MoviconXCE
Compact HMI for WinCE

Supervision and Control for embedded system based on Windows CE 5.0

Reference Guide
Movicon XCE

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INDUSTRIAL AUTOMATION SOFTWARE

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1. Preface

Movicon CE is the Movicon RunTime version for embedded Microsoft Window CE embedded operating systems. Movicon allows projects to be exported to Windows CE platforms and run with the Movicon CE Runtime module.

Movicon CE is the new generation of compact Scada/HMI for Windows CE. Thanks to the new Movicon technology the compact version (Compact HMI) of the Movicon supervision and control software also adopts the XML technologies and Web Services to guarantee enhanced performances and potentiality in the world of Pocket systems and display terminals.

Movicon CE supports the Microsoft PocketPC (Windows Mobile) and Embedded PC, version 5.x and later (WinCE.Net), operating systems.

- **Thanks to Movicon one-only development environment you can get scalability when creating applications that can run either in WinXP or WinCE.**

The Movicon CE runtime engine executes the same Movicon XML projects. Your projects can therefore be run on your HMI device, on display terminals, on PDA, Pocket PCs, mobile systems, Wireless... (Pocket PC and SSDK devices).

One-only project, the same file, run on different platforms, thanks to the project's XML structure.
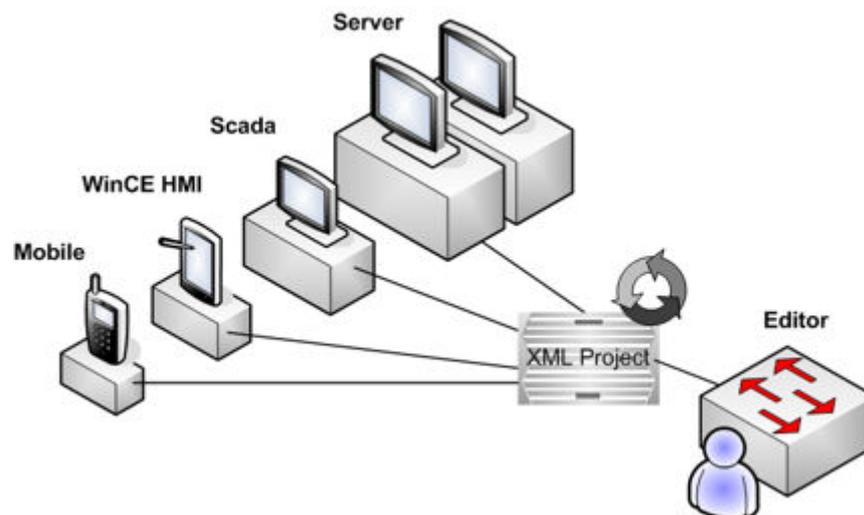
The advantages you get from using Movicon CE are:

Integrated applied project openness with the same software on different hardware terminals.
The advantage of being able to keep the software while changing operating panels allowing you to choose the product most suitable for your needs. For instance, the same project can be run on panels like Proface or Advantech or Vipa, Asem, ESA, Suetron and others.

Integrated machine information openness with product line or higher system levels.
The advantage of being able to freely have information circulation thanks to the Ethernet network and OPC technologies. All WinCE terminals have a LAN port integrated.

Increase in graphic potentiality.
Movicon CE can be termed as a "small Scada" with big integrated potentiality. Powerful graphics, powerful alarm management, powerful historicals with relational DB management which can be integrated on the net, trends, recipes, scripts, sending SMS. All ready to be used in a powerful but simple programming environment such as Movicon.

Cost Reductions.
Movicon CE therefore permits the use of one-only software in your company business, whether for supervision on PCs or for display terminals, saving you money in training, personnel and maintenance. Thanks to Movicon CE's extreme openness you will be able to reduce costs in terminals by choosing those most suited to your needs while having the benefit of keeping and using the same software.

Projects executed on the CE device may have restrictions of their own in regards to those of the operating system.
It would be wise to select the "WinCE" platform before doing any editing in the project's selection group properties. Remember that Movicon excepts muliti-selecting where the most powerful platform selected will always be the one considered.

1.1. Read Me First

Before starting a project for devices based on Windows CE you should check that the used device's capacity and carefully read the warnings below, the product documentation and guidelines for designing projects.

IMPORTANT:

BEFORE DESIGNING PROJECTS FOR DEVICES BASED ON WINDOWS CE WE STRONGLY RECOMMEND THAT YOU CHECK YOUR HARDWARE CAPACITY (MEMORY AVAILABLE AND CPU TYPE) AND CHECK ANY RESTRICTIONS AS INDICATED IN THE DOCUMENTATION ON "DESIGNING GUIDELINES FOR WINCE TOUCH SCREENS".

IMPORTANT:

YOU SHOULD ALWAYS KEEP IN MIND THAT DEVICES BASED ON WINDOWS CE HAVE MORE RESTRICTIONS THAN SYSTEMS BASED ON Win32 (ie. WinXP) BOTH AS HARDWARE AND AS OPERATING SYSTEMS.
THEREFORE IT IS IMPORTANT THAT YOU DESIGN YOUR PROJECT IN PARITY WITH THE CAPACITY OF THE SYSTEM YOU ARE USING.

THE MOVICON RESTRICTIONS FOR WinCE COMPARED TO THE NORMAL VERSION FOR Win32 HAVE BEEN HIGHLIGHTED IN THIS PRODUCT DOCUMENTATION, LEAVING THE DESIGNER TO CHECK THE RESTRICTIONS OF THE HARDWARE AND OPERATING SYSTEM

THEY ARE USING.

MOVICON EDITOR IS THE SAME ONE USED FOR Win32 and WinCE PROJECTS. EVEN THOUGH THIS IS A GREAT ADVANTAGE FOR THE DESIGNER IT MIGHT BE RISKY WHEN   USING   THE   SAME POTENTIALITIES INDEPENDENTLY FROM THE TARGET DEVICE USED.
BEFORE PROJECT DESIGNING TAKE NOTE OF THE DIFFERENCES IN RESTRICTIONS OF SYSTEM BASED ON WINDOWS CE AND THOSE OF THE VARIOUS DEVICES AVAILABLE ON THE MARKET.

WARNING:
Before designing projects for Windows CE, it would be in your favour to create a 'new' project by Movicon choosing the Windows CE as destination platform. Even though this is not obligatory as the project created will however be executable in Windows CE, it will however autoconfigure the new project by resetting some of the general properties correctly. In addition to this, a .ini file will be created in the project folder containing the default constraints which will be assigned to the project in editing mode (see relating chapter).

You can select the "WinCE" as the project's supported platform afterwards from the project's property options. Also remember that Movicon also multiple selections, where the most powerful platform selected will be considered.

2. General

2.1. General Concepts

Movicon CE is a runtime engine for Microsoft Windows CE embedded operating systems. The Movicon version supports Windows CE operating systems in versions 5.0 or later.

The user can use the Movicon development environment for creating supervision applications which can be interpreted and executed on Movicon CE runtime engines. The Movicon editor permits you to create projects built with XML files which can be run on both Desktop PCs and CE devices.
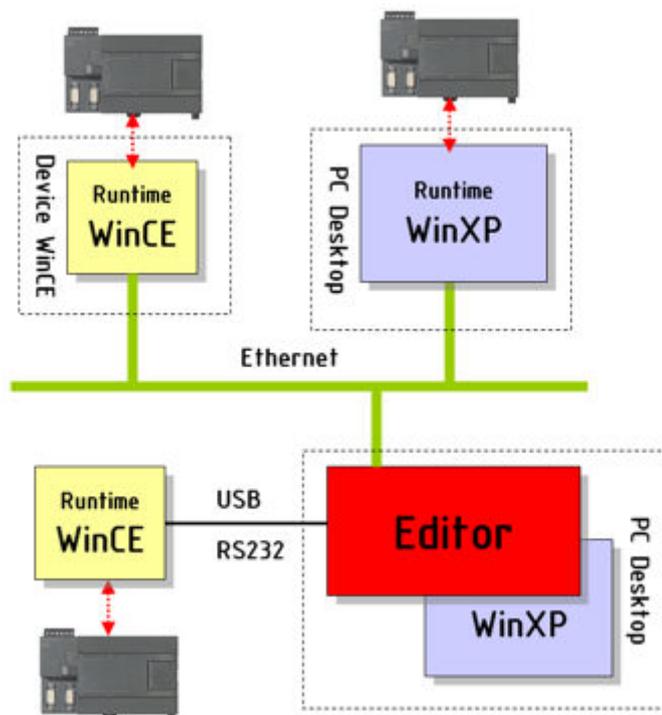
The programmer can then work using the Desktop PC with the same Movicon platform normally used. However, you must keep in mind that the WinCE device is not capable of completely supporting all the potentialities offered by Movicon and typical of supervision systems for Desktop PCs. Therefore you need to take into account the restrictions deriving from the operating system's scarce capacity and from the device hardware when creating projects for CE devices.

- **To ensure that the programmer is able to design only what the Windows CE is capable of supporting, the destination platform type should be selected from the Project's properties making sure that only WinCE is set up as platform**

2.2. Licences

Devices using Windows CE provide a licence management in the form of a **Softkey** Unlock code only.

There are no hardware keys of any type available. The project runtime will run in Demo mode on the WinCE device only without a license.

Movicon CE license management
When purchasing a Movicon CE you will receive it in the form of a Serial Number which gives you **access rights** to the Progea website to get the Softkey unlock code to be inserted into your device. In this way, you can access the website at any time, 24 hours a day, to automatically create the unlock code according to your website code.

Follow the step-by-step procedure in order to get and insert your softkey:

1. When purchasing the license (or purchasing a CE device already integrated with a license to be activated), you will receive a serial number and access rights to the Progea management website (www.progea.com or http://support.progea.com/softkey/)
2. Startup Movicon on the CE device. Movicon will display a window to be used for entering the license or for running Movicon CE in demo mode
3. Go to and access the Progea Website using your access code, then follow the instructions to insert the Site Code with which the license (SoftKey) will automatically be created
4. Jot down the Softkey license and insert it into the appropriate edit box which appears at the Movicon Startup
5. Many devices require you to save the WinCE Registry so that data is kept memorized permanently. In any case, the license is linked to the device and will not change upon reinstallation

*   **The instructions you received along with your purchase or those from the supplier should be respected.**

The Movicon CE license exists in two versions (Standard or Full).

The Standard version has some technical restrictions:	The Standard version has the following technical restrictions:
• Max. 256 Alarms	• Max. 1024 Alarms
• Max. 1 Web Client Users	• Max. 2 Web Client Users
• Max. 1 communication driver	• Max. 4 communication driver
• Max. 1024 bytes of variables in use	• Max. 4096 bytes of variables in use
• Max. 8 DataLoggers	• Max. 8 DataLoggers
• IL and VBA Logics (max. 128 kb)	• IL and VBA Logics (max. 128 kb)
• Networking, Max 256 connections	• Networking, Max 256 connections

> ⚠️ **IMPORTANT:**
> **APART FROM THE LICENSE TYPE USED AND ITS RESTRICTIONS, THE DESIGNER SHOULD ALSO CHECK THE RESTRICTIONS OF THE HARDWARE DEVICE BEING USED: THE FUNCTION RESTRICTIONS OF THE MOVICON PRODUCT LICENSE ARE GENERIC, BUT THE HARDWARE MAY HAVE ITS OWN DESIGNING RESTRICTIONS INDEPENDENTLY FROM THE LICENSE TYPE USED.**

Inserting the Movicon CE license
If an invalid or no license has been inserted at startup, Movicon CE will display a window for selecting the start mode.
When no license has been preinstalled by the device builders, you can get the license based on the "Site Code" displayed.
By using this Site Code (and the purchase serial number), you can get your runtime license according to the instructions received when purchasing the site key.
Your license, or "Site Key" must be inserted in the field underneath the Site Code, as shown below:

If you don't have a Site Key number to insert, you can still execute the project in Runtime mode by clicking the "Demo Mode" button in the same window. The project will be run for a limited two hours.

- **After having inserted the license (Site Key), remember to execute the command for saving the WinCE Registries (RegSave or its equivalent, depending on the device used).**

Once the license has been inserted and saved in the WinCE System Registry, the window used for inserting the license will now show again when starting up Movicon CE. You can, however, make this window show by executing Movicon CE through the WinCE command line and specifying the "/i" o "-i" option. From the WinCE "Start - Run" menu execute:

    MovXCE.exe -i

This functionality may be needed in situations where the device's "Site - Code" needs to be reviewed or to execute a license update with a new license containing different characteristics.

Run in Demo Mode on Window CE
At project startup, MovXCE will request you to enter the licence or press the Demo Mode button. When pressing the Demo Mode button the project will run in Demo mode. The project run is limited to 120 minutes in this mode. Messages are traced in the project log, at regular time intervals, indicating the remaining time left. The available options are:

- Screens = unlimited
- Alarms and Messages = unlimited
- I/O Bytes = 0
- Driver = 1
- Web Client users = 1
- All Options

2.3. Restrictions

Some functions that are not supported by the CE device should be kept under consideration when designing applications for WinCE devices. Although the non supported functions are appropriately "masked" when selecting WinCE as the target OS, it should however be remembered that a hardware device with limited calculation capacity and memory is being used and therefore the designer must always evaluate whether it is compatible with the objectives they wish to achieve.

Graphics Restrictions

Function	WinCE	WinXP/2000
Coloring	✔	✔
Linear Fillings	✔	✔

Polygon Fillings		✔
Rotations		✔
Dynamic X, Y Movements	✔	✔
Graphic Objects	✔	✔
Symbols Library	✔	✔
Button/Gauge with 3D Look		✔
Trend	✔	✔
Charts		✔
DB Grid	✔	✔
Embedded Screens	✔	✔

Other general graphics restrictions
- Composed drawing background (not solid)
- Dotted lines (solid and dashed) NB. when the line is thicker than 1 in respect to the drawing displayed on the desktop, where the line stays entirely inside, it will go over the border in the CE and will not show (no InsideFrame)
- Font escapement is not supported
- Drawing state is not supported (disabled, etc)
- EditPenProperties are supported but reduced
- Symbol Dragging is not support (because hardly used)
- The trend external setting files are not compatible between the desktop and the target PC
- The external Metafile drawings (WMF, EMF) are not supported in WinCE
- The PrePaint and PostPaint events pass a HDC without transforming the coordinates due to fact that Viewport is not supported

> *Movicon CE supports image files in all format types, however in order for these to be displayed they must also be supported by the device. Because the "BMP" format files are always supported does not mean that all the others are as well, such as "JPG", "GIF", etc.*

Alarms Restrictions

There are only restrictions in the notification and statistical analysis management.
Due to the fact that the Report Engine is not available in Windows CE, the commands for creating statistical reports on alarms are not available in the CE device.
The alarm notification functions are managed from the Alarm Dispatcher. Only the alarm notifications with SMS and E-mail are available in Windows CE as reported in the table below:

Function	WinCE	WinXP/2000
SMS - Via Modem GSM	✔	✔
SMS - Via SMMP		✔
Voice		✔
Fax		✔
E-mail - via TAPI		✔
E-mail - via SMTP	✔	✔
Alarm Statistics		✔

For further information please also refer to the paragraph on **"Alarm Management"**.

DataLogger/Recipe/Report Restrictions

The WinCE projects normally record the log files by using the IMDB technology (InMemory DB) which, different to ODBC/ADOCE, is much lighter and higher performing due to the XML text format used.

In situations where the ODBC has been selected in development mode (desktop) for recording log files, this will correspond to the ADOCE on the target as Windows CE does not support ODBC. Movicon will automatically convert the ODBC connections to ADOCE connections. In this way the projects on the target will have an open and standard historical log database.

The ADOCE data format is basted on Ms SQL Server CE.

Thanks to this automatic management, the project keeps the same identical characteristics in handling the historicals, but the database format on the target will be SQL Server CE type.

> *Always make sure that the CE device's memory capacity is sufficient enough to contain historical data in compliance to the amount setup in the project.*

The Crystal Report Engine is not supported in Windows CE.

Function	WinCE	WinXP/2000
Data Loggers	✔	✔
Recipes	✔	✔
Crystal Report Engine		✔

WinWrap Basic Restrictions

Movicon CE guarantees support to the VBA language, therefore the code executed on the desktop is the same executable file on the target.

> *Nevertheless, it must be said that Progea cannot guarantee the complete support to all the countless functions, properties, methods and events available on the Desktop. It has not been possible, up till now, to efficiently test out every type of device with the correct execution of each single instruction.*
> *The User is therefore advised to use the VBA code wisely by also always considering the device's calculation capacity on which the project is run.*

The following listed functions are not supported on CE devices:

Function	WinCE	WinXP/2000
CurDir		✔

> *The Alarm Dispatcher is not supported by the Basic Script code management and therefore the SMS, E-Mail, etc functions cannot be used in Basic Script code.*

IL Logic Restrictions

The IL Logic is perfectly compatible both with WinXP and WinCE. The deterministic features of WinCE are capable of managing logics inside the Movicon project with deterministic runtimes. Unfortunately, Progea has not carried out any specific tests on this and therefore cannot guarantee anything definite.

> The "ILSleep" default value for WinCE is "50" milliseconds. But stays the same for Win32 at 10 milliseconds. A different value will allow free more CPU resources in projects using IL logic, especially in devices that have slow CPU. The default reduction of this parameter may be beneficial to user interface smoothness but IL execution may be a bit slower than before. This parameter can be changed when necessary.

Debugger Restrictions

The CE device's **Remote Debug** has been introduced from this version. When using the 'Attach to Process' function as described in the "Remote Project Debugging" section in the programmer's manual, you can "link" up to the process being run on the Target device from the Desktop, where you will be able to use all the Debugger On Line functions as well as for the remote device too.

Driver Restrictions

The communication drivers used in the project are automatically installed on the device. It is absolutely necessary to verify whether the driver used in the project being edited is available in WinCE version.

The communication drivers for WinCE are purposely compiled for such operating system, however you need to check their availability. It is not always true that a driver for XP is also available in versions for WinCE. For instance, sometimes drivers use libraries of the PLC's constructors which might not be available in WinCE. Therefore always check driver availability before starting the project, by going through the table of drivers which is published and updated on the Progea Web Site mainly because they are continually being amplified, a driver which is initially unavailable may have been released or in the phase of being also released for WinCE. If in doubt, please contact the Progea offices or your dealer.

The driver for WinCE restrictions are:

Function	WinCE	WinXP/2000
Modem Telecontrol (TAPI)	To be verified	✔
VBA Interface	To be verified	✔
Multidriver	max. 2	✔

OPC Restrictions

Movicon CE supports the OPC technology as Client not as Server. Moreover the technology OPC Client XML is not supported.

Function	WinCE	WinXP/2000
OPC Client DA	✔	✔
OPC Server DA		✔
OPC Client XML DA		✔
OPC Server XML DA		✔

Web Client Restrictions

Movicon CE supports the Web Client technology. However, only two clients at a time are allowed contemporary access. This is to avoid the risk of having too many clients removing the already scarce quantity of resources, provided on the devices, all at once.

In addition to this you need to consider that a native Web Server is available in the devices as is with the WinXP which has a IIS (Internet Information Server) integrated. In this case too, access to the WinCE server for one Web Client user requires you to have the device specifications, supplied by its makers, at hand.

Access from a Web Client to a server based on Movicon CE can therefore be done in two ways:

1. Verify the whether there is a Web Server available on the device (if not, you can install one), configure it appropriately. In this case, access from Web Clients can be done by using the HTTP protocol and therefore through a normal Internet Browser
2. When there is not a web server, you can access as Web Client without using a browser, but by using the Web Client (JAVA) applet directly. In this case you will need to have the Web Client applet and a Java Virtual Machine installed

You can get further instructions on this by consulting the Movicon Web Client's User Manual.

2.4. Project Constraints

In order to let the designer know about device constraints when creating projects for Windows CE, Movicon automatically creates a file in the project folder with the default designing constraints. These constraints are purely indicative and can be modified by clicking on the text file as shown below. It is then the designer who must valuate whether these constraints established for default can be modified in function with the hardware being used.
If these limits are exceeded the following window will automatically appear:
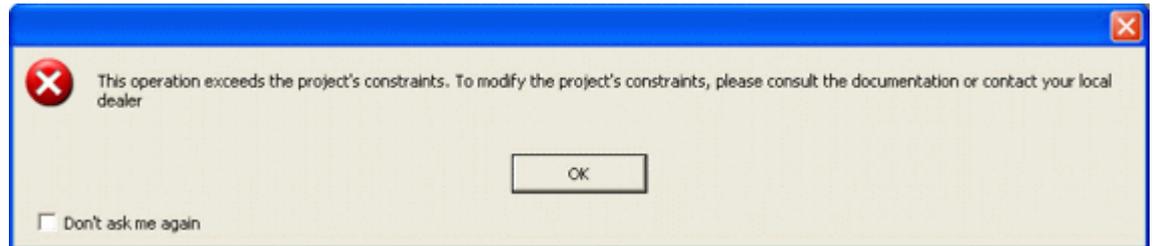
These constraints are managed with a xml file which has the name of the project with the ".Contraints" extension. These files contain default values which can be changed. The purpose of these constraints is to set projects with limits to stop them from getting too big for the chosen platform they are to be run on. However, it is important to keep in mind that any possible value changes made to these limits may degrade the project's performances.

An example of an xml file structure:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<Constraints>
   <MaxNumVariables>1024</MaxNumVariables>
   <MaxNumScreens>64</MaxNumScreens>
   <MaxNumScripts>8</MaxNumScripts>
   <AllowScriptInScreen>false</AllowScriptInScreen>
   <AllowILInScreen>false</AllowILInScreen>
   <MaxNumScreenObjects>64</MaxNumScreenObjects>
   <MaxScreenSizeCx>800</MaxScreenSizeCx>
   <MaxScreenSizeCy>600</MaxScreenSizeCy>
</Constraints>
```

Each attribute means:

MaxNumVariables	maximum number of variable that can be entered in the project's RealTimeDB
MaxNumScreens	maximum number of screens that the project can have
MaxNumScripts	maximum number of basic scripts that can be entered in the project
MaxNumScreenObjects	maximum number of objects that can be inserted on one screen. One symbol counts as one object
MaxScreenSizeCx	maximum length set in pixels that a screen can be set with
MaxScreenSizeCy	maximum height in pixels that a screen can be set with
AllowScriptInScreen	allows the script code to be edited in the screen or in its objects (default value is "true")
AllowILInScreen	allows the IL codes to be edited in the screen or in its object

	(default value is "true")

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

Win32.Constraints: file containing the Win32 project constraints
WinCE.Constraints: file containing WinCE project constraints
j2se.Constraints: file containing j2se terminal project constraints
j2me.Constraints: file containing j2me mobile phone project constraints

Please note: the set value is case-sensitive. Therefore when setting "True", for instance, it will be interpreted as "false" because it is a unrecognizable value.

3. Hardware types

3.1. Hardware

Please be reminded that Movicon is a powerful Scada/HMI platform designed for providing project designers just one unique and flexible designing tool for both powerful supervision systems based on Personal Computer (ie. WinXP) and small Touch Screen devices based on Windows CE at the same time.
The later requires the designer to carefully consider the target device's limitations, for which the project should be developed keeping the constraints in function with the panel's capacity in mind.
This document requires the designer to have the basic know-how of Movicon.

Touch Panels based on Windows CE usually vary in features. Therefore the designer should check whether their target device has at least the following requirements:

- Windows CE 5.0 or later
- A minimum CPU of 400 MHz
- A minimum RAM of 32 MB, 64 MB recommended

It is very important that the chosen hardware is suitable for the project you wish to design. Often mistakes are made in choosing Touch Panels for their price rather than their hardware features, which may turn out to be insufficient for project use.

- **The project must always be proportioned to the hardware used. Below are described how to choose the right device or how to adapt your project to the hardware available.**
- **Even though the Movicon software comes supplied preinstalled by the device builders, it does not mean that Movicon is a generic software and not designed expressly for one specific target. Therefore the tips mentioned in this documentation should always be taken seriously.**

Different WinCE hardware devices supported by Movicon

CPU type and graphics cards
The processor's calculation capacity is very important, and a good processor builds the foundations of obtaining good performances. It is important that you get good graphics cards for your panel's graphics. If processed program image outputs are sent to graphics

cards not in parity with the processor being used, you may find a noticeable performance drop when refreshing displayed data or in the time it takes to change pages.

Benchmarks Performances

The below table shows the results relating to the number of graphic refreshes a second using a Movicon test project for displaying on screen the value of variables exchanged with the PLC (worst condition).

Nr. of graphic refresh a second using Movicon displays	90 Displays	60 Displays	30 Displays
VIPA TP606C (PXA 277)	0.9	1.88	4
ASEM OT1000 (Transmits i486)	4.29	6	20
Other devices…			

Chipcard Benchmark tool Graphic	Test Results
VIPA TP606C (PXA 277)	136 upd-sec
ASEM OT1000 (Transmits i486)	168 upd-sec
Suetron TP12C (PXA 255)	60 upd-sec
Other devices…	

Considerations

The following performances are normally considered acceptable:

HMI Panel expectancy Times
Page Change 0,5 - 1 sec.
Displayed Data Refresh 0,5 – 1 sec.
Command execution 0,5 – 1 sec.

HMI Panel expectancy	Max. Times acceptable
Page Change	0.5 - 1 sec.
Displayed Data Refresh	0.5 – 1 sec.
Command Execution	0.5 – 1 sec.

Movicon will allow the above performance indications to be obtained with ease providing you design your project to match the hardware type it is to run on. Obviously, this shouldn't be a problem in the designing phase when using powerful panels. However if the touch panel does not have the required hardware configurations you will find yourself having to solve problems to satisfy these constraints in order to adapt and optimize your project to the hardware resources provided in its designing phase.

Movicon is a general-purpose software and therefore not tied just to one specific hardware and cannot fully ensure performances under the above mentioned circumstances.

- **Performances therefore depend on both project type and hardware type used which may result in being better or worst than those indicated on the table. This is not dependent on Movicon but on the system project designer.**

3.2. Supported Devices

Movicon CE has been created so that is can be installed on more wider range of devices and/or operating terminals found on today's market. The automatic installation verifies the device's processor type and installs the corresponding runtime automatically.

Many processor types are supported (x86, VIA, Eden, Arm, StrogArm, MIPS, etc.), independently of the panel builders.

We suggest that, in any case, you verify the compatibility of the device, you intend, to use with the Movicon product. Full compatibility is guaranteed on:

1. Processor type
2. Platform type
3. Operating system image type

The below list of panel makers are those which have been tested directly by Progea. There are many more devices on the market which function just as well, and whose compatibility has been verified directly by the their makers or clients.

- ADS-Tech
- Advantech TPC
- Asem
- Beckhoff CX1000
- B&R PowerPanel
- Divus
- Exor
- ESA Elettronica
- Future Pad Fujitsu
- IPS
- Keba
- Mettler & Fuchs
- Pilz HMI
- Phoenix Contact
- ProFace
- ROI Computer
- Sitek
- Sutron
- Techmark
- VIPA

PocketPC or palmtops:

- Compaq/HP (iPaq)
- Toshiba PDA
- Asus MyPAL
- Dell Axim X3

This list is updated on the Progea web site regularly (www.progea.com). For any further information on the type of devices used or the necessary tests, please contact the Progea offices or your local dealer.

4. Installation

Movicon has been designed so that the operations for installing Movicon CE are not requested on the device as they take place completely in automatic the moment the project is uploaded from the desktop to the target.
When uploading the project onto the device, through the Movicon development environment, a control check is carried out to see if any Movicon CE RunTime engine and its components are present. If non are found, they will be automatically be installed on the device.

> *The Movicon installer identifies which type of processor is being used by the device before automatically installing the Movicon CE executable most suitable.*

You can, nevertheless, install the Movicon CE RunTime engine on the device manually by following the procedures explained below:

Installing Movicon CE RunTime Module using ActiveSync

To execute this type of installation you need to create a connection between the "target" and the "desktop" beforehand (see the paragraph on "MS ActiveSync").

When executing a "Movicon CE" connection from the "Movicon" group, the ActiveSync will automatically acknowledge the processor type aboard the "target" and upload the right installation file on the "target", after which the Movicon CE Runtime module installation will be executed on the "target".
All the operations are done in automatic but the user is given the possibility to decide where the packet is to be installed: in the default folder for applications or in any other folder. It is advised not to use the default folder in SSDK devices as its contents will be lost when turned off because it does not store this memory.
You can select the Movicon CE installation with a "full" or "min" setup:

- **Movicon CE full Setup**: Movicon CE installation is installed with all the ADOCE libraries and SQL Server CE
- **Movicon CE min Setup**: Only Movicon CE is installed

> **The Communication Drivers are not installed automatically along with the Movicon CE installation and have to be done separately afterwards by selecting the appropriate "Drivers...." item.**

The Communication Drivers are installed in the Drivers folder within the Movicon CE installation folder:

..\MovXCE\Driver

Installing the MovXCE RunTime module manually

If the 'target' device has not been implemented with the ActiveSync you need to carry out the following procedures to install the MovXCE Runtime module onto the "target":
Setup a link between the 'target' and the 'desktop'. The link can be a network connection or a serial connection (see chapter Communicating with ActivSync).
Certify the type of processor aboard the 'target'.
Select the MovXCE "Program Files\Progea\Movicon \MovXCESetup" file with the .CAB extension specified for that processor from the installation directory on the 'desktop' and copy it to the 'target'.
Open a Dos session from the 'target' and write the command: \>WCELOAD NameFile.CAB
This will start the MovXCE Runtime module installation. When terminated the .CAB file will be automatically cancelled.

- **The SSDK devices (Touch Panel or similar) do not have all their memory buffered but only a few folders. The information which is recorded in volatile memory is therefore lost when shut off. It is recommended to execute the "RegSave" command after MovXCE has been installed, otherwise the runtime module may not work correctly.**

Uninstalling MovXCE

Windows 2000/NT and WinCE have a 'Add/Install and remove programs...' icon on their Control Panel which can be used to remove MovXCE. However, as the WinXCE installation is customized by its makers, it is sometimes not possible to remove the programs from the Control Panel. In cases such as this, a file dedicated for removing programs called "unload.exe" in the device's Windows directory can be used. To remove MovXCE use this command to open a DOS window and write the command:

> \>unload Progea Automation MovXCE

This will uninstall MovXCE.

4.1. MS ActiveSync

The Microsoft ActiveSync comes free of charge in the Movicon Cd Rom and is used for connecting the desktop PC to the target device which has Windows CE installed.

To get the communication going, at least for the first time, you need to establish an initial serial link between the desktop PC and the target PC then the connections can be subsequently commuted through FTP, USB, Ethernet or RAS.
Before carrying out any connections ensure that the "Allow connection with desktop computer when device is attached" function on the target PC has been activated. The function's status can be viewed by launching the Communication program icon from the Windows CE control panel. In addition to this, ensure that the ActiveSync settings in the desktop PC are correct: select the Connection Settings item from the File menu of the ActiveSync program and enable the serial connection by selecting the right COM communication port.
The in order to establish the connection you need to launch the RepLog.exe file, located in the Windows system folder, from the target PC; the ActiveSync program, on the desktop PC, will automatically establish a connection, otherwise you can force it by launching the "Get Connected..." command from the ActiveSync program's File menu. For further information on hoe to create connections between PC desktops and Target devices please refer to the "User Guide".
The desktop and target PC connection allows Movicon projects to be exported directly in Windows CE, new program installations on the target PC or to explore the disk's contents. The connection status can be viewed in the Windows application status bar where the status type is indicated the color of the ActiveSync icon: green means the connection is active and grey means it is disconnected.
Each time the cable is disconnected, you need to repeat the procedure described above to reconnect..
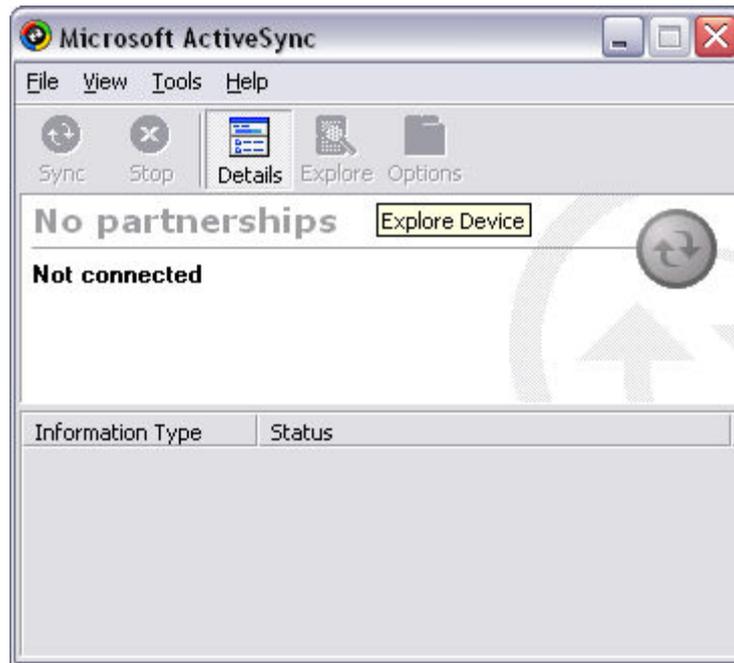
Communicating with MsActive Sync

The Movicon packet for Windows CE installation requires that the desktop and target are communicating with each other. The connection is established thanks to the MsActive Sync (at least version 3.5) and comes in three types:

1. Serial or Infrared communication through a COM Port
2. Comunication through USB
3. Network (Ethernet) Communication and with Remote Access Service (RAS)

As soon as communication between the desktop on target has been established, the ActiveSync will ask if you want to setup a partnership.

The partnership is needed when you wish to share and maintain syncronized data between the desktop and target. Normally the partnership is frequently used in Pocket PC devices but not in SSDK devices where communication is not always carried out successfully due to the lack of adequate modules in the target device.

The SSDK devices are generally designed for in the industrial world. Different types and sizes can be found on the market: some have communication serial ports between 232 and 485, ethernet cards, infrared ports and USB ports.

However, PocketPCs are directed at a wider public use due to their extreme simplicity and user friendliness, and are capable of quick data sharing with the desktop such as: phonebooks, internet addresses, files and others still.

Installing MsActiveSync

Active Sync is a Microsoft software freebie designed for managing the communication between Desktop and Target devices with Window CE aboard. If you don't have ActiveSync installed in your Desktop PC you can do it from the Movicon CD by running the executable file in the "MSActiveSync" folder. The installation is carried out in simple step-by-step procedures.

4.2. Serial Connections

Serial Communication with MsActiveSync

The serial communication works in all Windows CE devices and you only need to have a free serial port on your PC, a standard serial cable and the Active Sync installed on the Desktop. The communication velocity can go up to 115200 baud rate.

To get serial communication you need to carry out the following steps:

1. Install Active Sync on the Desktop. Once installed select the COM port you want to use. Active Sync will remain active, on hold, in wait for serial signal reception. ATTENTION: keep the serial port engaged even when no Active Sync communications are active. To free the serial you need to enable the connection option to the serial which is accessed from the "File-Connections setting.." menu
2. Open the control panel on the Target device and access the "Communication" settings
3. Enable the "Allow connection with Desktop computer when device is connected" selection in the "PC Connection" properties
4. Always check that the connection being used is correct in the "PC Connection" properties. You can always create new communications afterwards by accessing "Remote Networking" folder from the Programs/Communication
5. Close the Communication Settings window with OK. Close the control Panel
6. Connect the Desktop and Target device with a standard serial cable
7. Run the executable "repllog.exe" by selecting Run item from the Windows CE start menu accessed from the task bar
8. The communication will activate automatically
9. A window will open, on the Active Sync Desktop, enquiring whether to activate a "Partnership". It is not necessary to activate a partnership of the Movicon functions
10. The serial communication is now active

By using this type of connection you can transfer files between two devices, the Desktop and the Target. The "Mobile Device" can be displayed by using the Desktop's explorer to which you can access for reading or writing files. In addition to this you can export Movicon projects directly to the Target without having to "copy&paste". After having created a Movicon project you can actually execute the "Upload Project to Device/FTP…" from the"Commands" windows of the "Project Explorer" window. If the connection between the Desktop and the Target has already been activated by using Active Sync, Movicon will directly export the project to the Target, keeping the same .movprj source file path.

Communication on USB port
The communication on USB port is usually available in PocketPCs because it is the simpliest type to put into effect. In fact, you only have to connect cable to the PC's USB port and wait until the communication is established automatically.

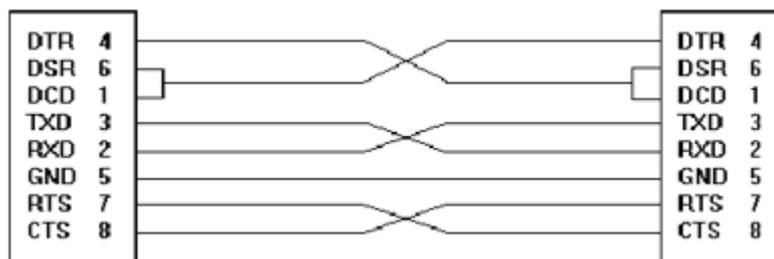# 4.3. Serial Cable for MS ActiveSync

The communication serial cable to be used for connecting the desktop PC to the target device using MS ActiveSync is as follows:
Nevertheless, it is always best to refer to the device's manufacturer's specifications if available.

Serial Cable with 9 pin (female) - 9 pin (female) connector

Serial Cable with 25 pin (male) - 9 pin (female) connector
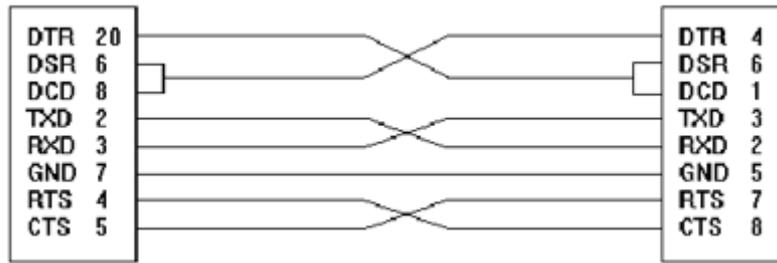
4.4. Network Connections

Network communicating with Ms ActiveSync

Network communication using Ms ActiveSync requires that both PCs, Desktop and Target, be supplied with a network card and be configured adequately. This system is used for transferring files at a much higher speed than a serial communication does with a maximum baud rate of 115.2 Kb. Communicating in net can be established only after a partnership has been created, which can only be established if there is a communication serial or USB port to start with.

The procedure for creating a network connection is as follows:

1. Connect the CE device up to the desktop with a serial cable
2. Connect the CE device to the same PC's network
3. If the net is without the DHCP service, you need to setup a fixed IP in the device which is compatible with that of the PC's. When the settings have been completed you need to save the registry to keep it intact if any reboots are carried out afterwards
4. Setup the ActiveSync on the desktop to accept serial, USB and Network type communications
5. Launch "repllog.exe" on the device
6. Establish a partnership with the device. Disable all the check boxes in the objects for partnership managing (they are not necessary). Information concerning the Desktop PC is memorized in the device's register while information concerning the device is recorded in the desktop PC's register. Therefore the register needs to be saved to keep information intact after a reboot
7. Disconnect the serial connection by using the appropriate repllog icon from the Windows CE task bar
8. Launch "repllog.exe /remote"
9. A window will open indicating the name of the desktop PC with which the partnership has been established. Click the 'Connect' key
10. The connection is put into effect via ethernet with the desktop by means of using the ActiveSync

> *If the desktop PC has not been changed, all following connections can be done directly in ethernet even when the desktop or device has been turned off and turned on again. Otherwise when using another desktop PC you will need to re-establish the connections via serial with the partnership again.*

Network Communication via FTP Server

Network communication via FTP Server requires that both the PCs, Desktop and Target, be supplied a network card and be configured adequately. This system is used for transferring files at a much higher speed than a serial communication does with a maximum baud rate of 115.2 Kb.

In addition to this a FTP server must be installed on the CE device.

Progea has created a FTP Server which is loaded on the device during Movicon CE installation. The project can be uploaded by using the "Upload Project" window once the FTP Server is put into execution on the CE device:

You need to select the "FTP Server" option from the "Upload Project" window and enter the CE device's IP address and its network name. However you can only transfer the project into the CE device's "Main Memory" with this connection. You cannot execute a Movicon

CE installation, startup projects from the Desktop PC or create connections on the Target. Once the project has been transferred you must take into account that it needs to be moved to the CE device's storage card.

5. Editing

5.1. Editing General Information

When creating projects for the Windows CE you need to take into account the differences there are compared to the Win32(Win2000/XP) platform version. The main difference is that the devices taken on board Windows CE are divided into two different categories:

- **Pocket-PC**
- **SSDK or HPC2000**

The Pocket-PC, also called palmtops, are rather small and have RAM memory storage. As you can imagine by its name, these devices are mobile and not much bigger than a mobile phone.
The SSDK devices (standard software development kit) are similar to operator panels and generally used in the industrial environment. They come in different sizes according to their display type, which can oscillate between 5.7" and 15". These devices have a RAM memory and a Compact-Flash memory only, which carries out the tasks of the Hard-Disk. The Operating System's image resides in the Compact-Flash and is loaded into RAM at device startup.

Windows CE Operating System

The Windows CE platform is rather different to the Win32 (Win2000/XP) platform as described below. You must first consider that WindowCE, like embedded systems, is much more restricted both on the performance side and with the amount of memory space available.

Features
In order to verify some of the device's features, you can access the "System" group from the "Control Panel" to get information on the following:

- Operating System and relative version
- Processor type
- Installed RAM memory
- Memory management: Storage Memory, being the memory reserved for system files; Program Memory, being memory available for running various applications
- Device name and description

To get further information on the device please refer to the section on "Project Debug".

Connections
The CE devices are connected to the PC desktop using serial , USB or network connections. Normally each device proposes a serial connection for default, such as ActiveSync, which is provided for the connection. The available connections are listed in the "Network and Dial-Up Connections", found on the "Control Panel", where you can also create new connections. However, please keep in mind that the serial connection via ActiveSync is normally executed on CE device's default connection (My Connection). In this case you need to check that the connection in question is that used by the device otherwise it can be setup through the "PC Connection" found on the "Control Panel". The window which appears shows which is the connection currently selected, and the following item needs to be enabled:

Allow connection with desktop computer when device is attached

> *Where the SSDK devices are concerned, you need to use the serial or USB connection the first time you execute a connection with the Desktop PC, after which you can then connect in net as explained in the paragraph on "Network Connections".*

Registry

The device's system registry is modified by the Movicon CE installation, where all the keys needed for making Movicon CE work are created. Therefore it is absolutely necessary that the system registry is saved after each change has been made. However, there are usually no problems when it comes to Pocket-PCs which stores its memory so that there are no risks of losing data when the device is turned off. The SSDK does not store its RAM, therefore when the device is turned on again, any system registry changes will be lost if not saved in the device's Compact Flash before being turned off. If saved, the system registry will be loaded along with the last changes when the device is next turned on. The system registry commands are different from one device to another, therefore the system registry save will have to be executed according to the device being used.

 Pocket-PC devices are supplied with a battery to keep data always saved in memory. However, when the batteries run out or get damaged all the saved data will be lost. Therefore it would be wise to regularly do a backup copy of the memory as a safeguard against losing data.

DOS Command Window

The DOS command window is opened by means of the "Command Prompt" item from the Windows CE Start menu. There are only a few commands provided which are listed by clicking the "Help" command. These commands include "ipconfig", "ping", etc..

Accessing the Compact Flash

Access to the Compact Flash is rather slow especially with SSDK devices. You may find that it takes time to open a certain folder to view its contents even when using the explorer resource. This usually happens when the MocXCE installation folder is being opened because the Movicon icon, to be associated to the "movprj" project file, is loaded.

Project compatibility between desktop and target

One of the biggest advantages of using Movicon is that you get a XML based project structure. Which means all the same project files run on Win2000/XP can be uploaded to the device and run by the Movicon CE runtime engine.

As a consequence, there is no need to compile the project file when uploading it from Desktop PC to CE device and project reverse engineering is no longer necessary.

This makes project handling extremely more simple.

Project Options

You can setup the project to be run on full screen or no by means of using the project's "Execution" settings. If you choose to activate the "Start Full Screen" option it would be advisable to insert a command (by button or by menu) to close the project. If the CE device does not have a keyboard, **it will not be possible to startup the operating system** when run on full screen making it impossible to stop the project without having to turn the device off.

The project's Output window can also be enabled but also in this case if the project is run on full screen, it will be impossible to access the window without using the keyboard (ALT+TAB keys and then select the process).

Folder Paths

Project working folders can be setup through the project's "Project Path" settings. You must take into account that the "C:\" disk does not exist in CE devises therefore the "C": is automatically taken away by Movicon. The working folders are used, above all, for defining the folder images and when Dataloggers and Historical Logs are to recorded on a compact flash which is different from the one where the Movicon installation resides.
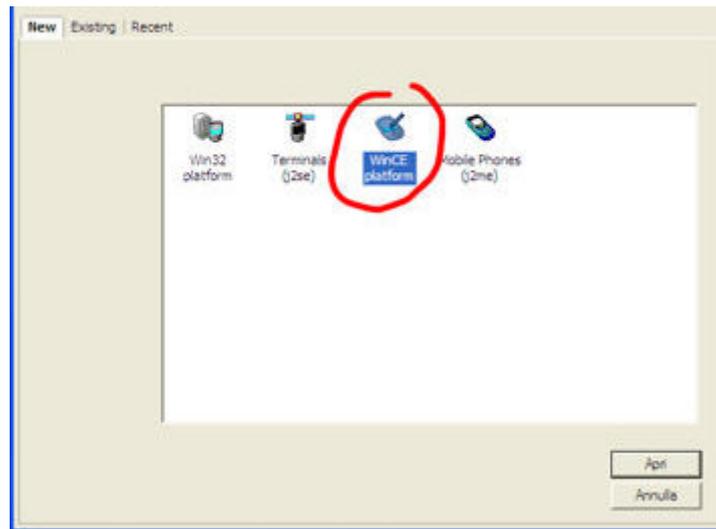
5.2. Designing Projects

Creating New Projects for WinCE

By using the Movicon Editor, you can create a new project by selecting the target device's icon as indicated below:

Although projects created with Movicon are executable WinCE devices as well, it would be best to create the new project by selecting the target device: this will automatically and optimally pre-configure the project's properties for WinCE devices.

Selecting platforms in Design mode
When creating a project for Windows CE you will need to consider the following restrictions and differences between using Windows XP and Windows CE, which involve the:
1. Significant hardware restrictions
2. Operating system restrictions
3. Consequent restrictions in Movicon CE

Creating a new project in Movicon for WinCE will automatically set the project's **"General properties"** in the **"Platform"** group. However, these properties can always be changed to set the platform type being designed with the Movicon Editor.

- **The Movicon Editor will hide those functions not supported by the target according to the platform type selected and display some graphic objects exactly as they will be represented in the device.**

To modify the project's **Platform** properties, select the project root with the mouse and use the Movicon **"Properties Windows"**.

Note: when designing for Windows CE, **it's advisable to create a new project explicitly for Windows CE to get all the default settings configured correctly!**
However, Movicon will accept more than one platform selection in the project's properties and assumes that different platforms are to be designed **for which the editor will always be preset for the most powerful one.**

Also take into consideration that when transferring projects designed for Win32 to WinCE devices, **the Movicon CE runtime will ignore and not manage all those functions not supported which will be notified** in the Output window and in the Log upon project transferral. Even though the project will run in the WinCE device, the designer should check whether it does so correctly keeping a special eye on performances and memory consumption.
Let it be known that all Movicon X projects, being based on XML files, **can be run on both WinXP and WinCE indifferently**.

Before Designing
Before starting your project for embedded devices you should always remember that your project must be created in parity with the capabilities and possibilities of your target device.

Devices based on WinCE are generally compact devices with restricted calculation and memory capacities and therefore we strongly suggest the designer to keep in mind all the tips mentioned in this guide and in the **"GuideLines for WinCE Touch Panels"** manual.

5.3. Uploading Projects

Project edited by Movicon can be uploaded onto devices using the appropriated command from the commands panel.

The **Upload Project to Device/FTP** command is made available from the commands panel (task pane) when the project is selected from the tree structure.
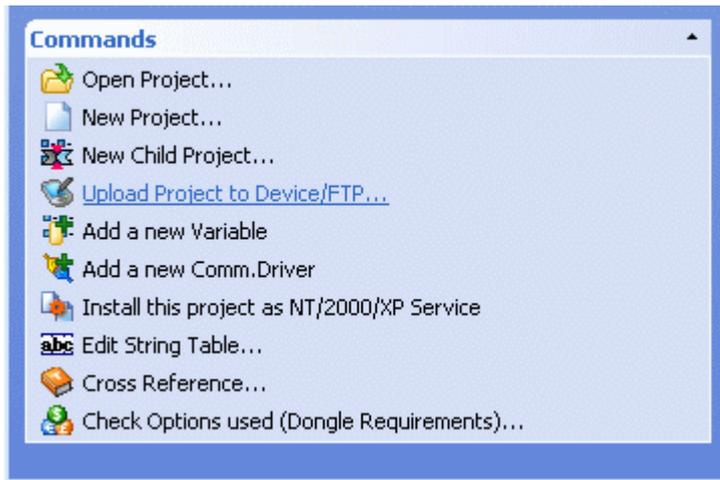
By clicking the 'Upload Project to Device/FTP...' command, the Movicon Editor will display the below Upload window showing the XML files, edited on the desktop, to be uploaded to the WinCE connected.
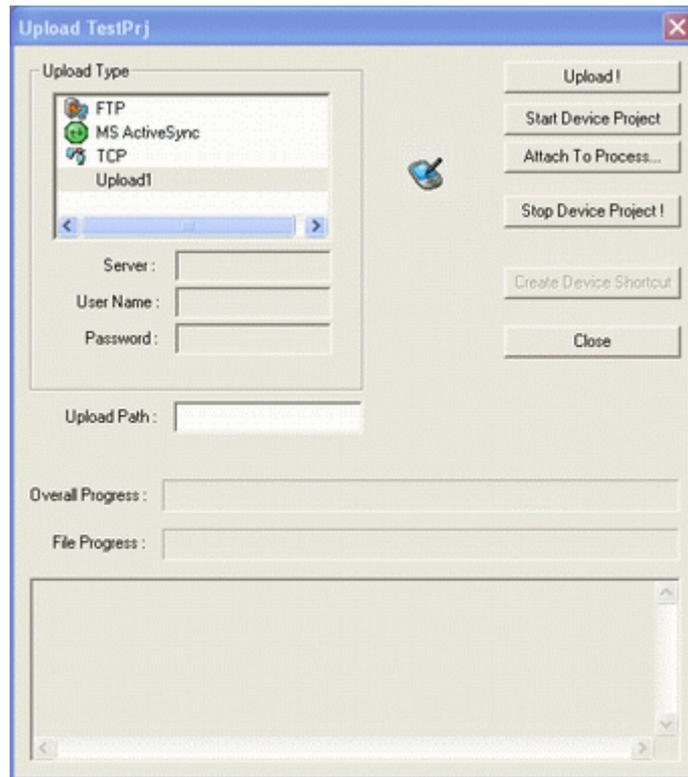
The first connection to the device must be done through MsActiveSync. After the first download, Movicon will automatically install the FTP Server to use it for uploading the projects (ie. on Ethernet) instead of ActiveSync on serial port.
When the Microsoft ActiveSync program is not connected to the target PC with Windows CE or, the selection of the export command invokes the appearance of this message:

"Cannot connect to device: ActiveSync not installed or not yet connected"

In this case, however, the project can be uploaded later on. As the project files are the same XML files of the desktop, it is always possible to install these files in device's folders or in the Compact Flash memory by using the supported opponents which can be connected to the PC.
When, on the contrary, a connection already exits between the desktop PC and the target PC, by executing the export on Windows CE command will find you the file in the target PC located in the compact flash memory (harddisk) and with a path identical to that used in the desktop PC. If, for example, the project file in the desktop PC is "C:\Documents\MyProject\MyProject.movprj", it will be automatically exported into the "HardDisk\Documents\MyProject.movprj" folder in the target PC by Movicon.
In addition to this, a connection will automatically created for running the project in the "MY Computer" folder. The name of the connection has the same name of the project (ie. MyProject).

> *The first connection with the device requires the use of the Microsoft ActiveSync product, through serial or USB port. Movicon will follow this by also downloading a FTP Server, making it possible to upload via network through the FTP.*

In the dialog window for uploading projects you will find a "Upload Path" field which is used for choosing the path for uploading the project. The set path is used independently of the transport being used (MS ActiveSync or FTP Server). When MS ActiveSync transport is being used, the path is added to the compact flash selected for the upload. When using the FTP Server transport, you will also need to indicate the compact flash in the path.
Movicon will export the project to the device and create all the necessary folders in order to do this. This project will then be exported in the path composed of "Selected Compact Flash (only with MS ActiveSync) + Upload Path * Local Path".
Here is an example of a path for the FTP Server with 'Harddisk' as the compact flash's name:

- Harddisk or \Harddisk
- Harddisk\Files Project or \Harddisk\Files Project

Below are some examples of paths for MS ActiveSync:

- Files Projects
- \Files Projects

Plug-in TCP

This plug-in allows the upload to be executed, start/stop project without needing an active Ms ActiveSync connection. The only thing needed is that the WinCE be already connect in ethernet net and that the new "CEUploadServer.exe" Progea service be already running in the device. This executable is uploaded in the device with the Movicon CE installation.

Custom Uploads

The project upload management also allows uploads to be customized by writing script codes (which in turn can recall custom dll and /or codes). The dialog user interface displays the list of exiting plugins. Apart from "Ms ActiveSync", "FTP" and "TCP" you will also find other additional plugins listed.
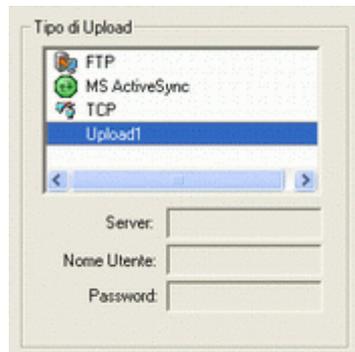
All plugins must be installed in the Movicon "UpdMgr" sub folder. Movicon will search and display all the files contained in this folder with ".updmgr" extensions on the list by file name and with its <plugin name>.ico icon if associated with one.
The custom plugin file must contain basic codes defining the following events:

```
Sub OnLoading(Output As String, bRet As Boolean)
Sub OnUnloading()
Sub OnConnect(TargetFolder As String, Output As String, bRet As Boolean)
Sub OnDisconnect(Output As String)
Sub OnCreateDir(DirName As String, Output As String, bRet As Boolean)
Sub OnCopyFile(Source As String, Dest As String, Output As String, bRet As Boolean)
Sub OnDeleteFile(DeleteFile As String, Output As String, bRet As Boolean)
Sub OnStartStop(bStart As Boolean, Project As String, Output As String)
Sub OnCreateShortcut(Project As String, Output As String)
```

These events have the following meanings:

OnLoading
This event is executed when the "Upload" command is executed for the first time for the selected plugin. This event can be used for initializing the plugin.

OnUnloading
This event is executed at the end when the plugin is unloaded. Therefore it can be executed for a previous plugin when another is executed, or when the "upload" dilalog window closes.

OnConnect

This event is executed on "Upload" command before file transfer starts. It can be used for asking which folder (compactflash) the project is to be uploaded to. This path is passed to the upload manager with the "TargetFolder" parameter.

OnDisconnect
This event is executed at the end of the project upload.

OnCreateDir
This event is executed before transferring a file when the destination folder has to be created in the target. The "DirName" parameter is composed by using the "TragetFolder" which has been initialized in the "OnConnect" event. The "\" character is always used at the beginning on the assumption that the "TargerFolder" is the name of a compactflash from the WinCE device. The plugin code must be able to accommodate when used for exporting projects to devices which are different to WinCE.

> ⚠️ *The "OnCreateDir" event may be executed with the same "DirName" many times when more than one file is to be transferred to the same folder. The plugin code must therefore manage any possible destination folder created beforehand.*

OnCopyFile
This event is executed for each file to be copied to the target. The "Source" and "Dest" parameters return the path of the source file and of the destination file. The "Dest" parameter is composed using the "DirName" which was initialized in the "OnCreateDir" event. The file name which must be copied is of course added to this. The plugin code must use these two parameters in order to copy the source file to the target.

OnDeleteFile
This event is executed when a file has to be deleted from the target. The "DeleteFile" parameter contains the path and name of the file which is to be deleted and is composed by using the "DirName" value initialized in the previous "OnCreateDir" event. The files to be deleted may not always exist and therefore this must be taken into account in the plugin code.

OnStartStop
This event is executed when the "Start Device Project" or "Stop Device Project" is used in the dialog window for uploading projects. You can check out from the "bStart" parameter which of the two Start/Stop commands has been executed. The "project"parameter contains the path and name of the project to be started or stopped. This is composed by using the "DirName" initialized by the "OnCreateDir" event which was executed before copying the project file.

OnCreateShortcut
This event is executed when the "Create Device Shortcut" button is used in the dialog window for uploading projects. The "Project" parameter contains the name of the project to be linked. It is composed by using the "DirName" initialized by the "OnCreateDir" event which was executed before the copying the project file.

Note:
The "Output" parameter is used for customizing written notes to be printed in the upload window's trace at the end of each operation.
The "bRet" parameter has the job of notifying the upload manager the outcome of specific operations. The execution of any following events can be interrupted when this parameter is set at "False".

"Plugin1.updmgr" File Example:
This plug-in copies the project to another directory.

```
Sub OnConnect(TargetFolder As String, Output As String, bRet As Boolean)
        TargetFolder = GetFilePath("[Select the target path]", "", CurDir, "Select the target path", 2)
        If TargetFolder = "" Then
                bRet = False
        Else
                TargetFolder = Left(TargetFolder, InStrRev(TargetFolder, "\"))
        End If
        Output = "OnConnect: TargetFolder->" & TargetFolder
End Sub
```

```
Sub OnCreateDir(DirName As String, Output As String, bRet As Boolean)
        Dim aFolders() As String
        Dim i As Integer
        DirName = Mid(DirName, 2)
        aFolders = Split(DirName, "\")
        DirName = aFolders(0) & "\"
        For i = 1 To UBound(aFolders)
                DirName = DirName & aFolders(i) & "\"
                On Error Resume Next
                MkDir DirName
                On Error GoTo 0
        Next
        Output = "OnCreateDir: DirName->" & DirName
End Sub

Sub OnCopyFile(Source As String, Dest As String, Output As String, bRet As Boolean)
        Dest = Mid(Dest, 1)
        FileCopy Source, Dest
        Output = "OnCopyFile: Source->" & Source & ", Dest->" & Dest
End Sub

Sub OnDeleteFile(DeleteFile As String, Output As String, bRet As Boolean)
        Kill DeleteFile
        Output = "OnDeleteFile: DeleteFile->" & DeleteFile
End Sub
```

5.4. Special Commands

Movicon provides you with some commands purposely built for making it much more easier to create projects for Window CE platforms.

Start Device Project

After having uploaded the project from the desktop to the CE target, you can run it on the target directly from the desktop, by using the "Start Device Project" button in the Upload window. This command can only work when connected via Ms ActiveSync.

Stop Device Project

You can stop a project from running on the target directly from the desktop by using the purposely predisposed "**Stop Device Project**" button from the Upload window. By doing this the project will be switched over into stop mode on the target. This command can only be invoked when connected with MS ActiveSync.

Create Device Shortcut

Once the project has been transferred to the CE device you can create a link in the device to run the project. The "Create Device Shortcut" actually creates a link in the device's Main Memory, through which the project can be put into run mode.

> **Movicon creates the link to the project in the device's Main Memory. This means that when the device is next turned the link will be lost. Therefore we advise you to copy the link into the Compact Flash folder.**

Remote Project Debugging

Once a project has been uploaded to and put into run mode on the CE device you can connect and debug it from your desktop PC by using the **"Attach to Process..."** command button. In this way you will be able to view the variable values, execute script debugs, etc.. For further information on these functionalities please refer to the section on **"Remote Project Debugging"** from the Movicon programming guide.

Screen Resources

The display area on the target PC, with Windows CE, will certainly be smaller than the desktop PC screen's and for this reason a new command has been introduced called "Remote Device Size (WinCE)" which is used for sizing the screen window with the characteristics of the target PC to which the project is to be exported. This command only works when connected via Ms ActiveSync.
The command can be activated from the Layout menu from any screen.

> *Before invoking this function you need to setup a connection between the desktop PC and the target PC with ActiveSync.*

You can also set the Screen's default settings by reading the device's resolution using the "Get Connected Device Dimensions" command from the project's Platform properties. This can be done every time you create a new Screen to automatically set it with the device sizes.

5.5. Configuration File

Movicon CE no longer uses the Windows registry keys for reading attributes which allow modifications to be done on the way it works. The 'MovXCE.ini' file is now used to do this job and is found in the MovXCE installation folder. The MovXCE.ini file must have the following xml format where each key is mapped as a tag:

```
<?xml version="1.0" encoding="iso-8859-1" ?>
<General>
<DontUseDecorativeFont>1</DontUseDecorativeFont>
<InstallComponents>0</InstallComponents>
</General>
```

As clearly shown above the registry key, in this case, is used as a tag and a value inserted with which to set it.

Key available only for MovXCE

Key	Description	Default
CheckFileTimeAndDate	This key is used for enabling/disabling the control of file data while exporting projects to WinCE.	DWORD = 1 0 = Disabled 1 = Enabled
ShowSIP	This key is available for WinCE only. It allows the WinCE virtual on screen keyboard to be deactivated. When set at zero the WindowsCE on screen keyboard cannot be activated.	DWORD = 1 0 = Disabled 1 = Enabled
ADOCEProvider	This setting identifies the Provider used for the connection to	String = Microsoft.SQLServer.OLEDB.CE.2.0

	the Database when using MovXCE.	
ADOCEDataSourceExt	This setting identifies the extension used or creating DataBase files when using MovXCE.	String = .sdf
ILLogicPriority	This value expresses the priority with which the IL logic is to be run.	DWORD =255
MaxAvailVirtual	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 screen property "Close Screen Delay" is set at "0". This management is disabled when set at "0" value.	DWORD = 5000000 Bytes
InstallComponents	This key is valid only for WinCE. Its default value is "1" and, when set at "0", allows the installation of the ADOCE and SQL Server CE components to be deactivated. It is used, for instance, to lighten the memory load in those devices where the ADOCE and SQL Server CE has been pre-installed and in the project to be run where they are not needed. Handling data from the	DWORD = 1

	IMDB becomes lighter and quicker with the same potentialies interms of queries.	
DontUseDecorativeFont	Some font properties are no longer loaded for default in MovXCE which require a high usage of resources. This will increase system performances but may make the fonts less attractive to look at. The loading of fonts can be restored to their original mode by setting this registry key at zero.	DWORD = 1
MaxCacheFont	This key allows you to use a cache for storing fonts used by MoivXCE so that they don't have to be recreated every time they are needed. The cache is set with a maximum limit to stop the system from being saturated with fonts when there are many different types.	DWORD = 0

5.6. RAM Use

The Windows CE operating systems allows less resource usage compared to the Win32 (2000/XP) system. It is for this reason that you should always consider the size of you wish to run on this platform and there resources it needs. One of the big constraints in Windows CE is that this system can only allocate 32 Mb of RAM at the most for each application (process) run. **The operating system will terminate any processes going over this RAM use threshold.**
The hardware device must have a sufficient amount of memory to cater for the applied project. The minimum memory required is 32 MB of free RAM, but we strongly advice you to use devices with 64 MB RAM. The project may require more RAM if programmed to use IMDB historicals, VBA logic or other advanced functions.

> **Each process (application) can use a maximum of 32 MB of memory in Windows CE. Movicon allows this limit to be exceeded when needed by using its Heap Memory management (project general properties). When this management is enabled, Movicon CE will use the Heap memory blocks to exceed the limit set by the WinCE operating system.   This is only valid for Windows CE 5.0 or later.**

Tests have been run on a device using a X86 processor to give you an idea on the minimum amount of memory a Movicon CE application can occupy. This test was done by creating and running a new empty project without any screens.
The results showed that the following memory was used:

Movicon CE (runtime)	7	MBytes approx.
WinWrap Basic	2,5 MBytes approx.	
ADOCE and SSCE	2,3 MBytes (optional)	
Total	**11,5 MBytes approx.**	
WinCE 5.0 (PRO)	37	MBytes approx.

It is quite clear that the Movicon CE process occupies as little as 11-12 Mbytes compared to the 36 MB of occupied memory used just for the Windows CE 5.0 (PRO vers.) image. The rest of occupied memory will depend on the **project size and the use of the IMDB**. Also consider that additional memory use will be needed when using Basic Script code in your project which can be calculated as follows:

- approximately 700 Kbytes needed for loading the basic script instruction interpreter which is loaded only once for each execution thread.
- approximately 300 Kbytes needed for each object or resource containing basic script (screens, symbols, alarms)

To avoid projects using too much memory a Movicon registry key has been inserted to define the minimum amount of memory that must remain free. When this limit is exceeded, the screens will be unloaded from memory even when enabled with "DO NOT Destroy", and the basic script resources will not be loaded in memory. Furthermore the page change will be managed as if set with the '0' value in 'TimeDeferClosingWnd' property. Once reentered from this status every thing will go back to working as before.
 The key in question is:

General->MaxAvailVirtual (default value 5000000 bytes)

The default value is 5 Mbytes. This means that once the free memory value for the Movicon CE process (32 Mbytes available) goes under the 5 Mbytes, Movicon will start behaving as described above.

For further information about the Windows CE memory management click the Microsoft link below:

http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dncenet/html/advmemmgmt.asp


RAM occupation of one project

Even though it is impossible to know exactly how much memory the project will occupy beforehand. We can, however, presume that a typical project containing approximately 200 variables, 20 screens measuring 640x480 with simple vector graphics, 200 alarms, one communication driver should occupy from 2 to 4 MB of memory (the project is loaded in RAM when run).
This is just purely indicative and is influenced by the graphic types used, the effective number of screens used and by the use of any external files (.BMP or other).

Heap Memory use

Projects that have no choice but to use more than 32 MB of memory, will need to use the "Heap Memory" which has to be activated in the project's properties. Before doing this, be absolutely sure that the project needs to use so much memory and check whether the device is capable of managing all the project's functions. When the application 32 MB memory limit, imposed by Windows CE 5.0, needs to be exceeded, you will need to set the project with the Heap management, which will allow Movicon to fragment the devices memory around the 32 MB limit.
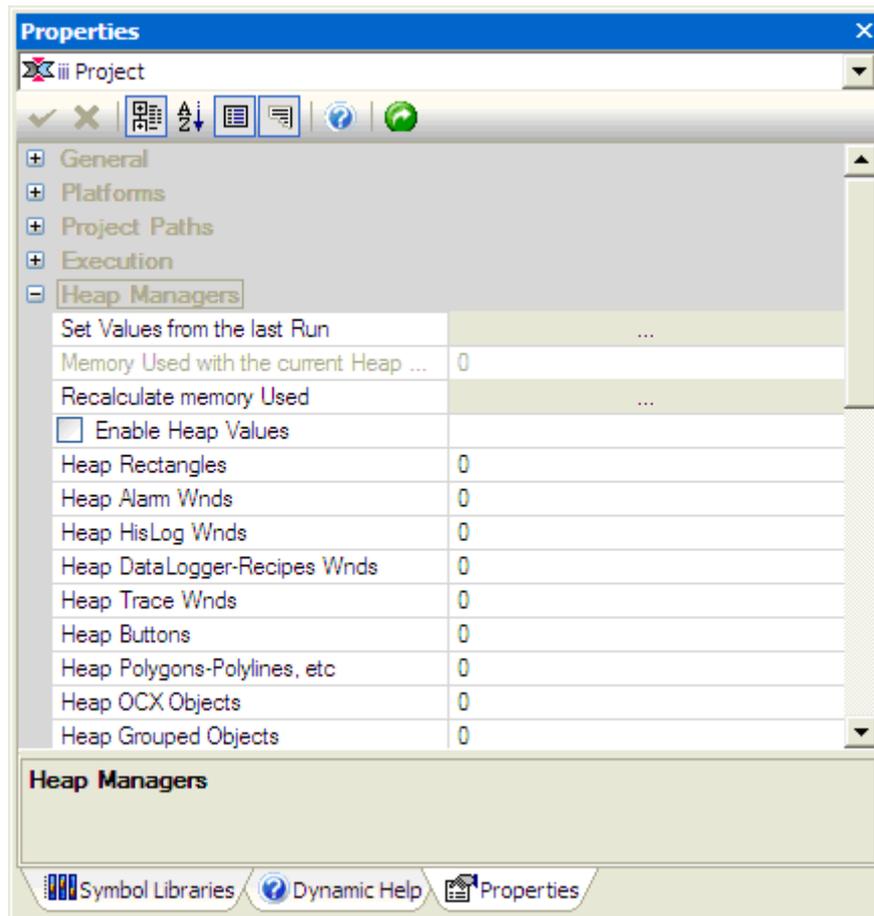
Tips on reducing memory use

These tips will help you reduce memory use on the Movicon CE process side:

- Use bitmaps images instead of jpeg. images which use up more memory because they decompress in memory. Furthermore, when they are used in symbols they remain in the symbols cache and therefore the occupied memory is not freed when the screen gets unloaded.
- Activate on those transports you intend to use in the networking settings. This will save you up to 1 Mbytes
- Use all historical in IMDB format instead of ODBC. Not only does this reduce resources and improve performances it also does not require you to install the ADOCE.

6. Memory Usage with Historicals

6.1. Memory Use with IMDB

The Movicon CE historicals (Log, Trace, Data Loggers and Recipes) are recored for default in **IMDB** (In Memory DB) mode. When creating projects for WinCE all the historical settings with IMDB are enabled for default in the developing enviroment as the ADOCE components need for recording on SQLCE are not always available in all devices. As an alternative, you can use a relational database, defined as the ODBC (Open Database Connectivity) in the development environment, for recording instead of the IMDB. WinCe does not support ODBC and therefore allODBC connections on the target device are converted automatically in ADOCE connections by Movicon. The SQL Server is the DataBase format set for default.

IMDB Engine

The IMDB engine saves and manages data directly in RAM. The memory tables are unloaded on text files with .dat extensions.
Each historical table has its own file where data is only saved in delayed mode based on a preset time (10 seconds for default) after the table has undergone any modifications. These text files have two functions: they can be used for transferring data to other supported files and are used at the project startup for preloading the tables with their most recent values in the historicals.

> **The Panel RAM use is also strongly conditioned by the use of the IMDB historicals (InMemoryDB).**

> **There is a "General/InstallComponents" registry key for WinCE that can be set at zero block the ADOCE and SQL Server CE components from being loaded at project start up. This will save memory space if you do not intend to use these components for recording data.**

The Movicon XCE project's historicals record data using the IMDB engine for default, (except for certain different settings). As an alternative, you can use a relational database for recording instead of the IMDB. If you do not select the IMDB settings in the project, Movicon will use the ODBC (Open DataBase Connectivity) in the Desktop by automatically converting to ADOCE (SQLCE) connections on the panel (WinCE does not have ODBC).
Historical data is recorded by the IMDB engine on output files in the permanent memory (Flash compact) and loaded in RAM at each project startup. The IMDB works in RAM (InMemoryDB) to ensure data access management, analysis, filters and queries in the project.

Default values
When creating a project for WinCE, Movicon will set the following values for default in each of the project's historical recording engines:
1. Use IMDB Manager (property)
2. Shared IMDB Tables
3. Data Max.Age is 180 days (caution, we recommend you reduce this value in panels with little memory capacity)
4. Nr. 4 MB RAM allocation for IMDB manager (movxce.ini)

- **The default values can or should be changed as required and according to device being use.**

New contraint values for the historicals
- The maximum historical log table age has been set with a new constraints value (in act from build 955) called "MaxDaysAgeHistoric". This value has been set at 7 days for WinCE projects, therefore the alarm, driver and system message tables cannot exceed this maximum age limit in WinCE projects.

Movicon XCE will therefore allocate 4MB of RAM for the projects IMDB tables for default.
 This value can be changed in the Movxce.ini file. You will need to check that:
1. The device has at least 4MB of RAM available.
2. That 4MB of RAM are enough to contain the files required in the project.
3. If the "Shared Tables" setting is disabled Movicon XCE will no longer allocate memory
and therefore you will need to make sure there is enough RAM to cater for the size of the
files set.

⚠ **It is essential that the recording engines (Historical Log and Data Loggers) are sized according to the amount of data needed: All the IMDB historicals are always stored in RAM which will be consumed during the project run until the preset memory allocated is completely occupied!!**

⚠ **Once this preset limit has been reached (4 MB for default) the IMDB will stop recording any further values until space has been freed from the Historicals' tables. A "IMDB - Internal error: Out of shared memory" message will appear in the system Log.**

measure memory consumptions
 The IMDB uses the RAM for managing historicals and allocates space to the compact flash
 for saing . .dat and /or xml. files.

The following table shows the correspondence between the types of Movicon project
variables and the data type created by the IMDB in its tables:

Data Type	Movicon Data Type	IMDB Bytes Size
Bit, String, Array, Structure	Character	1 byte per character (2 bytes for unicode)
Byte, Sign Byte, Sign Word, Word, Sign Dword, Dword	Numeric	4/8 bytes (32/64 bit value)
Float, Double	Decimal	8 bytes
TimeCol, LocalCol	Date/Time	8 bytes (100 nano-seconds resolute)

Some examples of RAM occupations are expressed as shown in this table:

Type of Device	Data Type	Column Nr.	Bytes per record	10 second for 7 days
Vipa - Intel PXA 270	Bit, Sign Byte, Byte, Sign Word, Word, Sign Dword, Dword, Float, Double, String (15 characters)	10	~ 512	~ 30 MB (needs to have 60 MB availability, as the deleting of data starts on the 14th day)
Suetron XScale PXA 255	Bit, Sign Byte, Byte, Sign Word, Word, Sign Dword, Dword, Float, Double, String (15 characters)	10	~ 158	~ 9 MB (needs to have 18 MB availability, as the deleting of data starts on the 14th day)
ASEM Transmeta i486	Bit, Sign Byte, Byte, Sign Word, Word, Sign Dword, Dword,		~ 474	~ 28 MB (needs to have 56 MB availability, as the deleting of data starts

	Float, Double, String (15 characters)			on the 14th day)

- The .dat file has a ratio of approximately 1:17 memory occupation in respect to that occupied by the same table. For instance, if one table occupies 1 Mbytes of memory, it will occupy 60 kbytes when exported on text file.
- The xml file has a ratio of approx. 1.4 memory occupation in respect to that occupied by the same table. For instance, if one table occupies 1 Mbyte of memory, it will occupy 256 kbytes when exported on xml file.

As followed indicated on the table, you can see the number of registered records and the related file size for .dat e .xml using the In Memory DB (IMDB). These values as indicated just as an example with a Data Logger in a project with 10 mixed columns (Bit, Sign Byte, Byte, Sign Word, Word, Sign Dword, Dword, Float, Double, Strings of 15 char.), using a Suetron XScale PXA255 device.

Size of IMDB (MB)	Records Nr.	Size of .dat (KB)	Size of .xml (KB)
1 MB	888	192	792
2 MB	2577	556	2292
3 MB	4259	916	3786
4 MB	6143	1320	5462
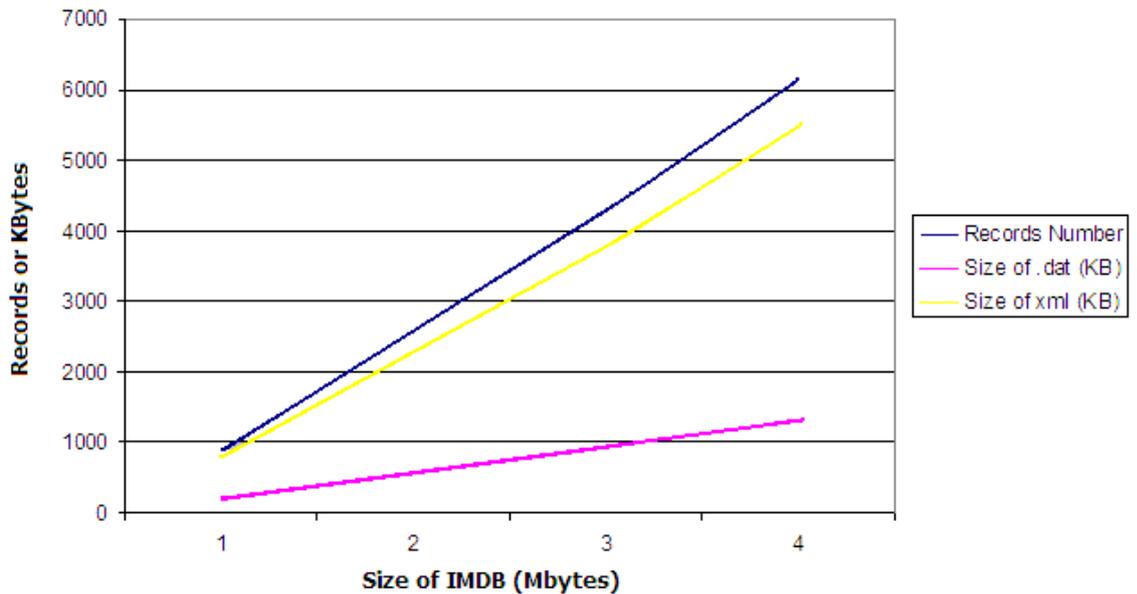
> **Note: Using a project with more than one Data Logger IMDB, it's reccomended to set an adequate value as property that define the writing delay time on the storage card, and if possible, different for any Data Logger. This is due to the slow response in writing on a compact flash of certain devices.**

> **î It is strongly advised that you use the historicals in ADOCE (SQLCE) when large amounts of data need filing or a big historical file (more than 30 days) needs to be stored!!**

IMDB Setting Options

"Shared Table"	Tables are created in shared memory, which is a chew memory not reserved just for MovXCE applications but can be shared (default value = true). As WinCE 5.0 is fixed at 32 MB the memory limit that each process can allocate, this option allows the remaining memory to be used in cases where the device's program memory is more than 32 MB.
"Max # Records"	This value can be used to limit the number of records existing on database. Therefore Movicon will see that the maximum number of records in the table is maintained, as from parameter. In any case, data which is older than the maximum age set will be deleted even though the maximum number of records has not been reached. The "0" default value disabled this function. This stops data from being lost when any product updates occur. The recipes are not subject to the max. number of records and age management even though they have these properties.

Some options can be inserted into the "MovXCE.ini" file which allow you to customize some aspects of the IMDB.

"IMDBMaxHMemory"	Maximum memory size which can be allocated in the shared area for managing the historicals. The default value is 4 Mbytes for WinCE and 16 Mbytes for Win32. Once this limit has been reached the IMDB will no longer record any values until space has been freed in the historical tables. This message will appear in the system log: "IMDB - Internal error: Out of shared memory".
"IMDBMaxLMemory"	Maximum memory size which can be allocated in the local area for managing historicals. This parameter has meaning only when historicals have been set not use the shared area. The default value is 4 Mbytes for WinCE and 64 Mbytes for Win32. Once this limit has been reached the IMDB will no longer record any values until space has been freed in the historical tables. This message will appear in the system log: "IMDB - Internal error: Out of local memory".

6.2. Memory Use with SQL CE

The Relational Database can be used as an alternative to the IMDB for recording data. This relational database has been defined as the ODBC (Open Database Connectivity). Due to the fact that WinCE does not support ODBC all the ODBC connections on the target device are converted to ADOCE connections by Movicon automatically. The SQL Server is the Database format set for default.

- In order to make the ADOCE and SQL Server CE work correctly, you must install their libraries in the device's "Windows" folder first.

ADOCE and SQL Server CE

The SQL Server CE allows recording to be executed in "sdf" format (SQL Server) rather than in "cdb" format (Access for CE). This is due to the fact that problems may occur when managing large amounts of data in the Access for CE Format and that only one connection at a time can be used.   Therefore it is not possible to record data on more than one Database at a time.
Movicon CE records data in SQL Server format for default. In order to change this setting and setup a different provider you need to insert the following keys in the "MovXCE.ini" Configuration file:

- **General\ADOCEProvider**: this setting identifies the Provider used for DataBase connections
  (String = Microsoft.SQLServer.OLEDB.CE.2.0)
- **General\ADOCEDataSourceExt**: this setting identifies the extension used for creating DataBase files

To get the recording on DataBase to work correctly, both the ADOCE and SQL Server libraries need to be installed in the device's "Windows" folder otherwise the system will not be able to manage them and therefore impossible for Movicon to record data in DataBase format. The " Windows" folder is loaded in Ram upon the device's startup and the installation of the ADOCE and SQL Server CE must be implemented in the operating system's image by the product makers. If this is not done so, each time the device is started up the "Windows" folder will be reloaded from the image saved in the Compact Flash and therefore without the ADOCE and SQL Server CE libraries. In this case, you will need to copy (for example with a ".bat" file) all the libraries from the MovXCE installation folder to the "Windows" folder manually. These libraries are installed in the "MovXCE" folder only when MovXCE full Setup has been chosen.

> *To get the recording on DataBase to work correctly, both the ADOCE and SQL Server libraries need to be installed in the device's "Windows" folder.*

In order to create a MovXCE Database file use an empty file to start with. Then in the first project startup phase the file will be copied and the necessary DataBase tables created. This is the reason why the "Empty.sdf" file is uploaded into the MovXCE folder during the installation phase.

Database Files

The Database file is created in the project's "DLOGGERS" folder. MovXCE creates a Database for each Data Logger or Recipe set up with a "ProjectName_DataLogger/ReicpeName.sdf" name. When Database files cannot be created, an error message will appear in the Output window and in the Status Bar and data will not be recorded in any format.

You must take into account that when using ADOCE you cannot open more than one connection to the same DataBase. This means that if you want to access data of Data Loggers and Recipes through the Basic Script functions, you will not be able to create a connection to the DataBase as the one created by Movicon for recording data is still active. This restriction is due to the fact that ADOCE is not a multi-threading functionality.

> WARNING! ADOCE does not support Table column names with spaces in. Therefore it would be a good rule of the thumb to avoid inserting spaces in column names. Otherwise an error message will be generated in the Output window and Status Bar when you run the project making it impossible to record data thereafter.

> It would be best, especially for Data Loggers, not to set high frequency recording times which may slowdown device performances to the point of causing them to crash. This problem is due to the fact that Compact Flash read/write operations are rather slow in CE devices.

By using the Microsoft® SQL Server™ 2000 Windows® CE Edition (SQL Server CE) **"Remote Data Access (RDA)"** a MovXCE application can be allowed to access data memorized in a remote SQL Server database. For further information please refer to the paragraph on this topic.

Measured memory consumption

Here are some examples of RAM memory occupating in SQL CE database files:

Type of Device	Data Type	Column Nr.	Bytes per record	10 second for 7 days
SQL Server CE on ARM devices	Bit, Sign Byte, Byte, Sign Word, Word, Sign Dword, Dword, Float, Double,	10	~ 56	~ 3 MB (Size of the .sdf file) (needs 6 MB availability in the CF, because data elimination starts on the

	String (15 characters)			14th day)
SQL Server CE on x86 devices	Bit, Sign Byte, Byte, Sign Word, Word, Sign Dword, Dword, Float, Double, String (15 characters)	10	~ 148	~ 8,5 MB (Size of the .sdf file) (needs 17 MB availability in the CF, because data elimination starts on the 14th day)

6.3. RDA (Remote Data Access)

The Microsoft® SQL Server™ 2000 Windows® CE Edition (SQL Server CE) "Remote Data Access" (RDA) is a easy ways for allowing Movicon CE applications to access data recorded on a remote SQL Server database. By using the RDA functions you can:

- Retrieve data from a table in a SQL Server 2000 database and record it on a local SQL Server CE 2.0 (Pull) table
- Update the data on the SQL Server 2000 database (Push) with the data of a previously retrieved local SQL Server CE 2.0 (Pull) table
- Run the SQL commands from Movicon CE which will go into execution on a SQL Server 2000 (SubmitSQL) database

Architecture

The Remote Data Access (RDA) uses the Microsoft® SQL Server™ 2000 Windows® CE Edition (SQL Server CE) data base engine, a SQL Server CE client agent and server agent.

The following flowchart shows how these components work together:
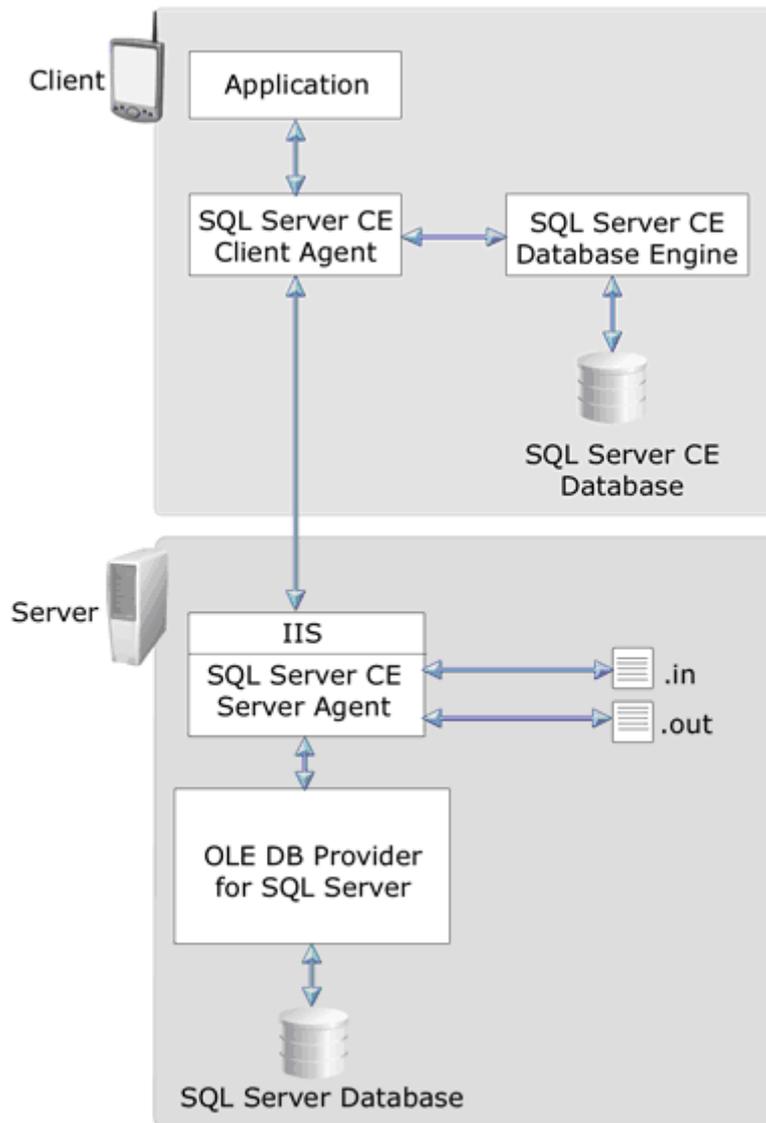
Hardware and Software Requirements

The hardware and software needed for implementing the Microsoft® SQL Server™ 2000 Windows® CE Edition (SQL Server CE) Remote Data Access (RDA) has been listed below. They have been divided into two groups, the first group concerns the client and the second concerns the server.

Server Requirements:
- Computer IBM compatible with ethernet cards
- Windows NT 4.0 (SP5 or higher), Windows 2000 or Windows XP
- Microsoft Internet Explorer 5.0 or higher
- Microsoft Internet Information Services

Client Requirements:
- PocketPC 2000 or Handheld PC 2000 devices
- Windows CE .NET version 4.1 or higher
- From 1 to 3 Mbytes of storage space. Depends on the type of processor and the components installed
- Microsoft ActiveX Data Objects CE 3.1 (ADOCE)
- Microsoft SQL Server CE 1.0 or 2.0

Implementation

To implement the Microsoft® SQL Server™ 2000 Windows® CE Edition (SQL Server CE) Remote Data Access (RDA) you need to install the software in the right order and configure it adequately.
The Movicon already CdRom contains some of the components needed for implement a data sharing technique with the RDA. Nevertheless, you can unload and install the same programs or any eventual updates free from the Microsoft website by using the following URL:

- Server Component: http://www.microsoft.com/sql/default.mspx
- Client Component: http://www.microsoft.com/sql/ce/default.mspx

The server components are all supplied free of charge by Microsoft and are to be installed on a compatible IBM computer (refer to the requirements for further information). The following programs are installed in the order in which they have been indicated with:

- Microsoft SQL Server Desktop Engine (MSDE) version 2.0
MSDE 2.0 can be installed with the Movicon CdRom, by selecting a "Custom" installation and setting it up on the list.

- Microsoft Internet Information Services (IIS)
IIS is a operating system component which is normally not installed but can be added by selecting it from the Windows list of components in the "Add or remove program" window from the control panel. The Windows CdRom will be requested upon installaton.

- Microsoft® SQL Server™ 2000 Windows® CE Edition (SQL Server CE)
This installation provides a series of components for developing (development tools) and a series of components for the RDA connectivity. You can also install the series of components called "server tools" but if you want to update or install the SQL Server CE version 2.0 on your device with Windows CE, you will need to install the other component as well. You will need to install the appropriate SQL Server CE agent, according to the version of the SQL server service installed, by using the following files:

> a. sqlce20sql2ksp1.exe -> SQL Server 2000 + SP1
> b. sqlce20sql2ksp2.exe -> SQL Server 2000 + SP2
> c. sqlce20sql2ksp3a.exe -> SQL Server 2000 + SP3a

All the client components are also supplied free of charge by Microsoft and are to be installed on the device with Windows CE (see the requirements for further information). The following programs are to be installed in the order in which they have been indicated with:

- System Files: wwb7_32.dll, wb7ent.ocx
The installation of these components is executed during the Movicon CE installation. The files are installed in the folder where Movicon CE resides.

- Microsoft ActiveX Data Objects per Windows CE (ADOCE) version 3.1
The installation of this component is executed during the Movicon CE installation if "Full" installation has been selected. The files are installed in the Windows CE ("\Windows") system folder or, if the not stored previously, on the memory support. They are then copied at each device start up (please consult the device manual for further information).

- Microsoft® SQL Server™ Windows® CE Edition (SQL Server CE)
The installation of this component is executed during the Movicon CE installation if "Full" installation has been selected. The files are installed in the Windows CE ("\Windows") system folder or, if the not stored previously, on the memory support. They are then copied at each device start up (please consult the device manual for further information).
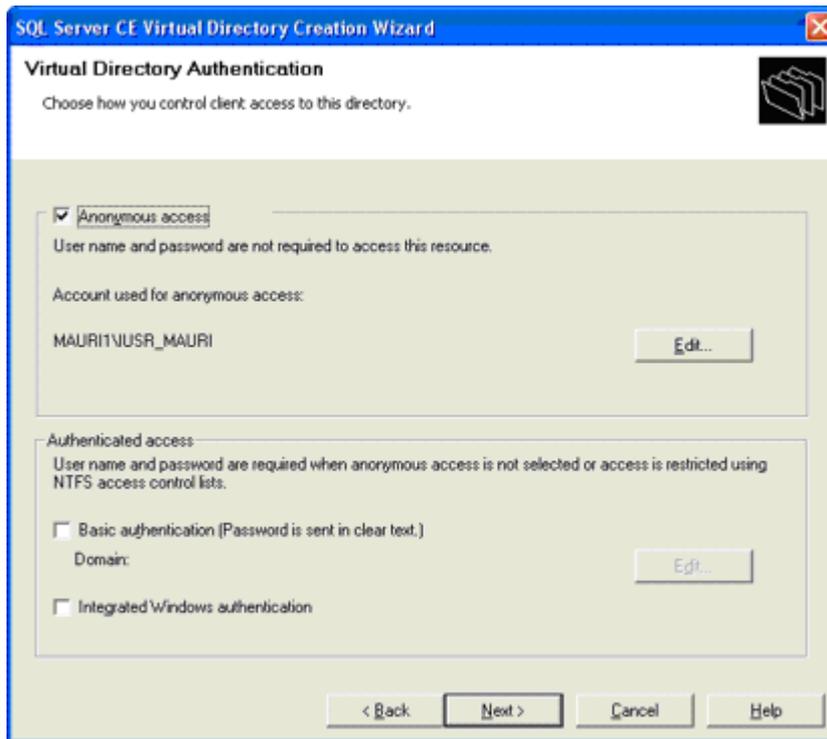
Server Configurations

A wizard is automatically launched at the end of the Microsoft® SQL Server™ 2000 Windows® CE Edition installation for creating the virtual directory for the SQL Server CE.

In the first wizard window you need to specify the virtual directory name which the SQL Server CE will use for managing the RDA. In the example below, the "sqlce" text has been used while, in the box underneath, the preset value is normally already the right one and corresponds to the folder in which the "sscesa20.dll" agent is situated.
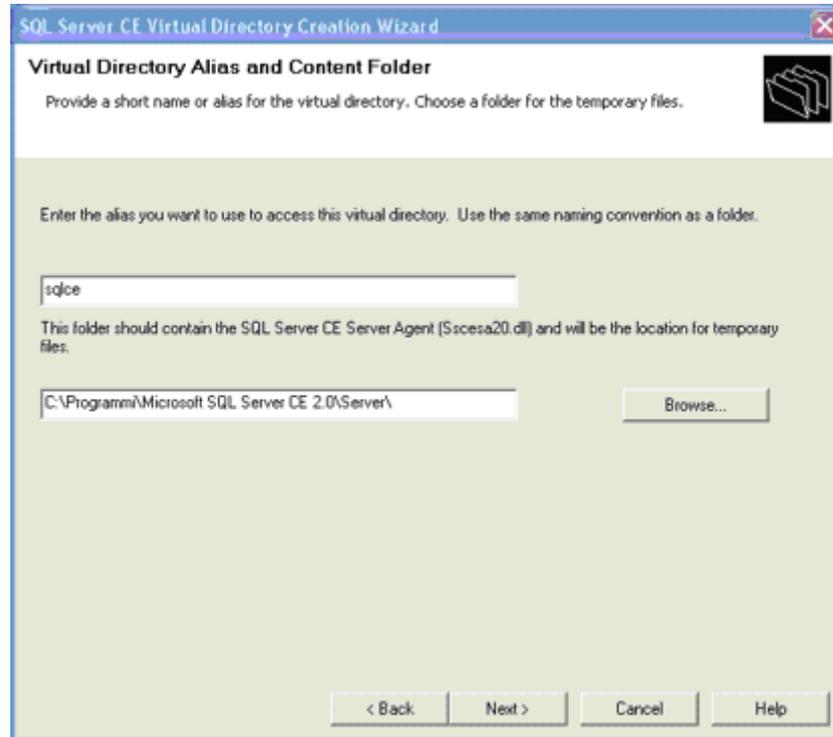
In second window you will need to specify which type of authentication must be supplied to use the IIS for those accessing the virtual directory externally. Being devices with Windows CE which access the virtual directory, you will need to configure an anonymous type access.

In the third window, you will be asked whether data replication functions must be guaranteed. As this function and description is not of interest to us we suggest you leave this option disabled.
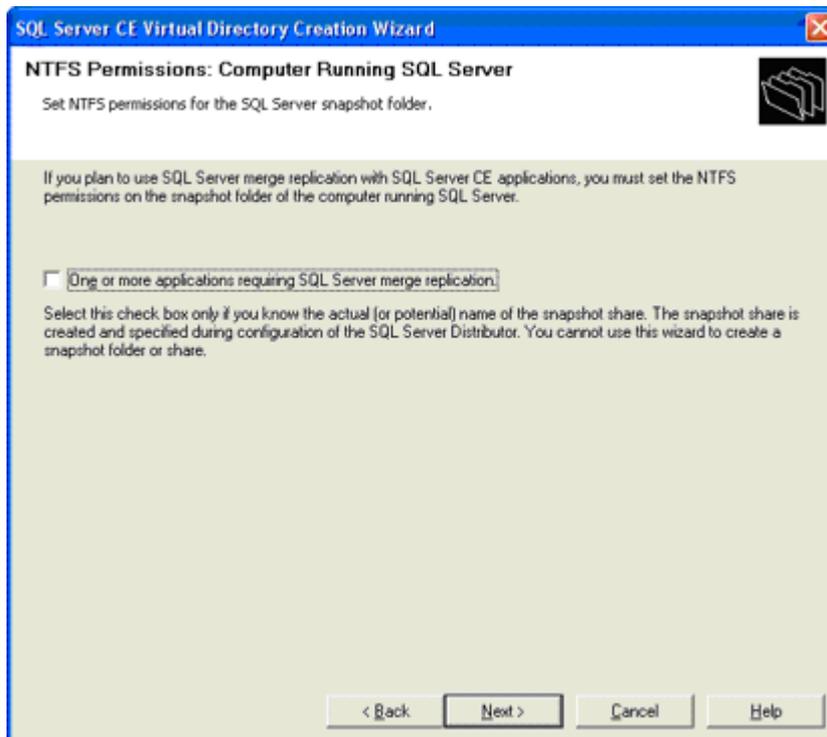
At the end of doing these configurations you should verify that the SQL Server CE agent functionality on the server computer work. In order to do this just open the Microsoft Internet Explorer program and type http://localhost/sqlce/sscesa20.dll. as the URL.

This test can be repeated from a remote computer or from a internet explorer page of the same device with Windows CE by replacing "localhost" with the computer's name or IP address.

 "SQL Server CE Server Agent" should appear in the internet explorer window for whatever way is used, otherwise an error will appear indicating the problem type.

Client Configurations

The device with Windows CE must be configured with a valid IP address so that it can trace down and connect to the server computer on which the IIS is run. In order to control the connectivity of these two systems you can execute the "Ping" command from the Prompt window of the Windows commands.

The rest of the configurations concern the Movicon CE application and are done by editing the VBScript Code.

7. Designing Guidelines

7.1. Variables

The number of variables in a project for Movicon CE should be proportioned to the device's performances. Generally, you need to consider the number of variables the project has **"In use"** and the type of driver being used.

Technically speaking there are no set limits in the programming phase due to the many different factors which determine device performances.

Therefore the programmer will have to decide whether the number of variables to be allocated and managed are adequate according to device's capacity.

It is important how retentive variables are managed as their values, which change constantly, are recorded on the Compact Flash and therefore should be kept to a minimum using only those thought to be indispensable.

Slow Compact Flash access in read/write is quite commonly used in CE devices. Therefore the less it is accessed, the better the device's performances will be. This also goes for the Variable Trace function which should be used only when necessary.

Tips:

1. The number of variables in a project must to proportioned to the panel's capacity. The Movicon XCE fixed limit on "Lite" licenses is 1024 bytes and 4096 bytes for standard licenses. However, the designer's own limit must be determined on the panel's potentiality and the communication drivers to be used. It is best not exceed the limit of 512 bytes in use in a 400 Mhx (approx.) panel with PLC communications via serial.

2. Variable retentivity should not be used unless really needed. As values are recorded on the Compact Flash, a good rule of thumb would be to keep a minimum number of necessary variables retentive especially when these change quite frequently. Compact Flash read/write access is quite slow in CE devices and therefore the less the compact flash is accessed the better the device performances will be.

3. 3. The variable Trace function should only be used when really necessary. Each variable value variation traced is recorded on disk with the same concept as that for the retentive variables.

4. The use of dynamic variable via OPC or Networking is onerous for WinCE system resources. Therefore, it would be best to create variables and link them statically using the OPC Client resource or the Tag's Client properties.

5. A good thumb of the rule to stick to would be to map data exchanged in the Word type variables and in the adjoining areas to optimize communications and thus performances. The bit variables can then be addressed to graphic objects or alarms using the name of the word followed by the bit: <name_tag>.<bit>

7.2. The Graphics

Operator panel screen pages should contain simple graphics. Don't get too carried away with the powerful functionalities provided by Movicon without knowing the capabilities of your Touch Panel hardware first. Make sure that the project's platform properties are set

to WinCE and go through the Windows CE graphics restrictions indicated in the manual to get a clear picture of the situation beforehand.
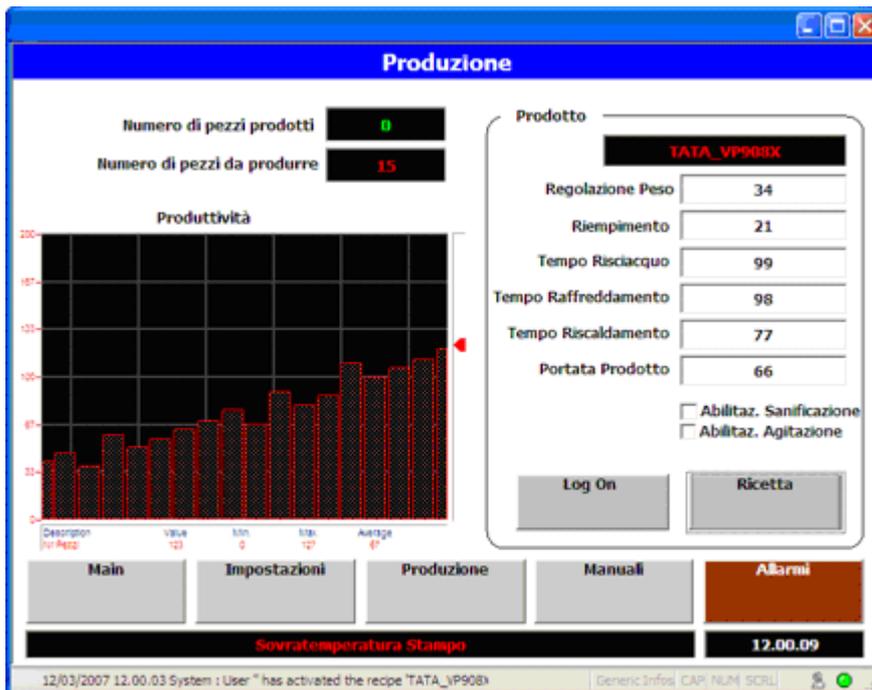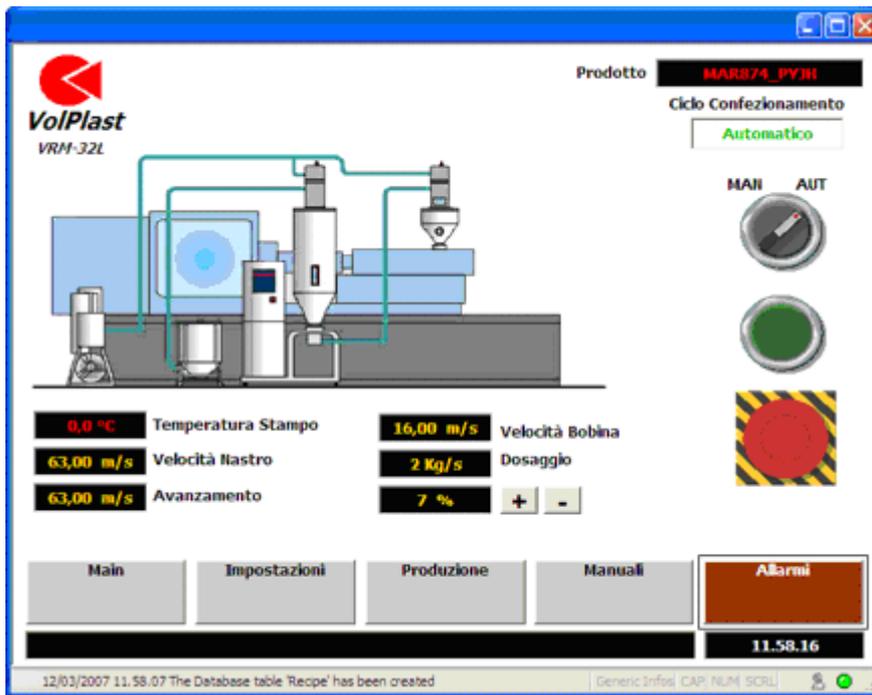
Graphic resolution

We suggest you consider the CE device's video screen's resolution. Normally the devices have a limited resolution (640x480 or 800x600) or they can even adopt screens with 1/4 of VGA (320x240).
Movicon allows you to adapt the graphics to the video screen's resolution, but if you are drawing with resolutions much bigger than those of the device, the graphics will appear adapted to this resolution but will lose their quality according to the difference between the resolutions (that of the project and that of the device).

Therefore it would be advised to set the video screen resolution or the project screen sizes as near as possible to the devices actual size.

Tips:

1. Start by setting the sizes of the screens to match the panel screen's resolution (Screen General Properties). Work on how the screen should display the graphics on the panel effectively and see exactly how many objects can be contained on screen within reason. By aiming for better user friendliness you will get better performances. Avoid applying graphic resolutions that are much different from those of the device while designing. For instance, if you are designing screens designated for a 5.7″ panel screen in a PC with a 1024x768 resolution you are bound to get poor quality graphics on the panel, with the risk of getting fonts much smaller than foreseen. **Give caution to using a ¼ of VGA (320x240), as screen adaptation from VGA to ¼ of VGA is not possible**.

2. The more graphic objects you put on screen, **the more calculation capacity will be needed to process it.** Try not to use more than 30-40 graphic objects per page unless you are a hundred per cent sure that your hardware device graphics capacity can take it. If in doubt, setup and trial run some pages to test how fast the graphics are on the panel before starting your project.

3. Be careful when using the Movicon symbol libraries. To get their very attractive-to-look-at effect, many of these symbols have been built with an elevated series of vectors. Therefore when you insert symbols from these libraries you must always take into consideration their vector content (even though grouped together) presented on screen. Even though static symbols do not degrade graphic performances, you should always take into account that the page's performances will also depend on its object content (whether static or animated). You can also find and use template objects (ie. Trends) specifically designed for WinCE in the object library.

4. Streamline the use of BMP images to allow only those deemed indispensable. High-resolution BMP images usually take up too much memory space. It would therefore be a good idea to save the 256 color images to reduce occupied memory. However, be warned that not all devices support GIF, JPG formats.

5. To get fast page changes, set the "Do Not Destroy in Run" property = True. By doing this, the displayed screen will remain in memory while other screens are being displayed. More global memory will be occupied but page change will be much faster.

6.   Avoid using logic and VBA script in screens. If you do use Script in graphic objects (Power Template), Movicon will have to allocate more memory and process more data, penalizing the project run. If unsure about the potential of your hardware, use the functions provided in the object's standard properties.

7. 8. Avoid using Color gradients, both in the screen background and in the object's background properties. The use of color gradients in backgrounds requires major graphic processing capacity, which will mean a drop in performances.

Supported Images
The image formats supported in CE devices depend on the operating system and tools installed on the device. Usually .BMP images are supported by all devices, while formats such as .JPG, GIF, etc. **may not always be supported.**

Change Page
Performances to change one page over to another one may depend on different factors. In general, the time needed to change over the screen is influenced by:

1. The number of objects and components there are on screen
2. The number and sizes of the associated images on screen

3. Compact Flash quality (access time)

The screens are usually unloaded from memory, after a certain presettable time, after which you have to access the relative disk to load them so that they can be displayed. In order to get the best graphic performances it would be best to distribute information adequately on a number of screens as required. When deemed necessary, a screen can always be kept in memory by using the "Not Destroyable" option in its properties. This will make changing screens faster as the screen is always kept in memory even when not displayed but will take up further use of the device's RAM memory resources.

Nevertheless, there are some attributes to insert in the "MovXCE.ini" configuration file that allow you to configure certain parameters for managing graphics:

*   **UseOffScreenMem**: this parameter allows you to decide whether to use the memory maps for managing screens. The use of the memory maps speeds up screen management (such as zooming operations) at the expense of using higher quantity of memory needed for each screen managed
*   **MaxMemoryLoad**: this parameter expresses the percentage of the memory in use that when exceeded will put the screens, in memory but not displayed, into a critical situation causing them to be unloaded and a message will be left in the Output window informing you of this action. The screens will be unloaded even though their "Not Destroyable" option is active
*   **ILLogicPriority**: this parameter expresses the priority with which the IL logic is executed. In this case by lowering the IL logic's priority the graphic's execution will be given more priority and viceversa

Font management optimization

To optimize the managing of fonts in WinCE, that in certain cases may be penalizing to system performances, two new keys have been added to be inserted in the "MovXCE.ini" Configuration File: "MaxCacheFont" and "DontUseDecorativeFont".

DontUseDecorativeFont

Using certain fonts in devices may greatly penalize device performances. For this reason MovXCE forces some of the registry keys before creating the font to exclude those parts in the font creation that slowed it down when being used.

Technically speaking, the parts which are forced in WinCE are:

>   lfOutPrecision = OUT_RASTER_PRECIS
>   lfClipPrecision = CLIP_STROKE_PRECIS
>   lfQuality = DRAFT_QUALITY

On the graphical side the created font may seem less attractive but nevertheless is quicker to render. The new **"DontUseDecorativeFont"** value, to be inserted in the "MovXCE.ini" Configuration File, restores the original font mode (DontUseDecorativeFont = False).

MaxCacheFont

The option to manage a font cache has been added for further optimization. This cache can be used for storing fonts to be reused whenever needed in order to save MovXCE the job of creating them over and over again. This additional modification, together with the one mentioned above, should make a great difference in improving performances when many texts are being used on screen. This cache has been set with a maximum number limit to avoid the system from being saturated with fonts when in many different types. This value can be managed by inserting the **"MaxCacheFont"** (default = 0) key into the "MovXCE.ini" Configuration File.

>   *All the various project fonts are inserted in the font cache and differ in size and type. Furthermore controls which have been set with the same font may be produced with different sizes if the option for adapting the text to the font size is being used.*

>   *For further optimization you can also change the system font. Try to avoid using TrueType fonts (TrueTypes require more processing during the scaling phase). The system font can be changed by using the below registry key:*

>   *"KEY_LOCAL_MACHINE\SYSTEM\GWE\Menu\BarFnt\"*

>   *This key contains the system font's facename.*

Using images

Using images usually requires memory resource allocation and therefore you need to check out the memory capacity available in the device and which format is supported. BMP formats are usually supported and very big BMP images take up considerable memory. This will need you to judge which BMP images to use as required.

Remember that Windows CE also supports a maximum resolution of 256 colors and would be to your advantage to verify the graphical result by setting a resolution of analog colors on the desktop in the programming stage. In addition to this, the Windows CE system colors may be different or less than those of Window 2000/XP, therefore it would be always best to use the standard colors.

7.3. Alarm Management

MocXCE completely supports the alarm management is completely supported which however carries a few restrictions regarding notifications and statical analysis. Due to the fact that the Report Engine is not supported in Windows CE, the commands relating to creating statical reports on alarms is not available on the CE device.

The alarm notification functions are managed by the Alarm Dispatcher. Only alarm notifications via SMS and E-mail are available in Windows CE as described in the chapter on Restrictions.

Tips:

1. The alarms do not have any particular limits on the way they function and do not require special configurations to optimize them further. However, it is always best to keep the alarm management simple based on the capabilities of your panel.

2. All the alarms are set with the Acknowledge and Reset management and recording on Historical Log for default. Each alarm therefore is managed by 4 events (ON, OFF, ACK, RST): The Acknowledge and/or Reset can be disabled when memory is low, to reduce the number of events managed (and recorded) by the system.

3. If you think you may have too many frequent events, try to avoid recording them in the Historical Log to ensure optimized memory and performances.

4. The Notification of alarms must only be used when deemed necessary and in function with the panel capacity being used. Alarm notification via SMS and Email is supported only.

AlarmDispatcher

In order to send SMS by means of using a GSM modem you need to manually copy the GSM driver configuration file from the Desktop PC to the CE device. This configuration file is found in the Alarm Dispatcher's installation folder with the default name "GsmSMS.stg":

"..\Progea\AlarmDispatcher\GsmSMS.stg"

This file must be copied in the Movicon CE installation folder:

"\Harddisk\MovXCE\GsmSMS.stg"

You have to remember that the Alarm Dispatcher version for Windows CE will always search for file called "GsmSMS.stg" only. However, this configuration file can be saved on the Desktop version with a different name. Therefore you need to rename the file with the "GsmSMS.stg" name before transferring it to the CE device.

7.4. Historical Log

The Movicon CE Historical Log is recorded for default in IMDB mode (In Memory DB). When creating projects for WinCE, all the historical log settings are marked with IMDB for default in the development environment to optimize resources by using the XML text format.

Tips on the Historical Log
1. The Historical Log based on IMDB (InMemoryDB) strongly influences the device's RAM. Make sure that the alarm management (see above) is enabled with an adequate Historical Log or use SQLCE if necessary.

2. All the alarms are set with the Acknowledge and Reset management and recording on Historical Log for default. Each alarm therefore is managed by 4 events (ON, OFF, ACK, RST): The Acknowledge and/or Reset can be disabled when memory is low, to reduce the number of events managed (and recorded) by the system.

3. If you think you may have too many frequent events, try to avoid recording them in the Historical Log to ensure optimized memory and performances.

4. It is essential that the Historical Log archive is sized correctly by setting its properties appropriately in the Project properties. As it is impossible to determine how many events can be recorded in a certain period of time, you should always make a wise estimate based on a daily average of recorded events according to the table below. Then, based on the device memory available, set a consistent number of days for data filing (for all three tables).

However you can use the relational database as a data base, which is set with ODBC (Open Database Connectivity) in the development environment. In reality, WinCE does not support ODBC therefore all the ODBC connections are converted by Movicon to ADOCE connections in the target. The SQL Server is set as the DataBase format for default.

*   In order to for the Historical Log to work in the right way you need to install the **ADOCE and SQL Server CE**,libraries correctly as explained in the paragraph dedicated for this matter

The Database file is created in the project's "LOGS" folder with "ProjectName_HisLog.sdf" as its name. In cases where it is impossible to create the Historical Log in Database format an error message will be generated in the Output window and in the Status Bar, after which the data will be recorded in text format in the project's "LOGS" folder. These files can then be copied and examined on a PC Destktop.

You must remember that more than one connection on one same DataBase cannot be opened at the same time when using ADOCE. This means that when you want to access Historical Log data by means of using the Basic Script functions, you will not be able to create a connection to the Database because the one created by Movicon, to record data, is already active. This restriction is due to the fact that ADOCE is not multi-threading.

7.5. Data Loggers and Recipes

Correct historical management is absolutely necessary for optimizing resources and the RAM on your panel. Therefore read the following tips carefully and decide whether it is more convenient for you to keep the IMDB engine or to use the SQLCE, based on the information reported in the Memory Usages chapter.

Tips

1. Data Loggers based on IMDB (InMemoryDB) may take up substantial device memory space. Make sure that your project's Historical management is handled in parity with the device memory capacity.

2. It is very important that the file archives of each Data Logger are sized correctly by setting the Database properties of each single Data Logger appropriately.

3. To get the right archive sizes, the Data Loggers should record "on time" and not on event or change. This will help you to determine how much memory is occupied for the period of time set. Contrary to this, the programmer should establish the archive time limits by taking care not to risk saturating the device's memory when setting long time periods.

7.6. Trends

The Trends are also supported in Movicon CE. However, you must keep in mind, especially when using Templates from the Symbols Library, that the Trends are rather complex and heavy components for the system to manage. When you use these objects you should always try and follow these tips:

- meet your needs by trying to use the less complex Templates among those available
- set slower sampling times when possible
- do not insert too many pens into one only Template
- set the sampling buffer with the lowest possible value when possible

The "DataBase" button, which is used for linking the Trend to a database which is different from the Project DataLogger, is not available when the Trend Template is exported to Movicon CE. This function is not supported because it needs to exploit DSN connections which are not supported in WinCE.

7.7. Grid

The Grid object is also fully supported on Movicon CE and therefore file contents can be displayed in DataBase format and also in text format (text format files have to be saved as UNICODE and not as ANSI).

The ODBC is not supported in WinCE for the time being and therefore the Database file DSN link cannot be exploited and the Grid's "ODBC DSN" property has to be changed during its configuration phase. This setting will then be different according to whether the Grid has to be linked to a DataLogger/Recipe or to any Database file. In the first case, Movicon will have already opened connections to the file and therefore the Grid should be able to exploit them. In the second case, however, the Grid will have to open a new connection to the DataBase file. As a consequence of this, the "ODBC DSN" property should be set as follows:

- **Connection to DataLogger/Recipe**: the DSN name in the "ODBC DSN" property is replaced with the name of the DataLogger/Recipe
- **Connection to DataBase**: The DSN name in the "ODBC DSN" property is replaced with the DataBase file name to be connected to, without specifying the extension. The DataBase file, in this case, must be found in the project's DLOGGERS folder or one of its sub folders

7.8. Communication Drivers

The Communication Drivers supported on Movicon CE are generally Serial or Ethernet type. This is due to fact that is difficult to find cards dedicated to communication compatibility with the WinCE environment. For the time being only the Hilscher CIF cards for Profibus DP or CanOpen can be found.
The list of supported drivers is continuously being added to and can be found on the Progea web site.

Many other devices communicate by means of the OPC technology which Movicon CE supports as OPC Client whether a specific DA or a XML DA.

The Communication Drivers are not installed during the Movicon CE installation. This is because the space provided on the CE devices is usually very minimal and not all the driver's dll need downloading. Therefore this job is left to the programmer to install only the ones he/she needs. For further information on installing Communication Drivers please refer to the section on "Installing Movicon CE".

The Communication Driver updates found on the Progea web site do not come in installation files and only the updated dll can be downloaded leaving the programmer to copy it in the appropriate folder on the CE device which will result as:

..\Movicon CE\Drivers

Tips

1. Before designing your project make sure the driver to be used is available for the Window CE version. Not all Movicon drivers can be used technically in Windows CE.

2. The Movicon XCE installation on device does not install drivers for reasons of occupying space. The communication drivers used must therefore be installed manually on the device according to the instructions in the manual.

3. Even though Movicon XCE allows contemporary communications with a max. of 4 drivers, it would be best just to used one only if unsure that your panel can handle more than one.

4. You can only connect as OPC Client to OPC Servers installed locally on the device with Windows CE. You cannot have a distributed OPC Server network

5. Instead of using Dynamic OPC connections in Tags, it would be better to create links to the OPC Server items in static mode using the OPC Client DA (COM) resource to avoid degrading performances.

6. The Movicon Client configuration is done in the project development phase and you will need to install the same OPC Server installed on the Desktop PC, which will then be used on the target device. Naturally, the two versions of the OPC Server will be specifically for the two WinCE and Win2000/XP platforms, but it is essential that they have the same "CLSID" ID code.

7. Above all things, when creating projects for CE, it would be a good habit to create OPC Item groups based on variable usage. For instance, variables that go in use at the same time should be grouped together. This will go towards optimizing performances, which is something that you must always take into account in WinCE. It would also be beneficial to insert groups with "Update Rate" times based on their execution priorities.

8. Before using the driver's advanced functions (VBA or Modem), check carefully which functions are available for the panel you are using.

Driver Performances Benchmark (Example)

Measured SIEMENS S7 TCP Driver performances in VIPA PXA270 420 Mhz Touch Panels:

Number of Words	Refresh Time (sec.)
32	0.39 -0.42
100	0.40 – 0.43
250	0.41 – 0.44
500	0.41 – 0.44
1000	0.42 – 0.46
1500	0.42 – 0.47
2000	0.42 – 0.48

7.9. OPC

Due to the fact that the devices are limited in what they can do, Movicon CE currently supports the OPC Client technology only (OPC Server is available only on Win32 platforms). In addition to this, as the DCOM technology is not supported on WinCE, Movicon can connect as Client only to OPC Servers installed locally on the device. It is not possible, however, to have OPC Servers distributed on a network.
The Movicon OPC configuration is done in the project development phase, where you will need to have the same OPC Server installed on your PC Desktop. This will then be used on the Target device. Obviously, the two versions of the OPC Server will be specific to the WinCE and Win2000/XP, but it is essential that they both have the same identification code "CLSID".

A good rule of the thumb, above all when creating projects for CE, would be to always try and create OPC item groups based on how the variables are used, or rather, to group those which go into use at the same time. This will give way to performance optimization, which is something you cannot ignore when it comes to WinCE. Another thing to do would be to insert a "**Update Rate**" time of the groups according to their execution priorities.

> **You must be careful when using dynamic OPC connections which are rather heavy for Movicon. Therefore to remedy this problem you should not use them for WinCE, but create static Tags by using the "OPC Client DA (COM)" resource.**

7.10. Logics

Movicon CE has VBA (Visual Basic for Application) and IL logic languages (Instruction List). Please take the following into account when you need to use logics in your target device:

> **Tips**

1. The use of the VBA script code may result onerous in panels with processor limits and should be avoided unless absolutely necessary. The Movicon objects provide optimal configuration, command and animation options in their properties.

2. VBA script code should not be used in symbols and screens if possible in some cases, otherwise this may effect screen refresh and change page performances. If needed, you can keep screen in the memory by enabling the screen's "Do not destroy in Run" property, even though this occupies substantial RAM space.

3. Even though Movicon CE ensures VBA language support (therefore the code executed in desktop is the same that can be executed in the target), and with all due reserved for users, Progea cannot guarantee full support to all the many functions, properties, methods and events available on the desktop. Up till now,

it has been impossible to carry out tests effectively on the correct execution of each and every instruction on all the different types of devices that exist today.

4. The use of IL Logic in screens may occupy more of the CPU, which in turn will effect the graphical performances. If necessary, (depending on the device type being used) you can reduce the priority level, assigned to the IL Logic by Movicon, by using the MovXCE.ini file's "ILSleep" and IL Priority" parameters.

7.11. Networking

Movicon CE allows you use the networking management both for Client and Server towards any other Movicon project connected in net, whether based on PC or any other WinCE devices.

⚠️ **Tips**

1. Only activate Network Settings with transports needed. This will save you up to 1 Mbyte.

2. Always use station IP addresses to identify terminals in network connections between projects.

3. Active network connections have to be in parity with the capacity of the device. Do not exceed 128 TCP connections when unsure about the capacity of your device.

7.12. Web Client

Movicon CE allows Web Client management, where the WinCE panel can carry out the job of Web Server towards Web Clients connected to the device in a TCP-IP network.

⚠️ **Tips:**

1. Movicon XCE supports the Web Client technology. Web client can only work when the panel has a Web Server. Otherwise you will need to access the Web Client through the Java applet as described in the accompanying manuals.

2. The screen's pages published on Web Client should be managed with a reduced size, furthermore is suggested to disable the option "Fit on Window" on the screen's properties. A good rule should be to never exceed the graphic resolution of the device, publishing a screen on the web. Infact, as more is the size of web screens pages, as more is the memory required on the device for the management. When the memory exceed the limit of 32 MB, WinCE 5.0 end the process Movicon CE.

3. When using the Web Client you must take into account those resources on your panel which carry out Web Server tasks and process data for those clients connected (client connection is limited to a maximum of 2).

8. Running

Running a project exported to Window CE can be done by creating a link to the MovXCE.exe file followed by the path and name of the project. The problem is that each device has customized procedures for executing files upon system startup and there does not exist any standard procedures to follow unless you intervene on the system's registry keys. However, with Pocket-PCs you can copy the link into the "Harddisk\Windows\Startup \" window where the project run is guaranteed at each PC target startup.

At the startup of the project on the target PC, if the software license has not yet been installed, a proposal will be made at the introduction or in the same window to press the "Please, Demo Mode" button to start MovXCE and the project in Demo modality.

Upon pressing this button the MovXCE project will then be started by loading the preset screen into the project.
The Exit command must be appropriately predisposed in the project to cater for when the system's menu bar is not made visible.

Automatic Run at Startup

The automatic running of a project upon system startup depends on the type of WinCE platform being used and which hardware has been installed. Therefore the documentation supplied by the device manufacturers should always be consulted. As a rule, you need to specify the device with a command line which provides the MovXCE.exe startup with the name of the applied project.
There exist devices which run applications at their startup which are contained in "autoexec.bat" files or specific files setup by their builders.
Unfortunately, there isn't one set of general rules to follow and therefore you will have to use those described in the device's instructions. Once started up, Movicon will run the project specified in the "MovXCE.boot" "Boot File" in the Compact Flash's root.
Here below are some examples below:

PocketPC Platforms
In the Pocket PC platforms (eg. Palm PCs such as Compaq iPack, Cassiopeia, etc.) you should only need to copy the link to the "Windows\Startup\" folder to get the project to run at every target PC startup, needless to say this also depends on the product type being used.
For example, when using the Compaq iPAQ you have to proceed in the following way with the "Test_Me.lnk" example project:
Create a link with the Dos EDIT program by creating a "Test_Me.lnk" file and inserting the line:

> #50"Programs\MovXCE\MovXCE.exe"   "iPaq   File
> Store"\Examples\Test_Me.movprj

SSDK Platforms
In SSDK platforms (or operator panels) the operating system does not have a folder for the startup as described above.
Also already mentioned, each device uses customized start-up procedures which are requested from the device builders. for example, if you are using Advantech devices you could use the following procedures:
The operating system executes a series of operations at the startup which are programmed in the windows registry. One of these operations generally runs the "Startup.exe" file, usually placed in the "\Storage Card\Startup\" path which interprets the "Startup.ini" file. The flash memory folder is usually called "Storage Card", but always check the configuration set in the hardware system being used just in case. If possible, you should set the "CF DISK FOLDER NAME" on the "Storage Card" so that the Startup.exe executable does not go into error.

Configuration example used with Advantech TPC 642 panels:

File "Startup.ini:
cmd /c \"Storage Card"\Startup\Startup.bat

File Startup.bat:
entouch OFF
\"Storage Card"\MovXCE\MovXCE.exe \IPSM\Me30\test.movprj

Using registries in automatic runs

The method, which allows runs at Start-up using system registry keys, is normally valid for all devices. However, in order to do this you need to be able to access the system registry's configuration, which is usually impossible when not linked up to the right tools, such as the "Windows CE Remote Registry Editor" installed with the "Miscosof eMbedded Visual C++ 4.0" embedded development environment.

The "HKEY_LOCAL_MACHINE\Init" registry key contains the list of executable files to be run at the device's startup. The files are listed under the LauchXX keys, where XX determines the run order. The other key, DependXX, permits the dependency to be specified (eg. Launch50 is not run until Launch40 has been successfully executed).

Normally, but best to check from device to device, you can create a new key under "HKEY_LOCAL_MACHINE\Init", with a progressive number, for example, Launch60 (or a number higher than Launch50), is specified with the name of the executable to be run (note that this must be a .EXE file, such as Startup.exe),in our case this should be "MovXCE.exe". If you wish the file to be run only after the other files have been run at startup, you should create a Depend60 and set the value to 32h (hex of 50).

A word of warning: automatic runs may depend on the configuration type of the operating system installed in function with the hardware device. For any further information, please consult the manufacturer's manual of the hardware being used or refer to the Microsoft Platform Builder settings.
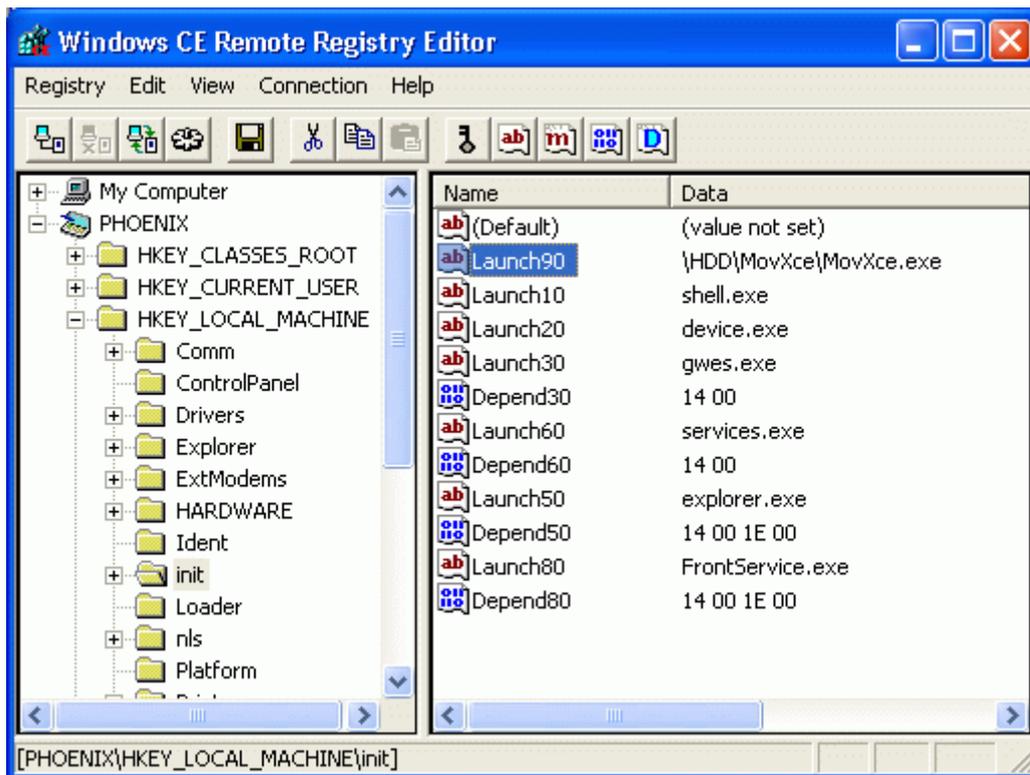
Boot File

When Movicon is run, it will search for the "MovXCE.boot" file in the root of the Compact Flash at its startup. The file specifying the path and name of the project file to be run should be in this file. The file is in XML format and is structured as follows:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<boot>
```

<filename>\HDD\PROJECTS\TEST\TESTXCE\testxce.movprj</filename>
</boot>

The "MovXCE.boot" file is automatically created in the root of the compact flash after the project has been uploaded This happens in automatic only when using the "MS Active Sync" option and by using a different plug-in programmed to manage this function.

> *After having changed the Device System's registry keys, you should carry out a save of the Registry to avoid losing the changes made at the device's next startup.*

Execute the RunTime module on Windows CE

The Movicon CE installation provides the runtime executive module only for starting and running projects only.
The runtime module is installed in the target, inside the default folder of the applications, or also in other folders if indicated otherwise during the installation. The Movicon CE runtime is identified by the "MovXCE.exe" file and by simply double-click it will put it into execution and prepare the next selection of the project to be executed.
As with the Movicon program for desktop, also the runtime module for Windows CE needs a license, the license in this case is software type only. When starting the program up where the software license has not yet been entered, a window will display with the Site Code and in which you can enter the corresponding Site Key to unlock it.
The project can be run in demo mode if the unlock code is not entered and demo reminder window will show at regular timed intervals.
Project run in automatic mode can be realized with a MovXCE.exe file link followed with the path indications, project name.

> The SSDK devices only have some folders saved on storage memory. The information which is recorded in RAM memory is therefore lost after a next re-start. Therefore we suggest you execute a registry save after the softkey code has been entered otherwise this will also get irretrievably lost.

8.1. Projects Debug

Running a debug on WinCE devices is usually quite limited since the operating system does not provide much information. In addition to the few details on system configuring, as already seen in the paragraph on "Windows CE Operating System", no other information can be got hold of. At this point, if you have a "Platform Manager" development environment installed on your Desktop PC, you can use one of the tools available on the software market, to link up and get more information on the device. 'Entrek ProcMan' is one recommendable tool you could use for displaying system information on active processes, etc.:
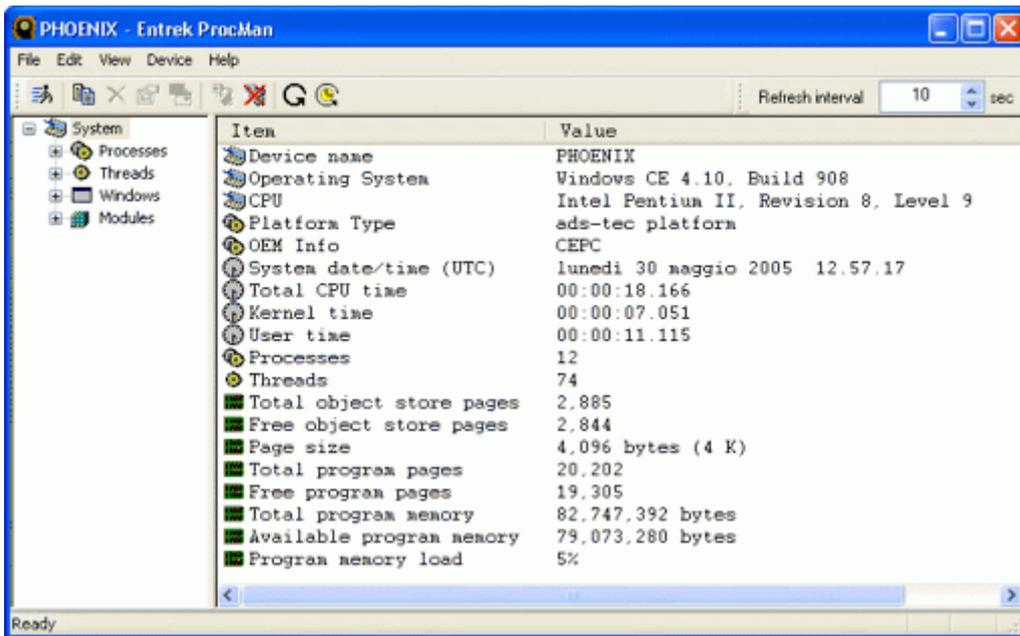
Anyway, it is always best to trial run and debug the project well on the Desktop platform first, seeing that it has the most tools available for using. When the Basic functions are being used which are not supported on Movicon CE or are different to those of the Movicon CE, it would be best to use the "RunningOnCE" function to change the code according to the where the project is being run.

Lastly, you can also enable the "Output" window on the Movicon CE, by using the project's "Show the Trace Bar" properties, so that you can consult log messages which are generated by Movicon. In this case it would be best to disable the "Start Full Screen" property to get easier access to the "Output" window.

Note Operative: