FAQ FETCH/WRITE to S5 over IE

service & SUPPORT

FETCH/WRITE to S5 over Industrial Ethernet

SIEMENS

FAQ

Entry-ID: 16697502

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Question

Entry-ID: 16697502

How do I create a S5-compatible communication with the services FETCH and WRITE to the SIMATIC S5 for the SIMATIC NET OPC server over Industrial Ethernet with the SIMATIC NET PC software?

Answer

The instructions and notes listed in this document provide a detailed answer to this question.

Entry-ID: 16697502

1 Assignment of tasks

In this example, a commercially available network adapter is used that implements the S5-compatible communication with the services FETCH and WRITE over the OPC server to the S5 station.

NOTE The method described in these instructions also applies to the CP1613, CP1623, CP1512 and CP1612 communication processors.

1.1 Condition

It is assumed that one of the two following configuration tools is installed:

- NCM PC
  NCM PC is supplied with the SIMATIC NET CD and allows you to create PC projects and open STEP 7 projects. It is, however, not possible to edit S7 blocks in the STEP 7 project with this software.
- STEP 7
  STEP 7 is a separate software package with which you can create S7-400, S7-300 and PC projects. S7 blocks can be edited with this software.

Only one of these tools can be installed.

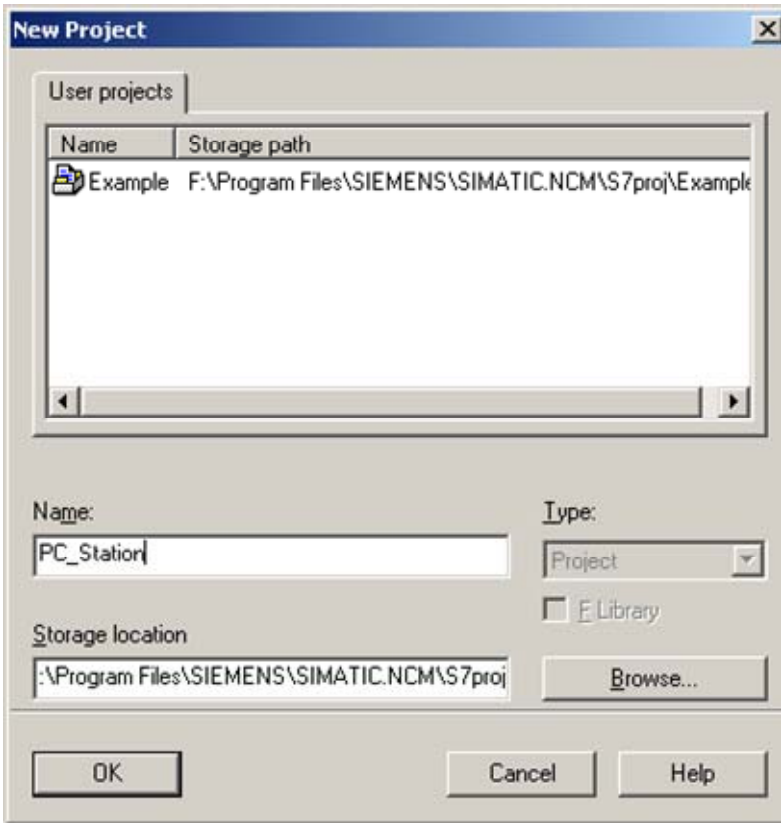
In chapter 2 “Configuration of the PC station” is described the configuration of PC station so that you can use the S5-compatible communication with the services FETCH and WRITE over Industrial Ethernet to exchange data between PC station and S5 station.

2 Configuration of the PC station

After successful completion of the hardware and software installation of the SIMATIC NET CD and the configuration tool and after restarting your computer, you start NCM PC or STEP 7 with "Start → (in Windows XP: All Programs→) SIMATIC → SIMATIC Manager or SIMATIC NCM PC Manager or using the desktop icon of the same name.

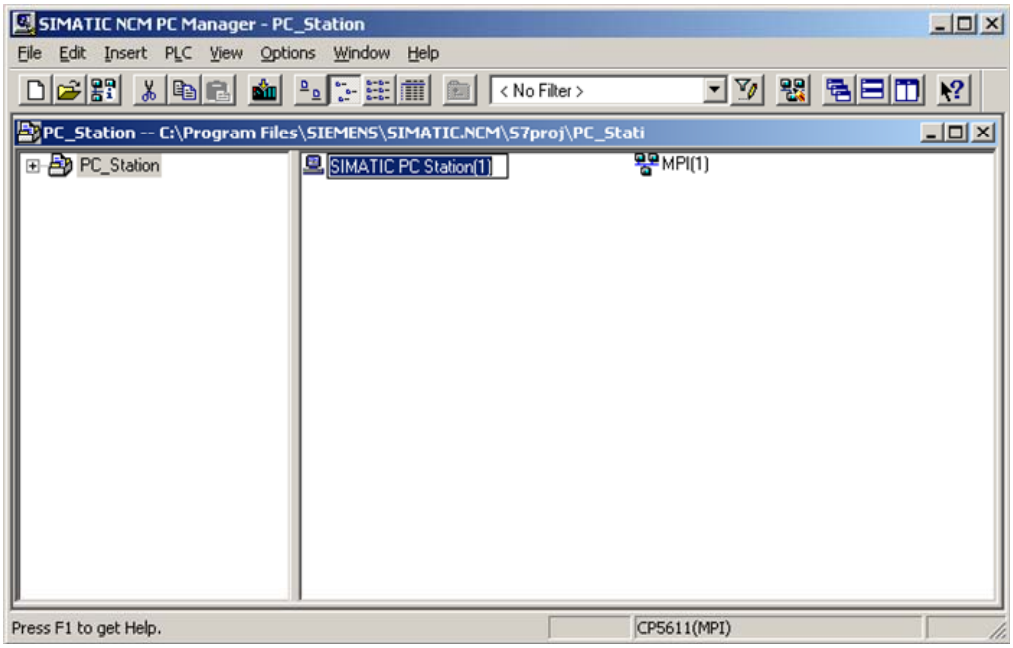
Create a new project with "File → New".

Figure 2-1 giving the project a name



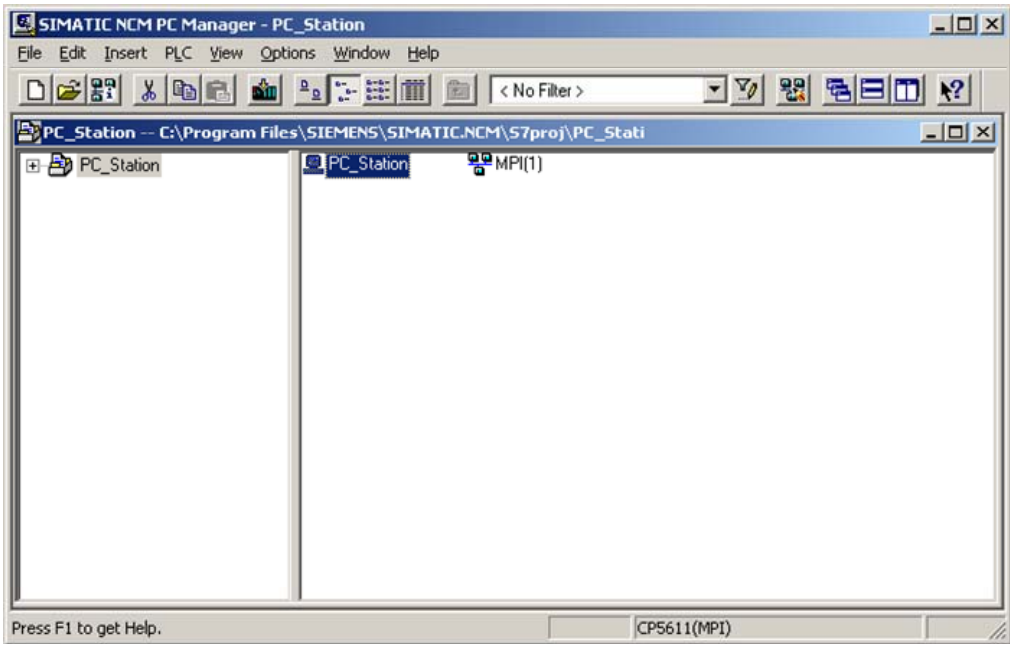
Confirm the project name you have entered (in the example: "PC_Station") with OK. An empty STEP 7 or NCM PC project is then created.

Figure 2-2 inserting the PC station



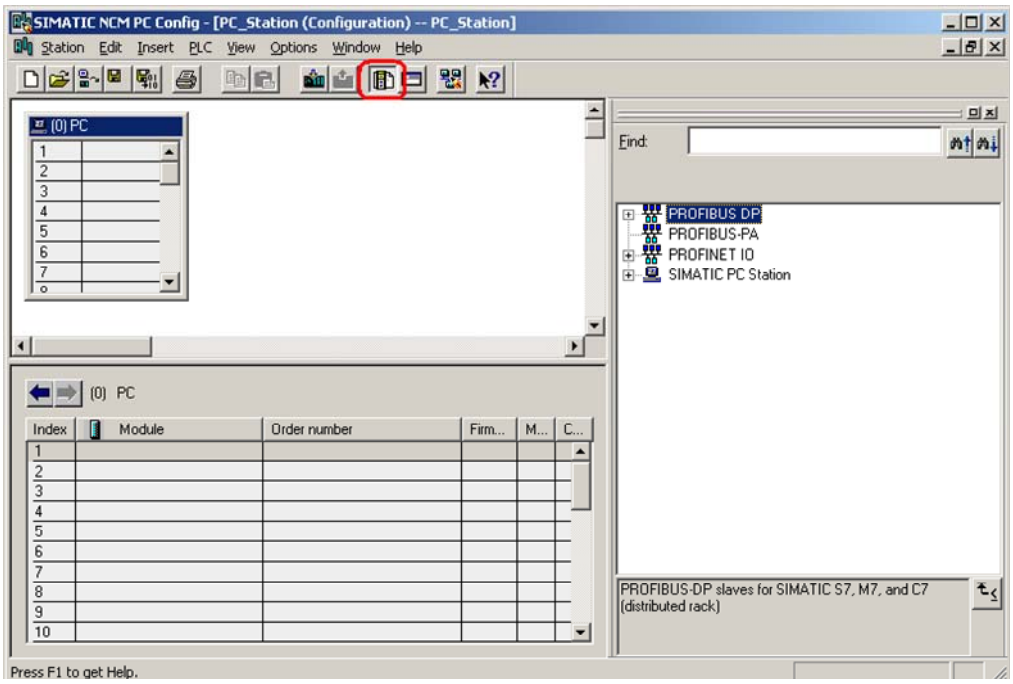
With the menu command "Insert → Station → SIMATIC PC Station", you insert the PC station.

Figure 2-3 changing the name of the PC station



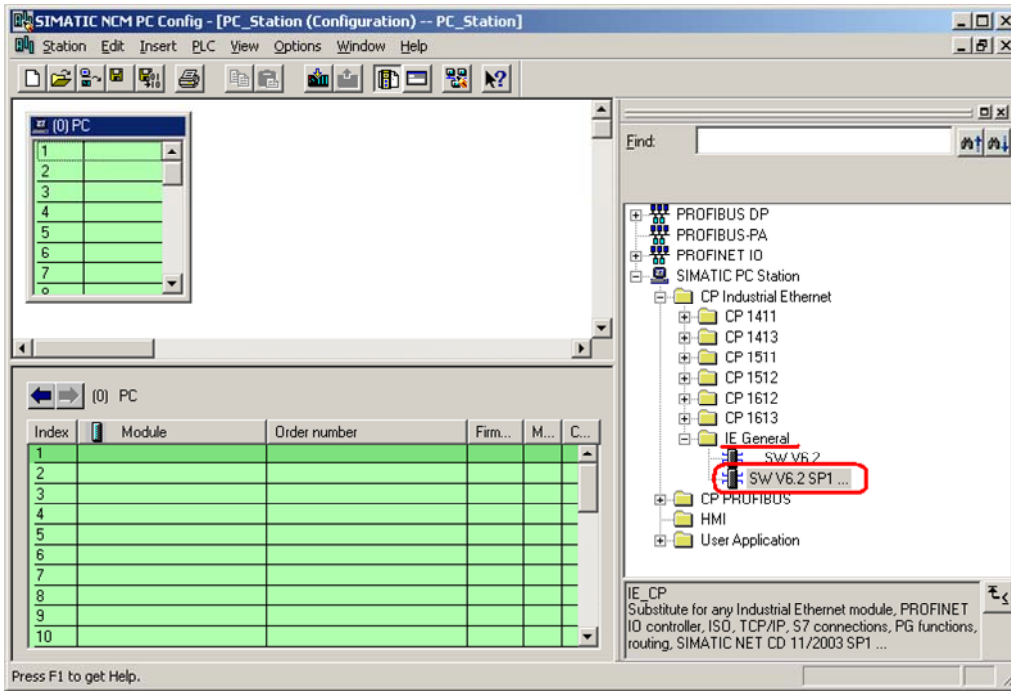
Give the PC station you have just inserted the same name as your computer (in the example: "PC_Station").
Now open the hardware configuration of the PC station by selecting the PC station, then pressing the right mouse button and selecting "Open Project" (STEP 7: "Open Object").

Figure 2-4 hardware configuration of the PC station



You will see an empty rack. If you cannot see the hardware catalog, click on the button marked in red.

Figure 2-5 selecting the modules from the hardware catalog

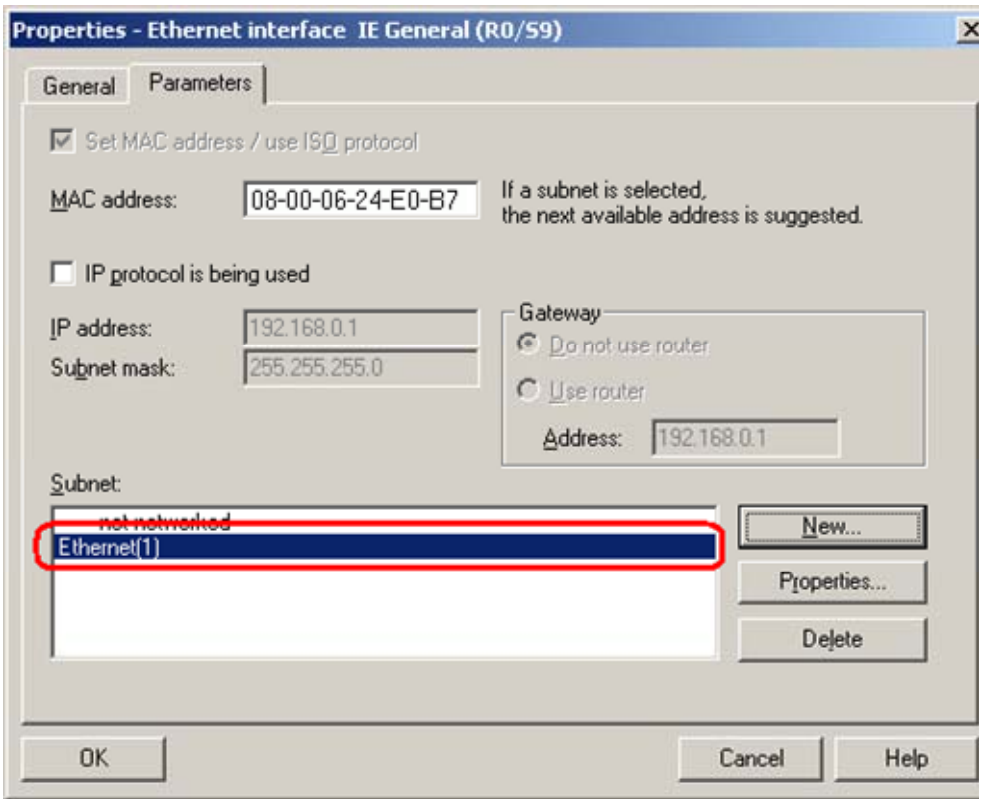


Now place your PC modules in this rack (for example by dragging them from the hardware catalog).

If you use a CP1613 (or CP1612 or CP1512) you will select the CP1613 (or CP1612 or CP1512) instead of IE General.

The following dialog appears automatically after you insert the module in the PC station.

Figure 2-6 address assignment dialog

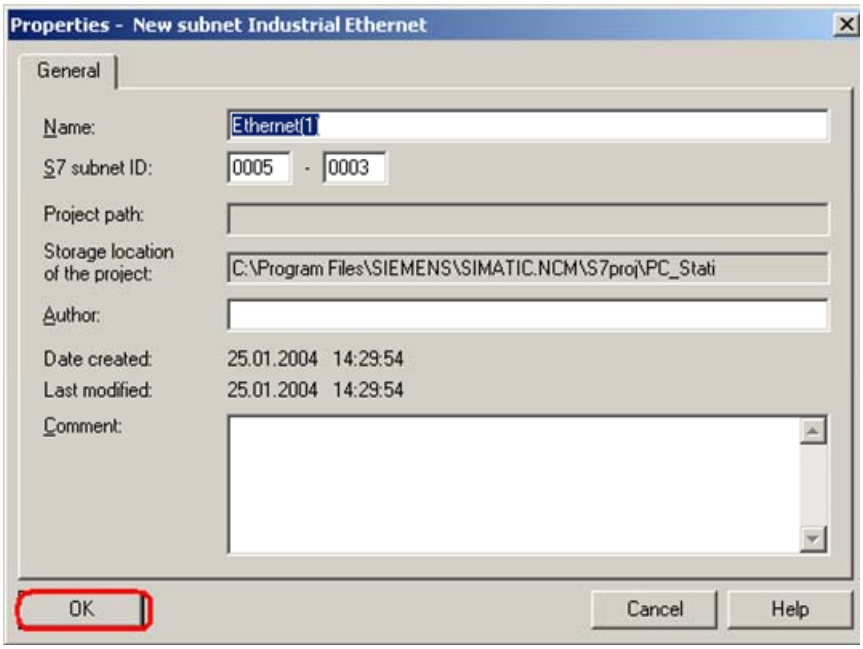


Select the check box „Set MAC address / use ISO protocol“. Following deselect the check box „IP protocol is being used“.

Enter the MAC address of the Ethernet network card.

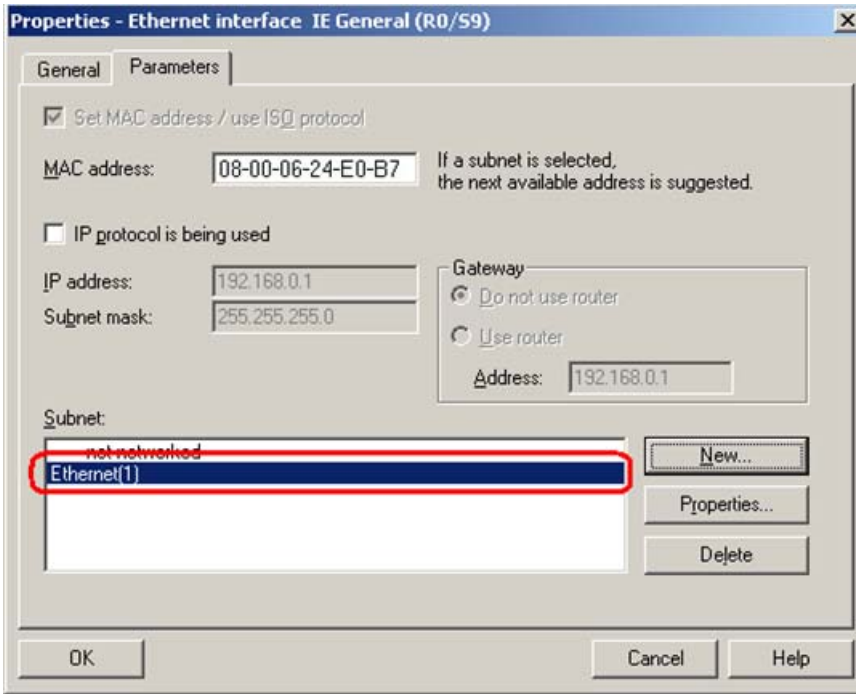
Click on the button “NEW” to add a new Industrial Ethernet network. The following dialog appears automatically.

Figure 2-7 setting up an Ethernet network in STEP 7 or NCM PC



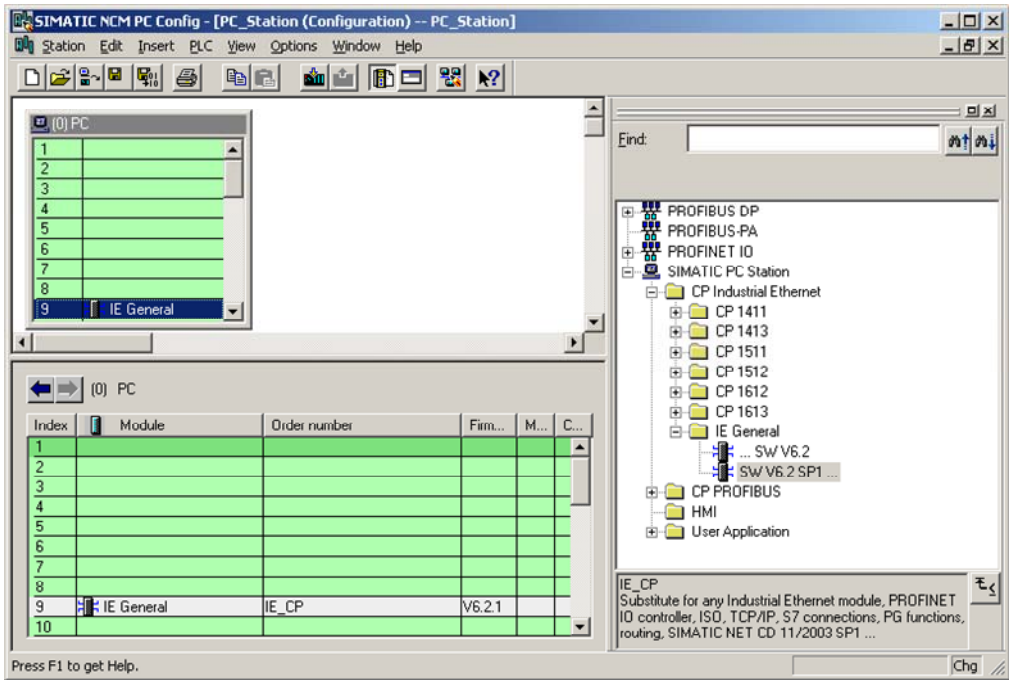
Confirm the dialog with „OK“.

Figure 2-8 fully configured network adapter



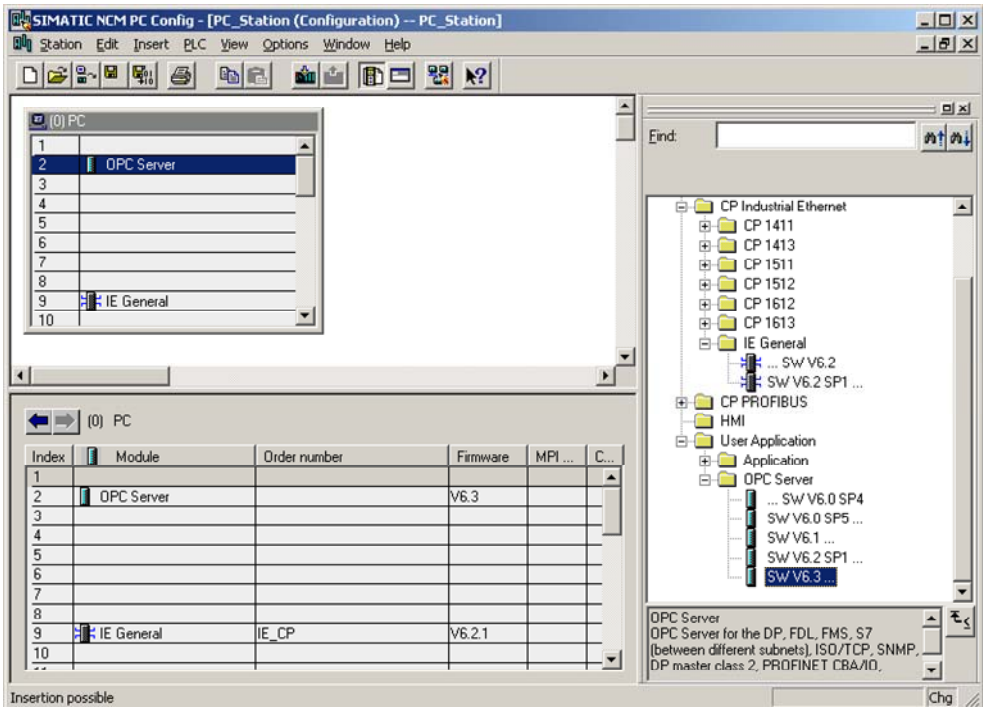
The network adapter is now fully configured and networked. Confirm the configuration with OK.

Figure 2-9 network adapter placed in the PC station



The module is now placed on a PC slot.

Figure 2-10 configuring the OPC server



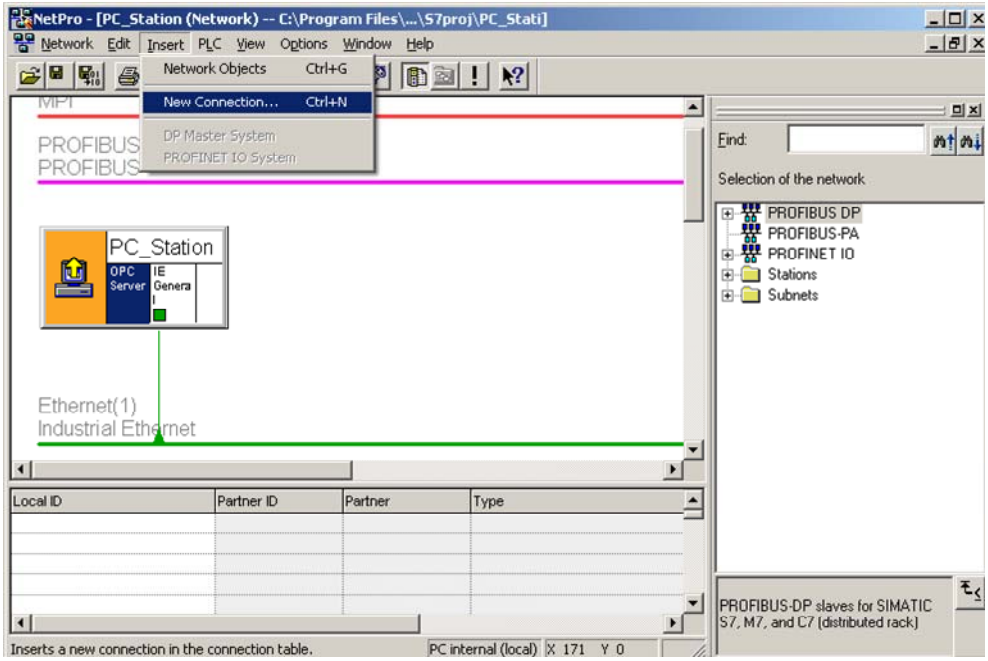
Select the OPC server in the hardware catalog and then drag it to any slot.

Figure 2-11 button „NetPro“

Now open the NetPro program. Use the button marked red in the toolbar in Figure 2-11 button „NetPro“.

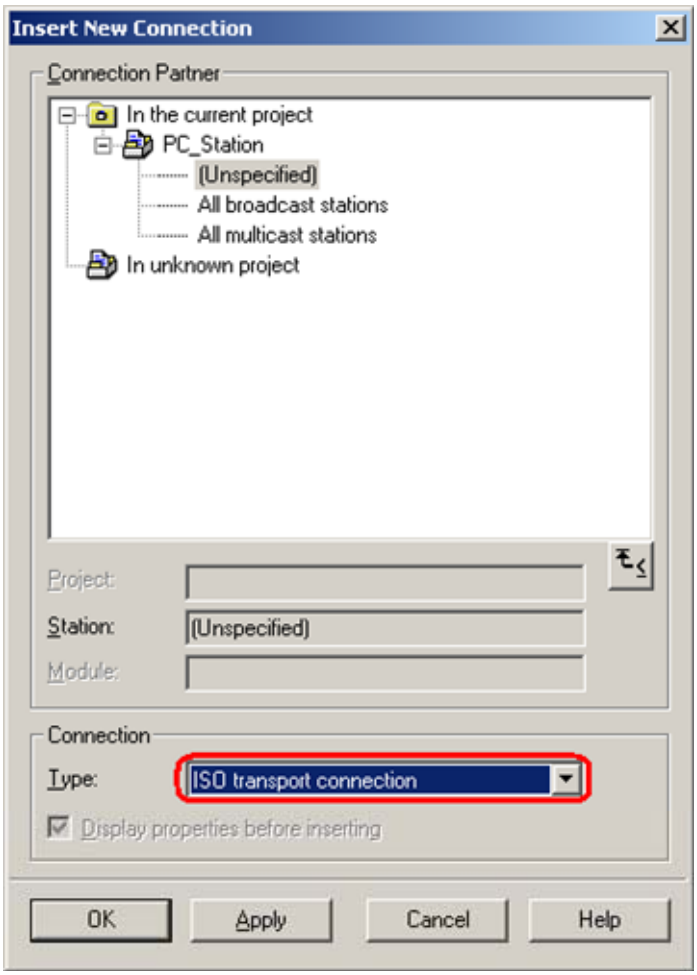
In NetPro you configure connections to exchange data between OPC server and S5 station.

Figure 2-12 configuring the S5-compatible communication in NetPro



Select the OPC server. Right-click the OPC server → "Insert → New Connection“or use the menu „Insert → New Connection“to insert a new connection.

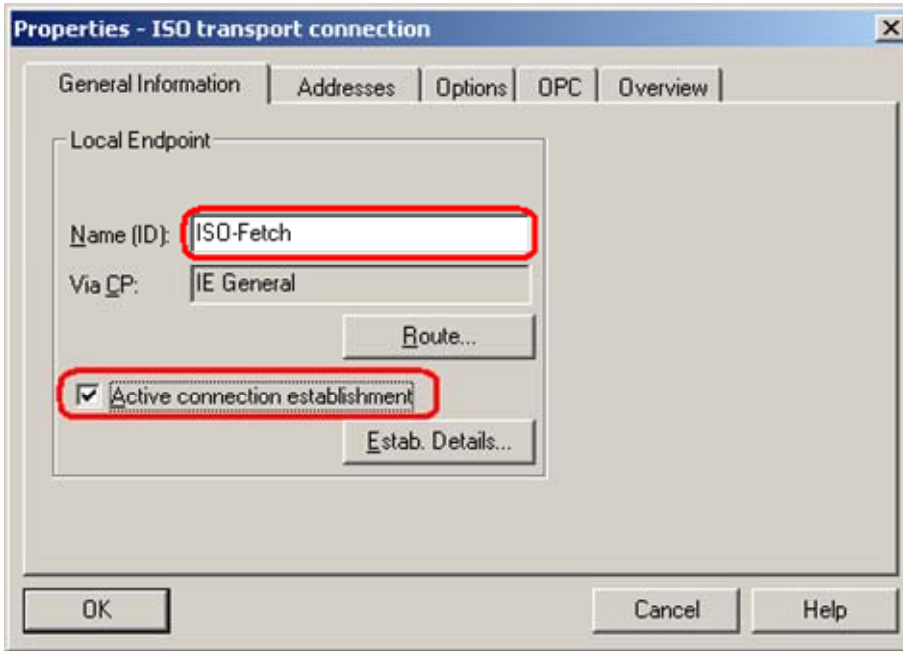
Figure 2-13 dialog „Insert New Connection“



Because the communication peer isn’t configured in the same S7 project like the PC station, as in this example, an unspecified connection with the type ISO transport will be configured. Select “unspecified” for communication peer in the dialog box.

Confirm the dialog with „OK“. Now the property view of the ISO transport connection will open.

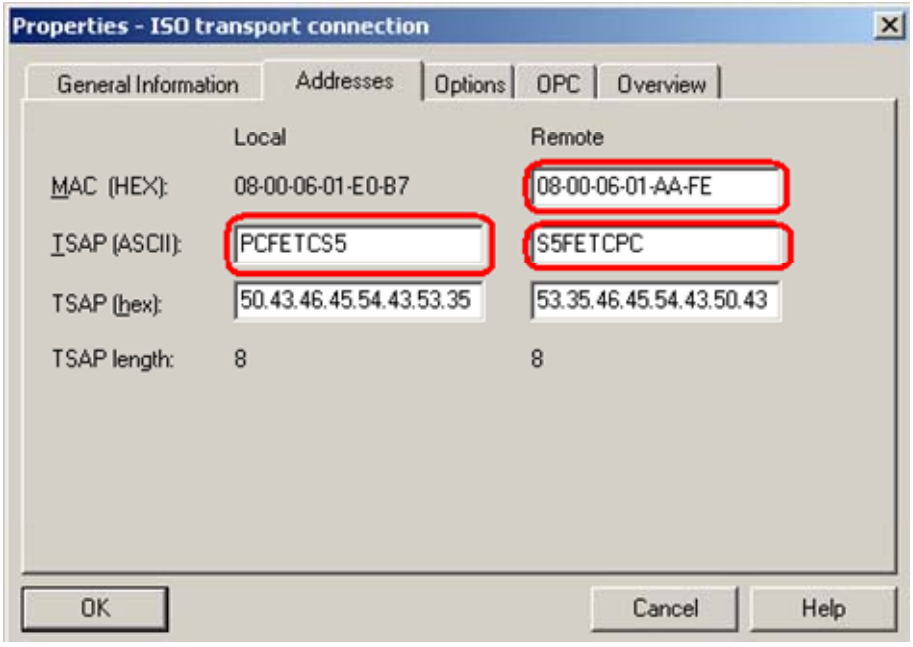
Figure 2-14 property view of ISO transport connection → register „General“



In the property view → register „General“you can enter a name, choose by yourself, for the ISO transport connection. Enter this name in the text field „Name (ID) “, for example „ISO-Fetch”. Select the check box „Active connection establishment“.

Change into register „Addresses“.

Figure 2-15 property view of ISO transport connection → register „Addresses“

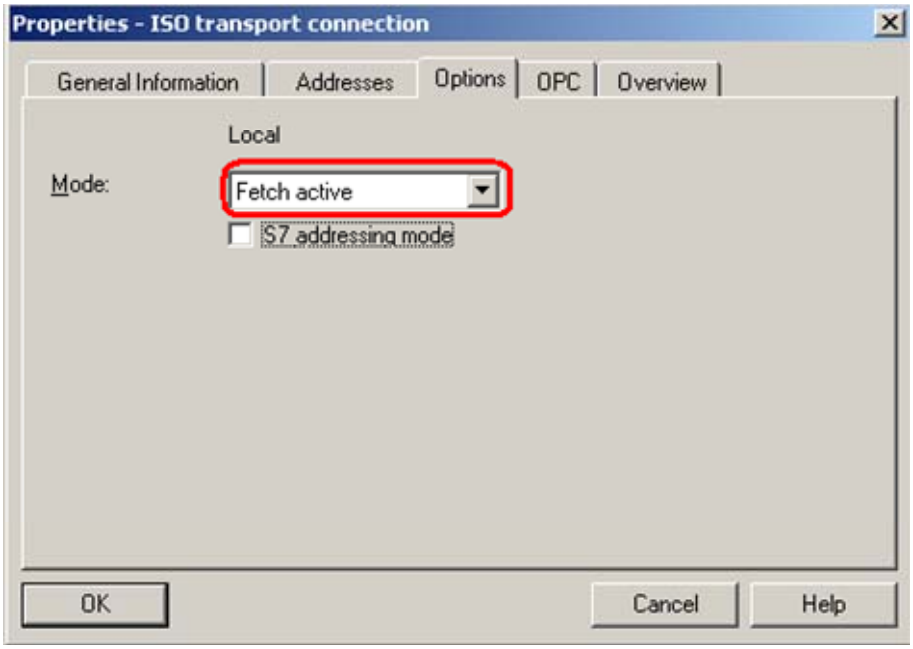


Enter the MAC address of the communication peer. The TSAPs are used to identify the ISO transport connection between the PC station and S5 station.

NOTE The address information of the created connection must be included in the connection configuration at the S5 end.

Change into the register „Options“.

Figure 2-16 property view of the ISO transport connection → register „Options“

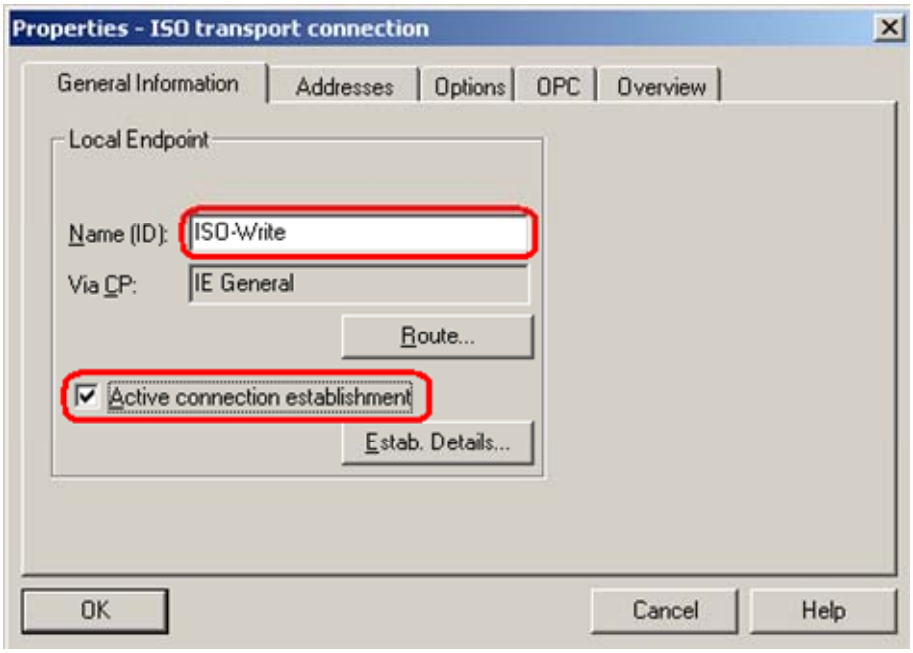


Select the mode „Fetch active“.

Confirm the dialog with „OK“.

Insert a further unspecified ISO transport connection for the OPC server with the following properties.

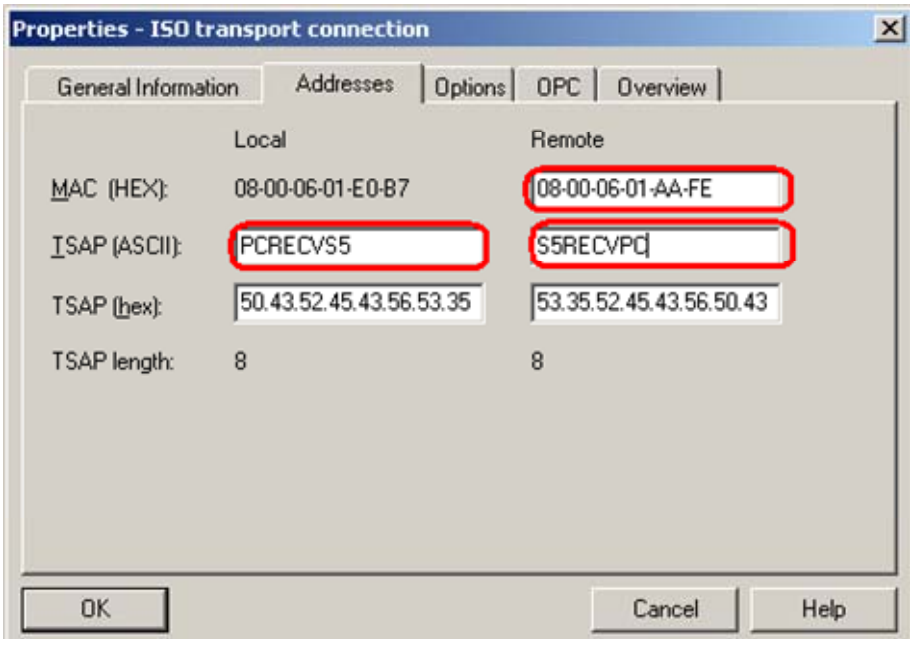
Figure 2-17 property view of the ISO transport connection → register „General“



In the property view → register „General” you can enter a name, choose by yourself, for the ISO transport connection. Enter this name in the text field „Name (ID) “, for example „ISO-Write”. Select the check box „Active connection establishment“.

Change into register „Addresses“.

Figure 2-18 property view of the ISO transport connection → register „Addresses“



Enter the MAC address of the communication peer. The TSAPs are used to identify the ISO transport connection between the PC station and S5 station.

Hinweis The address information of the created connection must be included in the connection configuration at the S5 end.

Change into register „Options“.

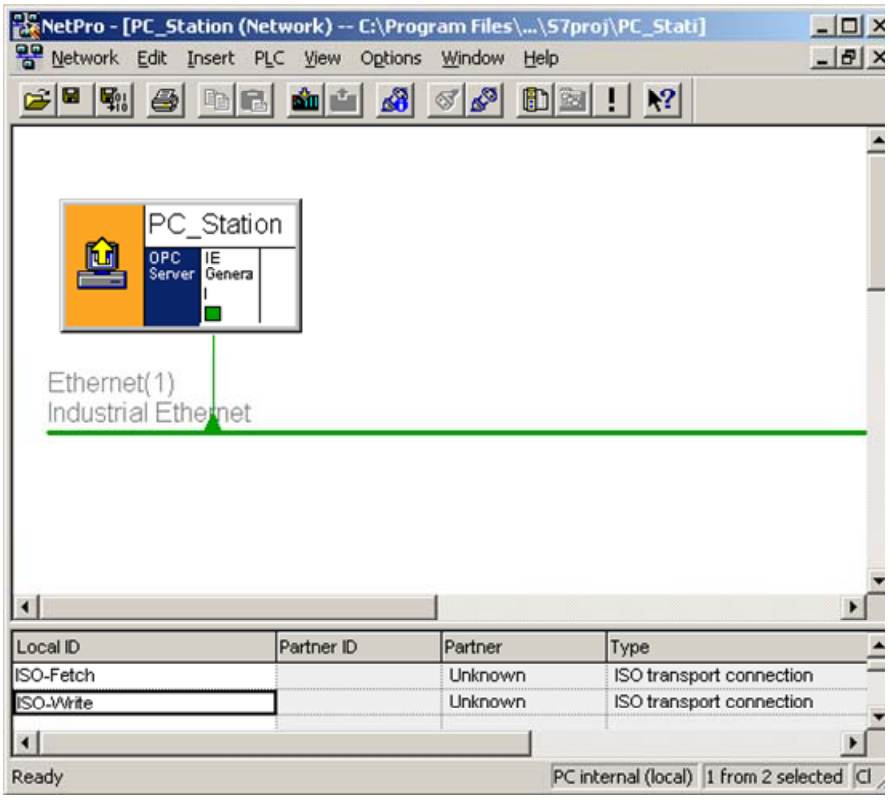
Figure 2-19 property view of the ISO transport connection → register „Options“

Select the mode „Write active“.

Confirm the dialog with „OK“.

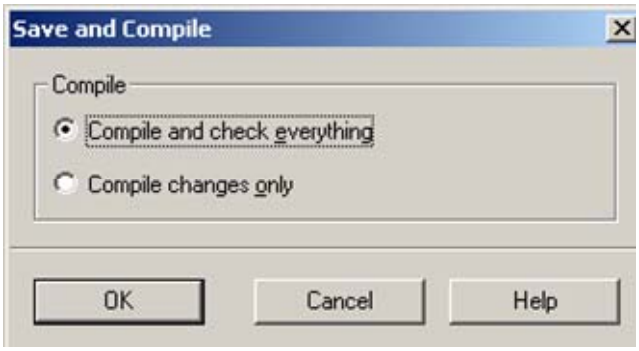
If you select the OPC server in the SIMATIC PC station, the created connections will be displayed in the connection table.

Figure 2-20 Angelegte Verbindungen in NetPro



Now the configuration of the ISO transport connections with the services FETCH and WRITE is finished. You have to save and compile S7 project. Therefore select the PC station in NetPro and click the button „Save and Compile" in the toolbar. This updates the information in the S7 project.

Figure 2-21 Save and Compile



NOTE Warning indications can be displayed while proceeding with the “Save and Compile” of a S7 project. Warnings serve as piece of information and have no functional effect. In case error warnings occur, search for possible divergences in the previous steps of the instructions.

After the configuration is finished successful you have two possibilities to download the configuration on the PC station.

2.1 Configuration and download from STEP7 or NCM PC

With this function it is possible to perform a configuration completely from a remote computer, if a network connection (standard Ethernet) to the target PC station is available. It is assumed that the PC station can be reached via network connection. The project engineering can be downloaded after that.

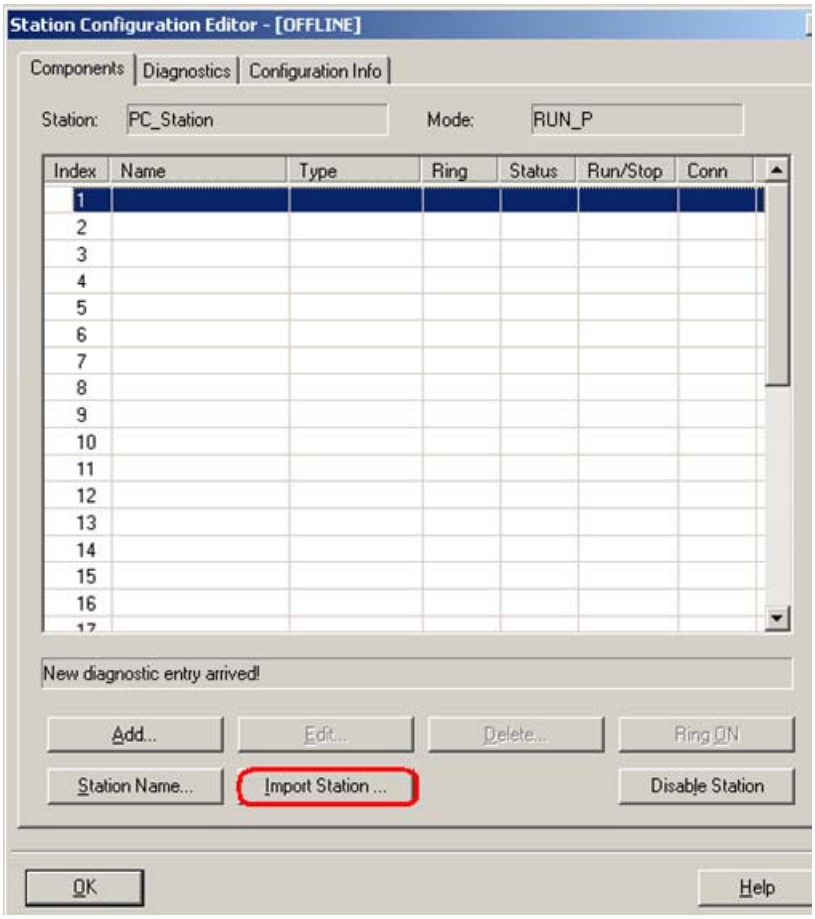
2.2 Configuration and Download via “Import Station”

With this function it is possible to download the configuration and project engineering at once also without a connection to the target PC station. Depending on the application, other configurations can be loaded.

Open the „Station Configuration Editor“ in the Windows START Menu → „Station Configuration Editor“ or with the following button in the Windows task bar.

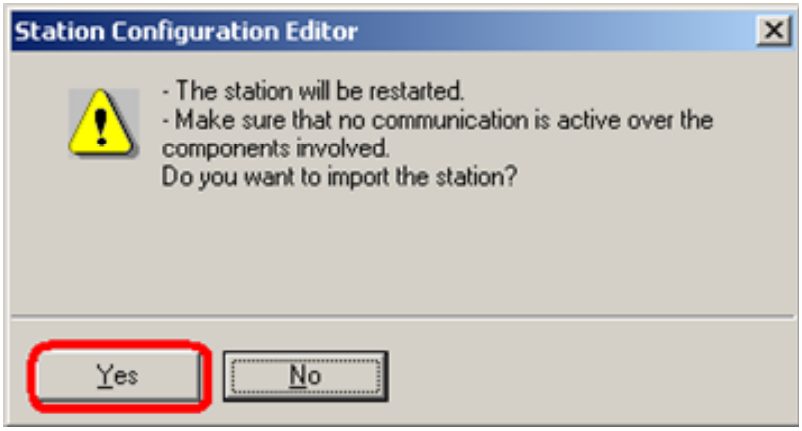
Figure 2-22 button „Station Configuration Editior“

Figure 2-23 Station Configuration Editior



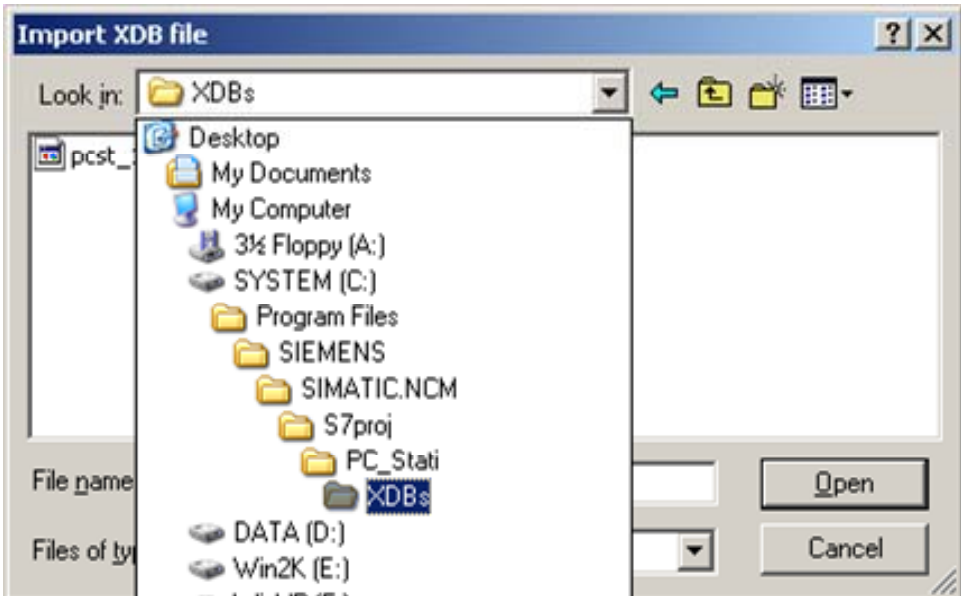
Click the button "Import Station…". A message about restarting the PC station will open.

Figure 2-24 message about restarting the PC station



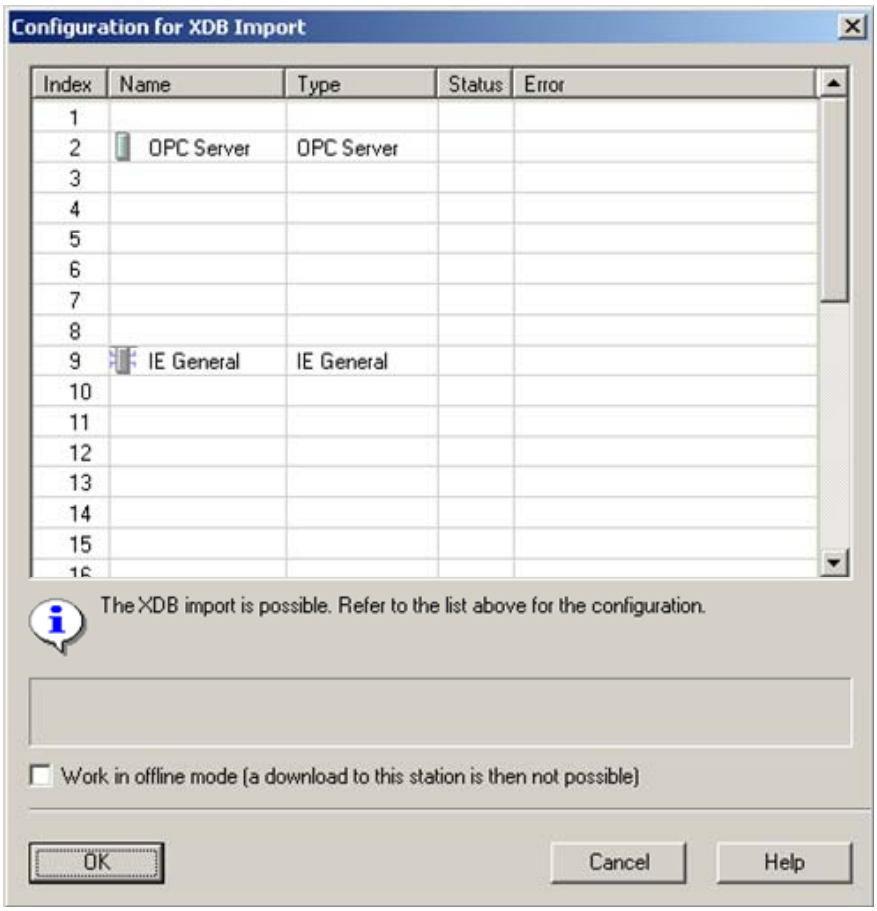
Confirm the message about restarting the PC station with „Yes“. The following dialog to select the XDB file, which should be import, opens.

Figure 2-25 selecting the XDB file



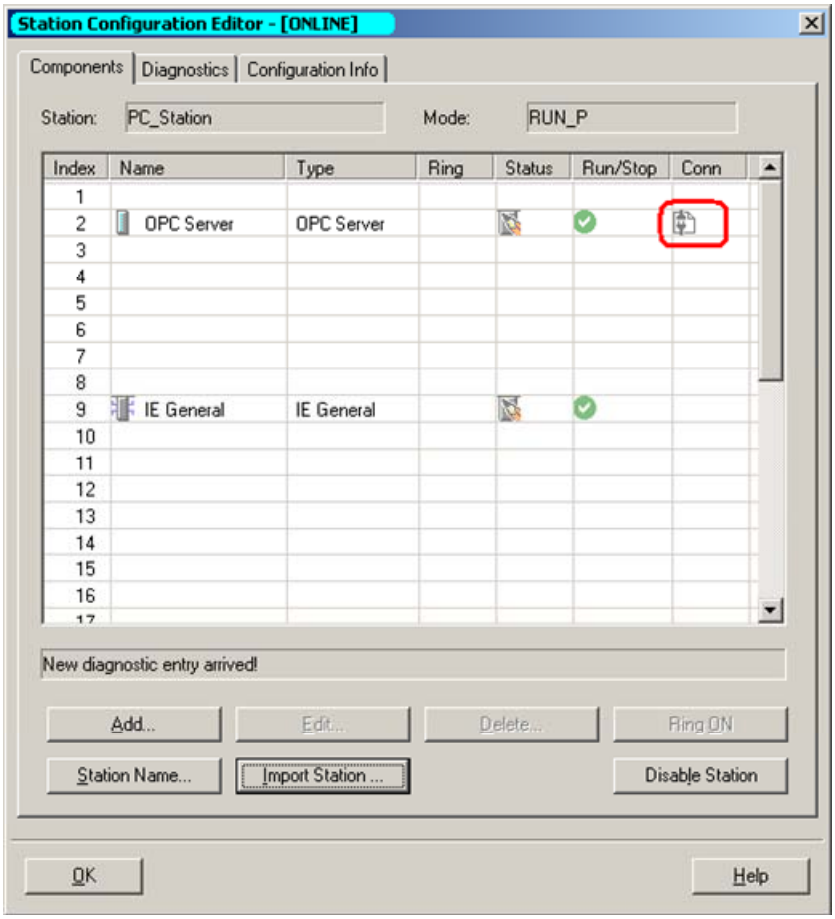
In this dialog you enter the path of the XDB file. The XDB file is always created in the project by NCM PC / STEP 7 (see **Fehler! Verweisquelle konnte nicht gefunden werden.**). With the combo box „Search in: “you navigate in the path of the XDB file.

Figure 2-26 information from the XDB file



As information, you can see once again which modules and applications are configured in the XDB file.

Figure 2-27 PC station is configured



Now the import of the XDB file is finished and the configuration is downloaded.

In the column connection, which is marked red, you see that the connection is also been downloaded.

Now the configuration of the PC station is finished.

3 Configuration of the SIMATIC S5

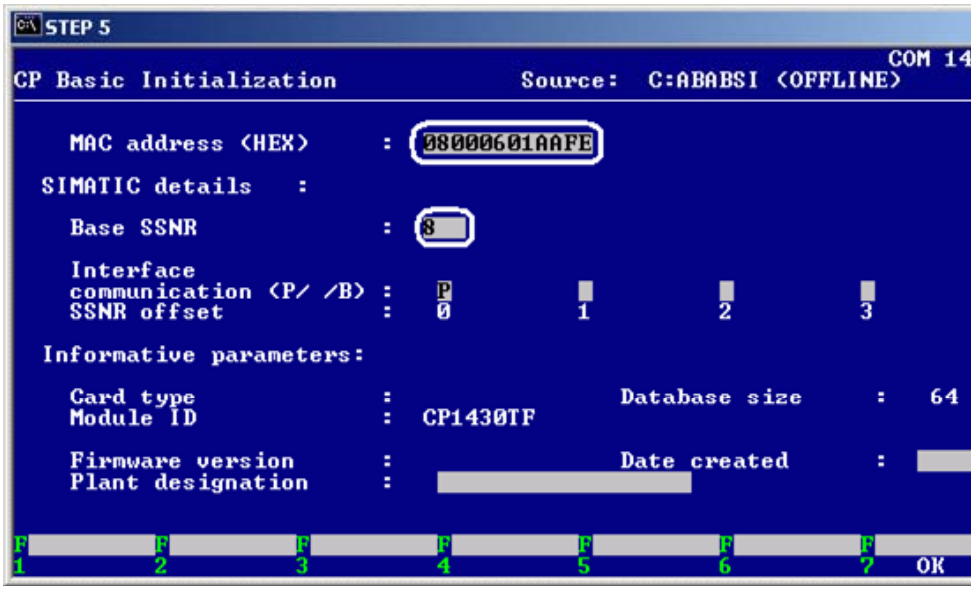
3.1 Initialization of the CP 1430 and configure the S5-compatible communication with the services FETCH / WRITE

Start STEP 5 in the Windows START Menu "Start → SIMATIC → STEP 5 → STEP 5.

Press the "F9" key to change to the configuration tool of the CP 1430 "SINEC NCM COM 1430".

NOTE The "SINEC NCM COM 1430" configuration tool is additional software integrated in STEP 5 to configure the CP 1430. This software is not included in the standard STEP 5 package and must be ordered separately. Initialize the CP using the "Edit → CP_Init" menu.

Figure 3-1 Initializing the CP



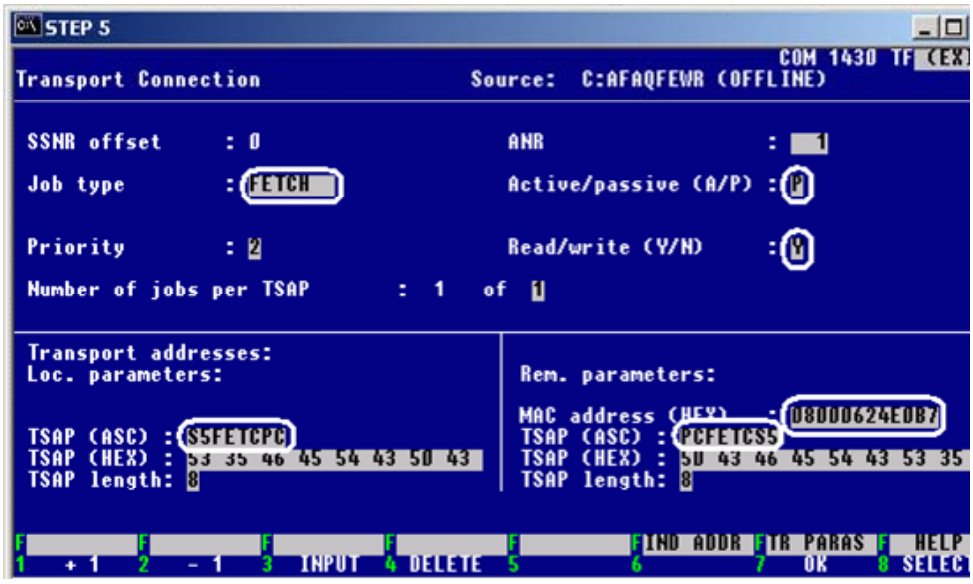
The MAC address of the CP 1430 must match the MAC address configured in NetPro (see Figure 2-15 property view of ISO transport connection → register „Addresses“).

The Base SSNR specifies the CP in the rack. This interface number must be used in the block calls in the S5 program.

Apply the settings with "F7".

Open the "Edit → Connections → Transport Connections" dialog.

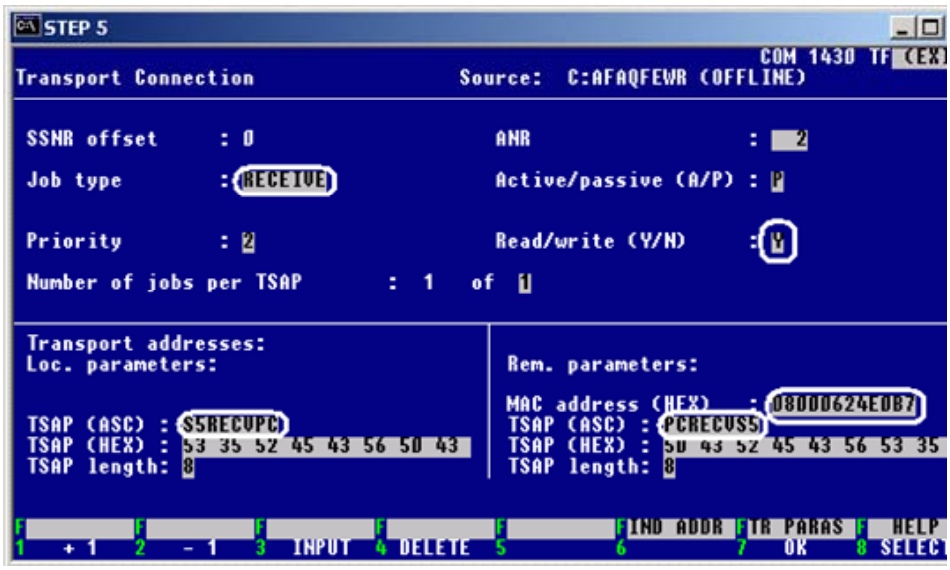
Figure 3-2 creating a connection with the service „FETCH“



- Enter "FETCH" for the job type and enter „P“for passive.
- In the local parameters, enter the remote TSAP which is defined in NetPro for the ISO transport connection with the service “FETCH” (see Figure 2-15 property view of ISO transport connection → register „Addresses“).
- In the remote parameters, enter the MAC address of the network card in the PC station and the local TSAP, which is defined in NetPro for the ISO transport connection with the service “FETCH” (see Figure 2-15 property view of ISO transport connection → register „Addresses“).

Create a second connection with „F3“.

Figure 3-3 creating a connection with the service „RECEIVE“



- Enter "RECEIVE" for the job type and enter „P“for passive.
- In the local parameters, enter the remote TSAP which is defined in NetPro for the ISO transport connection with the service “WRITE” (see Figure 2-18 property view of the ISO transport connection → register „Addresses“).
- In the remote parameters, enter the MAC address of the network card in the PC station and the local TSAP, which is defined in NetPro for the ISO transport connection with the service “WRITE” (see Figure 2-18 property view of the ISO transport connection → register „Addresses“).

Apply the settings with „F7“.

Following download the configuration with „Transfer → FD → CP“in the CP1430. To start the loading of CP1430 you have to stop the CP1430: CP-Function → stop.

Return to the STEP 5 configuration dialog with "File > Exit" and "ESC".

3.2 Description of the S5 program

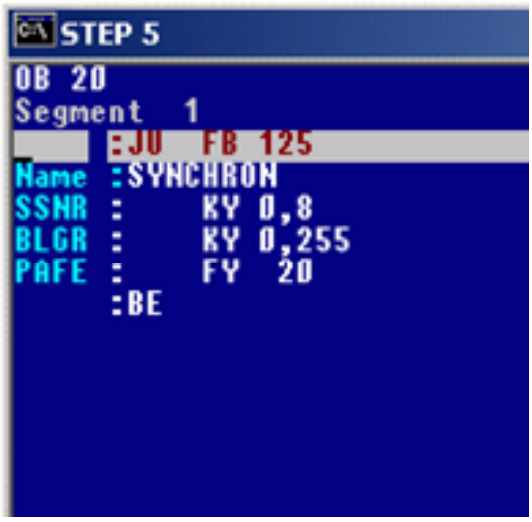
Synchronization of the CP 1430 with the CPU using the SYNCHRON call in the start-up OBs

Insert the following start-up OBs in the STEP 5 project:

- OB20
- OB21
- OB22

In these OBs, program the FB125 "SYNCHRON" call that synchronizes the CPU and CP.

Figure 3-4 call the FB125 „SYNCHRON“



Calling the block „SEND_ALL“and „RECEIVE_ALL“in the OB1

Create the OB1.

Program the call of the block FB126 „SEND_ALL“and FB127 „RECEIVE_ALL“.

Save the OB1 with F7.

Creating the send and receive buffer

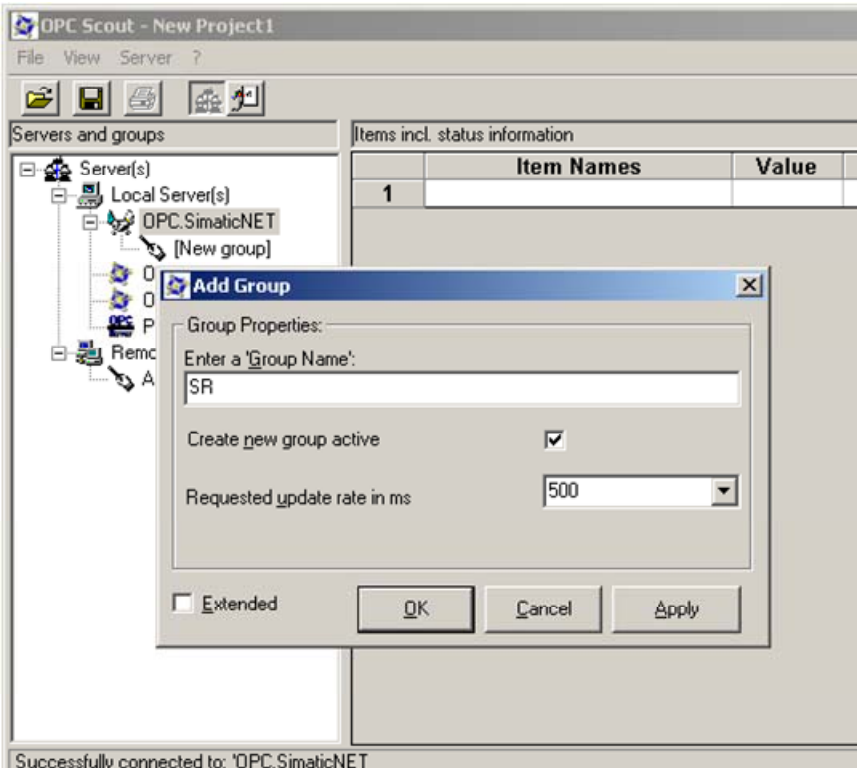
Since the send and receive buffer is located in DB10, this must be created in the project and declared with an adequate length. Then download the entire program to the S5 station.

4 Establish the connection with the OPC Scout

Start the OPC Scout with "Start → SIMATIC → SIMATIC NET → OPC Scout".

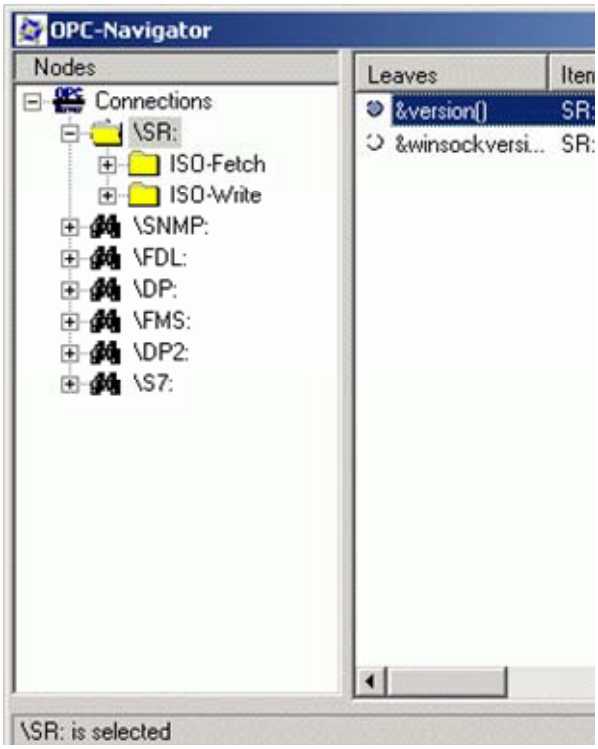
Double-click the „OPC.SimaticNet“for connection with the SIMATIC NET OPC server. In the dialog that appears, enter a suitable group name and confirm this with OK.

Figure 4-1 connecting with the OPC server and enter a group name



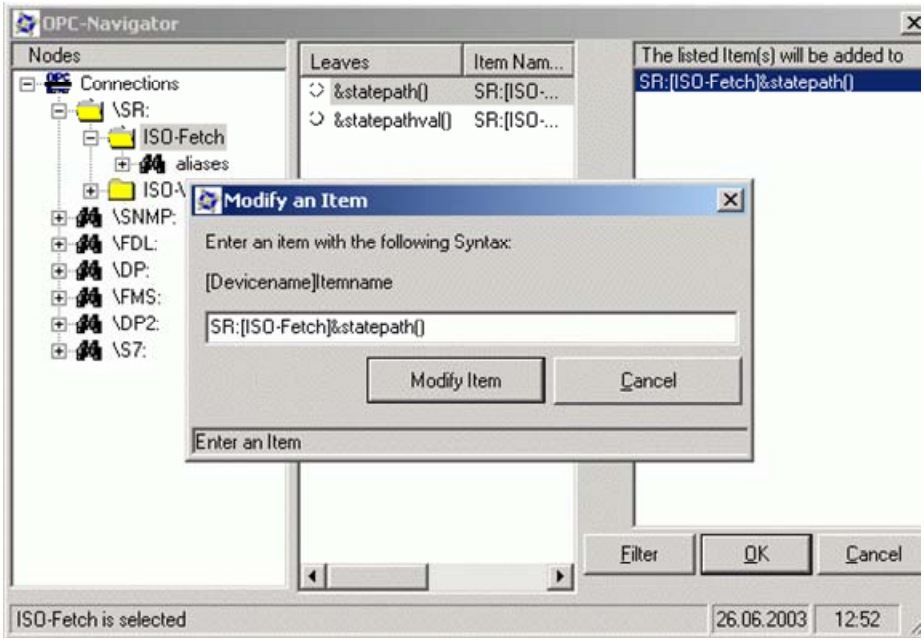
Double-click the OPC group which you have created. The "OPC-Navigator" opens. You will now see your protocols in the OPC Navigator. Double-click on "SR". The connection name you configured in NetPro appears.

Figure 4-2 OPC-Navigator



Double-click the configured SR-connection with the name “ISO-Fetch”. Two items appear in the middle window. Move one of the two items to the right-hand window with the button "→". Double-click the Item in the right-hand window.

Figure 4-3 defining a new OPC item in the OPC Scout



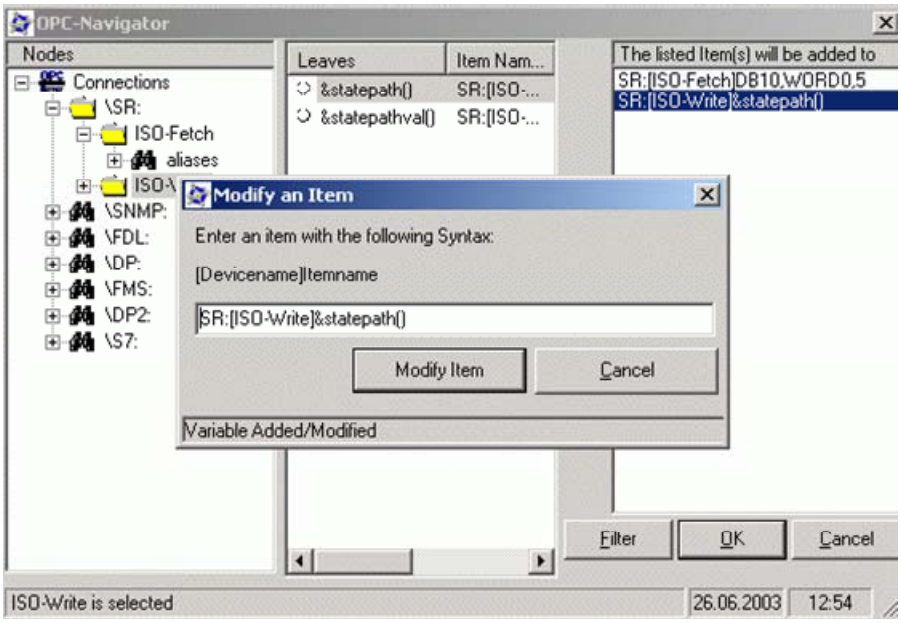
In this example, the send area of the CPU is located in DB10. DB10 must be created in the S5 station with an adequate data length. The item for writing from the PC to the CPU is declared as 5 words in DB10 starting at word 0. Click on "Modify Item".

Following dialog appears:

Figure 4-4 modifying name of item

Double-click the SR-connection with the name „ISO-Write“in the OPC Navigator. Two items appear in the middle window. Move one of the two items to the right-hand window with the button "→". Double-click the Item in the right-hand window.

Figure 4-5 defining new OPC items in the OPC Scout

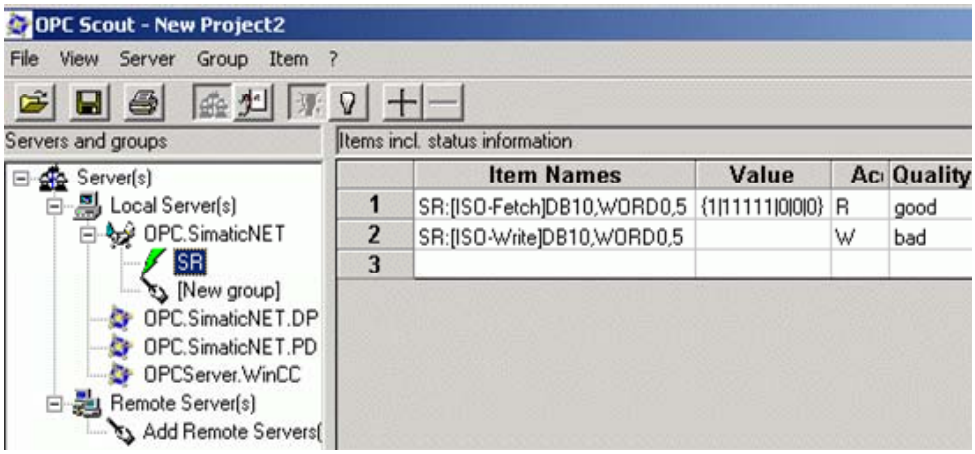


In this example, the receive area of the CPU is located in DB10. DB10 must be created in the S5 station with an adequate data length. The item for receiving CPU data is declared as 5 words in DB10 starting at word 0. Click on the button "Modify Item". Following dialog appears.

Figure 4-6 modifying name of item

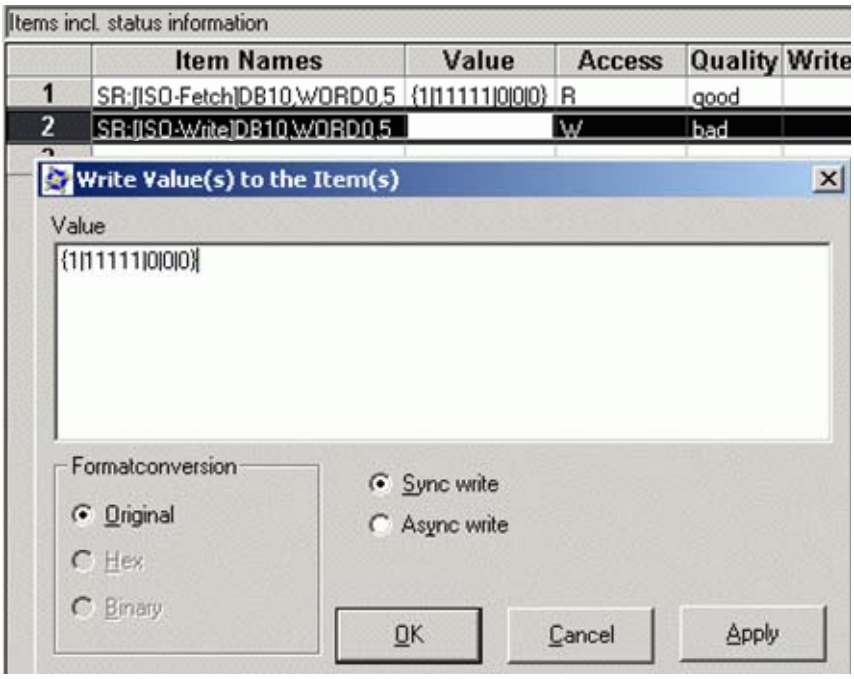
Exit the dialog with „OK".The items are adopted in the OPC Scout. If the quality of the first item is good, the SR-connection with the service "Fetch" to S5 station is established.

Figure 4-7 OPC Scout



Double-click on the box "value" of the OPC item ISO-Write to write values into the PLC of the S5 station.

Figure 4-8 writing values



NOTE If the number of values entered does not match the declared area of five words, the values cannot be written to the S5 station.

Successful sending of values to the S5 is displayed in the "Write Result" and "Error" columns of the OPC Scout. The "Write Result" and "Error" columns can be made visible in the "View → Options" menu.

Figure 4-9 successful sending of values

Item Names	Value	Qual	Write Result	Error
SR:[ISO-Fetch]DB10,WORD0,5	{1|11111|0|0|0}	good		
SR:[ISO-Write]DB10,WORD0,5	{1|11111|0|0|0}	bad	OK	The operation completed successfully

NOTE The quality of the OPC item “ISO-Write” remains constantly set to invalid because the connection is a one-ended write connection. The quality of the connection can not be checked.

5 Basic configuration instrutions

5.1 TSAP rules

- The length of the TSAP is 8 signs.
- The characters permitted for TSAPs are letters, numbers, hyphens, and underscores.
- Use upper case letters.
- The local and remote TSAP can bet be same.
- The TSAPs must be unique per connection.
- To check the TSAPs, use the output of the character string in hexadecimal format.

5.2 Interface number (SSNR)

- The interface number of the CP is assigned in the configuration tool of the CP1430 „SINEC NCM COM 1430“in the dialog “Edit → CP Init).
- The SSNR must be specified as a parameter in all communication blocks of the CPU (FB120, FB121, FB125, FB126, and FB127).
- The interface number must be divisible by 4 (0, 4, 8, 16…).

5.3 FB126 „SEND_ALL“ und FB127 „RECV_ALL“, FB125 „SYNCHRON“

- The PAFE and ANZW parameters are output parameters. These are used for diagnostics and job monitoring.
- The blocks must be called using unconditional calls (for example JU FB126).

6 History

Version	Date	Changes
V 1.0	03.03.2008	First Issue