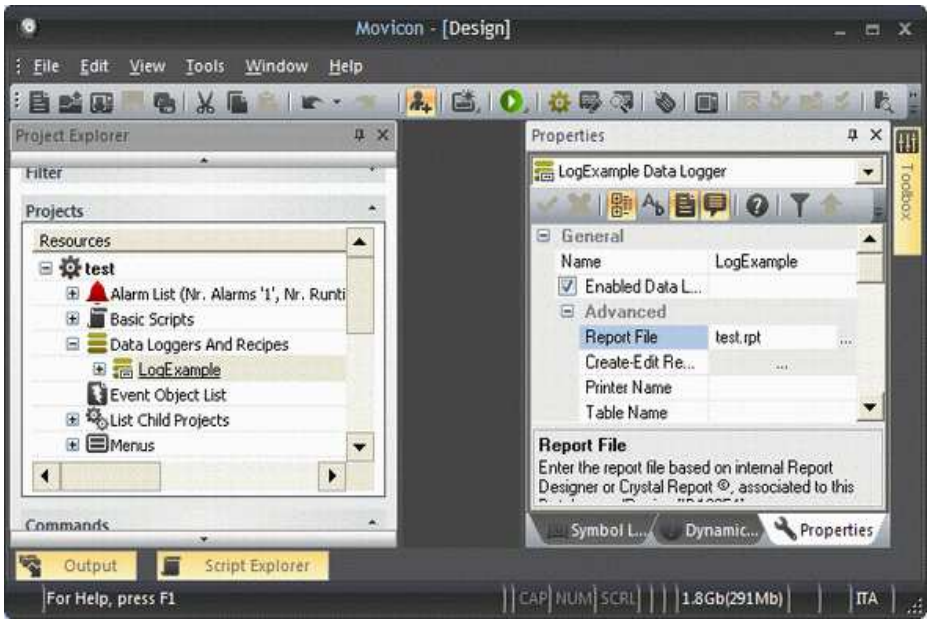
Crystal Report: Choose Template

Click "End" to open the report you have just created using the procedures above. You can adapt the report by using the Cyrstal Report function to suit your needs by adding information on data or calculations on values like average values, sum of data, ecc. (see Crystal Report documentation for information).
Save the report on file to end the report creating procedures.



Crystal Report: End Result

You now need to link the report file to the Movicon Datalogger. Open the project and display the DataLogger's properties window. In the "General" properties, click on "Report File and type in the name of the previously created Crystal Reports (.rpt). Click on "OK" and the name of the file will display in the DataLogger property. By doing this you will be able to display the report directly from the screen during runtime. To do this, add a button to the screen and select the "Report Command" by specifying "View" as its action and the name of the DataLogger as the object. When this button is clicked on during the runtime mode the Movicon Report Viewer should open and display.



Movicon: Chosen Report File

24.5. Textual Reports

Movicon allows you to use and manage simple textual reports. This report function's logic is based on a layout "template" file which the report file structure is defined. This layout supports fields with special syntax, with which variables or Data Logger or Historical Log fields are to be viewed and in which format. The textual reports can also be of "mixed" type, meaning that they can display values of some variables together with Data Logger or Historical Log field values in the same one report. In addition, there are other special fields for date and time printouts and page number. The layout file must be in a format that can be opened in text mode (ie. Richt Text Format or Text).

The textual reports are also supported in runtime for Windows CE, which allows simple reports to be viewed, printed and saved.

The Textual reports can be used for visualizing Data Logger/Recipe data or data from the Historical Log tables as well (in this case, the data extraction query is executed in the Alarms table as well).

Below are listed the commands which have been provided in the Command List's "Report-Recipe" and "Alarm" category for supporting the textual report management:

View Textual Report
Print Textual Report
Save Textual Report
Append Textual Report

All these commands are synchronous to the user interface. This means that the project's user interface objects cannot be accessed until the command has been completely executed. For instance, the "View Textual Report" command requires that you close the application that opened the temporary file before using this command.
The commands listed above also need you to set parameters, found in the Command List's "Report-Recipe" and "Alarm" category and listed below:

Data Logger-Recipe
Textual Report Template File (Layot File)
Textual Report Destination File
Textual Report Query
Textual Report Max Pages

For further information on the above listed commands and parameters please refer to the "Textual Report Commands and Parameters" section.

The " Layout File" will be searched for in the project's resource folder by default if no path is specified.
The "Destination File" will be created in the project's "DLOGGERS" folder for default if no path is specified.

The command for managing Textual Reports can be also executed using the "ExecuteCommand()" script function.

If a command for managing a Textual Report fails, the cause of the error will be reported in the project's Historical Log and Output Window. The list of error messages and their causes is reported in the paragraph titled "Textual Report Errors".

Template for Textual Reports (Layout File)

The Template document (Layout File) must be text type. The formats supported are ascii and unicode (.txt) generic text files and "Rich Text Format" (.rtf) files. To edit this document you will need to use an external program (not currently provided internal Movicon). We recommend you use "Notepad" for generic text files and "WordPad" for "Rich Text Format" files.

We advise against using "Microsoft Word" for editing "Rich Text Format" files. The main reason being is that when saving "Microsoft Word" files format characters are added between special fields by the textual report parser. As a consequence, these special fields cannot be viewed unless by re-opening the file with WordPad, re-formatting and saving it again.

In addition to normal text in the Layout File, you can also insert fields with special syntaxes. These fields determine the point in which the textual report manager must insert variable values or Data Logger or Historical Log data. The square brackets are used for determining the beginning and the end of a special field. The special fields can be as follows:

Variable Field

You must use the following syntax to insert a variable value from the project's RealTimeDB:

[Variable|Format]

The "Variable" part indicates the name of a project variable. The special field is therefore replaced with the variable's actual value upon the moment the command is executed. If this variable does not exist, the special field is deleted and replaced with an empty text.
The "Format" part indicates the format to be used for representing the variable's value (see paragraph "Data Formats" for further details). When the variable is string type and you need that a fixed number of characters be printed in order not to mismatch format alignments, insert the same number of "x" as there are characters to be printed in the "Format" parmeter:

[Variable|xxxxxxxxxx]

In the example above, after having inserted 10 "x", the number of characters that will be printed will be equal to 10. When the string is composed of number less than 10 characters, a number of spaces equal to the number of characters missing will be inserted. Control checks are only made if the number of characters is less than the number set. If the string exceeds the set number of characters, all of the string's characters will be printed.

Data Logger or Historical Log Field

To insert a Data Logger or Historical Log column value you must used the following syntax:

[$Column$|Format]

The "Column" part indicates the name of the Data Logger or Historical Log column to be displayed. The special field is then replaced with the value of the column presented in the data extracted from the Data Logger or Historical Log, using the row currently in use (the first row if command for next row has not been used). This special field will be deleted and replaced with an empty text, if the column does not exist in the data set extracted from the Data Logger or Historical Log.
The "Format" part indicated the format to use for representing the field value (see paragraph "Data Formats" for further details). When the data base field is string type and you need that a fixed number of characters be printed in order not to mismatch format alignments, insert the same number of "x" as there are characters to be printed in the "Format" parmeter:

[$Colonna$|xxxxxxxxxx]

In the example above, after having inserted 10 "x", the number of characters that will be printed will be equal to 10. When the string is composed of number less than 10 characters, a number of spaces equal to the number of characters missing will be inserted. Control checks are only made if the number of characters is less than the number set. If the string exceeds the set number of characters, all of the string's characters will be printed.

Data Logger or Historical Log next row field

To insert the next value of a Data Logger or Historical Log column you must use the following syntax:

[!$Column$|Format]

In this case and different to the previous command, the data set pointer is moved to the next row before retrieving the column's value.

Page Number Field

To insert a Page number field you must use this syntax:

[&PageInfo&]

This special field is replaced with the current page number when command creates more pages. The page number is set to the "1" value at the command start and increases every time a new page of data needs to be created by re-reading the Layout File.

Date Field

To insert a Date field you must use this syntax:

[&Date&]

This special field is replaced with the current operating system's date upon command execution. The date is formatted using the operating system's local settings for short date.

Time field

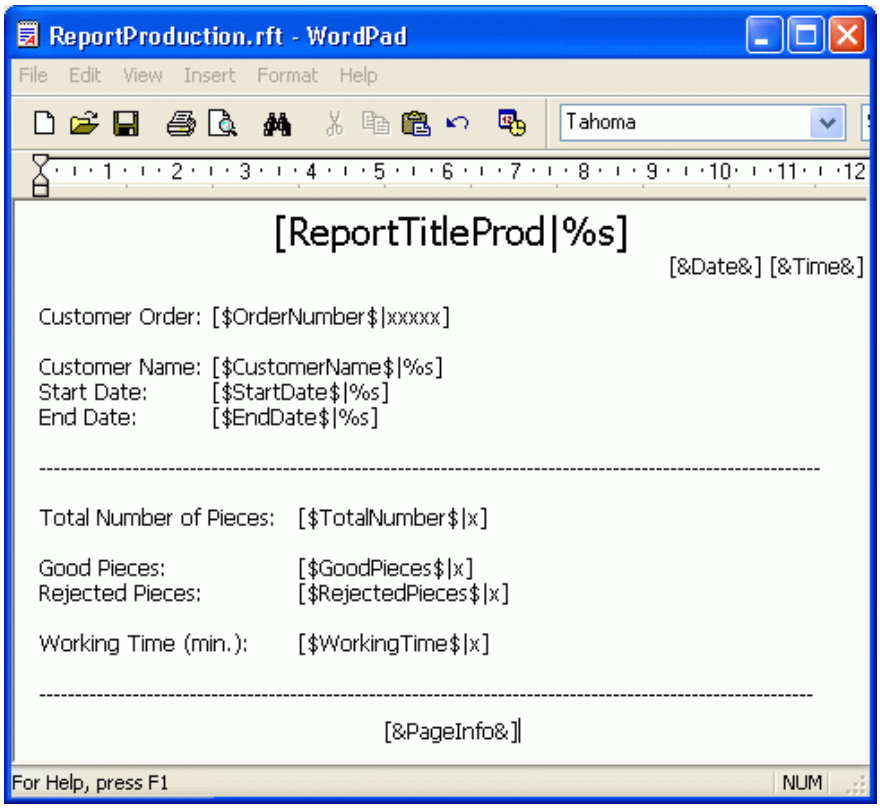
To insert a Time field you must use this syntax:

[&Time&]

This special field is replaced with the operating system's current time upon command execution. The time is formatted using the operating system's settings.

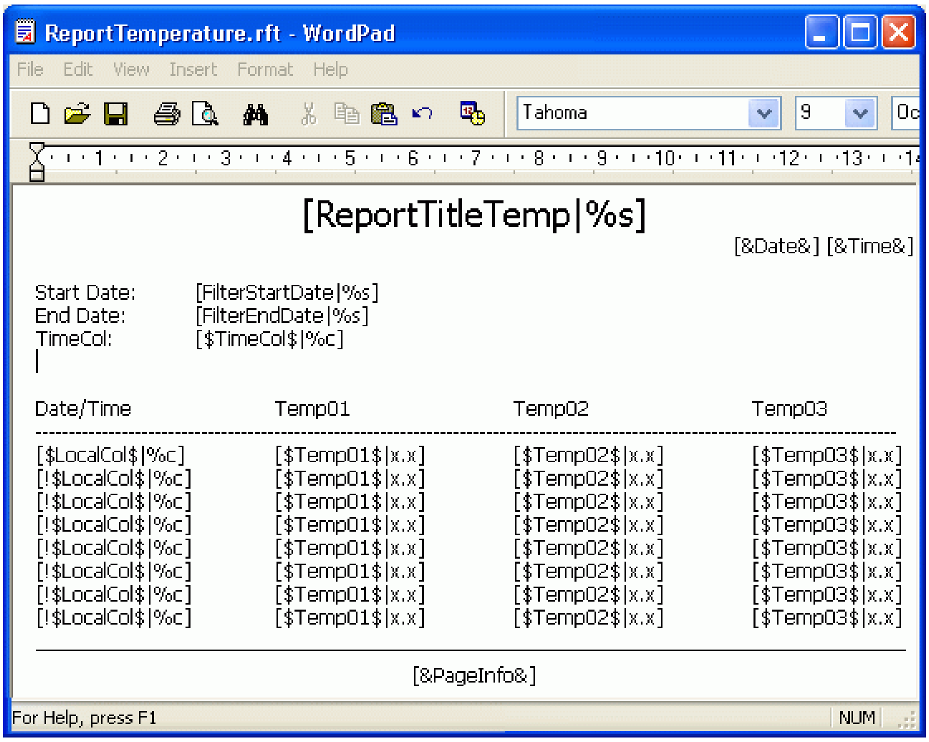
Viewing Data Logger or Historical Log values

When the Data Logger or Historical Log fields are displayed in the Textual Report the moment the report is opened a data recordset is passed depending on the selection query set (if no query has been set all the table's records will be loaded). The values of the recordset's first record are displayed at this point on the report page. If there are other records, the pointer will then be increased and the new record data will be inserted on a new report page. In this way, the number of report pages will be the same number for records resulting from the selection query.
The report example below shows how values are displayed for project values and Data Logger fields. In this case the same number of report pages will be created for the number of records selected by the data extraction query.



In order to display recordset data in table mode on the same page, y ou will need to insert the same database field many times using the syntax used for pointing to next record ([!$Column$|Format]).

By doing this the records will display on the same report page. However, a new report page will be created if the number of records selected is higher than the number of rows set in the report.
The below report example shows how Data Logger values are displayed in table format.



24.5.1. Textual Report Commands and Parameters

A series of commands for the Command List's "Report-Recipe" and "Alarm" categories has been made available to support the textual report management. These commands can be selected within the "Action" field.
When these commands are executed from the "Report-Recipe" category, the reference table, from where data is to be extracted, will be the one connect to the Data Logger/Recipe selected in the "Data Logger/Recipe". However,when the commands are executed from the "Alarm" category, the reference table where data is to be extracted from will be the Historical Log's Alarms table. Nevertheless, you can still also extract data from any one of the other Historical Log tables (Drivers and SysMsgs) by specifying the name of the table in the data extraction query using the "Textual Report Query" property.
The commands now available for Textural Reports are:

Action	Description
View Textual Report	This command opens a window to view the textual report. This command reads the layout file ("Textual Report-Layout File" parameter), interprets the special fields and creats the documents that have the same extension of that layout file. Also see the "Textul Report" section.
Print Textual Report	This command sends textual report to printer for printing. The Windows default printer can be used or the one predefined in the "Report/Recipe Commands Printer" or "Alarm Commands- Printer" properties. A selection window can also be used for selecting one by enabling the "Report/Recipe Commands- Chose Printer" or "Alarm Commands - Chose Printer" options. This command reads the layout file parameter ("Textual Report-Layout File" parameter), interprets the special fields, opens a channel with the predefined printer and sends the page/s to be printed.

	The print command manages a few formats for "Rich Text Fort" (RIF) documents, while all the other document types are printed exactly as the file contents are arranged. As a consequence we advice you against printing documents that are not text or rtf format. In cases where the RTF document contains unsupported format, an error will be printed in the output window and the print will be aborted. The formats which are supported are: Text alignment: left, center and right Font: type, size, italics, bold, bold italic, underlined Tabulations and tab position markers Paragraph: left, right and first line indent Text color: even when print is only done in black text color Also see the "Textul Report" section.
Save Textual Report	This command creates and saves a new textual report file. This report file will have the same file name set in the "Textual Report - Destination File" parameter, with a suffix added on showing the system's date and time when command was executed. The data and time is always added using the "ddmmyyyyhhnnss" format. The report file is created the layout file set in the "Textual Report-Layout File" parameter. Also see the "Textul Report" section.
Append Textual Report	This command adds a new page to textual report file set in the "Textual Report - Destination File" parameter. This report file is created for the first time when not already existing, after which a new page is added to the queue each time this command is executed. Pages are added using the layout file set in the"Textual Report-Layout File" parameter. The difference between the "Append" command and the "Save" command in cases where data is taken from a Data Logger ,is that "Append" command adds a page only independently from the amount of data in the recordset retrieved from the Data Logger. Also see the "Textul Report" section.

In addition to these commands some other properties have also been made available in the "Report-Recipe" and "Alarm" properties used for configuring Textual reports:

Report Template File
The textual report's Layout File name which in addition formatting, contains the special fields to be used and described in the "Template for Textual Reports (Layout File)" paragraph. If the file path is not specified, it will be searched for in the project's Resource folder.

Report Destination File
File name with which to save textual report. This parameter is only requested by the "Save Textual Report" and "Append Textual Report" commands. If the file path is not specified, it will be created in the project's "DLOGGERS" folder.

24.5.2. Text Error Report

The Text Report manager may notify error messages following command execution. These error messages are recorded in the Historical Log and printed in the Output Window. The possible error messages are:

TXT Report - Format string not correct. Format: '%s' Field: '%s'
A special filed has an invalid format string for that type of data (i.e.. [<WordVariable>|%s]). The format and the special field are indicated in the message text and can be traced in the Layout File.

TXT Report - Max number of pages exceeded for the command '%s'
The report printout (in printer of file) has been interrupted due to exceeding the maximum page limit set as command parameter. The last report file page will show the "Max number of pages exceeded" notifying the user that the printing out of this file has not been completed with the data requested.

TXT Report - Error appending the report file ('%s')
The "Appending" command has failed because it was not possible to open in write the report file set in the command. This may have been due to path setting error or file access has been denied due to invalid access rights.

TXT Report - Error saving the report file ('%s')
The "Save" command has failed because the report file set in the command could not be open in write. This may have been caused by path setting error.

TXT Report - Error opening the report file ('%s')
The Layout File set in the command could not be opened. This may have been caused by an error in the path setting or file name, or insufficient access rights to this file.

TXT Report - Printer not available
The "Print " command failed because the operating system's preset printer could not be found.

TXT Report - View application not found
The "View" command failed because the operating system's preset application to be used for opening the report file set in the command could not be found. Check to see if the report file's extension is correct.

TXT Report - Report file format not supported ('%s')
The Layout File format is not supported, for instance, file may not be text but binary.

TXT Report - Cannot open DB for Datalogger '%s'
The Data Logger set in the command is not valid and cannot be opened in write, or the query set in the command is not valid. Further messages may be saved in the DBMS Log following this error message.

TXT Report - The report '%s' cannot be printed because it has an unsupported format (command not supported: '%s')
The report cannot be printed because it contains text control characters with are not supported. The unsupported text control character that interrupted the print procedure will be highlighted in the message text.

25. Child Projects

Movicon allows you to structure projects by decentralizing resources in other projects (child) with dynamic relationships, giving you the possibility to distribute your projects.

Movicon has a powerful and innovative feature, which allows you to face new challenges in planning supervision systems. "**Child Projects**" are normal Movicon projects which, even when planned to function independently, are linked to parent projects creating a "Parent-Child" relationship where the Parent project is provided with all the resources of the Child project as if they were its own.

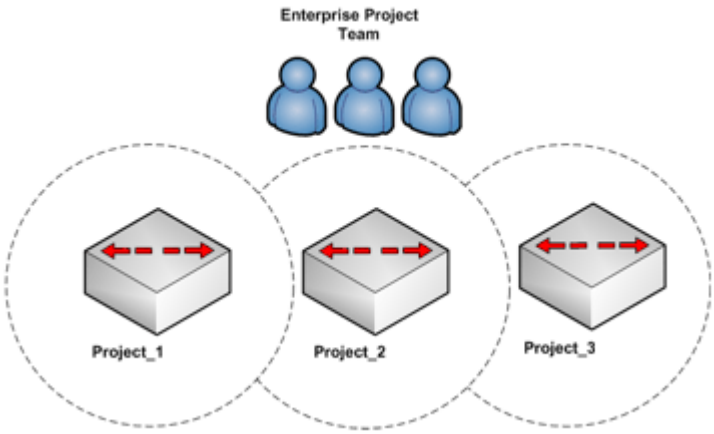
One project can be associated with many Child projects which can then become Parent projects and have their own Child projects. Therefore you can create a true and real dropdown family tree of projects.

This opens the way to many types of advantages. Let's look at the main ones:

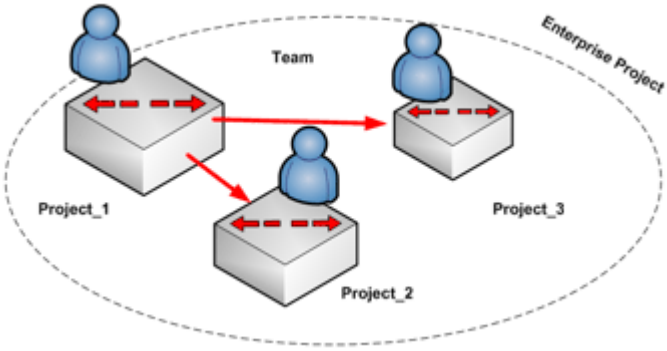
Distributed Projects

Projects structured with Parent-Child relationships provide many advantages to companies working in teams. In respect to the traditional technologies, where many people work using and sharing tasks in the same project, Movicon offers the possibility to distribute work in different projects independently where the Team Leader can have, in their own Parent Project, all the resources of the Child Projects of its collaborators, who can also completely work independently.
The Father Project is provided with all its children's resources internally, without any resource name distinction or duplication, as the name difference is governed by the child project's path. Therefore, for instance, a VAR0001 may co-exist in the parent project as well as in the child project because individualized by the project's name and path.

- Note: This architecture provides the automatic startup of child projects in Run when the Parent project Run is started up. This option is found in the Project's "Child Project Options Settings" properties.



A traditional Project team structure diagram



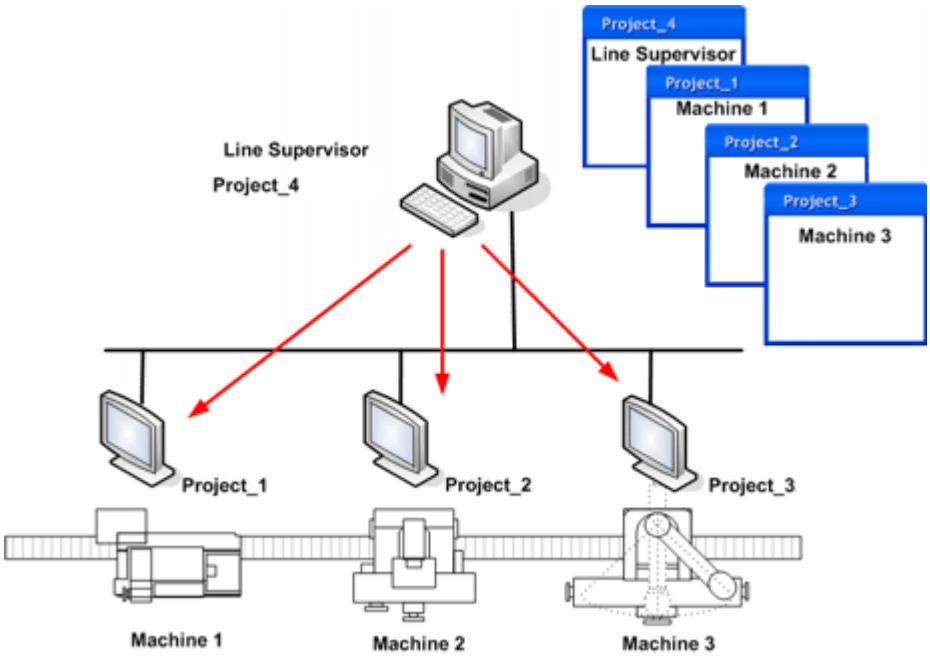
A distributed project structure diagram of Parent-Child project relationships

Distributed Run

The Father-Child Project relationship is very useful for modular systems or machines where, for instance, the plant is divided into zones which can also be independent from one to another. In a situation like this you can create more projects, one for each zone, and then integrate them into one Father project from which you can access the pages and the variables of the Child projects.

Example:
An automation line is composed of 3 independent machines. Each machine has its own project run locally on its PC. The machines are then integrated into a production line and linked to a main Supervision PC.
The big advantages Movicon gives you not only involve drastic development time reductions but also the chance to create **a main supervision project such as the "Parent Project" and three "Child Projects" representing the three individual machines,** which reside in local PCs.
In this way, the parent project can automatically be provided with all the individual variables of the various child projects, to produce general summary screen layouts. By using these general layout screens, residing in the parent project, **you can then open the screens of each individual machine** by simply opening the child project screens, which reside locally in the machines' PCs, in the father project . Not only do you save time but you get the advantage of having any **future modifications executed on the machines will automatically be executed in the main supervisor as well.**

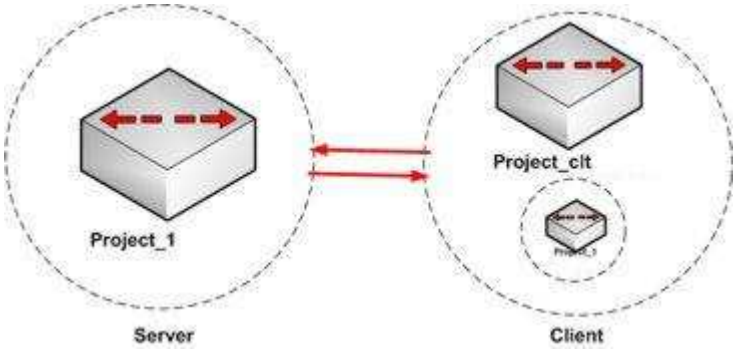
- Note: In the example indicated for this architecture, the automatic child project startup with the Parent project run startup, option provided in the Project "Child Project Options Settings" properties, is not required (being independent projects). However, the child projects must be entered with the Server project's (Supervisor) IP address in their settings.



This figure illustrates an automation system composed of one Server project (Supervisor) being the "Parent Project" of three individual local machine projects being the "Child Projects"

Client-Server with Child Projects

Parent-Child Projects may also be very useful in situations when needing a Server station and a certain number <n> of the "same" Client projects.
In this case, by using the "Parent-Child" relationship you can create child projects which can be easily be distributed in any PC network that won't need modifying if the Server has to be modified.
In order to do this just create an 'empty' Client project and setup a " project within to correspond to the Server project.
The child project can reside in the Client physically (by making an exact copy of the Server project beforehand) or it can be directly linked to the Server project via net. **This second configuration will allow you to use the same identical Client project in any PC connected in net.** Any client can connect to the Server PC to run project files.
Furthermore, this technique automatically provides you with software centralization: **any modifications executed on the Server will automatically be available to all clients.**



Client-Server structure with Parent (Client) - Child (Server) relationship

- Note: In the example indicated for this architecture, the automatic child project startup with the Parent project run startup, option provided in the Project "Child Project Options Settings" properties, is not required (being independent projects). **However, child projects must be entered with the Server project's (Supervisor) IP address in their settings.**
- **In this context it is important to specify that the port number set in the Parent project's networking services are different from the ones set for child projects and the child projects' ports are different from each other.** For instance, if you had two child projects called ProjectA and ProjectB, ProjectA's port would be set to the 12233 value, ProjectB's port set to the 12234 value and the Parent Project's port would be set to the 12235 value. You must also keep in mind that any server projects corresponding to the various child projects should have the same port value set for the various clients. Therefore in our example, ProjectA's Server's port would be set to the 12233 value and ProjectB's Server's port would be set to the 12234 value. If this is not done correctly, you may have some problems when a Web Client or a Client needs to be connected to the Parent project. In fact, if you open a child screen from the Parent project, and since the screen's variable has to be connected to the network server configured within the child project, Movicon will run the network services for that specific child project. If the child project uses the same port as the parent, this will cause them to have conflicts with each other.

25.1.1. Child Project Paths

The 'Child Projects' can be retrieved both with a local PC path in which the 'Parent Project' resides and with a network path.
When the Child project is local, it would be to your advantage to insert the folder containing the "Child Project" in the "Parent Project" folder, even though in reality it should be possible to set any path. In this way, however, it makes it easier because the search path of the "Child Project" will always be related to that of the "Parent Project", therefore by moving all of the "Parent Project'" folder in a different path or to another PC, will not cause any problems of unfound absolute paths.
When the "Child Project" is in the "My Documents" folder the search is always carried in relation to the "My Documents" folder of the user logged on to the operating system at that moment.
When the 'Child Project' is in another folder or in a computer working in net, the search path is a fixed one. In this case it is best to emphasize that the folders from the PC are to be shared.

When possible it is always best to insert the 'Child Project' inside the 'Parent Project' folder or subfolder to avoid absolute search paths errors.

25.1.2. Child Project Resource Access

One of the great uses of using 'Child Projects' is that they have the same resources of their 'Parent Project' which can be accessed from both projects. For instance a 'Parent Project' may need to call up a screen of the Child Project and vice-versa.
The pages of both projects may be displayed during Runtime without realizing that they come from different projects.
In the programming phase, resource access between Parent and Child projects simply requires only one syntax. Normally in the browse window for selecting the Parent project's resources you can also see the Child project's resources. This makes it easier to select the resource desired. However the Parent project's resources cannot be seen in the Child project therefore it is necessary to type in the name of the interested resource.

The syntax needed for accessing the Child Project's resources from the Parent project is as follows:

ChildProjectName\ResourceName

for example:

Childroject\Screen 1
ChildProject\VAR00001
ChildProject\Basic Script 1
ChildProject\Menu 1

The syntax for accessing the Parent project's resources from the Child Project is as follows:

..\ResourceName

for example:

..\Screen 1
..\VAR00001
..\Basic Script 1
..\Menu 1

It must be taken into account that there could be different nesting levels. For instance, If you have a "Father Project" with two "child projects, "Child Project 1" and "Child Project 2" you can access the "Child Project 2" resources from "Child Project 1" by using the following syntax:

..\ChildProjectName\ResourceName

For instance:

..\ChildProject2\Screen 1
..\ChildProject2\VAR00001
..\ChildProject2\Basic Script 1
..\ChildProject2\Menu 1

The other possibility would be to have a father project and a child project which itself has a further child project. Therefore you would have a "Father Project", a "Child Project" and a "Child Project2". In this case the syntax for accessing the "Child Project 2's resources" from the "Father Project" would be:

ChildProjectName\ChildProjectName2\ResourceName

for instance:

ChildProject\ChildProject2\Screen 1
ChildProject\ChildProject2\VAR00001
ChildProject\ChildProject2\Basic Script 1
ChildProject\ChildProject2\Menu 1

The syntax for accessing the resources of the "Father Project" from the "Child Project2" would be:

..\..\ResourceName

for instance:

..\..\Screen 1
..\..\VAR00001
..\..\Basic Script 1
..\..\Menu 1

Caution! If local screen variables have been set in the screen you are working in, the syntax to access the parent project variables may be different. When the parent project variable has the same name as the local variable you must use the following syntax:

..\..\<variable name>

The suffix"..\" is used for returning back one hierarchy on the variable's access. The hierarchy is:

Local Screen Variables -> Project Variables -> Parent Project Variables

Database Viewer

Data from the Child Project's Database can be displayed by the Parent Project. By using the execution properties of the **"Log Window"**, **"DataLogger Window"** and **"TraceDB Window"** objects you can select the 'Child Project' name to be linked in order to view its data.

25.1.3. Strings in Child Projects

Each Child Project could have his activation language context and his local languages. The Child Project first will find the String ID in the local string and if it doesn't exist then the string will be find in the Father Project String Table. In this way is not necessary copy the Child Project strings in the Father Project strings.

25.1.4. Child Project Users Inclusion

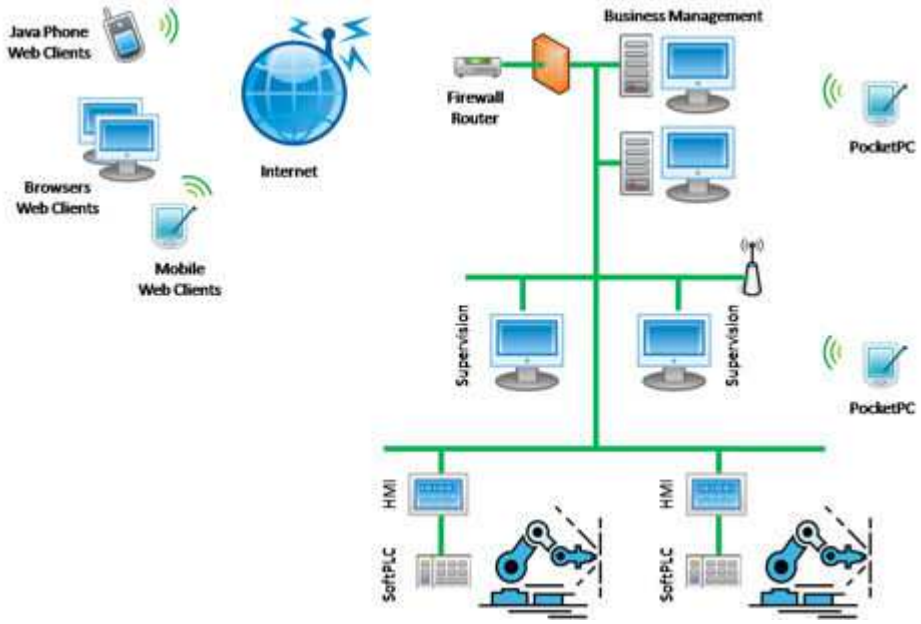
The User and Password management internal 'Child Projects' dependents exclusively on settings carried out in the 'Parent Project'. When the Password management is enabled in the 'Parent Project' this means that it will also be active in 'Child Project'. On the other hand, when it is not active in the Parent Project it won't be active in the 'Child Project'.
When the Password management is active, the 'Parent Project' users will be enabled, and therefore can also access the project commands of the 'Child Project' if they have requested rights to do so. The 'Child Project' Users are only active when they have been enabled in the settings of the Parent Project's **"Include Child Project Users"** group in the **"Users and User Groups Child Project Option Properties"**. In addition to this the Child Project User Max Level can also be specified for which the users must have in order to log on. Users with higher levels will not be acknowledged and denied access.

26. Networking

The Networking exploits the potentialities of protocols capable of going on Ethernet networks for interlinking Movicon workstations in Client/Server mode.

It is more than often that the distributed architecture of process control require plants to include multiple workstations, control or display stations which are used through one or two PCs linked up together in Ethernet network. Today's Ethernet network is the most used means of communication due to its hi-performances/low cost ratio.
This means, however, that more tools are needed for interlinking more stations capable of sharing process data.
Movicon nevertheless is able to satisfy these Networking connectivity requirements by exploiting the TCP/IP, UDP, and HTTP protocols which are also used on the Ethernet network as being the most widely used and fastest.
Two or more Movicon stations can be interlinked with just a few simple mouse clicks.

The remote link functions (Networking) are enabled in Runtime only when the appropriate option on each hardware key of each PC station (Client or Server) is active.
The variables in use in a Client and exchanged with the server will naturally be in use in the server as well.



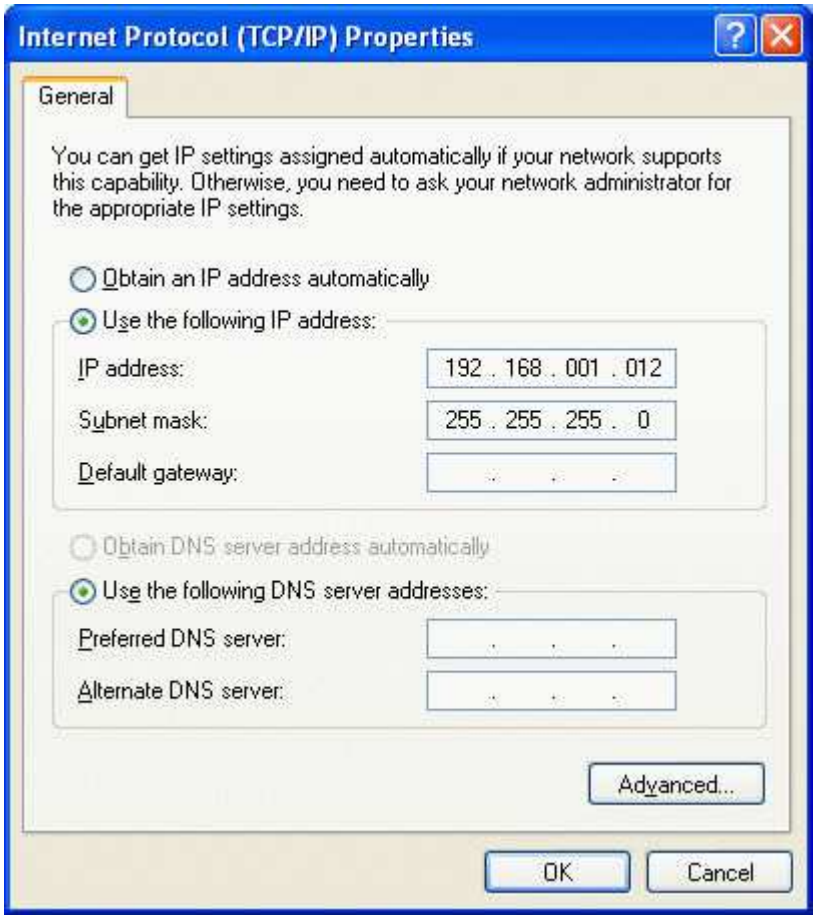
An example of the network architecture. Each PC station is connect in LAN network in Client/Server architect. Each Movicon station participant can read or write data to each other.

26.1.1. Network Installation

Before going ahead with connecting two Movicon stations in network you need to provide connections of two PCs through a Ethernet network and install the TCP/IP protocol on the Microsoft Windows operating systems.
We will describe the procedures needed for connecting up two Movicon stations to each other by using a normal compatible Ethernet NE2000 card and the TCP/IP network protocol, which is presented in the Windows operating system, as an example.

For any other network configuration permitting the use of the TCP/IP protocol please refer to its instructions.

After having installed the network card in the PC bus and having provided the relative configuration when a Plug & Play card is not being used, it is possible to use the Network functions from the Windows Control Panel to install the card and protocol in the system.
When having activated the network functions from the control panel you need to proceed with installing the card and protocol by using the Add button and selecting the item desired:
We will select the card type, the makers, any drivers needed etc for the card.
As for the protocol, in our example we will install the Microsoft TCP/IP protocol and configure it by assigning a specific IP address, such as illustrated in the figure below:



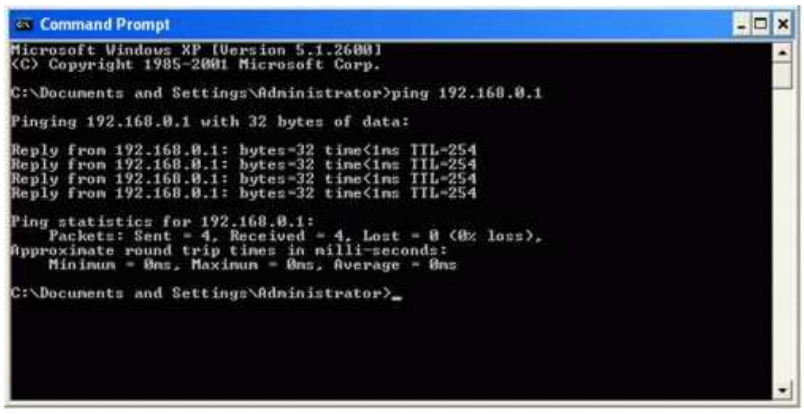
Obviously each PC should receive in association its own IP address which is expressed as being unique by the last two figures.

A check should be made at the re-startup of the system to see if the network has been connected correctly and the protocol for the operating system is working properly.
In order to be completely sure that the TCP/IP network is working correctly you can use the PING.EXE utility provided in all Microsoft systems.
To carry out a check use the Run command from the Start menu or start the DOS prompt, then write the PING command followed by the IP address of the station whose connections you wish to check.

For instance, let's suppose we need to check the correct running of the communication towards the PC connect in net whose IP address is 198.162.200.14, therefore we shall write:

PING 192.168.200.14
<ENTER>

DOS window responding to the call made should appear showing the connection which was carried out:



Only in this way can we be certain that the network has been installed correctly to be able to connect data of the two Movicon stations.

26.1.2. Network Connection

After installing the network correctly you can proceed with connecting data from one Movicon station to another.
Movicon permits one, a group or all the Real Time DB variables to be connected to the project through as many Real Time DB variables of another Movicon applied project existing on the same network.
To configure the connection of variables of one project to the variables of another project, proceed with using the **"Variable Network Client Properties"** through the 'Properties Window' to configure the necessary variables.
When you wish to connect a group of variables (or all the Database) you need to selection the ones needed and modify them through the **"Variable Network Client Properties"** from the 'Propertied Window'.

26.1.3. Exchanging Variables through a Network

Notification is given when communication takes place in the Movicon Network Client-Server architecture for exchanging variables and those "Even-Driven", being every time data changes at both Server and Client levels. Variable updating happens in the following modes:

When a Client variable, to be exchanged with the Server in "read" or "read/write" mode, is put into use in the Client, its "subscription" is the first operation performed towards the Server. This consents the Server to know that this variable must be kept updated. At this point, the Server will carry out the first update to align the Client's value, after which further variable changes on the Server or Client side will be notified. In addition,, the Client will use the time set in the "Network Client Settings- Timeout(msec)" property for variable read refreshes. This means that if a variable is set with "read" mode, a further change to this variable on the Client side will be subscribed again with the Server's value after "Timeout" even when the variable on the Server side has not changed.
No variable "subscription" operations are performed towards the Server when a Client's variable, to be exchanged with the Server in "Write" mode, is put in use on the Client side. However, each time the variable in question changes, a update command will be sent to the Server. Furthermore, the Client will use the time set in the "Network Client Settings- Timeout(msec)" for refreshing variables in write. This means that when a variable is set with "write" mode, a further change to this variable

on the Server side will overwrite it again with the Client's value after "Timeout" expires even when it has not changed on the Client side.

It must be taken into consideration that if a variable is exchanged in "read" or "read/write" mode when put in use on the Client, it is subscribed to the Server which updates it and then as soon as the variable goes in use, its value will be updated on the Client side. If, however, a variable is exchanged with "write" mode, nothing is notified to the Server when it goes in use unless it undergoes a variation. In this case, you will notice that it will take a few seconds from the moment in which the variable goes in use to the moment in which it is updated on the Server. This time is the one set in the "Timeout (msec)" used for refreshing variables.

Using variables in scripts

When a variable is used within the script code, it might happen that a read or write command of this variable must be executed twice before it is updated. This usually happens when the variable is put in use by the same command and the script is executed for the first time:

Situations with Variables in "read" or "read/write" mode

A variable read command, such as a "GetVariableValue("VAR00001")", puts in use the variable the moment it is executed followed by executing a subscription operation towards the Server. The value returned by this function will be the variable's current value and not the one updated by the Server, because the Server will not have carried out a variable refresh yet. A second execution of this function will return the correct value if the Server manages to update the variable beforehand.

Situations with Variables in "write" mode

A variable write command, such as a "SetVariableValue("VAR00001", 1)", sets the variable and puts it in use the moment it is executed. However, the fact that from the moment this variable goes in use, its value does not change and is not updated on the Server side immediately but only after the "Timeout (msec)" used for refreshing the variable has run out. However, if the variable changes again after going in use, the command will be sent immediately to the Server.

Unicode String Variables

Messages travelling in the Networking system are converted into ANSI code. any string variables containing Unicode texts are not however supported in this conversion in Movicon Networking.

26.1.4. Windows Terminal Server

The new Movicon Networking "Local Transport" management now allows easier project realization in the Terminal Server environment. The Movicon Terminal Server instances and projects started up as Service can communicate locally using the Networking and not the OPC (as was the case in the past).

To run Movicon from a Windows Terminal Server you need to use a certain configuration because each Terminal Server client runs a different Movicon project session. The system configuration must be done as follows:

1. The first Movicon project must be run as Service and has to manage field communications. It must be a Network Server and all the its project variables must be exposed to the Clients.
2. The second project must be a Network Client of the previous project, it must enable the "Local Transport" and it mustn't enable any communication driver. When the Client project is run, it will acquire the variables from the Network Server project.
3. The Terminal Server session must run the Network Client project and NOT the Network Server project, which is however managed as service.
4. The Movicon license must be NET type (network license) to enable a number of users equal to the maximum number of Terminal Server connections desired at the same time.

The use of the Network Server-Client configuration is necessary because only one project must execute the communication drivers. If the Terminal Server runs a new project session which has been enabled with drivers there will be communication conflicts. Therefore the project, run from the Terminal Server, must not have its communication drivers enabled and thus must retrieve data from the field by exchanging variables through Networking from the Server project.

You must take into account that Log files will be created independently from both the Server and Client projects. Therefore it will be necessary that the two ODBC connections are different (if the two

project names are different so will the ones for default be for the ODBC connections). If you want to display the Server project's Historical Log from the Client project you must use the grid object.
As regards to DataLoggers and Recipe with the need for one data source only, you will have to enable the registration in the Server project, set the Client project's ODBC connections to the Server project's database and disable the DataLogger/Recipe registration in the Client project.

Starting from the 11.0.1018 and 11.1.1055 versions the local protocol can also be used in Windows Vista/7 operating systems or later versions by launching the Server project as service. However you will need to heed the following rules:

1. The service must be started up by a user with administrator rights and not a "LocalSystem" user (default user)
2. If the Windows UAC is enabled, the Client project must be started up with the "Run As..." specifying a Administrator User. It is for this reason that the "with Windows Vista/7, the Local Transport networking requires Administrator privileges. Please, run Movicon as Administrator." message appears in the Client project in cased when the local protocol is active.
3. If the Windows UAC is not enabled, the user who starts up the Client project does not have to be administrator but must be inserted in the 'Local Policy Settings' relating to the 'Create Global Object' configuration parameters.

Warning message has only been inserted in the 11.1 version and appears only when an error generates while installing the local protocol.
The Screen and basic script "OpenSafe" command uses the local protocol for connecting to the instance variables in run mode. It is for this reason that the instance in run mode must have privileges for opening the local protocol port in listening mode.

Caution! In order to permit the Client project connect to Server correctly using the "Local Transport" protocol, there should not be any sessions, such as design mode, opened in Movicon. Otherwise the Server network services will not initialize properly causing the Client to switch into timeout when connecting to the Server.

26.1.5. Remote Project Debugging

The remote project debug function allows you to connect to other Movicon instances being run on remote computers/devices (Windows 32/64 bit or WinCE). This makes it all possible to debug projects in remote and above all those projects being run on WinCE platforms. This function exploits a major part of the potentialities provided in the Movicon Networking.
The command to execute remote process debugs can be evoked in two modes:

1. by using the **"Attach to Process"** command from the ToolBar
2. by using the **"Attach to Process"** command from the Upload window in projects for WinCE

When executing the **"Attach to Process"** command a dialog window will open to insert the Server to be connected to. The Server can be indicated by its set IP address or its name, or by searching for it in the tree of connections available in the network to which the computer is connected.

Caution! the server's name or its IP address must be specified without placing the "\" char. at the beginning.

After having set and confirmed the Server with OK, a second window will open requesting User authentication. The User name and password are obligatory only when the project being run has been enabled with the User management, otherwise click on the OK button straight away. When the project has been enabled with the User management, the user must have administrator level (level 1023) in order to be authenticated and granted connection. Furthermore the project must be enabled for remote debugging. This is done by enabling the "Debugger" option in the project's "Networking Server" properties (default = false).

After this procedure the project is started up in the same mode as the non startable child project. Therefore the variables in the controls are connected in dynamic mode ([\\NET]), the alarm, historic data viewer windows and the scheduler window are connected to the Networking Server. In addition to this all the project logic is not executed.

The remote debug provides the following functionalities:

- The Watch window allows the data relating to the Server project to be displayed and to monitor the variables in the Server
- The 'Scripts' new Watch window allows you to verify which Scripts have been loaded in memory and the total execution time of those in run mode. The debug window is opened by double clicking on a script
- A debug can be executed on the local and project IL logic (you can view the logic executed locally in the "Local IL Logic Window")
- The remote process can be restarted (not possible for the service). This possibility is proposed when disconnecting from the Server. A window opens where you can restart the project on the Server
- Analyses the project statistics with the right debug window (not supported on WinCE)

Other things to consider:

1. The remote debug messages have the lowest priority, they do not influence the normal running of the system where network traffic is concerned
2. The project to be connected to must be enabled with the "Networking Server" option (as well as the "Debugger" option) in the Networking Services settings
3. The Networking default transport is used for connecting in remote debug, this is the one selected in the "Client Network Settings" of the project to be connected to. This same transport must also be enabled in the Server's "Networking Service" otherwise any attempt to connect will fail
4. The screen's file path and name can be entered in the command line instead of those of the project and are exploited by Movicon to execute the remote project debugging

26.2. Network Services Properties

The "Network Services" properties are used for defining the settings concerning both Server and Client projects. This particularly includes the possibility to select and configure which protocol to use for communicating through the Ethernet.
The available protocols are:

- **Local**
- **TCP**
- **UDP**
- **HTTP**

Some of the advanced protocol options may slow down communications when dealing with big packets ("Sealing" and "Enable Encryption" properties), or with supplementary operations which the Server and Client must execute before sending packets ("Enable Compression" property).

26.2.1. Network Server Properties

The "Network Server" properties allow you to define the settings concerning the Server projects.

Network Server
This property is used for enabling or disabling the Network Server for the project in question.

Default Log On User
This property allows you to set the User that the Server project is to use for any anonymous remote connections. Therefore any anonymous Client trying to connect to the Network Server will be authenticated with the credentials of the user entered in this property. This option is only used when the user management is active in the Server project and behaves in the following way:

- A Web Client project will be automatically authenticated with the user set as "Default Log On User" in the Server. Therefore no login window will appear.
- A Network Client project without any user name entered for connecting to Server (Network Client Settings -> User), will be authenticated with the same user set as the "Default Log On User" in the Server. Therefore no "Network Server 'ServerName' Authentication failed" message will appear in the Client log window. Also "Alarm Windows" and "Scheduler Windows" will be authenticated using the user entered as the "Default Log On User" in the Server.

Debugger

This property is used for activating the debug function for the Networking communications.

Max # Clients

The maximum number of Client Stations, which can connect to the Server at the same time, is entered in this edit box.

Max # Failing Actions

The maximum number of error packets which can arrived from a Client Station before it put into quarantine is entered in this edit box.

Network Server Threading Pool

Number of threads to be used for handling Server packets. When inserting a number in the negative the subdivision of threads will be done based on the number of processors in the PC.

Routing Table

This property is used for re-addressing messages on another Server. In this case the PC works as a bridge. This maybe useful in situations where the destination Server is not visible from the source Server, for instance, when the destination Server is part of a local Lan and access is gained through a Server connected to internet.

26.2.2. Log and Security Properties

The "Log and Security" properties are used for defining the settings for the Log files inherent to the network communications and any eventual filters on IP addresses which can access the Server.

Log

This property allows you to enable or disable the recording of Log files relating to the Networking communication information. The Log files are saved in the project's "NETLOG" folder in ASCII format and contain information relating to the connection status, variable changes, etc.

Network Server log interpretation

Message types:

a. Variable subscription by a network client. Means that the variable in the client had gone in use. No messages appear in the network server log in cases where the network client is unable to get authenticated successfully on network server, or denied access to the variable they want to subscribe.

Example:

Requested variable monitoring get (Local_I1, 0), Result = 1

b. Cancellation of a variable from the list of the one subscribed. Means that the variable in client is no longer in use.

Example:

Stopped variable monitoring (Local_I1, 0), Result = 1

c. The network client has sent a request to the network server asking for a variable value. The network server will send the value only if if has changed. This type of request occurs for all subscribed variables by clients when the timeout, set in the client rules, expires, or beforehand if the variable changed in the network server: in this case the network server sends notification to the network client about variable changed, therefore the network client will send a request to read new value.

Example:

Requested variable monitoring poll (Local_I1, 0), Result = 1

d. The network client has sent a variable value to the network server. Means that the variable has changed value in the network client.

Example:

Requested variable set (Local_I1, 0), Result = 1

e. A webclient has connect to a network server screen.

Example:
Requested Open Screen (Screen1), Result =

Log File Size (Kb)
This property allows you to set the maximum size (in Kb) for each Log file. When this size is reached the Log file will be closed and a new one will be created with a progressive number at the end.

Max. Log File Age (days)
This property allows you to set the maximum log file duration. When this limit has been reached, expressed in days, Movicon will start to recycle by overwriting the files starting with the oldest ones.

Starting IP Address
Movicon allows IP address ranges to be set for which the Server will accept connection requests. Addresses which are not in these ranges will be refused. In this property you can insert the start addresses of the range desired.

Ending IP Address
Movicon allows you to set IP address ranges for which the Server will accept connection requests. Addresses which are not in these ranges will be refused. In this property you can insert the ending addresses of the range desired.

Clean Quarantine Address tick (min)
This property allows you to set every how many minutes the IP addresses in quarantine must be cleaned. In this way any Client in quarantine can be accepted by the Server again if the request to do so does not continue to generate an error.

Beep Under Attack
When enabling this property, the Server will give out an acoustic signal every time an unauthorized Client tries to connect.

Banned IP List
This property allows you to set a list of IP addresses which will be banned from accessing the Server. A dialog window will open through which you can insert the list of IP addresses to be banned:

26.2.3. Local Transport Properties

The Local Transport properties are used for defining the setting inherent to the Local communication protocol which concern the Network services. The **"LOCAL"** protocol is needed for communicating internal the same machine without using the net.
A network client project can connect to a local network server project. Any project not enabled as "Network Server" will startup its network services in client mode only if this is requested (it will not be committed to listen in on ports configured as Servers). This will allow the network client project's network connections to be set on "localhost" and to use the local or TCP transport for connecting to a Movicon network Server started up locally.

It would be best to leave the network client project with its local transport enabled, as this transport uses a shared memory block which is much more faster than the local network communication when using the TCP transport.

Enable
This property let's you enable or disable the use of the Local Transport for networking between Server-Client stations.

Timeout (ms)
This property allows to enter the timeout in milliseconds for the response of a message sent to a remote station. When this time expires a error message will be generated.

Inactivity (ms)
The set value (default 10 sec.) is used for keeping the resource active in the sockets so that to avoid having to repeatedly recreate it on the Server for the different Clients. In addition, this value is multiplied by 30 (default 10000 x 30 = 5 min) for managing the disconnection of inactive Clients. When a Client connection remains inactive for the time set here, it will be disconnected and reconnected only when the next request is made.

26.2.4. TCP Transport Properties

The "TCP Transport" properties allow you to define the settings inherent to the TCP communication protocol concerning the Network services.

Enable
This property allows you to enable or disable the use of the "TCP Transport" between Server-Client stations.

Timeout (ms)
This property allows you to set the amount of time to wait for a response (expressed in ms) after a message has been sent to a remote station. When this time elapses an error message will be generated.

Inactivity (ms)
The set value (default 10 sec.) is used for keeping the resources active in the sockets as not to continually create on the Server for the various Clients. This value is multiplied by 30 (default 1000 x 30 = 5 mins) to manage the disconnection of inactive Clients. When a Client's connection is inactive for the time set, it will be disconnected and only reconnected on the next request.

Port
This property allows you to set the number of ports (sockets) to be used for the transport.

Allow Routing
This property allows you to enable the Transport to participate in routing messaged addressed to other Transports.

26.2.5. TCP Transport Advanced Settings Properties

The "Advanced Settings" properties allow you to define the settings inherent to TCP communication protocol regarding the Networking

Transport Threading Pool
The number of threads to be used for managing the processes linked to the Transport. When entering a negative number the sub-diving of threads will be done based on the number of processors existing in the PC.

Client Threads Limit
This property is used for setting the number of threads to be entered at the same time for managing the Transport.

Incoming Speed Limit
This property is used for setting the maximum number of Bytes according to what can be received from the Transport.

Outgoing Speed Limit
This property is used for setting the maximum number of Bytes according to what can be transmitted by the Transport.

Bind Source IP Address
This property is used to ensure that Movicon opens the communicating port on the specified port. If nothing is specified in this field, the communication ports will be opened on the network card or ethernet communication channels predefined by Windows.

Max. Message Size
This property is used for entering the maximum message size which can be managed from the Transport.

Nr. Attempts to Connect
This property is used for setting the maximum number of connection attempts to a Server communication port before timeout expires. The default "0" value does not impose any limit on the number of connections attempts by the Client to a Server.

Attempts Interval
This property is sued for setting the interval in milliseconds between one attempt to connect and the next. The default value is "1000".

Enable Compression
This property allows exchanged packets to be compressed. This is handy to use when transmitting with low band rates.

Enable Encryption
This property allows exchanged packets to be encrypted for higher security reasons.
When publishing screen pages for the Web client the current TCP transport settings are used at that moment and set in the java applet parameters called in the html page published with IIS for the (Internet Information Services). However, these parameters can also be modified by opening th html page with an external editor.
AES is used as the encryption algorithm with a 128 bit private encryption key property.

This option must be enabled in both network Server and network Client in order for it to work properly.

Sealing
This property is used for setting a integrity control on messages sent in networking. The TCP transport has its own integrity control on exchanged data. By setting a sealing type you will make data transmission and reception more secure, but slower. There are three modes to choose from:

- **None**
- **MD5**
- **CRC32**
- **Adler**

26.2.6. TCP Transport SOCKS Options Properties

The "Socks Options" Properties allow you to set the settings inherent to the TCP communication protocol regarding the Networking services.

Enable
This property is used for enabling the Socks Option for the Transport in question.

Server
This property is used for specifying which is the Socks Server for the Transport.

Port
This property is used for setting the number of ports (sockets) to be used for the transport.

User
This property is used for specifying the name of the Socks user to be used.

Version
This property is used for selecting the Socks version to be used. The choices are:

- **Ver. 4**
- **Ver. 5**

Enable Authentication
This property is used for enabling the Socks authentication for the Transport.

Authentication
This property is used for selecting the authentication type to be executed. The choices are:

- **No Authentication**
- **User Code**

26.2.7. UDP Transport Properties

The "UDP Transport" properties allow you to define the settings inherent to the UDP communication protocol concerning the Network services.

Enable
This property allows you to enable or disable the use of the "UDP Transport" between Server-Client stations.

Port
This property allows you to set the number of ports (sockets) to be used for the transport.

Inactivity (ms)
The set value (default 10 sec.) is used for keeping the resources active in the sockets as not to continually create on the Server for the various Clients. This value is multiplied by 30 (default 1000 x 30 = 5 mins) to manage the disconnection of inactive Clients. When a Client's connection is inactive for the time set, it will be disconnected and only reconnected on the next request.

Allow Routing
This property allows you to enable the Transport to participate in routing messaged addressed to other Transports.

26.2.8. UDP Transport Advanced Settings Properties

The "Advanced Settings" are used for defining the settings inherent to the UDP communication protocol concerning the Networking services.

Bind Source IP Address
This property is used for excluding or rendering the IP addresses, specified for the Transport in question, invisible.

Max Message Size
This property is used for inserting the maximum message size to be managed by the Transport.

Enable Compression
This property is used for compressing transmitted packets. This may be useful when the band rate used in the transmitter is low.

Enable Encryption
This property consents to crypting messages exchanged between network Client and Server.
When publishing screen pages for the Web client the current UDP transport settings are used at that moment and set in the java applet parameters called in the html page published with IIS for the (Internet Information Services). However, these parameters can also be modified by opening the html page with an external editor.
AES is used as the encryption algorithm with a 128 bit private encryption key property.

This option must be enabled in both network Server and network Client in order for it to work properly.

Sealing
This property is used for setting a integrity control on messages sent in networking. The UDP transport has its own integrity control on exchanged data. By setting a sealing type you will make data transmission and reception more secure, but slower. There are three modes to choose from:

- **None**
- **MD5**
- **CRC32**
- **Adler**

26.2.9. HTTP Transport property

The "HTTP Transport" properties allow you to define the settings inherent to the HTTP communication protocol concerning the Networking services.

Enable
This property allows you to enable or disable the use of the "HTTP Transport" between Server-Client stations.

Timeout (ms)
This property allows you to set the amount of time to wait for a response (expressed in ms) after a message has been sent to a remote station. When this time elapses an error message will be generated.

Inactivity (ms)
The set value (default 10 sec.) is used for keeping the resources active in the sockets as not to continually create on the Server for the various Clients. This value is multiplied by 30 (default 1000 x 30 = 5 mins) to manage the disconnection of inactive Clients. When a Client's connection is inactive for the time set, it will be disconnected and only reconnected on the next request.

Port
This property allows you to set the number of ports (sockets) to be used for the transport.

Allow Routing
This property allows you to enable the Transport to participate in routing messaged addressed to other Transports.

26.2.10. HTTP Transport Advanced Settings Properties

The "Advanced Settings" properties allow you to define the settings inherent to HTTP communication protocol regarding the Networking services.

Transport Threading Pool
The number of threads to be used for managing the processes linked to the Transport. When entering a negative number the sub-diving of threads will be done based on the number of processors existing in the PC.

Client Threads Limit
This property is used for setting the number of threads to be entered at the same time for managing the Transport.

Incoming Speed Limit
This property is used for setting the maximum number of Bytes according to what can be received from the Transport.

Outgoing Speed Limit
This property is used for setting the maximum number of Bytes according to what can be transmitted by the Transport.

Bind Source IP Address
This property is used for excluding or rendering the IP address, specified to the Transport in question, invisible.

Max. Message Size
This property is used for entering the maximum message size which can be managed from the Transport.

Nr. Attempts to Connect
This property allows you set the max. number of attempts to connect to a Server communication port before timeout expires. The default value '0' does not limit the number of attempts by the client to connect to the Server.

Attempts Interval
This property allows you to set an interval in milliseconds between a connection attempt and the next. The default value is "1000".

Enable Compression
This property allows exchanged packets to be compressed. This is handy to use when transmitting with low band rates.

Enable Encryption
This property allows exchanged packets to be encrypted for higher security reasons.
When publishing screen pages for the Web client the current HTTP transport settings are used at that moment and set in the java applet parameters called in the html page published with IIS for the (Internet Information Services). However, these parameters can also be modified by opening the html page with an external editor.
AES is used as the encryption algorithm with a 128 bit private encryption key property.

This option must be enabled in both network Server and network Client in order for it to work properly.

Sealing
This property is used for setting a integrity control on messages sent in networking. The HTTP transport has its own integrity control on exchanged data. By setting a sealing type you will make data transmission and reception more secure, but slower. There are three modes to choose from:

- **None**
- **MD5**
- **CRC32**
- **Adler**

26.2.11. HTTP Transport SOCKS Options Properties

The "Socks Options" Properties allow you to set the settings inherent to the HTTP communication protocol regarding the Networking services.

Enable
This property is used for enabling the Socks Option for the Transport in question.

Server
This property is used for specifying which is the Socks Server for the Transport.

Port
This property is used for setting the number of ports (sockets) to be used for the transport.

User
This property is used for specifying the name of the Socks user to be used.

Version
This property is used for selecting the Socks version to be used. The choices are:

- **Ver. 4**
- **Ver. 5**

Enable Authentication
This property is used for enabling the Socks authentication for the Transport.

Authentication
This property is used for selecting the authentication type to be executed. The choices are:

- **No Authentication**
- **User Code**

Enable HTTP Proxy Server
This property enables the use of the Proxy Server to establish the connection to the Server.

HTTP Proxy Server
This property is used for setting the Proxy Server's IP address.

HTTP Proxy Server Port
This property is used for setting the Proxy Server's port.

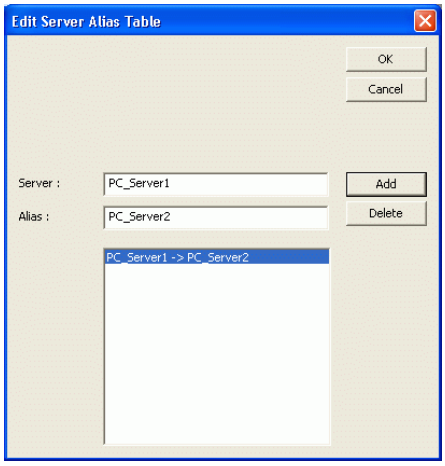
26.3. Setting up Network Clients

The 'Network Client' properties allow the settings concerning Client projects to be defined. The Client settings can be personalized in a particular way according to the Server which must be connected. Therefore 'Client Profiles' can be inserted (**"Add new Client Rules"** command) to diversify the Client's properties according to the Server to be connected (for example a different protocol may be selected for each Server). In addition to this you can also add 'RAS Stations' (**"Add new RAS Station"** command) in order to connect to a Server through phone connections.

26.3.1. Network Client Properties

The "Network Client" properties allow you to define the settings concerning Client projects.

Server Alias Table
This property allows you to re-route Server names with other names. This function is very handy, for instance, when having to change names of computers belonging to the network where this operation can be done altogether in one point of the project. The dialog window for editing the table of Aliases is as shown below:



The fields shown in the Alias window have the following meanings:

- **Server:** Name of the Server to which the project has to connect to when the Alias Table is not enabled. This is the name which the Server was set with in the **"Network Server"** property of the **"Variable Network Client Properties"**
- **Alias:** Name of the Server in which the connections must be re-addressed.

Using the Alias Table is very handy also in the designing and debug phases. You can, in fact, quickly re-route the Server's name in project tests. In addition, by knowing the plant server's name in advance you can insert it in the project and use it's Alias for internal testing in the office.

Black List Expiry Time

This property consents you to customize the Server expiry time on the Black List. The time is expressed in milliseconds and the default value is equal to 60,000. A Client can put the IP or the name of a Network Server on its Black List in cases where a timeout error has occurred for that Server. The Server will then remain on the Black List for the time set in this property and the Client will not make any attempts to connect to that Server during this time. The Black List management consents faster re-connections of variables from the primary Server to the backup Server, or viceversa. In Client-Server network configurations with only one network Server, it may be convenient to set this time to zero in order to eliminate any waiting times in reconnecting the Server which went into timeout.

26.3.2. Network Client General Properties

The "General" properties are used for defining time and transport settings to be used for Client projects.

Timeout (ms)

The Server's answer timeout (expressed in ms) after a message has been sent from the Client is entered in this property. An error message will be generated when the Timeout has expired.
This value is also used by the Client project as polling time for asking the Server for variables in use notifications.

User

This property is used for entering the name of the user with which the Client will represent itself to the Server. This setting is only significant when the Server project has the 'Password Management' enabled. In this case the user must also be present in the Server project to be acknowledged. By doing this the Client acquired the rights associated to the user in question, and can get access to variables based on these rights.

Ping Time (ms)

This property is used for setting the ping time to be used while connecting to the Server (the "0" value avoids the use of the ping time).

Transport

This property is used for selecting the Transport (Protocol) type to be used by the Client for communicating with the Server.

Priority

This property is used for associating a priority level to the connection in question The values are from 0 to 100. The higher the number, the higher the priority therefore the highest priority is a 100.

RAS Station

This property is used for selecting a RAS connection (which must be created beforehand) to connect to Server exploiting telephone lines.

Enable RAS Station

This property is used for enabling the use of a RAS station to connect to the Server exploiting telephones lines.

26.3.3. OPC XML DA Client Properties

The "OPC XML DA Client" properties allow you to define the settings concerning the Movicon XML Client.

Thread Pool
The number of threads to be used for requests to the XML Server. If you have to connect to more than one Server you can enter more threads, one for each Server. The value -1 is the setting for default.

Poll Time Server In Use (ms)
This edit box is used for setting the polling time in milliseconds towards the Server. This setting can be changed in Runtime with the appropriate Basic Script functions.

Poll Time Server NOT In User (ms)
This edit box allows you to set the polling time towards the Server in milliseconds when the variable are not in use. This setting can be changed in Runtime with the appropriate Basic Script functions.

Write Behind Delay (ms)
This edit box allows you to set the time in milliseconds for the Write Behind Delay. The OPC XML DA Client manager will delay the writing towards the Server according to the time set in this box.

26.4. RAS Stations

The Network communication between two Movicon stations can be done through a Ethernet network and through a RAS connection via modem as well. To make this possible you need to create an "Incoming Connection" on the PC Server, so that when the Client makes a call and connection is established, the two PCs will be linked as if they were networking with each other.
To add "RAS Stations" you need to use the **"Add new RAS Station"** command.

The **RAS Connection** is a Operating System function that allows a Server-Client type connection between two stations using a connection via Modem. One the connection has been established the TCP/IP protocol can be used for exchanging data between Server and Client. The RAS connection can be created from the "Control Panel - Network Connections". However, the configuration procedure may change slightly according to the Operating System being used (ie. Windows 32/64 bit).

The RAS Station must be created only on the PC acting as Client, while an "RAS Incoming Connection" must be configured on the PC Server which will allow it to respond to the Client's calls automatically.
For further information on how to set up a "RAS Connection" please consult the relevant form on the "Web Support Center".

Be careful not to confuse a **"RAS Station"** with a **"RAS Connection".** The "RAS Station" is infact a component of the Movicon project, which is used for setting up communication parameters between Server and Client. The "RAS Connection", however, is a Operating System Setup which is used for establishing a physical connection between Server and Client.

26.4.1. RAS Stations General Properties

The 'General' properties allow you to define the RAS Station settings for the Client project.

Name
The name of the RAS station is entered in this property. The Name is essential for being able to identify and access the properties and methods of the RAS Station through the Basic Script functions.

Dial-up

The name of the RAS Connection to be used for connecting the Client to the Server is entered in this property. In this case the RAS Connection should be created and configured in the Operating System beforehand. When this field is left empty you will need to fill in the next fields: "Telephone Number", "User Name" and "Password".

For further information on how to configure a "RAS Connection" please consult the appropriate card available on the "Web Support Center".

Phone Number

The telephone number which the Client station must dial is entered in this field. The number should correspond to the line connected to the Server station.

If the "Connection" property has been filled in this field my be left empty.

User Name

The user's name with which the Client station is to be authenticated by the Server station is entered in this property.

In this case the user must be a user known to the Operating system and therefore not necessarily a user of the Project Server, but a user declared in the Operating System.

If the "Connection" property has been filled in, this field my be left empty.

Password

The user's password with which the Client station is to be authenticated by the Server station is entered in this property.

If the "Connection" property has been filled in this field my be left empty.

Retries

The maximum number of connection attempts, which are to be carried out when the called fails first time, is entered in this property.

Disconnect after (sec)

How long after the inactivity time is the connection to be closed is entered in this property.

The time count starts the moment in which all the variables connected to the Server are no longer in use.

Retry Hold Time (sec)

The Retry Hold Time, before re-dialing when connection fails, is entered in this property.

Prompt Before Connecting

When enabling this property a confirmation window will appear each time Movicon execute a connection. In this case the operator must confirm or abort the call.

Show Dlg

When enabling this property a window will appear during the calling phase showing the current status of the connection.

Connection Variable

A numeric variable from the project's RealTimeDB can be entered here. Through the variable's settings you can control the RAS station connection and disconnection during runtime. When setting the variable with a value that is not zero, Movicon will make the RAS call to connect by using the RAS station settings. When setting this variable to zero, Movicon will close any connections currently in use. The variable can return to zero when the user decides to hang up on the call being made.

If this field is left empty, Movicon will connect/disconnect according to whether variables are in use or not in the project. Movicon will make calls in cases where at least one variable is in use and must connect to a RAS server.

The connection to a RAS station can be controlled using the command variable, even when the RAS station has not been associated to any Client Rules. In this case you just need to have this option enabled on your license.

26.5. Client Rules

The Movicon Networking communication architecture allows two or more stations to connect to each other with the possibility for additional Servers and Clients. When a Client station has to connect to a Server only the settings need configuring through the **"Network Client General Properties"**. But when a Client station must connect to two or more Servers you will need to configure various communication setups between the Client and the various Servers (eg. communication protocols, eventual RAS Stations, etc.). In this situation it would be appropriate to create **'Client Rules'** to customize the settings of the Client according to the Server to be connected to. By doing this the Client will be able to connect to the Server by using the **'Client Rules'** settings and not the general settings specified in the **"Network Client General Properties"**.
The **"Add new Client Rules"** command is used for adding 'Client Rules'.

The name of the 'Client Rules' must be the same as the Server to which the rules refer to. When a IP address is specified, the name of the "Client Rules" should be the same as the IP address.

26.5.1. Client Rules General Properties

The 'General' properties allow you to define the 'Client Rules' settings for Client Projects.

Apart from the 'Name' property all the others are the same as already described in **"Network Client General Properties"**.

Name
This property is used for entering the name of the Client Rules.

The 'Client Rules' name must be the same as the Server's name to which the rules refer to. When a Client project connects to a certain Server it verifies whether one exists with the same Server name on the Client Rules list. In this case the connection is carried out according to the settings specified in the Client Rules, otherwise the Client's general settings will be used.
When a IP address is specified. the name of the "Client Rules" should be the same as the IP address.

The name is also essential for being able to identify and access properties and methods of the Client Rules through the Basic Script functions.

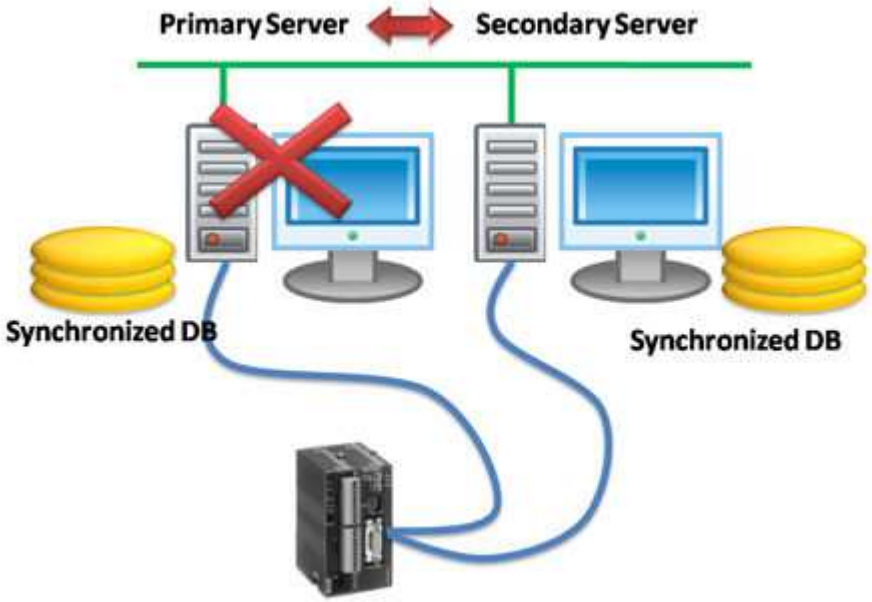
27. Redundancy

Movicon embeds powerful automatic functions to support the Hot Backup of critical stations workstations redundantly connected in network. Slave intervention, re-entry, data synchronization are managed in completely in automatic.

Some critical processes under supervision and control require emergency station intervention, known as Secondary Server, when the main PC unit, known as Primary Server, crashes.
This ensures that the process's supervision and control service will continue to function when the Master supervision station suddenly becomes unavailable or crashes.

The redundancy management, in a supervision and control system, has the task of preventing data and control functionality of the plant.

The redundancy functions are enabled in runtime only when the Redundancy and Networking option in each hardware key of every PC station (Primary or Secondary) have been enabled.



An example of a redundancy architecture for supervision stations. The Secondary Server enters into function automatically when the Primary PC crashes.

27.1.1. Redundancy Levels

The Redundancy's role in automation systems is to completely take over and substitute the primary component when it crashes with all the identical functionalities until the primary component has been repaired and put back into action.

The "Hot Backup" provides a secondary server to go into action automatically without requiring any manual intervention from the operator.
The redundancy concept can be applied to both software and hardware to stop the system loosing any data or functionalities when transferring control over to the secondary backup component from the Primary component.
The redundancy concept can be applied to the following components in automation systems:

PLC
- **CPU**
- **I/O Cards**

Connections
- **Bus**
- **Network Cable**
- **Serial**

Computer
- **Display System**
- **Control System**

The Redundancy functions embedded in Movicon support the Backup functionalities in your computer, allowing all the communication, display and control functions from the Primary PC Server to be transferred to a Secondary Server entirely in automatic.
This proprietary technology adopted by Movicon to perform these functions permits very fast synchronization times of up to less than a second when great amounts of data are involved. This is due to synchronizing data acquired during the emergency take over period by transmitting data in binary format instead of database format structures.

27.1.2. Redundancy Functionality

The redundancy management, whether with Master functionality or Slave functionality, is completely embedded in the Movicon software and ensures secondary system intervention in complete automatic mode after primary system timeout set up in the system's configuration.
The redundancy functions are imbedded and native in the following critical system functionalities in Movicon:

- **Communication Drivers management**
- **Data Logger management**
- **Recipe Management**
- **Historical Log management**
- **Alarm management**

Any one of these functions can be kept on Stand-by in the secondary station to activate when the Primary station crashes to safeguard against losing plant system control.
The Movicon redundancy control system requires two PC stations connected in network based on TCP/IP, with Primary and Secondary Server functions:

- **Primary Server**: is the workstation which is conditioned to function as normal to manage the plant, by communication with it, acquiring data and providing control. If this station crashes, the secondary station will enter into function and assume complete control
- **Secondary Server**: is the workstation which is conditioned to function as normal to manage the plant in redundancy mode, through shared variable memory areas. This station allows plant interaction in independent mode and supplies all the same identical functions of the primary station. If the Primary server crashes, the secondary server will automatically assume plant management by starting up the communication driver and recording engine functions, acquiring data and performing process control

"Normal" Conditions

In normal working conditions, both the Primary and Secondary Servers are operative in the plant according to distinguished functionalities.
The Primary Server is dedicated to manage the driver's communication and historically log data on hard disk, according to the normal functioning of each Movicon application.

The Secondary Server is kept on stand-by and operative to carry out the same functions as the Primary in independent mode, except for the following different operating modes:

- The drivers of the secondary server are put on Stand-by and do not communicate directly. Operability of the secondary server is based on mirroring the variable memory areas, which are shared in automatic and transparent mode on the Primary server. As a consequence a command towards the field can be performed both on the Primary or Secondary indifferently, but change page performances must be done locally as each workstation processes its own graphic functions locally
- The Secondary's historical logs (Data Logger, Recipes and Log) do not work directly, to ensure absolute seamless recorded data. The system's redundancy functions make sure that collected and recorded data from the Primary of Secondary Server is archived in the same identical and transparent mode used in these Servers. The synchronization mechanism ensures complete data integrity and time precision, and is independent from the Data Base type being used (SQL Server, MS Access, IMDB, etc) on the Primary and on the Secondary .
- The cache memory shows the alarm situation of the primary's alarms and updates by mirroring the primary's cache for the same reasons as above
- The General IL Logic will be placed in pause mode on the Secondary project, while the Local IL logic assoicated to the Scree or object will however be executed.
- the Event list and the Events in script variables will not be executed in the Secondary Server

"Emergency" Conditions

When the primary server stops working (crashed, error, hardware damages), the secondary server will go into action immediately and communicate with the driver on stand-by and the execution all of the project's logic and Events is reactivated. The configurable response time is immediate to the second.
The historical engines will start to record the plant data directly the moment it enters into service to assess how much data has to be sent to the primary server the moment it returns into action. This will allow you to optimize the historicals' synchronizing times.
Once the Primary server re-enters into action it will automatically synchronize the historicals' status and the alarm situation in order to completely restore its functionality and archives to avoid any data loss.
The system, by exploiting its own technology, will only send the data recorded during the emergency period to the primary server by transferring the data in binary mode without using any database structures.
Once synchronization has been completed, which is automatically done by the redundancy management embedded in the system, the secondary server will return on Stand-by.

For correct use of the redundancy management you must install and configure the network form and the TCP/IP protocol in the operating system being used beforehand. For more information on how to do this please refer to the section on Networking.

Data Synchronization

The redundancy management optimizes those projects which have many Data Loggers and a high sampling frequency because they have to manage large volumes of historical data. This management mainly limits memory used for data synchronization files, to avoid any system memory saturation in cases where large amounts data MBytes have to be synchronized. Two properties have been provided in the redundancy to deal with this allowing data synchronization to be managed with:

Max Historical Cache
Max. Nr. Historical Cache Files

The data synchronization files are created in the project's "DATA" folder. This files signify:

File Extension	Description	Struttura XML
.dmr	Cache file for the project's Data Logger.	<?xml version="1.0" encoding="ISO-8859-1" ?> **/el/e** Node with all the necessary information for recording data records of a Data Logger **/el/e/HE** Node with the information relating to the Data Logger that has generated a record: Data Logger name, date and time of recording and standard column values **/el/e/list** Node with the information on the

		recorded record columns **/el/e/list/c** Node with the information on one of the recorded record columns **/el/e/list/c/v** Node with the value information of one of the recorded record.
.hlr	Cache file for the project's Historical Log tables.	<?xml version="1.0" encoding="ISO-8859-1" ?> **/el/e** Node with all the information needed for recording a Historical Log table's data record. **/el/e/HE** Node with all the information relating to the record to be recorded: table name, data and time and standard column values.
.tbr	Cache file for the Trace DB tables for the Project's variables.	<?xml version="1.0" encoding="ISO-8859-1" ?> **/el/e** Node with all the information needed for recording a data record of a variable's Trace DB table. /**el/e/HE** Node with the information relating to the variable which has generated a Trace DB record: table name, date and time of recording and standard column values. **/el/e/vb** Node with information of the variable's previous value. **/el/e/va** Node with information on the current variable's value.

27.1.3. Advanced Redundancy Functions

Movicon has some special functions embedded in the critical system redundancy management to extend the functions provided for the user.

Synchronized Time Frequency

The Movicon Redundancy has an automatic tool embedded in the complex synchronization control management between two PC Servers: the automatic synchronization of the system's clock on the Secondary Server by the Primary Server.
Automatic Secondary Server clock synchronization always ensures the user that data is always congruent in all circumstances.
Synchronized time frequency takes place according to how the **"Sych. Time Frequency"** property from the "Redundancy Settings has been set.

System Diagnostics

Movicon gives out information system messages when the Secondary Server has entered into action, the re-entry of the Primary Server and the data being synchronized etc.
This information will be displayed on both systems and recorded in the Historical Log automatically.
This will enable the operator to always have the information s/he needs to carry out an accurate analysis to valuate how the critical system is working.

Status Variable

The redundancy management also provides the programmer the option to use a status variable, in order to inform the logic on the operating status of the Primary and Secondary Servers. For further information please refer to the **"Status Variable "** property from the "Redundancy Settings".
Some Basic Script functions dedicated to the Redundancy management have also been provided.

Communication via OPC

Communication via OPC is not managed in redundancy by Movicon. This means that both the Primary Server and Secondary Server will be connected to the OPC Server at the same time (different to the communication drivers which communicate one at a time).
To maintain communication with just one of the two Movicon Servers (Primary or Secondary), you will need to create a script that manages the enbling/disabling of Movicin OPC Groups and disable the projects variables in use management (InUse Variable Manager).

Redundancy Restrictions

The Redundancy management used in a critical plant situation has some restrictions as regards to how some of the project's functionalities work and which the programmer should keep in mind.
This would be best done by considering those Movicon functions which are not critical and not managed in redundancy.

These functions must be evaluated carefully as their non redundancy use may effect the system backup management in a critical situation.

The functions not subject to Movicon project redundancy are:

Function	Description
System Variables	Movicon System Variables can not be made redundant.
Alarm Basic Scripts	The Alarm Basic Script interface is not managed in redundancy.
Trend Output	Out put on Trend files is not managed in redundancy due to the fact that the Trend's connection to the Data Logger is managed for this.

Furthermore, you must keep in mind that while the IL Logic associated to the project is executed only on the active Server, the screen or designs' Local IL Logic is always executed on both the Primary and Secondary Servers independently from which one is active. To avoid any problems you need to manage the Local IL Logic shrewdly by using, for example, the screens' local variables.

Please also remember that the Event and Alarm managements are disabled in the Secondary Server when in 'Stand-by' mode. For instance, this will mean that Alarm Areas used for symbol animations ('Variable Is Alarm Group' property from the symbol's Dynamic 'Background Color' and 'Dynamic Text and Edge Color' property groups) will not have any effect in the Secondary Server when in 'stand-by'.

When using the communication driver's basic script functions you will need to introduce the right controls in the codes. In this case, for example, before executing the functions for creating and the task management, it will be necessary to verify whether the station is communicating (verify whether there are any errors and its quality status). Otherwise, the driver may not be loaded because being used by another Server. You can also refer to the appropriate status variables to see if the Secondary Server has driver control.

Caution: The Redundancy function and the data synchronization mechanism may present criticalities when the total amount of data to be managed is very high. Therefore, it is advised you carefully read the section on "Data Synchronization" and to also consider the hardware characteristics of the PC being used.

System Requirements

A redundant system must be based on a configuration which allows the network connection of two PCs, which do not have to be necessarily identical to the hardware's configuration.
Both systems should at least give the same performances and have the same memory capacity while having identical redundancy functionalities.
It is fundamental that both systems are correctly installed with the network card and TC/IP protocol, on which the whole redundancy management is based.

27.2. Redundancy Settings

The Redundancy Settings can be configured through the "Network Services" resource found in the "Project Explorer" window. To edit the Redundancy settings, select the group with the mouse and use the Movicon **"Properties Window"**:

Type

This edit box is used for selecting the Server type to be used for running the project. The options are:

- **None**
- **Primary**
- **Secondary**

When the "None" option is selected the Redundancy functionality will not be activated.

Server

The name or the IP address of the Primary Server is entered here. This property is set only in the Secondary Server project.
The IP address or Server name which is to be set in this redundancy field is also used as Backup Network Server for each variable that is not set with a Backup Network Server.

Backup Server

The name or IP address of the Primary Server is entered in this box. This property is set only in Secondary Server projects.
The Secondary Server will attempt to connect to the Primary backup Server when the main Primary Server is not available. Once the connection remains connected to the backup Server, and failure to do so, an attempt will be made to connect to the main Primary Server. Failure of both connection procedures to one of the two primary Servers will activate the Secondary Server. When the Backup Server is not specified only the main Primary Server will be used. The 6 bit in the status variable indicates that the primary server is connected through the Backup Server. In cases where the Secondary is the active Server, the 6 bit will blink each time the secondary controls the presence of the backup server.

Timeout

This edit box is used for entering the timeout after which the Secondary Server will take over control when the Primary Server crashes, disconnected etc.

Retries

The number of connection retries the Secondary Server should carry out before going into action is entered in this box.

Status Variable

This box is used for selecting one of the variables from the Movicon Real Time DB which will be used as the Redundancy's status variable. The meaning of each bit of the selected variable depends on the Server where the project is being run:

- **Bit 0:** Primary Server. This bit is set at true only in the project set as Primary Server
- **Bit 1:** Secondary Server. This bit is set at true only in the project set as Secondary Server
- **Bit 2:** Active Server. This bit is set at true only in the Server project active at that moment
- **Bit 3:** Secondary Connected. This bit will be set at true only in Primary Server projects when the Seconddary project is connect to the Primary Server.
- **Bit 4:** Synchronization in course. This bit is set at true in both projects, Primary and Secondary, when synchronization is taking place between the Secondary Server and Primary Server
- **Bit 5:** Drivers startup on Secondary. This bit will be true in projects set as Primary Servers when the Communication Drivers in the Secondary are activated due to an error in the Primary Server.
- **Bit 6:** Secondary Server. This bit will be true when the Secondary Server is connected to the Primary Backup Server. It will start blinking when controlling the presence of the Secondary Backup Server
- **Bit 7:** not used

Switch on Driver Error

This selection box is used for activating the Secondary Server to switch on its own Communication Drivers when any errors in the Primary Server's Communication Drivers occur. This switching on can also happen without the Secondary Server taking over plant control.

Driver Error Timeout

This box is used for entering the timeout after which the Secondary Server will switch on its own Communication Drivers in event of problems in the Primary Server's Communication Drivers.

Max Historical Cache

This box is used for setting the maximum number of records in the historical cache file for redundancy (default value = 100). A new cache file will be created when this value is exceeded. Historical data is cached when the primary or secondary project is verified to be the only when active. The cache files are then used for synchronizing the two primary and secondary projects.

Max. Nr. Historical Cache Files

This box is used for entering the maximum number of files which can be used for recording historical data which must be made redundant. There cache files are created on disk and used as unvolatile memory for synchronizing historical data of the two primary and secondary project.

Sych. Time Frequency

The number or hours the Secondary Server is to synchronize its time frequency with that of the Primary Server is entered here. The synchronization will not be executed when the "0" value is entered.

28. OPC (OLE for Process Control)

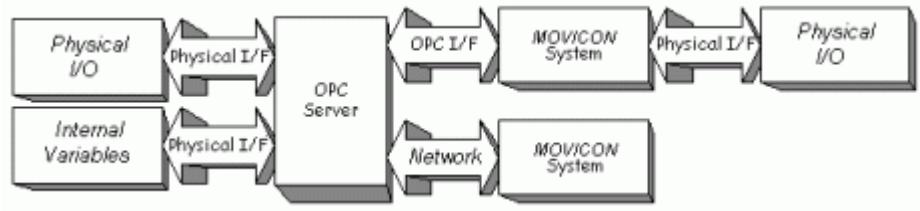
OPC is the most commonly used standard due to its user-friendly communication modalities based on different bus technologies.

OPC stands for "OLE for Process Control", where OLE refers to the Windows' abbreviation of: "Object Linking and Embedding", a powerful automation interface for the Windows applications.
OPC simply rounds off the programming concept which implements an unified interface of different bus technologies on one part and programs for vision and automation on the other. Thanks to the standard technologies, today's communication between automation devices means more independence for the individual producer, especially when their apparatus supports the OPC standard. Thanks to the unified interface, hardware producers can always guarantee OPC interface availability by equipping their hardware product with OPC Server software products. This will ensure the user of being able to interface their purchased product with any applied software supporting the OPC standard.

The OPC standard is defined by public specifications released by the **OPC Foundation** consortium which are adhered to by Microsoft and all the major automation manufactures worldwide including Progea.

Movicon is an application based both on the OPC Client and OPC Server standards.
As Client it can interface with all the OPC Serves with follow the 1.0A and 2.0 standards; as Server it allows all or part of the project variables to be shared with other applications and notifies them of events such as: Alarms, messages, system information and variable changes within the project.

In view of the increasing consolidation of the OPC standard in industrial automation, this technology must be considered as a communication mode with bus network devices or with other local or remote applications only.



This figure shows a block diagram of a typical OPC communication.

OPC XML Client
To use Movicon as OPC Client XML implement the follwoing settings:

1) use the variable's "Physical I/O address" property to connect an opc xml tag to it
2) select the OPC XML Server to connect to by using the variable's "Physical I/O address" property. The server name must be its address plus the port to be used (i.e. http://ServerXML.progea.it:9090)
3) enable the License "OPC XML Client" option

28.1. OPC Client Editor

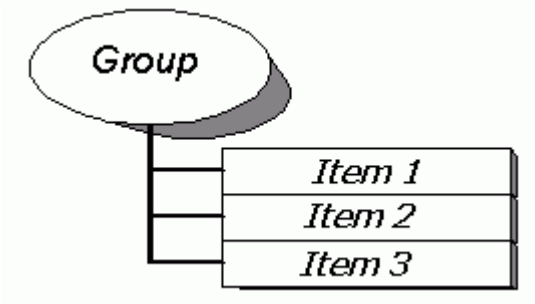
In the OPC communication Movicon has provided a Client interface which can be entirely configured and which supports any OPC Server created according to he OPC 1.0A and 2.0 specifications. This

resource, integrated into the system, is identified with the "OPC Client DA (COM)" name and can be accessed through the Movicon "Project Explorer" window.

By using this resource you can setup the communication in OPC with one or more Servers. Movicon displays a list of Servers available on the local computer, but you can also go and use OPC Servers installed on other remote computers connected in net or on the web.
Two OPC Server interfaces are currently supported: "DataAccess" and "Alarms&Events", identified respectively with the signs "DA" and "AE".

Data Access Specification

The first type of Server is organised in a structure composed of Groups and Items, as shown below, and permits I/O or variables in devices, which form part of the network field bus, to connect with variables from Movicon projects.



Alarms & Events Specifications

The second type of OPC Server, "Alarm&Event", notifies the occurrence of a specific event and alarm condition, configured within the Server itself, therefore it can be acknowledged with the Movicon project and managed accordingly.

The managing of events and alarms sent by the AE OPC Server can be done by using the corresponding event of any basic script within the project.

Importing from other Projects

Movicon allows any object (OPC Server, Groups, Items) setup within the "OPC Client DA (COM)" resource to be copied from one project to another. In order to carry out this procedure, you need to activate the project containing the parts to be copied, select the objects desired from the "OPC Client DA (COM)" resource, execute the Copy command, then activate the current project again, from the "OPC Client DA (COM)" local resource, and execute the Paste command. The copied objects will then be also made available in the current project.
The Drag & Drop technique can also be used to carry out this procedure.

DCOM Settings

The connection to a OPC network Server involves the usual necessity to setup the Windows DCOM services so that Clients are allowed access to the Servers. To get easy access to the DCOM configuration window use the **"Edit DCOM Settings"** command in the "Commands window" from the "Project Explorer" or from the text menu which appears by right mouse clicking on the name of the interested OPC.

OPC Client Log

the OPC client Log can be set for recording information relating to events received for value change notification items and items written to opc servers. This is made possible by setting the "OPCClient\Trace" key to value "1" (key is already documented in the list of registry keys).

28.1.1. OPC Client DA Properties

The OPC Client DA properties allow you to set some of the parameters for the dynamic Items and test functions.
To change the OPC Client DA properties, select the resource with the mouse and use the Movicon **"Properties Window"**.

Default Dynamic Update Rate
The update time for the project's dynamic OPC Items is entered in this edit box.

Add Item Timeout
The Timeout time, in milliseconds, for inserting a new dynamic OPC Item is entered in this edit box.

Startup Timeout
This property controls the timeout for initializing the OPC Server. When the OPC Server does not initialize within the time set, including all items set, a "Cannot start OPC Client Manager Thread" message will show. The default value is 30000 msecs, but this value my not be enough for projects with very high numbers of items which are synchronized at startup and therefore will need to be increased.
This property can also be accessed through the "StartupTimeout" of the "OPCClientCmdTarget" basic script function.

 # Test Thread Pool
This edit box is used for entering the number of Threads to be used for the OPC Item test run upon connecting to the Server.

Test Item Timeout
This edit box is used for entering the Timeout, in milliseconds, for the OPC Item test run upon connecting to the Server.

28.1.2. OPC Server DA Properties

The OPC Server DA properties allow you to set some of the OPC Server parameters so that Movicon can connect to it afterwards.
To change the OPC Server DA properties, select the resource with the mouse and use the Movicon **"Properties Window"**.

Name
This edit box is used for entering the name of the OPC server. This is filled in automatically by Movicon when selected from the "Tag Browser" window.

Network Node
This edit box is used for entering the OPC Server's network path. This is filled in automatically by Movicon when selected from the "Tag Browser" window. The Local Server will be entered When left empty.

CLSID
The OPC Server's CLSID code is entered in this edit box.

Reconnect time
The time after which the Server will be reconnected is entered in this edit box in milliseconds.

ReRead Dynamic Items
This option, which is only applied to dynamic items created by directly inserting the OPC link in variable "Fixed I/O address" properties, allows you choose whether to execute a synchro. value read every time a write (syncro or asynchro) is executed. This may be necessary when using certain OPC Servers (re. RsLinx by Rockwell) which do not manage asynchro. notifications correctly.
A analogous "Reread Items" property and also be set in Items defined as objects in the Item list of the Server selected from the "OPC Client DA" resource.

28.1.3. Entering New OPC Servers

To enter a new Server into the "OPC Client DA (COM)" resource is done by selecting the "Add a New OPC Item" command from the Project Explorer's Commands window or by selecting the same command from the menu which appears after double-clicking on the "OPC Client DA (COM)" resource.
In both case a "Tag Browser" window will appear showing a list of available OPC Servers in the local computer and a list of Servers existing in other computers in the network.

In the window which shows the list of available Servers you can select a local Server from the "Local (My Computer)" group or a Server residing in another PC on the network from the "Microsoft Windows Network" group. Whereas the "Internet Servers (OPC XML DA)" group allows you to select a OPC XML Server instead.

Filter

In this text box you can execute filters for displaying the selected Server's items. The filter is then applied on the right side of the window and in order that the list is updated in accordance with the filter you need to execute the **"Refresh"** command with the appropriate button.

Server

The name of the Server with which you wish to connect to is entered in this text box. A further setup window is opened by using the Browse button on the right where you can enter the User and Password for Server access.

Live Data

When this option box is enabled the list of Items displayed on the right side of the window will be refreshed according to the values of the Server.

28.1.4. OPC Item Connection String

In the project's Real Time DB XML file (<ProjectName>.movrealtimedb) you will find the attributes which consent to modifying the characters used in the OPC Server's 'Tag Explorer' window for dividing the various components in connection strings which return after selecting an OPC item. These attributes are not visible in the Properties Window in the development environment, but can be modified by opening the <ProjectName>.movrealtimedb file:

...
<EnableOPCServer OPCServerName="" OPCServerDescription="MOVICON OPC Server"
EnableOPCServerAE="0" EnableOPCServerDynTag="1" OPCServerDebugEvents="0"
OPCServerAutoShutdown="0" OPCServerAutoUnregister="0" OPCServerAutoRegister="0"
OPCServerRefreshRate="250" OPCServerShutdownClientsTimeout="5000"
OPCServerEnableAEAck="0" OPCServerThreadingMode="1" SINGLE_PATH_SEPARATOR="\"
DOUBLE_PATH_SEPARATOR="\\" OPX_PATH_SEPARATOR="~">0</EnableOPCServer>
...

The properties involved are:

- **SINGLE_PATH_SEPARATOR**: character used for distinguishing the name of the OPC Server form the other items (ie. "[OPC]MMIOPC.Simulator\Simulator.CosDouble"). The default value is **"\"**
- **DOUBLE_PATH_SEPARATOR**: character used for distinguishing the name of the computer in which the OPC Server is located (ie. "[OPC]\\PCTest\MMIOPC.Simulator\Simulator.CosDouble"). The default value is **"\\"**
- **OPX_PATH_SEPARATOR**: character used for distinguishing the name of the OPC XML Server from the other items. The default value is **"~"**

It might be necessary to modify the values in these attributes when the OPC Server to which is being interfaced returns the same characters.

28.1.5. Entering New Groups

The next step to take after having inserted an OPC Server is to establish a connection by entering one or more Groups which refer to that specific Server.
This operation can be done by selecting the "Add New OPC Group" item from the "Project Explorer's" command window or from the menu which appears after having double-clicked the right mouse key on the name of the interested OPC Server. The possibility of inserting more than one group will optimize communication further: each group has its own parameters which can be setup and can be enabled or disabled whenever needed by using the basic script functions.
To change the OPC Group properties, select the object with the mouse and use the Movicon **"Properties Window**".

Name
This edit box allows you to set the name to be assigned to the Group.

Update Rate
This edit box allows you to set the update time in milliseconds of the Items with in the Group. This setting can be changed in Runtime with the appropriate basic script functions.

This update time is a parameter which is passed to the Server. The Server can manage it as much as is possible. If for example, the update time is too short the Server will use its own update rate.

Update Rate NOT In Use
This edit box allows you to set the refresh time in milliseconds of the Items within the Group when the variables associated to the Item are not in use. This setting can be changed in Runtime with the appropriate basic script functions.

This refresh time must be set longer than the "Refresh Every" time.

Deactivate NOT In Use
This option box allows you to deactivate the Group when the variables associated to the Items are not in use. This setting can be changed in Runtime with the appropriate basic script functions.

Active
This option box allows you to enable or disable the Groups and as a consequence the Items it contains as well. This setting can be changed in Runtime with the appropriate basic script functions.

Dead Band
This edit box allows you to set a Dead Band rate value from 0 to 100 for the Items contained in the Group. The dead band is applied to the Group's Items which have a EU Type parameter set on Analog, in this case the Low and High EU parameters are used for calculating the Item's range. The range is multiplied by the dead band rate to create an exception limit in cases in which the difference between the previous value read and the new one is higher.
The dead band is used for avoiding problems created due to interference in reading analogic values: with exceptions, the Item remains at the previous value read.

Time Bias
This editbox allows you to set a value in minutes which will be used to convert the Item's Time Stamp property, contained within the Group, to the device's local time. Normally, there is no need to change the default value which is set by Movicon based on the PC's local time zone. For instance, using Rome's local time, being GMT + 1.00 hr, the Time Bias will be set at -60, an hour less than GMT.

Local ID
This edit box allows you to set the Group with a numeric ID value to localize the strings sent by the Server. Normally the default zero value done not need changing.

28.1.6. Entering New Items

One or more Items can be inserted into each Group and linked to project variables. The Item from the Server of interest is selected through the "Tag Browser" window which is displayed by selecting

the "Add New OPC Item" from the Project Explorer's Commands window or from the menu which displays when double-clicking with the right mouse key on the interested Server. One or more tags can be selected at the same time by multiple selecting them from the "Tag Explorer" window and when confirmed with "OK" all the items will be inserted and Movicon will automatically create the variables and link them to the items. The variables will be created of the same OPC Server tag type and with the name defined as:

<Name OPC Server>_<Name OPC Items>

All the characters not included in the name of a variable and which are found in the name of the OPC Server or in the name of the OPC item will be replaced with the underscore ("_") character.

When customizing the name of the Movicon variable to be linked to the item, you will need to change the names of those inserted automatically or create them again and link them by means of using the item's appropriate properties.

To change the OPC Item properties, select the object with the mouse and use the Movicon **"Properties Window"**.

Item ID

This box is used for identifying the Item which you wish to add the group, this box is automatically filled in when the Item is selected from the list situated in the "Tag Browser" window.

Access Path

It may be useful to enter the path for localizing the Server if requested by the OPC Server.

Variable

This list box allows you to select a variable from the project RealTime DB to be associated to the Server's OPC Item. While the item is being inserted Movicon will insert the variable in automatic mode by creating it with the <Name OPC Server>_<Name OPC Items> name.

Type

This option lets you enter the variable type to be read from the Server. Normally it is advised to leave the original format. The possible selects are:

- **Default Server**: No conversions will be done following the read or write of an item when this option box is enabled. In this case we advise you to use a Movicon variable of the same type set in the Item properties
- **Short, Long, Float, Double, etc.**: According to the option box checked, the corresponding conversion will be carried out on the item, and therefore the project variable assigned, to contain the data in the format indicated here

Write Item to Server

This selection, when set enables the item in write, therefore the variable changes in the Movicon project will also involve the writing of the item.

ReRead Item

This option allows you decide whether to execute a sync read of the value each time a write is executed (synchronous or asynchronous). This may be needed when using OPC servers (such as Rockwell's RsLinx) which do not manage asynchronous notifications in the correct way.

Write Sync

This opton allows you decide whether to execute a sync (default) or async write. The async writes can be executed very fast, in respect to those in sync, but the OPC Server must be setup to able to accept a very high number of requests, for example, when the variables in the Movicon project change value continuously. It is for this reason that the default value has been set at Synchronous which is slower and more reliable and works well with all OPC Servers.

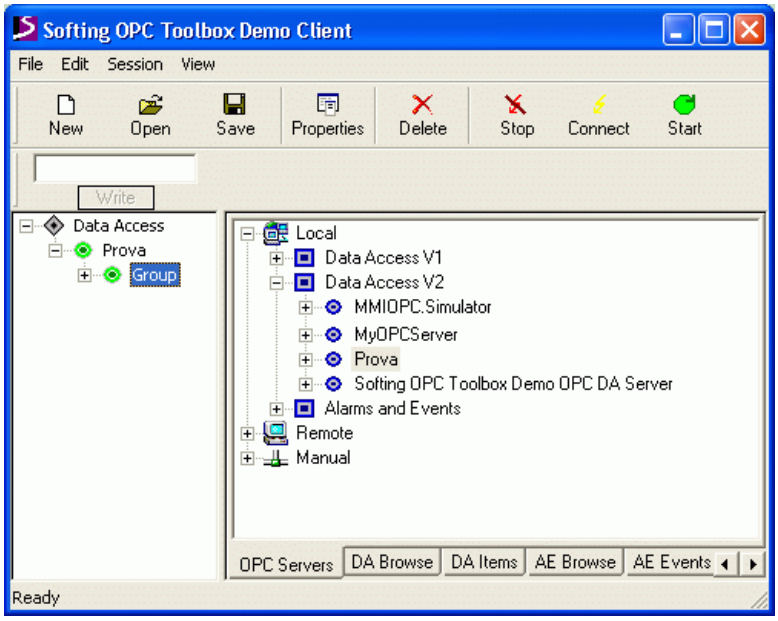
Read Item Startup

This option allows you to decide whether to execute an item read at the project startup, after it has been created, to synchronize the value of the variable with that from the field. This functionality is disabled for default to avoid any delays in initializing the OPC communication due to the fact that all items have been set at synchro. You can enable those properties in the items where it is really necessary to synchronize values.

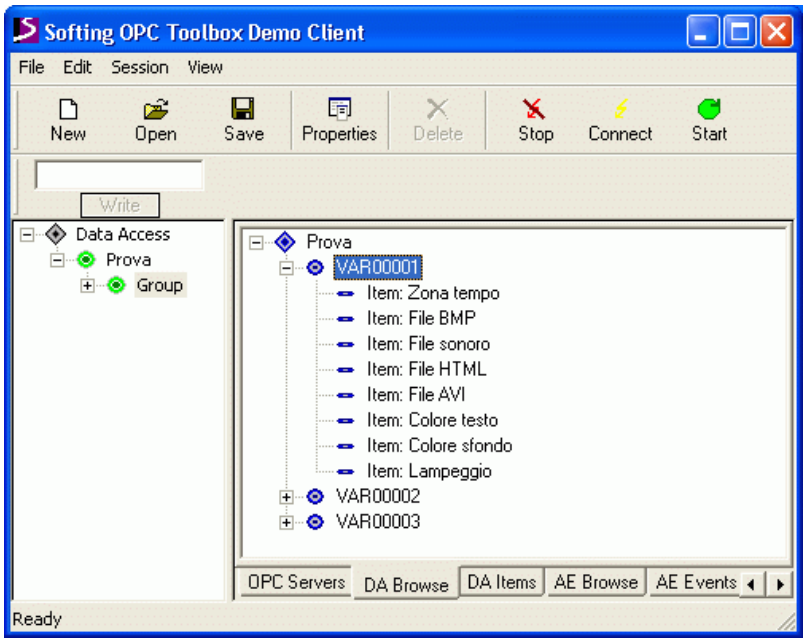
28.2. OPC Server

In addition to the OPC Client Movicon has also integrated the OPC Server functions which gives notifications of events to any OPC Client applications connected. The Movicon OPC Server supports Clients created with the "DataAccess" and "Alarms&Events" OPC standards.
This technology permits the sharing of project variables with other applications with a OPC Client DA and at the same time it can notify a Client AE of events such as Alarms and Messages system information and variable changes in the applied project real-time Database.

Any OPC Client wishing to connect to the Movicon Server, according to the settings given in the project, is provided with a list of items to which it can connect to. The list is contained in a group identified by the project name and each item has the same name of the project variable to which it is linked. The possibility to change values is controlled within the project in the settings of each variable permitting the Movicon variables to be viewed externally with the maximum security.
Based on the settings implemented in the project, the Movicon OPC Server will startup automatically the moment a Client connects and likewise it will shutdown automatically when the Client disconnects.



When selecting the Movicon Server you will be provided with a list of the variables enabled for being shared with Clients.



OPC Server Settings

The Movicon OPC Server can be configured through the **"Real Time DB OPC Server Settings"** which is accessed from the Real Time DB resource properties.
The Movicon OPC Server, if registered on the list of OPC Servers available, can startup in automatic, with the last opened project, the moment an OPC Client connects. To enabled this function you need to disable the **" AutoUnregister Server"** function.
When selecting the **"AutoShutdown"** option, Movicon will shutdown at the same moment in which the OPC Client disconnects.

OPC Server XML settings
Iimplement the following settings in order to use Movicon as OPC Server XML:
1) enable the OPC XML Server (Real Time DB resoure's "OPC XML DA Server - Enable OPC Server" property)
2) enable the "Enable OPC Server" option from the "Options" property group of the variables to be published.
3) enable the "OPC XML DA Server" License option

OPC Server Variable Properties

To connect the variables through the OPC Server to OPC Client applications you need to setup the variables to be connected by means of using the **"Variable Options Properties"** after having configured the Movicon OPC Server settings. By doing it in this way the variables will be ready for Clients to create communication Tags.

The Tag is only a link between the Movicon variable and the OPC Client's item and nothing else. In order to obtain this link you must first enable the "Enable OPC Server" property of the Movicon variable so that the OPC Client can see the list of the Server variables.

29. On-line Changes to Projests

The Movicon developer may need to make changes to his or her project without interrupting it during Runtime mode as they would normally have to do. Movicon permits On-line changes to various resources of the project, such as Screens, Menus, Accelerators, Basic Scripts, etc.

To make on-line changes during the project Runtime mode you will need to open another Movicon instance, or rather start the Movicon application again. From the second active Movicon instance, select the Open command from the File menu. Select the project you wish to edit, which should be the one already running, from the window which appears.
Once you have made the changes you will need to save the project. This should of course be consented by the protection key (License) being used. When the application in Runtime processes the edited resource, it will be loaded by the project and opened with its new changes. This means that the resources which were active when the changes were made will not acknowledge these changes if not unloaded and then reloaded in Runtime.

The project in which will put the changed into effect On-Line must be started up and executed directly in Runtime with a shortcut to Movicon .exe and option/R, with a shortcut to MoviconRunTime .exe or as service. Otherwise, if the project is run from a Movicon Development request any changed made On-Line to the resources will be lost.

Project On-line changes can be also done between two PCs connected up in ethernet network. In this case the Movicon development session should open the project residing on the RunTime station by means of using the ethernet network.

On-Line Changes are not supported in WinCE. There is no way of knowing which file has changed with WinCE, therefore it will be necessary to reload all the project's files.

29.1.1. List of editable resources in RunTime

Projects can be edited with Movicon while being run. The changes made on-line are acquired straight away during and throughout the project run. The resources which can be edited on-line have been listed below. Those which cannot be edited on-line are not listed.

IL Logic

Project IL Logic on-line editing is supported for screens and objects.
When any editing is done to the project's IL Logic the Runtime session will temporarily stop for the time necessary to load the changes.
When changes are made to the screen's IL Logic or one of its objects, you will need to reload the screen in memory again to acquire the changes made.

The window for the project's IL Logic debugging does not fully support the changes which can however be monitored with the local IL Logic debug.

Real Time DB

Variables and Structure prototypes can be added.
The eliminated variables continue to be managed by the Runtime session until the next application startup.
Not all of the variable properties support on-line changes. These properties are:

- "General -> Type" Property
- "General -> Area" Property
- "General -> Address" Property
- "Options-> Enable OPC Server" Property
- "Options-> Enable Network Server" Property

Menu Resources

The on-line changes are applied to these resources after the first consecutive change page has been executed.

Screen Resources

The on-line changes are applied when the screen is reloaded into memory. If the screen was already active when the changes took place, you will have to close it, wait until it is unloaded from memory and then re-open it.

Shortcut Resources

The on-line changes are applied to these resources after the first consecutive change page has been executed.

Basic Script Resources

The Basic Script must be unloaded from memory with the "Unload" command because it will acquire modifications upon the next startup.

String Table

The changes made in development mode for each column are loaded only when the column is activated in the Project in Runtime mode.

30. Movicon Configuration Keys

The Movicon configuration keys permit you to customize some of the settings not available in the programming environment.

There are a few advanced options within the Movicon environment which can only be modified when setting certain values using the keys in the Windows configuration registry or when editing ".ini" files with XML structures. You must take into account that in cases where the ".ini. file has been inserted, Movicon will load the configuration values from the file and not from the Windows configuration registry at startup. Movicon will only read values from the Windows configuration registry when no ".ini" file has been created.

The Windows configuration registry is an important component for running the operating system and any errors could effect how it runs. Therefore, it is advised that you always use the XML file for modifying the configuration keys.

Editing XML Configuration files

The XML structure of the configuration file allows you to insert values in various keys as well. This structure provides a XML root tag called "Settings" in which all the Movicon sub keys with their respective values must be inserted. The file structure will result as follows:

```
<?xml version="1.0" encoding="iso-8859-1" ?>
<Settings>
<General>
<NumericPadFont>MS Sans Serif</NumericPadFont>
<MaxLogFiles>5</MaxLogFiles>
</General>
<OPCClient>
<WriteMaxBuffer>1</WriteMaxBuffer>
</OPCClient>
</Settings>
```

In this example two values have been inserted in the "General" key and one value has been inserted in the "OPCClient" key.

The XML files, according to the Movicon module used, must have the following names:

- **Movicon.ini** (when Movicon.exe module is used)
- **MoviconRunTime.ini** (when MoviconRunTime.exe module is used)
- **MoviconService.ini** (when MoviconService.exe module is used)

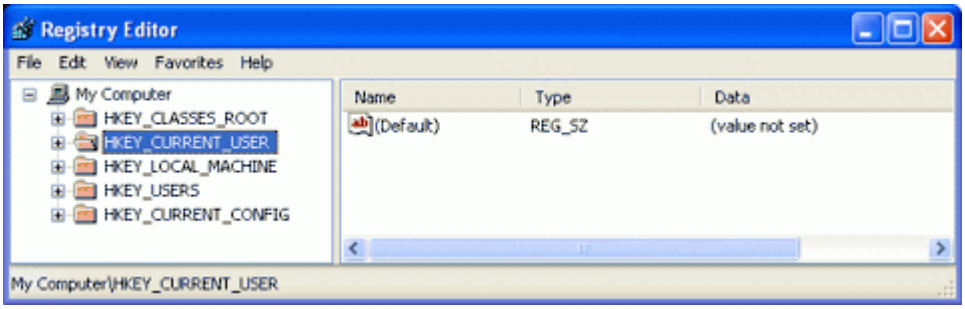
The XML files listed above must be inserted in the Movicon installation file, being where the executable files reside.
All the key values which can be inserted in the configuration files are listed and described in the appropriate tables found in the **"Configuration Key List"** section.

Registry Key Editor Window

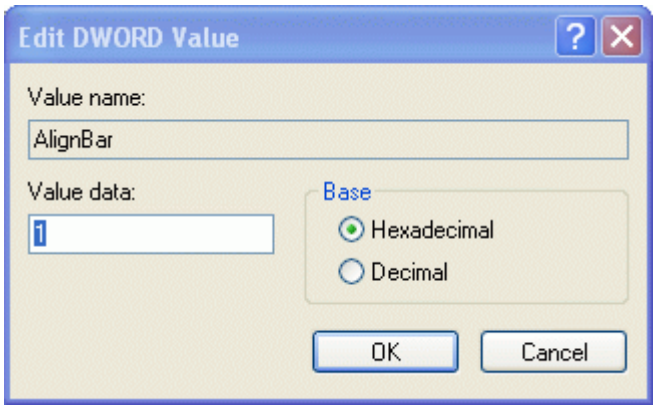
Windows configuration Registry key editing must be carried out with the Movicon program closed by carrying out the below specifications.

Go to the Windows application bar by means of the **Start** menu, or activate the **Run** command whereby a dialog window will display. Enter the **'Regedit'** command by using the keyboard and press **Enter**. This will open the System Registry Editor window which is divided into two panes: the

main items are listed in a tree structure of key classifications on the left, the values of the key selected on the left are shown in the right pane.



When referring to the table describing the keys mentioned in the **"Configuration Key List"** paragraph, you should select the key you are interested in by browsing through the tree structure on the left in the window. Once you have found the key, select it to view its already set values in the right pane. If the value you are interested in has not been set you can add it by activating the **New** command found in the **Edit** menu or with a right mouse click. The value you wish to insert must be one of they types specified in the key description table ("Type" column).
Any changes to just inserted or already existing values can be made by selecting the **Edit** command from the **Edit** menu or by double-clicking on the name of the value. In the window which appears you select the **Hexadecimal** or **Decimal** data Base and enter the value.



All the key values that Movicon uses can be searched for or inserted starting with this path:

HKEY_CURRENT_USER\Software\Progea Automation 11.2\MOVICON

When Movicon is started up as a Windows service the following configuration key will be used instead when:

HKEY_USERS\.DEFAULT\Software\Progea Automation 11.2\MOVICON

If you are using PowerHMI as scada the path where the keys are to be search for is:

HKEY_CURRENT_USER\Software\Progea Automation 11.2\POWERHMI

This HKEY_USERS\.DEFAULT\ key is actually used by programs and services that are started up by the "Local System" user and therefore by Movicon when started up as service under the "Local System" user.

30.1. Configuration Key List

The registry keys listed below refer exclusively to the running of the Movicon program, and are therefore not influential to the running of the system.

Please bare in mind that the following keys listed below can be used with the last Movicon version but some of them may not be supported by previous versions.

You must also take into consideration that the major part of the keys listed below are not presented in the configuration file or Windows registry. In fact Movicon does not create them in the installation phase. When a key is not present Movicon uses the default value, which is shown in the Default column in the tables listed below. Therefore it is at the programmer's discretion to create the keys and associate them to the values desired if different from the ones for default.

The Windows registry keys are not used in the Movicon CE version to read the attributes which allow modifications to change the way they work. In order to modify the configuration key default values you must use the ".ini. Configuration File as described in the relating Movicon section for WinCE.

30.2. Development Registry Keys

List of parameters which influence the development environment.

Key	Value	Type	Description	Default	Win32/ 64	Win CE
General	AppLook	DWORD	Application working environment look: 0 = VS.NET 1 = Office 2003 2 = Office XP	2	•	-
General	MaxUndoLevel	DWORD	Number of undo or redo levels of operations executed in project design mode.	20	•	-
General	CreateSharedVariables	DWORD	Area type where to insert new variables: 0 = Not Shared 1 = Area Flag	0	•	-

General	NotSharedRetentive	DWORD	"Retentive" option value when a new variable is inserted: 0 = Not Retentive 1 = Retentive	0	●	-
General	MRUCount	DWORD	Maximum number of projects listed in recent files under the "File" menu item and in the "Recent" tab after executing the "File-Open" command.	8	●	-
General	Trace	DWORD	Shows the identifiers called by the application in the Output window's "Trace Help" folder of the argument selected with the Dynamic Help window when active. 0 = Enabled 1 = Disabled	1	●	-
General	DefaultAlphaBlend	DWORD	Transparency percentage factor of the application windows. Valid only with Windows 2000 OS or later.	80	●	-
General	AnimationDelay	DWORD	Trigger in milliseconds for showing script editor windows.	1	●	-
General	AnimationTime	DWORD	Time in milliseconds for showing controls. Not used in application resources for the time	100	●	-

			being.			
General	ContInser	DWORD	Enables the continuous insertion of objects on screens. 0 = New selection must be made from the 'Object' window after each object is inserted. 1 = Enabled	0	●	-
General	NumWatchWindows	DWORD	Number of watch Tabs in the Project Debug window (Watch window) when the project is run from the development mode (minimum value = 1).	4	●	-
General	RulerSize	DWORD	Screen side ruler widths in pixels.	18	●	-
DoNotAskAgain	*.*	DWORD	Values that deactivate confirm request windows, which appear after certain operations are carried out in programming, are saved in this key. If the "Do not ask again" option is marked before these windows are closed, the window in question will no longer be shown again. To restore the initial situation just cancel the		●	-

			values in this registry key.			
General	StringSep	SZ	/ character used for separating string table fields, when imported or exported from text files.	TAB	●	-
General	StoreCryptProject	DWORD	Sets the predefined value which the "Crypted Project" property must obtain a new project is being created. 0 = New projects will not be saved cryted 1 = New projects will be saved crypted	0	●	-
General	StoreCryptProjectResources	DWORD	Sets the predefined value which the "Crypted Project Resources" property must obtain when a new project is being created. 0 = New projects will be saved without crypted resources. 1= New projects will be saved with crypted resources.	0	●	-
General	StoreUnicodeProject	DWORD	Sets the predefined value to the "Unicode Project" property, when a new project is created.	Standard language operating system : 0	●	-

			0 = New projects will not be saved in unicode. 1 = New projects will be saved in unicode.	Unicode language operating system : 1		
General	StoreZippedProject	DWORD	Sets predefined value to the "Zipped Project" property when creating new project is created. 0 = New projects will not be saved compressed. 1= New projects will be saved compressed.	0	●	-
ExportCE	CheckFileTimeAndDate	DWORD	Enables data control of files while exporting projects in WinCE. 0 = Disabled 1 = Enabled	0	●	-
General	DefaultNewNumInput	DWORD	Sets the predefined byte number value for the Input area (shared area), when creating a new project. Note: minimum value = 10.	32768	●	-
General	DefaultNewNumOutput	DWORD	Sets the predefined byte number value for the Output area (shared area), when creating a new project.	32768	●	-

			Note: minimum value = 10.			
General	DefaultNewNumFlag	DWORD	Sets the predefined byte number value for the Flag area (shared area), when creating a new project. Note: minimum value = 10.	32768	●	-
General	MaxStatObjects	DWORD	Max. number of Handle objects used for project statistics when running projects from the developing environment.	1000	●	-
General	MaxArraySize	DWORD	Max. size to be obtained by variables in byte arrays with fixed lengths.	4096	●	-
General	DisableDockedAnimation	DWORD	Disables the docked window animations. Therefore, when the mouse is positioned a tab, the corresponding window will appear on screen already open. 0 = Docked window animation is disabled. 1 = Docked window animation is enabled. Note: Animations of these windows remain	0	●	-

			disabled when working in a server terminal session or when the symbol library window is open.			
Softkey	Trace	DWORD	Setting this value to "1" will enable the "SoftKey.Log" log file registration in the "C:\Windows " folder.	0	●	-
General	MaxVariableToOpenLightDBVariable	DWORD	This value sets the max. number of variables in the RealTimeDB in addition to which Movicon will open the "Tag Window" in light version instead of Full version.	3000	●	-

30.3. User Interface Registry Keys

List of parameters that influence the user interface and graphics.

keys	Value	Type	Description	Default	Win32 /64	Win CE
General	TooltipTimeAutoPop	DWORD	Time in milliseconds for closing a tooltip window automatically.	5000	●	-
General	TooltipTimeInitial	DWORD	Time needed in milliseconds before a tooltip window can reappear in an object. the mouse pointer must remain outside the object for the time indicated in this parameter.	200	●	-
General	UsePCSpeaker	DWORD	DWORD value which set to the zero value will disable the use of the computer's Speaker and substitute it with the audio file specified in the "AlarmSound" string value of the General key. This	1	●	

			file muse reside in the Movicon installation folder.			
General	AlarmSound	STRING	String value used for customizing alarm sound through the sound card when the speaker is disabled(UsePCSpeaker = 0).. This file is searched for in the Movicon installation folder.	'Alarm.wav'	●	
General	CheckCoveredOnClick	DWORD	Permits the enabling or prohibiting the Click's 'passing' effect on overlapping buttons, symbols or objects. The value for default is "1" and impedes the on click's passing through effect on overlapping buttons, symbols objects, so that the mouse click is intercepted by background objects as well. This kind of procedure has an exception in cases when two overlapped objects are both using the Sub Click() event in their VB script context. In this case the object at the forefront has exclusivity over the other object behind in background in receiving Clicks independently from the set "CheckCoveredOnClick" value.		●	●
General	ShowTooltipPreview	DWORD	Permits the Tooltip to be displayed with the Screen resource or Basic Script JPEG image preview when the value is set at '1'. Note:When this value is set at '1', the screen's iimage will automatically be created or modified each time when edited in the folder in which it resides with the name of "<Screen>_c.jpg"	0	●	-
General	TooltipTimeFadeIn	DWORD	Fading in duration index time effect of the tooltip window while appearing in objects.	1	●	-

General	TooltipTimeFadeOut	DWORD	Fading out duration index time of tooltip window while disappearing from objects.	1	●	-
General	BlinkLedKeyboard	DWORD	Permits you to choose whether or not to have the "Scroll Lock" led blink when an alarm occurs. 0 = Blink disabled 1 = Blink enabled Note: Activating the blink might compromise application stability in devices which do not use standard drivers for managing keyboards.	0	●	●
General	BlinkTypeFast	DWORD	'Fast' option blink time in milliseconds, selectable in some symbol animation properties.	500	●	●
General	BlinkTypeMedium	DWORD	Blink time in milliseconds for the 'Medium Blink' option, selectable in some symbol animation properties.	1000	●	●
General	BlinkTypeSlow	DWORD	Blink time in milliseconds for the "Slow Blink' option, selectable in some symbol animation properties.	2000	●	●
General	NumberShade	DWORD	Number of colour shadings when using backgrounds with two colours fading into each other.	Win32/64: 64 WinCE: 16	●	●
General	BrightnessOffset	DWORD	Number of brightness tones when using backgrounds with one colour fading.	50	●	●
General	StepBrightness	DWORD	Number of Brightness steps used when increasing or decreasing design brightness or contrast.	5	●	●
General	TraceCommentFont	SZ	Font used in standard variable"Trace Comment" windows.	MS Sans Serif	●	●

General	TraceCommentFontSize	DWORD	Font size used in variable "Trace Comment" windows. Note: The size of the window on screen is in relation to this value. The size "8" is the minimum size for the default font. For reduce the window dimension it's necessary to use a different font, such as the "Small Font".	8	●	●
General	DBFilterFont	SZ	Font used in "Filter" window which can be opened from the "Historical Log", "DataLogger/Recipe" and "DB Trace" windows.	MS Sans Serif	●	●
General	DBFilterFontSize	DWORD	Font size in the "Filter" windows which can be opened from the "Historical Log", "DataLogger/Recipe" and "DB Trace" windows. Note: The size of the window on screen is in relation to this value. The size "8" is the minimum size for the default font. For reduce the window dimension it's necessary to use a different font, such as the "Small Font".	8	●	●
General	MDITabs	DWORD	This DWORD value consents you to show the MDI bar displayed in design and runtime mode if desired. The possible values are: 0 = The MDI tab bar is a no show. 1 = The MDI tabs display in 3D. Three button are displayed on the far right of the MDI bar; two for scrolling the tables and one for closing the selected document. 2 = The MDI tabs are displayed in 2D. The button used for scrolling tabs are on the far left and right. Each tab contains a button for closing the selected document. 3 = The tabs are displalyed in 3D (VS2005 type). Each tab contains a button for closing the	3	●	●

			selected document; wihile th on the a menu will appear on the estrremen right of the MDI bar to change the tab.			
General	MDITabsAutoColor	DWORD	Setting the DWORD value to '1' will automatically display all the Movicoin MDI bar tabs in color.	0	●	●
General	NumericPadFont	SZ	Font used for the numeric pad window.	MS Sans Serif	●	●
General	NumericPadFontSize	DWORD	Font size for numberic pad window.	Win32/64/CE: 14 PocketPC: 8	●	●
General	AlphaNumericPadFont	SZ	Font used for alphanumeric pad window.	MS Sans Serif	●	●
General	AlphaNumericPadFontSize	DWORD	Font size used for alphanumeric pad window.	Win32/64/CE: 14 PocketPC: 8	●	●
General	GetPasswordFont	SZ	Font used for the password window for authenticating users. NOTE: the chosen font type must support the sizes set in the "GetPasswordFontSize" value the image on the top left of the password window will not appear if this key is used. This will avoid any overlapping of edit boxes and texts of in the	MS Sans Serif	●	●

			window when changing size			
General	GetPasswordFontSize	DWORD	Font size used for the password window for authenticating users. The size "8" is the minimum size for the default font. For reduce the window dimension it's necessary to use a different font, such as the "Small Font". NOTE: the image on the top left of the password window will not appear if this key is used. This will avoid any overlapping of edit boxes and texts of in the window when changing size	Win32/64/CE: 14 PocketPC: 8	●	●
General	PasswordExpiredFont	SZ	Font used for the expired password window for authenticating users. NOTE: the chosen font type must support the sizes set in the "PasswordExpiredFontSize " value the image on the top left of the password window will not appear if this key is used. This will avoid any overlapping of edit boxes and texts of in the window when changing size	MS Sans Serif	●	●
General	PasswordExpiredFontSize	DWORD	Font size used for the expired password edit window for authenticating users. The size "8" is the minimum size for the default font. For reduce the window dimension it's necessary to use a different font, such as the "Small Font". NOTE:	Win32/64/CE: 14 PocketPC: 8	●	●

			the image on the top left of the password window will not appear if this key is used. This will avoid any overlapping of edit boxes and texts of in the window when changing size			
General	AlarmCommentFont		Changes the font used in the comment window on alarm ack.	MS Sans Serif		●
General	AlarmCommentFontSize		Changes the font size used in the comment window in the comment window on alarm ack.	default '8'		●
General	ShowSIP	DWORD	Enables the appearance of theWinCE virtual keyboard when needing to edit values.	1	-	●
MouseCursor	Visible	DWORD	Enables the mouse cursor visibility when application is being run.	1	-	●
General	DontUseDecorativeFont	DWORD	Sets the application to manage fonts in order to speed up graphics updating to the max. Fonts will appear less attractive graphically as a consequence. 0 = Decorative fonts 1 = No Decorative fonts Note: When this parameter is set at 1, the following attributes are forced when a new font is created: lfOutPrecision=OUT_RASTER_PRECIS lfClipPrecision=CLIP_STROKE_PRECIS lfQuality=DRAFT_QUALITY	1	-	●
General	ScrollLastAlarmText	DWORD	Setting the value to zero in the Movicon 11 'General' key, the 'LastAlarmText' system variable will not scroll the active alarm list but will display the last active alarm only (as with the previous Movicon version).	1	●	●

General	ShowPad	DWORD	Setting this value to "0", the Pad will be displayed in accordance with the editable display's "Show Numeric Pad" option. When using the default '1' value, the Pad will always appear in Window CE or in Touch Screen panels without mouse support.	1	-	●
General	UseMouseGestureOnScreen	DWORD	When this value is set at "1" the "mouse gesture" is managed on screen in WinCE. This means that when keeping the mouse button pressed down on a point where there are no objects, a menu will appear consenting the following commands to be invoked: Zoom In Zoom Out Zoom To Reset Zoom Refresh This same menu also appears in Windows 32/64 bit with a right click on screen. This feature is always enabled in Windows 32/64 bit independently from the registry key which is only need for WinCE.	0	-	●
General	EnableSysTrayMessage	DWORD	This allows you to disable the project startup notification message from showing in the Windows System Tray by setting value to '0'.	1	●	

Platform	SymbolsPath	SZ	This value is used for inserting the path where Movicon will go to search for the Symbol Library's ".msxz" file (new path must terminate with "\" at the end). The default path corresponds to : "C:\Documents and Settings\All Users\Documents\Progea\Movicon\Symbols\" for Windows XP in English "C:\Documents and Settings\All Users\Documenti condivisi\Progea\Movicon\Symbols\" for Windows XP in Italian "C:\Users\Public\Documents\Progea\Movicon\Symbols\" for Windows Vista in English "C:\Utenti\Public\Documents\Progea\Movicon\Symbols\" for Windows Vista in Italian		●	-
General	OldStretchImageSize	DWORD	Consents to restoring the management prior to the build 1056 to adapt images in control objects. In fact, previously when an image had the same sizes as the control that hosted it would be adapted, obtaining a size bigger by 1 pixel in height and 1 pixel in width.	0	●	●
General	HighQualityStretchImages	DWORD	Increases the quality of images that get adapted but jeopardize page rendering performances.	0	●	-
General	NoAlarmStatusOnACK	DWORD	Permits alarms that don't have Resettable thresholds to stay active even when acknowledged. When set to 1 (true) the alarm will be restored with its previous behaviour: as soon as it is acknowledged it will disappear from the Alarm Window even though the field condition satisfies the Threshold's activation condition.	0	●	●

General	UseGroupDescription	DWORD	In all the operations requiring a name of a symbol, first its description will be used, if one does not it exist, its name will then be used. This search sequence can be inverted by leaving the default zero value, meaning that the symbol's name has priority over its description. this will change behaviours in various areas: - Names used for listing screen objects - Dynamic property window Tabs - Tabs of all symbol browser windows - 'Name' parameter to be used in basic script functions that return objects. - Values returned by the basic script function that return the object name. - etc. Note: The symbol name has priority over the description in build 1056 and onwards; while previous versions gave priority to the symbol's description. Therefore you will need to set this key to value 1 when wishing to restore previous behaviour.	0	●	●
General	ReloadResources	DWORD	This value enables or disables the manager which reloads project resources modified with external editors. For further information about this feature please refer to the paragraph entitled "Modifying Resources With XML external editor". When setting this value to "1"the reload files management will be enabled. Whereas the '0' value, will disable this management.	1	●	-
General	RowsOneColor	DWORD	This value restores the data displayed in the grids with only one background color in the same that the previous build did. The default value, however, actives the data display in	0	●	●

			the grid with an alternated background color. Only the alarm window is excluded from this management.			
General	Restore3DButtonLook	DWORD	This value restores the 3D button look to as it was in the 11.1 version. However when regaining previous look, you will no longer be able to exploit new characteristics such as bolder border lines or custom rounded effects.	0	●	-
BasicScript	EscapeKeyDownFreeUI	DWORD	Descriptio : Setting this value to zero will disable the possibility of pressing the ESC key to allow Movicon to free the user interface of scripts being executed in the user interface thread.	1	●	●
General	SelectAllTextOnEdit	DWORD	This value consents Display objects to be entered in edit mode selecting all texts with one single click. This setting may result very handy in touch screen systems where double clicking is difficult to use. With the default 0 value, one single click on the Display will enable it in edit mode but will not select text (Windows 7 standard behaviour), whereas the value 1 will also select the text.	0	●	●

30.4. Communication Registry Key

List of parameters which influence communications: networking, drivers, OPC

Key	Value	Type	Description	Default	Win32/64	WinCE
OPCBrowse	UseRegistry	DWORD	Enables use of Windows configuration registry to search for installed OPC Servers. This shows listed those OPC Server 1.0 which still used this method. 0 = Uses OPCEnum to make a list of the installed OPC Servers. 1 = Uses the registry to	0	●	-

			make a list of the installed OPC Servers.			
General	DeadSocketTimeout	DWORD	Timeout in minutes before closing inactive network client connections.	5	●	●
General	MaxTimeStartupDrivers	DWORD	Startup time in milliseconds for loading communication driver. When time expires the project will startup even if the communication driver has not been loaded.	5000	●	●
General	DontRemoveOPCItems	DWORD	Enables the Don't Remove of OPC server items, when the variable is no longer in use in the project. This only happens when the the variable has been configured with a OPC dynamic address. In this case the OPC Server item is created when the variable goes into use, and can be destroyed when the variable goes out of use, according to the value set in this parameter.	1	●	●
OPCClient	WriteMaxBuffer	DWORD	Buffer size of variables linked to opc server items. Each variable change linked to a opc server item gets buffered. Changes are then sent to the opc server one at a time until the buffer is emptied. 1 = buffer management is disabled.	1	●	●

30.5. Historical Log Registry Keys

List of parameters which influence project historicals.

Key	Value	Type	Description	Default	Win32/64	Win CE
General	ODBCQueryTimeOut	DWORD	Timeout in seconds for extracting data from one historical. Once exceeded the operation in progress will be annulled and notified	15	●	●

			with a message printed in the log.			
General	ODBCLoginTimeout	DWORD	Timeout in seconds for authenticating database login. Once exceeded the operation in progress will be annulled and notified with a message printed in the log.	15	●	●
General	TimeToWaitAfterODBCError	DWORD	Waiting Time in seconds before retrying a command towards the database which generated error.	10	●	●
General	ODBCMaxReadingChars	DWORD	Value in bytes of the reception buffer for ODBC dataabase "nVarChar" values. If the text in the database exceeds this value, it will be cut off when in read. (in existence starting from build 1018).	2048	●	-
General	MaxLogEntries	DWORD	Max. size in Kbytes of each LOG file created by the application's trace.	100	●	●
General	MaxLogFiles	DWORD	Max. number of LOG files used for each trace type. Once this value is reached data will be recycled to the oldest file. When setting value to 0 the creation of the log file creation will be disabled in the "logos" sub folder.	10	●	●
General	IMDBMaxHMemory	DWORD	Max. size in Mbytes of memory which can be allocated to shared areas to manage InMemoryDB (IMDB) historicals. Once this limit is reached no other value will be recorded until memory space has	Win32/64: 16777216 WinCE: 4194304	☐	☐

			been freed. A "IMDB - Internal error: Out of shared memory" message will appear in the system log. Min. Value Min = 1048576 Max. Value = Memory available in PC/Device			
General	IMDBMaxLMemory	DWORD	Max. size in Mbytes of memory which can be allocated to private areas to manage InMemoryDB (IMDB) historicals. Once this limit is reached no other value will be recorded until memory space has been freed. A "IMDB - Internal error: Out of shared memory" message will appear in the system log. Min. Value = 1048576 Max. Vaue = Max. memory which can be allocated for each process for the operating system being used (WinCE 5.0 = 32 MB).	Win32/64: 67108864 WinCE: 4194304	●	●
OPCClient	Trace	DWORD	Enabling of registration in the OPC Client log of information relating to events received for value change items and items written to OPC servers. 0 = Only base information is traced. 1 = All information is traced.	0	●	●
General	ADOCEProvider	SZ	Name of provider used for connecting to databases in WinCE.	String = Microsoft.SQLSERVER.MOBILE.OLED	-	□

				B.3.0		
General	ADOCEDataSourceExt	SZ	Extension used for creating databases in WinCE.	.sdf	-	●
General	ODBCTokenForSpaces	SZ	This value is used for inserting the start and end character that Movicon will use in composing Queries when Table or Column names contain spaces. These character may differ according to the DataBase being used. The default characters used in syntax for SQL Server and MS Access are square brackets. String type values must contain at leas two characters where the first will be used for opening and the last for closing syntax.	[]	●	●

30.6. General General Registry Keys

List of general parameters which effect the application in runtime.

Key	Value	Type	Description	Default	Win32/64	Win CE
General	MaxAppInstances	DWORD	Maximum number of application instances which can be executed at the same time. 0 = no instances will be started up.	100	●	●
General	ILSleep	DWORD	Time in milliseconds between the execution of one group of instructions and the next. The group of instructions' size is set with "MaxILInstruction " parameter. Note:	Win32/64: 10 WinCE: 50	●	●

			In cases where the number of instructions in an object's Il logic is lower than this value, the sleep time set will still be respected.			
General	MaxILInstruction	DWORD	The number of instructions processed before sleep time goes into action, equal to the value set in the "ILSleep" parameter.	100	●	●
General	ILLogicPriority	DWORD	Priority of the thread which processes the project's IL logic. This parameter has no influence on the priority with which the IL logic contained in the screen or object is processed. This value can be set from 0 to 255, where 0 is given to the project's IL logic with the highest priority over the rest. Note: WinCE is a multithreading and determinstic operating system, therefore when too many high priorty project IL logic will block all the other O.S. threads which have lower priorties.	Win32/64: 0 WinCE. 255	●	●
General	TimerEventFrequence	DWORD	VBA design "OnTimer" event execution frequency. The value entered corresponds to the number of times which the procedure must be executed a second.	2	●	●

			Note: Values 1 to 10 are allowed.			
General	InstallComponents	DWORD	Enables the installation and registration of the ADOCE and SQL Server CE optional components at the application startup. 0 = the ADOCE and SQL Server CE components are installed and registered only when the project being run needs them. 1= the ADOCE and SQL Server CE components are installed and registered at the application startup with any project.	0	-	●
General	DisablePublicSymOnDesign	DWORD	This value allows you to decide whether Public Symbol updates should be done in project design time or runtime: 0 = updates Public symbols in design mode 1 = updates Public symbols in runtime	0	●	-
General	PdfPrinter	SZ	This value allows you to set the name of the PDF printer to be used for default by the Movicon Embedded Report commands.	Movicon PDF Writer	●	-

General	PdfViewer	SZ	This value is used for setting the executable name which must be used for displaying Movicon Embedded Report pdf files. This registry key is only valid for the Windows CE platform.	\\Windows\\wt6explr.exe /d wt6pdf*.dfr	-	●

30.7. Advanced Registry Keys

Advanced parameter List. Avoid modifying these parameters unless absolutely necessary for they may effect system behaviour.

Caution: These parameters should never need modifying but if circumstances make this unavoidable only expert personnel, in strict agreement with the Progea Technical Support team, must carry out the necessary modifications only.

Key	Value	Type	Description	Default	Win32/64	Win CE
General	UseLFH	DWORD	Enabling the use of Windows functionalities called LFH (Low Fragmentation Heap, available only for some Windows versions). This functionality allows memory to be used more efficiently. 0 = Disables the use of LFH 1 = Enables the use of LFH	1	●	-
General	MaxMemoryLoad	DWORD	Percentage of fixed memory in use in the operating system whose situation will become critical when exceeded. When this threshold is exceeded, the application will enter into "Low memory condition". Note: Please refer to the manual for further information on how the resources are managed when entering the "low memory condition" status.	0	●	-

General	MaxDTMessagesPurge	DWORD	Number of events per tick emitted on the project status bar.	20	●	●
General	MaxProcessingLogLine	DWORD	Max. number of messages a second printed in the output window and the LOG files.	100	●	●
General	SleepCounter	DWORD	Application performance optimization value.	5	●	●
General	GeneralTimeout	DWORD	Timeout used for executing some operations. For example, has influence on following commands/operations: maximum valuation time of a Basic Script expression associated to a control "GetSynopticInterface" function execution time for adding an item to a OPC XML server process run (for example, executing the "Export and Send Mail" command)	10000	●	●
General	MaxSymbolCache	DWORD	Max. size of the symbol caches. Vectorial symbols which do not contain animations or VBA code, are managed as bitmap images. 0 = Disabled. 0 = Max. Num. of objects that can be put in the cache.	0	●	●
General	UseOffScreenMem	DWORD	Enables the use of the memory map for managing screens. The use of the memory map allows some operations on screen to be down faster, such as zooming, however this will require additional memory use for each screen managed.	Win32/64: 1 WinCE: 0	●	●

General	MaxCacheFont	DWROD	Font management cache size. Therefore fonts can be stocked away in the cache for reuse instead of being recreated right from the beginning whenever needed. 0 = Cache manager disabled Note: The font cache keeps a map to speed things up in the most simplest way possible. However, some of the most common font styles are also managed in the cache such as bold, underline etc.	0	-	●
General	FloatingPointPrecision	DWORD	This value allows you modify the precision used for converting floating point numbers (float and double) to text. The '0' default value means that the standard precision equal to 6 chars will be used. Movicon converts floating point numbers in text format when needing to save values in xml files such as retentive variable files, or in Movicon networking communications. is '0'. Some Examples: 6 figure default precision: The "100.000,12" floating point value is converted into "100.000" text, because "0,10" difference has not meaning. The "5200908" floating point value is converted into "5200910" text, because the difference of "2" has no meaning. 8 figure custome precision: The "100.000,12" floating point value	0	●	●

			converted into "100.000,12" text, therefore not precision is lost in this conversion. The "5200908" floating point value is converted into "5200908" text, therefore not precision is lot in this conversion.			
General	MaxAvailVirtual	DWORD	Quantity of memory in bytes still available, that becomes critical when lowers. when the memory still available for programs in the WinCE operating system , or the VM memory allocated from the process (WinCE 5.0 max. 32MB), is lower than this value; the application entered into the "low memory condition" status. Note: Please refer to the manual for further information on how resources are managed in a "low memory condition".	5000000	-	●
General	MaxGestureSpeedRate	DWORD	This value allows the absolute value to be modified for the project's Gesture Speed Rate.	200	●	●

30.8. Speech Synthesis Keys

In this table you will find a list of Windows configuration registry keys concerning the Microsoft speech synthesis (**TTS - Text-To-Speech**).
The values in these keys can be changed with the "MsMouth.exe" tool found on the installation CdRom.

Caution:
The "MsMouth.exe" program utility always writes all modifications in the U.S. key independently from the operating system language in use. Therefore when using operating systems in Italian you will need to copy the "Mode" binary key contents from the "Local PC" to the "Local Computer" manually.

Key	Value	Type	Description	Default	Win32 /64	Win CE
HKEY_CURRENT_USER \Software\Voice \VoiceText \Local PC	Mode	BYNARY	Phoneme settings which the application used with the operating systems in USA version or other.	-	●	-
HKEY_CURRENT_USER \Software\Voice\ VoiceText\ Local Computer	Mode	BYNARY	Phoneme settings which the application used with the operating systems in Italian.	-	●	-

30.9. SourceSafe Keys

List of parameters which influence SourceSafe integration settings.

Key	Value	Type	Description	Default	Win32 /64	Win CE
VSSSettings	UserName	SZ	User name to be used for connecting to the SourceSafe database. If not specified the name of the user logged in the operating system will be used. The default value is an empty string.	""	●	-
VSSSettings	Password	SZ	Password to be used for connecting to the SourceSafe database. Must coincide with the one set for the SourceSafe User. The default is an empty string.	""	●	-
VSSSettings	DefaultPath	SZ	Path and name of the SourceSafe Configuration File (usually called "srcsafe.ini"). When left empty, the default database set in the SourceSafe is used. The default value is an empty string which corresponds to the last database opened	""	·	-

			with the sourceSage 2005 administrator program. Note: This key needs to be set when using the Visual Studio SourceSafe 2005 version in Italian, as no database has been predefined for the SourceSafe. The Visual SourceSafe 2005 in English does not have this problem.			
VSSSettings	AutoCheckIn	DWORD	Consent disablement of Auto check of resources when project closes. The automatic check is disabled when the key value is set to zero.	1	●	-
VSSSettings	DefaultRoot	SZ	Path to created the project in the SourceSave database. The default value is "$/". The path to set in this key can be read using the SourceSafe and displaying the folder's properties wished to be used as default. Note: path to be set must always end with the "/" character.	""	●	-
VSSSettings	SymbolGallery	SZ	Name of the SourceSafe project for the symbol library. The default value corresponds to the name of the product followed by the "symbols" suffix. The same folder tree structure, with the various symbol categories filed in the installation folder in the computer, will then be created in the SourceSafe project.	""	●	-
VSSSettings	CheckOutComment	DWORD	Consents the SourceSafe dialog window to be displayed for entering a comment every time a "Check Out for	0	●	

			Edit..." command is executed in a project resource.			
VSSSettings	CheckInComment	DWORD	Consents the SourceSafe dialog window to be displayed for entering a comment every time a "Check In" command is executed in a project resource.	1	●	
VSSSettings	Enabled	DWORD	Consents to enable the Visual SourceSafe managment. The default value is 1. In cases where the SourceSafe management is disabled, all commands inherent to the SourceSafe will result as disabled. Therefore, when opening projects shared with the SourceSafe, problems may arise when editing their resources because these resources wil lbe blocked in "read-only" mode by the SourceSafe. This will need you to delete the SourceSafe project and restore all the project files as "read-write".	1	●	

30.10. MS ActiveSync Keys

This is a list of parameters which allow you to customize some of the aspects concerning the Project "Upload/Download" management when the MS ActiveSync plugin is used.

Chiave	Valore	Tipo	Descrizione	Default	Win32/64	Win CE
Platform	DeviceInstallPath	SZ	Path used for creating the "InstallDir" value in the Windows CE configuration registry.The "InstallDir" value contained the path in which the runtime has been in installed and is created from the product installation packet. Gets used on project Start/Stop command.	SOFTWARE\Apps\Proge a Automation MovCE	●	-

Platform	DeviceExecutable	SZ	Name of runtime application installed in the Windows CE desvice. Gets used on project Start/Stop command.	MovCE.exe	●	-
Platform	LocalDriverDeviceSetup	SZ	Relating path where files are searched for communication driver setups.	MovCESetup	●	-
Platform	LocalPocketPCSetupPath	SZ	Relating path where files for PocketPC application setups are searched for. This path is used when the project Startup command fails and consents to finding the installation cab file for Windows CE pocketPC platforms.	MovCESetup\Movce.PPC.ini	●	-
Platform	LocalHPCDeviceSetup	SZ	Relating path in which files for setting up applications for the SDK Standard platform are searched for. This is used when the project's Startup command fails and consents the installation cab file search for Windows CE SDK standard platforms.	MovCESetup\Movce.SSDK.ini	●	-
Platform	DeviceBootFile	SZ	Name of the boot file. This is used after project uploading during the search for the boot file.	\MovCE.boot	●	-
ExportCE	CheckFileTimeAndDate	DWORD	Valid for TCP plugin. Defines project transfer modality. When the value is set to '1', the date/time of the destination device synchronized to the data/time of the source PC desktop before transferring only those project files that have been modified since the last transfer. When set to '0', the devices in question are not synchronized and all the project files are transferred.	1	●	-

31. IL Logics (Instructions List)

The Movicon IL Logic permits the use of PLC type logic tasks in projects for managing the control of variables or I/O.

The **IL Logic (Instructions List)** is the key feature of the Movicon system. This resource can has all the effects of a PLC (Programmable Logic Controller) which runs it program in background independently of the system's logic, graphic or historical engines.

The IL Logic offers a number of obvious advantages. Basically it allows you to perform any type of non-standard executions using internal PLC type programs.

Considering the possibility of installing or connecting digital or analog I/O devices directly to the PC, the Movicon system is capable of replacing the plant control device, such as the PLC (replaced by the IL Logic).

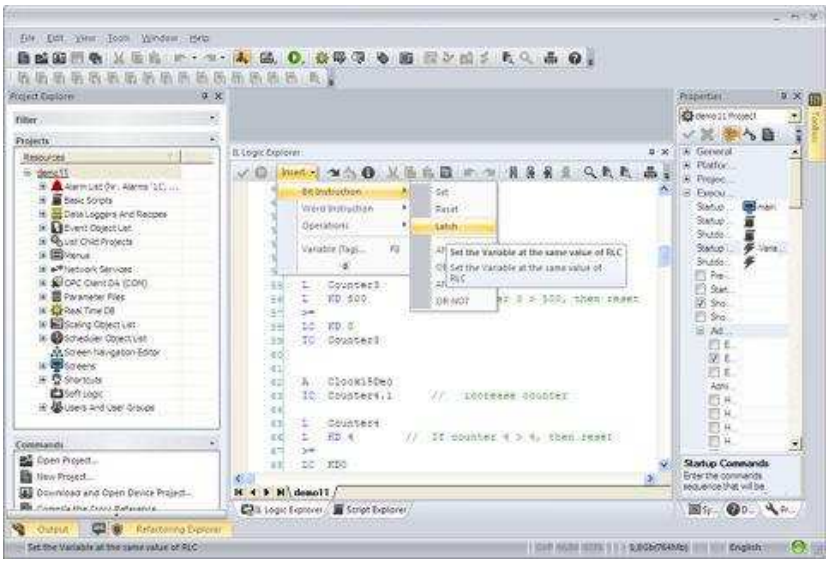
The IL Logic can be associated to projects, where it is known as **General Logic**, or it can be associated to symbols (drawings and controls) and to screens where it is known as **Local Logic**. The fundamental difference between the General Logic and Local Logic are:

1. At project startup the General Logic is run and continues running cyclically until the project stops. The Local Logic, however, is run only when the object containing it is active, ie. when loading a screen in RAM
2. The General Logic run has priority over the Local Logic

The Logic is edited through the **"Logic Explorer"** window which displays the logic associated to the component selected at that moment.

31.1. Inserting IL Logic instructions

Inserting instructions which form the Movicon IL Logic Resource is done by using the appropriated editing window called **"Logic Explorer"**, which is accessed from the 'View Menu'.
The **"Logic Explorer"**, illustrated below, allows you to type the instructions and the variables which form the IL Logic program as a normal text editor, permitting the use of graphic formatting to make the program easier to understand.



The Movicon Logic Editor should be used as a normal Windows standard text editor. The programmer, while inserting the program, should naturally respect the programming syntaxes when entering logic instruction for variable combinations.

The programming has been made easier by the possibility to insert all the instruction by using the appropriated commands from the Insert Menu found in the 'Logic Explorer' window. This makes editing easier for the not-so-expert programmer by guiding them through the necessary procedures.

Any syntax errors made during programming unguided by the Insert Menu will be indicated and highlighted in the compilation phase. However, you can use the 'Compile-Check Syntax' command which is available from the 'Logic Explorer' window to check to see if there are any errors.

The opening of the Logic window determines the displaying of the empty editing area with the cursor positioned at the top left. You can then proceed with writing the logic program by respecting the Movicon Editor's programming syntaxes.
Program editing works with the ordinary procedures of a normal text editor, apart from the fact that the programming syntaxes are automatically acknowledged and represented with default colors.

You are unlimited with the number of comment texts that can be written as long as they are preceded at the beginning of the line with the '//' character.

Access to the variables is only permitted by using the Variable's name. You cannot access to variables through their absolute addresses (even when the variables are mapped in the Input, Output and Flag shared areas).

The IL logic instructions have also been adapted to the AWL syntax of the Step7. Therefore some instructions may be written in three different syntaxes: Movicon standard syntax, English Step7 syntax, German Step7 syntax. You can use on of these three syntaxes in mixed mode in the same listed IL logic. For further information on the instruction please consult the relevant tables.

Unsupported Variables

Some variable types cannot be used in the Movicon IL Logic especially those listed below:

- **Double Variables (64 bit double precision)**: these variables cannot be used in as the ACCU1 and ACCU2 registered in 32 bit
- **String and Byte Array type variables**: these variables cannot be used as their format is not supported in IL Logic

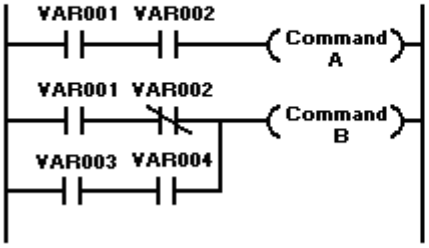
Variable Access

You can address variables in the IL Logic which have been declared in a different hierarchical level in respect to that of the object in which the logic has been inserted, such a Father or Child project RealTimeDB Variables with the same Local screen variable name. You can use the '..\<VariableName>' and '<ChildProjectName>\<VariableName>' suffixes tor indicate the variables. When the name of the variable is indicated only, a search is made for the context in which the logic is executed.

31.2. Logic Programming

The Movicon Logic Editor provides you with a powerful set of logic, mathematic or compare instruction for combining variable with each other in order to activate logic commands which form the base of the project.
The Movicon programming logic language is in instruction lists (known also as AWL or IL Instruction List).
This type of language, defined by the IEC 1131-3 standards to which Movicon abides by, require a vertical list of logic or compare instructions which, combined with each other, determine a binary result which will be referred to as **"Combined Logic Result CLR"** or **"LCR"** from now onwards.
The Logic Editor can be used indifferently either in the Project's General Logic or in the Local Logic.

Example of contact logic representation (Ladder)



Example of instruction list logic representation (AWL)

```
AND  ¥AR001
AND  ¥AR002
= Command A

AND  ¥AR001
ANDN ¥AR002
O
AND  ¥AR003
AND  ¥AR004
= Command B
```

31.2.1. Combined Logic Result CLR

The combination of two or more digital variables constitutes the basis of a logic program and always determined a **'Combined Logic Result'**, being a binary logic state that determines whether or not to activate the next operation.
The combined logic result **"CLR"** can assume two logic states only:

"zero" (0, FALSE, LOW)
"one" (1, TRUE, HIGH)

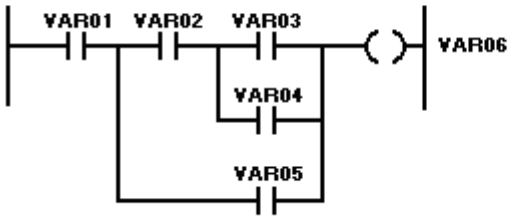
The CLR always works on the combination of instructions with variables in bit or the result of comparison operations.
The other operations (mathematical, arithmetical, Load, Transfer) do not effect the CLR.
If for example the logic result of a given sequence of instructions is in logic state '1', the next command will be executed or ignored if the logic state is otherwise.

All the mathematic, arithmetical, load and Transfer instructions do not effect the CLR but they can be conditioned by it. All these instructions can be conditioned in the execution of the combined logic result of the previous instructions.

31.2.2. Bracket levels for the CLR

The Movicon logic programs are capable of handling up to three bracket levels containing logic instructions. Enclosing logic instructions between brackets means that logic conditions can be determined whose CLR result is placed in relation to the previous CLR result. In practice, in an AND combination inside brackets, an AND is placed between the CLR in brackets and the previous CLR.
Combinations inside brackets can be nested together up to the third level, and they can be opened with AND or OR.

Example of contact logic representation (Ladder)

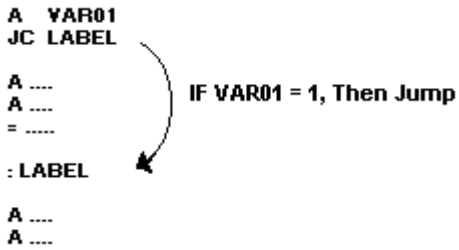


Example of instruction list logic representation (AWL)

```
A  ¥AR01
A(
A  ¥AR02
A(
O  ¥AR03
O  ¥AR04
)
O  ¥AR05
)
=  ¥AR06
```

31.2.3. Jump to Labels

The Movicon logic programs are capable to manage instructions to jump to labels set up in the program. The jump instruction transfers the flow of execution to the preset labels (obligatory).
The jump instruction can be absolute or conditioned. In the first case the jump will be executed independently of the previous Combined Logic Result. In the second case, the jump will be executed only when the CLR = 1, otherwise the jump instruction will be ignored.



The jump label, which must always be preceded by the ":" character, can be either positioned at the front or at the back of the jump instruction.

ATTENTION! the programmer must take care not to insert closed jump loops otherwise this will block the General Logic with out any warning from Movicon.

31.2.4. Variables in Floating Point

You can process logic by using the values in floating point. The variables or constants in floating point are 32 bit (Float).
To run programs in floating point, you need to precede the program with the **FLOAT** instruction. To restore work on integer values, you need to declare the **INT** instruction.
If not specified differently, the logic will assume work with integer values for default. It is therefore possible to run parts of the program working in floating point by enclosing the part of the program concerned between the "FLOAT" and "INT" instructions.

Example:

```
FLOAT

L KF 124,5
L TEMPER
*
T HT_TEMPERT

INT
```

31.2.5. The Logic Accumulators

In the instruction in byte, word or doubleword, Movicon uses two system logic accumulators called ACCU1 to indicate the first accumulator (main) and ACCU2 to indicate the second accumulator. The accumulators are considered as temporary buffers used by the system to process and handle the variables in byte, word or doubleword. Only the ACCU1 is used in simple loading or transferring operations. ACCU1 as well as ACCU2 are used in comparison or mathematical operations.

Instruction	Value	ACCU1	ACCU2
L VAR00001	345	345	0
L VAR00002	89	89	345
+		434	89
T VAR00003	434	434	89

Note: the format of the data contained in the accumulators is understood as value with sign, independently of how the variable is declared in the DB. Therefore even the variables declared without sign are interpreted by the General Logic with sign.
When working with data in Float, the accumulators work with variables in 32 bit floating point.

31.2.6. Constants

In the IL Logic you can use numeric constants preceded by the following suffixes:

KD	Integer decimal numbers (i.e. KD 28)
KH	Integer hexadecimal numbers (i.e. KH FE5A)
KF	Floating point numbers (i.e. KF 72.289)

Numerical constants may need to be used in compare instructions or in arithmetic instructions.

31.2.7. End program processing

The Logic program ends automatically with the last instruction within it. The system returns back and executes the program from the beginning, cyclically, without needing a 'return' instruction.
Nevertheless you can insert an end program instruction which will terminate the processing and the return back to the beginning of the programming.
The end program instruction can also be conditioned by the CLR combined logic result.

```
A
  VAR00001
   =
    VAR00002
   BE                  // end program processing unconditional

   A
    VAR00003
   BEC                 // end program processing conditioned by
                       VAR00003 variable
```

31.2.8. Inserting Comments

We highly recommend that you use comments internal logic programs so that they or part of them are easier to understand. Movicon gives you unlimited use of comments in any point of the program, whether being General Logic or Local Logic.
In order to this you must first insert a double slash '//' at the beginning of the line, before typing the comment text. These characters indicate to the compiler to completely ignore the remaining text in the line.
Entering comments is made easier by using the Comment command from the Insert Menu from the 'Logic Explorer' window.

```
A   VAR00001
S    VAR00002    // *****  Enabling command Motor 1  ******
```

Comments can be inserted either at the beginning of the line, as headings for a block of instructions, or at the side of the instruction line. You must keep in mind that the text typed in at the point where '//' is inserted up to the end of the line will be considered as a comment.

31.3. Logic Bit Instructions

The Logic in bit instructions allow binary logic variables, available in the system, to be combined in sequence with each other to create a CLR for activating following commands.
The start of a logic in bit sequence is done by directly using the AND or OR instructions.

31.3.1. AND Logic

To combine two Movicon binary variables together in sets (boolean multiplication), you need to use the AND or AND NOT instructions. The AND NOT instructions will execute the AND operation with the associated variable's negation (contact closed).
Example: to set the "Out_Motor1" output variable when both the "Start_Motor" and "Cycle-Machine" input invariables are at logic state '1', you need to:

```
A    Cycle_Machine
A    Start_Motor
=    Out_Motor1
```

31.3.2. OR Logic

To combine in parallel two Movicon binary variables together (boolean sum) you need to use the OR or OR NOT instructions. The OR NOT instruction performs the OR operation with the associated variable in negative (contact closed).
Example: to get "Out_Motore1" output when any one of "Start_Motor" and "Cycle_Machine" inputs are at logic status '1' logic, you need to do as follows:

```
O    Cycle_Machine
O    Start_Motor
=    Out_Motor1
```

31.3.3. Sequence Combination

Logic sequences can be combined together. The example below illustrates the OR combination of two AND sequences for setting the output variable:

```
A    Ciclo_Auto
A    Start_Motor
O
A    Ciclo_Man
A    Start_Motor
S    Out_Motor1
```

31.3.4. Setting Variables

The combination between two or more binary variables always determine a Combined Logic Result CLR. The combined logic result can determine the setting of one or more variables or command activations.
To set the binary state of a variable in function with the CLR, you need to use the '=' instruction. By doing this, the indicated variable will assume the value '1' when the CLR is equal to '1', or value '0' when the CLR is equal to '0'.
To assign a logic state to a variable in Latch mode, you need to use the SET (S) and RESET (R) instructions.
The Set instruction places a variable to logic state '1' when the LCR is equal to '1'. The variable will subsequently remain at logic state '1', even if the CLR changed to '0', until the Reset instruction of that variable is activated.

Example 1: the 'Out_Motor1' variable will remain at '1' only when both the 'Cycle_Machine' and 'Start_Motor' variables remain at '1'

```
A    Cycle_Machine
A    Start_Motor
=    Out_Motor1
```

Example 2: the 'Out_Motor1' variable goes to '1' only when both the 'Cycle_Machine' and 'Start_Motor' variables go to state '1' at the same time, after which it will remain at '1' until the 'Cycle_Machine' variable turns to state '0', independently of the 'Start_Motor' value.

```
A    Cycle_Machine
A    Start_Motor
S    Out_Motor1

AN   Cycle_Machine
R    Out_Motor1
```

31.3.5. Setting Timers

Movicon Timers start exclusively with the "=" instruction. The Movicon Timers are activation delay type. When the CLR is equal to '1', the set timer will start to count until the desired Preset time, in tenths of a second, has been reached.
When the timer is time count is higher or the same as that Preset, the Timer's variable ('Contacts') is set at the logic value '1' and will remain so until the Timer activation CLR remains at '1'.

```
A    Start_Timer
=    T    1.30        // timer preset with 3 seconds
```

There are 1000 timers available from 0-999. The Timers are 'local' logic, therefore each 'General' and 'Local' logic provide 1000 timers for use. This means, for example, that the '0 Timer' can be used internal the logic of each Movicon object without creating any malfunctioning.

31.3.6. Summary Table Bit Instructions

Functions	Movicon Instruct.	Step7 ENG Instruct.	Step7 GER Instruct.	Operands	Descriptions
AND	A	A	U	I,O,F,T,Not Shared	Combination of AND logic between binary variables. Bit interrogation on signal "1"
OR	O	O	O	I,O,F,T,Not Shared	Combination of OR logic between binary variables. Bit interrogation on signal "1"
AND NOT	AN	AN	UN	I,O,F,T,Not Shared	Combination of AND NOT logic between binary variables. Bit interrogation on signal "0"
OR NOT	ON	ON	ON	I,O,F,T,Not Shared	Combination of logic OR NOT between binary variables. Interrogation of bit upon "0" signal."
LATCH	=	=	=	I,O,F,T,Not Shared	Setting of variable to the same value of the CLR. If the variable is a timer, it activates the time with activation delay.
SET	S	S	S	I,O,F,Not Shared	The variable is set to logic state "1" when the CLR = 1.
RESET	R	R	R	I,O,F,Not Shared	The variable is reset to logic state "0" when the CLR = 1.
Bracket AND	A(	A(	U(		Opens brackets. The contents of the brackets will be

					combined by AND with the previous CLR. The instruction always needs the close bracket ")".
Bracket OR	O(	O(	O(		Opens brackets. The contents of the brackets will be combined by OR with the previous CLR. The instruction always needs the close bracket ")".
JUMP Unconditioned	JU	JU	SPA	LABEL	Unconditional jump to specified label. The program flow will be transferred to the label position ":".
JUMP Conditioned	JC	JC	SPB	LABEL	Conditional jump to specified label. When the CLR = 1, the program flow will be transferred to the label position ":". When the CLR = 0 the instruction will be ignored.
Timer	= T 0.10				Start counting time (Delay) for a Timer.

31.4. Word Logic Instructions

The word logic instructions allow the logic variables in byte, word or doubleword, which are available in the system, to be combined with each other in order to allow data up to 32 bits to be loaded, transferred or handled.

All the instructions in word can be conditionally executed according to the CLR, by placing the letter "C" after the instruction. In this way, when the CLR is equal to "1", the instruction will be executed or ignored if otherwise.

Instructions in word do not influence CLRs.

31.4.1. The ACCU1 and ACCU2 Logic Accumulators

The instructions with byte, word or doubleword are provides the use of the Movicon Logic Accumulators. The main accumulator is called ACCU1 while the secondary one is called ACCU1. These accumulators are temporary buffers through which the system handles variables in byte, word or doubleword.
You must pay particular attention when using the instructions, described in the specific paragraphs, as to where the data is loaded, how it is processed and where the result is placed.

31.4.2. Loading Variables and Constants

Before transferring variables or handling their contents, it is always necessary load them into the Accumulator. The load instruction or LOAD (L) just transfers the contents of the variable specified into the ACCU1 Accumulator. The system may have to move the contents of the ACCU1 to the second accumulator AACU2, if the ACCU1 already contains a value which must not be lost.
Apart from a variable the data to be loaded may also be formed by a numeric constant (preceded by a KD suffix), by a numeric constant with floating point (preceded by a KF suffix), by a hexadecimal (preceded by a KH suffix).

31.4.3. Transferring Variables

When transferring previously loaded data or the result of previously run data processing, you need to use the TRANSFER (T) instruction.
This instruction evokes the transferring of the ACCU1 contents in the specified variable. The destination, cannot be a constant.

31.4.4. Logic Operations on Word Variables

Movicon allows logic combinations of byte, word or doubleword variables. The AND logic or OR logic or OR EXCLUSIVE combinations permit the data of two variables to be combined (or of one variable and one constant) previously loaded in the accumulators, with the result placed in the ACCU1 accumulator. The result may they used as pleased before the accumulator is used again in logic.

Example: to execute the OR logic between two 'Data1', Data2' words and transfer the result to 'Data3' word, you need to do as follows:

```
L   Data1      // load Data1 value into ACCU1
L   Data2      // load Data2 value into ACCU1 and move the Data1 value into ACCU2
OW             // execute the OR between the two values and put it in ACCU1
T   Data3      //  transfers ACCU1 to Dato3
```

31.4.5. Operations on Accumulators

Movicon allows the contents of two accumulators, ACCU1 and ACCU2 to be swapped over when needed by the programming requirements. When executing the **TAK** instruction, the contents in ACCU1 are transferred to the ACCU2 and viceversa.
You can also execute the binary complement to '1' of the data contained in ACCU1 by executing the **KEW** instruction. The result is always placed in ACCU1.

31.4.6. Word Summary Table

Function	Movicon Instuct.	Step7 ENG Instuction	Step7 GER Instuction	Operand	Description
LOAD	L, LC	L, LC	L, LC	Byte, Word, DWord from any area.	Loading a byte, word or doubleword into Accu1. Loading a numerical constant.

				Constants KD,KH,KF	LC instruction = loading conditional upon CLR
TRANFER	T, TC	T, TC	T, TC	Byte, Word, DWord from any area.	Transfer of contents from Accu1 into a byte, word or doubleword. TC instruction = transfer conditional upon CLR
AND Word	AW, AWC	AW, AWC	UW, UWC		Data contained in two accumulators Accu1 and Accu2 combined by AND logic. The result is placed in Accu1. AWC = AND conditional upon CLR
OR Word	OW, OWC	OW, OWC	OW, OWC		Data contained in two accumulators Accu1 and Accu2 combined by OR logic. The result is placed in Accu1. OWC = AND conditional upon CLR
OR Exclusive	XOW, XOWC	XOW, XOWC	XOW, XOWC		Data contained in two accumulators Accu1 and Accu2 combined by logic EXCLUSIVE OR.The result is placed in Accu1. XOWC = EXCLUSIVE OR conditional upon CLR
ACCU Exchange	TAK, TAKC	TAK, TAKC	TAK, TAKC		Content of two accumulators Accu1 and Accu2 exchanged (Accu1 goes to Accu2 and vice versa). TAKC = Accumulators exchanged if CLR = 1
Complement 1	KEW, KEWC	INVI, INVIC	INVI, INVIC		Calculation of the Complement to "1" (NOT operation) on contents of accumulator Accu1. The result is placed in Accu1. KEWC = Complement to 1 upon CLR
BCD Convers.	BCD, BCDC	ITB, ITBC	ITB, ITBC		Data contained in Accu1 converted from binary code to BCD code. **The data**

					must be in Word format.
Decimal conversion	DCB, BCDC	BTI, BTIC	BTI, BTIC		Data contained in Accu1 converted from BCD code to binary code. **The data must be in Word format.**
Swap Byte	SWAPB, SWAPBC	CAW, CAWC	TAW, TAWC		Bytes exchange for the Accu1 Word
Swap Word	SWAPW, SWAPWC	CAD, CADC	TAD, TADC		Words exchange for the Accu1 DWord

31.5. Compare Instructions

All the Movicon compare instructions always examine the ACCU1 and ACCU2 contents. The data contained in the ACCU1 or ACCU2 can be produced by processing operations or can be variables or constants previously loaded with the Load instruction.

The execution of a compare instruction will always determine a CLR Combined Logic Result.

Example: If you wish to transfer the 255 numeric constant to the "Data1" variable only when the "Data2" variable is equal to zero or on the contrary, if you wish to transfer the 0 numeric constant to the "Data1" variable you need to set as follows:

```
L   Data1          // load Data1 value in ACCU1
L   KD   0         // load zero in ACCU1 and move the Data1 value into ACCU2
==                 // when Data1 = 0 , CLR = 1
L   KD   255       // absolute loading of the 255 value into ACCU1
TC   Data2         // when CLR = 1, transfer ACCU1 into Data2

L   Data1          // load Data1 value into ACCU1
L   KD    0        // load zero into ACCU1 and move Data1 value into ACCU2
><                 // when Dato1 is other than 0 , CLR = 1
TC   Dato2         // when CLR = 1, transfer ACCU1 into Data2
```

The compare operations are largely employed in all applications. The outcome of the comparison, which always determines a CLR, can activate any successive instruction or command type.

31.5.1. Compare Summary Table

Function	Movicon Instruct.	Step7 ENG Instruction	Step7 GER Instruction	Operand	Description
Equal	==	==	==		"Equality" comparison between the data contained in the two accumulators. If Accu1 = Accu2, CLR is set at 1.

Different	><	><	><		"Difference" comparison between the data contained in the two accumulators. If Accu1 is different from Accu2, CLR is set at 1.
Greater	>	>	>		"Greater than" comparison between the two accumulators. If Accu2 is greater than Accu1, CLR is set at 1.
Lower	<	<	<		"Lower than" comparison between the two accumulators. If Accu2 is less than Accu1, CLR is set at 1.
Greater or Equal	>=	>=	>=		"Greater than or equal to" comparison between the data contained in the accumulators. If Accu2 is greater than or equal to Accu1, CLR is set at 1.
Lower or Equal	<=	<=	<=		"Lower than or equal to" comparison between data contained in the two accumulators. If Accu2 is less than or equal to Accu1, CLR is set at 1.

31.6. Arithmetic Instructions

All the arithmetic instructions process and modify the contents of the ACCU1 and ACCU2 accumulators. The variables to be manages are therefore first loaded into the accumulators and, after the arithmetic instructions, transferred to destination variables.
The execution of an arithmetic instruction does not influence the CLR Combined Logic Result.

The execution of an arithmetic instruction can be influenced by the CLR if the letter 'C' is placed after the instruction.

Example: Let's suppose that we need to transfer the result of an arithmetic subtraction between the "Data1" variable and the "Data2" variable to the "Data3" variable. To do this you need to set:

```
L   Data1     // load Data1 value  in ACCU1
L   Data2     // load Data2 value in ACCU1 and move the Data1 value into ACCU2
-             // subtract the ACCU1 value from the ACCU2 value and put the result into
              ACCU1
T   Data3     //  transfer ACCU1 to Data3
```

31.6.1. Arithmetic Instructions Summary Table

Function	Movicon Instruct.	Step7 ENG Instruction	Step7 GER Instruction	Operand	Description
Sum	+, +C	+, +C	+, +C		Arithmetic addition of the two values loaded in the accumulators (integers or floating point). Accu1 plus Accu2 with result in Accu1. +C instruction = Addition conditional upon CLR.
Subtraction	-, -C	-, -C	-, -C		Subtraction between the two numbers loaded in accumulators (integers or floating point numbers). Accu2 minus Accu1 with result in Accu1. -C instruction = Subtraction conditional upon CLR
Moltiplication	*, *C	*, *C	*, *C		Multiplication between the two numbers loaded in accumulators (integers or floating point numbers). Accu2 multiplicated for Accu1 with result in Accu1. *C instruction = Multiplication conditional upon CLR
Division	/, /C	/, /C	/, /C		Division between the two numbers loaded in accumulators. Accu2 divided by Accu1 with result in Accu1 (remainder in Accu2). \C instruction = Division conditional upon CLR.
Increment	I, IC			Byte, Word, DWord from any area.	Logic variable increment by specified quantity after point (e.g. to increment VAR0001 by 4, the syntax is = I VAR0001.4) IC=Increment conditional upon CLR.
Decrement	D, DC			Byte, Word, DWord from any area.	Logic variable decrement by specified quantity after point (e.g. to decrement VAR0001 by 1, the syntax is = D VAR0001.1) IC=Increment conditional upon CLR.
Increment ACCU1	INC	INC	INC		ACCU1 increment by specified quantity (e.g. to increment ACCU1 by 4, the syntax is = INC 4)
Decrement ACCU1	DEC	DEC	DEC		ACCU1 decrement by specified quantity (e.g. to decrement ACCU1 by 4, the syntax is = DEC 4)

Shift to Right	>>, >>C	SRD, SRDC	SRD, SRDC		Data bit contained in accumulator Accu1 are shifted to right by specified quantity. The freed bits are placed equal to zero (e.g. shift right by 6 places: >> 6). The right shift takes into account the sign of the value loaded in Accu1 (although variable used is without sign) setting the most significant bit at 1 if Accu1 is negative. >>C instruction = Shift to right conditional upon CLR
Shift to Left	<<, <<C	SLD, SLDC	SLD, SLDC		Data bit contained in accumulator Accu1 shifted left by specified quantity. The freed bits are placed equal to zero. (e.g. shift left by 2 places: << 2) <<C instruction = Shift to left conditional upon CLR.

31.7. Mathematic Instructions

All the mathematic instructions process and modify the contents of the ACCU1 and ACCU2 accumulators. The variables to be managed are first loaded into the accumulators and then transferred into the destination after the mathematic instruction has been carried out.

If you wish to get precise mathematic results use values with floating commas by activating the "FLOAT" instruction before activating the mathematic instruction. The "FLOAT" or "INT" instructions cause the accumulators to swap over and remain active for the system until an instruction to the contrary is given.

All the instructions can be made conditional upon the previous CLR. By placing the letter "C" at the end of the instruction it will be executed only when the CLR is equal to "1", otherwise it will be ignored.
The execution of a mathematic instruction does not influence the CLR.

Example: if you want to transfer the calculated cosine of the number contained in the "Data1" variable to the "Data2" variable you will have to set as follows:

```
FLOAT      // preset to work with floating comma
L  Data1   // load Data1 value into ACCU1
COS        // execute cosine calculation and put it into ACCU1
T  Data3   //  transfer ACCU1 to Data3
INT        // preset to work with integers
```

31.7.1. Mathematic Instructions Summary Table

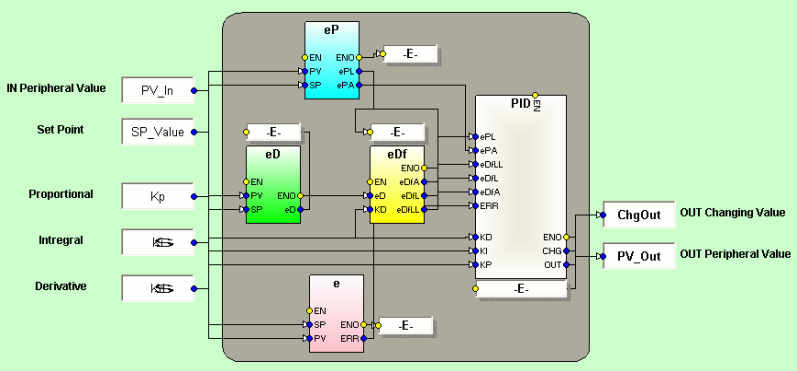
Function	Movicon Instruct.	Step7 ENG Instruction	Step7 GER Instruction	Operand	Description
Floating Point	FLOAT	DTR	DTR		Preset for calculations with numbers in floating point format. The following mathematical numbers will be considered in floating point format. This is a modal instruction and can be deactivated using INT instruction.
Integer	INT	RND	RND		Preset for calculation with integers. The following mathematical numbers will be considered integers. Active by default unless otherwise specified.
Sin	SIN, SINC	SIN, SINC	SIN, SINC		Calculation of Sine of number contained in Accu1. The result is placed in Accu1. The value of the function is express in Radiant.
Cosin	COS, COSC	COS, COSC	COS, COSC		Calculation of Cosine of number contained in Accu1. The result is placed in Accu1. The value of the function is express in Radiant.
ArcSin	ASIN, ASINC	ASIN, ASINC	ASIN, ASINC		Calculation of ArcSine of number contained in Accu1. The result is placed in Accu1.
ArcCosin	ACOS, ACOSC	ACOS, ACOSC	ACOS, ACOSC		Calculation of ArcCosine of number contained in Accu1. The result is placed in Accu1.
Tangent	TAN, TANC	TAN, TANC	TAN, TANC		Calculation of Tangent of number contained in Accu1. The result is placed in Accu1. The value of the function is express in Radiant.
ArcTangent	ATAN, ATANC	ATAN, ATANC	ATAN, ATANC		Calculation of ArcTangent of number contained in Accu1. The result is placed in Accu1.

Hyperbolic Sin	SINH, SINHC				Calculation of Hyperbolic Sine of number contained in Accu1. The result is placed in Accu1.
Hyperbolic Cosin	COSH, COSHC				Calculation of Hyperbolic Cosine of number contained in Accu1. The result is placed in Accu1.
Hyperbolic Tangent	TANH, TANHC				Calculation of Hyperbolic Tangent of number contained in Accu1. The result is placed in Accu1.
Exponential	EXP, EXPC	EXP, EXPC	EXP, EXPC		Exponential calculation of natural number "e" with exponent contained in Accu1. The result is placed in Accu1.
Power	POW, POWC				Exponential calculation of Accu1 raised to the power of Accu2. The result is placed in Accu1.
Logarithm "e"	LOGE, LOGEC	LN, LNC	LN, LNC		Calculation of natural logarithm (base "e") of number contained in Accu1. The result is placed in Accu1.
Logarithm 10	LOG, LOGC				Calculation of base 10 Logarithm of number contained in Accu1. The result is placed in Accu1.
Square Root	SQRT, SQRTC	SQRT, SQRTC	SQRT, SQRTC		Calculation of square root of number contained in Accu1. The result is placed in Accu1.

32. Synapses

The synapse allow complex or not so complex logic to be entered within screens using graphical links between various objects.

Movicon has a powerful engine for processing logic internally within screens. The **Synapse** are tools left at the programmer's discretion for entering this type of logic. Their use permits the programmer to graphically connect objects on screen to each other and program logic using basic script code associable to each object.
Each object can be configured with a determined number of inputs and outputs (the synapse), which will be linked to other symbols using the connector objects. The input and output status can be read within the basic script code of each object and the appropriate output values can be written as a consequence and propagated to the other graphically linked objects.
Each symbol containing synapse can be saved in the Symbol Library and reused in other projects. There are already fully working symbols containing synapse logic in this library, among which you will find components for creating "PIDs" for instance.



An example of a screen with Synapse Logic

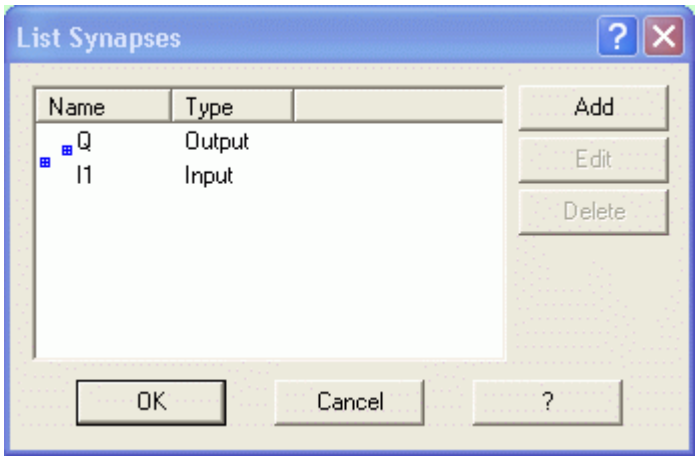
Synapse logic editing is composed of two phases:

- **Creating the graphics**: this phase consists of creating the graphical part then after having inserted the objects you need on screen, you should proceed with creating the Synapse (or connector points) to be associated to each object. This points will then be linked to the synapse of the various objects using the connector object (see "Inserting Synapse" and "Connecting Synapses")
- **Inserting Script Code**: this phase consists of inserting basic script code internal each object to which one or more synapse has been associated. This will permit information to be transmitted between the various objects during runtime mode (see "Synapse Logic Programming")

The graphical part is the most easiest to accomplish, compared to inserting code in each of the objects needing you to have sufficient know how on the basic script functions (see "Synapse Logic Programming"). However, programmers with little know how can still complete these tasks easily by using the Synapse symbols from the Symbol Library, which are already tested, functionable and modifiable in all their parts. After having inserted a symbol containing synapse from the Symbol Library, you can replace the variables, used within, with those from the project you are developing.

32.1.1. Inserting Synapse

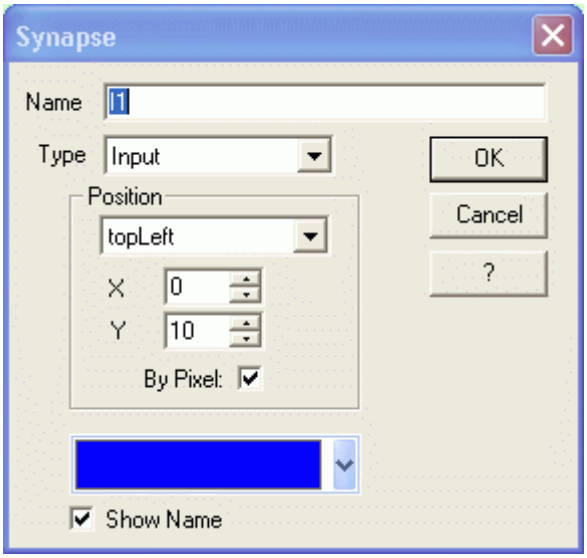
The first thing to do when creating Synapse logic is to assign the screen object one or more synapse, in "Input" or "Output". To insert an object's synapse right click on the object and select the **"Edita Sinapses..."** command to open the dialog window listing any already Synapse associated to the object:



The following commands can be used through this window:

- **Add**: this button adds a new synapse, by associating it to the selected object. Upon pressing this button another dialog window will open to allow you to configure the synapse as described below.
- **Edit**: this button allows you to edit the synapse selected in the list. Upon pressing this window the same dialog window used for inserting a new synapse will show as the editable properties are the same ones at this moment.
- **Delete**: this button allows you to delete the synapse selected in the list and therefore its association to the object selected.

As mentioned above, the "Add" button is used for inserting a new synapse which will be configured to define its type and graphical aspect. Once a synapse has been created it can then be edited afterwards using the "Edit" command. The Synapse configuration window is as shown below:



Name

This editbox is used for assigning the synapse with a name. Its name must be unique and different from the other synapses defined for the object you have selected. An error message will appear, If you insert a name that has been already given to another synapse.

Type
This selection box permits you to establish whether the synapse should be input or output:

- **Input:** the synapse is considered as an input point for the object in which it is inserted and can be connected to other output synapse in the same screen.
- **Output:** the synapse is considered as an output point for the object in which it is inserted and can be connect to other input synapse in the screen.

Position
These controls are needed for establishing the synapse's position, presented by a small colored dot, within the object in which it has been inserted. The position is provided with a selection dot in which to apply the synapse and any eventual offset in the X and Y coordinates for moving the dot within the object. The position options are:

- **top left**
- **top right**
- **bottom right**
- **bottom left**
- **at the top**
- **on the right**
- **at the bottom**
- **to the left**
- **in the middle**

You must consider that the synapse's initial position is always on the edge of the rectangle that surrounds the object it is associated to. However, you can associate a movement offset starting from this initial position:

- **X:** this editbox establishes the synapse's horizontal movement. This movement is always towards the right with positive numbers and towards the left with negative numbers, independently from the position assigned to the synapse.
- **Y:** this editbox establishes the synapse's vertical movement. This movement is always towards the bottom with positive numbers and towards the Top with negative numbers, independently from the position assigned to the synapse.
- **by Pixel**: The synapse's offset will be calculated in pixels when this check box is enabled.

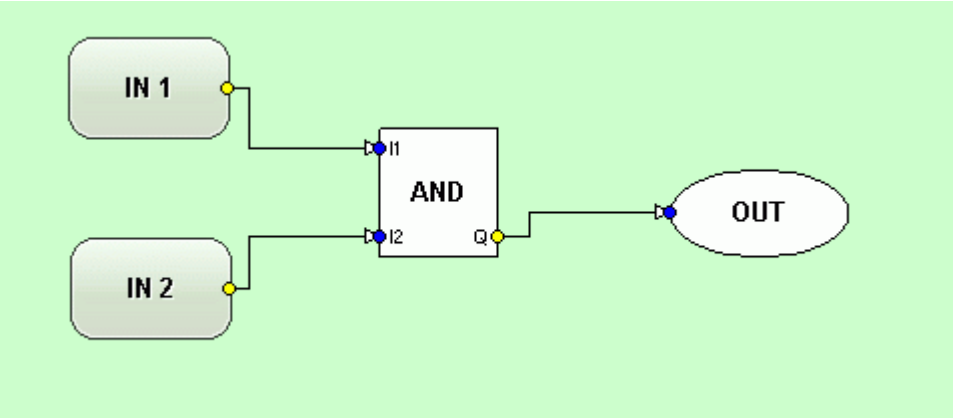
It is not possible to position the synapses outside the symbol's perimeter (of the surrounding rectangle). In cases where a X and Y offset has been assigned making the synapse go outside the object, it will still be kept inside.

Back Color
This button is used for assigning the synapse a color. When clicking this button a color will show enabling you to pick the one desired. By assigning different colors to the synapses allows you to visually tell Input and Output synapses apart.

Show Name
This option box is used for displaying the name of the assigned synapse at the side of the small coloured circle. The name's position follows the position assigned to the synapse and the text is positioned inside the symbol in which the synapse has been associated.

32.1.2. Connecting Synapses

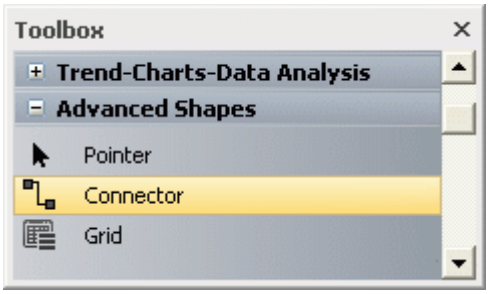
Synapses can be connected to each other within screens by using "Connector" objects selectable from the Toolbox "Advanced Shapes" group. These objects are displayed within the screen as connector lines and their properties follow the synapses they are connected to. Therefore once the synapse are connected up together, they can be moved around within the screen without losing their original connections.
This diagram below shows connected synapse objects. The "Out" synapse are in yellow and the "IN" synapses are in Blue.



If the objects are moved, their Connector lines will change position and shape accordingly. Below is described how the synapse connectors are inserted or modified:

Adding Connectors

The **"Connector"** objects are available from the Toolbox "Advanced Shapes" group. Unlike other objects, these objects remain valid while being inserted until another object type is selected or restoring the "Pointer" in the toolbox. You will find that this will speed up synapse connecting operations of the various drawings and symbols on screen.



A new connector must always start from an Out synapse and finish at an In synapse. A grey square will appear within the synapse to indicated that it is selectable, on the contrary a no entry sign will appear to indicate that the Connector cannot be connected at that point, or that there is no synapse, or the synapse is not the input/output type consented at that moment.
It is important to remember that each synapse can be connected with more than one connector and therefore more than one object. This allows one single out synapse value to be shared with more objects at the same time, simplifying code which controls logic.

Modifying a Connector

Modifying a connector inserted on screen can be done by simply selecting it and dragging one of its ends to another synapse of the same type (input/output. In order to do this, you need to first restore the point if not already done so, using the "Pointer" command from the toolbox. After having clicked on the connector line to be changed, if you move on to one of the two synapse connected, the mouse pointer will change shape indicating that the connector can be dragged. Press and keep pressed the mouse key to drag the connector end to another synapse.

Deleting a connection

In order to delete a connection restore the mouse pointer, if not done so already, using the 'Pointer' command from the toolbox. Select the connector to be deleted and cancel it with the "Canc" keyboard key or use the "Delete" command from the Edit menu which appears with a right mouse click.
Deleting an object containing connected synapse will automatically delete all of the Connectors in the object.

Connector Properties

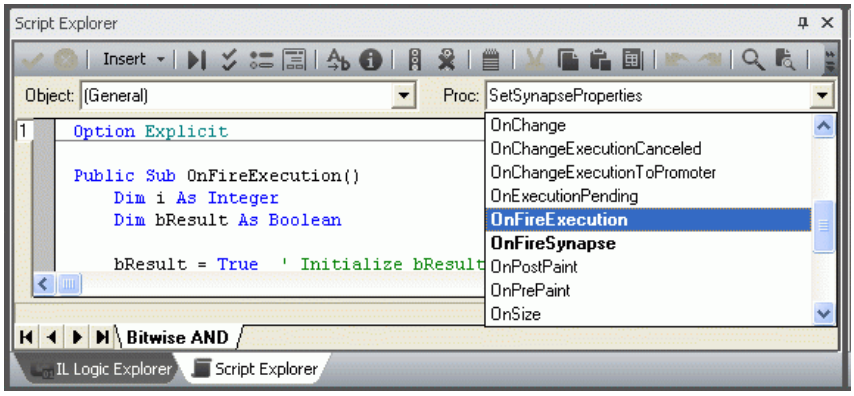
A Connector object is a normal line with all the effects and properties available for this type of object. Therefore, please refer to the relating section describing object properties.
To modify the connector properties, select the one desired and then use its property window.

32.1.3. Synapse Logic Programming

So far we have seen how to insert and link synapse with each other within a screen. Now we come to the most complex stage: programming Synapses.
The relationship between an input synapse and an output synapse must be programmed within the basic script code of the object to which the synapses are associated and for which you will need basic script programming know how.
Below you will find a brief description on the properties, methods and events regarding the synapse basic script programming. For further information on these functions and basic script programming we suggest you refer to the sections on VBA languages.
In cases where the user is not an expert basic script programmer but wishes to use synapses in a screen, they can use symbols from the Movicon Symbol Library and build a logic linking the various synapses.
To access the basic script code of each object, select the object and activate the "Script Explorer" window.

Events generated from synapse executions

In the basic script code of each symbol you can used a series of events, generated automatically by the system the moment in which the synapses are executed within a screen.
Each event is generated in a determined moment, during the synapse logic execution and is listed below.
A new event is entered by selecting the corresponding item in the "Proc" dropdown on the top right of the "Script Explorer" window. In cases where the event has already been managed, the script will appear in bold on the list will appear in bold and its selection will place cursor focus on the same tested procedure.



The events available for managing synapses are:

OnChangeExecutionCanceled (DrawCmdTarget Event)
OnChangeExecutionToPromoter (DrawCmdTarget Event)
OnExecutionPending (DrawCmdTarget Event)
OnFireExecution (DrawCmdTarget Event)
OnFireSynapse (DrawCmdTarget Event)

OnStartSynapsisExecution (SynopticCmdTarget Event)
OnStopSynapsisExecution (SynopticCmdTarget Event)

Synapse Methods and Properties

There are a series of methods and properties available which allow you to created basic script code for executing synapse logic. As already explained in the section on using VBA code, these methods and properties are part of the "DrawCmdTarget Property" and "SynopticCmdTarget" basic script interface.

Properties:

SynapseBackColor (DrawCmdTarget Property)
SynapseValue (DrawCmdTarget Property)
SynapseValueFromID (DrawCmdTarget Property)

SynapsisVisible (DrawCmdTarget Property)

SynapsisExecution (SynopticCmdTarget Property)

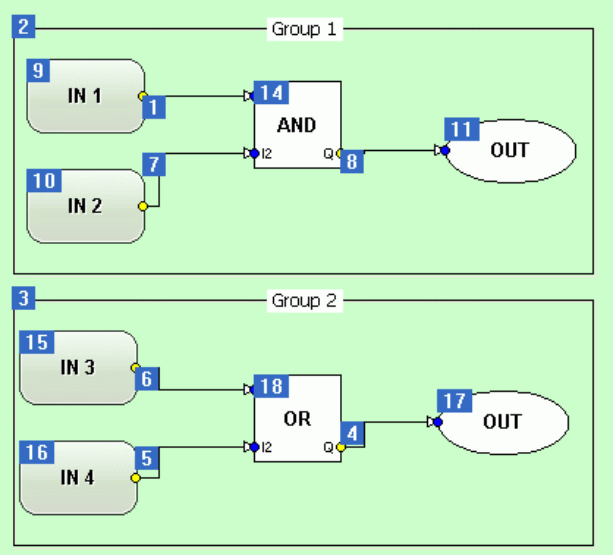
Methods:
GetConnectorObjectConnected (DrawCmdTarget Function)
GetNumConnectionsOnSynapse (DrawCmdTarget Function)
GetNumSynapsis (DrawCmdTarget Function)
GetObjectConnectedOnSynapse (DrawCmdTarget Function)
GetSynapseName (DrawCmdTarget Function)
GetSynapsePoint (DrawCmdTarget Function)
HasSynapsis (DrawCmdTarget Function)
IsSynapseConnected (DrawCmdTarget Function)
SynapsePassExecution (DrawCmdTarget Function)

GetObjectByUniqueID (SynopticCmdTarget Function)
SetSynapsisVisible (SynopticCmdTarget Function)

32.2. Synapse Execution

Synapse programmed within a screen can be executed at any given time using the appropriate commands available from the different Movicon resources.
Synapses are executed starting with the first object's **OnFireExecution()** event contained by the synapse logic inserted in the screen. The same events are generated for the other objects based on the order they have been connected using the Connector objects, and commanded by the **"SynapseValue()", "SynapseValueFromID()"** properties or the **"SynapsePassExecution()"** method.
When these above mentioned properties or methods are not used in an object's **OnFireExecution()** event, the synapse logic's execution will remain pending and still in that object.

More than one distinct synapse logic block and be inserted on screen, where each block will be composed of objects and synapse connected to each other with connectors. However,the individual block cannot be connected to other but you can establish a tab order to execute each block when needed.
The order in which the synapse logic is executed is established through each object's tab order settings, activated with the **"Tab Order"** from the **Layout** menu or with the "**Ctrl+D"** keys.
In the flow chart illustrated below a screen is displayed with two synapse groups, marked out in two decisive group boxes.
When the synapse logic execution command is given, the logic group in "Group 1" with the AND block will be executed first. This is because the connector object with the lowest tab number is in Group 1.



It is clear from this chart that only one connector object belonging to one group has been set in a tab order to allow quicker order selecting. The final execution flow is therefore determined by the logic connections created between the various synapse, but is given execution priority over those groups containing connector objects assigned given lower tab orders compared to the others.

The command to start the synapse logic execution can be given in different ways as follows:

Synapse Logic Execution form Screen

There are two execution properties available in the screens, which consent you to manage the synapse logic execution start:

- **Execute Synapse**: When enabled, this property will active the execution of any synapse logic upon Screen load. The logic will only be executed once.
- **Synapses Cyclic Execution**: When enabled, this property will activate the cyclic execution of any synapse logic when the Screen is active. The synapse logic needs to be executed at least once before the cyclic execution activates, therefore you will need to enable the "Execute Synapse" property as well or invoke the start command through one of the other methods described below.

Execute Synapse Logic on command

The synapse logic execution can be commanded using the Movicon Command List. In the "Screen" command group you will find the "Execute Synapses" command which will activate the synapse logic execution for the screen selected. The Command List can be used in different Movicon resources and therefore synapse logic execution activation can be commanded as pleases. In addition, it is absolutely necessary that the screen be open or loaded in memory in order for its synapse logic to be executed.

Execute Synapse Logic using Basic Scripts

To start the synapse logic execution from a basic script you will need to use the appropriated "ExecuteCommand" function. The command string to be passed to the function is:

```
ExecuteCommand("<CommandType synoptic='Screen1' action='6' monitor='0' parameter='' x='-1' y='-1' width='0' height='0' Caption='true' Border='true' Resizeable='false' SysMenu='false' MinimizeBox='false' MaximizeBox='false'>Synoptic</CommandType>")
```

It is important to specify the below parameters for this type of command:

synoptic: name of the screen where the synapse logic is to be activated
action: The value 6 identifies the "Execute Synapse" command

It is indispensable that the screen be opened or loaded in memory in order to execute the synapse logic.

Synapse Visibility

You may find it useful not to have the synapse and their connectors visible on screen during the runtime mode. This can be done by disabling the screen's "Show Synapses" style property, or by using the appropriated "SetSynapsisVisible" basic script function.

33. Soft Logic

33.1. SoftLogic IEC 61131-3 Integration

Movicon integrates an optional programming environment called Logicon, a SoftPLC software compliant to the IEC 61131-3 standard.

Logicon is a SoftPLC programming environment integrated in Movicon. Thanks to this powerful tool, users are now fully equipped with an all-in-one environment covering supervision and RealTime I/O logic control.
Logicon is the result of intense collaboration between Progea and KW Software GmbH, the German MultiProg producer company, whose Logicon version is integrated in Movicon.
The advantages offered are numerous where only one unique platform is needed, capable of developing and creating both on the HMI side and control side, with the enormous benefit of sharing Tags in an all-in-one system. Projects are run synchronized but separately in two Windows' layers (User Mode for supervision and Kernel Mode for PLC).
The Movicon development environment is now even more enhanced and enriched with the additional PLC IEC 61131-3 planning environment. The PLC runtime, called ProConOs, is executed in a realtime kernel as a normal PLC and is also available for both Windows 32/64 bit and Windows CE.

The Soft Logic programming environment on-line help is only available in English and can be accessed through the Soft Logic editing window.

Soft Logic Software Components

In order to create a project with Soft Logic you will need to use certain components to execute it in runtime and exchange data with Movicon. These components are:

- **Logicon**: is a soft logic project development which has ben implemented in Movicon and therefore can be opened as a Movicon MDI window.
- **ProConOs**: is a soft logic runtime module. Once the project has been created it must be compiled and transferred to this module for running. ProConOs is available for both Windows 32/64 bit and WinCE versions.
- **ProConOs OPC Server**: is the soft logic's OPC Server which consents tags to be exchanged between the ProConOs runtime and Movicon.

Integrated Soft Logic Editor

The SoftLogic Logicon editor has been integrated in Movicon by means of using a resource with the same name "Soft Logic". This resource appears in the Project Explorer's tree structure and has specific commands and configuration options displayed in its corresponding properties window. It also comes with an editor which is opened by double-clicking the resource name.

In cases where other Movicon processes have been started up (Movicon.exe, MoviconService.exe or MoviconRuntime.exe) you won't see the "SoftLogic" resource listed in the project's Explorer window.

As already mentioned, by double-clicking on the Soft Logic resource will open its editor. If this editor has not yet been opened for creating a soft logic project, a window will show for selecting the Template to be used for beginning the project. If you already have a soft logic project it will open up directly in editing mode.
The soft logic project will be created with the same of the Movicon project but with the ".mwt" extension. In addition, a new folder will be created with the same name of the project within which all the soft logic project files will be inserted.

The ".mwt" project file and the soft logic folder must have the exact same name of the Movicon project.

There are two "Soft Logic" resource command selections available in the "Command" pane in the "Project Explorer" window:

Soft Logic OPC Server Configurator

This command allows you to open the ProConOS OPC Server configuration window. The ProConOS OPC Server is the channel which consents Movicon application tag communication with Soft Logic. The OPC Server must therefore be configured to allow Movicon projects and the ProConOS SoftLogic to communicate with each other correctly (see "ProConOs OPC Server Configuration").

Synchronization Variable Database

This command allows the Soft Logic tags to be synchronized with those of the Movicon project. Tags can be synchronized each time modifications are done to the global tag table in the Soft Logic. This synchronization consents missing tags to be imported within the Movicon project and, for each tag imported, the dynamic link is set automatically to the tag in the Soft Logic (see "Variable Database Synchronization").

Automatic Soft Logic Commands

Movicon manages the following Soft Logic commands in automatic while working in project development mode:

- **Soft Logic Compilation**: this command is activated each time the Movicon project is saved only on the condition that the Soft Logic editor be previously opened at least once in the opened project.
- **Soft Logic Compilation, Stop, Upload and Restart:** this command is activated every time the Movicon project switches from design to run mode only on the condition that Soft Logic editor be previously opened at least once in the opened project. Movicon manages a 10 sec. timeout when uploading the SoftLogic after which the project is started even when no Upload termination notifications have been received from the Soft Logic.

Debug Window in Runtime mode

When the Movicon project is activated in runtime from the development mode, you will find a button in the command runtime bar to open the Soft Logic Debug window. This window is used for carrying out modifications to the Soft Logic project, while the Movicon project is being run, which are applied by uplaoding them to the Soft Logic PLC ProConOS. In addition, the soft Logic editor button also allows you to activate the debug mode, consenting you to read the status of the tags in the Soft PLC ProConOS, force values and monitor POU logic executions.

33.1.1. Soft Logic General Properties

These general properties are used for setting parameters for configuring the Soft Logic OPC Server. To edit this properties, select the Soft Logic resource and use the Movicon **"Properties Window"**.

OPC Server Soft Logic

This edit box allows you to insert the ProConOs OPC Server name to be used for connecting to the Soft Logic (default = "OPC.OUT.PCOS.21").

Modifications to the OPC Server name do not require you to re-enter or modify the dynamic addresses of each already imported tag. Modifications will be displayed automatically and applied when the project is saved.

OPC Server Resource Name SoftLogic

This edit box permits you to insert the name of the OPC resource to be used for connecting to the Soft Logic. The ProConOs OPC Server Configuration window consent you to insert more than one resource. Each resource can be set connect to a different Soft Logic or PLC. The name or the resource must be the same one set in the ProConOs OPC Server.

Modifications to the OPC Server name do not require you to re-enter or modify the dynamic addresses of each already imported tag. Modifications will be displayed automatically and applied when the project is saved.

Default Variable Group Name

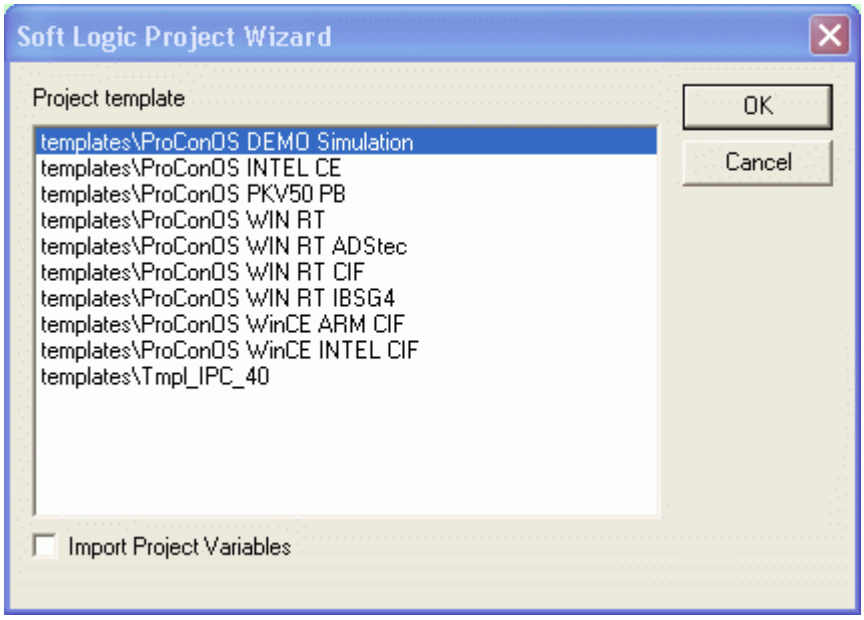
This edit box permits you to customize the default name to be used for the Movicon Tag group which contain the Soft Logic tags. Other sub-groups will be created within this group reflecting the same group hierarchy in the Soft Logic.

33.1.2. Variable Database Synchronization

The Soft Logic tags can be synchronized with those from the Movicon project. This syncronization is bidirectional, but there are few restrictions that must be taken into account. Below is described the procedures to use for synchronizing tags.

Importing Movicon RealTime DB tags to Soft Logic

Tags created in the Movicon project, kept in the RealTimeDB, can be imported to the Soft Logic project only when the project is created first time round where a window will show for selecting the template to be used for creating the Soft Logic project. In this window you will find the "Import Project Variables" option. When enabled this option consents the Movicon RealTimeDB variables to be imported to the Soft Logic project when enabled.



When importing tags automatically, Movicon will insert the OPC link to the Soft Logic tags in the in the "Fixed I/O address" tag properties. During this phase you will not be able make tag selections to be imported as all tags existing in the RealTimeDB will be imported.
Once the Soft Logic project has been created you will not be able to import other Movicon variables.

Importing Soft Logic tags to the Movicon RealTimeDB

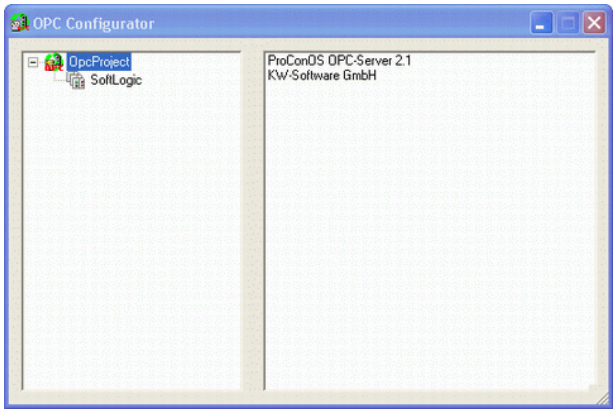
Importing soft Logic tags to Movicon can be done at any time using the "Synchronize Variable Database" command from the "Project Explorer Window's command pane. This command gets enabled automatically each time a tag's "OPC" option is enabled in the Soft Logic "Gobal Variables" resource. If this command should become disabled, just enable the property of any Soft Logic variable or check this option again. "Synchronize Tag Database command activation will import all those Soft Logic tags with enabled OPC and not already present in the Movicon RealTimeDB. The imported tags will be created with the same names of those from the Soft Logic and with the "Fixed I/O address" properties already compiled with the corresponding OPC links. These tags will then be inserted in a tag group with the same name set in the "Nome Gruppo Tag di Default" property. Other sub-groups will be created within this group reflecting the same group hierarchy in the Soft Logic.

New tags can be created in the Soft Logic using the "Data Types" resource. These types of tags can be "ARRAY", "STRING" and "STRUCT". The tags which have been declared with a "Data Type" in a custom "Global Variables" resource will not be imported automatically to the Movicon RealTimeDB.

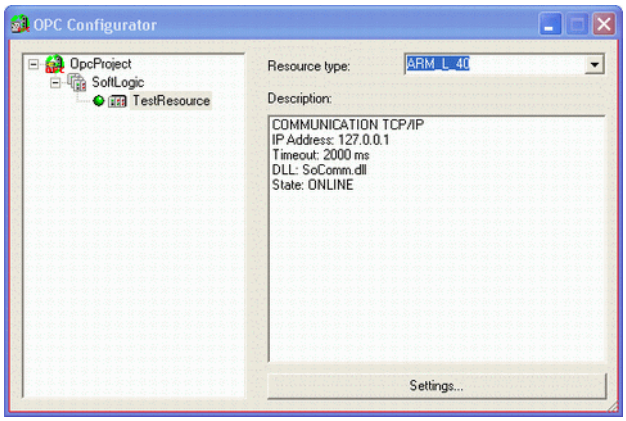
33.1.3. ProConOs OPC Server Configuration

Once the Soft Logic project has been created you should proceed in configuring the OPC ProConOs Server to associate the Soft Logic as follows:

1. Start the OPC configurator using the "Soft Logic OPC Server Configurator" command found in the "Commands" drop down window at the bottom right of the "Project Explorer" window, or from the Windows "Start - All programs - KW Software - ProConOS OPS server 2.1 desktop – OPC Configurator" menu. This configurator window will appear:

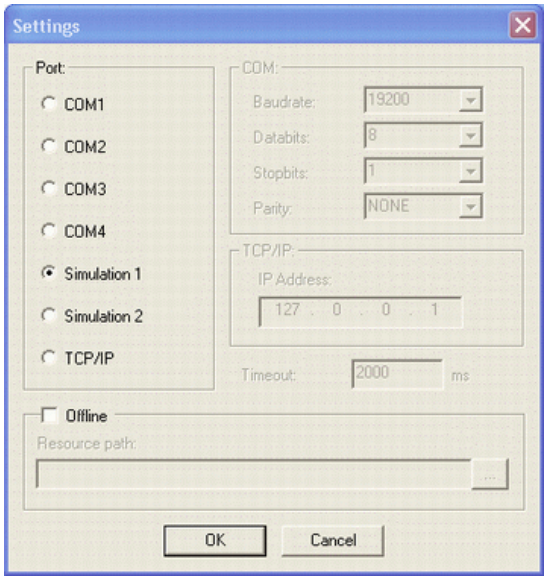


2. Right click on the "OPCProject" and select "New Workspace..." or "Open Workspace..." if you have a workspace already. This will open a browse window where you must select the Soft Logic project in question. This will change the name of the "Workspace" to the project's name.
3. Now right click on the project's name (Workspace) and ass a new resource using the "New Resource..." command. Change the name of the new resource by inserting the one defined in the Movicon "OPC Server Resource Name SoftLogic" property (or as an alternative you can insert an name of your choice and then also insert it the Movicon "OPC Server Resource Name SoftLogic" property. Keep the resource name selected and select the "ARM_L40" item from the "Resource Type" list on the right.



4. Click on "Settings..." button to open the dialog window below and select the communication port option desired. If you don't have any field devices you can select "Simulation1" to test the project in simulation mode. Otherwise select "TCP/IP" if communicating through Ethernet

and specify the device's IP address. Confirm with OK to close the window to go back to the above window.



5. Right click on the "OpcProject" item and invoke the "Save Workspace" command. This will create a file with the resource name in the Soft Logic project folder (ie. "TestResource") with the ".opc" extension containing the OPC settings. This file will the one used by the ProConOs OPC Server for exchanging data with the field devices and the Movicon OPC Client.
6. In cases where a Windows CE device has to be used and therefore the OPC Server, the ProConOs will be executed on the WinCE device, the ".opc" file ("TestResource.opc" as an example) must be copied to the "OPCProjects" folder from the OPC Server ProConOs installation folder in the WinCE device.

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