FAQ Communication over PROFIBUS

service & SUPPORT

FDL connection over PROFIBUS between PC station and SIMATIC S7

SIEMENS

FAQ

Entry-ID: 16650266

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Question

How do I configure a FDL connection to a SIMATIC S7 over PROFIBUS for the SIMATIC NET OPC Server with the SIMATIC NET PC Software?

Answer

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

Entry-ID: 16650266

1 Assignment of tasks

In this example a CP5611 is used, that implements FDL communication over the OPC Server with a S7 station on PROFIBUS.

NOTE The method described in these instructions also applies to the communications processors CP5613/14 (A2), CP5621, CP5511 and CP5512.

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.

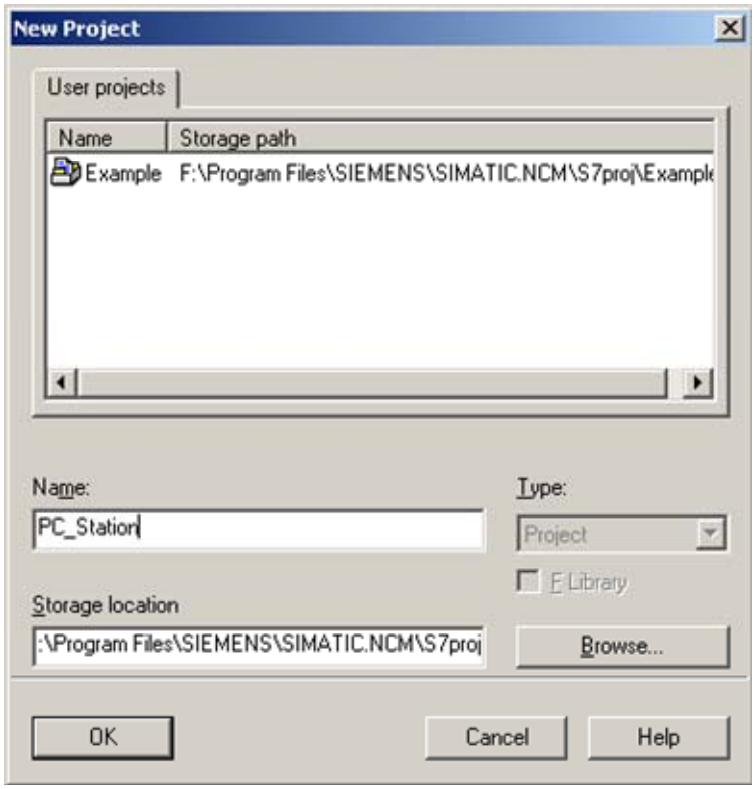
In chapter 2 “Configuration of the PC station” is described the configuration of PC station so that you can use the FDL communication over PROFIBUS to exchange data between PC station and S7 station.

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.

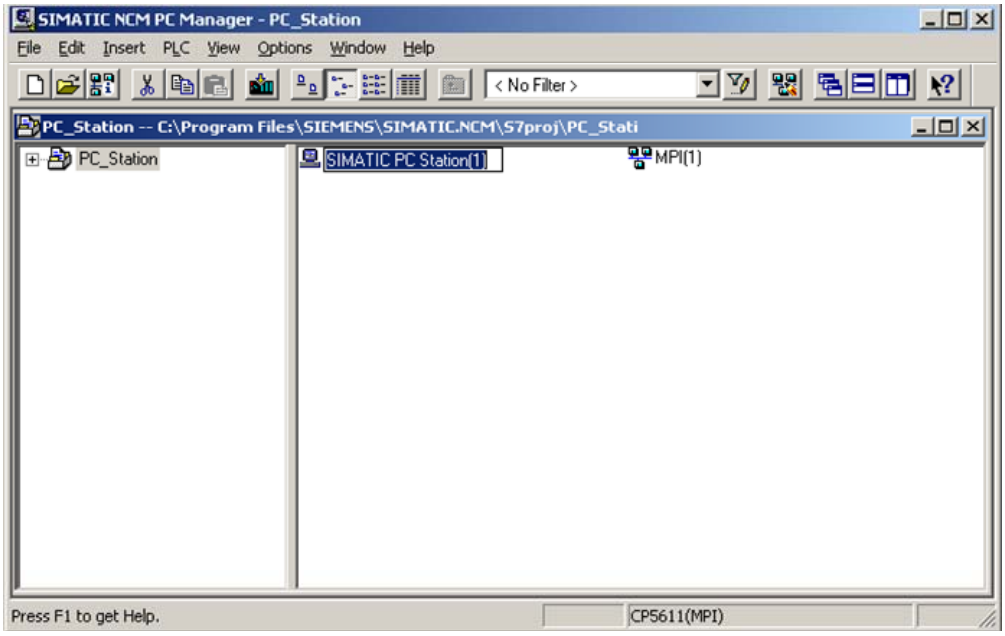
Create a new project with "File → New".

Figure 2-1 giving the project a name



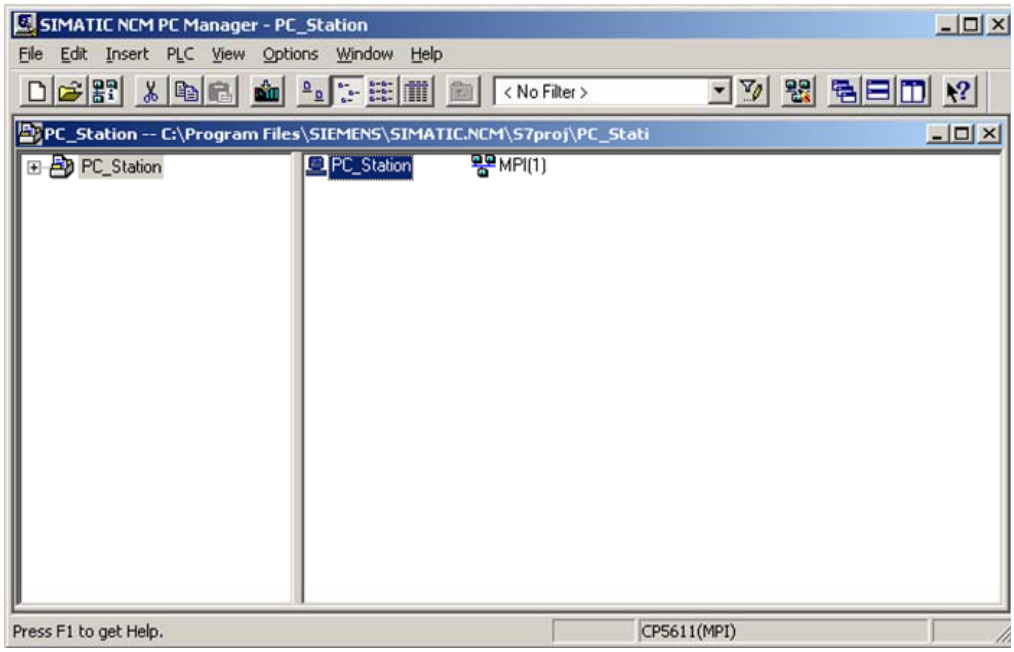
Confirm the project name you have entered (in the example: "PC_Station") with OK. An empty STEP 7 or NCM PC project is then created.

Figure 2-2 inserting the PC station



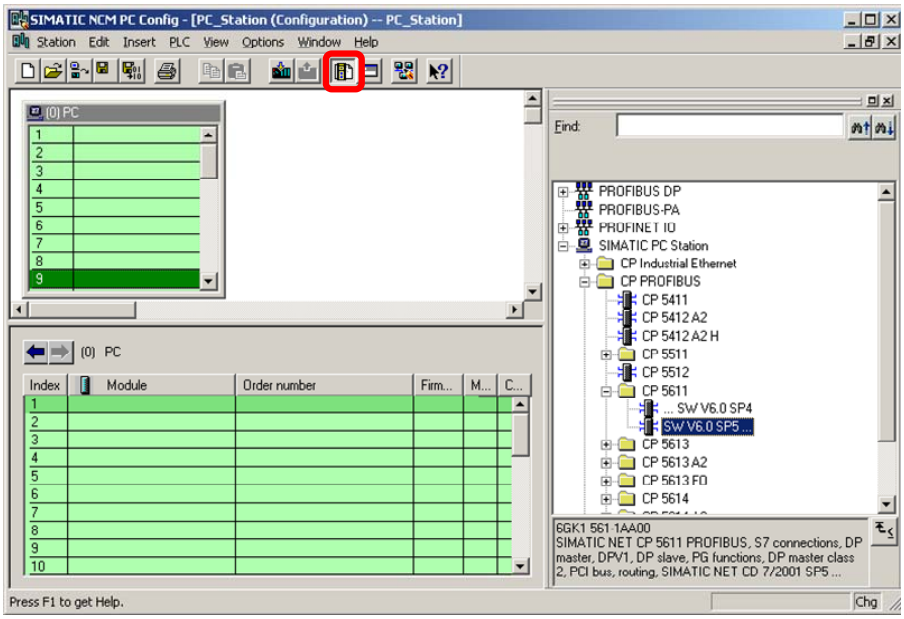
With the menu command "Insert → Station → SIMATIC PC Station", you insert the PC station.

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



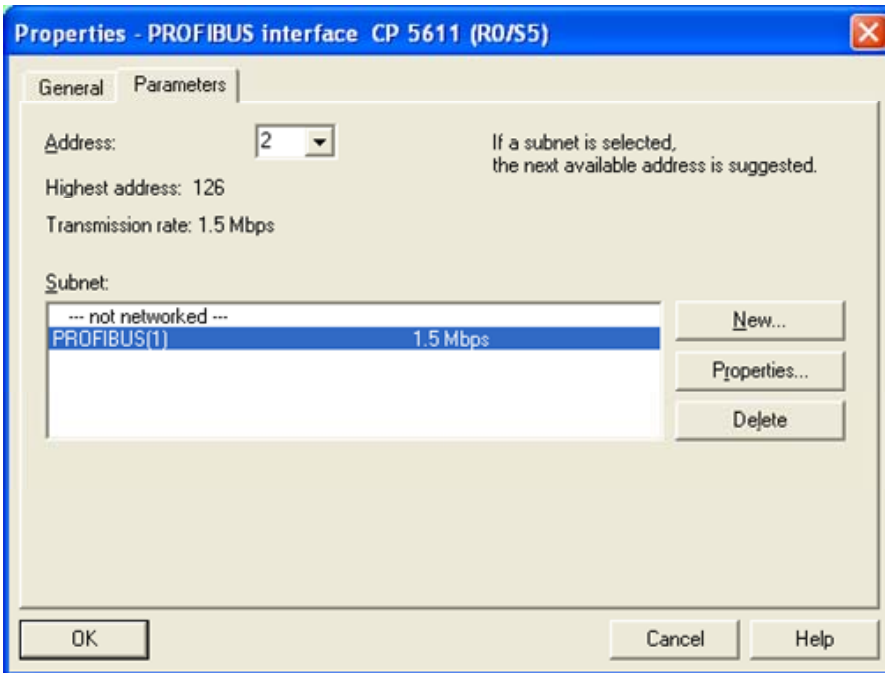
You will see an empty rack. If you cannot see the hardware catalog, click on the button marked in red.

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

If you use a CP5613/14 (A2) (or CP5511 or CP5512) you will select the CP5613/14 (A2) (or CP5511 or CP5512) from the STEP7 hardware catalog.
If you use a CP5611 A2 or CP5621 you will configure these modules as CP5611.

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

Figure 2-5 address assignment dialog



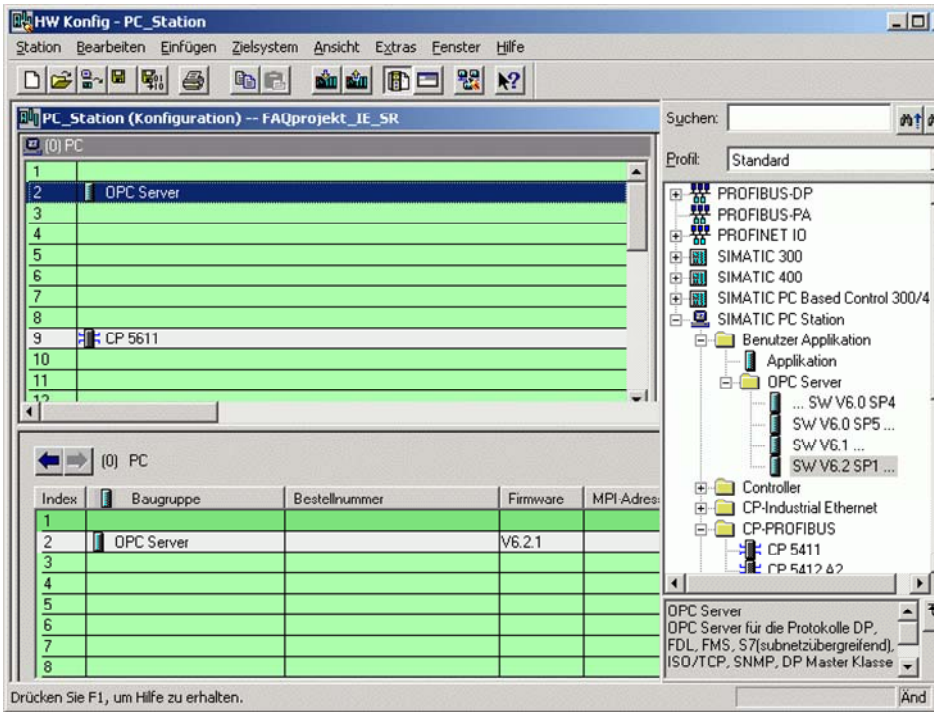
In this dialog you set the PROFIBUS address of the CP5611. Following you select the existing PROFIBUS subnet and close the dialog with „OK“. So you assign the CP5611 to an existing network.

If there isn’t an existing PROFIBUS subnet you will click the button "New" to create a new PROFIBUS subnet which you assign to the CP5611.

The configuration and networking of the CP5611 is finished now.

Following you select the OPC server in the hardware catalog and then drag it to any slot.

Figure 2-6 finished hardware configuration of the PC Station

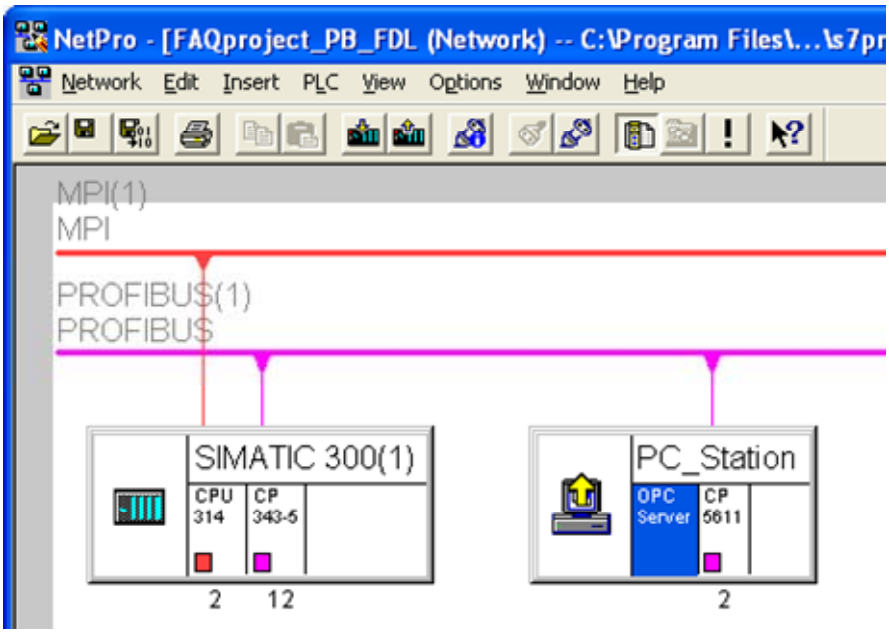


Now open the NetPro program. Use the button marked red in the toolbar in Figure 2-7 button „NetPro.

Figure 2-7 button „NetPro“

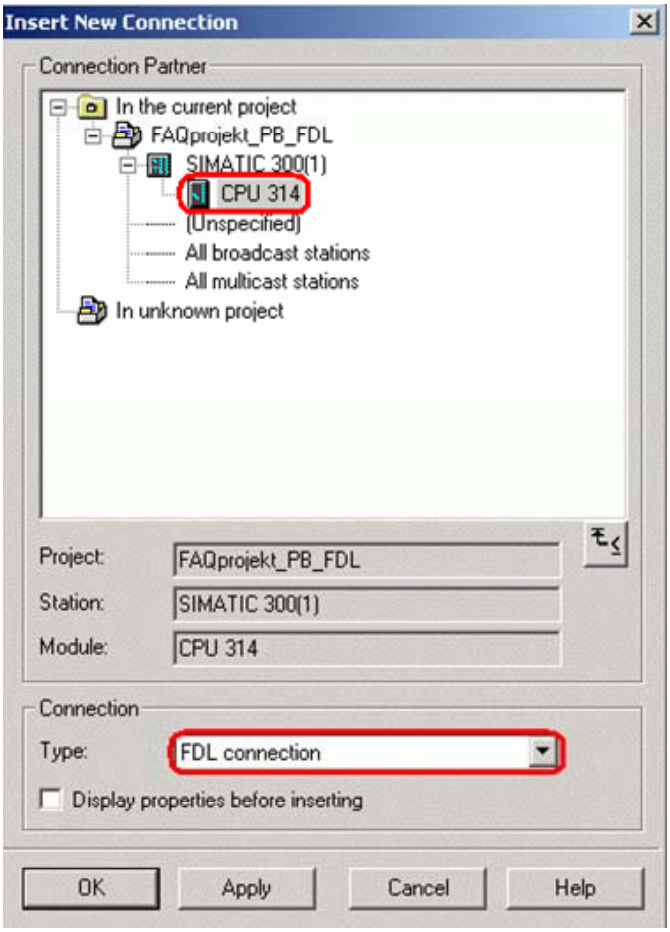
In NetPro you configure a FDL connection to exchange data between the OPC server and the S7 station.

Figure 2-8 configuring the FDL connection in NetPro



Select the OPC server and choose the menu command "Insert → New Connection" to create a new connection for the OPC server or right-click the OPC server → „Insert → New connection“.

Figure 2-9 insert a new connection in NetPro



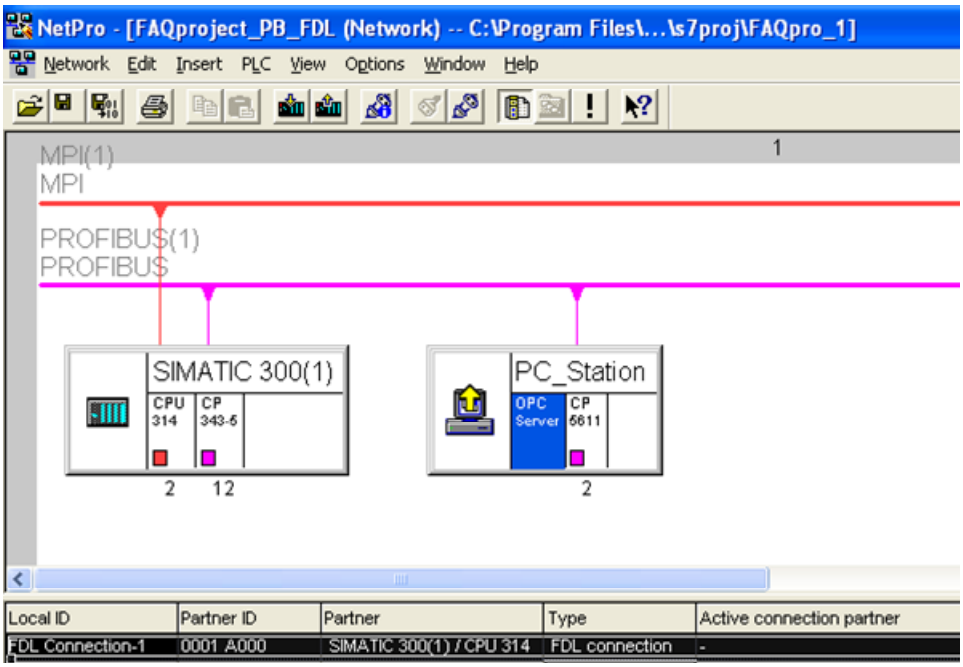
If the communication partner is configured in the same STEP 7 project like the PC station you can select the relevant communication partner directly. In this case the communication partner is a S7 station with PLC 314. Select the connection type „FDL connection“. The FDL connection is created automatically.

Close the dialog „Insert New Connection“with „OK“.

If the communication partner isn’t configured in the same STEP 7 project like the PC station you will configure an unspecified connection. Select “unspecified” in the dialog box “communication partner”.

If you select the OPC server in the PC station you will see the FDL connection you have just created in the connection table.

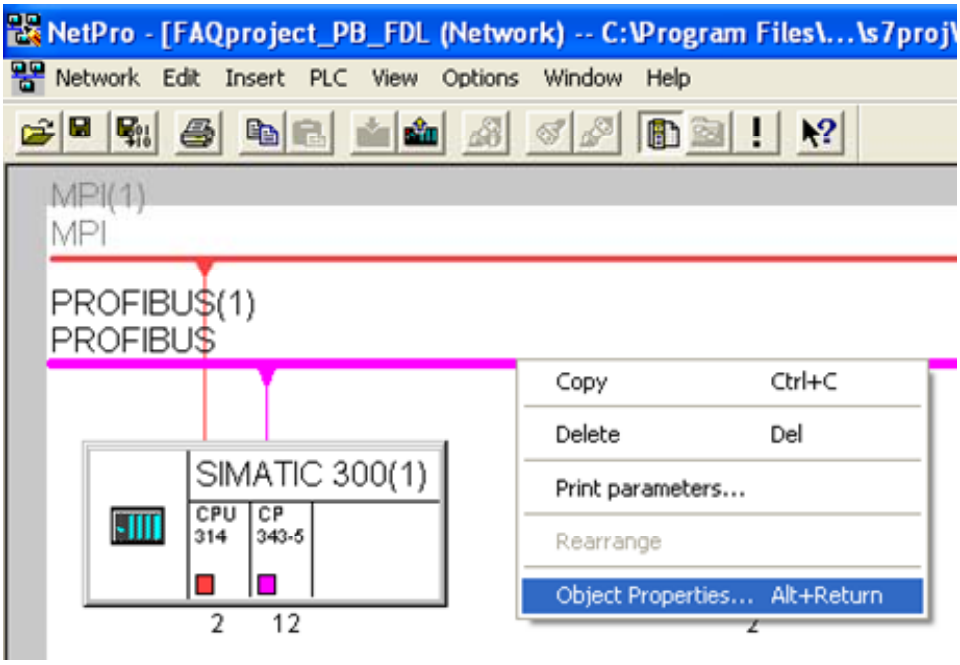
Figure 2-10 connection table with created FDL connection



Now the configuration of the of the FDL connection is finished.

Check the PROFIBUS network settings to know if you have to change declarations concerning the transmission rate and the bus profile. Therefore right-click the PROFIBUS subnet which is assigned to the PC station and S7 station and open the object properties of the PROIBUS subnet.

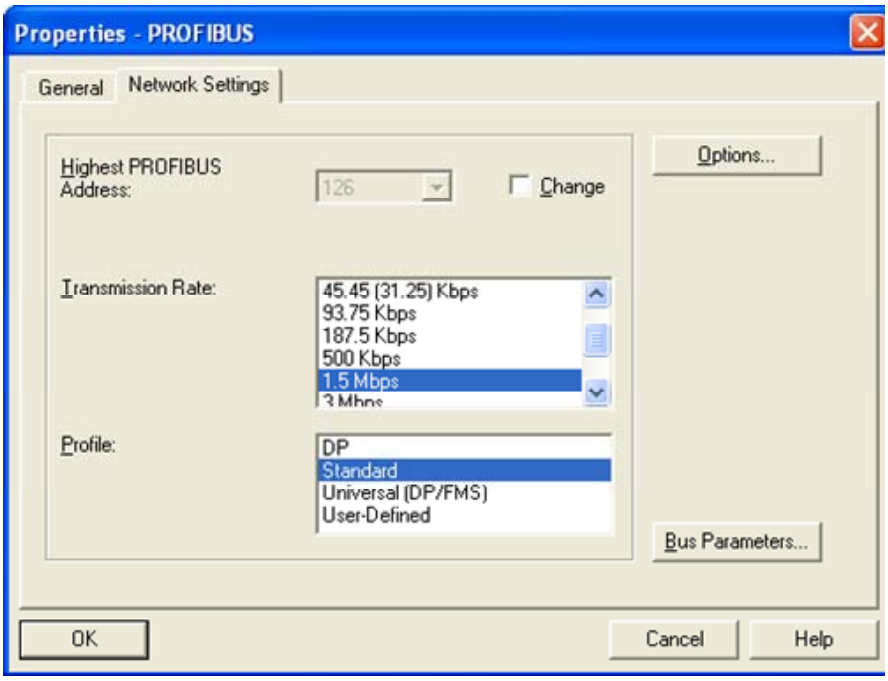
Figure 2-11 opening the object properties of the PROFIBUS subnet



In the object properties of the PEOFIBUS subnet you have to change to the register „Network Settings“. Adapt the transmission rate and the bus profile. The parameters have to be identically for all members of the PROFIBUS subnet.

NOTICE	**For FDL communication over PROFIBUS you have to use the bus profile „Standard“.**

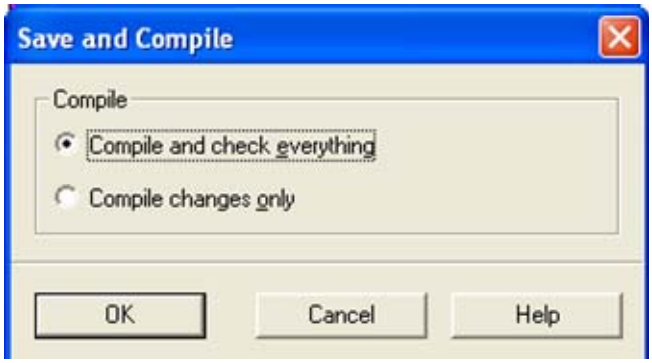
Figure 2-12 property view of the PROFIBUS subnet



Close the property view of the PROFIBUS subnet with „OK“.

Save and compile the 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 2-13 Save and compile



Note

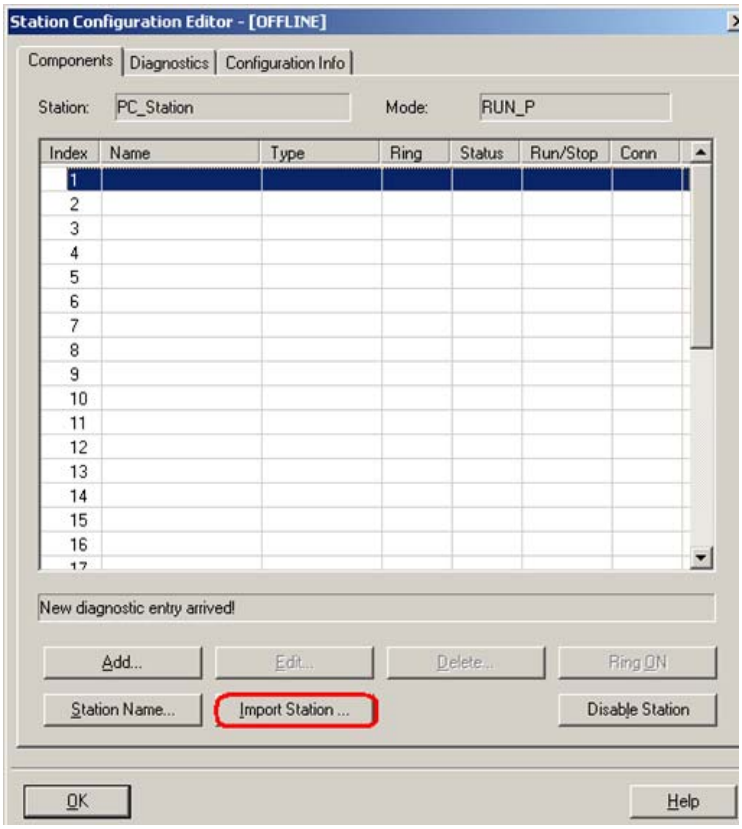
Warning indications can be displayed while proceeding with the “Save and Compile” of a S7 project. Warnings serve as piece of information and have no functional effect. In case error warnings occur, search for possible divergences in the previous steps of the instructions.

3 Download the configuration into PC station

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

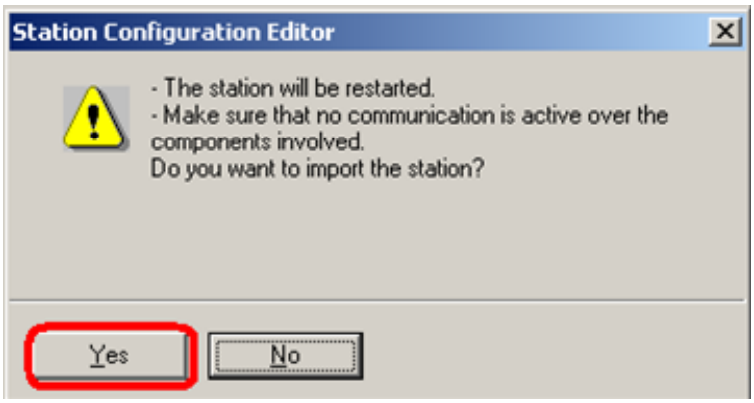
Figure 3-1 button „Station Configuration Editor“

Figure 3-2 Station Configuration Editor



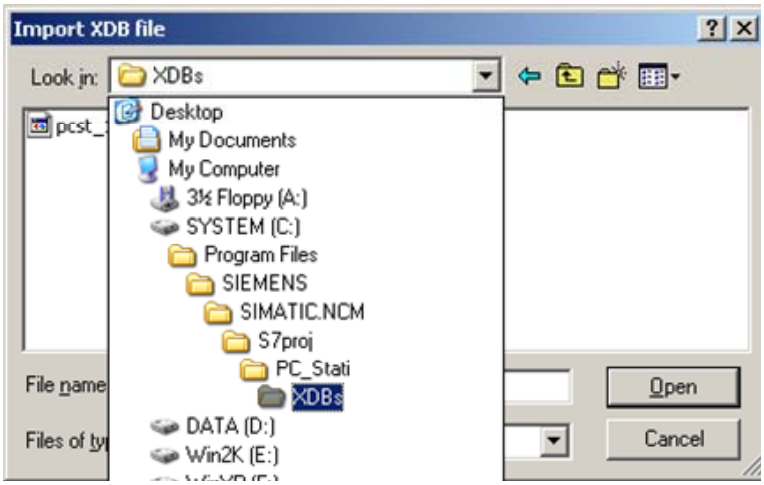
Click the button "Import Station…“. A message about restarting the PC station will open.

Figure 3-3 message about restarting the PC station



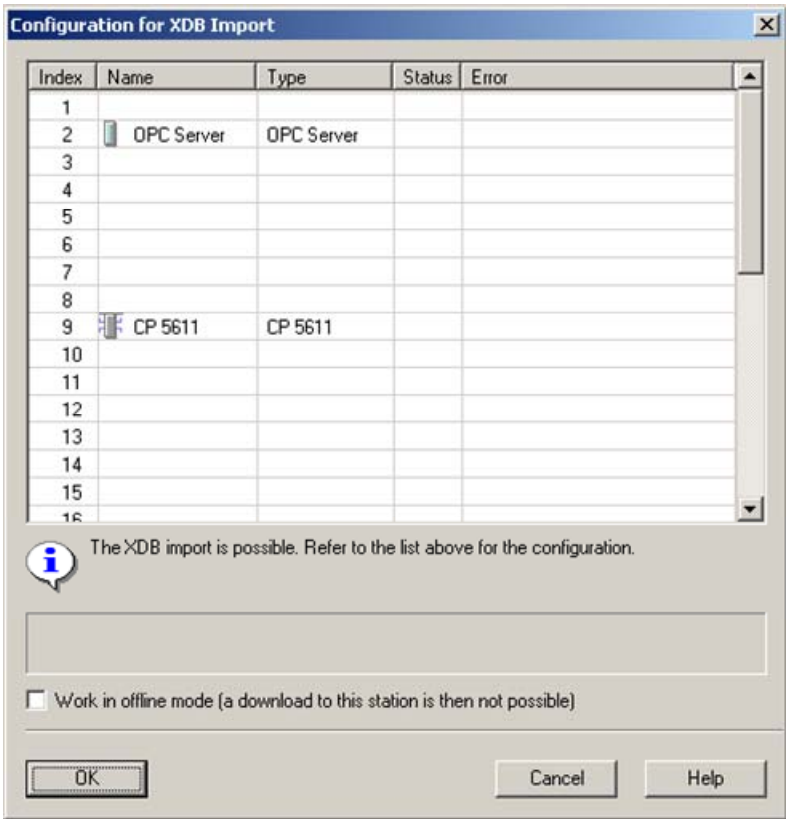
Confirm the message about restarting the PC station with „Yes“. The following dialog to select the XDB file, which should be import, opens.

Figure 3-4 selecting the XDB file



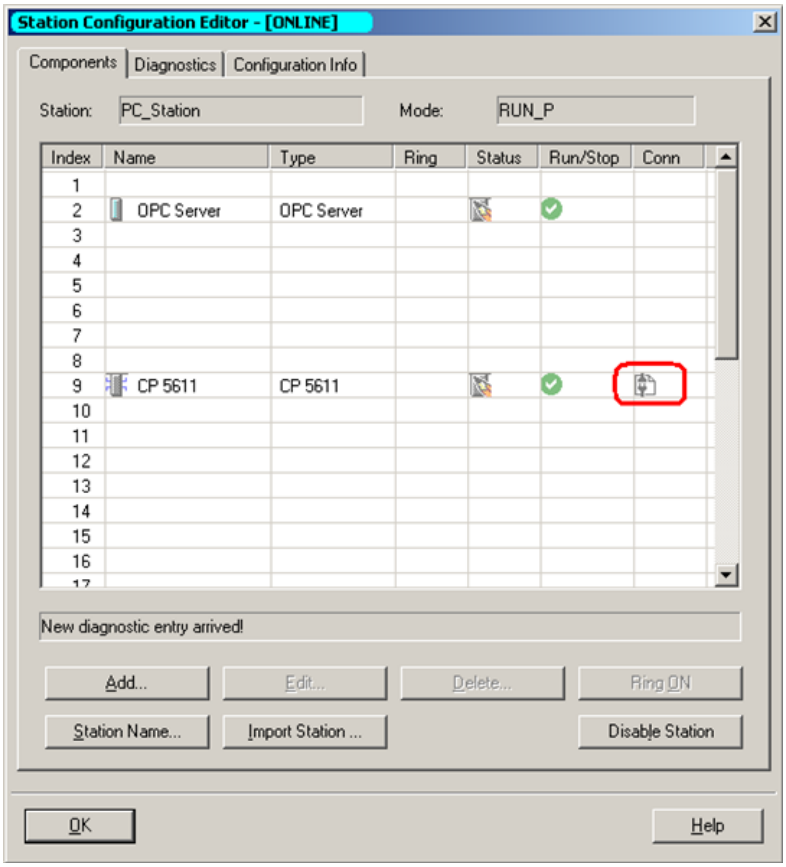
In this dialog you enter the path of the XDB file. The XDB file is always created in the project by NCM PC / STEP 7 (see Figure 2-1 giving the project a name). With the combo box „Search in: “you navigate in the path of the XDB file.

Figure 3-5 information from the XDB file



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

Figure 3-6 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.

So the configuration of the PC station is finished.

NOTE

After downloading the configuration into PC station you have to download the configuration of the FDL connection to the S7 station.

You have to download the configuration of the FDL connection into PC station and to S7 station.

4 Description of the S7 program

In the S7 program you have to call the communication blocks FC5/50 „AG_SEND/AG_LSEND“ and FC6/60 „AG_RCV/AG_LRCV“. You can find the communication blocks in the SMATIC_NET_CP library under CP 300→Blocks and CP 400→Blocks respectively.

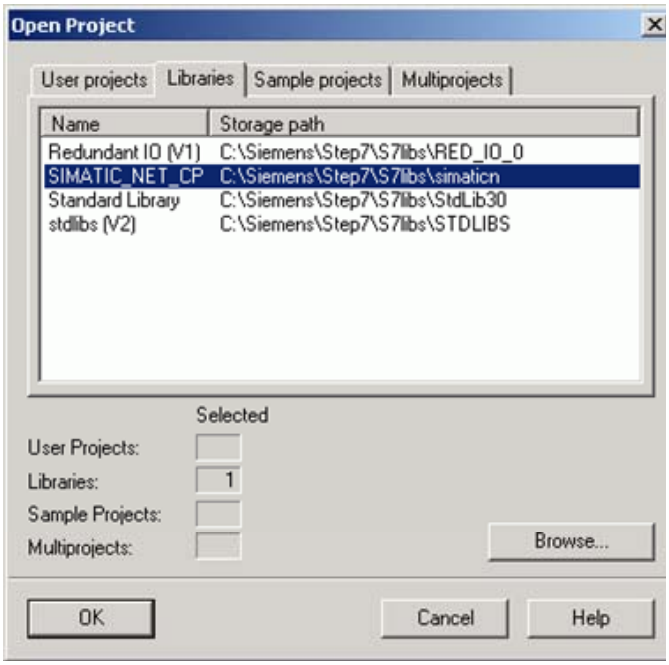
In this example is used a S7-300 station. For this reason the communication blocks FC5 „AG_SEND“ and FC6 „AG_RCV“ are used.

There are the communication blocks FC50 „AG_LSEND“ und FC60 „AG_LRCV“ for the S7-400 station.

Open the STEP 7 project.

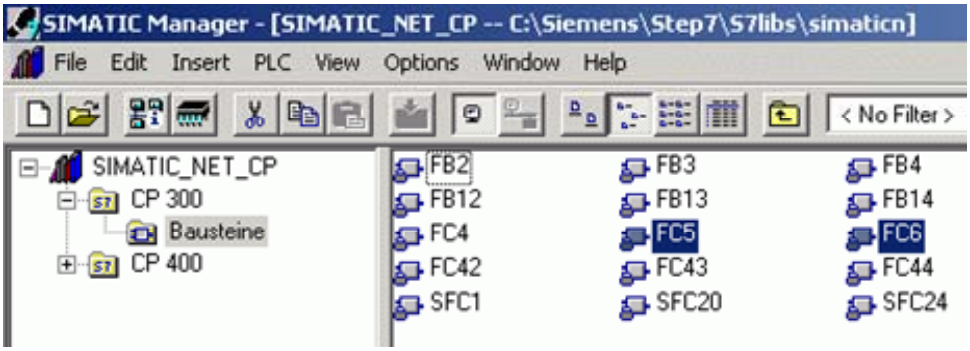
Open the SIMATIC_NET_CP libary in the SIMATIC Manager with the menu command „File → Open → Libaries”.

Figure 4-1 opening the SIMATIC_NET_CP libary



You can find the communication blocks FC5 „AG_SEND“ und FC6 „AG_RCV“ in the SIMATIC_NET_CP library under CP 300 → Blocks.

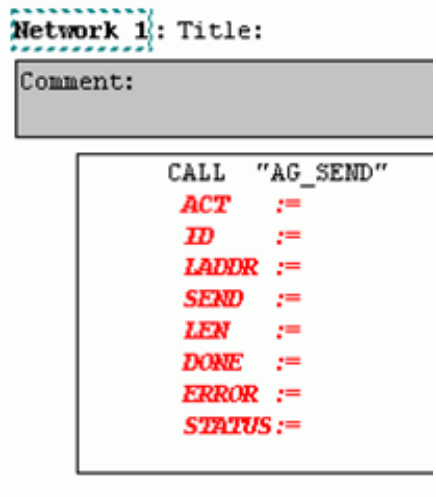
Figure 4-2 copy FC5 and FC6



Copy the communication blocks FC5 and FC6 in the folder „Blocks“ of your S7 program.

You cyclical call the FC5 „AG_SEND“ in the OB1.

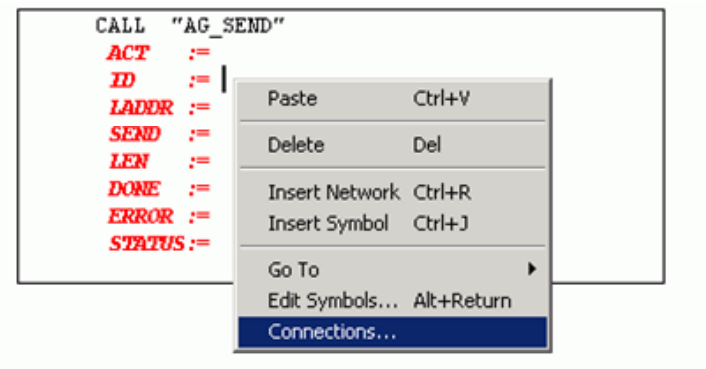
Figure 4-3 calling the FC5 „AG_SEND“



The "ID" and "LADDR" function parameters were already specified by the connection set up in NetPro.

You can enter these parameters automatically with the right mouse button and "Connections".

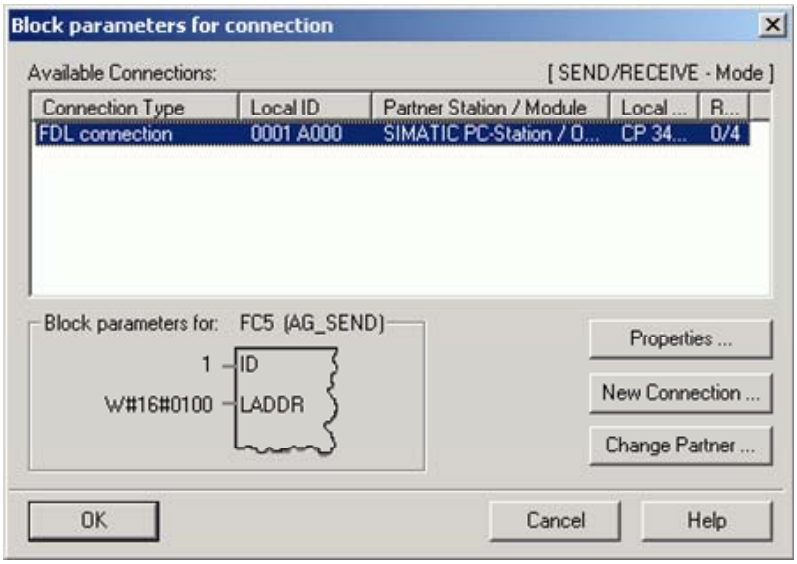
Figure 4-4 setting parameters ID and LADDR eintragen



In the next dialog you select the FDL connection which you have configured in NetPro for the S7 station.

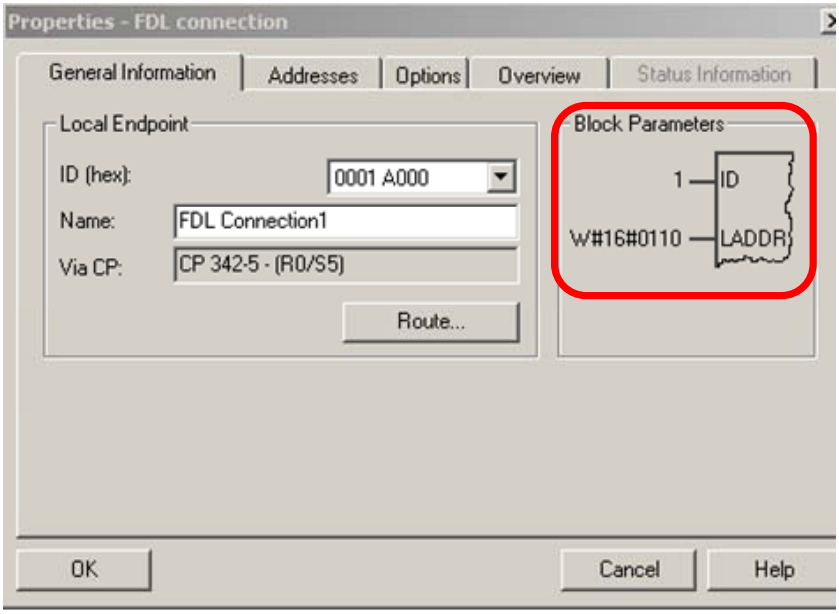
Confirm the dialog with "OK".

Figure 4-5 selecting FDL connection



It's also possible to find out the values of the parameters in the property view of the FDL connection which is configured for the S7 station.

Figure 4-6 property view of the FDL connection → register „General Information“



Call the FC6 “AG_RCV” and parameterize this function block in the same way like the FC5 “AG-SEND”.

A sample program for calling FC5 / FC6 might look as shown below.

Figure 4-7 sample program FC5/6

```
      U     M    100.0
      S     M      0.0


      CALL  "AG_SEND"                  //AG_SEND block call
       ACT   :=M0.0                    //Job triggered by memory bit
       ID    :=1                       //Connection ID from NETPro
       LADDR :=W#16#100                //Load address from NETPro
       SEND  :=P#DB10.DBX0.0 BYTE 50   //Buffer with send data
       LEN   :=50                      //Length info for send data
       DONE  :=M10.0                   //job ready without error
       ERROR :=M10.1                   //job ready with error
       STATUS:=MW11                    //Status code


      O     M     10.0
      O     M     10.1
      S     M    100.0
      U     M      0.0
      R     M      0.0
      R     M    100.0
      UN    M     10.1
      SPB   noER
      L     MW    11

noER: SET

      CALL  "AG_RECV"                  //AG_RECV block call
       ID    :=1                       //Connection ID from NETPro
       LADDR :=W#16#100                //Load address from NETPro
       RECV  :=P#DB10.DBX0.0 BYTE 50   //Buffer for receive data
       NDR   :=M20.0                   //job ready without error
       ERROR :=M20.1                   //job ready with error
       STATUS:=MW21                    //Status code
       LEN   :=MW23                    //really received mount of data
```

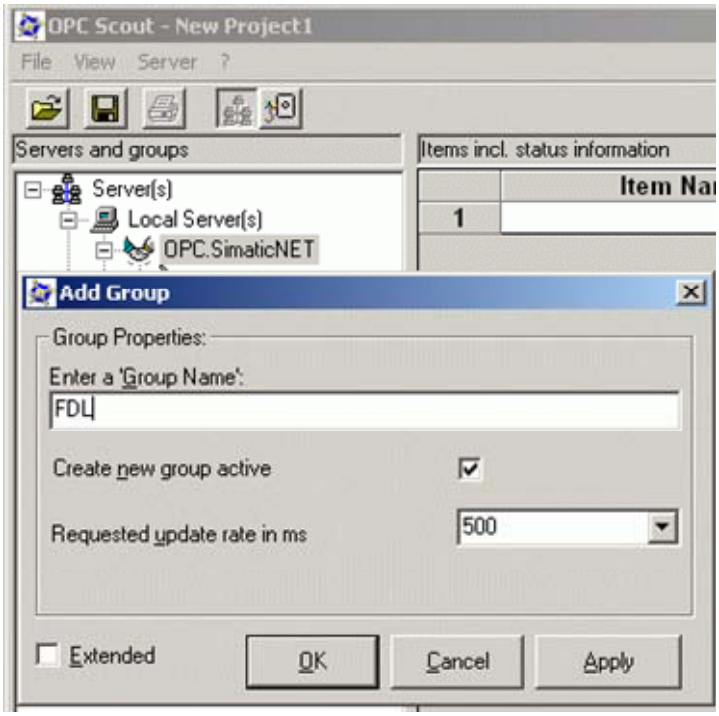
Save the program you have created and download the blocks to the S7 station.

5 Establish the connection with the OPC-Scout

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

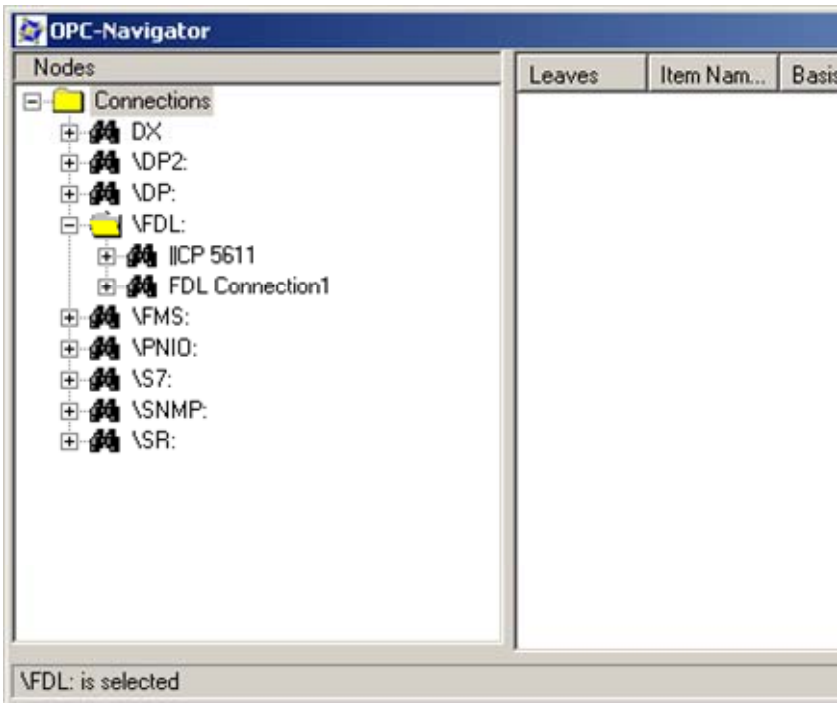
Double-click the „OPC.SimaticNet“for connection with the SIMATIC NET OPC server. In the dialog that appears, enter a suitable group name and confirm this with OK.

Figure 5-1 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 "FDL". The connection name you have configured in NetPro appears.

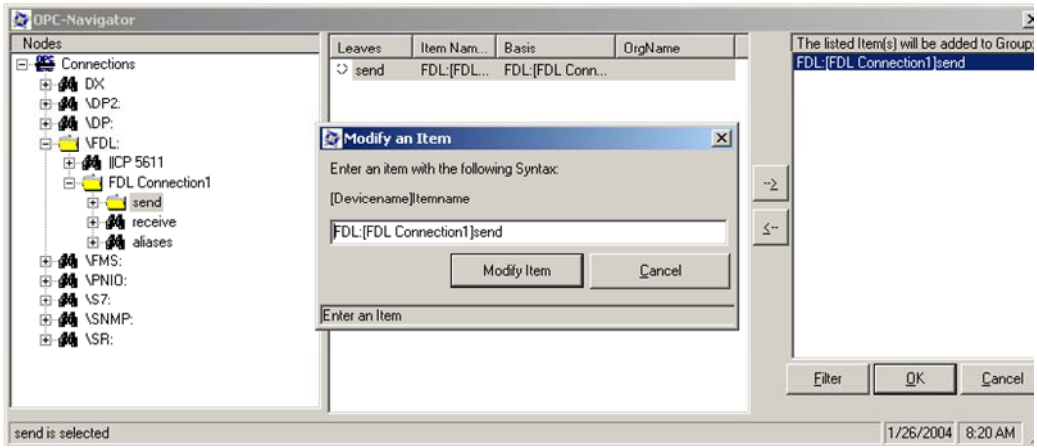
Figure 5-2 OPC-Navigator



Double-click the configured connection to define new items for the communication and to insert existing items respectively.

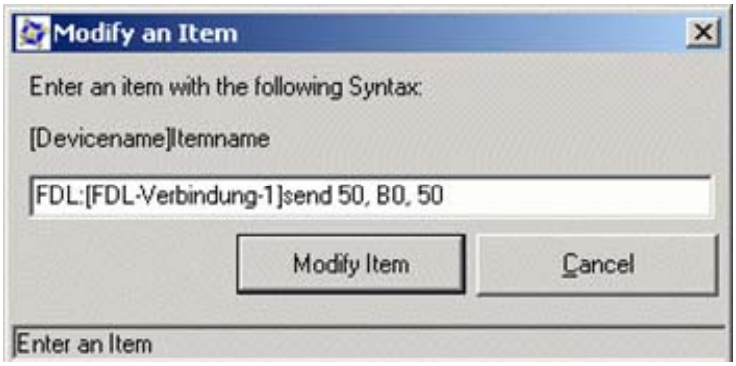
If you select “send” ", an item appears in the middle section. Move this "send" item to the right-hand window with the button "→". Double-click the item in the right-hand window.

Figure 5-3 insert „send“ item



Change the name of the item (see Figure 5-4 changing the name of „send“ item) and click on the button „Modify Item“ to apply the entry.

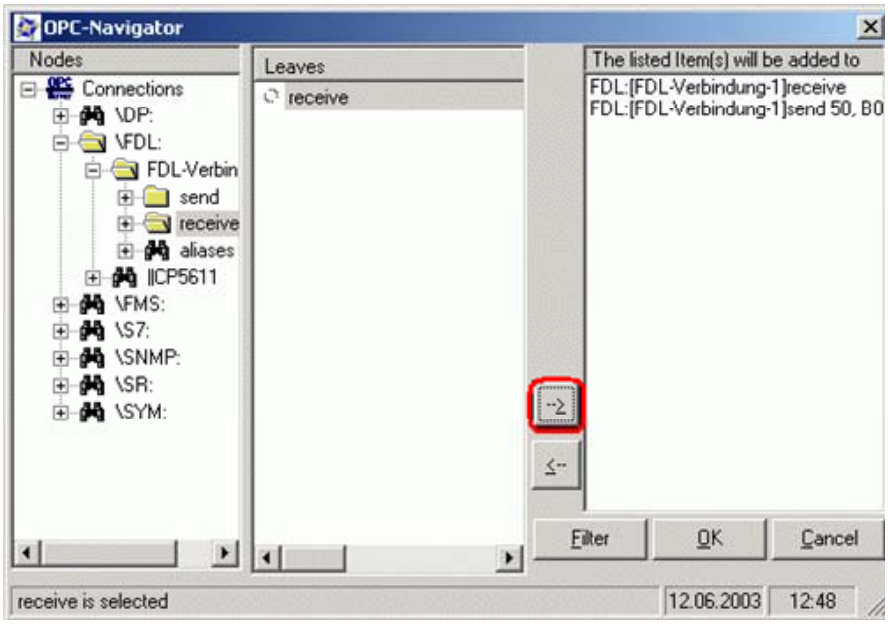
Figure 5-4 changing the name of „send“ item



Select „receive“ in the OPC-Navigator and add the existing „receive“ item, which is shown in the middle section, with the button “→” to the item list in the right-hand window.

Close the dialog with "OK".

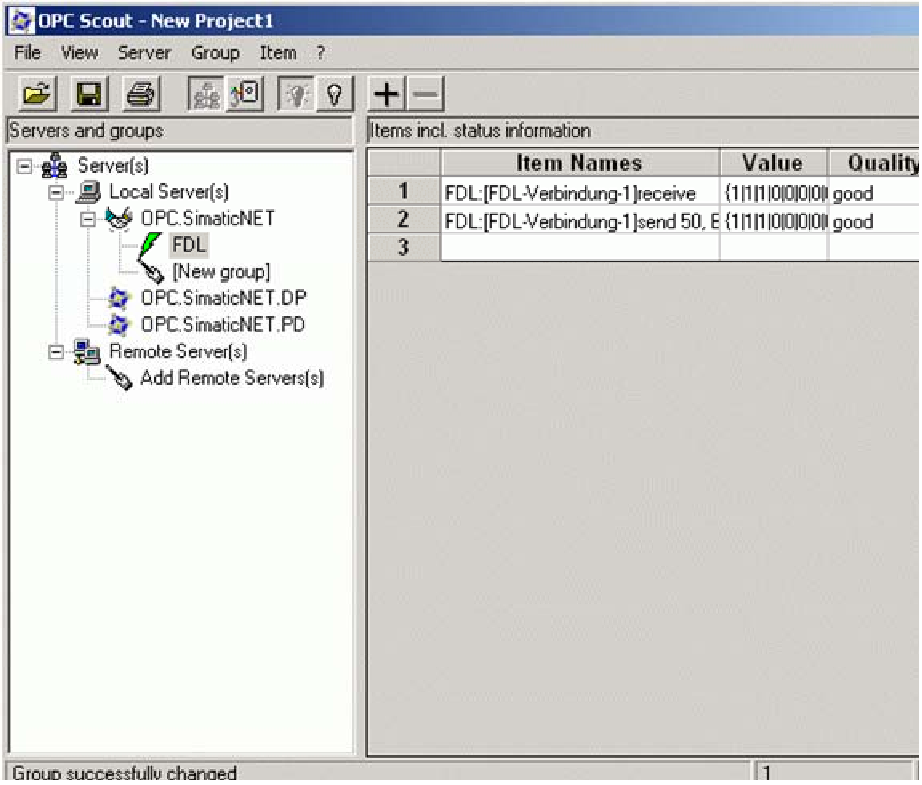
Figure 5-5 insert „receive“ item



NOTE The send job is triggered by setting the memory bit 100.0 on the S7 station once manually. This starts communication between the S7 station and the PC station.

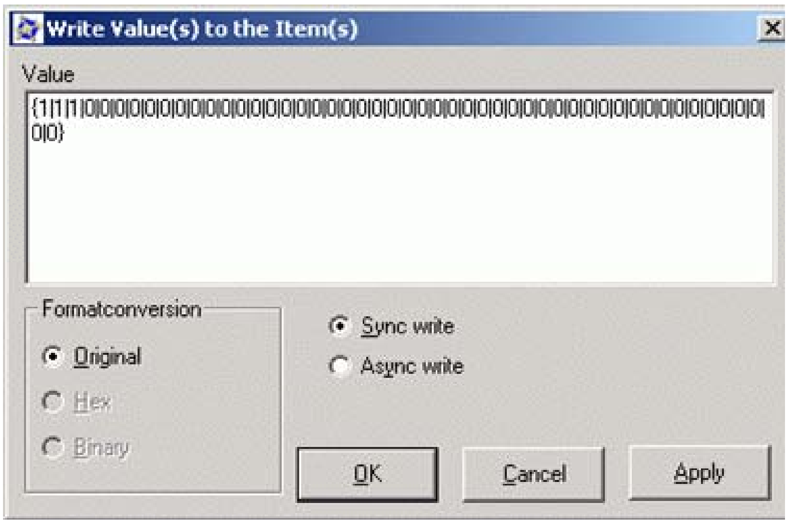
The items are adopted in the OPC Scout. If the quality of the first item is good, the connection is established. So it’s possible read and write the items.

Figure 5-6 OPC-Scout



Double-click on the box “value” of the “send” item to write values into the PLC of the S7 station.

Figure 5-7 writing values



The default structure of the value input {0|0} must not be modified. Only the values themselves may be modified {1|1}.

Figure 5-8 successful sending of values

Item Names	Value	Quality	Vrite Resul	Error
FDL:[FDL-Verbindung-1]receive	{0|0|0|0|(	good		
FDL:[FDL-Verbindung-1]send 50, B0,50	{0|0|0|0|(	good	OK	The operation completed successfully

Successful sending of values to the S7 station 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.

6 History

Version	Datum	Änderung
V 1.0	01.04.2008	Erste Ausgabe