

WinPLC7

Version 3.x

Installation and brief tutorial

Programming and simulation software
for S7-300®, S7-400®, VIPA-S7 CPUs
and compatibles.

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Contents

1 Introduction 4

1.1 Brief description of WinPLC7 4
1.2 Versions of WinPLC7 4
1.3 System requirements 4
1.4 Installation of WinPLC7 5
1.5 New features WinPLC7 version 3 5

2 Introduction and brief tutorial 7

2.1 The arrangement of the WinPLC7 screen 7
2.2 Opening a WinPLC7 V1 project 8
2.3 Opening a WinPLC7 V2 project 8
2.3.1 Opening a sub-project 9
2.3.2 Opening blocks in a sub-project 9
2.4 Creating a new project 10
2.4.1 Renaming a sub-project 11
2.4.2 Creating a new block 12
2.5 Procedure: creating an S7 Program 12
2.6 Simulating an S7-program 13
2.7 Importing an S7-program from STEP®7 of SIEMENS 17
2.8 Exporting an S7-program for STEP®7 of SIEMENS 18
2.9 Connecting to a S7-300® / S7-400® 18

3 Starting parameter 19

4 FAQ list 20

1 Introduction

1.1 Brief description of WinPLC7

The WinPLC7 software is a programming and simulation system for SIMATIC®-S7 type S7-300®, S7-400® and VIPA type 100V, 200V, 300V PLCs and compatibles..

The programmer can create STEP®7 programs on a PC in STL, FBD and LAD. Completed programs can be tested in off-line mode on the PC and without any hardware.
The software-PLC integrated into WinPLC7 operates exactly like a real S7-PLC. The software-PLC can be used to analyze incorrect responses and to use the diagnostic options by means of the diagnostic buffer, I-STACK and B-STACK.

You can use an MPI cable (via USB or RS232) to transfer the S7 program into a real PLC.

For the connection to VIPA-S7-CPUs you can also use the Green-Cable (at 38400 baud). The Green-Cable can only be used with VIPA-S7-PLCs!

The program provides can not be used for the SIEMENS S7-200 since this PLC does not accept programs created in the STEP®7 programming language. Furthermore, the hardware protocols are different from those that are used by the S7-300®/400.

Note:
WinPLC7 is also being distributed by the name of WinSPS-S7. This is the same software.

1.2 Versions of WinPLC7

Two different versions of WinPLC7 are available:

- Standard-version
- Profi-version

The following restrictions apply to the standard version:

- The standard version does not support communications with an external PLC.
  The standard version can only be used for simulation purposes.

1.3 System requirements

- PC with 500 MHz and 128MB of RAM
- A display adapter providing a min. of 16-bit colors
- Win 98 SE, WinME, Windows 2000, Windows XP
- MPI cable to communicate with an S7-PLC of the series S7-300®, S7-400® , MHJ-Netlink via TCP/IP or a "Green-cable" for VIPA-S7-CPUs.

We recommend a minimum resolution of 1024 x 768 pixels.

1.4 Installation of WinPLC7

The following are required to activate WinPLC7:

- WinPLC7 Installation CD.
- WinPLC7 serial number (34-digit).
  You should have received the serial number when you purchased of the software.
- An internet connection and a valid e-mail address.

You can install the software under the following operating systems:
Windows 98 SE, Windows ME, Windows 2000, Windows XP.

Yiu can activate the software by means of a form that is available on the Internet.
As an alternative you can purchase a USB token.

1.5 New features of WinPLC7 version 3

The following features have been added to version 3 of WinPLC7:

1. Global clipboard
The global clipboard can be used to save individual lines of the STL, entire networks or complete modules for later insertion at another location (module or project). The exchange of STL- lines, networks or modules is a simple and quick operation. You can create multiple clipboards. Since the clipboard is stored in a file on disk its contents are retained when you turn off the PC.
Menu Item: "View->Show protocol"

2. Checking a PLC-program by means of a profile
This function tests whether a PLC program can be executed on a specific CPU. It operates as follows: first the profile of the PLC is determined via the MPI interface. For this purpose the PLC must be connected to the PC. This profile contains the properties of the CPU: number of I, O, M, T, C, available OBs, available SFC/SFB etc. When you press the "Check" - button the entire PLC program is tested for "errors". Any "errors" are presented in a list to enable the programmer to implement the required corrections.
Menu Item: "Extras->Check PLC program"

3. View "Call structure"
The call structure displays the architecture of the PLC program in the form of a tree. This provides a quick overview of the operation of the program, particularly when you are working on foreign PLC programs. The display also includes any unused blocks.
The structure of the program is included as tab-entry in the catalog of instructions.

4. Creating an assignment
The assignment lists allocated inputs, outputs, flags, timers and counters in a table. Here you can see which bits have been used. The use of bytes, words and double-words is also shown in graphical form. In this way you can quickly recognize overlapping bit- or word-based commands.
Menu Item: "View->Assignment"

5. Importing bin-files
Until now Winplc7 could only be used to export a binary file. You can now use the import function for binary files to import an MMC file for example (this contains a sequence of all the blocks in binary form). This function can also be used to import a backup that was created by means of the free software **"Buddy for S7"**.
Menu Item "File->Import->Import binary file (MMC file)"

6. Listing recently edited blocks
A listbox with a list of recently edited blocks is displayed to the left of the selected target (simulator, external). Here you can see immediately which blocks have recently been edited in a project:



Fig.: Combo-box with recently edited blocks

7. Project protocol
When the project logging function is enable any modifications to blocks and to important AS functions (write blocks, master reset, etc.) are logged together with the date and time. In this way you are always able to check when a block was changed and by whom. The current project processing time is also included in the display.
Menu Item "View->Show protocol"

8. Block status of DBs
Until now it was not possible to view the block status of data blocks. From version 3 of WinPLC7 this is now possible: select the desired data block editor and press the "eyeglasses" on the mouse button bar.

9. Importing and exporting text
You can use this function to prepare a PLC program for translation into another language. You can export any text (commentaries) to a text file. This text file can then be translated by a translator. At a later stage you can import the translated text into your project.
Menu Item "File->Imort->Import strings" and "File->Export->Export strings"

10. User Logon after the start of WinPLC7
If you have turned on the user logon the respective request is displayed immediately when WinPLC7 is started. The user can enter an abbreviation for his/her name. This entry is then used as author in the block editor. The user can also define the working directories. This function is especially useful when several users will employ Winplc7 on the same PC (e.g. on a network).
You can turn on the user logon feature in the dialog "Extras->Settings->General" .

11. New hardware configurator with Profi-Bus support
The new hardware configurator can also be used to configure PROFI-BUS networks.
The hardware configurator is started by means of menu Item "PLC->Hardwareconfigurator" (only available in 'External' mode).

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2 Introduction and brief tutorial

This chapter contains a number of different brief tutorials that provide you with a quick introduction to the WinPLC7 program.

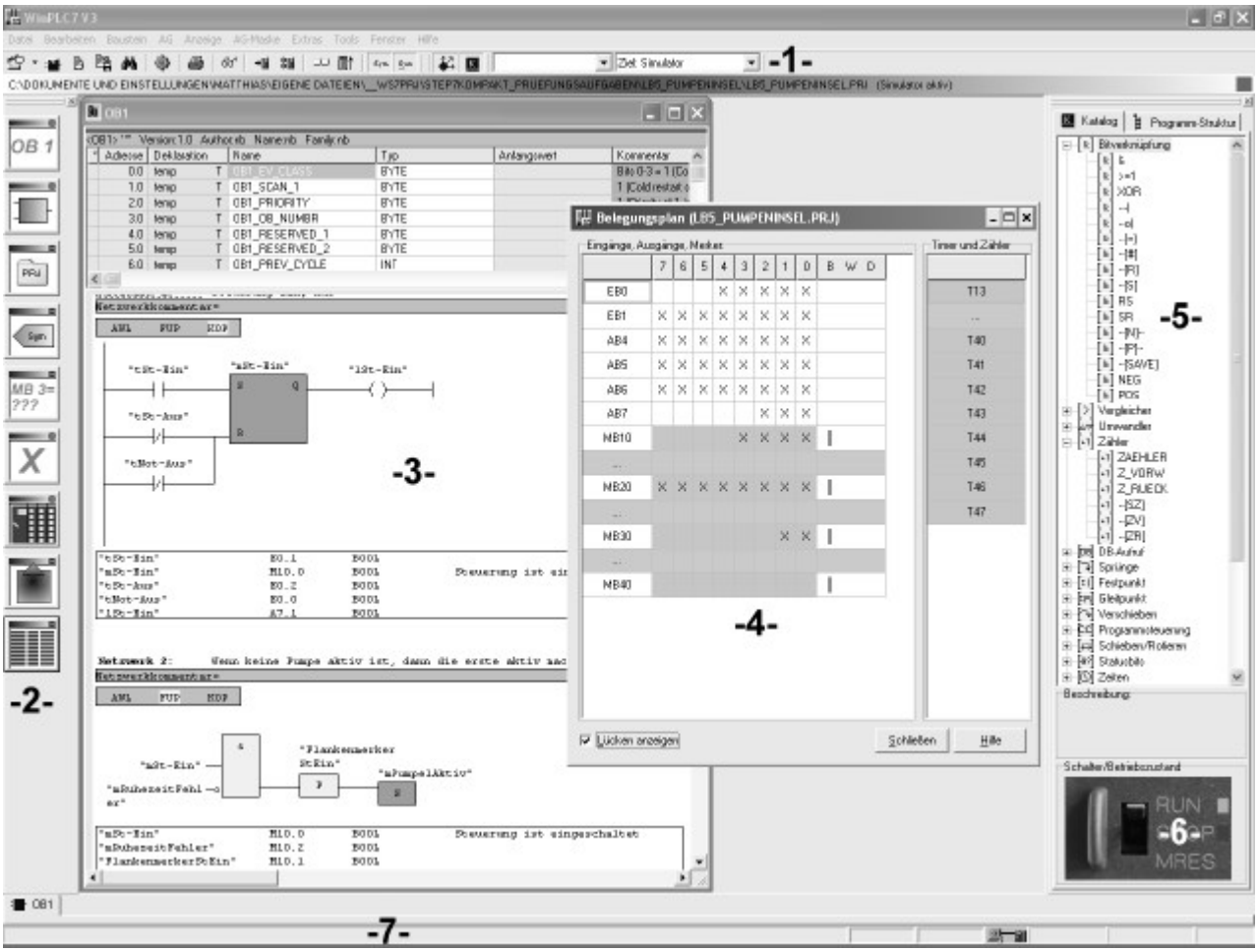


Fig.: WinPLC7 with block editor an dialog "assignment".

2.1 The arrangement of the WinPLC7 screen

(1) Mouse-bar for frequently used functions.
(2) Project navigator providing access to the most important windows.
(3) Block editor to change OB/FC/FB/DB
(4) Dialog "Assignment"
(5) **Command list** for STL/FBD/LAD and **"Call structure"**
(6) Status indicators of the PLC/simulator
(7) Status bar

2.2 Opening a WinPLC7 V1 project

You can use the menu item "File->Open V1.x project" to open a project that was created by means of WinPLC7 V1.0 - V1.4x.
If you are opening a V1-project you can not, however, create any additional sub-projects in this section.
This is only possible in case of V2-projects.

2.3 Opening a WinPLC7 V2/3 project

Select menu item "File->Open/create a project" to open an existing project.
The following dialog box is displayed:

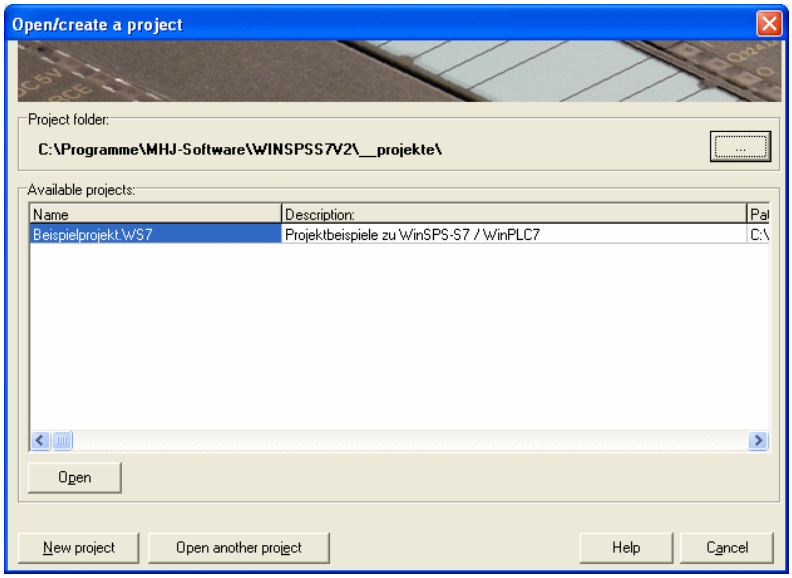


Fig.: Open/create a project dialog box

This dialog box displays all the projects that exist in the selected project directory. The default location of the directory is the installation directory of WinPLC7. You can change the project directory by means of the "..." button located next to the directory line.
You can open an existing project by selecting the respective project from the list of "Available projects" followed by the "Open" button.
As a result the opened project is displayed in the title of the window.

2.3.1 Opening a sub-project

A single WinPLC7 project can contain several sub-projects. You can open the required sub-project by selecting the menu item "View->Sub-projects". You can also access this dialog box by means of the project navigator. You must use the following button for this purpose.



Fig.: accessing the sub-project dialog box
by means of the project navigator

The sub-project dialog box is displayed as follows:

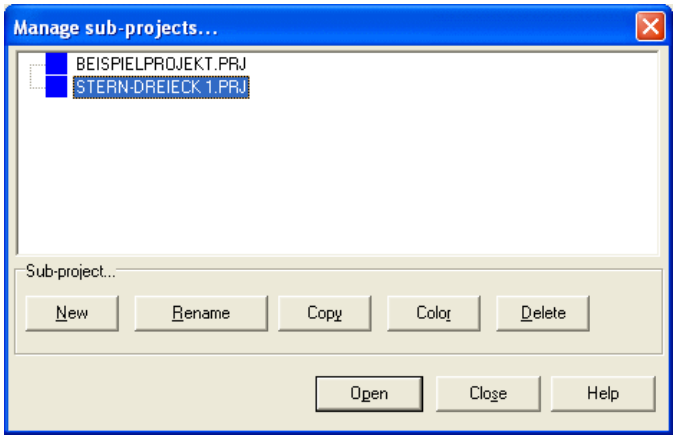


Fig.: Dialog manage sub-projects

Every sub-project contains a PLC program. To open a sub-project you select the sub-project in the list and press the "Open" button.

Only 1 sub-project can be active when you are working WinPLC7. The commands in menu item "PLC" always refer to the active sub-project.

2.3.2 Opening blocks in a sub-project

The blocks contained in the sub-project that is currently open are displayed in the "Block management" dialog box. You can access this dialog box via the menu item "View->Block management". You can also use the following button on the project navigator for this purpose.

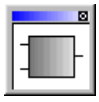


Fig.: Accessing the "Block management"
dialog box via the project navigator

Select the required block in the "Block management" dialog box and press the "Open" button. The selected block is displayed on the desktop.

Note:
A list of the 9 recently used projects will be displayed in menu item "View->Re-open". You can use keys '1' to '9' to open these projects quickly...

2.4 Creating a new project

To create a new project you must first select menu item "File->Open/create a project". The following dialog box is displayed:

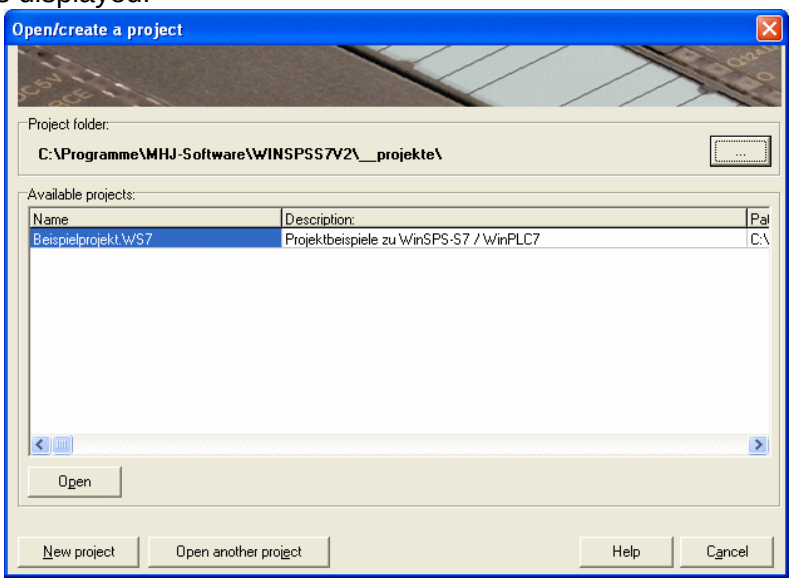


Fig.: Open/create a project dialog box

This dialog box displays all the projects that exist in the selected project directory. The default location of the directory is the installation directory of WinPLC7. You can change the project directory by means of the"..." button located next the directory.
A new project will be created in the specified project directory. The advantage of saving all the projects in a single directory is you will only have to backup the respective directory when you create the necessary backup.

Press the "**New project**" button to enter the name for the new project. Type the name into the input dialog box that will be displayed:

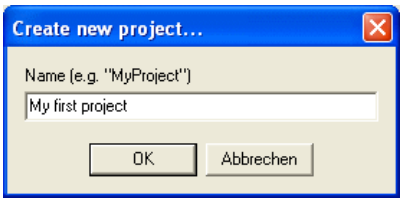


Fig.: entering the name for the new project.

The project is created when you confirm your entries by pressing "OK".

2.4.1 Renaming a sub-project

When you create a new project a sub-project with the name of the project is created in the project by default.
You can change the name of this sub-project by means of the "Manage sub-projects" dialog box. Access to this dialog box is provided by the menu item "View->Sub-projects". You can also press the following button on the project navigator.



Fig.: accessing the sub-project dialog box
via the project navigator

The resulting dialog box is displayed as follows:

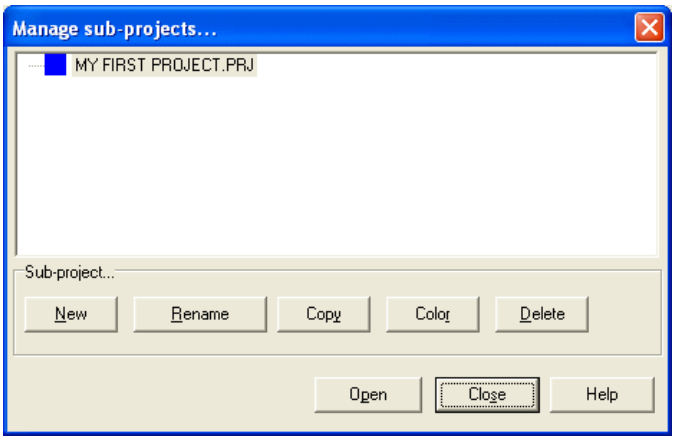


Fig.: sub-project dialog box

To rename a sub-project you must select the respective entry in the list and press the "Rename" button. Enter the required name into the dialog box that is displayed.

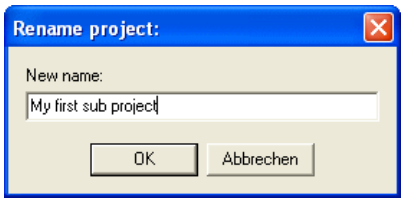


Fig.: entering the new name into the dialog box.

When you have confirmed your entry by pressing "OK" the renamed project is entered into the list. Press the "Open" button to open the sub-project.

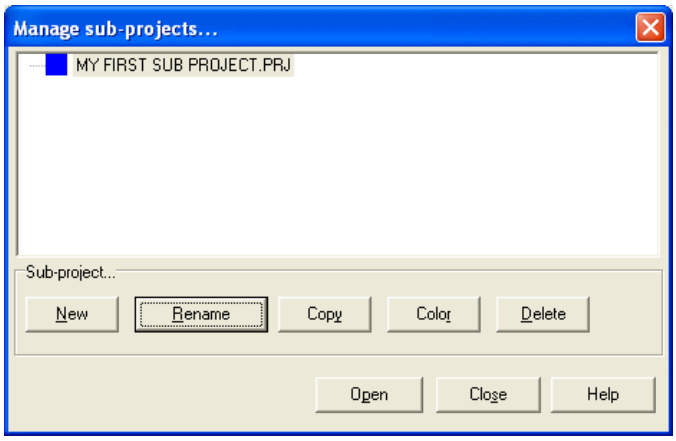


Fig.: after renaming the sub project

2.4.2 Creating a new block

You can create a new block by selecting the menu item "File->Create a new block". You can then enter the name for the new block (e.g. FC10, FB1, DB3 etc) into the dialog box that will be displayed. The name must not exist in the sub-project.
When you confirm your entry the editor of the respective block is displayed on the desktop.

2.5 Procedure: creating an S7 Program

The following steps are required to create a new S7 Program using WinPLC7:

1. Open a new project using **"File->Open/create a project"**
2. Display the sub-project dialog box by means of **"View->Sub-projects"**. Here you can rename and open the sub-project.
3. Open the symbolism editor using **"View->Symbolic editor"**.
   Enter the required symbols into the symbolism editor (symbol, operand, data type and commentary)
   Save the symbolism file by means of the button "Save". The symbols are now available to the project.
4. Adjust the symbolism settings as required (menu item **Extras->Settings->Symbolic settings**).
5. Create the required blocks by means of **"File->Create a new block"**.

Step 3 and 4 are only required if you wish to use symbols.

2.6 Simulating an S7-program

The following steps are required to simulate an S7 program:

1. Open a project
First you open a project using **"File->Open/create a project"**

2. Open a sub-project
Display the available sub-projects by means of **"View->Sub-projects"**. Select the sub-project in the dialog box and press the "Open" button.

Note:
When you open a project, the same sub-project is activated that was active when this project was closed.
Step 2 is only required when you want to change the sub-project.

3. Selecting simulator mode
The list of mouse buttons contains a selection list where you can select the WinPLC7 simulator mode. Here you must select "Simulator".

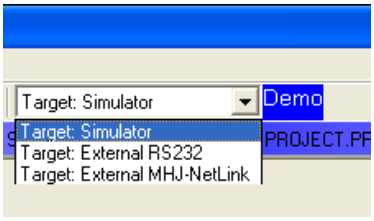


Fig.: WinPLC7 will use the internal software-PLC
when you have selected "Simulator".

4. Transferring blocks into the simulator
At this point you must transfer the respective project blocks into the simulator. Select menu item "**PLC->Send blocks**".

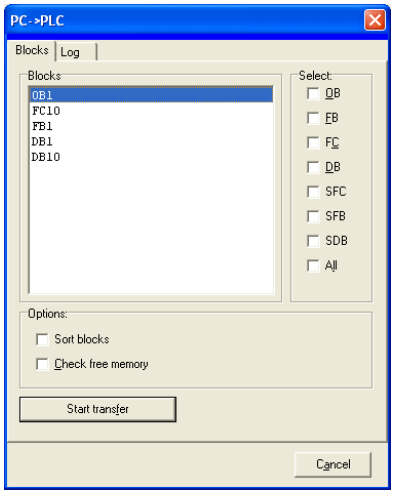


Fig.: selecting blocks for the transfer

Select the blocks you wish to send in the dialog box that is displayed and press the "**Send**" button.

You can monitor the transfer in the "Log" tab of the dialog box. Here you can check whether the different blocks are transferred properly:

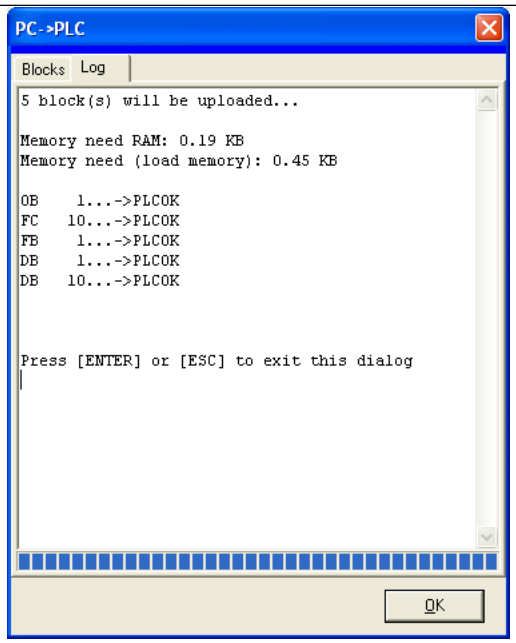


Fig.: the log that is displayed after the transfer

6. Setting the software-PLC to RUN mode

The blocks will be processed as soon as the software-PLC is switched to RUN mode. For this purpose you select the menu item "PLC->Operating mode". A dialog box will be displayed where you must select the startup type "Hot restart" or "Warm restart". As a result, the shape of the function selector at the lower right edge of the WinPLC7 window will change.



Fig.: function selector

7. Display the process-image windows

Amongst others, you can use the process-image windows to switch the inputs in the simulation. If you wish to display these inputs you can select the menu time
"View->View Process-image window". The respective windows are displayed as follows:

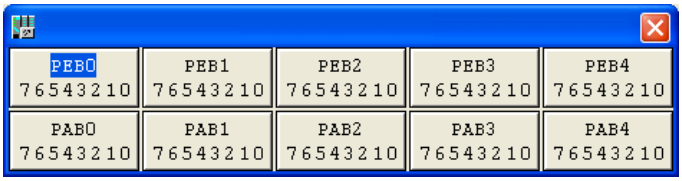


Fig.: process-image windows

You can dock the process-image windows to the upper portion of the desktop of WinPLC7.
You can define the status of the operands on the display by double-clicking the address of one of the process-image windows (for instance PEB0 in the figure above). The dialog box "Process-image-line configuration" will be displayed:

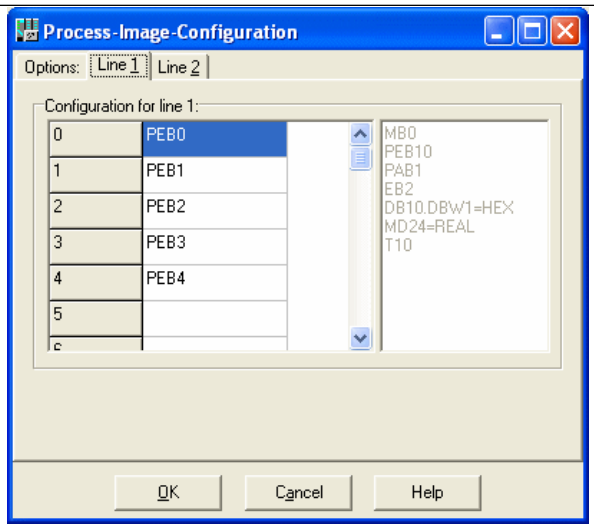


Fig.: the dialog box to configure the process-image window

In this dialogue you can select the operands that must be displayed and the respective format. You can change the status of input bytes and flag bytes in order to simulate the PLC program. The settings are accepted when you press "OK".

8. Displaying the block status

Select the menu item **"Block->Monitoring On/Off"** to view the status of a block. The result is that the OB1 of the software-PLC and the status of the different lines are displayed.
If you wish to display another block in the CPU right-click the editor of OB1. A **Context menu** will be displayed where you can select the menu item **"Open block"**. The result is that the dialog box "Change block (PLC)" is displayed.

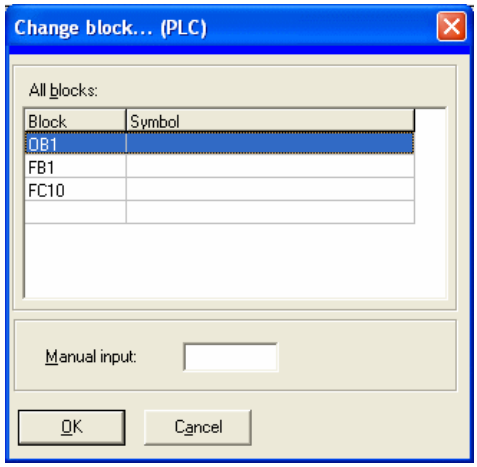


Fig.: "Change block (PLC)" dialog box

This dialog box lists all the block that are available in the CPU (in this case those that are available in the software-PLC). You can now select the block of which you wish to view the block-status.

The status window can be displayed as follows:

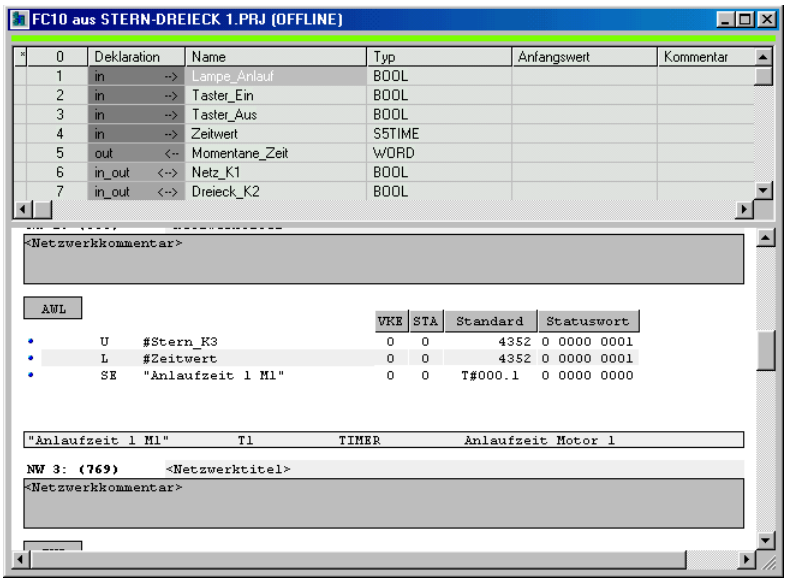


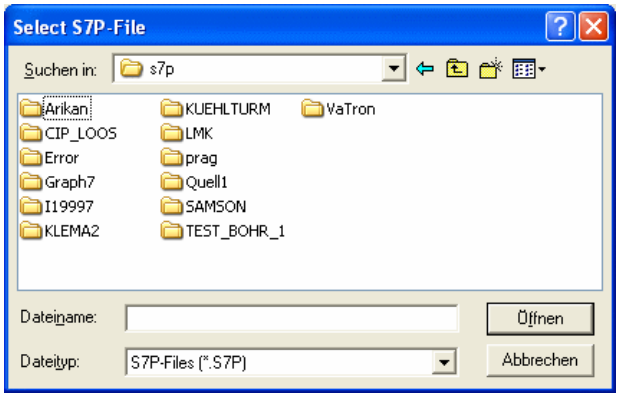
Fig.: the "Block status" window

2.7 Importing an S7-program from STEP®7 of SIEMENS

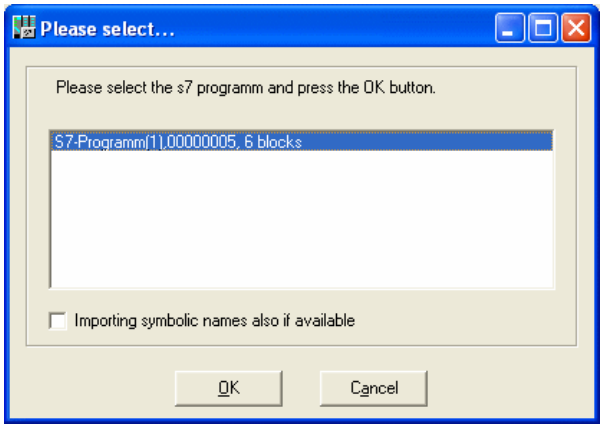
It is possible to import a project that was created by the SIEMENS-STEP®7 software (version 4, 5 or higher) into WinPLC7 by means of the menu item "File->Import->S7 Project (S7P).

Procedure:

1. If you have not done so, open or create a project (File->Open/create a project).
2. Create a new sub-project using the dialog "Manage sub-projects" (View->Sub-projects)
3. Select the menu item "File->Import->Import S7P"
4. A selection-dialogue will be displayed. Use the dialog to locate the STEP®7-project that you want to import. Select a STEP®7-project file that has the extension .S7P:
   Press the "OK" button when you have selected the file.



5. The selection dialog shown below will be displayed:



   Select the required S7 program and press the button "OK".

6. A block selection dialog box will be displayed where you can select the blocks that you wish to import. You confirm your entries by means of the "Import" button.

7. The selected blocks are imported and you can edit them by means of WinPLC7.

2.8 Exporting an S7-program for STEP®7 of SIEMENS

You can use the menu item "File->Export...->Export S7P"
to export a WinPLC7 project in the project-format of the original SIEMENS software.
The following data is exported:

- Blocks OB, FC, SFC, FB, SFB, DB
  This export includes the protected blocks.
- All commentaries
  (block commentaries, network commentaries, block titles, ...)
- Symbolism file

The STEP®7 project-format consists of several tables and many different files.
The exported project is always stored in "S7P" directory in the current sub-project directory.
When the export has been completed you should archive the project using "ZIP" or "ARJ" to simplify transportation.

2.9 Connecting to a S7-300® / S7-400®

The following procedure is required to establish a connection with an S7-300®/S7-400® or compatible controller:

1. Open a project using **"File->Open/create a project"**.
   Open a sub-project by means of the "Manage sub-projects" dialog box . Select menu item **"View->Sub-projects"** for this purpose. In the list of communication paths you must select **"External RS232":**

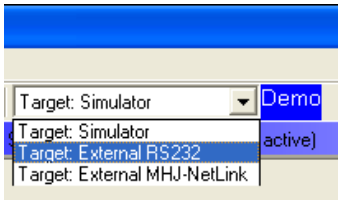


Fig.: when you have selected "External RS232"
WinPLC7 is using an external S7-PLC.

2. Enter the interface data by means of the menu item **"Tools->RS-232 interface settings"**.
   For instance:
   - Baud rate
   - COM-port
   Press the button "Direct". This establishes a connection with the PLC that is connected directly to WinPLC7. You require an MPI cable that is connected to the serial interface of the PC to be able to establish a connection. Exception: for Vipa-S7-CPUs you can use the so-called Green-Cable. In this case the baud rate must be set to 38400.
3. Press the button "Establish a test connection". The message "Connection OK" should be displayed.
4. If you should encounter errors check the following:
   - correct COM-port (COM1 ...COM4) selected?
   - correct baud rate selected in WinPLC7?
   - correct baud rate selected on the MPI-cable?
5. When the connection has been established successfully you can use the functions in the "PLC" menu tree (e.g. Module status)

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3 Starting parameters

You can use the following parameters to start WinPLC:

Parameter	Description
WinPLC7 project	You can specify a .WS7-file. This is opened directly. Example: "....WS7V3.EXE" "c:\My Documents\MyProject.WS7"
/USER	The following user logon is displayed after WinPLC has started: "....WS7V3.EXE" /USER
/PRJ="<path>"	You can specify a directory for the project folder "....WS7V3.EXE" /PRJ="c:\MyS7Projects\"
/INI="<path>"	You can define the directory for the Winplc7-INI file: "....WS7V3.EXE" /INI="c:\OwnFiles\"
/CLIPB="<path>"	You can define the directory where the global clipboard is saved. "....WS7V3.EXE" /CLIPB="c:\OwnFiles\Winplc7-clipboard"
/AUTHOR=name	You can specify the author. "....WS7V3.EXE" /AUTHOR=MIKE NOTE: the author can only consist of a max. of 8 characters (without spaces).

Note:
You can also define a directory for the project when you start WinPLC by **modifying** the shortcut to WinPLC7:

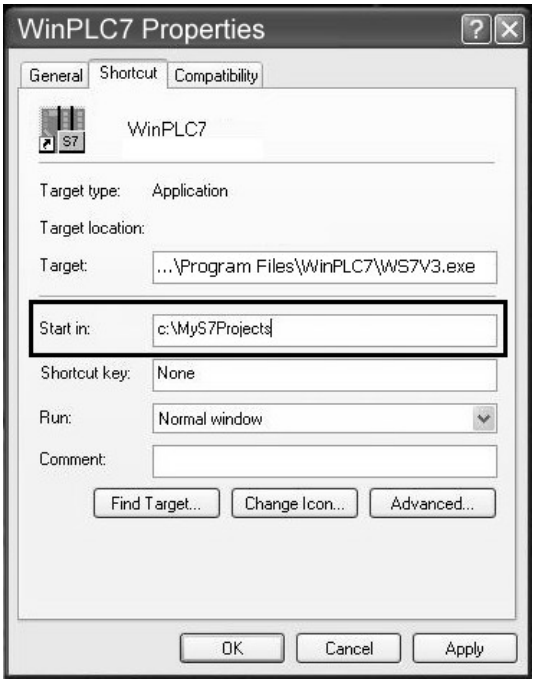


Fig.: WinPLC7 Properties

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4 FAQ list and supplemental information

Frequently asked questions relating to WinPLC7:

1. Can WinPLC7 be executed under Windows 2000, XP?
WinPLC7 is a 32-Bit Windows-compliant program that runs under the following operating systems:
Win98, WinME, Win2000, WinXP

2. Does it support the CPU Simatic® S7-200?
No, this CPU is not supported since it employs a different instruction set to the S7-300®/S7-400®.

3. How can I erase the AS Mask-Simulation module?
You can erase the module by clicking the address of the module with the left mouse-key and dragging it into the CPU module.
When you release the left mouse key the module is erased.
You can also use this procedure to move modules.

4. Which S7-CPUs are supported by WinPLC7?
Here you must differentiate between programming, diagnostics and hardware configuration: you can program, test (status-block, status-variable, ...) and diagnose (I-STACK, B-STACK, diagnostic buffer) any S7-300® and S7-400® CPU.

You can only use the hardware configuration for S7-300®-modules. Any of the modules listed in the catalog of the hardware configurator are supported.

5. When is it necessary to perform a hardware configuration?

A hardware configuration is required under the following circumstances:

- when analog modules are being employed
- when the MPI address of the CPU must be modified
- when it is necessary to modify special properties of the CPU (clock memory, cycle time limits, retentive data, alarms, passwords, etc.)

Under the following circumstance a hardware configuration is not necessary:

- when you employ a CPU that only has digital inputs and outputs

6. I am unable to communicate with an S7-PLC! What can I do?
At first you should check whether the interface number (COM1, COM2, ...) is correct.
On an S7-controller with a Profi-Bus interface you should also check whether the MPI cable is connected to the MPI socket and not to the Profi-Bus socket.

When the Siemens MPI-interface is employed:
This MPI cable can only be used at a Baud rate of 19200 and 38400 Baud. Older cables can only be used at 19200 Baud.
The Baud rate is selected on the cable by means of a micro-switch.

When the "Green-Cable" for VIPA CPUs is being employed:
This connection requires that the Baud rate is set to 38400 Baud. Other Baud rates are not supported.

If you are using a **SIEMENS PLC straight out of the factory** you must first perform a **master reset** by means of the operating mode switch before the PLC will communicate properly.

7. Certain dialogs are not displayed correctly. What is the reason?
This effect occurs when you have changed the scaling of the font size while you were configuring the display adapter.

The scaling of the font size should always be set to 100% of the normal size.

Additional information

You can obtain additional information about WinPLC7 from the following sources:

- The online-help of WinPLC7 menu item "Help->Help contents"
- The program group of WinPLC7 contains various PDF-documents for different workshops.
- The WinPLC7 homepage: www.WinPLC7.de