

# Getting Started with

## *S7 for Windows<sup>®</sup>*

### Version 6.x

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## **Content**

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Complete training classes available for *S5 for Windows®*; *S7 for Windows®*; and also for the Siemens PLC Programming Software Step® 7.

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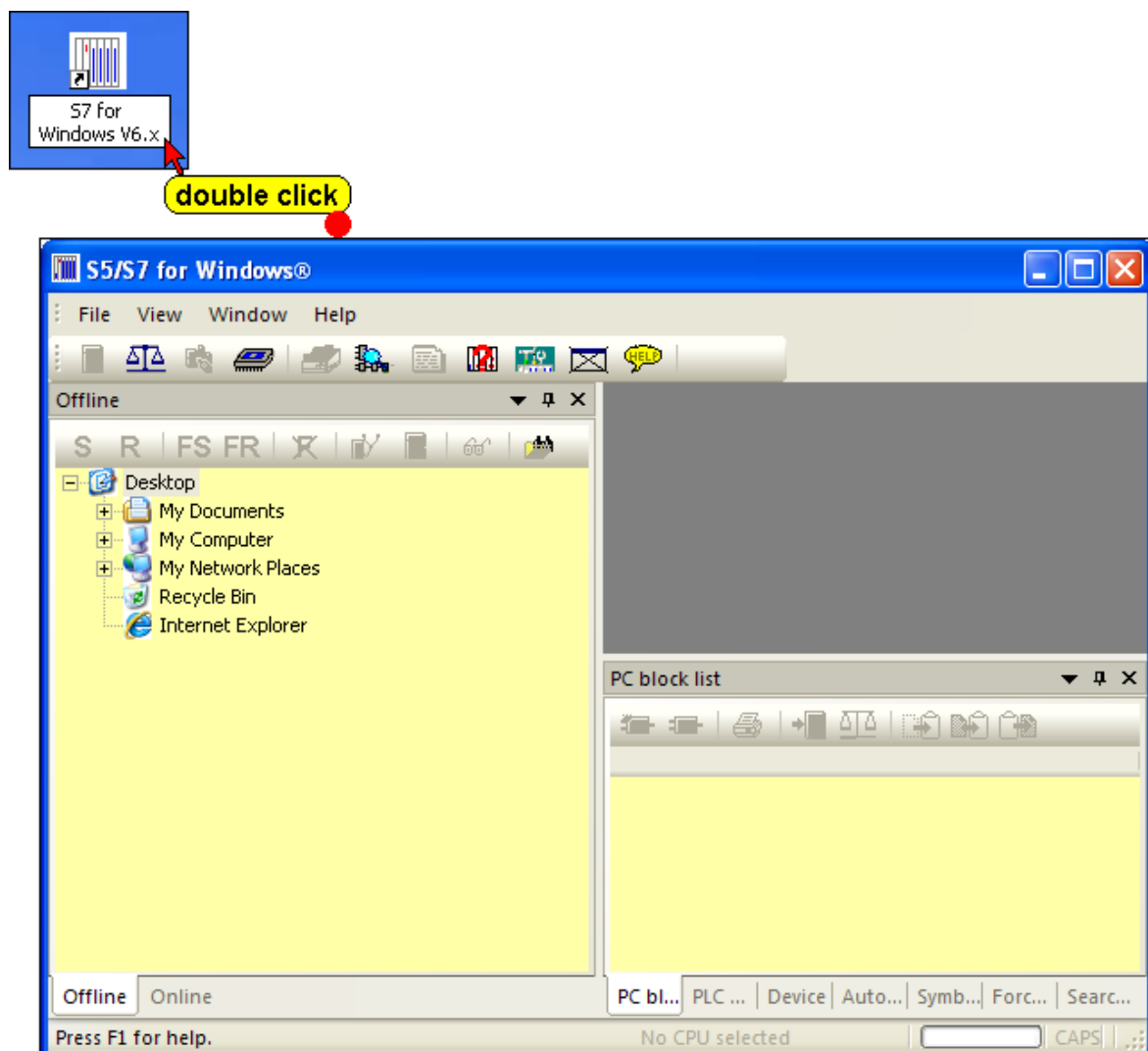
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# 1 S7 for Windows® Basics

To work with S7 for Windows® basic skills are necessary.

## 1.1 Opening the S7 for Windows® Software

During the installation of S7 for Windows® an icon has been inserted. Double click the icon “S7 for Windows®” to start the programming system.

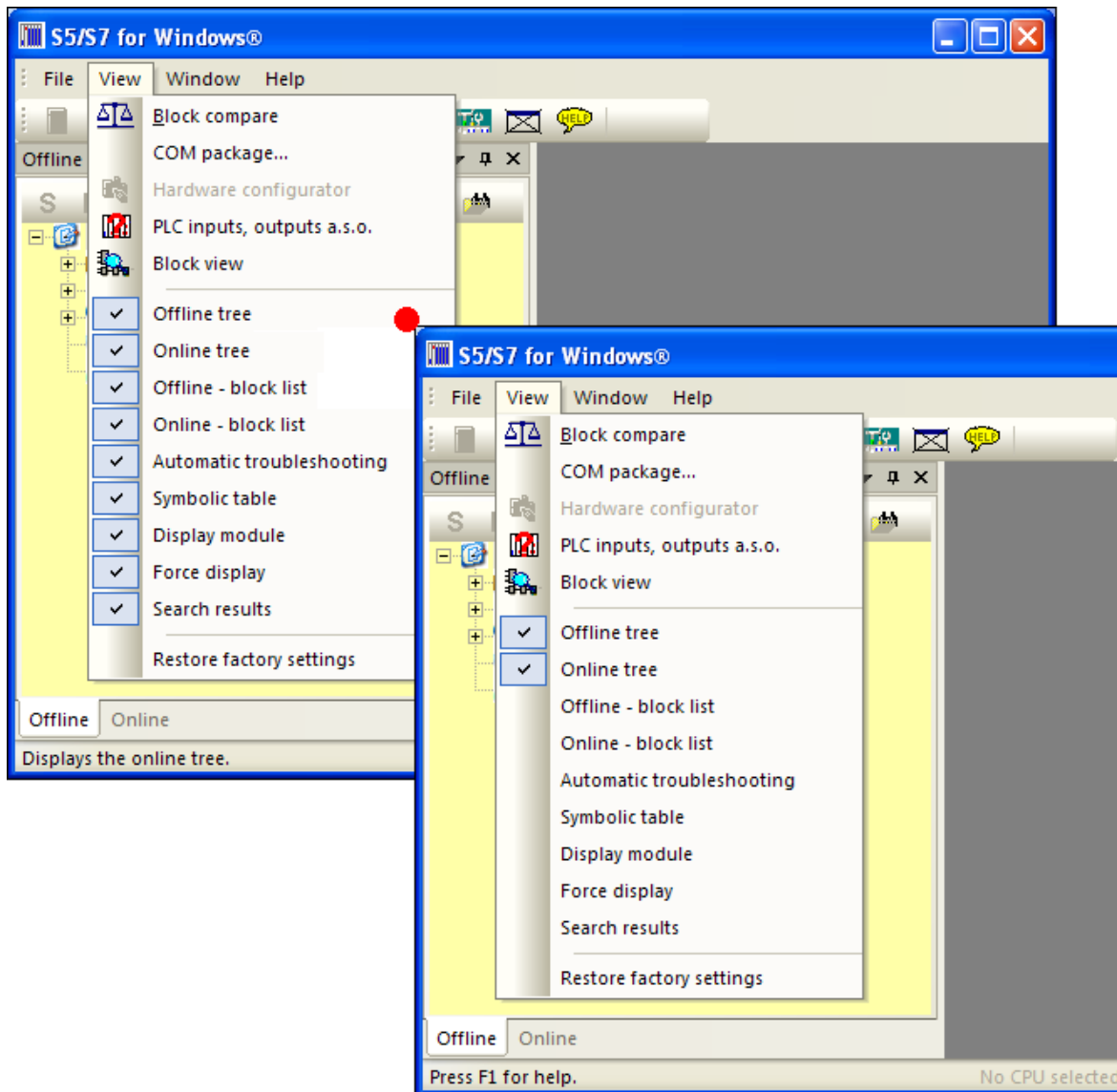


Several “tabs” may be displayed at the left as well as at the bottom of the S7 for Windows® window. The “Tabs” displayed depend on the selected windows in the “**View**” menu.

We recommend the following settings for easier use of *S7 for Windows®*.

**1. Close all unnecessary windows.**

Open the “**View**” menu and select the “Offline tree” and “Online tree”. Deselect all other views.



The “**Offline tree**” is used to select the “**S7 Project**” that you want to work with. The S7 Project contains the files necessary for a S7 PLC program. Later, how to generate a S7 Project will be explained. An S7 Project is always required to work with a S7 PLC program executed on a PLC.

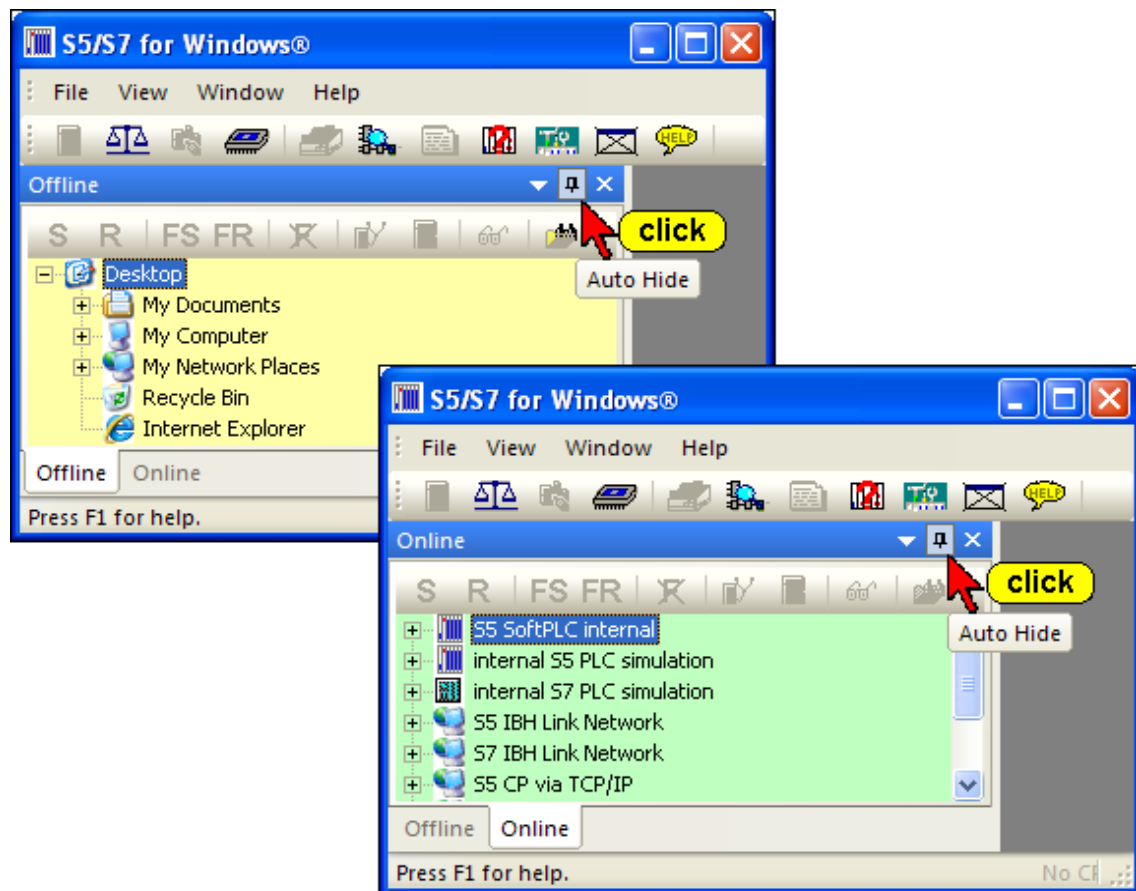
The “**Online tree**” is used to select the PLC to be connected with.

## 2. Using the “Auto Hide” functions.

It is recommended that you use the “Auto Hide” icon to lock the tab at the outside border of *S7 for Windows®*. By bringing the mouse pointer to the tab, the window will open automatically.



Use the “Auto Hide” icon to close the “Offline tree” and the “Online tree”.



## 3. Operator Interface mode.

Version 6.x of *S7 for Windows®* has a new concept for opening and closing windows in the workplace.

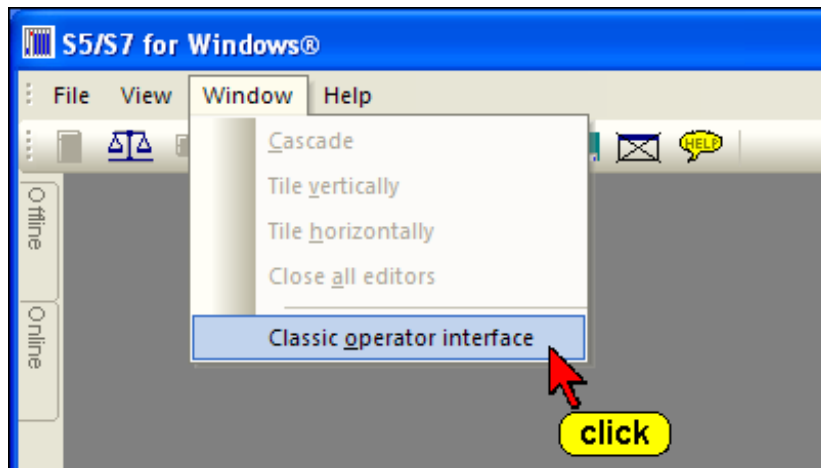
You can use the “Auto Hide” icon to lock the tab at the outside border of the workplace. By moving the mouse pointer to the tab, the window will open automatically. As soon as the mouse pointer leaves the automatically opened window, the window is closed.

If you click at tab the opened window will stay open until it is closed.

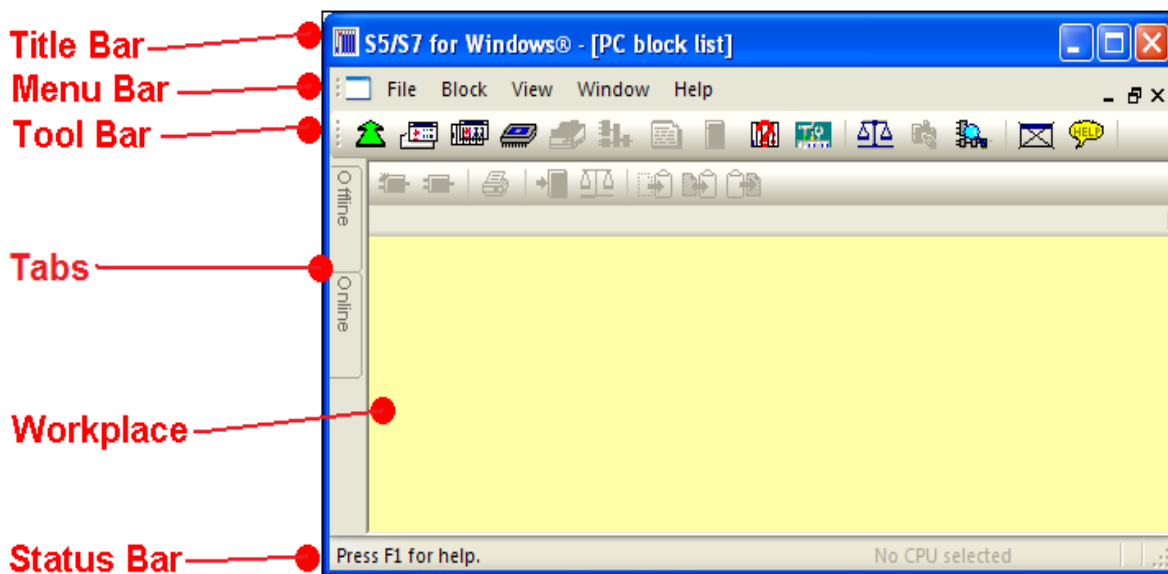
## Classic Operator Interface

If the “Classic operator interface” mode is selected, the “Tool Bar” is extended and the open windows will stay open until they are closed.

To select the previously described mode, click “Classic operator interface” in the “Window” menu.



### 1.2 S7 for Windows® Basic Window (Classic Operator interface)



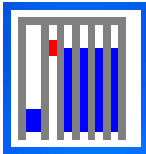
In “Classic operator interface” mode the “PC Block List” window is open and fills the whole workplace.



## Title Bar



The title bar displays *S7 for Windows®*, and, if an additional Window is open in the workplace, the name of the open window is also displayed. The Icons are “Windows” specific.



### Open Control menu

This icon opens the Control menu that contains the commands to Restore, Move, Size, Minimize, Maximize, or Close the open Window. The Keyboard shortcut is Alt + Spacebar.



### Minimizing the open window to an icon

Clicking the button at the right side of the *S7 for Windows®* title reduces the open window to the size of an icon (same function as the **Minimize** command from the Control menu).



### Maximizing the open window

Clicking the Maximize button in the upper right corner of *S7 for Windows®* will enlarge the window to its maximum size (same function as the **Maximize** command from the Control menu).



### Restoring an enlarged window to its previous size

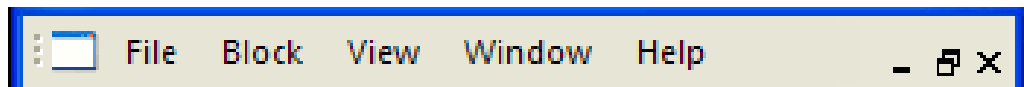
Clicking the Restore button in the upper right corner of *S7 for Windows®* will restore an enlarged window to its previous size (same function as the **Restore** command from the Control menu).



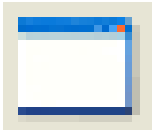
### Closing S7 for Windows

Clicking the Close button in the upper right corner of *S7 for Windows®* will terminate S5 for Windows (same function as the **Close** command from the Control menu).

## Menu Bar



The menu bar lists the available menus. The menus contain the available commands of *S7 for Windows®*. The menus in the menu bar change depending on the *S7 for Windows®* application windows opened. You can open a menu by clicking the name of the menu or by pressing the **ALT** key and then the first Letter of the menu name.



### Open Control menu

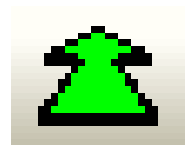
This icon opens the Control menu that contains the commands to Restore, Move, Size, Minimize, Maximize, or Close the Window opened (active) in the workplace.

## Tool Bar I – Classic Operator Interface



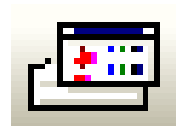
The tool bar provides instant access to frequently used *S7 for Windows®* commands. Click an icon with the mouse and the command is executed. You can reach these functions with the keyboard via the window menu and/or the function keys.

This tool bar is the same for all *S7 for Windows®* application windows (Classic operator interface mode).



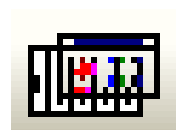
### Open next Window

This icon allows you to switch rapidly between open windows with a mouse click. The keyboard shortcut **Ctrl+F6** provides the same function.



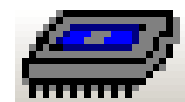
### PC (Personal Computer) Block List

This index lists all the blocks with the date and time it was created or changed and a comment. One or more blocks may be selected for further manipulation.



### PLC Block List

This index lists all the blocks stored in the PLC. One or more blocks may be selected for further manipulation in the same way it is handled in the windows file manager.



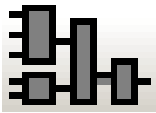
### EPROM / EEPROM / Flash EPROM Burner

This icon opens a menu to control EPROM / EEPROM / Flash EPROM burning. It is only active when the EPROM burner option has been purchased.



### Cross Reference Display

A click on this icon lists the appearance of operands, as a symbol or absolute, throughout the whole program. This function may be called from any window.

**Block Edit**

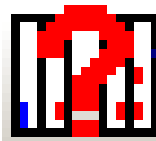
The block selected in the block listing will be displayed in the block editor and is ready for any changes. The keyboard shortcut **F10** provides the same function.

**Symbolic Table Editor**

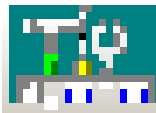
With this easy to use integrated editor you can write, cut, copy and paste text to create and modify the symbol table. The symbol table may be tested for multiple uses of addresses or symbols. The symbol table can also be sorted by addresses or symbols.

**PLC Error Display (I-Stack, B-Stack, Diagnostic Buffer)**

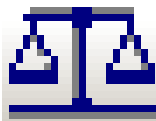
This icon enables you to view the program interrupt information stored in the PLC (I-Stack, B-Stack, Diagnostic Buffer). The information is displayed in real language with the faulty portion of the program.

**On-line PLC Status**

The status of flags, inputs, outputs, timers, counters, comparators, data words, and peripheral words are displayed and can be modified.

**Preferences**

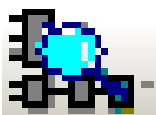
This icon opens dialog boxes to customize the appearance of *S7 for Windows®*. The settings for the serial port, the editors, the indexes, the display font and other (miscellaneous) settings are saved and are reloaded whenever a new PLC project is opened.

**PLC Block (Program) Compare**

*S7 for Windows®* offers a powerful PLC Program (Block Compare). The command **Compare** opens dialog boxes to select PLC Program files to compare (online and offline).

**S7 Hardware configuration**

This icon opens a window to setup and change the Hardware configuration of the S7 PLC.

**Dynamic PLC Block Display**

Enables fast switching between open PLC status windows.

**Closing Open Windows**

The *S7 for Windows®* active window is closed by clicking this icon. The keyboard shortcut **Ctrl+F4** provides the same function.



## Help Function

An integrated, subject related help file with an index and a list of keyboard shortcuts for easy operation is available. The keyboard shortcut **F1** provides the same function.

## Tool bar II (PLC Block List)

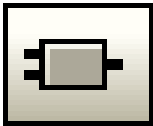


The tool bar II provides instant access to frequently used PC block list commands. Click an icon with the mouse and the command is executed. With the keyboard you can reach these functions via the file menu and the Block menu.



### Create new PLC Block

A dialog box to establish the name of the new block is opened. After entering the new Block, the Block Editor window is opened and ready for creating a new Block.



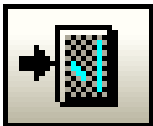
### Edit Block

The block selected in the block listing will be displayed in the block editor and is ready for any changes. The keyboard shortcut **F10** provides the same function.



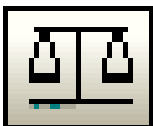
### Print Block

The marked block is printed. The keyboard shortcut **Alt+B, R** provides the same function.



### Transfer Block to PLC

The marked blocks are transferred to the PLC. The keyboard shortcut **Alt+B, T** provides the same function.



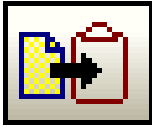
### PLC Block Compare

The marked Block is compared with the Block in the (online and offline compare).



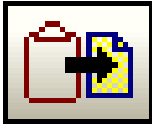
### Cut Block

The marked blocks are transferred to a temporary buffer and are removed from the Block List. The keyboard shortcut **Ctrl+X** or **Shift+Backspace** provides the same function.



### Copy Block

The marked blocks are transferred to a temporary buffer and remain in the Block List. The keyboard shortcut **Ctrl+C** or **Ctrl+Insert** provides the same function.



### Paste Block

The blocks currently in the temporary buffer are transferred to the PC block list. The blocks remain in the temporary buffer. The keyboard shortcut **Ctrl+V** or **Shift+Insert** provides the same function.

### Workplace Column Title Bar

Block	Format	Symbol	Length	Last Modification	Comment
-------	--------	--------	--------	-------------------	---------

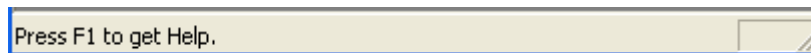
Clicking the title of a column will sort the PC Block List information in an ascending order. Clicking the title again will sort the information in a descending order.

The column width can be adjusted by dragging the column border with the mouse.

### Workplace

All the blocks of an open PLC program file are listed in the PC block List. Additional application windows fill out the workplace.

### Status Bar



The status bar may displays additional information on the open window and executed tasks.

#### Note:

The **right mouse button** may be used within the Workplace.

If the **right mouse button** is clicked, a menu with the most important commands is opened.

## 1.3 Generating a S7 Project

A new S7 Project can only be generated in an existing Folder.

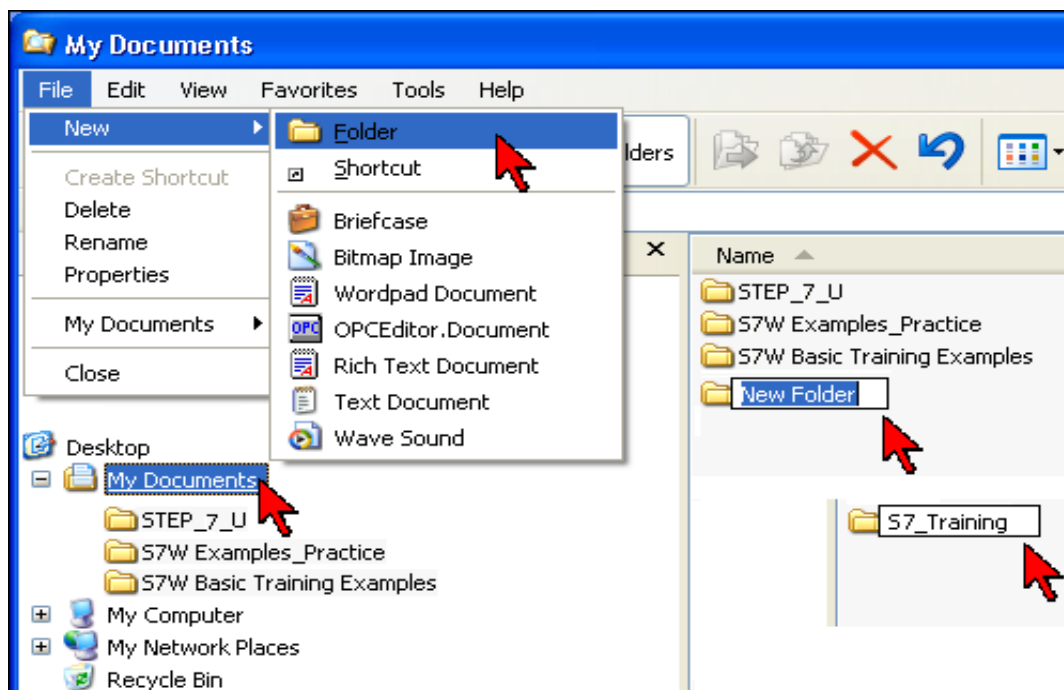
### Note:

To “debug” a PLC program located in the PLC, you have to have the PLC program located in a S7 Project. This could be the original project with comments and symbols (preferable).

If the original project is not available you must download the PLC program into a newly generated S7 Project.

It is not recommended that you generate a new project directly in the “My Documents” folder. You can name a new folder and put it in the “My Documents” folder, for instance “S7\_Training”.

### Generate a new “S7 Project” folder



### Note:

Windows with “**Offline – information**” have a light yellow background.

### Note:

Windows with “**Online – information**” have a light green background.

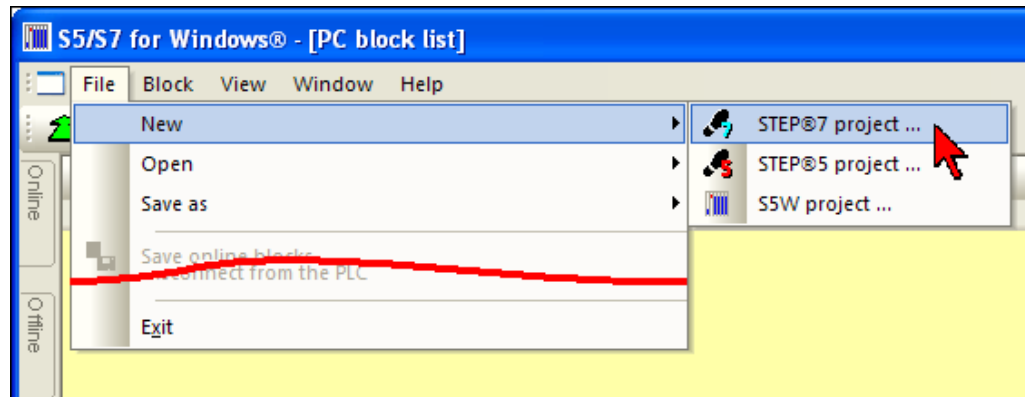
## Commands to open a new project

S7 for Windows® provides the possibility to generate S7 projects in the same format than the SIEMENS® STEP® 7 projects.

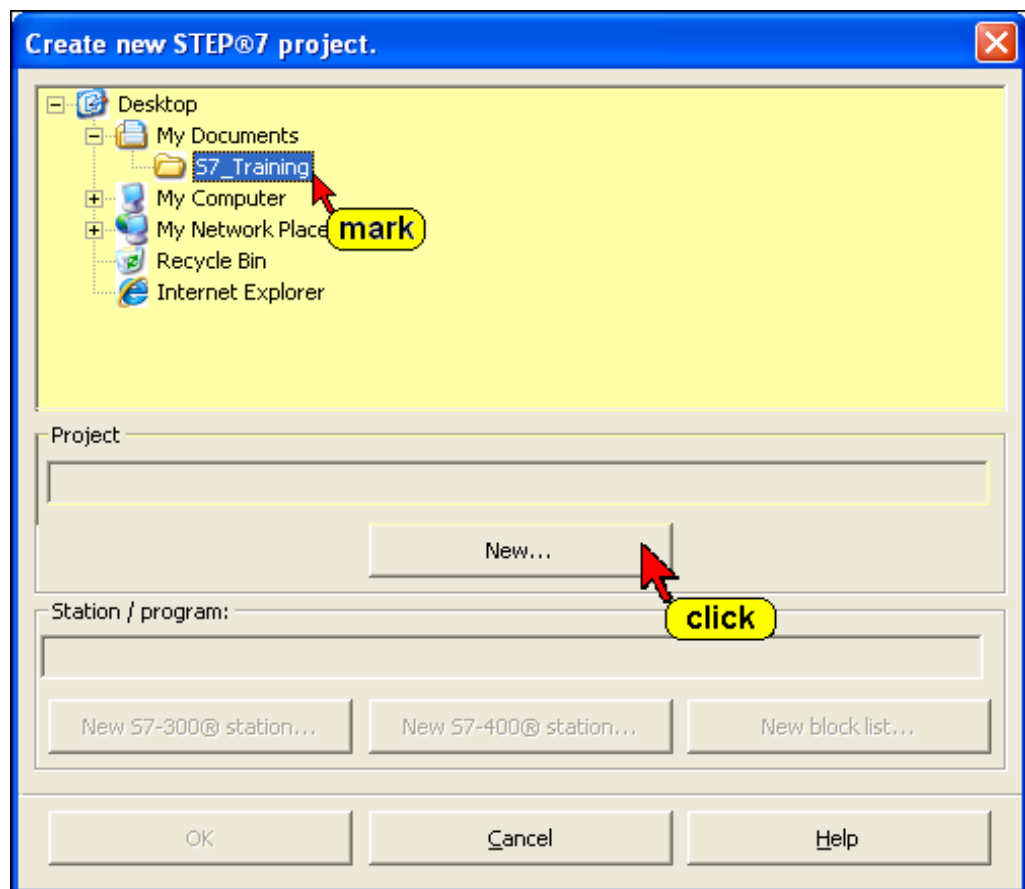
This way import and export functions are not required with S7 for Windows®.

The following t explains the handling of a “**New STEP® 7 project**”.

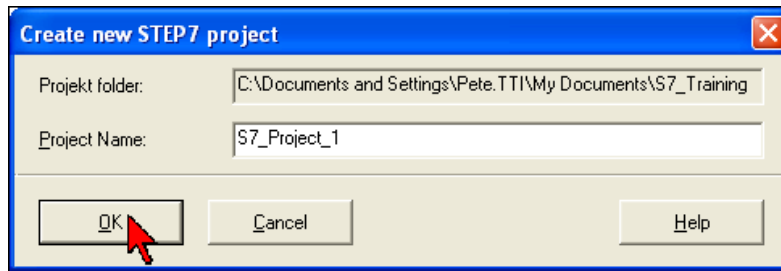
- Click “New **STEP® 7** project” in the File / New Menu.



- Select the “Path” in the “Create new STEP®7 project” dialog box and click “New”.

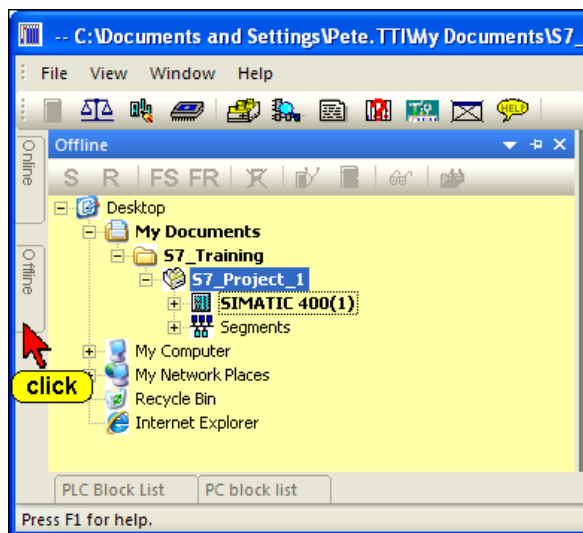


- Type the “Project Name” in the “Create new STEP®7 project” dialog box and confirm with “OK”.

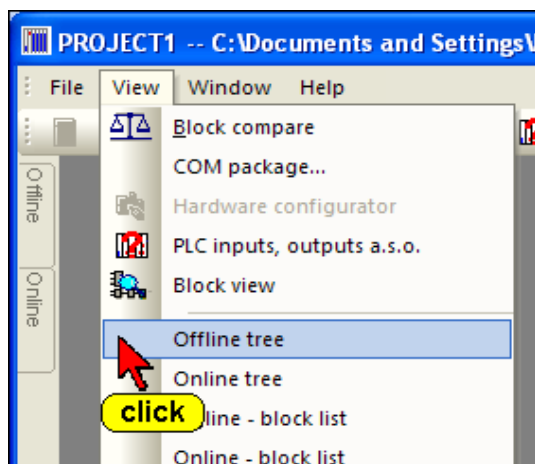


- If you want to transfer a PLC program from a S7 300 PLC click the “New S7-300® station...” button. If the PLC you want to work with is a S7 400 PLC click the “New S7-400® station...” button and confirm with “OK”.

The S7 project with its name “PROJECT\_1” is listed in the “Offline – Tree”.

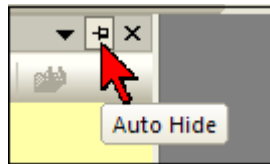


If the “**Offline**” tab is not shown, use the command “Offline tree” from the “File” menu.





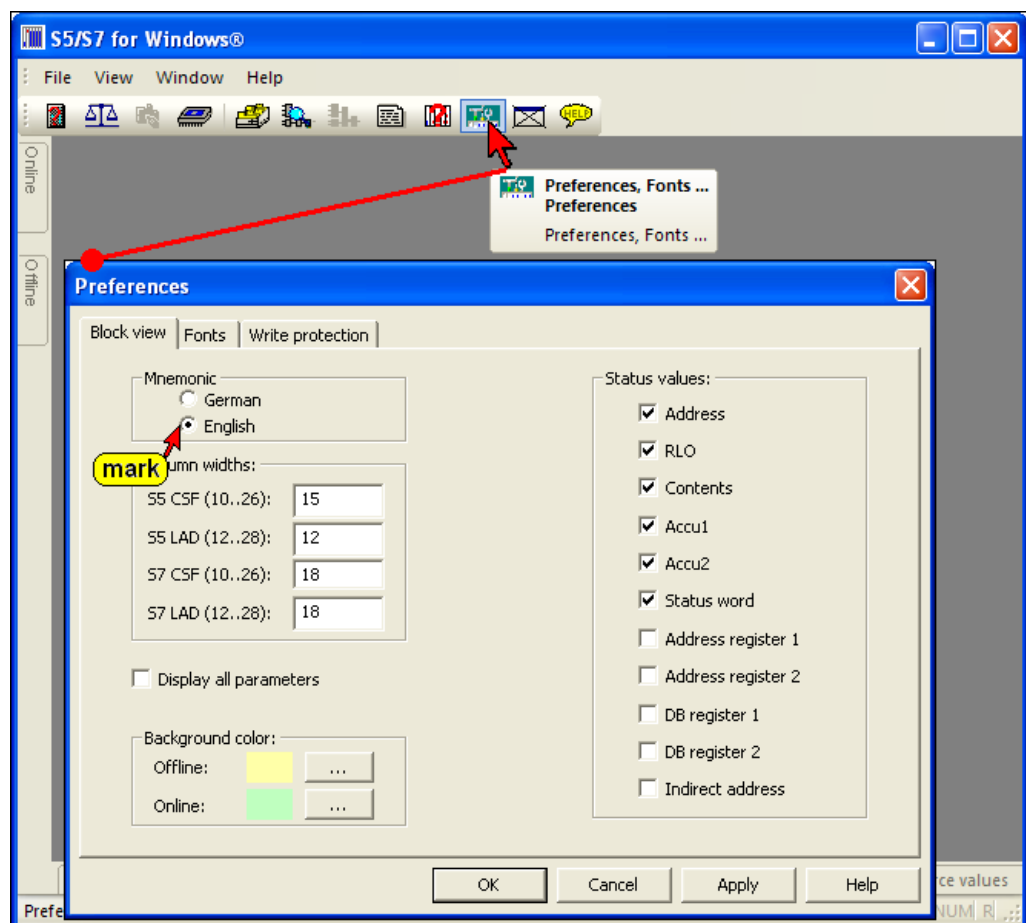
It is recommended that you use the “Auto Hide” icon to lock the tab at the outside border of *S7 for Windows®*. By moving the mouse pointer to the tab the window will open automatically.

**Note:**

A “Project” is required to make a PLC user program. You also must have an open project to transfer and save an existing program from a PLC for backup purposes.

## 1.4 Selecting the English Mnemonics

In the US, PLC programs usually use English Mnemonics.



The selection changes the mnemonics of the instructions (key words), the operands in the logic and the symbolic table. The selection will not change the language of the program (menu commands, symbols, comments, etc.).

The mnemonics to identify Bit-Memory, Timers, Counters, Inputs, Outputs, and the instruction set used for Statement List (STL) programming are identified with their English (International mnemonics) syntax.

### Examples:

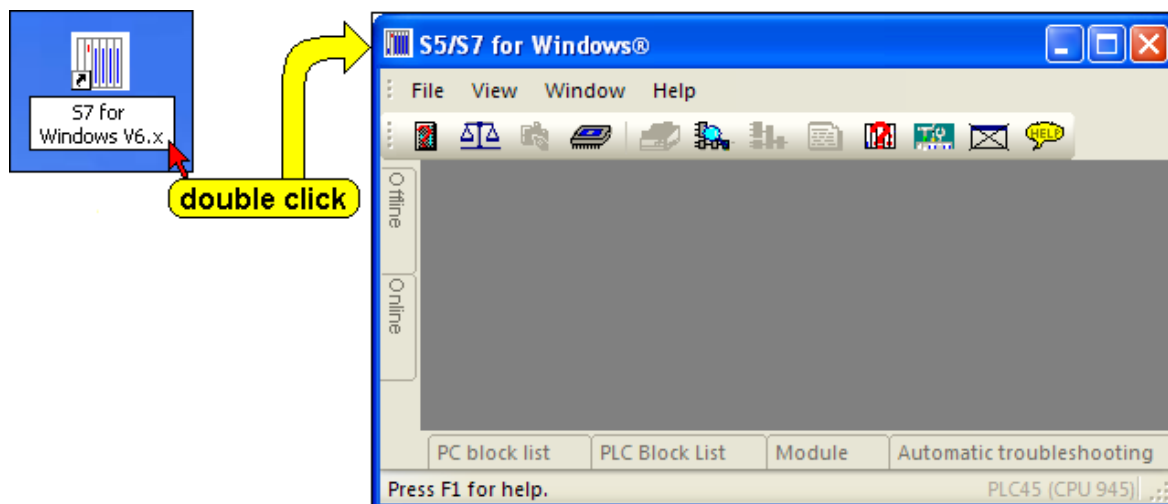
Input	I	Timer	T	OR	O
Output	Q	Counter	C	Count Down	CD
Memory	M	AND	A	Count Up	CU

## 1.5 S7 for Windows® Basic Window (Standard interface)

### Note:

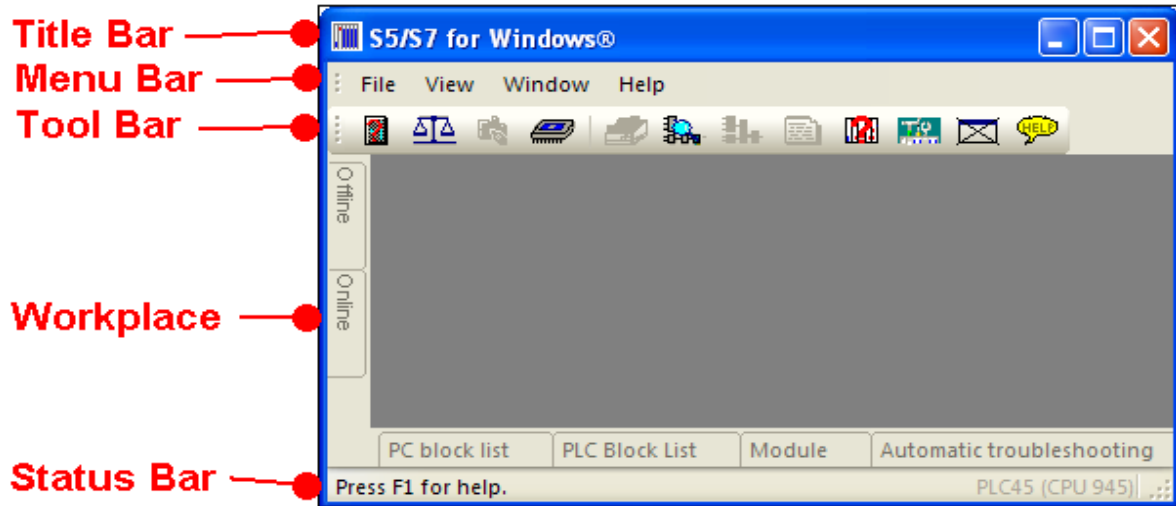
If you are not familiar with *S7 for Windows®* we recommend that you use the “Classic operator interface” (see chapter 1.2).

### Opening the S7 for Windows® Software



During the installation of *S7 for Windows®* an icon has been inserted. Double click the icon “*S7 for Windows®*” to start the programming system.

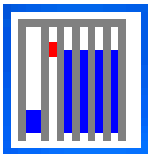
## S7 for Windows Basic® Window



### Title Bar



The title bar displays *S7 for Windows®*, and, if an additional Window is open in the workplace, the name of the open window is also displayed. The Icons are "Windows" specific.



### Open Control menu

This icon opens the Control menu that contains the commands to Restore, Move, Size, Minimize, Maximize, or Close the open Window. The Keyboard shortcut is Alt + Spacebar.



### Minimizing the open window to an icon

Clicking the button at the right side of the *S7 for Windows®* title reduces the open window to the size of an icon (same function as the **Minimize** command from the Control menu).



### Maximizing the open window

Clicking the Maximize button in the upper right corner of *S7 for Windows®* will enlarge the window to its maximum size (same function as the **Maximize** command from the Control menu).



### Restoring an enlarged window to its previous size

Clicking the Restore button in the upper right corner of *S7 for Windows®* will restore an enlarged window to its previous size (same function as the **Restore** command from the Control menu).



### Closing S7 for Windows

Clicking the Close button in the upper right corner of *S7 for Windows®* will terminate *S7 for Windows®* (same function as the **Close** command from the Control menu).

### Menu Bar



The menu bar contains a list of menus. You can open a menu by clicking the name of the menu or by pressing the **ALT** key and then the first Letter of the menu name.

### Tool Bar – Standard Operator Interface

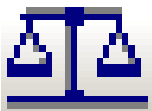


The tool bar provides instant access to frequently used *S7 for Windows®* commands. This tool bar is the same for all *S7 for Windows®* application windows. Click an icon with the mouse and the command is executed. You can reach these functions with the keyboard via the window menu and/or the function keys.



#### CPU Function (I-Stack, B-Stack, Diagnostic Buffer)

This icon enables you to view the program interrupt information stored in the PLC (I-Stack, B-Stack, Diagnostic Buffer). The information is displayed in real language with the faulty portion of the program.



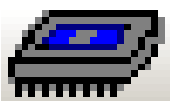
#### PLC Block (Program) Compare

*S7 for Windows®* offers a powerful PLC Program (Block Compare). The command **Compare** opens dialog boxes to select PLC Program files to compare (online and offline).



#### S7 Hardware configuration

This icon opens a window to setup and change the Hardware configuration of the S7 PLC.



#### EPROM / EEPROM / Flash EPROM Burner

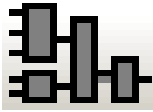
This icon opens a menu to control EPROM / EEPROM / Flash EPROM burning. It is only active when the EPROM burner option has been purchased.

**Cross Reference Display**

A click on this icon lists the appearance of operands as a symbol or absolute throughout the whole program. This function may be called from any window.

**Dynamic PLC Block Display**

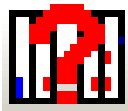
Enables fast switching between open PLC status windows.

**Block Edit**

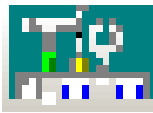
The block selected in the block listing will be displayed in the block editor and is ready for any changes.

**Symbolic Table Editor**

With this easy to use integrated editor you can write, cut, copy and paste text to create and modify the symbol table. The symbol table may be tested for multiple uses of addresses or symbols. The symbol table can also be sorted by addresses or symbols. The keyboard shortcut F6 provides the same function.

**On-line PLC Status**

The status of flags, inputs, outputs, timers, counters, comparators, data words, and peripheral words are displayed and can be modified.

**Preferences**

This icon opens dialog boxes to customize the appearance of *S7 for Windows®*. The settings for the serial port, the editors, the indexes, the display font and other (miscellaneous) settings are saved and are reloaded whenever a new PLC project is opened.

**Closing Open Windows**

The *S7 for Windows®* active window is closed by clicking this icon. The keyboard Ctrl+F4 provides the same function.


**Help Function**

An integrated subject related help file with an index and a list of keyboard shortcuts for easy operation is available. The keyboard shortcut F1 provides the same function.

**Workplace**

Additional application windows fill out the workplace.

## Status Bar



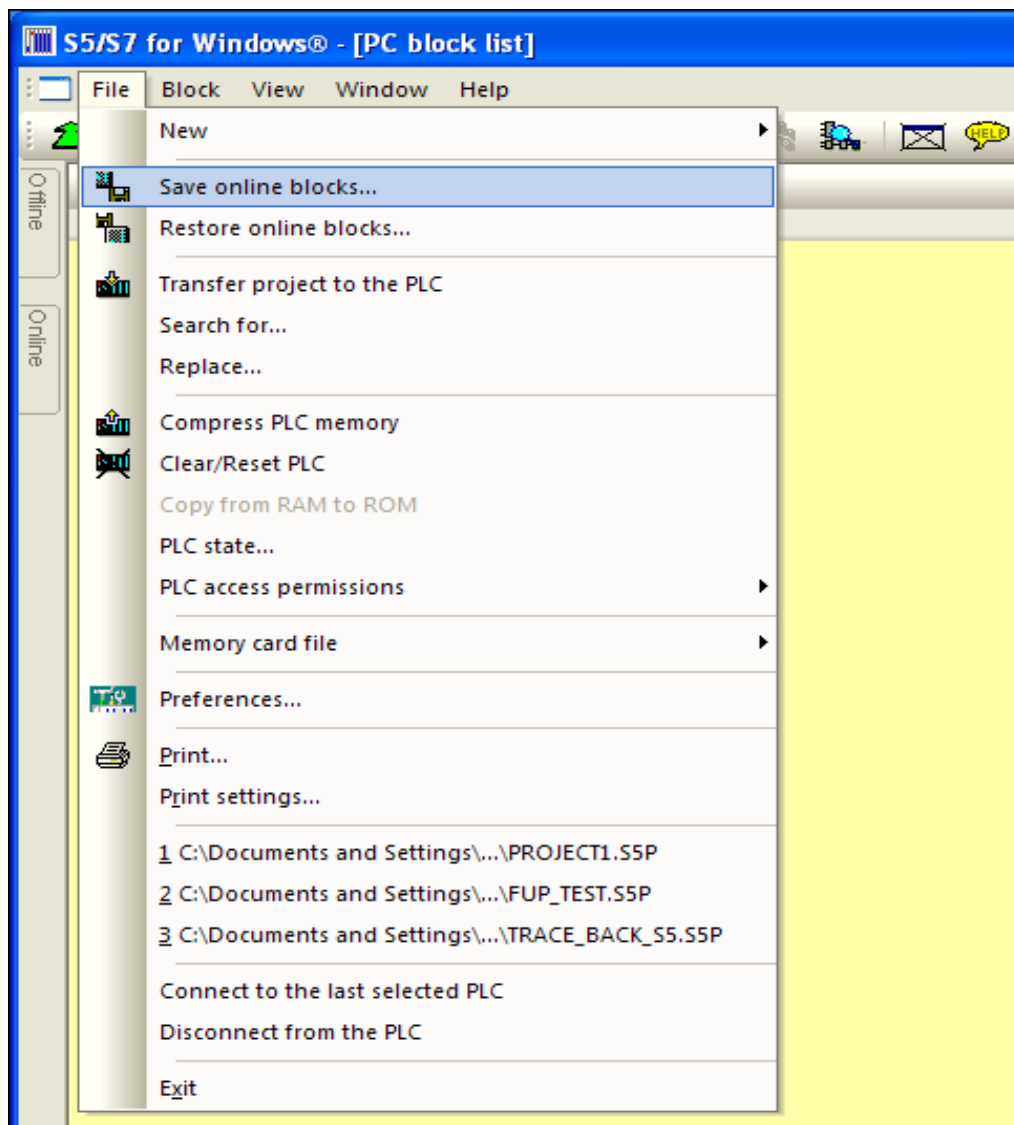
The status bar may displays additional information on the open window and executed tasks.

### Note:

The **right mouse button** may be used within the Workplace.

If the **right mouse button** is clicked, a menu with the most important commands is opened.

## 1.6 File (File Menu - PC Block List)



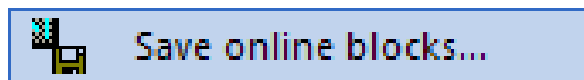
## File (File Menu - PC Block List)

The commands in the File Menu control the opening and saving of projects (files). Your personnel preference settings as well as the printing and documentation layouts are also controlled by the commands from this menu. Basic online debug functions are also available.

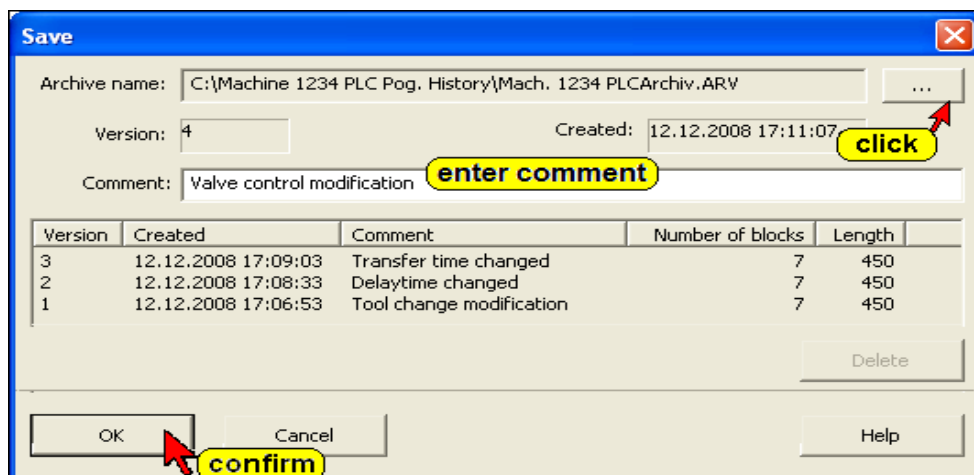
### New (New Project)

The **New** command is used to create a new project. An additional menu is opened to select the type of project (see Chapter 1.3 Generating a S7 Project).

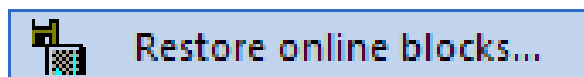
### Save Online Blocks



The PLC Blocks in the connected online PLC can be saved in an archive file (compressed). A dialog box is opened where you can select the **Archive Name** and the path to save the archived PLC program. This command is used to backup PLC programs and save the different versions (Backup History).

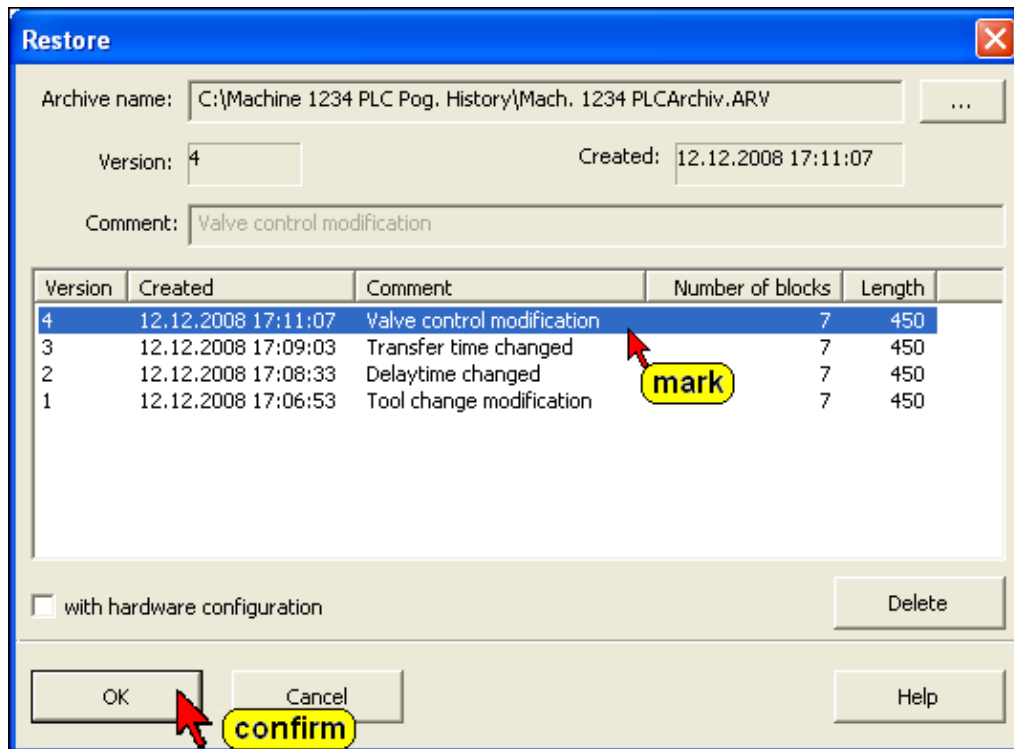


### Restore Online Blocks

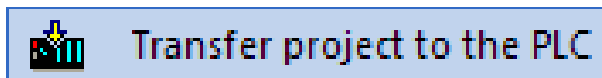


The archived PLC Programs saved in the PC (different versions – backup History) are listed. The marked archived PLC Program can be transferred to the connected online PLC. This program will replace PLC program inside the PLC.

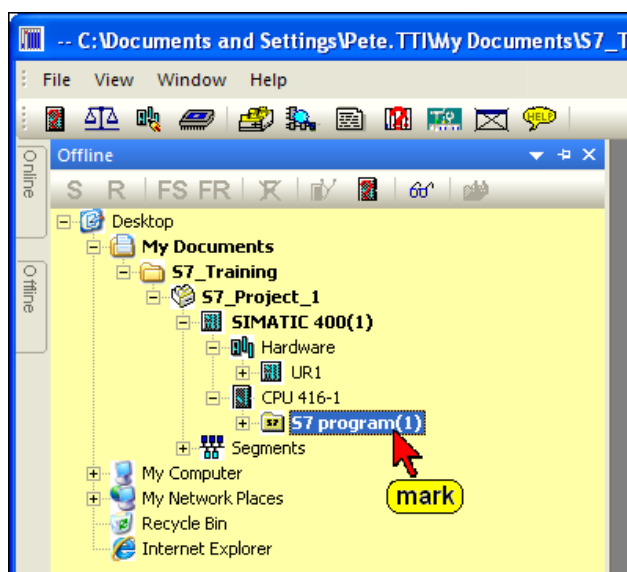
## Restore Online Blocks



## Transfer Project to the PLC



The PLC Program marked in the “Offline Tree” is transferred to the connected online PLC.



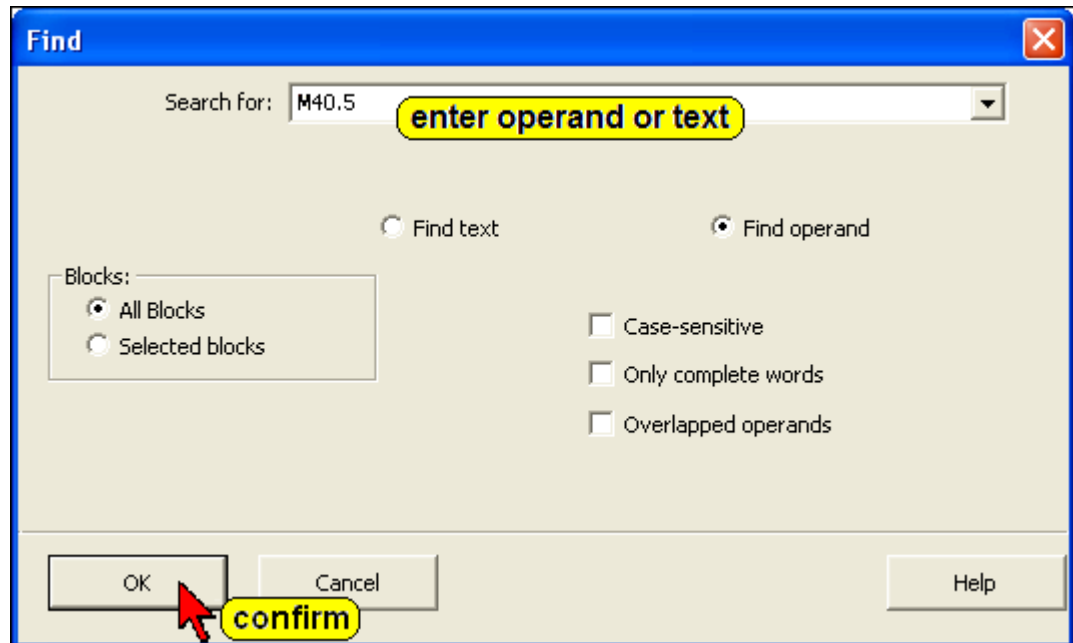
Prior to overwriting a Block a warning is displayed to allow or cancel the overwriting.



## Search For

Search for...

A dialog box is opened providing the tools to search for an operand or text within a PLC Block or within the whole PLC program. This feature works only with the offline S7 project.



The result is shown in the “Search result” window.

Search results						
Symbol	Address	Comment	Block	Segment	Position	Access
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 2	2	5	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 2	3	2	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	1	2	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	3	2	writing
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	3	5	writing
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	4	1	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	4	3	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	5	0	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	6	6	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	7	0	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	8	0	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	9	0	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	10	3	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	11	0	reading
M40.5	M40.5	1-LOADING CYCLE IN PROGRESS	FC 12	12	0	reading

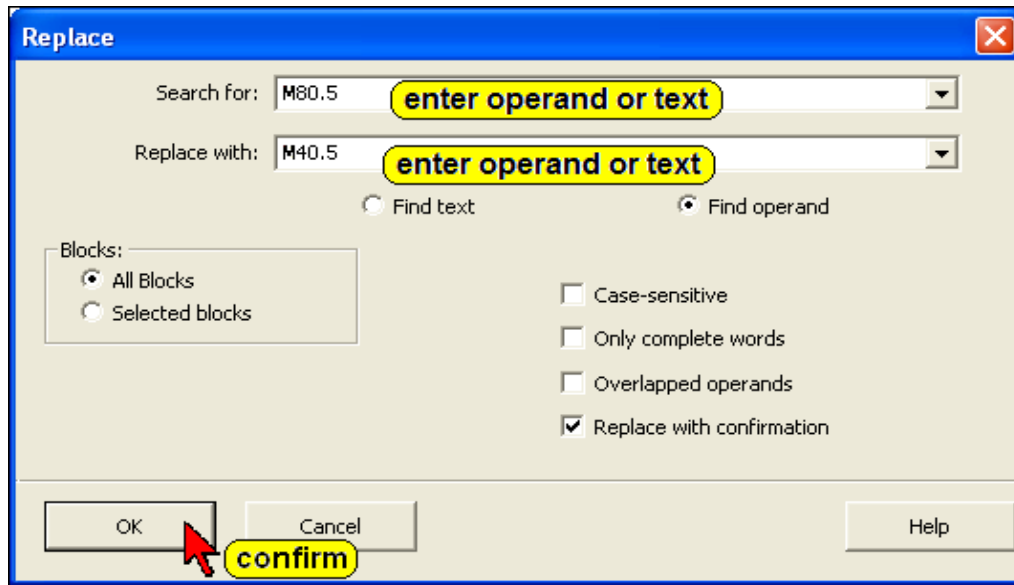
Press F1 for help. PLC45 (CPU 945)

Double clicking a line or using the right mouse button will open the editor window displaying the Block and Segment of the selected operand.

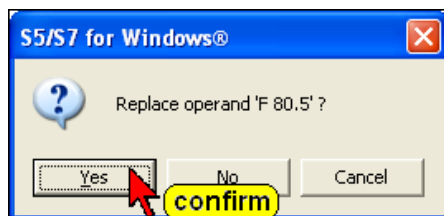
## Replace

Replace...

A dialog box is opened providing the tools to replace an operand or text within a PLC Block or within the whole PLC program. This feature works only with the offline S7 project.



If “Replace with confirm” is marked a field is open to allow or not each replacement or cancel the replacement completely.



## Compress PLC Memory

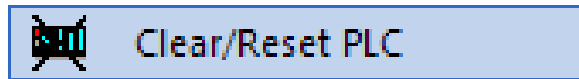


Compress PLC memory

Deleting blocks in the PLC does not remove these blocks from the PLC memory. The deleted blocks still occupy space in the memory. If blocks with the same name are transferred to the PLC, the old block remains in the PLC and occupies space in the PLC memory. The **Compress** command, from the PLC menu, reorganizes the PLC memory. All the unused blocks are deleted. After executing this command only usable blocks remain in the PLC memory.

The compress function does not work in the RUN mode.

## Clear / Reset PLC



### Overall Reset; Erasing the Program Memory and Resetting the CPU

Before downloading a new program to the S7 programmable controller (PLC) a memory reset on the CPU should be performed to ensure that no "old" blocks and information are still in the CPU.

### Overall Reset deletes the following:

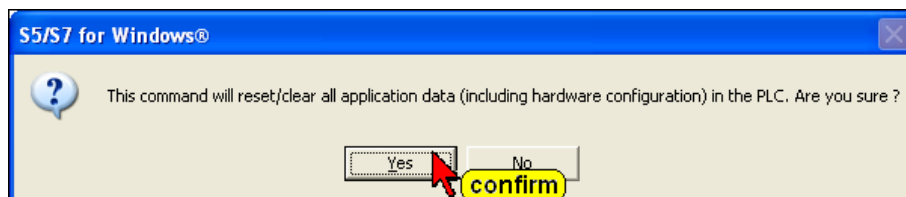
A memory reset clears the following data from the selected module:

- Work memory
- Read/write area of the load memory  
If a memory card is inserted, the module copies the contents of the memory card to the internal load memory following the memory reset.
- System memory
- Backup memory

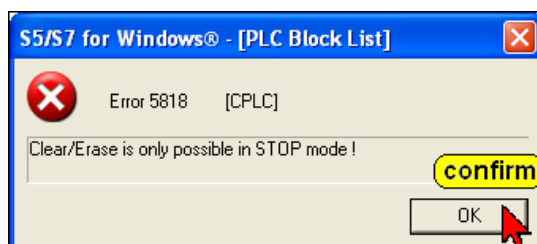
The S7 MPI parameters and the diagnostic buffer are not changed.

Click the command **“Clear / Reset PLC”** in the File menu.

To ensure that the command **“Clear / Reset PLC”** is not accidentally executed a warning is displayed. Confirm the warning.



If the CPU is not in the Stop mode a message is displayed and the command **“Clear / Reset PLC”** will not be executed.



## Copy from RAM to ROM

This menu command copies the contents of the RAM of the active module to the ROM area (only modules which support this function).

## PLC State

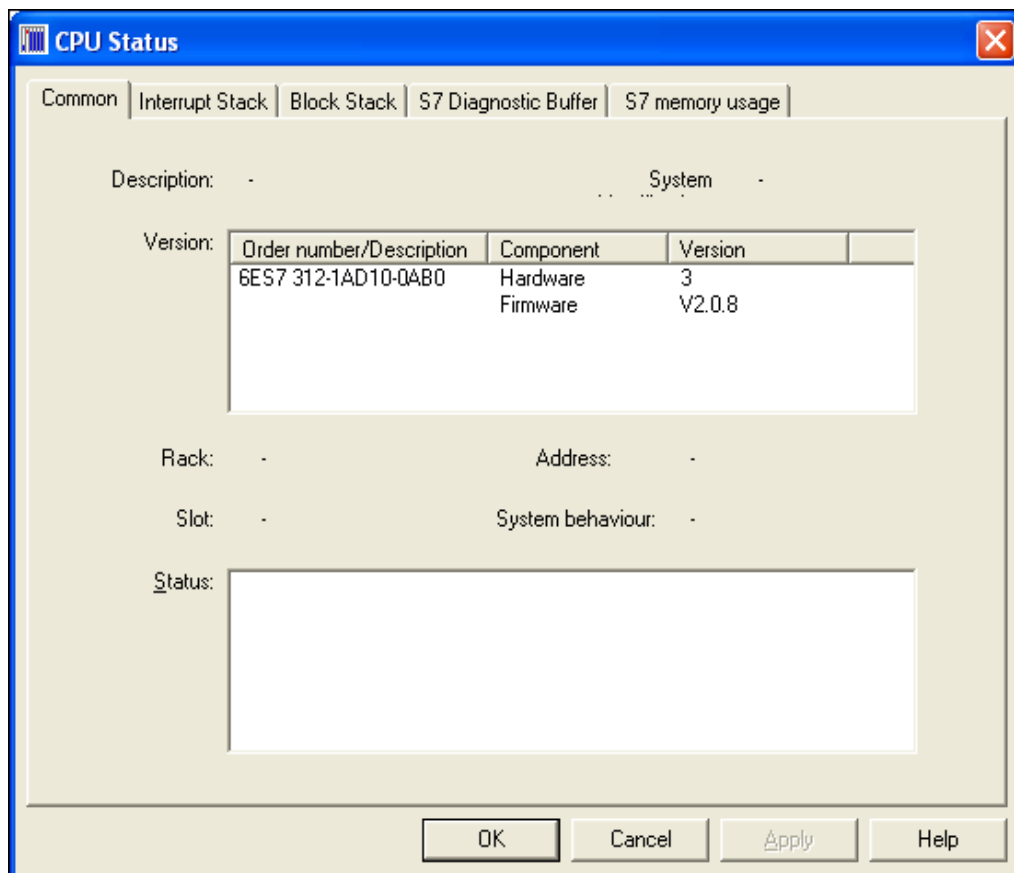
PLC state...

Several displays are provided to display the status of the online PLC.

If the PLC is running only the common, the S7 Diagnostic Buffer and the S7 memory usage display are available.

If the PLC is in a stop due to a fault condition, the Interrupt Stack (I-Stack) and the Block Stack (B-Stack) will display the reasons for the stop condition.

## Common Information

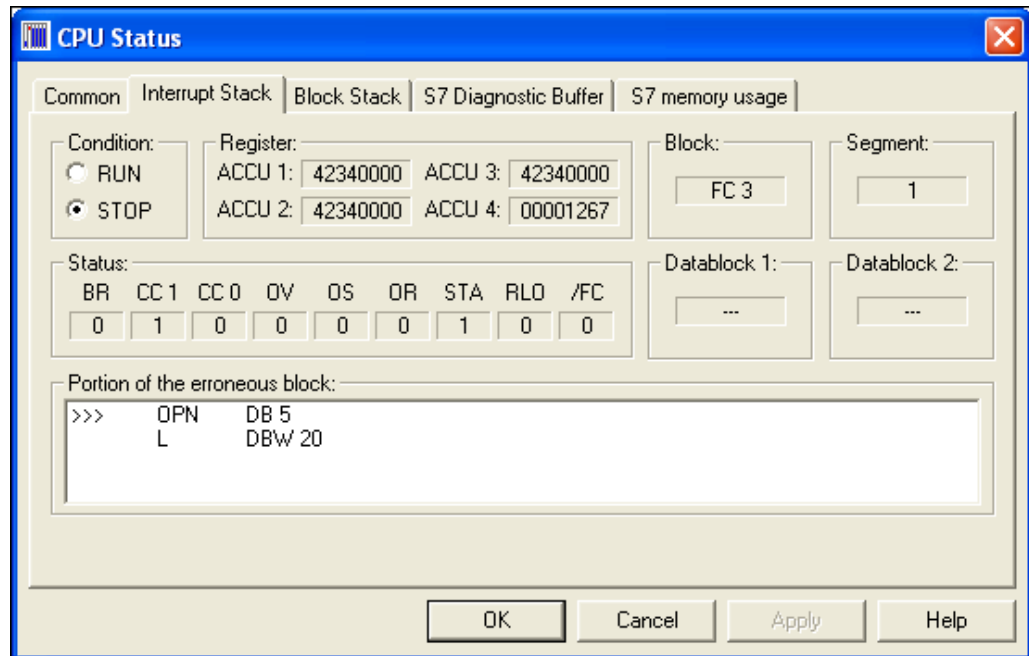


The "Module Information" property sheet contains detailed diagnostic and maintenance information on the module. Depending on the diagnostics capability of the module different information are available.

## Interrupt Stack (I Stack)

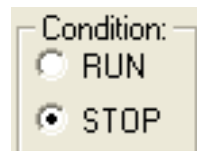
Clicking the “Interrupt Stack” tab opens the interrupt stack (I stack). The interrupt stack always refers to a priority class. First the respective organization block must be marked (selected) in the B stack.

The data displayed is valid for the interrupted priority class assigned to the organization block (OB) selected in the block stack.



### RUN

The PLC is in a RUN condition. Clicking the button puts the PLC into a RUN condition.

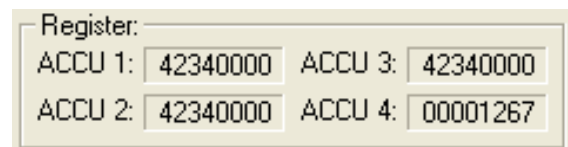


### STOP

The PLC is in a STOP condition. Clicking the button puts the PLC into a STOP condition.

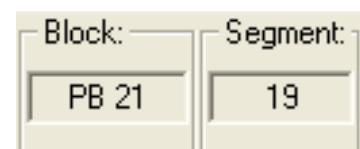
### Register (ACCU's)

The contents of accumulators 1, 2, 3, and 4 are displayed in hexadecimal form.



### Block and Segment

The block and the Segment where the PLC program was interrupted (stop condition) is displayed.



## Data Blocks

The active data blocks (DB) are listed when the PLC program was interrupted, the data block numbers will be displayed.

Datablock 1:	Datablock 2:
10	...

## Status

Status Word Bits:

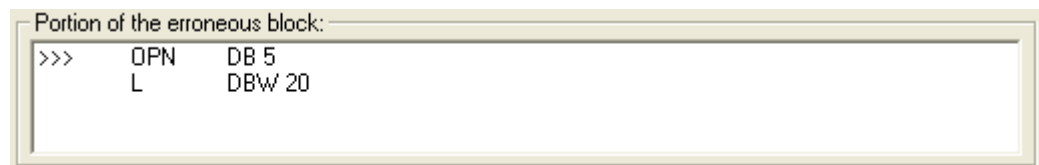
The bits zero to eight of the status word are also displayed and given an abbreviation for their meaning (bit 9 ... 15 unassigned).

Status:									
BR	CC 1	CC 0	OV	OS	OR	STA	RLO	/FC	
0	1	0	0	0	0	1	0	0	

Assignment	Bit	Description	
BR	8	Binary Result	<p>The BR bit is used to indicate whether or not an error occurred during the execution of an SFB or SFC.</p> <ul style="list-style-type: none"> <li>● If an error occurred the BR bit is 0</li> <li>● If no error occurred the BR bit is 1</li> </ul>
CC 1, CC 0	7, 6	Condition Code 1 Condition Code 0	<p>The CC1 and the CC0 bits provides information about the results of various operations:</p> <ul style="list-style-type: none"> <li>● Results of a math instruction</li> <li>● Results of a shift or rotate instruction</li> <li>● Results of a comparison instruction</li> <li>● Results of a word logic instruction</li> </ul>
OV	5	Overflow	<p>The OV bit is set if an error occurred during an arithmetic function, math function or compare function. The OV bit is reset if the fault is cleared.</p>
OS	4	Stored Overflow	<p>The OS bit is set together with the OV bit but is not reset if the fault is eliminated. The bit can be reset with the Jump if OS=1 (JOS), the block call, or the block end commands.</p>
OR	3	Or (AND before OR)	<p>The OR bit is used during the execution of a logical AND instruction (A, AN, A(, AN(,)and NOT) prior the OR operation. If the RLO of the logical AND instruction a "1", the OR bit is set. Any other logical bit instruction resets the OR bit.</p>
STA	2	Status	<p>The STA bit stores the value of the addressed (referenced) bit.</p>

**Status Word Bits** (continued)

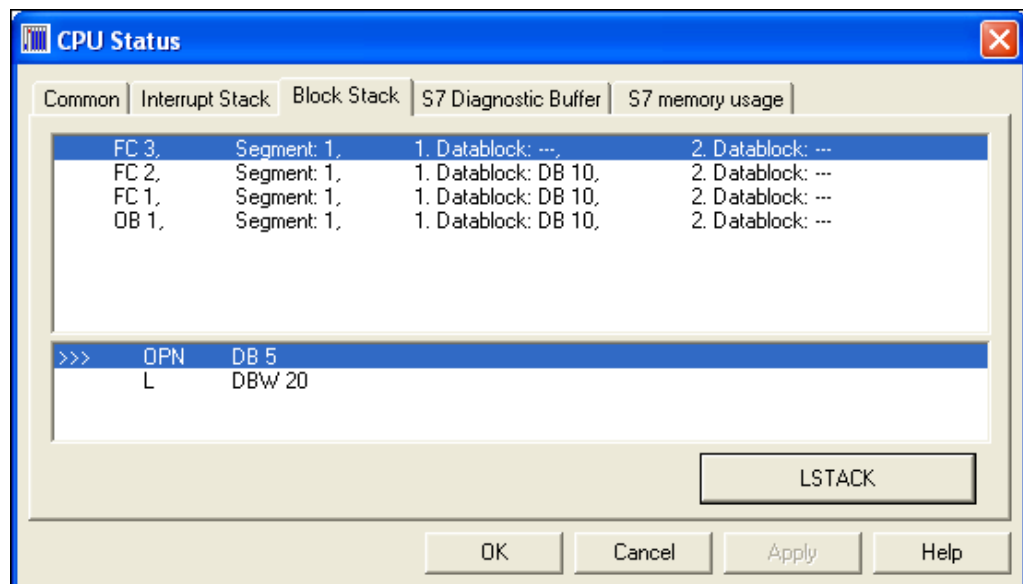
Assignment	Bit	Description	
RLO	1	Result of Logic Operation (previous)	The RLO bit stores the result of a logical operation triggered by a bit logic instruction or math comparing instructions.
/FC	0	First Check Bit (negated)	The value of the FC bit is used to control chained logical and compare instruction.

**Portion of Erroneous Block**

A list field is provided to display the portion of the PLC where the fault occurred. The statement where the PLC went into a STOP condition is displayed with a blue background.

**Block Stack (B-Stack)**

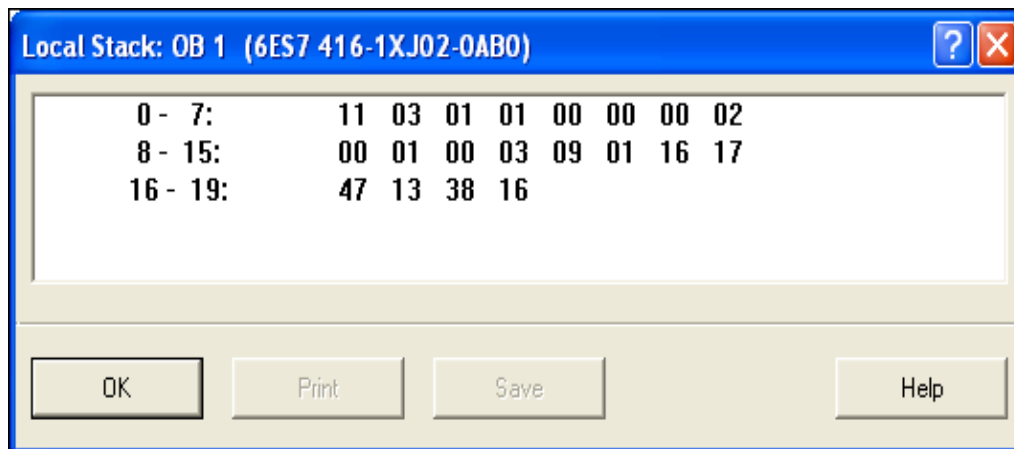
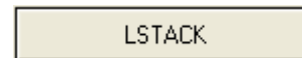
During the program execution the jump instructions enter data in the block stack. The block where the jump (block call) originated and the following locations are listed. The block stack lists all the blocks that that were called but had not been completely processed prior to the CPU going into its STOP mode.



Details are displayed about the selected block (segment). Mark the Block that you want details on.

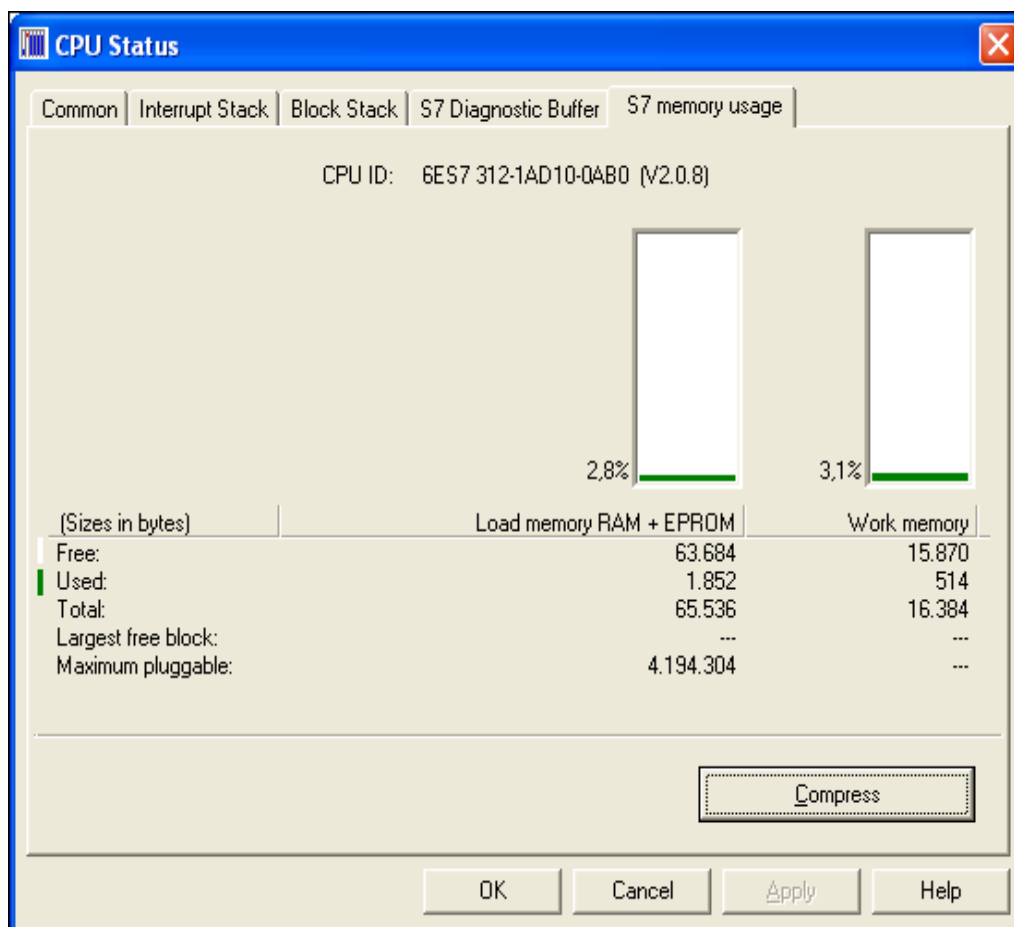
## L-STACK

The data in the L-Stack (local Temp data) can be displayed. Select the Block and click the “LSTACK” button.



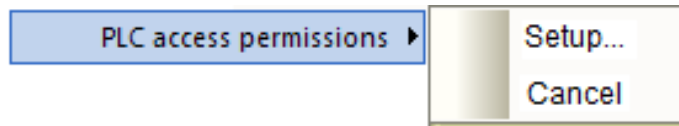
## S7 Memory usage

The used memory with its absolute addressing is displayed. A button is provided to compress the memory.



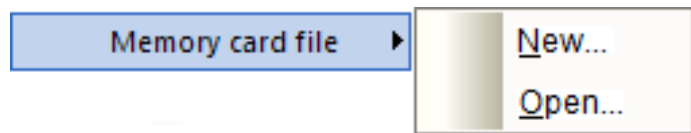


## PLC Access Permission



The "SETUP" command opens a dialog box to assign a password to access an online connected PLC. With the "Cancel" command the access can be permitted. Not all CPUs support this function.

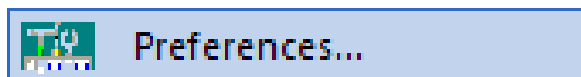
## Memory Card File



The "Memory Card file New..." and "Memory Card file Open..." functions can be used to save a full set of data from a project to a memory card along with any other data desired.

These data can then be retrieved from the memory card for subsequent use. In addition, you have the option of saving the current user program (including the HW configuration) to the memory card. To save or retrieve data, the memory card can be located either in a CPU or in the slot of a programming device (PG) or PC. The "New.../Open... Data on Memory Card" functions are only available for newer CPUs.

## Preferences

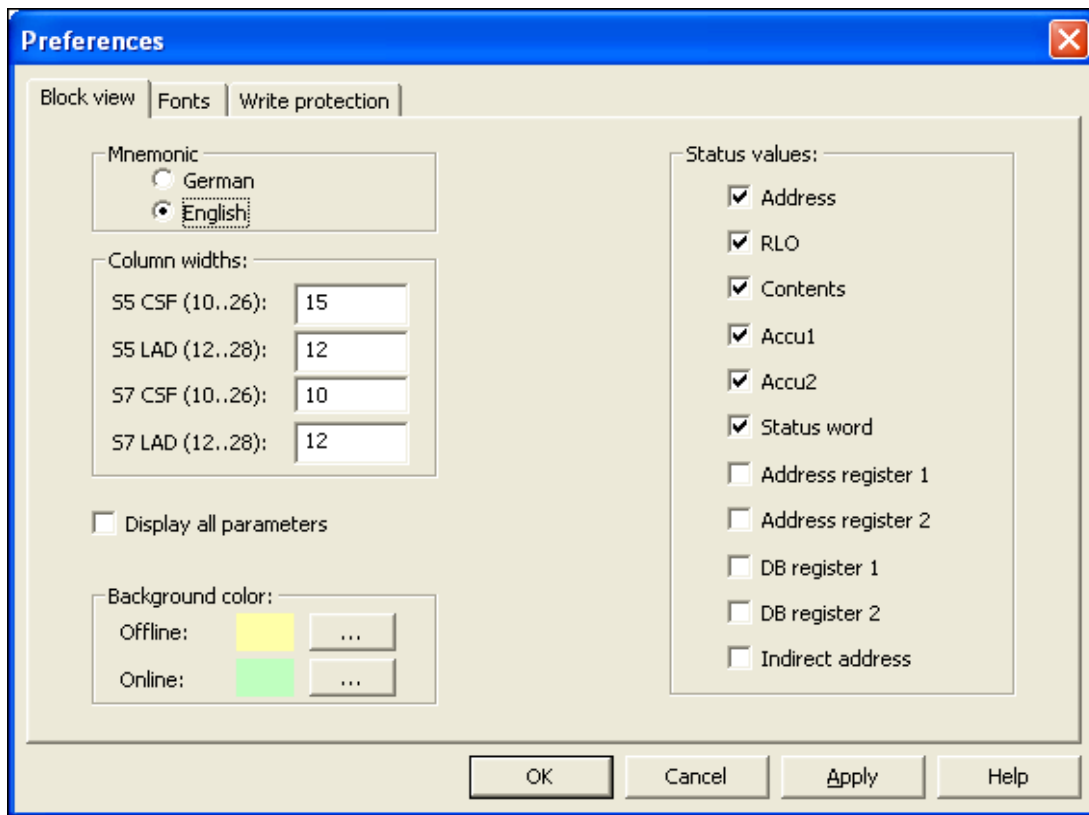


The **Preferences** command or clicking the icon opens the **Preferences** dialog box.

The dialog box is designed as a card file with tabs to separate the different subjects.

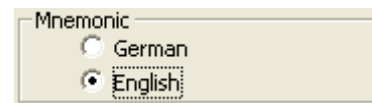
Each dialog box card offers buttons and command fields to setup the appearance of *S7 for Windows®*.

## Block View Tab



### Mnemonics

The language of the mnemonics you want to use can be set. The selection changes the mnemonics of the instructions (key words) and the operands in the logic and the symbolic table. The selection will not change the language of the program (menu commands, symbols, comments, etc.).



### English Mnemonics

The mnemonics to identify Bit-Memory, Timers, Counters, Inputs, Outputs, and the instruction set used for Statement List (STL) programming are identified with their English (International mnemonics) syntax.

Mnemonics		
Name	English	German
Input	I	E
Output	Q	A
Memory (Flag)	M	M
Timer	T	T

Mnemonics		
Name	English	German
Counter	C	Z
AND	A	U
Count Down	CD	ZR
OR	O	O

## Column Width

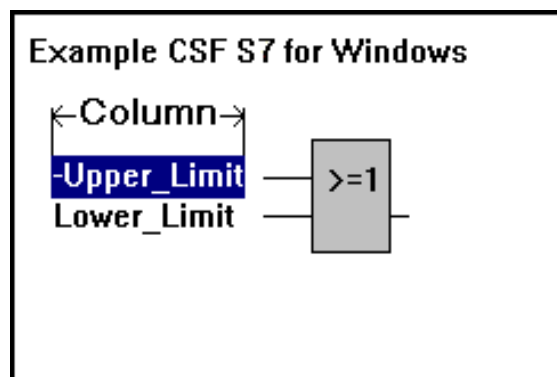
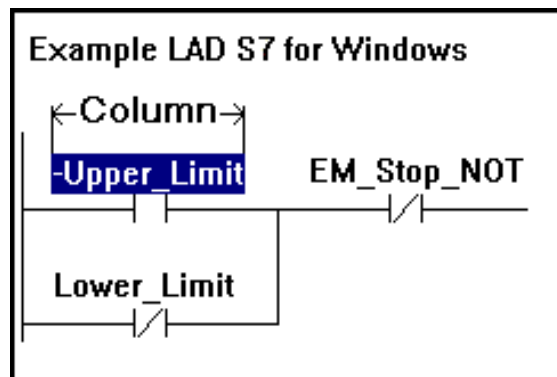
S7 for Windows® can display a symbolic operand with up to 24 characters (without a hyphen). To display symbolic operands with their full length name, the column width is adjustable. It is insured, that the operand is correctly identified even when the symbolic name is truncated in the display.

Column widths:	
S5 CSF (10..26):	<input type="text" value="15"/>
S5 LAD (12..28):	<input type="text" value="12"/>
S7 CSF (10..26):	<input type="text" value="10"/>
S7 LAD (12..28):	<input type="text" value="12"/>

The column width is separately adjustable for the Control System Flowchart (**CSF**) and the Ladder Diagram (**LAD**) display. You can select a column width between 10 and 26 characters (including the leading hyphen) for the CSF display. LAD display allows a column width between 12 and 28 characters (including the leading hyphen).

The number entered as the column width is the number of characters spaces possible to display. The width of a character space varies with the font selected and does not always match the width of the other characters. Usually the number of space characters is slightly higher than the number of characters possible to be displayed in a given column width.

Column width example S7 for Windows®



## Status Values

### Address

In this column the memory addresses of the S7 instruction is displayed. The address displayed in the STL Status window online is the relative addresses within the PLC RAM area.

### RLO

In this column the Result of a Logical Instruction (ROL) of the instruction in that specific line is displayed.

### Contents

In this column the Status Bit or the Contents of counters and timers is displayed.

### ACCU1, ACCU2

In these columns the contents of the Accumulators are displayed. The accumulators are 16 or 32 bit general purpose registers and are used to process bytes, words, and double words.

### Status Word

In this column the contents of the Status Word is displayed. The eight (8) lower bits of the 16 bit Status Word Register are showing detailed information about the instruction.

### Address Register 1, Address Register 2

The contents of the Address Registers are displayed in these columns.

### DB Register 1, DB Register 2

The contents of the Data Block Registers are displayed in these columns.

### Indirect Address

In this column the information about the indirect addressing in use are displayed.

Status values:

- ☒ Address
- ☒ RLO
- ☒ Contents
- ☒ Accu1
- ☒ Accu2
- ☒ Status word
- ☐ Address register 1
- ☐ Address register 2
- ☐ DB register 1
- ☐ DB register 2
- ☐ Indirect address

### Note:

The more information you want to display in the **STL Status** window the longer it takes to build up the **STL Status** window. All information being displayed has to be transferred from the PLC to the PC.

## Display all Parameters



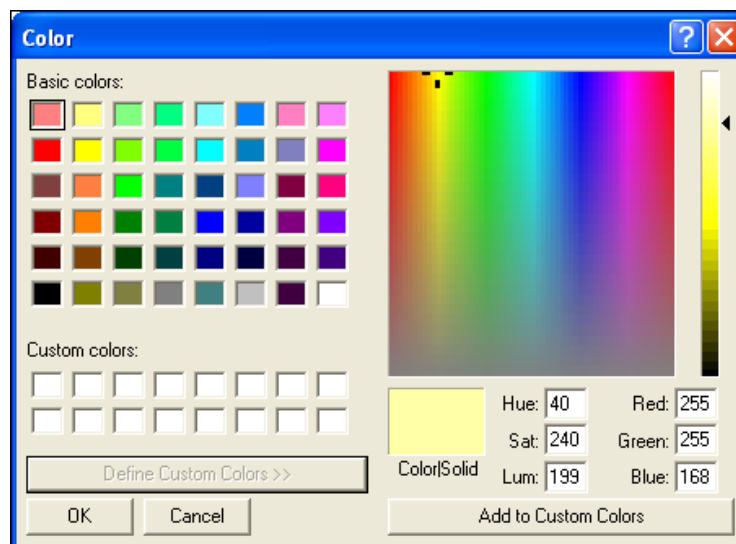
If selected all formal operands are displayed if calling a Function Block (FB).

## Background Color

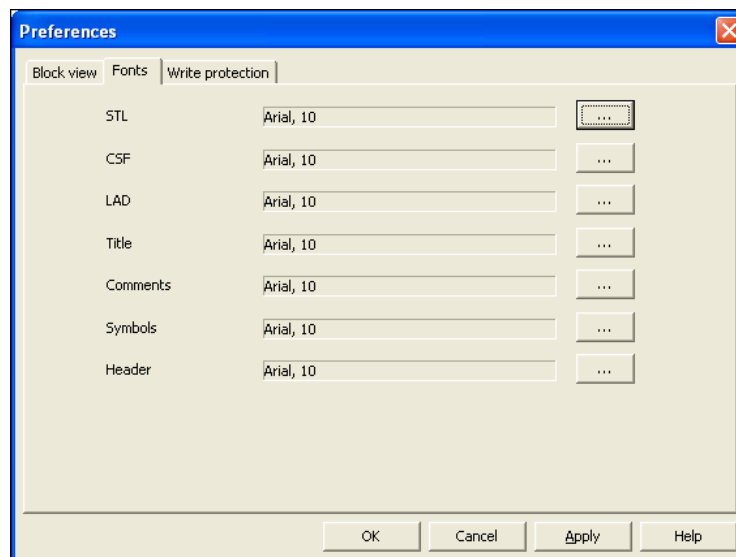
The default setting is that Windows with **“Offline – information”** have a light yellow background. Windows with **“Online – information”** have a light green background.



The color of the background can be changed. Clicking the button will open a dialog box to change the colors.



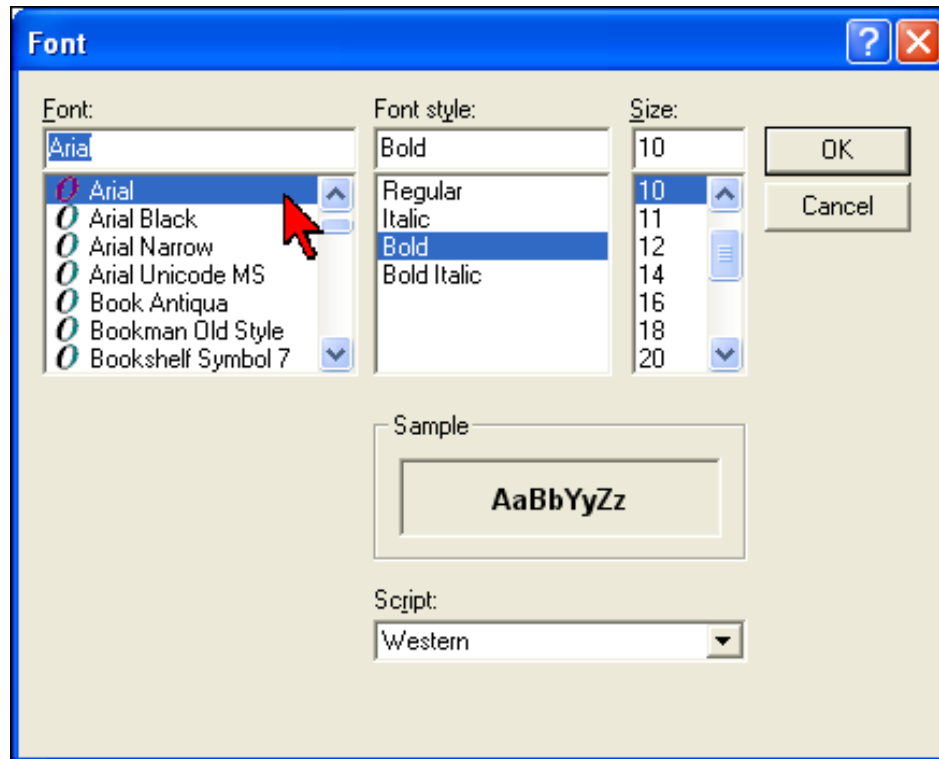
## Fonts Tab



The font can be changed. Clicking the button will open a dialog box to change the fonts.



Different fonts may be assigned to various subjects for separation and a better reading. Also the font size and its style may be set.

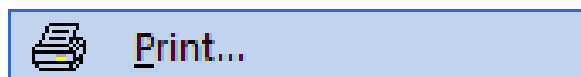
**Note:**

The font selection (done via the **Presentation Fonts** settings) is for the CRT display only. The fonts for the documentation printout are selected with the settings from the **Font Type** card of the **Documentation Layout** dialog box.

## Write Protect Tab

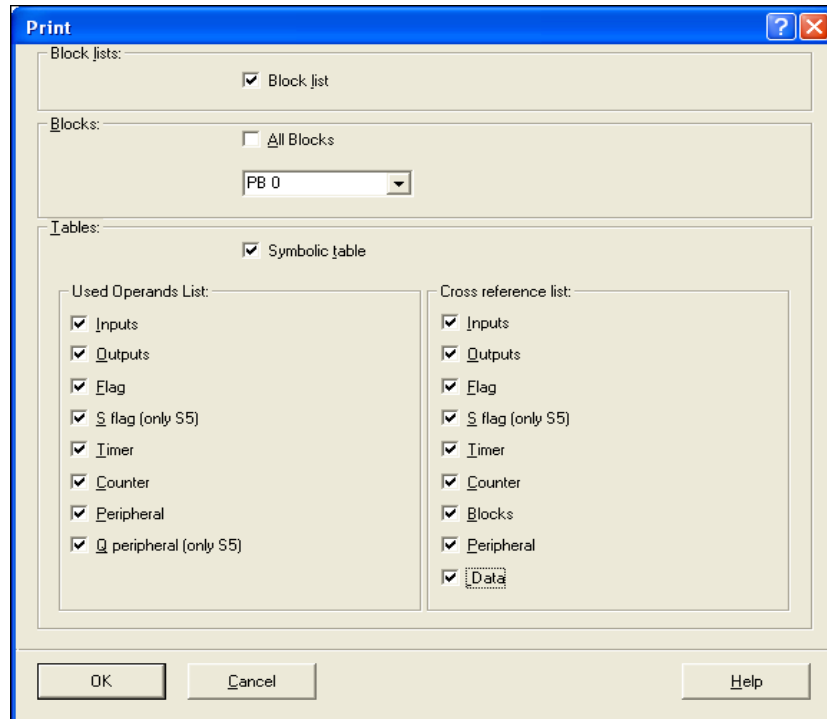
With *S7 for Windows®* you can prohibit the online access to the PLC. The access can be password protected.

## Print



The command **Print** opens the dialog box **Print**. The dialog box gives you the ability to select the items to be printed.

## Print



### Block List

If the block list button is marked, a list is printed with the information displayed in the **PC Block List** window with the names of the blocks, their length, date and time of the last modification, and the comments that will be printed out

### Symbolic Table

If the symbolic table button is marked, the symbolic table will be printed out.

### Used Operands List

The portions of the **Used Operands List** to be printed can be selected. You may mark one, several, or all operand groups to be printed in the used operands list. The used operands list is printed, showing the selected operands and where they are used (block and segment number) within the PLC program.

### Cross Reference List

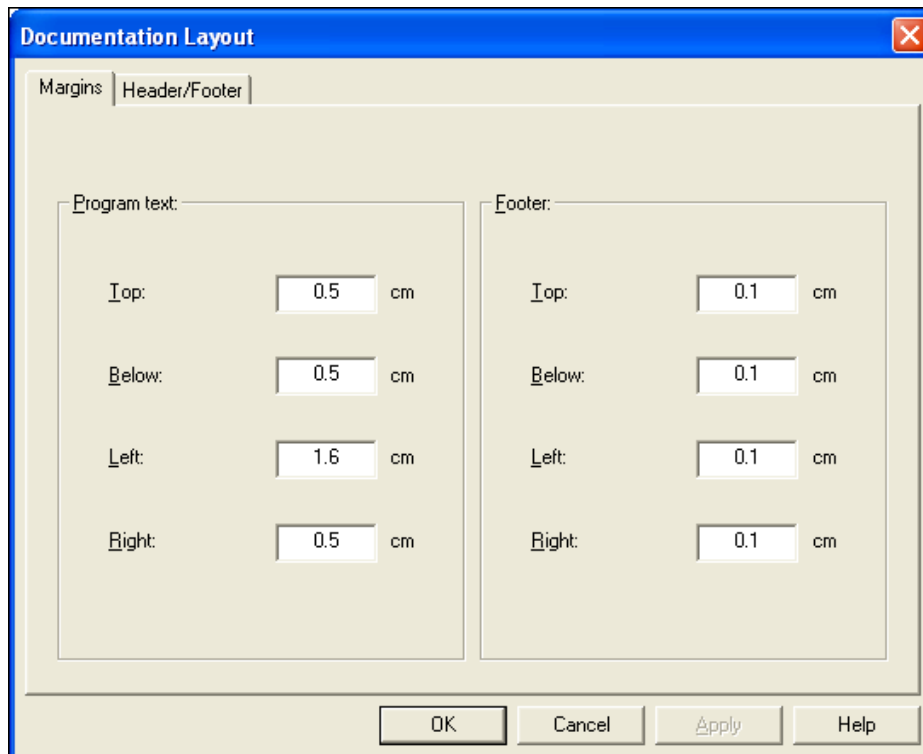
The portions of the **Cross Reference List** to be printed can be selected. You may mark one, several, or all operand groups to be printed the cross- reference list. The cross-reference list is printed showing the selected operands and where they are used (block and segment number) within the PLC program.

## Print Settings

### Print settings...

The **Print Settings** command or clicking the icon opens the **Documentation Layout** dialog box.

The dialog box is designed as a card file with tabs to separate the different subjects.



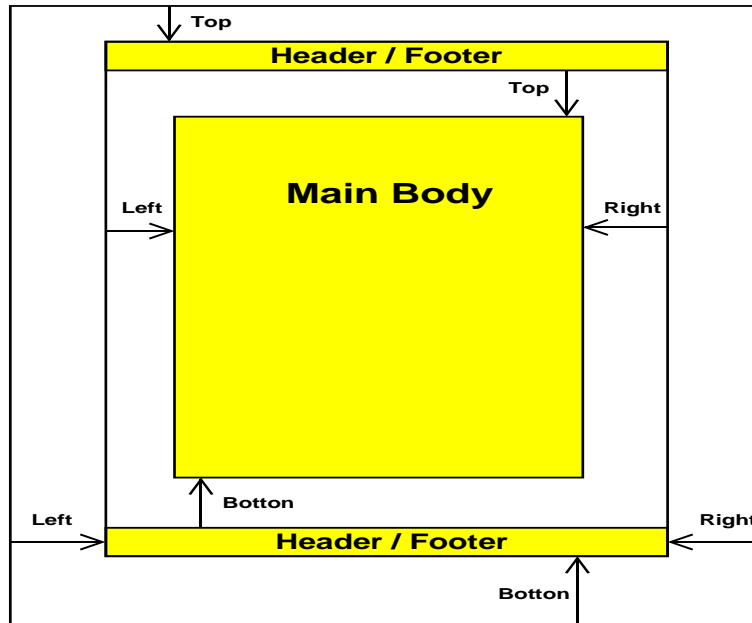
### Margins Tab

Select the set margins dialog box to customize the page layout. The margins of the **Program Text** (Main Body – area where the PLC logic is printed) and the **Footer** (Header / Footer) are set independently. The dimensions are in centimeters (cm).

- The measurements must be entered in centimeter (cm).
- The margins for the header and the footer are measured relative to the page.
- The margins of the main body are measured relative to the header and footer (inside).



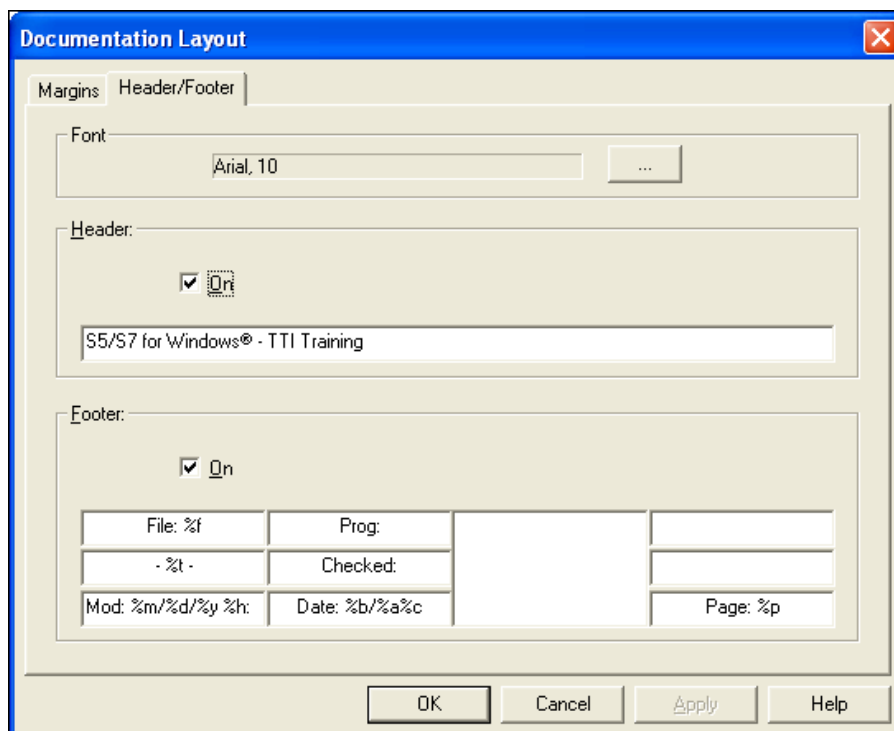
## Page Layout Margins



The tab provides fields to customize the appearance of the page of documentation for the PLC program.

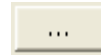
You may type any text in the text fields. There are field abbreviations available to assist you when entering PLC program information and date and time information to the header and footer. Buttons are available to disable the footer or header. The font for the header and footer may also be set.

### Header / Footer Tab



## Font

The font can be selected. Clicking the button will open a dialog box to change the fonts.



The font selections made in the **Fonts Type** settings box, are used for printing only.

## Header

The tab provides a field (you may enable / disable the header) to customize the appearance of the page header of documentation for the PLC program. You may type any text in the text field.

## Footer

The tab provides a field (you may enable / disable the footer) to customize the appearance of the page footer of documentation for the PLC program.

There are field abbreviations available to assist you when entering PLC program information and date and time information to the footer. You may type in addition to the abbreviations any text in the text field.

## Footer Field abbreviations

%f	File name of the PLC program without file name extension.	
%t	List name (Title).	
%p	Page number.	
%a	Day	Printing date
%b	Month	Printing date.
%c	Year	Printing date.
%d	Day	File creation/modification date.
%m	Month	File creation/modification date.
%y	Year	File creation/modification date.
%h	Hour	File creation/modification date.
%l	Minutes	File creation/modification date.
%s	Seconds	File creation/modification date.

## Connect to the last selected PLC

Connect to the last selected PLC

The last selected PLC online connection is established again (how to select and establish an online PLC connection see chapter 2).

## Connect to the last selected PLC

Disconnect from the PLC

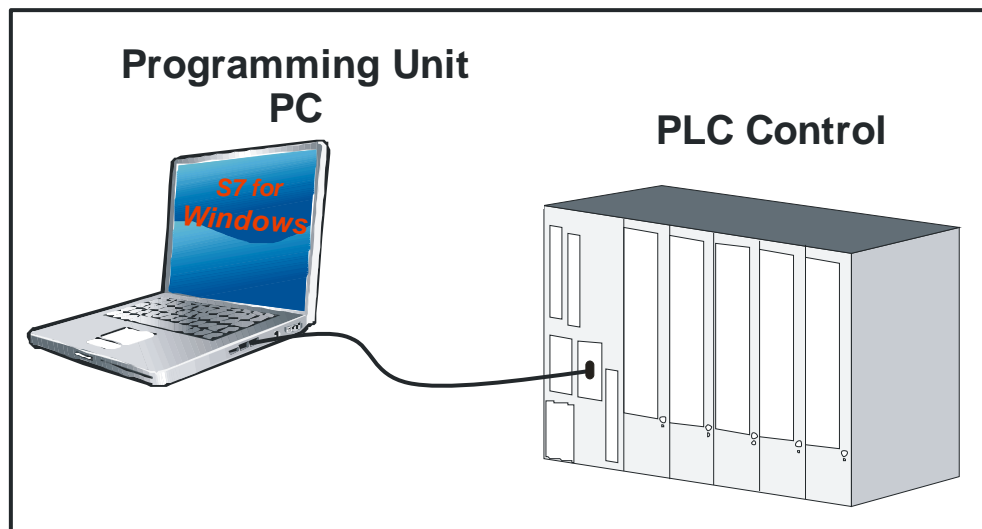
The PLC online connection is disabled.



## 2 S7 for Windows® Online Functions

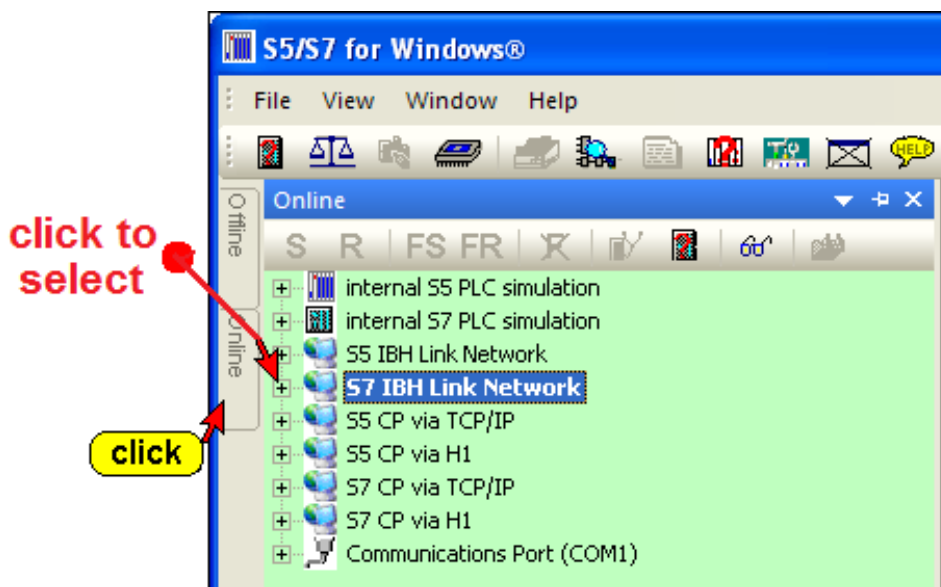
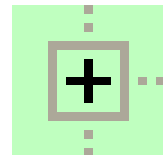
How to troubleshoot an On-Line connection to the PLC

### 2.1 Connecting the S7 PLC with a PC

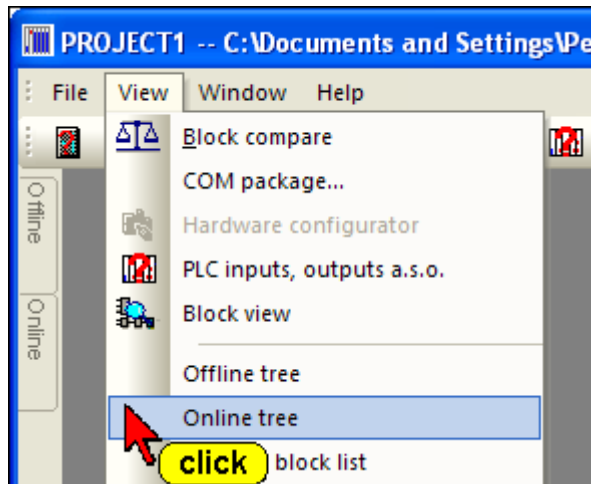


The S7 PLC's connected to the PC are listed in the **"Online – Tree"**.

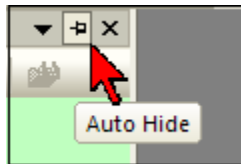
All possible connections are listed. To select a connection click the icon in front of the name. The established connection is displayed in bold letters.



If the “**Online**” tab is not shown, use the command “Online tree” from the “File” menu.



It is recommended that you use the “Auto Hide” icon to lock the tab at the outside border of *S7 for Windows®*. By moving the mouse pointer to the tab, the window will automatically open.



## S7 SoftPLC internal



On the PC executing *S7 for Windows®*, an S7 SoftPLC can be installed (optional). This software PLC could be used to control machinery. Inputs and outputs are handled via a bus system (Profi Bus etc.)

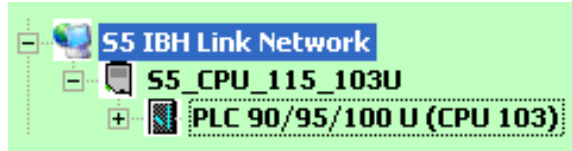
## Internal S7 PLC Simulation



*S7 for Windows®* provides an internal simulation PLC. With the integrated simulation PLC you can test PLC programs. For testing you do not need additional hardware. The programs are tested directly within your PC. The status is displayed, you can force inputs, and you can display the outputs.

The internal simulation PLC is fully compatible with the S7 CPU 416.

## S7 IBH Link Network



The **IBHLink S7** is an Ethernet-converter within a 15-pin Sub-D-housing for a connection via a switch, a hub or even directly to a PC with a common network adaptor. The protocol used is the standard TCP/IP protocol. In this way, the user can benefit from all the advantages of Ethernet, such as remote maintenance via a standard router or VPN-connections (Virtual Private Network). Likewise, a direct connection to the Internet is possible.

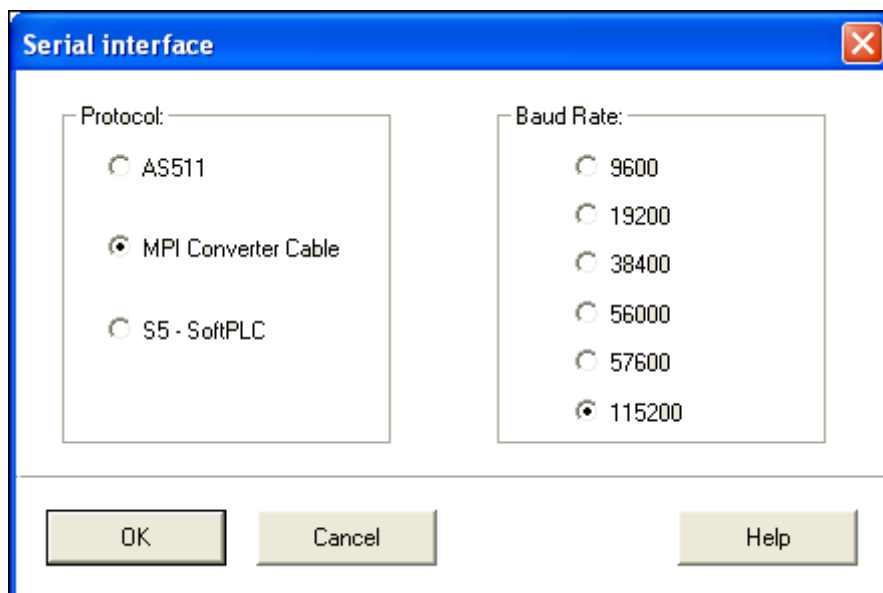
## S7 CP via TCP/IP; S7 CP via H1

These connections require “Communication Processor Boards” in the PLC. The connections are listed because a standard Ethernet connection is required at the PC side.

## Communication Port (COM1)



Selecting the Communications serial ports (COM 1 – COM 4) will open a dialog box to select the Baud Rate and the Protocol. USB Cables require conversion software.



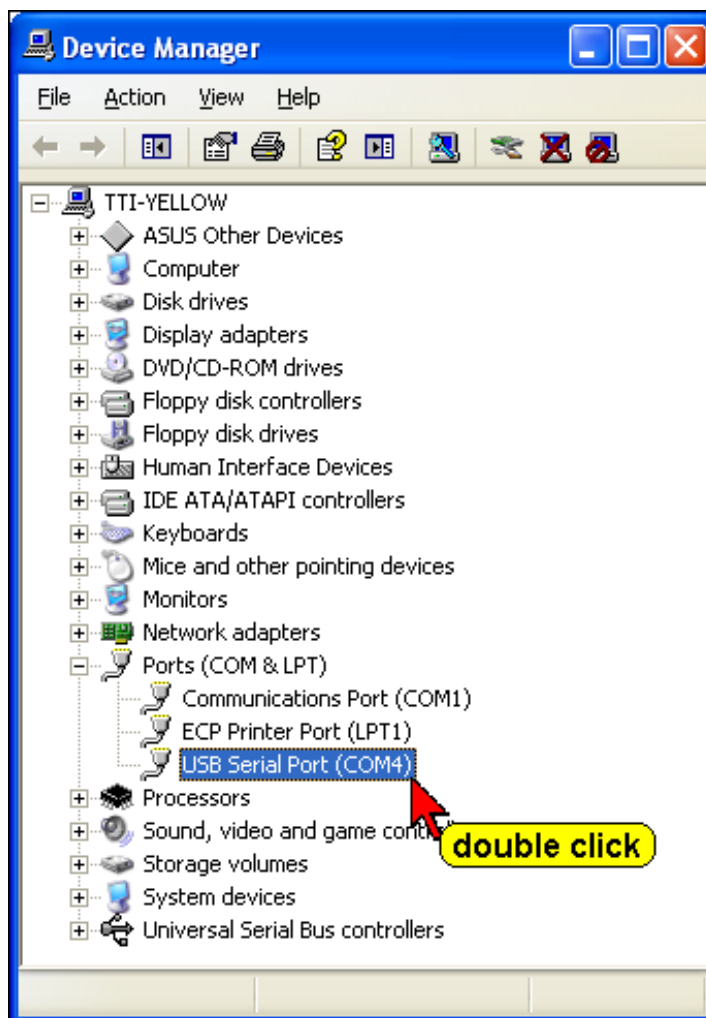
The Simatic S7 PLC must be connected to one of the serial ports (COM 1 – COM 4) of your PC via a MPI Converter Cable.

Depending on the type (manufacture) the MPI Converter Cable can handle Baud Rates of 1920 Baud, 38400 Baud or, 115200 Baud.

### USB Serial Port (COM4)

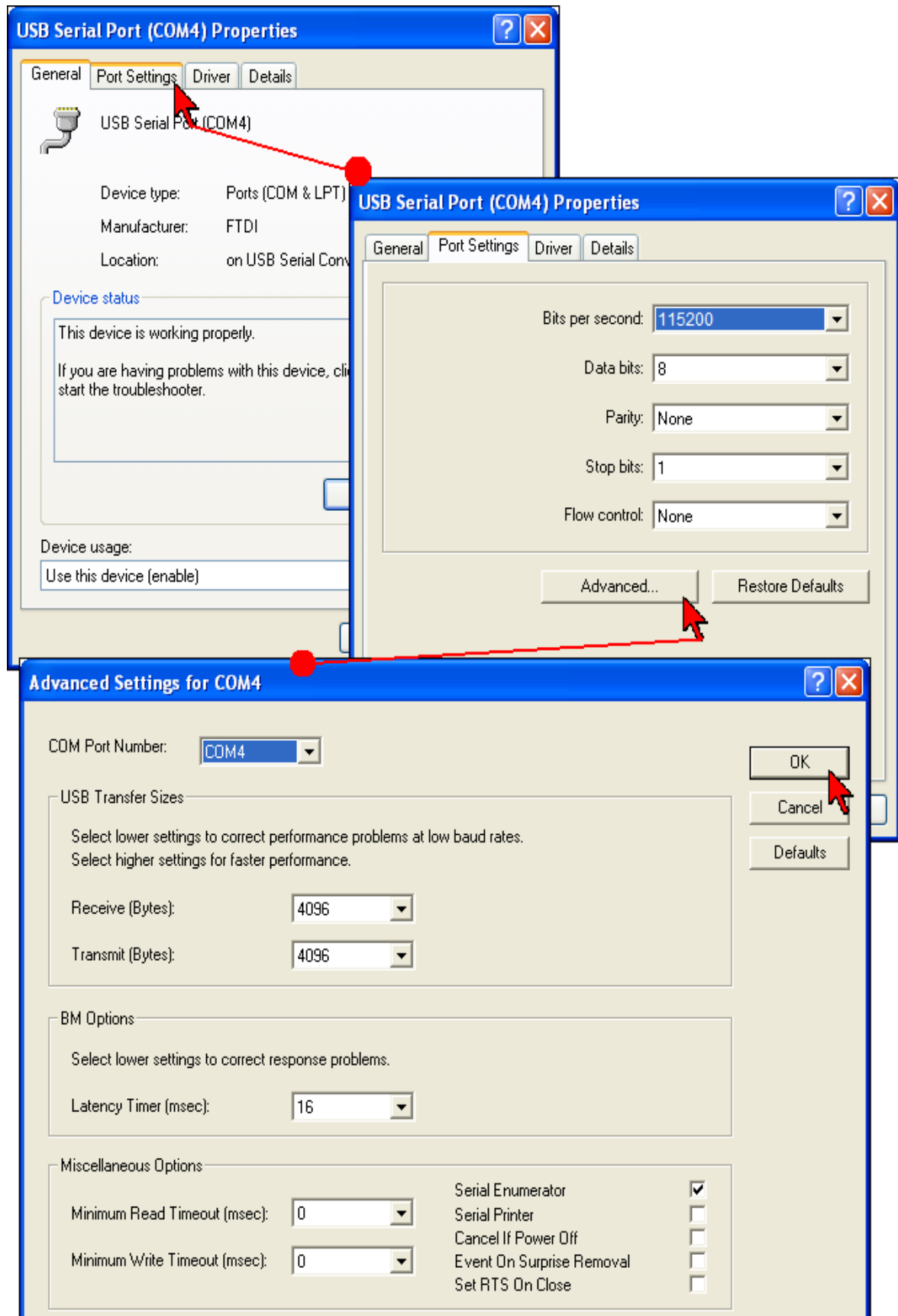


S7 for Windows® cannot handle an USB Port connection directly. To use an USB connector cable, software must be installed to convert the COM port connection to an USB port. This software driver is provided with the USB cable. The following pictures show the correct settings of the USB Serial Port conversion. Double click “USB Serial Port (COM3)” to open the dialog to set the port parameters.





## Device Manager Settings (USB – COM conversion)

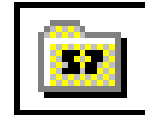


## 2.2 Transferring all PLC Blocks of a STEP® 7 Program to the PLC

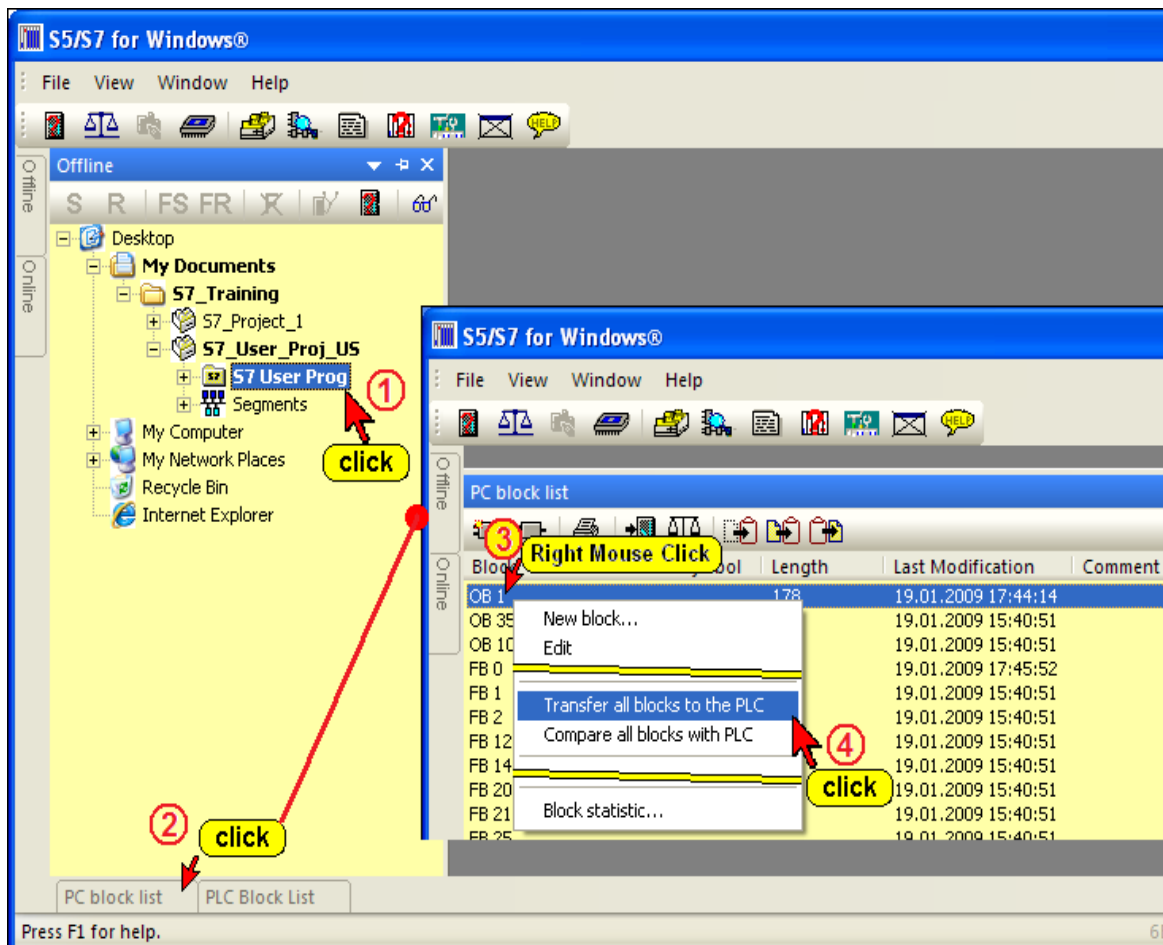
The PLC Blocks of a STEP® 7 Program can be directly transferred to the connected PLC. No conversion is necessary.

### Transferring a STEP® 7 Program to the PLC

The following icon identifies a STEP® 7 Program. PLC projects (programs) created with the basic PLC programming package STEP® 7 from SIEMENS may directly be transferred to the PLC.

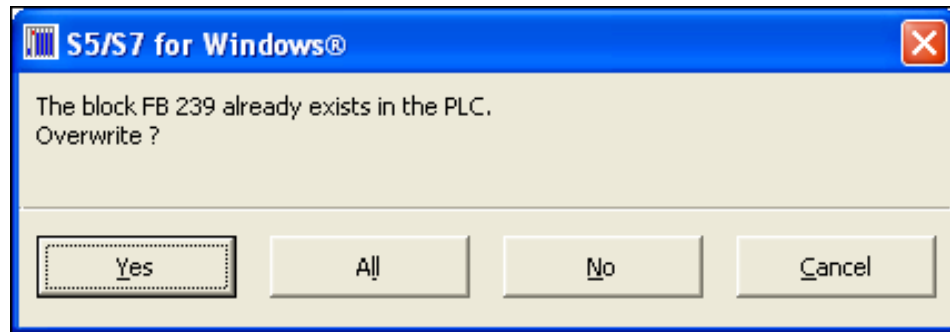


Open the “Offline – Tree” and click the program name <sup>①</sup> with the mouse button. Click the “PC block list” <sup>②</sup> tab.



The PC block list window opens. Open the context menu with a right <sup>③</sup> click on any of the Block names. With a click on the command “Transfer all Blocks to the PLC” the S7 Program is transferred to the connected PLC. <sup>④</sup>

If a block is currently stored in the PLC, a dialog box will open to allow you to overwrite the block or to abort the transfer.



Activating the “**Yes**” button will only overwrite the PLC block mentioned in the dialog box. If another block is stored in the PLC, the dialog box will be opened again.

---

## 2.3 Transferring a PLC Program or PLC Blocks to the PC

To transfer Blocks from the PLC to the PC, an S7 project must be available in the PC to store the transferred Blocks. The project must be selected prior transferring Blocks to the PC.

A single Block, several Blocks or all Blocks can be transferred via the serial link to the PC. The selected (marked) blocks in the PLC block list are transferred to the PC. This can be a single block or multiple blocks.

### Warning:

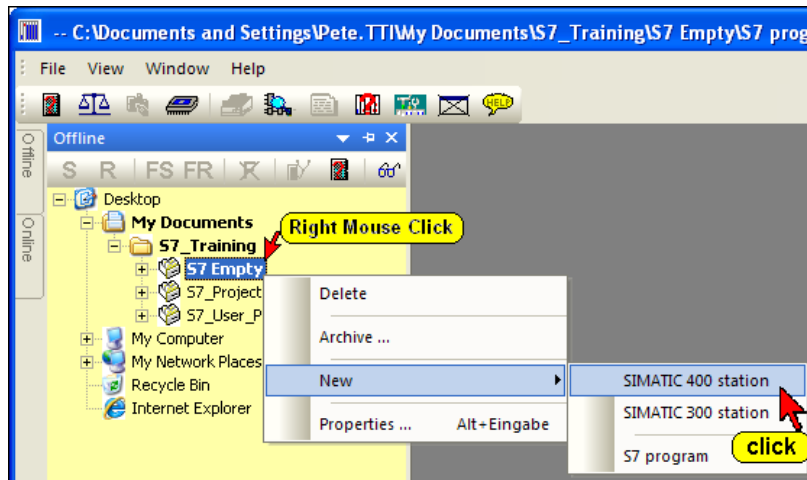
You should only transfer blocks from the PLC to the PC if the selected blocks do not exist in the PC Block List.



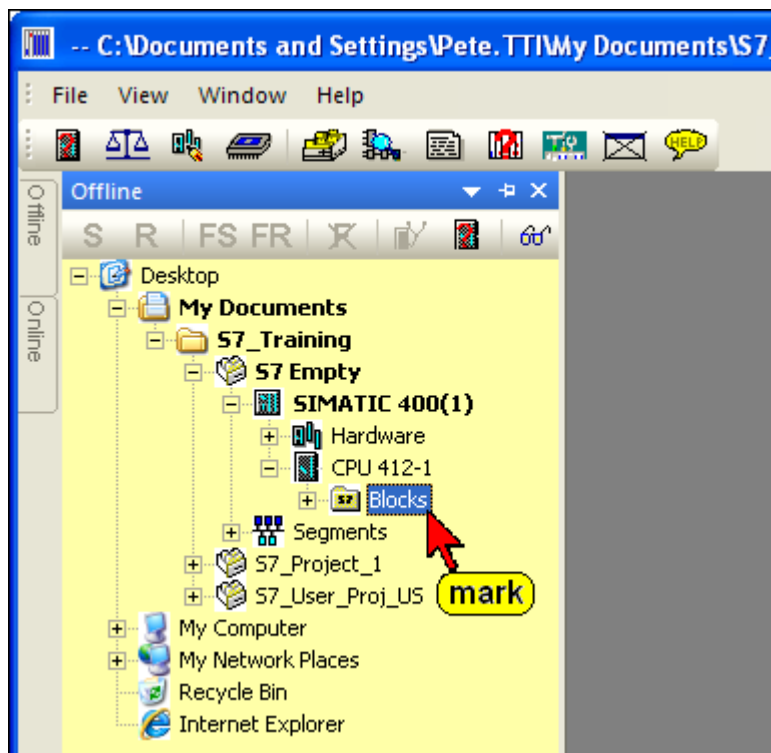
If a block in the PC is overwritten by a PLC block, it is possible that comments will be shifted. Jumps may not be valid anymore and jump labels may be exchanged with substitute labels (M001 etc.) and shifted.

The names of Local Variables are changed into substituted names (IN1, OUT2, IN\_OUT3, STAT4, TEMP5, etc.).

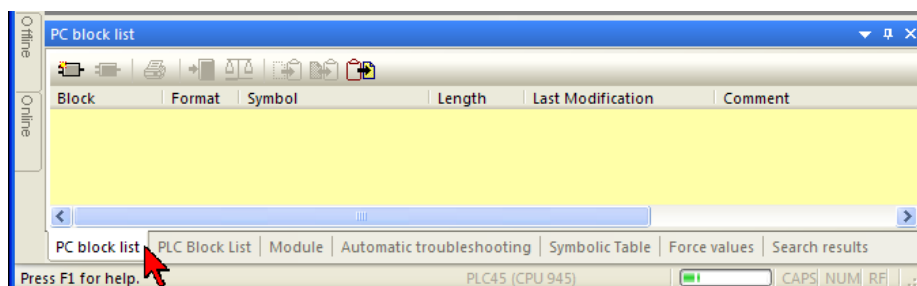
## Select the Project, the Hardware Station and the S7 Program to save the PLC Program



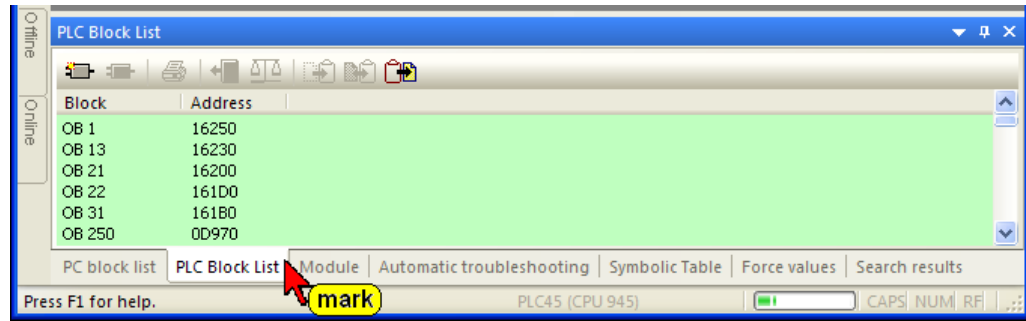
How to generate a project and an S7 300 / 400 Hardware station, see chapter 1.3. Mark the S7 Program folder.



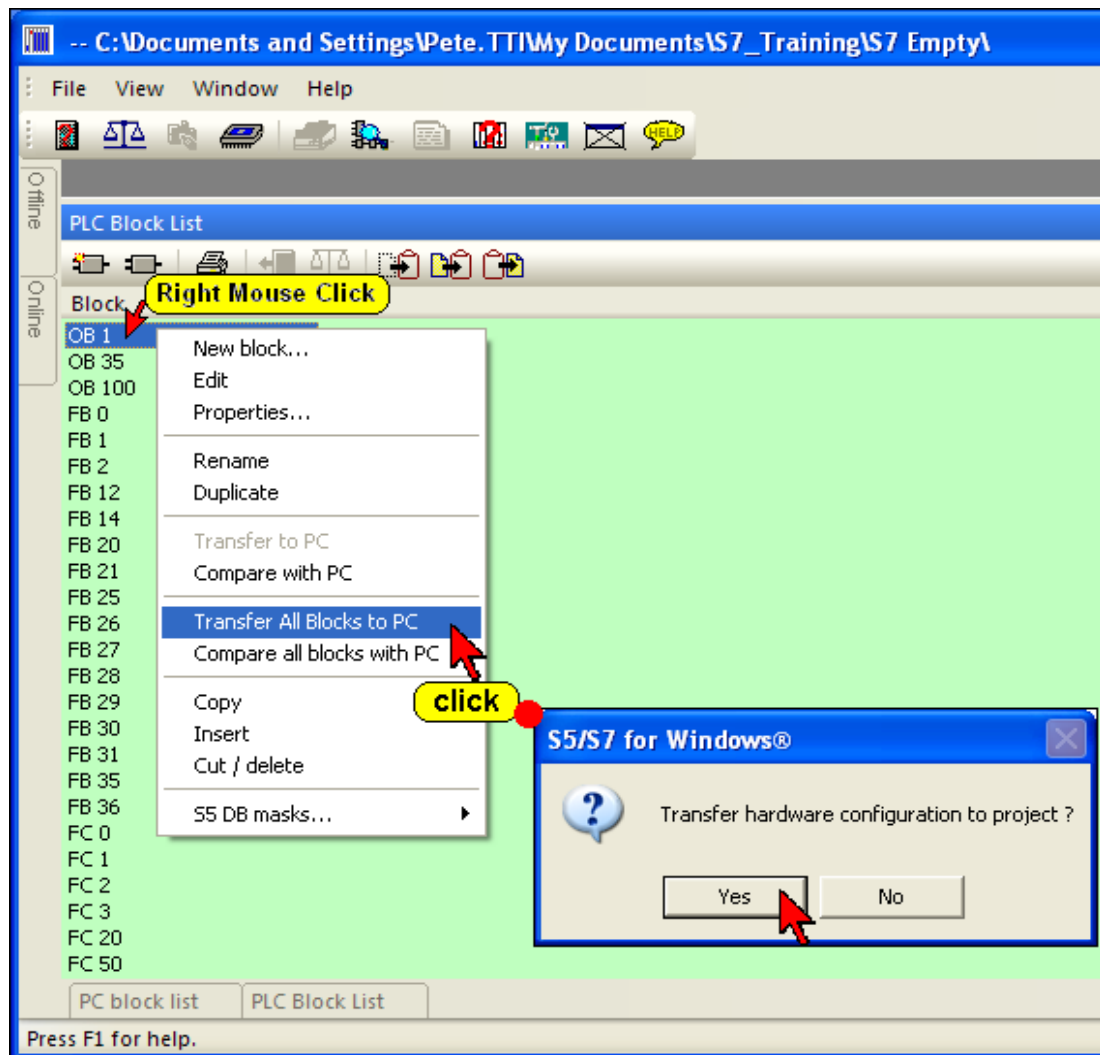
Make sure the PC Block List is empty.



## Open the PLC Block List



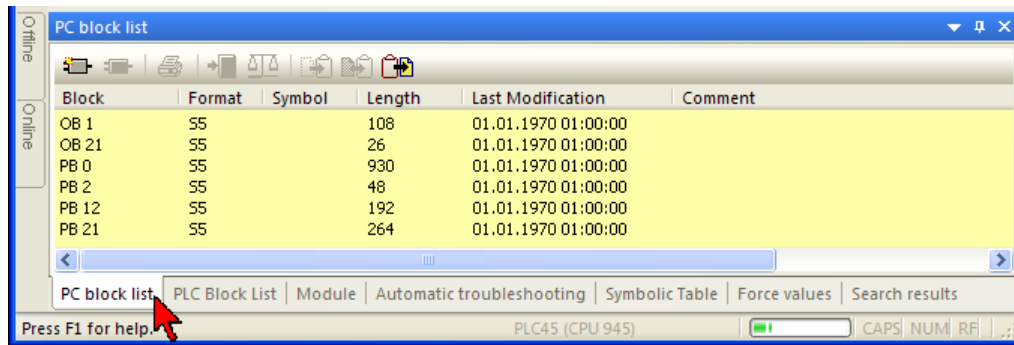
To transfer all PLC Blocks from the PLC to the PC, use the command "Transfer all blocks to PC". Click on one of the marked Blocks with the right mouse button. Click "Transfer all blocks to PC".



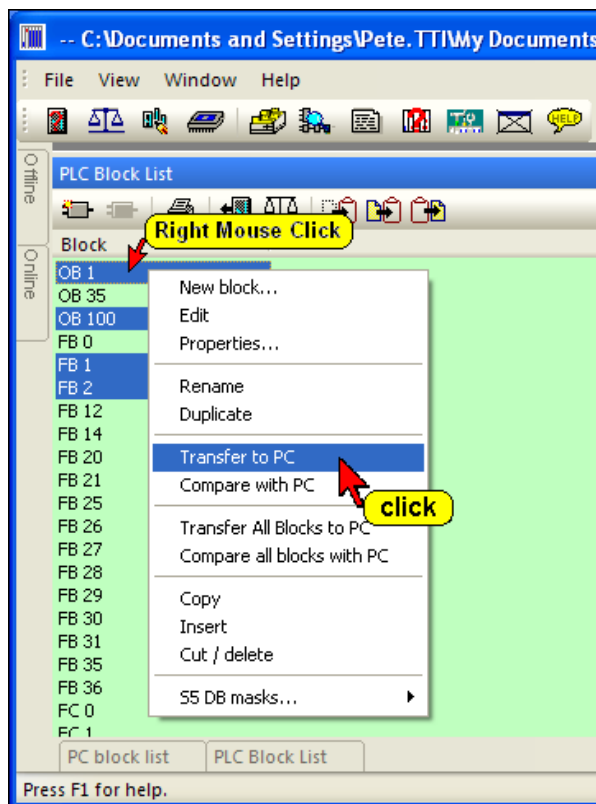
All Blocks from the PLC are transferred to the PC and are listed in the "PC Block List".

If you want to transfer the hardware configuration as well, (recommended), click "OK" in the opened information box.

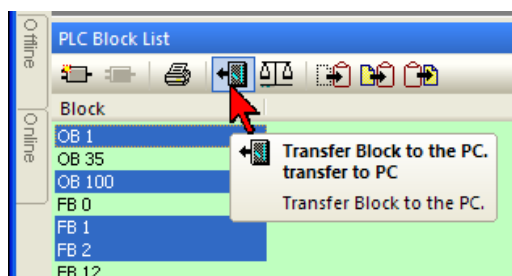
The marked Blocks are transferred to the PC and are listed in the “PC Block List”.



If you want to transfer one or several blocks to the PC, mark these blocks in the PLC Block List and click on one of the marked Blocks with the right mouse button. Click “Transfer to PC”.



Instead of using the right mouse button and the command “Transfer to PC” you may use the “Transfer to PC” icon.



### 3 S7 for Windows® Tools to Debug a S7 PLC Program

Most tools to debug a S7 PLC Program can only be used if the PLC Program is present in the online PLC, **and** also saved in a S7 Project on the PC.

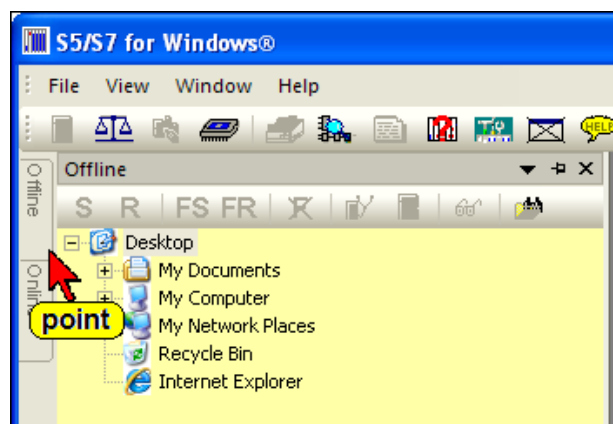
#### ATTENTION:

If you don't have the original PLC program with symbols and comments we recommend that you download the PLC program to the PC as described in chapter 2.

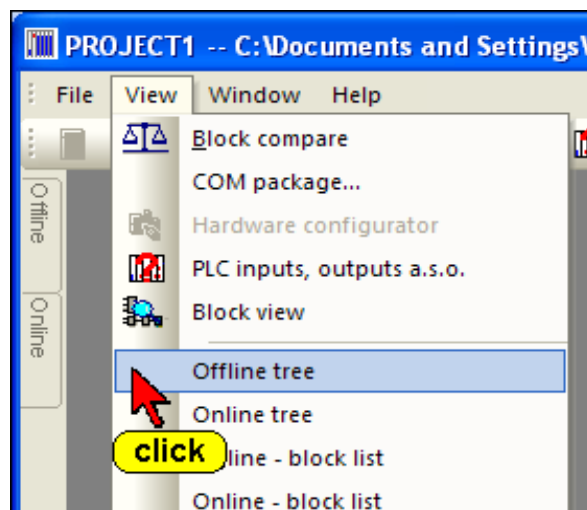


#### 3.1 Opening a S7 PLC Program saved in a “S7 Project”

Open the “Offline – Tree” by pointing at the “Offline” tab.



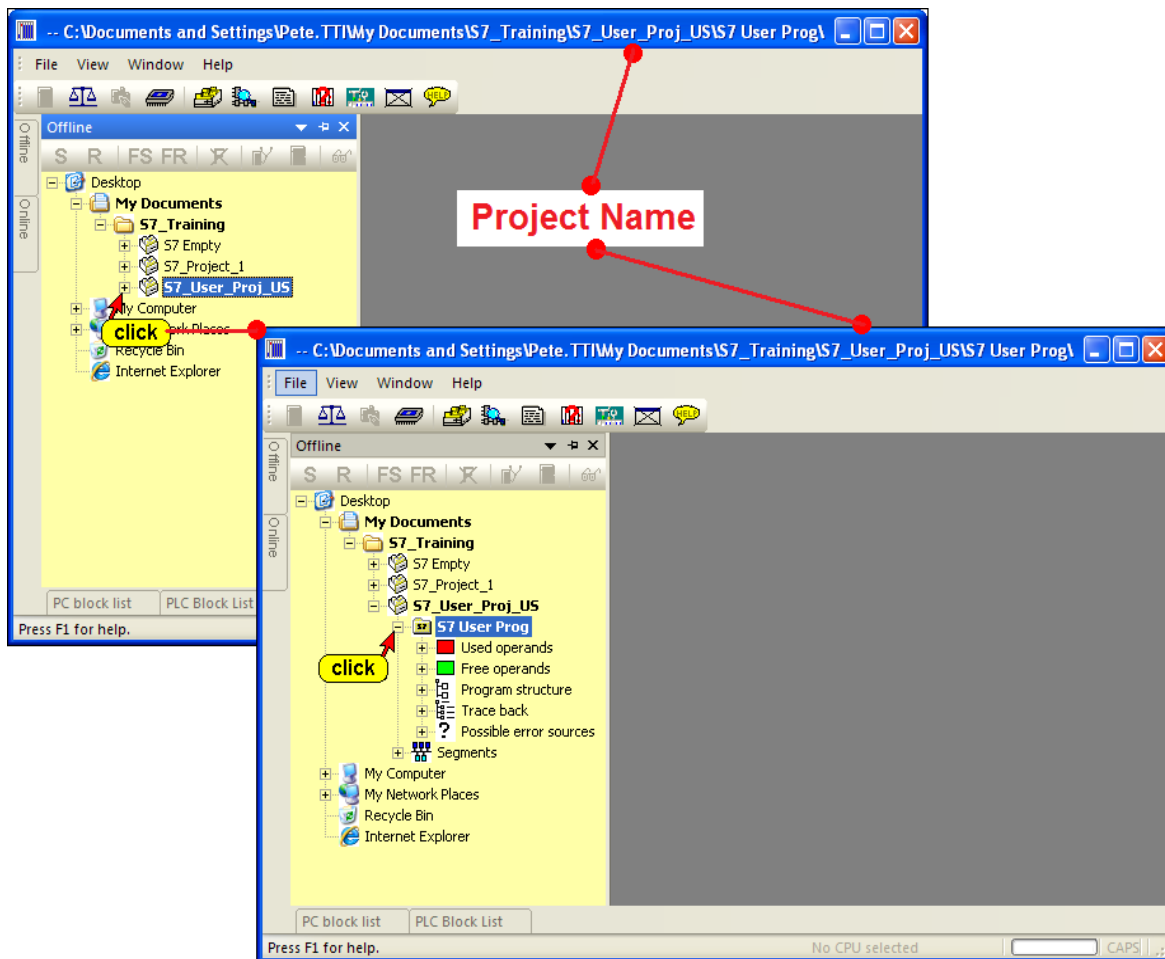
If the “Offline” tab is not shown, use the command “Offline tree” from the “File” menu.



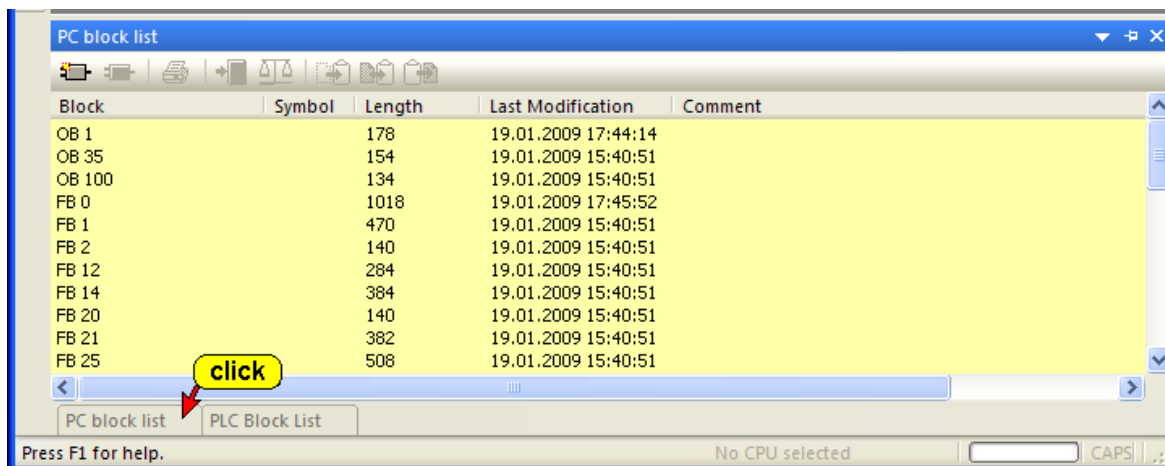
In the “**Offline**” window select the path and click on the icon in front of the project name (**S7\_User\_Proj\_US**).



The project files and other tools are shown.



The project name and the S7 Program name (**S7 User Prog**) with its path, is shown. Also the Blocks are listed in the “PC Block List”.



The PLC Program is now open for further use.



## 3.2 Comparing the existing Online and Offline PLC Program

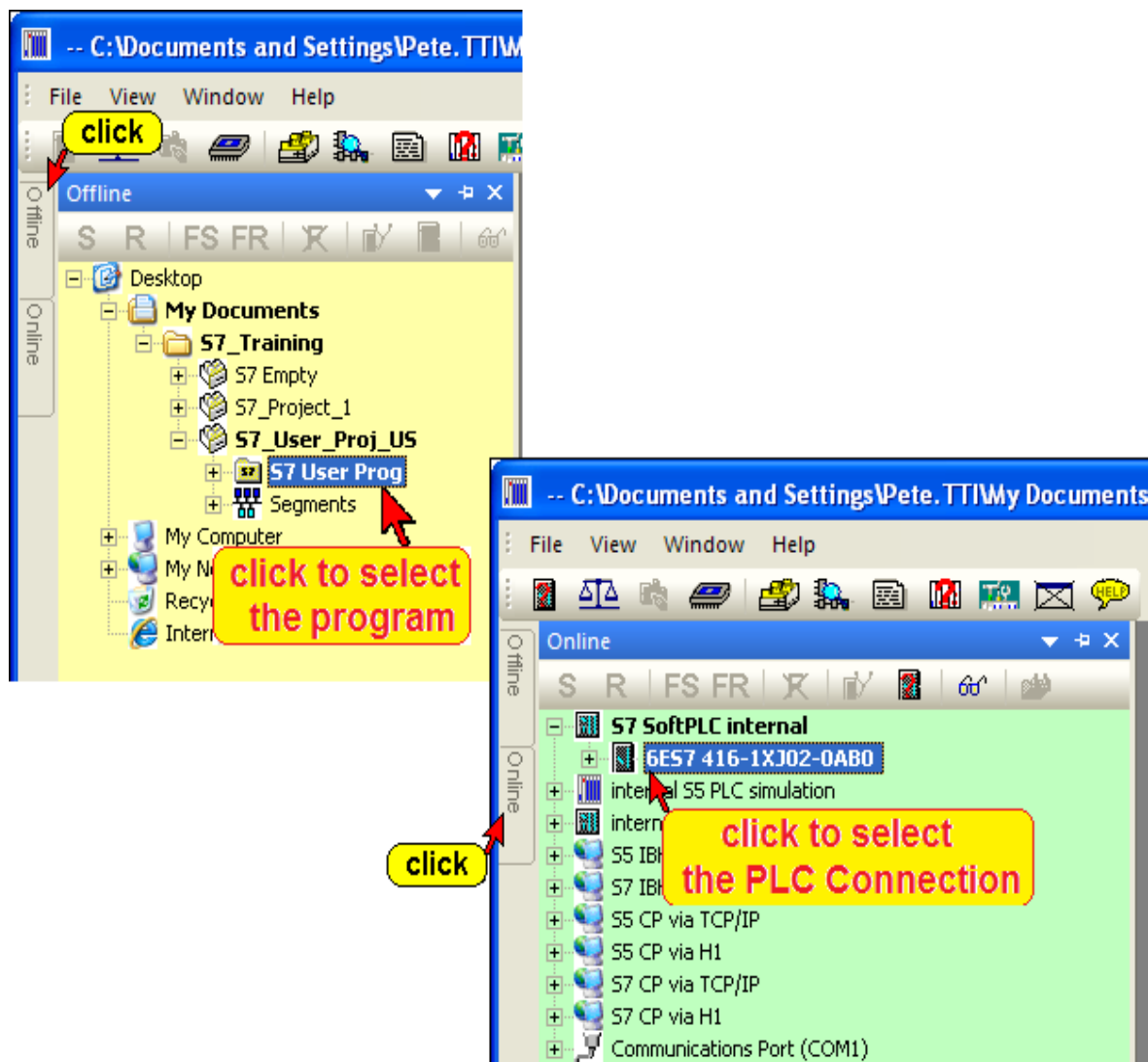
### ATTENTION:

If you are using the original PLC program with symbols and comments make sure that the program executed at the PLC is identical with the original PLC program you have on the PC.

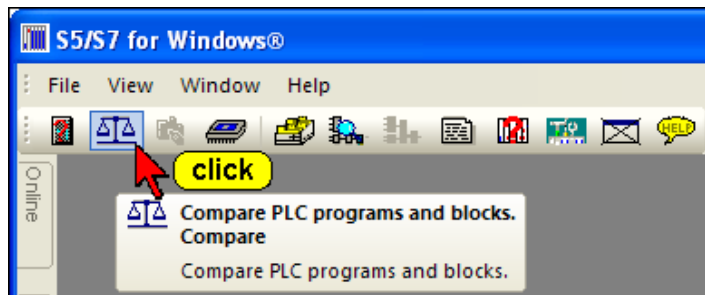


Use the “Compare Tool” to verify that the Program on the PC has the same code as the PLC program executed at the PLC.

Select the required PLC at the “Offline – Tree” and the PLC to be connected to from the “Online – Tree” (see chapter 1).

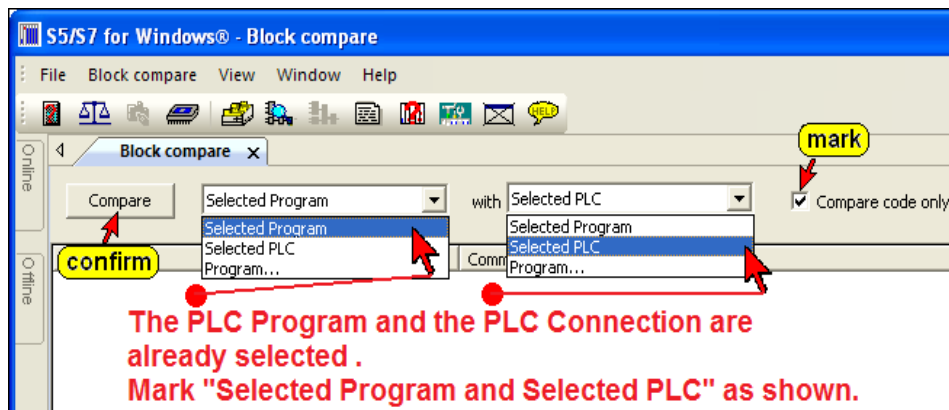


## Compare Tool

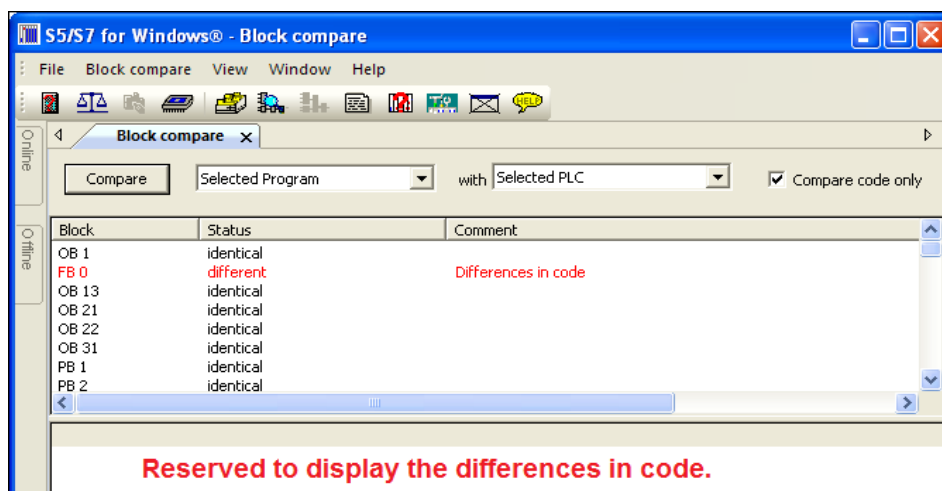


Click the icon to open the Compare window.

You may select the two locations where the files to be compared are located.



When comparing a PLC Program on the PC with the Program executed on the PLC, only the code is relevant. Mark “Compare code only”. To start the comparison confirm by clicking the “Compare” button.

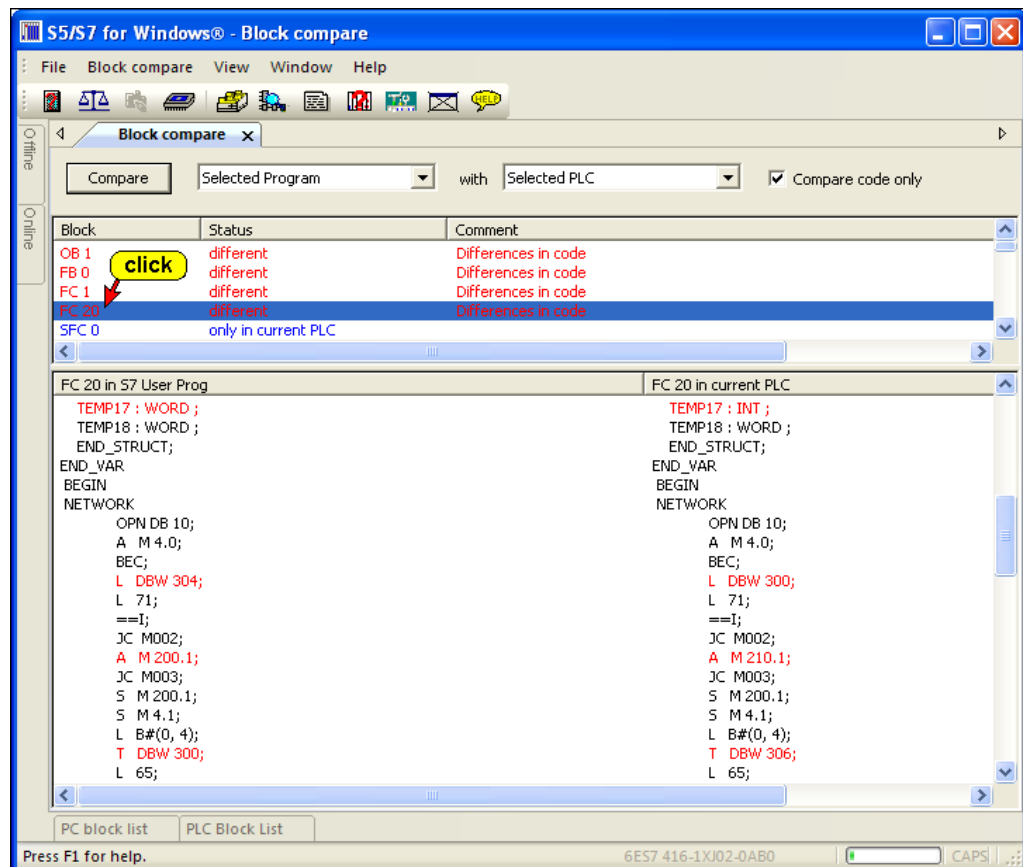


The compare result is shown in the upper part of the compare window. PLC Block names written in black are identical, PLC Block names shown in red have differences in the code.

**ATTENTION:**

Do not transfer blocks from the PLC to the PC if the selected blocks exist in the PC RAM.

If a block in the PC is overwritten by a PLC block, it is possible that comments will be shifted and labels may not be valid anymore (labels are exchanged with substitute labels (M001 etc.).

**Differences in Code**

Clicking the Block name opens a window with the details of the compared Blocks. Any differences are displayed in red.

**ATTENTION:**

Comparing a PLC Program on the PC with the Program executed on the PLC will show (most of the time) differences in Data Blocks (DBxx). This is normal if the data stored in the Data Block is collected from the PLC.

In any event the length of the Data Blocks must be identical.



### 3.3 Arranging Window in the Workplace

Version 6.x of *S7 for Windows®* has a new concept to open and close windows in the workplace.

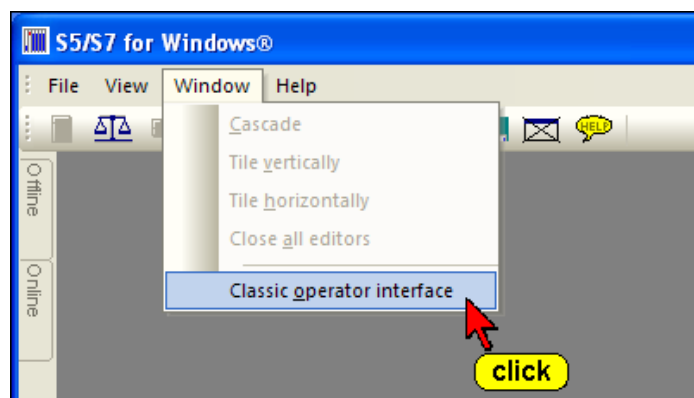
You can use the “Auto Hide” icon to lock the tab at the outside border of the workplace and by moving the mouse pointer to the tab the window will open automatically.

It is also possible to open the “PC Block List” in the workplace and start the “Debug Tools” from there. The “PC Block List” window stays open until you close “PC Block List” the window.

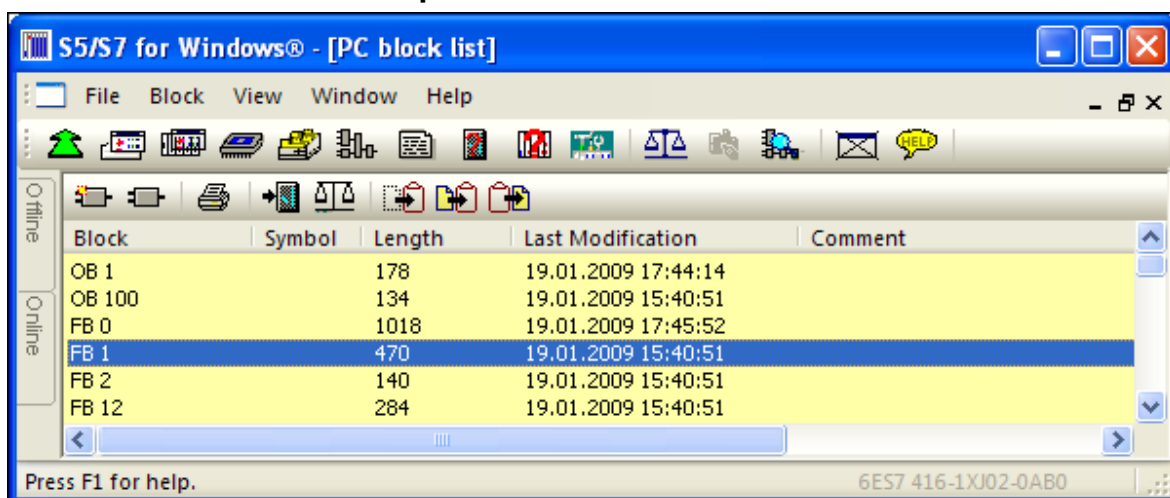
This mode is preferable if you want to change between Blocks being displayed online and offline for modifications.

To work in this “Classic Operator Interface” mode the S7 PLC Program must be opened (see chapter 3.1).

To select the previously described mode, click “Classic operator interface” in the “Window” menu.

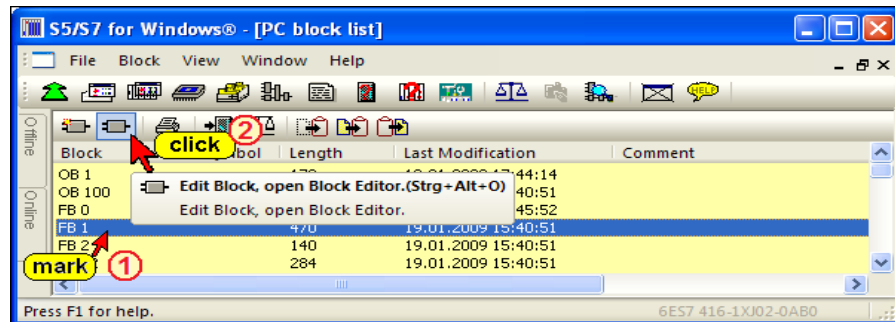


#### PC Block List in “Classic Operator Interface” mode

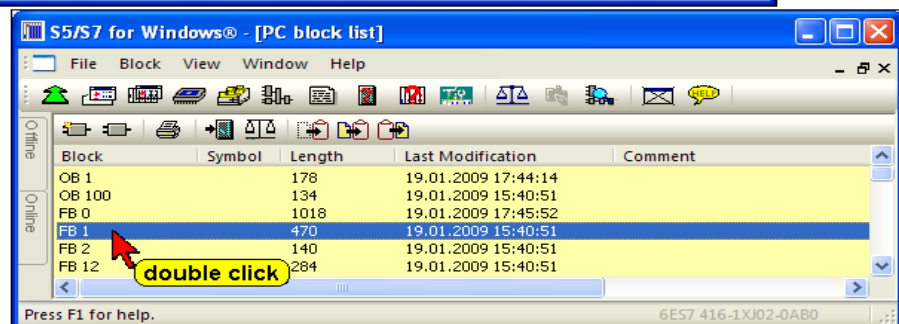


### 3.4 PLC Block Status display

To display the PLC status you must open the desired PLC Block with the “Editor”. You may open the Editor by double clicking the Block name or by marking the Block name and clicking the icon.



or



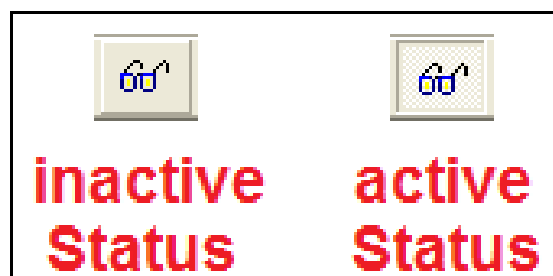
The Block may be selected from the “PC Block List” or the “PLC Block List”. If you use the “PC Block List” existing symbolic comments may be displayed within the status display.

#### Note:

We recommend that you select the Block from the “**PC Block List**”. If any modifications are made they are saved in the PC and therefore are available the next time the Block is opened.

### Activating the Status

An icon is provided to activate the status. Clicking the icon again will deactivate the status.



## Status Display, Statement List (STL) Presentation

S5/S7 for Windows®

File Block Edit Find Insert Presentation View Window Help

FB 1

Segment 1:

label	Instruction	Operand	Comment	Address	RLO	Contents	Accu1	Accu2	Status
AN	T 126		AUX START METERCOUNTER REFRESH DELAY	0000	1	000.0			000000011
L	S5T#10S			0002	1		00001100	00000300	000000011
SD	T 125		START METERCOUNTER A/B REFRESH DELAY	0006	1	032.1			000000010
NOP	0			0008	1				000000010
NOP	0			000A	1				000000010
NOP	0			000C	1				000000010
A	T 125		START METERCOUNTER A/B REFRESH DELAY	000E	0	032.1			000000001
R	M 5.2		ANTIREP. TX METER COUNTER "A" RESET	0010	0	0			000000000
R	M 7.2		ANTIREP. TX METER COUNTER "B" RESET	0012	0	0			000000000

Segment 2:

label	Instruction	Operand	Comment	Address	RLO	Conte...	Accu1	Accu2	Status
A	T 125		START METERCOUNTER A/B REFRESH DELAY	0014	0	032.1			000000001
L	S5T#100MS			0016	0		00000010	00001100	000000001
SD	T 126		AUX START METERCOUNTER REFRESH DELAY	001A	0	000.0			000000000

Segment 3:

label	Instruction	Operand	Comment	Address	RLO	Conte...	Accu1	Accu2	Status
AN	T 125		START METERCOUNTER A/B REFRESH DELAY	001C	1	032.1			000000011
L	S5T#100MS			001E	1		00000010	00000010	000000011
SE	T 124		RUNNING MACHINE REFRESH PULSE	0022	1	000.0			000000010
NOP	0			0024	1				000000010
NOP	0			0026	1				000000010
NOP	0			0028	1				000000010
A	T 124		RUNNING MACHINE REFRESH PULSE	002A	0	000.0			000000001
R	M 6.1		ANTIREP.FOR RUNNING MACHINE	002C	0	0			000000000

Segment 4:

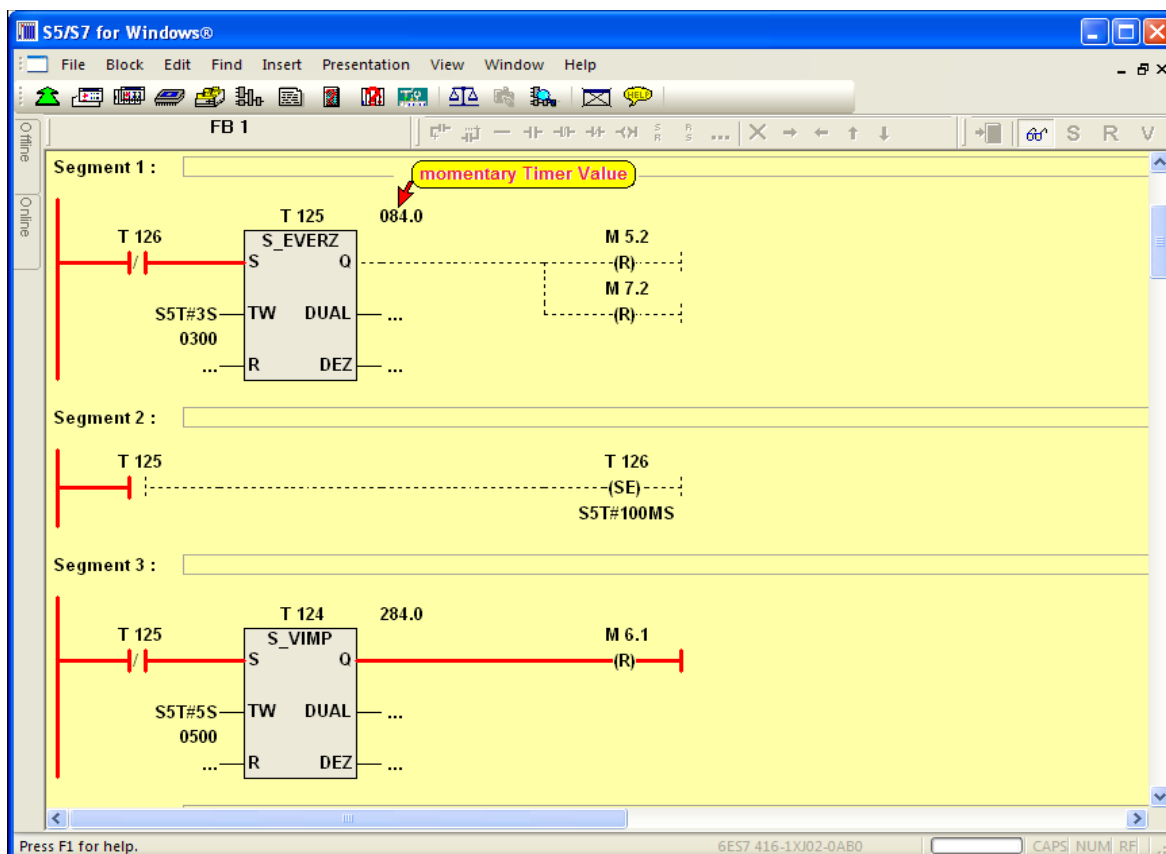
label	Instruction	Operand	Comment	Address	RLO	Conte...	Accu1	Accu2	Status
A	I 25.3		1-SPOOLER IN AUTOMATIC SELECTOR	002E	0	0			000000001

Press F1 for help.

6ES7 416-1XJ02-0AB0

CAPS NUM RF

## Status Display, Ladder Logic (LAD) Presentation



## Status Display, Ladder Logic (LAD) Presentation with Symbolic Table

Symbolic Table:

Symbol	Operand	Data type	Comment
I25.3	I 25.3	BOOL	1-SPOOLER IN AUTOMATIC SELECTOR
I25.4	I 25.4	BOOL	1-1ST PRESELECTION ACHIEVED
I25.5	I 25.5	BOOL	1-2ND PRESELECTION ACHIEVED
I25.6	I 25.6	BOOL	...
I25.7	I 25.7	BOOL	...

## Status Display, Control System Flowchart (CSF) Presentation

Symbolic Table:

Symbol	Operand	Data type	Comment
T125	T 125	TIMER	START METERCOUNTER A/B REFRESH DELAY
T126	T 126	TIMER	AUX START METERCOUNTER REFRESH DELAY
T127	T 127	TIMER	...
C1	C 1	COUNTER	1-SPOOLER BINDING REVOLUTIONS COUNTER
C3	C 3	COUNTER	1-SPOOLER INITIAL BINDING COUNTER

