Programmer's Manual

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MOVICON X1

PROGRAMMER'S MANUAL

INDUSTRIAL AUTOMATION SOFTWARE
progea

Movicon is a S.C.A.D.A. system for Windows™ entirely developed and produced by Progea.

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Movicon X1 Programmer Guide

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1. Introduction

Movicon Programmer's Guide Contents

The Programmer's Guide contains all the necessary information for Movicon 10 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.
For further information about the default graphic Editor (Paintbrush™ or Paint™ according to the Windows version being used), please refer to the Microsoft Windows™ 'User's Manual'.
When using a graphic editor different from that for default please consult the relevant manual provided with the graphic editor being used.
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.

1.1. Preface

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

- All the illustrations in this manual refer to the 10 version with Windows™XP platform. Unless specified otherwise, Movicon's features refer to version 10.
- Windows™2000 and Windows XP refer to the trademarks of Microsoft inc.
- Crystal Report refers to the product registered by Seagate, version 10 or later.
- Movicon™ refers to the supervision system developed by Progea Srl and is protected by the international Copyright laws for version 10 or later.
- Please refer to the owner of any other trademark or product cited.
- 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.

1.2. Keyboard and Mouse Conventions

Movicon exploits the Windows standard techniques such as Copy, Paste, Drag, Multi-selecting etc., for managing projects. Below are listed some conventions and key sequences which are normally used and which will often be referred to in this guide:

KEY1 + KEY2	A (+) sign between the name of the keys indicates that they must be pressed together at the same time. For instance press CTRL+C means press the CTRL key together with the C key at the same time. You can first press the CTRL key and keep it pressed while you press the C key.
TEY1 , KEY2	A (,) sign between the key names indicates that the keys are to be pressed one at a time. For instance press ALT,F means press and release ALT, then press and release F.

***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 Accelerators, 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 'Accelerators' in this guide.
When using the Mouse, the following conversions are used:

CLICK	This means press and release the left mouse key while pointing to a component such as a resource, or any kind of object.
DOUBLE CLICK	This means press the left mouse key twice in quick succession while pointing to a component such as a resource or any king of object. In this case a drop-down menu will appear reporting a list of Windows standard commands, such as Copy, Paste, etc., and some commands or specific properties, if available, for the component selected.
CLICK with right key	This means press and release the right mouse key.
DRAG	This means press the left mouse key while pointing to the object required and keeping the key pressed down, move the mouse pointer to the position desired and then release it.
MULTI-SELECT	This means select more than one object at the same time. In order to do this you have to select the first object in the list and then keeping the 'SHIFT' key pressed, click on the last object to be selected or use the UP ARROWS or DOWN ARROWS until the last object has been selected. By doing this all the objects, including the first to the last selected, will automatically be selected. If you use the 'CTRL' key instead of the 'SHIFT' key, by keeping it pressed you can select only the objects you need by clicking them one at a time with the mouse, skipping over those you don't need.

The most frequently used commands are normally:

COPY	Select the object you wish to copy on to the clipboard or in the Operating Systems RAM. Use the CTRL+C command or click with the right mouse key and select 'Copy'. The selected object, text or component will then be copied in memory.
PASTE	Point the mouse to the you wish to paste the items you copied beforehand. Use the CTRL+V command or click with the right mouse key and select 'Paste'. The object, text or component, previously copied, will be copied in the selection position.
DELETE	Select the object you want to delete. Use the 'Canc' command or click the right mouse key and select 'Delete'. The selected object, text or component will be eliminated.
CUT	Select the object you wish to cut. Use the 'CTRL+X' command or right mouse click and select 'Cut'. The selected object, text or component will be eliminated from its original position but at the same time copied onto the clipboard or in the Operating Systems RAM and remain there ready for the next 'PASTE' command.
CANCEL	Use the CTRL+Z' or right mouse key click and select 'Cancel...'. If you have just carried out an operation by mistake, i.e. 'DELETE', 'PASTE', etc, and you want to cancel it and restore the situation back to what it was before.

The commands reported in the above table are also normally available in the Movicon Main tool bar in icon form.

For further details on *"Standard Techniques of Editing"* please refer to the relevant section in the Guide.

1.3. Installing and Running Movicon

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

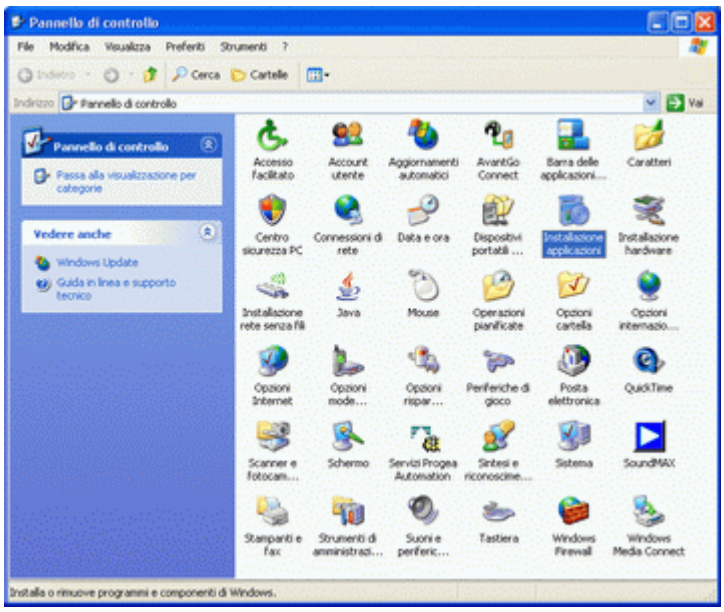
The procedures for installing Movicon on the hardware platform are very simple, and comply with the Microsoft Windows XP/2000 specifications. When inserting the CD-ROM you will automatically enter into the installation environment where the guide command will activate for installing the Movicon components 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:\MoviconX1\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 "MoviconX1" default folder which will then be created with the path: "..\Program Files\Progea\MoviconX1".

Uninstalling Movicon

Movicon, in compliance with the Windows standards, consents to a simple system uninstallation for the removal of 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.



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.PRJ project file:

C:\Program Files\Progea\MoviconX1\Movicon.exe /R C:\Documents\Test.prj

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 "MovRunTime.exe" file which is found in the same Movicon installation folder. The following example is a command line for automatically running the TEST.PRJ project file:

C:\Program Files\Progea\MoviconX1\MovRunTime.exe C:\Documents\Test.prj

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

Movicon Startup as Service

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.

Startup in Demo Mode

Running the applicatoin 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.

1.4. 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.

1.4.1. 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.
For instance, version 10.1.902 means: Version 10.1, Build 902.

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.

The change over to one build to the next does not always maintain compatibility with the previous build. The Internal Release has to be the same to get compatibility. The Internal Release number of the product version can be obtained from the BugBase found on the Progea website.

1.4.2. 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 on the **Support Center** page, 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.

1.5. Technical Support

By filling in and sending back the Movicon Customer Registration form the user will get client technical support and system development updates or parts held relevant (if requested by client) free. Plus 3 months software package guarantee coverage starting from the postage date as stipulated in the contract or purchase licence.
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.

Phone Support

By registering the product, you will have the right to received free phone support for the contract periods. Please check the http:://www.progea.com website for information on how to get phone support access.
You can also subscribe to the Support Contract for extended access time to the FTP site reserved for downloading updates, new drivers, symbols, examples and other utilities.

World Wide Web

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, knowledgebase, 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.

E-mail

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.

Note: To get the most out of the technical support service use the Bug Report module available on the web:
http://www.progea.com at the page "Support Request"
The module permits any problems to be indicated clearly and correctly so that the problem can be quickly singled out and put right which in turn will improve the service.

1.5.1. Web Support Center

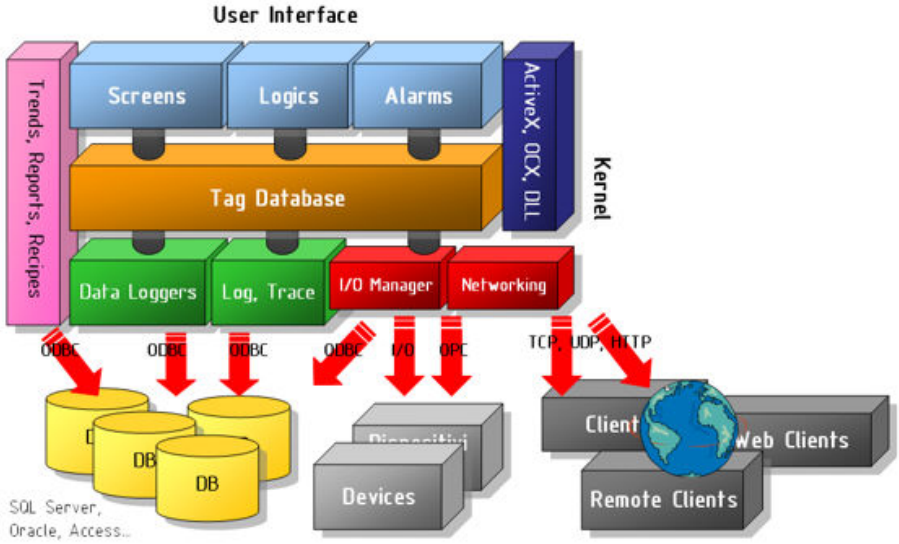
The Progea website can be accessed at:

http://www.progea.com choosing the "Support Center" item from the Support section.

A WebHelp is available on this 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. 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".

2.1. 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:

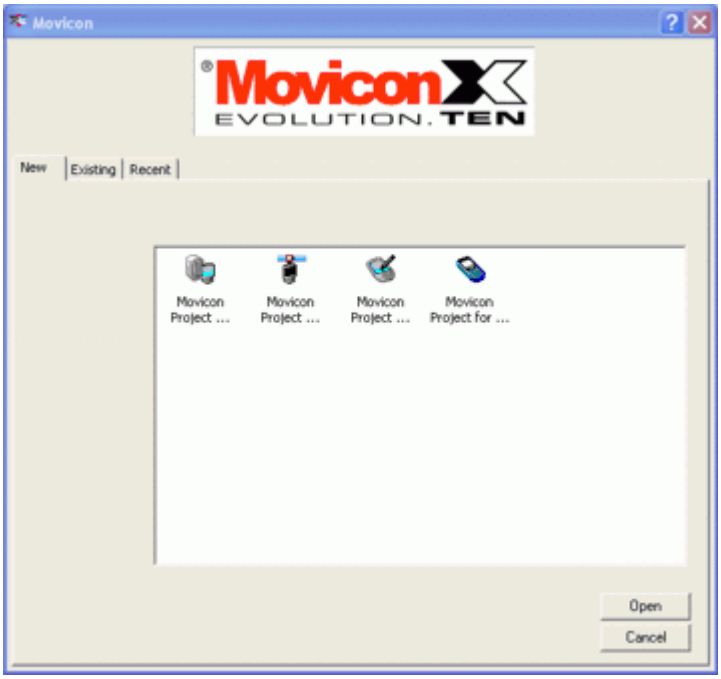
1. create **New** project
2. opens **Exiting** project
3. opens a project in the list of **Recent** projects

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 on which destination software platform the project is to be execute.



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 (O.D.B.C.)
Data Loggers and Recipe Settings (O.D.B.C.)
Alarms Settings

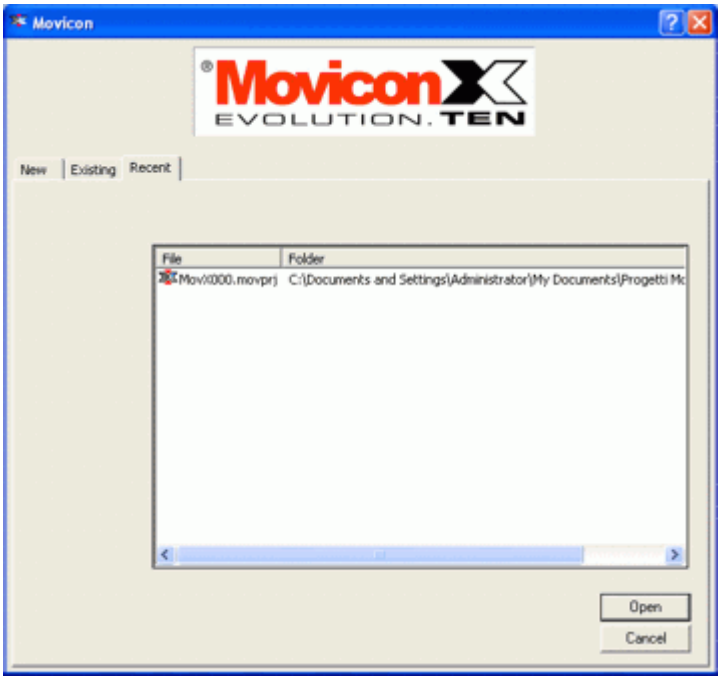
Exiting

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.

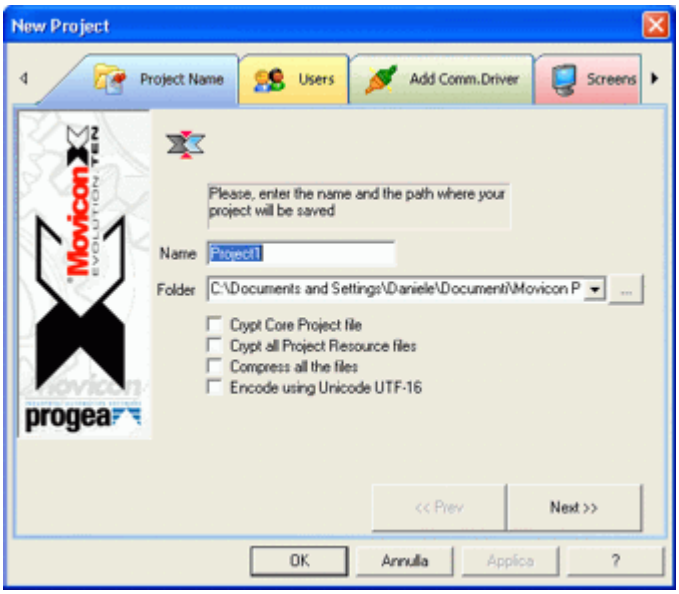
Recent

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.



2.1.1. 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\Movicon Projects\Project1

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

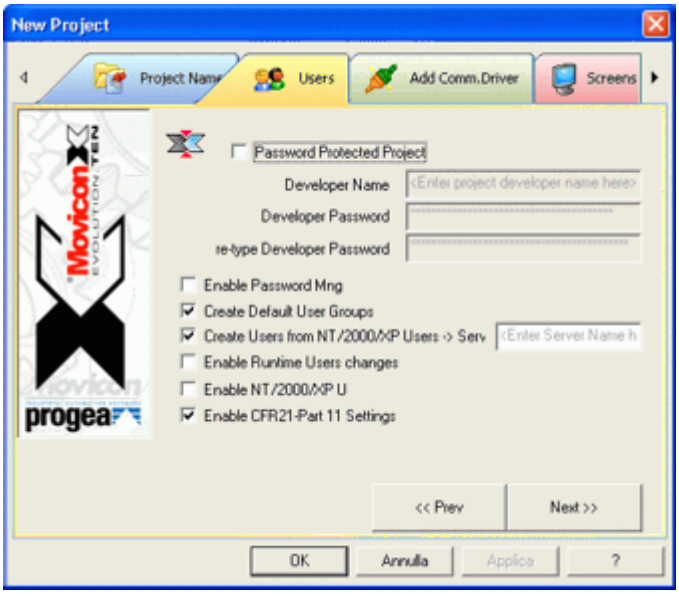
When this option is checked the Movicon Project will be saved in compressed format. This setting can be change after the project has been created through the "Zipped Project" properties accessed from the Project's 'General Settings'.

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'.

2.1.2. 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 10) 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 NT 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 NT User Login

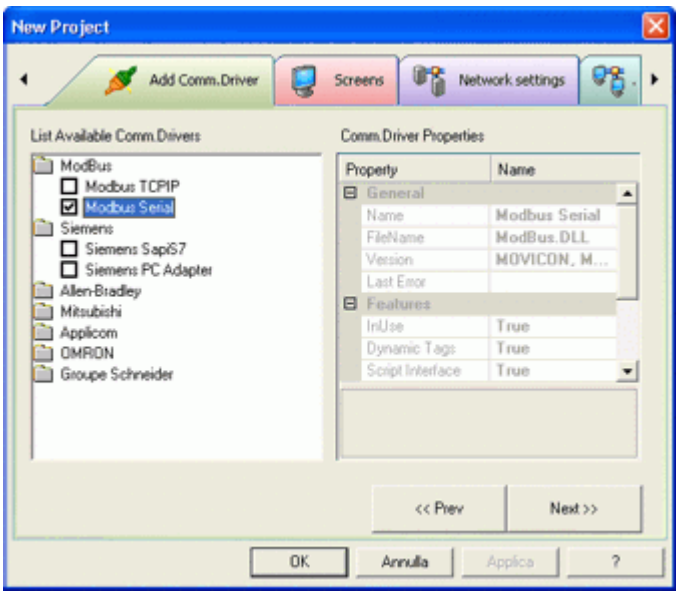
When enabling this option it will become possible to share users from the operating system domain or Windows NT/2000/XP Server in the applied project. This setting can be changes after the project has been created, through the "Enable NT/2000/XP Users" property which is accessed from the NT Users and 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'.

2.1.3. Communication Drivers

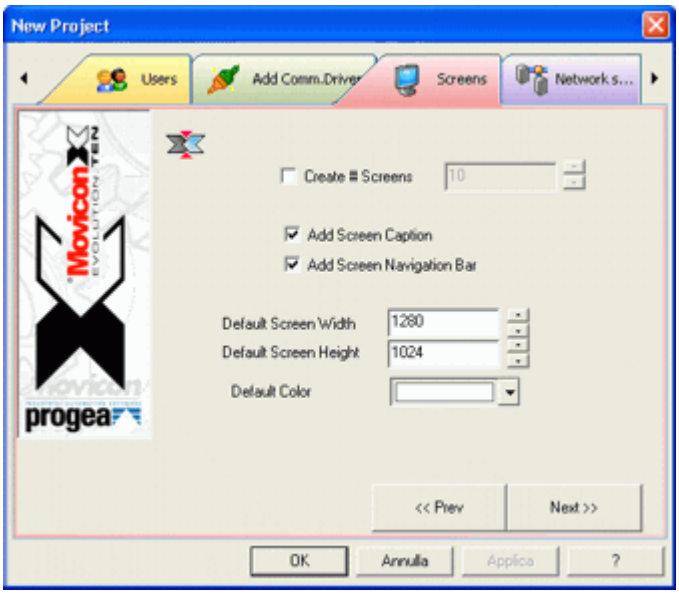
When creating a new project you can define the 'Add Communication Driver' settings to enable one or more communication Drivers to be used in the Project. These settings can then be also edited afterwards, during the project developing phase, through the 'Real Time DB -> List Available Communication Driver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

2.1.4. 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 'Resource' 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'.

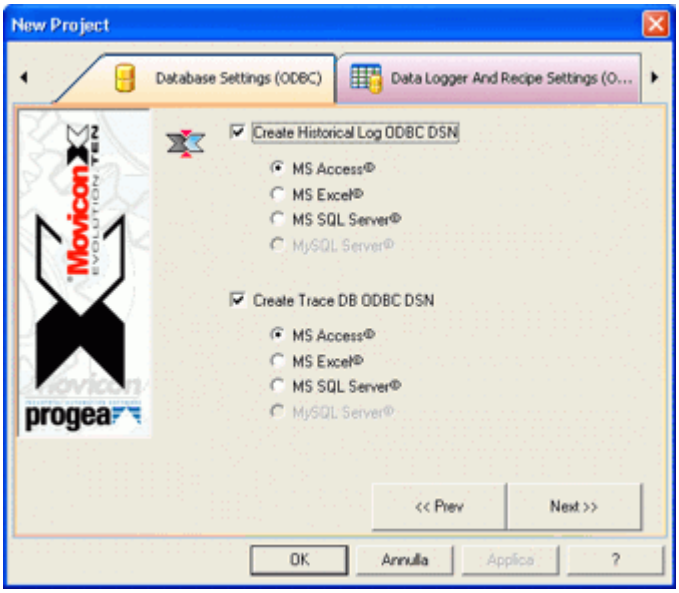
Default Color

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".

2.1.5. 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.



WARNING! Although Microsoft also releases a ODBC driver for Excel™, this is not however a Database, but an electronic worksheet. It is for this reason that Excel™ does not support all the SQL commands compatible with the most common Databases and therefore it is impossible to use Excel™ as if it were a Database. The Movicon resources such as the Data Loggers, Recipes, Historical

Logs, Variable Trace etc., can therefore not be managed with a ODBC link through a Excel™ file.

Create Historical Log OD BC DSN

When this is checked Movicon will create the ODBC Link the DataBase and the Tables inherent to the recording of data for the Historical Log. The formats which can be selected are:

- **MS Access®**: a DataBase is created in Access 2000 format
- **MS Excel®**: a worksheet is created in Excel 2000 format
- **MS SQL Server®**: a Database is created in SQL Server 2000 format
- **MySQL Server®**: a Database is created in MySQL Server format

ODBC link

The ODBC link is always created by using the following name:

ProjectName_HisLog

DataBase

As regards to the DataBase files there are a few differences according to the driver selected:

MS Access: the DataBase will have the name "ProjectName_HisLog.mdb" and will be placed in the project's "LOGS" folder
MS Excel: the worksheet will have the name "ProjectName_HisLog.xls" and will be positioned in the project's "LOGS" folder
MS SQL Server: the DataBase will have the name "ProjectName" and will be inserted in the MSDE driver's installation "..\MSSQL\Data" folder
MySQL Server: the DataBase used is the one already set by MySQL with the name 'Test', found in the MYSQL Server engine installation "..\mysql\data" folder

Tables

The names of the Tables inserted in the DataBase, or worksheets if Excel, are:

Alarms: table containing alarm messages
Drivers: table containing driver error or warning messages
SysMsg: table containing system error or warning messages

Create Trace DB ODBC DSN

When this is checked Movicon will create the ODBC link and the DataBase inherent to the recording of date for the Movicon Variable Trace. The relative tables will be created after through the appropriate "Variable Trace Options Proprieties". The formats which can be selected as default are:

- **MS Access®**: a DataBase is created in Access 2000 format
- **MS Excel®**: a worksheet is created in Excel 2000 format
- **MS SQL Server®**: a Database is created in SQL Server 2000 format
- **MySQL Server®**: a Database is created in MySQL Server format

ODBC link

The ODBC link is always created by using the following name:

ProjectName_TraceDB

DataBase

As regards to the DataBase files there are a few differences according to the driver selected:

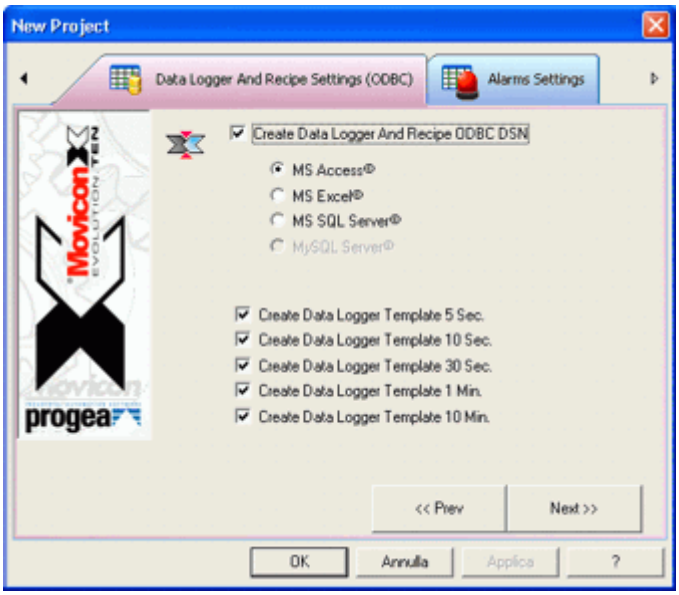
MS Access: the DataBase will have the name "ProjectName_TraceDB.mdb" and will be placed in the project's "LOGS" folder
MS Excel: the worksheet will have the name "ProjectName_TraceDB.xls" and will be positioned in the project's "LOGS" folder
MS SQL Server: the DataBase will have the name "ProjectName" and will be inserted in the MSDE driver's installation "..\MSSQL\Data" folder
MySQL Server: the DataBase used is the one already set by MySQL with the name 'Test', found in the MYSQL Server engine installation "..\mysql\data" folder

Tables

The names of the Tables inserted internal the DataBase, or the names of the worksheets, are defined with the same name of the variable they represent. i.e. if the trace option is enabled for the variable called "VAR00001", a Table called "VAR00001" will be created in the DataBase for every variable enabled with the Trace.

2.1.6. Data Loggers and Recipe Settings (ODBC)

When creating a new project you can set the 'Data Logger and Recipe Settings (ODBC) to define which ODBC link is to be used by Movicon for default to record data inherent to the project's Data Loggers and recipes.



WARNING! Although Microsoft also releases a ODBC driver for Excel™, this is not however a Database, but an electronic worksheet. It is for this reason that Excel™ does not support all the SQL commands compactible with the most common Databases and therefore it is impossible to use Excel™ as if it were a Database. The Movicon resources such as the Data Loggers, Recipes, Historical Logs, Variable Trace etc., can therefore not be managed with a ODBC link through a Excel™ file.

Create Data Loggers And Recipes DSN ODBC

When this is enabled Movicon will create the ODBC link and the DataBase inherent to the recording of data for the Movicon Data Loggers and Recipes. The relative tables are created after through the appropriate "Create DB Table" property which can be accessed from the Database Settings common to Data Loggers and Recipes Properties'. The formats which can be selected as default are:

- **MS Access®**: a DataBase is created in Access 2000 format
- **MS Excel®**: a worksheet is created in Excel 2000 format
- **MS SQL Server®**: a Database is created in SQL Server 2000 format
- **MySQL Server®**: a Database is created in MySQL Server format

ODBC link

The ODBC link is always created by using the following name:

ProjectName_DLR

DataBase

As regards to the DataBase files there are a few differences according to the driver selected:

MS Access: the DataBase will have the name "ProjectName_DLR.mdb" and will be placed in the project's "DLOGGERS" folder
MS Excel: the worksheet will have the name "ProjectName_DLR.xls" and will be positioned in the project's "DLOGGERS" folder
MS SQL Server: the DataBase will have the name "ProjectName" and will be inserted in the MSDE driver's installation "..\MSSQL\Data" folder
MySQL Server: the DataBase used is the one already set by MySQL with the name 'Test', found in the MYSQL Server engine installation "..\mysql\data" folder.

Tables

The names of the Tables inserted internal the DataBase, or the names of the worksheets if Excel, are defined with the same name of the Data Logger or Recipe. i.e. if a Data Logger call 'Temperature is inserted, a Table called 'Temperature' will be created in the DataBase. Therefore a table will be created for every Data Logger and Recipe inserted into the project.

Create Data Logger Template

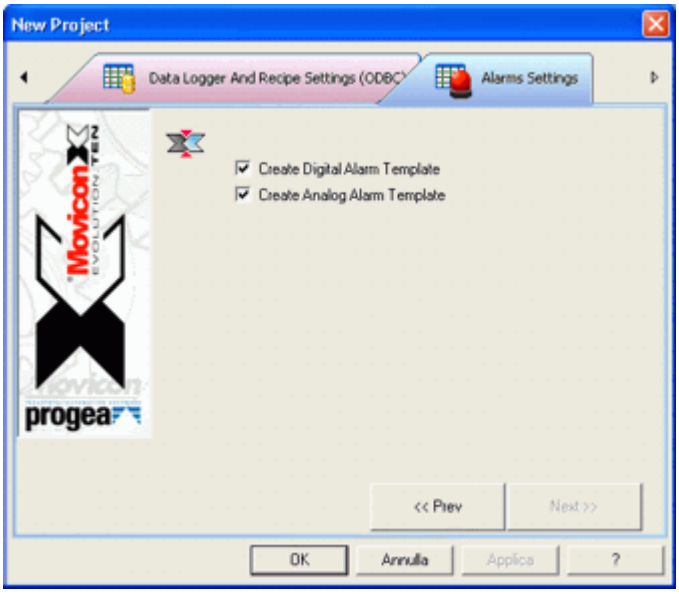
When this box is checked 1 to 5 Data Loggers will be automatically added to the list of the project's Data Loggers as Templates. The only difference between these Data Loggers is the recording which may be:

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.

2.1.7. 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. 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 "Associating Alarms to Variables", 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.

Create Analog Alarm Template

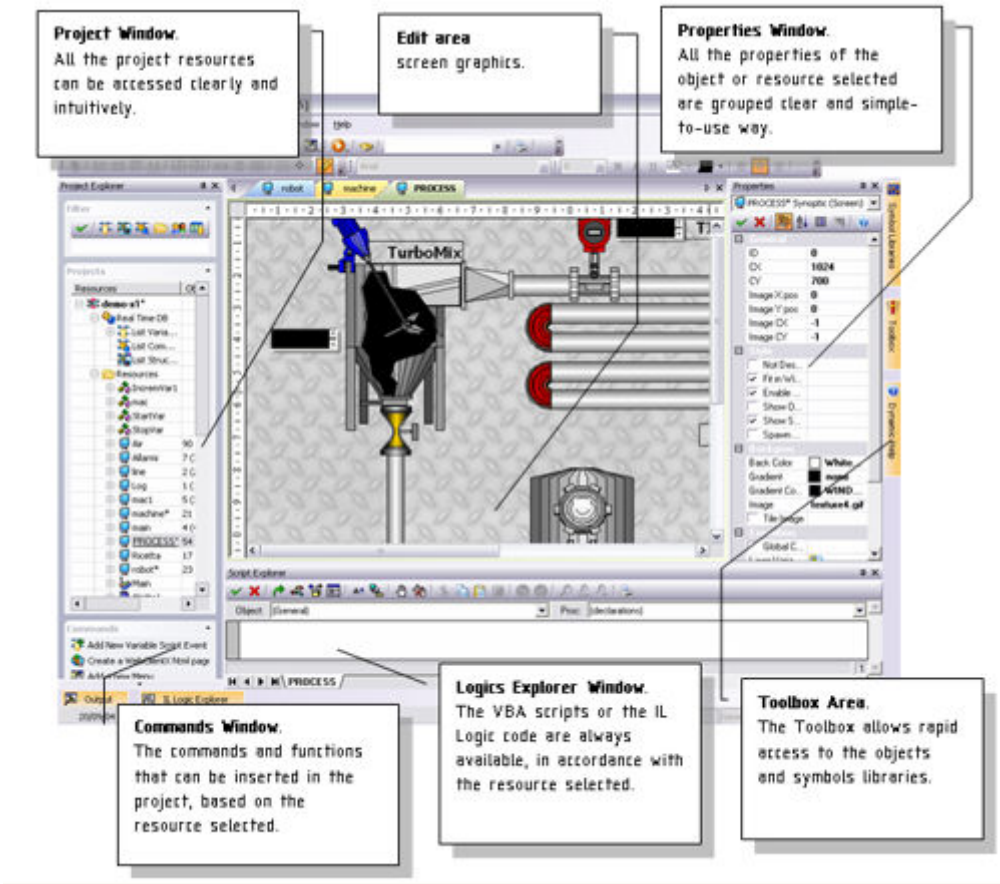
When enabling this selection box an Analog alarm will automatically added to the project's 'Alarms List', which is an alarm with more than one intervention thresholds. These alarms have four thresholds which are defined as follows:

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 "Associating Alarms to Variables", 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.

2.2. 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:

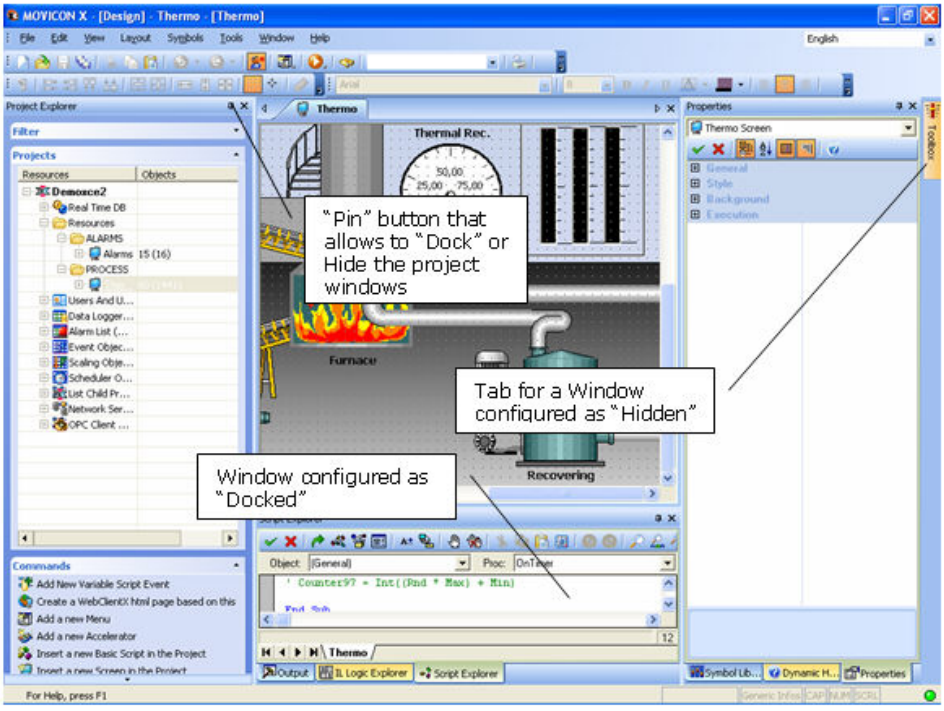
By right clicking on these TABs a window will display as shown below:

The two commands have the following functions:

- **Close**: closes the resource in question
- **Go to Resource**: the resource in question is highlighted in the "Project Explorer" tree structure. This is handy when the resources are opened in more than one project, or any child projects, at the same time, to identify which project the resource belongs to (especially when the resources of the different projects have the same name).

2.2.1. 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:

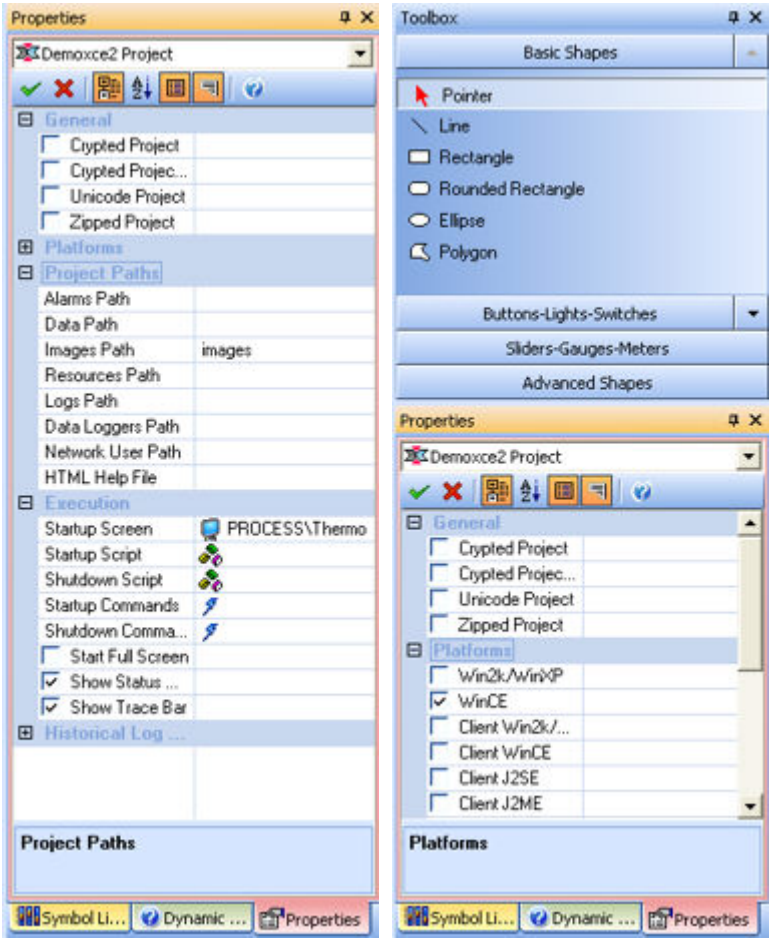
This icon means that the window is 'Docked', therefore it will remain in the foreground and always visible in the position defined by the programmer.

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

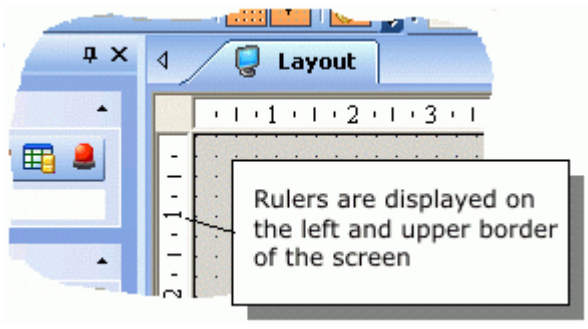
When a window is docked you can drag it to a more suitable position either by attaching it to the Movicon window border or moving it to the centre of the Movicon workspace or to any other area. In order to do this drag the window by its title bar.
In addition to this you can also create compositions 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.

2.2.2. The Rulers

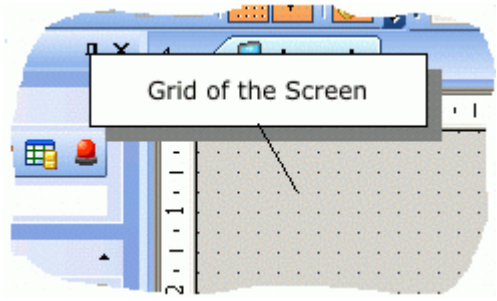
The Movicon Screen windows can be given lateral **'Rulers'** to facilitate designing the graphical interface.



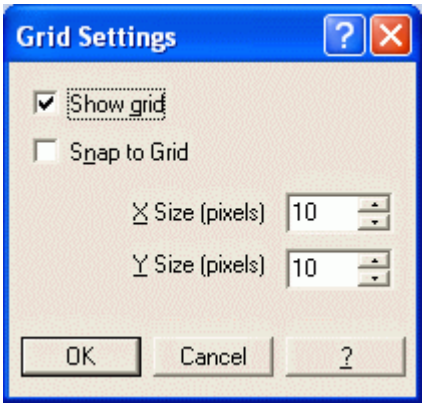
To enable or disable the Rulers just simply use the appropriate command found on the **"Aligning Bar"**, or use the **"Ruler"** item from the **"Layout"** menu. When using the menu item you can enable the horizontal and vertical rulers separately as well as setting the referential measure units (Millimetres,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

2.2.3. 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.

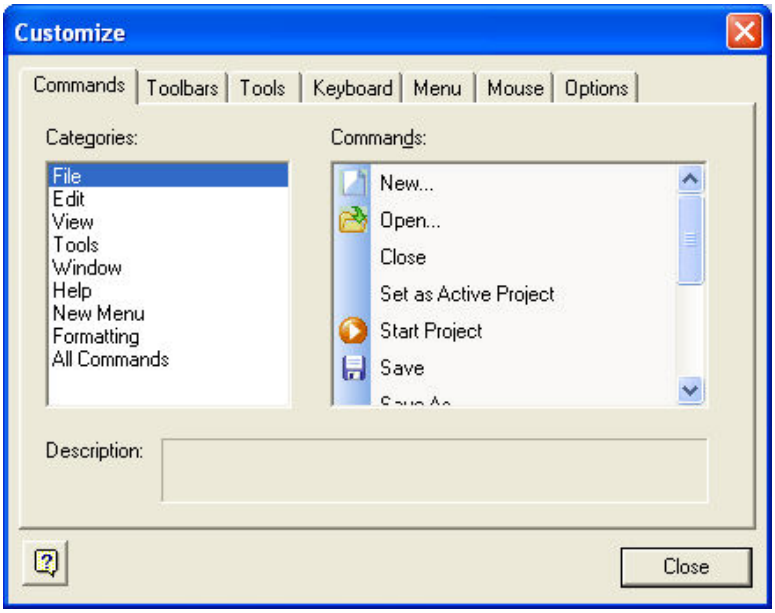
2.2.4. Customizing Menus and Toolbars

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.

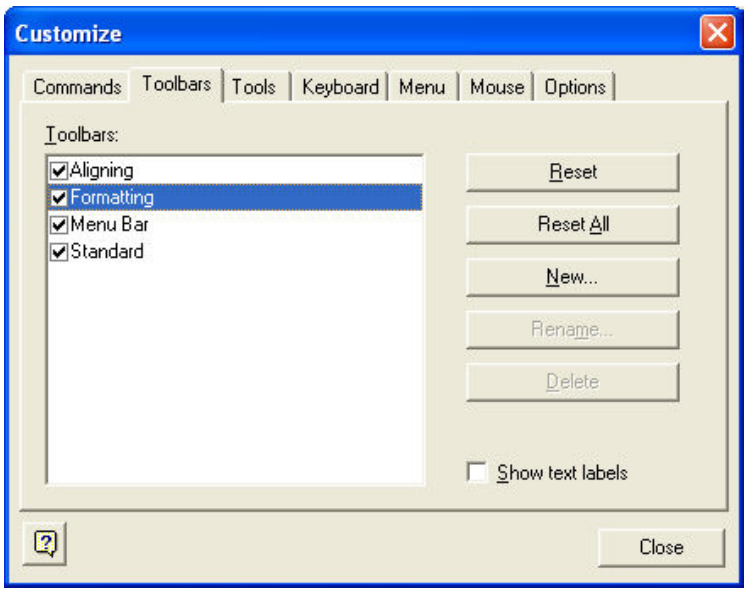


The Toolbars

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.

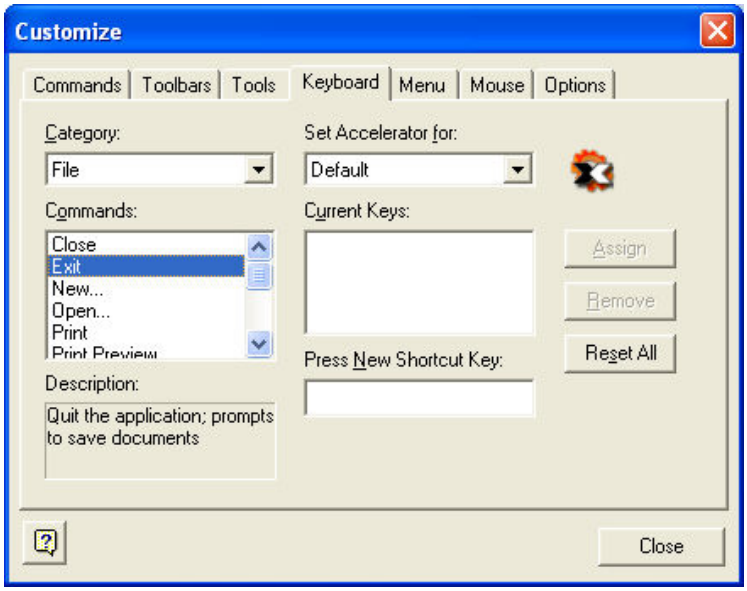
Tools

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.



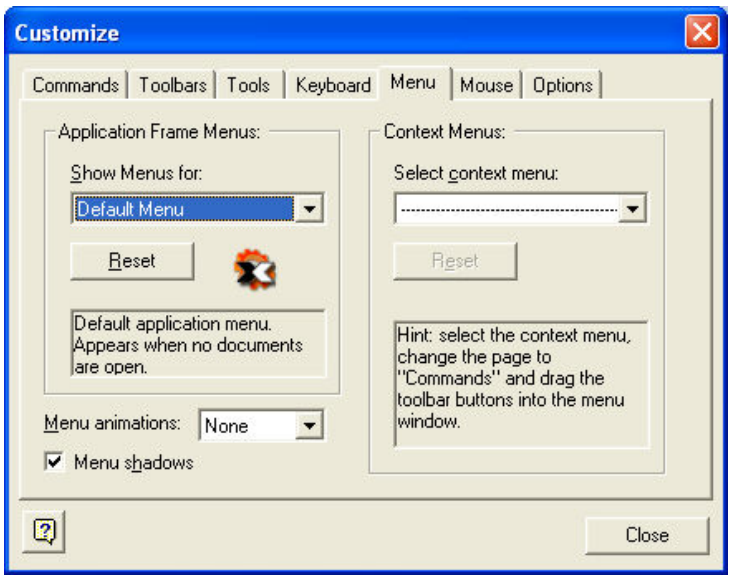
Keyboard

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.

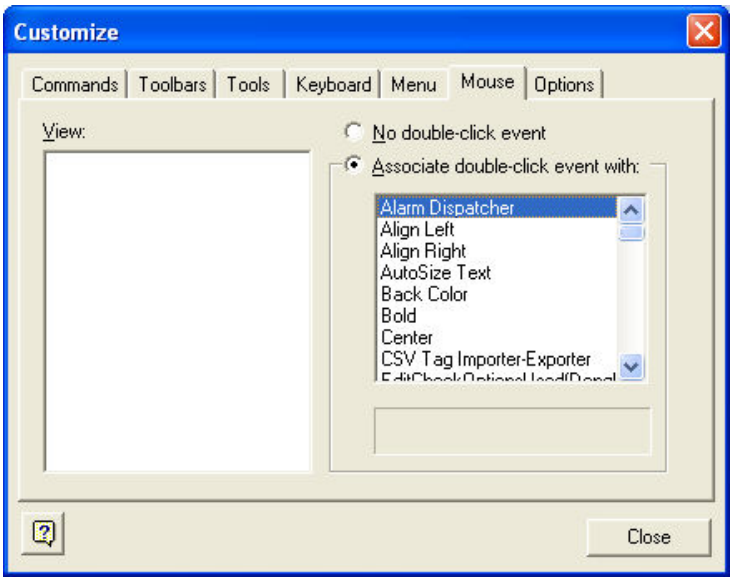


Menu

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.

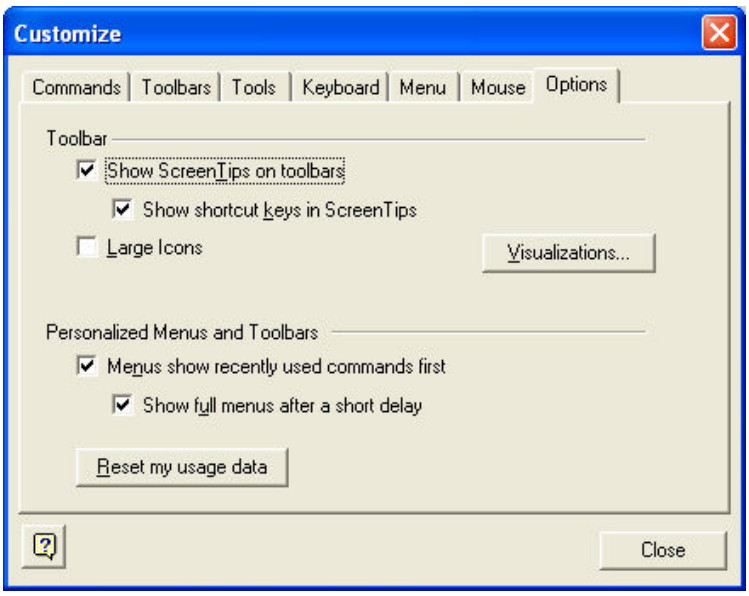


Mouse



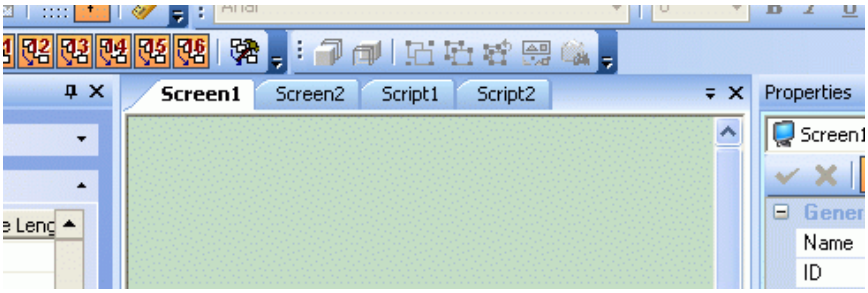
Options

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.

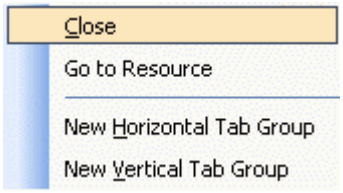


2.2.5. Resource TAB Groups

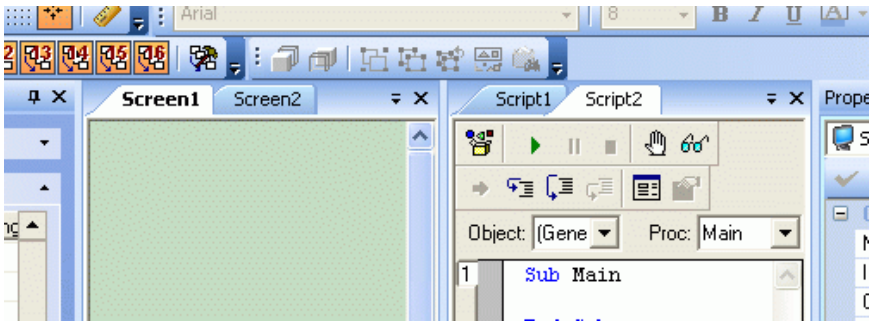
When having various resources opened at the same time during the project editing phase, a series of TABs will be displayed with which you can use to pass from one resource to another very quickly. This series of TABs is called the **"TAB Group"**.



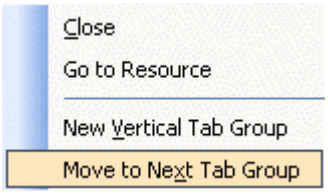
When right mouse clicking on the TAB group a menu will appear to let you execute certain commands:



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:



2.3. 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.

2.3.1. 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"** di 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"**.

Save (Ctrl+S)

Saves the changes made to the resource currently selected. For example, if any changes have been made either in the 'Real Time DB' or the 'Data Loggers & Recipes', by positioning the mouse on the 'Real Time DB' and executing a save, the file belonging to that resource will be saved only.

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

Save all

This makes a complete save of all the project, independent of the Resouce in focus.

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 Resource into the **'Resources'** group in the **'Project Explorer**' window. In this case, four 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 five 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 **'Resources'** Group in the **'Project Explorer'** window.

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

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

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

New Folder. Inserts into the previously selected folder from **'Resources'** Group in the **'Project Explorer'** window. Structuring the 'Resources' Group 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:

Run. 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"**.

Find Next

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

Find

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.

2.3.2. 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.

Test

Command not available.

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.

2.3.3. 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.

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.

2.3.4. 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.

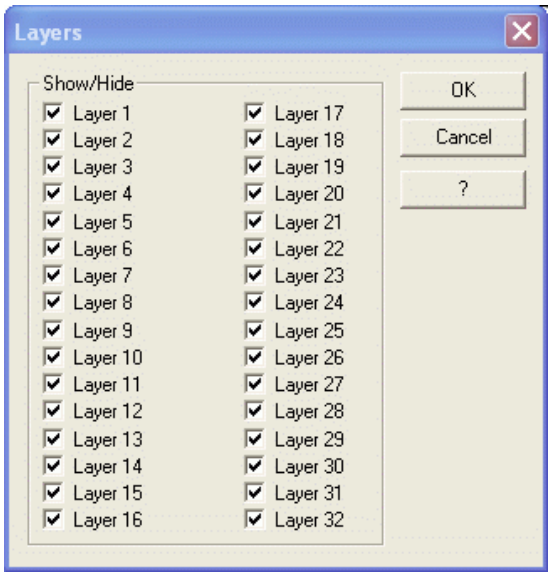
Layer

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.



2.3.5. 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.

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

This icon, when blinking, indicates that there are active alarms in the system. This alarm is not displayed when there are no active alarms.

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 icon represents a 'Led' that when green 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.

2.4. Menus

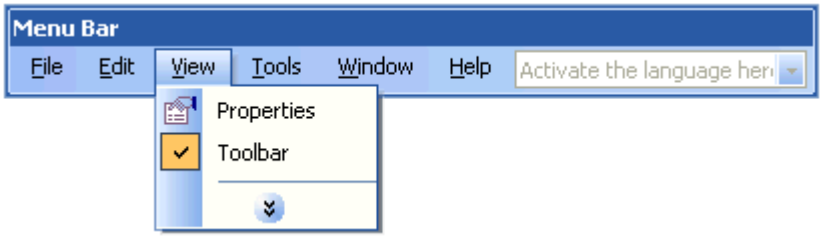
Movicon has a **Main Menu Bar** which lets you access some of the Movicon principle commands. The Menu Bar is only available during the project development phase and is deactivated during Runtime. The Menu Bar can be dragged to any point in the workspace and can easily be returned to its original position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

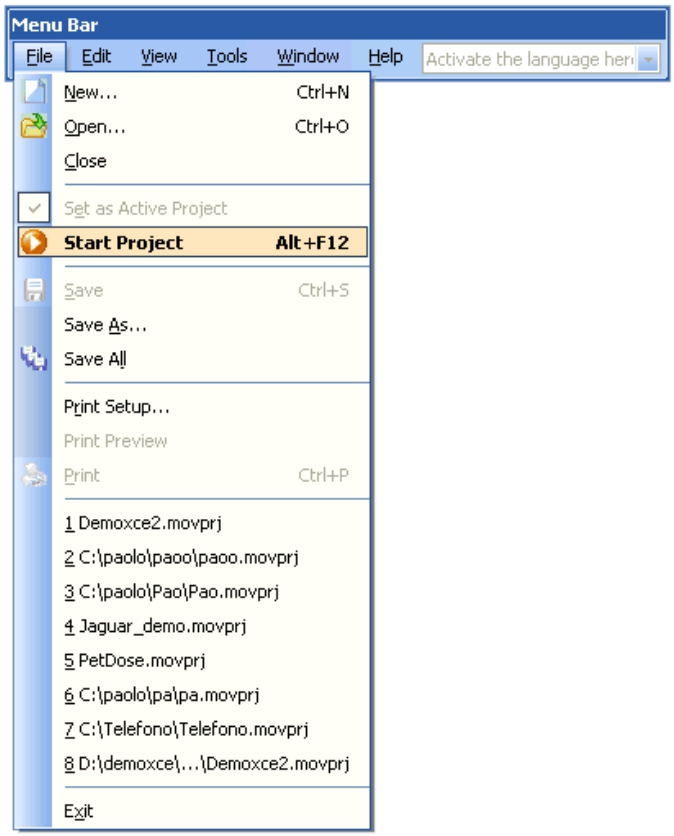
Movicon, as consolidated in the Windows environment, hides the not so frequently used menu items to make the selecting of item lists much easier and intuitive.



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.

2.4.1. 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"**.

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)

Saves all the changes made to the resource selected at that moment. When, for example, changes are made to the 'Real Time DB' and the 'Data Loggers & Recipes' by positioning the mouse and executing a save in the 'Real Time DB' only the file inherent to the 'Real Time DB' will be saved.

This command is also available from the Movicon **"Tool Bar"**.

Save as...(Ctrl+S)

A window will be displayed for renaming the project when executing a complete save of all the project.

Save All

Executes the complete save of all the projects opened, and also the application settings.
This command is also available from the Movicon **"Tool Bar"**.

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

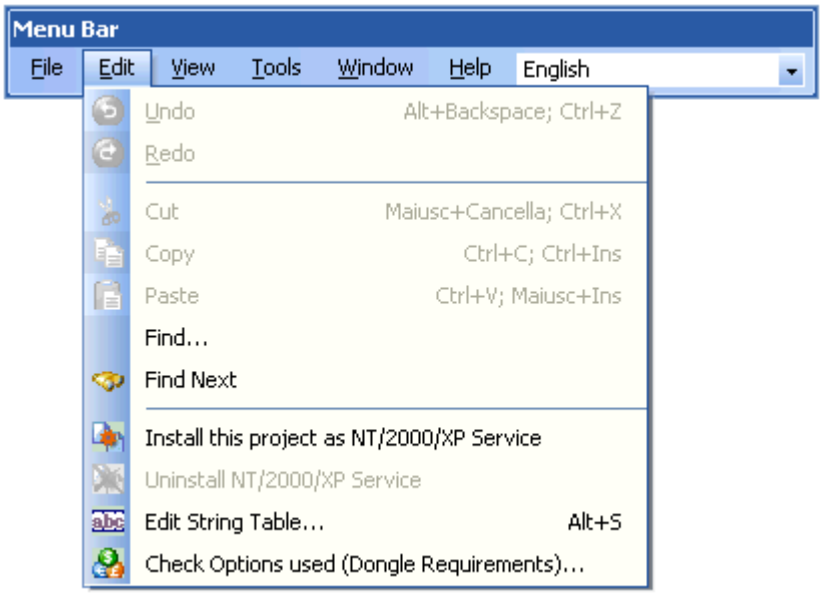
The last eight projects opened by Movicon are listed in this area of the window. You can directly click on the project name to open it without having to go to the selection window presented by the 'Open' command.

Exit

Executes exit from Movicon.

2.4.2. 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)

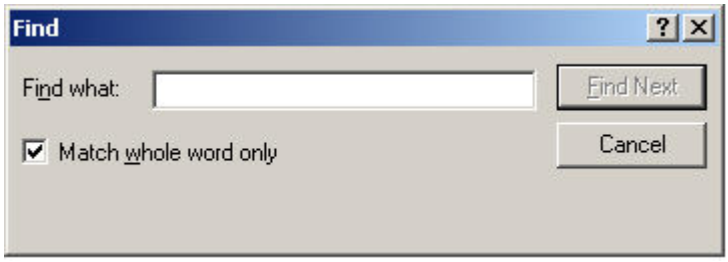
Deletes the select object without copying it in the Windows Clipboard.

Paste Special

Being Prepared

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.



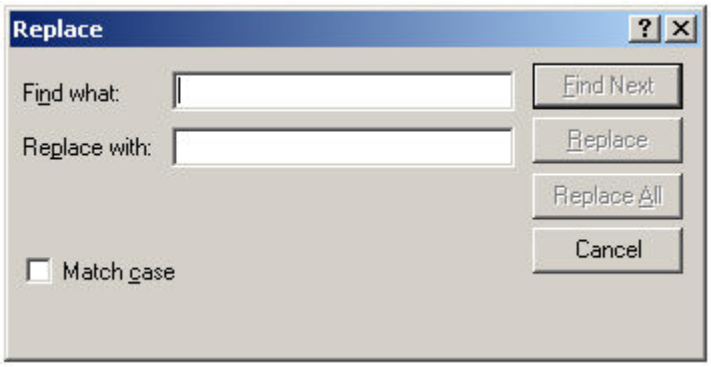
The Find command can also be accessed with the ALT+F3 keys from the keyboard, or from the **"Tool Bar"**, if available, through the Find editing box.
This command is also available from the Movicon **"Tool Bar"**.

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.



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"**.

Import Draw...

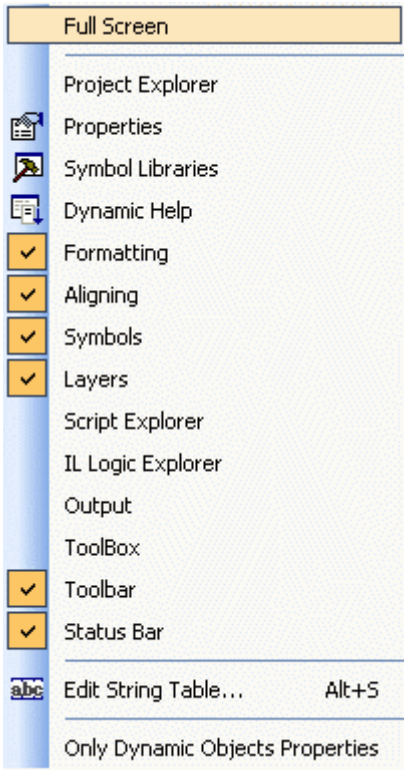
This command is used to import a vectorial drawing into the screen which has been realized with an external editor. Windows Metafile (EMF, WMF) is the format supported.
For further information please refer to paragraph **"Importing/Exporting Vectorial drawings"**.

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"**.

2.4.3. 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.

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"**.

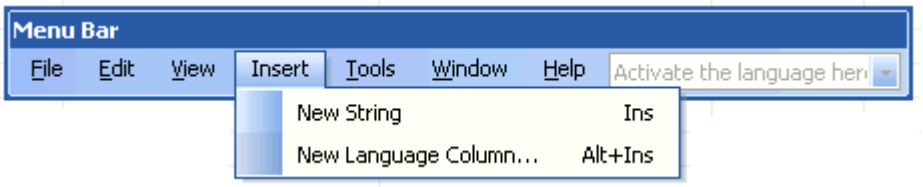
Status Bar
This selection displays or hides the **"Status Bar"**.

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

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".

2.4.4. Insert Menu

The commands for inserting strings are in the **Insert Menu** which is made available after the **"String Table"** window has been opened.



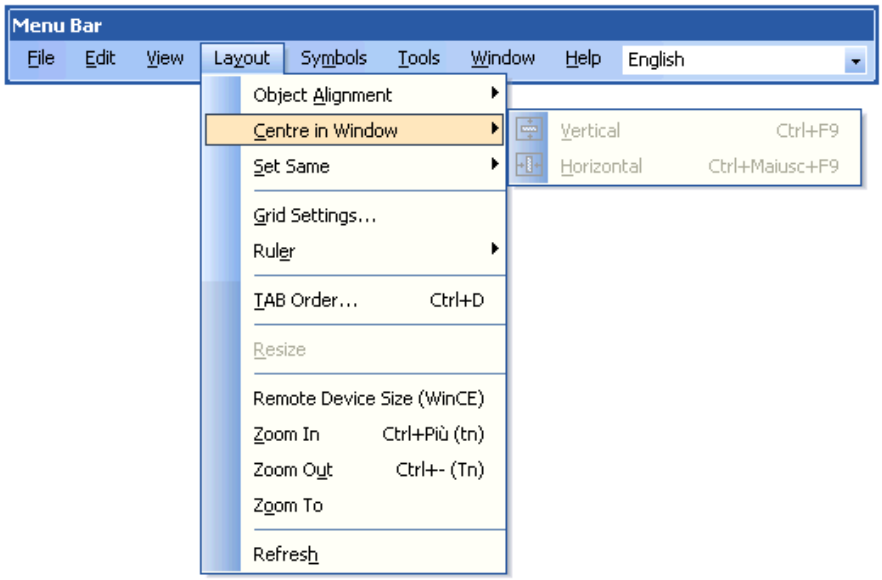
New String (Ins)
This command inserts a new string in the table. The string's ID is inserted with a progressive number with the following syntax: "String00001".

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).

2.4.5. 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

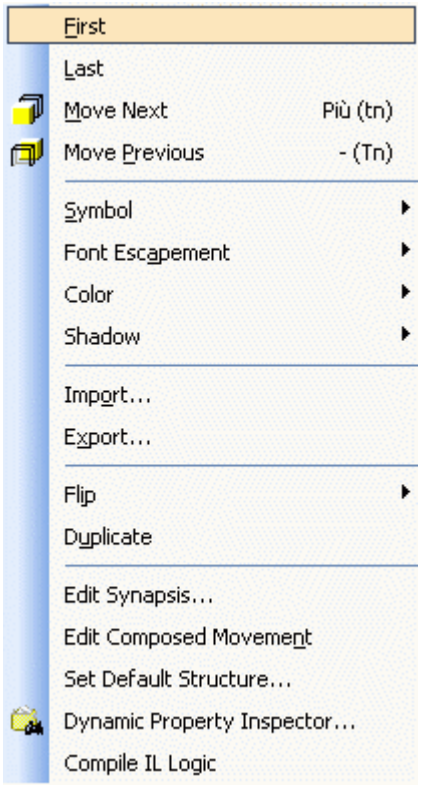
The Zoom To function lets you enlarge a selected part of the screen.
To select the part to be enlarged, mouse click on the first corner of the square and drag it. When releasing the mouse the screen will show an enlargement of the selected square.

Refresh

The Refresh command regenerates the video drawing.

2.4.6. 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))

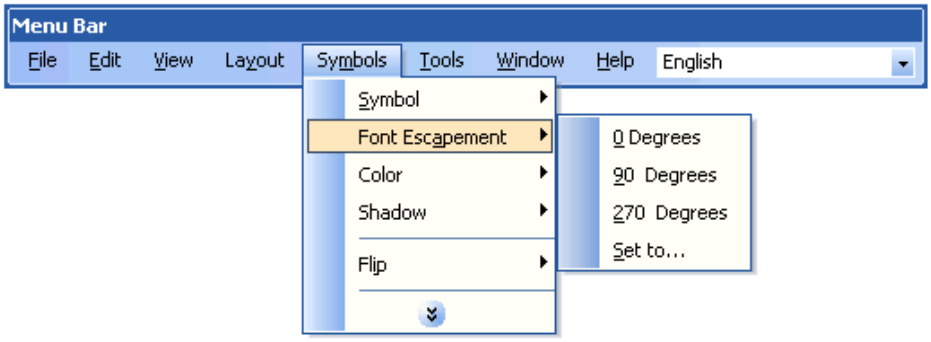
This command is used to move the selected object one place back in the overlapping order.
For further information please refer to the paragraph on **"Overlap Order"**.

Symbol

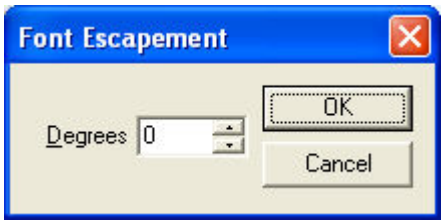
This command is used to group, ungroup or insert Movicon symbols in the library.
For further information please refer to the paragraph on **"Commands for Creating Symbols"**.

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.

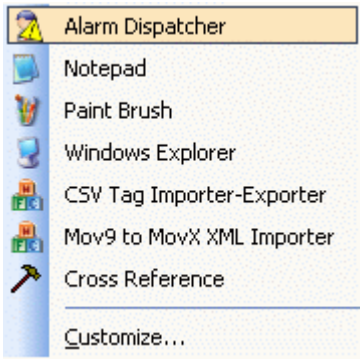


A customized angle can be inserted by using the appropriate dialog window as shown below:



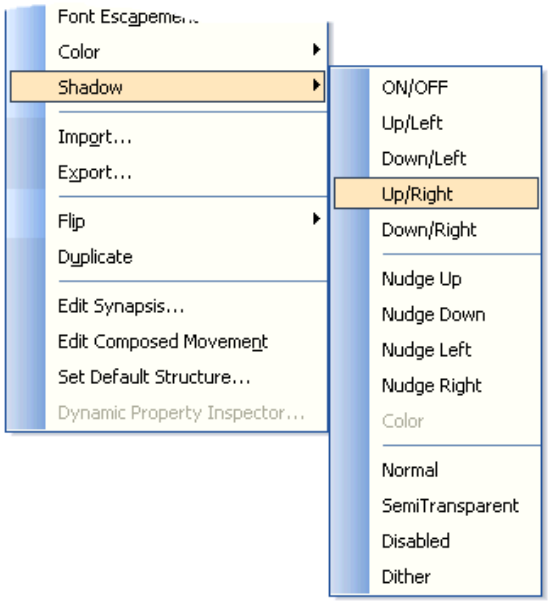
Color

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...

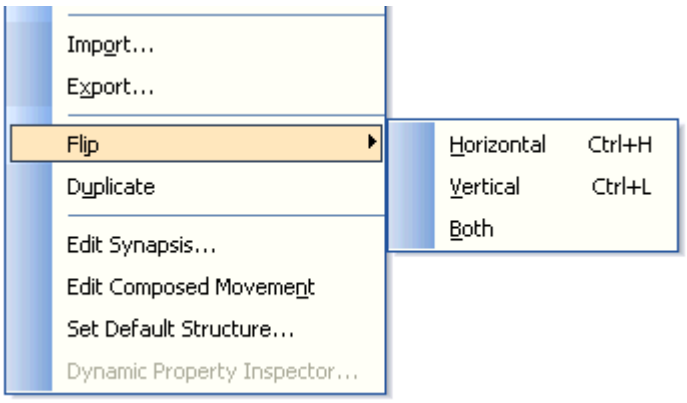
This command is used for importing a vectorial drawing realized with an external editor onto the screen. The Windows metafile (EMF, WMF) is the supported format.
For further information please refer to the paragraph on **"Importing/Exporting Vectorial drawings"**.

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 Synapsis...

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

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...

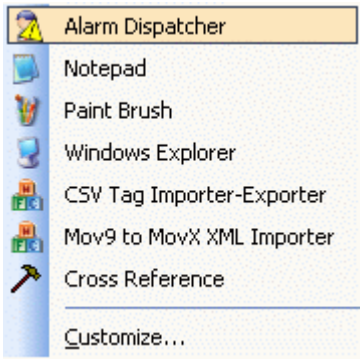
This command lets you open the selected object's **"Dynamic Property Inspector Window"** window.

Compile IL Logic

This command compiles the IL Logic for the selected symbol.

2.4.7. Tools Menu

The **Tools Menu** shows the commands for executing frequently used applications.



Alarm Dispatcher

Open the Alarm Dispatcher application session to configure the SMS, Voice, Fax alarms notifying.

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 session to allow the importing/exporting from the Real Time DB in csv. files.

Mov9 to MovX XML Importer

Opens a Mov9 to MovX XML session to allow the importing/exporting of projects from the Movicon9 version. This kind of importation has a few restrictions as described in the application's help.

Cross Reference

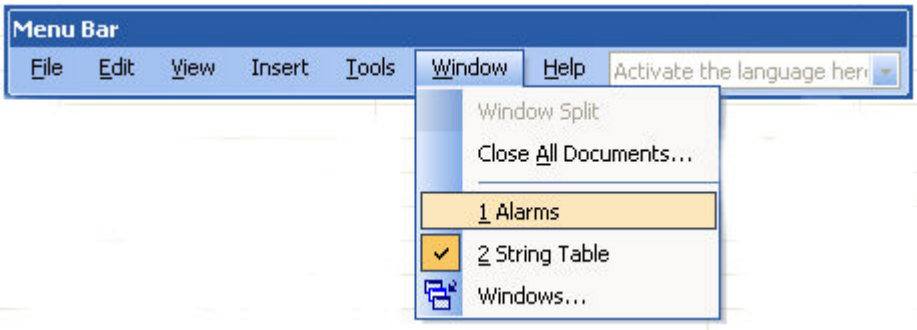
Opens a Cross Reference application session to allow you to get a cross reference list of the variables usages within the project.

Customize

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

2.4.8. 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

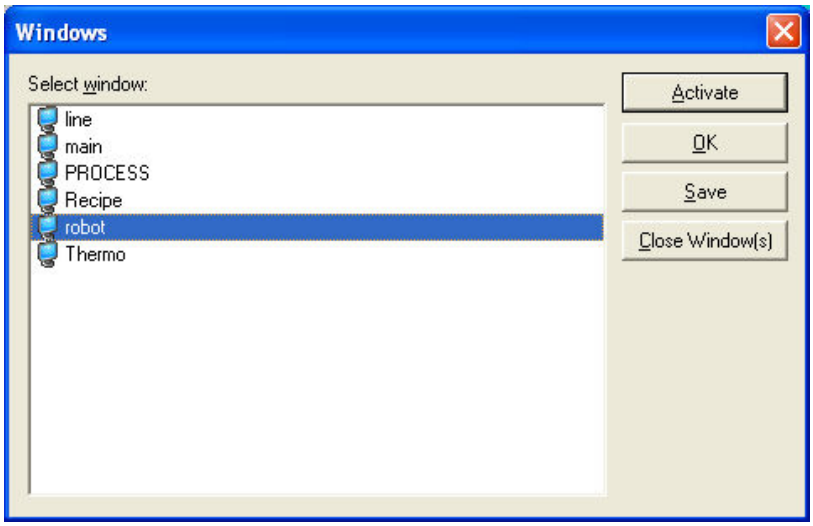
The Close All command closes all the resource windows, currently active in the project's workspace, all at the same time.

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.

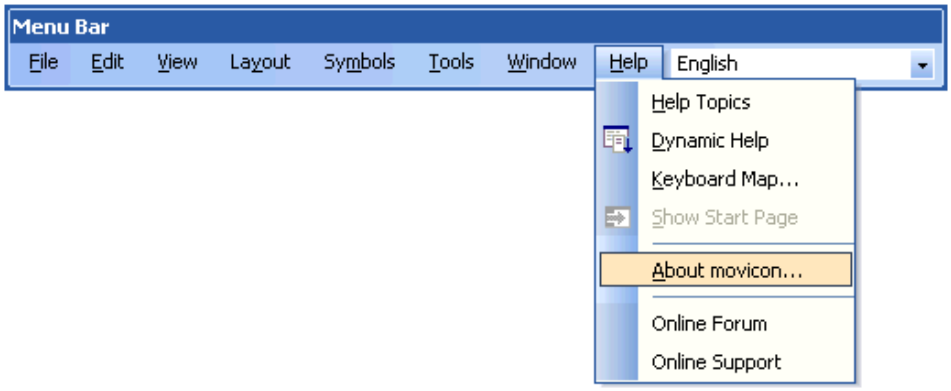


The commands available in the this window are:

- **Activate:** activates the window selected in the list by bringing it into forefront vision
- **OK:** closes the window
- **Save:**
- **Close Window:** closes the window selected in the list

2.4.9. 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

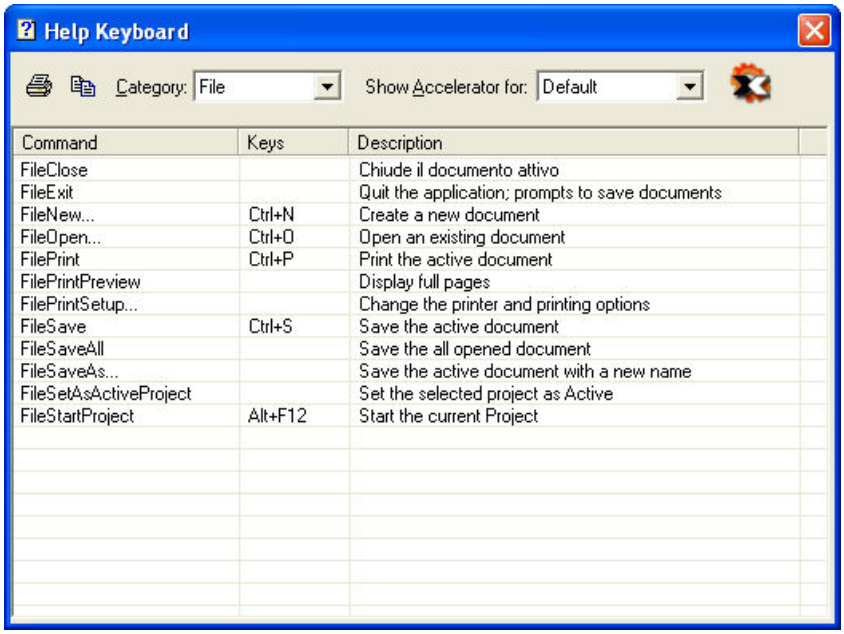
This command opens the general Help window of the 'Movicon Online Guide'.

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.

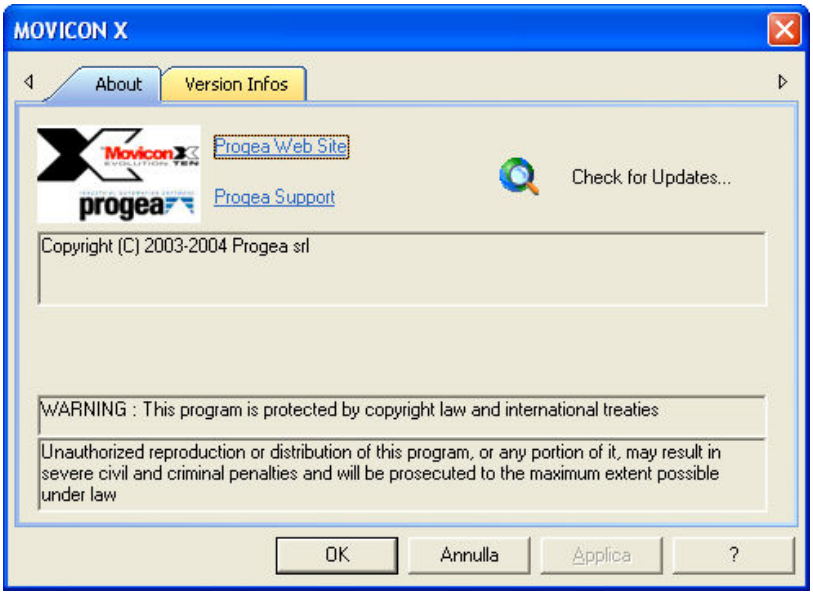


Show Start Page

Not available at this moment.

About Movicon...

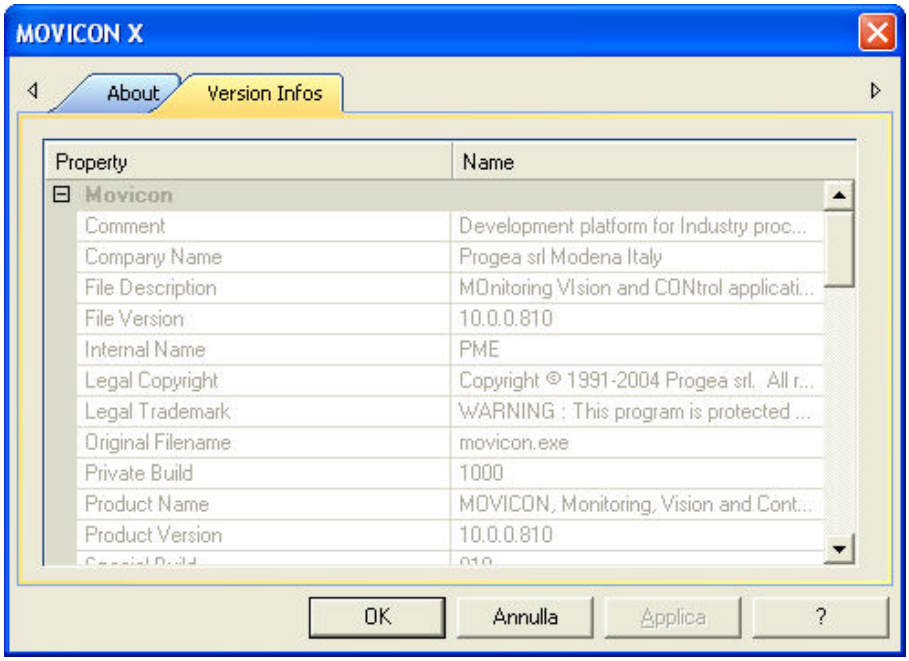
By using this "Information on...", you can access information of the Movicon system being used which is very helpful when having to ask for any **"Technical Support"**.



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.



Online Forum

Opens a connection to the Progea Web Forum on Internet. In order for this to work the WEB connection must be active.

Online Support

Opens a connection to the Progea Support Center Web page on internet. In order for this to work the active WEB connection must be active.

2.4.10. 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...

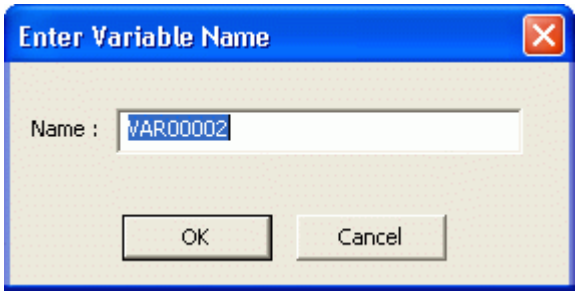
Executes the insertion of a child project by presenting the wizard window to search for and create the project desired. In this case you can insert an existing project or create a new one.

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.

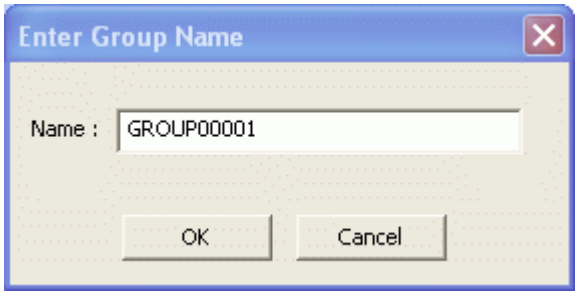
New Variable...

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 NT/2000XP Service

Installs Movicon as NT/2000/XP service. In this way Movicon will startup as Service when the PC is started.

Uninstall NT/2000/XP Service

Removes Movicon as NT/2000/XP 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.

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.

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 "Resources" group.

Add a New Accelerator

Inserts a new **"Accelerator"** resource internal the "Resources" group.

Add a New Script

Inserts a new **"Script"** resource internal the "Resources" group.

Add a New Screen

Inserts a new **Screen"** resource internal the "Resources" group.

Add a New Folder

Inserts a new **"Folder"** internal the "Resources" group.

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 "OnNomeVariabileChanged" (Eg. OnVAR00001hanged). 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.

Add New Accelerator Command

Inserts a new Accelerator Command in the selected Accelerator resource.
For further information please refer to the section on **"Accelerator 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 NT/2000/XP Local Domain

Inserts users from the selected group in the PC's Local NT 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.

Add a new Alarm

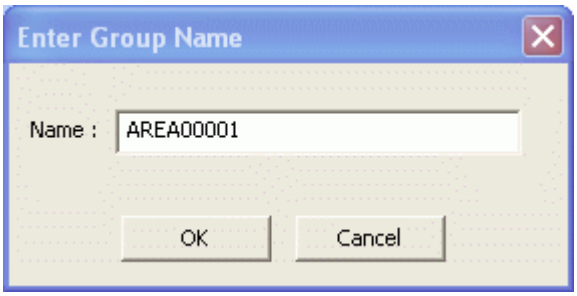
Inserts a new alarm object in the Movicon 'Alarm List' resource.
For further information please refer to the section on **"Alarms"**.

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

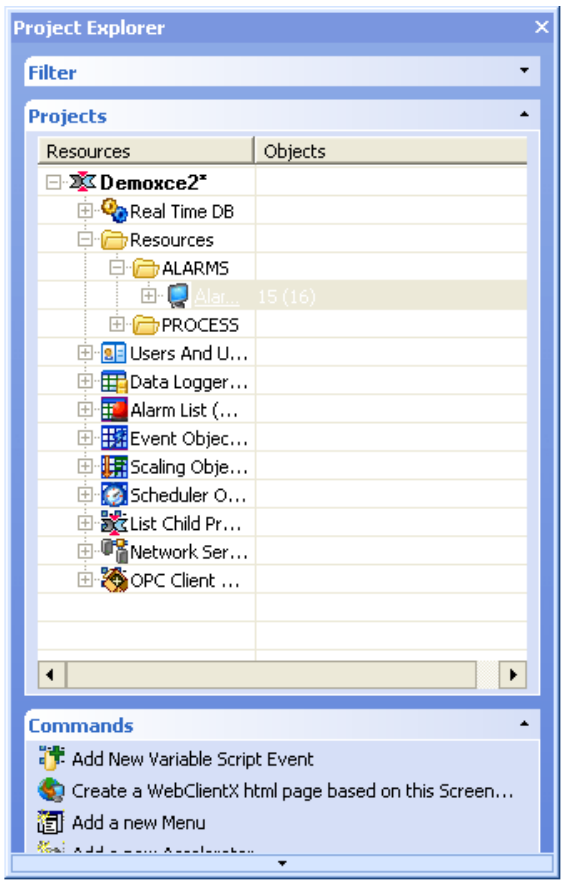
Inserts new Client Rules.
For further information please refer to the section on **"Client Profiles"**.

Edit DCOM Settings

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

2.5. Project Explorer Window

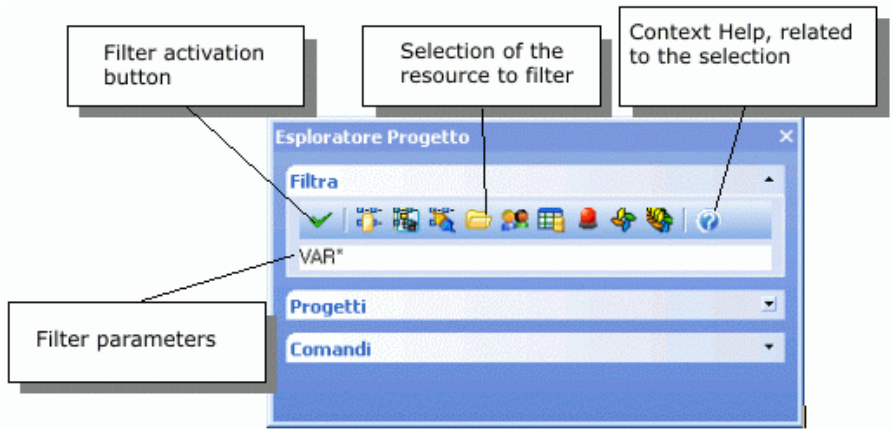
All the Project's Resources are grouped in the **'Project Explorer'** window. This is the main window of the Movicon Workspace. This window allows you to display all the information relating to the resources which are the essence of the project itself.
The 'Project Explorer' window gathers all the Resource 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.

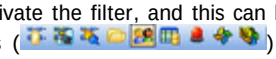


The 'Project Explorer', as all the Movicon windows, can be **'Docked and kept in foreground view'** as described in the section titled "Docking Project Windows".
The 'Project Explorer' window divides into three different areas, which can be exploded to display the contents or compressed to hide them. The three areas are **"Filter"**, **"Projects"** and **"Commands"**.

Filter

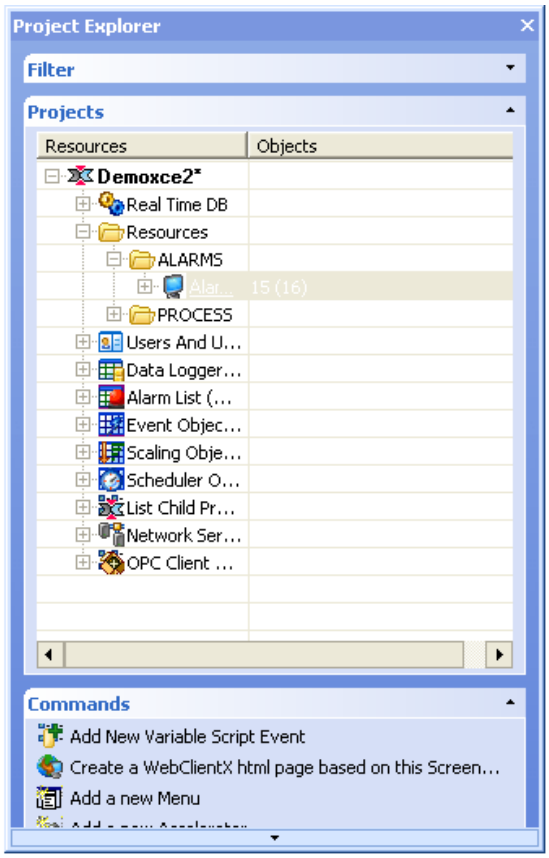
This 'Project Explorer' sub-window is used for creating display filters in elements from various Project Resource groups, displayed in a tree structure in the Project's sub-window as described further ahead:



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

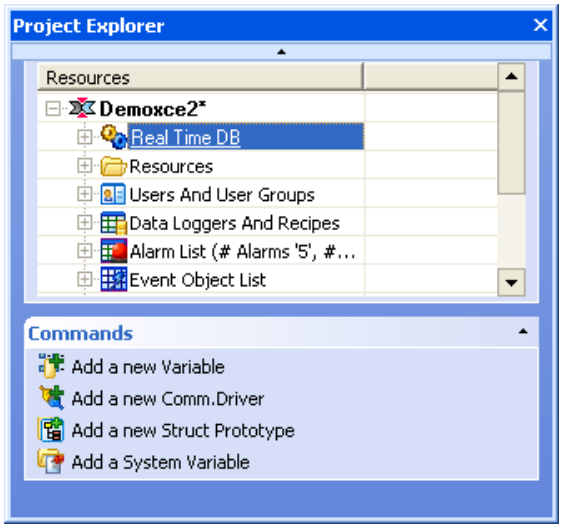
This 'Project Explorer' sub-window gathers the project's resources together in groups in a tree structure:



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:



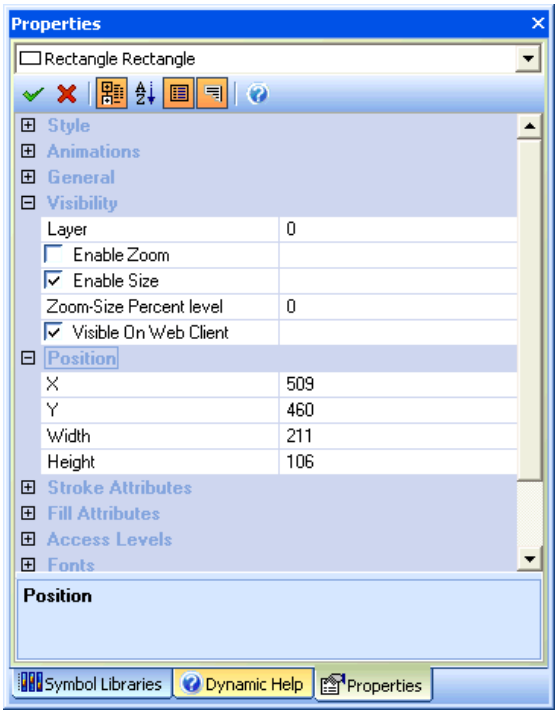
For example, if you select the "Real Time DB" group the listed commands will be:

- 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"**.

2.6. 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 X 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.

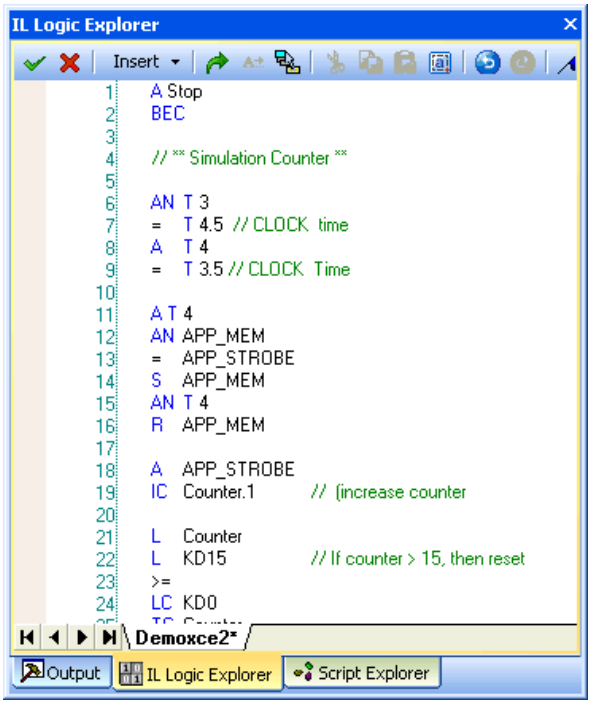
This button is enabled only when the properties are displayed in groups. In this case by pressing this button you can pass from 'Exploded' to 'Compressed' group displays or vice-versa. This allows you to hide or view all the properties contained in each group.

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.

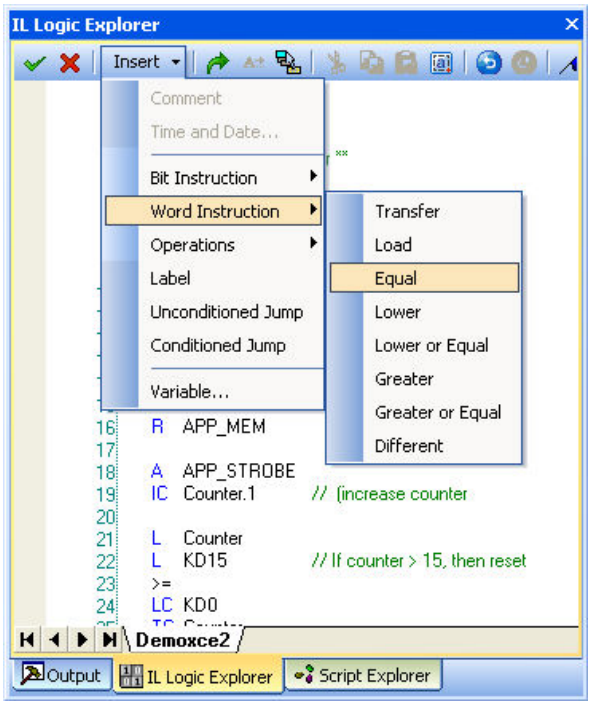
2.7. Logic Explorer Window

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.



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

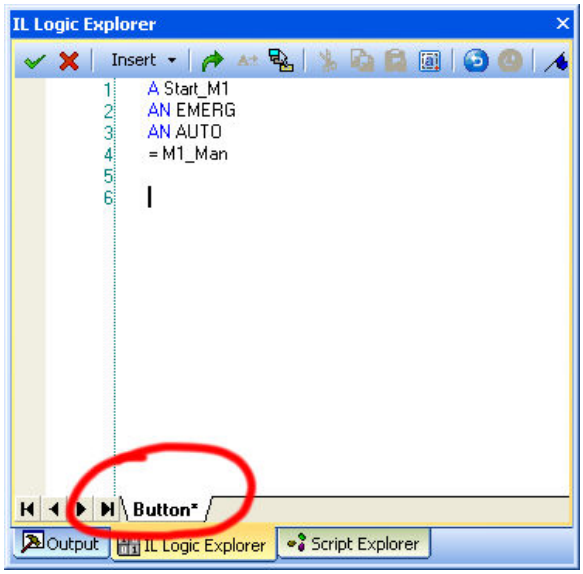
Replace

Find Next

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

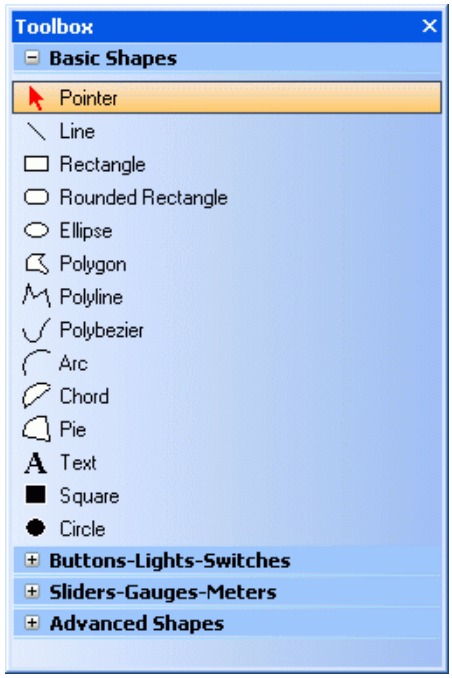
Objects being Edited

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:



2.8. Objects Window

You can select one of the many drawings and controls through the Movicon **'Objects Window'** which can be inserted inside the Screen windows. All these components are grouped into four categories in the **'Objects Window'** according to how they work.
The **'Objects Window'** is activated with the 'Objects' command from the 'View' menu.



All the Drawings and Controls are vectorial type objects and present diverse working analogies which concern especially the Animation properties. Therefore some of their properties are common to all other components.

The Movicon Drawings and Controls can be grouped together to form composed symbols.

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.

Sliders-Gauges-Meters

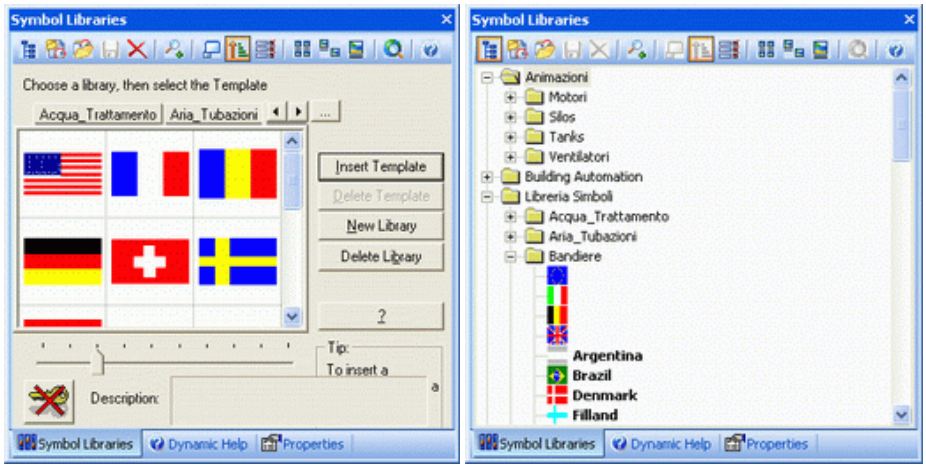
In this category you will find a series of **"Gauge"** type controls in graphical shapes. There are a list of diverse objects which all derive from the same Gauge component modified in the Style properties.

Advanced Shapes

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.

2.9. 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. To scroll the categories click on the relating card or on the scroll buttons found on the top right window border.
You can create new categories or delete them by using the appropriate buttons placed on the window's right border.

Buttons	Description
Insert Template	This command executes the insertion of the symbol selected in the library in the current screen.
Delete Template	This command deletes the symbol selected in the library.
New Category	This command allows a new category to be added to the library. Movicon will request the name of the new library.
Delete Category	This command deletes the Category selected in the library.
?	This command calls up the selected symbol's or category's help.

A category's symbols can be inspected by using the scroll bar. In addition to this you can also use the cursor placed on the window's bottom border to zoom in and out of the symbol.

You can customize the window display by using the command bar positioned at the top of the 'Symbols Library':

The icons presented in the command bar are described below:

When pressing this button the library will be displayed in a tree structure or by category.

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 displaying or hiding the button on the right hand side of the window. By doing this only the symbols will be seen in the window.

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

Pressing this button opens the **"Dinamic Proprerty 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.

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.

Symbol Library Protection

The 'Symbol Library' can be given password protection to safeguard any customization carried out. To activate the symbol's password protection you need to press the button on the bottom left border representing a key. 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.

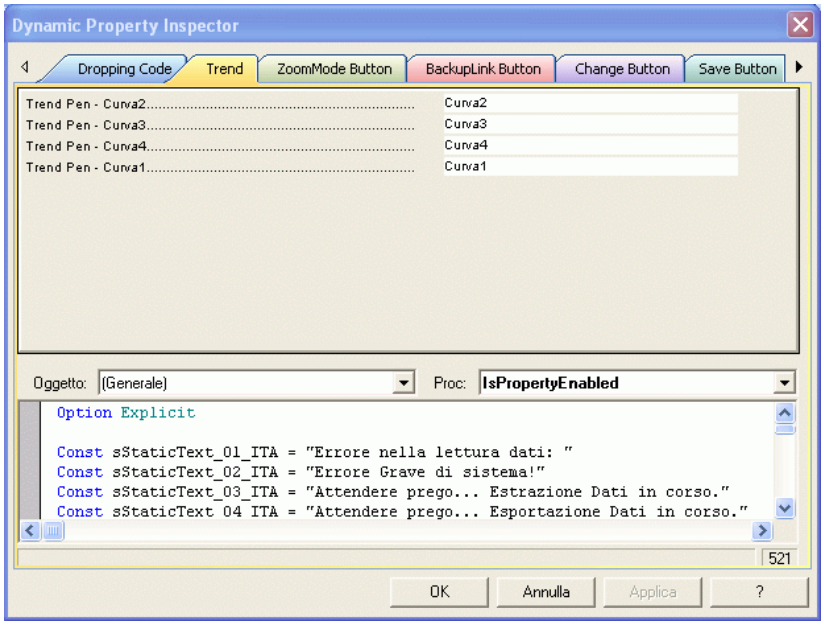
Favourite Categories

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.

2.10. 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 "Simbols Library" is inserted containing animation variables or basic codes.*

Replacing Variables

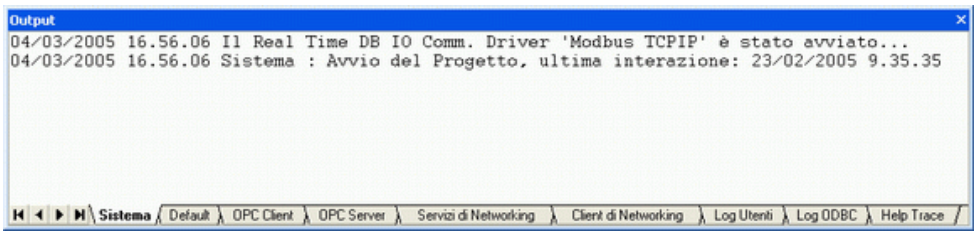
The inspector window indicates the variables which the selected drawing element has been associated with by specifying the interested dynamic property. Each one of the variables can be replaced with a different one, or the Variables DB can be accessed by clicking on the **[...]** setting button on the 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.

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

2.11. 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.

ODBC Log

Lists the messages inherent in the ODBC, such as retrieved errors.

Trace Help

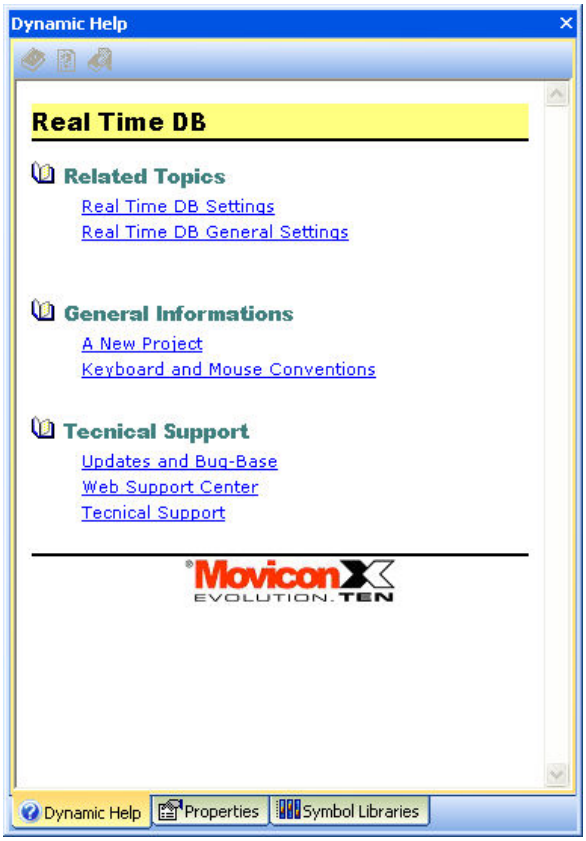
Returns the index number of the Movicon dynamic help required.

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.

2.12. 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 whicha 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.

2.13. 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.
The **"Watch"** window is composed of groups, each one displays certain information:

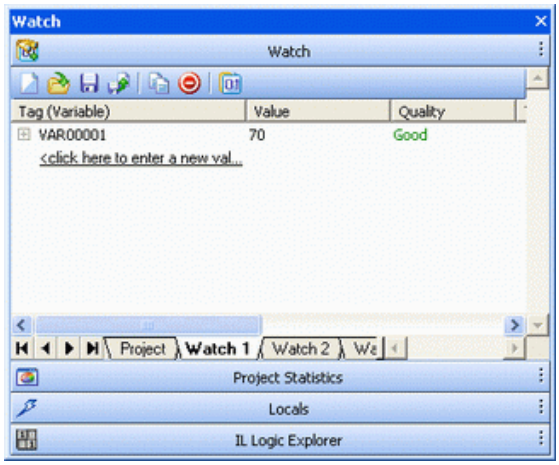
Watch

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.

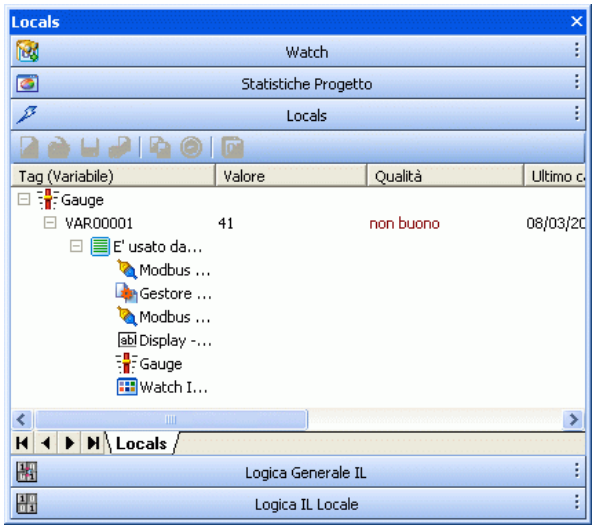
Project Statistics

The Project Statistics group documents the use of the resources retrieved by the system by representing them on a table correlated with pie charts.



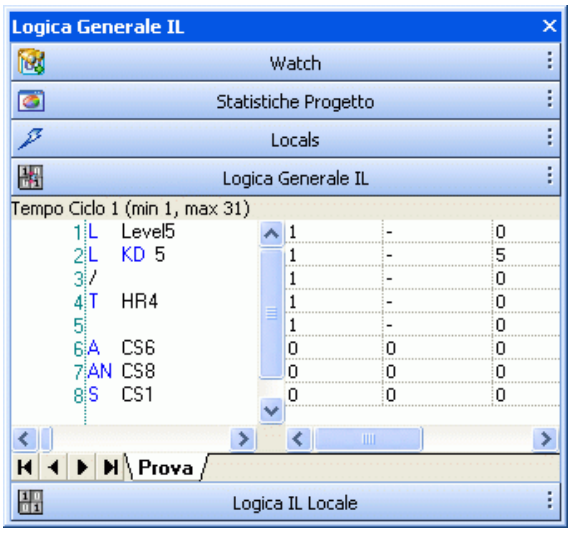
Locals

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.



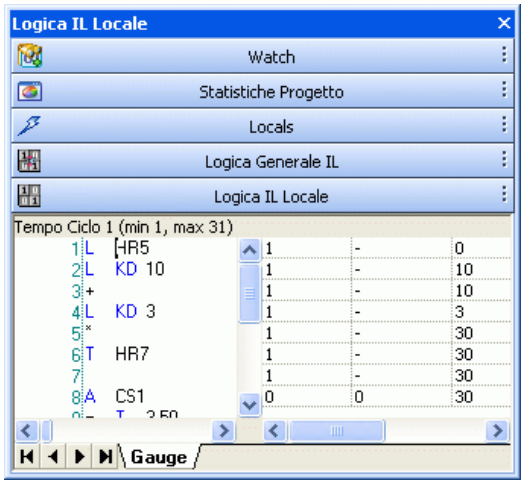
IL General Logic

The IL General Logic group allows the Debug of the IL Logic resource associated to the project to be run.



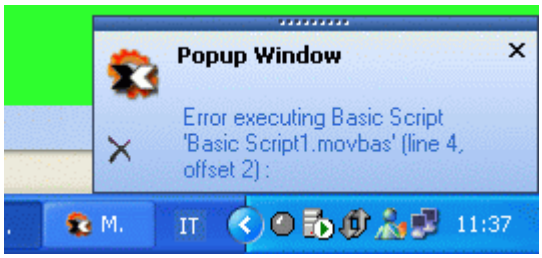
IL Local Logic

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.



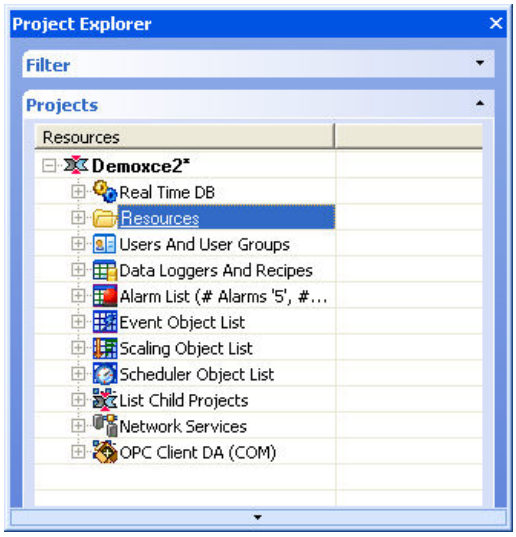
2.14. Popup Window

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.



2.15. 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

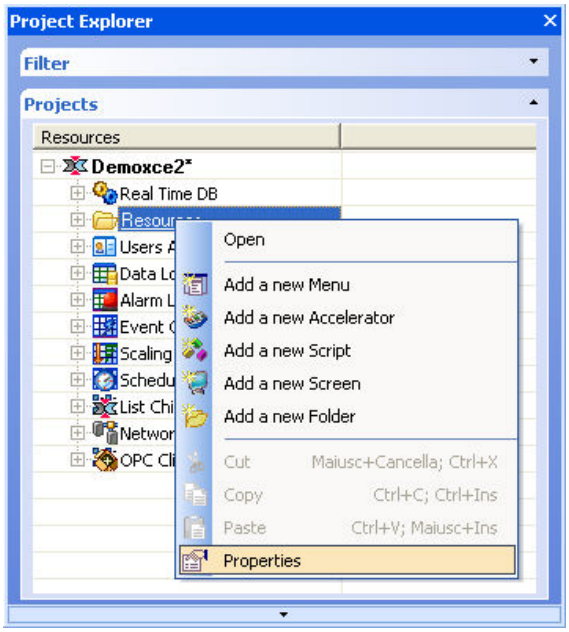
Each resource can be cut, copied and pasted within the same project or in different projects. Before carrying out any one of these command you need to select the resource or resources first.
The Cut, Copy and Paste command can be accessed from the "Edit" menu by using the right mouse key or from the 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.,.

2.15.1. The Resource Group

The **Resource** group presented in the **"Project Explorer"** window is the group in which the resources for managing the graphical part of the project are inserted. The following resources can be inserted:

Screens
Menu
Accelerators
Basic Script

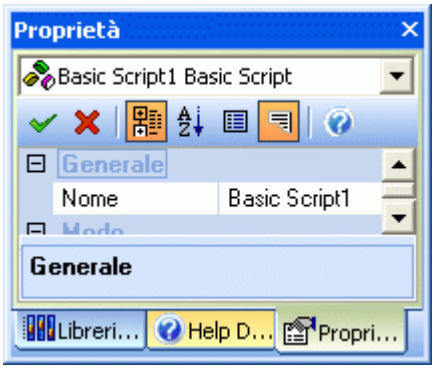


Apart from the four categories listed above you can also keep the resources organised by creating folders. This may be very useful when you need to group together the graphic resources of one project in different folders, so that they can be kept in a logical order depending on which requirements they have in common (i.e. starting areas). To give you a better idea, let's suppose a project is being realised to monitor a plant divided into different zones. Here it would be appropriate to create a folder for each zone of the plant within which the screens, menus etc., resources regarding that specific zone are to be grouped together.

The only purpose of the tree structure, that is realised in the Resource Group by creating customized folders, is to keep the project organized better and has not influence whatsoever on how the project works.

2.15.2. 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"**.

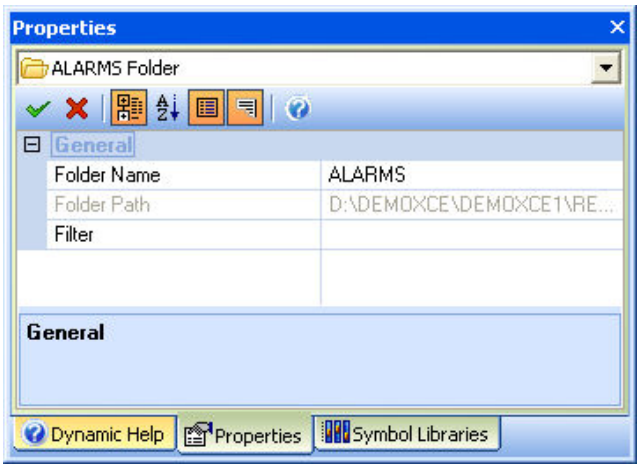


Name

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.

2.15.3. Resource Folder General Properties

The names of the Folders inserted in the Resource group of the "Project Explorer' window is set in the 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.

2.16. 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
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.
_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.

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	Files with the '.var' extension containing 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*

	In addition to this there will also be files containing 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* Finally the Database file can be found for the **"Real Time in ODBC Shared Settings"** management. The file will be created in this folder for default with the name: *ProjectName_RealTimeDB.mdb*
DLOGGERS	The Database file containing the project's Data Loggers and Recipe tables is inserted in this folder. The file will only exist if the selected format is Access, as regards to the SQL Server, the Database will be created in the MSDE folder. The file will be named: *ProjectName_DLR.mdb*
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. Another two files may also presented in this folder, in Database Access format, one which will always contain data relating to the project's HistoricalLog, and the other one containing data relating to the project's **"Variable Trace Options Proprieties"** naturally for those variables in which have been enabled this option. The two files will be called: *ProjectName_HisLog.mdb* *ProjectName_TraceDB.mdb*
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	The files relating to the Resource of the 'Resource Group' (Screens, Accelerators, Menus and Basic Script) are presented in this folder. Movicon will create a file with the resource's name and extension, based on the resource type, for each resource inserted into the project: *Screenss = .movscr* *Accelerators = .movacc* *Menu = .movmenu* *Basic Script = movbas* In addition to this, the same tree structure created also in the 'Project Explorer' window in the 'Resource Group' 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*

	The Vectorial Trend configuration files will also be kept in this folder. These files will have the following extension: ***.TSXML***

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".

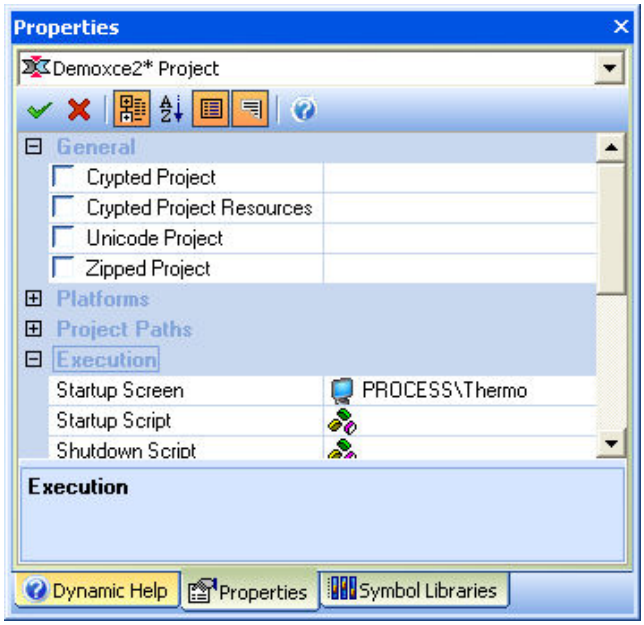
2.17. Project Settings

Each Movicon project can be configured to adopt the specific functionalites 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.

2.17.1. 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.

Unicode Project

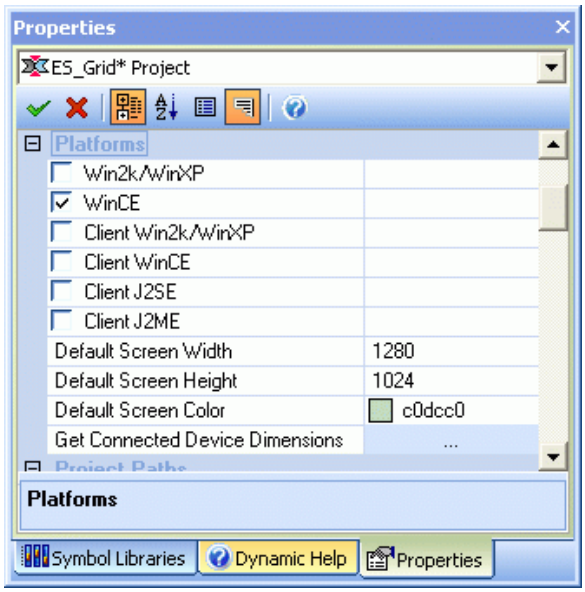
When enabling this property all of the project will be saved in UTF-16 Unicode format.

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.

2.17.2. 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'**.



Win2k/WinXP

This property enables project development for Windows 2000/XP platforms.

WinCE

This property enables the project development for Windows CE platforms.

Win2k/WinXP Client

This property enables project development for Windows 2000/XP Client platforms.

Client WinCE

This property enables the project development for Windows CE Client platforms.

J2SE Client

This property enables the project development for J2SE Client (Java to Standard Edition, such as Windows, Linux or other Java-enabled platforms).

J2ME Client

This property enables the project development for J2ME Client (Java to Machine Edition, such as JavaPhones or mobile phone platforms).

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.

Default Screen Color

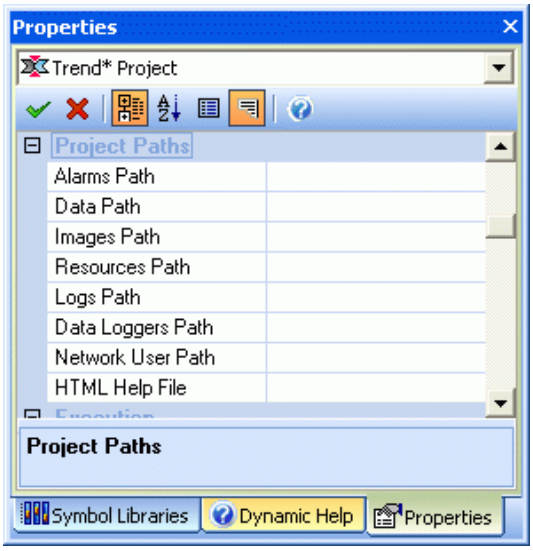
This property sets the default background color with which the Screen window is to be created..
For further information please refer to the paragraph on "Colour Threshold Settings in Drawings and Controls".

Get Connected Device Dimensions

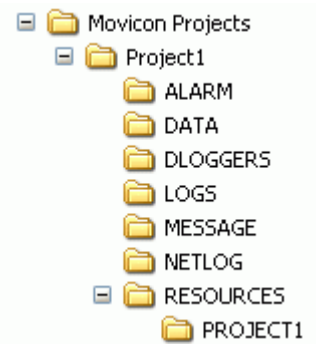
This function allows you to set the default screen sizes according to the characteristics of the WinCE target PC where the project is to be exported. Before carrying out this function you need to setup a connection between the desktop PC and the target PC with ActiveSync.

2.17.3. Project Path Settings

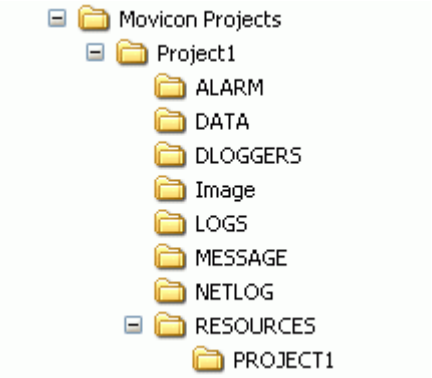
The project files can be organized in secondary folders according to the default settings or those carried out in the Project's **'Working folder Settings'**.
To modify the project Paths properties, select the object with the mouse and then use the Movicon **'Properties Window'**.



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 uses internal the project, can be declared or selected in this box.
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.

It is highly advise to use 'Image' folders internal the project folder so as to avoid having to use any images with absolute paths in the project. When an image is inserted into a project by taking it from the 'Image' folder (the folder can be given any name as long as it can be found internal the project's folder and that the 'Image Folder path' property is selected), Movicon will search for the image inside the project folder. This means that by copying the project in a different path or in another PC there will be no errors when pointing to image files.

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

The working folder in which Movicon is to insert the project's network users 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.

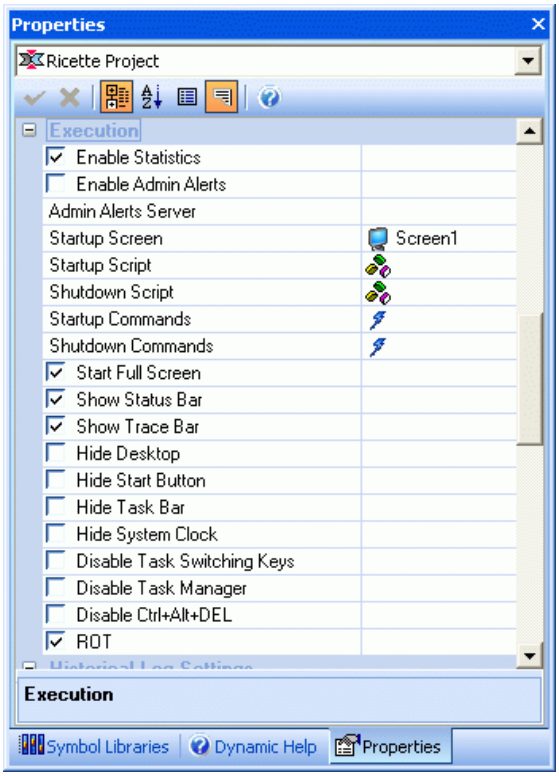
HTML Help File

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.*

2.17.4. 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.

Enable Admin Alerts

This property is used for enabling or disabling the sending of 'Admin Alert' messages to a PC Server.

Admin Alerts Server

This name of the Server where the 'Admin Alert' messages are to be sent is entered in this box.

Startup Screen

The name of the Screen to be displayed at project startup is entered in this box.

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"**.

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 Trace Bar

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.

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

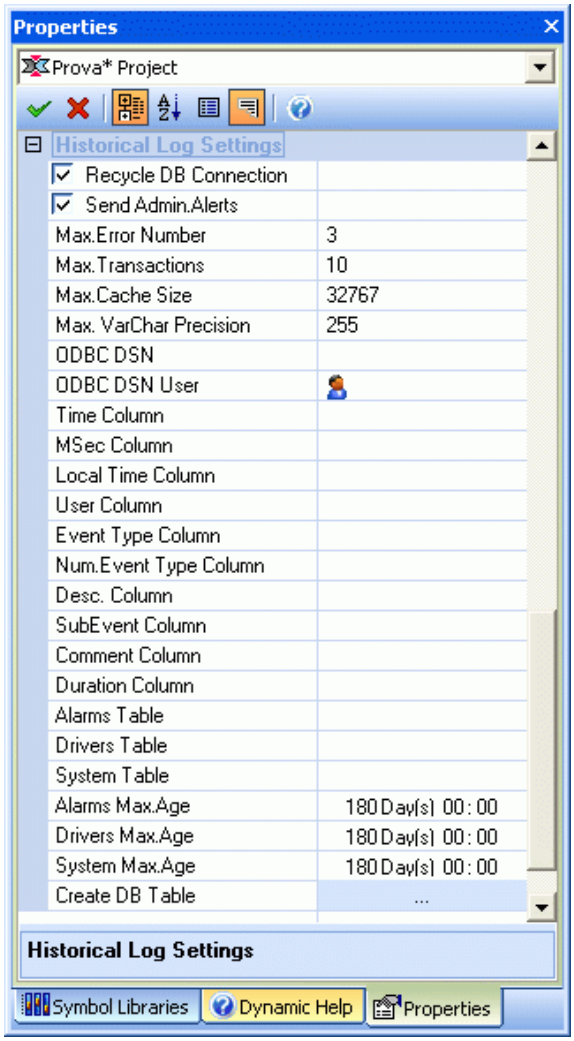
When this option is enabled the "PmeDocCmdTarget" interface will be recorded in the Windows' ROT (Running Object Table) each time a new project is opened for the first time. This interface is available to any script engine which supports OLE Automation (such as Visual Basic, by means of using the GetObject function). This allows you to keep the currently used "PmeDocCmdTarget" object so that you don't have to create a new one. By accessing the methods and properties of this interface you will also be able to access the project's variables in order to read or write them. The syntax for creating the object from Visual Basic code is as follows:

```
Dim Movicon As Object
Private Sub Form_Load()
        Set Movicon = GetObject(, "Movicon.Document.10.1")
End Sub

Private Sub Form_Unload(Cancel As Integer)
        Set Movicon = Nothing
End Sub
```

2.17.5. 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.



Recycle DB Connection

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** in the section on **"ODBC"**.

Send Admin.Alerts

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** in the section on **"ODBC"**.

Max. Error Number

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** in the section on **"ODBC"**.

Max. Transactions

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** in the section on **"ODBC"**.

Max. Cache Size

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** in the section on **"ODBC"**.

Max. VarChar Precision

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** in the section on **"ODBC"**.

ODBC DSN

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** in the section on **"ODBC"**.

ODBC DSN User

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** in the section on **"ODBC"**.

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.

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.

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.

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.

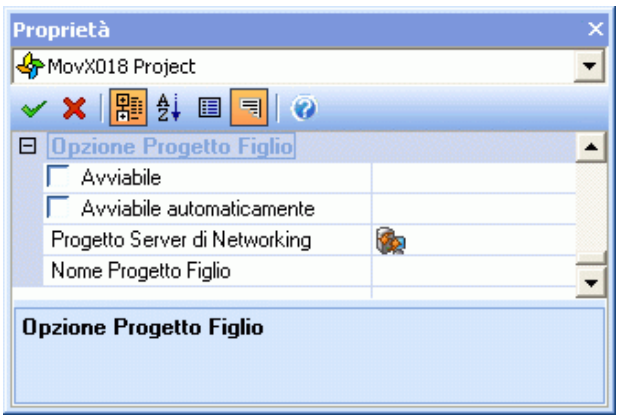
Create DB Table

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.

2.17.6. 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 permits you to set the Networking Server Project's name from which the child project is to update the values of its variables.

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.

3. Standard Techniques of Editing

Movicon, in full respect for 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:

- OPC Support
- ODBC Support
- SQL Support
- OLE2, OLE2 Automation Support
- VBA Compatible 100%
- 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.

3.1. The Windows Standard Techniques

Movicon, in respect to the standards, manages projects in tree structures for clarity and organization reasons for managing the project resources in an orderly fashion.
Each Movicon project will be formed with a resource group (called 'root'), from which other groups or other resources can branch off from at the discretion of the programmer.
Project usage and management is carried out by following the editing techniques according to the Windows standards.

3.1.1. Cut, Copy, Paste

The **"Cut"**, **"Copy"** and **"Paste"** commands are always available from the Movicon Main toolbars, from the **"Edit"** menu or from the menu activated with the right mouse key or by using the keyboard equivalents, which are all described below:

Command	From the Menù...	From the Keyboard...	From the Toobars...
CUT	Edit Menu Right mouse key	CTRL+X	
COPY	Edit Menu Right mouse key	CTRL+C	
PASTE	Edit Menu Right mouse key	CTRL+V	

The Cut, Copy and Paste commands have effect both in the sources and in objects as well as all texts being edited.

Movicon distinguishes the different resource types previously cut or copied to the clipboard.
As a consequence, the resource or object will be pasted in function with the display type or active window type.

To select the text of a document, proceed as follows:
When using the mouse, double-click at the beginning of the text you wish to select and, by keeping the mouse key pressed down, scroll the text until all the part you wish to select has been selected. Release the mouse key. To de-select a previously selected text, click the mouse on any part of the text.
When using the keyboard, position the cursor at the beginning of the text you wish to select by using the direction arrow keys then by pressing down the SHIFT key and keeping it pressed, use the directions arrows to select all the text all wish to select. To de-select a previously selected text, just press any one of the direction arrows.

To select an object proceed as follows:
Click the mouse on the object desired or press the TAB key repeatedly until the object desired is selected. To select more objects, click on the area of interest and drag it to the size desired to include all objects you wish to select. When the left mouse key is released, the objects within this area will appear selected.

*Make sure the object desired is selected before using the **Cut** or **Copy** commands.*

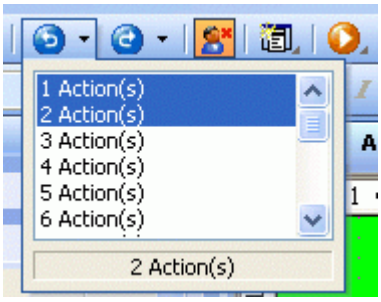
3.1.2. Undo and Redo

The **"Undo"** and **"Redo"** commands are always available from the main tool bar of Movicon, from the **Edit** menu or from the menu activated by the right mouse key or even still by using the equivalent keyboard techniques, as described below:

Command	From Menu...	From Keyboard...	Tool Bar...
Undo	Edit Menu Right mouse key	CTRL+Z	
Redo	Edit Menu Right mouse key	CTRL+A	

The Undo command cancels the last editing operation carried out in the project, so that any programming errors made can be recuperated.
The Redo command restores the cancelled operation, by retrieving the conditions as they were before the Undo command was executed.

When using the icons on the Movicon Main Tool Bar you can select the number of operations to be cancelled or restored. When having carried out numerous operations and you only want to cancel the last two, for example, you can do it by using the downward arrow of the Undo icon and then selecting the first two actions from the list:



3.1.3. Find, Find next

The **"Find"** and **"Find Next"** commands are always available from the Movicon **"Edit"** menu when a resource, supporting these commands, is active. By using these commands, which can be executed with both the right mouse key and with the ALT+F3 and F3 combination keys on the keyboard, you can search for a character or string text in the resource selected. The text string to be found can be written in the appropriated dialog window, through which the search parameters can also be set.

The Find command can also be executed by means of using the Main Tool Bar, by writing the string to be searched for in the box shown below and then pressing ENTER. The search box memorizes the last set search strings to make it easier for frequent use.

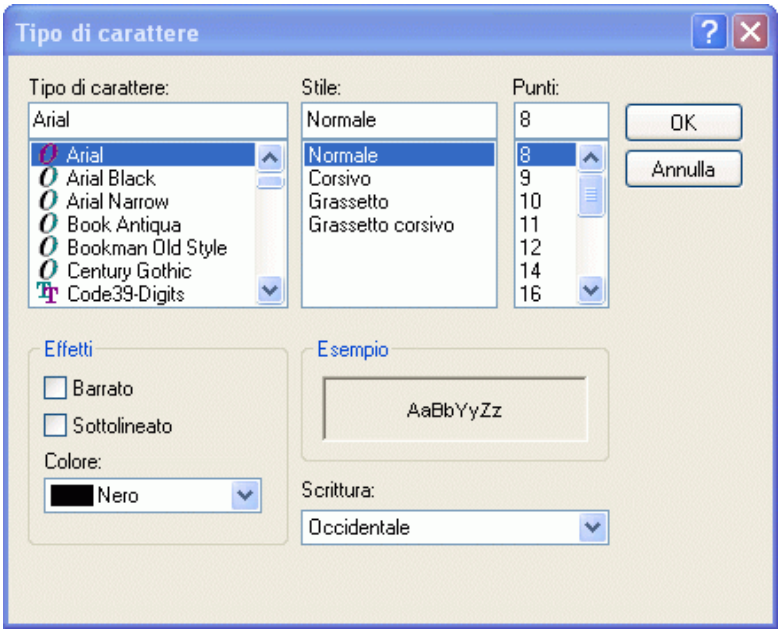
3.1.4. Replace

The **"Replace"** command is available from the Movicon **"Edit Menu"** when a resource supporting this command is active. By using this command, which can also be activated with the right mouse key, you can search and replace a character or a text string.
The text string to be found and the one to be replaced can be entered in the appropriate dialog windows, through which search parameters can also be set. The "Find Next" command button starts one single search. The "Replace" command button makes one single substitution allowing a next search to carried out.
The "Replace All" button carries out all the substitutions to be made in the whole resource.

3.1.5. Text Formatting

Movicon allows texts to be formatted according to the Windows standard settings. Wherever the possibility exists to edit visible texts in the project, the formatting and styles can be set by using the Font settings button from the object's or resource's 'Properties Window'.
Whenever the resource in question is General Logic, the edited program can be considered a document and the General Logic resource can be considered as a text program equal to the Windows text editing program standards.

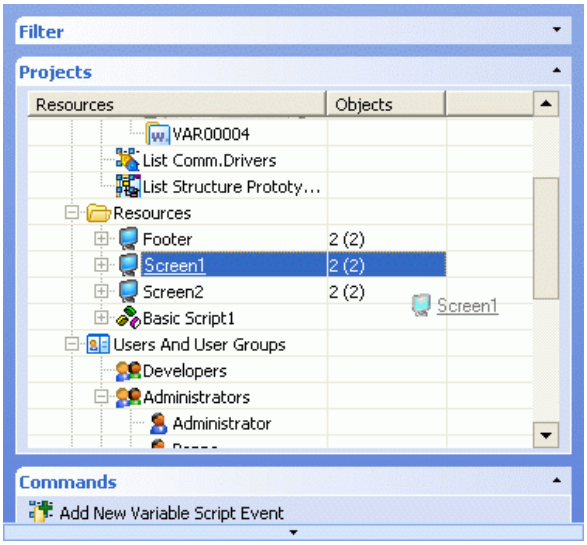
Apart from this, Movicon text formatting can be done through the appropriate settings executable from the resource's 'Properties Window'.



The setup and text formatting window

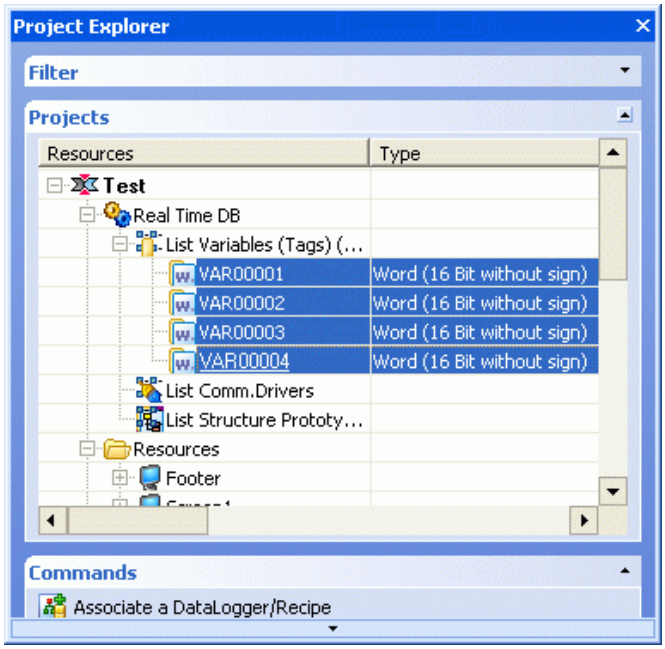
3.2. Drag & Drop Techniques

The standard Windows techniques called **"Drag & Drop"** allow you to move or copy objects or resources by simply dragging the mouse. These techniques speed up the programmer's work enormously consenting him/her to do various jobs such as grouping the desired resources into tree structure groups by just clicking on the mouse and dragging the resource to the point desired by keeping the button pressed down.
This criteria can be applied internal Movicon whether in the same project environment, between different projects or between Movicon and any other Windows application supporting this standard.
For example, a bitmap can be selected with Windows Explorer© and dragged into the Movicon Images resource to be inserted in the project.



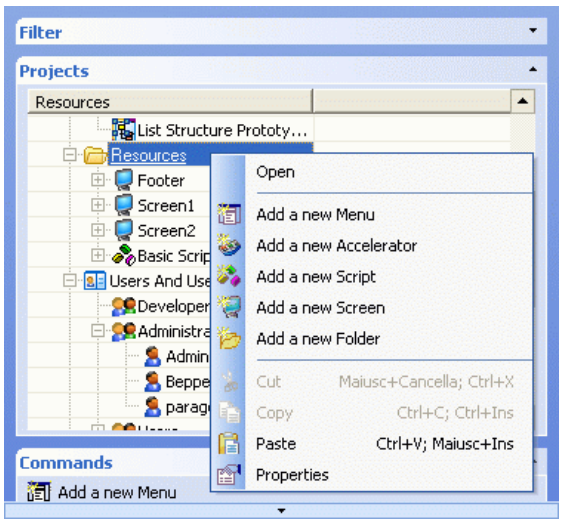
3.3. Multiple Selecting

The Windows standard technique called **"Multiple Selecting"** allows more than one object or resource to be selected at the same time after which they can be moved, copied, deleted, etc. The use of this technique speeds up the work of the programmer enormously where he/she can, for example, move resources from one group to another group in the tree structure by simply selecting multiple resources and then dragging them.
This criteria is applicable either internal Movicon in the project environment or between different projects, or between Movicon and any Windows application supporting this standard.
To do Multiple Selecting you first need to select the first object of the list, then click while keeping the 'SHIFT' key pressed down on the last objest to select, or use the "UP/DOWN DIRECTION ARROWS" until the last object is reached. In this way all the objects comprised from the first one selected to the last one will automatically be selected.
When pressing down the "CTRL" key instead of the "SHIFT" key, you can use the mouse to select only the objects desired on the list by clicking one object at a time, skipping over the ones you are not interested in.



3.4. The right mouse key

Movicon fully supports the Windows standards inherent to the right mouse key. The right mouse key changes its function according to the selected area or object selected the moment the key is activated.
The pop-up menu activated by pressing the right mouse key will contain the commands relating to the selected resource for simple and intuitive use.
To get a more detailed description on the relevant commands, please refer to the possible settings for the selected resource.



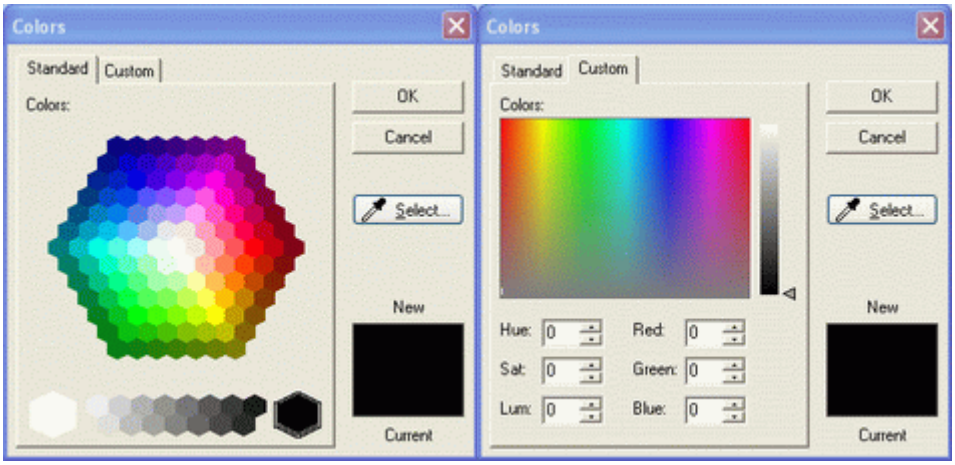
An example of a menu opened with the right mouse key relating to the selected resource.

The right mouse key is extremely useful for programmers and operators. All the operation which can be carried out on the selected object or resource are made available immediately by using the right mouse key. This saves time by avoiding having to search for items on system menus.

3.5. Color 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" of the object or resource.
Movicon, in this case, will automatically displays a variety of colors on a palette in conjunction with the quantity of colours available on the screen card of the platform being used and the system's palette. The color selection is very simple and intuitive to use by just selecting the one you desire with the mouse.
When using the keyboard, select the color palette with the TAB and then use the direction arrows to select the color you desire from those made available by using the SPACE BAR, then press ENTER.

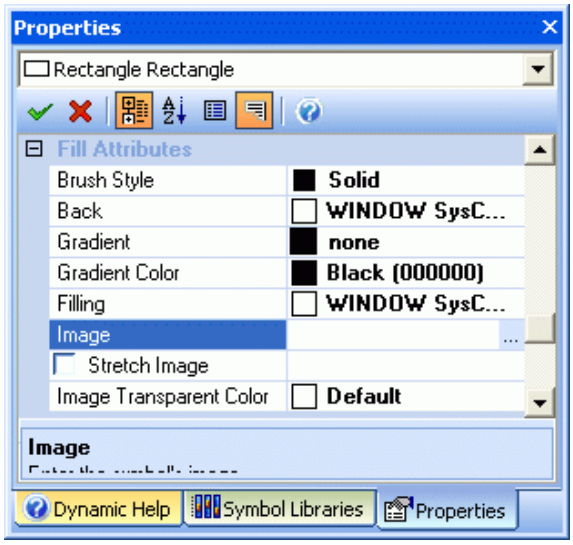
You can set customized colors by using the **"More Colors..."** command. The selection of customized colours can be done according to the "Standard" (color palette) or "Custom" (Color RGB selection) modalities.



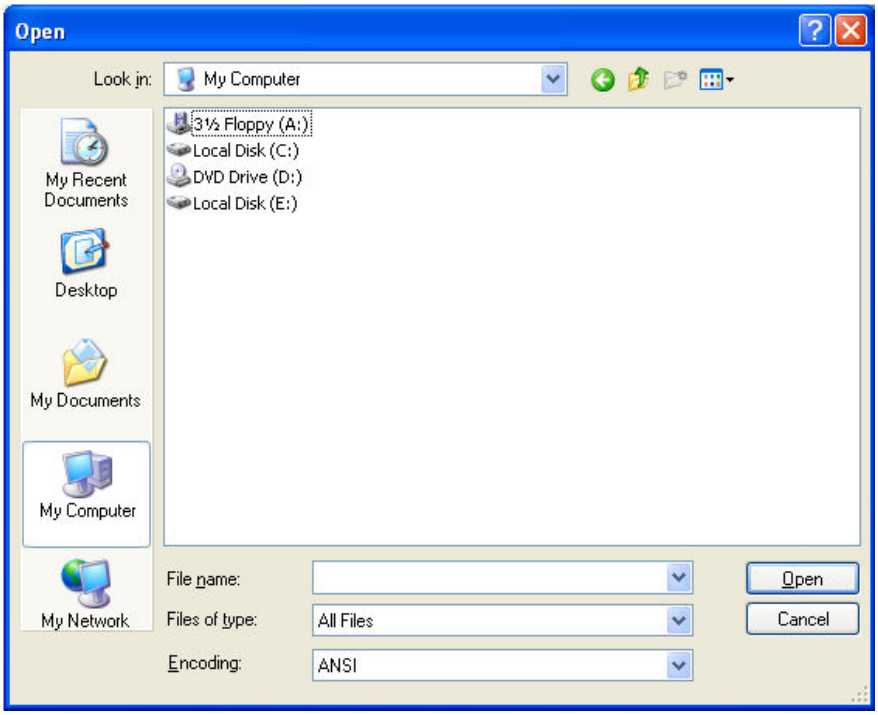
By using the **"Select..."** button in the window you can select a color from the screen. When the button is pressed, the mouse pointer will change to a **'dropper'** which draws up the color it is clicked on.

3.6. Standard file selection

In some cases, while project configuring, Movicon offers the possibility to setup files to be linked or embedded in the project. A classical example would be a screen background file.
This setting, which is always done through the "Properties Window", lets you select the file desired from those existing on the hardware platform by using the Windows standard techniques.
Accessing the file selection is done by activating the purpose built button which is identified by the **"..."** characters situated at the far right side of the box used for writing in the name.



By activating the "..." button you will get access to the Windows standard window for selecting files:



Double click or click once and press ENTER to open the file selected.
For further information on the standard file selection techniques please consult the Windows User's Guide.

4. Licensing

Every Movicon package is supplied with its license against unauthorized use of the hardware and software. Two types of protection have been implemented and the final user can choose the one most suitable.

- **"SoftKey" Key Code**
- **Hardware Keys (Dongles)**

Although both possibilities are available in the Movicon version for WinXP/2000, the product is supplied by default with the LPT hardware, unless otherwise requested at the time of the order. In the compact Movicon version for Windows CE, in view of the reduced size of these devices, and the impossibility of adding hardware components, it is only possible to introduce the softkey option.
Considerations:
To display the serial number or the options enabled for the corresponding Movicon package, select the “CHECK OPTIONS HARDWARE KEY” command from the Command Pane. The Table shown below will be displayed from which all information can be obtained regarding the license.

The use of dongle allows the client to use a “floating” license easily transportable from one PC to another, and independent of problems to the hard disk. The softkey option, being a software license, has the advantage of eliminating a hardware component and possible risk of loss, theft or damage.
In both cases all the products purchased with their possible options have a specific serial number.

When you run Movicon, if any dongle is detected, the program will be executed in EVALUATION MODE.

Movicon X also switches over to "demo mode" when the license's limit of bytes in use is exceeded limit. In this case a message will appear in the "System" log and a count-down window will appear every 10 minutes. This window does not block any process of the project being run. After 2 hours the application will automatically abort. If the number of bytes in use returns under the limit allowed by the license within 2 hours, Movicon X will switch over from "demo mode" and a message will be printed in the "System" log.

Demo Mode

If you have not yet got a Movicon hardware or software licence you can try it out in Demo Mode where you can develop and test run a project in a given time limit. The two hour time limit has been set to let you practise using Movicon in order for you to evaluate it properly. After the two hour time limit has expired Movicon will close down leaving you with another possibility to get another two hours use by starting it up again. While you are using Movicon in demo mode a "Evaluation Mode" window will appear around every ten minutes.

The restrictions regarding the functions in Demo Mode (or Evaluation Mode) are:

- there are no function restrictions. Is possible to use an unlimited number of screens, variables, alarms and drivers. The only limitation is in the use of only one Web Client User. A "Evaluation Mode" window will appear every 10 minutes and Movicon will close down after it has been used for 120 minutes.

During the RunTime phase the application might enter into "Demo Mode" for the following reasons:

- The licence which has been installed is Development type only
- The licence which has been installed enables a number of variable bytes inferior to the ones actually being used.

When functions which are not enabled by the key, such as Datalogger, Network etc, are used in the project a warning message will appear in the Historical Log and the Output Window to let you know that the functions in question are not active and are not working.

*Running the project with the "D" key pressed, Movicon will startup in "**Demo Mode**".*

4.1.1. Total number of I/O bytes Count

The Movicon Licenses are based on both the options to be used and the number of I/O bytes needed.
The byte count for sizing the license is only executed for those variables used in the following resources:

- OPC Client DA or dynamic [OPC] variable types
- OPC Server but only when an OPC Client connects to the Movicon X variable
- OPC XML Client or dynamic variables of this type
- OPC XML Server but only when an OPC Client connects to the Movicon X variable
- Network Client or dynamic [NET] variable types
- Network Server but only when a Movicon X client connects to the variable
- When a variable is used with a Movicon X Communication Driver. The variables used for enabling a static task are not counted.

The byte count, for sizing the license, is done only for variables which are **InUse**. For instance, a variable linked to the field, through a Movicon X Communication Driver, is only counted when it goes in use, such as when a screen is displayed.

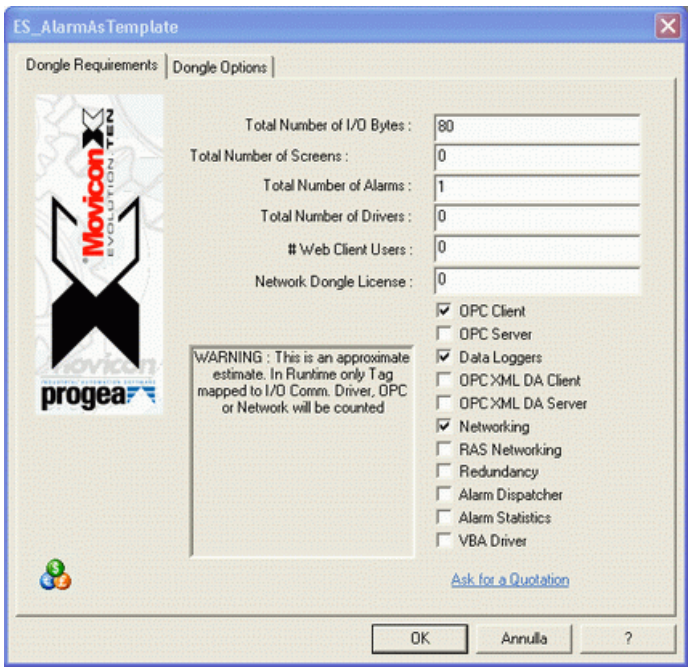
4.1.2. Dongle Requirements

To get information on the necessary dongle requirements or on the dongle installed you need to use the **"Check Options Used (Dongle Requirements)..."** command which is made available by right clicking on the name of the project or in the "Commands" window of the "Project Explorer". The dialog window, which opens, shows two TABs, as described below:

- **Dongle Requirements**
- **Dongle Options**

Dongle Requirements

The Dongle Requirements widow is automatically filled in by Movicon according to how the project has been structure. Movicon will fill in the fields based on the options and resources which have been used in the project, making it easier for the programmer to set the license type need for that specific project.



Some field are compiled by Movicon by simple saving the project. In order to set the other fields, such as the "Total Number of I/O bytes" or "Total Number of Screens" it is necessary that the project be put in run mode and executed in its various features executed.

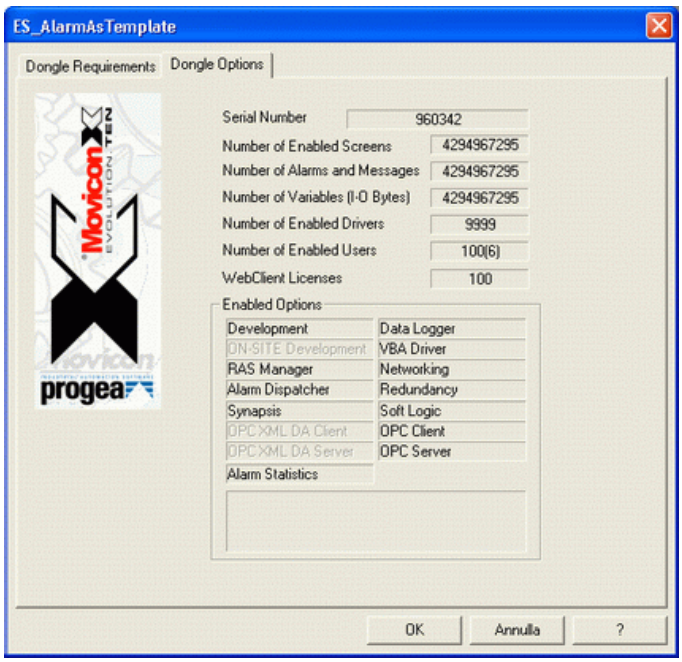
For reasons of realization complexity not all the options are enabled automatically by Movicon. For instance, the "Alarm Dispatcher" and the "Alarm Statistics" options are enabled manually.

The various fields and the various options can then be edited manually by the programmer to get the license they want and to get a quotation. The quotation is obtained by using the **"Ask for a Quotation"** command where an e-mail is sent to Progea with the set Dongle Requirements.

The "Total Number of I/O bytes" is calculated based on the maximum number of variables which went in-use at the same time. For further information please refer to the section on **"Total number of I/O bytes Count"**.

Dongle Options

This window shows the options which have been enabled on the dongle (hardware or software) inserted in the system.



The "Enabled Options" for the license are those in black. the options in grey are those which are not enabled.

Serial Number

This field reports the serial number of the license used. The "0" value means that there is no presence of a license and the system will work in DEMO mode.

Number of Enabled Screens

This field tells you the number of screen which can be used in the project.

Number of Alarms and Messages

This field tells you the number of alarms or message which can be used in the project.

Number of Variables (bytes I/O bytes)

This field tells you the number of I/O bytes which can be used in the project.

Number of Enabled Drivers

This field tells you the number of Communication Drivers which can be used in the project.

Number of Enabled Users

This field reports the number of users who can use Movicon at the same time when the license is a network license. This field will remain blank when a single license is being used.

Web Client Users

This field tells you the number of Web Client Users who can connect to the project at the same.

Development

When enabled this option allows you to develop the project.

ON-SITE Development

When enabled this option allows you to develop one single project. This project can only be run with that specific license.

RAS Management

When enabled this option allows you to use the functions for executing RAS calls in the project.

Alarm Dispatcher

When enabled this option allows you to manage the dispatcher for sending SMS, Vocal Messages, E-mails and faxes for the project's alarm events.

Synapsis

When enabled this option allows you to use the Synapsis objects in the project.

OPC XML DA Client

When enabled this option allows you to use the OPC XML DA Client in the project.

OPC XML DA Server

When enabled this option allows you to use the OPC XML DA Server in the project.

Alarm Statistics

When enabled this option allows you to display project alarm reports.

Data Logger

When enabled this option allows you to use the DataLogger object in the project.

VBA Drivers

When enabled this option allows you to use the Communication Drivers' Basic Script interfaces in the project. Without this option the "GetDriverInterface" method from the "PmeDocCmdTarget" interface will always return nothing and therefore it will not be possible to access the basic functions of the communication drivers which have been installed and are in execution with the project.
This option is not provided with the softkey in desktops and is only enabled for MovXCE when a full license is being used.

Network

When enabled this option allows you to use the Network functions in the project.

Redundancy

when enables this option allows you to use the Redundancy functions in the project.

General Logic

When enabled this option allows you to use the IL Logic in the project.

OPC Client

When enabled this option allows you to use the OPC Client in the project.

OPC Server

When enabled this option allows you to use the OPC Server in the project.

4.2. Hardware Dongles

The hardware protection Dongles can be LPT or USB type. The LPT type dongle is connected to the PC's LPT parallel port. When there are other LTP ports on the PC, Movicon will search for the dongle in the parallel ports in sequence starting with LPT1. If a printer is connected to this port, disconnect the printer, insert the protection dongle and then reconnect the printer to the same protection dongle.
The USB dongle is connected to the USB port (Universal Serial Bus). In this case, according to the USB connections typology, the dongle can be installed into any one of the PC's USB ports and can be connected or disconnected with the PC on.
When an unlock software code is not being used, the protection dongle is absolutely necessary for the system with the enabled options to work and contains a progressive serial number issued by the constructors. To view the serial number and the enabled options in the Movicon packet you have purchased, select the **"Check Options Used (Dongle Requirements)..."** command.

USB dongle installation

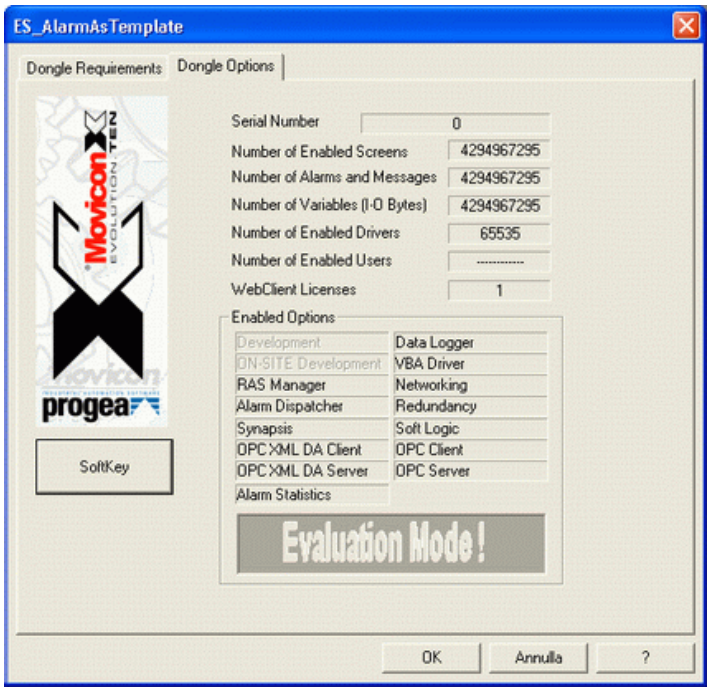
When installing a USB dongle, the operating system will request the driver of the installed product on the first installment.

LPT dongle installation

The LPT protection dongle is compatible with all PC parallel ports according to the current standards.

4.3. Softkey Codes

If the hardware protection dongle is not explicitly requested when purchased, Unlocking the Movicon protection can be done by requiring the softkey code.
To get the softkey code, you first need to install the Movicon software on the PC then go to the **"Dongle Options"** window by using the **"Check Options Used (Dongle Requirements)..."** command where the **'Softkey'** button should be.



The following dialog window will appear when clicking on the 'Softkey' button:

You should take note of the **"Site Code"**, being the system code linked to the machine. Once this 'Site Code' has been supplied to Progea they will release the 'Site Key' code, according to the necessities and options purchased. This code enables the software to function as acquired.

4.3.1. Site key Request

You may make a request for the Site Key to Progea only after having installed Movicon to obtain your Site Code, being the PC station code, which must be supplied to the Progea Client Services office in order to get the site key.
To get the Site Code, you need to:

1. Execute the **"Check Options Used (Dongle Requirements)..."** command from the Commands window situated in the Project Explorer
2. Display the **"Dongle Options"** window and pressed the **"SoftKey"** button
3. Note down the number shown in the "Site Code" box in the "Authorization" window. This number is personal and **changes for each software installation.**
4. Contact the Progea offices to request the 'Site Key'

The **"Site Key"** is strictly linked to the **"Site Code"**. Progea cannot send site keys without knowing the site code. The site key is sent by Progea immediately after the request has been made and which you should receive within the next 24 hours. The request can only be done when a purchase has been made otherwise you will need to make a purchase from Progea or from a local distributor.

4.3.2. Entering and keeping the Softkey

Once a softkey code has been received from the Progea Sales Office (generated on the basis of the **Site Code** supplied), you need to enter it in the **Site Key** box of the window relating to the softkey. Proceed as follows:

1. Execute the **"Check Options Used (Dongle Requirements)..."** command from the Project Explorer's Command window
2. Display the **"License Options"** window and press the **"SoftKey"** button
3. Enter the code received in the **"Site Key"** box from the **"Authorization"** group
4. Close the window with OK

At this point the softkey code is registered in the system. At the next restart, Movicon will behave as if a hardware key were present with the difference that the software key is installed instead.

Warning! Look after your system. Any re-installations of software on the same PC or other PCs generate new Site Codes which will require new unlock codes from Progea!

4.3.3. Transferring Softkeys

It may at times be necessary to decide whether to re-install the software or to transfer the licence to another PC. Before going ahead with this operation, you first need to remove the license by transferring the softkey onto a Floppy Disk and inserting it into the new position.
By defining the two computers as:

- Source PC: is the one which contains the Movicon license
- Destination PC: is the one where the license is to be transferred

we can describe the following operation sequences:

1. Insert a floppy disk into the Destination PC and preset the later to receive license with the **"Register Transfer"** command found in the **"Site Key General License Authorization"**. This window can be accessed with the "Softkey" found in the "Dongle Options" window which is accessed with the **"Check Options Used (Dongle Requirements)..."** command.
2. Transfer the floppy disk to the Source PC and press **"Transfer Out"** found in the same **"Site Key General License Authorization"** window.
3. Return the floppy disk, which at this point should contain the license, to the Destination PC and press the **"Transfer In"** button found in the **"Site Key General License Authorization"** window.
4. At this point the license has now been transferred to the Destination PC. To return the license back you need to repeat these above operations.

Therefore the operations to be carried out for transferring licenses are:

1. REGISTER TRANSFER
2. TRANSFER OUT
3. TRANSFER IN

4.4. Movicon XCE License

Devices using Windows CE require a management Softkey license.
Without this license the project runtime will be executed in Demo mode on the WinCE device.

Movicon XCE Management License

When having purchased the license for Movicon XCE, the user will receive a Serial Number allowing them access rights to the Progea web site to get the Sofkey code to be entered in the device.
This enables the user to access the web site at any time, 24 hrs a day, to automatically generate the softkey in function with their site code.

- **Carefully carry out the instructions received when purchasing the license.**

Runtime in Demo Mode on Windows CE

When starting up the project, Movicon XCE will ask the user to enter their licence code. When the Demo Mode is selected the project will run in demo mode with a 2 hour time limit and with the communication drivers and the networking functions disabled.

5. Real Time DB

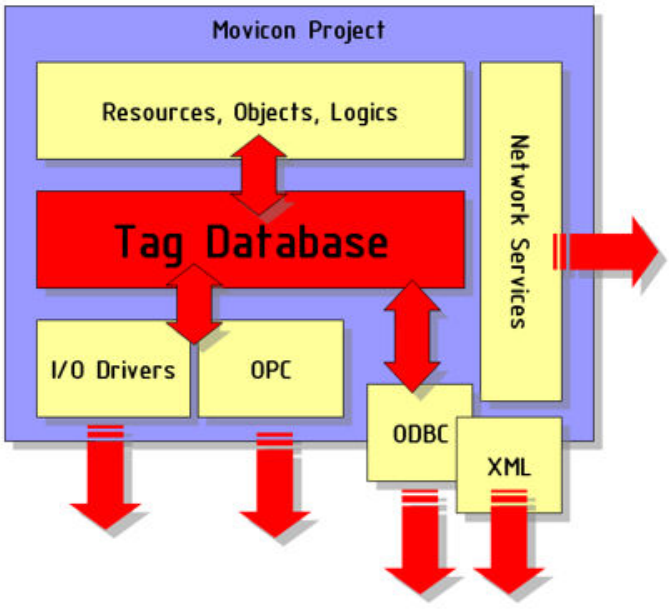
This section describes how Variables are managed within Movicon projects, memory areas, the Variables List and their functionalities.

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 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.

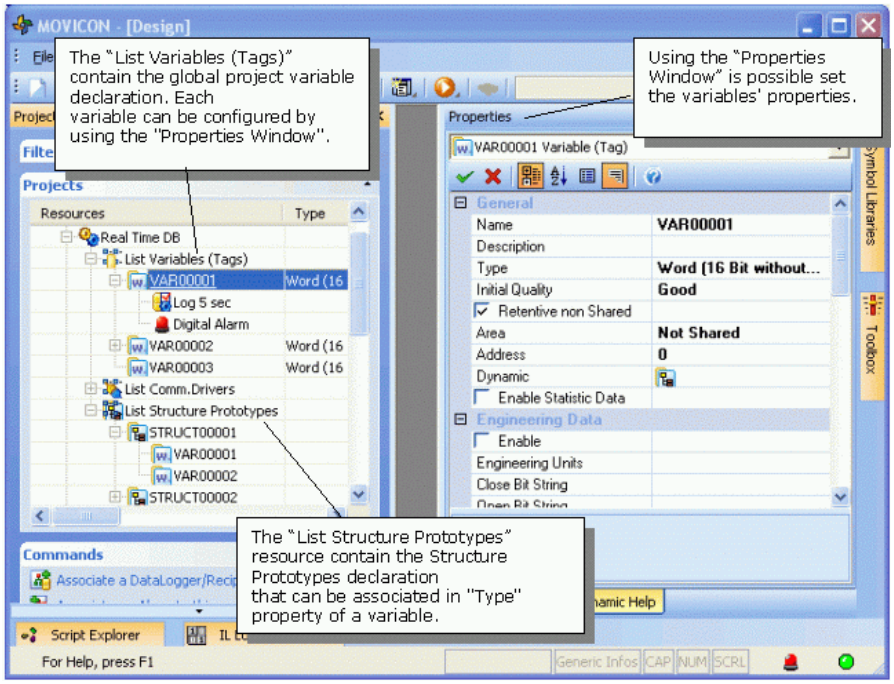
5.1. Variable List(Tags)

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 recognised 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



5.2. Variable Tracing

Variable Tracing is a Movicon functionality which allows you to historically log the behaviour of variables by recording on database files 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 go and monitor, internally, the required variable's value and will record in the Database file, dedicated for this purpose, each single variation of the value contained in the variable when it happens. The Database file containing information on the Variable tracing will be created automatically by Movicon in the 'LOGS' folder of the projected called "NameProject_TraceDB.mdb" in Access2000 format. 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:** indicates the active user's name when recording took place
- **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
- **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

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.

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.

5.3. Movicon 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	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 returnd 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	Byte	System Time: Year
ActTimeString		System Time in string value
ActDateString	String	System Date in string value
StrobeExitApp	Bit	Exit from Movicon
StrobeYearLocalTime	Byte	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.
AlarmsSoundState	Bit	Variable which sets the sound status of the alarms. This variable can also be set for activating/deactivating the sound by 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.
InputAckAlarms	Bit	This variable acknowledges alarms when set at true. After the command has been executed Movicon will reset the variable to false.
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.

5.4. 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 imported from projects realized with the Movicon 9.1 version using the "XML Converter" tool.*

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 "NameVariable.NumberBit" (for instance typing a text for the '0' bit of the "VAR0001" just type 'VAR0001.0").

5.4.1. Retentive Variables

You can use retentive variables when the project must store the variables' logic states or word contents 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.

Movicon will create a file in XML format For each variable defined as retentive 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:

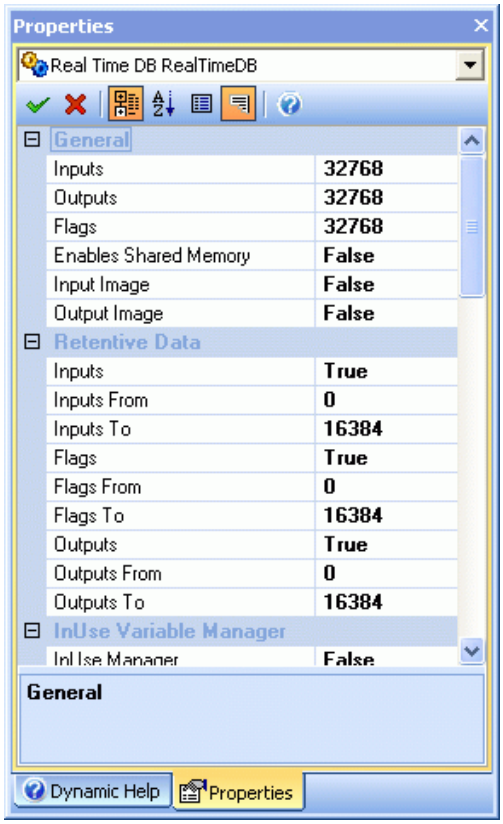
NameProject_NameVariable.var

for example the "VAR0001" variable of the "Project1" project will be in a retentivity file called:

Project1_VAR0001.var

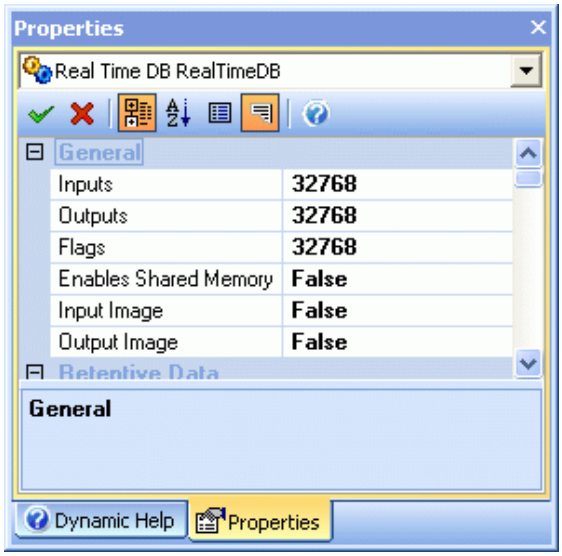
5.5. Real Time DB Settings

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.



5.5.1. 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.

Enables Shared Memory

This setting permits you to enable or disable the usage of the Shared Memory area.

Input Image

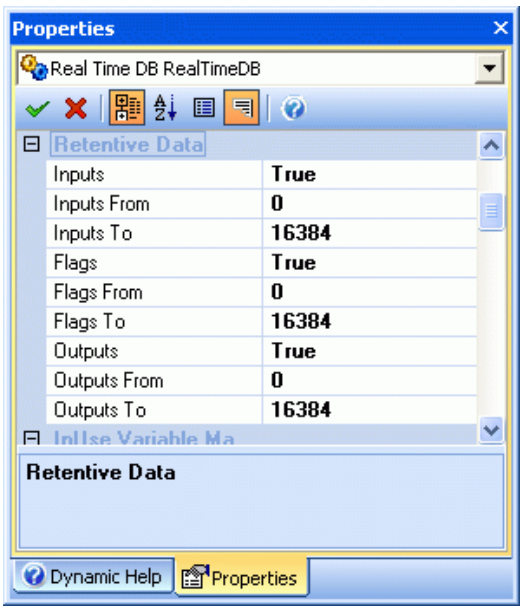
When enabling this selection the synchronization between data read by the communication driver and the project's general logic will be activated. At the beginning of every processing cycle of the general logic a process image of all the project inputs is saved. In this way any updates on inputs, carried 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.

5.5.2. 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'.**



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:

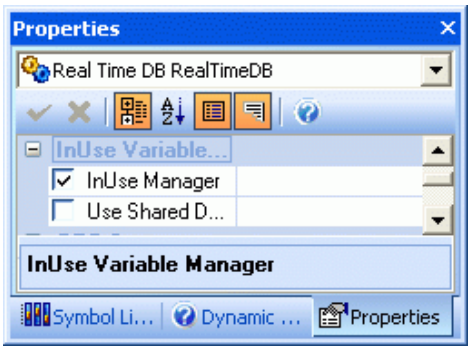
This setting permits you to insert the starting address for the retentive Output area.

Outputs A:

This setting permits you to insert the ending address for the retentive Output area.

5.5.3. Real Time DB Variables InUse Management 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

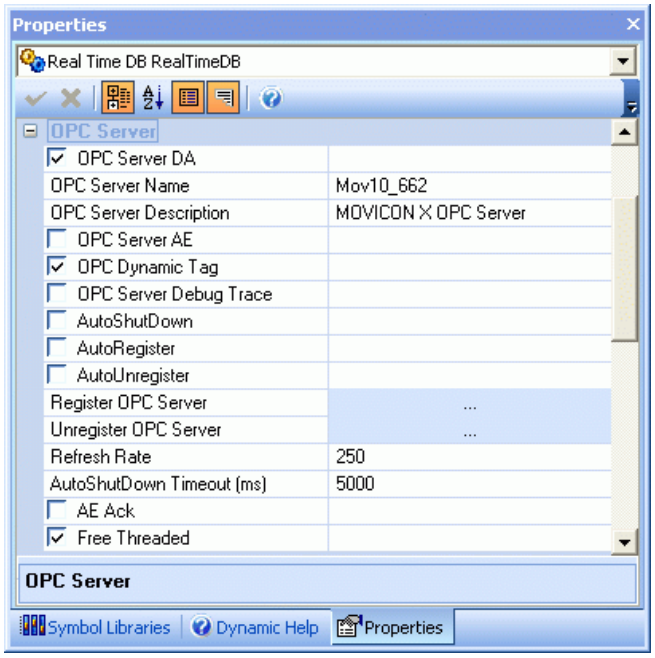
This setting allows you to enable or disable the Variables in use management.
This lets communication with devices to be optimized (by means of Drivers, OPC, etc.) because only the jobs containing the variables in use are kept active. When this property is disabled all the communication jobs will always be kept active and therefore effecting system performances.

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.

5.5.4. 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.

5.5.5. 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

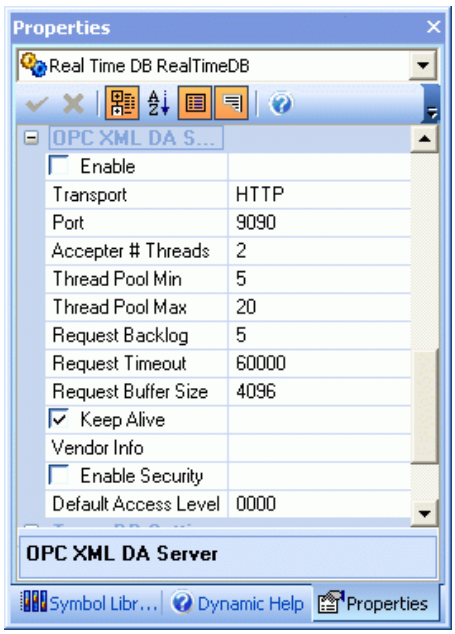
This property allows you to enable the OPC Server Security management. When enabled only users acknowledged by the Server, to which the users connect to through the Client, can carry out operations consented by their access rights.

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.

5.5.6. 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"**.



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

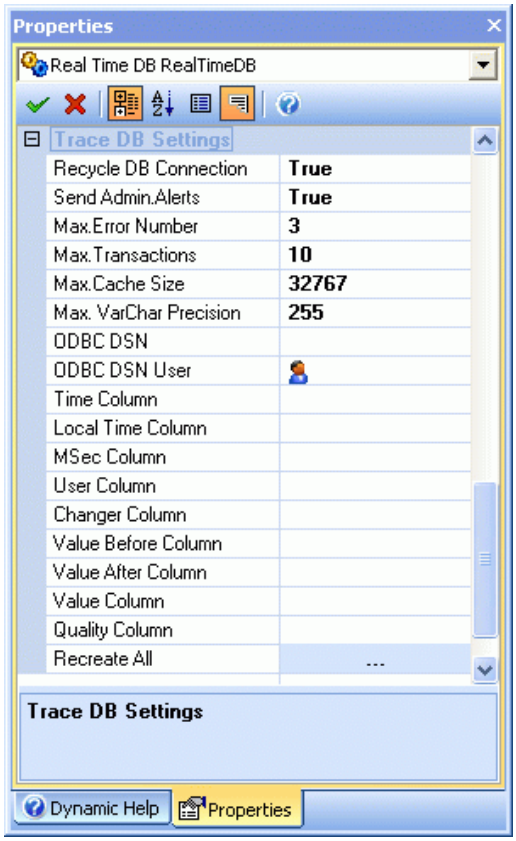
Allows you to enable Server OPC XML DA access security.

Default Access Level

Allows you to enter the Default Access Level for anonymous connections.

5.5.7. Real Time DB Trace DB Settings

The Variable Tracing is a Movicon functionality which allows you to historically log the behaviour of variables, by recording on Database files 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'.**



Recycle DB connection

See **"O.D.B.C. Settings for Recording Files on DataBase"** paragraph in the **"ODBC"** section.

Send Admin.Alerts

See **"O.D.B.C. Settings for Recording Files on DataBase"** paragraph in the **"ODBC"** section.

Max. Error Number

See **"O.D.B.C. Settings for Recording Files on DataBase"** paragraph in the **"ODBC"** section.

Max. Transactions

See **"O.D.B.C. Settings for Recording Files on DataBase"** paragraph in the **"ODBC"** section.

Max. Cache Size

See **"O.D.B.C. Settings for Recording Files on DataBase"** paragraph in the **"ODBC"** section.

Max. VarChar Precision

See **"O.D.B.C. Settings for Recording Files on DataBase"** paragraph in the **"ODBC"** section.

ODBC DSN

See **"O.D.B.C. Settings for Recording Files on DataBase"** paragraph in the **"ODBC"** section.

ODBC DSN User

See **"O.D.B.C. Settings for Recording Files on DataBase"** paragraph in the **"ODBC"** section.

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.

Recreate All

The command regenerates all the tables of the variables enabled with the Trace. All existing data will be lost.

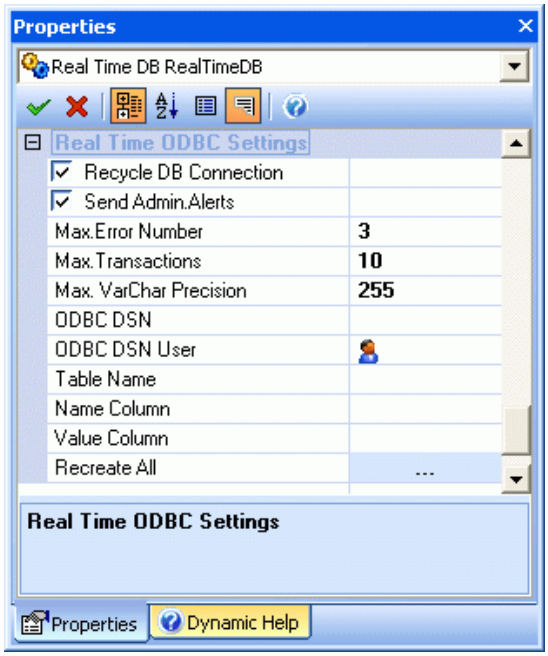
5.5.8. Real Time in Shared ODBC Settings

The **"Variable Real Time ODBC Properties"** is a Movicon functionality which allows you to establish a dynamic link between the Movicon Real Time DB variable and a data field of a database file in your 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 to contain a column iwht the variable names (defined in the 'Name' box in the 'Variable General Prrperties') and a column containing the corresponding values.
Movicon will create the Database file in the project's "DATA" folder for default with the name:

NameProject_RealTimeDB.mdb

*To change the ODBC link and the connected file created by Movicon for default use the **"ODBC DSN"** properties as described below.*



Recycle DB Connection
See paragraph on **"O.D.B.C. Settings for Recording Files on DataBase"** in the **"ODBC"** section.

Send Admin.Alert
See paragraph on **"O.D.B.C. Settings for Recording Files on DataBase"** in the **"ODBC"** section.

Max. Error Number
See paragraph on **"O.D.B.C. Settings for Recording Files on DataBase"** in the **"ODBC"** section.

Max. Transactions
See paragraph on **"O.D.B.C. Settings for Recording Files on DataBase"** in the **"ODBC"** section.

Max. Cache size
See paragraph on **"O.D.B.C. Settings for Recording Files on DataBase"** in the **"ODBC"** section.

Max. VarChar Precision
See paragraph on **"O.D.B.C. Settings for Recording Files on DataBase"** in the **"ODBC"** section.

ODBC DSN

See paragraph on **"O.D.B.C. Settings for Recording Files on DataBase"** in the **"ODBC"** section.

ODBC DSN User

See paragraph on **"O.D.B.C. Settings for Recording Files on DataBase"** in the **"ODBC"** section.

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 ODBC table's Variable Name column. This column reports the name of the variables enabled with the ODBC 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 ODBC table's Variable Value Column. This column reports the variable's value enabled with the ODBC function. If nothing is entered, the **"Val"** name for default will be used instead.

Recreate All

This command regenerates the tables containing data of the variables enabled with the ODBC functionality. Any existing data will be lost.

5.6. 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 accelerator keys.
The dynamic variables cannot be used internal General Logic or SoftLogic, 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.

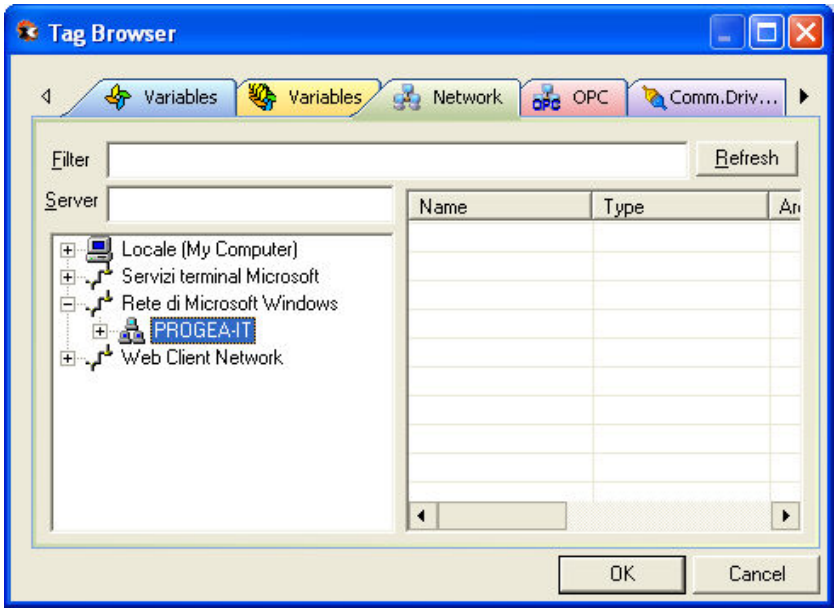
The dynamic variables are subdivided into three categories: Network Variables, OPC Variables and Communication Driver Variables. Their management by Movicon is identical for all categories.

The number of dynamic variables used must always be compatible with the number of tags provided by the Movicon license being used.

5.6.1. 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:

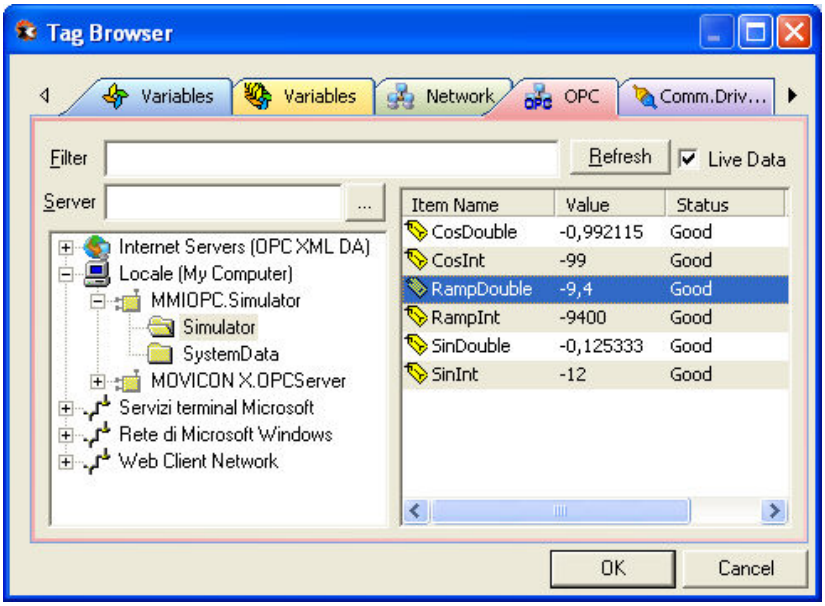
[NET]\\ComputerName\VariableName

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".

5.6.2. 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:

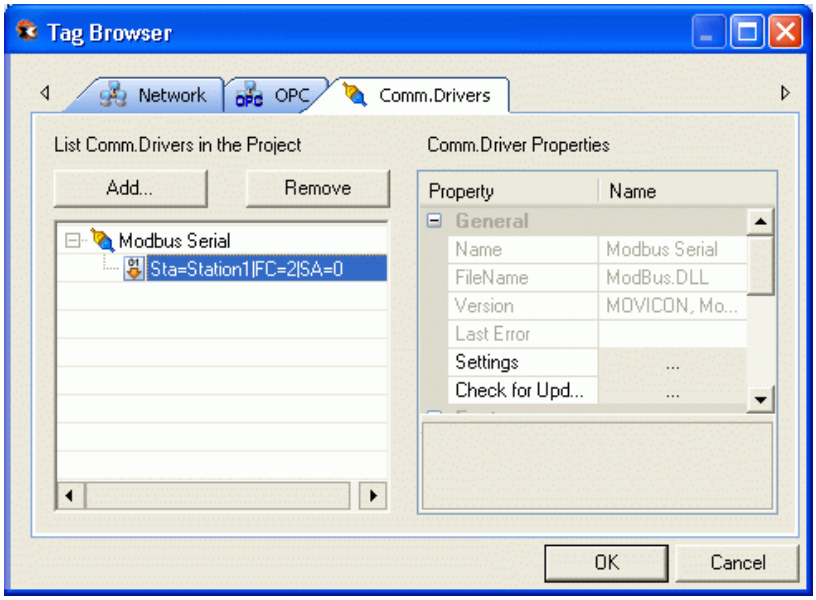
[OPC] ServerName.Version\DeviceName.GroupName.TagName

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.

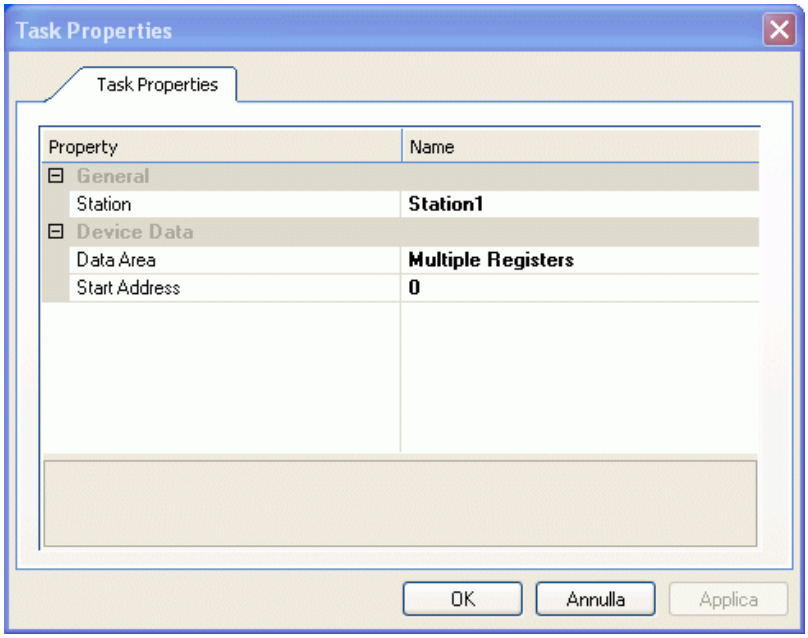
In order to use these Dynamic OPC variables you need to have the OPC Client option enabled on the dongle and have an OPC Server already installed and configured. In addition, when accessing a remote OPC Server (on another computer) you need to configure the DCOM components appropriately on both the operating systems to get an adequate access level.

5.6.3. 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:

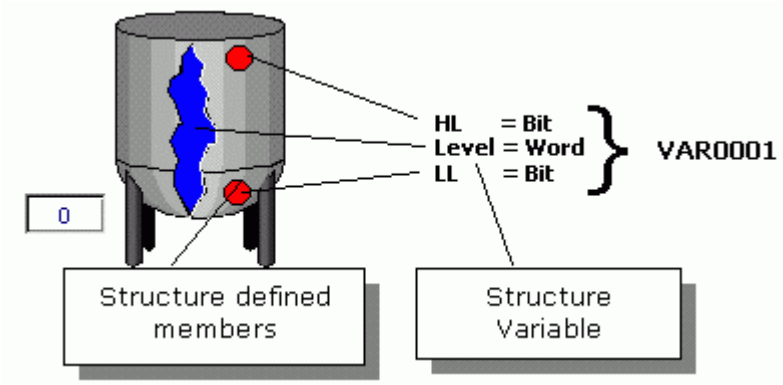
[DRV]DriverName.Sta=StationName|Addr=TagAddress

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)

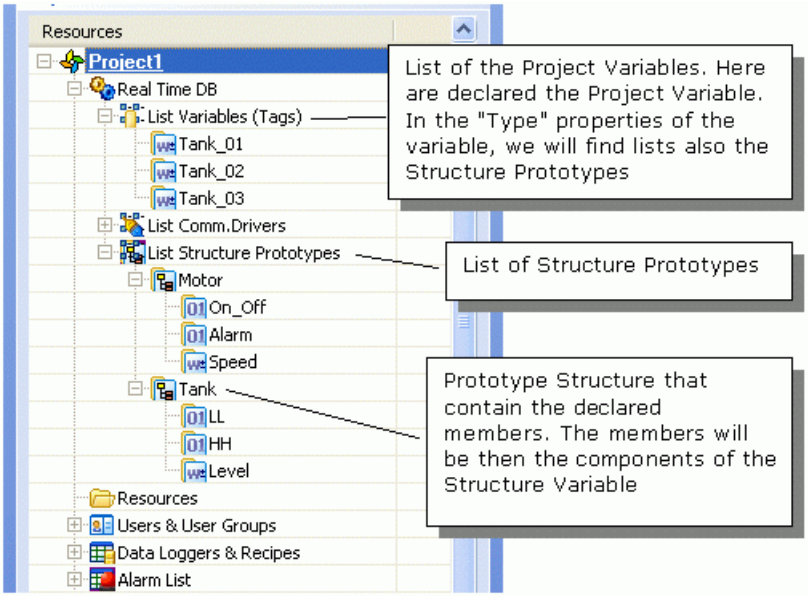
In order to use the Dynamic Communication Driver variables the appropriate communication drivers have to be enabled on the dongle.

5.7. Structure Variables

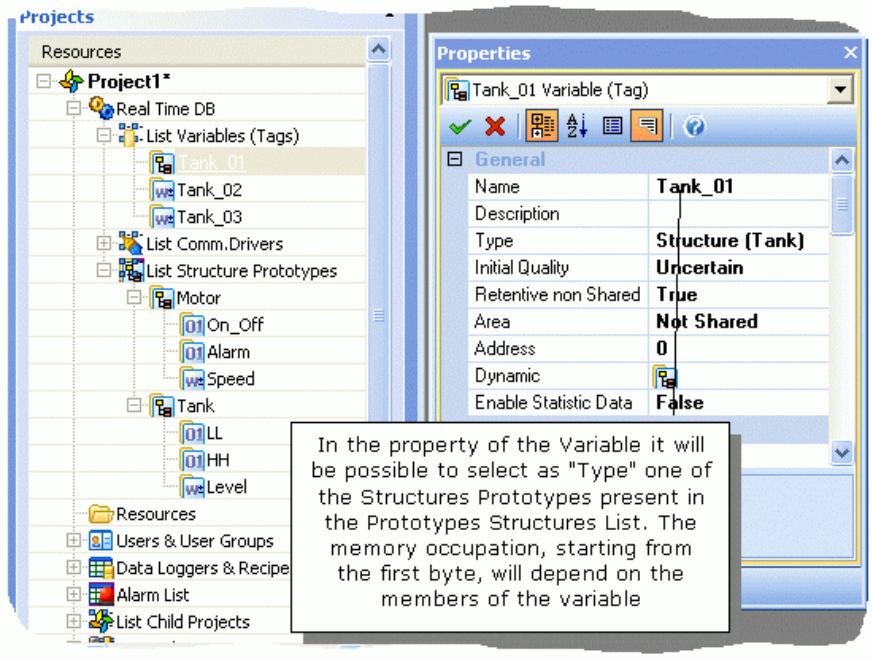
Movicon provides variables defined as Structures to simplify and slim down the employment of groups, containing a mixture of different type variables, in projects.
These type of variables therefore contain a series of information deriving from other variables of different types, grouped together by one variable known as Structure.
Le't 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.



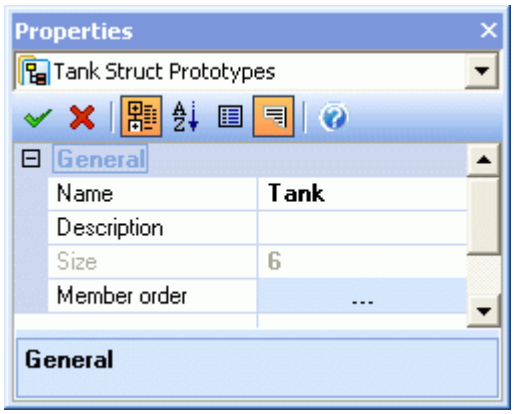
Before inserting a Structure variable into the Real Time DB, its Prototype needs to be set from the project's **'List Structure Prototypes**'.
The Structure Prototypes allow you to setup the Type of structure you wish to create by declaring the Member Variables which will take part in it. After having 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.

5.7.1. 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

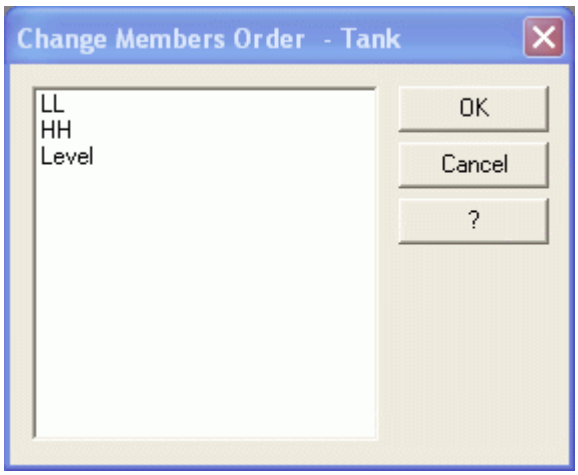
This field is read only, it reports the live occupation of the Structure Prototype in bytes.

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"**.

5.7.2. 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.

5.7.3. 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 '_' character when accessing variables directly, without using the Movicon functions (GetVariableValue(), SetVariableValue(), etc):

```
Sub Main()
        Dim nVar as Integer

        nVar = Tank10_Livello
        nVar = GetVariableValue("Tank10:Livello")
End Sub
```

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.

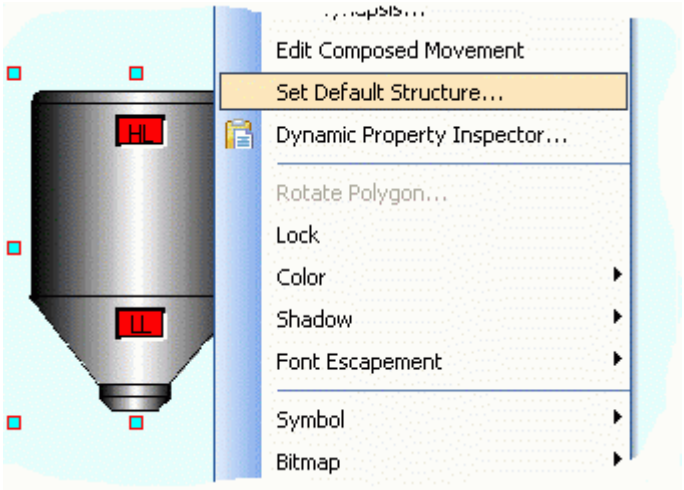
5.7.4. Default Structures in symbols

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

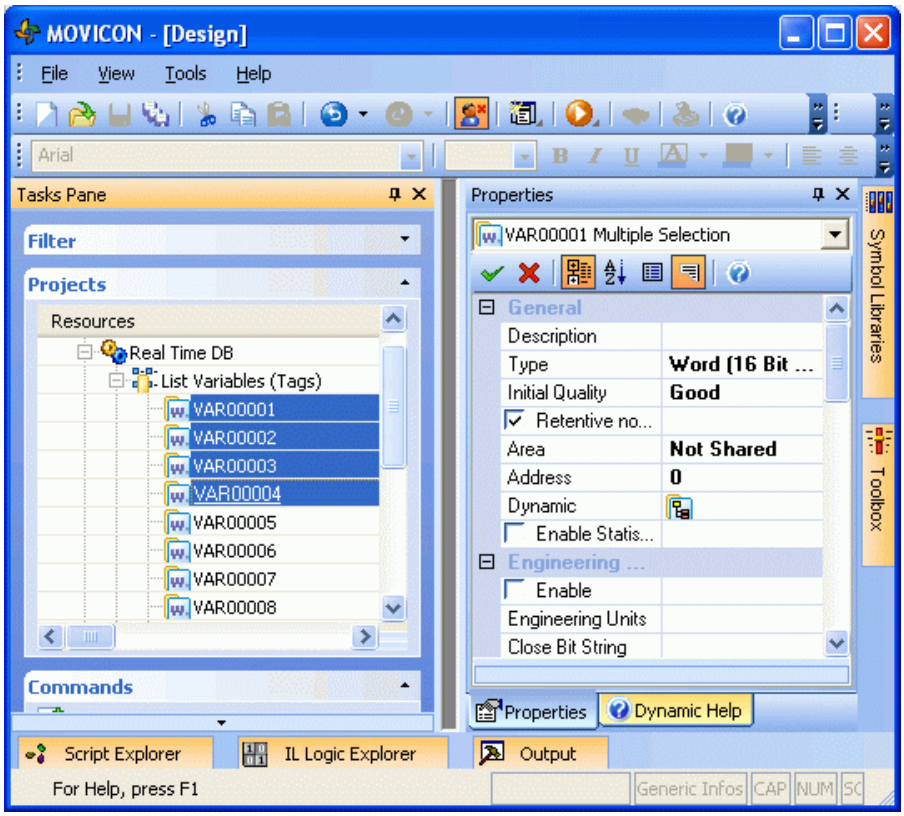
The starting Structure variable can be set using the symbol's Default Structure.
To assign the Default Structure you have to select the symbol and use the right mouse key and access the **'Set Default Structure'** command. The selection window will display showing the Variable Structure along with those 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.



5.8. 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.

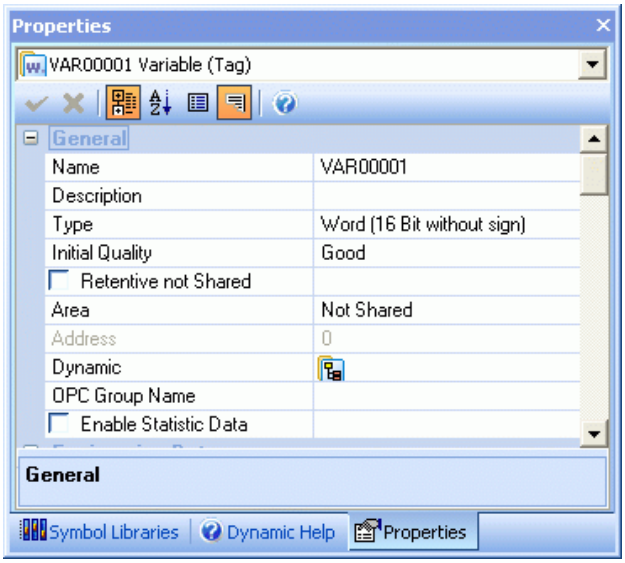
Movicon allows you to carry out multiple variable selections for which only the properties common to all the variables selected will be enabled in the **'Properties Window'**. Any modifications carried out in anyone of these properties will effect all the variables selected.



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.

5.8.1. Variable General 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)
Structure: A list of Structure types available will be listed if present on the 'Structure Prototypes' group.

The string type variables can be up to a maximum of 1024 characters.

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.

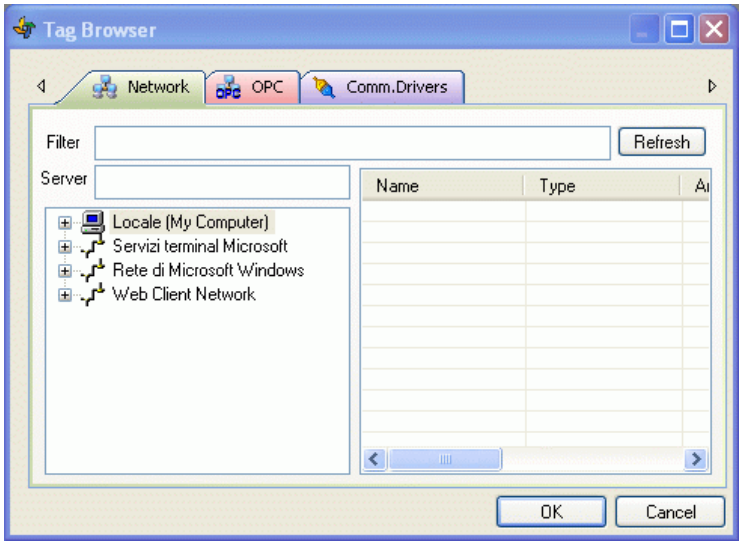
Address

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) while the 'x(x)' (Eg. 10(5) = Array of 5 bytes to start from address 10) syntax must be used for byte arrays.

It is advised to always use the ' Not Shared' areas when possible so as to avoid superimposing unwanted addresses.

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)

OPC Group Name

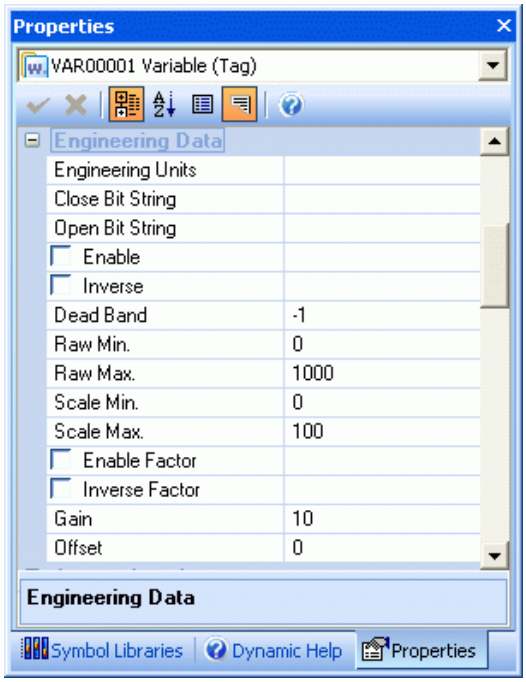
The name of the OPC Group to which the variable is to belong is entered in this field. This setting only has meaning when the OPC link has been inserted in the variable's "Indirizzo Dinamico" property. When no Group name is entered Movicon will insert the dynamic tag in a generic group purposely created 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..

5.8.2. 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.

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.

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.

Enable

This setting enables or disables the variables scaling property.

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.

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 rfers to the Movicon variable and not the Communication Driver's value. Therefore the most explicative formula would be:

DriverValue = (MoviconValue * Gain) + Offset

Inverse Factor

This property allows you to use Gain and Offset factors in inverse mode for scale calculations. The expressions become:

(Value - Offset) / Gain

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 = (MoviconValue - Offset) / Gain

Gain

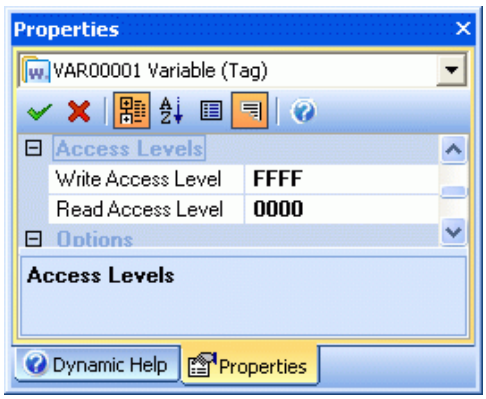
The Gain value for the scale calculation with the use of multiplication factors.

Offset

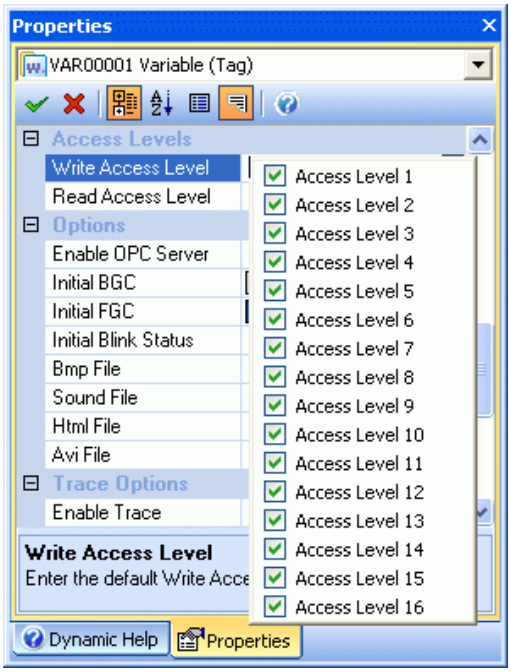
The Offset value for the scale calculation with the use of multiplication factors.

5.8.3. 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

For further information on 'Access Levels' please refer to the **"Write Access Levels"** paragraph.

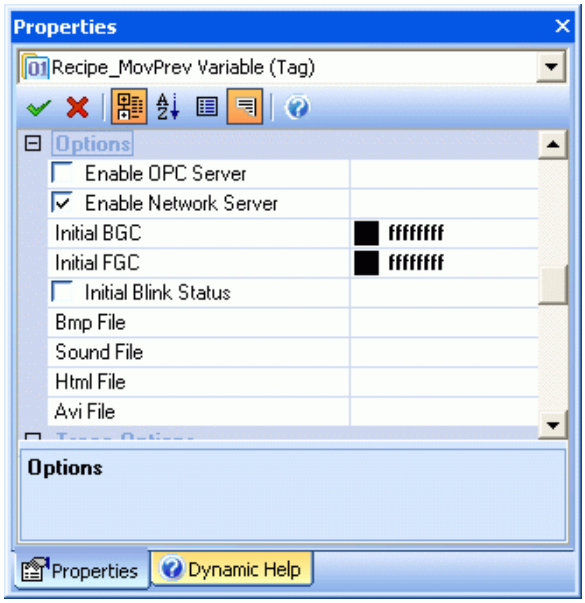
Read Access Level

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.

5.8.4. 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.

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.

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'**.

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'**.

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

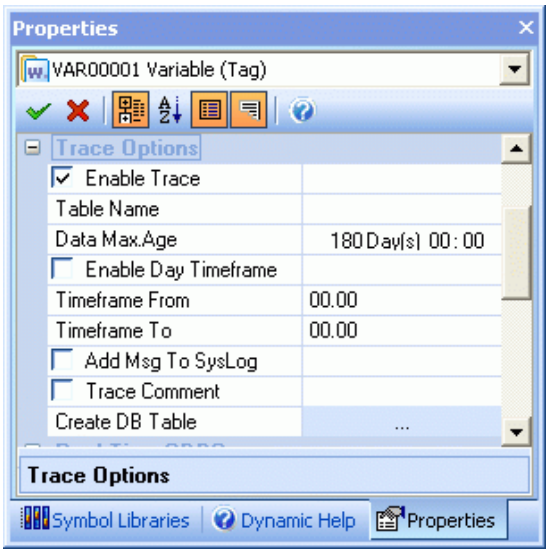
By means of this property you can associated a Html file to the Variable. This property can be interpreted by the connected OPC Client if predisposed with the necessary functionalities.

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.

5.8.5. 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'**.



The database containing variable Trace information will be created automatically by Movicon in the project's 'LOGS' folder 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.

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.

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.

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

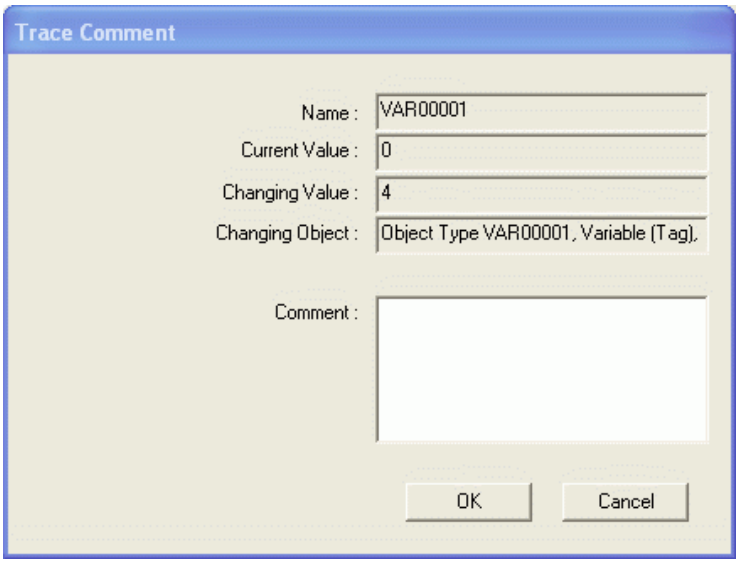
The time in which the variable's trace ends is set here when the **'Enable Day Timeframe**' option has been enabled.

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.

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

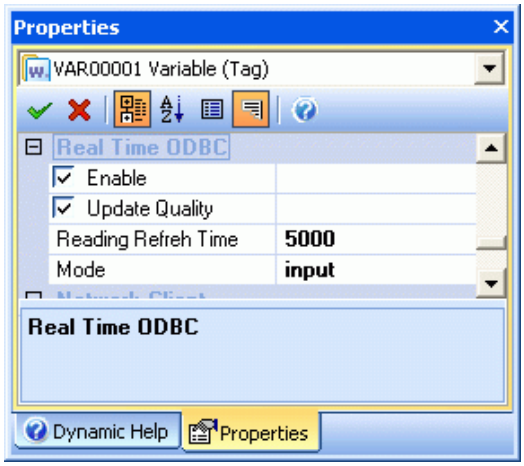
Modifying the font or its size will also change the dialog window's sizes.

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.

5.8.6. Variable Real Time ODBC Properties

By using the Real Time ODBC 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 **"Real Time in Shared ODBC Settings".**
To modify the Real Time ODBC properties of a variable you have select the object with the mouse and use the Movicon **'Properties Window'**.



Enable

This property allows you to enable the variable which is to be shared with the Database enabled for this purpose.

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.

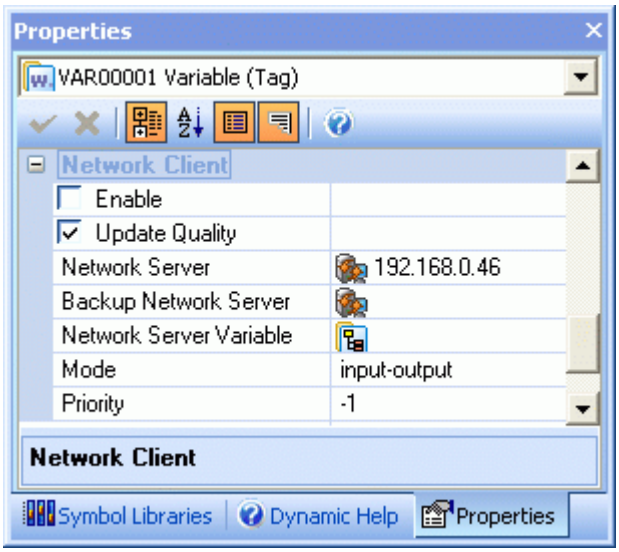
Mode

The operating modes of the ODBC link for the specified variable is set in this option box. The operating modes are:

- **Input** Movicon reads the variable's value specified by the linked Database file and writes its contents on the variable of the Movicon project.
- **Output**: Movicon writes the value contained in the local variable of the Movicon project in the relevant field of the linked Database field.
- **Input/Output**: 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 locally to the project or in the Database file.

5.8.7. 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'.**



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

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

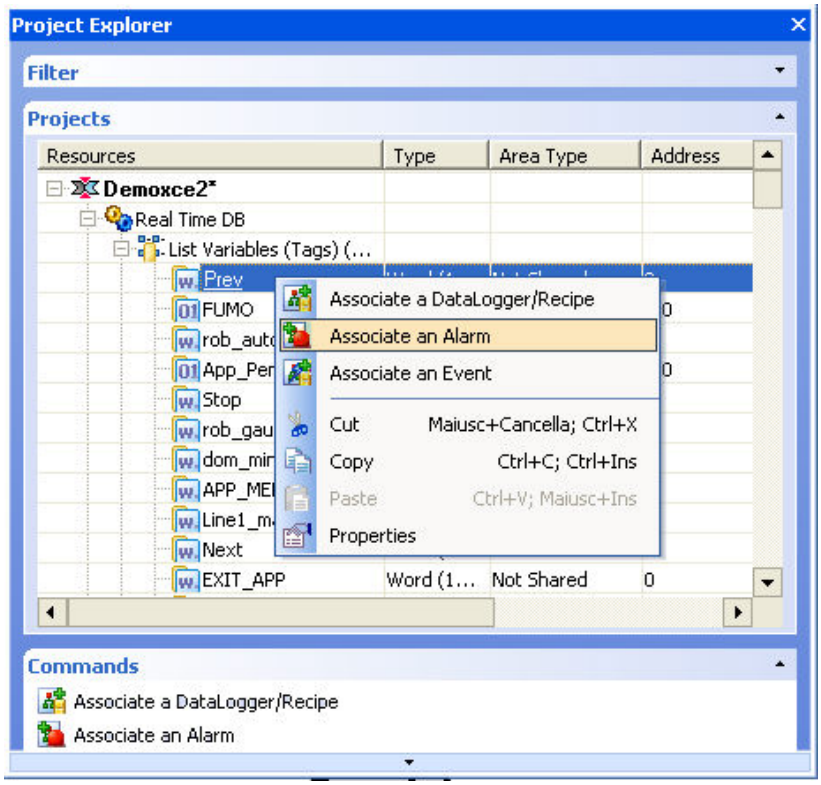
Priority

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**.

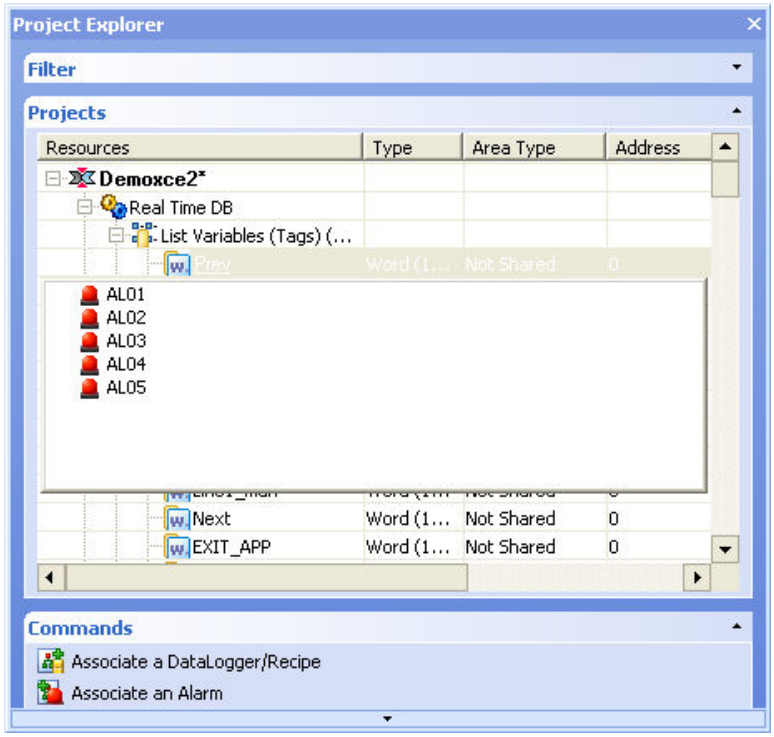
5.9. Associating Alarms to Variables

Usually alarms are first created then each one associated to a alarm activation variable in the project's class of alarms. You can, however, also do this by reversing the procedure by first associating the variable to a certain alarm. This procedure is very handy when having to create many alarms of the same type but referred to different devices. A classic example would be 'Overheating' which must be activated on all the plant's motors. If for example the plant has 30 motors, by using the standard procedures 30 alarms should be created to which 30 variables read from the field are associated. In this case however the only thing that changes in the 30 alarms is the name of the variable and the motor indications in the text of the alarm in question (ie. 'Overheating Occurrence'), then associate this alarm to the 30 variables read from the field. Using this technique Movicon will execute the alarm text composition by linking the variable name and the alarm text. Obviously the variable name must indicate the device it represents.
Associating an Alarm to a Variable can be done by clicking with the right mouse buttons on the variable in the 'Variable List' group presented in the 'Project Explorer' window and selecting the

command 'New variable' or by using the 'Add new variable' command which can also be found in the 'Command' window of the 'Project Explorer'.



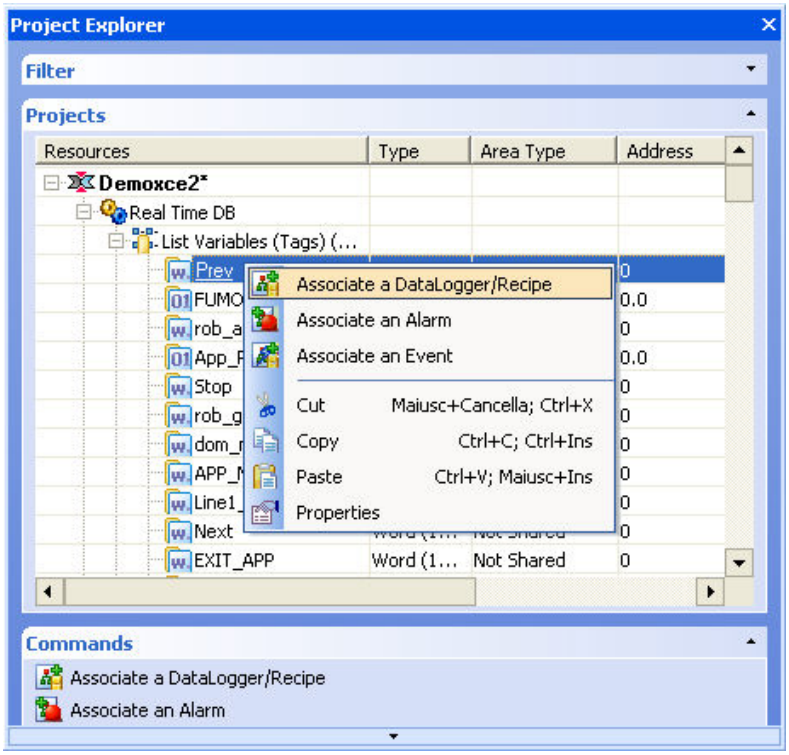
The 'Associate an Alarm' request opens up another window containing a list of the alarms available, which were entered beforehand:



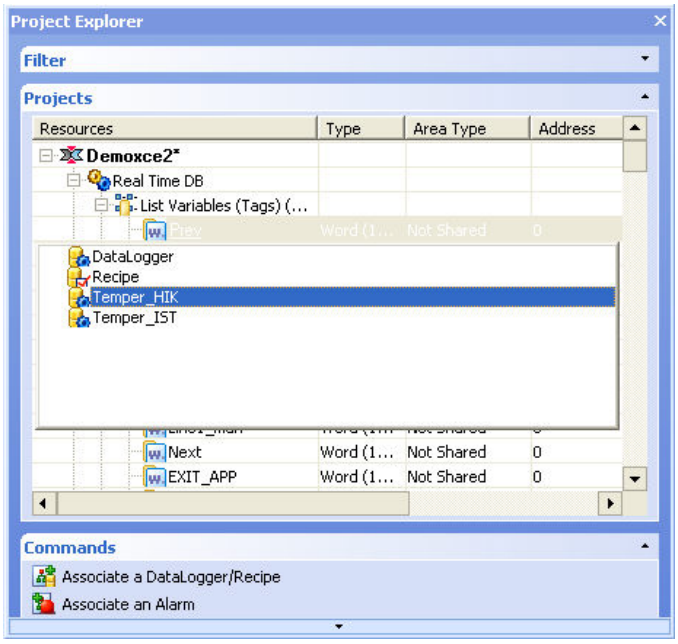
There shouldn't be any reference variable specified in the property of the alarm to be associated to the variable where only the text and the activation conditions are to be entered.

5.10. Associating Data Loggers and Recipes to Variables

Normally in a classic project Data Logger/Recipe management the Data Loggers/Recipes are created then associated to the variables to be recorded. However this can also be done in the reverse by associating a specific Data Logger/Recipe to a variable. This procedure is very handy when the variables to be recorded in the Data Logger/Recipe are added to the project at different times during the application development stage.
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.



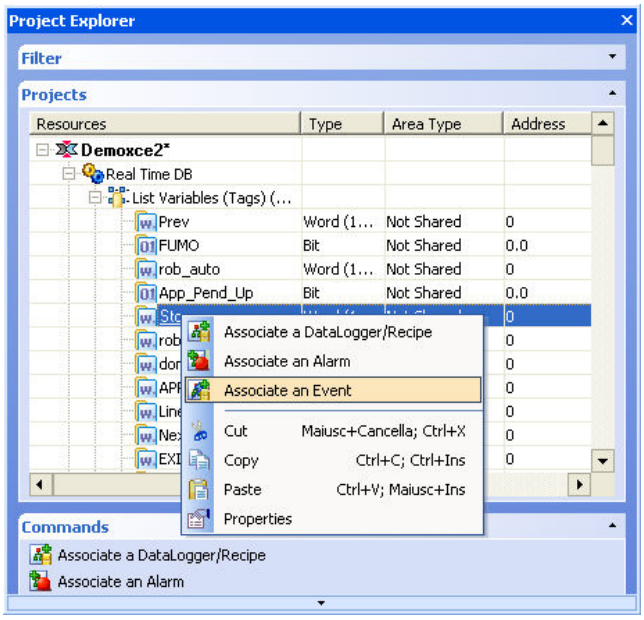
The request to associate a Data Logger/Recipe will open a further window containing the list of Data Loggers/Recipes available and which were inserted beforehand;



The association of a Data Logger/Recipe to a variable can also be done when the object already contains the variables to be recorded. In addition to this, if the Data Base already contains data, it will be maintained and a new column will simply be inserted into the Data Base's structure.

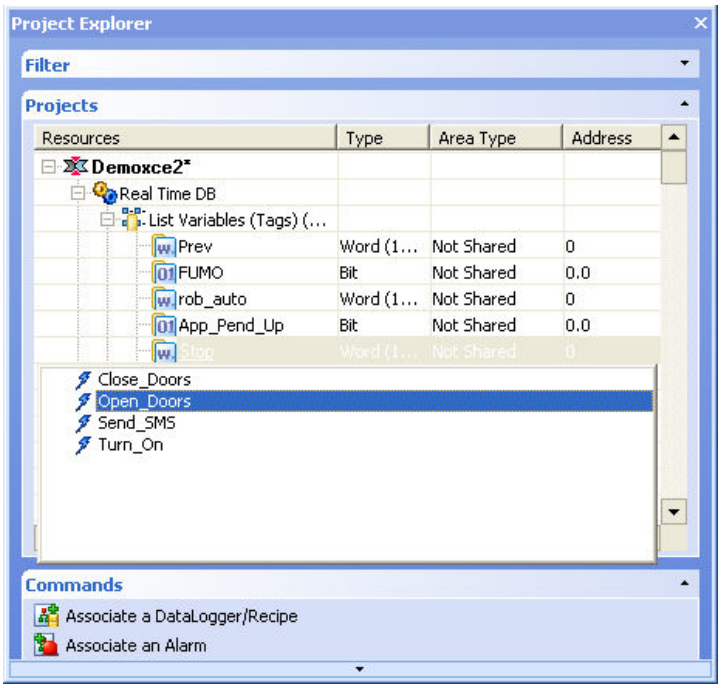
5.11. Associating Events to Variables

By using the Movicon 'Command Scheduler' 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.



The request to associate an alarm will open another window containing a list of the alarms available which should have been inserted beforehand:

The request to associate an event will open another window containing a list of events available, which should have been inserted beforehand:

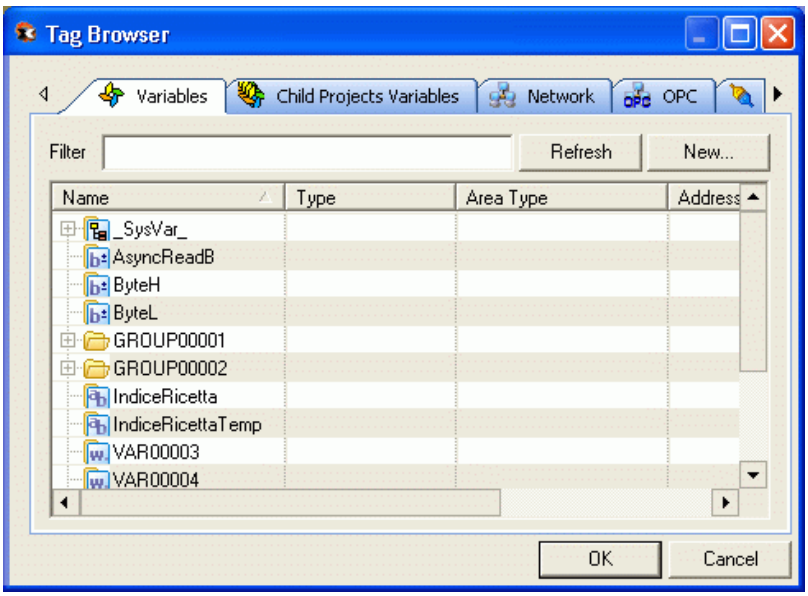


Only the text and activation condition should be inserted and no reference variables should be specified in the properties of the alarm to be associated to a variable.

You should not specify any reference variable, but only the activation conditions and the commands list in the properties of the event to be associated to a variable.

5.12. 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 X "Tag Browser" window.



The "Group" property is found in the "DBVarObjCmdTarget" Basic Script interface and allows you to retrieve the group which the variable belongs to.

5.13. 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" sytax. 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.

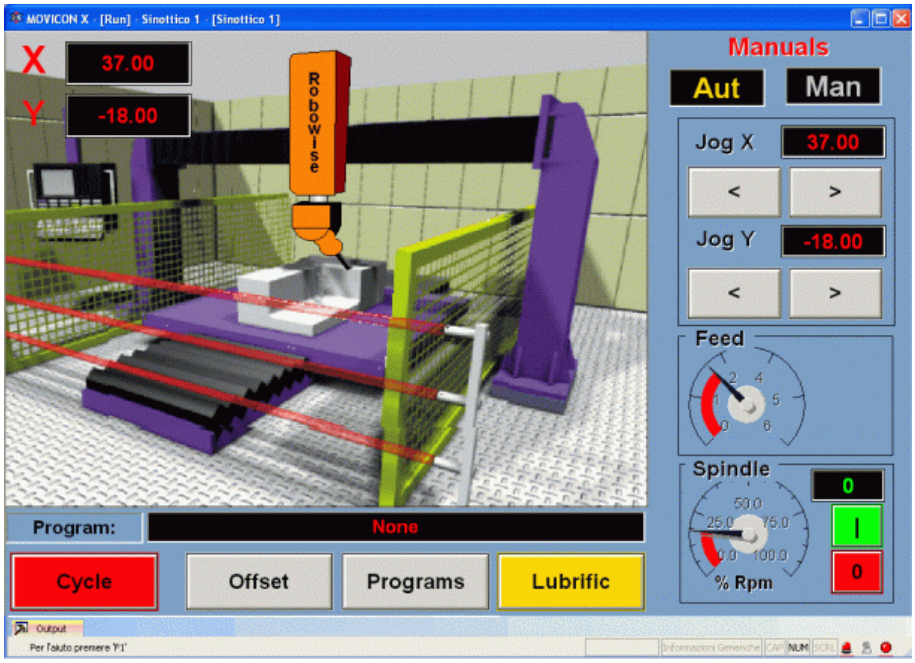
6. Screens

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.

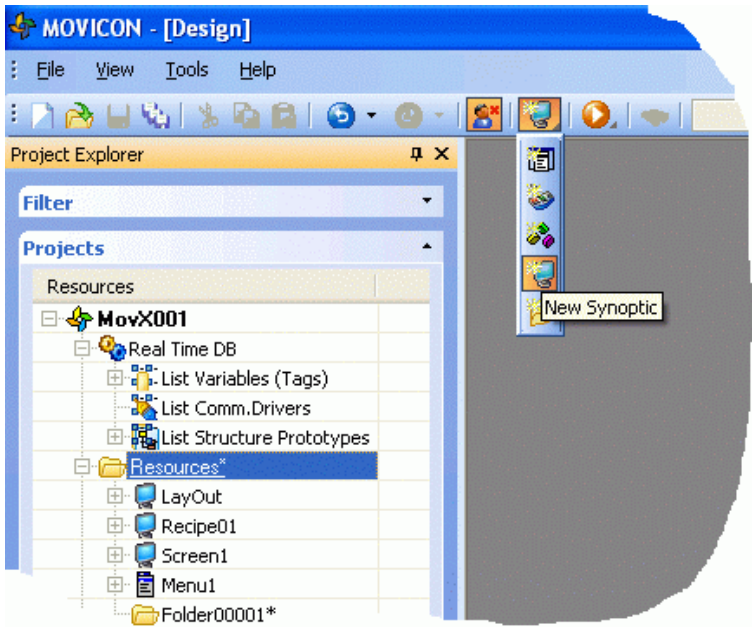
The Screen windows are preset to contain, apart from graphical drawings, controls such as all the graphical command functions or displays already preset by Movicon. The descriptions for inserting and setting controls in Screen windows are found in the appropriate chapters.



An example of the Screen page. A Screen is the container of controls and designs and can receive background image files.

6.1. 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 'Resources' group residing in the 'Project Explorer' window. You can insert a new Screen either by right mouse clicking on the 'Resources' 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 Resources Window of the source project, execute the Copy command then point to an area in the Resources 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.

6.2. 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.

6.3. 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 opening Screens Modalities are as described below:

Open Normal (MDI Child)

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

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

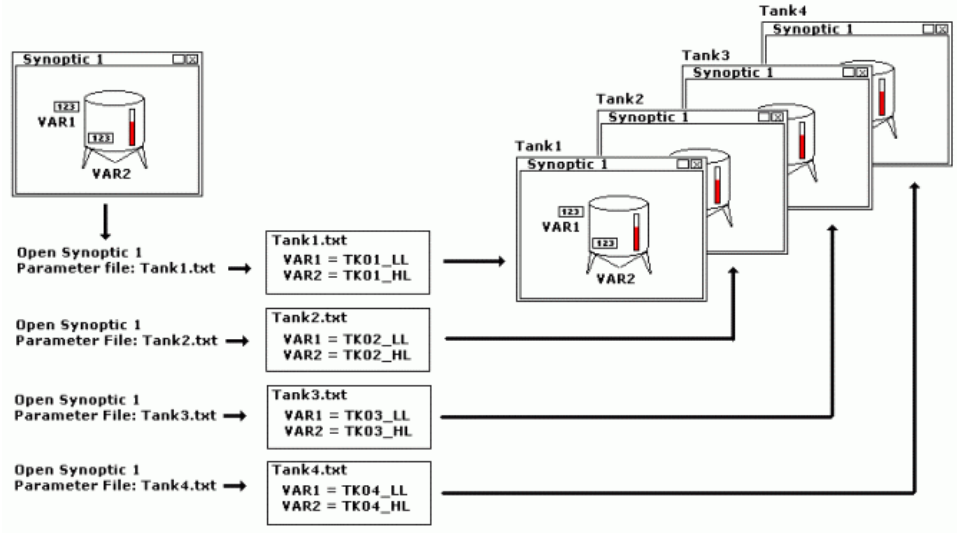
The 'Open Frame' command evokes the opening of a Screen in a window different from the Movicon Main window. The window in question will remain at the forefront but will not be modal, therefore you will also be able to execute commands presented in the window underneath.

Open 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).

6.4. 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'.**
The file, as already mentioned, must be a normal text file, which states the Screen's 'Parameter Variable' names, the separator characters and the 'real Variable names required to replace the parameter. A line must be added to the file in the above described format for each parameter.

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:

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.

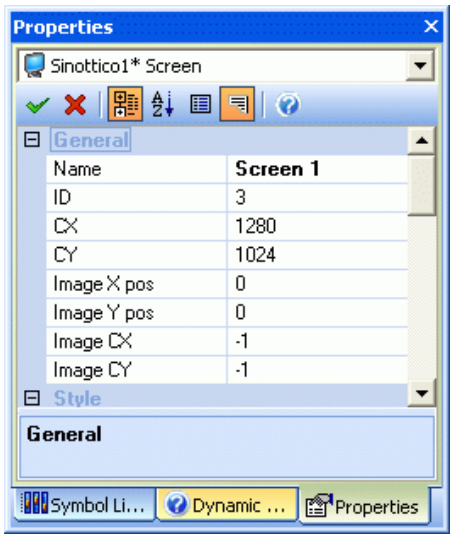
*The opening of a Screen with parameters can also be executed with the appropriate Basic Script functions as well as by using the Movicon '**Command List**'.*

6.5. Screen Properties

The Screens inserted into the **'Resource'** 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**'.

6.5.1. 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'**.



Nome

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 for each Screen window can be declared a ID number which can be specified in this edit box. The purpose of this setting is to know which is the active Screen at a certain moment using the Movicon logic by reading the values returned from the 'System Variables'.

CX

The Screen's width in pixels, which it is to be displayed with, is entered in this edit box.

CY

The Screen's height in pixels, which it is to be displayed with, is entered in this edit box.

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).

Image CX

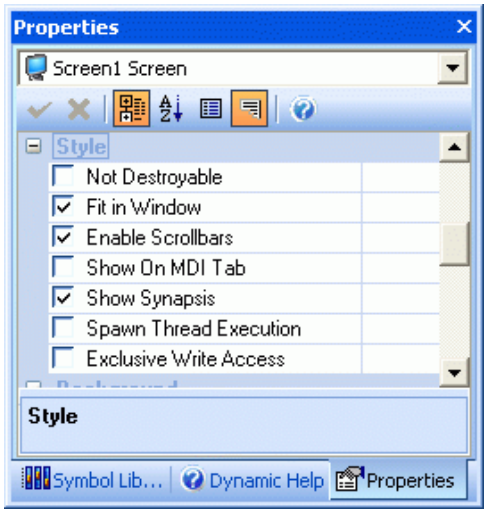
By using this edit box you can define the width in pixels with which the background associated to the Screen is to be displayed. When using the '-1' value the image will be displayed with its default size, otherwise the image will be resized according to the sizes set but with the possibility of losing its graphical quality.

Image CY

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.

6.5.2. 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'**.



Not Destroyable

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.

*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.

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.

Show On MDI Tab

By activating this option box the Screen's MDI Tabs will be displayed during Runtime as well.

Show Synapsis

By activating this option box the Screen's Synapsis connectors will be displayed during Runtime as well.

Spawn Thread Execution

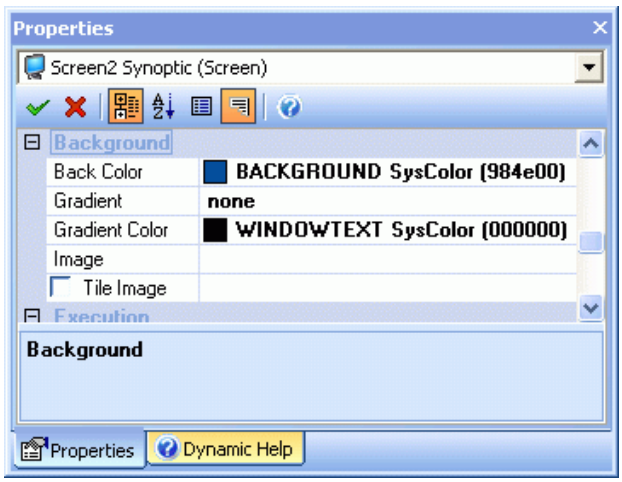
Each Screen processes the logics and tasks associated in the User Interface thread. When this option is active, the Screen will execute in a separate thread, independently from other project threads. This is handy to use when there are Screens containing significant logic or synapsis processes**.** In 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.

Exclusive Write Access

when this property is enabled, only the first Web Client user connected to the screen resource can access the variables in write by using the predisposed controls on screen. The other Web Client users will see the changes only. This stops other connected users writing on the same variable at the same time.

6.5.3. 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.

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

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.

A Screen does not have to be necessary associated with a background drawing. The Movicon symbols and controls can simply be disposed on top of a background colour of your choice.

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.

6.5.4. 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'**.

Global Container

Enabling this property permits the Screen's child objects be published in DOM format (Document Object Model, XML).

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.

Execute Synapse

When enabled this property activates the execution of any synapsis logic upon Screen loading.

Synapsis Cyclic Execution

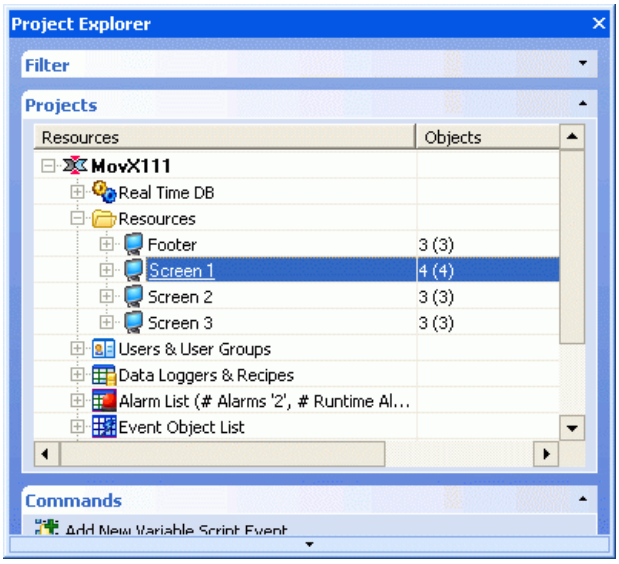
When enabled this property activates the cyclic execution of any synapsis logic when the Screen is active.

6.6. Associating Variable Script Events to Screens

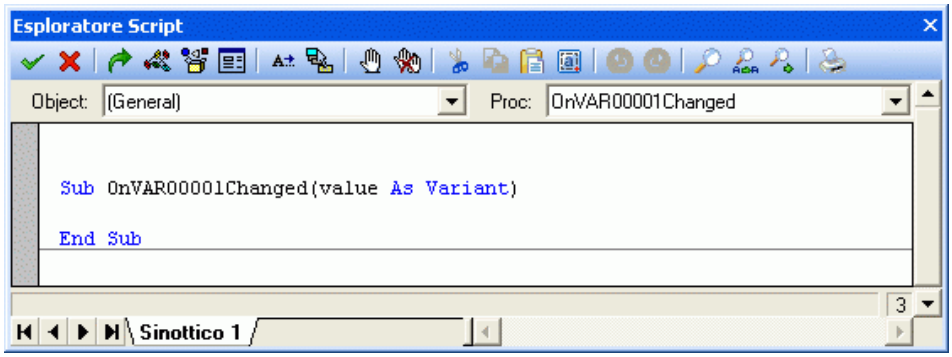
In addition to the standard events made available by Movicon (Click, DblClick, KeyDown, etc.) customized events, associated to Movicon Real Time DB variable variations can also be inserted into the screen's Script Code. Practically, an event can be added to be executed whenever the selected variable 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.

Apart from the standard events offered by Movicon (Click, DblClick, KeyDown, etc.) you can also insert customized events, associated to the variations of the Movicon Real Time DB variables, into the screen's Basic Script Code. This means that an event can be added which will be executed every time the selected variable changes status. Obviously it is the programmer who has to insert the necessary code inside the event according to what is required. The inserted event will then be active and processed only when the Screen is active, in other words loaded into 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'.



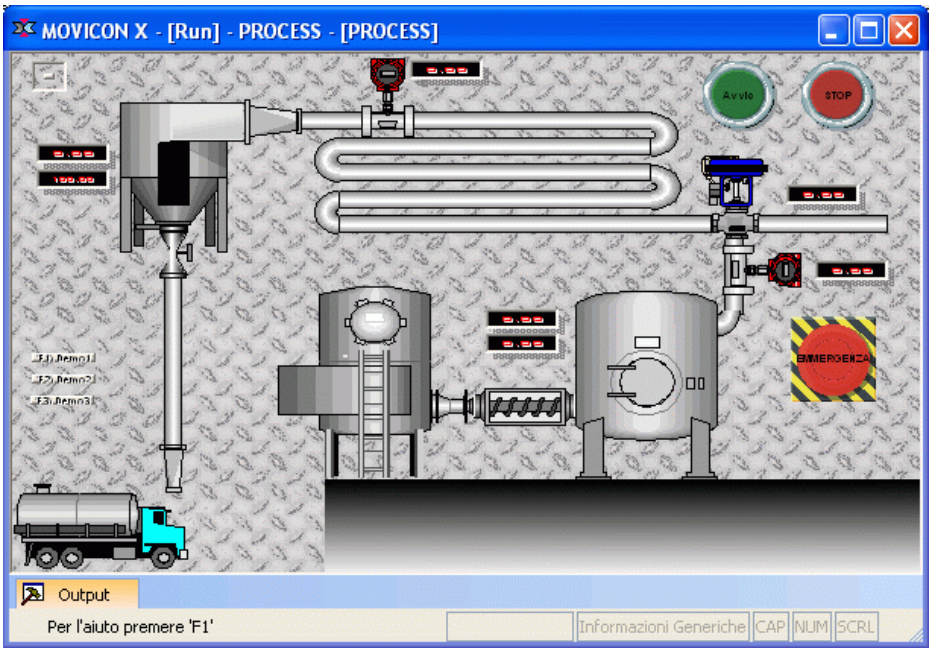
The request for a Variable Script Event association to a Screen will open up a further window containing a list of the available Real Time DB variables. Once the variable has been selected the new event will automatically be inserted in the Script Explorer window with the syntax *"OnVariableNameChanged"*:



7. 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

7.1. 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.

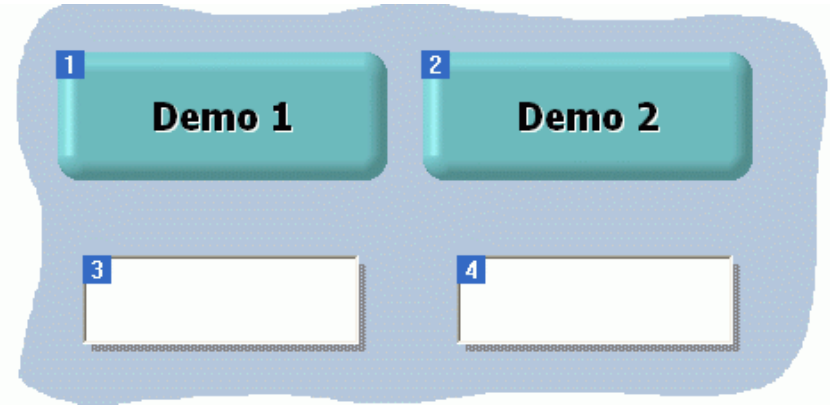
It is not compulsory for a screen to be associated with a background file as a static drawing. The screen's graphic interface can also be created with just a drawing and the Movicon vectorial symbols. The Movicon tools also permit you not to use any background drawings if you wish not to do so.
The drawing 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.

7.2. 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"**.

7.2.1. 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.

7.2.2. 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

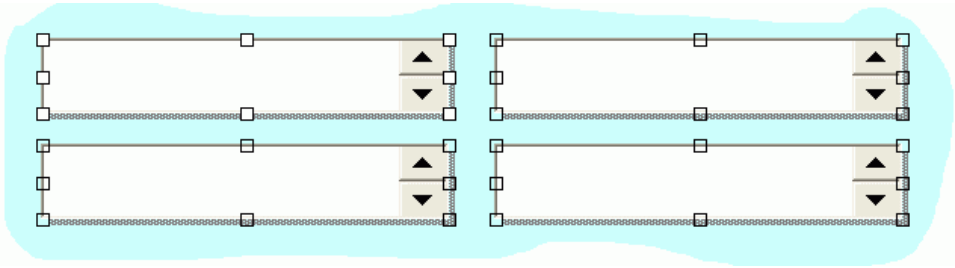
7.2.3. Object Multiple Selections

When using elements within a synoptic, it may sometimes be convenient to select an area containing a group of elements to modify their position, alignments or size or to set 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 elements within this area will now be selected, are ready to be handled as a group. To de-select the objects, click on any point of the synoptic outside the selected area.

If you like to de-select one symbol inside a group, you can double click with the left mouse button and keeping pressed the CTRL key.
To change the reference control, you can click on the desired symbol using the left mouse button.



The reference control in a symbol group is the one that shows the delimitation border not transparent, but with solid withe back color.

7.2.4. 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 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.

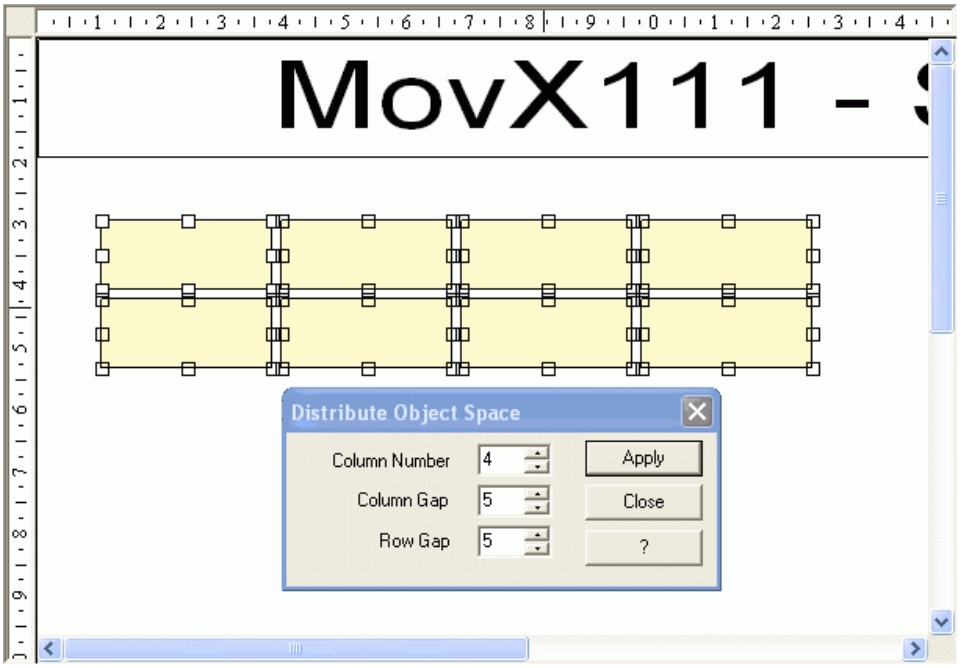
The object with the lowest Tab number will be used as the reference object for aligning the other objects. The reference object's small selection squares will be highlighted in a different colour in respect to the other objects. Once the group of objects has been selected you can change the reference object by clicking the one you desire.

Centre in Window

	Vertical	This command centres 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.

7.2.5. 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.

7.2.6. Dragging & Dropping Variables

This function allows you to easily link variables to objects on screen. You only need to drop a variable (by clicking on and keeping the mouse key pressed down on the variable from the Project Explorer's "Variable List" down and drag the variable) on an object on screen and this will link to the object without having to do so through the object's properties.
The objects which support this function are: Trends, Charts, Displays, ListBoxes, Guages, Buttons and Hot Regions (Including the Spin objects).

The trends, for instance, have all their pens removed and then new pens are created according to the amount of variables dropped.

You can also insert a new object on screen and link a variable directly to it by carrying out the steps below:

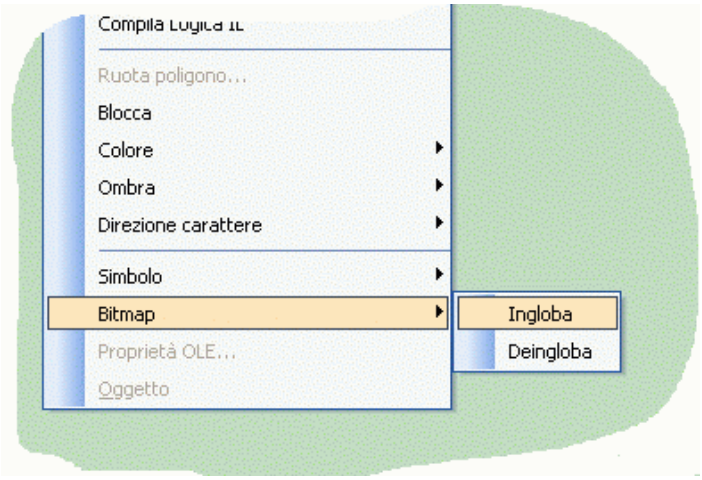
1. select the object you wish to create from the toolbox (eg. Display)
2. Select the variable desired from the Project Explorer's Variable list
3. drag and drop the variable on an empty spot in the screen
4. release the mouse key and Movicon will create the object and link the variable.

7.2.7. 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 oppropriate window you then need to selecte 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.

7.2.8. Embedding Images in Symbols

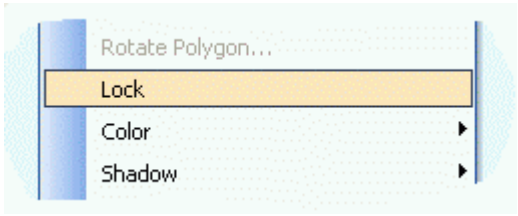
This symbol function allows images to be embedded in symbols which have been linked to the symbol through the 'Fill Attributes' Group's "Image" property. The image or images will then be saved together with the symbol and the use of the image file will no longer be needed. The command for embedding the 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.

7.2.9. LockingLocking 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.

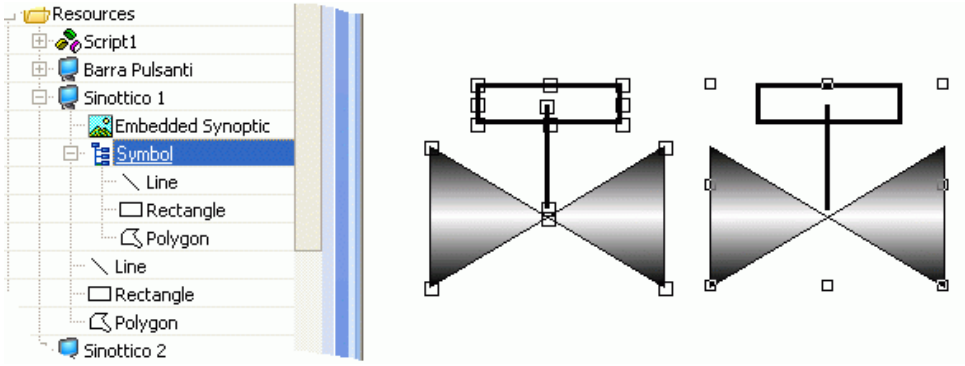
Re-click with the right mouse key on the lock command to unlock the object.

7.3. 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\Progea\MOVICON X\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.

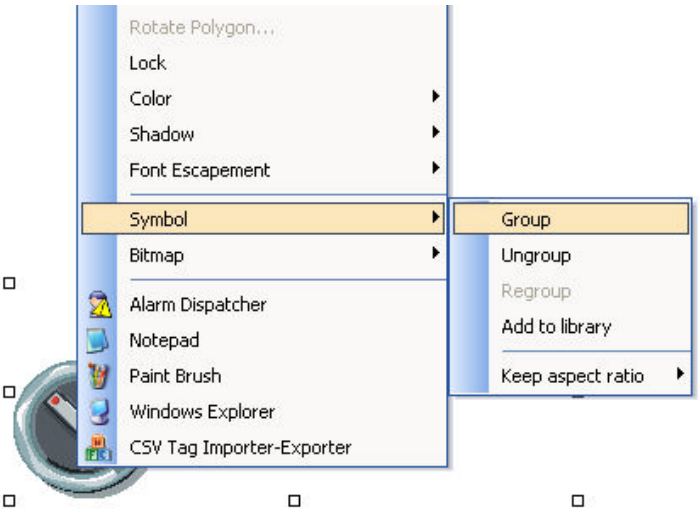


The valve on the left shows the selected drawing's group of elements. By using the Symbol >Group command the group of drawings will become one symbol (valve on the right). The symbol's structure, viewed from the 'Project Explorer' window, also allows graphic commands to be associated to each single element of the symbol.

The command for graphically editing symbols can be accessed from the **"Symbols Menu"** or by right mouse clicking on the Symbol item.

7.3.1. 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.

7.4. Templates: Dynamic Symbols

Movicon allows to use a technology studied in order to simplify and decrease the time necessary to build up an application: the Power Template© technology. This philosophy allows the programmer to independently create his own objects, configure basic alarms, " type" recipes, Trends and Data Logger.
After being suitable configured as required, each symbols group can be saved in the Symbol Library by applying the "Template" concept. Each Template symbol can be inserted in the required symbols category or in a specially created new category.
This concept is the basis of the modern programming techniques that make it possible to exploit the work done without the need for repeated accessory configurations.

- **The Power Template technology allows Movicon to keep the settings, the animation, the functionality and the eventual basic script associated to the symbols.**

At the time of insertion of the symbol inside the synoptic or project, Movicon will propose an automatic insertion of the variable associated to the object with a default name and address.
All the function will, therefore, be maintained and updated, where necessary.
All this means considerable saving of time by the programming in accessing all the resources related to the object, in managing and updating them in a completely automatic way.

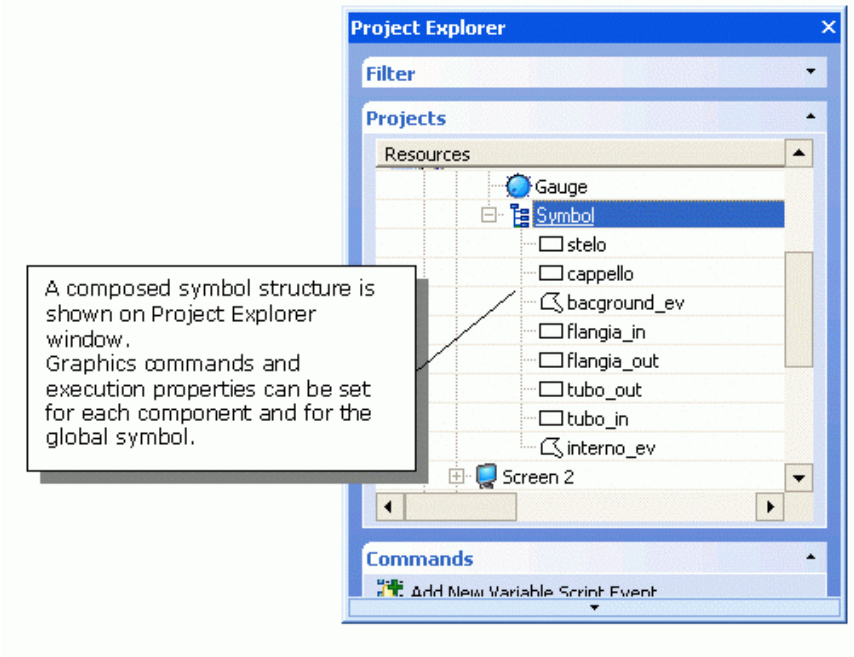
Each single property setted to the symbols or objects, after becomes a Template, will be saved within the symbol itself into the library. The symbols will keep each animation feature or each VBA script and can be considered as a Template.

7.5. 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. 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.

7.5.1. 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.

7.5.2. 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.

7.5.3. 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.

7.5.4. 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("#nomevariabile#")

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.*

7.5.5. Images inside Symbols

When the symbol you want to export to the **"Symbols Library"** contains an image which must be exported together with the symbol, you first need to Embed the image inside the symbol before carrying out the exporting procedures. To do this simply click with the mouse right key on the symbol and select the 'Bitmap-Embed' item.

7.5.6. OnCustomizeSymbol() Event

Movicon provides the possibility to edit a basic routine which will be executed when the Template is inserted into the screen. This basic code must be inserted into the **'OnCustomizeSimbol()'** event which is accessed from the **"**Symbols Library**"** by opening the **"Dynamic Property Inspector"** window of the Symbol in question. The **Dropping Code** is the first item which appears in the Symbol's components list when any one of the Templates' **"Dynamic Property Inspector"** is opened. When this item is selected, the **OnCustomizeSimbol()** event will display. This functionality is very handy for setting static properties in symbols. If these properties are set when the Template is inserted by means of the code contained in the **OnCustomizeSimbol()** they will remain permanently in that symbol along with the other characteristics saved in it. They will become the symbol's non accessible constants. The **OnCustomizeSimbol()** event is therefore used so that the Template can be customized while being inserted from the Library.
This event's parameters are:

Parameters	**Description**
bRet as boolean	When set at False, the Template insertion operation will be cancelled.
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.

The code contained in the **OnCustomizeSimbol()** event remains memorized in the Template and can be re-executed by using "Open..." button, found in the Template's general properties or by double-clicking on the mouse while keeping the SHIFT key pressed down.

8. Draws and Objects

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.

8.1.1. Control Command Shortcuts

Some of the Movicon Objects and Controls which can be inserted on screen, available from the **"Objects Window"**, can be configured through setting windows supplementary to the "Properties Window". You can access these settings windows in the following ways:

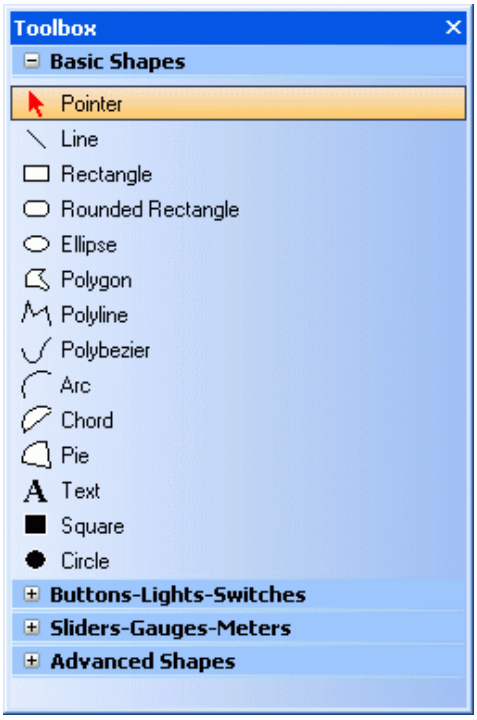
- **Press Shift key and double click with left mouse key on the object (Shift+DbClick)**
- **Click "Open" button found in the "General" properties group in the object's "Properties Window"**

The table below shows the settings windows which open according to the control selected:

Object	Settings Window
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	The Trend 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.

8.2. 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.

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.

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.

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.

Cord

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

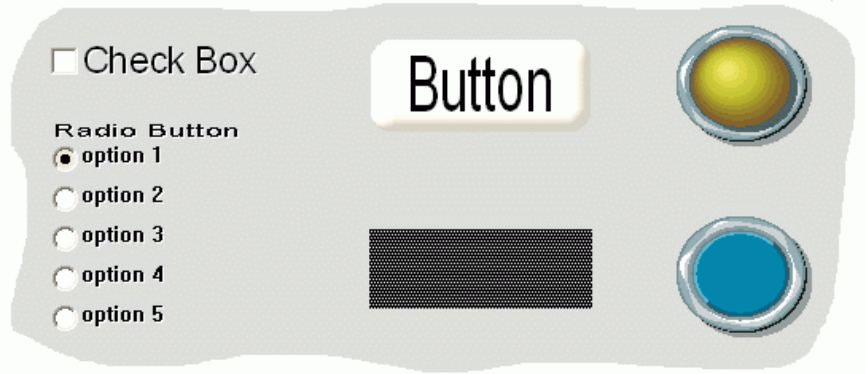
This object represents a vectorial square shape. This shape is originally a "Rectangle" with its **"Preserve Aspect Ratio"** enabled so that when it is resized it will always keep its sides in proportion to form a square and not a rectangle.

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.**

8.3. 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-Switches' group found in the **"Toolbox Window"**.



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.

*There are some controls, such as lights, illuminated buttons, switches and selectors available in the 'Buttons-Lights-Switches' group in the **"Objects Window"**. All these controls derive from the Button objects by 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.

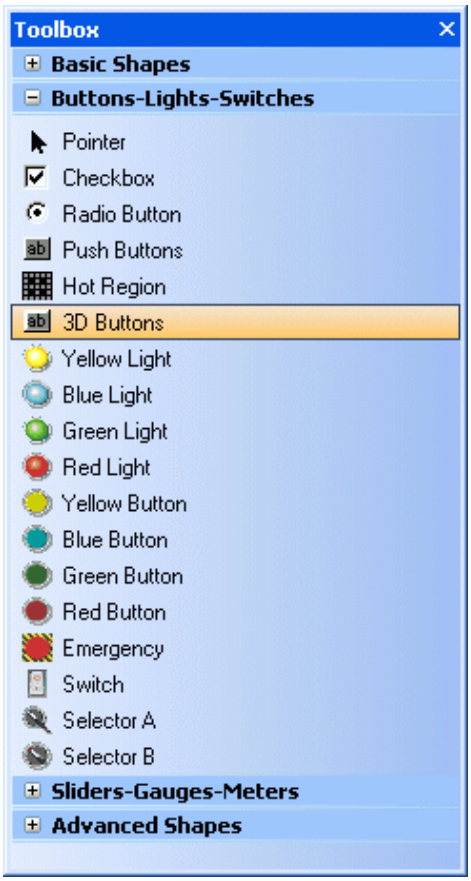
The Screen zone within which the Hot Region has been placed, it built only with a background representing the 'strategic' design. During project processing the zone

will be invisible but detectable with the mouse whose pointer will change into a hand when entering the Hot Region area. 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.

8.3.1. Components deriving from Button Objects

The Button 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 **"Buttons-Lights-Switches"** 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.

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 - Checked": this property is enabled for managing the "Check Var." 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 - Checked": this property is enabled for managing the "Check Var" to make it 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 - Checked": this property is enabled for managing the "Check Var" to make it an ON/OFF command button type.

Switch

The "Switch" objects which can be inserted are normal buttons changed in the following properties:

- "Style - Style": changes its graphical aspect by making it look like a plant ON/OFF switch.
- "Execution - Checked": this property is enabled for managing the "Check Var" to make it an ON/OFF command button type.

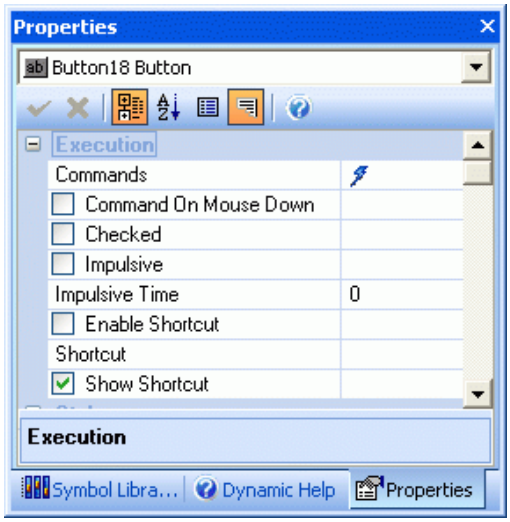
Selector A/B

The "Selector A/B" objects which can be inserted to are normal buttons changed in the following properties:

- "Style - Style": changes its graphical aspect to make it look like a ON/OFF switchboard selector switch.
- "Execution - Checked": this property is enabled for managing the "Check Var" to make it an ON/OFF command button type.

8.3.2. 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'**.



Commands

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 control activation. 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.

Check Variable

The name of the variable which will be set by the **"Check Box Buttons"** and **"Radio Button"** controls is entered in this edit box (or selected with the '...' browse button on the right).

*When enabling the **'Checked'** property button object the **'Commands'** field will be replaced by the **'Check Variable'** field, and the Button will acquire the two states typical of Check-box functions.*

Checked

The selection box is used for enabling the 'Button' object to function as a Check-Box Button' and therefore is used to set the status of a variable rather than execute the commands available in the **'Command List'** window.
This property is only available for the 'Button' objects.

Num. Radio Buttons

The number of options buttons to appear for the control type 'Option Buttons' is entered in this edit box.

Impulsive

When this selection box is enabled the "Button" object will be enabled to function in impulsive mode, and therefore the status of a variable is set to value 1 for the time set in the "Impulsive Time" property.

Impulsive Time

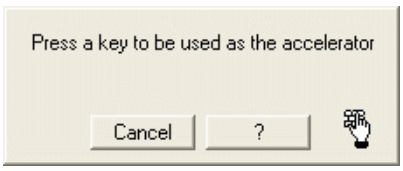
The impulsive time duration is inserted in this edit box when the button is set as "Impulsive". When the impulsive time is equal to zero the variable will be kept at value 1 until the button is released.

Enable Shortcut

When enabling this check-box, an accelerator key will be associated to the control. Therefore the control's command can be executed during runtime by simply pressing the preset accelerator key (eg. 'F1'). After having activated this property it will be necessary to setup the Accelerator key to be used through the **'Accelerators'** 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 'Accelerator' box.
This operation can be cancelled with the 'Cancel' button.

The Accelerator key is only active when the control's 'Enable Accelerator' property has also been enabled.

Show Shortcut

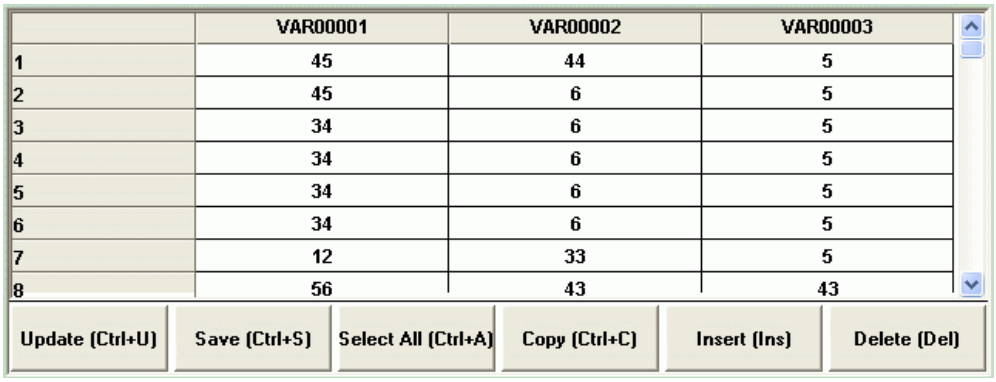
Enabling this check-box will show the selected 'Accelerator' key at the side of the control's title.

8.4. 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.



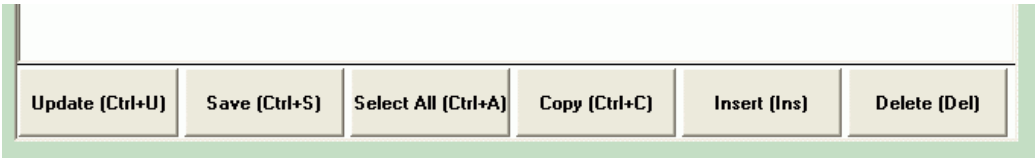
This is an example of a Grid displaying the contents of a DataBase.

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.

8.4.1. The Grid Buttons

The Grid object allows you to execute some commands during the Runtime phase by using the buttons described below:



Update (Ctrl+U)

This command updates the variables which have the same name of the table columns with the record values of the grid selected.

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)

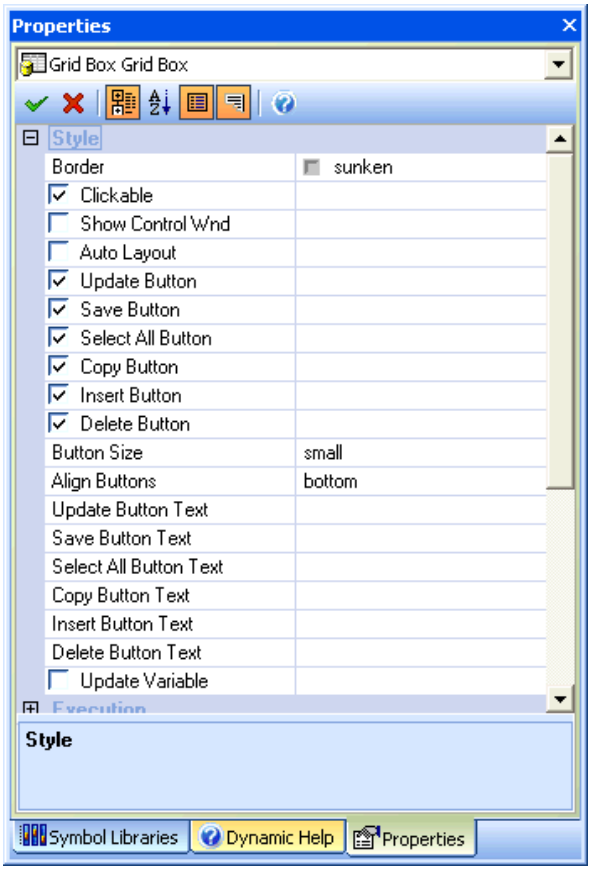
This command inserts a new line in the table.

Delete (Del)

This command deletes the line or lines selected in the table.

8.4.2. 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"**.

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"**.

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.

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"**.

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

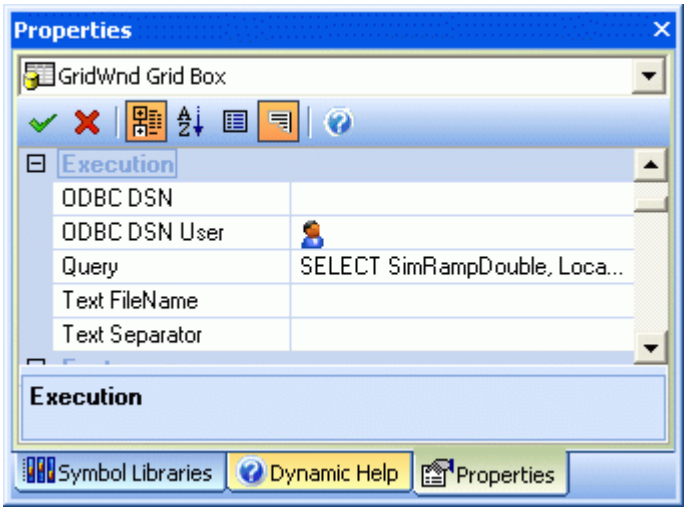
This edit box allows you to insert the text to be associated to the Delete Button. When this field is left empty the default text will be used instead.

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.

8.4.3. 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.

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.

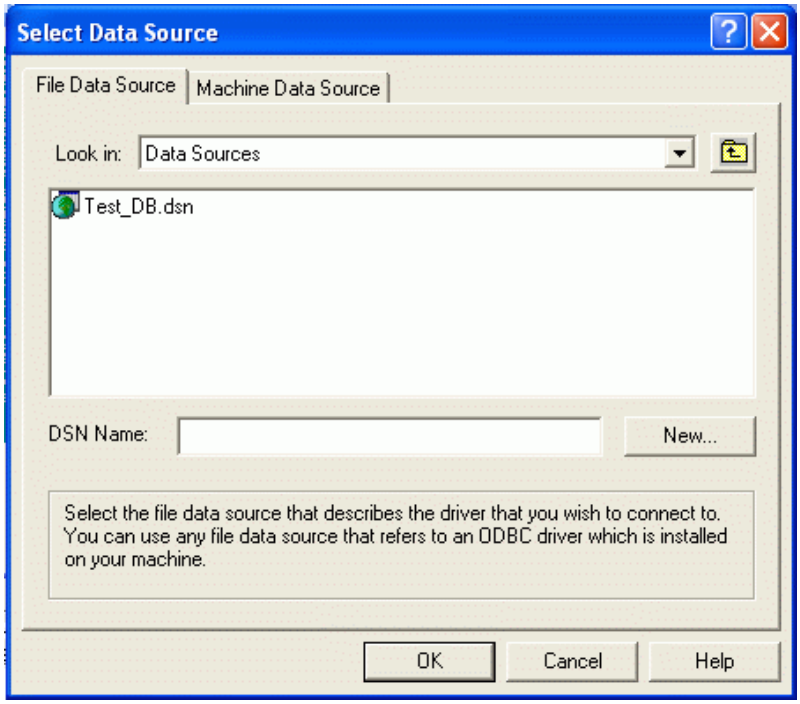
Text Separator

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.

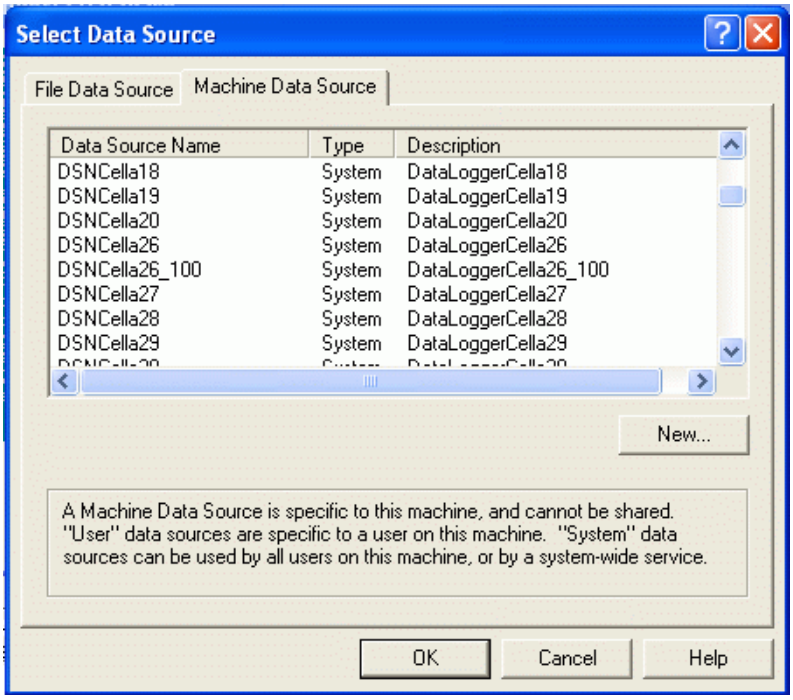
8.4.4. Data Source Selection (DSN)

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

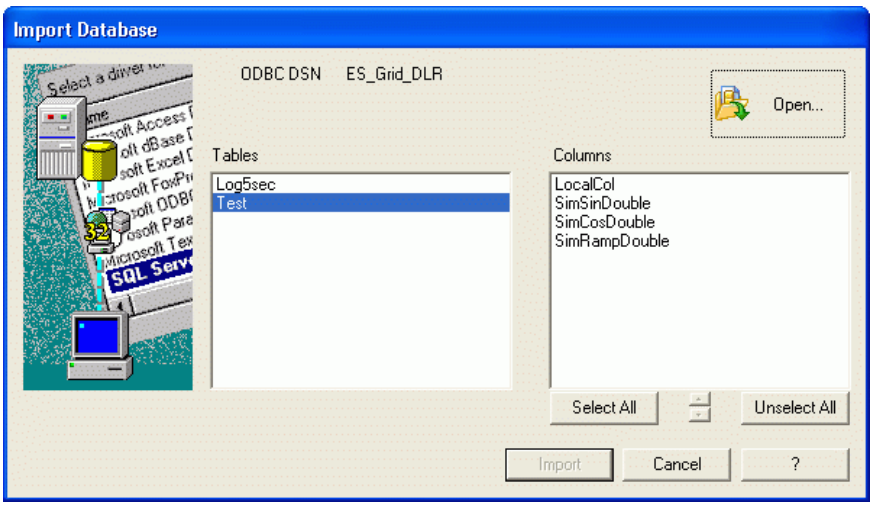
the object's General properties or double click on the object while keeping the SHIFT key pressed down. The following window will appear:



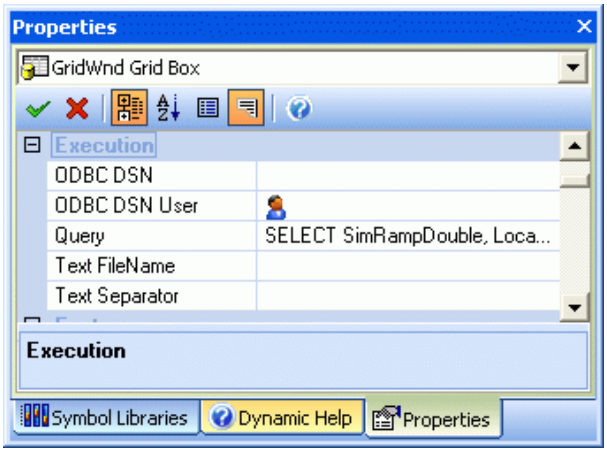
You can select or create a file data source by using the "New..." from this window. If you select the other tab you will be able to select the machine data source:



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.



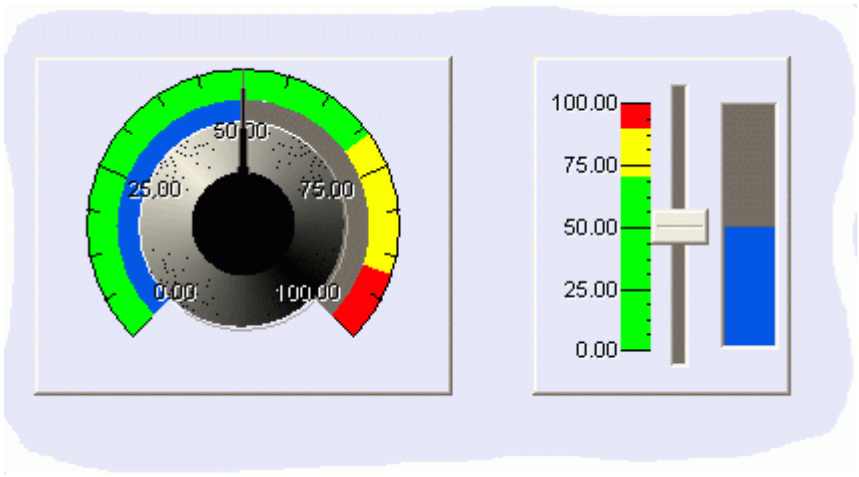
You can select or deselect the table's fields to import the table columns need. A SELECT query will be generated based on the selection made to extract the data to be displayed on the Grid.
The "Open" button allows you to select a new data source, by re-showing the previous window.
The "Import" button 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 recognised 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.

8.5. 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

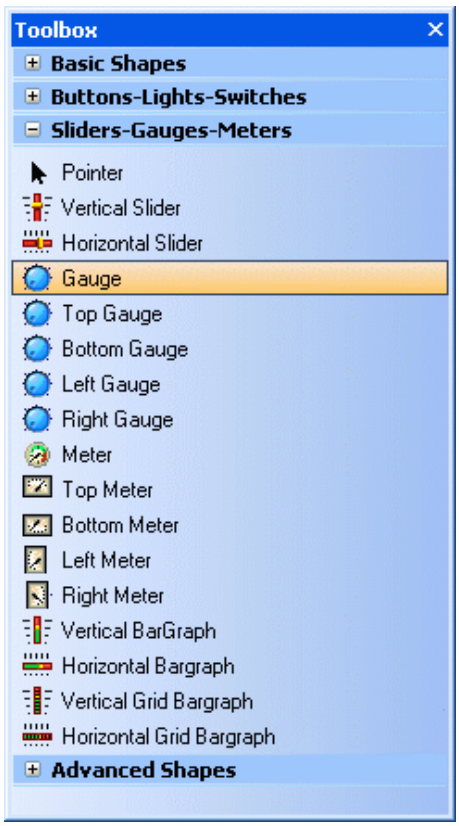
The Vectorial Gauge tool has the following functionalities:

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.

8.5.1. 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 Sliderr": 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

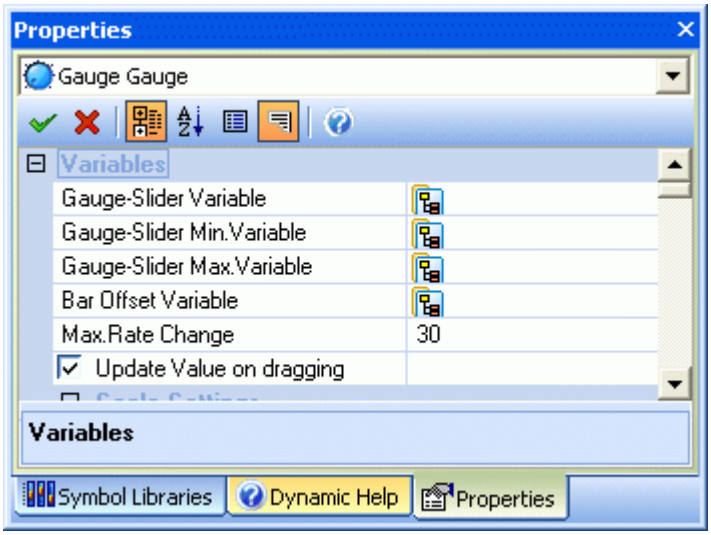
Horizontal Grid BarGraph

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

8.5.2. 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

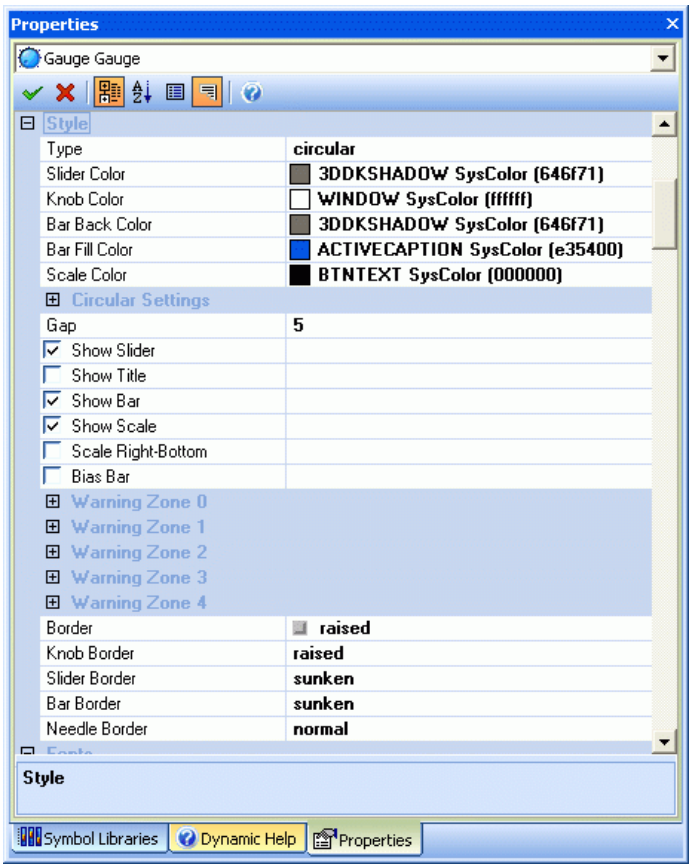
This edit box is used for entering the maximum value, in percentages, of variable changes that can be made when directly clicking on the value to be obtained instead of dragging the Gauge's needle.

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.

8.5.3. 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'**.



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

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.

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.

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

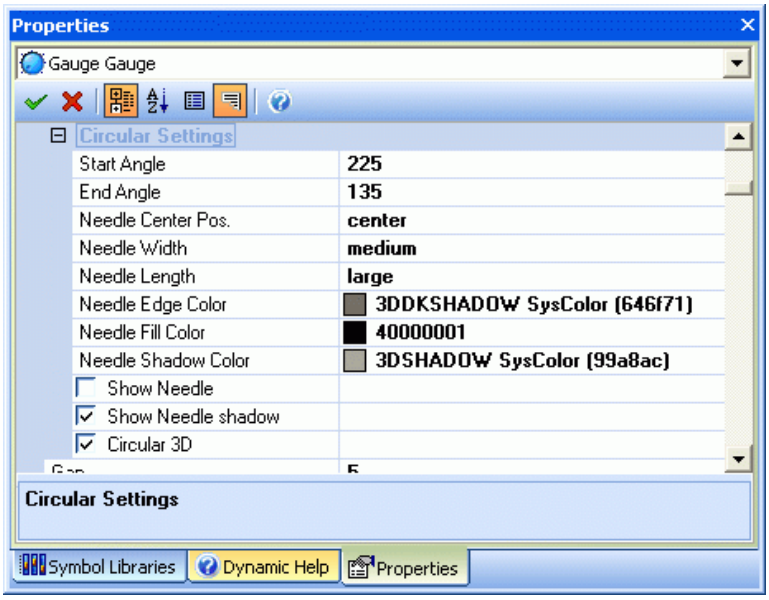
This option is used for setting the Gauge Bar's Border display type.

Needle Border

This option is used for setting the Gauge Needle's border display type.

8.5.4. 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

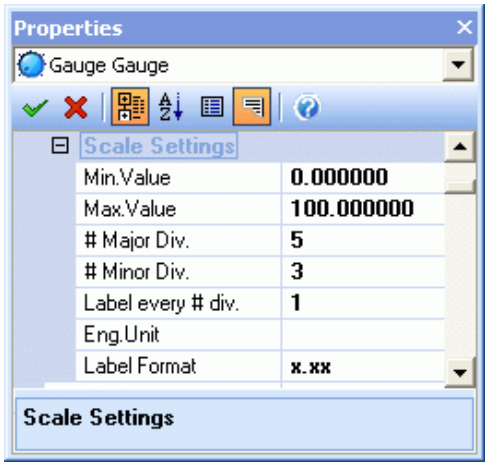
This enabling box is used for displaying the or hiding the Needle's shadow for indicating the values or the variable associated to the Gauge. This enabling is only valid if the Needle's display has been enabled beforehand.

Circular 3D

This enables the 3D effect when the Gauge object has been configured as a Meter.

8.5.5. 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.

*The **'Min. Value'** will be ignored if a variable has been specified in the "Variabile Min. Gauge Slider" properties of the **'Gauge Variables Properties'** group to dynamically manage the threshold.*

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.

*The **'Max. Value'** will be ignored if a variable has been specified in the "Variabile Max. Gauge Slider" properties of the **'Gauge Variables Properties'** group to dynamically manage the threshold.*

 # 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

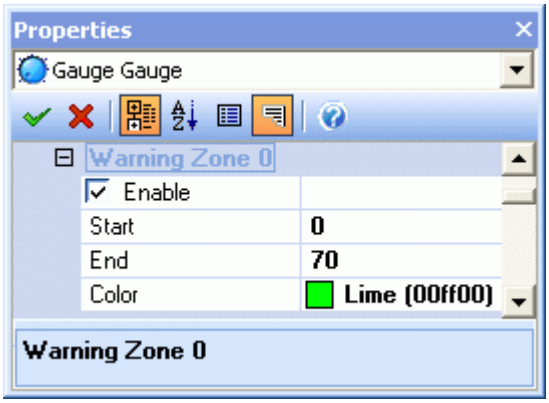
The type of numeric format display of the variable associated to the Gauge is set through this option box.
The formats available are represented by the following syntaxes:

x: where the x number identifies the number of figures to be displayed
x.x: where the x number after the decimal point indicates the number of decimal figures to be displayed

When using the decimal figure format, **'x.x'**, the meaning changes according to the variable type being used whether integer or floating point. When the number is an integer the value can be displayed as a decimal (divided by 10,100, etc.). When the number is in floating point the selected decimal numbers will be displayed.

8.5.6. 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.*

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".**

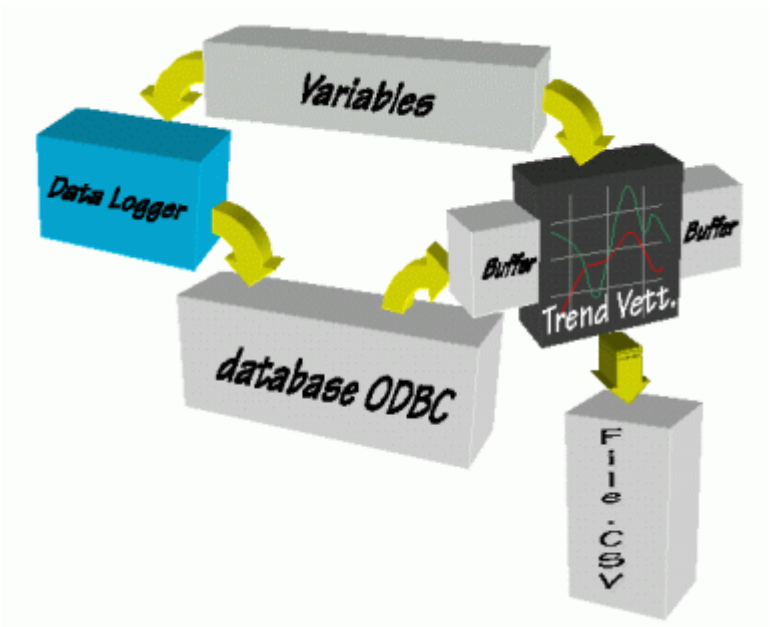
8.6. The Trends

The Trends graphically show curve representations of variable behaviour and analysis of data filed by the recording engine.

The Vectorial 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 Vectorial 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 Vectorial Trend belongs to the Movicon "Advanced Shapes" category and therefore can be inserted in screens through the **"Objects Window"**.

The Vectorial 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 vectorial 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 Vectorial Trend usually graphically represents data recorded by the Data Loggers, which carry out the task of the recording engines for the Vectorial 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 vectorial 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.



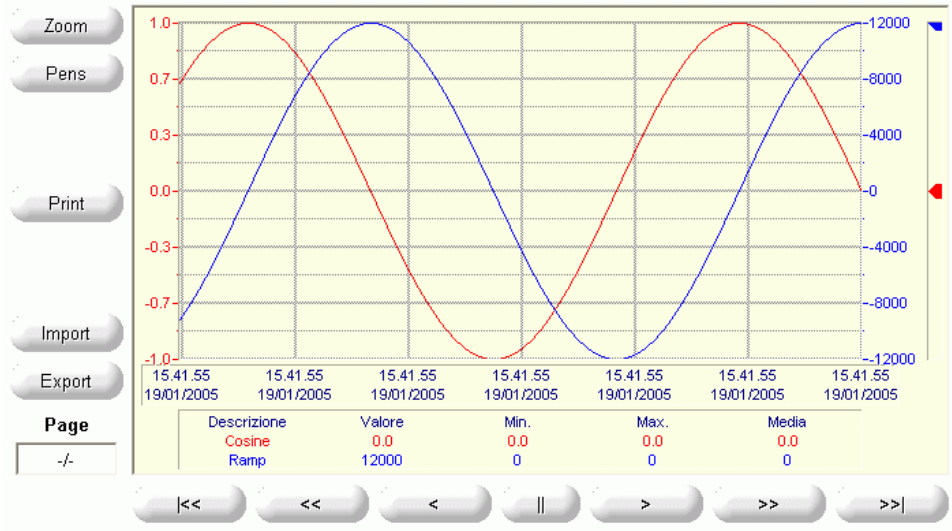
A flowchart of how the Vectorial Trends work.

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 Vectorial Trends

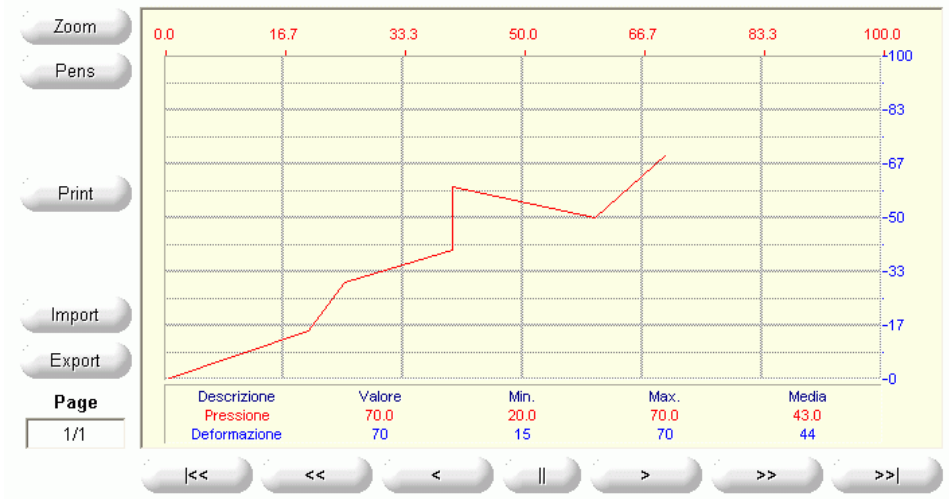
These types of trends are based on the Movicon vectorial drawings and allow a very advanced management of representing data and recording engines, as well as chart representations of database values recorded by Data Loggers.



This is an example of a template containing a symbol composed of a Vectorial Trend object and other correlated button objects.

X/Y Vectorial Trends

The vectorial 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 vectorial trend for each sampling which links the previous XY point to the current one. More XY curves can be displayed in one-only vectorial trend when other pen couples are inserted.



8.6.1. Trend Functions

The Vectorial 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 Vectorial 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 Vectorial 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.
Recording data is not the primary role of the Vectorial Trend object as the recording for graphical data analysis is a job designated to the Data Logger as already said.
The Vectorial 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 Vectorial 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 Operativity

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.

8.6.2. Linking Trends to the Data Logger

The Vectorial Trend is pre-built to be linked to a recording engine of data managed in the project's Data Logger resource.
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.

In order for the Trend to be set with this function you need to have at least one Database object inserted in the Data Logger resource with the Time column enabled.

The names of the pens set in the Trend must be the same as the DataLogger's database columns. This is automatically managed by Movicon which, after the DataLogger has been selected and confirmed, will insert the pens into the Trend in function with the DataBase.

The Trend will be linked to the database by using the same ODBC 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 command on them (Update or Insert). The extractions refer to the SQL "Select" command managed from the order or filter functions.

8.6.3. Displaying Trend data

Displaying data, represented in trend curves inside vectorial trend objects, is entirely customizable and thus very powerful. The Trend sampler invokes the displaying of data in Start mode, which can be different from that invoked by any associated Data Logger which displays data in Stop mode, by displaying the values recorded at different times or on command and event or on status change, by selecting or sorting the displayed data as pleased.
The pen configuration, done through the object's properties, allows associations between the chart curves and project variables to be setup.
The traces displayed by the Trend can receive in association different styles, colors or the automatic displaying of minimum, average and maximum values for each trace. Also the value scales, the logarithmic scales, the legend and every thing else concerning the object's graphical style can be completely configured. The Trend curve display configurations are described in the appropriate sections.

8.6.4. 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 object to be used in customizing functionalities in the Trend 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.

8.6.5. Preconfigured Accelerator Keys

The Vectorial Trend has already been pre-configured to manage a few accelerator commands in automatic as described in the table below. When the Trend is selected with the mouse (with a click on the object), and therefore put in focus, the accelerator keys can be pressed to execute their related commands.

keys	Command Description
S	This is used for Run/Stop Vectorical 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 vectorial Trend page being displayed. A Windows interface opens for selecting the printer after which the print out operation can be confirmed.
Z	This is used when the vectorial Trend is in Stop mode for enabling the zoom with which mouse pointer can be used to identify the curves to be enlarged.
Esc	This accelerator key has two distinct functions: 1. When pressed with the cursor in zoom mode, the cursor will return to the scrolling values modality. 2. When pressed with the cursor in scroll mode, the zoom will be reset and the curve will be re-displayed with the pre-configured settings.
F2	Used for displaying the Trend in expanded mode or for returing it to its normal display size.
PagUp	When the Trend is in pause mode this allows you to go to the next page in the Trend.
PagDown	When the Trend is in pause mode this allows you to go to the previous page in the Trend.

8.6.6. Commands available in Run Time

Some commands are made available by the Vectorial Trend in RunTime mode which can be activated with the Mouse to easy carry out consultations on the Trend itself. These commands can also be managed through the respective Basic functions of the **"TrendCmdTarget"**:

1. **Pen Configurations**: The configuration window of the pen in question is opened by double-clicking on a Trend line. The pen's properties can then be changed or at least the pen's name

and its associated variable can. The changes made will be maintained only until the Trend remains active. When the screen is closed this changed will be lost.

2. **Scroll Trend area**: Once the Trend is switched to stop mode you can scroll the data by pressing the right mouse button in the area of interest and move the mouse while keeping its right button pressed down. The right mouse button does not have to be programmed for this function.

8.6.7. Change Language for Trend Pens

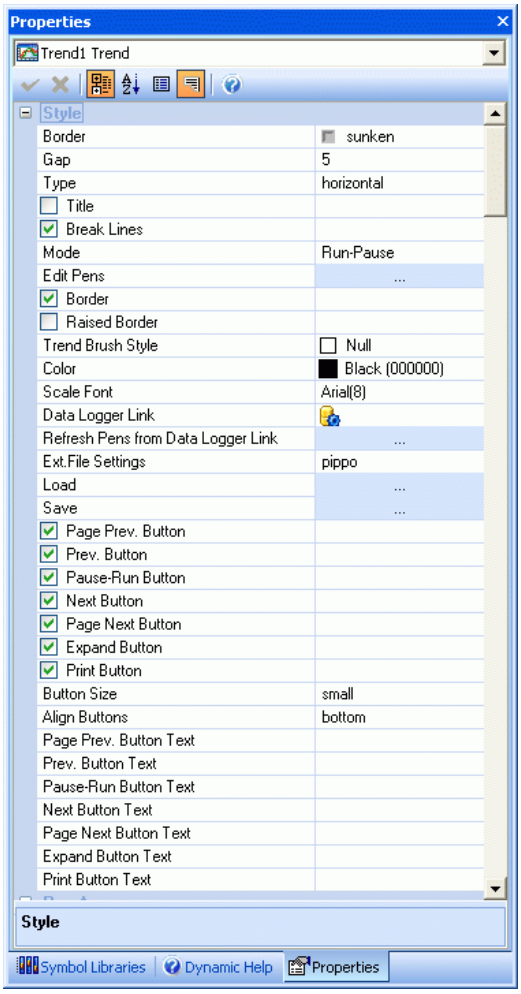
The Trend Pens can also have change languages by inserting a string ID with the same name as the pen. The Trend will display the text contained in the ID string instead of the pen's name.

8.6.8. Trend Settings

The Vectorial Trends 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 Vectorial Trends have a series of properties through which you can access specific settings of the Trend object.

8.6.9. Trend Style Properties

The Trend 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"**.

Gap

The **"Gap"** property is used to customize, in pixels, the gap between the Trend's data and its border.

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 vectorial 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 vectorial Trend object by inserting other pairs of pens

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 Trends top border.

Break Lines

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.

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 will open.

Border

This check box is used to enable the border relating to the Trend'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 area, displaying the curves only, to be displayed with a raised 3D effect instead of sunken.

Trend Brush Style

This property allows you to select the brush style to apply to the background of the Trend'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 area displaying the curves only.
For further information on selecting colors please refer to the paragraph headed **"Color Selections"**.

Scale Font

When clicking the "..." button on the right a window will open to select the font to be associated to the characters in the pen's scale. The selection is done by using the Windows standard techniques.

Data Logger Link

This selection box is used for specifying which Data Logger object the vectorial Trend 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.

Compress data

Property not jet available.
This check box sets the Trend's behaviour in tracing the curves of the values extracted from the recordset, when the number of samples to be displayed exceeds the number of pixels provided in the Trend area.
When this option is checked, Movicon will compress, on video screen, the data read from the DataLogger to which the vectorial Trend has been linked, by automatically executing a point average to guarantee that the whole extracted period is displayed.
When this option is unchecked, Movicon will occupy the Trend area by graphically calculating all the samples possible by assigning a pixel to each one. The areas exceeding the Trend Window space will have to be scrolled with the cursor in the next Trend pages.
The compression therefore automatically compacts the samples to force the display of extracted periods with large numbers of samples into one Trend page only.
This method calculates the average values on an number of points in order to associate a number of samples to one pixel, and consequently produces approximations in each single display point.

Ext. File Settings

Configuration file name in which the Trend's settings are saved or loaded during Run-Time.
The file format must be .TSXML (Trend WorkSpace XML).
The configuration file, set in this property, is loaded automatically when the Trend is displayed, and saved automatically when the pen's properties are modified with the appropriate window.

Load

This command is used for loading the settings of the configuration file selected in the "Ext. File Settings" property and applied to the Trend object.

Save

This command is used for saving the Trend object's settings in the configuration file selected in the "Ext. File Settings" 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. 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 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 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. The same command can be executed with the "PagUp" key.

Expand Button

This selection provides the command button for expanding the Trend 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 area. The same command can be executed with the "F"" key.

Print Button

This selection provides the command button for executing a printout of the Trend area. The same command can be executed with the "P" key.

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"**.

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.

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.

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.

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.

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.

Expand Button Text

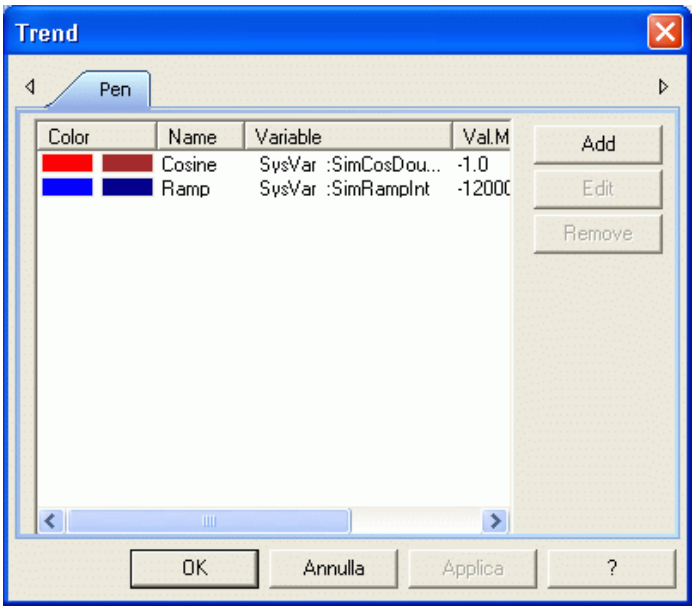
The text which is to appear on the **'Expand Button Text'** is entered in this edit box. The default text will be used if left blank.

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.

8.6.10. Trend Pen Properties

The Pen properties are used for setting associations between the curves displayed in the Trend 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.



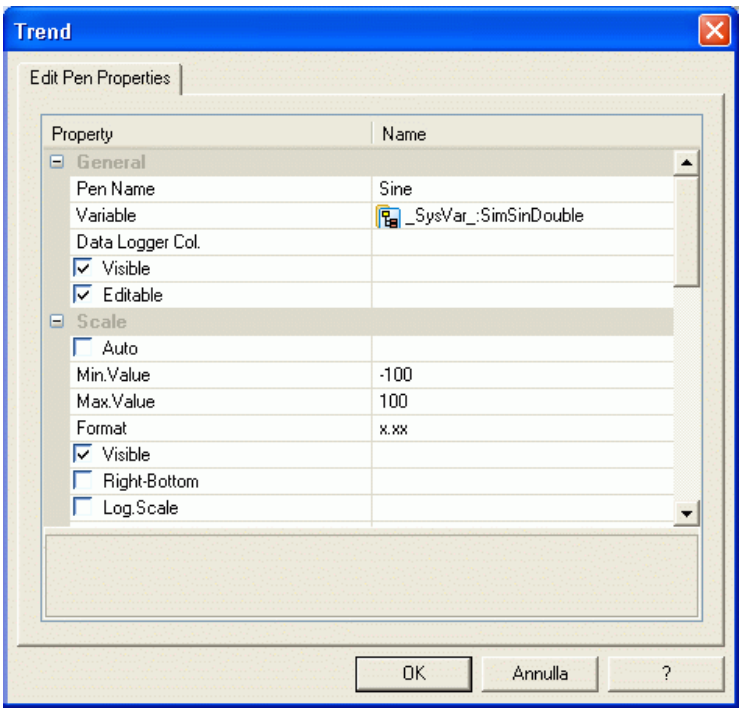
This window shows the pen table inserted in the objects, indicating the colors, names and database variables associated.
To insert new pens you need to press the **Add** button on the right hand border, through which the setting window, as shown below, is activated.
To change the pen settings previously 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.

Pen Configurations

The **Edit Pen Properties** window is accessed when the **Add** or **Edit c**ommands 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. Further more, 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 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'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'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.

Data Logger Col.

The pen's name can be different to the name of the Data Logger's column. The "Data Logger Col." property allows you to set the reference column for the pen and therefore assign any name as "Pen Name". When no name is set, the column's name will be used instead.

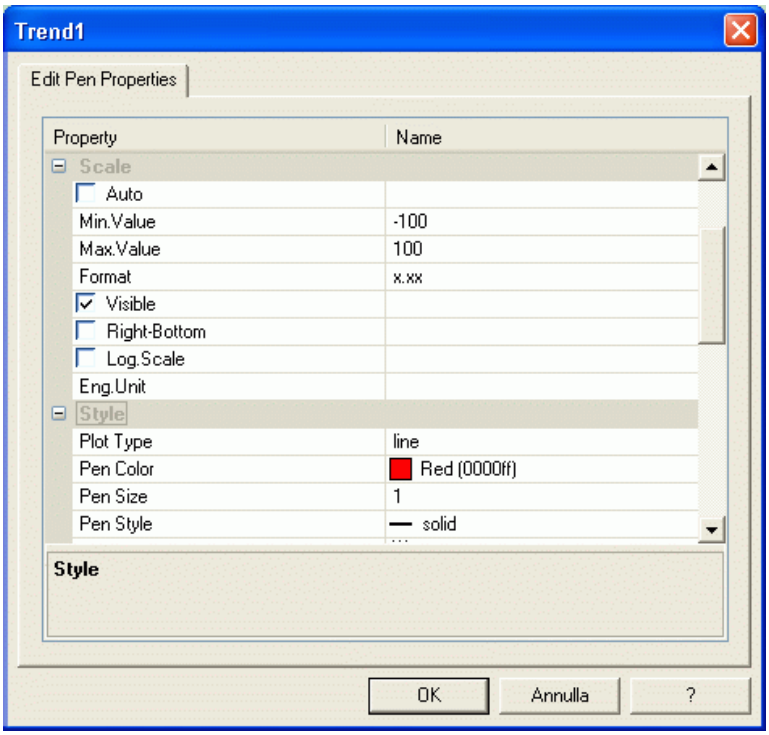
Visible (Pen)

This selection box permits the pen's visibility and trace to be set in the Trend window, allowing data to be sampled without displaying the values in the Trend.

Editable

This property allows you to make the pen editable during Runtime mode. A pen can be edited during Runitme by double clicking on the curve.

Scale



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.

Min. Value

The lowest value which the variable in the Trend may obtain is set in this edit box and which will be returned on the variable's scale situated on the Trend's border at the side.

Max.Value

The highest value which the variable in the Trend may obtain is set in this edit box will be returned on the variable' s scale situated on the Trends border at the side.

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 types of format available are represented by syntax:

x: where the number of x identifies the figure to be displayed
x.x: where the number of x after the decimal point indicated the decimal figure to be displayed

Formats with decimal figures, **"x.x"** have meaning only when a variable is inserted in 'floating comma' format. When the number is integer the decimal figure will always remain at zero.

Visible (Scale)

When checking this box the scale of values will be enabled on the border at the side of the Trend 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 area.

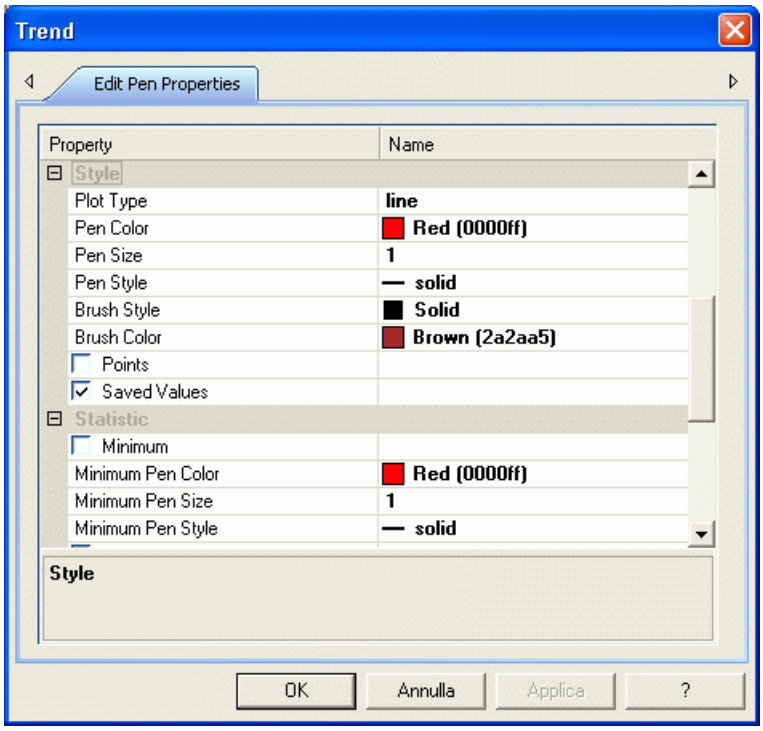
Log. scale

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'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 floodfilled by a color
- **Line-Area**: in this case the area subtended by the chart's curve is filled with a series of vertical bars

Pen Color

By using the "Color" selection button you can set the color for the pen, its trace in the Trend 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, when a non standard line type has been selected.

Brush Color

This is used for setting the color for the Trend 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"**.

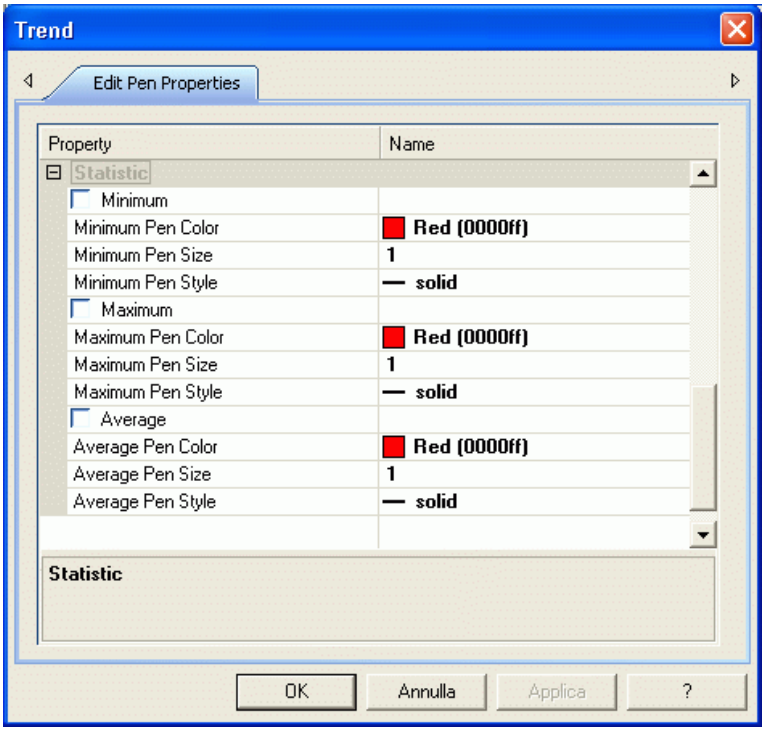
Points

This setting highlights the points along the Trend curve.

Saved Values

This setting displays the values of the points on the Trend curve.

Statistic



Minimum Pen / Maximum Pen / Average Pen

When these properties are enables, an additional trace will be displayed in the Trend 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

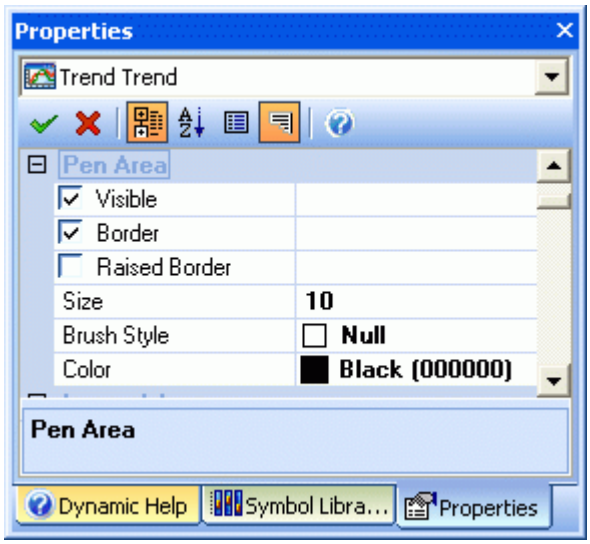
This edit box is used for setting the size of the trace representing the Minimum, Maximum and Average values assumed by the variable associated to the pen.

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.

8.6.11. 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

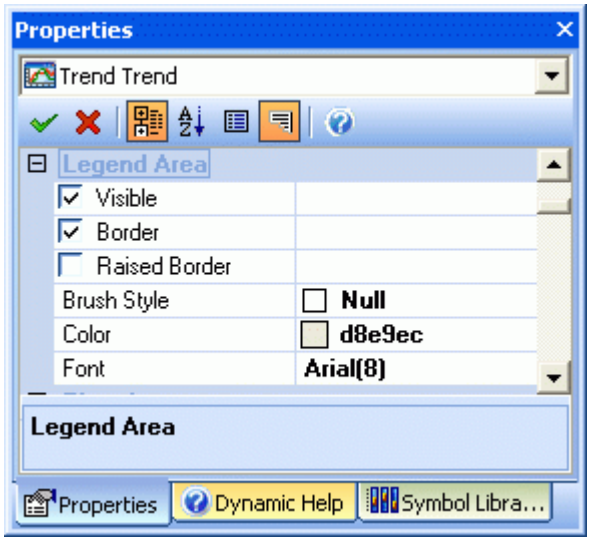
This property allows you to select the type of brush stroke (hatched) from the list of the various styles available, to be applied to the Trend's "Pen Area", being the display area of the pens only.

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".**

8.6.12. Trend Legend Area Properties

The Trend Legend Area properties determine the main configurations of the area in which the legend of the Trend'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's "Legend Area" to be hidden or displayed.

Border

The **"Border"** property consents the border relating to the Trend'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'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's "Legend Area". This applies to the display area of the legend only.

Color

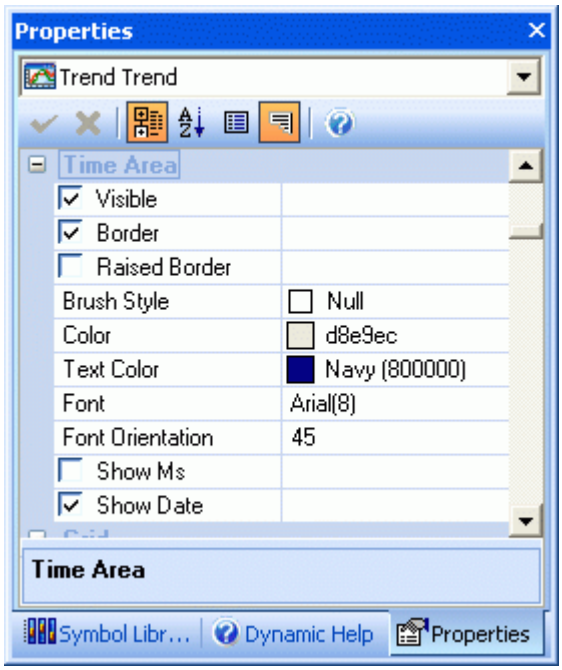
This property allows you to select the background color to be applied to the Trend's "Legend Area". This applies to the display area of the legend only.
For further information on the color selection please refer to the paragraph on **"Color Selection"**.

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's legend. The selection is done by using the Windows standard modalities.

8.6.13. Trend Time Area Properties

The Trend'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.

Border

The **"Border"** property allows the border relating to the Trend'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'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'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'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'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'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's "Time Area", to be displayed or hidden.

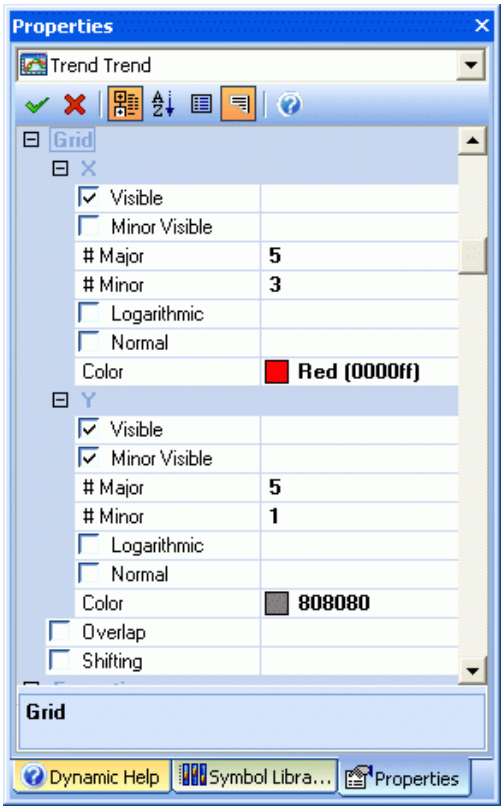
Show Date

This property permits the recording date, displayed in the Trend's "Time Area", to be displayed or hidden.

8.6.14. Trend Grid Properties

The Trend Grid properties are used to configure the identical styles of the Trend'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.



Grid X/ Grid Y Visible

This check box is used for displaying or hiding the Grid's Major lines, whether for the Grid X card (horizontal axis) or for the Grid Y card (vertical axis).

Grid X Minor Visible/ Grid Y Minor Visible

This check box is used for displaying or hiding the grid's Minor lines, whether for the Grid X (horizontal axis) or the Y Grid card (vertical axis). This display will take effect only when the grid's Major lines have also been enabled.

 # Major on Grid X/ # Major on Grid Y

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 window whether for the Grid X (horizontal axis) or the Y Grid card (vertical axis).

 # Minor on Grid X/ # Minor on Grid X

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 window whether for the Grid X (horizontal axis) or the Y Grid card (vertical axis).

Logarithmic

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

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.

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"**.

Overlap

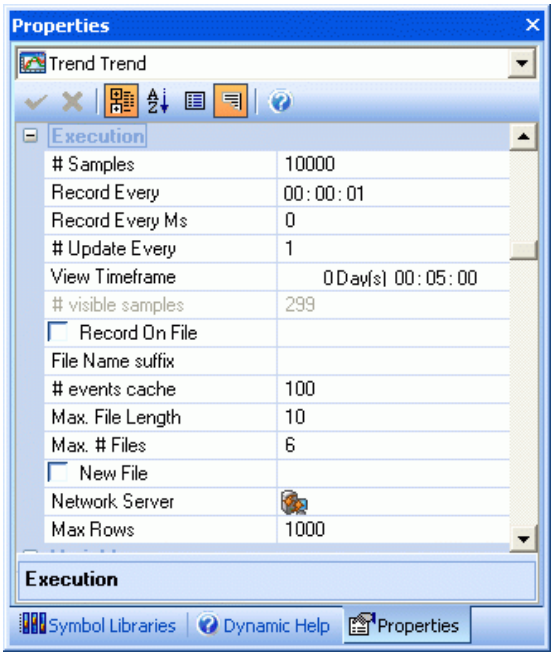
When enabling this check box the Trend's grid will overlap to the curves.

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.

8.6.15. Trend Execution Properties

The Execution properties are used to setup how the Trend's data sampling is to work.
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).

10,000 is the highest number of samples that can be managed when the Trend is configured as "Horizontal" or "Vertical". However, when the Trend has been setup as "X/Y", the highest sampling number is limited to 1000 values to keep the user interface light otherwise it will become very slow to use if exceeded.

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.

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.

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.

Network Server

This property allows you to insert the name of the Movicon network server. In this way the Trend can ask the Movicon Server for any historical data is has to retrieve and not by using the local project Data Logger's ODBC connection. Historical data from a remote Data Logger will then be displayed on the PC in trend form.
Seeing that the trend 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

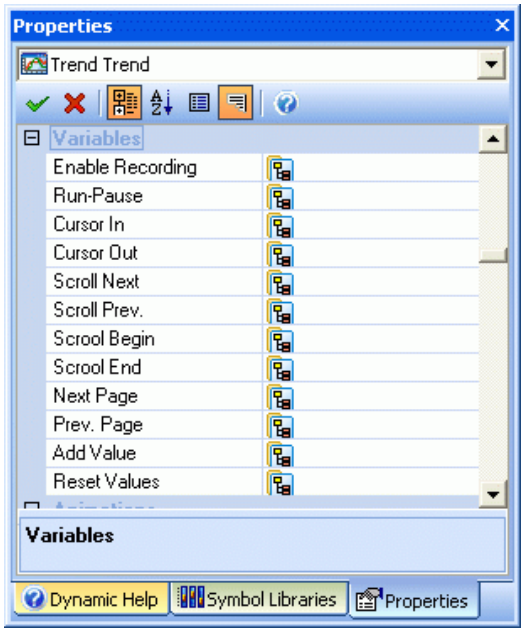
The data logger connected to the trend must also be configured in the local project. However, its "Enable" property can be disabled to prevent any recordings taking place in local database.

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.

8.6.16. 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

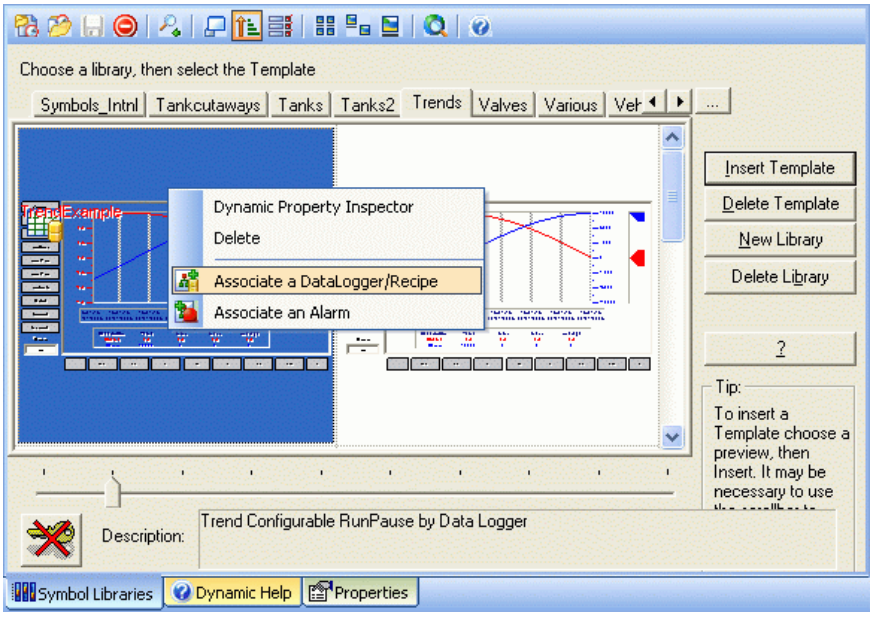
The name of the variable for executing the cancelling of data in the Trend's buffer is entered in this edit box (variable name can also be selected with the "..." browse button on the right). When setting this variable at "1", the Trend will execute the cancelling of data recorded up till that moment and return the variable to "0".

8.6.17. Templates with Vectorial Trends

One of the most useful functionalities for the programmer to have, when working in a development environment, is the possibility to keep safeguarded any work carried out. This is what the Template philosophy is all about where symbols from the Movicon library are allowed to keep their execution characteristics intact.
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 Vectorial 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 "trends as 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 Vectorial 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 then can be inserted whenever needed, and Movicon will create the variables and databases related to the new Trend introduced into the screen and the project.

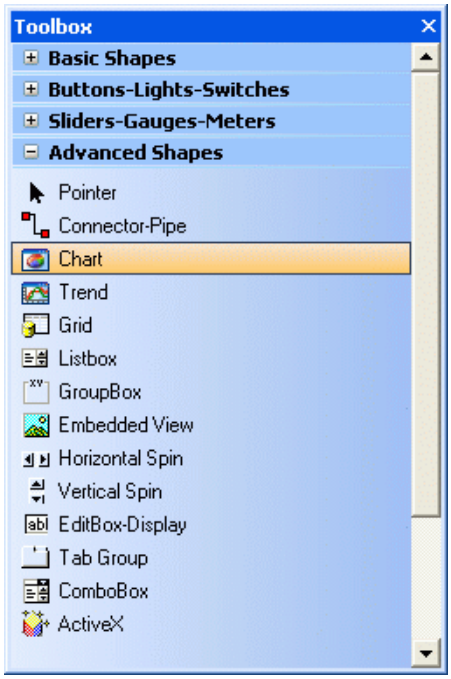
To apply the Template concept to Trends and the Data Loggers, you need to select the Trend object realized and saved in the Symbols library and use the **"Associate a DataLogger/Recipe"** command, which is accessed with the right mouse key, then select the DataLogger desired.



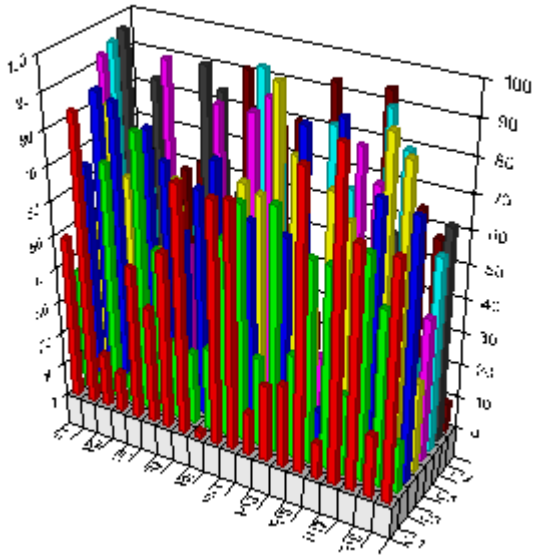
8.7. Chart Objects

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 "Special Objects" 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.

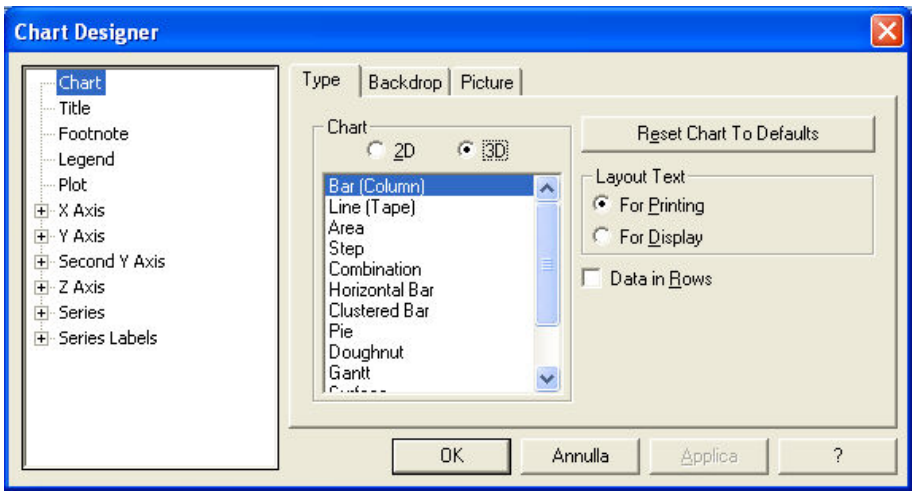
For further information on charts and their configurations, please consult the "First Impression 5.0 On-Line documentation" (VCFI5.HLP) online guide, available in the Movicon's installation folder.

8.7.1. 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.

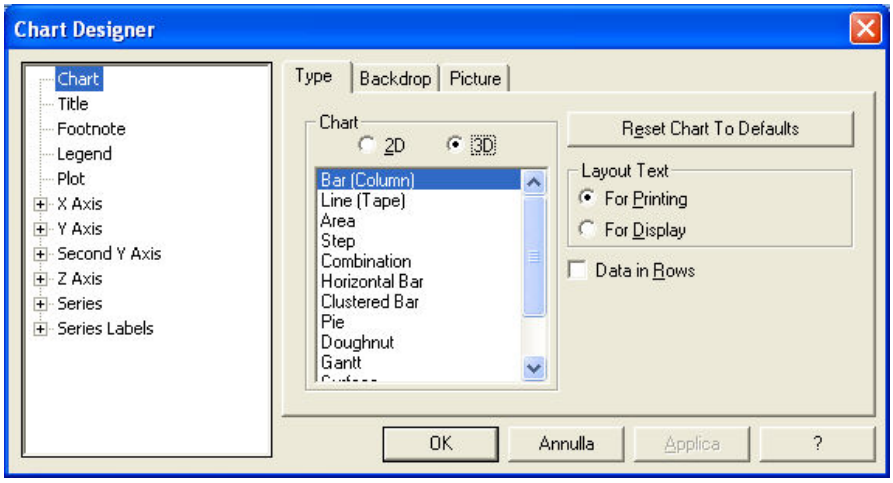


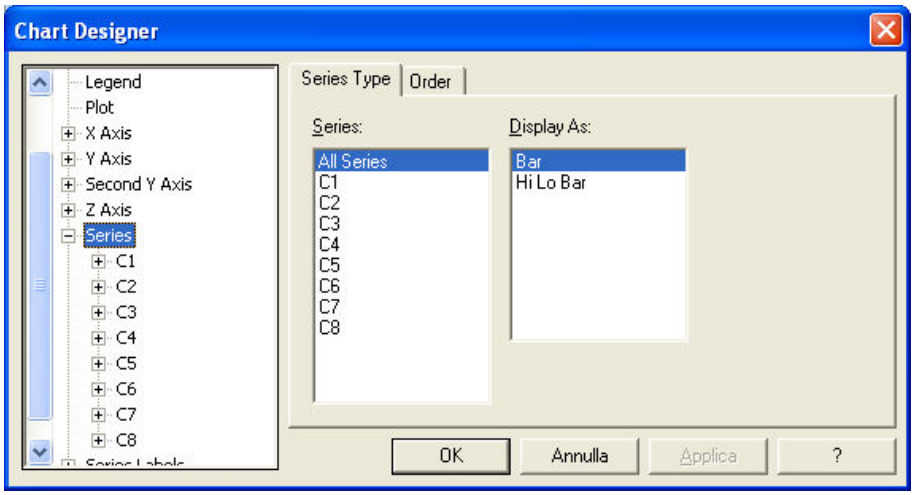
Chart Editing

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)

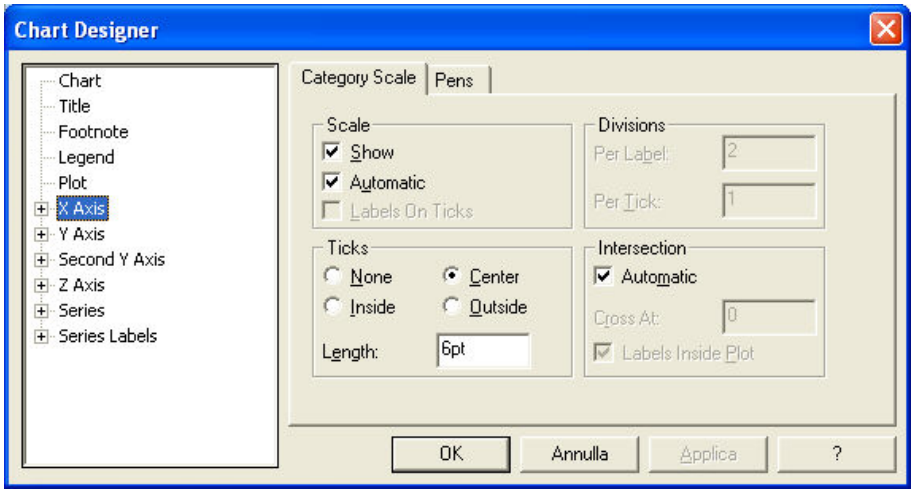
Pointing and double-click the chart's variables to active the variable style settings window.
You can edit the colors, sizes or styles of the variables representations in the chart by using these options.



Axis format

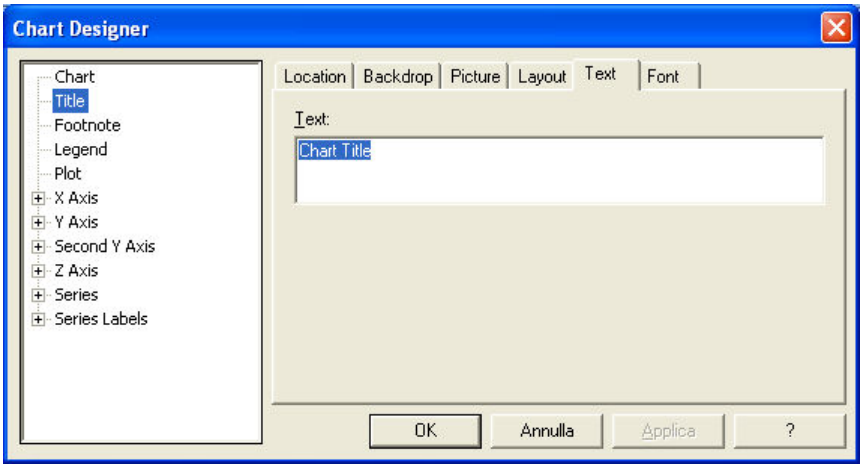
Point and double-click the chart grid to activate the variable scale style setting window.
These options allow you to change the color, size and style of the chart's variable scale
This option is important for setting the two operating modes of the scale

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.



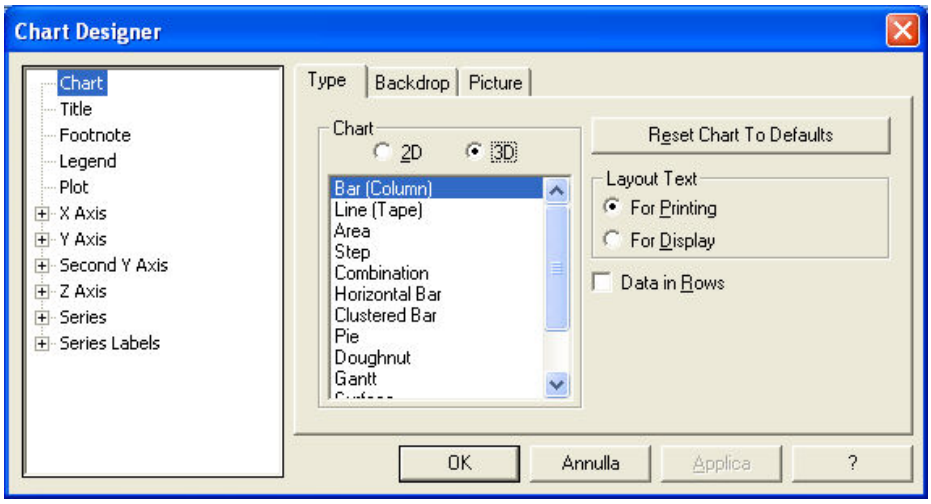
Axis Title Format

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.



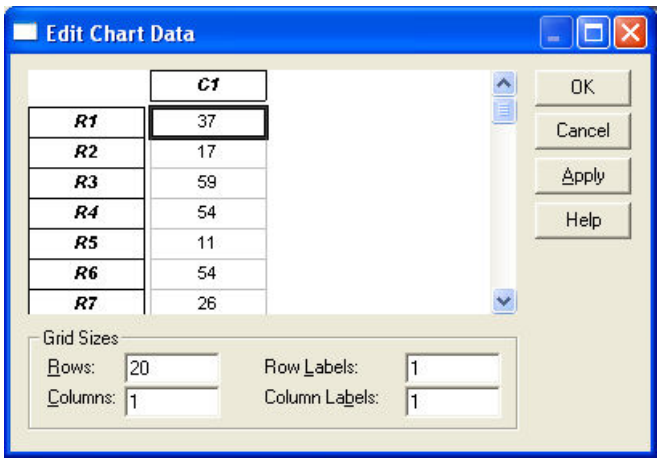
Plot Format

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.



8.7.2. 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.

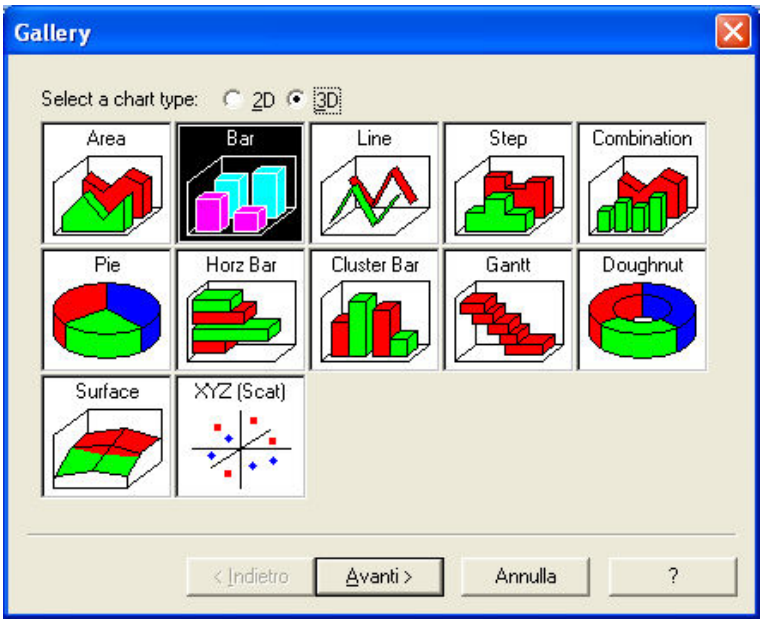


The data entered will replace the default labels displayed in the chart.

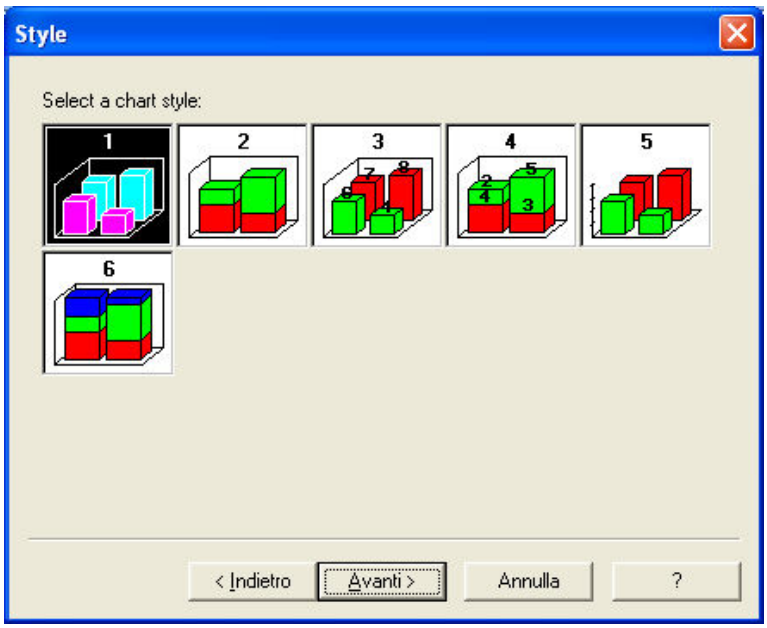
8.7.3. Chart Wizard

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.

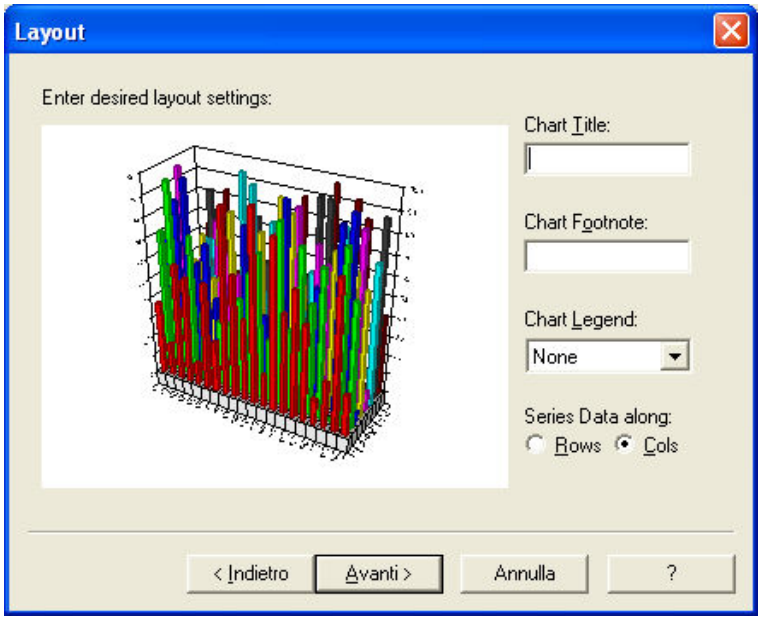
Select either the 2D (two-dimensional) or the 3D (three-dimensional) chart type option. Select the one of the icons representing the different chart aspects.



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.

8.7.4. 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"**.

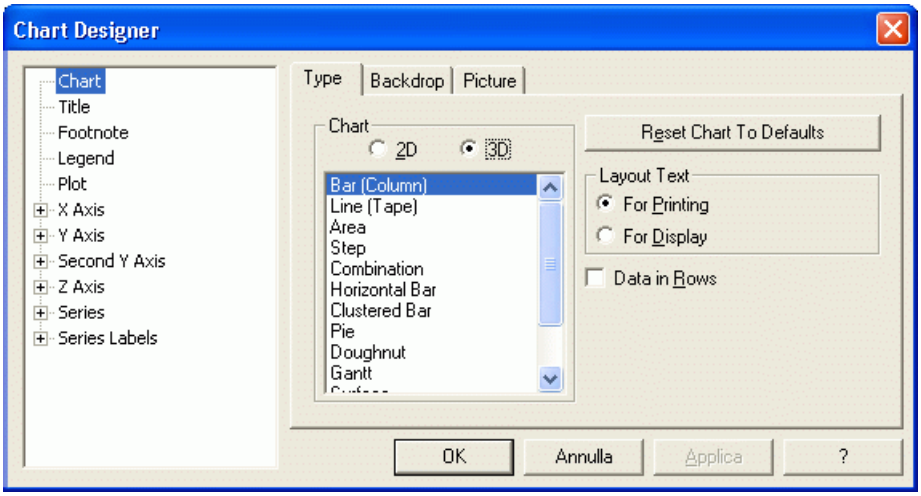
The chart objects have two different types of properties. The Movicon functional properties, which can be set only in programming mode as for all the other objects, and the chart style properties which can be set through an appropriate window whether in programming or runtime mode.

8.7.5. 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.

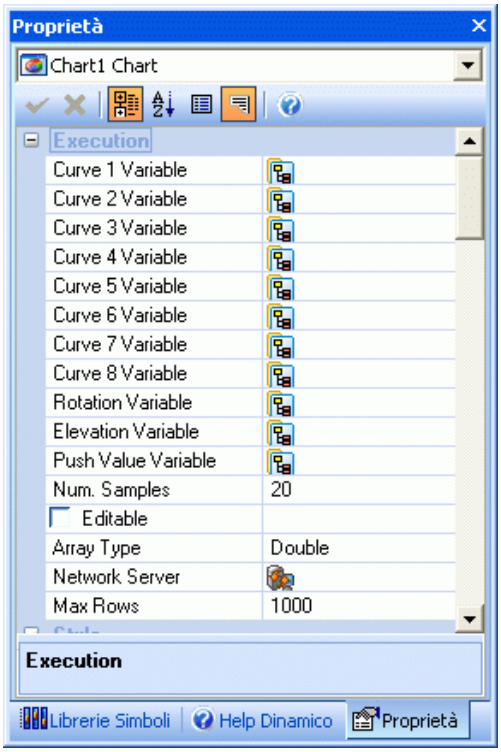
Open

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.



8.7.6. 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 Byte 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.

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 X server when retrieving data instead of getting data from the local Data Logger's ODBC 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

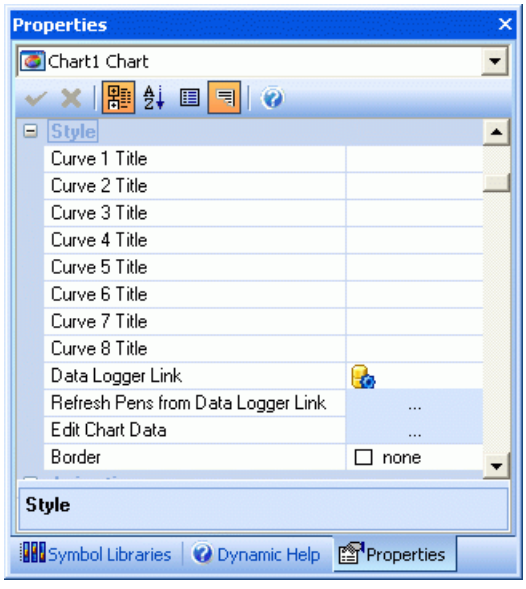
In addtion to this, the Data Logger linked to the Chart must also be configured in the local project. However, you can disable its 'Enable' property to avoid that recordings on Database, also local, are carried out.

Max Rows

This edit box allows you to insert the maximum number of records to be retrieved from the Server's Data Logger.

8.7.7. 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

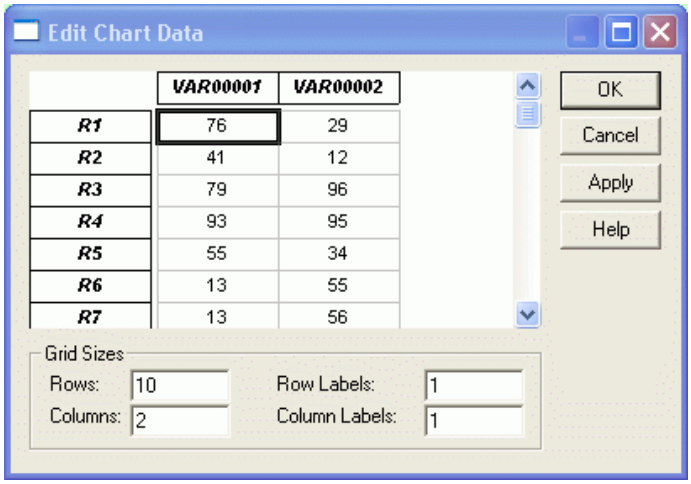
This property allows you to specify the name of the Data Logger to be associated to the Chart.

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 "Curver 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".

8.8. Embedded Screens

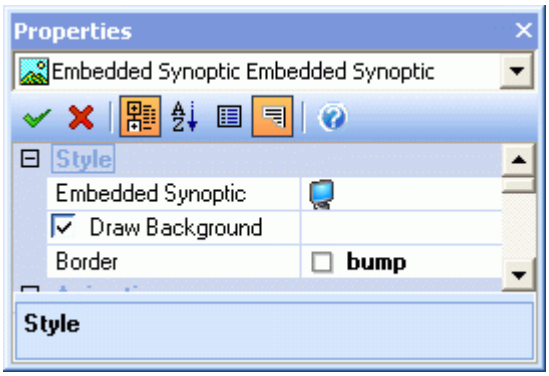
Movicon has a special component called Embedded Synoptics or 'Embedded Screens' which can be inserted into Screens. This object, as implied by its name, has the job of representing Screens existing in the project and embedding them, which means inserting them inside other Screens as vectorial components.
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"**.

8.8.1. Embedded Screen Style Properties

The Embedded Synoptic Style Properties are used for associating the Screen to be displayed.
To edit the Stile 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 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.

Draw 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.

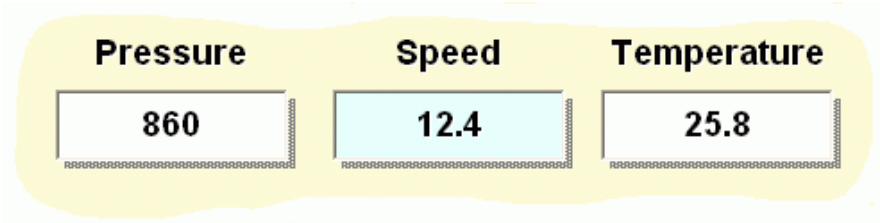
Border

The 'Border' property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

8.9. 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.

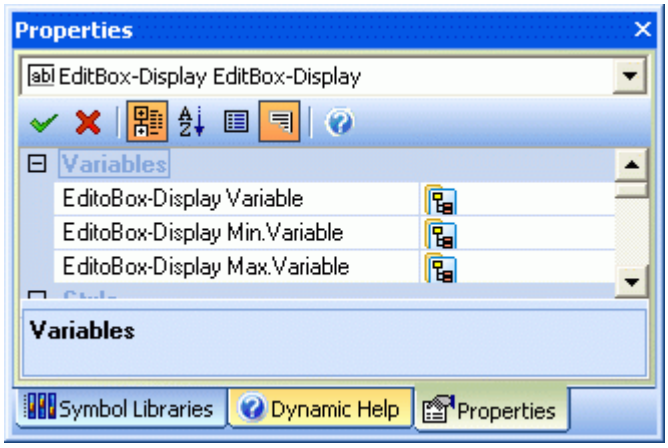


An example of Movicon Display application. The Movicon Real Time DB variables can be read and written through these Displays.

The Displays show the associated variable's value during project processing, with the style and sizes set through the **'Properties Window'.**

8.9.1. Display Variables Properties

The Display Variables properties are used for associating the Movicon Real Time DB variables to Displays. To edit the Variables properties, select the object with the mouse and use the Movicon **'Properties Window'**.



Variables

The name of the variable to be displayed or set by using the Display is entered in this edit box (or selected with the '...' browse button on the right).

Min. Variable

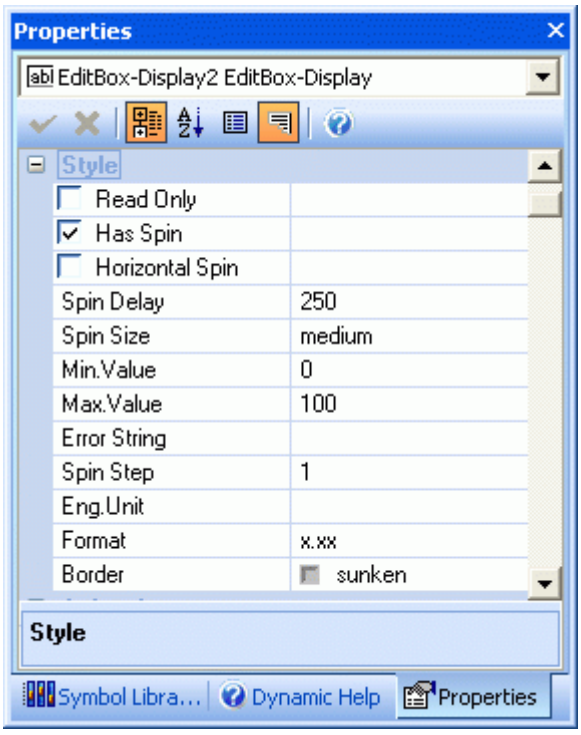
The name of the variable whose value will be used as the lowest value which can be set in the **'Variable'** is entered in this edit box (or selected with the '...' browse button on the right). By doing this the threshold value is made dynamic and therefore editable during Runtime.

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.

8.9.2. Display Style Properties

The Display Style properties are needed for setting the graphical display of the object.
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.

Has Spin

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.

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

The minimum value in which the Display's variable can assume is entered in this edit box.

*The **"Min. Value"** will be ignored if a variable in the "Min. Variable" property of the **'Display Variables Properties'** group has been specified for managing the threshold dynamically.*

Max. Value

The maximum value which the Display's variable may assume is entered in this edit box.

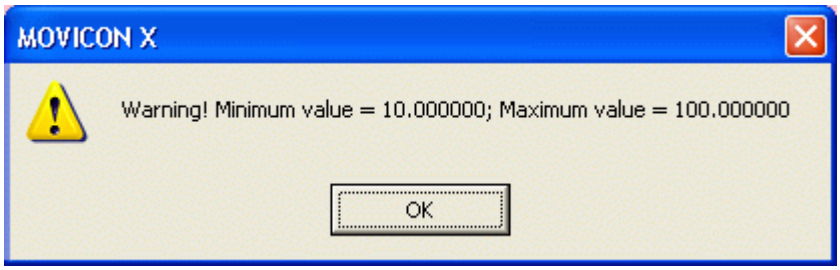
*The **"Max. Value"** will be ignored if a variable in the "Max. Variable" property of the **'Display Variables Properties'** group has been specified for managing the threshold dynamically.*

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:



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

The associated Display variable's numeric format to be displayed is selected through this box.
The type of formats available are represented by the syntaxes below:

x: where the x number identifies the figure to be displayed
x.x: where the x number after the decimal point indicates the decimal figures to be displayed

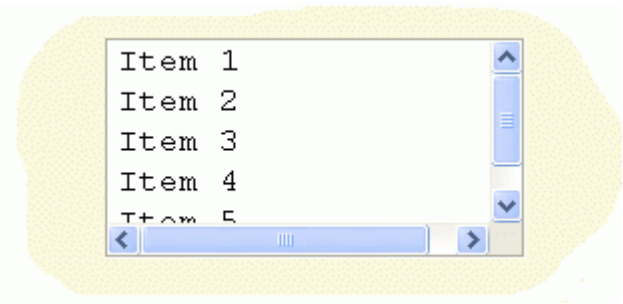
The format type with the **"x.x"** decimal figures is valid when a variable in floating point format is inserted. When using a integer number the decimal figure will always remain at zero.

Border

The **'Border'** is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

8.10. 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"**.



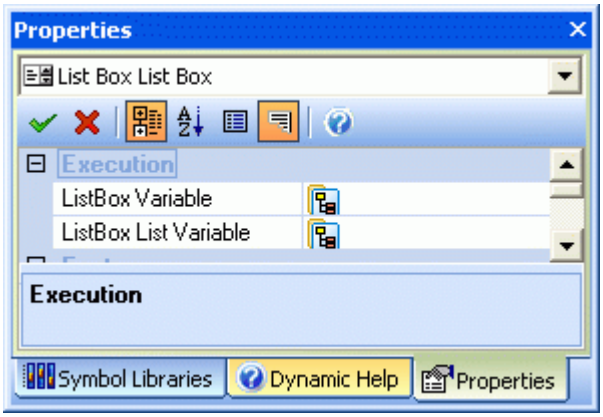
An example of a Movicon List.

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).

8.10.1. 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.

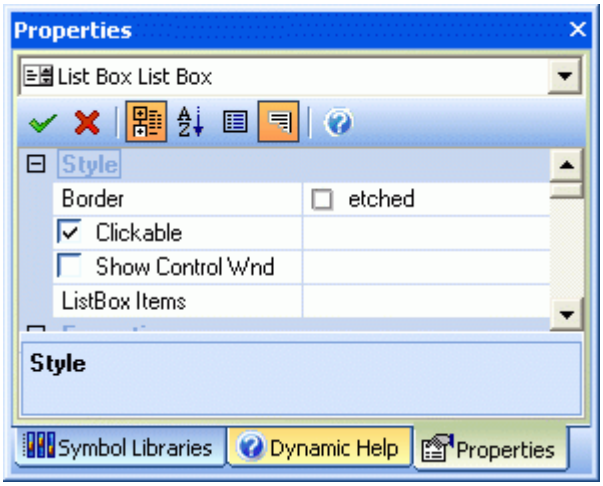
Items ListBox

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 ("|" ie. 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.

8.10.2. List 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"**.

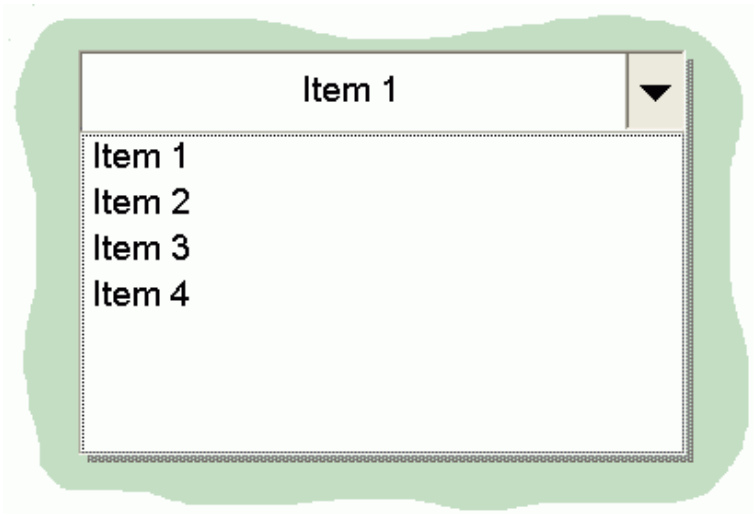
ListBox Items

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.

8.11. 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"**.



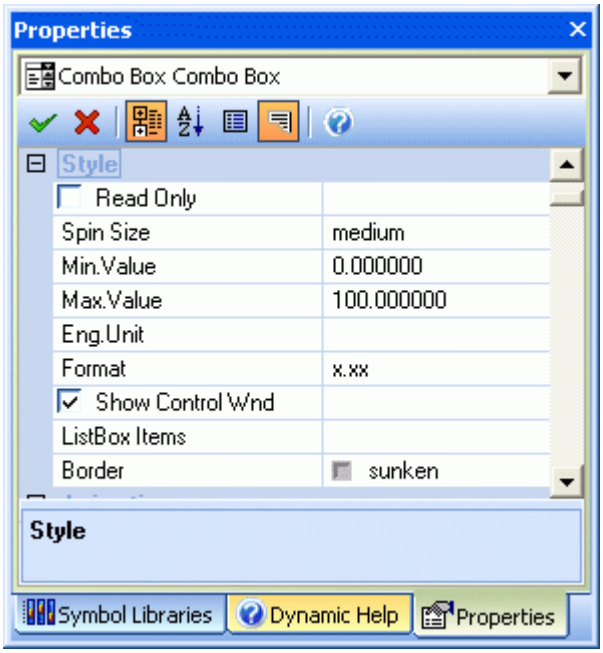
Movicon Combo Box example

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).

8.11.1. 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

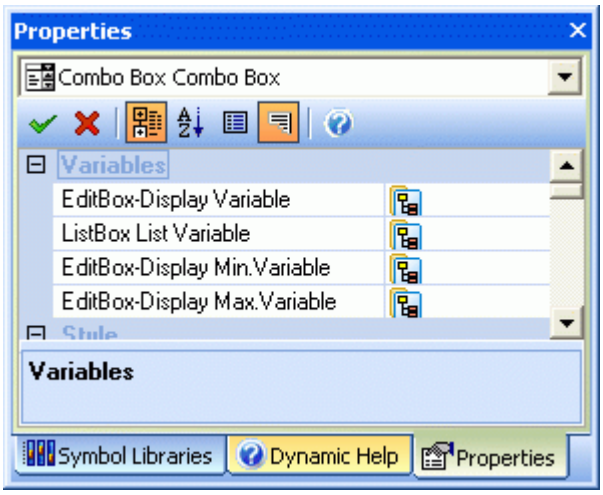
The **"ListBox Items"** property is described in the paragraph headed **"Display Style Properties".**

Border

The **"Border"** property is described in the paragraph headed **"Style properties common to Draws and Controls".**

8.11.2. 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.

ListBox List Variable

This property is described in the paragraph headed **"ListBox Execution Properties"**.

EditBox-Display Min. Variable

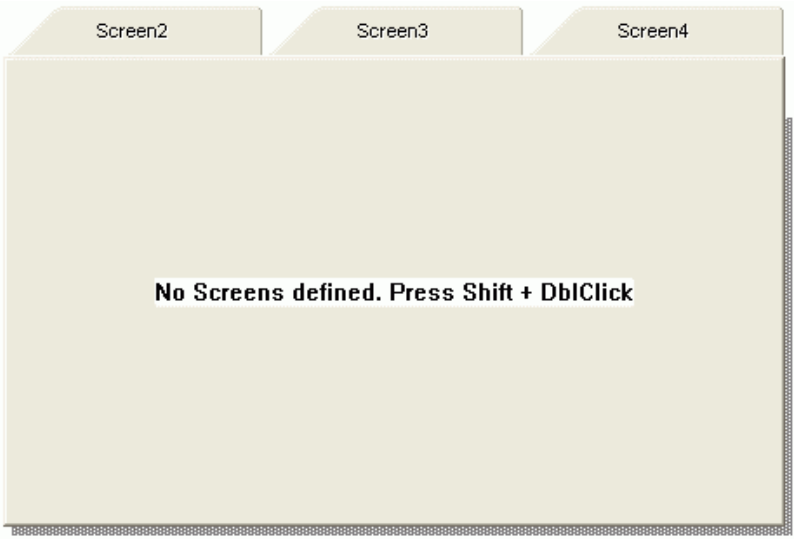
This property is described in the paragraph headed **"Display Variables Properties".**

EditBox-Display Max. Variable

This property is described in the paragraph headed **"Display Variables Properties".**

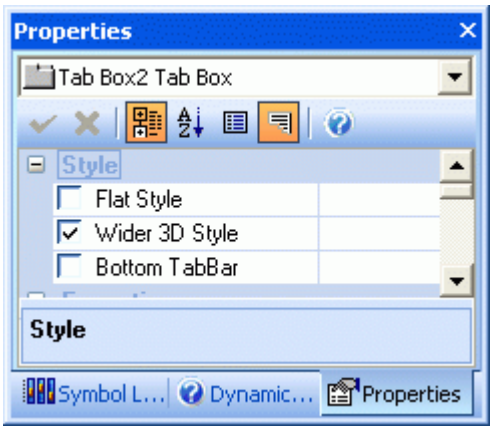
8.12. TAB Group Object

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"**.



8.12.1. 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

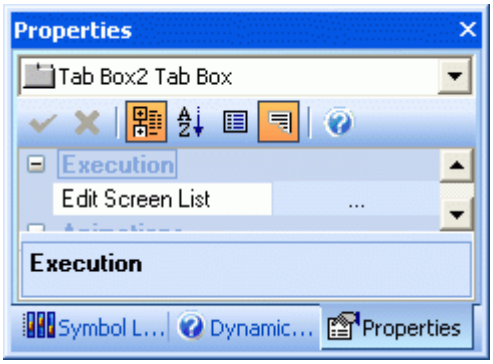
This property displays the TAB in 3D. This setting has only effect when the **"Flat"** property is disabled.

Bottom TabBar

This property displays the TAB bar at the bottom of the object instead of at the top.

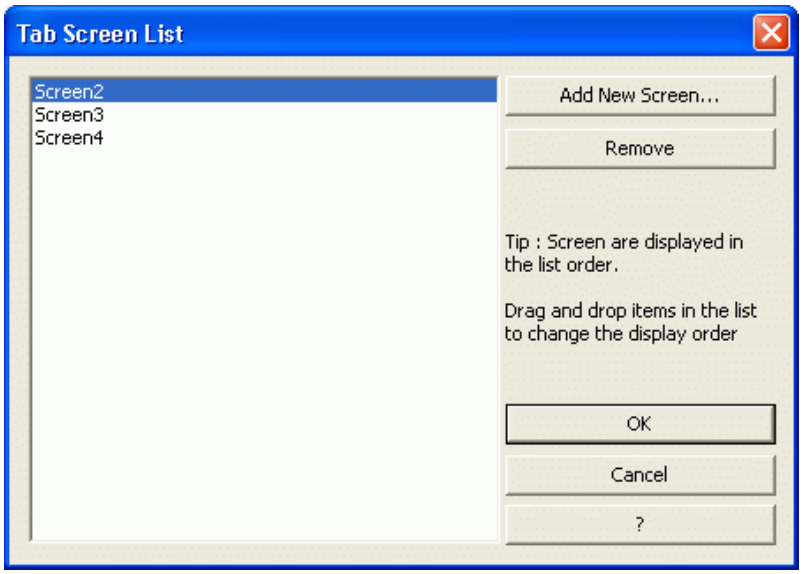
8.12.2. TAB Group Execution Properties

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:

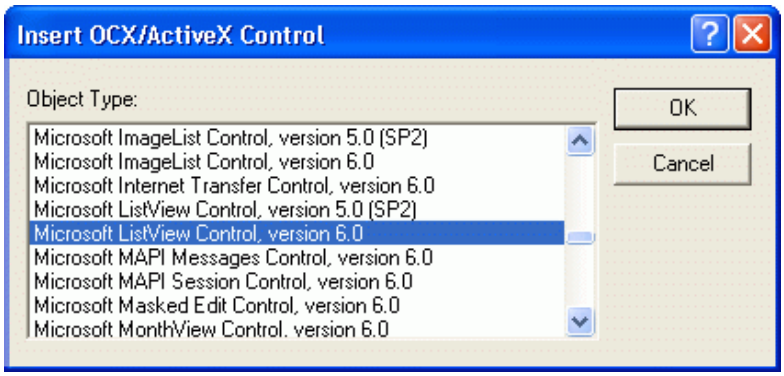


The current screen list is shown on the left hand side of the window. Other screens can be added to the list by using the **"Add New Screen...."** button while the **"Remove"** button is used to remove the selected screen from the list. To change the order of list just click on the screen to be moved and drag it to the position desired.

8.13. 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.

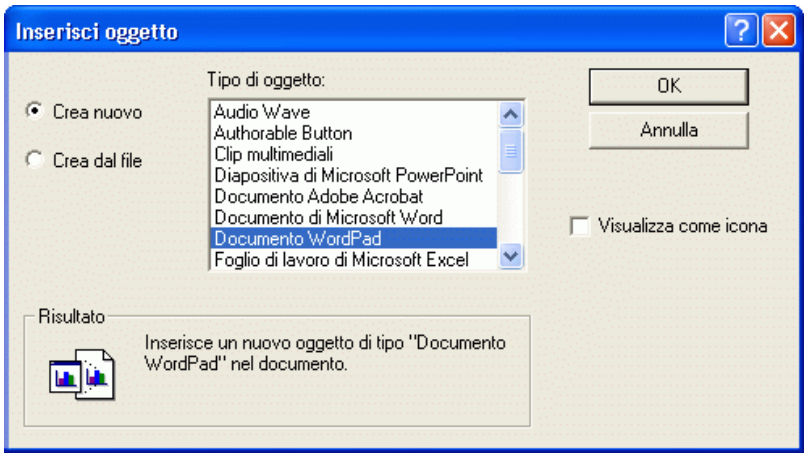


This technique renders the Movicon application open to external object integration where they will be treated as Movicon objects.
For further information of how to use Active/OCX and their usages please refer to the section titled **"ActiveX Objects"**.

8.14. 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"**.

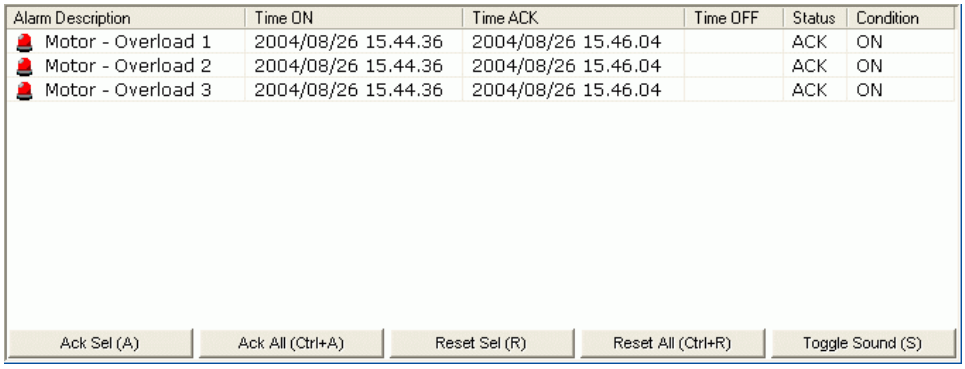
When the "OLE" item is selected, the window below will open showing the list of applications available in the system.



This techique renders the Movicon application open for intergrating 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"**.

8.15. Alarm Window

The Movicon Alarm Window is a configurable object designed to represent and control local or area plant alarms, or remote station alarms (Server) connect in net.
The Alarm Window is available from the 'Controls' group in the **"Objects Window"**.



Example of an Alarm Window representation

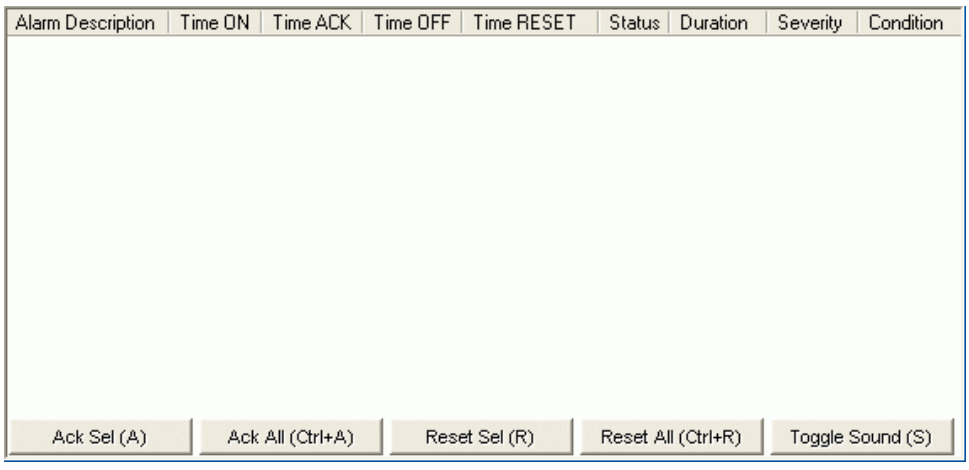
When the Alarm Window is inserted into the Screen it will appear the default settings. After having inserted the Alarm Window it can be sizes as pleased by dragging its borders with the mouse.

A number of Alarm Window can be inserted into the project, ie. in more Screens, as required.

In the Alarm Window both alarms supporting Reset and Ack, which therefore have to be acknowledged and reset to disappear from the window and alarms not supporting the Reset and Ack, which therefore appear and disappear automatically in function with the ON/OFF status of the alarm itself.

8.15.1. 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.

Image

The "Image" column shows the image which has been associated to the variable in the **"Variable Options Properties - BMP File"**, which created the alarm.

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. The text with a customized time format as described in the **"Duration Format"** property from the **"Alarm Window Style Properties'** can also be inserted.

Severtiy

The 'Severity' column reports the alarm priorities. This value should have been previously inserted in the **"Severity"** property from the **'Alarm Threshold Execution Properties'**.

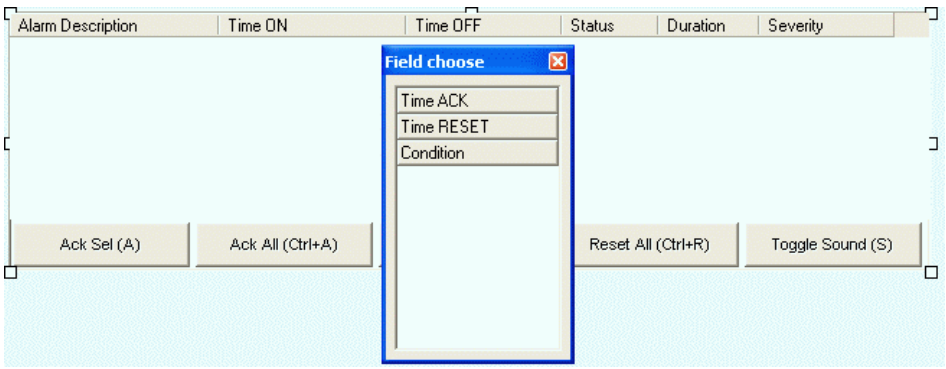
Condition

The 'Condition' column reports the alarm's current condition. The options are:

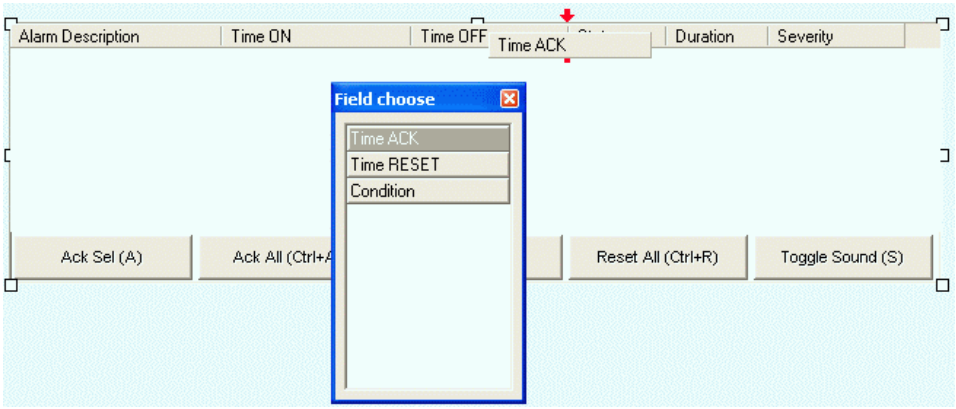
- **ON:** alarm active
- **OFF:** alarm not active

8.15.2. 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.

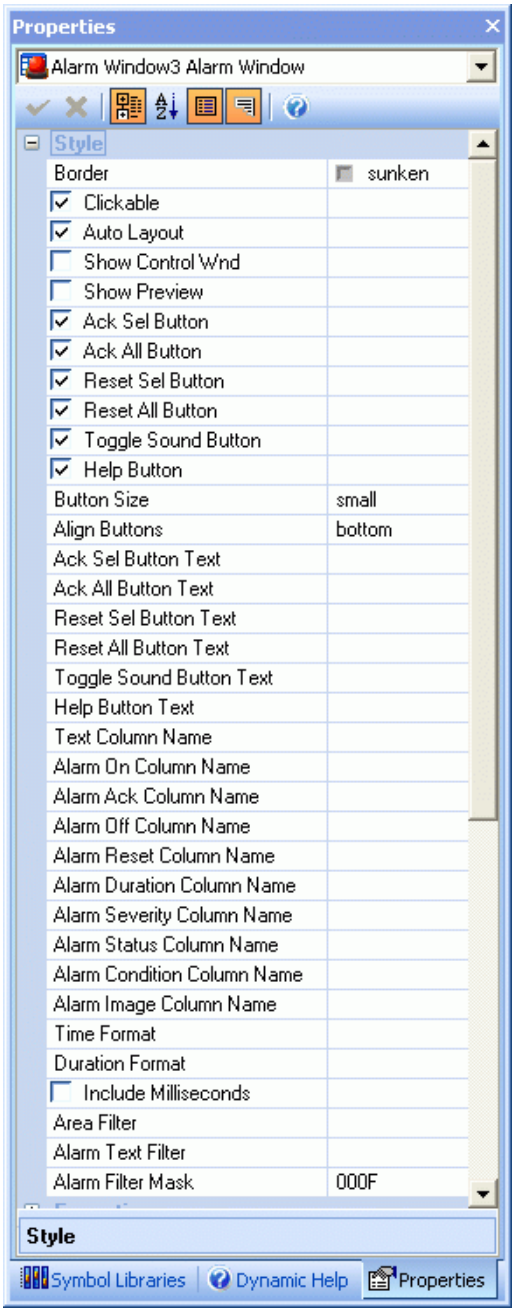
8.15.3. Alarm Help in the Alarm Window

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 with the same name of the variable associated to alarm/s. For example, if you have a alarm set as "Alarm001" which has been associated with the "Alarm_1" variable, the corresponding help topic should then be named "Alarm_1".

8.15.4. Alarm 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'**.



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.

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.

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.

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.

Toggle Sound Button

This option enables the command button for activating or deactivating the acoustic signal associated to the priorities of unacknowledged alarms.

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"**.

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.

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 Severity Column Name

The text which is to appear as the **"Severtiy"** 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.

Time Format

The date and time format which is to be displayed in the 'Time On', 'Time Ack', 'Time Off 'and 'Time Reset' columns is entered in this property. All the format codes which can be used in this property are listed below:

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"

Duration Format

The text which is to be displayed in the Alarm Window's 'Duration' column is inserted in this property. The message will be updated only on 'Alarm Off' events.
The message may include the following special codes only:

- **%H** = Alarm duration in hours
- **%M** = Alarm duration in minutes
- **%S** = Alarm duration in seconds

When this field is left empty, Movicon will automatically insert the alarm's total duration in the following formation:

00:00:00

where 00:00:00 indicates the time of the alarm's duration in hours, minutes and seconds.

Include milliseconds

Milliseconds will be included in the 'Time' formats of the 'Time On', 'Time Ack', 'Time Off' and 'Time Reset' columns when this check-box is enabled.

Area Filter

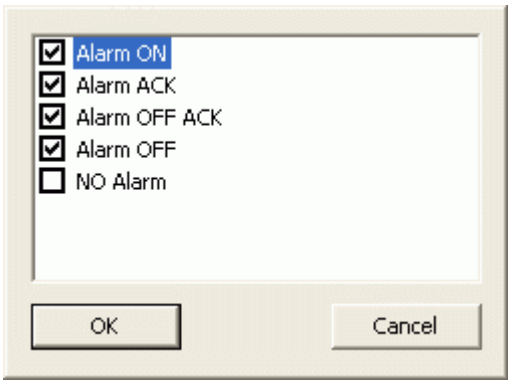
A filter can be inserted in this property to display the alarms belonging to a certain area only. The filter can contain one or more special characters "*" (ie. *Area*).

Alarm Text Filter

A filter can be inserted in this property to display alarms based on their text. The filter is applied to the 'Alarm Description' column and an contain one or more special characters "*" (ie. *Turbine*).

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:

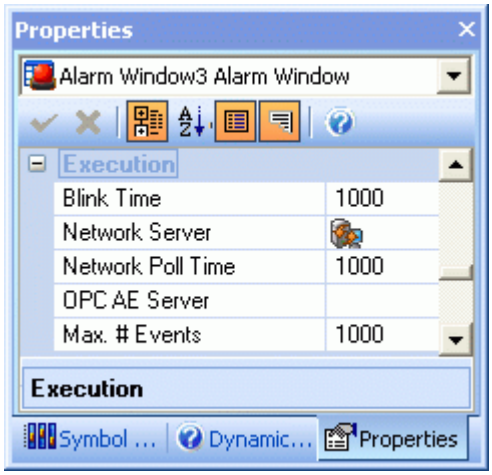


The filters are:

- **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

8.15.5. Alarm Window Execution Properties

The Alarm Window Execution Properties are used for setting the eventual Server names from where data to be viewed is taken.
To edit the Execution properties, select the object with the mouse and use the Movicon **'Properties Window'**.



Blink Time

This setting represents the blink time for alarms not yet acknowledged. The value is expressed in milliseconds.

Network Server

The name of the eventual Networking Server, from which alarms are taken and viewed in the window, is entered in this edit box.

Network Polling Time

This setting represents the network's polling time. The value is expressed in milliseconds.

OPC AE Server

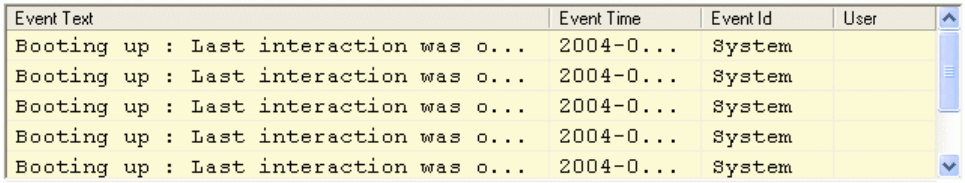
The name of the eventual OPC AE Server, from which alarm notifications are to arrive and be displayed in the window, is entered in this edit box. In this way the alarm window will be configured so that it keeps track of a certain number of events in arrival from a OPC Server AE. In addtion to this, the "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. # Events

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. When the set limit is reached the oldest traces will be replaced with the newest ones.

8.16. 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"**.



Example of a Log Window

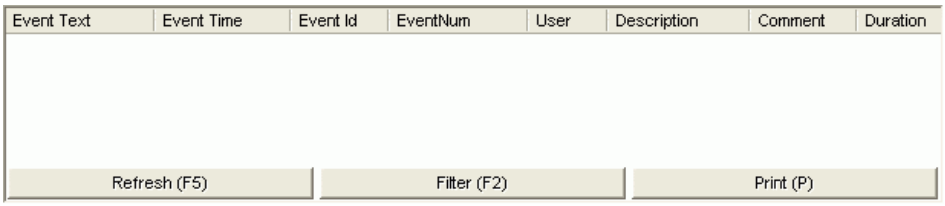
When a Log Window is inserted into a screen it will appear with its default size. After being inserted it can be resized as pleased by dragging the borders with the mouse.
The Log Window can display three different types of data: System Messages, Alarm Messages and Communication Driver Messages.

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.

8.16.1. 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 'User' column reports the name of the user active the moment the recording took place.

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

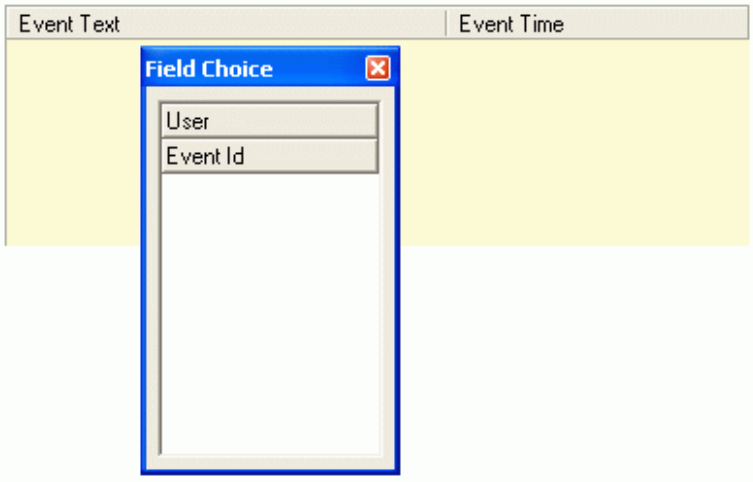
The "Event Number" column reports the event's identification code number. For further information please refer to the paragraph on "Log Window Fields".

Comment

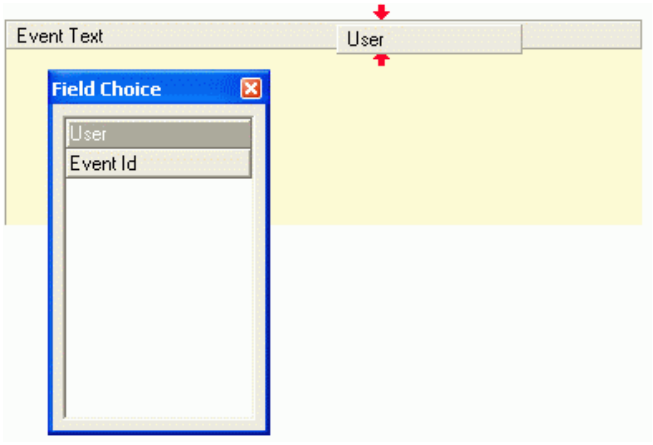
The "Comment" column reports different information according to the type of event which occurred. For further information please refer to the paragraph on "Log Window Fields".

8.16.2. 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.



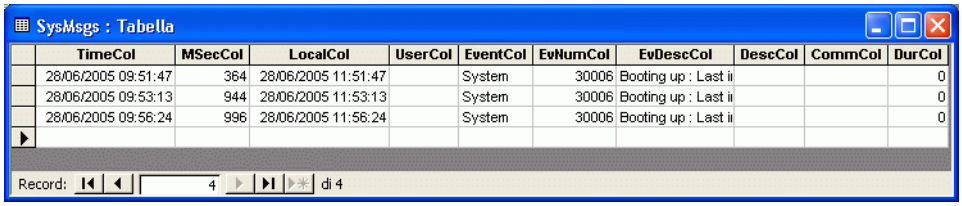
The available fields which have not yet been inserted into the Log Window will be listed in the 'Field Choice' window. To move a field from the 'Field Choice' window to the Log Window just select the field with the mouse and drag it to the position desired in the Log Window. Note that the field can only 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.

8.16.3. 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

This field reports the name (Description or Electronic Signature) of the user logged on when the recording took place.

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

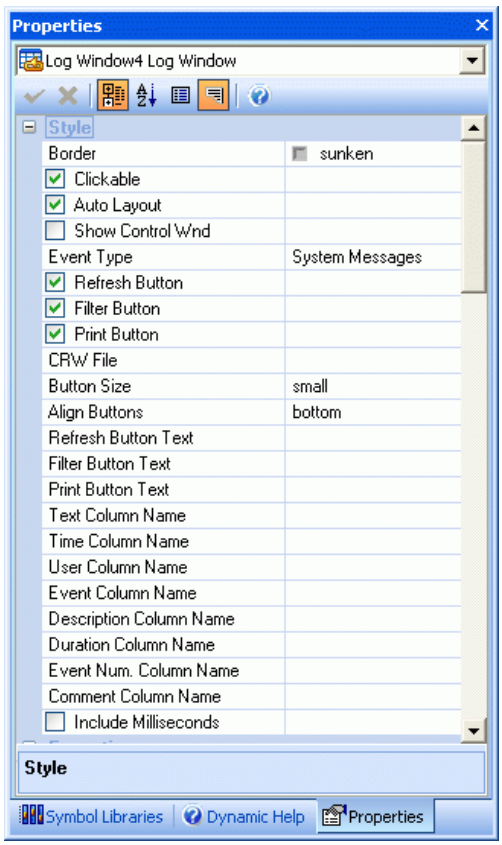
In Alarm Tables, this field reports the alarm duration in text format.
The variable's description is saved in the SysMsgs table when the Variable Trace function and the "Add Msg in SysLog" property has been enabled.

DurCol

In the Alarm Tables, this field reports the alarm duration in numeric format (seconds).

8.16.4. 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.

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"**.

CRW File

The **'CRW File'** 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"**.

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

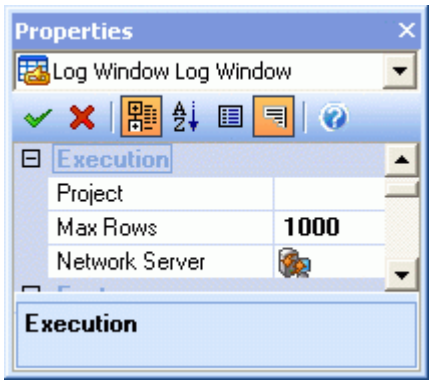
The text which is to appear as the name of the **"Comment"** column is entered here. The default text will be used when this field is left empty.

Include milliseconds

The **'Include milliseconds'** property is described in the paragraph on **"Style Proprieties common to Drawings and Controls"**.

8.16.5. 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

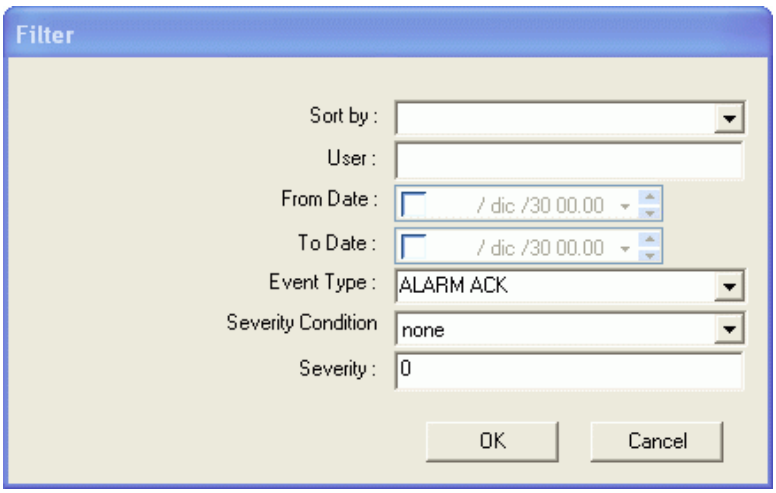
The highest number of rows which can be displayed in the Log Window is entered in this edit box.

Network Server

The name of the eventual Network Server is entered in this edit box from which the data, to be viewed in the window, is taken.

8.16.6. 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.

8.17. 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"**.

Event Time	Reason	User	VAR00...	VAR00002	VAR00003
2004-09-20 16:13:00	Time On		81	77	0
2004-09-20 16:13:05	Time On		55	77	32
2004-09-20 16:13:10	Time On		55	77	32
2004-09-20 16:13:15	Time On		55	77	32
2004-09-20 16:13:20	Time On		55	77	32
2004-09-20 16:13:25	Time On		55	43	67

An example of a DataLogger Window

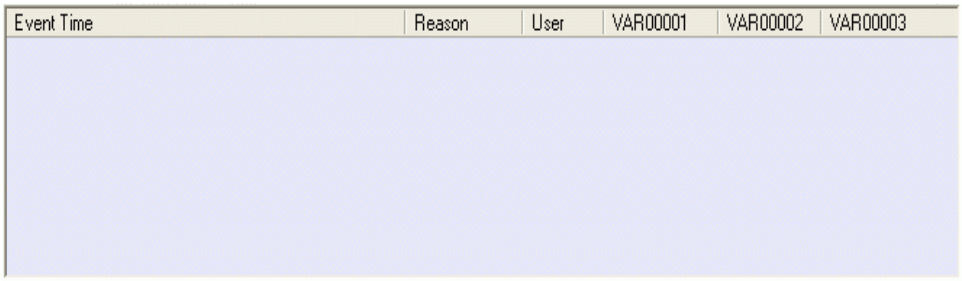
When a DataLogger Window is inserted into a screen it will appear with its default size. After being inserted it can be resized as pleased by dragging the borders with the mouse.
Each DataLogger Window can display data of only one DataLogger or Recipe which must be setup in the object's **"Execution 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.

8.17.1. 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

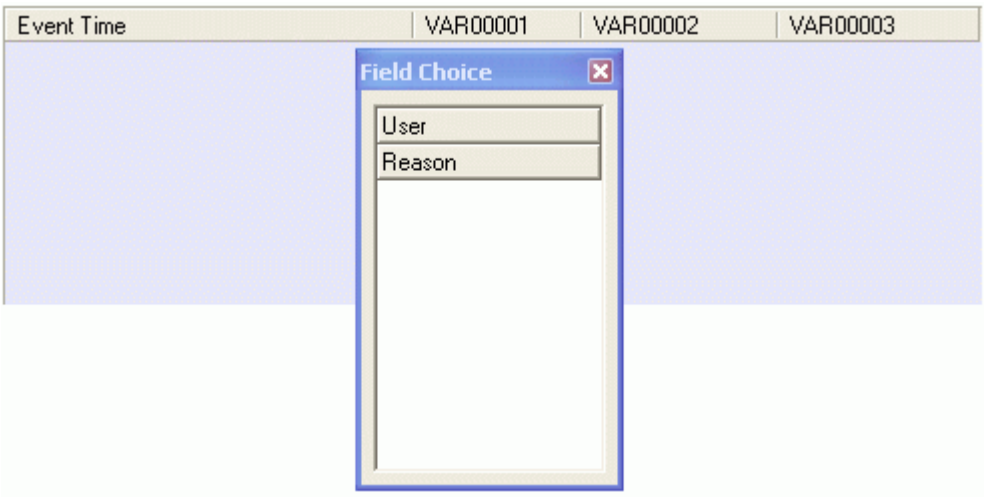
The 'User' column reports the name of the user who was active when the recording took place.

Variable

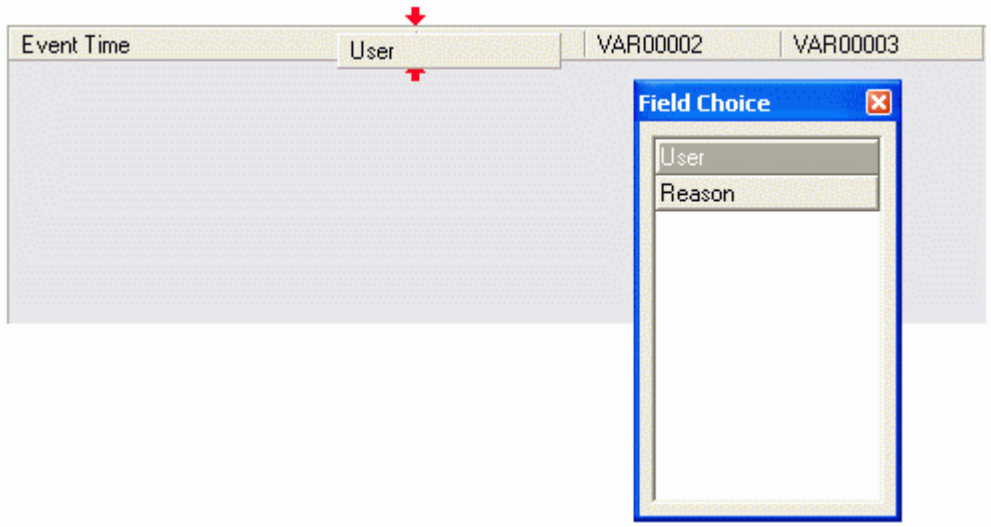
A column is created in the database for each variable associated to the DataLogger or Recipe with the same name set in the "Data Loggers and Recipes common Column General Properties".

8.17.2. 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.



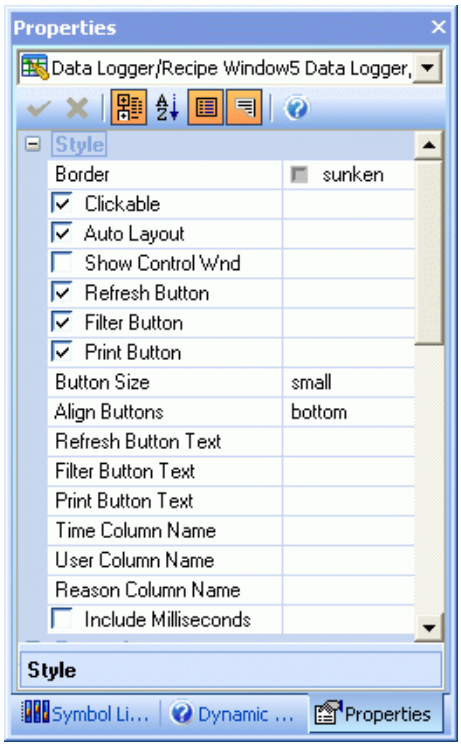
The available fields which have not yet been inserted into the DataLogger Window will be listed in the 'Field Choice' window. To move a field from the 'Field Choice' window to the DataLogger Window just select the field with the mouse and drag it to the position desired in the DataLogger Window. Note 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.

8.17.3. 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

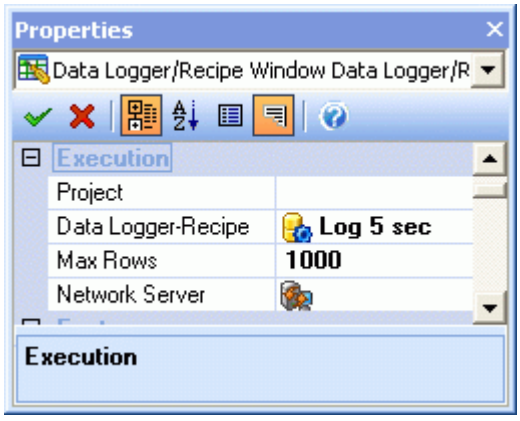
The text which will appear as the **"Action"** column's name is entered in this edit box. The default text will be used when this field is left empty.

Include milliseconds

The **'Include milliseconds'** property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

8.17.4. 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.

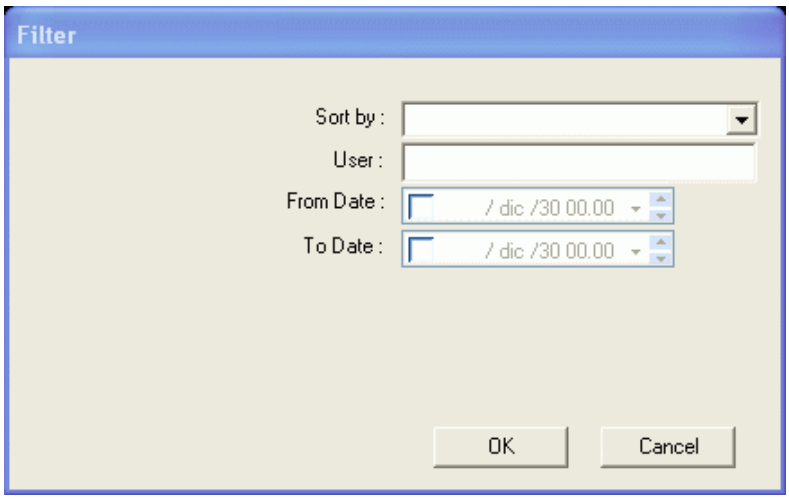
Network Server

The name of the eventual Network Server from which the data, to be viewed in the window, is taken from is entered in this edit box.

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.

8.17.5. 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.

8.18. 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".**

Event Time	User	Action	Value	Before	After	Quality
2004-09-20 16:06:29		Obje...	81	8	81	Good
2004-09-20 16:06:27		Obje...	8	9	8	Good
2004-09-20 16:06:07		Obje...	9	50	9	Good
2004-09-20 16:06:03		Obje...	50	89	50	Good

An example of a TraceDB Window representation

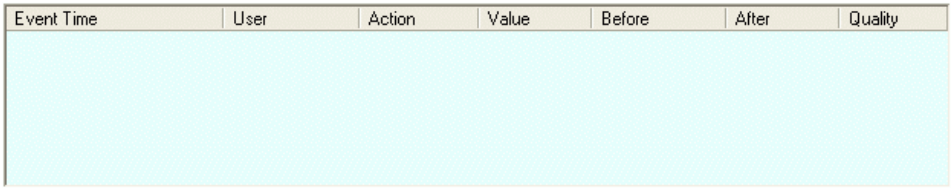
The TraceDB Window will appear with its default settings when inserted into a screen. After it has been inserted, it can be resized as pleased by dragging its borders with the mouse.
Each TraceDB Window can display the data one variable only which must be set in the object's **"Execution Properties"**.

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.

8.18.1. 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 'User' column reports the name of the user who was active when the recording took place.

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

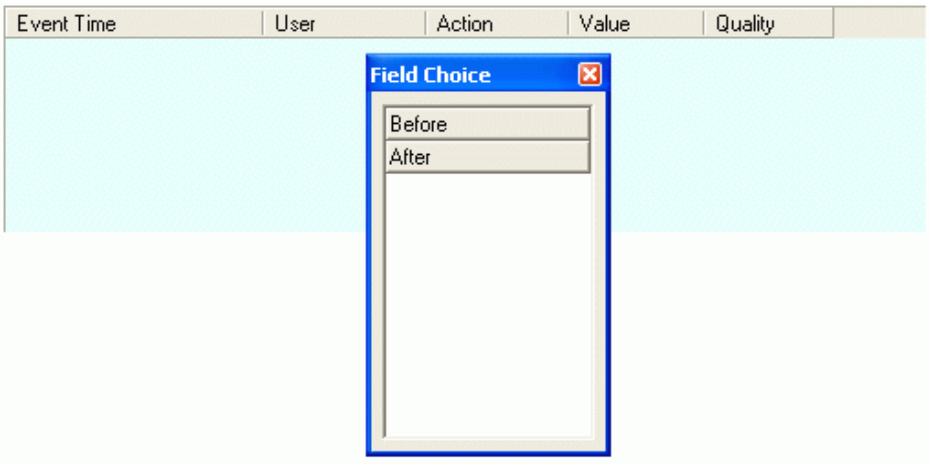
The 'After' column reports the final value obtained after being changed. In certain cases this value might not correspond to the one requested, for instance if the writing is not executed properly.

Quality

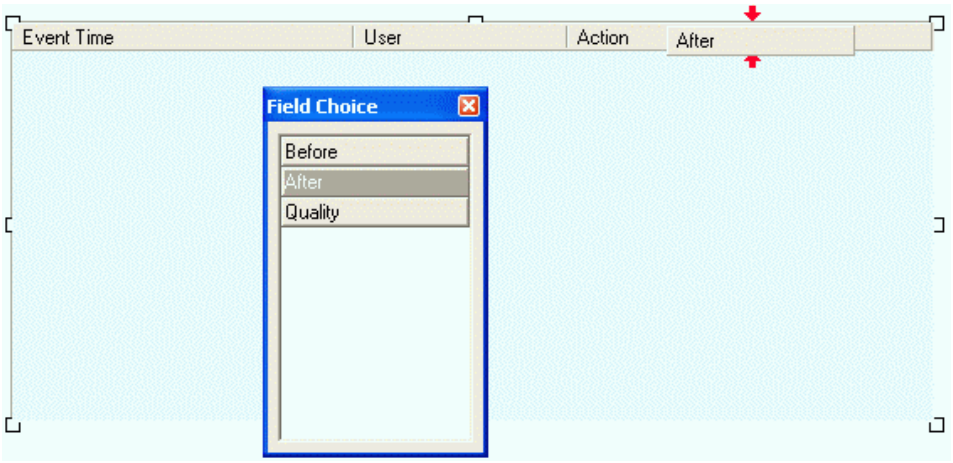
The 'Quality' column reports the quality of the variable at the time of the recording.

8.18.2. 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.



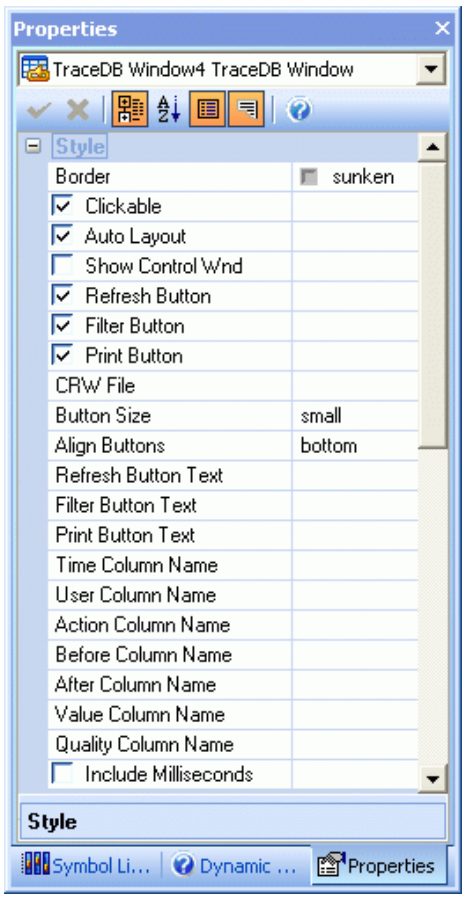
The available fields which have not yet been inserted into the TraceDB Window will be listed in the 'Field Choice' window. To move a field from the 'Field Choice' window to the TraceDB Window just select the field with the mouse and drag it to the position desired in the TraceDB Window. Note that the 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.

8.18.3. 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".

CRW File

The **'CRW File'** 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.

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

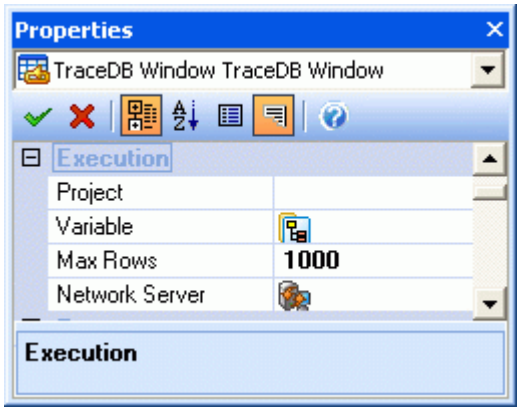
The text which will appear as the **"Quality"** column's name is entered in this edit box. The default text will be used when this field is left empty.

Include milliseconds

The **'Include milliseconds'** property is described in the paragraph on "Style Proprieties common to Drawings and Controls".

8.18.4. 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

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. However if the table's name has been customized through the **"Table Name"** settings of the **'Variable Trace Option Properties'**, it will have to be entered by using the keyboard.

The 'Variable Table' property requires the name of the Trace Database table and not the name of the associated Variable.

Max. Rows

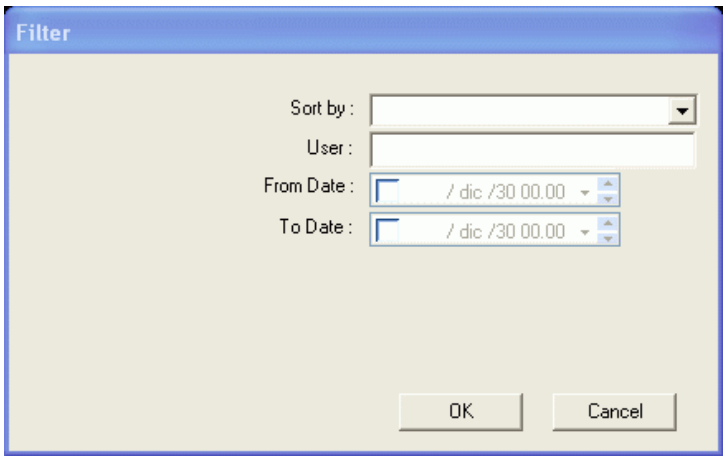
The highest number of rows that can be displayed in the TraceDB Window is entered in this edit box.

Network Server

The name of the Network Server from where the data of the variable to be displayed in the window is taken.

8.18.5. 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:

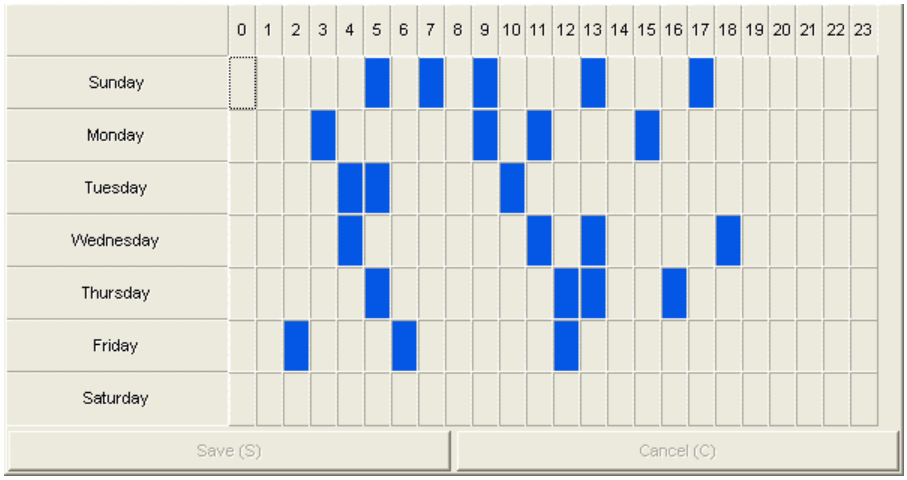
The date with which the extractions are to start from is entered here.

To Date:

The date with which the extractions are to finish is entered here.

8.19. 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 hour plan.
The "Hour Selector " object is found in the "Advanced Objects" group from the **"Objects Window"**.



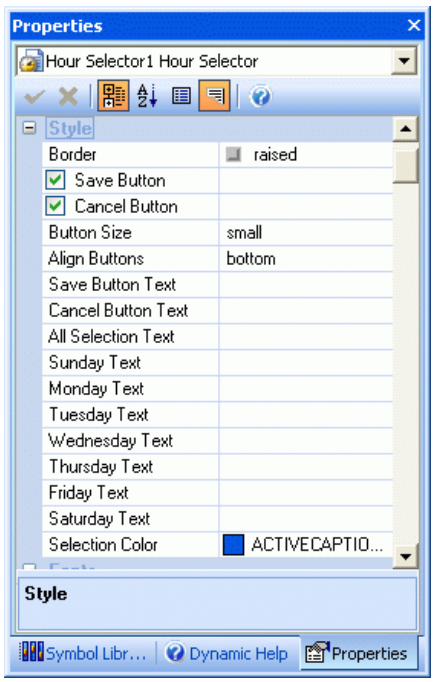
An example of an Hour Selector

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, which it has been associated to, during Runtime.

A "Hour Selector" can also display the hour plan of a Scheduler setup in a Network Server project by using the appropriate property.

8.19.1. 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"**.



Border

Please refer to **"Style Proprieties common to Drawings and Controls"** for this property's description.

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.

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.

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

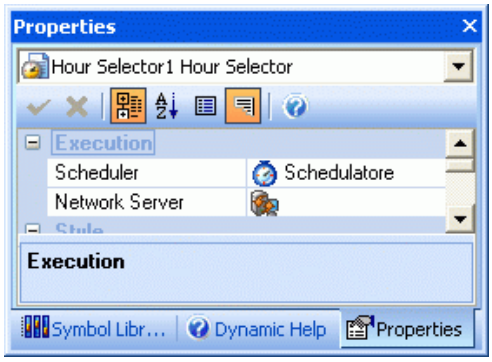
The text to be displayed in the **'Saturday'** box is inserted here. The default text will be used when left blank.

Selection Color

This property is used for setting color of the cells in the Hour Selector window.
For further information please refer to **"Color Selection".**

8.19.2. 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"**.



Scheduler

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.

Network Server

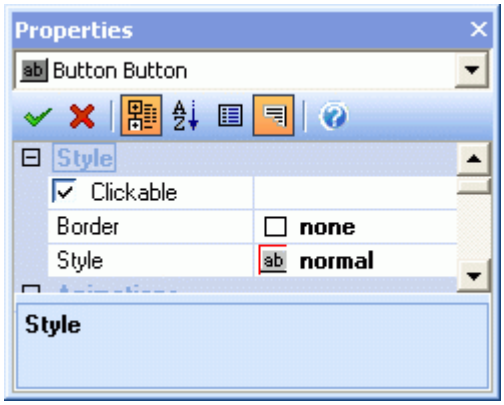
This edit box is used for inserting the name of the Network Server where the Scheduler data, to be displayed in the window, is to be taken from.

8.20. 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.

8.20.1. Style Proprieties common to Drawings and Controls

The Style properties of the drawings or controls 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".

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.

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. The print will be executed by using the report file which must to be specified in the "File Crystal Report©" property. MoviconX will pass the same filter setting s to the Crystal Report for printing the data, which must coincide with that displayed in the Display window in question.

File Crystal Report©

The name of the report file to be used for printing the data displayed in the Display window in question. The file must be a Crystal Report© (.rpt) created file. If this filed is left blank, Movicon will use the default report file created by Progea.

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**

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**

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.

Look 3D

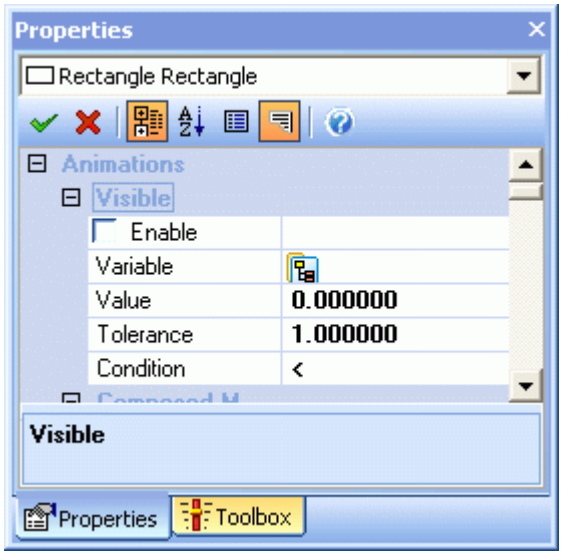
This setting allows the component to be displayed in 3D. This property is only available for "Rectange" objects and makes the Rectangle look like a real button.

Look 3D Pressed

This setting allows the component to be displayed in 3D pressed down look. This property is only availabe for "Rectangle" objects and makes the Rectangle look like a real button.

8.20.2. Visible Properties common to Drawings and Controls

The Visible properties permit you to display the component on the 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**'.



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.

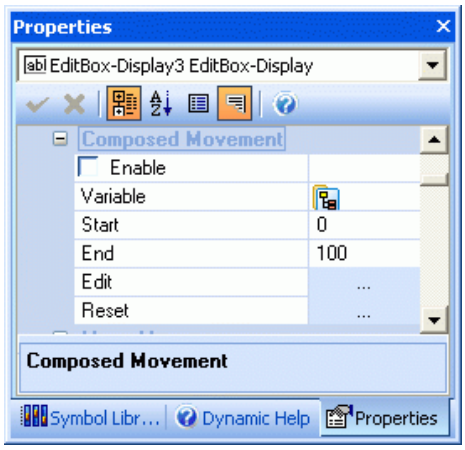
Condition

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

8.20.3. Composed Movement Properties common to Drawings and Controls

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

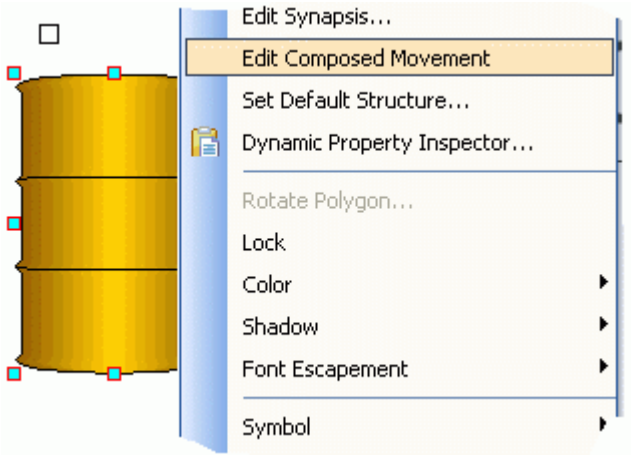
This command allows you to activate and start the component's composed movement editing.

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.

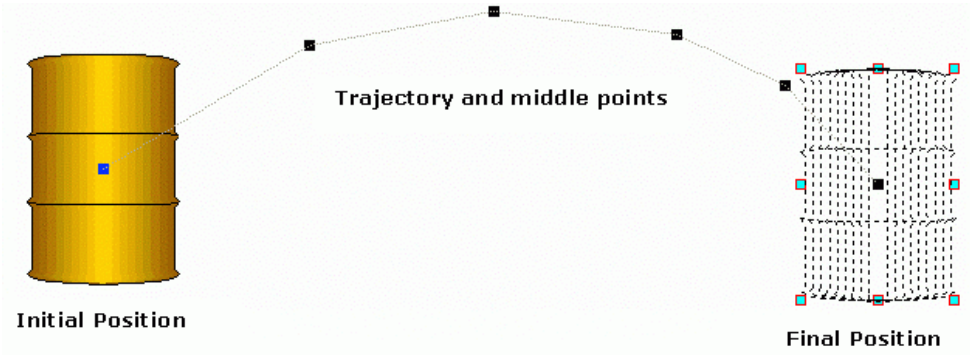
Composed Movement Editing

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

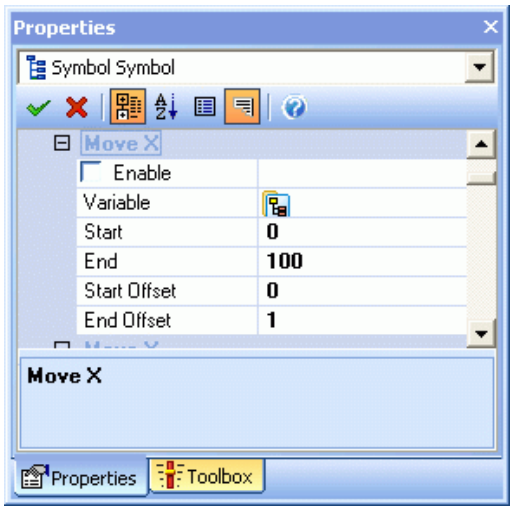


The composed movement permits a composed trajectory to be created for the symbol. The points are inserted one after the other beginning with the starting point and finishing with the ending point. The EXIT key aborts the editing procedure.

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.

8.20.4. Move X Properties common to Drawings and Controls

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

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.

Variable

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

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

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.

Start Offset

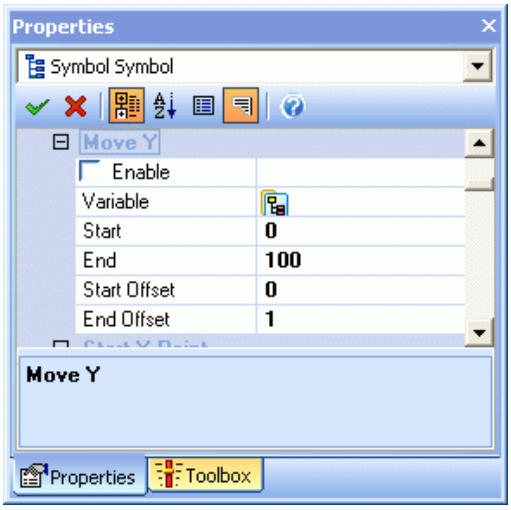
The position Offset value, which the component is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object will be positioned to the point relating to the quota taken from the total amount of the **Start** value and the **Start Offset** value.

End Offset

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.

8.20.5. Move Y Properties common to Drawings and Controls

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

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.

Variable

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

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

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.

Start Offset

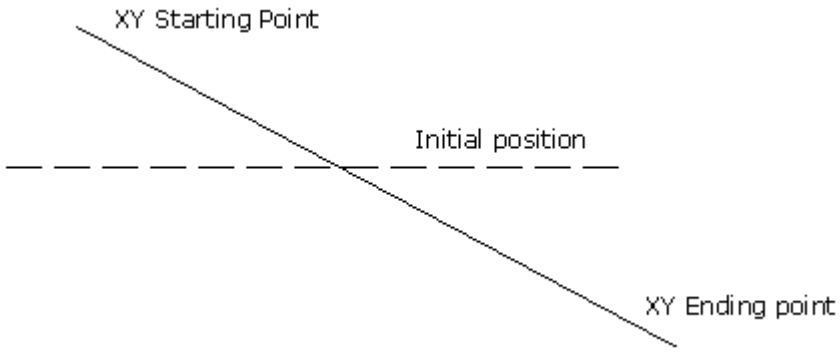
The position Offset value, which the component is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object will be positioned to the point relating to the quota taken from the total amount of the **Start** value and the **Start Offset** value.

End Offset

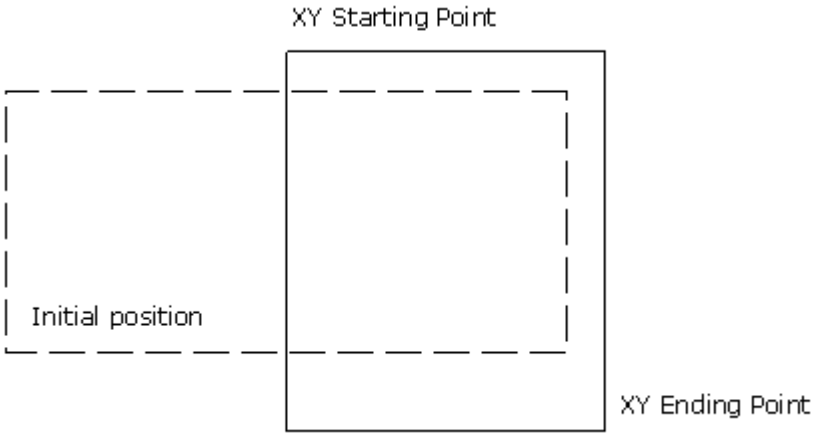
The position Offset value, which the component is to assume when the **Variable** is set with values higher than the End value, is entered in this edit box. In this case the object will be positioned to the point relating to the quota taken from the total amount of the **End** value and the **End Offset** value.

8.20.6. Points Points Properties common to Drawings and Controls

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.

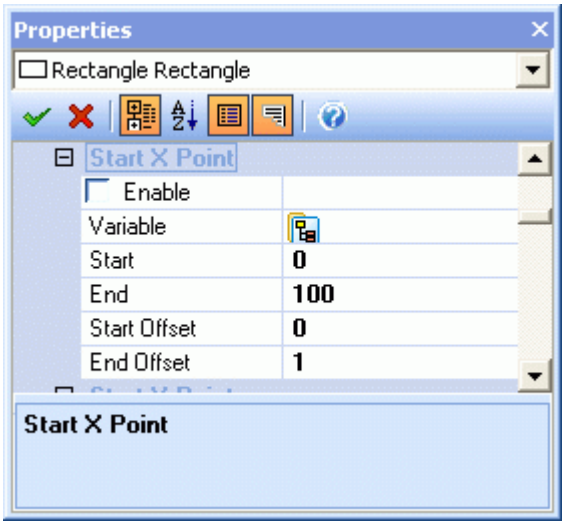


To set the properties concerning points refer to the appropriate sections:

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

8.20.7. Start X Point Properties common to Drawings and Controls

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.

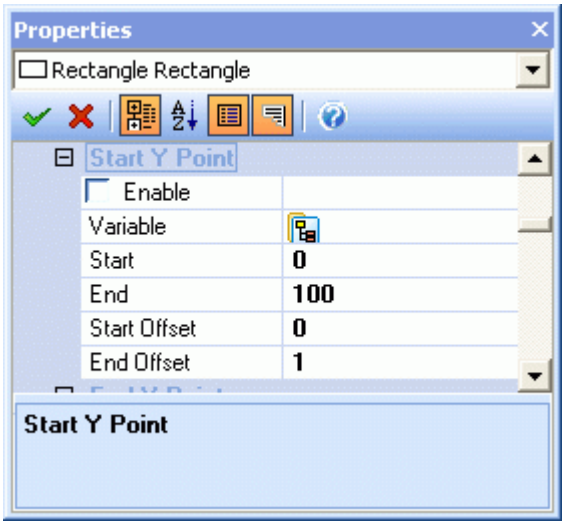
End Offset

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.

8.20.8. Start Y Point Properties common to Drawings and Controls

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

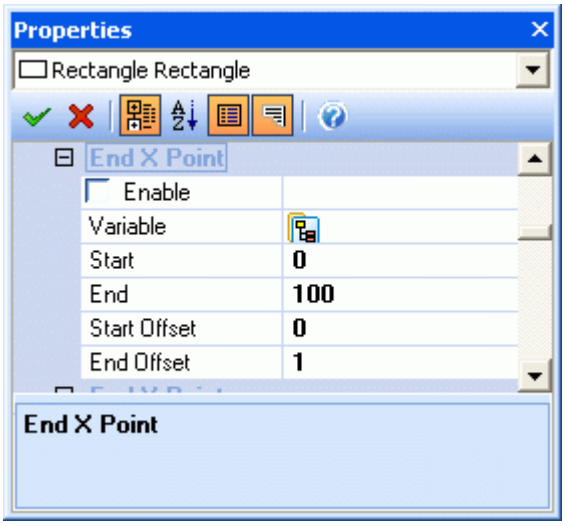
The position Offset value, which the component's Start Y Point is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object's Start Y Point will be positioned to the point relating to the quota taken from the difference of 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.

8.20.9. End X Point Property common to Drawings and Controls

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

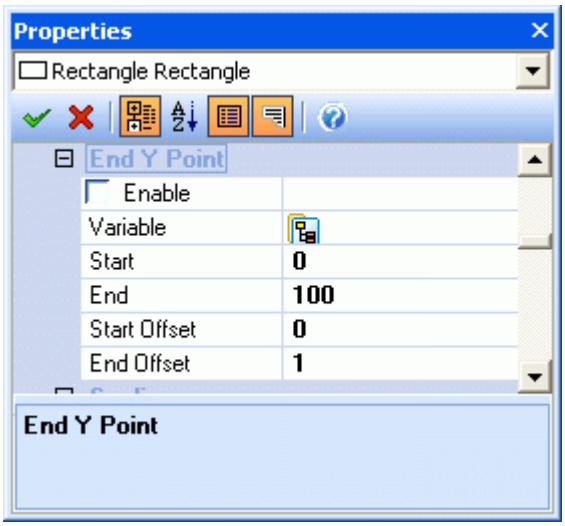
The position Offset value, which the component's End X Point is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object's End X Point will be positioned to the point relating to the quota taken from the difference of the 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.

8.20.10. End Y Point Properties common to Drawings and Controls

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

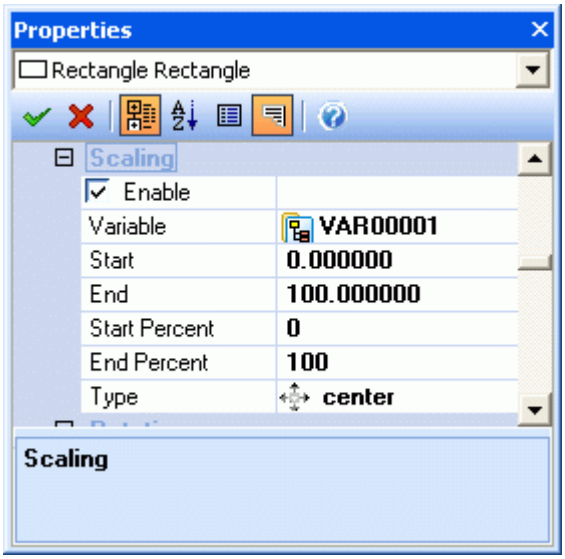
The position Offset value, which the component's End Y Point is to assume when the **Variable** is set with values lower than the **Start** value, is entered in this edit box. In this case the object's End Y Point will be positioned to the point relating to the quota taken from the difference of the 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.

8.20.11. Scaling Properties common to Drawings and Controls

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.

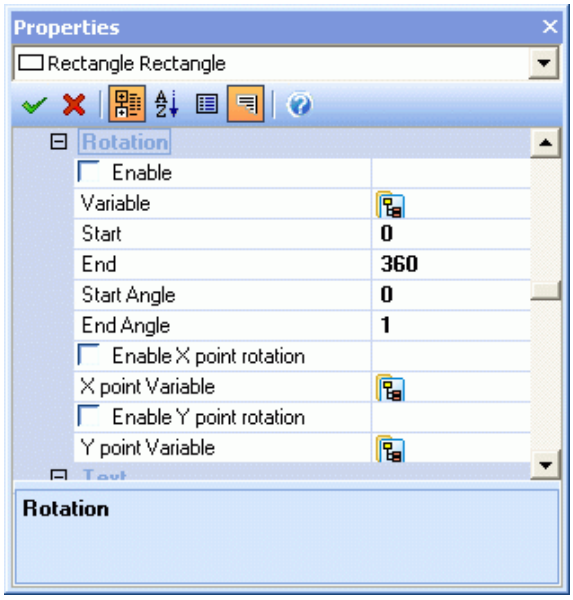
Type

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.

8.20.12. Rotation Properties common to Drawings and Controls

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 baryenter 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 Barycenter the end X coordinate of the object.

Enable Y point rotation

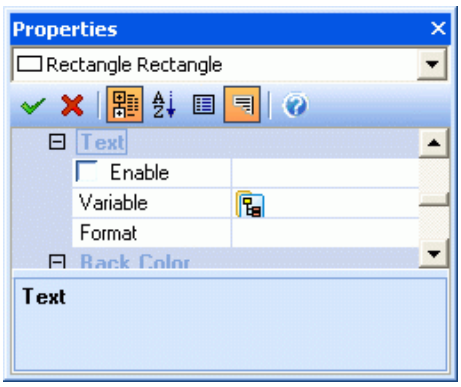
This check-box has to be enabled in order to dynamically define the Y position of the object's baricenter to where the rotation is to take place. This position is given by the value contained in the **Y point Variable.**

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 Barycenter the end Y coordinate of the object.

8.20.13. Text Properties common to Drawings and Controls

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.

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).

Format

The format, with which the numeric values presented in the **Variable** are to be displayed, is specified in this edit box. The type of syntax supported 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.

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 comman 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 indiacting:

- h: short integer (default)
- l,L: long interger

The preset format types are:

x: where the x number identifies the number of figures to be displayed
x.x: where the x number after the decimal point indicates the number of decimal figures to be displayed

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.). When being a 'floating point' number, the selected decimal numbers will be displayed.

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	Value Displayed
1	0.01
10	0.10
100	1.00

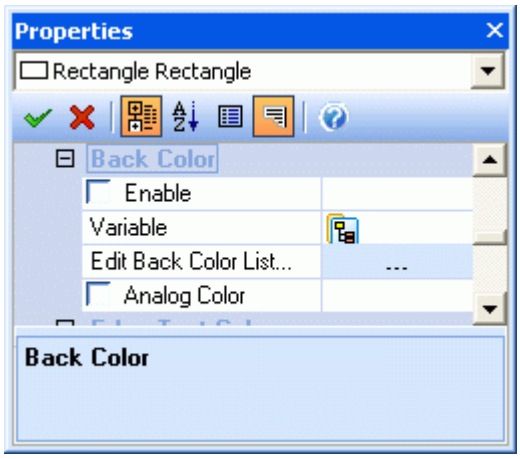
Variable Float Value	Value Displayed
1.2345	1.23

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.

When using basic expression in symbols Text Aniamtion Property, it must be set the format "%f".

8.20.14. Back Color Properties common to Drawings and Controls

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.

Edit Back Color List

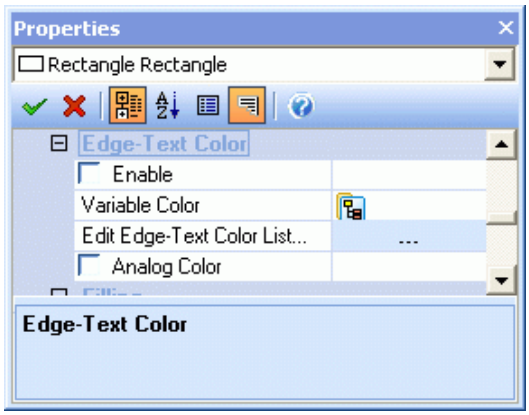
By using this property you can assign the desired colours for the component's background to the numeric values obtained by the Variable. Click on the **"..."** button to open the Color Threshold configuration window. To get further information please refer to the paragraph on **"Colour Threshold Settings 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.

8.20.15. Edge - Text Color Properties common to Drawings and Controls

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.

Edit Edge-Text Color List

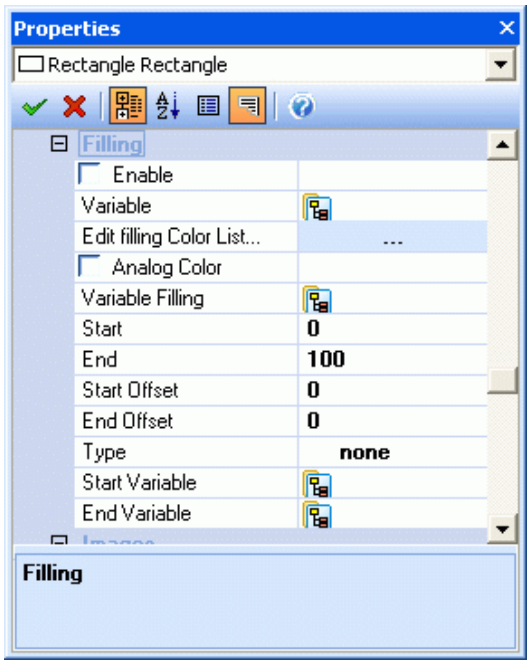
This property is used for assigning colours desired for the component's edges and text of the numeric values obtained by the Variable. Click on the **"..."** button to open the Color Threshold configuration window.
To get further information please refer to the paragraph on **"Colour Threshold Settings 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.

8.20.16. Filling Properties common to Drawings and Controls

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

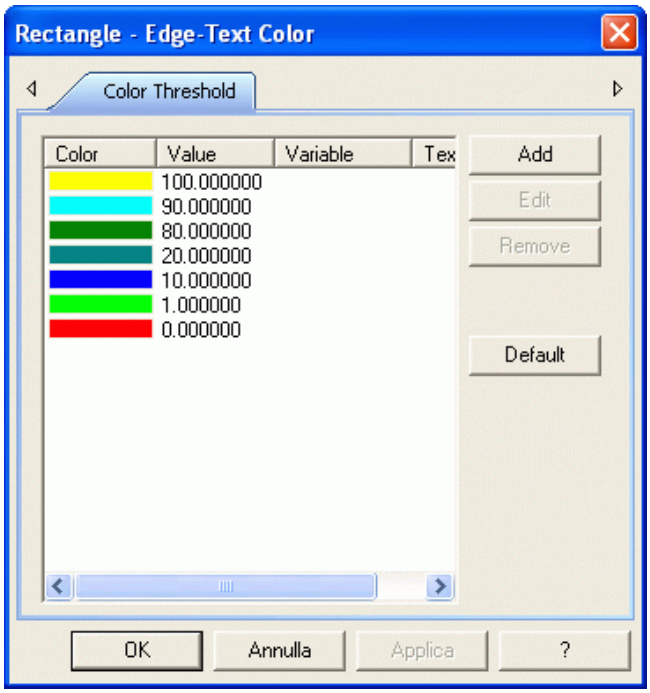
The name of the variable to be used as a dynamic Start value is inserted in this edit box (or selected with the "..." browse button on the far right). When a variable is entered here, the **Start** property will be ignored and the value contained in the selected variable will take its place.

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.

8.20.17. Colour Threshold Settings in Drawings and Controls

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.*

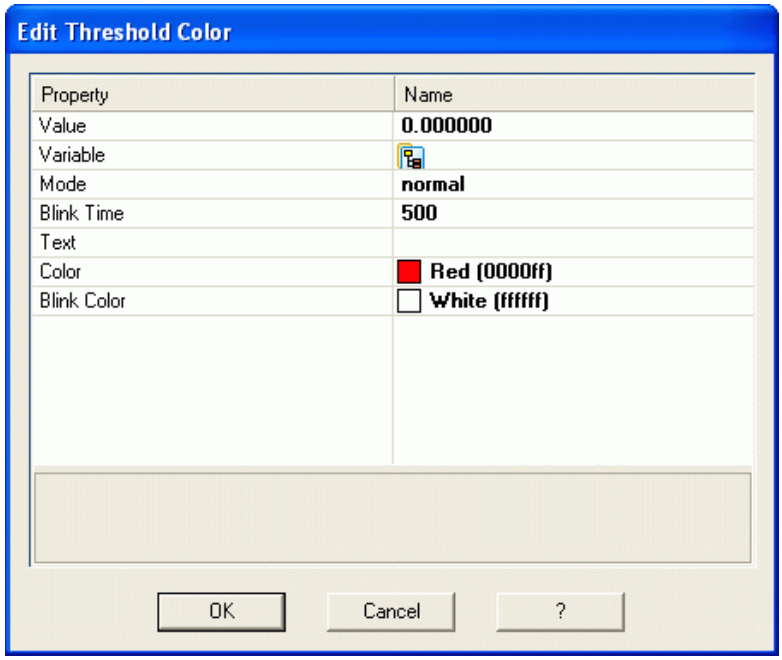
The buttons positioned on the right hand side of the dialog window allow you to edit the colour thresholds. Their functions are:

- **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

It is compulsory to define at least two thresholds, one for colouring and the other for restoring the colour (or text).

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
- **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
- **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
- **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

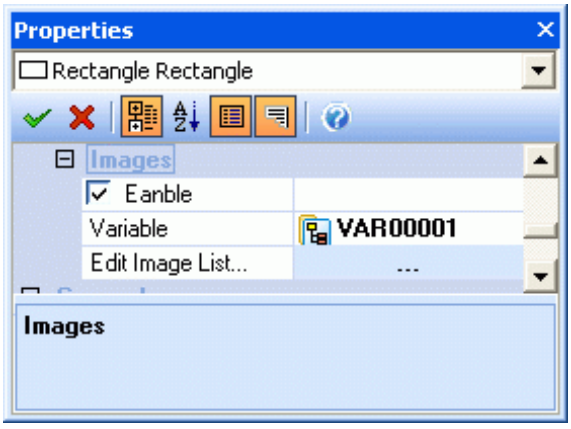
This setting is used for selecting the colour to be associated to the Threshold.
For further information on selecting colours please refer to the paragraph on **"Color Selection"**.

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"**.

8.20.18. Image Properties common to Drawings and Controls

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

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.

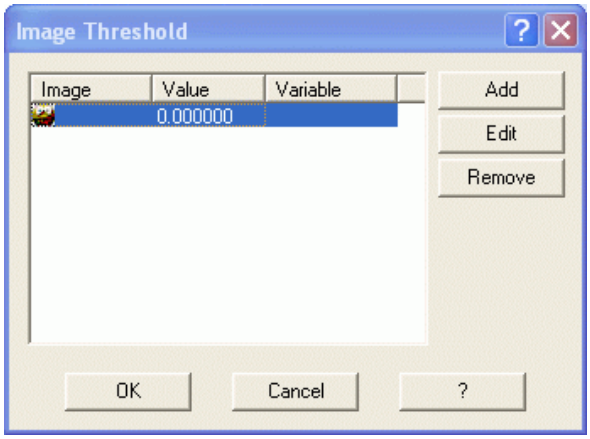
Variable

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

Edit Image List

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:

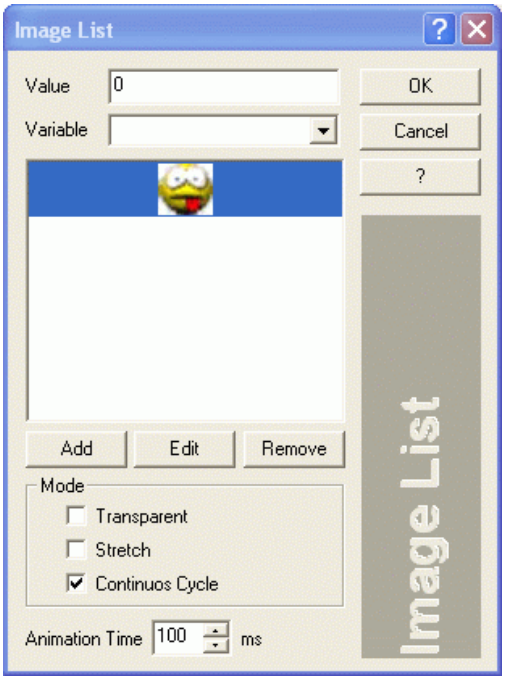


When the Variable assumes the value associated to the image, it will be displayed in the component.
The buttons available for editing the list are:

- **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.

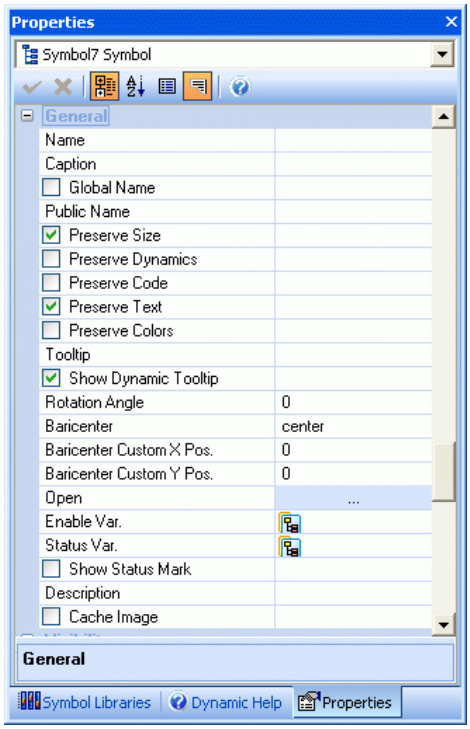
The possibility to enter more than one image for each threshold consents the different images to appear in sequence within the symbol by simply creating graphic animation in single sequences or continuous cycle.

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.

8.20.19. Drawings and Controls common General 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'**.



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.

Caption

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.

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**".

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**".

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

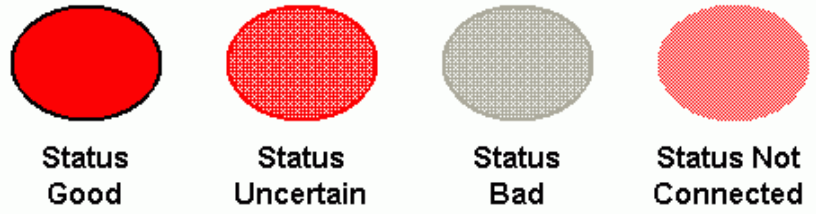
This button opens the configuration window for controls which have particular functions. For instance the **'Button'** control opens the '**Command List**' window.

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 components command functions. When the variable is entered the component will be enabled when the variable's value is different from zero.
When the value is zero, the graphic animation functions remain active but the Commands, Basic Script codes, the Logic etc will be disabled.

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:



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.

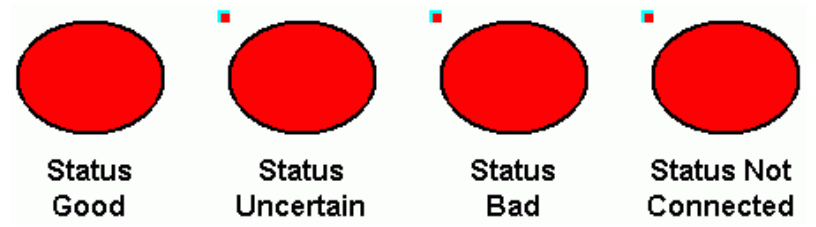
The graphic management shown above is only active when the "Show Status Mark" property is disabled.

The same effect obtained by using Win2000/XP 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.

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 disabled.

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.

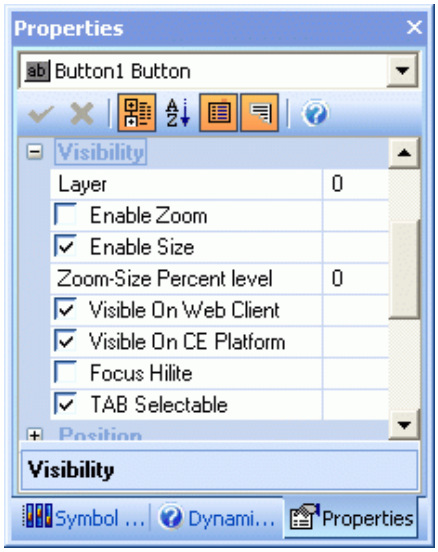
Cache Image

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.

8.20.20. Visibility Properties common to Drawings and Controls

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

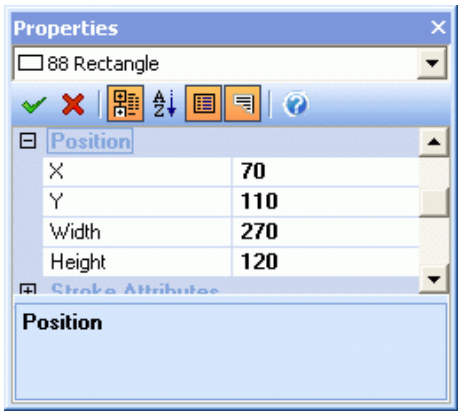
When this check-box is enabled the object will invert its background and foreground colors when focused on.

TAB Selectable

When this check-box is enabled, the object can be selected by using the TAB key during Runtime mode.

8.20.21. Position Properties common to Drawings and Controls

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

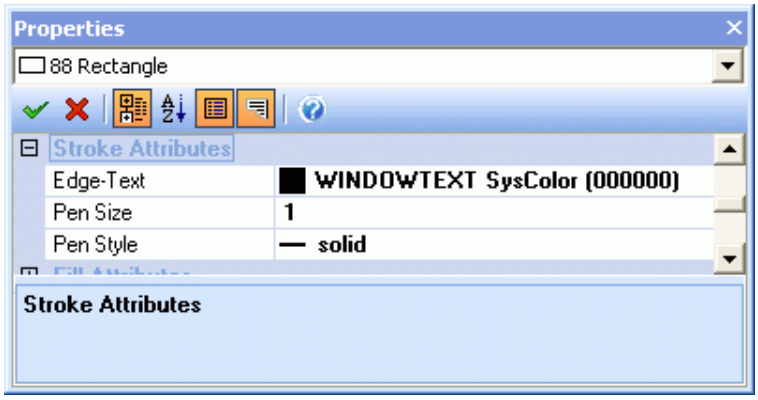
This property expressed the component's width. The value is expressed in pixels. The value of this property is automatically modified each time the component is resized in width and vice-versa by modifying this value the component will graphically change is size.

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.

8.20.22. Stroke Attributes Properties common to Drawings and Controls

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

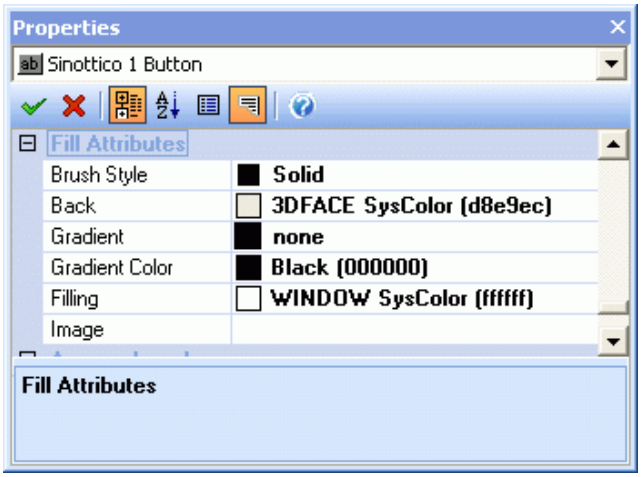
This property allows you to select the size of the component's border lines.

Pen Style

This property lets you select the component's borderline style.

8.20.23. Fill Attributes Properties common to Drawings and Controls

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

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

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

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"**.

Image

This property allows you to select an image to be displayed in the control.

To avoid getting any problems with the images' absolute paths, it is advised to insert all the images used in the project inside an 'Images' folder within the project folder.
When inserting an image into the project by getting it from the defined 'Images' folder (the folder name can be in any name, providing that it can be found internal the project folder and that it can be selected in the 'Image Folder Path' property), Movicon will search for the image within the project folder. This means that by copying the project in a different path or on another PC there will not be any errors when search image files.

Stretch Image

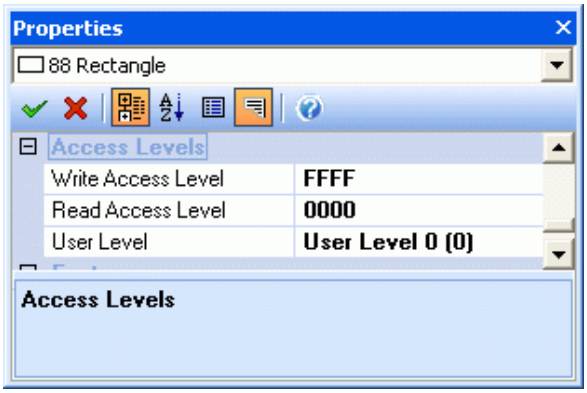
This property is used for setting the sizes of the associated image to fit in the object containing it. Keep in mind, however, that when changing the image's sizes it's graphical look may be effected.

Transparent : Property currently NOT available.

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"**.

8.20.24. Access Levels Properties common to Drawings and Controls

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

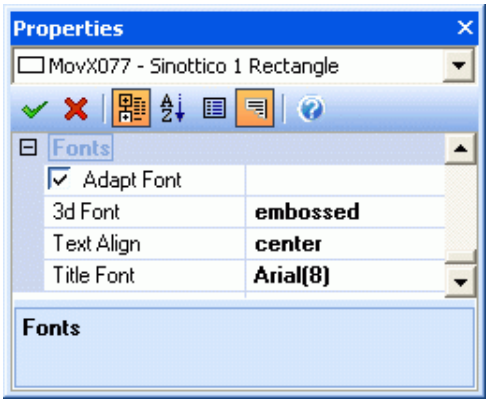
By means of this property you can define the Access Level mask needed for reading the control. If the access level mask of the user logged on at that moment does not correspond to the control's settings, the user will not be able to see the control which becomes invisible.
For further information see 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".**

8.20.25. Font Properties common to Drawings and Controls

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. 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'.

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**

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**

Title Font

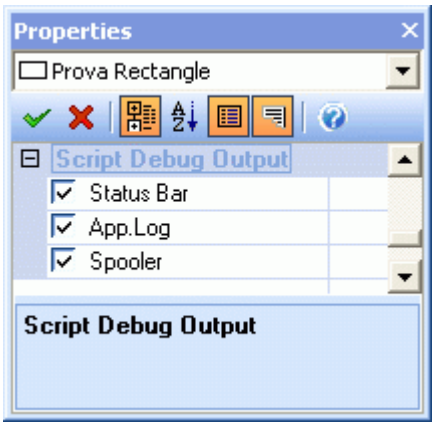
The name of variable whose value is to be displayed by the component is entered in this edit box (or select name by using the "..." browse button on the right hand side).

8.20.26. Script Debug Output Properties common to Drawings and Controls

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.

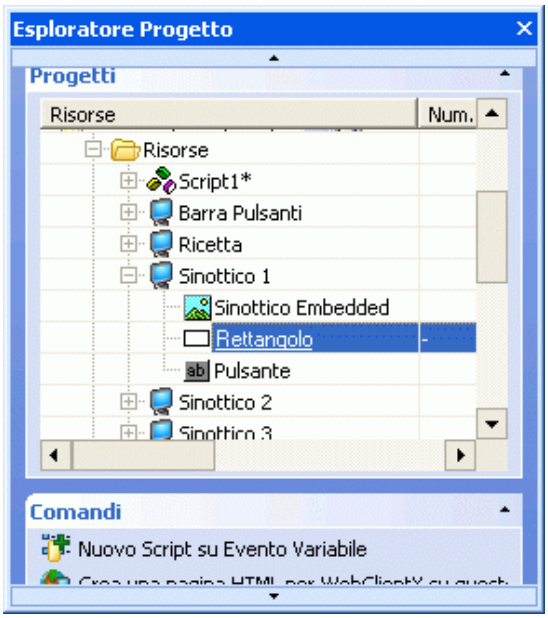
Spooler

When enabling this property, the Basic Script 'Debug.Print' function will be sent to the system's print spooler.

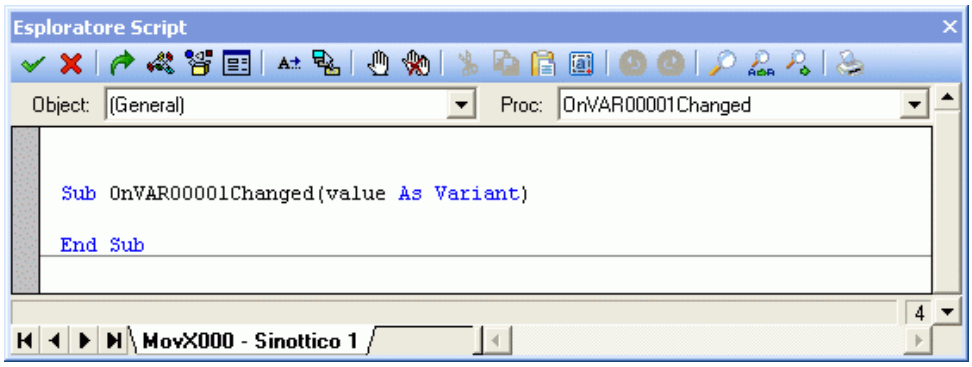
8.21. Associating Variable Script Events to Symbols

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:



8.22. 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.

8.22.1. 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 updating of public symbols is only carried out in the Runtime phase, therefore during the programming phase, the symbols defined as public will display their native properties and characteristics. Movicon will only carry out any changes made to them during Runtime. This allows the public symbols to be deactivated and to return back to their original configuration.

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".

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's

The reference public symbol will be the one contained in the reference Screen which can be selected through the **"Public Source Container"** property from the **'Screen Execution Properties'**.

9. ActiveX, OCX, OLE

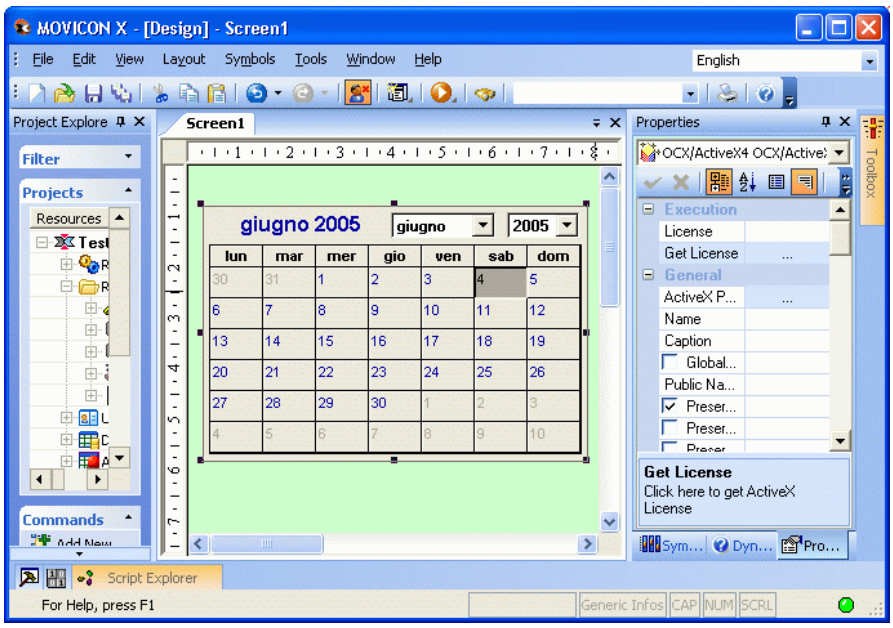
Movicon supporta pienamente gli standard ActiveX, OCX e OLE2 per consentire l'integrazione nel progetto di applicazioni esterne, sia come oggetti che come supporto Basic Scripts alla gestione degli eventi, metodi e proprietà delle componenti software di terze parti.

All'interno di un progetto Movicon, è possibile inserire componenti software di terze parti, utilizzabili secondo i principi ed i metodi degli standard Microsoft OLE2, ActiveX e OCX.

9.1. 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.

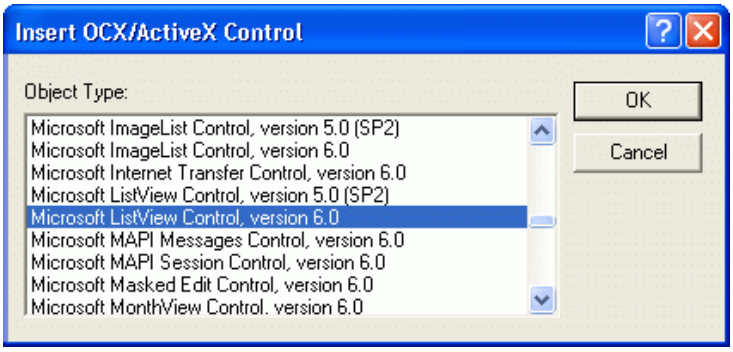


This illustration shows a screen containing the "Calendar Control 8.0 from Microsoft Access™" ActiveX object. This object provides its properties and methods to the application containing it (Movicon) through the window illustrated.

9.2. 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 Windowi"**. 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.

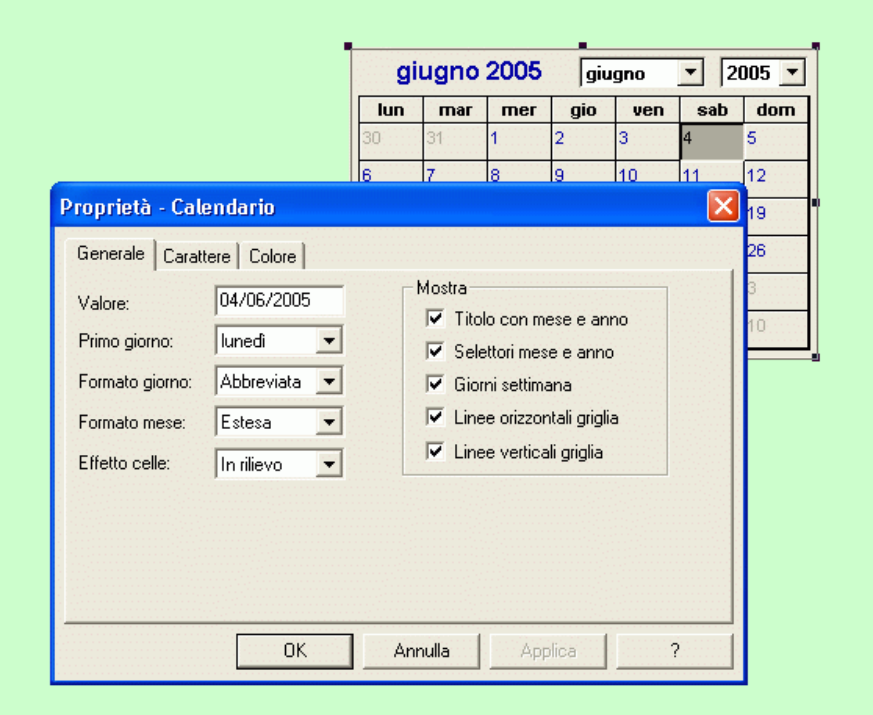
When an ActiveX object is inserted into a screen, if is in fact inserted in the ActiveX object container. This container object is to be considered a s a simple rectangle object. All the animation properties,

available in the Movicon "Property Windows" when the ActiveX object is selected, all refer to this container.

9.3. 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.



This edit window, of the ActiveX control properties, was called up by means of using the Movicon Properties Window.

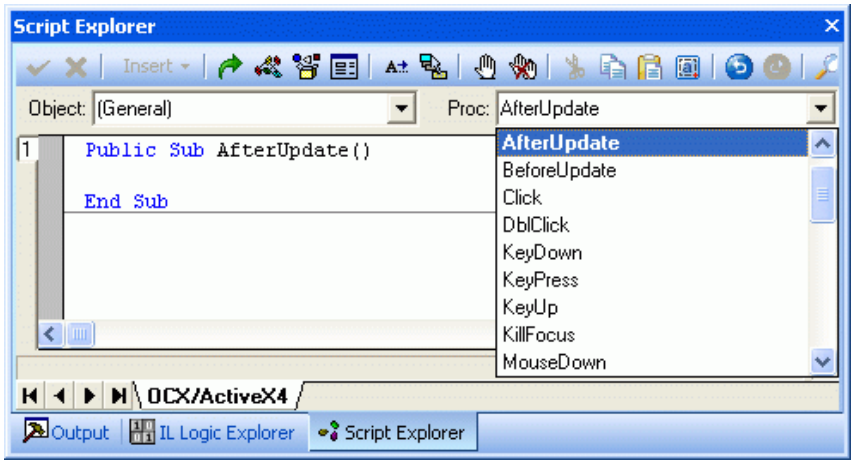
9.4. Editing ActiveX using VBA

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.

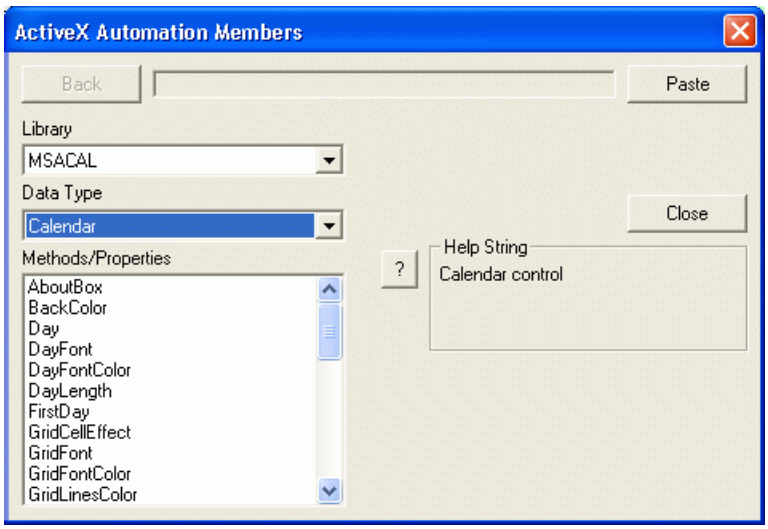
ActiveX object event management

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 provide by the object and selectable from the **"Proc:"** list box placed on the top border. 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 Calender ActiveX type has been inserted on screen in which a button is to be used for displaying the days selected in the Calender. 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
```

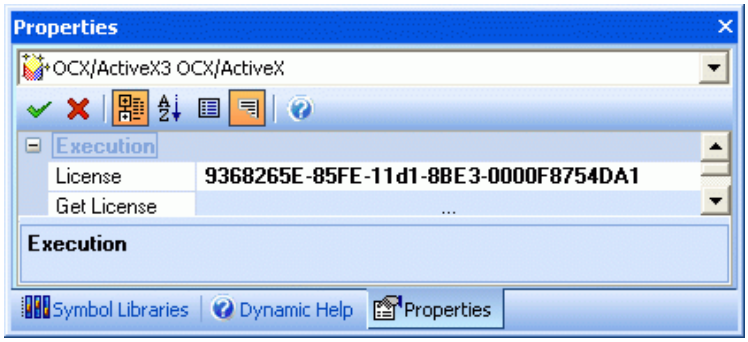
The "objCalendar" object is the Calendar object, therefore provides all the methods and properties belonging to the ActiveX.

9.5. 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.

9.5.1. 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 Office2000/XP, 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

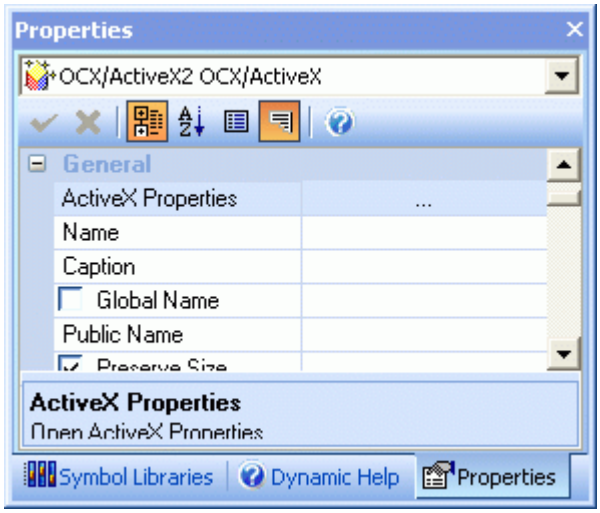
After the Active X license code has been inserted with the **"Get License"** command, it is displayed in this box.

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 licence 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 Office2000/XP, Visual Basic, etc.. In this circumstances the project can be executed in Runtime, but no editing can be done to the ActiveX object.

9.5.2. 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.

9.6. 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.

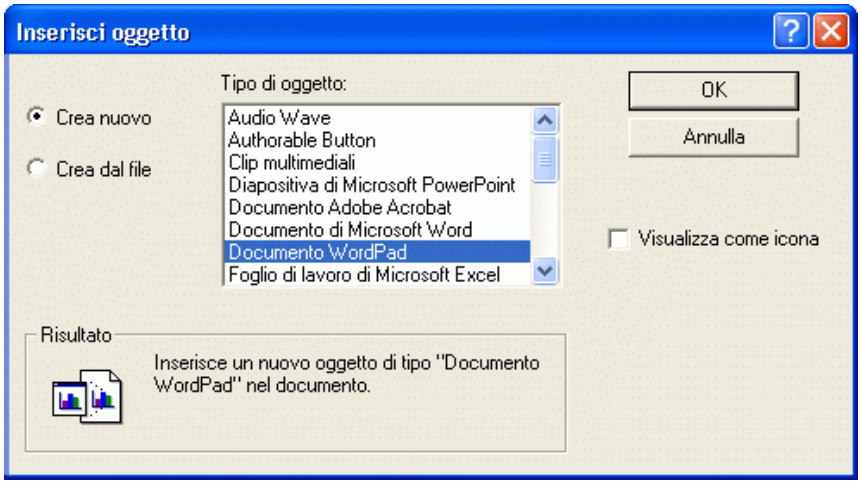
The type of OLE objects, which can be inserted into Movicon projects, depend on whether the applications installed on the hardware platform are capable of supporting this standard.

9.6.1. 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.

9.6.2. 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.

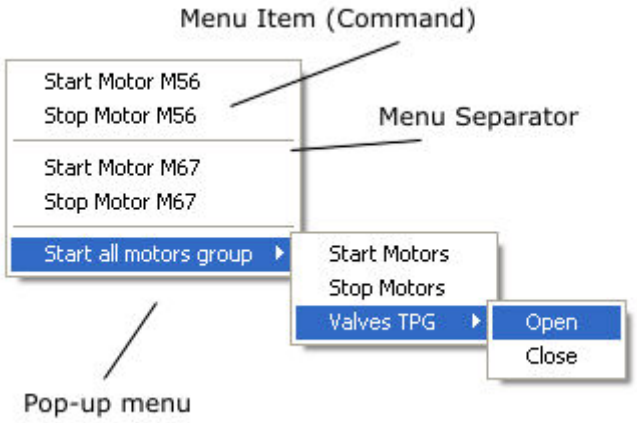
10. Menu

The Movicon graphic interface permits pop-up Menus to be created and activated with the mouse, or menu bars to be customized replacing the system's.

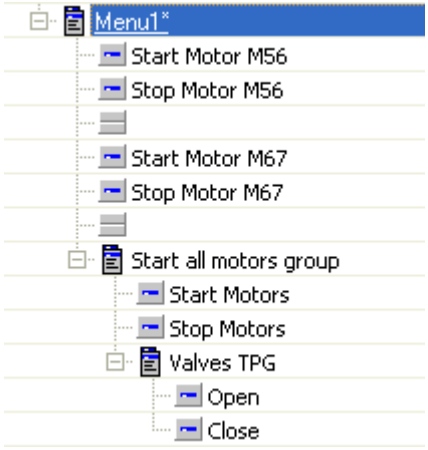
The Movicon Menus are very useful in projects for creating a complete man-machine interface.

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 replacing the main menu bars.

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.

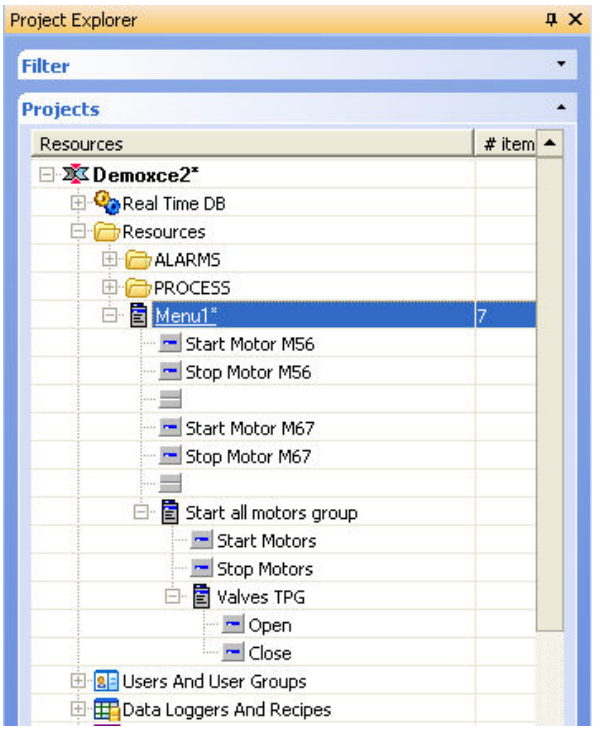


The Menu resource offers numerous operating options in any application.

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.

10.1. Inserting Menus

When inserting a Menu in the project the procedures for inserting new objects in the 'Resource' group in the 'Project Explorer' window have to be carried out. This can be done by either right mouse clicking on the 'Resource' 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"**.

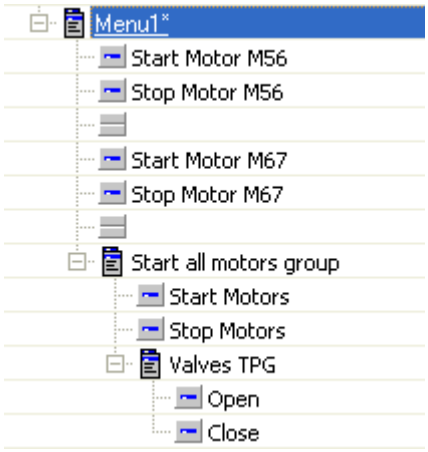
The Menu resource can subsequently be assigned a Name by either clicking the resource and entering the name replacing the one for default, or select the resource and press the F2 key and proceed with inserting a new name.

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 Resource window, execute the Copy command, then position the mouse pointer in the destination project's Resource 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.

10.2. Movicon Menu Items

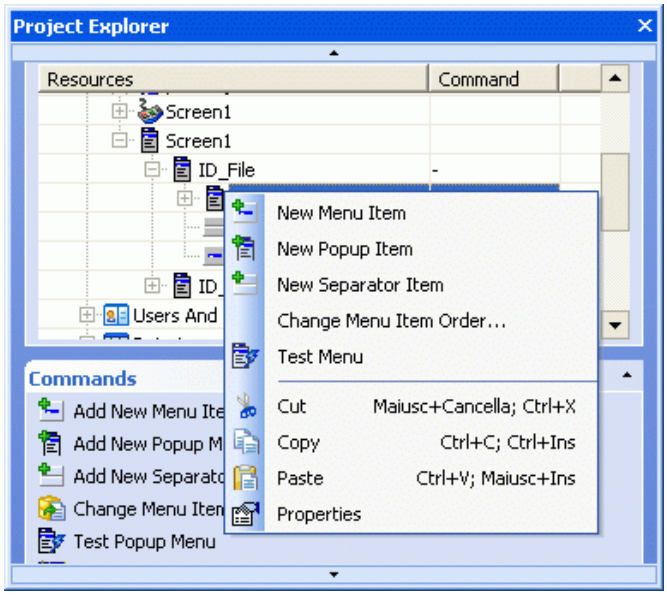
Each project menu is composed of one or more Items, which are components belonging to the menu. The Items are displayed in a tree structure within the **'Project Explorer'** window.
From this window the items, which are to compose the menu, can be inserted, configured and be structured as sub-menus. 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.

10.2.1. 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.*

10.3. Customizing Menu Bars

Movicon consents the **Menu Bar** to be customized to replace the Movicon system menu bar.
Therefore the system Menu Bar can be replaced by one created and customized according to the different functions required by the programmer.
To replace the Movicon menu bar with a customized one, 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.

By assigning a menu the same name as the Screen's, will replace the Movicon main Menu Bar. The Menu Bar can be displayed or hidden by using the View menu commands.

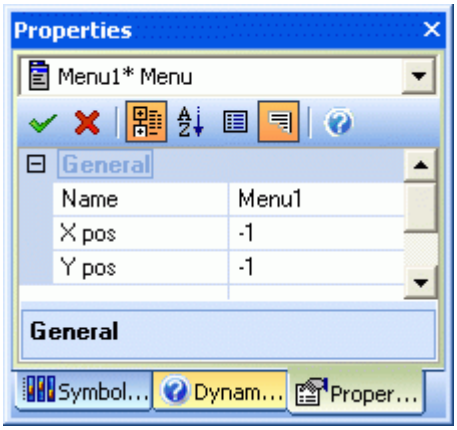
The menu associated to the "Startup Screen" will be displayed as a default menu for all the other Screens unless menu resources with the same Screen names already exist.

10.4. Menu Properties

The menus inserted in the 'Project Explorer' window's **'Resource'** 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'**.

10.4.1. 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 synoptic's top left corner (being X0)

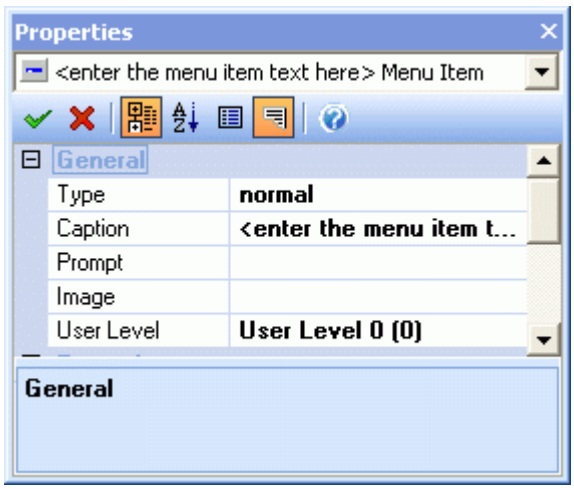
To make the menu appear where the mouse pointer is positioned, set (or leave set) the default value at "-1".
The menu's coordinates in the workspace can be checked out by carrying out a 'Test Menu' with the appropriate command.

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.

10.4.2. 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

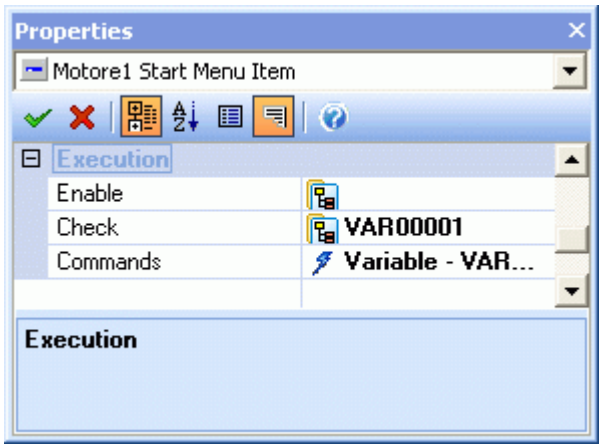
This property is used for selecting the image to be displayed in menu in the place of the title.

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".**

10.4.3. 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.

10.5. 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'.

11. Accelerators

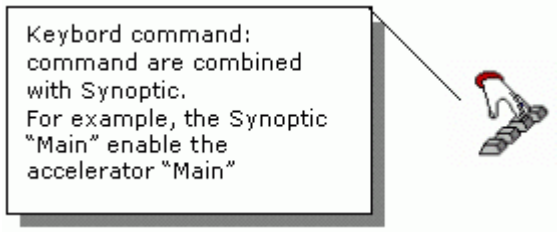
The Movicon graphical interface permits complete and easy keyboard usage, by associating commands to keys or combination keys in function with the active Screen.

This section describes how to use and set the Movicon Accelerator Resources in projects. The Movicon Accelerators (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 Accelerator 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 (accelerators) to be assigned in function with the active screen page.

The name assigned to each Accelerator Resource is very important as the Accelerators are associated to their Screens according to their name. The Accelerator must have the same name as the Screen's in which they are to be active.

The Accelerator associated to the "Startup Screen" will automatically be activated by the system upon starting up the project. In addition to this the Accelerator associated to the "Startup" will also be activated each time a Screen, which has not been associated any Accelerators, is loaded.

By means of the Movicon Accelerators 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.



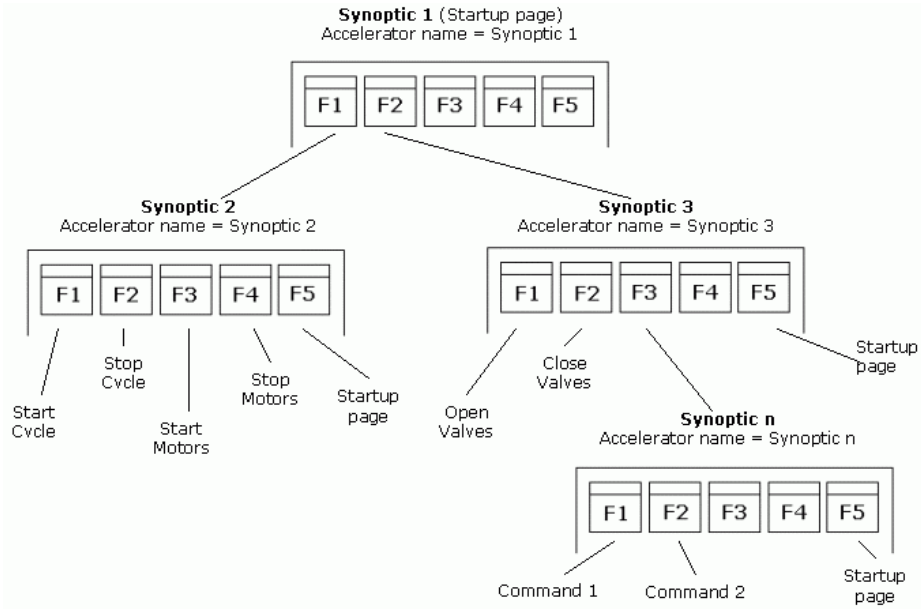
The Movicon Accelerator keyboard commands, when active, always have top priority over the same keys or combination keys used by Windows for operating system commands as the accelerator provides command activation upon being pressed and not released.
Example: If the Windows system provides the F1 key for activating the guide and the Movicon accelerator is active which has the same command for executing upon pressing the F1 key, the command associated in the accelerator will be given priority.

11.1. Accelerator Activation

Movicon is predisposed in order that an Accelerator associated to the **"Startup Screen"** is activated at its start up together with the "Startup Screen". If there is no Accelerator associated to the "Startup Screen", no accelerator 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 Accelerator resource with the same name as the active Screen. If one is found it will also be activated otherwise the main accelerator will be activated for default being the one associated to the "Startup Screen".
When the accelerator 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 Accelerators are therefore closely related.

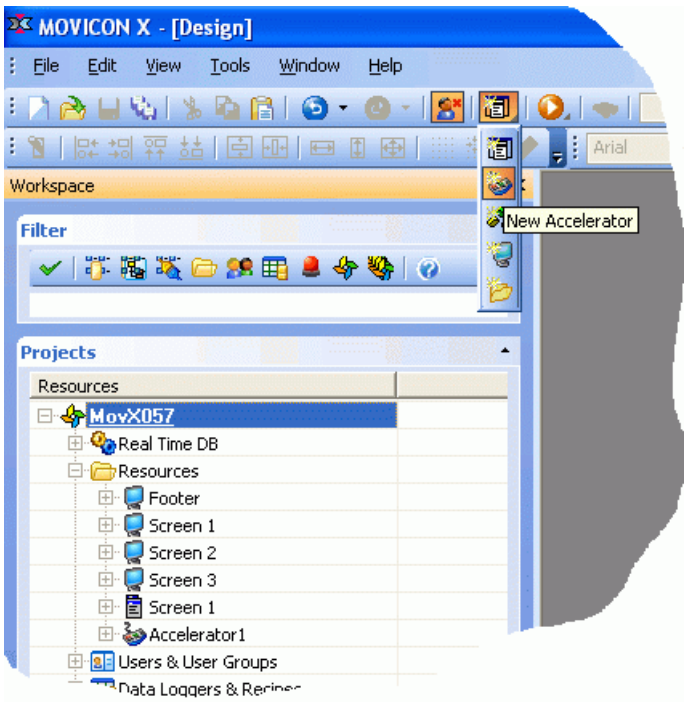
The association of Accelerators to Screens permit the same keys to be associated to different functions relating to the screen page displayed.
This illustration shows an example of how Screens and Accelerators are related:



Relation between Screens and Accelerators. A set of keyboard commands is always disposed in relation to a screen page or Screens.

11.2. Inserting Accelerators

In order to insert Accelerators in to the project you need to carry out the procedures for inserting a new object into the 'Resource' group in the 'Project Explorer' window. Inserting a new Accelerator can be done by right clicking the mouse on the on the 'Resource' group in the 'Project Explorer' window and selecting the 'New Accelerator' 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 accelerator 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 Accelerator's properties as described in the documents about **"Inserting Accelerators**.

A name can then be assigned to the Accelerator 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 Accelerators from other Projects

Movicon allows the copying of one or more Accelerators from one project to another. To carry out this procedure both projects need to be opened first, then after having selected the Accelerators from the Resource window of the source project execute the Copy command. Next position cursor in the Resource window of the destination project and execute the Paste command. The copied Accelerators should then be available also in the destination project.
The Drag & Drop technique can also be used with the following procedure: select the Accelerator from the source project and keep the left mouse key pressed drag it to the point desired in the destination project then release.

11.3. Accelerator Keyboard Commands

Each project Accelerator 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 accelerator 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 accelerator commands can be viewed through the **"Command List"** window, which can be accessed from the **'Accelerator Execution Properties'** window. This window is used to enter and configure the accelerator commands.
New keyboard commands can be entered by using the 'New Accelerator Command' when selecting an Accelerator 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 accelerator.
The accelerator command properties can be set by using the Movicon 'Properties Window'.

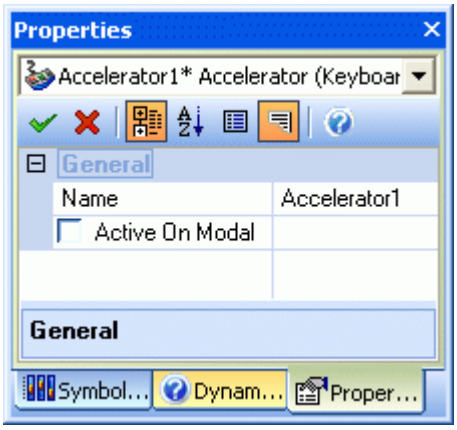
Identical key combinations associated with different commands will execute the first command taken into consideration.
Any active Movicon Accelerator keyboard commands will always have priority over the same keys or combination keys used by Windows for system operating commands, as the accelerator provides command activation upon pressing the key and not upon releasing it.

11.4. Accelerator Properties

Accelerators inserted into the 'Project Explorer' window's **'Resource'** folder can be completely customized in the properties. In order to do this just select the Accelerator or Command required and then edit their settings through the Movicon **'Properties Window'**.

11.4.1. Accelerator General Properties

The Accelerator General Properties are used for setting the Accelerator to be active also during the opening of a modal Screen.
In order to do this just select the Accelerator and then edit its settings through the Movicon **'Properties Window'**.

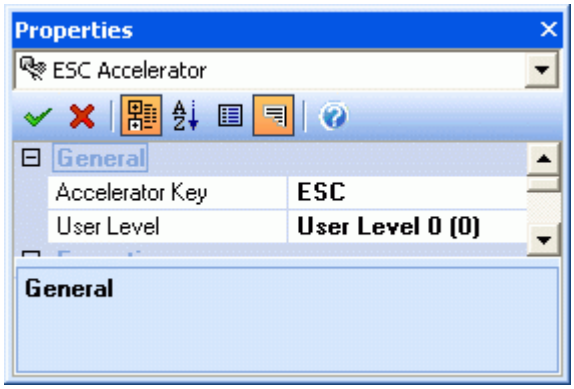


Name
This edit box permits you to define the Accelerator object's name which is to be configured.

Active On Modal
By enabling this property the Accelerator will be made active also during the opening of a modal Screen. In this case if an accelerator 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 accelerator will be made active.

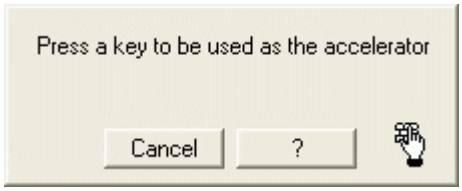
11.4.2. Accelerator Command General Properties

The Accelerator Command General Properties are used to define whether the Accelerator must also be active during the opening of a modal Screen.
In order to do this just select the Accelerator and then edit its settings through the Movicon **'Properties Window'**.



Accelerator 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:



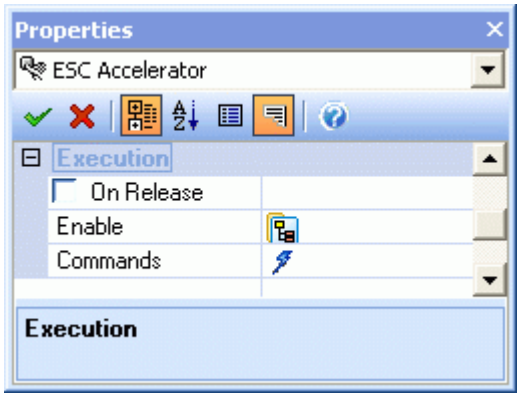
Then just press any one of the keyboard keys or a combination of keys which also incudes the 'modifier', as this is recorded in the 'Accelerator Key' box.
The operation can be cancelled with the Cancel button.

User Level

This property is used for setting the Password User Level necessary for executing, for example, the command list associated to the accelerator command. When the Accelerator 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".**

11.4.3. Accelerator Command Execution Properties

The Accelerator Execution properties are used to determine whether the Accelerator should also be active or not during the opening of a modal Screen.
In order to do this just select the Accelerator 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 Accelerator 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 Accelerator command will not be available. When the selected variable obtains another value apart from 'zero', the Accelerator command will be available for execution. If nothing is specified in this option by leaving it empty, Movicon will consider the Accelerator 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 Accelerator command is activated, is set. For further information about the commands available please consult the paragraph on **"Command List"**.

11.5. Accelerator 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 Accelerators 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 Accelerators as follows:

1. Create a new Accelerator resource from the 'Project Explorer' window and call it 'Main'. This accelerator 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' accelerator will consequently become the project's default accelerator). Edit the new accelerator 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 Accelerator resource from the 'Project Explorer' Window and call it 'Silos'. This accelerator resource will always activate whenever the 'Silos' Screen is loaded. Edit the new accelerator by adding the command for calling up the 'Main' Screen by pressing the ESC key.
3. Create a new Accelerator resource from the 'Project Explorer' window and call it 'Working Area'. This accelerator resource will always be activated whenever the 'Working Area' Screen is loaded.
4. Edit the new accelerator 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 Accelerator 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 Accelerator resource from the 'Project Explorer' window and call it 'Main'. This accelerator resource will always be activated whenever the 'Main' Screen is loaded (by setting the 'Main' Screen as the project's startup Screen, the 'Main' accelerator will consequently become the project's default accelerator). The project will not contain other accelerators, therefore the 'Main' Accelerator will remain active independently of the Screen currently active.
2. Edit the new accelerator 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

12. 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 **Multilanguage** 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.

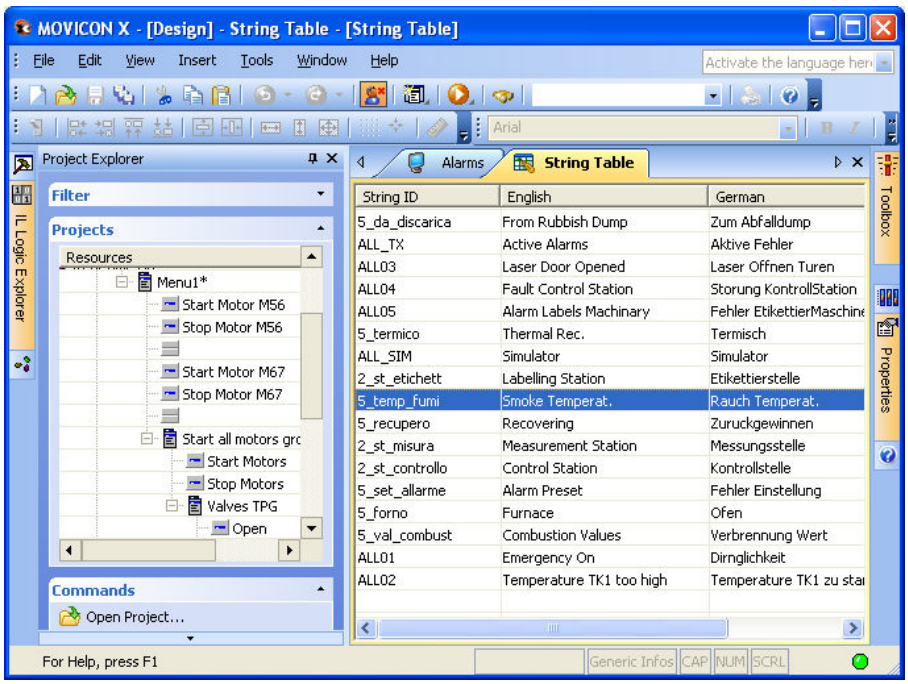
The String Table can contain a virtually unlimited number of Strings divided up according to columns, whose text can be entered directly in the table fields, or copied or imported from other text applications. String will be saved into a XML file, each one for any language inserted.

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.

12.1. 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.

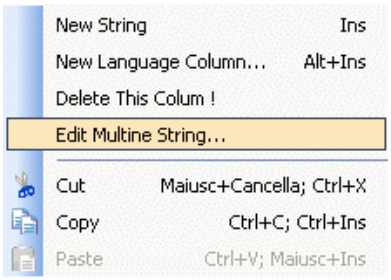
The window can then be closed by using the Windows standard techniques such as the () box from the control panel or the CTRL+F4 combo keys.



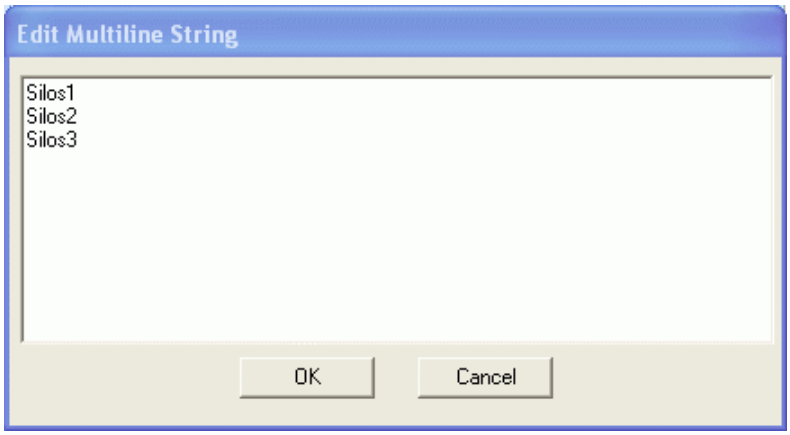
You can insert, edit or delete strings from the string table by using the purpose-made commands.

A new string is inserted by pressing the right mouse button on the area of the table 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. You can also use the 'TAB' key to move from one field to another and the 'F2' key to enable the selected field's editing.

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 "\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.

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

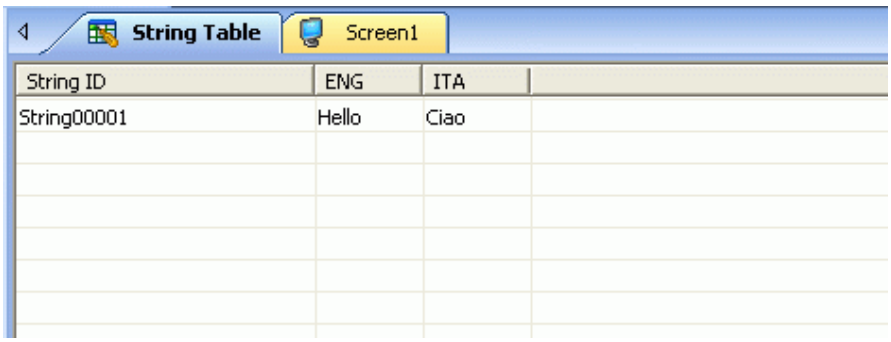
The '&' character works in a certain way, and is not always acknowledged as a simple character by Movicon. When it has to be used in a string, or inserted in the title of an object, or whenever you wish to make it appear, it may not be enough to write is once only like all the other characters: Movicon acknowledges and interprets it as a special Accelerator command, whereas Windows uses the '&' symbol placed before a letter to use it as an accelerator. 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 "Progea & CO" text appear you will need to type the "Progea && CO" string:

String: Progea && CO
Text displayed: Progea & CO

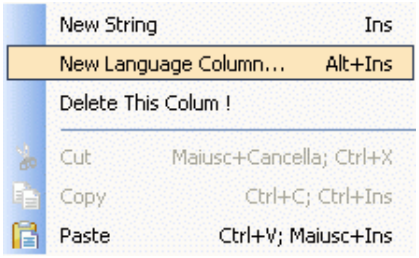
12.2. Multilingual Function

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 columns are added to the Table the identifier will be able to refer to different strings in function with the column selected as active language. Selecting the column, thus the language to be activated, can be done either with the Change Language command found on the Movicon 'Commands List' during the Runtime phase, or while programming by selecting the column to be activated by means of the comb-box situated on the right hand side of the Movicon Menu Bar:

The following table shows the subdivision in columns, where columns with stings in different languages refer to one ID. The enabled column (active column shown in combo-box) will be the one which represents the text in the language desired.



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:

12.2.1. 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.

Virtual Keypad for Touchscreens

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 the title of the Virtual Keypad

_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 CAPSLOCK key

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 the title of the Log On window
_LEVEL_GETPTEXT_	Text desired for the password level request **Warning**, to display the password level request you need to put the %u character after the text specified, ie: Password Level = %u

Vectorial Trend Legend

Special ID	Description
_TLEGEND_DESC_	"Decription" Text
_TLEGEND_VALUE_	"Value" Text
_TLEGEND_MINVALUE_	"Min." Text
_TLEGEND_MAXVALUE_	"Max." Text
_TLEGEND_AVERAGE_	"Average" Text

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)

ID Speciale	Descrizione
_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
_TODATE_DBFILTER_	Text to replace the "To Date:" string
_SEVCOND_DBFILTER_	Text to replace the "Severity Condition:" string
_SEVERITY_DBFILTER_	Text to replace the "Severity:" string

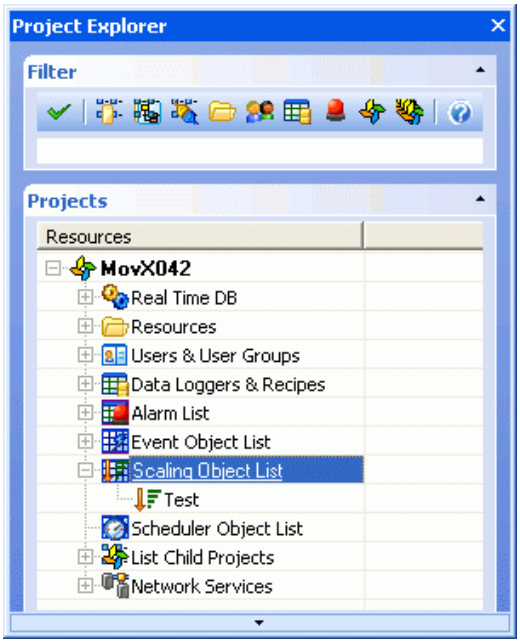
Dialog Box for insert Trace Comment for a variable

ID Speciale	Descrizione
_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

13. Variables 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.

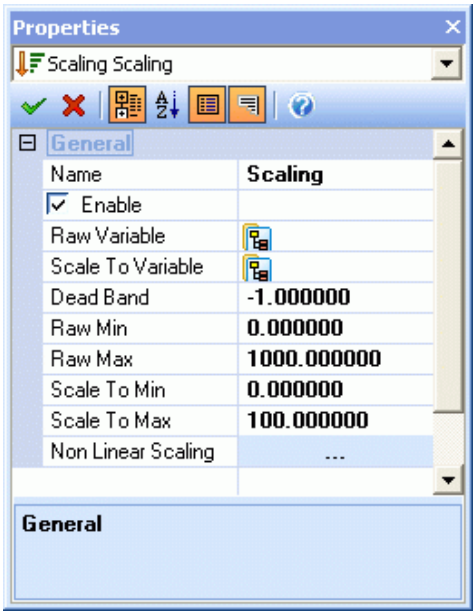
13.1. Variable Scaling Properties

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.*

13.1.1. 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.

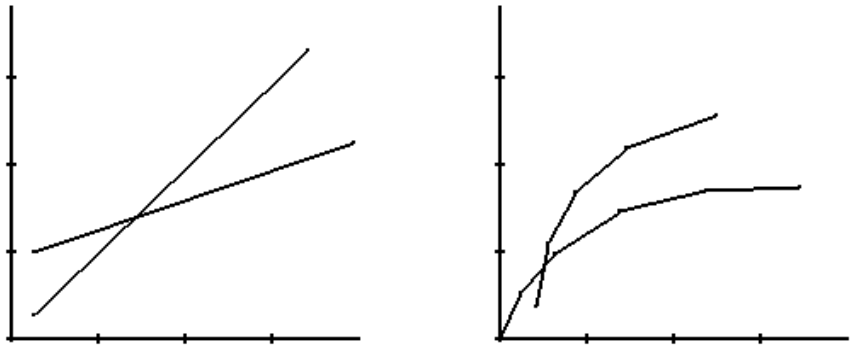
The maximum value of the scaled variable is specified in this box, being the output value corresponding to the real physical quantity.
This value will represent the first non linear segment when non linear scaling is being used. The next segments are entered through the **"Non Linear Scaling"** window.

Non Linear Scaling

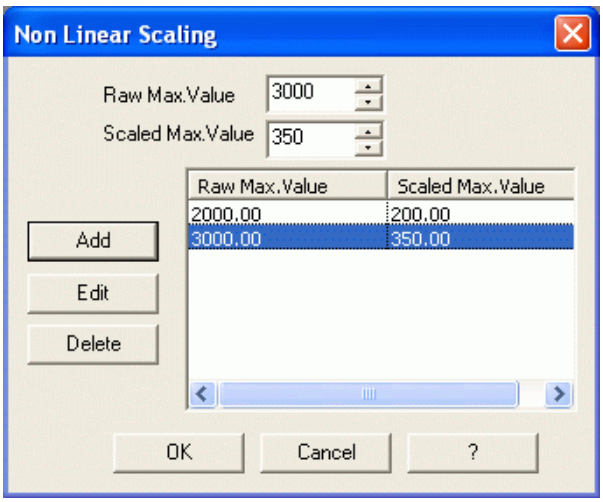
Non Linear Scaling can also be used if required. The segment settings are accessed through this button where they can be established between the min. and max. values. This will create a theoretic line broken up into a number of segments.
For further information refer to the paragraph **"Non Linear Scaling".**

13.2. 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 cancelling 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.

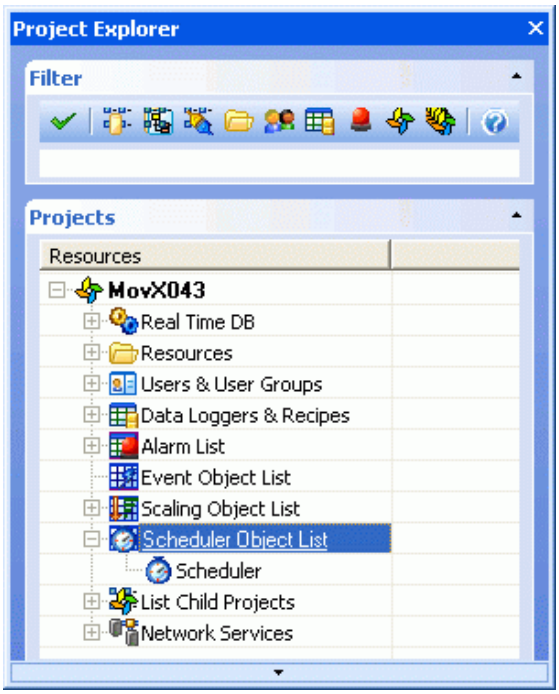
14. Command Scheduler

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'**.*

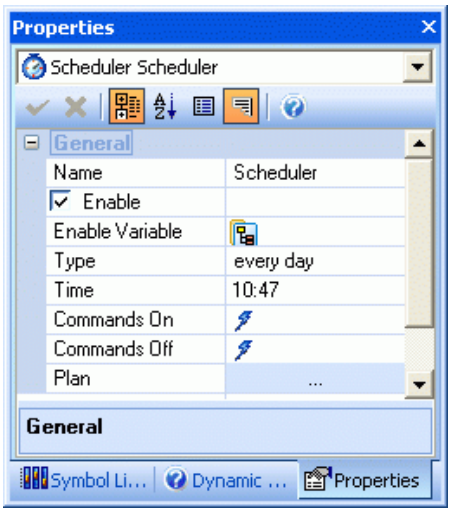
The Command Scheduler resource offers great operating advantages in any application, especially in those sectors (ie. Building Automation) which normally require commands to be automatically executed on preset times.
A few of the most common uses would be for example the commands for turning on/off of lights, central heating, etc.
These simple operations can therefore be realised 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"**.

14.1. 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**'.

14.1.1. 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.

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.

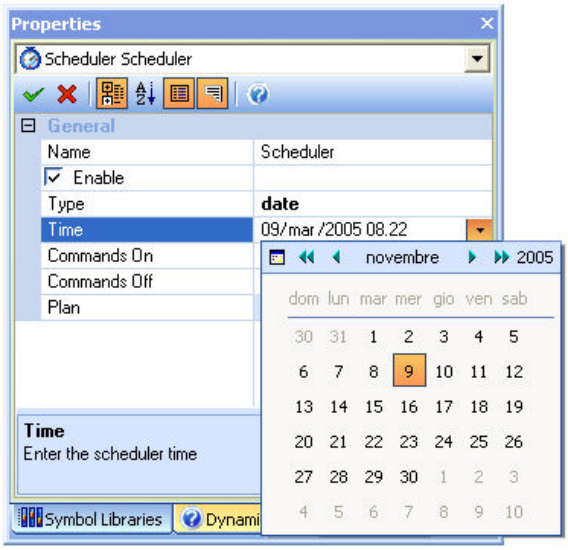
Type

The Scheduler object's purpose is to execute one or more Movicon commands on preset time periods.
The 'Type' selection box allows you to select the frequency of time periods, where it may be necessary to specify the precise time in the period selected.
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

This edit box has two functions according to the selection entered in the **'Type'** property. When selecting the day or month you must enter the command activation time. When selecting **'Date'**, click on this box to open a window for selecting the day on which the command is to be activated.



Commands On

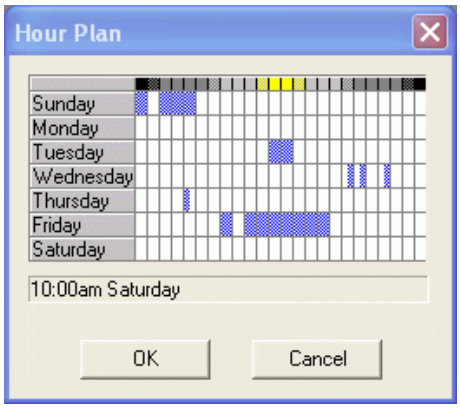
This button opens a Movicon 'Command List' through which you can set a list of one or more commands to be executed by the scheduler when the time goes On. For further information on the commands available please consult the paragraph on **"Command List"**.

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 hour plan window allows you to configure the time intervals 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 minutes.
Click on the day to select the whole 24 hours for that day.



14.2. 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 'o6.30' 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.

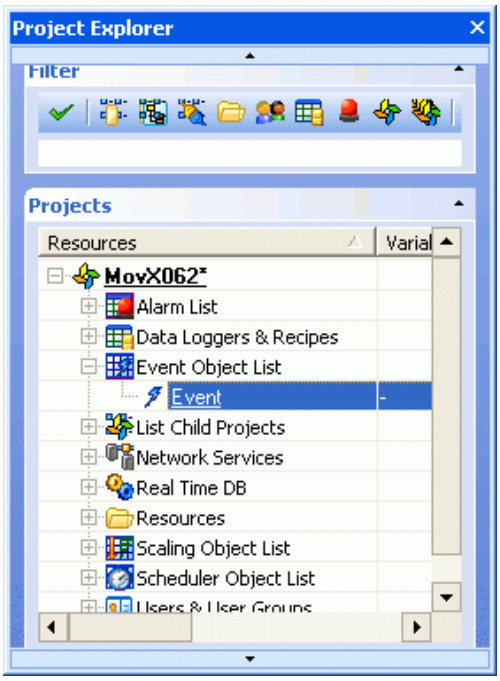
15. Commands on Event

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'**.*

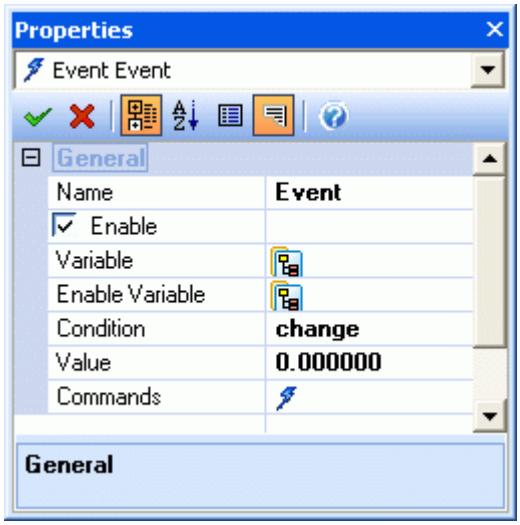
The Event Object resource offers great operating advantages in any application where variable values need to be controlled to execute one or more commands upon value changes. This enables the programmer to avoid writing codes need for the controls of the variables in question. To add, copy or cancel an Event Object use the standard techniques described in the paragraph titled **"The Resource"**.

15.1. 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'.**

15.1.1. 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"**.

16. Objects Commands List

Movicon provides a list of commands which can be executed during Runtime from both the resources and controls.

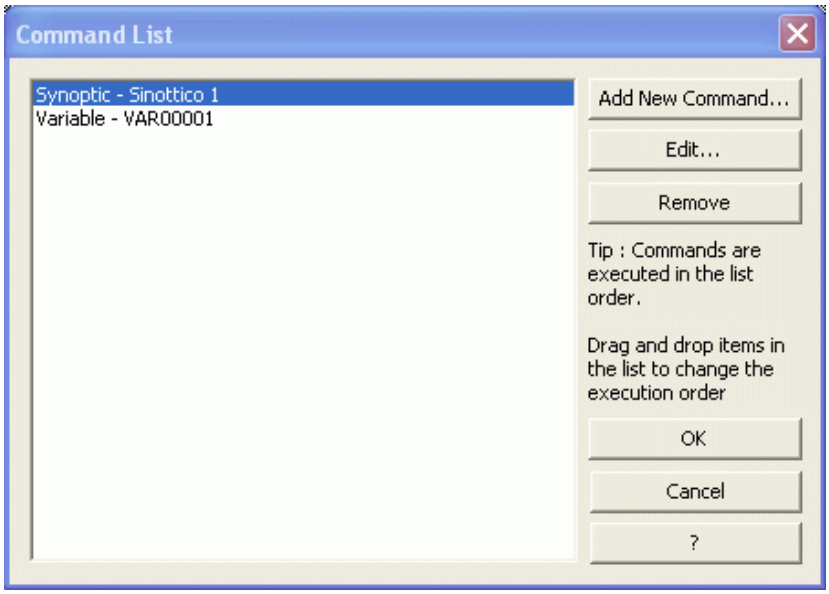
The Movicon resources and controls predisposed for executing commands are set up through the **'Command'** property found in the **'Properties Window'** of the object selected.
By activating the **'Command'** property the **'Command List'** will open through which the required commands can be inserted, 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

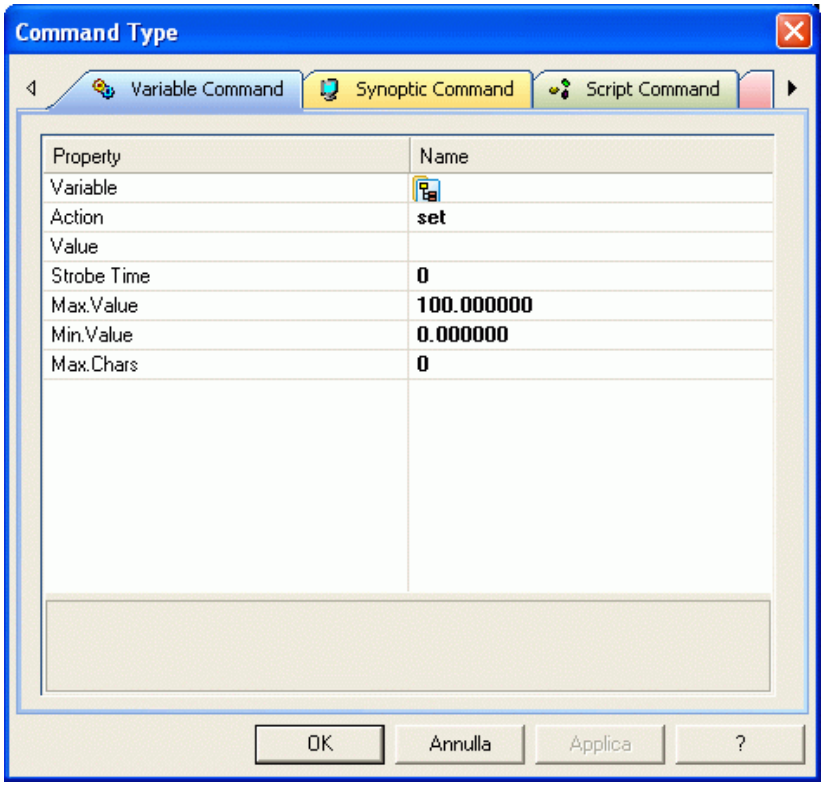
The **"Command List"** window lists the commands that are already inserted in the selected resource or control.



To add a new command to the list use the **'New Command...'** button. The **"Command Type"** window will open to select and configure a new command.
To edit the new command, just inserted into the list, select the command with the mouse and click on the **'Edit'** button to open the **"Command Type"** window.
To delete commands from the list simply press the **'Delete'** command.

16.1.1. 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

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.

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.
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.
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.
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.

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.

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.

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.

Max. Chars

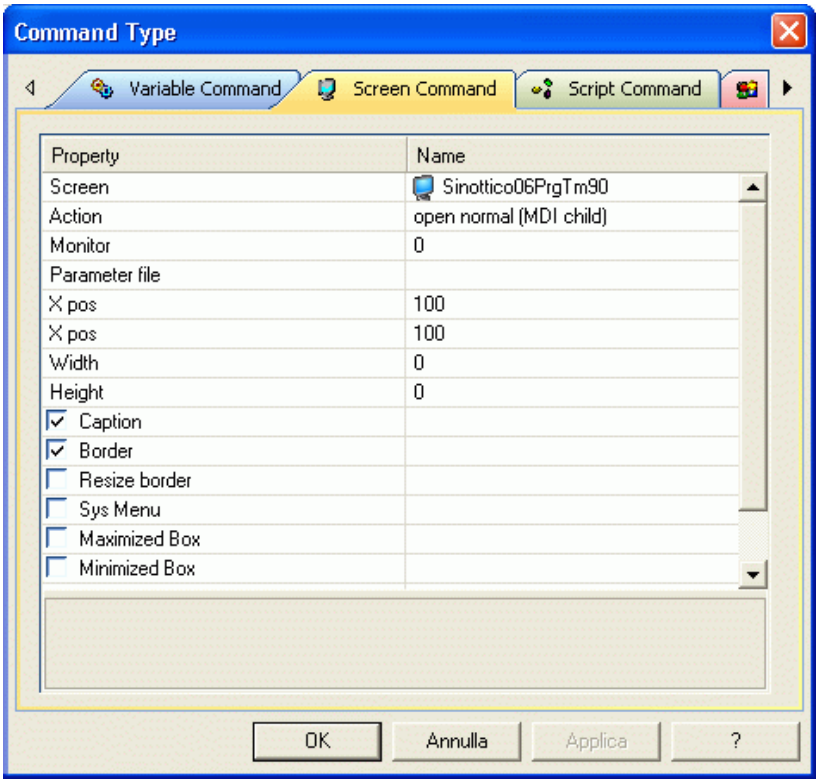
This property is only valid for string type variables and when the following items have been selected in the **'Action'** property:

- **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.

16.1.2. Screen Commands

This group of commands are used for carrying out opening operations of the Movicon Screen windows.



Screen

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 (MDI Child)	This command consent 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	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	This command opens and displays a Screen by opening a new window different from Movicon's main window.
Open 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 executes the printing of the selected Screen.
Close	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.
Execute Synapsis	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.

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 X 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).

*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).

*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 ().

Miximized Box

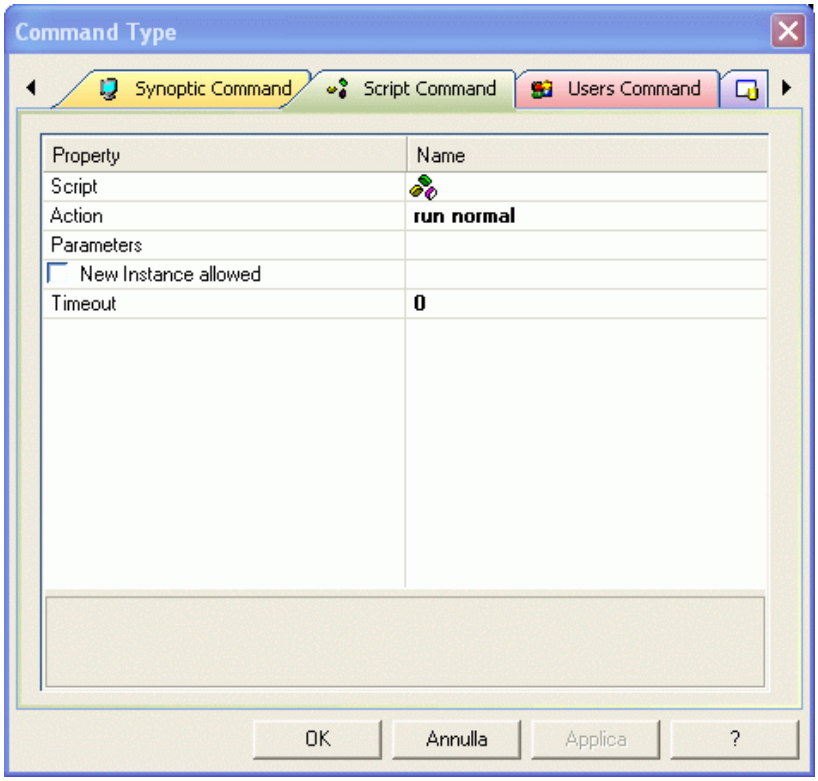
When enabled, this property allows the button for enlarging the window to be displayed on the top right in the title bar (). If the **'System Menu'** has not been enabled, this setting will have no effect.

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.

16.1.3. 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 systax 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. ***The stop 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 a stop 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()" funcion from the "ScriptMEInterface" should then be used within the Basic Script routine for retrieving the parameters.

New Instance allowed

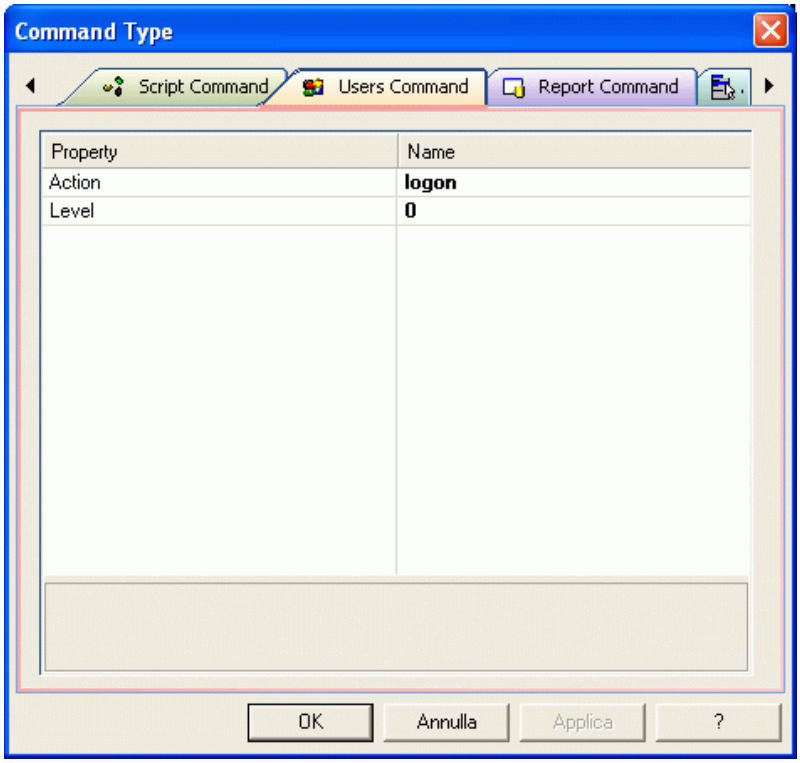
This property allows you to run more instances from the same Basic Script at the same time. In order for this to work property you must, however, specify a number higher than one in the Basic Script's "Maximum Instances" property.

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.

16.1.4. 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 logon of a user.
Logoff	This commands executes the logoff 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:

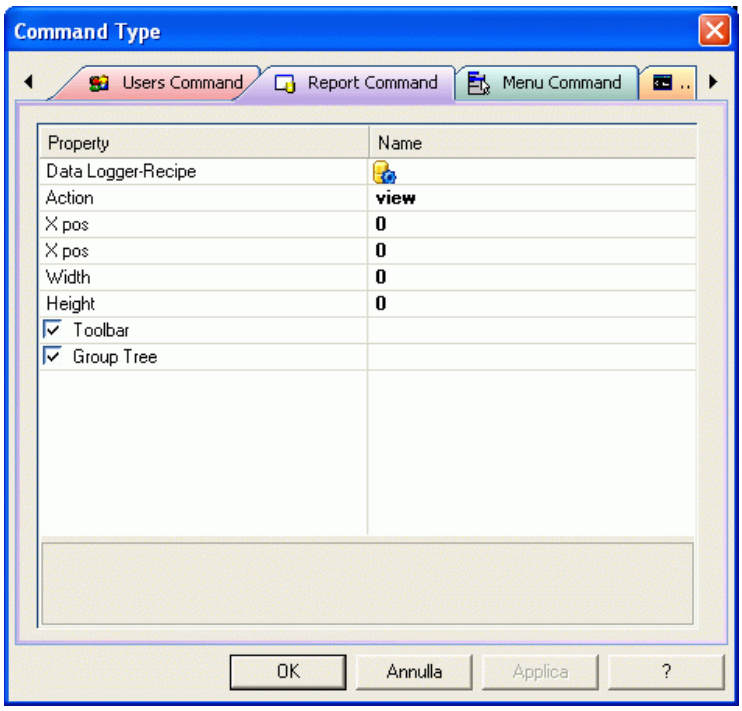
The icon which represents the user on the bottom right can be in colour or in just grey. Grey means that no users are logged on therefore simply double-click on the icon to display the User logon window where a '0' level authentication will be requested. When the icon is in colour, this means that a 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 **'Logon'** has been selected in the **'Action'** property.

16.1.5. Report 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 sing the **"..."** browse button on the right).

Action

The command or action type to be executed for the selected DataLogger/Recipe. Some of the commands allow reports, which have been previously associated to the DataLogger/Recipe, to be viewed or printed. The Report files supported by Movicon must be created with **'Crystal Report©'** 10.0 version or subsequent versions.

Action	Description
View	This command executed 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.
Print	This command executes the direct printout of the Report file associated to the DataLogger/Recipe without showing any previews.
View Safe	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.
Print Safe	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.
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".

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).

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).

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).

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).

Toolbar

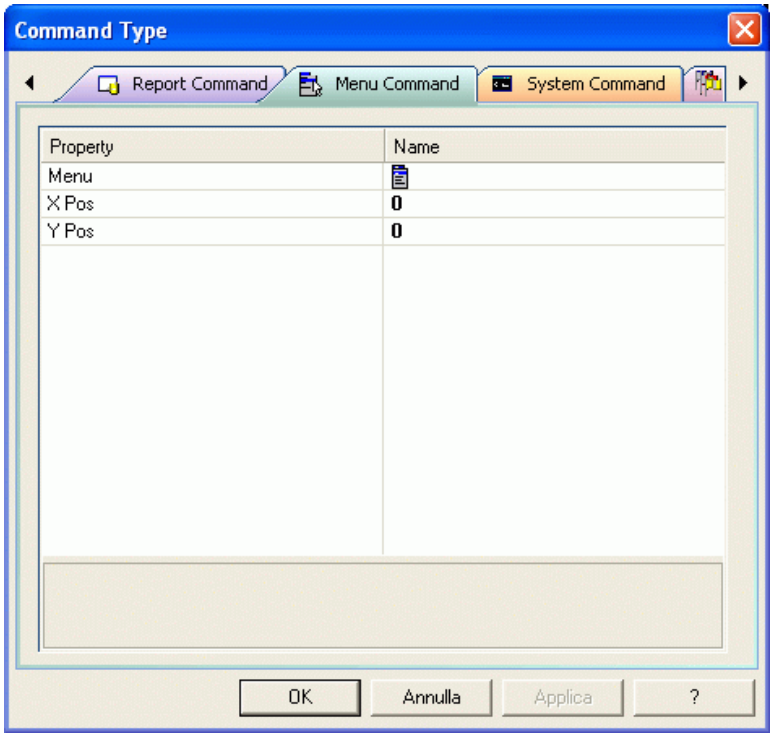
This check box is used for displaying or hiding the toolbar in the report preview window.

Group Tree

This check box is used for displaying or hiding the group Tree in the report preview window.

16.1.6. 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

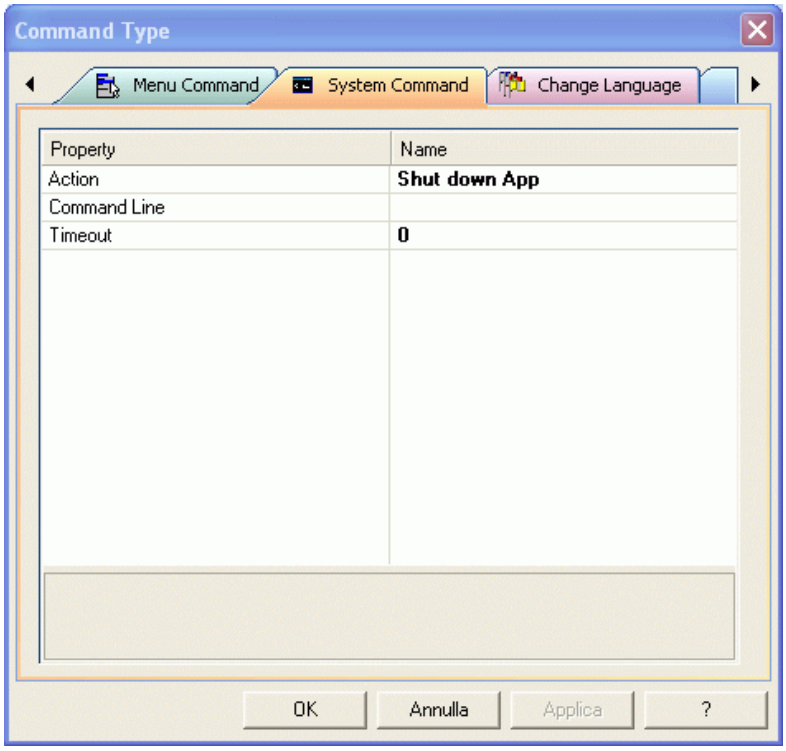
This property is used for entering the horizontal position of the Menu window's origin. The value is expressed in pixels (the '-1' value takes the position of the mouse).

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).

16.1.7. 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.
Launch App and Wait	This command launches a Windows application, which must then be specified in the **'Command Line'** property.

Command Line

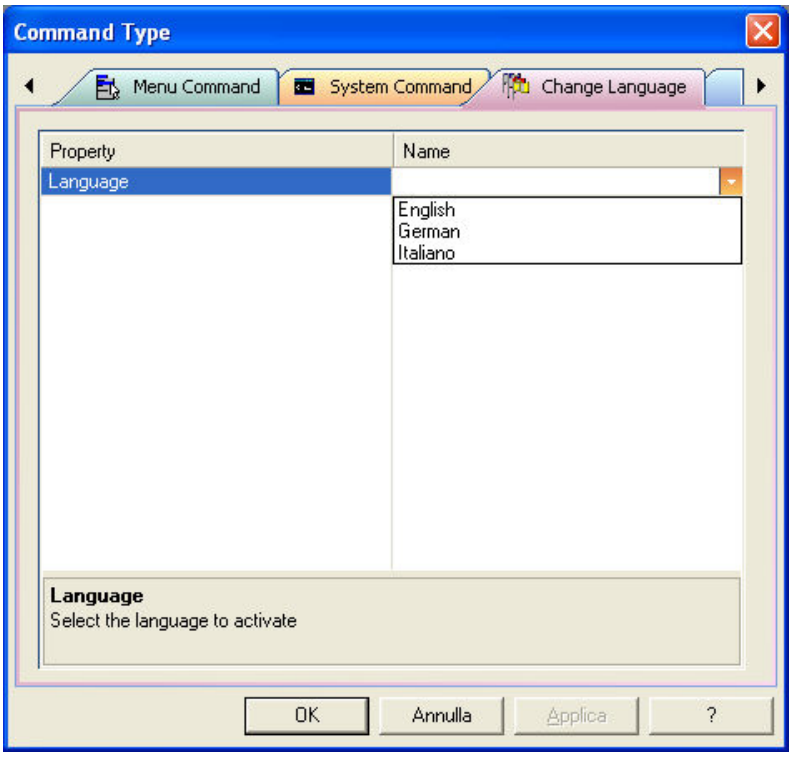
The command line for executing a Windows application is entered in this edit box. If the executable file path is not specified, Movicon will search for it in the Windows' folders.

Timeout

The timeout, which Movicon attends to when application is not responding, is specified in this edit box in milliseconds.

16.1.8. Change Language

This group of commands are used for carrying out operations to change languages in Movicon texts.

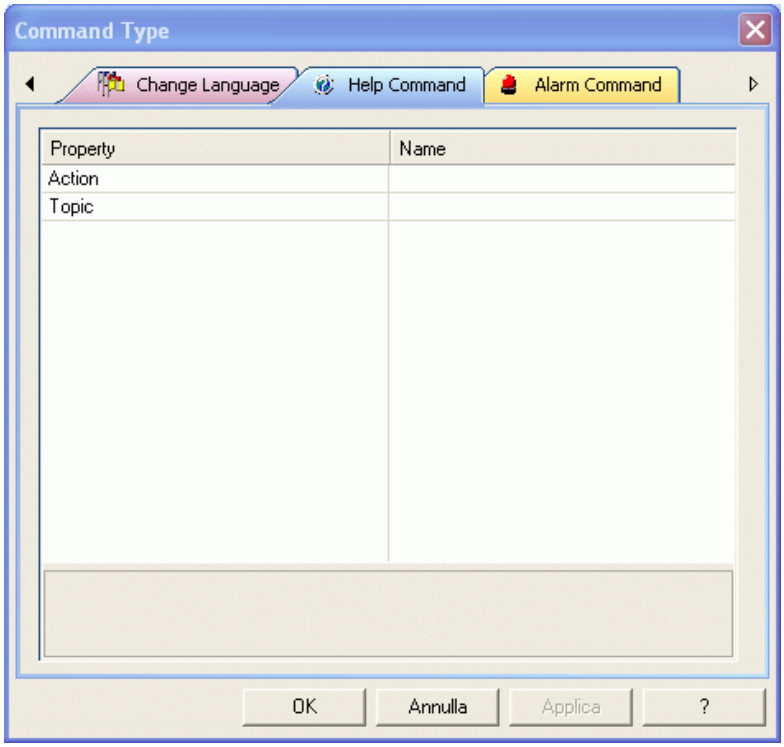


Language

The language to be activated is selected through this property. The languages set in the **Strings Table** are listed.

16.1.9. 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:

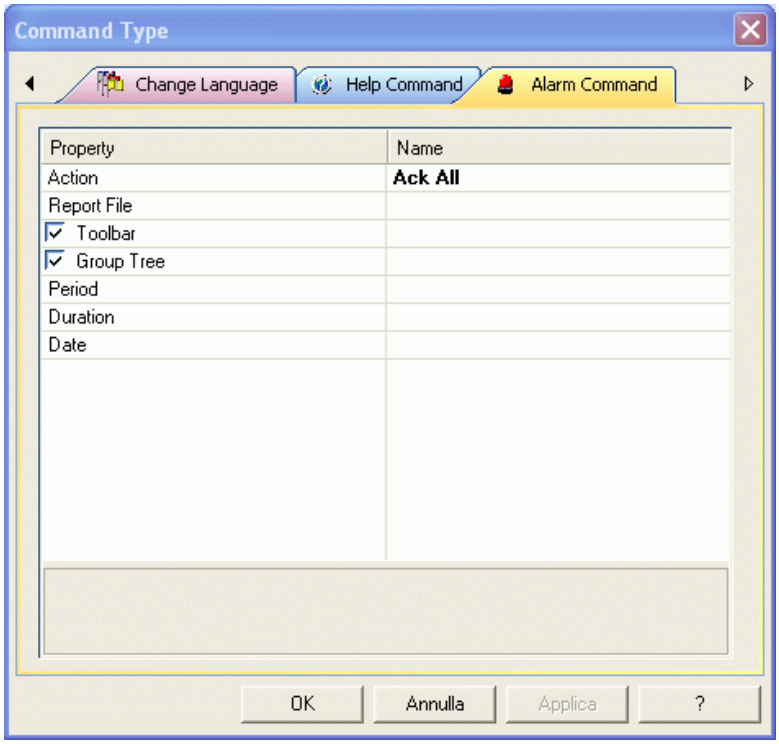
Action	Description
Topic	This command executes the opening of the topic specified in the **'Topic'** property. The topic will be searched for in the help file associated to the project, by means of the **"HTML Help File"** property available in the **'Project Work Folder Path Settings'**.
Tooltip Popup	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.

16.1.10. 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.

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.
Sound ON/OFF	This command enables or disables the management of the acoustic signal which will be activated for unacknowledged alarms.
Show Report	Opens a Report preview window of the alarms. ***This is an optional feature: check your dongle options.***
Print Report	Directly sends the alarm Report to be printed without opening a preview window. ***This is an optional feature: check your dongle options.***

Report File

Movicon supports two commands designed for interacting with the alarm reports. The commands are 'Show Report' and 'Print Report'.

Each command permits you to choose which report file to open or print in the 'Report File' parameter. The drop-down list reports the names of four existing and already available Reports, but other names can also be entered. If the customized report to be displayed or printed is in the Movicon installation folder then only the report name needs to be entered without the extension (ie. MyReport); otherwise the whole path including the extension will have to be entered (ie. C:\Temp\MyReport.rpt).

The four default reports have been created with the Crystal Report 10 version and are interfaced with the 'Alarms' table from the Movicon Historical Log:

1. **OrderByDate.rpt:** Report of alarms in activation date order. Each alarm is reported with the date and time of its activation, the date and time of it's occurrence and duration. The total of all the durations throughout each day and the selected period are represented. The last page reports a bar chart with the number of alarm appearances each day
2. **OrderByDuration.rpt:** Report of alarms in duration order (starting with the longest duration to the shortest). Each alarm is reported with the date and time of their activation, the data and time or their occurrence and duration. The duration totals of the period selected is represented. The last page reports a line chart showing the longest, average and total of durations in seconds of each day
3. **GroupByThreshold.rpt:** Report of single alarms in alarm groups. Each alarm is reported with its description, date and time of activation, date and time of occurrence and duration. The total duration of each alarm for the period selected and the total duration of all the alarms in the period selected are represented. The last page reports a pie graph with the duration percentages of each single alarm for the period selected
4. **GroupByFrequency.rpt:** Report of alarms grouped by frequency. Each alarm is reported with its description and how many times they occurred in the period selected. A classification of the first three most frequent alarms in the period selected is also represented. The last page reports a pie graph with the frequencies of each single alarm in the period selected

Movicon searches for these Report files in the same folder where Movicon.exe. is found.

ToolBar

This property permits the toolbar to be displayed or hidden in the report preview window.

Group Tree

This property permits the group in tree structure to be displayed or hidden in the report preview window.

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
- 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".

17. 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.
Movicon provides a completely configurable Alarms management.

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.

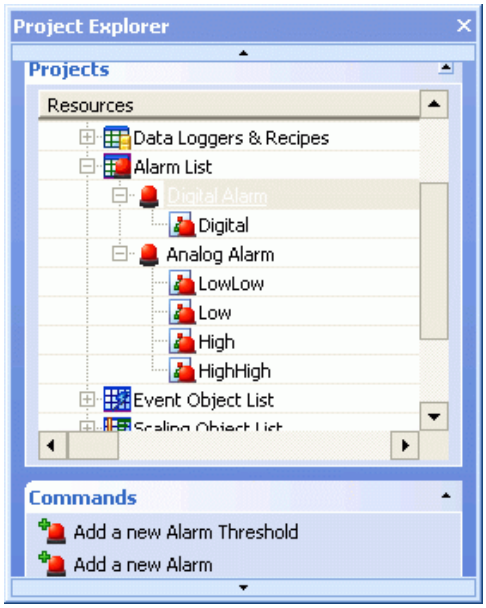
The Alarms can be grouped in one certain area, to allow the Alarm Window to display the alarms relating to a specific logic area of the plant only.

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.
The Alarm objects, after being configured, can be saved in the Symbols Library, as Templates. Each single alarm can be saved in the library individually or associated to the symbol required.
This technology, defined as Power Template, permits the programmer to drastically reduce project developing time, by allowing them to insert symbols, automatically inserting variables and other Templates linked to them.
The **'Alarms List'** resource is available in the Movicon **'Project Explorer'** window.

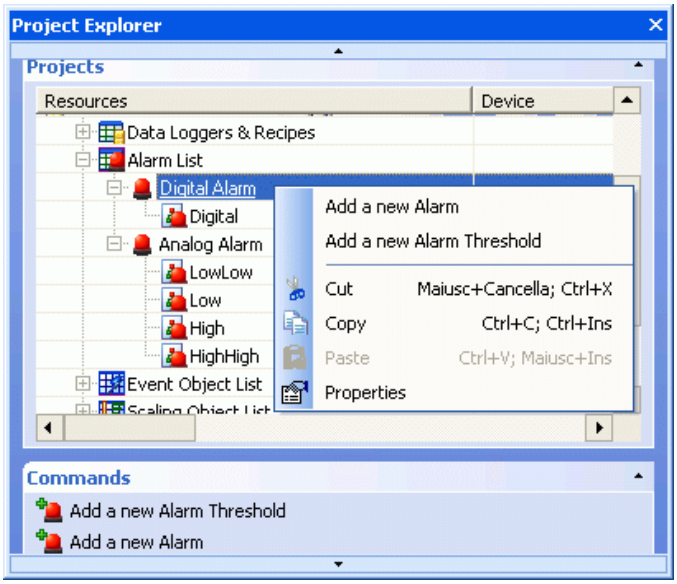


Scroll Lock Led Key

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.

17.1. 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".**

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 eill associated the Area name to the alarm threshold.
2. create Areas in the "Alarm Lst" 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.

Warning! When both methods are applied to the same alarm, priority will be given to the Area set in the "Alarm Threshold General Settings".

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

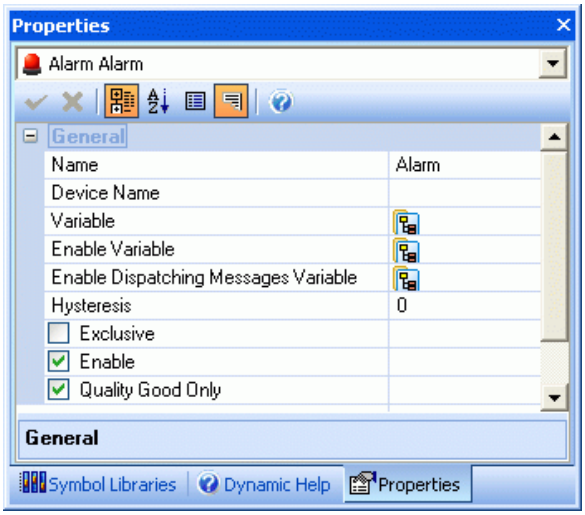
The Movicon Alarms predisposed with a useful enabling property, to allow the programmer to temporary deactivate the working of each single alarm.
This setting can be done by accessing the **"Enable"** item through the **'Alarms General Properties'** of the Alarms' 'Properties Window'.
Alarm groups or 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.

17.2. 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'**.

17.2.1. 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.

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).

Enable 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.

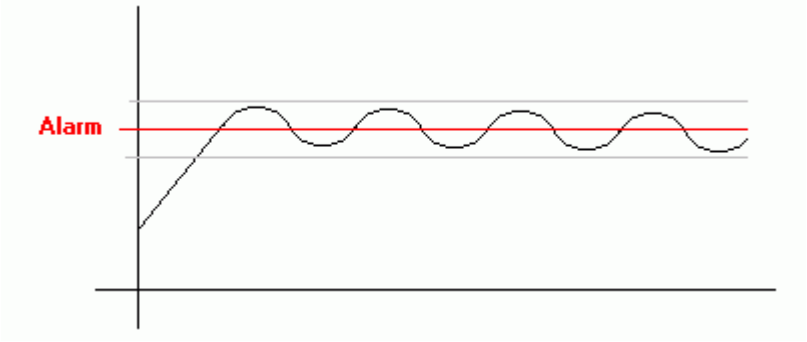
Enable Dispatching Messages Variable

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

The alarm's hysteresis allows you to define a variation in the intervention threshold in percentage to the value of the controlled variable.

The hysteresis value therefore permits you to insert a control on the alarms effective re-entry when the threshold value is oscillating, so much as to provoke an over-intervention (ON) and re-entry (OFF) of the alarm itself.



Thanks to the hysteresis set value percentage established, the alarm will be considered effectively re-entered when it has reached the threshold value minus the hysteresis percentage assigned.

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

This selection box is used to enable or disable the alarm intervention.

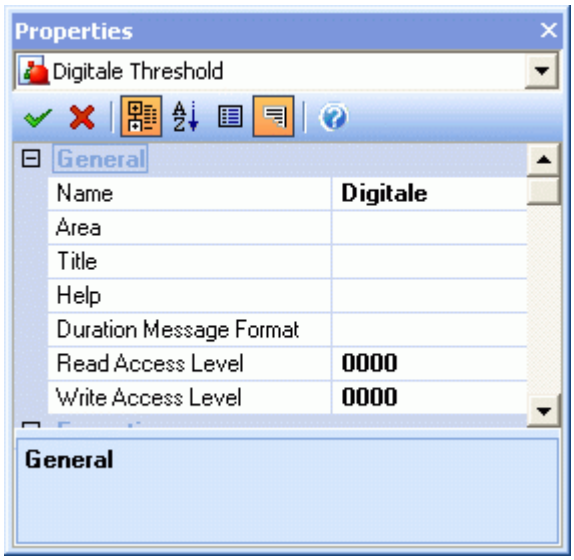
*The **'Enable'** property has priority over the **'Enable Variable'**.*

Quality Good Only

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.

17.2.2. 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'**.



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>.

Area

This box is used to associate one or more areas for the Alarms or Messages in question if needed.
By doing this the alarm can be viewed by activating the pre-chosen area.
When inserting more than one area use the ';' character as separators (Eg. Area1;Area2;Area3).

Title

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.

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:

- **%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 00:00:00

where 00:00:00 indicates the alarm's duration in hours, minutes and seconds.

Read Access Level

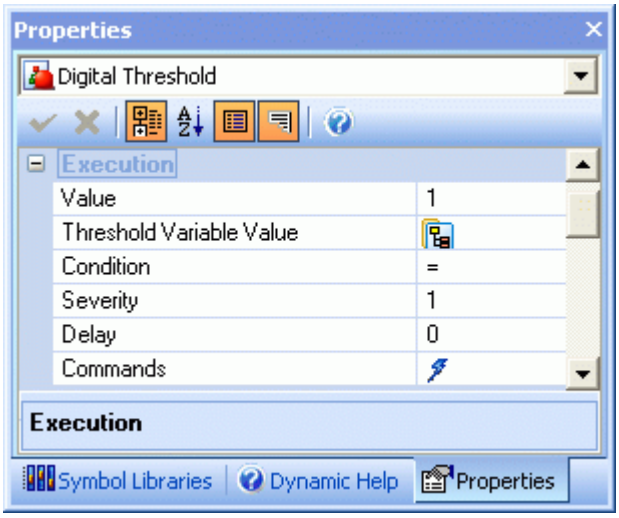
By using this property you can setup the Access Level mask needed for displaying the alarm in the "Alarm Window". When the Access Level mask of the user currently logged on does not correspond to the control's settings, the user will not be able to see the alarms. The "0000" and "FFFF" settings make 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 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.

17.2.3. 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'**.



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.

Threshold Variable Value

The name of the variable to be used in place of the Value property is entered in this edit box (or selected with the '...' browse button on the right). In this way the threshold value can be made dynamic regarding how much of the variables' contents can be taken and edited during Runtime.

Condition

This property determines on what condition the alarm is to activate:

- **'>='** means that the alarm activated when the variable value is equal or higher than the 'Value' property setting
- **'<='** means that alarm activates when the variable value is equal or lower than the 'Value' property setting
- **'='** means that the alarm activates when the variable value is the same as the 'Value' property setting

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

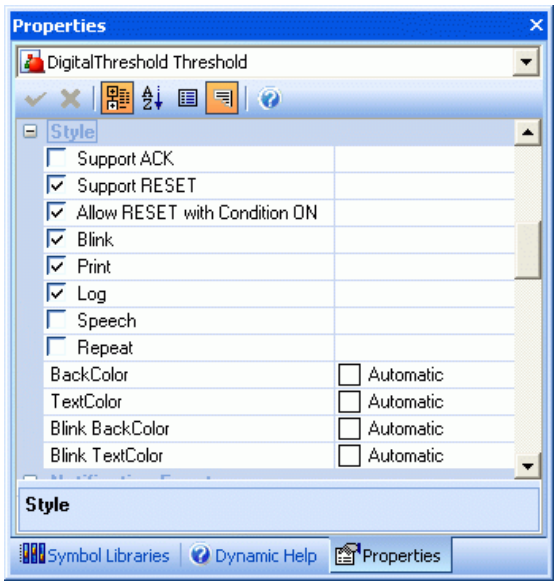
You can enter a numeric value comprised between 0 and 65535 in this edit box. The value entered, expressed in seconds, will establish the alarm's intervention delay time, thus creating a filter in the threshold.
The default value is zero (no delay).

Commands

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"**.

17.2.4. 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.

Support RESET

This selection box permits you to determine whether you want the alarm reset (RESET) activated or not.

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"**.

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 kept in the ' "**Alarms**" table of the Historical Log Database created by Movicon in Access2000 format in the 'LOGS' folder with the name: 'NameProject_HisLog.mdb'.

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".

Speech

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

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.

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

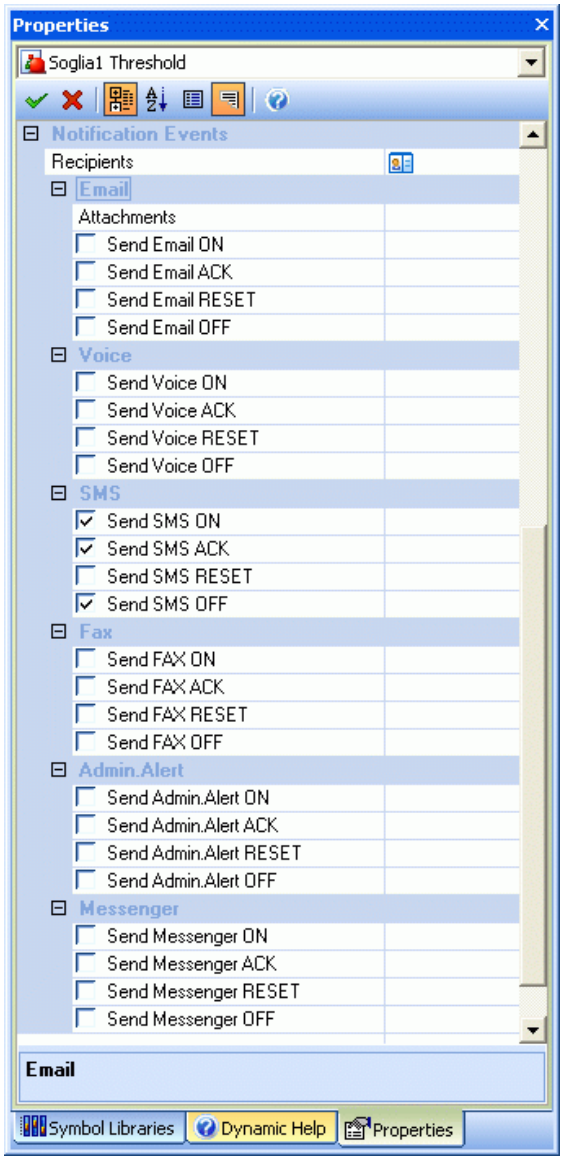
This property is dedicated to selecting the colour to be associated to the background relating to the alarms or messages displayed in the appropriated window during the blinking phase.
Selecting colours is done according to the standard selection modes using the colour palette.
You can reset the set 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.

17.2.5. 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 address or Messenger address in accordance to what is required for sending messages.

E-Mail

Attached

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).

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.

Admin.Alert

Send Admin.Alert ON

This property activates or deactivates the send Admin.Alert messages.
The message will be sent upon the Alarm's intervention (ON).

Send Admin.Alert ACK

This property activates or deactivates the send Admin.Alert messages.
The message will be sent the moment in which the alarm is acknowledged (ACK).

Send Admin.Alert RESET

This property activates or deactivates the send Admin.Alert messages.
The message will be sent the moment in which the alarm is reset (RESET).

Send Admin.Alert OFF

This property activates or deactivates the send Admin.Alert messages.
The message will be sent the moment the alarm stops ringing, independently from the acknowledge or reset status.

Messenger

Send Messenger ON

This property activates or deactivates the send messages management through the Microsoft MSN Messenger service. This management requires the enabling of the MSN Messenger service and an Internet connection.
The message will be sent upon the Alarm's intervention (ON).

Send Messenger ACK

This property activates or deactivates the send messages management through the Microsoft MSN Messenger service. This management requires the enabling of the MSN Messenger service and an Internet connection.
The message will be sent the moment in which the alarm is acknowledged (ACK).

Send Messenger RESET

This property activates or deactivates the send messages management through the Microsoft MSN Messenger service. This management requires the enabling of the MSN Messenger service and an Internet connection.
The message will be sent the moment in which the alarm is reset (RESET).

Send Messenger OFF

This property activates or deactivates the send messages management through the Microsoft MSN Messenger service. This management requires the enabling of the MSN Messenger service and an Internet connection.
The message will be sent the moment the alarm stops ringing, independently from the acknowledge or reset status.

17.3. 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).

18. Historical Log

A project's Historical Log automatically manages the recording of plant alarms or events on archive files in database format.

The Historical archive of events or Historical Log has the task of chronologically recording all the project or system events occurred throughout the applied project runtime.
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

A part from the messages recorded by the system, all the other events can only be recorded if the programmer has enabled this possibility in the Alarms or Logic settings.
The recording of events and the database format must be configured in the **"Project Historical Log Settings"**.

Log event recordings are executed on two different database files according to the type of event being recorded. In particular all the events concerning the **"Variable Tracing"** are saved on the "ProjectName_TraceDB.mdb" file in the project's 'LOGS' folder. All the other information is saved in the "ProjectName_HisLog.mdb" Log Database File inside the project's 'LOGS' folder.

The log data can be displayed through the appropriated **"Log Window"** and **"TraceDB Window"** windows which can be inserted into any project screen.

18.1.1. Database Log File

The Database file containing Log information will be created by Movicon automatically in the project's 'LOGS' folder with the name "ProjectName_HisLog.mdb" in Access2000 and fromat. The file name and **ODBC** links can be customized through the **"Project Historical Log Settings"** property. Three different tables are created in the Database, each one containing data relating to specified event. The tables are:

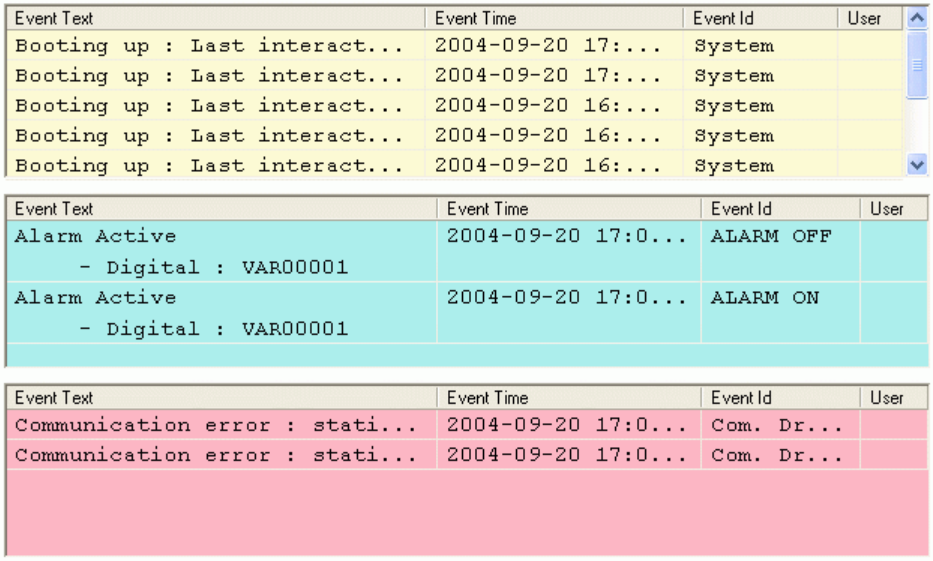
- **Alarms:** contains the project's alarm messages
- **Drivers:** contains messages coming from the project's Communication Drivers
- **SysMsgs:** contains the project's system messages

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):** reports the name of the user who was active at the time the recording took place
- **Event Column (EventCol):** reports the event type recorded (Eg. Alarm ON, Alarm OFF, System, ecc)
- **Event Number Column (EvNumCol):** reports an ID number of the event recorded
- **Event Description Column (EvDescCol):** reports the event description
- **Description Column (DescCol):** reports informations about the event type
- **Comment Column (CommCol):** reports informations about the event type
- **Duration Column (DurCol):** reports the duration time of the event in question

However the names of the database columns can be customized through the **"Project Historical Log Settings"**.



An Example of a Log Window containing data taken from the three log tables.

19. Users and Passwords 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.
Supervision project Users and Passwords management allow the possibility to declare users who run the plant by giving them an exclusive password and access level. The project should therefore provide the commands necessary for guaranteeing security by previously verifying the users' preset levels and the relating passwords.
Movicon consents to a complete password management with a virtually unlimited number of users and access levels.

19.1. 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")
Accelerator "User Level" property (paragraph: "Accelerator Command General Properties")

Access Levels

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.

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")

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")

19.2. 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".

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.

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.

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.

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.

19.3. 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.

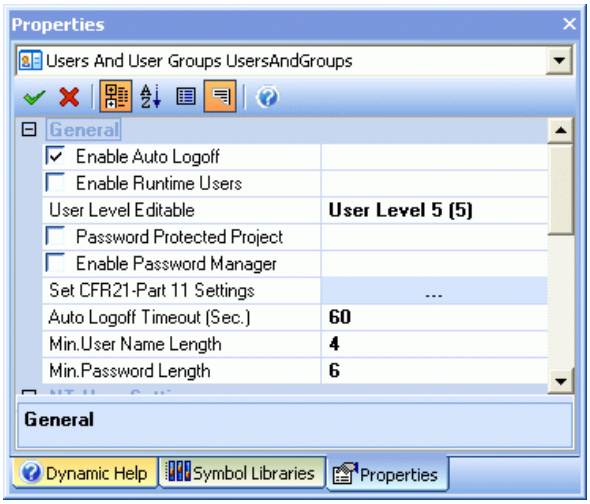
The password will be requested only during the project Runtime when the "Enable Password Manager" property is enabled before its startup. The password with Developer level will be also requested when opening the project in programming mode where the "Password Protected Project" property has been enabled. 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.

19.3.1. 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.

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.

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 activate the User editing in conformity with the **"FDA21 CFR Part 11"** rules.

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.

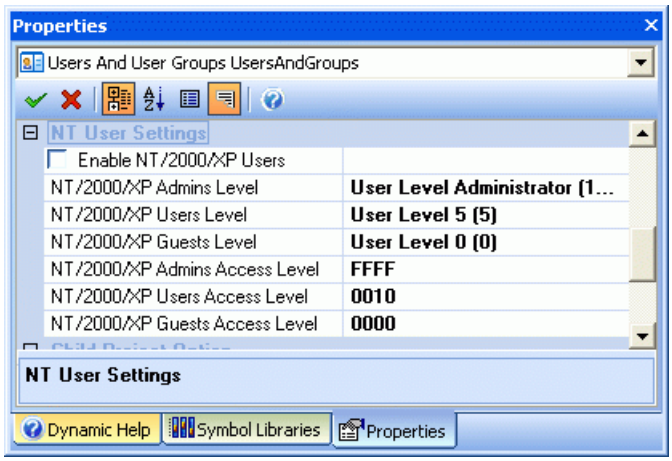
Min. Password Length

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.

19.3.2. Users and User Groups NT User Properties

By using the NT 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 NT Users properties, select the "Users And User Groups" group from the Project Explorer window with the mouse and use the Movicon **"Properties Window"**.



Enable NT/2000/XP Users

Movicon provides you with the possibility to share users from the O.S. domain or from a Windows NT/2000/XP 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 NT/2000/XP server.
Movicon accepts mixed applications, such as users inserted in the project list and users deriving from the NT domain.

The users from the project list can receive in association a customized user level. The users deriving from a domain of a NT/2000/XP 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 (Administartors, Users, Guests).

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.

NT/2000/XP Admins Level

This property is used for selecting the Password level to assign to the Operating System Users belonging to the Administrators group.

NT/2000/XP Users Level

This property is used for selecting the Password level to assign to the Operating System Users belonging to the Users group.

NT/2000/XP Guests Level

This property is used for selecting the Password level to assign to the Operating System Users belonging to the Guests group.

NT/2000/XP Admins Access Level

This property is used for selecting the Access level to assign to the Operating System Users belonging to the Administrators group.

NT/2000/XP Users Access Level

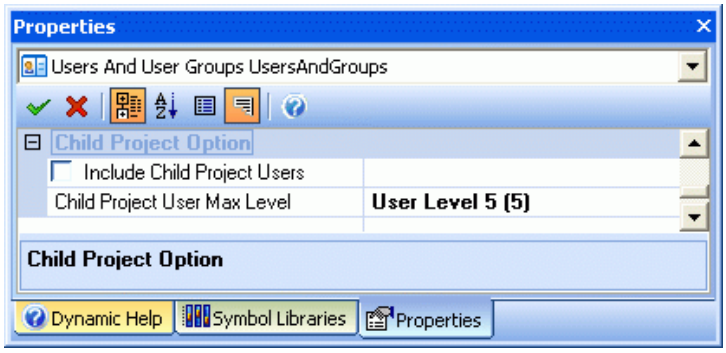
This property is used for selecting the Access level to assign to the Operating System Users belonging to the Users group.

NT/2000/XP Guests Access Level

This property is used for selecting the access level to assign to the Operating System Users belonging to the Guests group.

19.3.3. 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.

Child Project User Max Level

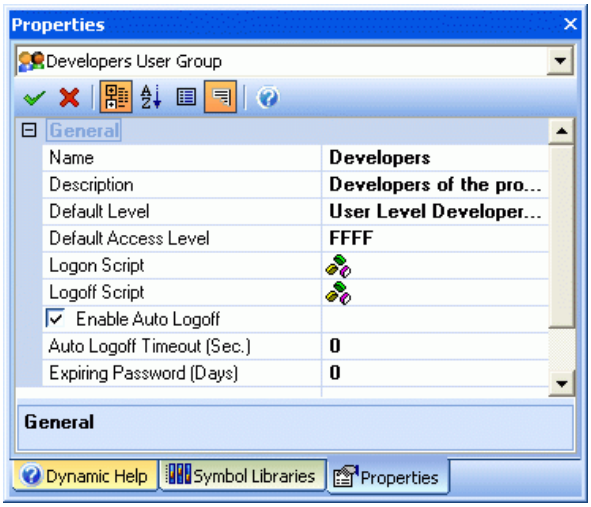
This property permits you to set the maximum password level which can be inherited by a child project. The users in the child project who have a higher level to that set in this property will not be inherited and therefore cannot be used by the parent project.

19.4. 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"**.

19.4.1. 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:

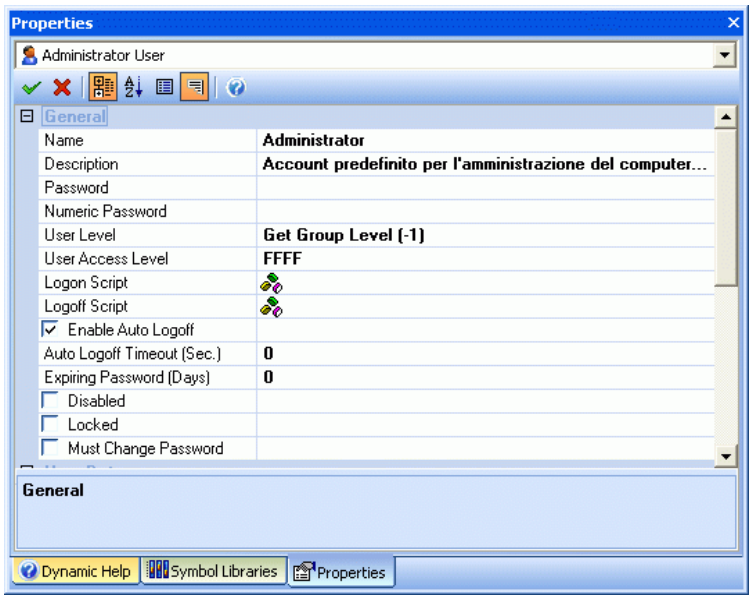
- **Developers**: FFFF (Access Levels 1-16)
- **Administrators**: FFFF (Access Levels 1-16)
- **Users**: 0010 (Access Levels 5)
- **Guests**: 0000 (Access Levels 0)

19.5. 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 NT 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"**.

19.5.1. 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 NT 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

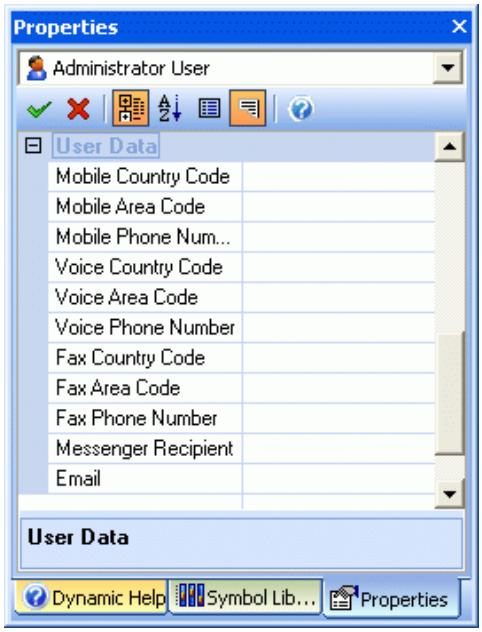
This property locks the User out. the 'Locked' user is one who cannot be substituted with a runtime user who has the same name. This means that any runtime user with the same name will not be managed. For further information please refer to the section on **"Runtime Users"**.

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.

19.5.2. 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

The name or address of the User's Messenger Recipient for sending messages exploiting the MSN Microsoft Messenger program is entered in this box.

E-mail

The User's E-mail address for sending e-mails is entered in this box.

19.6. RunTime Users

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 this 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. 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
2. Movicon, when loading the file containing the runtime users, will not activate those users who have the same **"Descrption or Digital Signature"** of a already existing user. In this case a warning messaged will be generated in the Output and Historical Log window
3. 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
4. When a runtime Group is created with the same name of a Group declared in the programming mode, this group will be replaced with the runtime Group

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.

20. Data Loggers and Recipes

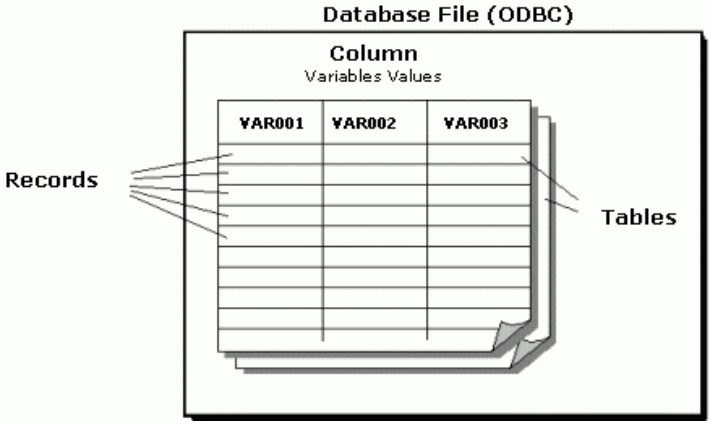
The Data Logger is a powerful tool for recording and simplifying the managing of data in databases which exploit the ODBC potentiality. The Reports, Trends and Recipes functions can all be linked to the Data Logger.

Movicon has a powerful engine for recording data in **ODBC** standard database format, for historical recording of historical data tables usable in projects in the form of Reports, Recipes, Graphics or for any other viewing and analysing of filed process data functionality.
Before using a report or a data table you have to carry out the necessary procedures for configuring the database according to your requirements.

To get access to the Movicon database engine settings go to the **"Data Loggers & Recipes"** resource which can be selected from the **"Project Explorer"** window.
A virtually unlimited number of databases, tables and records can be inserted into the project by means of using the **"Data Loggers & Recipe"** resource.
The Movicon Data Loggers and Recipes have access to Database files through a **ODBC** link, where the user can provide production data in their preferred data format, guaranteeing system openness to external applications and promoting factory data integration to higher levels of the production hierarchy.
The Data Loggers usage permits simple and guided resolutions to historically logging any required real-time data, allowing total use of the tools integrated into the project so that recorded data can be provided in a certain way to be viewed, analyzed, formatted and presented or for printing production reports.

20.1.1. The DataBase

The Data Loggers and Recipes record data on Database files. These Databases are created automatically by Movicon using the appropriate prefixed commands. However, first of all the Databases' characteristics have to be configured, which entails some of the properties of the same Data Loggers or Recipes only, involving the Database name, the Table name, the quantity of data to be recorded (records) and the columns. These are the minimum requirements that a Database has to have knowledge of before being generated by Movicon through the **ODBC** drivers.
Databases contain data in tables (the linked Database file can contain various tables), which are organized in records, consisting of a number of lines and columns which represent the variables.

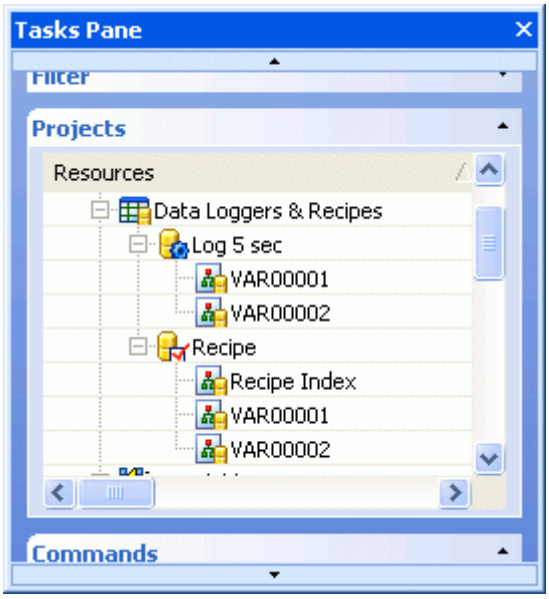


Organization of data in a normal database

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.

20.1.2. 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".**



Data column structure in a normal Database

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**

20.1.3. 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 **Crystal Report™** files, according to the **.RPT** format.
Crystal Report™ is one of the most powerful tools for representing data available on Database. For this Movicon integrates the Crystal Report™ interpreted format motor internally, so that a .RPT file

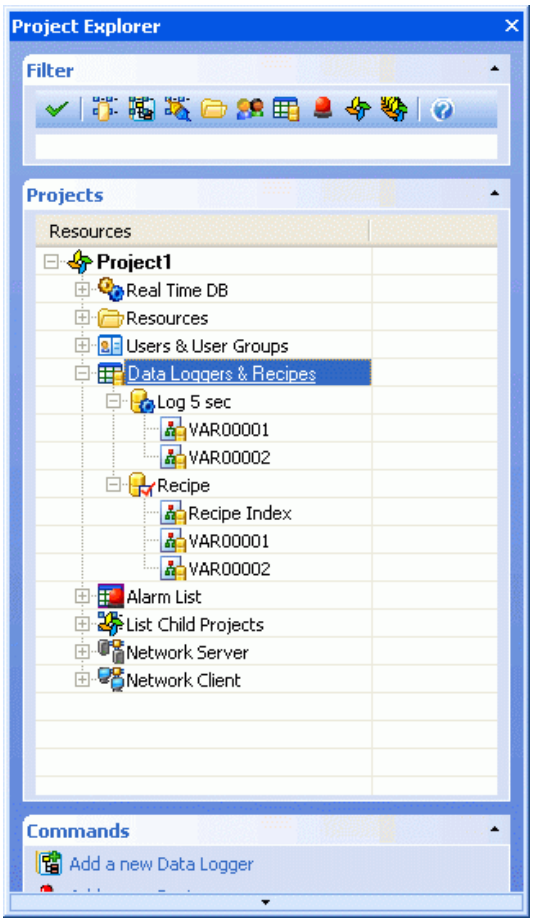
can be generated and connected to any Database object, thus permitting you to preview or automatically print the report according to what has been predefined in the .RPT file.
The .RPT files associations to Data Loggers or Recipes and variable definitions for automatic print on event, are done through 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.

20.1.4. 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.
The **"DataLoggers/Recipes Window"** is described in the respective section.

20.2. Data Loggers and Recipes Editor

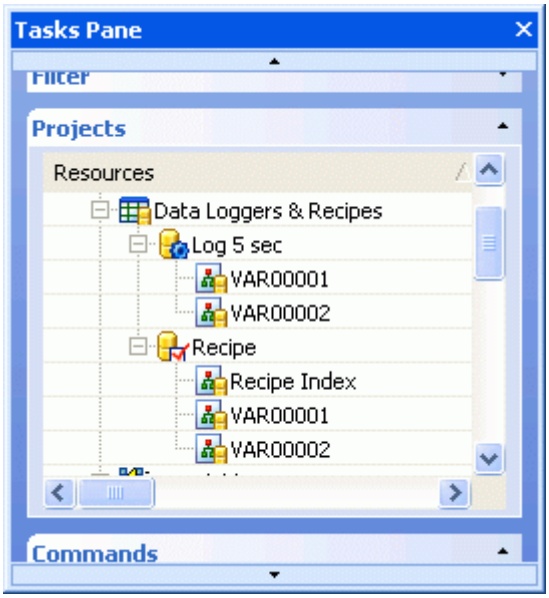
Movicon has a powerful tool to configure registration engines managed by projects. The **"Data Loggers & Recipes"** resource is the main tool for generating data files in standard format which can be used for managing reports, recipes, graphics or any other viewing functions, printing or analysing filed 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.



The 'Data Loggers & Recipes' editor consents object configuration of the project's Database registration engines. The inserted Data Logger and Recipe objects can be saved in the Symbols library individually or in association to already existing graphic symbols.

20.3. 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.

20.3.1. 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 2000 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"**.

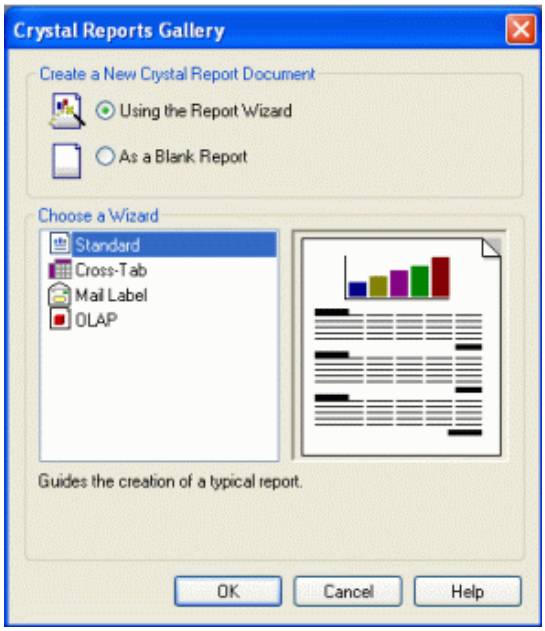
20.3.2. Importing Data Loggers and Recipes from other Recipes

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.

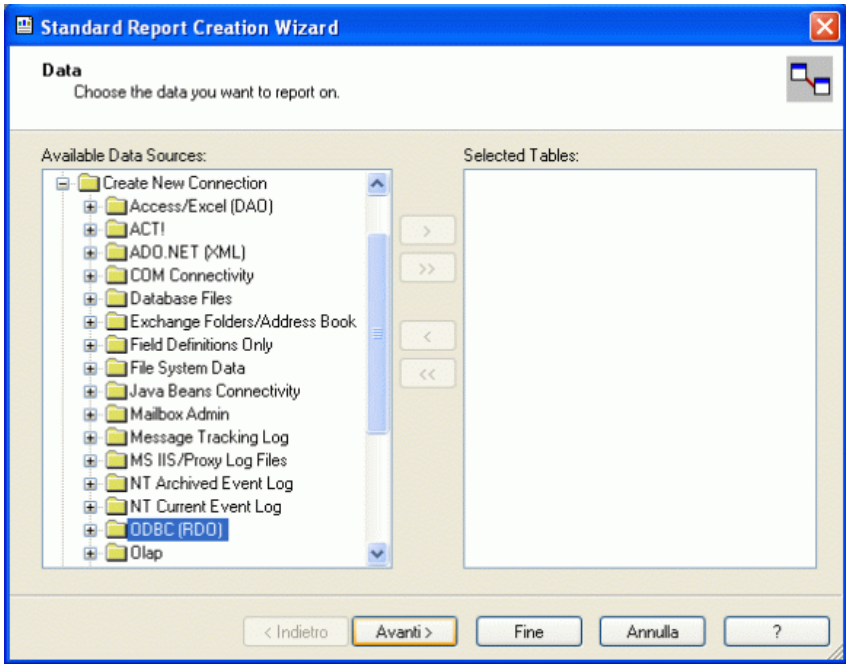
20.4. Creating Reports with Crystal Report

The procedures for creating data reports using the integrated Crystal Report with Movicon X are described below. In order for these procedures to work properly you will need to use the Crystal Report version 10.0 and subsequent versions.
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.



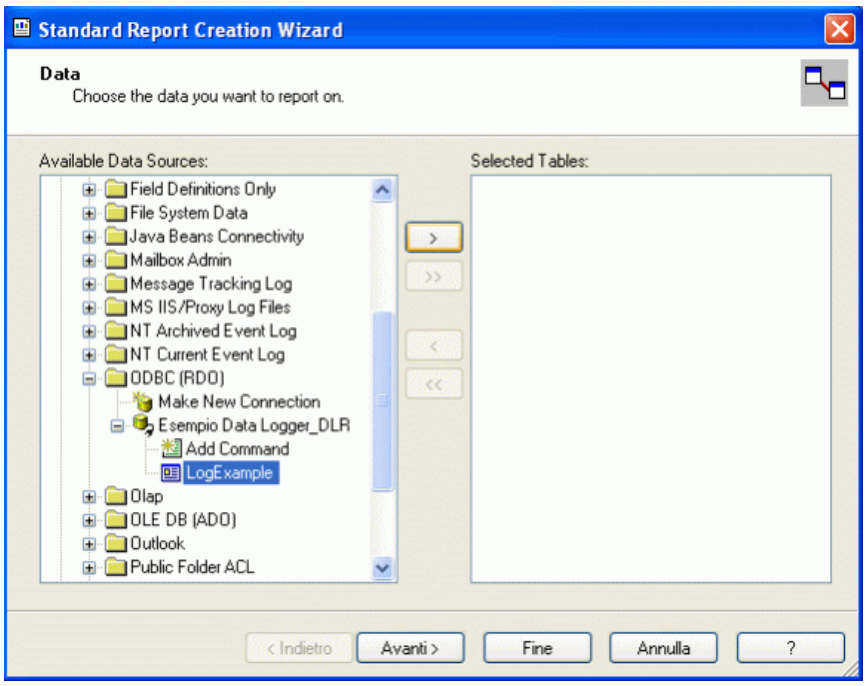
Crystal Report: New Project

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".



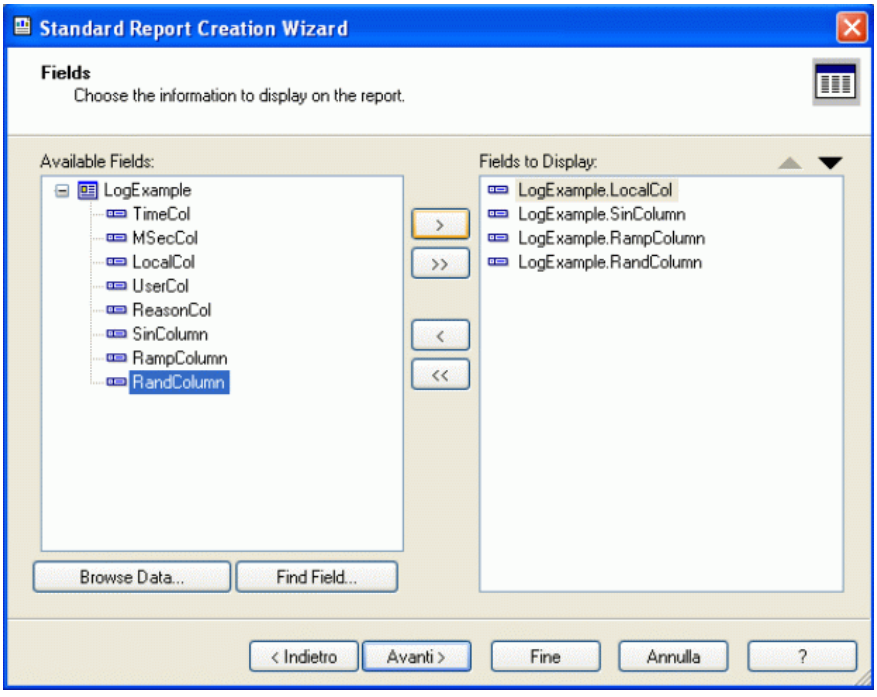
Crystal Report: Create a new ODBC Connection

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".



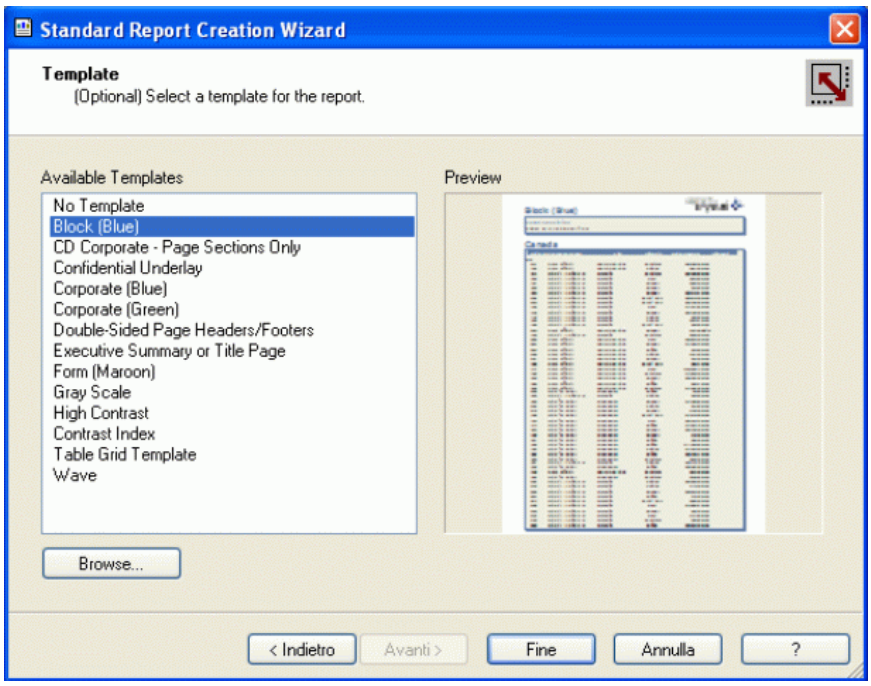
Crystal Report: Add Table

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.



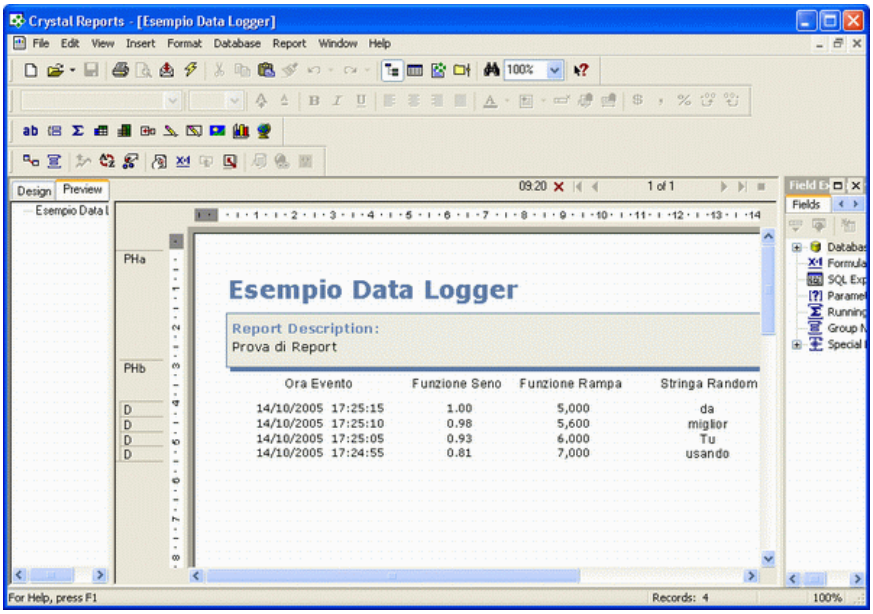
Crystal Report: Add the fields to be displayed

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.



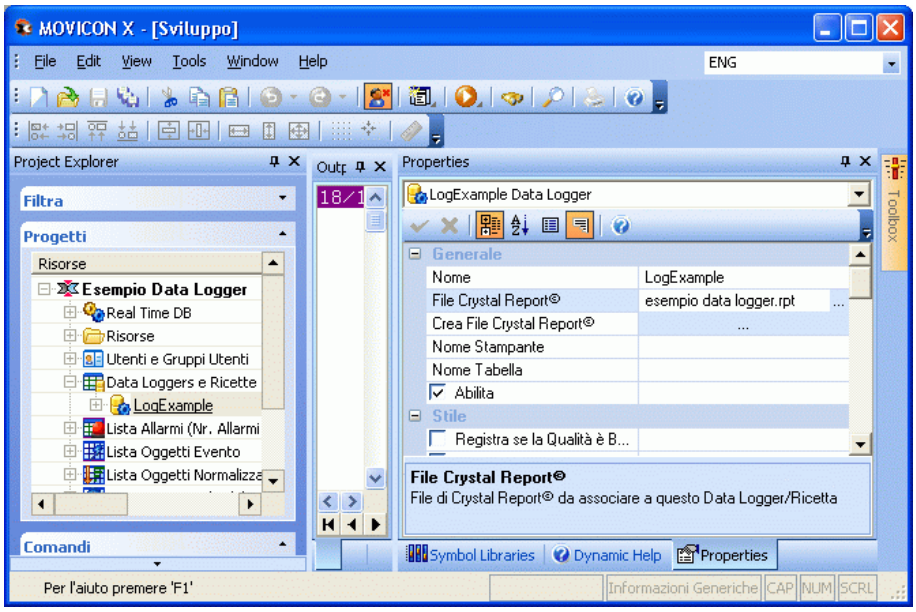
Crystal Report: Choose Template

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" property click on "File Crystal Report" and select the Crystal Report (.rpt) you created previously. 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 X: Chosen Report File

20.5. 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 used the ODBC for recording Recipe data on filed in Database format (ie. MsAccess©) through the appropriate commands defined by variable set in the Recipe properties.

20.5.1. SQL Commands for Recipes in the Database

The Recipes memorized in the Database are saved on database files in the chosen **ODBC** 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'

20.5.2. Creating Recipes on Database

Movicon allows the use of Recipe objects in the "Data Loggers & Recipe" editor's Database in order to manage recipes and file data on database files by using the **ODBC** technology and by exploiting the Screen's graphics potentiality for operator interfacing.

The Recipe resource can be used for realizing powerful data and recipe filing management, by using files in your preferred **ODBC** database format.

By using the variables associated to the recipe ("Recipe Execution Properties") you can add ("Var. Save"), edit or delete (Var. Delete) the recipes from the Database.
In addition to this, by using the Database record scrolling variables ("Move previous Variable", "Move Next Variable, etc.), you can view data contained in each single recorded recipe.

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.

By using the potentiality of the Symbols and the functions from the Movicon Basic Script libraries you can insert the necessary components on screen for managing the insertion, editing and activation of recipes. The purposely created Symbols and the Recipe resources can also be saved as Templates in the "Symbols Library", for further use in other projects, without having to insert line of codes, by exploiting the Power Template© technology.

Creating Recipes requires the knowledge of the fields which compose recipes. Each field must correspond to a variable in the Movicon Real Time DB in the appropriate format (Byte, Word, DWord, Float, etc...). In this way you can create a Database containing all the recipe's fields where each one is associated to the respective column in the Database table.
One of the Database columns has to be used for the **'Recipe Index',** being numeric codes or descriptive names which identify one recipe from another. The other database columns represent the values to be recorded.

Once the Recipe and the Database for recording data has been created you can go ahead and create the graphic objects on screen, the display management to be used and the recipe commands. Usually the Insert-Update, Activate and Delete commands plus the scroll commands of the recipes existing on Database are the main ones used.
Movicon provides a very handy Auto screen creating command by automatically inserting the components (display, buttons, etc) needed for displaying and editing recipes ("Create Recipe Editor"). When using this command the recipe execution variables will be automatically associated to the inserted controls (Save Button, Delete Button, etc.) when these have been specified in the "Recipe Execution Properties". If these variables have not been inserted the corresponding "Report Commands" will be associated to the controls.

20.5.3. 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.

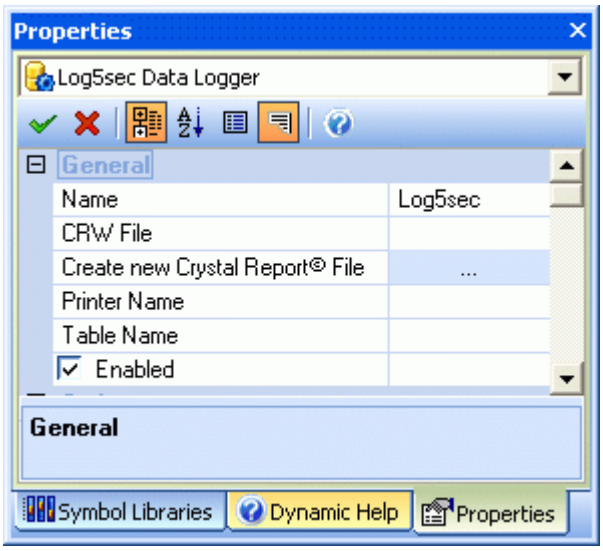
This functionality's use can be configured through a Recipe property which can be assigned a command, filter or ordering Query, then point to the record from the RecordSet, automatically created by the Query execution, to represent, in the variables associated to the Data Logger or Recipe columns, the 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.

20.6. 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.

20.6.1. 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.

CRW 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, contained in the print matrix, must be edited with **Crystal Report©**, one of most simple and powerful systems for creating 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.

Create new Crystal Report© File

This command is currently unavailable due to the fact that the libraries from **Crystal Report©** version 10 and above for the "**Wizard**", released by Seagate, are no longer free of charge and require a Royalty fee. For this reason Progea has stopped implementing the use of these libraries therefore making it impossible to create report files with the Wizard even though you still need to have the **Crystal Report©** development environment.

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.

Enable

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.

20.6.2. 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

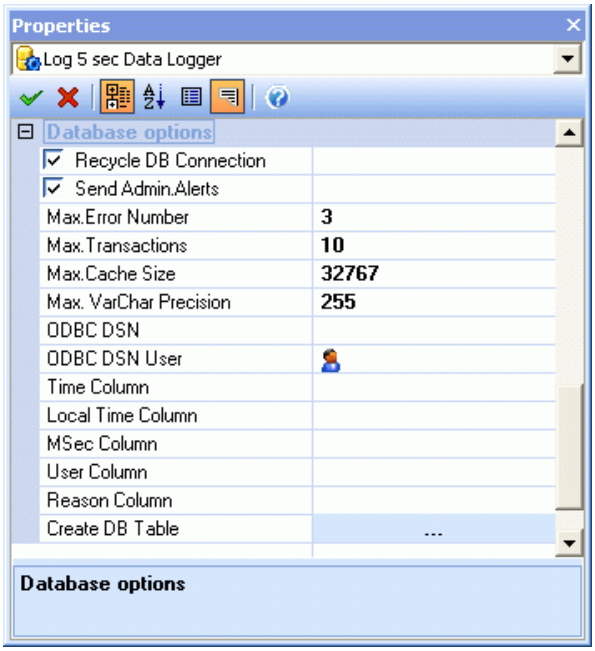
The 'Print Variable' selection box allows a variable from the Movicon Real Time DB to be associated which will carry out a recorded data print out when it changes to a logical state different from zero. The variable will therefore be set at 'zero' value by Movicon once the operation has been executed. The print always refers to the Report specified in the Data Logger's **"CRW Report File"**. The report is in Crystal Report (.RPT) format and is associated to the Data Logger's data table.
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.

20.6.3. 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.



Recycle DB Connection

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** from section **"ODBC"**.

Send Admin.Alerts

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** from section **"ODBC"**.

Max. Error Number

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** from section **"ODBC"**.

Max. Transactions

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** from section **"ODBC"**.

Max. Cache size

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** from section **"ODBC"**.

Max. VarChar Precision

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** from section **"ODBC"**.

ODBC DSN

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** from section **"ODBC"**.

ODBC DSN User

See paragraph **"O.D.B.C. Settings for Recording Files on DataBase"** from section **"ODBC"**.

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.

20.6.4. 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. 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.
The data type supported by the column depends on the selected database format and the ODBC link.

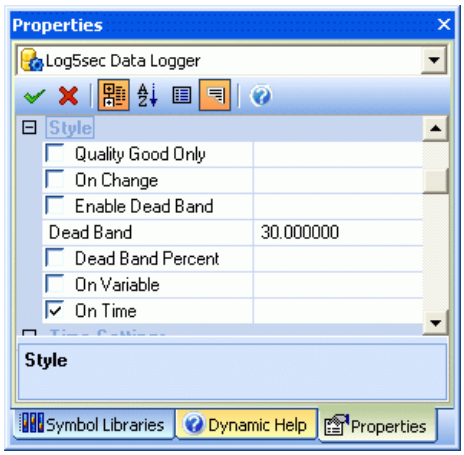
*When dealing with a **Data Logger,** the variable contents will be the value recorded in the records with the recording command.*
*When dealing with a **Recipe,** the variable in question will be the one where the recipe data will end up when the activation command is executed.*

20.7. 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'**.

20.7.1. 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.

The recording will take place in compliance with the. "Recording Variable" settings. If no settings have been enabled the Recording command will be ignored.

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 change of variables associated to Data Logger columns if the Recording Enable Variable is different from zero.
- Movicon records on the crescent front edge of the variable enabling, if a variable associated to a Data Logger column has changed value since the last recording carried out by Movicon.
- Movicon DOES NOT record anything if the enabling flag is set with a zero value.
- Movicon DOES NOT record on the crescent front edge of the enabling flag if all the variables associated to the Data Logger column have not changed values since the last recording. This also goes for all those variables which changed while the Data Logger was disabled but all returned back to the values last recorded.

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 the recording cause on command, being the change over from 'zero' status to a status 'higher than zero' of variable from the Movicon Real Time DB. 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 ODBC 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.

Recording will be carried out in compliance to the recording enabling settings "Enable Recording Variable". Otherwise the Recording command will be ignored.

Data 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.

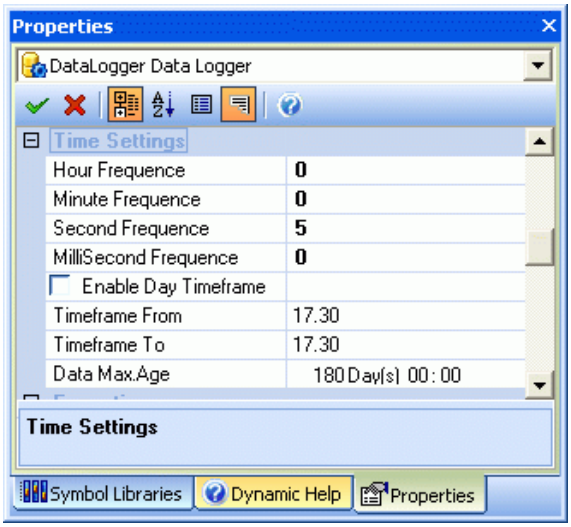
On Time

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 will be carried out in compliance to the recording's enabled settings. Otherwise the Recording command will be ignored.

20.7.2. 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.

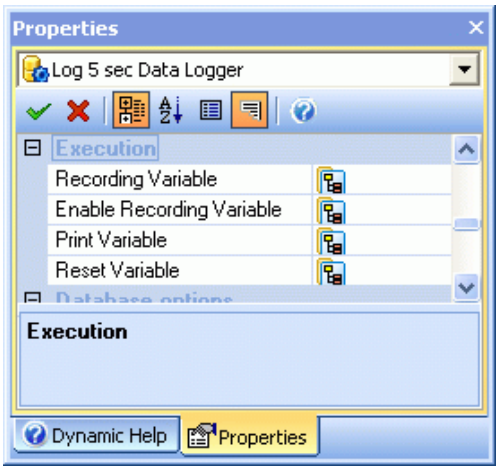
Data Max.Age

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.

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.

20.7.3. 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

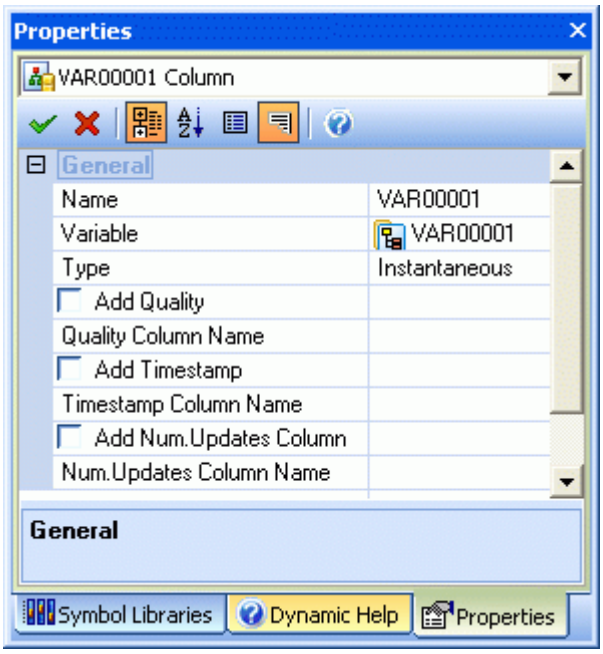
The 'Enable Recording Variable' selection box allows you to associate a variable from the Movicon Real Time DB which will determine to consent data recording, whether on event or timed. It may sometimes be necessary to impede the recording of values as being insignificant or unnecessary for specific phases of the process.
In this case you can specify a variable which, when the logic state is set different from zero, will consent the recording of data associated to the Data Logger, independently from the fact that the recording be executed on command, upon change or timed.

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.

20.7.4. Data Logger Column General Properties

Each Data Logger object had been created to manage the required number of columns. 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 undertaken in the time interval, that elapses between one recording and the next, will be recorded
- **Maximum:** the variable's maximum value undertaken in the time interval, which elapses between one recording and the next, will be recorded
- **Average:** the variable's average value undertaken in the time interval which elapses between one recording and the next, will be recorded

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

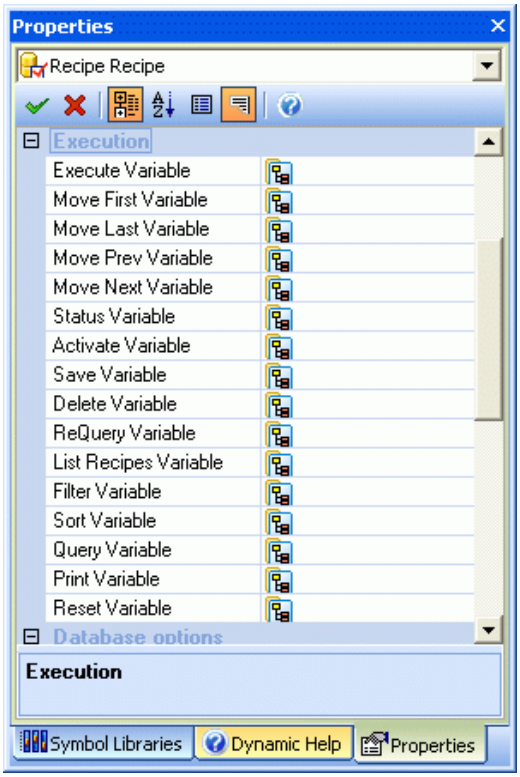
This property allows you to define a customized name for tbe Num.Updates Column when the "Add Num.Updates Column" property is enabled. If the field is left empty the default name will be used instead (NameColumn_NumUpdates).

20.8. 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'**.

20.8.1. 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.

Status Variable

In this edit box you can select a variable from the Movicon Real Time DB where the execution status of any eventual query can be returned.
When a query is to be executed, Movicon permits the logic to be informed about the set query's execution status, by notifying the status through the following bit management on the selected variable:

Bit 0 = query in Execution
Bit 1 = BOF
Bit 2 = EOF
Bit 3 = Record Cancelled
Bit 4 = Error

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

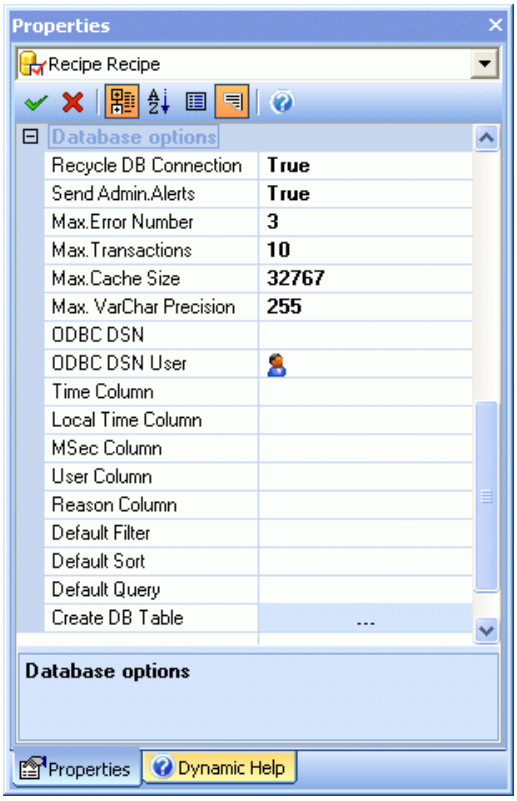
In this edit box you can select a variable from the Movicon Real Time DB to be used for sorting out the recipe data (ORDER BY clause).

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.

20.8.2. Recipe Database Settings Properties

The Recipe's Database settings properties can be used to customize the settings of the database to be generated.
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. The filter functions automatically shows the WHERE suffix in a drop-down window, allowing you to simple indicate the filter parameters.

The text string is static and cannot be changed in runtime. When you wish to use a dynamic filter function in the database object, you will need to use the "Query Variable" 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.

The text string is static and cannot be changed in runtime. When you wish to use to dynamic Sort function in the database object, you will need to use the "Query Variable" which can be setup in the "Recipe Execution Properties".

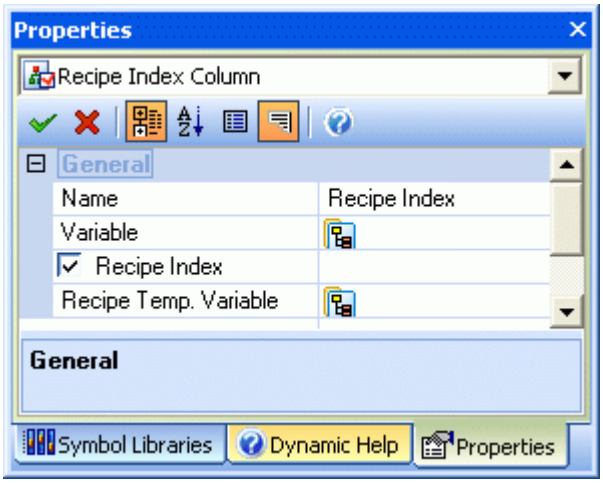
Default Query

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 is static and cannot be changed in runtime. When you wish to use to dynamic query function in the database object, you will need to use the "Query Variable" which can be setup in the "Recipe Execution Properties".

20.8.3. Recipe column General Properties

Each Recipe object has been created to manage any required number of values to be recorded and therefore Database columns. In any case 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.

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.

21. IL Logic (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 is commonly known as 'SoftLogic' and 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 (SoftLogic).

Considering the possibility of installing or connecting digital or analog I/O devices directly to the P:C, the Movicon system is capable of replacing the plant control device, such as the PLC (replaced by the IL Logic).

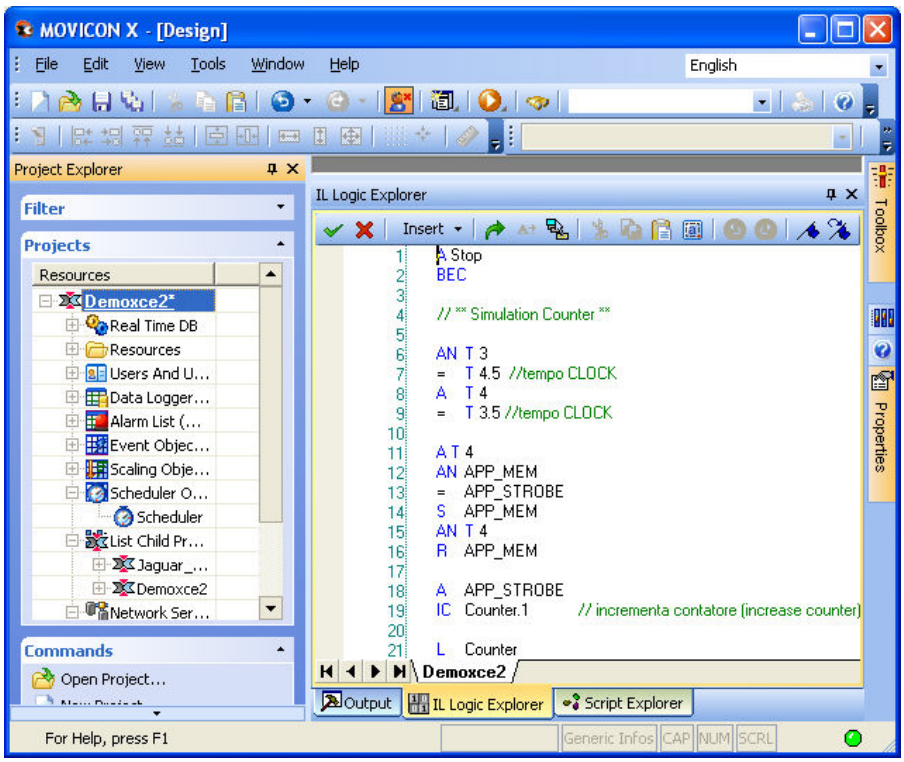
The IL Logic can be associated to projects, where it is known as **General Logic**, or it can be associated to symbols (drawings and controls) and to screens where it is known as **Local Logic**. The fundamental difference between the General Logic and Local Logic are:

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.

21.1. 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.

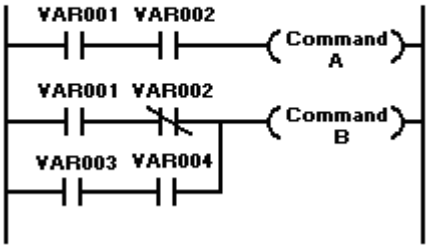
You are unlimited with the number of comment texts that can be written as long as they are preceded at the beginning of the line with the '//' character.

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).

21.2. 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  VAR001
AND  VAR002
= Command A

AND  VAR001
ANDN VAR002
O
AND  VAR003
AND  VAR004
= Command B
```

21.2.1. 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)

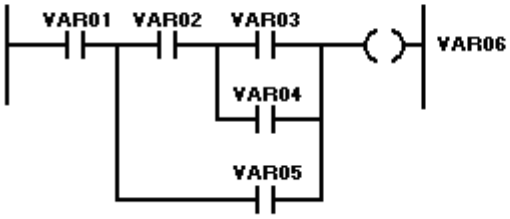
The CLR always works on the combination of instructions with variables in bit or the result of comparison operations.
The other operations (mathematical, arithmetical, Load, Transfer) do not effect the CLR.
If for example the logic result of a given sequence of instructions is in logic state '1', the 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.

21.2.2. 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)

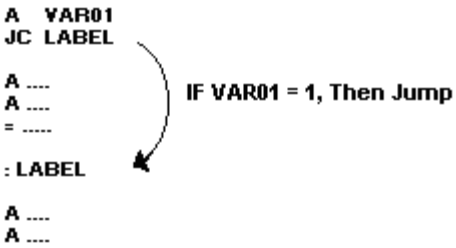


Example of instruction list logic representation (AWL)

```
A  VAR01
A(
A  VAR02
A(
O  VAR03
O  VAR04
)
O  VAR05
)
=  VAR06
```

21.2.3. 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.

21.2.4. 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
```

21.2.5. 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.

21.2.6. 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.

21.2.7. 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
```

21.2.8. 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.

21.3. 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.

21.3.1. AND Logic

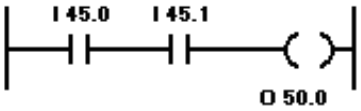
To combine two Movicon binary variables together in sets (boolean multiplication), you need to use the AND or AND NOT instructions. The AND NOT instructions will execute the AND operation with the associated variable's negation (contact closed).
Example: to set the "Out_Motor1" output variable when both the "Start_Motor" and "Cycle-Machine" input invariables are at logic state '1', you need to:

```
A    Cycle_Machine
A    Start_Motor
=    Out_Motor1
```

Example of Movicon's logic representation (AWL)

```
A  I 45.0
A  I 45.1
=  O 50.0
```

Example of contact logic representation (Ladder)



21.3.2. OR Logic

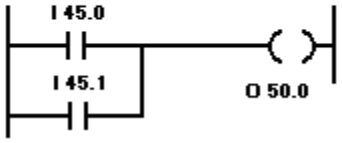
To combine in parallel two Movicon binary variables together (boolean sum) you need to use the OR or OR NOT instructions. The OR NOT instruction performs the OR operation with the associated variable in negative (contact closed).
Example: to get "Out_Motore1" output when any one of "Start_Motor" and "Cycle_Machine" inputs are at logic status '1' logic, you need to do as follows:

```
O    Cycle_Machine
O    Start_Motor
=    Out_Motor1
```

Example of Movicon's logic representation (AWL)

```
O  I 45.0
O  I 45.1
=  O 50.0
```

Example of contact logic representation (Ladder)



21.3.3. Sequence Combination

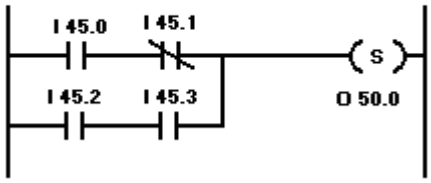
Logic sequences can be combined together. The example below illustrates the OR combination of two AND sequences for setting the output variable:

```
A   Ciclo_Auto
A   Start_Motor
O
A   Ciclo_Man
A   Start_Motor
S   Out_Motor1
```

Example of Movicon's logic representation (AWL)

```
A   I 45.0
AN  I 45.1
O
A   I 45.2
A   I 45.3
S   O 50.0
```

Example of contact logic representation (Ladder)



21.3.4. 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
```

21.3.5. 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.

21.3.6. Summary Table Bit Instructions

Functions	Instructions	Operands	Descriptions
AND	A	I,O,F,T,Not Shared	Combination of AND logic between binary variables. Bit interrogation on signal "1"
OR	O	I,O,F,T,Not Shared	Combination of OR logic between binary variables. Bit interrogation on signal "1"
AND NOT	AN	I,O,F,T,Not Shared	Combination of AND NOT logic between binary variables. Bit interrogation on signal "0"
OR NOT	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	I,O,F,Not Shared	The variable is set to logic state "1" when the CLR = 1.
RESET	R	I,O,F,Not Shared	The variable is reset to logic state "0" when the CLR = 1.
Bracket AND	A( )		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( )		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	LABEL	Unconditional jump to specified label. The program flow will be transferred to the label position ":".
JUMP Conditioned	JC	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.

21.4. 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.

21.4.1. 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.

21.4.2. 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).

21.4.3. 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.

21.4.4. 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 into ACCU2
OW            // execute the OR between the two values and put it in ACCU1
T  Data3      //  transfers ACCU1 to Dato3
```

21.4.5. 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.

21.4.6. Word Summary Table Summary Table

Function	Instruction	Operand	Description
LOAD	L, LC	Byte, Word, DWord from any area. Constants KD,KH,KF	Loading a byte, word or doubleword into Accu1. Loading a numerical constant. LC instruction = loading conditional upon CLR
TRANFER	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		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		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		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		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		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		Data contained in Accu1 converted from binary code to BCD code. **The data must be in Word format.**
Decimal conversion	DCB		Data contained in Accu1 converted from BCD code to binary code. **The data must be in Word format.**
Swap Byte	SWAPB		Bytes exchange for the Accu1 Word
Swap Word	SWAPW		Words exchange for the Accu1 DWord

21.5. 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.

21.5.1. Compare Summary Table

Function	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.

21.6. 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 ACCU2 value and put the result into ACCU1
T  Data3    //  transfer ACCU1 to Data3
```

21.6.1. Arithmetic Instructions Summary Table

Function	Instruction	Operand	Description
Sum	+, +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		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		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		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.
Shift to Right	>>, >>C		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		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.

21.7. 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
```

21.7.1. Mathematic Instructions Summary Table

Function	Instruction	Operand	Description
Floating Point	FLOAT		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		Preset for calculation with integers. The following mathematical numbers will be considered integers. Active by default unless otherwise specified.
Sin	SIN, SINC		Calculation of Sine of number contained in Accu1. The result is placed in Accu1.
Cosin	COS, COSC		Calculation of Cosine of number contained in Accu1. The result is placed in Accu1.
ArcSin	ASIN, ASINC		Calculation of ArcSine of number contained in Accu1. The result is placed in Accu1.
ArcCosin	ACOS, ACOSC		Calculation of ArcCosine of number contained in Accu1. The result is placed in Accu1.
Tangent	TAN, TANC		Calculation of Tangent of number contained in Accu1. The result is placed in Accu1.
ArcTangent	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		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		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		Calculation of square root of number contained in Accu1. The result is placed in Accu1.

22. Child Projects

Movicon lets one project be integrated with other projects enabling it the possibility to interact with their resources.

The **'Child Projects'** are normal Movicon projects, which can function quite easily in independent mode, are embedded by another project defined as the **'Parent Project'**. This type of mechanism allows a relationship between the projects to be established permitting each project to interact with the resources of the other.

The Child Projects facility are of a great help to plants or modular machines, when, for instance, the plant is subdivided into different areas which may also be independent of the other. In this case more projects can be created, one for each area, and then integrated in one unique Parent Project from which the pages and variables of the Child Projects can be accessed.

A project can be also associated with more than one Child Project which in their time can also be Parents to other numerous Child Projects. Therefore a real family tree structure of projects can be created.

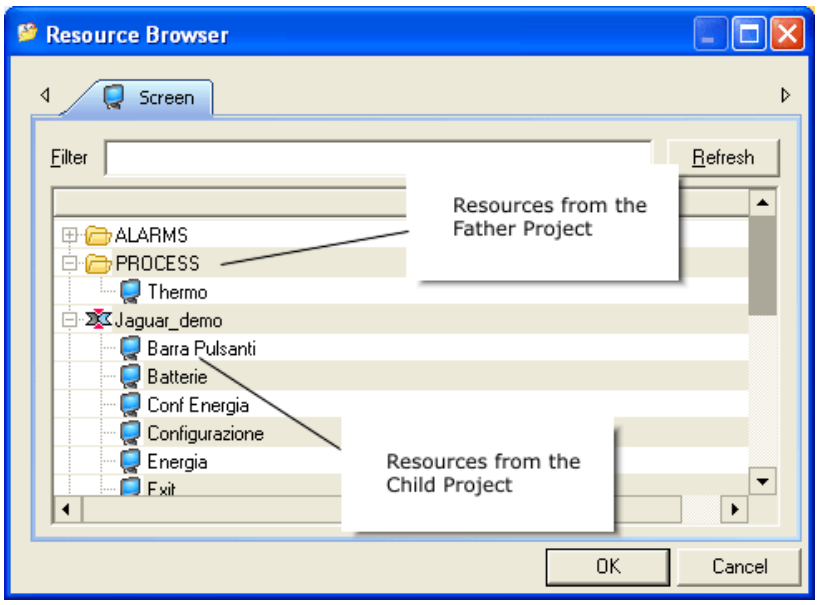
22.1.1. Child Project Paths

The 'Child Projects' can be retrieved both with a PC local path in which the 'Parent Project' resides and with a network path.
The most easiest way is surely to insert the folder containing the 'Child Project' into the 'Parent Project' folder. In this way the 'Child Project's' search path will always be related to the 'Parent Project's' path so when moving all the 'Parent Project' folder to a different path or to another PC there will not be any problems with not finding it.
When the 'Child Project' is inside the 'My Documents' folder the research will always be carried out in relation to the 'My Documents' folder of the user logged on at that moment.
When the 'Child Project' is in another folder or in a computer in net the research path will be fixed.

When possible it is always best to insert the 'Child Project' inside the 'Parent Project's' folder or subfolder to avoid absolute research paths.

22.1.2. 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

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.

22.1.3. Child Project Users Inclusion

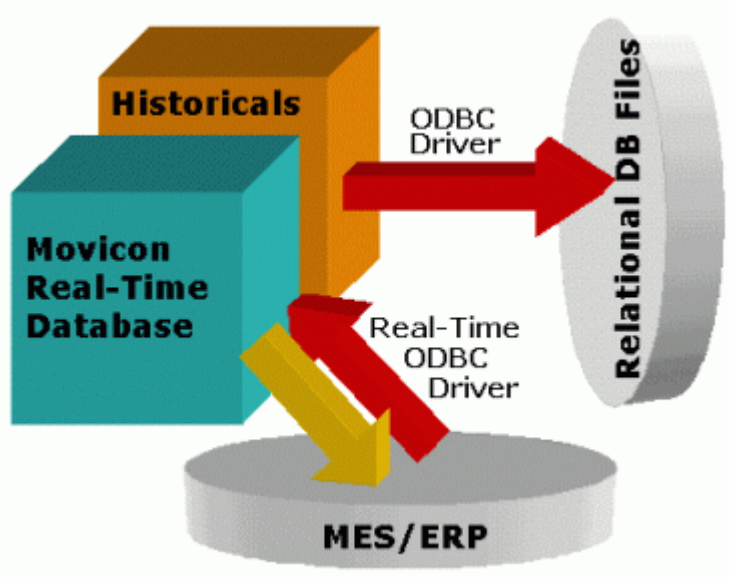
The User and Password management internal 'Child Projects' dependents exclusively on settings carried out in the 'Parent Project'. When the Password management is enabled in the 'Parent Project' this means that it will also be active in 'Child Project'. On the other hand, when it is not active in the 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 requisted 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.

23. O.D.B.C.

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 (O.D.B.C.) 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.



This illustration demonstrates how the data link works according to the ODBC standard

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 independ 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.

23.1. O.D.B.C. 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 for MsAccess™, Excel™
To install the SQL Server™ drivers you need to execute a 'Customized' installation and select the MSDE item (Microsoft Data Engine). In this way Movicon will install the MSDE kit which integrals only the RunTime part of the SQL Server database management.

Movicon is preset to install the ODBC drivers of the Microsoft Access, Excel and SQL Server MSDE products.
When using other database products you will need to check whether the relevant ODBC driver supplied by the manufactures has been installed.

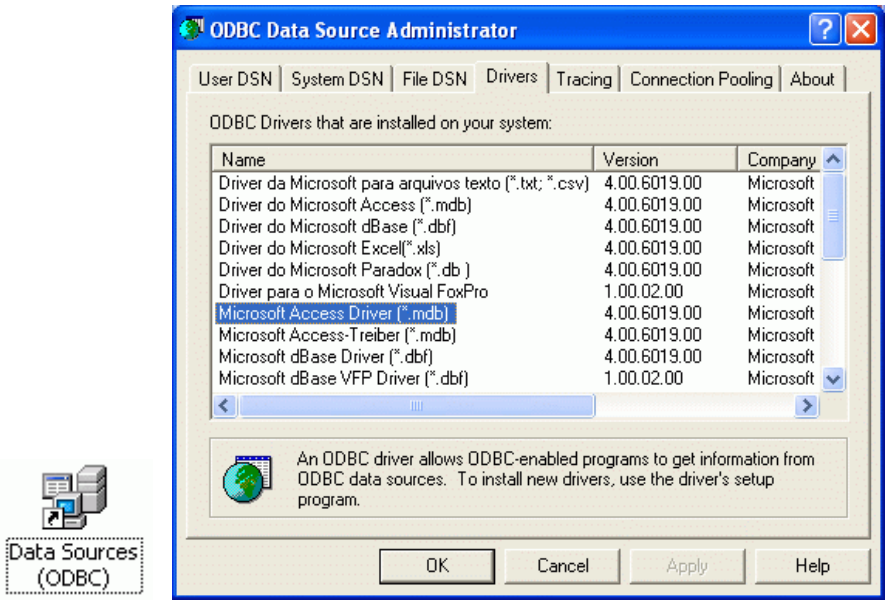
The operating system, however, provides a series of ODBC drivers already available in different formats (Paradox, FoxPro, dBase, ecc.), which can be accessed just like all the other ODBC settings from the **'Administrator Tools - ODBC Data Source'** item on the **'Control Panel'.**

23.2. O.D.B.C. 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.

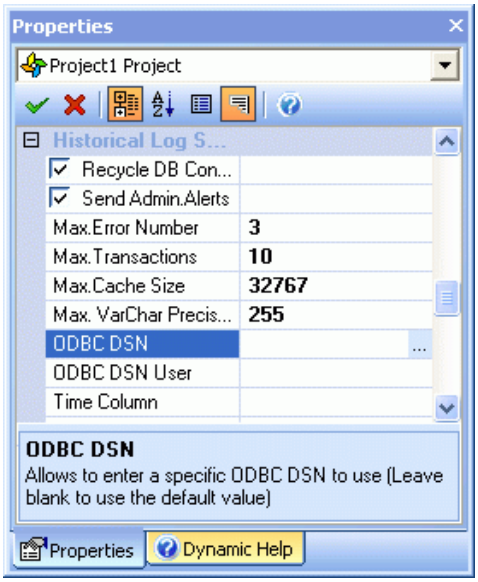
It is through this 'Link with the ODBC driver that enables a resource from a Movicon project application to record data on file. The ODBC links must all be registered in the operating system through the appropriate ODBC system settings from the **'Administrator Tools - ODBC Data Source'** item on the **'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™ 2000 format with only one command.
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:

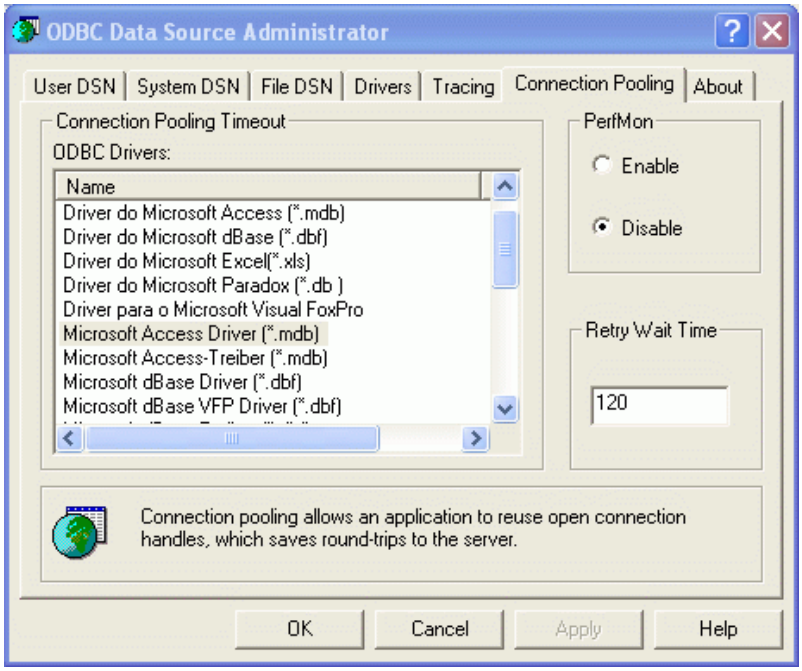


If the user is using a SQL Server™, Access™ or Excel™ database format, Movicon will remarkably simplify the ODBC links management by automatically creating the necessary manoeuvres with just one command.

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.

23.2.1. 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.

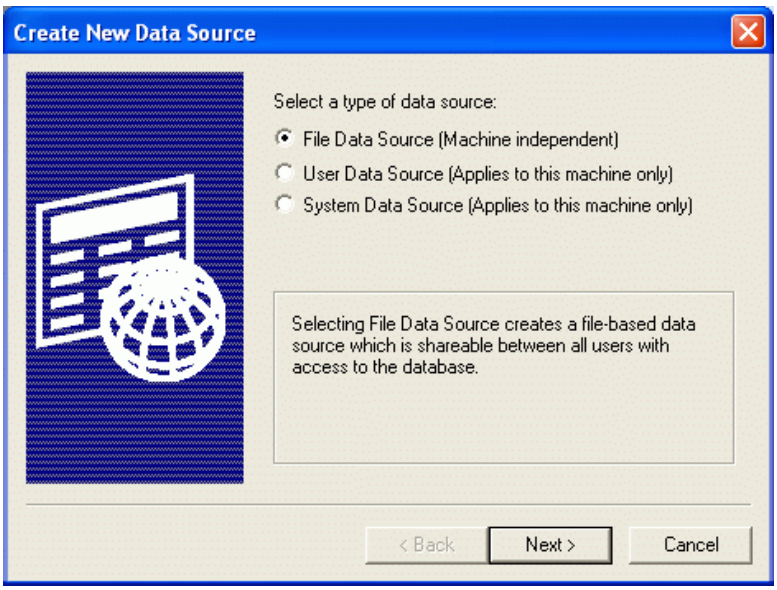
23.3. Creating O.D.B.C. links automatically

The first thing Movicon X does at Startup is check for any existing ODBC links and only when none exist does it create one by using the default provider (changeable with the registry key "UseDefaultSQLServer"). 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), when the existing one does not allow database connectivity.

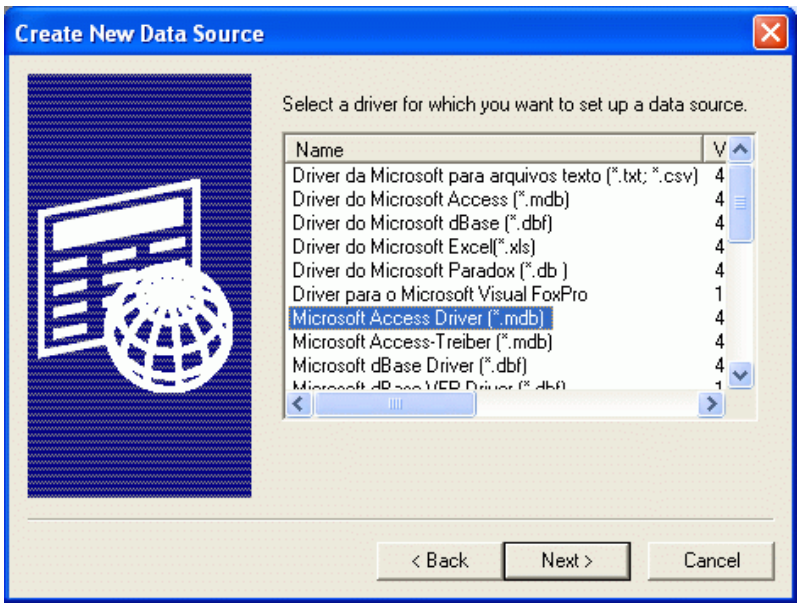
23.4. Creating O.D.B.C. Links Manually

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:

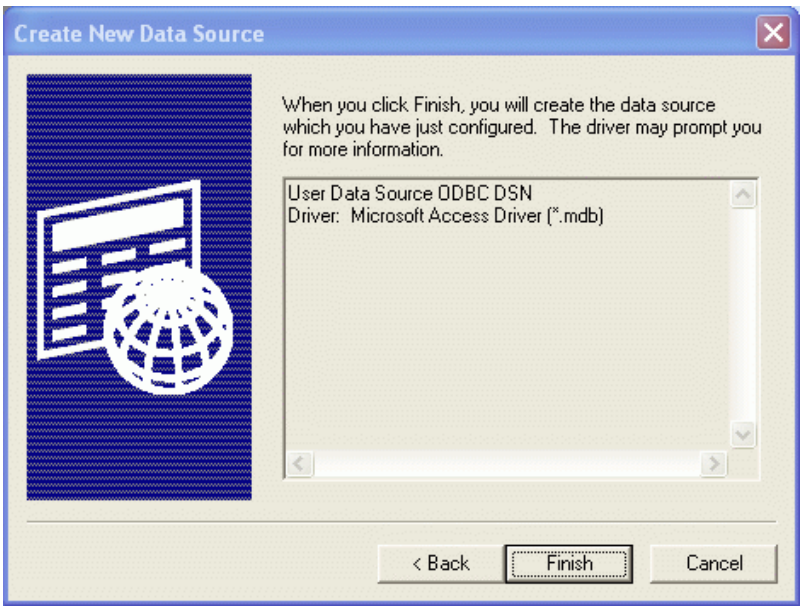
The first thing you will be asked is to select the type of ODBC data source. The most common selections are usually 'User Data Source' or 'System Data Source':



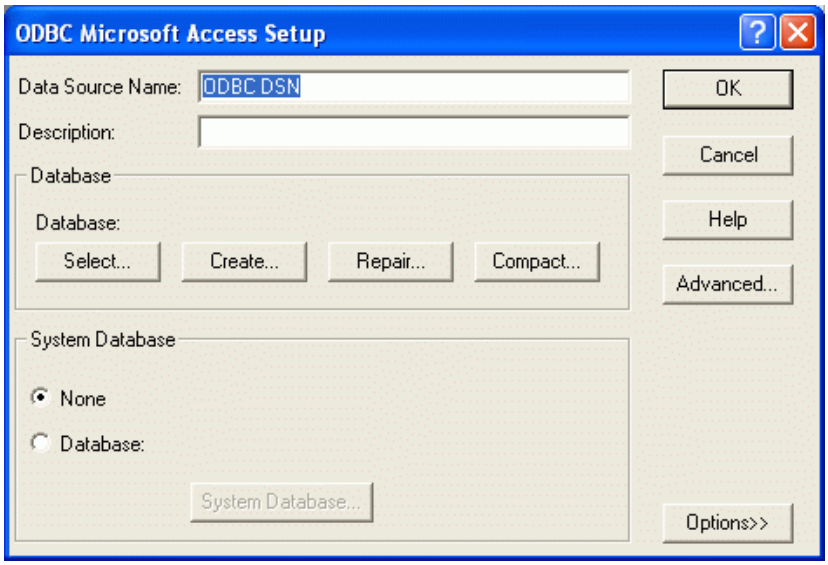
2. At this point you will need to select the ODBC driver you intend to use:



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.

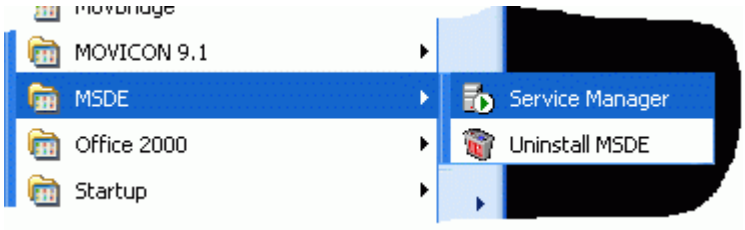
23.5. SQL Server with MSDE

If you decide to use the SQL Server format, Movicon permits the Microsoft MSDE, the SQL Server standard, to be installed. This SQL product requires the user to refer to the instructions reported in the SQL Server's user's manual.

The Microsoft MSDE service is installed from the Movicon installation CDROM by executing a 'Custom' installation and selecting the MSDE (Microsoft Data Engine) item.
The Microsoft MSDE Manager provides the use of the SQL Server ".MDF" formats by managing tables customized within the SQL Server Database.

If you need to re-install the MSDE service, it can be done by launching the 'MSDEx86.exe' file from the Movicon CD ROM directory with the same name by following the installation information reported in the 'readme.txt' file. If any errors are signalled during the installation phase you will have to refer to the 'Setup.log' file and the more specific 'Sqlstp.log' file which are found in the Windows installation directory.
The Service Microsoft MSDE service has to be running before any ODBC links with the SQL Server data format can be carried out. In order to do this carry out the following procedure:

1. Install the Microsoft MSDE service from the Movicon installation CD, if not already done so
2. Run the MSDE Service Manager from the Windows start menu, if not already active



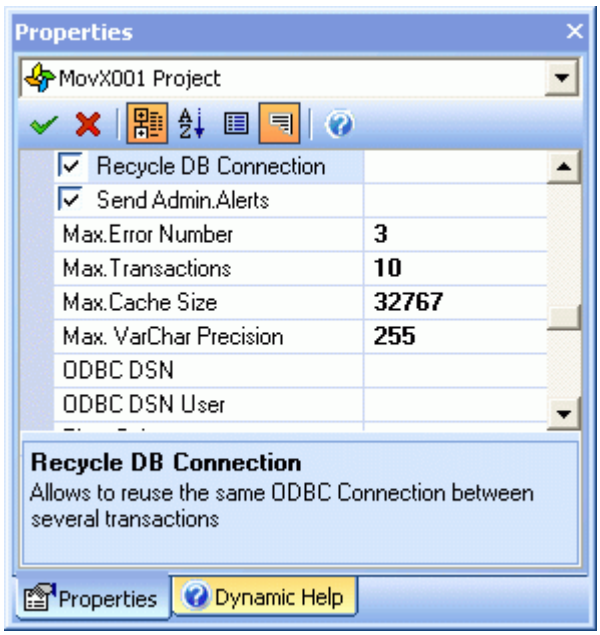
3. Put the MSDE engine in Start/Continue, if not already done so:

4. Check whether the MSDE icon shows in the Windows application bar:

5. From this point onwards you can go ahead with creating the ODBC links in Microsoft SQL Server format.

23.6. O.D.B.C. Settings for Recording Files on DataBase

Some parameters which are used for ODBC links are always the same ones used, independently whether recording a Historical Log, a Data Logger, variable tracing, etc. These parameters are described below:



Recycle DB Connection

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.

Send Admin.Alerts

When this property is enabled, each time an error is generated in the current **ODBC** connections the operating system will open an error alert message window by means of Windows' 'Messaging Services'. The **"Abilita Admin.Alerts"** property must also be enabled in the 'Project Run Settings'. The error alert message can also be sent locally to the PC where the Movicon project is being run or to a PC connected in net. This is to be specified in the **"Server Admin Alerts"** property in the **'Project Executing Settings'**.

Max. Error Number

The highest number of ODBC 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 onf 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 X 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

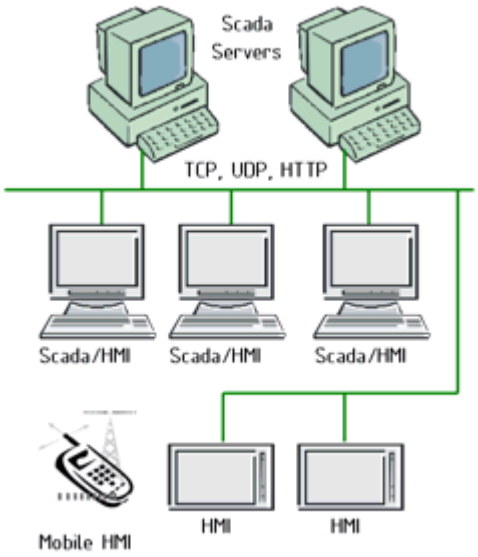
This property specifies the users name to be used for the **ODBC** connection.

24. 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.



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.

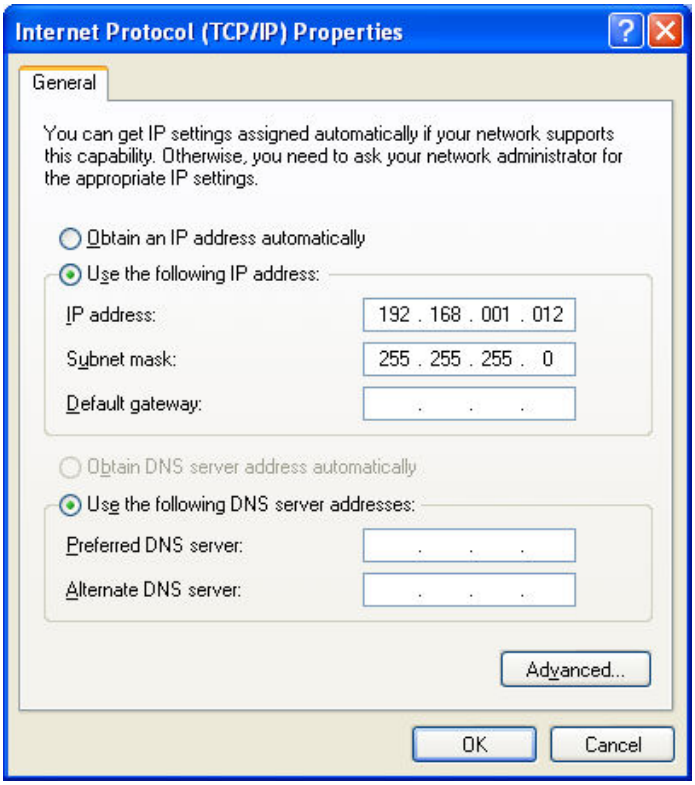
24.1.1. Network Installation

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:

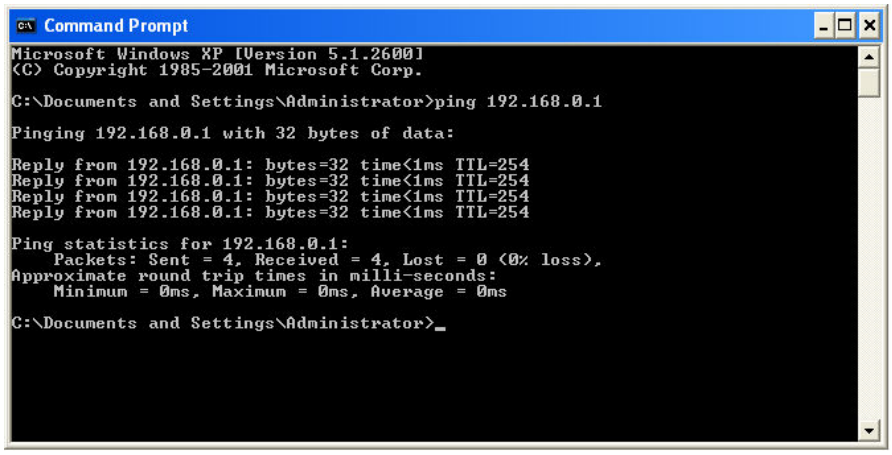


Obviously each PC should receive in association its own IP address which is expressed as being unique by the last two figures.

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.

Using WinXP SP2, remember to check the Access Rights for the Firewall.

24.1.2. Movicon in Network

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'.

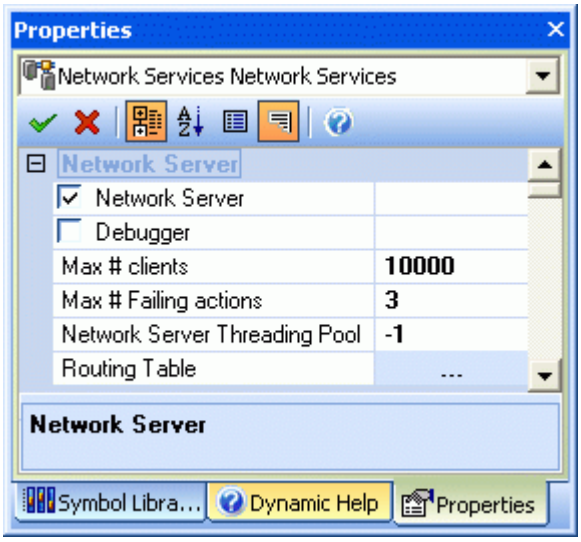
24.2. Network Services Properties

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**

24.2.1. 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.

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.

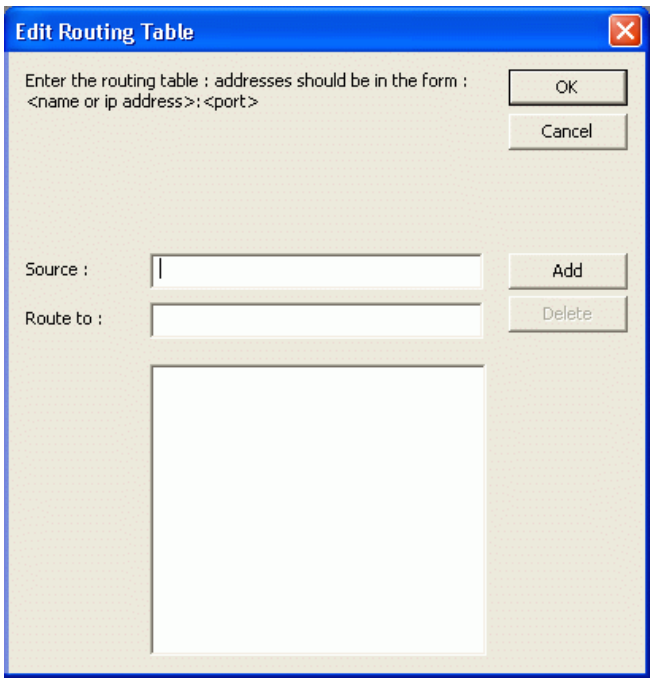
Max # Failing Actions

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

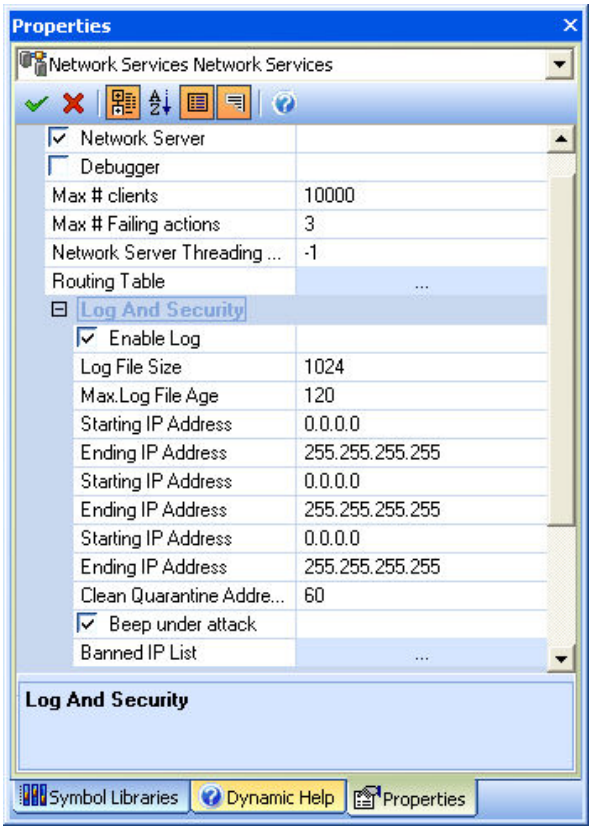
Number of threads to be used for handling Server packets. When inserting a number in the negative the subdivision of threads will be done based on the number of processors in the PC.

Routing Table



24.2.2. 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.

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)

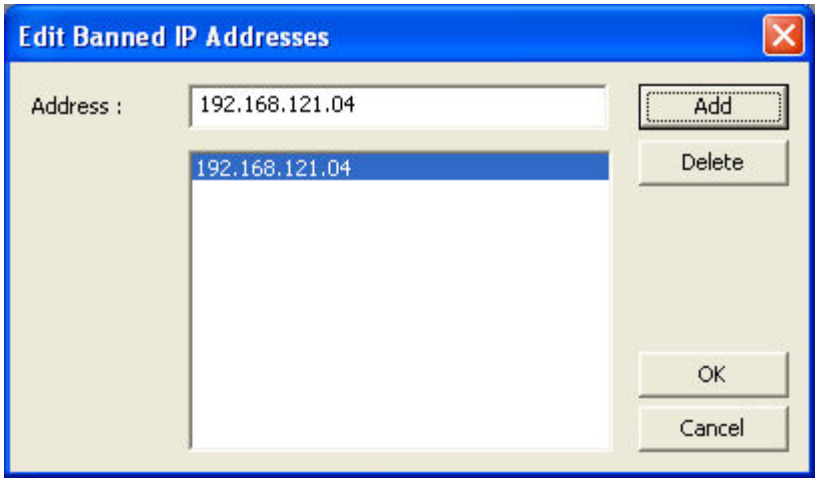
This property allows you to set every how many minutes the IP addresses in quarantine must be cleaned. In this way any Client in quarantine can be accepted by the Server again if the request to do so does not continue to generate an error.

Beep Under Attack

When enabling this property, the Server will give out an acoustic signal every time an unauthorized Client tries to connect.

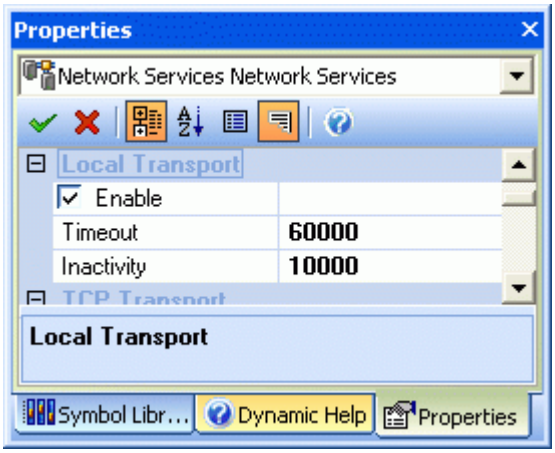
Banned IP List

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:



24.2.3. 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. This is very handy above all in the project debug phase for carrying out simulations.



Enable

This property let's you enable or disable the use of the Local Transport for networking between Server-Client stations.

Timeout (ms)

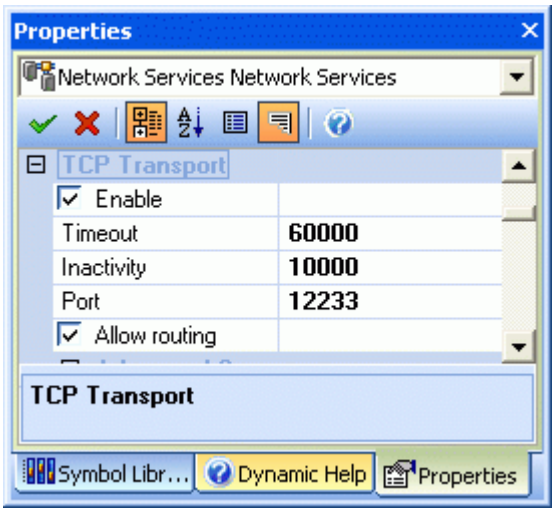
This property allows to enter the timeout in milliseconds for the response of a message sent to a remote station. When this time expires a error message will be generated.

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.

24.2.4. 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

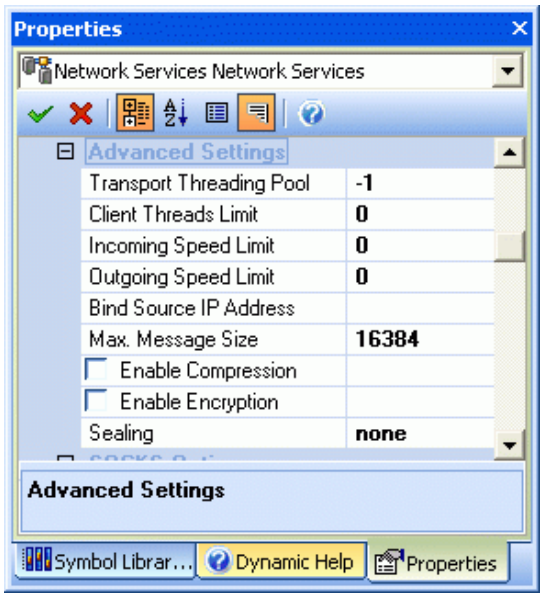
This property allows you to set the number of ports (sockets) to be used for the transport.

Allow Routing

This property allows you to enable the Transport to participate in routing messaged addressed to other Transports.

24.2.5. 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.

Enable Compression

This property allows exchanged packets to be compressed.

Enable Encryption

This property allows the exchanged packages to be encrypted to guarantee top security.

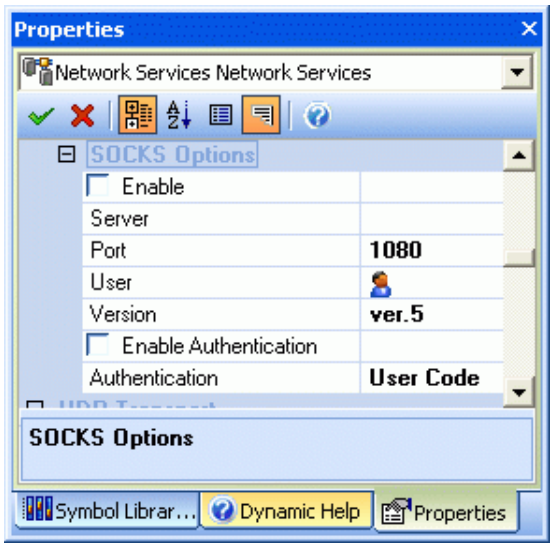
Sealing

This property allows you to select the desired encryption algorithm. The choices are:

- **None**
- **MD5**
- **CRC32**
- **Adler**

24.2.6. 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**

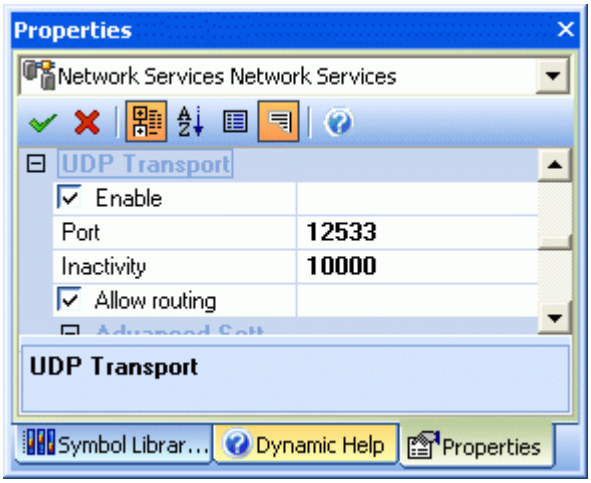
Enable Authentication
This property is used for enabling the Socks authentication for the Transport.

Authentication
This property is used for selecting the authentication type to be executed. The choices are:

- **No Authentication**
- **User Code**

24.2.7. 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.

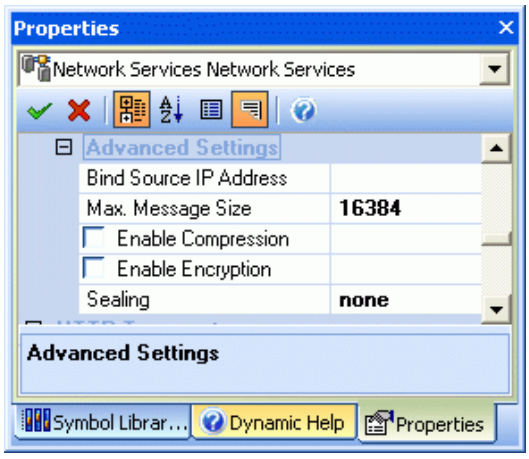
Inactivity (ms)
The set value (default 10 sec.) is used for keeping the resources active in the sockets as not to continually create on the Server for the various Clients. This value is multiplied by 30 (default 1000 x 30 = 5 mins) to manage the disconnection of inactive Clients. When a Client's connection 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.

24.2.8. 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.

Enable Encryption

This property is used for encrypting transmitted packets to guarantee maximum security.

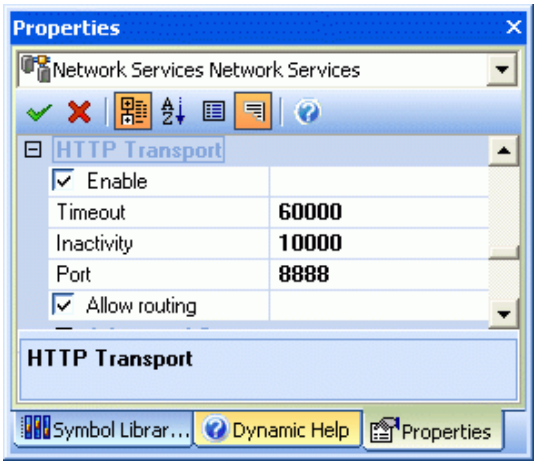
Sealing

This property allows you to select the encryption algorithm desired. The choices are:

- **None**
- **MD5**
- **CRC32**
- **Adler**

24.2.9. 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

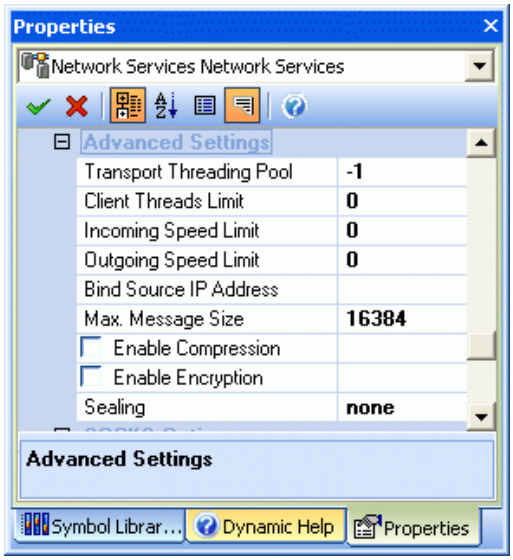
This property allows you to set the number of ports (sockets) to be used for the transport.

Allow Routing

This property allows you to enable the Transport to participate in routing messaged addressed to other Transports.

24.2.10. 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.

Enable Compression

This property allows transmitted packages to be compressed.

Enable Encryption

This property allows the exchanged packages to be encrypted to guarantee top security.

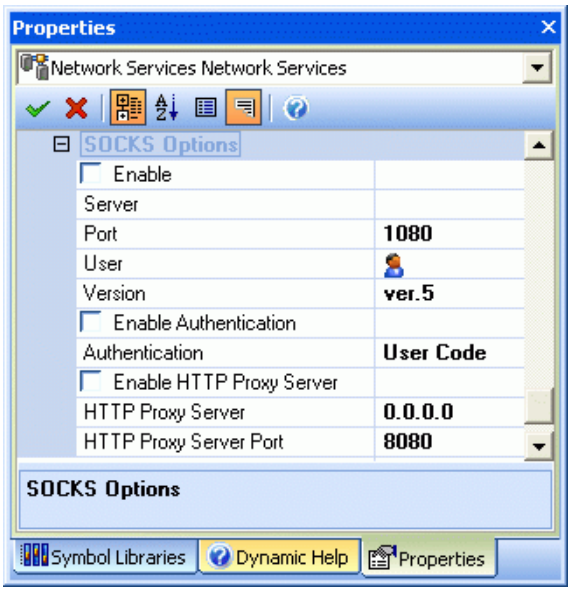
Sealing

This property allows you to select the desired encryption algorithm. The choices are:

- **None**
- **MD5**
- **CRC32**
- **Adler**

24.2.11. 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

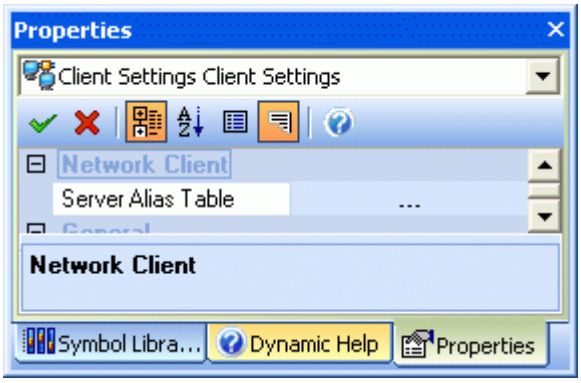
This property is used for setting the Proxy Server's port.

24.3. 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.

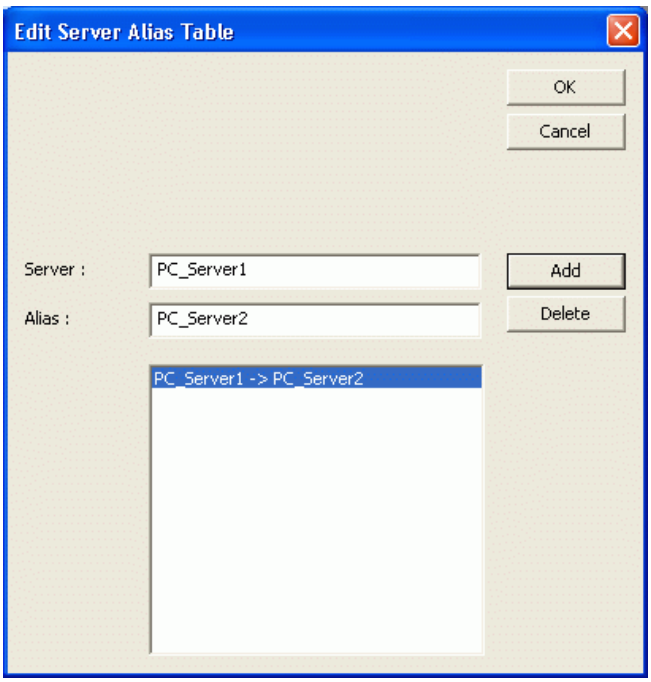
24.3.1. Network Client Properties

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:



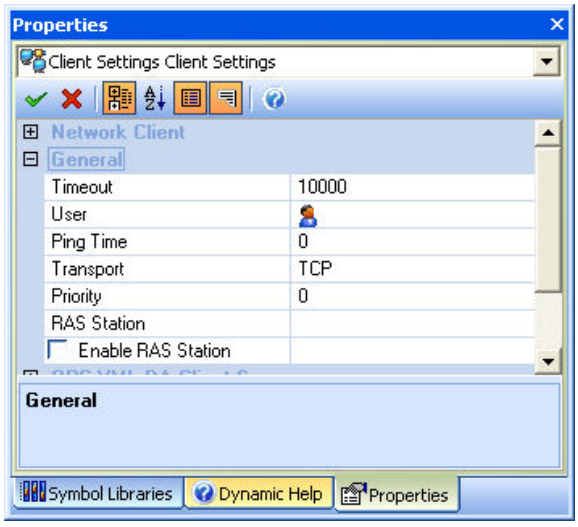
The fields shown in the Alias window have the following meanings:

- **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.

24.3.2. 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.

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

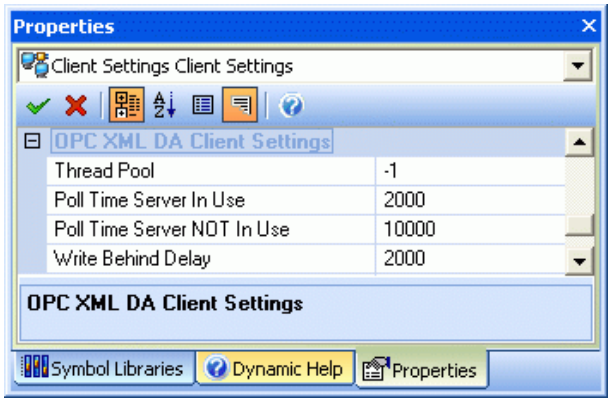
This property is used for selecting a RAS connection (which must be created beforehand) to connect to Server exploiting telephone lines.

Enable RAS Station

This property is used for enabling the use of a RAS station to connect to the Server exploiting telephones lines.

24.3.3. 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.

24.4. 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.

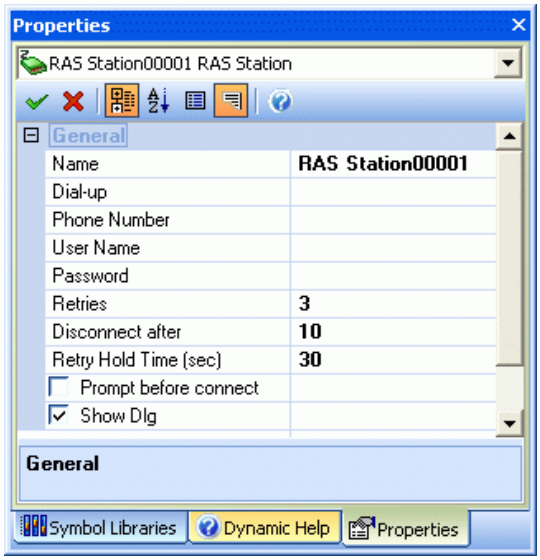
*The **RAS Connection** is a Operating System function that allows a Server-Client type connection between two stations using a connection via Modem. One the connection has been established the TCP/IP protocol can be used for exchanging data between Server and Client. The RAS connection can be created from the "Control Panel - Network Connections". However, the configuration procedure may change slightly according to the Operating System being used (ie. Win2000, WinXP).*

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.*

24.4.1. 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.

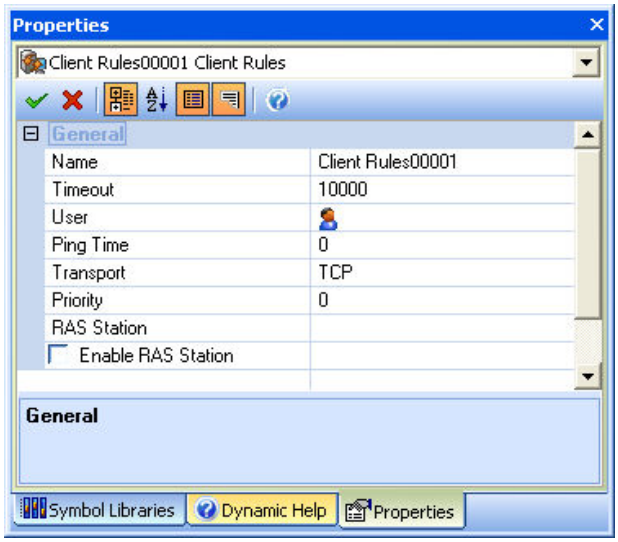
24.5. Client Rules

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.

24.5.1. 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.

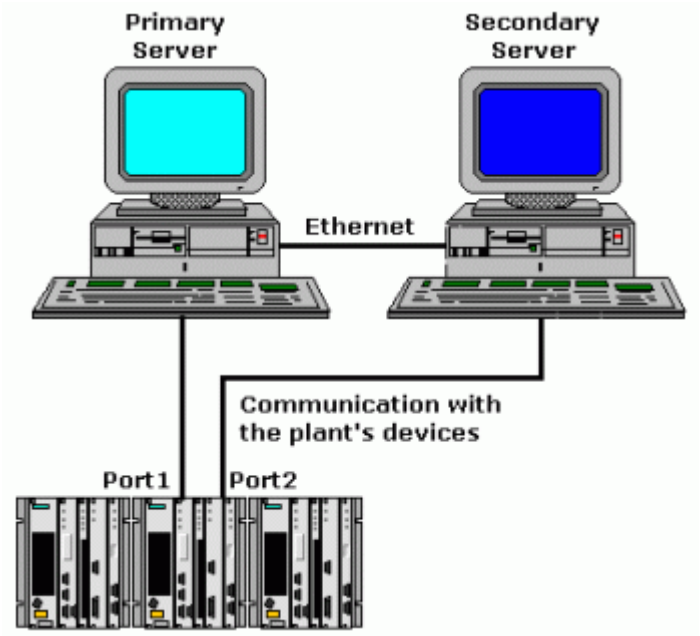
25. Redundancy

Movicon embeds powerful automatic functions to support the Hot Backup of critical stations workstations redundantly connected in network. Slave intervention, re-entry, data synchronisation 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.

25.1.1. 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**
- **Schede I/O**

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 synchronisation times of up to less than a second when great amounts of data are involved. This is due to synchronising data acquired during the emergency take over period by transmitting data in binary format instead of database format structures.

25.1.2. 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
- Historical Log management
- Alarm management

Any one of these functionalities is kept on Stand-by in the secondary station, and becomes active when the Primary station crashes to safeguard against losing control over the plant.
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. Operativity 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 archives (Data Logger and Historical Log) do not work directly, to ensure absolute identical recorded data. The appropriated system redundancy functions make sure that data acquired and recorded by the primary are archived identically and directly on the secondary. This ensures complete data integration with time precision
- 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

"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. 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.

25.1.3. Advanced Redundancy Functions

Movicon has some special functions embedded in the critical system redundancy management to extend the functions provided for the user.

Sychronized 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.

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:

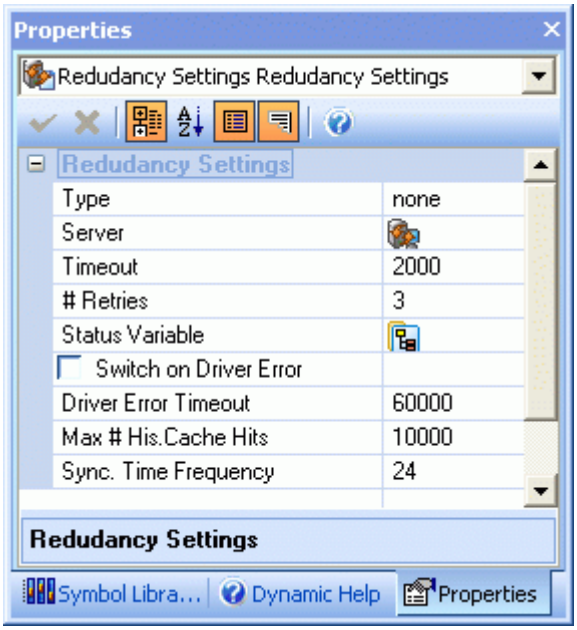
Function	Description
System Variables	Movicon System Variables can not be made redundant.
Alarm Basic Scripts	The Alarm Basic Script interface is not managed in redundancy.
Trend Output	Out put on Vectorial Trend files is not managed in redundancy due to the fact that the Trend's connection to the Data Logger is managed for this.

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.

25.2. 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.

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 is set at true in both projects, Primary and Secondary, when the Secondary Server is connected 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 Started Up on Secondary. This bit is set at true only in the project set as Secondary Server when its Communication Drivers start working due to an error in the Primary Server, eg. crash, disconnected etc
- **Bit 6:** not used
- **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 # His. Cache Hits

The maximum number of recordings on the Historical log before being the DB is recycled and loses synchronization is entered here.

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.

26. OPC (Ole for Process Control)

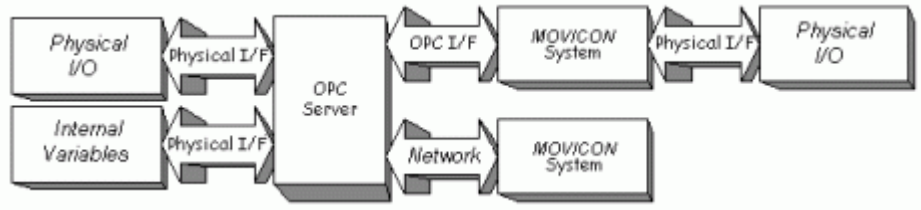
OPC is the most commonly used standard due to its user-friendly communication modalities based on different bus technologies.

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.

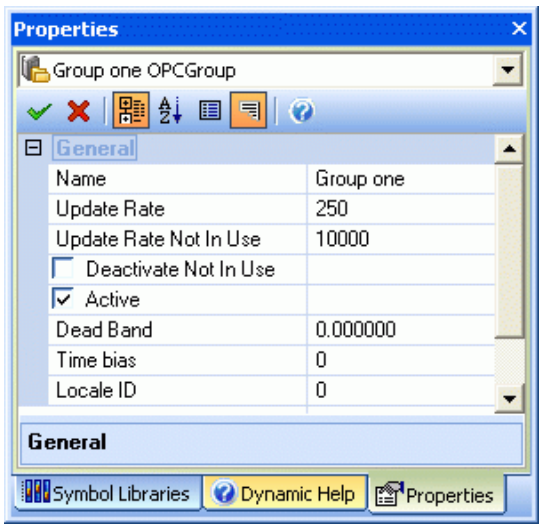
In view of the increasing consolidation of the OPC standard in industrial automation, this technology must be considered as a communication mode with bus network devices or with other local or remote applications only.



This figure shows a block diagram of a typical OPC communication.

26.1.1. 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 edit box allows you to set a value in minutes which is needed for converting the Group's Items' Time Stamp property to the device's local time. Normally the default zero value does not need changing.

Local ID

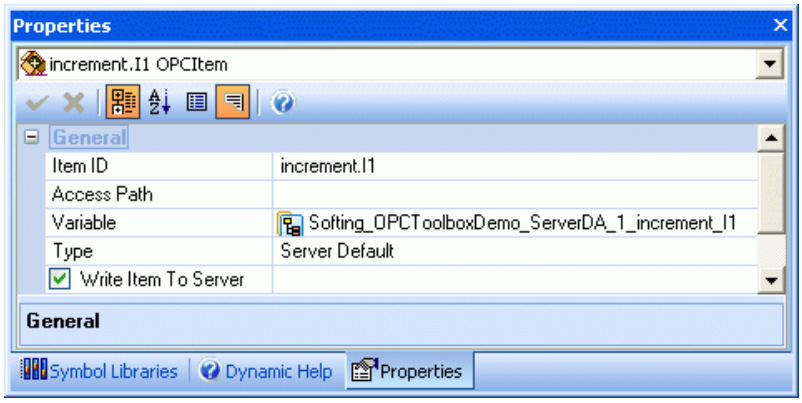
This edit box allows you to set the Group with a numeric ID value to localize the strings sent by the Server. Normally the default zero value done not need changing.

26.1.2. 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

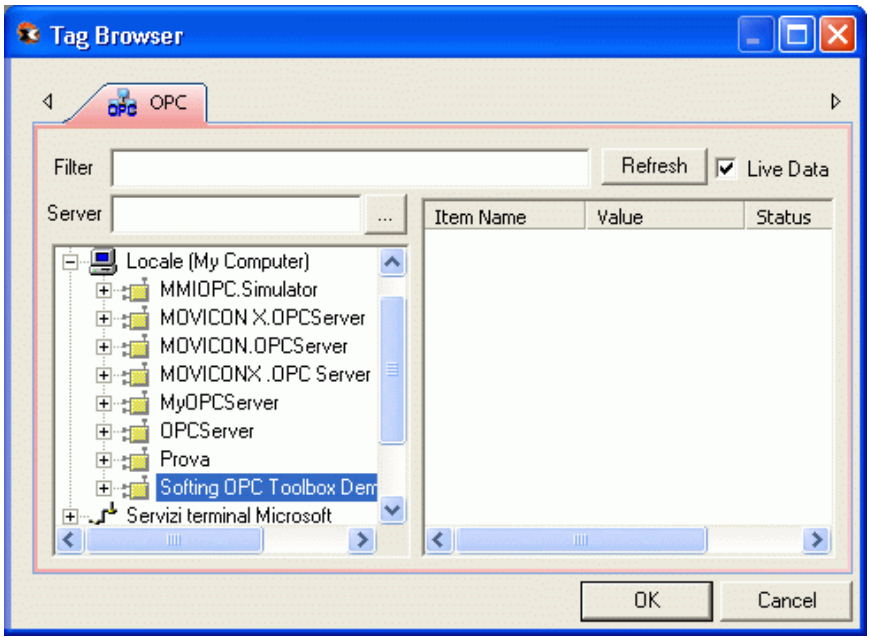
- **Short, Long, Float, Double, etc.**: According to the option box checked, the corresponding conversion will be carried out on the item, and therefore the project variable assigned, to contain the data in the format indicated here

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.

26.1.3. 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.



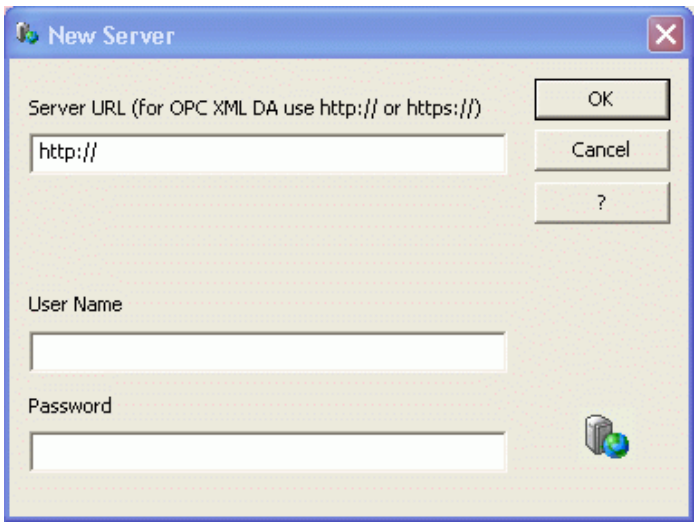
In the window which shows the list of available Servers you can select a local Server from the "Local (My Computer)" group or a Server residing in another PC on the network from the "Microsoft Windows Network" group. Whereas the "Internet Servers (OPC XML DA)" group allows you to select a OPC XML Server 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:

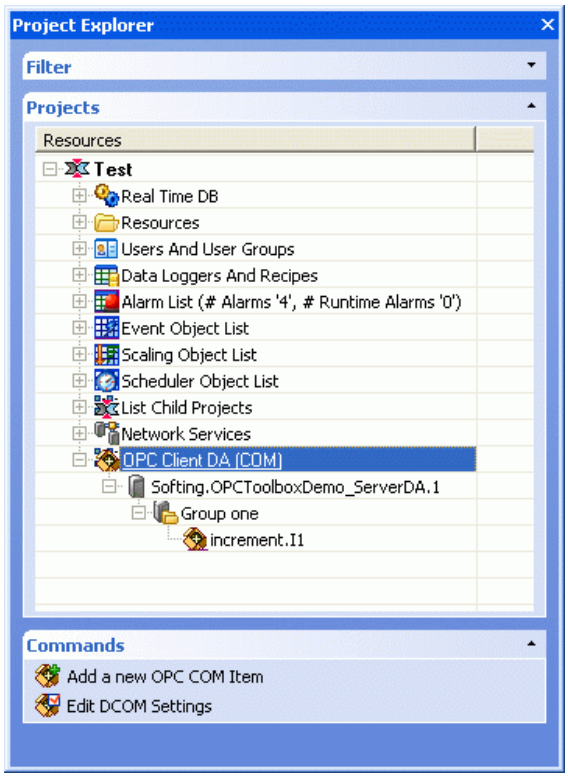


Live Data

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.

26.2. OPC Client Editor

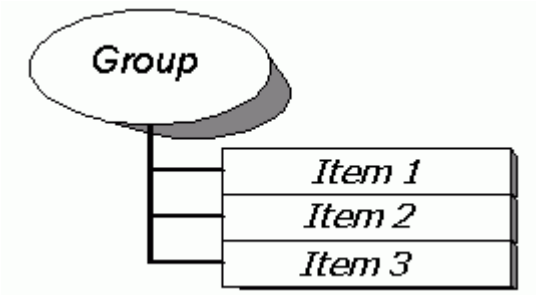
In the OPC communication Movicon has provided a Client interface which can be entirely configured and which supports any OPC Server created according to he OPC 1.0A and 2.0 specifications. This resource, integrated into the system, is identified with the "OPC Client DA (COM)" name and can be accessed 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

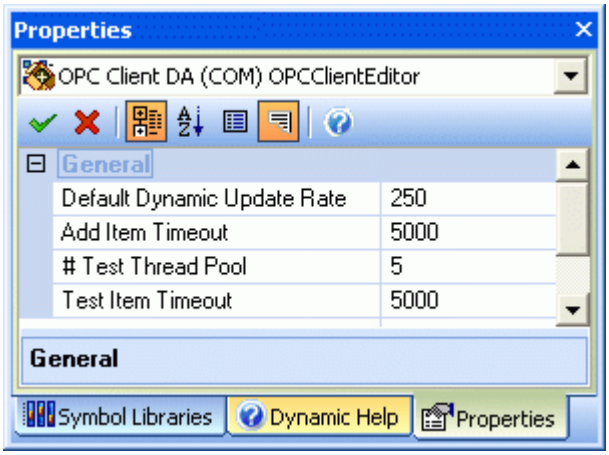
Movicon allows any object (OPC Server, Groups, Items) setup within the "OPC Client DA (COM)" resource to be copied from one project to another. In order to carry out this procedure, you need to activate the project containing the parts to be copied, select the objects desired from the "OPC Client DA (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.

26.2.1. 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.

 # Test Thread Pool

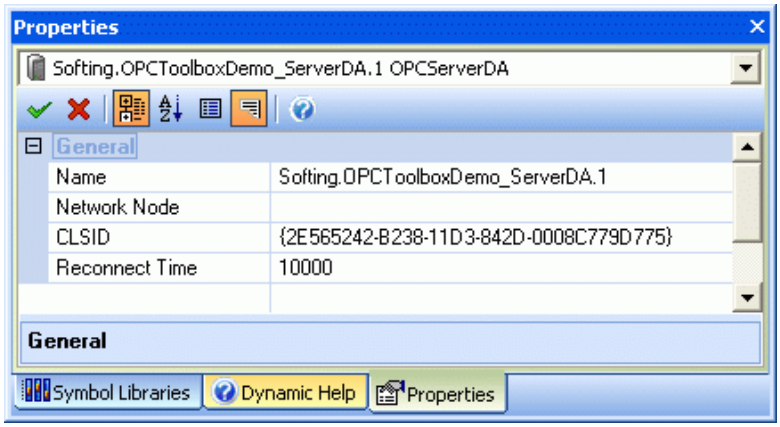
This edit box is used for entering the number of Threads to be used for the OPC Item test run upon connecting to the Server.

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.

26.2.2. 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.

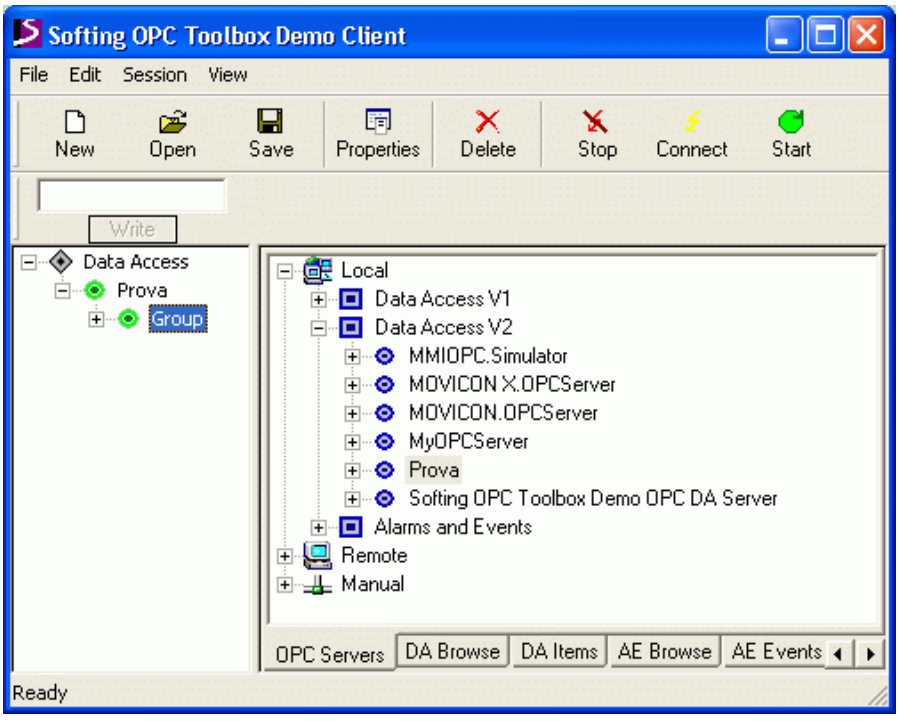
Reconnect time

The time after which the Server will be reconnected is entered in this edit box in milliseconds.

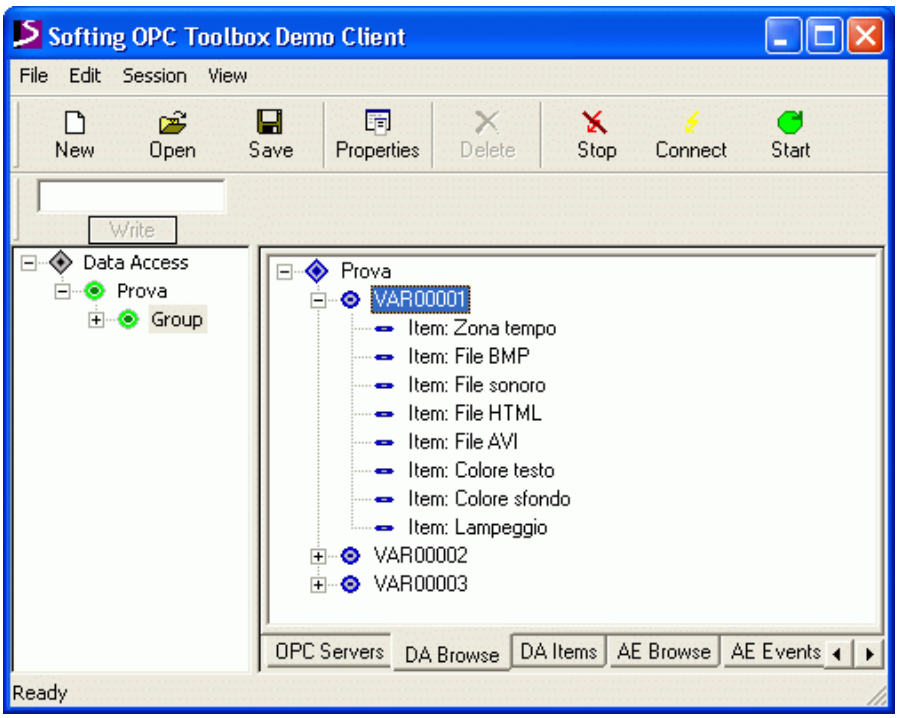
26.3. OPC Server

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 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.

27. On-line Changes to Projects

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.

27.1.1. 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.

Accelerator Resources

The on-line changes are applied to these resources after the first consecutive change page has been executed.

Basic Script Resources

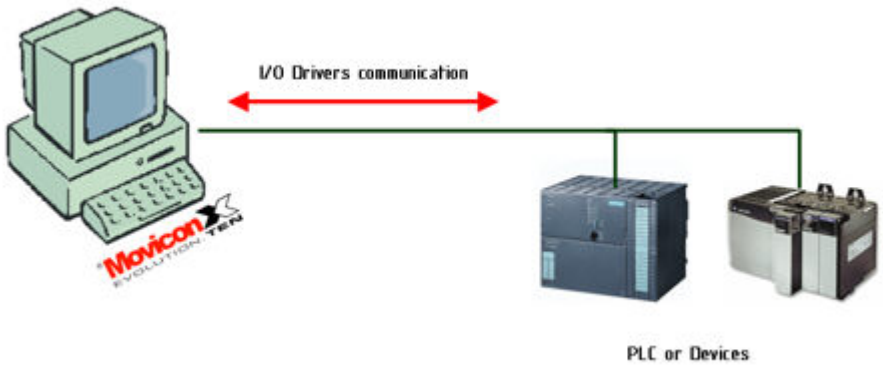
The Basic Script must be unloaded from memory with the "Stop" command in order to acquire the changes at the next startup.

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.

28. Communication Drivers

The arguments dealt with in this section concern the settings which must to carried out for the Movicon Communication I/O Drivers, presented in the Real Time DB resource of each Movicon X project.
The driver are dynamic libraries (.DLL files) which, according to a 'exception-based' logic, transfer the information received from the connected device's memory areas to the Movicon memory areas and viceversa, according to the predefined settings.
By using the Driver's settings you can specify the associations between the field variables and the Movicon variables. The system, through the serial port, the fieldbus or the network being used, will read and write the variables 'from' and 'to' the plant, according to the set modalities.



The tread pooling technology, adopted by the Movicon X drivers, is used to exchange information with the field in the most efficient way possible, by managing automatically optimized communication according to the effective use of the variables in the project being run.
In fact, only the **effectively-in-use** variables from the system will be exchanged with the field, leaving the driver the job of optimizing and making communication more efficient.

The Movicon X Drivers have been enhanced to make supervisor communication extremely more powerful and scalable.
Thanks to the features which are common to all drivers, you can get:

1. Optimized and efficient communication
2. Links to PLC addresses which can be managed directly in Tags or indirectly through 'Tasks'
3. Runtime configurability through VBA Script interface
4. Automatic device database importing
5. Bridging function to allow transparent access to external devices via modem (ie. teleservice)
6. TAPI functions to allow automatic calls for remote serial devices via modem
7. RAS functions to allow automatic calls for remote ethernet devices via modem
8. Advanced debugging functions
9. Immediate and direct cable and communication Testing

28.1. Drivers in Projects

A Movicon project is built with a set of resources and objects and once compiled and processed in Runtime,will manage information, logics and user interfaces as required.
Communicating with the field is determined by the usage of Communication Drivers (**as well as the OPC technology**). The Drivers, in forms of dynamic libraries, have the task of reading or writing in the memory areas of the device connected to the memory areas managed by the project.

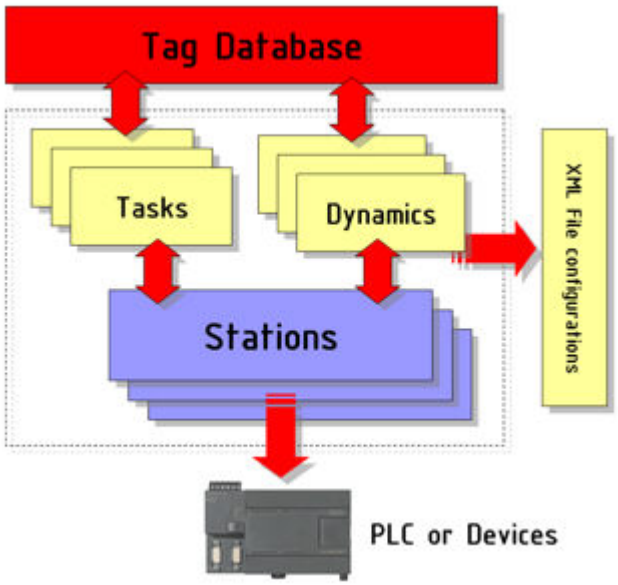
As an example, when using PLCs the driver will use the communication protocol provided by the device for reading or writing the memory areas of PLC to the supervisor and viceversa, according to the configurations an data associations set in the driver properties and/or in the variable properties of the Movicon project.

The memory areas in which the driver can read or write and the transmission modalities are determined by the devices constructors, therefore the instructions provided with the specific advice to which you wish to connect must be read through first of all.

Carefully read and follow the specifications given by the constructors of the hardware device for connecting and associating data between the device and the supervisor.

Independent of the protocol and the hardware constructors, the Movicon drivers allow the programmer to use the same user interface to configure and setup the communication according to the configuration possibilities provided.

The structure of a Movicon communication driver is described in the illustrated layout below:



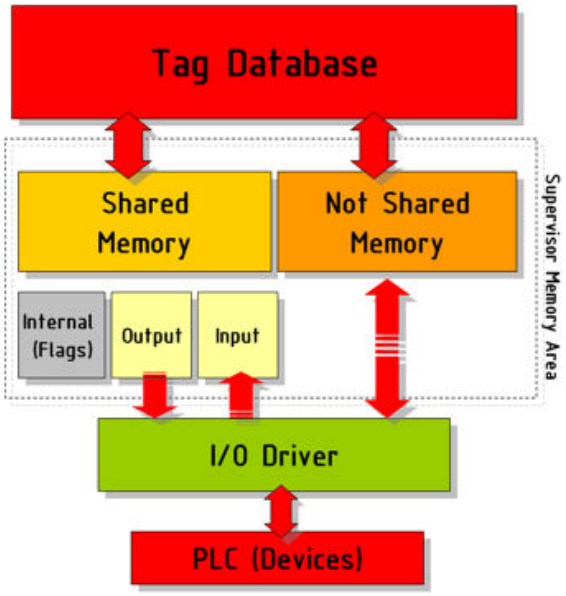
According to the illustrated layout above, the driver manages communication protocol at a low level.

1. The driver requires the setting of the main communication parameters by using the **'Station'** concepts (the relative parameters need to be set according to whether you are dealing with serial or network drivers)
2. By means of using the "**Tasks**" concept, the driver lets an 'indirect' association between the device addresses and the variables of the Movicon project be setup. The tasks offer the possibility to communicate in data blocks, by setting a variable (or a group of variables) in association to the device's address (or start address). In this way the user can configure links to the device's area memories in indirect mode and therefore independently of the project
3. By using the **'Dynamic Address'** concept, the driver consents to a direct association of the memory address in the project's Tag properties. In this way the variable points directly to the devices address, leaving the driver the job of dynamically creating communication tasks which will always be managed in an optimized fashion.
4. The driver always works with the supervisor project's "**Realtime Database**" . The variable are therefore associated directly (Tags property) or indirectly (Tasks). In any case communication is optimized according the 'Variables in use' concept
5. The driver's configuration is saved in the appropriate **XML files** in the project's 'Resources folder'. The files are based on XML metalanguage, as with all the project, for maximum transparency. The driver's files are:
   <driver_name>.drvsettings = files containing the driver's general settings
   <driver_name>.dynsettings = files generated upon runtime start with the characteristics of the calculated dynamic tasks.

The Movicon Drivers are libraries which can also be used independently of the Movicon projects, which means they can also be inserted in other programming environments which are compatible with the ActiveX technology.

28.2. Linking to memory areas

The Movicon Real time DB tags are dynamically mapped in the PC's memory, independently of the communication techniques used. The mapping in the supervisor Tags' memory areas is setup in the 'general properties' of each single tag.
The variables can be mapped in two different data areas, the data area defined as **'Not Shared Memory'** (proposed for default) and the data area defined as **'Shared Memory'**.



'Not Shared' Supervisor Area

The 'Not Shared' data area is the area proposed for default when creating Tags in the Movicon project. When the Not Shared areas are used, the supervisor will decide how and where its Tags will be allocated in memory.
In this way the user does not need to worry about allocating the tags nor where Movicon will allocate them during runtime. This saves the user from having to assign any other addresses accept for those needed for any eventual links to devices.

Usually this selection is preferably used to avoid allocating incorrect data inside the supervisor. Movicon automatically manages its information internally and only communicates with the driver when the variable is connected to the device.

'Shared' Supervisor Area

The 'Shared' data area, when selected, permits you to specify data allocation internal the memory areas of the supervisor, independently of the communication driver. **Selecting this area obligatorily requires the programmer to assign the area and absolute address of the Tag in the supervisor's memory.**
Therefore the programmer must be very careful in assigning the correct address to avoid superimposing other variables in memory by mistake.
The Shared area requires the selection of the **Area Type** by choosing one of the following:

1. **Input Area**
2. **Output Area**
3. **Flag Area (Internal)**

- The **Input** area is a memory area dedicated to read only, therefore the driver will be able to execute write tasks only according to the polling modalities set

- The **Output** area is a memory area dedicated to write only or read-write. The execution modalities can be set in the properties of each single task which are:
    1. Write on exception (the driver writes to the device only when there has been a change in data)
    2. Write unconditioned (the driver will continue writing to the device even when the data has not been changed)
    3. Read-Write (the driver executes read and write only when there has been a change in data)
- The **Flag** is an internal memory area. It can be used for all the supported variables. It cannot not be associated to drivers or OPCs, therefore it is not counted for in the license size

  It needs to be kept into account that the variables shared in the Flag area cannot be associated to the driver and therefore not taken into consideration in the size of the license. However, the variables mapped in the Input or Output areas are included in the license even when not physically connected to the driver.

Link to device

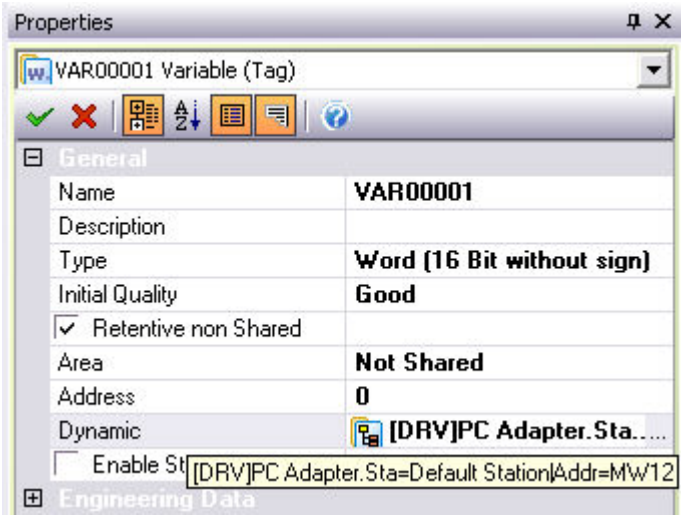
There are two different methods for assigning the device's address to a Tag:

- **By using Dynamic Tags**
- **By using Tasks**

28.3. Dynamic Addressing

Movicon X permits the device's address to be specified directly in the Tag's general properties, in the project's RealTime Database resource. When using this technique the driver will generate communication tasks in dynamic mode, according the to the optimization and grouping concepts of the predefined data. At project startup the driver will actually generate a number of adapted tasks by grouping data blocks and communicating only when the variables are used in the project.
To assign the address in dynamic mode, you need to:

1. Select 'Dynamic Address' from the tag's general properties
2. Select the Drivers Tab from the Explorer Window
3. Double click the driver desired from the list. The window for assigning the address will appear
4. Specify the address in the device address memory



Selecting the address relating to the device can also be done, apart from the configuration, by specifying the addressing syntax directly by providing:

[DRV]<Name of Driver>.Sta=< Name of station>|Addr=< Address of device>

Nevertheless, you should refer to the specific information relating to the addressing of each Driver.

Dynamic Task Concepts

As mentioned above, Movicon will dynamically create a number of tasks necessary to manage the communication at the project startup.
The "**Minimum Threshold**", in the driver's property, is the parameter which determines the automatic task generating. This parameter sets the minimum value as the fragmentation threshold in generating a number of tasks.

For instance:

VAR00001 is linked to the device's word 0 address
VAR00002 is linked to the device's word 3 address
VAR00003 is linked to the device's word 12 address
VAR00004 is linked to the device's word 18 address

The 'Minimum Threshold' parameter is set at 5 for default. In this example when the project starts up the driver will dynamically create the '.dynsettings' XML file in the project's 'Resources' folder, in which the generation of 2 dynamic tasks will be calculated to the driver.
In the first task the words from 0 to 3 will be read, in the second task (which is necessary because the next word to be read is to an address which exceeds 5 bytes as indicated by the Minimum Threshold' parameter) the words from 12 to 18 are read.
If, however, we set the 'Minimum Threshold' parameter at 20, the driver will dynamically create one task only by reading from the word 0 to the word 18 upon project startup.

The number of tasks generated automatically depends on the value set in the 'Minimum Threshold' parameter.

The tags associated to the driver in 'dynamic' mode will be automatically managed for default in read-write by the driver. The driver will decide whether to manage only in write or in read-write according to the possibilities offered in the associated device's area. Moreover this setting can be changed through the '.dynsettings' XML file generated automatically at the start of the project run. The data in the XML file regarding the type of run is as follows:

<TypeName> where it is possible to change the default value 1 with the following values:
0 = Input
1 = Input/Output
2 = Output exception
3 = Output continuous

28.4. Task Addressing

Movicon X permits the association between the device's addresses and the project's Realtime Database tags' addresses in indirect mode by means of using the tasks. By using this technique, the driver will require that the association between the set project tags and the device's memory areas be specified in the configuration properties of each single Task. In addition to this the type of communication also needs to be set (read, write, or both).
The list of generated tasks will be saved in the "drvsettings" XML file and therefore will remain there independently of the project.

To insert and configure the tasks, you need to:

1. Select the Tasks card from the driver settings
2. Insert a new Task by using the 'Add' button
3. Configure the properties of the task according to the data exchanging requirements
4. Confirm with OK and proceed with the next task if needed

Important Note: to set a list of tags in the task which are linked to start from an device address , you will need to type in the names of the tags, separated by the ';' character, in the Tags property.

The following Task execution principles are to be kept in mind:

Input These read data from the connected device and write it in the Movicon Tags. They can also be executed on event. In this case the task will be executed only when the associated tag is set different from 0. When the Input task is not executed on event, it will be executed with the polling technology together with the other input tasks.

Output These write the Movicon Tag data in the connected device. The output tasks are executed by Movicon with the 'Event-driven' technology, which means only when there is a variation in data in the supervisor which needs to be notified to the PLC or connected device. The driver also permits continuous data writing.

Input/Output The input/output tasks are managed in 'polling' to keep data read from the connected device updated, whereas the writing of data is performed on event only when there is a data change in the supervisor by rewriting the changed data to the connected device. The input/output tasks are, however, always read data from the device first, then write data when necessary.

COM (OLE2) Movicon can also manage tasks which have not been configured directly in the driver, but performed in runtime by the VBA Basic Script. In this case the tasks are executed by the driver according to language code written by the user, by executing the read or write tasks in synchronous or asynchronous mode.

Even though the programmer must be very careful when using Tasks he/she will however have the benefit of being able to decide how data is to be exchanged and not the supervisor.
The communication tasks are executed by tag name only and not by absolute addresses.

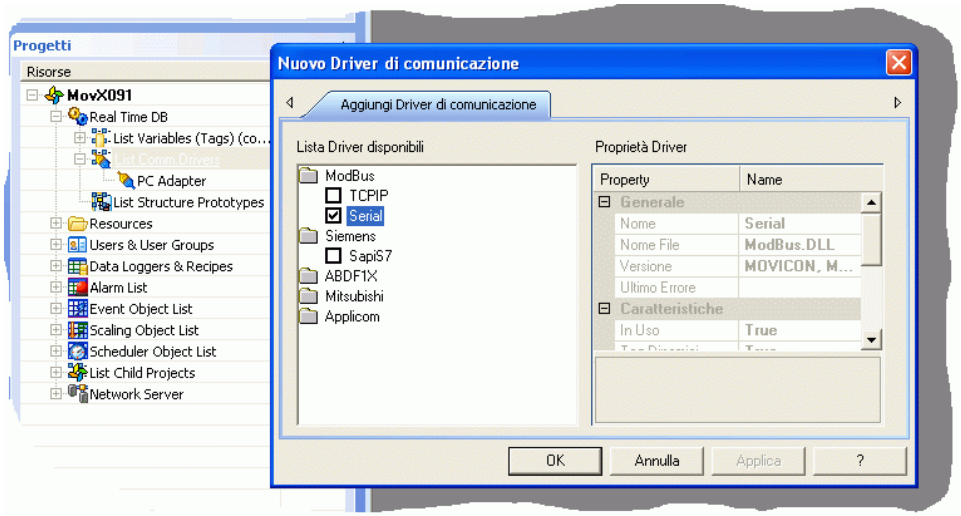
Remember that the tasks also allow the COM *(Component Object Model)* interface to be used for any handling or performing of communication tasks to the driver by means of using **VBA scripts**.

28.5. Driver Installation

The Movicon installation provides the automatic installation of the available drivers library together with the platform.
The Movicon Drivers, being built with simple .DLL files, can be easily enlarged or updated in independently of the development platform. To update or install a new driver, just copy the relevant .DLL file into the Drivers folder, which is found inside the Movicon installation folder.
(I.e. C:\Program Files\Progea\MoviconX1\Drivers).

Programmers may choose which communication driver to insert and configure in their various applications one at a time, in function with their requirements, by selecting it from the list provided.

The insertion and setting up of a communication driver is done in Movicon programming mode, through the 'Comm. Drivers List' resource from the 'Real Time DB' group in the 'Project Explorer' window. When activating the 'Add new Comm. Driver' command a dialog window, containing a list of the drivers available, will display.



The window used for inserting Drivers in to the project.

Once the driver has been inserted, it can be configured through the Movicon 'Properties Window'.
More than one communication driver can be inserted into one single project, as long as they comply with the options set on the hardware key.

28.6. Running Drivers

The installed communication driver or drivers will be run at the application project's startup and will remain active for the whole duration of the project's processing, according to the execution modes chosen or the VBA scripts logic using the driver COM (Component Object Model) interface.
At each activation of the communication with the field, the system will record a communication status notification message in the Historical Log.

The presentation of a green coloured led on the Status Bar on the Movicon window's bottom border (if displayed) means that the installed driver is communicating correctly with the field. The red coloured led means, however, there is a communication error.

Any communication problems (cable, connections, settings, etc.) will generate communication errors that will be alerted by the driver in the Status Bar and recorded in the Historical Log.

Note: the drivers are independent of the project, and their configurations are saved in separate appropriated files, which are identified by the ".drvsettings" and "dynsettings" extensions. This philosophy guarantees that the project is kept intact when changing PLCs or communication devices.

The driver can be subordinated to the conditions established by the programmer during runtime execution.

28.7. Hardware RS232 Errors

The Movicon Communication Drivers auto-diagnosis emits codes of hardware communication errors, according to the indications supplied by the recording status of the UART chip of the serial installed on the PC.
We recommend that you use serials with UART 16550A chips which use FIFO 16 byte data management. The type of serials installed on the PC is easily detected by running the Microsoft Diagnostics MDS.EXE file.

The communication hardware errors are generally due to the following possible causes:

- Serial line disturbances
- Potential difference between the device masses.
- Serial cards inadequate for the performances required
- Defective or inadequate communication cables
- Baud rate too high for the hardware being used
- Communication device breakdown

The hardware errors supplied by the driver relate to the codes emitted on the error register of the serial UART chip.

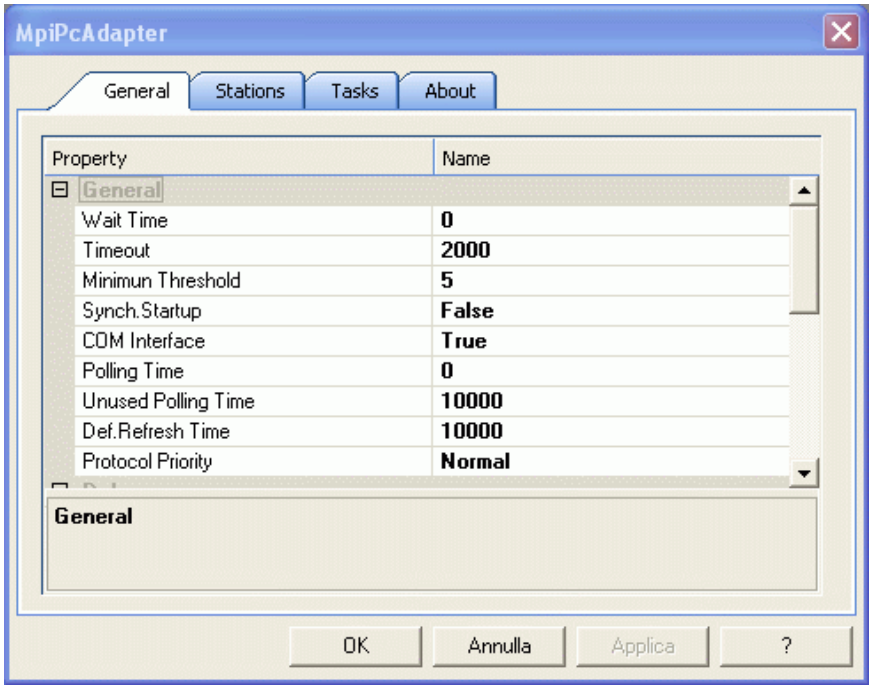
When there are any hardware errors, Movicon will alert a generic error by reporting a number, translated in binary, with which you can identify the error or errors by confronting each single bit whose meanings are described in the table below:

VALUE	CODE	MEANING
1	RX OVER	The serial has received more characters than the buffer capacity can hold
2	OVERRUN	The serial has received a character before the previous one was processed by the system
4	RX PARITY	Error in parity, inconsistency between the parity received and the one set.
8	FRAME	Data frame error. The data received does not respect the set characters (length, stop bit, etc.)
16	BREAK	Break Status requested by participant

All the other communication errors depend on the specified protocol therefore you need to refer to the indications of that specific driver. The driver error messages are displayed on the status bar and can be viewed in the Historical Log.

28.8. General Settings

Some of the properties common to all the communication drivers, can be configured on this setting card.
It is not generally necessary to change any of the default settings.



Wait Time

The pause time, expressed in milliseconds, between the execution of two tasks (data blocks) of successive communication. The value 0 (no pause) has been set for default. It may be necessary to change the default value (0) for devices which need a wait time between one interrogation and the next (ie. device with poor performances).

Timeout

The timeout time for executing synchronized tasks. The value is expressed in milliseconds, with the default time set at 2000 ms.

Minimum Threshold

The parameter determines the minimum threshold for the fragmenting of data blocks exchanged with the device. As indicated in the introduction, of the dynamic communication management, Movicon automatically calculates (at project startup) the size and quantity of dynamic tasks are to be created to the driver for communication relating to the dynamic variables (tag dynamic addresses).
Movicon, in fact, tries to optimize the communication by combining the highest number of data possible in one task only. When the data is linked to addresses distanced between each other, this value determines the distance in bytes which allows Movicon to decide whether to create a new task for the next data block.

Example:

VAR00001 is linked to the device's word 0 address
VAR00002 is linked to the device's word 3 address
VAR00003 is linked to the device's word 12 address
VAR00004 is linked to the device's word 18 address

The driver's 'Minimum Threshold' parameter is set at 5 for default. In this example the driver will dynamically create the '.dynsettings' XML file in the project's 'Resources' folder, in which the generation of 2 dynamic tasks will be calculated to the driver.

In the first task the words from 0 to 3 will be read, in the second task (which is necessary because the next word to be read is to an address which exceeds 5 bytes as indicated by the Minimum Threshold' parameter) the words from 12 to 18 are read.
If, however, we set the 'Minimum Threshold' parameter at 20, the driver will dynamically create one task only by reading from the word 0 to the word 18 upon project startup.

The number of tasks generated automatically depends on the value set in the 'Minimum Threshold' parameter .

Synch.Startup

This option determines the synchronization between the logic and driver communication at the project's startup.
When this option is set with 'true', Movicon will wait until the static input tasks have been completely executed before processing the project's logic and scripts.
Default Value = false.
Even though this option will cause the project to take longer in starting up, the logic will be run with the certainty of 'updated' input values.

COM Interface

Indicates whether the driver supports the COM (Component Object Model) interface. The COM interface, also defined as OLE2, grants the use of VBA script logic for handling the driver, according to the methods, the properties and the events described in the appropriated documents.
Default Value = true.

Polling Time

This parameter, expressed in milliseconds, determines the polling Time for executing the tasks (whether dynamic or static). for updating the data **when the tags are in use**.
This value can be changed in the property of each single stastic Task.
The Polling Time default value is = 0, and means that the data is updated with the highest velocity possible.
A higher value can be set, for example, when the data does not require elevated updating times.

Unused Polling Time

This parameter, expressed in milliseconds, allows data updating to be forced even **when the tags are not in use, establishing, however, a polling time.**
This value can be change singularly in the property of each single static Task.
The default value is = 10000 (being 10 seconds), but van be changed as required.

When this parameter is set = 0, the tasks will not be executed when the tags are not in use.

Def. Refresh Time

Currently not in use. Work in progress and will be implemented in the near future.

Protocol Priority

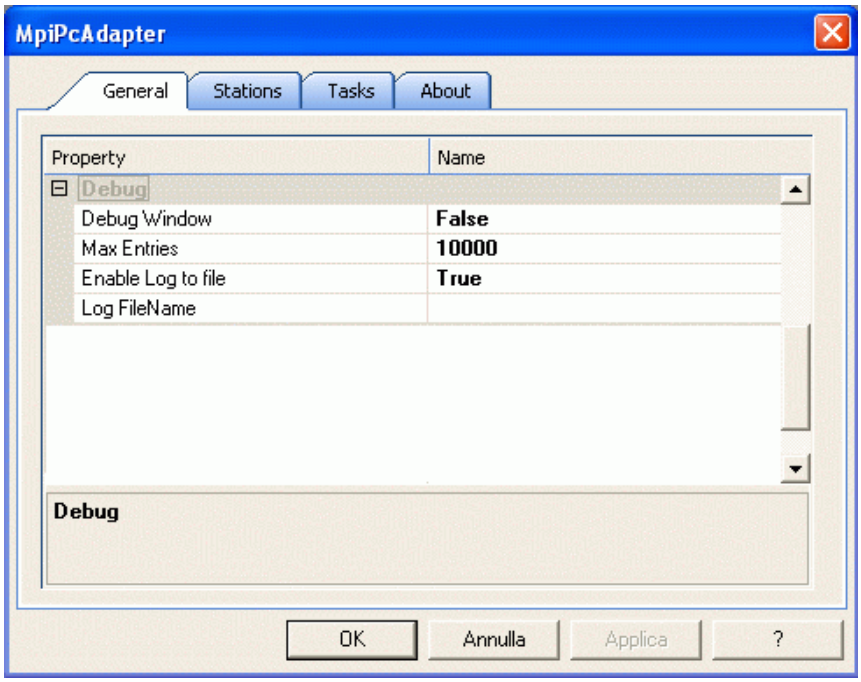
This box is used for setting the communication thread priority, which is the priority given to the driver's execution in respect to the other processes of the supervisor.
The values starting from low to high priority are:

- **Normal**
- **High**
- **Very High**
- **Real Time**

It is recommended that when changing the default value (Normal) extreme care is taken as not to exceed the CPU workload (CPU at 100%).
It may be useful to try and increase the driver's process priority due to elevated communication loads. In this case it is advised to set the Wait Time parameter at a value other than 0, to avoid the driver using too many system resources.

28.8.1. Debug

Some of the properties concerning the Debug, common to all the communication drivers, can be configured on this setting card.
It is not generally necessary to change any of the default settings.



Debug Window

When selecting 'true', the driver will show all the diagnostic and debug messages generated by the driver in the appropriated Debug window (they can also be viewed in the Movicon workspace Output bar).
When selecting 'false', the Debug window will not be displayed.

Max Entries

The value, relating to the maximum number of diagnostic message strings displayed in the debug window before being recycled, is set in this box. When the default value is left, the window will keep the last 10,000 message strings displayed.

Enable Log to file

When selecting "true", the driver will record on file all the Debug's diagnostic messages generated by the driver.
The set amount of recorded data is defined in the previous setting, while the file name and path are set in the setting after.

Log FileName

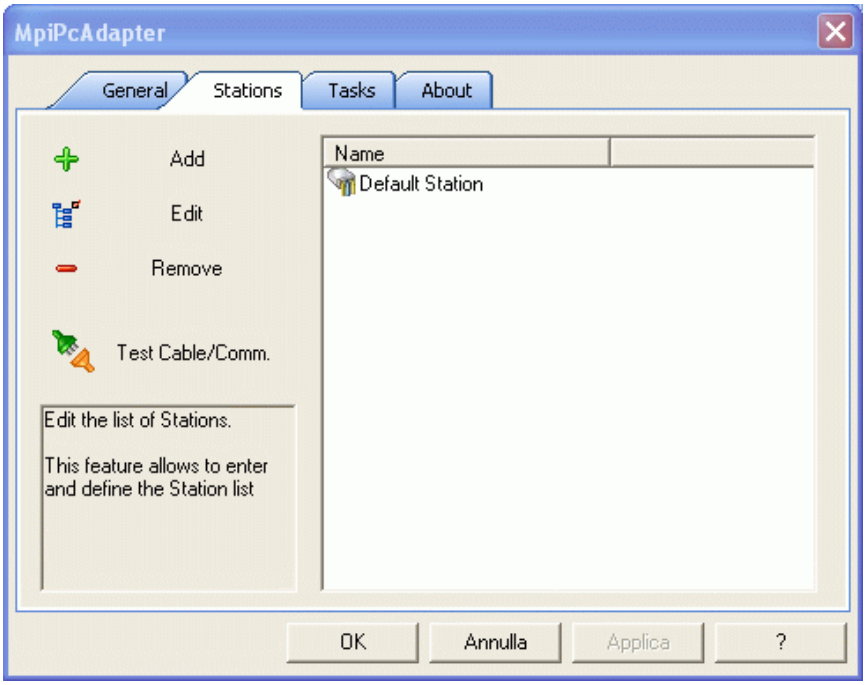
The file name and path for the driver's diagnostic Log must be entered in this box.
The generated file will be a normal text file.

28.9. Station Settings

In this import card you need to insert and configure the **'communication stations**'. Each driver should have at least one communication station inserted and configured.

Be reminded that Movicon offers the possibility of setting up the driver communication both by using 'dynamic tasks' or 'Tasks' concepts (described in the appropriate chapters). The dynamic tasks are created automatically by the driver upon project startup, in function with the links to the device's addresses set in the 'Dynamic Address' properties of each single tag).

The communication stations allow you to set, like the driver, how communication must be managed, where each station represents a communication channel towards the configured device.



Add

The "Add" button allows you to insert a new 'station' for the communication driver. When inserting a new station a window will automatically display for setting the parameters of the communication required.
Once the station or stations have been inserted you can change or remove them by using the buttons indicated below.

Edit

The 'Edit' button allows you to modify the parameters of a previously inserted station. Therefore you first need to select the station you wish to modify then use the 'Edit' button or double click.

Remove

The "Remove" button allows you to delete a previously inserted station. Therefore you need to first select the station you wish to modify then use the 'Remove' button.

Test Cable/Comm.

This button allows you to run a communication test with the device. Thanks to this very handy functionality the driver will attempt communication to verify whether the cables have been connected correctly.

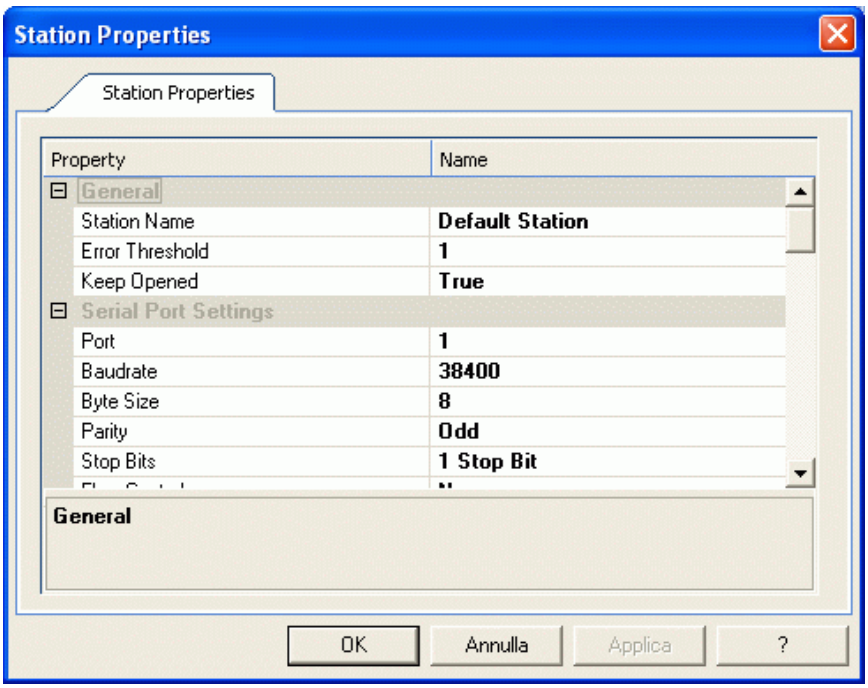
Attention: This test is run to see if the cables have been connected properly only, leaving it in the hands of the programmer to set the parameters of the communication configurations and to associate the memory areas correctly.

The communication test is invoked by reading specific data according to the test criteria of each single protocol.
Therefore it might be necessary to refer to the specifications indicated by each of the drivers to see what kind of test is carried out.
For instance, with generic protocols such as Modbus, the test invokes the reading of a specific Function Code (FC2) which may not necessarily have been implemented on the connected device.

Please be reminded again that in each case the test only verifies whether the cable and general parameter configurations have been done correctly and that it is the programmer who has to verify whether data between the supervisor and the device has been associated correctly.

28.9.1. General (Stations)

This settings card is used for defining the settings inherent in the 'General' properties group setting of the selected station.



Station Name

Name which identifies the station corresponding to the device with which it is to communicate. The station name is one which is internal the driver.
When more than one station is to be set, each one must have its own name.
Default value = 'Default Station'.

Error Threshold

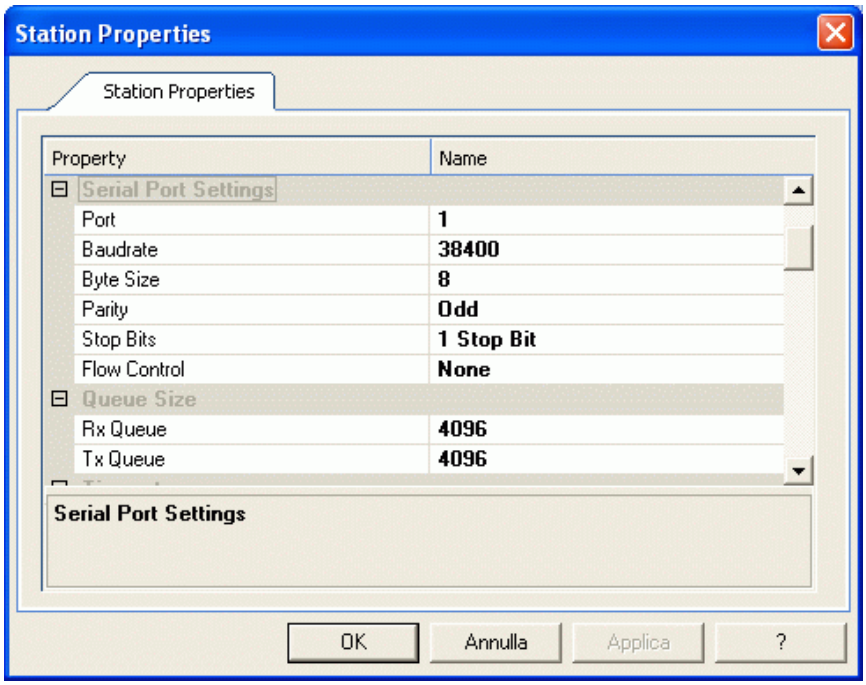
When there are any communication errors, this parameter sets the number or errors to be reached in order for the Driver to effectively give communication error notification. The internal counter does not alert any occurrences of communication break-down straight away but will attempt to retrieve communication again. When the number of attempts have been reached the driver will give out an error warning.
The default value is = 1.

Keep Opened

This allows you to establish whether the driver (only for serial drivers) must keep the communication port open (and therefore always busy). When the value = True is set, the driver will be loaded at the start up of a project run and will always keep the associated communication port open (busy).
When setting the value at 'False', the driver will close the communication serial port after every 'Input' or 'Output' operation has been done thus leaving it free.

28.9.2. Serial Port Settings

In this group of settings you need to set the configurations inherent in the Serial Port Settings property group for the selected station.



Port

Sets the number of serial ports to be used for communicating.

Note: you need to make sure that there are no conflicts in Windows when using the ports. For instance, when installing the Com4 and the Com4 ports, you need to check whether the assigned address and IRO are compatible with the PC's configurations. Therefore we suggest you use addressable serial cards.

Baudrate

Sets the velocity of the serial communication (Baud Rate). The value of the communication's velocity must correspond with that of the device to be communicated with.

Byte Size

Sets the amount of bytes required by the protocol of the communication in question.

Parity

Sets the parity type required by the protocol of the communication in question.

Stop Bits

Sets the number of Stop Bits required by the protocol of the communication in question.

Flow Control

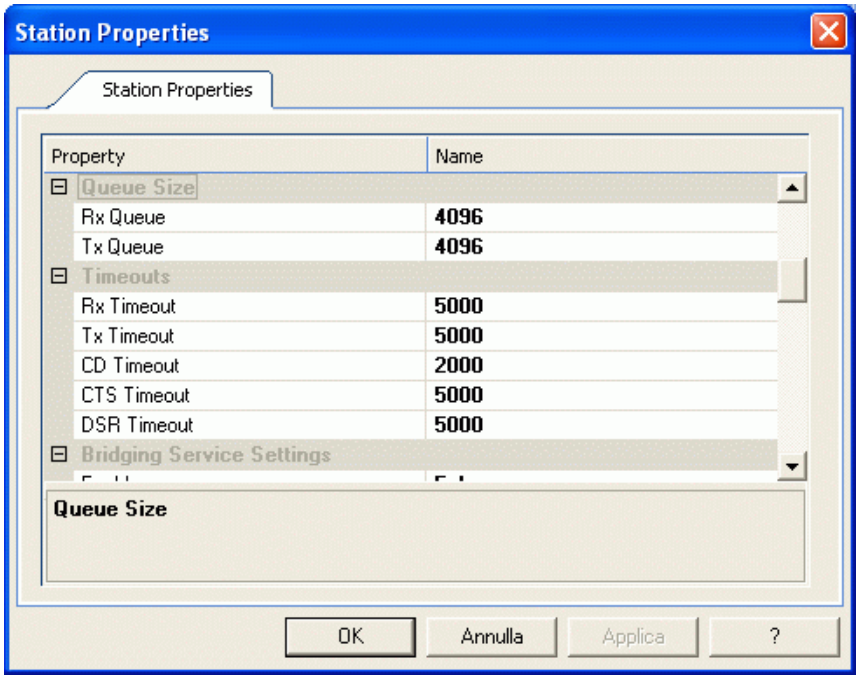
Sets the data Flow Control type for the type of communication in question. This property permits the flow of communication data from the connected device's serial port to be adapted to needs required by protocol at low level. The driver sets 'None' for default which means no flow control, nevertheless it might be necessary to select a flow control type (ie. when signaling errors with code '1').
The options are:

None: No Flow Control. Protocol does not require this control
Hardware: The Flow Control is managed by the serial line's electrical signals (eg. RTS, CTS, etc.)
Xon/Xoff: The data Flow Control is Xon/Xoff

28.9.3. Queue Size

In this group of settings you need to set the configurations inherent in the buffer size of the serial port for the selected station.

Generally, these settings are reserved for the expert user and therefore it is advised to use the default settings.



Rx Queue

Sets the quantity of data bytes to be managed by the serial port to buffer values being received. The default value of 4096 will be used if not specified differently.
Expert users can change this value to adapt it to the needs of the system being used.

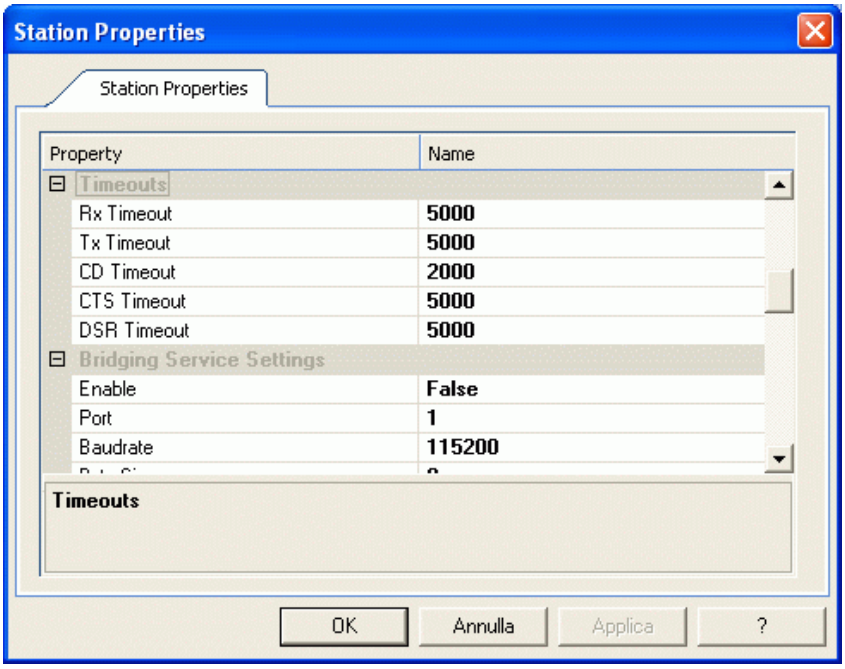
Tx Queue

Sets the quantity of data bytes to be managed by the serial port to buffer values being transferred. The default value of 4096 will be used if not specified differently.
Expert users can change this value to adapt it to the needs of the system being used.

28.9.4. Timeouts

In this group of settings you need to set the selected station with the configurations inherent in serial communication timeouts.

Generally, these settings are reserved for expert users and therefore it is advices to keep the default settings.



Rx Timeout

Sets the time value in milliseconds that when exceeded the driver will notify timeout of communication reception.
The timeout refers to data being received.

Tx Timeout

Sets the time value in milliseconds and when exceeded the driver will notify timeout of communication transmission.
The timeout refers to data being transmitted.

CD Timeout

Currently not in use. Reserved for future use.

CTS Timeout

Sets the time value in milliseconds that when exceeded the driver will notify communication timeout for the CTS serial parameter.
Sets the time within which each single write operation must be completed, in low level (Window API) in the serial port.

DSR Timeout

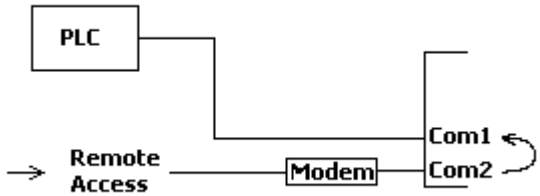
Sets timeout value in milliseconds which will also be notified to the DSR serial parameter by the driver. This property sets the maximum timeout between the reception of one character and the next, which will also be the maximum time within which each single read operation must be completed at low level (Windows API) in the serial port.

28.9.5. Bridging Service Settings

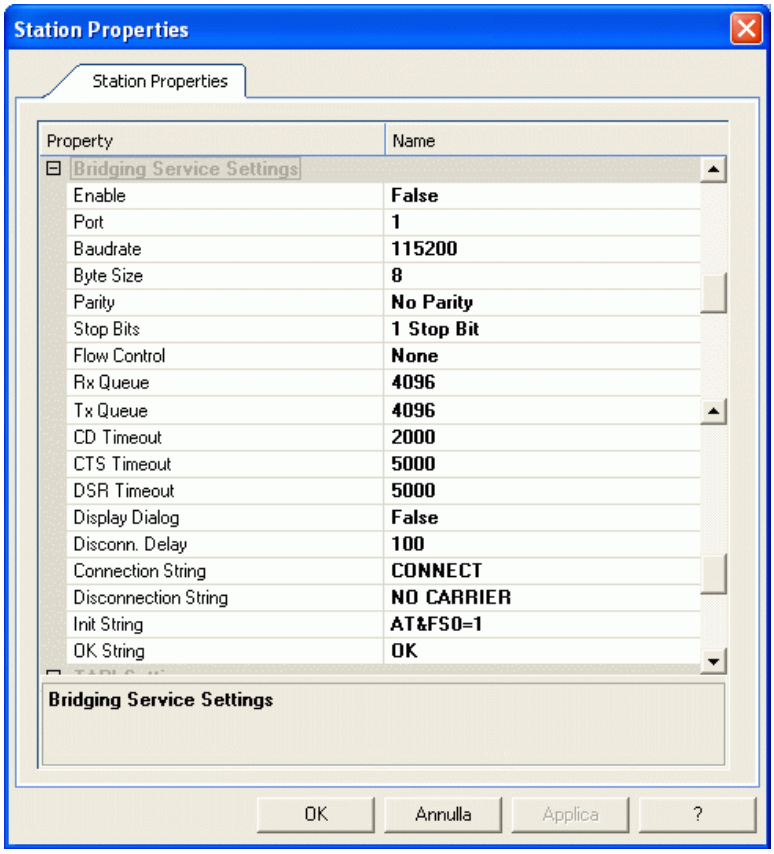
In this group of settings you need to set configurations inherent in the Bridging function of the selected station.

The Bridging functions offer the opportunity to use the supervisor as a 'bridge' for teleservices rendering it transparent for any remote communication through modem ports from PC to PLC, which means the PLC can be accessed directly from a remote PC by using the driver communication port.

The illustration below demonstrates this type of connection:



Naturally the driver, during access in 'external bridging', will interrupt its communication.



Enable

Enables the Bridging Function. When set at 'true', the driver will attend to the specified serial port, when a remote call is made (ie. by teleservice), the driver will disconnect communication towards the PLC and connect the modem port up with the port connected to the PLC, in transparent mode, until being disconnected by command and automatically restoring the supervisor's communication.
The service is disabled for default.

Port

The number of the COM serial port, to be used for the Bridging service on which the modem is connected, is entered here.

Note: you need to make sure that no conflicts occur in Windows when using the ports. For instance, when installing the Com4 and Com4 Ports, you need to make sure that the assigned address and the IRQ are compactible with the PC's configuration. In order to do this we advice you use addressable serial cards.

Baudrate

Sets the velocity of the serial communication (Baud Rate). The value of the communication's velocity must correspond with that of the device to be communicated with.

Byte Size

Sets the amount of bytes required by the protocol of the communication in question.

Parity

Sets the parity type required by the protocol of the communication in question.

Stop Bits

Sets the number of Stop Bits required by the protocol of the communication in question.

Flow Control

Sets the data Flow Control type for the type of communication in question. This property permits the flow of communication data from the connected device's serial port to be adapted to needs required by protocol at low level. The driver sets 'None' for default which means no flow control, nevertheless it might be necessary to select a flow control type (ie. when signalling errors with code '1').
The options are:

None: No Flow Control. Protocol does not require this control
Hardware: The Flow Control is managed by the serial line's electrical signals (eg. RTS, CTS, etc.)
Xon/Xoff: The data Flow Control is Xon/Xoff

Rx Queue

Sets the quantity of data bytes to be managed by the serial port to buffer values being received. The default value of 4096 will be used if not specified differently.
Expert users can change this value to adapt it to the needs of the system being used.

Tx Queue

Sets the quantity of data bytes to be managed by the serial port to buffer values being transferred. The default value of 4096 will be used if not specified differently.
Expert users can change this value to adapt it to the needs of the system being used.

CD Timeout

Currently not in use. To be implemented in the near future.

CTS Timeout

Sets the timeout value in milliseconds which will also be notified to the CTS serial parameter by the driver. This property sets the time within which each single write operation must be completed at low level (Windows API) in the serial port.

DSR Timeout

Sets timeout value in milliseconds which will also be notified to the DSR serial parameter by the driver. This property sets the maximum timeout between the reception of one character and the next, which will also be the maximum time within which each single read operation must be completed at low level (Windows API) in the serial port.

Display Dialog

When enabled (= true), it allows the supervisor to display a dialog window upon connecting in Bridging to let the local user to cancel the connection by remote control.

Disconn.Delay

Set the delay time in milliseconds from receiving the disconnection signal, to effectively activating the closure of the bridging connection.

Connection String

Sets the string received from the modem which determines the remote connection request. When receiving this string the driver will activate the bridging service request.

Disconnection String

Sets the string received from the modem which determines the request to disconnect the remote connection. When receiving the string, the driver will deactivate the bridging service and restore the driver's communication back to normal.

Init String

Sets the initialization string of the modem.

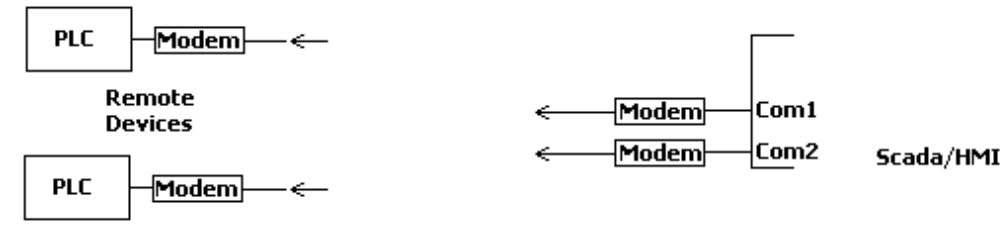
OK String

Sets the modem's OK string.

28.10. TAPI Settings

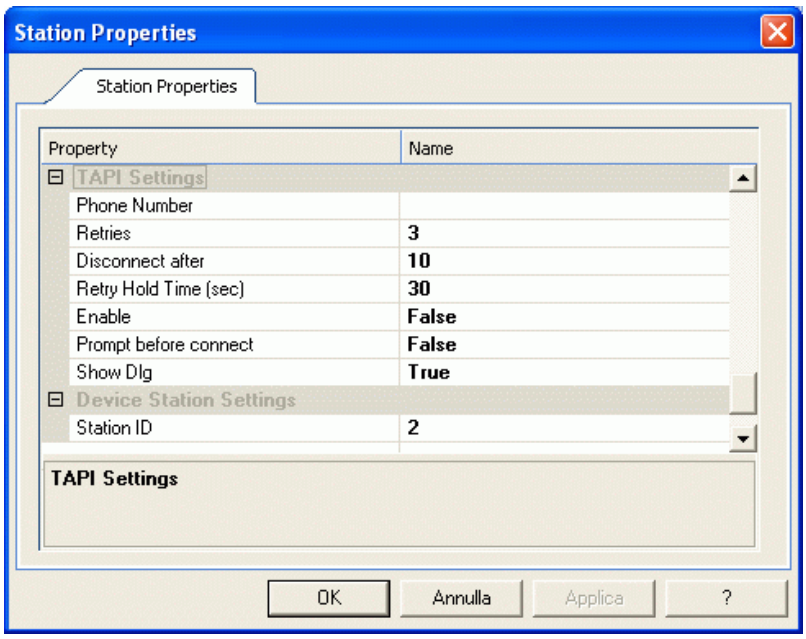
In this group of settings, for the selected station, you need to set the configuration inherent in the driver's TAPI functions.
The TAPI functions allow the driver to connect to the remote station via modem in automatic and transparent mode.
When you need to connect remote PLCs or devices via modem to the supervisor, the TAPI function allows you to manage the communication protocol after having established the remote connections.

The diagram below demonstrates this type of connection:



The modem of the PLC Server must be configured ready to receive calls from the supervisor. The supervisor will automatically put into effect a call to the interested modem, for the interested driver stations, the moment the associated tags go into use.

Please be reminded that the resources 'always in execution' (being DataLoggers, Alarms, Schedulers, General Logic) always keep the tags in use.



Phone Number

Sets the telephone number of the remote station to be connected to.

Retries

Sets the maximum number of connection attempts if the first one fails. When this number expires and all attempts have failed , a error will be alerted.

Disconnect After

Sets the time in seconds of inactivity, before disconnecting. The connection is made as soon the interested tags go into use in the project. When the interested tags are not in use, the supervisor will disconnect after the set time expires.

Retry Hold Time (sec)

Sets the time in seconds of the before retrying to connect.

Enable

Enables, if set at 'true', the TAPI functions and calls via modem to the remote device.

Prompt before connect

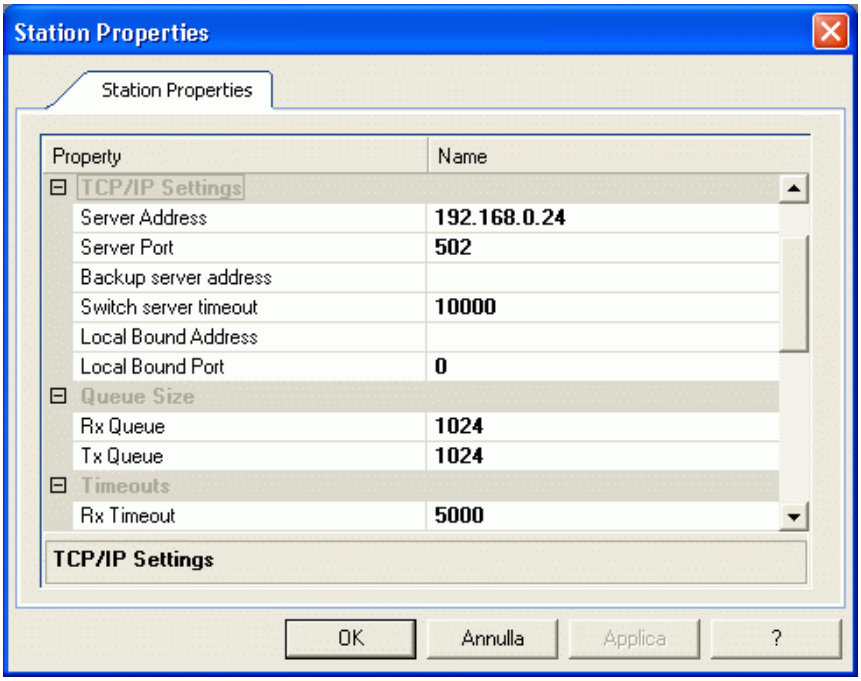
When enabled (true), the system will display a dialog window asking you to confirm before sending the call and activating the remote connection every time it has to execute connections via modem.

Show Dlg

When enabled, the system will display a dialog window to inform the user of the connection in action and its status.

28.11. TCP/IP Settings

In this group of settings you need to set, for the station selected, the configurations inherent in the TCP-IP Ethernet access parameters.



Server Address

The IP address of the server or the network device to be connected to is entered in this field.
In the near future you can insert he server's name instead of its IP address which has to be inserted for the time being.
The parameter provides the indications of the device's simple IP address.

Server Port

The TCP port of the server or device to be connected to is entered in this field. This value completes the device's IP address. For instance, the 502 port is always used for the TCP-IP Modbus (as established by the protocol), but when dealing with other devices you need to refer to their documentation on this matter.

Backup Server Address

The backup server address is entered here. If this address is set (default value = empty string), the driver will try to connect to the backup server when it is unable to communicate with the 'primary' server. This happens in a redundancy situation at driver level. If communication with the backup server is interrupted, the driver will try to connect to the primary server again and so forth.

Switch Server Timeout

The time entered here in milliseconds is the time which passes between a communication error verified on one server and an attempt to connect to another. The default value is 10000 ms (10 seconds).

Local Bound Address

The local IP address is entered in this field, being the one from the PC's ethernet card you intend to use for communicating. Normally this property is left empty and only used when more than one ethernet card has been installed on the PC. When leaving this field empty (as for default), the system will use the operating system's default address.

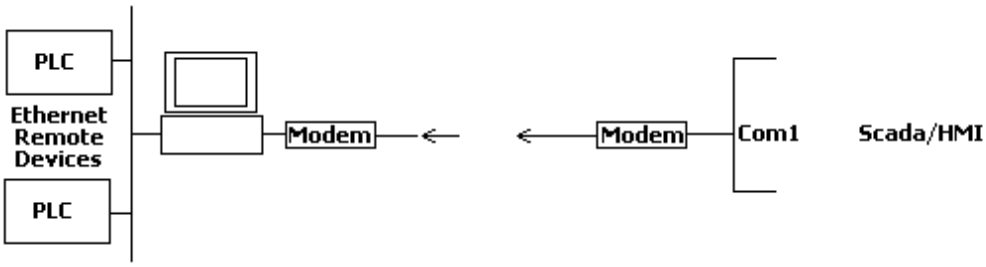
Local Bound Port

The local TCP port address, referring to the PC's ethernet card which you intend to use for communicating, is entered in this field. Usually this field is left empty, unless required by the protocol or device being used.
Leaving the field = 0 (as for default), the choice of port is left in the hands of the operating system to decide.

28.12. RAS Settings

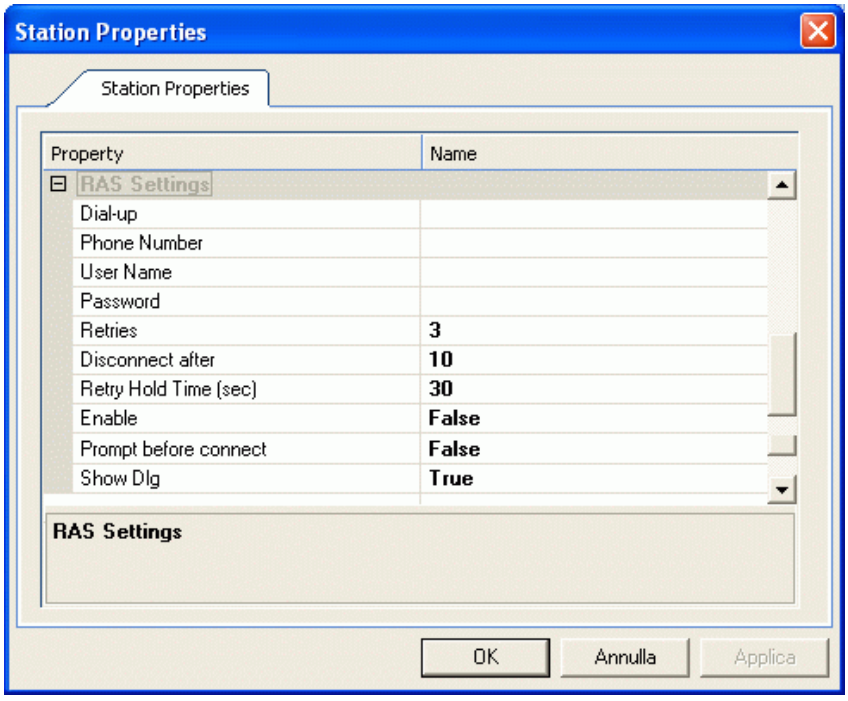
In this group of settings you need to set, for the selected station, the configuration inherent in the access parameters to remote devices by means of the RAS functions (Remote Access Service) of the operating system.
The driver's RAS functions allow you to connect to a remote network via modem in automatic and transparent mode.
When needing to connect to network devices from remote PCs, the RAS function lets you manage the network communication protocol after having established the connection with the modem through accessing a RAS Server, being a PC for accessing to the network which can be reached via modem. After gaining RAS connection, the driver can access to the network.

The diagram below demonstrates this type of connection:



The modem of the RAS Server must be configured ready to receive calls from the supervisor. The supervisor will automatically put into effect a call to the interested modem, for the interested driver stations, the moment the associated tags go into use.

Please be reminded that the resources 'always in execution' (being DataLoggers, Alarms, Schedulers, General Logic) always keep the tags in use.



Dial-up

Permits you to specify one of the RAS Connections set in the operating system. When left empty, the driver will ask you to enter manually the telephone number, username and password of the station to be connected to when you try to connect.
The connection will be requested as soon as one of the associated tags goes into use in the project being run.

Phone Number

Sets the telephone number of the remote station to be connected to.

User Name

Sets the username for accessing the remote station.

Password

Sets the password for accessing the remote station.

Retries

Sets the maximum number of connection attempts if the first one fails. When this number runs out and all attempts have failed, a error will be alerted.

Disconnect After

Sets the time in seconds of inactivity, before disconnecting. The connection is made as soon the interested tags go into use in the project. When the interested tags are not in use, the supervisor will disconnect after the set time expires.

Retry Hold Time (sec)

Sets the time in seconds of the before retrying to connect.

Enable

Enables, if set at 'true', the RAS functions and calls via modem to the remote device.

Prompt before connect

When enabled (true), the system will display a dialog window asking you to confirm before sending the call and activating the remote connection every time it has to execute connections via modem.

Show Dlg

When enabled, the system will display a dialog window to inform the user of the connection in action and its status.

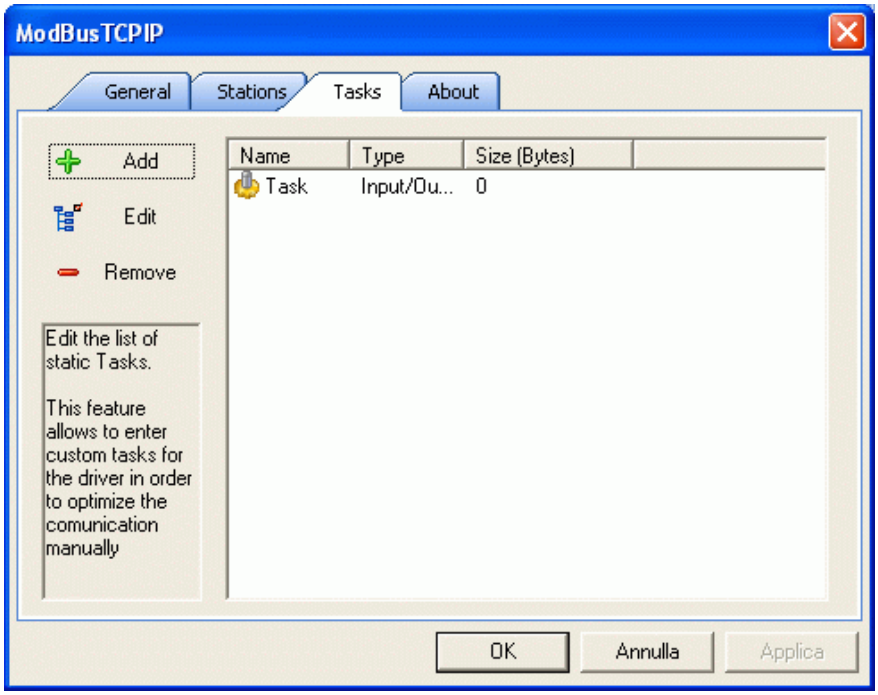
28.13. Task Settings

In this section you need to insert and set the 'communication tasks', when you intend to use this communication technique this.

Please be reminded that Movicon offers you the possibility to set the driver's communication by means of using the 'task' concept or the **dynamic tasks** concept. the dynamic tasks. The dynamic tasks are automatically created by the driver at the project startup, in function with the links to the device's addresses set in the 'Dynamic Address' properties of each single tag.

The communication tasks allow **'static'** tasks to be assigned to the driver, which will be executed in polling to the device provided.

By using the communication technique in tasks, you will need to set, in static mode, the relationship between the Movicon variables and the device addresses. The Movicon variables have to be assigned in the Input or Output data areas. Variables from 'Not Shared' areas are not to be used in tasks.



Add

The 'Add' button allows you to insert a new Task for the communication driver. When a new task is inserted, a window will automatically display to set the parameters of the communication requested. The inserted tasks can be edited or removed afterwards by using the button described below.

Edit

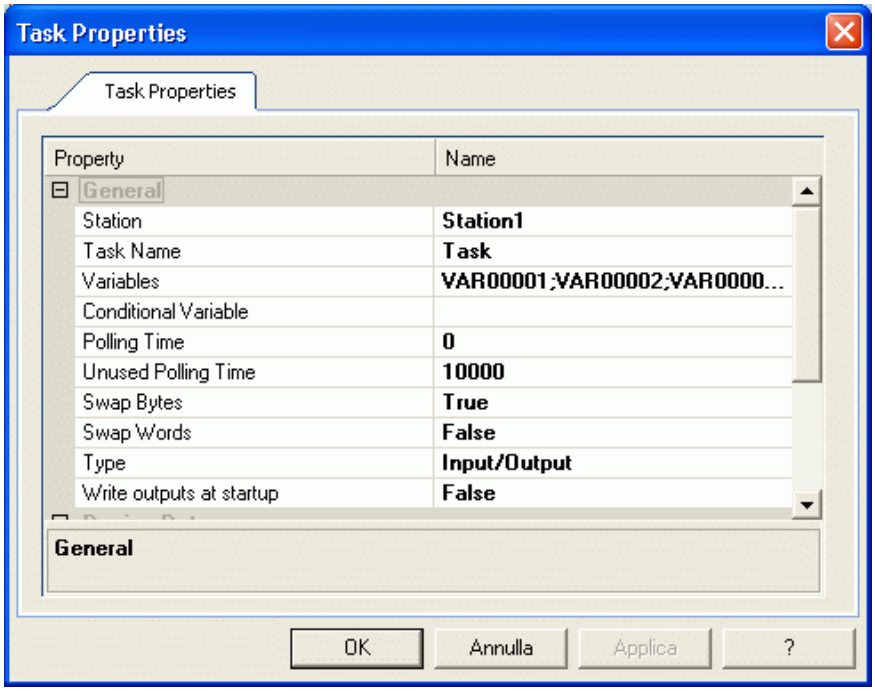
The 'Edit' button allows you to changed the parameters of previously inserted tasks. You will first need to select the task desired and then use the 'Edit' button or double-click.

Remove

The "Remove" button allows you to delete previously inserted tasks. You will first need to select the task desired and then use the 'Remove' button.

28.13.1. General (Tasks)

In this settings card you need to define the settings inherent in the 'General' properties group for the task selected.



Station

The name which identifies the station corresponds to the device which you intend to communicate with. The stations must be set (at least one)in the relative settings card.
When more than one station has been set, you need to select the station where the task is to be executed in this box.

Task Name

The name which identifies the task's name being set. Any identification string can be used to identify the Task.
When more than one task is being set, the name of each one must be different.
Default value = 'Task'

Variables

Allows you to associate the supervisor's variable (or variables) in which the communication task is to perform. You can select any variable (Tag), previously inserted into the project's Realtime Database, by using the select button placed on the right border.

Important Note: to set the task a list variables to link starting from a device address, for the time being you will have to manually type the names of the Variables separated by the ";" character in the Variables property.

Conditional Variable

Allows you to associate a project variable whose status will determine the communication task's execution condition. You can select any variable (Tag), previously inserted into the project's Realtime Database, by using the select button placed on the right border.
The variable (of any type) will therefore condition the task's execution: when set at a value other than zero (><0) the communication task will be executed by the driver.

When the execution of the task has been completely executed the driver will automatically set the value of the associated variable to zero. Therefore this needs to be taken into consideration when variables are managed by logic.

Polling Time

This parameter, expressed in milliseconds, determines the polling time of the each single task's execution for updating data **when the variables are in use**.
The default value for the Polling Time is determined by the value set in the driver's General properties, but it can be changed as pleased for each single task. Normally the value is =0, and means that data will be updated with the most highest velocity rate possible.
A higher value can be set, for instance, when the data does not require increased updating times.

Unused Polling Time

This parameter, expressed in milliseconds, allows you to force a data update of each task even **when the variables are not in use, by establishing a polling time.**
The Polling Time default value is determined by the value in the driver's General properties, but this can be changed as pleased for each single task. Normally the value is = 10000 (being 10 seconds), but can be changed according to your needs.

When this parameter is set = 0, the tasks will not be executed when the variables are not in use.

Swap Byte

This selection allows you to swap the bytes over in 'word' type data. When doing this the data linked to the supervisor and the device will have the 'high' byte swapped over with the 'low' byte and viceversa, for each word type data of the task.
The default setting is 'False', and needs to be changed only when the device inverts the normal order of the words in the data.

Swap Word

This selection allows you to swap the 'double words' over in 'word' type data. By doing this the data linked to the supervisor and the device will have the 'high' word swapped over with the 'low' word and viceversa, for each double word type data of the task.
the default setting is 'False', and needs to be changed only when the device swaps over the normal order of the words in the data.

Type

In this selection you need to set the execution type that you want to assign to the task.
The options offered are:

Input	This option sets the task as 'Read Only'. So when the variables are in use, the driver will execute the read polling in the addresses associated for the device, and transfer them to the related project variables.
Input/Output	This option sets the task as 'Read-Write'. So when the variables are not in use, the driver will execute the polling in read in the associated addresses for the device, and transfer them to the variables of the project desired. When a variable changes its value from supervisor, the driver will write data to the device, then return in read.
Exception Output	This option sets the task as 'Write Only', thus managing data on exception, which means only when there is a data change.
Unconditional Output	This option sets the task as 'Write Only', thus managing continuously in write, independently of data changes.

Write Outputs at Startup

This property has only meaning for Input/Output or "Exception Output" tasks. When set at 'True' the task is executed in output when the project starts up. The property is also displayed for Movicon dynamic variable links.
The corresponding property in the task's Automation (basic) interface is "WriteOutputsAtStartup". This is a read only property.

Device Data

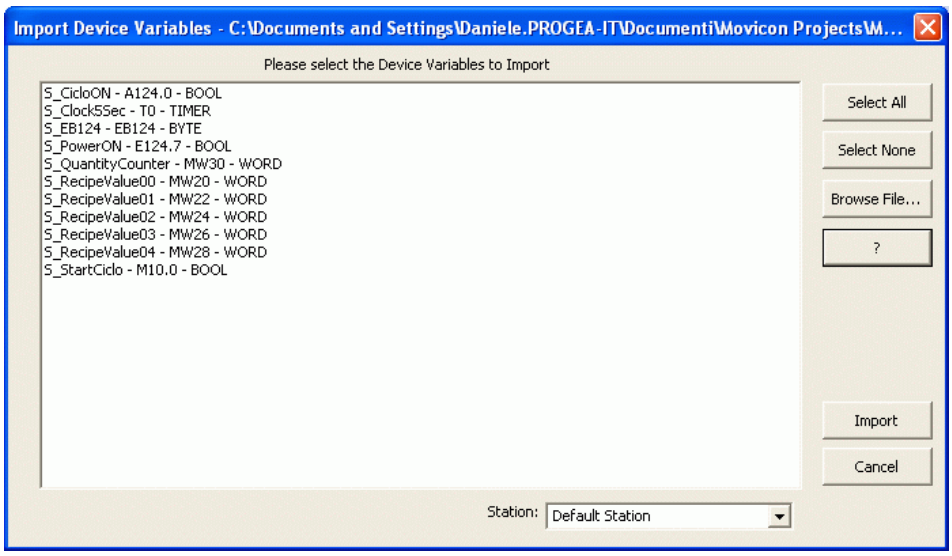
The parameters of this group set the addresses to the memory areas of the specified device.
Please refer to the documentation on the protocol's specifications.

28.14. Import Device Database

Thanks to this important functionality, you can access the database of the PLC or the device directly (to the equivalent data source to import the desired Tags into the Movicon project.
When terminating this operation, the project's RealTime Database will be automatically filled up, by inserting all the imported tags, which will be defined as Dynamic Tags in the 'Non Shared' areas, with the corresponding tag type and with the address already assigned for the device.

The window, for selecting the 'data source', being the PLC database, the symbolic file or the .CSV file obtained from the PLC data or device explorer, will display upon command activation.
After getting hold of and then selecting the file you will be shown the window, as illustrated below, which displays the variables it contains.

Attention: Importing data from the PLC is supported in all the drivers for the most well-known devices. Check the access modalities or 'data source' requirements, which may vary from one device to another.



Select All

Allows you to select all the variables of the importation file.
Use the CTRL+Click or SHIFT+Click combo keys for partially selecting variables.

Select None

Allows you to deselect all the variables from the importation file.
Use the CTRL+Click or SHIFT+Click combo keys for partially deselecting variables.

Browse File...

Allows you to change the origin file, by activating the standard window for file selection.

? (help)

Activates the guide containing information relating to the origin data format requirements.

Import

Activates the importation of variables from the origin file (device's data source) to the Movicon project. When the importation has terminated, the project's Realtime Database resource will result as being populated with all the imported variables.

As the 'data sources' depend on the device and might change, it is advised to always check the imported variables' properties to see whether the automatic parsing, the type assigned and the device's address have been executed correctly when the importation has terminated.

Cancel

This button cancels the importing operation.

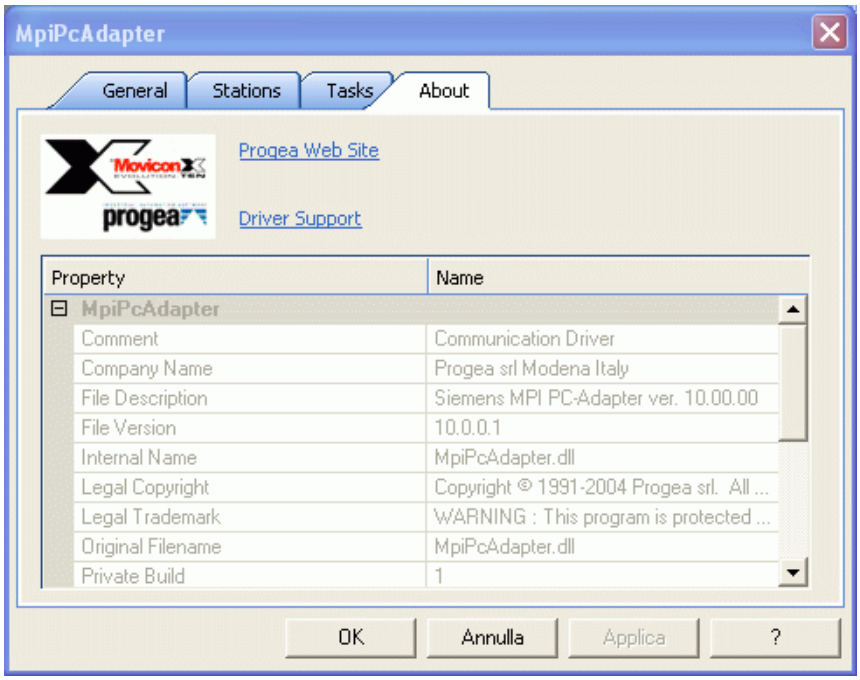
Station:

This box allows you to select the driver's station to be assigned to the imported variables, when the driver has been set with more than one station.

28.15. About

Though this window you can checkout the selected **Driver version** and any associated descriptions and comments. Links to the Progea site and the Progea Technical Support e-mail address can also be found in this window.

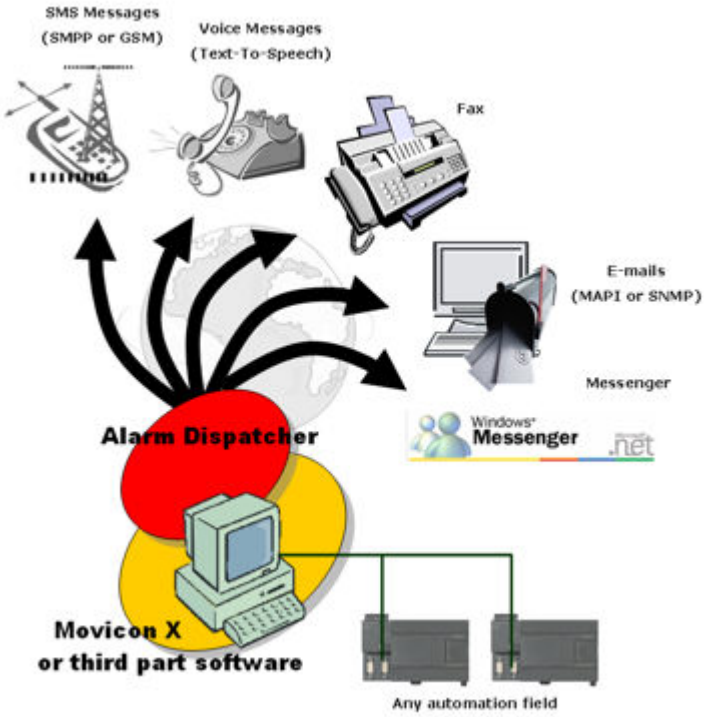
Always check whether the Movicon X Driver file is the latest available, otherwise it would be in your best interests to update the file (.DLL) by downloading it from the Progea support web site according to the modalities provided.



29. Alarm Dispatcher

Alarm Dispatcher is a software program for (notification) sending messages using various means of communication (Plugin), from among those configured. The communication technologies available are:

1. **SMS messages by means of SMPP protocol**
2. **SMS messages by means of GSM**
3. **Sending a Fax**
4. **Sending Voice Messages (Voice Synthesis)**
5. **Sending E-mails by means of SMTP protocol**
6. **Sending E-mail by means of MAPI**



The software is designed by Progea so that it can be managed by Movicon X or by any software capable of handling the functions, properties and methods available in the Alarm Dispatcher program.
The use of the Movicon X is totally transparent in notification of messages and handling general information. However, its use can be customized by means of VBA scripts or third party programs can command the Alarm Dispatcher for notification of messages according to the programming techniques described in this documentation.

Alarm Dispatcher maintains a list of the recipients and the list of plugins to be used, for each of its configuration projects, for sending messages. Alarm Dispatcher is designed for acting as a server for dispatching messages. The messages come from Movicon X or from any Client application which must interface using the functions concerned.
However, receiving the messages and distributing them leaves a trace in the log window, apart from in the relative log file.

Use by means of Movicon X

Movicon X uses the Alarm Dispatcher functions in a completely transparent manner. The messages are transmitted by the properties of the Movicon project alarms, and the user profiles (Recipients) are those of the Movicon project users management.
However, it is possible to use the Movicon X VBA Scripts to customize the management of notification according to the requirements.

Operating methods

Alarm Dispatcher has two operating methods:

1. **Configuration**
2. **Run**

Configuration

The program starts in design mode (except for startup with the option from command line) from which it is possible to create new configuration projects, open existing projects, modify and save them. Starting the program causes the last project saved to be loaded. From this mode it is possible to access the project settings windows, by means of the "Settings" menu item or by using the buttons on the toolbar. The "File" menu and the relative buttons on the toolbar, allow handling of these projects, whether new or pre-existing ones. The Run and Stop commands, present in the "File" menu, allow to change over from one operating mode to the other.

Run

In this mode, the messages are actually dispatched and sent.
Whenever possible, depending on the criteria for each type of message, the messages for the same Recipient are grouped into a single one, to save time and resources.
It is not possible to modify the work settings or close the program. To do this, it is necessary to return to the Project design mode.
An icon in the area tray indicates the state of the application and provides access to the log window. Use the RH mouse button to activate the contextual menu which provides certain commands, useful if the application has been started by another program as a hidden application.

29.1. Menu Commands

Menu File

New

Opens a new project, setting the default values for the attributes. From the standard dialog window for selecting a file, select the path and name of the new project.

Open

Opens an existing project. The default extnsion is <nome>.dspt

Save

Saves the current project. The default extension is <name>.dspt

Save as

Saves the current project in a new project.

Run

Runs the messages dispatching process, using the current project settings.

Stop

Stops the dispatching process. The program returns to the Project design mode.

Exit

Ends program.

29.2. Licensing

The Alarm Dispatcher does not require a license if used by Movicon X since it uses the Movicon X license.
But, if used by third party programs, the program requires an activation code which must be set by means of the COM interface.

```
BOOL AlDInit(LPCTSTR lpszSerialNumber)
```
Subject: `LPCTSTR lpszSerialNumber` License code for deactivating Demo mode.
Return: TRUE (1) if code entered is correct.

Allows to release demo operating mode. In demo mode, the functions are complete, except for the fact that the message sent is a constant text, and cannot be modified by the user. Contact the Progea S.r.l. commercial Dept. for the license code.
Note: In demo mode it is not possible to send either MAPI or SMTP email messages.

- The activation code must be handled as an initialization parameter by the program user code. Contact the Progea Sales offices (sales@progea.com) for more information
- The code acquired is valid for using the program on a single station only

29.3. COM Interface

Alarm Dispatcher is a program which carries out the server functions for transmitting messages and notification of alarms. It is designed to allow notification of messages by your VB/C++ application or using any program or application that is capable of handling the code in a suitable manner to activate the functions provided by Alarm Dispatcher.
The Alarm Dispatcher command interface can be used by registration in the Windows ROT.

Use by means of Movicon X

Movicon X uses the Alarm Dispatcher functions in a completely transparent manner. The messages are transmitted by the properties of the Movicon project alarms, and the user profiles (Recipients) are those of the Movicon project users management.
However, it is possible to use the Movicon X VBA Scripts to customize the management of notification according to the requirements.

Using with other programs

Alarm Dispatcher can be handled and used by any third party program, whether Scada/HMI software or VB, C/C++ or other programs. Alarm Dispatcher will function as notification server for the Client applications using the services provided by Alarm Dispatcher by means of the following functions:

o----------o

```
LONG SendMessage(LPCTSTR lpszMessage)
```

Subject: LPCTSTR lpszMessage, string containing the message to be sent and the data for transmission.

The string consists of text fields, separated by the character ‘|’, as shown below:

"Media type"|"Message"|"Priority"|”Group name”|"Recipient name"|"IntCodeMoblie"|"AreaCodeMobile"|"Mobile number"|"IntCodeVoice"|"AreaCodeVoice"|"VoiceNumber"|"IntCodeFax"|"AreaCodeFax"|"FaxNumber"|"emailAddress"|"messenger"|"AddFlag"

- "Media type": indicates the type of plugin to which reference must be made, and it may be sms, email, voice, smpp, messenger, gsm, smtp, mapi, fax.
- "Message": the text to be transmitted. If an Email message is sent, the message will have a special syntax that includes specific data that appear in the electronic mail message.
    - the email syntax is: from~subject~mail message.
      ’~’ is the separator character.
    - Es. geronimo@sioux.augh~Subject Test~Test Message
- "**Priority**": message priority level
- “**Group name**”: name of group of users. Required for sending voice messages to group of users. To send a voice message to a group of users, a message must be sent, to Alarm Dispatcher, for each user of the group, all the messages must have the same group name. To end the group and send the message, a closing message must be sent. This message must contain the group name, with all the following boxes empty.
- "**Recipient name**": name of recipient. To send a message to a recipient included in the internal list, enter the name here, leaving the relative transmission data boxes empty.
- "IntCodeMobile": mobile phone number international code
- "AreaCodeMobile": mobile phone number operator code
- "Mobile number": mobile phone number
- "IntCodeVoice": voice phone number international code
- "AreaCodeVoice": voice phone number area code
- "VoiceNumber": voice phone number.
- "IntCodeFax": fax number international code
- "AreaCodeFax": fax number area code
- "FaxNumber": fax number
- "emailAddress": Email address
- "messenger": contact, not used
- "AddFlag": ‘a’ adds recipient to internal list

Return: message identification number, if entry was successful. An error code returns if message entry was not successful.

Error	Value	Description
ERROR_SEND_SYNTAX	-1	Error in syntax of string representing the message
ERROR_SEND_NOMESSAGE	-2	The text of the message to be sent is an empty string
ERROR_SEND_RECIPIENTDATA_NOTAVAILABLE	-4	Recipient data not present and recipient not included in internal list.
ERROR_SEND_NTRANS_NOTVALID	-5	Message transmission queue is not available for entry. Try again subsequently.
ERROR_SEND_MEDIA_NOTAPPLICABLE	-6	The plugin for which the message is meant is not amongst those available.
ERROR_SEND_SMS_MESSAGE_TOO_LONG	-7	The sms is longer than the maximum permitted length.
ERROR_SEND_MEDIA_NOTLOADED	-8	The plugin for which the message is meant is not configured, or does not exist.

Enters message in Alarm Dispatcher transmission queue.

o----------o

`LONG RemoveMessage(LONG dwTransaction)`
Subject: `LONG dwTransaction` message identification
Return:

0	message not found
1	message removed
2	message not accessible (try again)

Remove message with identification corresponding to `dwTransaction`. Only messages with delayed transmission can be removed.

o----------o

`LONG GetMsgStatus(LONG dwTransaction)`
Subject: `LONG dwTransaction` message identification
Return:

0	message sent
1	message aborted (communication errors)
2	message in queue
3	message not found
4	message cancelled with RemoveMessage
5	message grouped

Message returns to current status with identification.

o----------o

`LONG SetDispatcherState(BOOLbGo)`
Subject: `BOOL bGo` indicates whether dispatching is to be started or stopped
Return: 1

Start (bGo = TRUE/1) or stop (bGo = FALSE/0) message dispatch.

o----------o

```
LONG GetDispatcherState(void)
```
Subject: none
Return:

0	Message dispatching stopped
1	Message dispatching started

o----------o

```
LONG PutLog(LPCTSTR lpszLog)
```
Subject: `LPCTSTR lpszLog` String to be logged
Return: 0
Enters a line in the log window.

o----------o

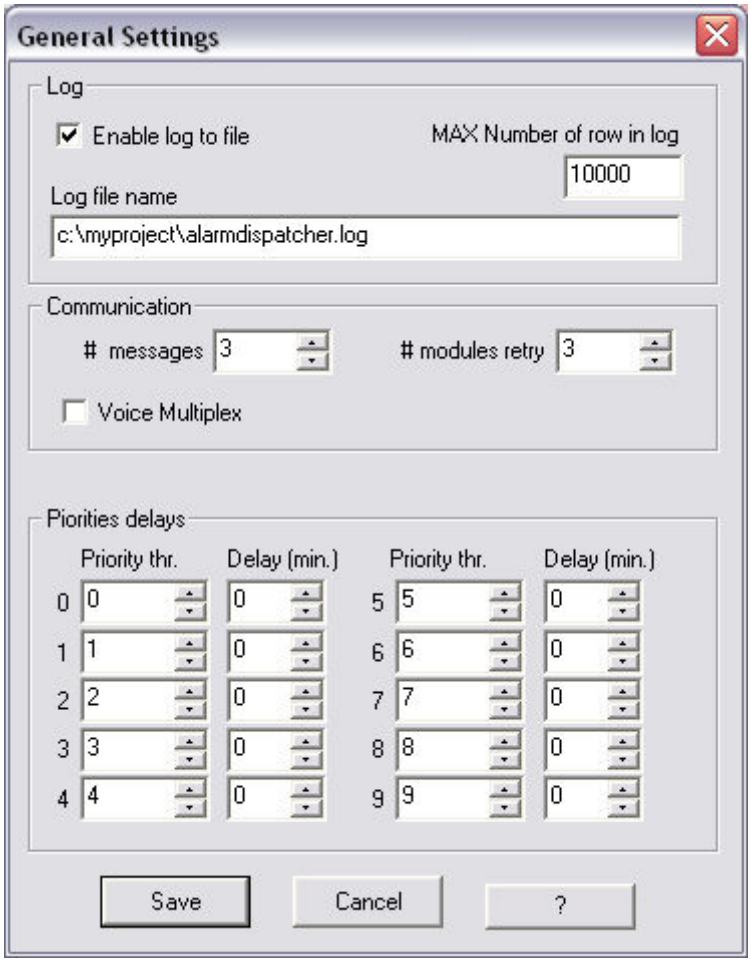
```
BOOL AlDInit(LPCTSTR lpszSerialNumber)
```
Subject: `LPCTSTR lpszSerialNumber` License code for deactivating Demo mode.
Return: TRUE (1) if code entered is correct.

Allows to release demo operating mode. In demo mode, the functions are complete, except for the fact that the message sent is a constant text, and cannot be modified by the user.
Contact the Progea Sales offices for the license code.

- **Note: In demo mode it is not possible to send either MAPI or SMTP email messages.**

29.4. General Settings

The General Settings make it possible to define certain general configurations for the entire project. There are three sections: Log, Communication and Priority delays.



Log

Check enabling for recording the file path and the maximum number of lines on event files, before the file starts recirculating.

Enable log to file: if enabled, it causes generation of a file containing a trace of events which occur during the running of the program, i.e. the start and end, sending of messages and dispatch errors.

Max Number of row in log: the maximum number of rows in log. The successive recordings will be overwritten on the older rows (recirculation).

Log file name: a name to be given to the log file can be specified here. If the box remains empty, the log file will have the same name as the project, with extension .dsplog.

Communications

Determines the messages notification method.

 # Messages: Determines the number of consecutive attempts for message notification. After the specific number of attempts, the program indicates the error in sending the message.

 # Modules retry: Determines the number of consecutive errors in messages notification for a single module (Plug In). After the specific number of attempts, the program indicates the error in the specified module.

Voice Multiples: If this option is selected, notification of vocal messages will however be sent to all the recipients of a group, independently of individual acknowledgement by each recipient user.

Priority Delay

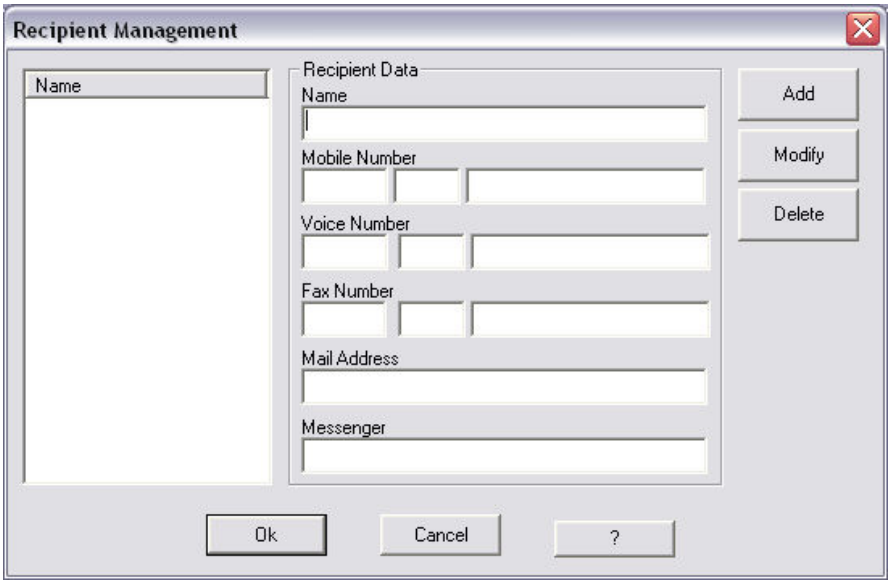
Determines the messages notification method.

Priority Thread - Dealy : parameters relative to messages notification priority. Each priority has a corresponding delay time (min.). If the message is notified by Movicon X, the priority assigned to the alarm identifies the corresponding notification delay time. In case of requests for sending messages to third party programs, it is necessary to assign a send priority (SendMessage function), the corresponding number of which will determine the relative delay time.

Example: if there are one or two alarms to be notified, the program will check the priority number and consequently the delay time assigned. It will then proceed with sending the message with the lower Delay time first, identifying the time on the basis of the priority number.

29.5. Users

The Recipients settings window is used to enter the general data regarding recipients of notifications, available for the project.
The users inserted will be listed on the left.
Each user can be added using the "**Add**" button, modified using the "**Modify**" button or removed using the "**Delete**" button.



Name

Defines the Recipient's name. It may be any string of characters.

Mobile Number

Defines the recipient's mobile phone number for receiving the SMS messages notified by the program. The number consists of three parts: the international code, area code and phone number.

Voice Number

Defines the recipient's mobile phone number for receiving the Voice messages notified by the program. The number consists of three parts: the international code, area code and phone number.

Fax Number

Defines the recipient's mobile phone number for receiving the fax messages notified by the program. The number consists of three parts: the international code, area code and phone number.

Mail Address

Defines the E-mail address for receiving the E-mail messages notified by the program.

Messenger

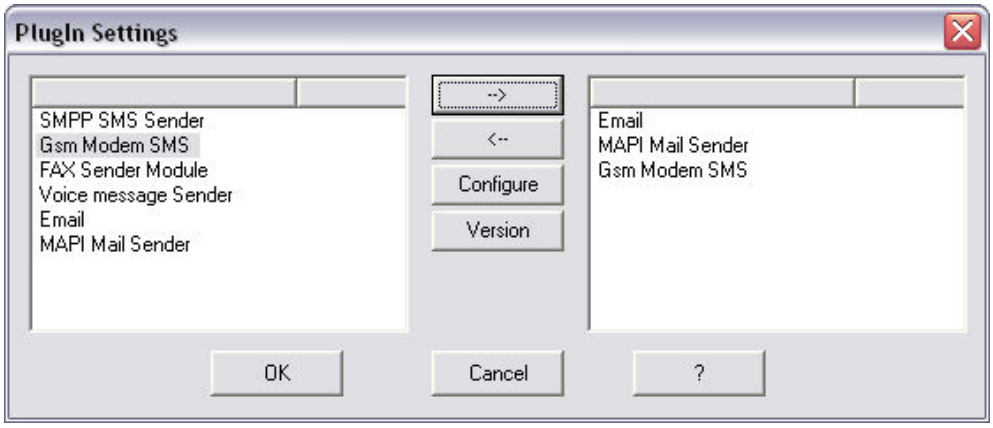
Defines the address of the recipient user connected online by means of the Microsoft Windows Messenger program.

Use by means of Movicon X

Movicon X uses the Alarm Dispatcher functions in a completely transparent manner. The messages are transmitted by the properties of the Movicon project alarms, and the user profiles (Recipients) are those of the Movicon project users management.
However, it is possible to use the Movicon X VBA Scripts to customize the management of notification according to the requirements.

29.6. Plug-In Modules

The PlugIn (Notification Modules) settings window makes it possible to insert the messages notification transmission mode, using the plug-in modules available in the program.
Each plug-in module available can be freely inserted and configured in the program, depending on the requirements.
The plug-ins available are listed on the left, while those inserted will be listed on the right.
Each plug-in can be selected and then added using the "**->**" button, or removed using the "**<-**" button.

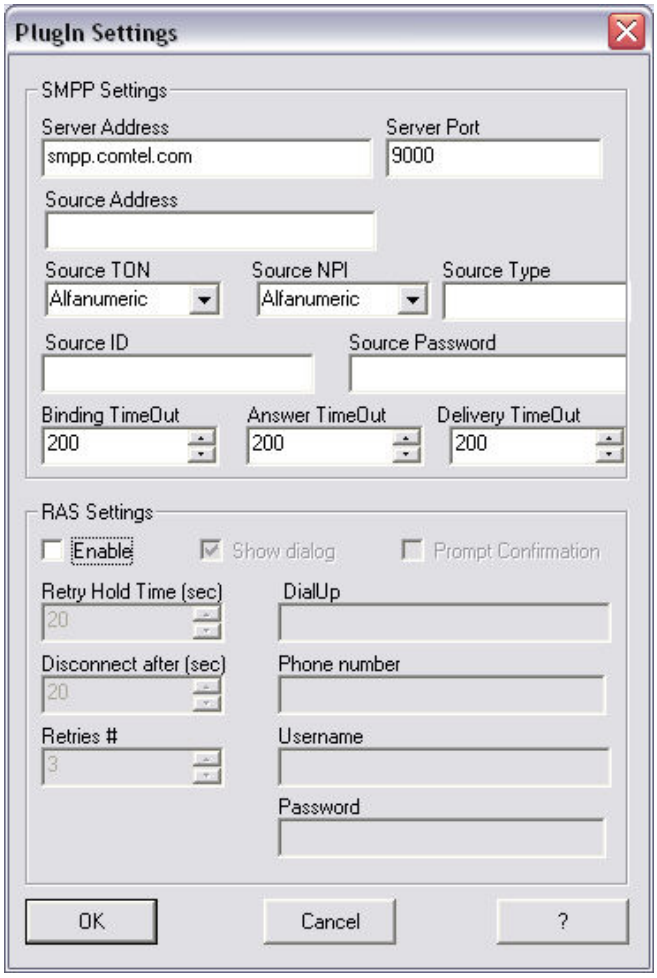


Each plug-in module inserted must be configured. To activate the module configuration window, select it from the list of modules inserted and double click or use the "**Configure**" button. The window will be displayed with the relative settings.

The "Version" button is used to check the version and release of each module, among those inserted. The version number is useful for checking the availability of the latests versions.

29.7. SMS via SMPP

This settings window makes it possible to configure the messages notification system by means of the SMS technology based the SMPP (Short Message Point-To-Point) protocol.
Thanks to this notification technique, the system is capable of sending SMS messages to recipient phones by directly accessing a SMPP server, without the need for a GSM modem.
Obviously, it is necessary to check if a phone operator is available for the service, and then activate the subscription. Depending on the service provider, the relative functional and access parameters must be set.



Server Address
Specify the phone operator SMPP server and service provider address.

Server Port
The 9000 port is usually required, but always check the server port required by the service provider.

Source TON, NPI, Type
Access parameters required by service provider.

Source ID, Password
Access parameters required by service provider. Received after subscription is activated.

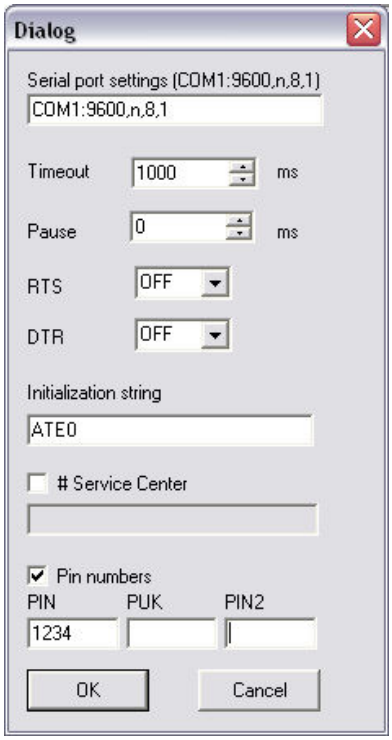
Timeout: Binding, Answer, Delivery
Setting time (msec) relative to operating timeout.

RAS Settings
If access to the internet requires an RAS (modem) connection, the relative parameters must be specified for the call and the internet connection.

Enable:enables use of a RAS connection for access to server via modem. If this is not the case, it means access to the server (internet) uses a permanent connection (e.g. LAN).
Show Dialog:enables display of the dialog window during the connection
Retry Hold Time: Timeout for retry of connection
Retry Hold Time: Timeout for disconnecting
Retries: Number of retry attempts
Dial Up: allows use of a connection already available in the operating system (previously inserted in the network connections)
Phone Number: if an existing account is not used, specify the phone number for access to the service
UserName, Password: if an existing account is not used, specify the parameters for access to the service

29.8. SMS via Modem GSM

This settings window makes it possible to configure the messages notification system by means of the SMS technology based on GSM, using any standard GSM modem.



Serial Port Settings
In this settings group the parameters must be specified for using the serial port to which the GSM modem is connected.

Inizialization String

Modem initialization String ATE0 is normally used, but it is preferable to follow the documentation of the modem used.

ServiceCenter

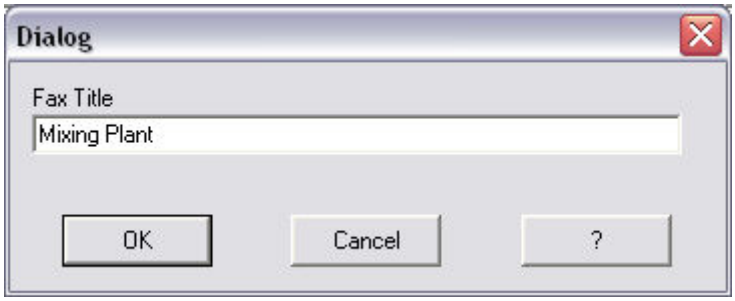
This number can be obtained from the SIM Card used by the modem.

Pin Numbers

Enter the PIN according to the SIM Card used by the modem.

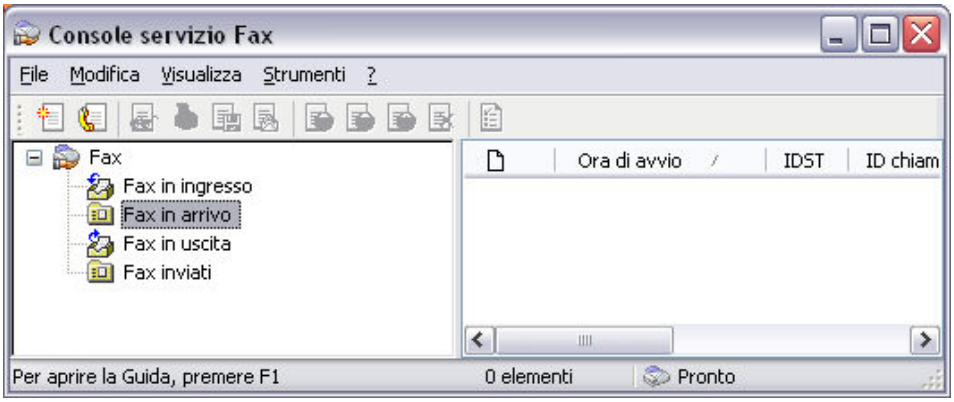
29.9. Fax Sender

This settings window is used for configuring the messages notification system by means of the Windows XP/2000 Fax Sender.
The program makes it possible to send a fax using the Windows fax printer.
The only property to be configured in the program is therefore the "Title" of the fax to be sent.



- **Important: because of the features used, the Fax Sender requires a Voice Modem**

Before using the notification service via Fax, proceed with correct and complete configuration of the service in Windows.
To do so, use the Control Panel to access the "Printers and Fax" item.



29.10. Voice Message Sender

This settings window is used to configure the messages notification system by means of the Voice-Text-To-Speech technology. Thanks to this technology, the program will vocally summarize the strings of text messages and notify these to the recipients via phone.

- **It is necessary to use a Voice Modem 100% compatible with the TAPI specifications**

Method for sending voice images:

1. The program notifies the voice messages to the recipient indicated. In case of group of recipients, the program sends the messages in two ways:

    a. **"Voice Multiplex"** property not selected (as default) in **General Settings**: The program notifies the messages starting from the first recipient of the group. The first recipient who acknowledges (Ack) the message determines the success of the notification procedure.
    b. b. "**"Voice Multiplex"**" property selected: The program notifies the messages starting from the first recipient of the group. The program however notifies the messages to all receipients in the group, independently of individual acknowledgement (Ack). The acknowledgement leads to a success of the notification procedure, but does not interrupt notification to all the recipients.

2. If a user answers a call, the program gives the welcome message and then starts notification of the alarm message. The alarm is repeated until the (Ack) command is given or until timeout. Acknowledgement may occur in two ways:

    a. **"Force Ack with key #"** property not selected (as default) in the Voice properties: The program notifies the message until one of the phone buttons is pressed, and will then consider the alarm as acknowledged and will pass on to the next one (if present), after giving the "New Alarm" message. The next messasge will also be repeated until one of the buttons is pressed. With the last message, if a button is pressed, the communication is shut off, with positive result.

    If no button is pressed, the system will repeat that message until timeout, and then shut off communication with negative result in the Log.

    a. **"Force Ack with key #"** property selected in the Voice properties: the program will act as above but will shut down the communication only if the "#" button is pressed on the phone.

    Thus, pressing a button will make the program move on to the next message, but at the end of the messages, the system will restart communicating the first message considering only the "#" button for confirmation and acknowledgement of alarms. If the "#" button is not pressed, the system will repeat the message until timeout.
    Pressing the "#" button will lead to acknowledgement of all the alarms, even those that are not yet notified.

Welcome Message

Allows definition of a text string that will be transmitted as an introductory message, at the beginning of the notification call, preceding the messages.

Farewell Message

Allows definition of a text string that will be transmitted as a final message, at the end of the notification, to warn of shutdown of the communication.

Next Message

Allows definition of a text string that will be transmitted between notification of one message and the next.

TimeOut

Defines the time (sec.) beyond which the system will abandon communication, if no sign of acknowledgement is received (such as, for example, in the presence of an answering machine).

Max Retry

Defines the maximum number of attempts at sending the notification.

Force message Ack with "#" key

This selection makes it possible to set the type of action by the recipient user for handling the alarms acknowledgement (Ack) command.

> **Option not selected**: on notification of messages, the system will await pressing of a button on the phone to acknowledge (Ack) the alarm being notified. If other alarms are present, pressing of a button will cause the system to pass on to the next message, otherwise it will shut down the notification successfully.
>
> **Option not selected**: on notification of messages, the system will await pressing of the # button to acknowledge (Ack) the alarm being notified. Pressing # will shut down the notification process successfully, even in the presence of other alarms.

Voice Engine Choice

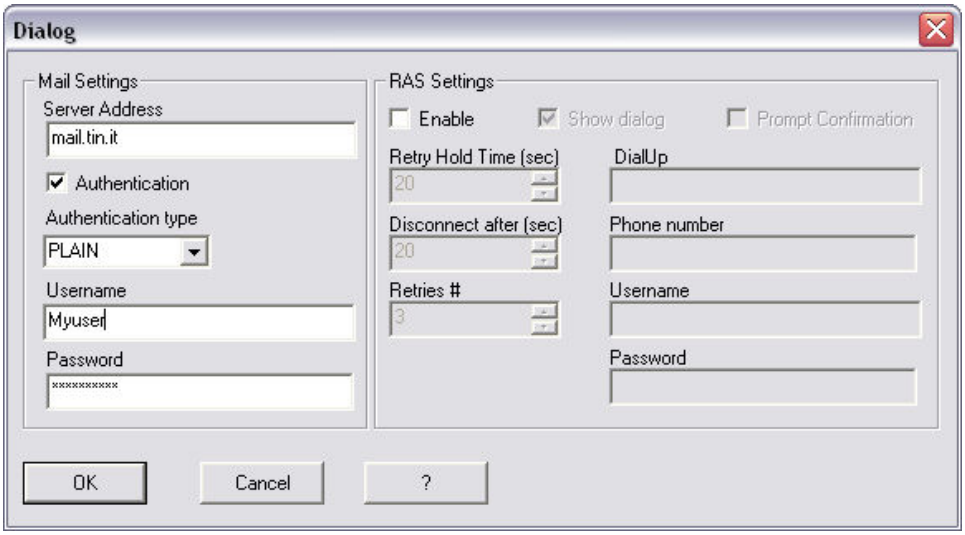
Allows personalization of voice synthesis modes, by selecting the type of voice from among those provided by the TTS engine.
The settings require the presence of a Voice Modem.

Lexicon

Makes it possible to set the phoneme (language) required for voice synthesis
The settings require the presence of a Voice Modem.

29.11. E-mails sender (via SMTP)

This settings window allows configuration of the messages notification system by e-mail using direct access to a server using SMTP protocol.
This type of notification makes it possible to send e-mail also in the absence of a mail sender program (e.g. Ms Outlook) installed on the plant PC. The notification system however requires a modem for internet access.



Server Address
This setting makes it possible to define the name of the mail server that handles the account.

Authentication
Makes it possible to specify if access to the server requires authentication for access.

Authentication Type
Allows selection of type of authentication required by mail server. The only type of authentication supported at the moment is "Plain".

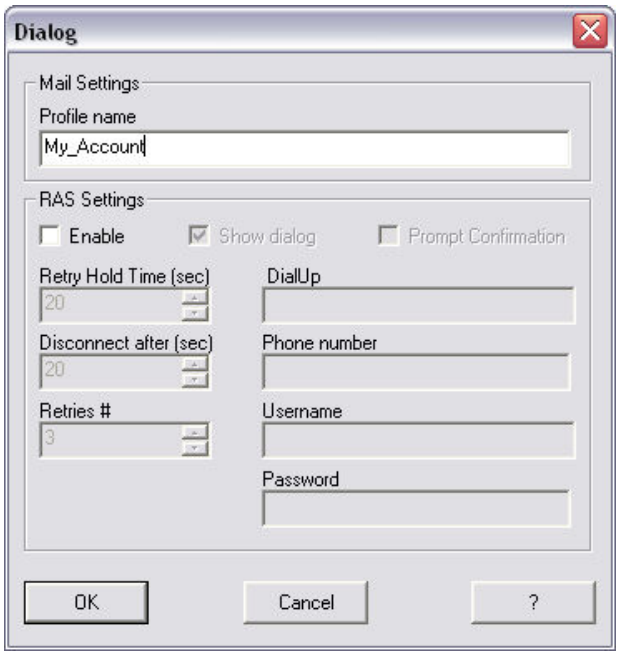
UserName, Password
In these two edit boxes, specify the username and password required for accessing the mail account.

RAS Settings
If access to the internet requires an RAS (modem) connection, the relative parameters must be specified for the call and the internet connection.

Enable: enables use of a RAS connection for access to server via modem. If this is not the case, it means access to the server (internet) uses a permanent connection (e.g. LAN)
Show Dialog: enables display of the dialog window during the connection
Retry Hold Time: Timeout for retry of connection
Retry Hold Time: Timeout for disconnecting
Retries: Number of retry attempts
Dial Up: allows use of a connection already available in the operating system (previously inserted in the network connections)
Phone Number: if an existing account is not used, specify the phone number for access to the service
UserName, Password: if an existing account is not used, specify the parameters for access to the service

29.12. E-mails sender (via MAPI)

This settings windows allows configuration of the messages notification system by means of e-mail using the program for sending mail configured in Windows as "Mail sender Program" (like Ms Outlook). Remember that this type of notification uses the mail sender program configured, therefore it is indispensable to make sure this program is installed and configured correctly.



Profile Name

Allows specification of name of the profile (account) present among those recognized in the mail sender program installed. All the parameters for access to the mail server will therefore have to be configured in the account of the mail program (like, Ms Outlook).

RAS Settings

If access to the internet requires an RAS (modem) connection, the relative parameters must be specified for the call and the internet connection.

Enable: enables use of a RAS connection for access to server via modem. If this is not the case, it means access to the server (internet) uses a permanent connection (e.g. LAN)
Show Dialog: enables display of the dialog window during the connection
Retry Hold Time: Timeout for retry of connection
Retry Hold Time: Timeout for disconnecting
Retries: Number of retry attempts
Dial Up: allows use of a connection already available in the operating system (previously inserted in the network connections)
Phone Number: if an existing account is not used, specify the phone number for access to the service
UserName, Password: if an existing account is not used, specify the parameters for access to the service

29.13. Errors

GsmSMS

ERROR_INIT_FAILED	–1	serial opening error.
ERROR_NO_MODEM_INIT	–2	modem initialization error. Answer received with error, or no answer. In this phase, the initialization string, ending with \r, is passed to the modem.
ERROR_NO_PIN	–3	error or no answer after sending PIN The "AT+CPIN=<numero pin>\r" string is sent to the modem. If an error is received in response, or no answer is received within timeout, an error occurs.
ERROR_NO_SERVICE	–4	error or no answer after sending service centre number. The "AT+CSCA?\r" string is sent for requesting the current service centre number set. If different from that present in the settings, it is sent together with the "AT+CSCA=<num. Centro servizi>\r" string. If an error is received in response, or no answer is received within timeout, an error occurs.
ERROR_NO_ASCII_FORMAT	–5	error or no answer following ASCII mode setting. The AT+CMGF?\r" string is sent to check if the ASCII mode is already set. If it is not set, do so using the "AT+CMGF=1\r" string. If an error is received in response, or no answer is received within timeout, an error occurs.
ERROR_NO_WRITE_NUMBER	–6	phone number writing failure The "AT+CMGS=\"<num. telefono>\"\r" string is sent.
ERROR_NO_ANSWER	–7	no answer to writing of phone number.
ERROR_NO_WRITE_MESSAGE	–8	error while writing message. The "<messaggio>\x1A " string is sent
ERROR_NO_ANSWER_MESSAGE	–9	error or no answer to message sent.

SMTP

ERROR_PARSE_MESSAGE	–1	error in format of string containing message and data to be sent.
ERROR_CONNECTING_RAS	–2	error in RAS connection.
ERROR_WINSOCK_INIT_FAILED	–23	error in stack TCP initialization.
ERROR_SMTP_SERVER_CONNECT_FAILED	–24	error during connection to SMTP server.
ERROR_SMTP_SEND_MAIL_FAILED	–25	error while sending message to SMTP server.

Voice

ERROR_NO_BUZZ	–8	MovBuzz not loaded, probably not present, or voice modem not installed.
ERROR_PARSE_MESSAGE	–4	error in format of string containing message and data to

be sent.

SmppSMS

ERROR_BIND_TIMEOUT	-1	No answer from SMPP server, on request for connection. The Binding time has run out.
ERROR_CONNECTING_RAS	-2	Error in completing RAS connection.
ERROR_SUBMIT_TIMEOUT	-4	No answer to SMS sent. Answer timeout
ERROR_ENQ_ANSWER_TIMEOUT	-5	No answer to SMS sent request. Delivery timeout.
ERROR_DELIVERY_TIMEOUT	-6	The message was not sent within the Delivery timeout.

MAPI

ERROR_PARSE_MESSAGE	-1	error in format of string containing message and data to be sent.
ERROR_CONNECTING_RAS	-2	Error in completing RAS connection.
ERROR_MAPI_NOT_INSTALLED	-4	Impossible to load MAPI library. Check installation.
ERROR_MAPI_LOGON_FAILED	-5	Connection to specified account failed. Check account data.
ERROR_MAPI_SEND	-6	Error while sending message. Check message data.

Fax

ERROR_NO_BUZZ	-1	MovBuzz not loaded, probably not present, or voice modem not installed.
ERROR_FAX_ERROR	-2	Error in transfer to Microsoft Fax Service. Check installation of service and the message data.

30. Windows Registry

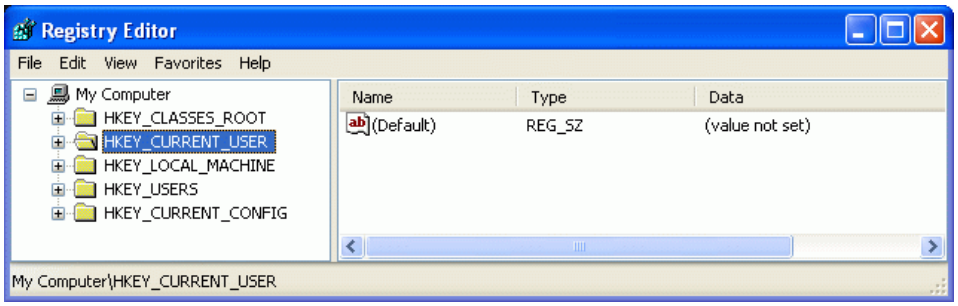
Windows configuration registry keys

Certain advanced options of the Movicon environment can only be edited with the appropriate Windows configuration registry keys. A part of these registry keys can also be edited in the Movicon package in following versions.

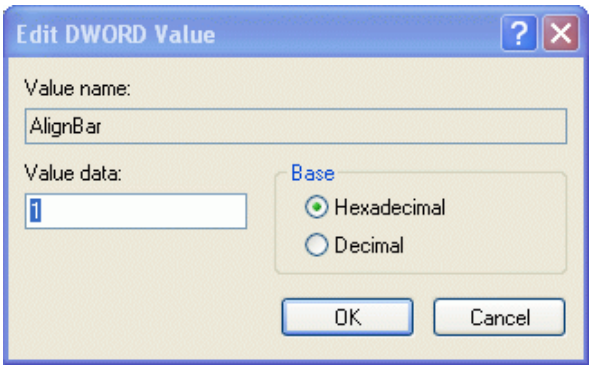
The Windows configuration registry is an important component for running the operating system and any errors could effect its run. Therefore great care must be taken when carrying out any operations.

30.1. Registry Key Editing

Windows configuration Registry key editing must be carried out with the Movicon program closed by carrying out the following 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 parts: the main items, classed in a tree structure, are listed on the left hand side. The keys,with the corresponding values, of the selected folder are displayed on the right.



By referring to the table described in the paragraph titled **"List of Movicon Registry Keys"**, you can select the path corresponding to the key, to be edited, to display it on the left hand side of the window. When the key required is not presented in the list you can add it by activating the **New** command from the **Edit** menu or click the right mouse button.
A key just entered or already present can be edited by selecting the **Edit** command from the **Edit** menu or by double-clicking on the name of the key. This will display a window where either the **Hexadecimal** or **Decimal** database is to be selected and the required values entered.



30.2. List of Movicon Registry Keys

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.
All the keys listed and described below can be searched and inserted starting from the following path:

HKEY_CURRENT_USER\Software\Progea Automation\MOVICON X [version]

Please bare in mind that the following keys listed below can definitely be used with the last Movicon version but some of them may not be supported by previous versions.

User Interface

In the table below you will find a list of Windows configuration registry keys which influence the running of the user interface, being Movicon's performances regarding operations directly concerning the user.

Key	Description	Default
General\ MaxUndoLevel	Number of "Undo" levels for cancelling editing or operations executed.	DWORD = 20
General\ CreateSharedVariables	Value of the 'Area' property for inserting new variables.	DWORD = 0 0 = Not Shared 1 = Flag
General\ NotSharedRetentive	Default value of the 'Retentive (Not Shared)' property of a Variable for inserting new variables.	DWORD = 1 0 = Not Retentive 1 = Retentive
General\ MaxArraySize	Maximum size that a 'fixed length byte Array' variable type can obtain.	DWORD = 4096
General\ MRUCount	Maximum number of projects that are to be listed among the recent files under the 'File' menu item and in the 'Recent' tab after the 'Open-File' command.	DWORD = 8
General\ BlinkLedKeyboard	To choose whether or not to have the blink of the keyboard's 'Scroll Lock' led when an alarm is present.	DWORD = 0 0 = Disabled 1 = Enabled
General\ NumberTestStep	Number of animation test steps in Screens (Ctrl+T).	DWORD = 10
Help/ Trace	Shows the identifiers in the appropriate 'Help Trace' folder of the Output window which have been called up by Movicon on the argument selected with the Help Context window when active.	DWORD = 1 0 = No 1 = Yes
General\ DefaultAlphaBlend	Movicon's windows' transparency factor. Only valid with Windows 2000 OS or follow-ups.	DWORD = 80
General\ AnimationDelay	Trigger in milliseconds for the editor script window's display.	DWORD = 1
General\ AnimationTime	Time in milliseconds for controls' display. Not currently used in any of the Movicon resources.	DWORD = 100

General\ UsePCSpeaker	Enables the use of the audio card installed in the PC for alerting the presence of alarms.	DWORD = 1 0 = Disabled 1 = Enabled
General\ GridVisible	Determines the grid's visibility state in Screens.	DWORD = 1 0 = Not visible 1 = Visible
General\ SnapToGrid	Determines whether the objects in Screens must be aligned with the grid during mouse moves.	DWORD = 1 0 = No 1 = Yes
General\ ContInser	Enables the continual insertion of objects in Screens. When set at '0', a new selection from the 'Drawings' window must be made after each object insertion.	DWORD = 0 0 = No 1 = Yes
General\ GridSizeX	Distance in pixels of the horizontal grid (minimum value = 2)	DWORD = 10
General\ GridSizeY	Distance in pixels of the vertical grid (minimum value = 2)	DWORD = 10
General\ EnableSysTrayMessage	Permits alarm alert pop-up messages to be disabled when Movicon does not focus.	DWORD = 1 0 = Disabled 1 = Enable
General\ NumWatchWindows	Number of watch Tabs in the Project's Debug window (Watch Window) when the Project is run during the developing stage (minimum value = 1).	DWORD = 4
General\ FormattingBar	Sets the 'Formatting' bar's visibility.	DWORD = 1 0 = Not Visible 1 = Visible
General\ AlignBar	Sets the 'Align' toolbar's visibility.	DWORD = 1 0 = Not Visible 1 = Visible
General\ EnableRuler	Enables or Disables the displaying of Rulers at the side of the Screens.	DWORD = 1 0 = Not Visible 1 = Visible
General\ RulerSize	Width in pixels of Rulers at the side of Screens.	DWORD = 18
General\ RulerUnit	Measure units of rulers at the side of Screens.	DWORD = 1 0 = Inches 1 = Centimetres 2 = Millimetres
General\ EditUsersExe	Path and name of the application that Movicon must execute following the command for the editor of Users in Runtime. When the file name is specified only Movicon will search for it in its installation folder first and then in the Windows' 'PATH' list.	SZ = EditUser.exe

HKEY_CURRENT_USER\ Software\ Progea Automation\ movicon.exe\ DoNotAskAgain	The keys which deactivate the confirm request windows which may appear during programming for certain operations are saved in this group. If the "Don't show again" check-box is checked before closing this window, the window in question will no longer be proposed. To restore the initial situation just cancel this register key.	
General\ StringSep	In this string type key you can specify the separator characters which Movicon is to used for Importing/Exporting String Tables on ASCII files. "TAB" is the default character used by Movicon.	String = TAB
General\ StoreCryptProject	This key is used for setting the default values of the "Crypt Project" properties of a new project. This property will be set according to the key's value when a new project is being created.	DWORD = 0 0 = Disabled 1 = Enabled
General\ StoreCryptProjectResources	This key is used for setting the default value of the "Crypt Project Resources" of a new project. This property will be set according to the key's value when a new project is being created.	DWORD = 0 0 = Disabled 1 = Enabled
General\ StoreUnicodeProject	This key is used for setting the default value of the "Unicode Project" of a new project. This property will be set according to the key's value when a new project is being created.	DWORD = 0 0 = Disabled 1 = Enabled
General\ StoreZippedProject	This key is used for setting the default value of the "Zipped Project" of a new project. This property will be set according to the key's value when a new project is being created.	DWORD = 0 0 = Disabled 1 = Enabled

Graphic Interface

This table shows the Windows configuration registry keys that influence the graphic interfacing performances, being Movicon's behaviour regarding operations concerning the graphics in Screens or objects inside Screens.

Key	Description	Default
General\ AppLook	This key sets the Movicon workspace's look.	DWORD = 2 0 = VS.NET 1 = Office 2003 2 = Office XP
General\ MDITabsAutoColor	This key sets how the MDI tabs look in the Movicon workspace. You can select whether to have them displayed in color or not.	DWORD = 1 0 = Non Colorate 1 = Colorate
General\ BlinkTypeSlow	Blink time in milliseconds for the 'Slow' option which can be selected in some of the symbols' animation properties.	DWORD = 2000
General\ BlinkTypeMedium	Blink time in milliseconds for he 'Medium' option which can be selected in some of the symbols' animation properties.	DWORD = 1000
General\ BlinkTypeFast	Blink time in milliseconds for the 'Fast' option, which can be selected in some of the symbols' animation properties.	DWORD = 500

General\ NumberShade	Colour grades when using backgrounds with two shades of colour.	DWORD = 64
General\ BrightnessOffset	Brightness grades when using backgrounds with one colour.	DWORD = 50
General\ StepBrightness	Number of steps used when increasing or decreasing the brightness or design contrast.	DWORD = 5
General\ TooltipTransparency	Transparency percentage of the Tooltips window in Runtime and in Developing stage (0-100%).	DWORD = 30
General\ Tooltipeffectbk	Tooltip's background effect in Runtime and developing stage. The following values can be obtained: EFFECT_SOLID = 0 EFFECT_HGRADIENT = 1 EFFECT_VGRADIENT = 2 EFFECT_HCGRADIENT = 3 EFFECT_VCGRADIENT = 4 EFFECT_3HGRADIENT = 5 EFFECT_3VGRADIENT = 6 EFFECT_NOISE = 7 EFFECT_DIAGSHADE = 8 EFFECT_HSHADE = 9 EFFECT_VSHADE = 10 EFFECT_HBUMP = 11 EFFECT_VBUMP = 12 EFFECT_SOFTBUMP = 13 EFFECT_HARDBUMP = 14 EFFECT_METAL = 15	DWORD = 0
General\ TooltipTimeAutoPop	Tooltip's maximum display time in milliseconds on screen even when the mouse remains still in the same position.	DWORD = 5000
General\ TooltipTimeInitial	After the a symbol's Tooltip has been displayed, the mouse pointer has to remain outside the symbol area for the time indicated in this parameter to allow the next displaying of the Tooltip when the mouse cursor returns into the symbol's area. The time is expressed in milliseconds.	DWORD =200
General\ TooltipTimeFadeIn	How long the Tooltip's fade in effect, during its appearance, is to last. The parameter is expressed in steps.	DWORD =1
General\ TooltipTimeFadeOut	How long the Tooltip's fade out effect, during its appearance, is to last. The parameter is expressed in steps.	DWORD =1
General\ TraceCommentFont	Allows you to change the font used in a variable's "Trace Comment" window.	String = MS Sans Serif
General\ TraceCommentFontSize	Allows you change the size of the font in a variable's "Trace Comment" window. This value also changes the size with which the window opens up on screen.	DWORD =8
General\ DBFilterFont	Allows you to change the font used in the "Filter" window which can be opend from the "Historical Log Window", "DataLogger/Recipe Window" or the "DB Trace Window".	String = MS Sans Serif
General\ DBFilterFontSize	Allows you to change the size of the font in the "Filter" window which can be opened from the "Historical Log Window", "DataLogger/Recipe Window" or the "DB Trace Window".	DWORD =8
General\ NumericPadFont	Allows you to change the font used in the NumricPad dialog window.	String = MS Sans Serif
General\ NumericPadFontSize	Allows you to change the size of the font in the NumericPad Dialog window.	DWORD =14 (Win32) DWORD =8 (WinCE)

General\ AlphaNumericPadFont	Allows you to change the font used in the AlphaNumericPad dialog window.	String = MS Sans Serif
General\ AlphaNumericPadFontSize	Allows you to change the size of the font used in the AlphaNumericPad dialog window.	DWORD =14 (Win32) DWORD =8 (WinCE)

Real Time DB

In the table below are described the Windows configuration registry keys that have influence on the Movicon Real Time DB settings.

Key	Description	Default
General\ DefaultNewNumInput	Number of bytes set for creating a new project for the 'Input' area (Shared area) in the 'Real Time DB' property (minimum value = 10).	DWORD = 32768
General\ DefaultNewNumOutput	Number of bytes set for creating a new project for the 'Output' area (Shared area) in the 'Real Time DB' property (minimum value = 10).	DWORD = 32768
General\ DefaultNewNumFlag	Number of bytes set for creating a new project for the 'Flag' area (Shared area) in the 'Real Time DB' property (minimum value = 10).	DWORD = 32768

Networking

The Windows configuration registry keys which influence how the Movicon Networking works are described below. Networking involves the functions that allow two Movicon projects to communicate to each other through the net.

Key	Description	Default
General\ DeadSocketTimeout	Timeout in minutes before closing an inactive Client connection.	DWORD = 5

WebClient

The Windows configuration registry keys regarding Movicon's performances concerning any eventual ActiveX WebClient connected in net are described in the table below.

Key	Description	Default
General\ WebServiceClientLoggerLevel	Level requested by the Movicon Server from an ActiveX WebClient wishing to connect.	DWORD = 9 (1...10) 9 = System Level

Communication

The Windows configuration registry keys concerning Movicon's communications with other applications are described in the table below.

Key	Description	Default
General\ UseMailServer	Enables the use of an e-mail Server, instead of a Client, for automatically sending e-mail.	DWORD = 0 0 = Mail Client 1 = Mail Server
General\ MaxTimeStartupDrivers	Maximum time needed in the communication drivers Startup phase. This is used when the driver will not start or has problems. Time is expressed in milliseconds.	DWORD = 5000

Basic Scripts

The Windows configuration registry keys regarding Movicon's inherent aspects in managing the Basic Script resources.

Key	Description	Default
General\ TimerEventFrequence	Execution frequency of the 'OnTimer' Basic Script event. The value entered corresponds to how many times the procedure must be executed in a second.	DWORD = 10 (1...10) 1 = each second 10 = 10 times a second

Historics and DataBase

The Windows configuration registry keys concerning Movicon's aspects inherent to Data Loggers and Historical Logs.

Key	Description	Default
General\ UseDefaultSQLServer	Indicates Movicon to give preferential use to 'MS SQL Server' for ODBC links.	DWORD = 1 0 = MsAccess 1 = MS SQL Server
General\ ODBCQueryTimeOut	Maximum timeout in seconds for extracting data through the ODBC. When this time is exceeded the Movicon project being run will be blocked and an error message will display.	DWORD = 15
General\ ODBCLoginTimeout	Maximum timeout in seconds for logging in on a ODBC. Exceeding this time will block the Movicon project being run and an error message will display.	DWORD = 15
General\ TimeToWaitAfterODBCError	Time in seconds that Movicon is to wait before retrying a ODBC command which created an error.	DWORD = 10
General\ MaxLogEntries	Maximum size of log file expressed in KBytes.	DWORD = 100
General\ MaxLogFiles	Maximum number of log files to be created. When this value is reached the	DWORD = 5

	data will be recycled on the oldest files.	
General\ ADOCEProvider	This setting identifies the Provider used for the connection to the Database when using MovXCE.	String = Microsoft.SQLServer.OLEDB.CE.2.0
General\ ADOCEDataSourceExt	This setting identifies the extension used or creating DataBase files when using MOvXCE.	String = .sdf
General\ MaxProcessingLogLine	This value represents the number of messages a second with which the output window unloads.	DWORD = 100

OPC Server and Client

The Windows configuration registry keys concerning the aspects of Movicon as OPC Server and OPC Client when communicating.

Chiave	Descrizione	Default
General\ DontRemoveOPCItems	Movicon, for default, does not remove items form the OPC Server when they are not in use. This is applied to those items configured in the project variables "Dynamic Address" property. Frequent removal of items does, in fact, use up many resources.	DWORD = 1 0 = Remove Items 1 = DON'T remove items

Performances

The Windows configuration registry keys concerning the aspects of Movicon which can influence its performances are described in the table below.

As regards to the 'Heap' keys, for memory management optimization, the default settings are enabled only for MovRunTime.exe, MovCE.exe and MovSvr.exe modules while keys with the required values have to be inserted for enabling the optimized management for the Movicon.exe module.

Key	Description	Default
General\ MaxDTMessagesPurge	The writing of events in the Movicon status bar distributes the flush of events in more ticks. The set value is a maximum of 20 events per tick, but it can be changed.	DWORD = 20
General\ SleepCounter	Value for optimizing Movicon performances (not to be changed).	DWORD = 5
General\ MaxStatObjects	Maximum limit of Handle objects for the project statistics during its execution. This value is only valid if the project is run during the developing stage.	DWORD = 1000
General\ GeneralTimeout	General Time-out for certain types of operations. eg. influence on maximum valuation time for a Basic Script expression associated Basic Script to a control.	DWORD = 3000
General\ DrawRecthHeap	Maximum number of 'Rectangle' objects from the 'Basic Shapes' class which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawCharthHeap	Maximum number of objects from the 'Buttons-Light-Switches' class which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawButtonhHeap	Maximum number of 'Graphical' objects from the 'Advanced Shapes' class which can be allocated ate the same time (0 = unlimited).	DWORD = 0

General\ DrawPolyhHeap	Maximum number of 'Polygon' objects from the 'Basic Shapes' category which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawOleObjhHeap	Maximum number of 'OLE' objects from the 'Advanced Shapes' category which can be allocated at the same time. (0 = unlimited).	DWORD = 0
General\ DrawOcxObjhHeap	Maximum number of 'OCX/ActiveX' objects from the 'Advanced Shapes' category which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawGrouphHeap	Maximum number of container symbols which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawWholeSynObjhHeap	Maximum number of 'Embedded Screen' objects from the 'Advanced Shapes' category which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawTrendObjhHeap	Maximum number of 'Trend' objects from the 'Advanced Shapes' category allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawAlarmWndhHeap	Maximum number of 'Alarm Window' objects from the 'Advanced Shapes' category that can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawHisLogWndhHeap	Maximum number of 'Log Window' objects from the 'Advanced Shapes' category that can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawDLWndhHeap	Maximum number of Data Logger/Recipe Window' objects from the 'Advanced Shapes' category which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawTraceDBWndhHeap	Maximum number of 'TraceDB Window' objects from the 'Advanced Shapes' category which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawGaugeObjhHeap	Maximum number of 'Sliders-Gauges-Meters' objects which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ DrawEditBoxObjhHeap	Maximum number of 'EditBox' objects from the 'Advanced Shapes' category that can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ VariableObjHeap	Maximum number of Variables which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ OPCAEObjHeap	Maximum number of "Server OPC AE" which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ OPCItemObjectsHeap	Maximum number of "Items OPC" which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ OPCGroupObjectsHeap	Maximum number of "Groups OPC" which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ OPCObjectsHeap	Maximum number of "Clients OPC" which can be allocated at the same time (0 = unlimited).	DWORD = 0
General\ MaxAppInstances	Maximum number of 'Movicon.exe' process instances which can be executed at the same time (0 = unlimited).	DWORD = 0
General\ TimeDeferClosingWnd	Timeout in milliseconds before Movicon unloads a 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.	DWORD = 5000
General\ MaxSymbolCache	Maximum number of symbols with which the image cache can be created. The default value is 0, meaning the cache management is disabled.	DWORD = 0
General\ ILSleep	This value expresses the sleep time in milliseconds between the execution of one group of IL instructions and the next. The size of the instruction groups is setup by means of the 'MaxILInstruction' key.	DWORD = 10

General\ MaxILInstruction	This value expresses the number of instructions processed before sleeping.	DWORD = 100
General\ ILLogicPriority	This value expresses the priority with which the IL logic is to be run. This setting is mainly for MovXCE.	DWORD = 0 MovXCE = 255
General\ UseOffScreenMem	This value allows you to choose whether to use memory maps for managing screens. Memory maps allow screens to be managed faster (ie. zoom operations) but uses more memory for each screen managed.	DWORD = 1 MovXCE = 0
General\ MaxMemoryLoad	This value expresses the percentage of memory in use that when exceeded the situation of the screens, which are in memory but not displayed, becomes critic for which they will be unloaded from memory creating a message in the trace. Unloading is done independently from the screens' active 'Not Destroyable' option. Furthermore the change page will be managed as if the "TimeDeferClosingWnd" key were set at "0". This key will not be managed by MovXCE.	DWORD = 90
General\ MaxAvailVirtual	This values expressed the amount of memory space still available for the Movicon XCE process. If no memory space is left, the screens will be unloaded and the basic scripts will not be loaded in memory. Futhermore the change page will be managed as if the 'TimeDeferClosingWnd' key were set at '0'. All will function as before once re-entered from this status. This key is used only by MovXCE.	DWORD = 5000000 Bytes

Microsoft Voice

The Windows configuration registry keys regarding the Microsoft MSVoice installed together with Movicon packet are described in the table below.

Make sure that the MsMouth program utility writes always writes the modifications in the U.S. key, independently of the operating system being used.

Therefore when the operating system is in Italian you need to manually copy the binary **Mode** key from the **Local Computer's Local PC/ Local Computer PC**.

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Notes:

MOVICON X1

PROGRAMMER'S MANUAL

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