

service & SUPPORT

fault-tolerant S7 communication via IE

SIEMENS

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Question

How do I configure a fault-tolerant S7 connection for the SIMATIC NET OPC server via Industrial Ethernet with the SIMATIC NET PC software?

Answer

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

1 Assignment of tasks

In this example, a CP1613 will be used. The CP1613 allows the S7 communication for a user application to a S7-400 H System on Ethernet. An existing configuration of S7-400 H system with network connection is required to proceed as described below.

NOTICE

Fault-tolerant S7 connections are only available with a CP1613 (6GK1161-3AA00), CP1613 A2 (6GK1161-3AA01) or CP1623 (6GK1162-3AA00). If you use a CP1613 A2 or a CP1623 these devices will be configure as CP1613 in the STEP 7 hardware configuration.

The use of a normal network adapter is not possible.

1.1 Conditions

You need an engineering station with STEP 7 for the commissioning of the PC station. You compulsory need STEP 7 to configure a fault-tolerant S7 connection between PC station and S7400-H System.

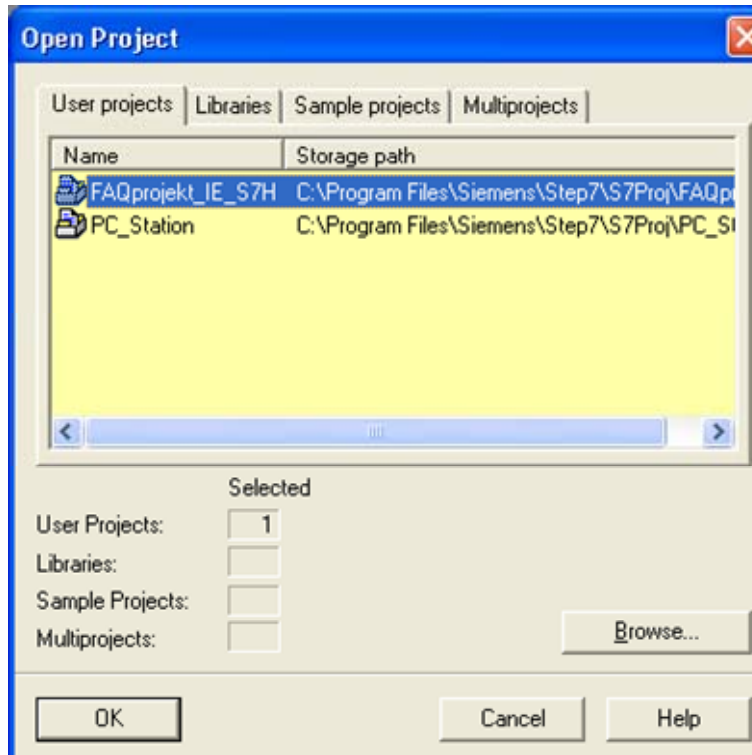
Furthermore you need the license for the SIMATIC NET PC software S7-REDCONNECT on the PC station, which communicates with the S7400-H system over fault-tolerant S7 connections.

2 Configuration of the PC station

After successful installation of the hardware and software of the SIMATIC NET CD and also of the configuration tool comprehending a restarting of your computer, start NCM PC or STEP 7 with Start →(in Windows XP: All Programs→) SIMATIC → SIMATIC Manager or SIMATIC NCM PC Manager".

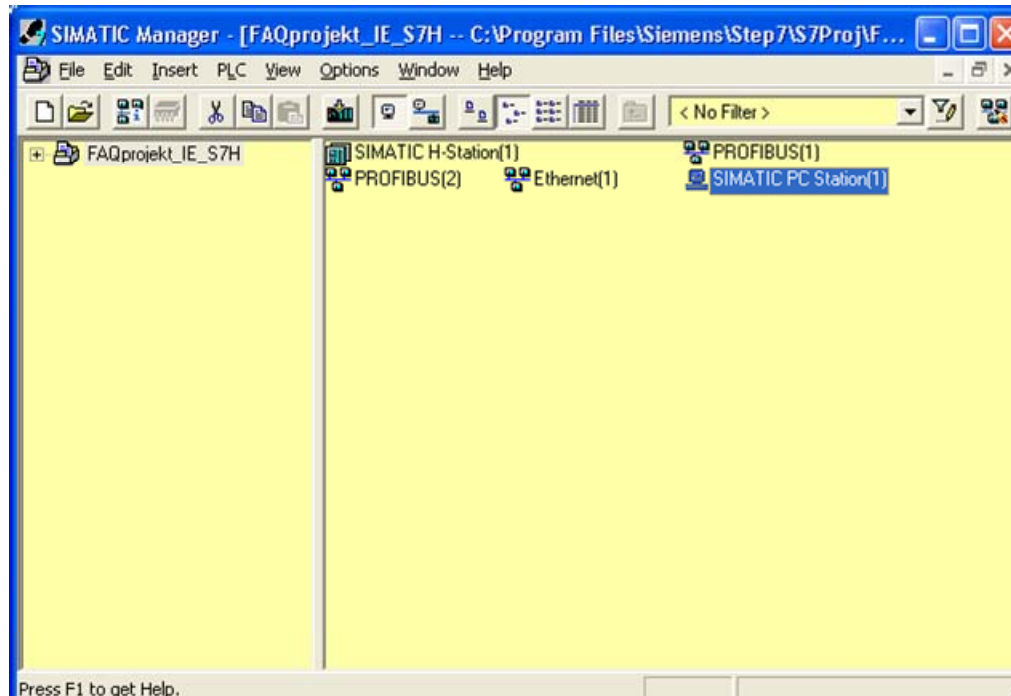
Open the STEP 7 project of the SIMATIC S7400-H controller with "File→Open".

Figure 2-1 Opening the project



Confirm the selection of the project (in the example: "FAQprojekt_IE_S7H") with OK. The project will open.

Figure 2-2 Inserting the PC station

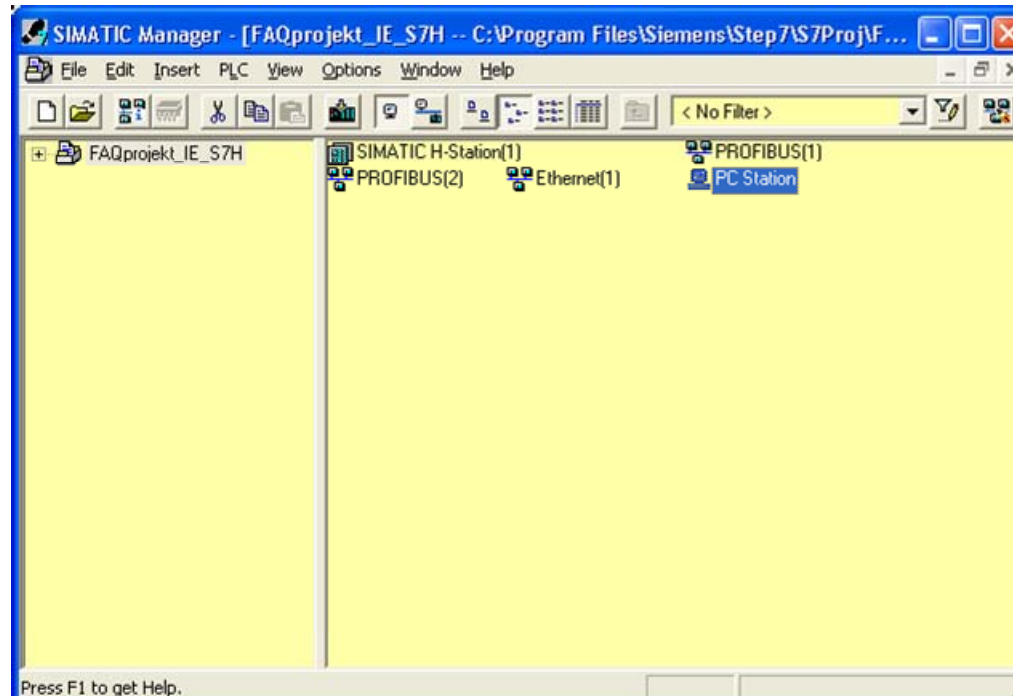


With the command "Insert → Station → SIMATIC PC Station", insert the PC station.

Hinweis

Standard STEP 7 always creates a MPI network. Because the SIMATIC S7400-H CPU has a PROFIBUS interface, you have in the STEP 7 project additional two PROFIBUS networks.

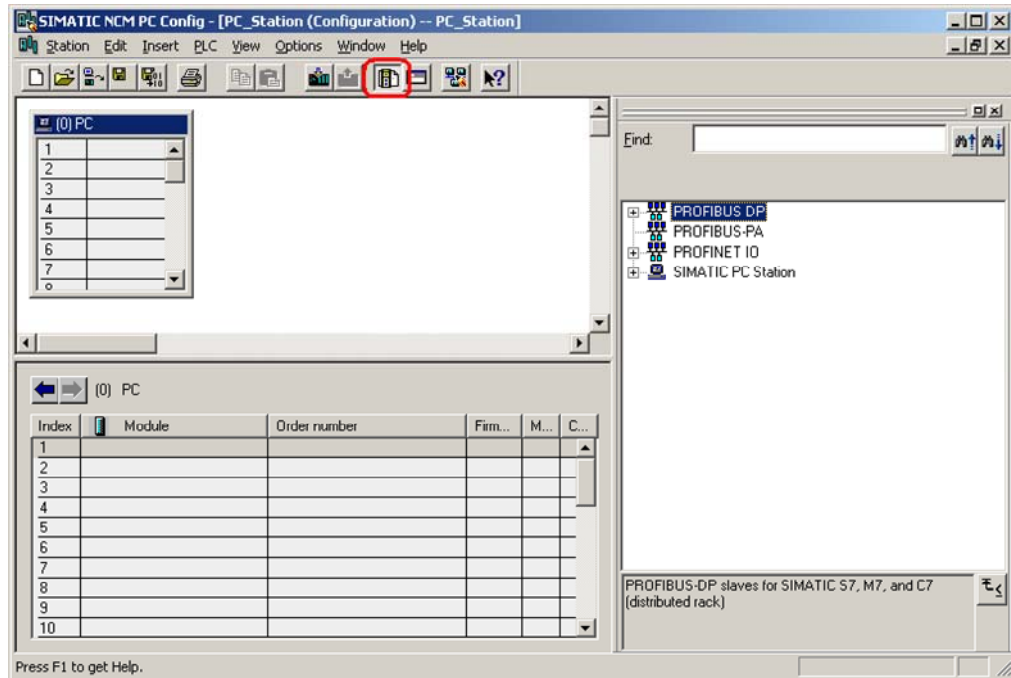
Figure 2-3 Adapting the Name of the PC Station



Assign the PC station you have just inserted the name of your computer (in the example: "PC Station").

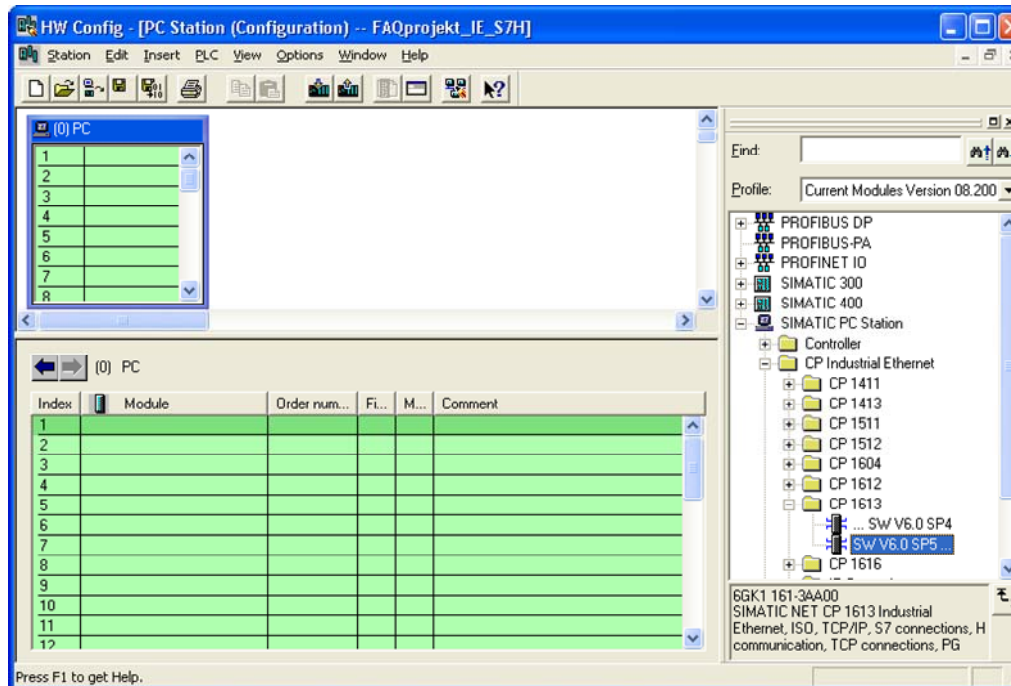
Now open the hardware configuration of the PC station by selecting the PC station. Select the PC station, then press the right mouse button and select "Open Project" (STEP 7: "Open Object").

Figure 2-4 Hardware Configuration of the PC Station



An empty Rack is now displayed. If the hardware catalog is missing click on the button marked in red.

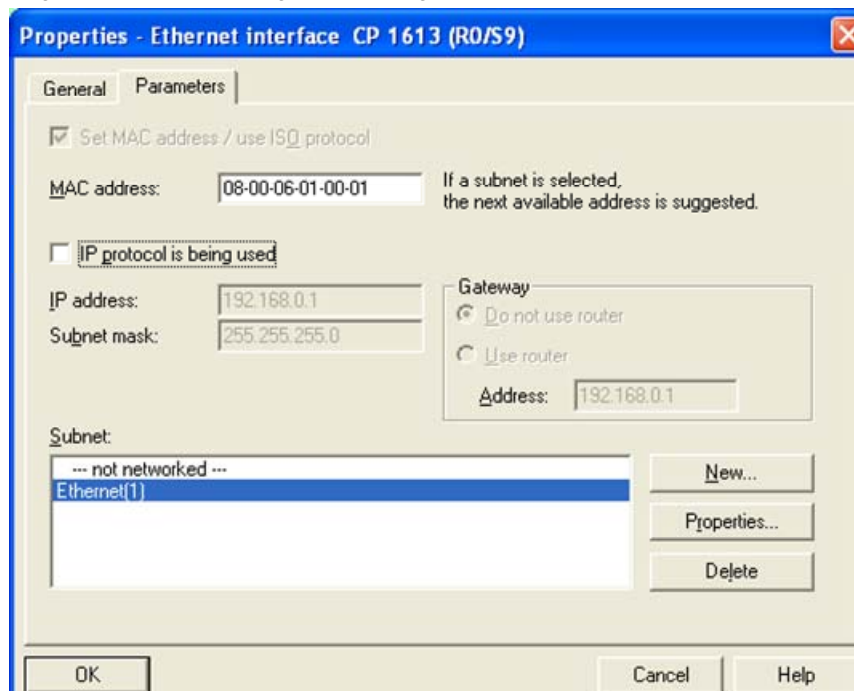
Figure 2-5 Selecting the Modules from the Hardware Catalog



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

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

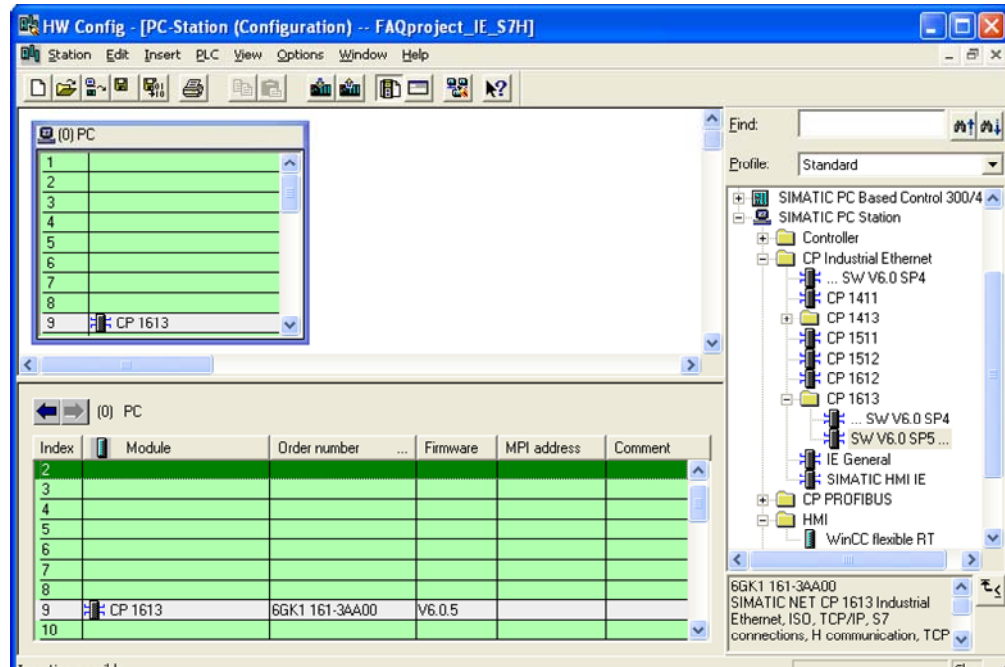
Figure 2-6 Address Assignment Dialog Box



Deselect the "IP Protocol is being used" check box and select "MAC address". Please enter the MAC address of the CP1613 and choose under subnet the already existing Ethernet network.

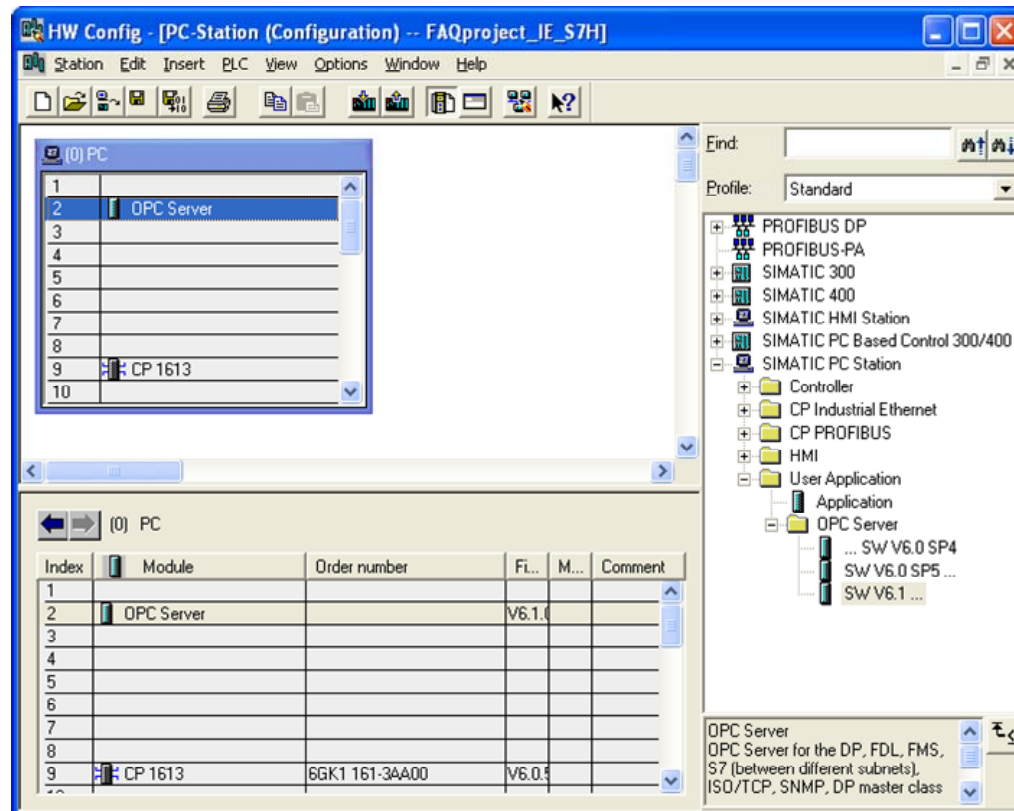
The CP1613 is now configured and networked. Confirm the configuration with "OK".

Figure 2-7 The CP1613 placed in the PC Station



The module is now plugged in a PC Station slot

Figure 2-8 Editing OPC Server



From the hardware catalog choose "user application" and move the "OPC server" with "drag & drop" into the slot.

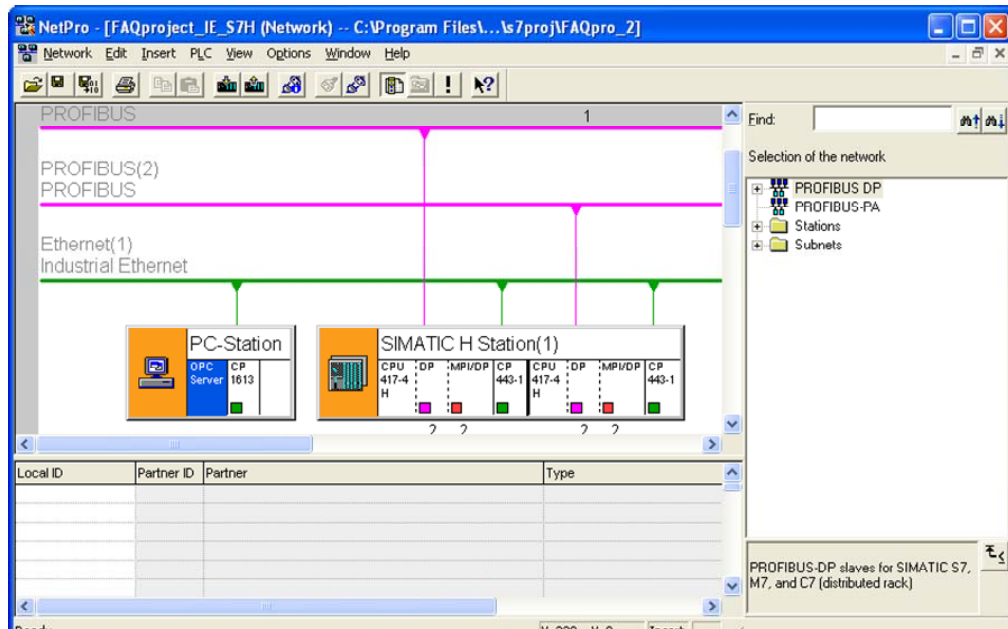
In the next step the fault-tolerant S7 connection between the S7400-H system and the OPC server will be created.

Figure 2-9 NetPro Symbol



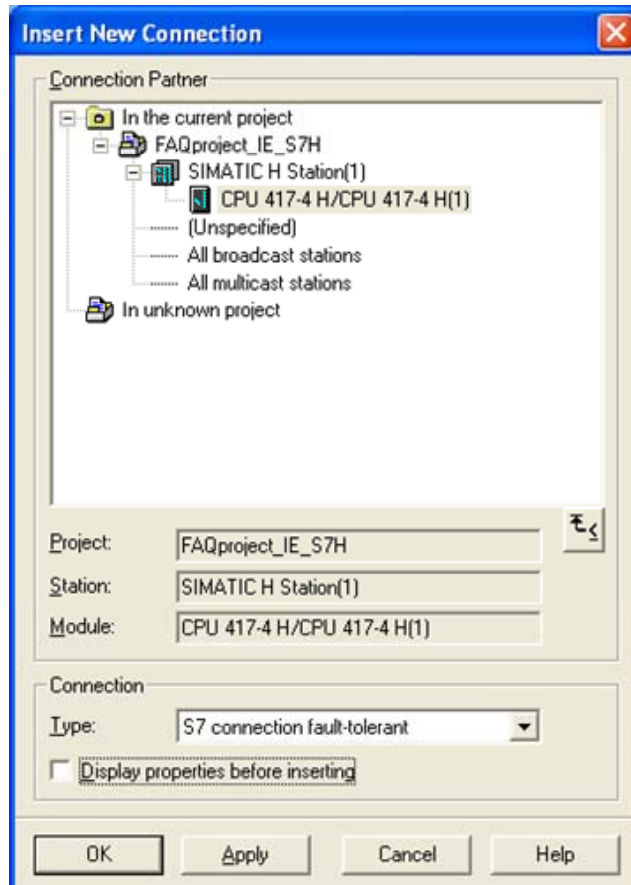
Open the program NetPro. Use the symbol which is marked in red in the Toolbar (see Figure 2-9 NetPro Symbol).

Figure 2-10 STEP 7 NetPro



To insert a connection choose the OPC server. With "Insert → New Connction" create a connection.

Figure 2-11 Insert a new connection in NetPro with STEP 7

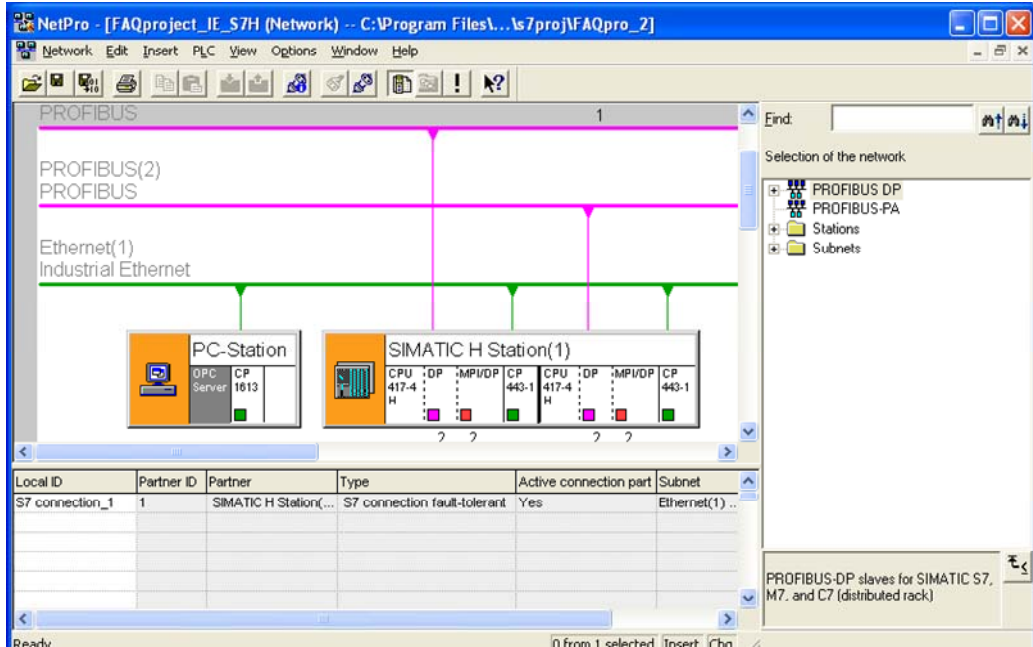


Choose as partner the existing S7400-H CPU and use as connection type "S7-connection fault-tolerant" connection.

Deactivate the box "Display properties before inserting".

By confirming the settings with "OK" the connection will be created in the station. A redundant connection to each S7 CPU of the SIMATIC S7400-H system will be created automatically.

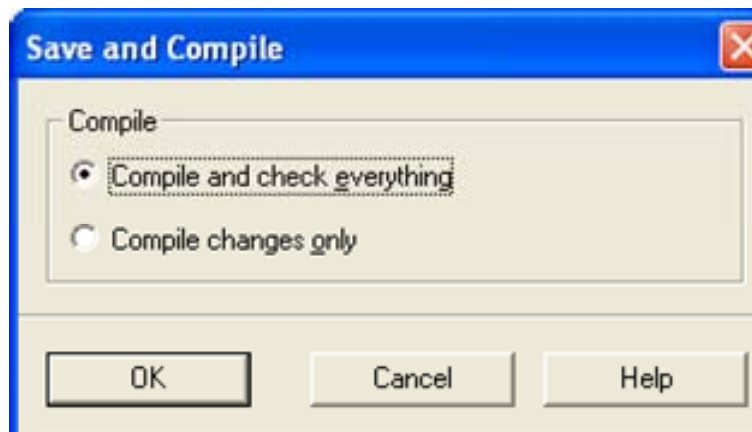
Figure 2-12 Established connection in NetPro



If you mark the OPC server in the SIMATIC PC station the connection you have created will be shown in the connection table.

After the fault-tolerant S7 connection has been created the configuration is done. Save and compile the project (“Network → Save and Compile”). Proceeding that way the information in the project will be updated.

Figure 2-13 Save and Compile



NOTE Warning indications can be displayed while proceeding with the “Save and Compile” of a 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 the download the configuration on the PC station.

2.1 Configuration and download from STEP7 or NCM PC

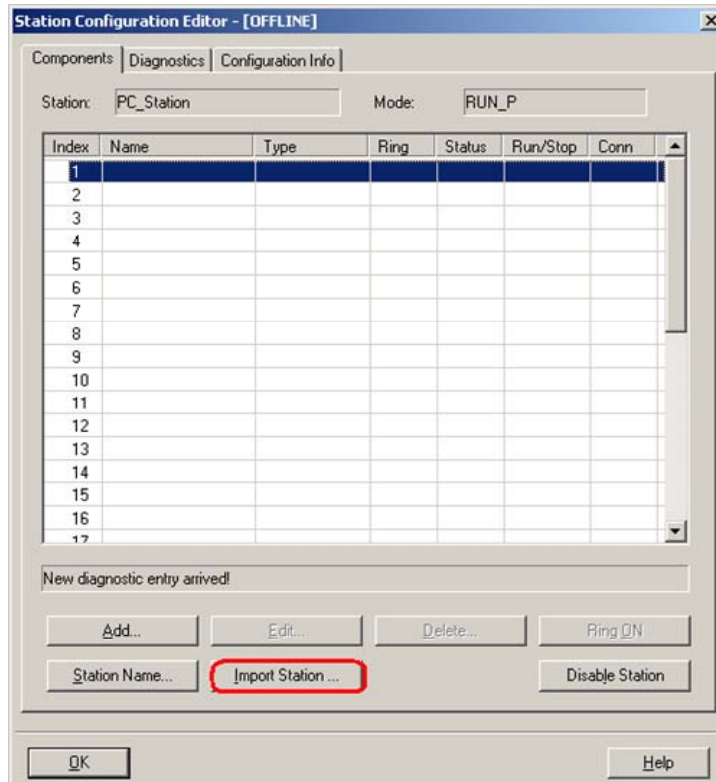
With this function it is possible to perform a configuration completely from a remote computer, if a network connection (standard Ethernet) to the target PC station is available. It is assumed that the PC station can be reached via network connection. The project engineering can be downloaded after that.

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.

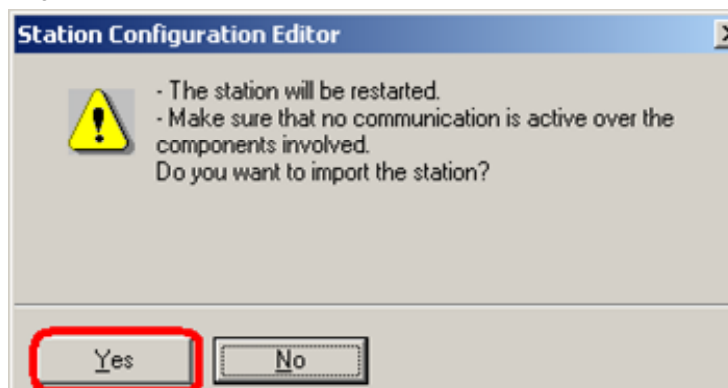
Open the “Station Configuration Editor”. You will find its icon on your desktop and also in the system tray.

Figure 2-14 Station Configuration Editor



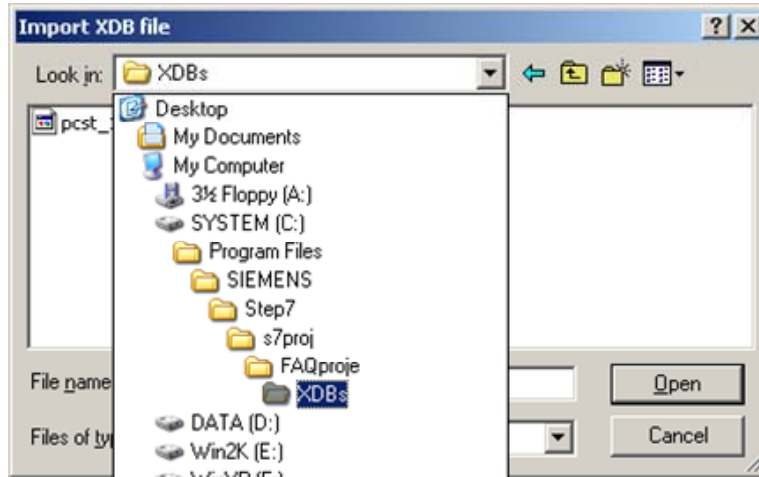
Click on the button "Import station ..." marked in red.

Figure 2-15 Import station



Click on the button "Yes" marked in red.

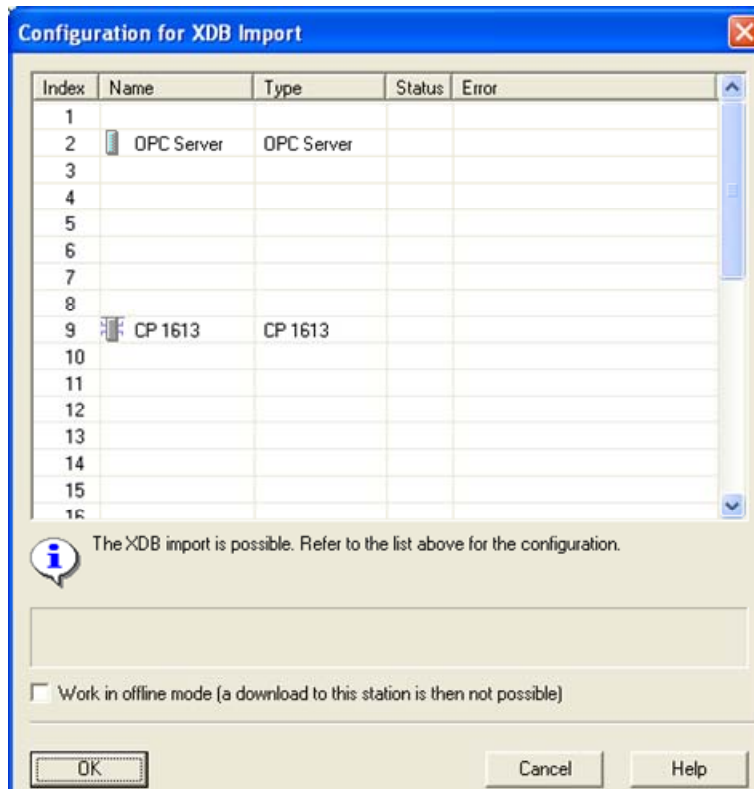
Figure 2-16 Searching for XDB



In the dropdown choose the directory which contains the *.xdb file. The XDB file is generated by STEP 7. You have to copy it from the engineering station to the PC station.

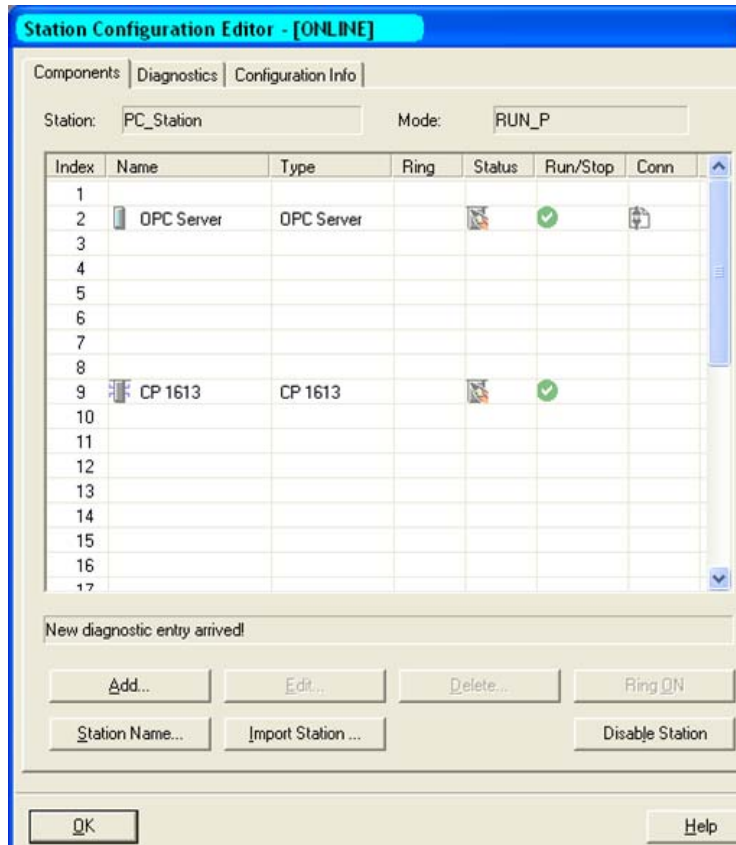
The XDB file is always set in the project directory ".../SIEMENS/STEP 7/S7PROJ" (see Figure 2-1 Opening the project)

Figure 2-17 Information from the XDB file



Information about the concerning components and application in the XDB will be shown. Confirm this dialog box with "OK"

Figure 2-18 PC station is now configured



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The import is now completed and the configuration is loaded. The connection column shows that the connection is also loaded.

NOTE

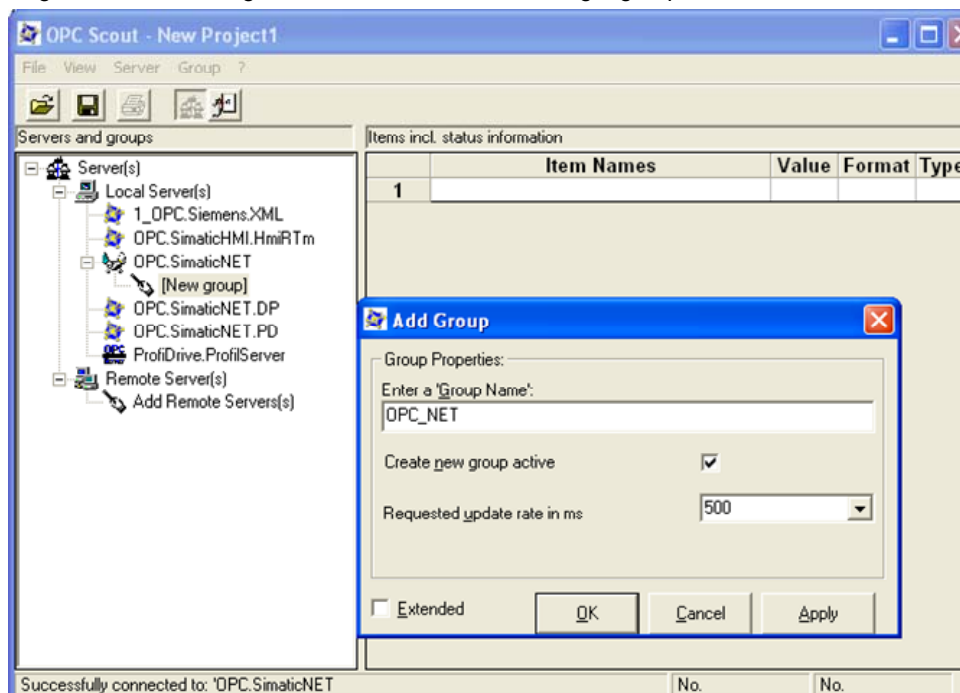
After loading the PC station, the S7 system must be loaded. Without the loaded connection information from NetPro the S7400-H station will not accept the connection establishment from the PC station. Therefore the connection can not be established.

3 Testing the communication with the OPC Scout

You can now start the OPC Scout with "Start → SIMATIC → SIMATIC NET → OPC Scout".

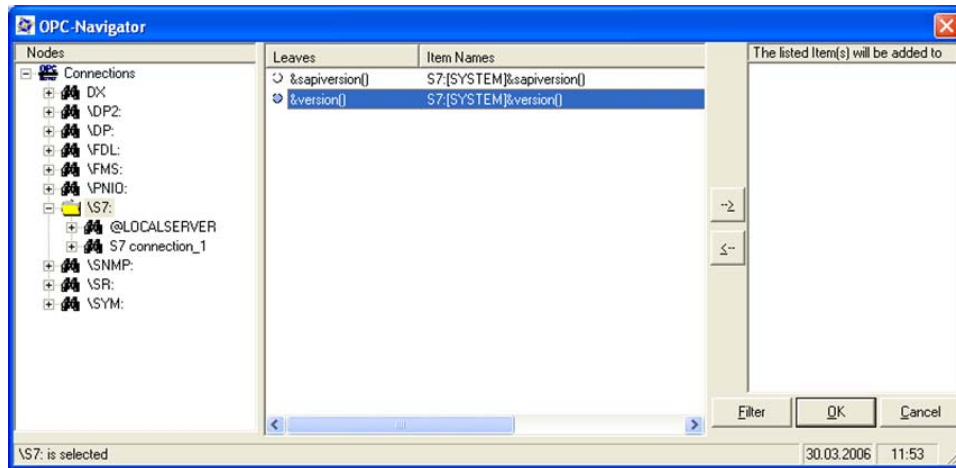
Connect to the OPC server by double-clicking on "OPC.SimaticNet ". Enter a suitable group name in the dialog box and confirm this with "OK".

Figure 3-1 Connecting to the OPC server and creating a group



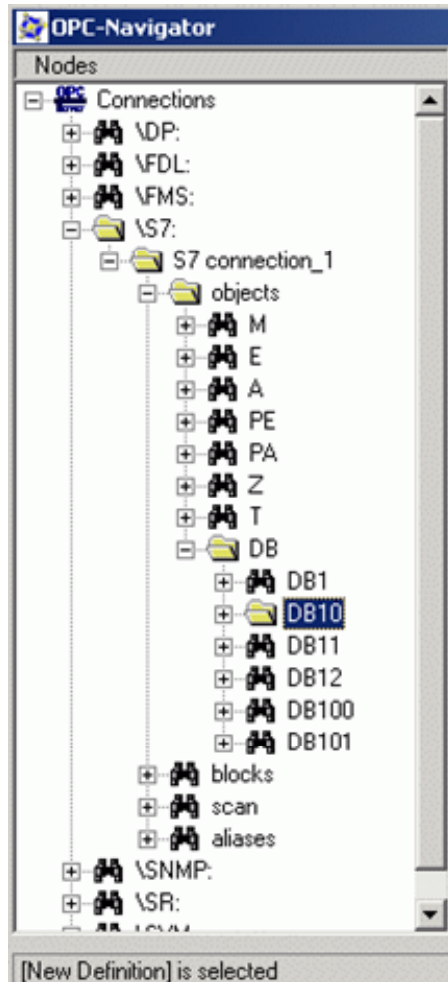
Once the group has been created, double-click on it and the "OPC Navigator" opens. You will now see your protocols in the OPC Navigator. Double-click on "S7". The connection you have just created will appear from NetPro.

Figure 3-2 OPC Navigator



With a double click on the connection and on "objects" you see the structure which contains the objects will be displayed. If the blocks are downloaded into the CPU then they will appear here.

Figure 3-3 Objects in the OPC Navigator



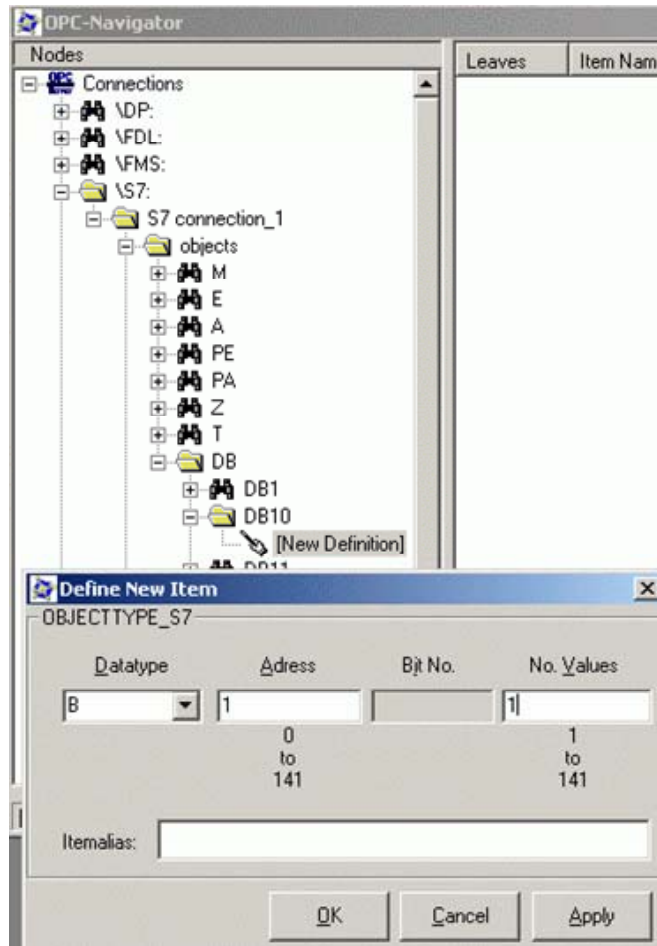
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With a double click on a "DB" you can add a variable. If the DB is crossed through in red, this is OK. You will find a more detailed explanation in the SIMATIC Technical Support in the internet under the following entry:

<http://support.automation.siemens.com/WW/view/en/8763769>

To add items double click on "new definition". Following a new dialog appears where the different variables and data types can be defined.

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



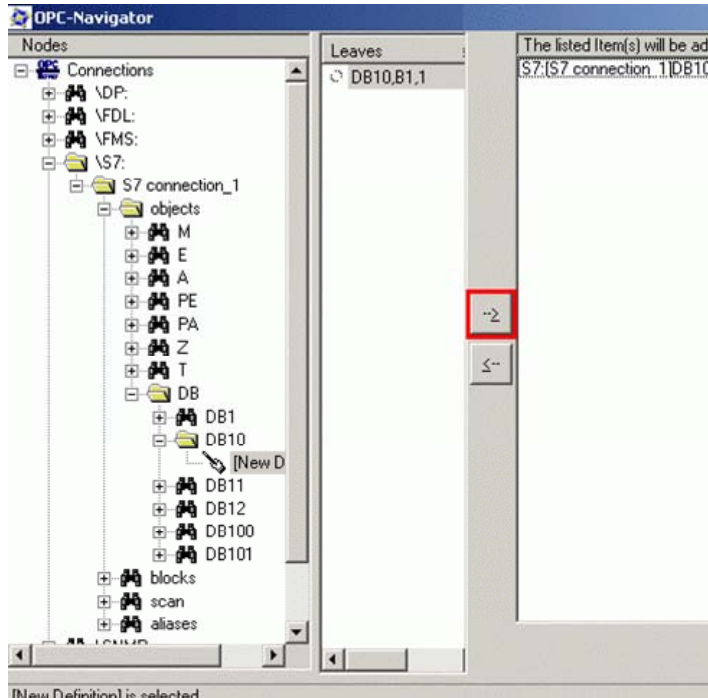
In the example is accessed to the second Byte in the Block DB10.

The Syntax for DB is:

S7:[<connection name>]DB<no>,{<type>}<address>{,<number>}

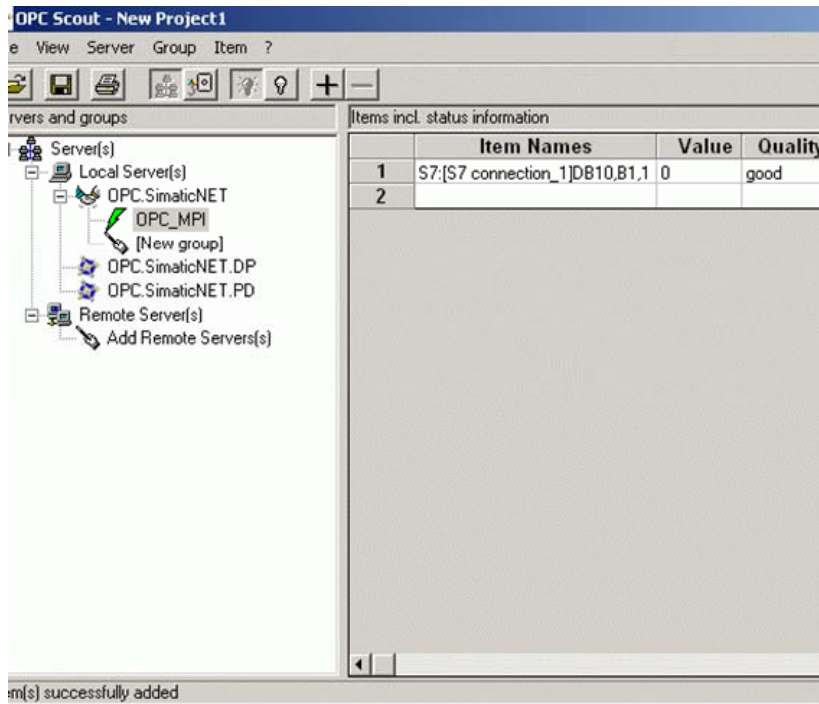
You have to click on "OK". The item will be displayed in the middle of the window. With a click on the "→" button you can drag the item into the right column.

Figure 3-5 Item definition



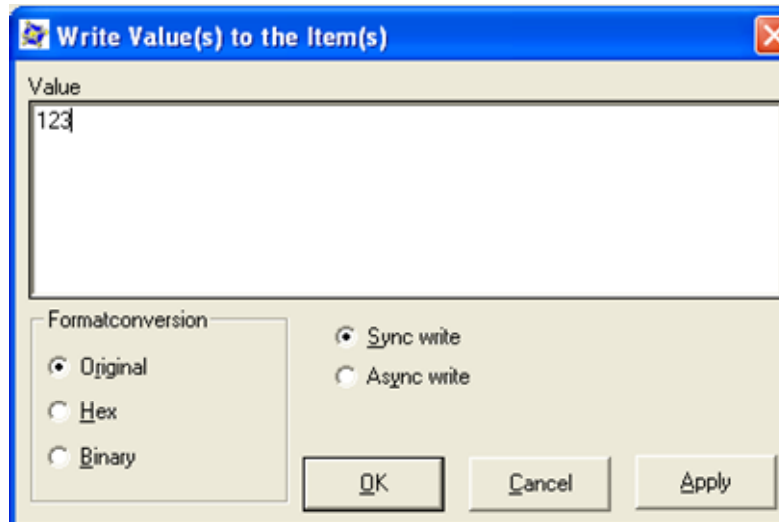
With a click on the button "OK" the item will be inserted into the OPC Scout. If the quality is good, the connection will be established and a "read/write" process is possible.

Figure 3-6 OPC Scout



With double click on the field you can write a value.

Figure 3-7 Writing Values



If the write process is successful the dialog closes itself without an error message.

4 History

Version	Date	Changes
V 1.0	06.12.2007	First Issue