

# Getting Started: How to learn quickly Movicon X

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# **1** Introduction

Welcome to the Movicon tutorial. This tutorial is aimed at giving you a quick guided demonstration of the main Movicon Scada/HMI platform techniques used. At the end of this tutorial you will have learnt the most essential techniques for using Movicon base functionalities.

Before going ahead with this tutorial you should first install the software by using the setup procedures.

All the information in this document is based on the assumption that:

- 1. Windows XP is the operating system being used
- 2. The user knows how to use the Windows' techniques
- The user has sufficient knowledge on automation systems, on variable and PLC concepts.

For further information on each argument, please consult the Online Guide or the User's Manual.

### 2 How to create and structure a project

Starting up Movicon with the option command line, the program will start in Programming mode (Developer). The last project being used is usually opened. The workspace will display empty upon the first execution. The workspace uses the modern disappearing window techniques and therefore just simply point the mouse on the Tab you require to make it appear in the workspace. To keep the window displayed in the workspace use the relevant commands as indicated below:



Movicon Workspace with hidden windows:

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N 4 P N\test 7 1 4 2 Soute to the cost of a c			
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	For Help, press F1		Savare total Catella and Scial

Movicon workspace with window kept displayed.

#### 2.1 Creating a new project

To create a new project, use the 'New' command from the File menu (Ctrl+N).



A Wizard will appear to guide you in creating the new project:

S Movicon		? 🗙
	Movicon 2 Extend your power	
New Existing   Recent		
	<b>∧</b>	
, ug	j 😼 🥸	
Win32 platform	Terminals WinCE Mobile Phones (j2se) platform (j2me)	
		<u>O</u> pen
		Cancel

First of all you need to select the type of platform on which the project must be run. In this way the functions which are not supported by the selected platform will not be available in programming mode (the selection can be changed later). Confirming this operation will display the configuration window:

Project Name	×
Nau Lawod unok puesta Fold	Please, enter the name and the path where your project will be saved  Mer <enter here="" name="" project="">  Er C:\Documents and Settings\Daniele\My Documents\Movic   Cypt Core Project file  Cypt all Project Resource files Compress all the files Encode using Unicode UTF-16</enter>
	<back next=""> Cancel Help</back>

In the window (as shown above), you will need to enter the desired name of the project in editing phase.

The other settings are not to be used for the time being but can be checked out in the manual if wished.

Click on the Next button to open the 'Users' settings.

MoviconX Extend your power	Developer Name CEnter project developer name neres Developer Password re-type Developer Password Enable Password Mng Create Default User Groups Create Users from NT/2000/XP Users -> Serv Center Server Name h Enable Runtime Users changes Enable NT/2000/XP U Enable NT/2000/XP U Enable CFR21-Part 11 Settings

The security settings can be defined in this window. We will skip this part for the time being and go on with Next button to access the Driver settings.

Movicon – Release 10

List Available Comm. Drivers	Comm.Driver Pro	perties	
ModBus ModBus TCPIP Modbus Serial Siemens Allen Bradley Mitsubishi OMRON Schneider SiaieBurgess GE-Fanuc Beckhoff Panasonic - Matsushita Hischer REP	Property	Name	

The drivers you wish to include in the project can be selected from this window. We will also skip this part and leave it for later. We will not set anything at this stage. Now click on Next button to reach the Screens Settings.

Screens Wowiccon X B R R R R R R R R R R R R R R R R R R	Create # Screens 10
•	Default Color

Here you can indicate whether or not to create screens in the project. You can also indicate whether to create each one with a Title, and a contents navigation bar with scroll page buttons on the bottom border. The default setting can be left alone or adapted to your requirements which can always be changed later.

Going still ahead with the wizard other windows will be shown for the configuration of the possible historical, alarms etc..

On the last window, Alarm Settings, when confirming these operations with Finish button, the wizard will proceed creating the project according to the settings carried out.

The Wizard will create the project's structure by pre-setting all the basic configurations in automatic.





#### 2.3 Project Properties

Each Movicon project has properties, which are used to set all the project's configuration functions.

To display the project's properties, click on the project name, at the beginning of its tree structure, or select the name and activate the Properties Window with the right mouse key.

Project Explorer	×
-	
Projects	•
Resources	▲
⊡ · 🗴 demo-x1	
🕀 🍓 Real Time DB	
🕀 🗁 🗁 Resources	

Properties ×						
*	🗴 demo-x1 Project 🔹 💌					
~	' 🗙   🎛 🛃 💷 🗏   🧭					
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	Enable Statistics					
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	Admin Alerts Server					
	Startup Synoptic	🤵 main				
	Startup Script	20				
	Shutdown Script	20				
	Startup Commands	9				
	Shutdown Commands	9				
	Start Full Screen					
	Show Status Bar					
	Show Trace Bar					
	Hide Desktop					
	Hide Start Button					
	🗌 Hide Task Bar					
	Hide System Clock					
	Disable Task Switching K					
	🗌 Disable Task Manager					
	Disable Ctrl+Alt+DEL					
Ξ						
	Recycle DB Connection					
	Send Admin Alerts	•				

The Project's properties permit you to setup the general characteristics of the project itself, among which are:

- 1. Eventual encrypted file protection
- 2. Selecting project's destination Operating System
- 3. Working Folder paths
- 4. Setting Startup behaviour (runtime execution)
- 5. Operating system access security
- 6. Historical Log settings
- 7. Tracing historical settings

For further details on all the properties please refer to the Programmer's Manual.

#### 2.4 Project Structure

The Movicon projects are built from a set of files XML format. Each project resource is saved in a XML file in that project's folder and in the subfolder of the relating resource.

Unless specified otherwise, the projects are saved in the "Documents\Movicon Projects" default folder.

The files, being 'open' thanks to the XML, can be encrypted and compressed in the project by means of using the project's properties .The structure of the files respects the structure the resources provided in the Movicon project window.

Let's go over the structure of the project files in detail, using the Windows Resource Explorer.



# **3** How to create Tags

To introduce a new variable (Tag) into the project you need to:

1. Select the RealTime Database resource from the project window

Project Explorer	×
<b>▲</b>	
Projects	-
Resources	
⊡ - <mark>XX</mark> <u>demo-x1</u>	
📄 🍳 Real Time DB	
🕀 👬 List Variables (Tags)	
List Comm.Drivers	
List Structure Protot	
🗄 🗁 Resources	

2. Select the "Add a new Variable" command from the Command Pane found at the bottom of the project window. You can also use the analog command by using the right mouse key.

Project Explorer		×
Filter		•
Projects		•
Resources	Туре	•
🗆 🕸 test*		
🖻 🇠 Real Time DB		
🖃 🎁 List Variables (Tags)		
	Word (16 Bit w	
List Comm.Drivers		
List Structure Protot		

A new variable will be created in the project with default name and properties. The Properties Window, if hidden, is displayed by doubleclicking on the new variable (if can be further displayed by using the relevant command from the 'View' menu).

You now need to assign the properties deemed necessary, especially the General properties, through the **'Properties Window'**. In our case we shall keep the default settings, with the PLC address to be assigned later. However we shall briefly go over the main properties for you:

Pro	Properties X						
w.	😡 VAR00001 Variable (Tag)						
~	✓ ×   P 2↓ ■ □ □   ②						
Ξ			-				
	Name	VAR000	D1				
	Description						
	Туре	Word (16	6 Bit without sign)				
	Initial Quality	Good					
	Retentive non Shared						
	Area	Not Sha	red				
	Address	٥ <u>ر</u>					
	Dynamic	🖪 🔪 Г	<u></u>				
	📄 Enable Statistic Data	``	Variable Property The crucial				
Ξ			rag properties are in the				
	Engineering Units		Here you can get the name				
	Close Bit String						
	Open Bit String		and link to the device's				
	🗌 Enable						
	linverse		physical address.				
	Dead Band	-1,0000					
	Raw Min.	0,0000d					
	Raw Max.	1000,00	DOOO				
	Scale Min.	0,00000	D				
	Scale Max.	100,000	DOO				
	Write Access Level	0000					
	Read Access Level	FFFF					
E	Antions		<u> </u>				

Let's go over which are the fundamental properties of each Tag:

Name: permits you to assign the name desired for the variable.

- Type: permits you to specify the data type (bit, byte, word, etc.)
- Area: permits you to indicate whether an explicit memory area is to be used for the supervisor. When leaving the area as 'Not Shared', the supervisor will decide if the tag must be considered for the licence. The tag will be counted for the licence only if it's exchanged with the field throught teh driver, OPC, ecc..
- **Dynamic Address**: permits you to set the physical address to connect to the Tag to. The Tags Explorer can be used to specify the connection by means of an I/O Driver, OPC or Networking.
  - All the other properties allow you to go and specify the Tag's behaviour, in the project, in detail. We, therefore, advise you to refer to the Programmer's Manual for further details.

We will leave the Tag with its default settings for the time being.

# 4 How to communicate with drivers

New communication drivers (I/O Drivers) can be inserted into the project at any time. In order to do this you need to:

1. Select the RealTime Database Resource from the project window

Project Explorer	×
▲	
Projects	-
Resources	
⊡- <u>¾ demo-x1</u>	
🖻 🍄 Real Time DB	
🕀 🎁 List Variables (Tags)	
📲 🕌 List Comm.Drivers	
List Structure Protot	
🗄 🦳 Resources	

- Select the 'Add a new Comm.Driver' command from the Command Pane found at the bottom of the project window. You can also use the analog command by using the right mouse key.
- 3. A window will appear through which you must choose the driver you need from the list of drivers available.
- 4. Each driver is subdivided into product categories. By clicking on one product will get you the drivers and the relative communication protocols available.

		mm.Driver Properties	
ModBus	Pr	operty	Name
		General	
		Name	PC Adapter
Semens SapiS7 C PC Adapter ABDF1X		FileName	MpiPcAdapte
		Version	Siemens MPI
		Last Error	
	E	Features	
		InUse	True
Mitsuhishi		Dynamic Tags	True
MELSEC-FX		Script Interface	True
MELSEC-Q TCP		Cross Reference	True
MELSEC-Q Serial Format 1	-		-
Applicom			
OMRON			

Check the communication driver relating to the product and the protocol desired.

We will check the Siemens S7 MPI "PC Adapter" protocol for our example.

When confirming the operation the driver will be inserted into the project and add4ed to the list of drivers in the project window.

We can now proceed with necessary configurations through the properties window:

Pro	operties	×
	PC Adapter Driver	•
~	′ 🗙   🎛 🛃 💷 🔄   🕢	
	General	
	Name	PC Adapter
	FileName	MpiPcAdapter.dll
	Version	Siemens MPI PC-Adapter c
	Last Error	
	Settings	
	Check for Updates	
Ξ		
	InUse	True
	Dynamic Tags	True
	Script Interface	True
	Cross Reference	True
	Diagnostic Tag	True
	Import-Update Device Databa	True
50	ettings aver to adit the Comm Driver Comm	ral Cattings
AI	ows to ealt the Comm.Driver Gene	rai settings

First of all you must proceed with the driver settings configurations from the **General** properties group.

Go to the 'Settings' item where you will find an activation button for accessing the communication settings window.

#### 4.1 Configuring the Driver

In this example we have chosen to use the Siemens S7-MPI PC Adapter driver as an example. The techniques used are the same for all the other drivers accept a few protocol specifications. The first thing to do is sort out the configurations of the driver's **General Characteristics**.

Ξ	Debug		
	Debug Window	False	
	Max Entries	10000	
	Enable Log to file	True	
	Log FileName		
Ξ	MPI Network Settings		
	Network Bitrate	187.5 KBit/sec	
	Movicon MPI Address	1	
	Highest Address	31	
	Only Master	1	-

- Usually the default settings are left as they are accept for certain specifications required by the device being used. As an example lets suppose we have a standard PLC with a standard MPI connection for which we will keep the General default settings.
- 2. After the general settings, select the **'Stations'** window needed for the communication station settings which we will create for the driver.

MpiPcA dapter	
General Stations	Tasks About
Add	Name
👄 Remove	
Test Cable/Comm.	
E dit the list of Stations. This feature allows to enter and define the Station list	
[	OK Annulla Applica ?

- 3. Use the "Add" button to add the necessary communication station to the driver in order for it to communicate.
- 4. When entering the new Station, its relating settings window will display through which we will configure the communication details of our station for which we will only concentrate on the fundamental properties.

Pro	operty	Name	
	General	D ( DC C	<u>+</u>
	Station Name	Default Station	_
	Error Threshold	1	
	Keep Opened	True	
Ξ	Serial Port Settings		
	Port	1	
	Baudrate	38400	
	Byte Size	8	
	Parity	Odd	
	Stop Bits	1 Stop Bit	-
			•

**Station Name**: Assign a name to the station. In our case we will put PLC1 (but any other name is acceptable).

Port: Assign the serial port number being used. In our case we will use the COM1 serial port, for which we will leave the value left at 1.
Baudrate, Byte Size, Parity, Stop Bit: Assign the parameters of the communication port. In our case we will keep the Default settings. Station ID: this is the last property on the list whose setting is based on the ID address set in the PLC.

All the other station properties permit you to further configure the communication modalities. For instance, the TAPI functions can be used for communicating via modem or the Bridging functions used for communicating via the modem on the PC, to use the same communication port for the PLC's remote maintenance (eg. Teleservice). To get further information on these features please consult the Programmer's Manual.

However, we will limit ourselves in using just the base functions relating to device communication for the time being.

When confirming the settings, the communication station will be inserted in the communication driver.

Other stations for communicating with other devices on different COM ports can also be inserted with the same MPI protocol.

MpiPcAdapter				
General Stations General Stations General Stations General Stations General Stations General Stations Test Cable/Comm. Edit the list of Stations. This feature allows to enter and define the Station list	Tasks Name PLC1	About	[	
	ОК	Annulla	Applica	2

When arriving at this point the driver should have been inserted and the device already connected and ready for communicating. To verify whether all is in order and working correctly we shall run a test by using the "**Test Cable/Comm.**" button. In this way Movicon will be able to verify whether communication with PLC device has been set up correctly and the cables are correct. Any errors found should then be resolved to ensure that communication works correctly.

#### 4.2 Assigning address to Tags

After having inserted at least one station, we will proceed with how to assign a physical address to the Tags.

 Select the Tag previously inserted into the project (or create a new one)

Project Explorer		3	×
Filter		•	
Projects		•	
Resources	Туре	-	
🗆 🕸 test*			
🖨 🍓 Real Time DB			
🕀 🎁 List Variables (Tags)			
WAR00001	Word (16 Bit w		
List Comm.Drivers			
List Structure Protot			

2. Double-click on it to open the Properties Window.



3. Select the **'Dynamic'** property from the **'General'** group to open the Tag Browser window.

ist Comm.Drivers in the Project	Comm.Driver Prop	perties
🗆 🍡 PC Adapter	Property	Name
	🗉 General	
	Name	PC Adapter
	FileName	MpiPcAdapt
	Version	Siemens MP
	Last Error	
	Settings	
	Check for Up	d

- 4. Select the Tab relating to the communication driver from the Browser window.
- 5. Double-click on the PC Adapter previously inserted to open a window to assign the physical address.

Property	Name
E General	
Station	PLC1
Device Lask Settings	
Device Address	DBI.DBWU
Davica Address	
Device Address	

- 6. Select the driver's station with which you want to communicate with (in our example we have only entered the station named PLC1), then you need to specify the device's physical address in "Device Address" to which the variable is to be connected.
- In our example, we shall connect the Word type variable called VAR00001 to the PLC's DB1 data block's word DW0.

Note: You can also enter the syntax of the physical address In the Tag's `Dynamic' property directly:

[DRV]PC Adapter.Sta=PLC1|Addr=DB1.DBW0

With the Tag property set, Movicon will establish communication with the device for reading-writing data from the PLC on the corresponding variable during project runtime.

#### 4.3 Importing Tags directly from PLC

The Movicon drivers offer an extremely useful feature when the database of ready-made PLC variables is being used:

The 'Import-Update device database' command, from the Command Pane, is made available when selecting the driver from the Movicon project window.

When activating this command you will be request to select the file corresponding to the PLC database. As we are using Siemens S7 we need to select the .SDF file by means of the file selection window:

Apri						? 🔀
Cerca jn:	C Simatic S	7	•	+ 🗈 💣	•	
Documenti recenti Desktop Documenti	面 57-Exp-exa	ample.sdf				
Risorse del computer						
	<u>N</u> ome file:				-	Apri
Risorse di rete	<u>⊺</u> ipo file:	System Data Files (*.sdf) Apji in sola lettura			-	Annulla

When selecting the file with the PLC database, the Movicon Import Device variables window will open to allow you to select all or part of the variables contained in the PLC database.

nport Device Variables - C:\Programmi\Progea\MovSymport\Samples\Simatic \$7\\$7	-Exp-examp	le.sdf 🛛 🚺
Please select the Device Variables to Import		
009_M1_EnableForBefDCC - M165.7 - BOOL 2 Tobacco - M315.5 - BOOL	^	Select All
AATR3 - MD706 - REAL		
ABypassSafetyBwd07011 - A0.0 - BOOL ABypassSafetyBwd080M2 - A1.0 - BOOL		Select None
ABypassSafetyBwd090M2 - A1.2 - BOOL ABypassSafetyFwd070M1 - A0.7 - BOOL		Browse File
ABypassSafetyFwd080M2 - A1.1 - BOOL ABypassSafetyFwd090M2 - A1.3 - BOOL		
Active_Check_Cicle - M303.0 - BOOL Acustic_Alarm - A2.5 - BOOL	_	ſ
AMTC4 - MD822 - REAL AMTC5 - MD826 - REAL	_	
AMTR4 - MD710 - REAL APSR3 - MD702 - REAL	-	
ATTR - MD714 - REAL		
auxFNMiotorU2URun - M159.5 - BOOL auxFNMiotor130Run - M159.4 - BOOL		
auxOneShotStartBatchOB35 - M335.0 - BOOL Avg(1) - MD874 - DWORD		Import
Avg(2) - MD878 - DWORD		Canad
Ava(7) - MD886 - DWORD	~	
Station: PLC1	•	

When confirming the operation the 'Import' button, Movicon will go ahead with:

- 1. Creating the Tags in the Movicon project keeping the same name and type taken from the PLC database
- 2. Assigning the relative physical address to each Tag

By using this useful function you can get the Movicon project's Variables DB created and completed with the device's physical addresses assigned automatically in just a few seconds.

Each Tag's 'Dynamic' property will be shown associated with the following syntax (which can be changed as pleased):

[DRV]PC Adapter.Sta=Default Station Addr=M265.0 Typ=0

# 5 How to create a Screen (Synoptic)

To create a graphic interface you need to used the project's Screen resource.

1. Select the **Resources** Folder from the Project window's tree structure.

Projects	•
Resources	Туре
⊡-¥ test*	
🗄 🍓 Real Time DB	
E C Resources	
🗄 🔝 Users And User Groups	

 Select the 'Add new screen in the project' command from the Command Pane at the bottom of the project window. You can also use the analog command by using the right mouse key.

MOVICON X - [Design] - Screen1 - [Screen1]		6	- B
Ele Edit Yew Layout Symbols Iools Window Help		Activab	e the language her
🗋 🚵 🖶 🗞 🖄 🕼 👘 💿 - 💿 - 🔡 💐 🌔 🐢 👘 🔹 💽	<u> </u>		
🐮 / 많 뭐 뀨 삶 / 🖻 🕪 / 🖴 🛛 🐼 / 🏭 🔶 💋 🚽 🚧	<u></u> B I U A	R. 📧 💷 📖	E.
roject Explorer 0 X. 4 [ Screen1	▶ ×	Properties	0 X
Filter • • • • • • • • • • • • • • • • • • •		Screen1* Syn	noptic (Screen) 💌
		🗸 🗙 🔞	24 💷 🔄 🛛 🤕
Projects		General	
Resources		ID	0
		CX.	1024
Ci Ci		CY	768
P Screen1"		Image X pos	0
C C Users And User Groups		Image Y pos	0
The Data Loggers And Reci		Image CA	4
🗉 💶 Alarm List (# Alarms '0' 🔤 🤿		E	
🕀 🏥 Event Object List		Not De	
🕀 🗱 Scaling Object List		P Filin	
Scheduler Object List		Enable	
act List Child Projects		Show	
Network Services		Show	
		Spawn	
		Backgro	-
		Back Color	BACKG
*		Gradient	windo.
		Gladerk C	WINDO
0 <sup>1</sup>		Tile Im	
		E incontion	
0		Global	
		Layer Vari	1
		Public Sou	Q
ommands •		Execut	
👎 Add New Variable Script Event 🦷 🦂		Synap	
🧙 Create a WebClentX html pag 🔢 🗋			
🛃 Add a new Menu			
🐼 Add a new Accelerator			
🚴 Insert a new Basic Script in th	Image: Second		
	3		
🛛 Output 🛛 🔛 11. Logic Explorer 🚽 Script Explorer			
Exe Halo server E1	Gar	wir Infox CAP N	MISCOL

- 3. The new screen will be created in the project and displayed with its default settings in the workspace.
- 4. You can change the screens default properties through the Properties Window. This window is accessed by double-clicking on the screen itself or by using the same command from the View menu.

- We will only deal with the screen's background color properties. Please refer to the Programmer's Manual for details on the other properties.
- 6. Select the 'Back Color' property from the 'Background' property group and assign white as the screen's background color. This property takes effect when being confirmed with the ✓ key.



 Repeat this operation to introduce another screen into the project. By doing this we can setup an example to be used in the 'change page' lesson up ahead.

#### 5.1 Displaying the screen at project startup

To get the screen to open automatically at the start of a project Runtime you need to specify the screen in the project's Execution properties.

Projects	•
Resources	
⊡- <mark>™</mark> test <sup>*</sup>	
🕀 🎨 Real Time DB	
🗄 🧰 Resources	

 Double-click on the project name at the beginning of the project's tree structure to display the its properties, or select the name and activate the Properties Window with the right mouse key.

Pro	Properties X				
2	(test* Project	•			
~	′ 🗙 📳 🛃 🔳 📃 🧭				
Ŧ		<b>▲</b>			
Ð					
Ŧ					
Ξ					
	Enable Statistics				
	Enable Admin Alerts				
	Admin Alerts Server				
	Startup Synoptic	🧔 Screen1			
	Startup Script	<i>s</i> o			
	Shutdown Script	80			
	Startup Commands	9			
	Shutdown Commands	9			
	🔽 Start Full Screen				
	Show Status Bar				
	🔽 Show Trace Bar	-			
SI Al	t <b>artup Synoptic</b> lows to enter the Synoptic(Screen)	to be loaded at startup			

 Select the Execution Property, then the 'Startup Synoptic' property. By using the activation button, activate the window for selecting the screen desired. Then press the 'Refresh' button to add it to the list.

<sup>3</sup> Resource Browser	
4 Synoptic (Screen)	 Þ
<u>Filter</u>	<u>R</u> efresh
Screen1	
Screen2	
	Cancel

3. We will select 'Screen 1' to use in our example (or you can select another one if you prefer). Then confirm with OK.

The specified screen will be the one to open and display automatically at the project startup.

#### 5.2 Graphic Editing with Objects

We will now re-open 'Screen1' to examine the basic graphic editing concepts.

- 1. Double-click on the 'Screen1' resource, found in the Resource folder in the project window, to open the screen
- 2. Use the drawings tools by taking them from the Toolbox positioned on the workspace's right border.
- 3. Select the 'Basic Shapes' from the Toolbox and then select the drawing to be used graphically on the screen.



- After having selected the chosen drawing, double-click on the insertion point on the screen and drag the drawing until you reach the size desired.
- 5. Repeat these operations to create the drawing you want on screen.
- 6. These graphic elements, once on the screen, can be given general, style and animation properties by using the Properties Window as described below.



#### 5.3 Object Libraries

In addition to the Basic shapes provided in the Toolbox you can also access other graphic object categories. These categories contain vectorial drawings with style and animation properties similar to those of the basic shapes but already predisposed with execution functions for which they have been designed for.

Toolbox	< Toolbox ×	Toolbox ×
Basic Shapes	Basic Shapes	Basic Shapes
Buttons-Lights-Switches	Buttons-Lights-Switches	Buttons-Lights-Switches
▶ Pointer	- Sliders-Gauges-Meters 🔺	Sliders-Gauges-Meters
Checkbox	Pointer	Advanced Shapes 🔺
Radio Button	Transfer Vertical Slider	▶ Pointer
Push Buttons	🗰 Horizontal Slider	Tonnector-Pipe
🗰 Hot Region	🚫 Gauge	Chart
ab 3D Buttons	🔘 Top Gauge	Trend
😳 Yellow Light	💮 Bottom Gauge	🚰 Grid
Blue Light	🔘 Left Gauge	≣≝ Listbox
🕥 Green Light	🚫 Right Gauge	<sup>xv.</sup> GroupBox
Red Light	le Meter	😹 Embedded View
💛 Yellow Button	Top Meter	Time Control
Blue Button	🔀 Bottom Meter	💵 Horizontal Spin
Green Button	🔀 Left Meter	💐 Vertical Spin
Red Button	Right Meter	abl EditBox-Display
i Emergency		🛗 Tab Group
Switch		📲 ComboBox
🔍 Selector A		Progress Bar
Sliders-Gauges-Meters 🗸		🔐 ActiveX
Advanced Shapes	Advanced Shapes 🔻	<b>•</b>

To use the ToolBox's Objects, simply select the object desired then double-click the mouse to insert the object on the point of the screen where you want it to be and drag it until you reach the size desired.



After having inserted the your chose objects, you can then proceed with assigning their properties by using the Properties Window. Each object will have, apart from the general properties, also style and animation properties, which are common to all objects, and the execution properties specified for each single object.

Please refer to the Programmer's Manual for further details.

#### 5.4 Symbol Libraries

Movicon provides a vast variety of graphic symbols in libraries which have been pre-built purposely to meet all the graphical representation requirements in automation.

These symbol libraries can either be accessed through the 'Symbol Libraries' window, displayed on the border on the right hand side of the workspace, or by using the analog command from the 'View' menu.



Each symbol from each category can be inserted on screen by simply using the Drag&Drop techniques and re-sizing it as desired by dragging its borders just like any other graphic object.

• The symbols can be configured in their properties just like any other drawing object, by using the Properties Window.

#### Graphic editing example:

Insert a 'Rectangle' object into the screen from the 'Basic Shapes' ToolBox and a 'Tank' symbol from the Symbol Library.



#### 5.5 Creating a composed symbol

All the drawing elements (Drawings, Symbols, Objects) can be grouped together in Symbols and then added to the Symbol Library. Now let's proceed with inserting a few drawing elements which we will then associate to a graphic symbol.

By following the procedure described above, insert a **Rectangle** and two **Ellipses** from the **Basic Shapes** ToolBox to form the shape shown below:



Select all three elements with the mouse by clicking in the area and dragging the selection. The figure below shows how the drawing should look like with the **reference object** highlighted for any eventual align commands.



With the right mouse key, in the workspace, select the **Symbol – Group** command to group all three drawings together to make one symbol.



The symbol can now be added to the Movicon Templates library by using the right mouse key on **Symbol -> Add to Library**. Any animations or codes associated to the symbol will also be kept in the library.

The composed symbols can be inspected in the project's tree structure. The objects and the composed symbols are displayed in structures under the screen they belong to.

Therefore each components of each symbol can be selected singularly and configured in its properties.



• When using this technique we suggest you assign a **name** to each symbol or drawing so that they can be identified straight away.

# 6 How to create dynamic animations

We will now look at the editing techniques used, which entail the association of Tags, for creating dynamic animations.

#### 6.1 Dynamic Color

In our example we have chosen to assign the animation properties to color the drawing's background in function with the VAR00001 tag previously introduced.

- 1. Activate the screen where the graphic symbols were inserted as described above.
- 2. Select the rectangle shape representing a tube.
- Double-click or use the other techniques to display the Properties Window.
- 4. Select the Animation group from the Properties Window and then the Back Color item.

Properties	>
🛅 Symbol Symbol	•
🛩 🗙   🎥 🛃 🔳 🗐   😨	)
Animations	<u> </u>
Composed Movement	
🗄 Move X	
🗄 Move Y	
🗉 Start 🗙 Point	
🗉 Start Y Point	
■ End X Point	
End Y Point	
⊞ Text	
🗉 Back Color	
🔽 Enable	
Variable	🕞 VAR00001
Edit Back Color List	
Analog Color	
Edge-Text Color	
🕀 Images	-
Enable Allows to enable the back color a	

Check the 'Enable' box to enable the pre-selected animation function, then select the tag among those inserted in the project's RealTime DB.

Then select the 'Edit back color list' to set the activation thresholds of the tag and the relating colors to be displayed.

A window for setting the Thresholds should appear.

Recta	Rectangle - Background Color				X	
4	Color	Threshold				⊳
	iolor	Value 1,000000 0,000000	Variable		Add Edit Remove	
	OK	Ar	nulla	Applica	?	

The window contains a series of standard default thresholds. Use the relative commands on the side to delete, add of edit them.

Use the relative settings window, shown below, to add or edit the animation characteristics:

Property	Name
/alue	1,000000
/ariable	
Mode	normal
3link Time	500
Color	Lime (00ff00)
3link Color	White (ffffff)

By using this window you can set the threshold values and he animation colors, as well as other properties which are explained in the Programmer's Manual.

Confirm the setttings with OK.

#### 6.2 Other examples of dynamic animations

We will now insert some animations requiring Word type tags, which can be inserted into the project as described above in chapter 4. Let's assume that two tags, VAR0001 and VAR00002, both in Word are available in our example project.

We will demonstrate another example of dynamic animation for on screen symbol movement: Composed Movement.

- Open the screen and select the Symbol, created previously with the Rectangle and Ellipse drawings grouped together, then activate the **Properties Window**.
- Select the 'Animations' group and then **Composed Movement**. This animation sets the graphic symbol to move on the screen along a trajectory line graphically drawn out with the mouse in proportion to the tag values associated.
- Check the 'Enable' box.
- Associate the VAR00002 tag previously inserted

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	End	100,000000	
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Ē			
<b>Varia</b> Enter	<b>ble</b> the composed movement anir	nation variable	

- Confirm with ♥.
- Close the property window and activate the mouse's **right key** commands from the selected symbol. Select the **'Edit Composed Movement'** item.
- Drag the symbol's shape to the **end point**, i.e. to the right hand side of the tank.
- To insert the intermediate points of the path, double-click with the mouse on the line and drag it to the intermediate point desired and continue like this until the trajectory line is complete.
- Press the ESC key when finished. You should get this result as shown below:



- Select the **Scaling** box from the Animations properties group to activate the relating settings window.
- Associate the VAR00002 tag previously inserted.
- Enter the 50-100 values as scale **Percentage**, so that the symbol remains visibile at 50% of its scale as minimum value.
- Select the direction of the scaled re-sizing (leave the default selection).

Prope	Properties ×		
🚦 Syr	mbol Symbol	•	
<b>~ )</b>	🖌   🎛 🛃 🔲 🤜   🧭		
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	Start	0,000000	
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	Start Percent	50	
	End Percent	100	
	Туре	<ê→ center	
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E		<u> </u>	
Enab Allows	<b>le</b> s to enable the scaling animat	ion	

Confirm with 🖌 .

## 7 How to execute commands from object

Execution commands can be assigned to objects in the screen's user interface, in function with their characteristics.

We will follow up the chapter reported above regarding graphic animation to complete the argument by explaining the techniques used for assigning execution commands to object.

In our case we shall use a **'Button'** object and a **'Gauge'** object, which are needed to produce the animation which we configured previously.

- Attivate the screen where the graphic symbols, described above, are inserted.
- 2. Take a 'Gauge' from the ToolBox's "Sliders-Gauges-Meters" category and insert it in the screen.
- Take a 'Green Button' from the ToolBox's 'Buttons-Lights-Switches' category and insert it in the screen.



#### 7.1 Button

Let's proceed with configuring the button which we will use for acting on the variable used for managing the rectangle's (tube) color animation.

- Double-click or use the other technique to display the inserted Green Button's Properties.
- Select the Execution group from the properties window and then the Check.Var. item. Select the VAR00001 tag previously inserted. By using this characteristic the button will toggle the Tag, by setting it with the '0' and '1' values. The tag can also be interacted on by using the command selection as we will show you up ahead.

Pro	operties	x
ab	Button Button	•
~	′ 🗙 📳 🛃 🔳 🔳 🧭	
Ξ		
	Check Var.	Part VAR00001
	Checked	
	Enable Shortcut	
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	Show Shortcut	
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<b>Ci</b> Er	heck Var. hter the cheking variable	

Confirm with ♥.

#### 7.2 Gauge

Now we shall configure the gauge which we use to interact on the tag to manage the created symbol's animated movement.

- Double click or use the other technique to display the inserted gauge's Properties Window.
- 4. Select the Variable group from the properties window and then select the Gauge-Slider Variable item. Select the VAR0002 tag previously inserted. In this way the gauge will interact directly on

the VAR00002 tag. The gauge object is totally configurable, by using the numerous properties provided. It is only necessary to do the configuration as indicated for our example. The other properties can be referred to in the Programmer's manual.

Pro	operties	2	×
	Gauge Gauge		·
~	′ 🗙   🎛 🛃 🔳 🔳 👔		
Ξ			
	Gauge-Slider Variable	🕞 VAR00002	
	Gauge-Slider Min.Variable	Ra .	
	Gauge-Slider Max.Variable		
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G. Er	auge-Slider Variable Iter the variable for the Gauge-Sli	der Value	

Confirm with 🖌 .

#### 7.3 Operating Commands

Different types of commands can be assigned to any command object (Buttons, Menu, Accelerators) and command lists can also be created. The commands can be activated by simply **NOT** checking the **'Checked box'** as proposed by default.

The button's execution properties are:



When activating the '**Commands**' selection from the Execution properties you can edit the command list to be associated to the object by using the 'Add New Command' button in the Command List window.



The 'Add New Command' button opens the settings window of the operating commands to be assigned to the object.

Each configured command will be added to the Command List which the object will execute.

ommand Type		
🌯 Variable Command	😺 Synoptic Command	📽 Script Command
Property	Name	
Variable	G	
Action	set	
Value		
Strobe Time	0	
Max.Value	100,000000	
Min.Value	0,000000	
Max.Chars	0	
	JK Annulla	Applica ?

There are commands in Tags (Set, Reset, Toggle, Strobe, Increase, Decrease, Virtual Keyboard...) or on Screen windows (with the various opening modalities).

Please consult the manual for further details on all the command operation which can be assigned to objects.

#### 7.4 Start Runtime

At this point, with the objects configured we can run the project to verify its Runtime behaviour.

- 1. Press the Start Project command from the File menu (or ALT+F12).
- 2. Movicon will ask you to save the project. Save the project using the classic Windows techniques.
- 3. After having saved the project on file, it will be executed in run mode where you can operate the objects to see if they work.
- To return to Programming mode, use the ALT+F12 keys or the button from the bar.

Note: (you can customize system menus by inserting all the commands desired as well as for the Movicon or Windows shutdown from the project in Runtime mode).

# 8 How to manage alarms

In this brief lesson we will quickly see how to activate, display and record alarms in Movicon projects.

We shall continue with our example from where we left off with a few Tags and a pair of screens already predisposed in our project.

 Note: The alarms are objects from the project. Each alarm has their own General properties where they are assigned names and associated to tags.

Each alarm is built with at least one threshold, whose value and condition determine the activation of the alarm with an associated text.

#### 8.1 Inserting Alarm Objects

- Select the 'Alarm List' Resource from the project window which in turn will show the relative commands in the command Pane at the bottom.
- Use the "Add a new Alarm" command from the Command Pane or with the right mouse key. A new alarm object will be created in the project and can be renamed as pleased.

Project Explorer		×
Filter		•
Projects		•
Resources	Device	
⊡-¥ test*		
🖻 🍫 Real Time DB		
🗄 🎁 List Variables (Tags)		
🗐 🕌 List Comm.Drivers		
📃 🏹 PC Adapter		
List Structure Protot		
🕀 🧰 Resources		
🕀 🔝 Users And User Groups		
🕀 🌐 🖽 Data Loggers And Recipes		
📄 🔛 Alarm List (# Alarms '1',		
AL0001	-	
🕀 🖽 Event Object List		
🕀 🛄 Scaling Object List		
🗄 🐼 Scheduler Obiect List		<b>•</b>
		•
Commands		•
📲 🎦 Add a new Alarm Threshold		_
🔪 🐴 Add a new Alarm		

Activate the alarm object's properties window to assign the desired name, i.e. ALL001, then the Tag from the project by selecting it from those

inserted in the project's RealTime DB. In our example, the object's properties are those indicated in the figure below:

- Properties × 🚨 ALOOO1 Alarm • 🖌 🗶 🔡 🛃 🔛 🕄 📀 Ξ AL0001 Name Device Name 🔓 VAR00001 Variable Enable Variable **12** 0,000000 Hysteresis Exclusive 🔽 Enable 🔽 Quality Good Only Variable Enter the variable (Tag) for this alarm
- Important: if the 'Quality Good Only' is left checked the alarm will be activated only when the RealTime DB assigns the tag with a certain value. For instance, in cases where a Tag connected to a driver or in network, becomes disconnected the value turns to 'uncertain' and therefore the alarm will not appear. If in doubt, uncheck this option for a test run.
- 3. After having entered the Alarm object, you can enter at least one activation threshold. Therefore, select the alarm from the project Window and use the 'Add a new Alarm Threshold' from the Commands Pane or use the right mouse key.

roject Explorer		
Filter		Ŧ
Projects		•
Resources	Condition	•
🖃 🕱 test*		
🖹 🌯 Real Time DB		
🗄 🎁 List Variables (Tags)		
🖹 🕌 List Comm.Drivers		
🔤 🍋 🔍 PC Adapter		
List Structure Protot		
🗄 🦳 Resources		
🗄 💶 Users And User Groups		
🗄 🌐 Data Loggers And Recipes		
🚊 🏭 Alarm List (# Alarms '1',		
🖻 🚨 AL0001		
Threshold	>=	
🗄 🇱 Event Object List		
🗄 🛄 Scaling Object List		_
🕀 🐼 Scheduler Ohiert List	<b>_</b> _	•
Commands		
Page Add a new Alarm Threshold		
Add a new Alarm		

4. By doing this the alarm will show one intervention threshold which we will configure through its properties.

- 5. We will configure the alarm's activation on the value desired in the threshold properties Window.
- 6. Go to the 'General' properties group to assign the 'Title' being the text which will be associated to the alarm. The title can be typed directly in the property box or, as a good rule, can reside in the project's 'String Table' and there may be subject to language change.
  - Note: when using the string table, you need to select the project name from the project resource window and use the 'Edit String Table' command from the Command Pane. Then insert the columns (each column is a text language) and then proceed with inserting the texts which will then be made available all over the project.
- 7. We then have to assign the threshold value in the 'Value' box in the 'Execution' property group. You can also use a 'dynamic' threshold value, where the alarm activation value derives from the contents of another tag. Leave the default activation >= (more than or equal to).
- The Style and Notification Event properties are of no interest to us for the time being and therefore we will leave those for default.

The alarm is historically logged in the file for default and can be traced or reset as well as other characteristics to be referred to in the Programmer's Manual.

Pro	perties	×
	Threshold Threshold	•
~	🗙 📳 🛃 🔲 🤜 👔	
Ξ	General	
	Name	Threshold
	Area	
	Title	Emergency On
	Help	
	Duration Message Format	
	Read Access Level	FFFF
	Write Access Level	FFFF
Ξ		
	Value	1,000000
	Threshold Variable Value	
	Condition	>=
	Severity	1
	Delay	0
Ξ		
	Support ACK	
	Support RESET	
	🔽 Blink	
	Print	
	✓ Log	
	Speech	
	Repeat	
		——————————————————————————————————————
St	yie	

The alarm and its activation threshold (each alarm can have a number of activation thresholds) have now been configured.

We can now move on to how to view active alarms and those historically recorded on file.

#### 8.2 Displaying Alarms

The active alarms, setup in the project's Alarm List resource, can be displayed in purpose-made object viewers which can be inserted on the screen.

We need the use of a screen. In our example project we have setup two screens, 'Screen1' and 'Screen2' where Screen1 has already been used for the graphic examples. Therefore we are left with Screen2 for this example.

 Double-click on 'Screen2', in the Resource folder from the project Window, to open it in edit mode.



- 2. Activate the Toolbox and take out an 'Alarm Window' object from the 'Advanced Shapes' category.
- 3. Click on a point on the screen's top left, then drag the selection to insert the 'Alarms Window' object in the size desired.



4. Double-click to activate the 'Alarm Window' object property. The Style property permits you to fully configure the Alarm Viewer object. The Fill property permits you to assign the background colour desired for the alarm's window. The Font property permits you to choose its characteristics as desired. The numerous properties, described in the Programmer's Manual, permit you to manage the viewing of alarms according to any applied necessities. In our case, for simplicity, we will leave all the default settings as they.

🗸 🗶 🔡 💱 🔲 🗐 🧭		
3 Style		
Border	🗉 sunken	
🔽 Clickable		
Auto Layout		
Show Control Wnd		
Ack Sel Button		
🔽 Ack All Button		
Reset Sel Button		
Reset All Button		
Toggle Sound Button		
Button Size	small	
Align Buttons	bottom	
Ack Sel Button Text		
Ack All Button Text		
Reset Sel Button Text		
Reset All Button Text		
Toggle Sound Button Text		
Text Column Name		
Alarm On Column Name		
Alarm Ack Column Name		
Alarm Off Column Name		
Alarm Reset Column Name		
		-

You can modify, add or take away the columns describing the alarms in the Alarms Viewer by using the appropriate tools, which are displayed with the "Shift + Double-click' in the same window.

4 📮 Scre	en1 🧔 Screen2
	.2.1.3.1.4.1.5.1.6.
- - - - -	ription
10	Field Choice 🛛 🖸
	Lime ACK
- -	Time OFF
	Time BESET
-	Status
	Status
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-	
-	
-	
- I	

#### 8.3 Displaying Alarm History

All the alarms are historically logged for default. The recording modalities and the Historical Log archives management can be customized through the Historical Log properties which is accessed by selecting the project name from the tree structure and then using the properties Window.

To display the historical data of the alarms, you need to proceed as described above for the Alarms Viewers.

Apart from the Alarm Viewers you will also find the Historical Log Viewer in the ToolBox. Carry out the same procedures for inserting the Historical Log as described above for the Alarms Viewer.



All we have to now is verify what we have done. For this we need the following function in the project, considering all that has been realized up to this point:

- 1. a command for alarm simulation on the alarms page.
- 2. The change page commands.

#### 8.4 Simulation

We shall find room in the Alarms screen window to insert a command object which will interact on the VAR00001 tag associated to the alarms.

- Open 'Screen2' from the project window. Arrange the viewer objects so that the is enough space left for inserting the other objects (i.e. on the bottom border).
- Insert a 'switch' object from the Toolbox and position it on the bottom border. Activate its properties and assigned the VAR00001 tag in the Execution properties.

Ξ		
	Check Var.	🔁 VAR00001
	🔽 Checked	
	Enable Shortcut	
	Shortcut	
	Show Shortcut	

The switch object will interact on the VAR00001 tag, which we have already assigned to the Alarm object.

3. Insert another new 'button' object, again from the Toolbox, as before. Position it on the bottom border at the side of the switch. Activate its properties and assign the opening of 'Screen1' in the Execution properties. This button will then permit us to execute a page change to return back to the first page.

Property	Name
Synoptic (Screen)	Screen1 🔺
Action	open normal (MDI child)
Monitor	0
Parameter file	
X pos	100
X pos	100
Width	0
Height	0
Caption	
V Border	
Resize border	
Sys Menu	-
Maximized Box	
Minimized Box	
Maximized Box Minimized Box Synoptic (Screen) Enter the synoptic resource name	

4. Now we can insert the same object into 'Screen1', the startup screen, so that we can dispose the open Alarms page command. The button object's 'Cut & Paste' can also be used to dispose it on another screen after which its properties can be modified.

#### 8.5 Executing Runtime

We now have the necessary items arranged in our example project to test run it:

- Screen1: graphic simulation screen, with command and graphic animation objects. The appropriate button is used for accessing Screen2.
- 2. Screen2: Alarms simulation screen, with the alarms activation and viewer objects.

At this point, we are all set for executing a test run of the project to verify its behaviour during Runtime.

- press the Start Project command from the File menu (or ALT+F12).
- 2. Movicon will ask you to execute a project save. Execute the save according to the usual Windows' techniques.
- 3. After having saved the project file, it will be put into run mode letting you try out the objects to see if they work.
- 4. To return to Programming mode use the ALT+F12 keys or the button from the bar.

Note: (you can customize a system menu by inserting all the commands desired, including the ones for shutting down Movicon or Windows from the project in Runtime mode).

Descrizione Allarme		Tempo ON	Durata Pr	iorità Condizione
💄 Mancanza Aria		03/10/04	1	ON
Riconosci (A)	Riconosoi Tutti (Ctrl+A)	Reset (R)	Reset Tutti (Ctrl+R)	Abilitazione Suono (S)
Aurio del Progetto	ultime in 2004	10-02 16:05:14	Utente	
Avvio del Progetto	ultime in 2004	-10-03 16:02:26		
Avvio del Progetto	ultime in 2004	-09-30 16:27:13		
Avvio del Progetto	ultime in 2004	09-30 16:20:27		
Avvio del Progetto	ultime in 2004	-09-30 16:19:33		
Avvio del Progetto	ultime in 2004-	-09-30 14:33:52		
Avvio del Progetto,	ultima in 2004	-09-30 14:31:47		
	• <b>)</b>			× 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Output				



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