

service & SUPPORT

fault-tolerant S7 communication via IE

SIEMENS

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Question

How do I configure a fault-tolerant S7 connection via Industrial Ethernet to a SIMATIC S7 with a user application?

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 and a CP1623. 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.

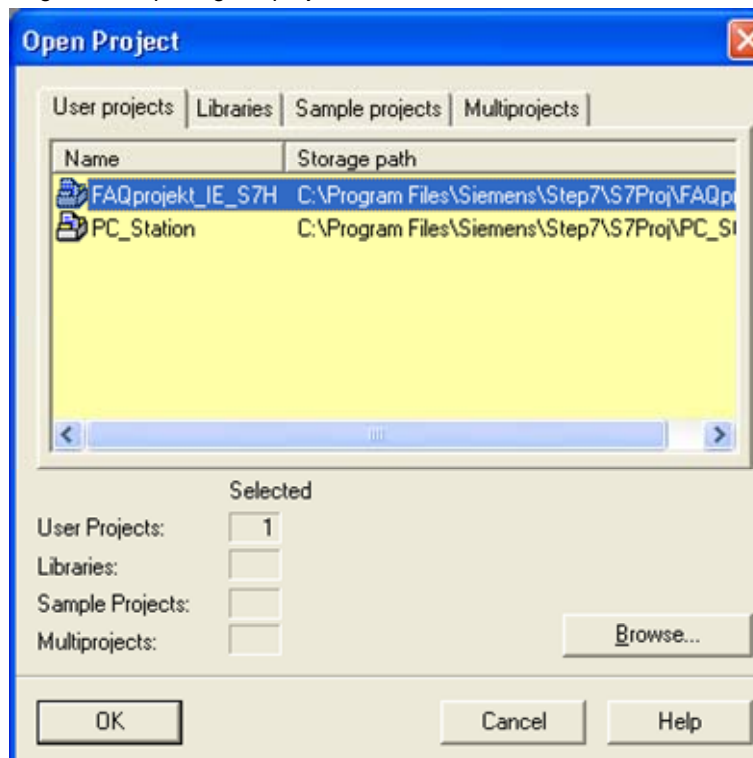
Furthermore you need the license for the SIMATIC NET PC software S7-REDCONNECT on the PC station, which communicates with the S7400-H system over fault-tolerant S7 connections.

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".

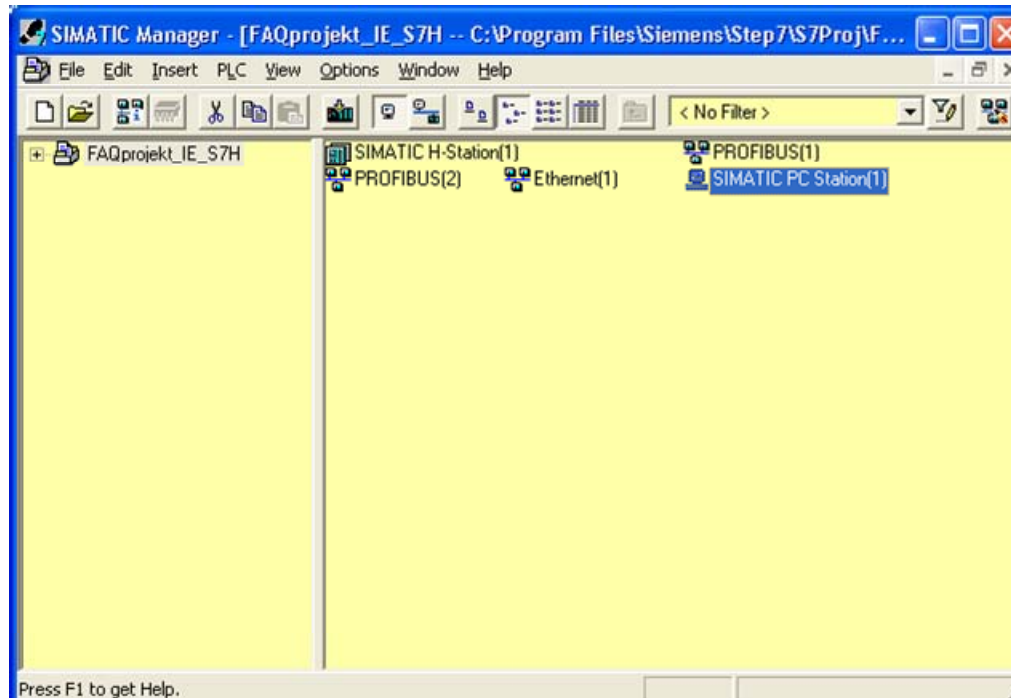
Open the STEP 7 project of the SIMATIC S7400-H controller with "File→Open".

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

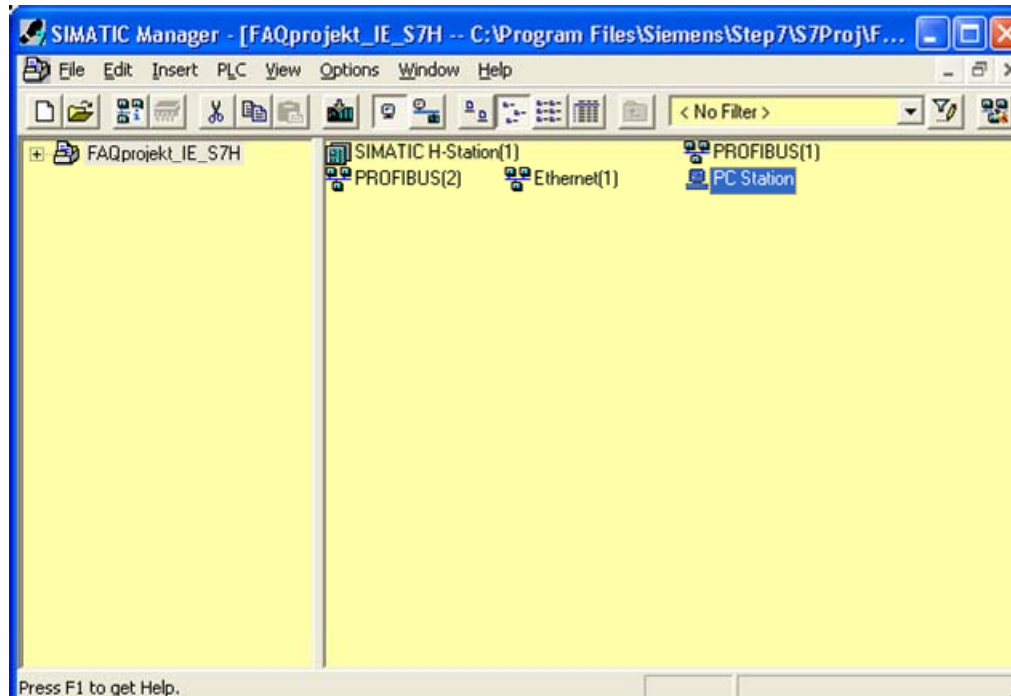


With the command "Insert → Station → SIMATIC PC Station", insert the PC station.

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.

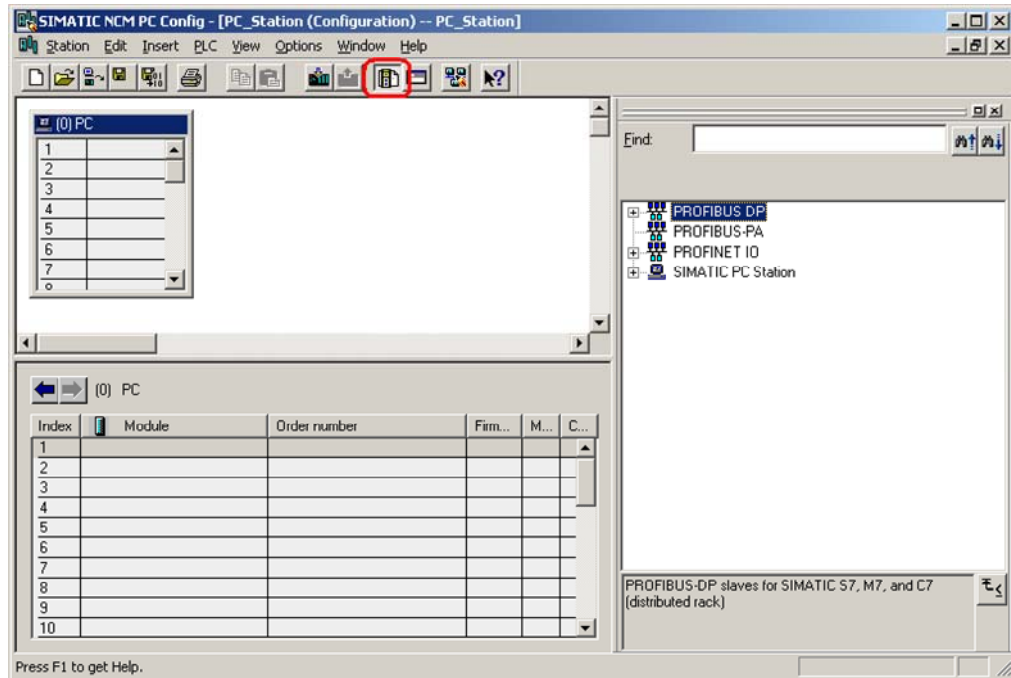
Figure 2-3 Adapting the Name of the PC Station



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

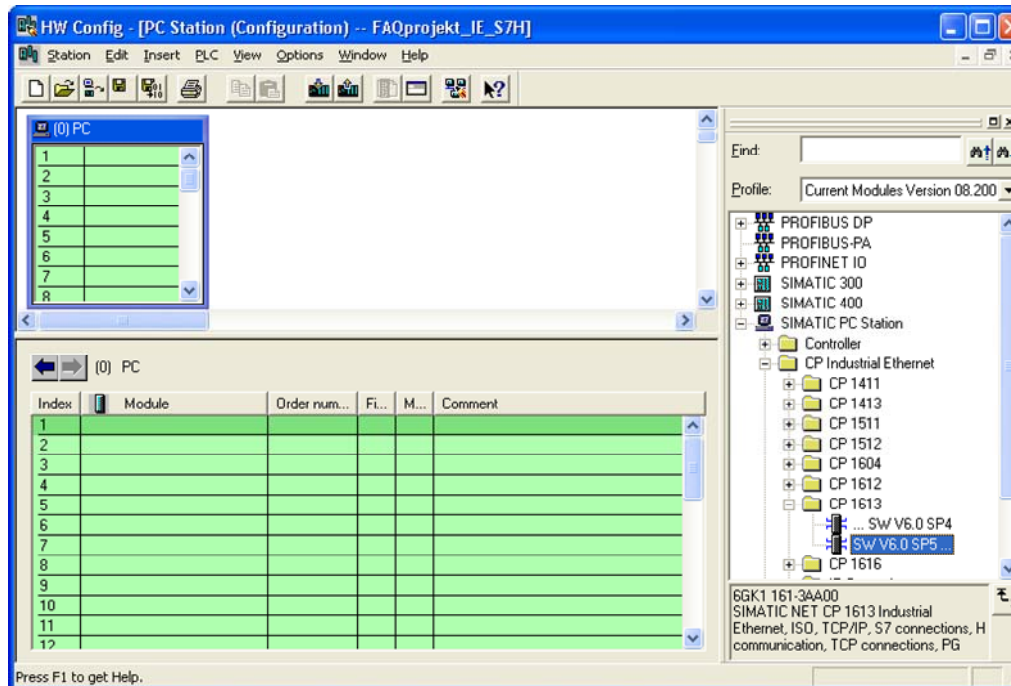
Now open the hardware configuration of the PC station by selecting the PC station. Select the PC station, then press the right mouse button and select "Open Project" (STEP 7: "Open Object").

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.

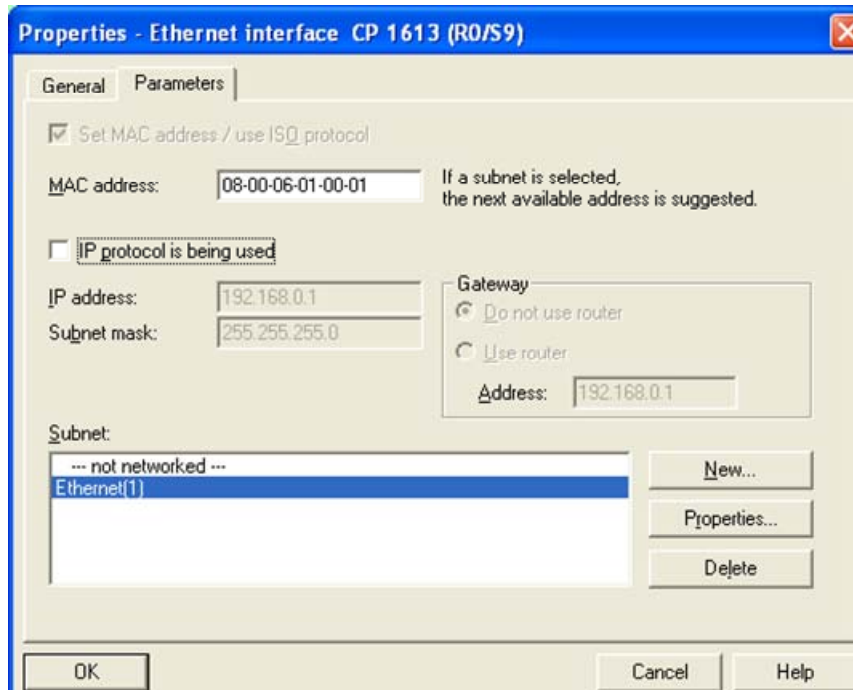
Figure 2-5 Selecting the Modules from the Hardware Catalog



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:

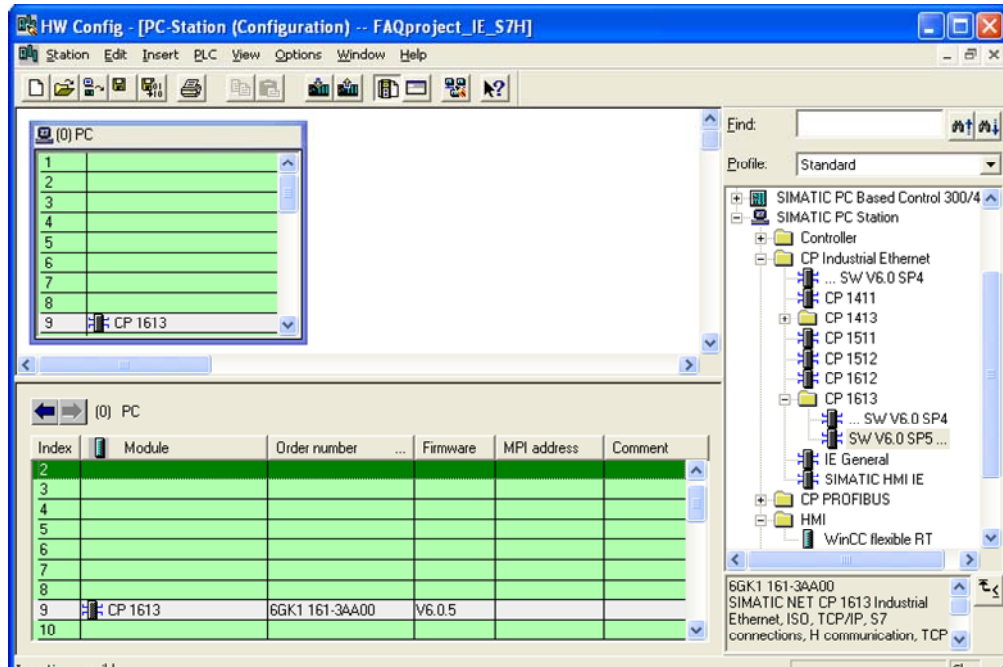
Figure 2-6 Address Assignment Dialog Box



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 Edit the Application Project

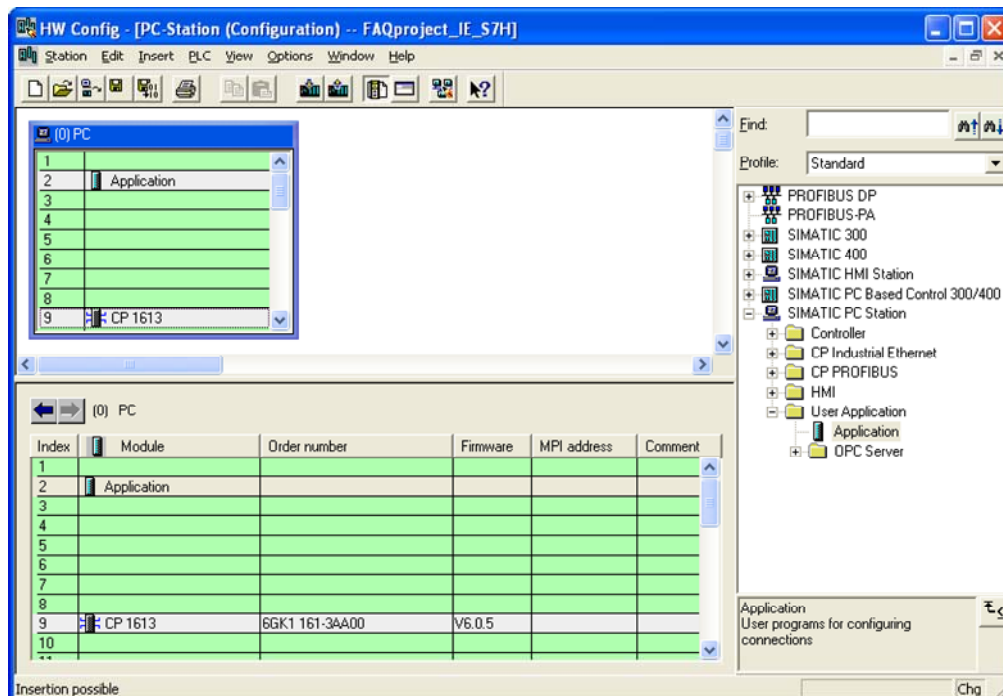
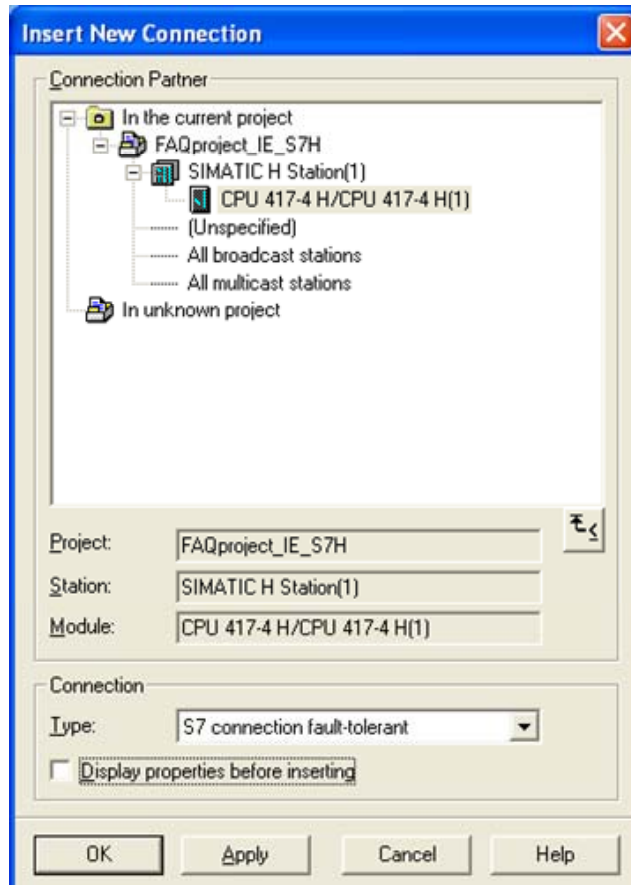


Figure 2-11 Insert a new connection in NetPro with STEP 7

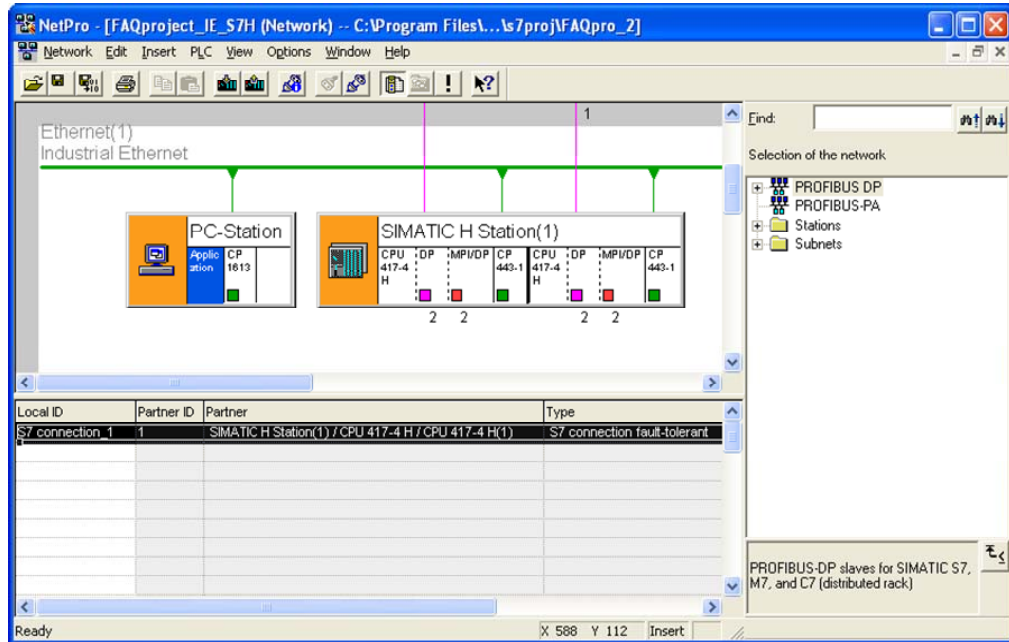


Choose as partner the existing S7400-H CPU and use as connection type "S7-connection fault-tolerant" connection.

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.

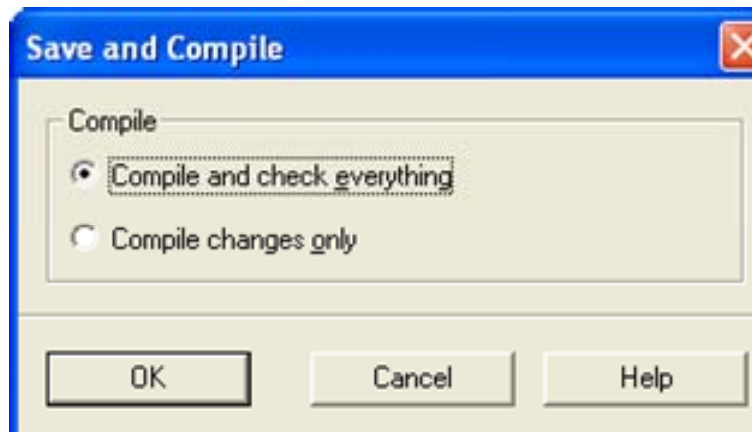
Figure 2-12 Created connection in NetPro



If you mark the application 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

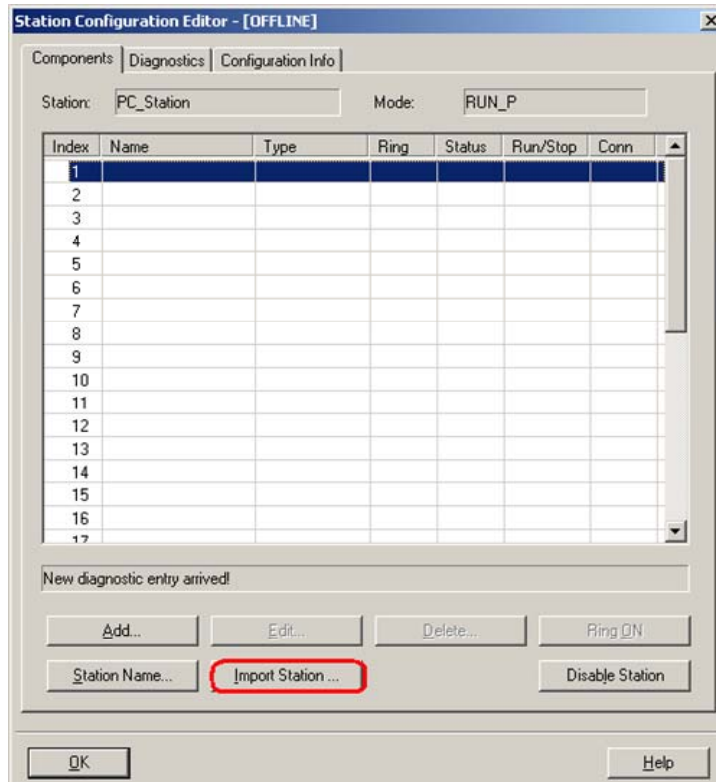
With this function it is possible to perform a configuration completely from a remote computer, if a network connection (standard Ethernet) to the target PC station is available. It is assumed that the PC station can be reached via network connection. The project engineering can be downloaded after that.

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.

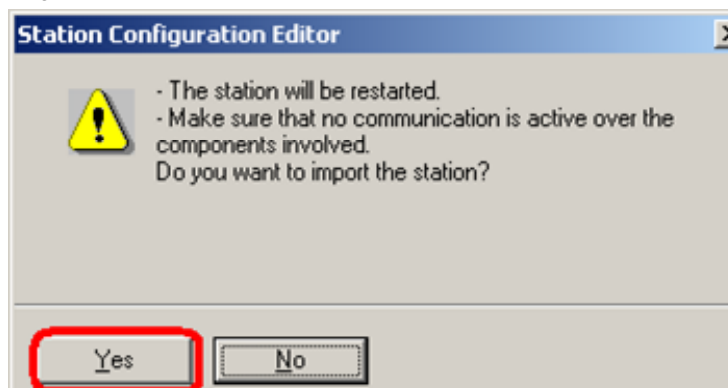
Open the “Station Configuration Editor”. You will find its icon on your desktop and also in the system tray.

Figure 2-14 Station Configuration Editor



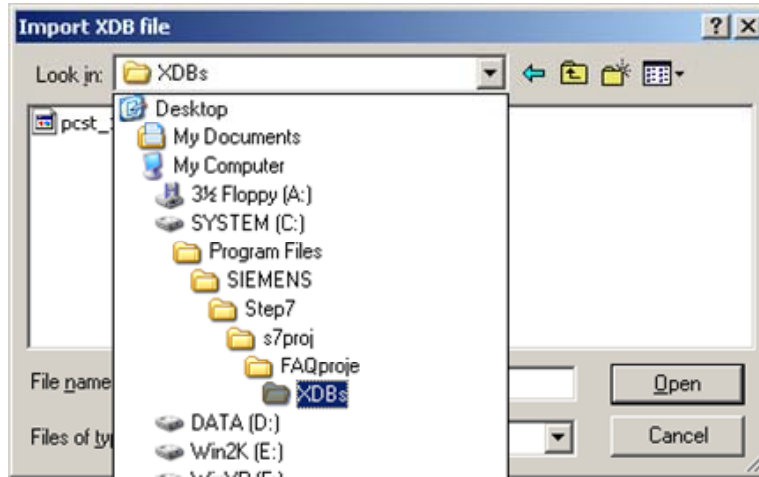
Click on the button "Import station ..." marked in red.

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).

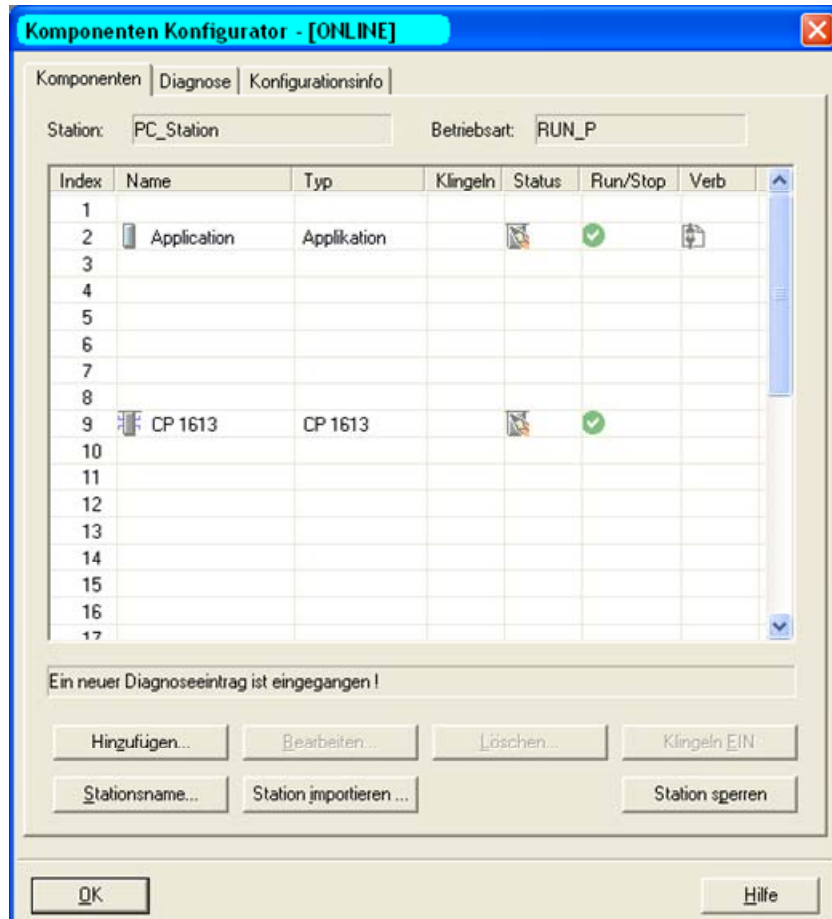
Figure 2-17 Information from the XDB file



entry ID: 16667714

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 configured



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.

For a user application there are two different application types:

- Configuration with WinCC as user application
- Configuration with a SAPI S7 application or a third party application

3 Example: Using WinCC as user application

NOTE In this example WinCC is used stand-alone as user application.

Conditions:

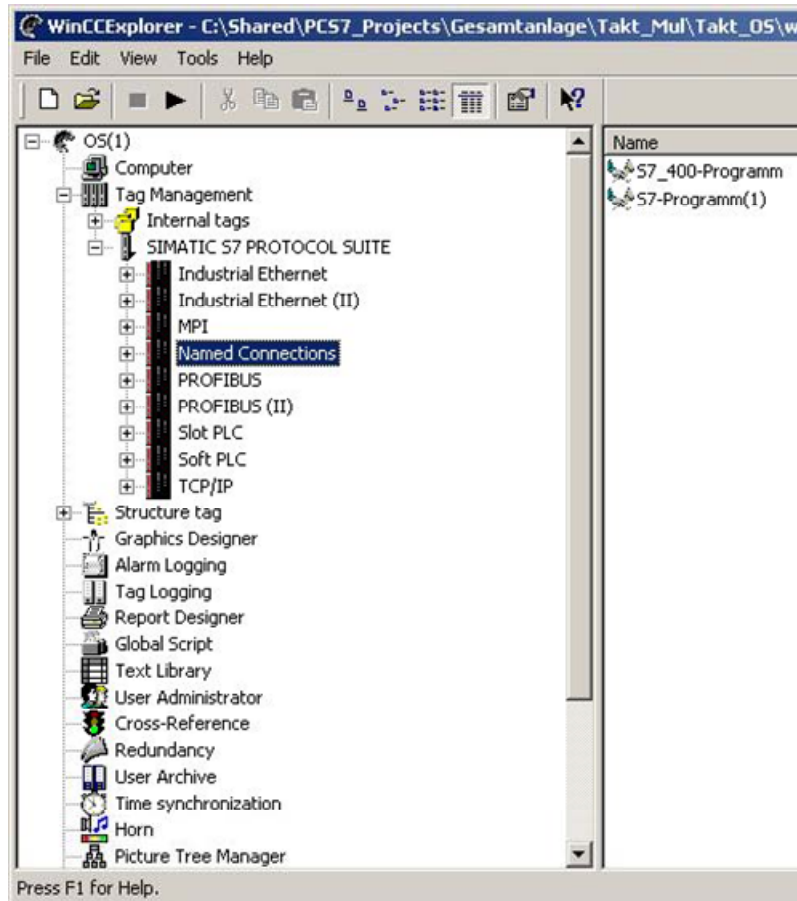
- The configuration of the PC station is created and downloaded to the PC (see chapter 2 "Configuration of the PC station") where WinCC is used as user application for communication to the S7 station.
- The WinCC project is created on the PC where WinCC is used as user application for communication to the S7 station. That means the engineering station is also operation station.

Start the WinCC "Start → SIMATIC → WinCC → Windows Control Center".

Open the WinCC project.

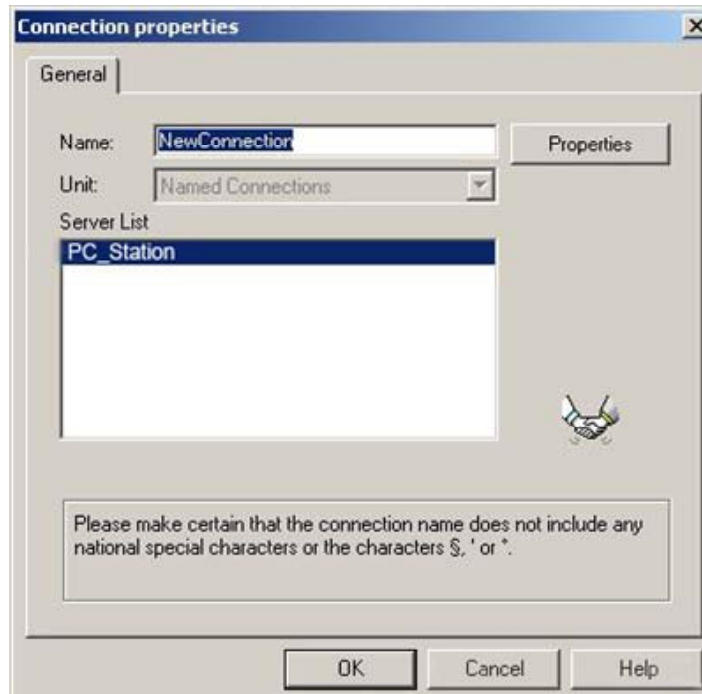
Follow the path of the treenode in the explorer of the WinCC project "Tag Management → SIMATIC S7 PROTOCOL SUITE" till to "Named Connections" to configure the connection of the H System.

Figure 3-1 select „Named Connections“



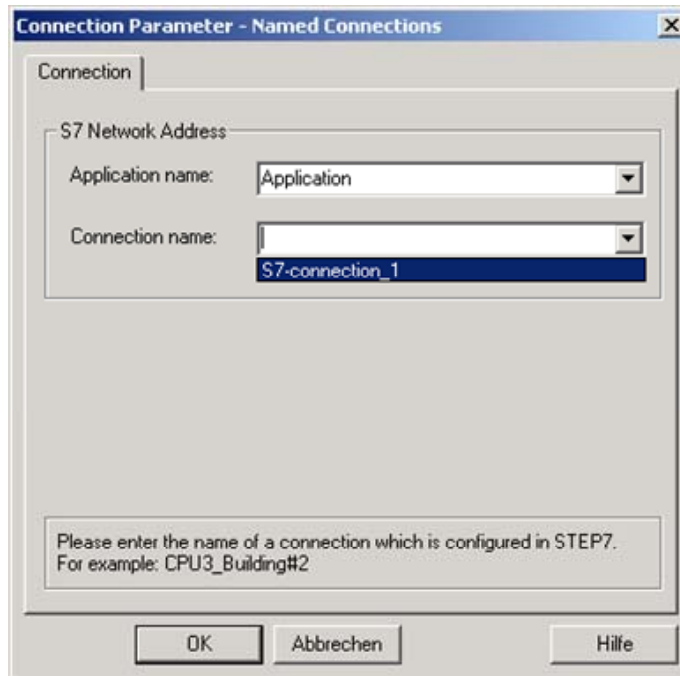
Click on "Named Connection" with the right button of the mouse. Select "New Connection" to create a new connection in WinCC. Enter a name for the connection and then select "properties".

Figure 3-2 set the connection name



Choose in the dialog box the configured S7 Data. In the text field "application name" type the name you have chosen in Figure 2-8 Edit the Application Project. At the dropdown box "connection name" choose the connection name you have used in NetPro (see Figure 2-12 Created connection in NetPro). Information concerning the task is automatically given. A manual entry is not needed.

Figure 3-3 select "S7 Connection Parameter"

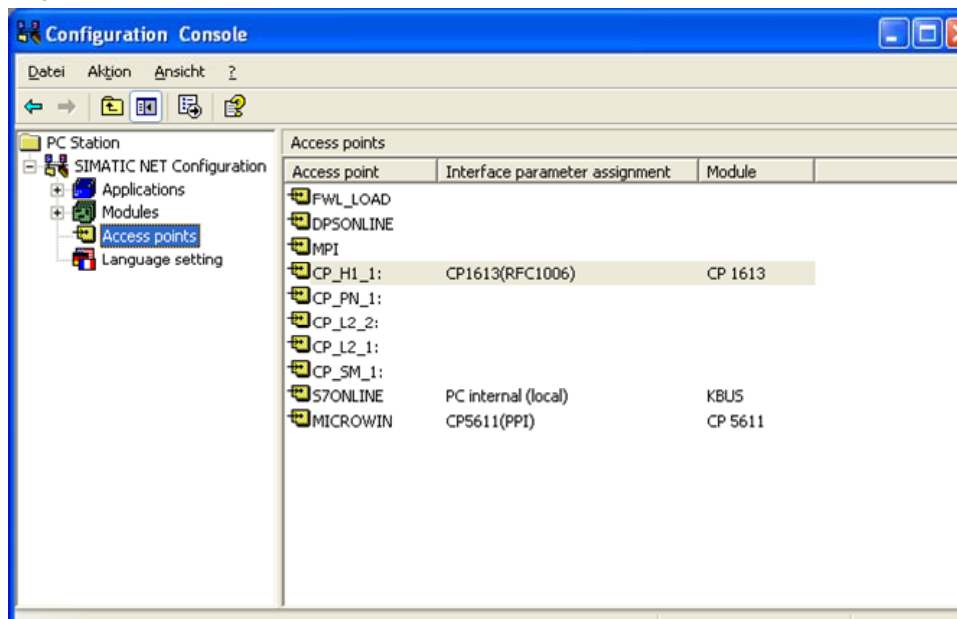


Close the dialog box with "OK". The configuration is completed.

4 Example: Using a SAPI S7 application or a third party application

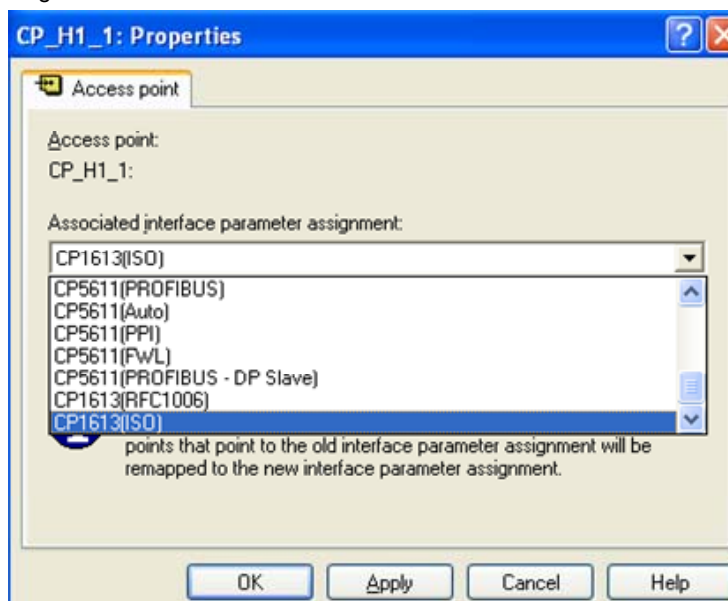
Start the Program "Setting the PG-PC Interface" with "Start → (WinXP: Start → All Programs→) SIMATIC → SIMATIC NET → Configuration Console".

Figure 4-1 choose the Access Points



Switch to the tree node Access Points. Choose the Access Point with a double click.

Figure 4-2 set the Access Point



entry ID: 16667714

Choose under "Associated interface parameter assignment" the entry "CP 1613(ISO)".

NOTE

A fault-tolerant S7 connection can be used only via ISO. The chosen access point must respond to the user application.

5 History

Version	Date	Changes
V 1.0	04.12.2007	First Issue