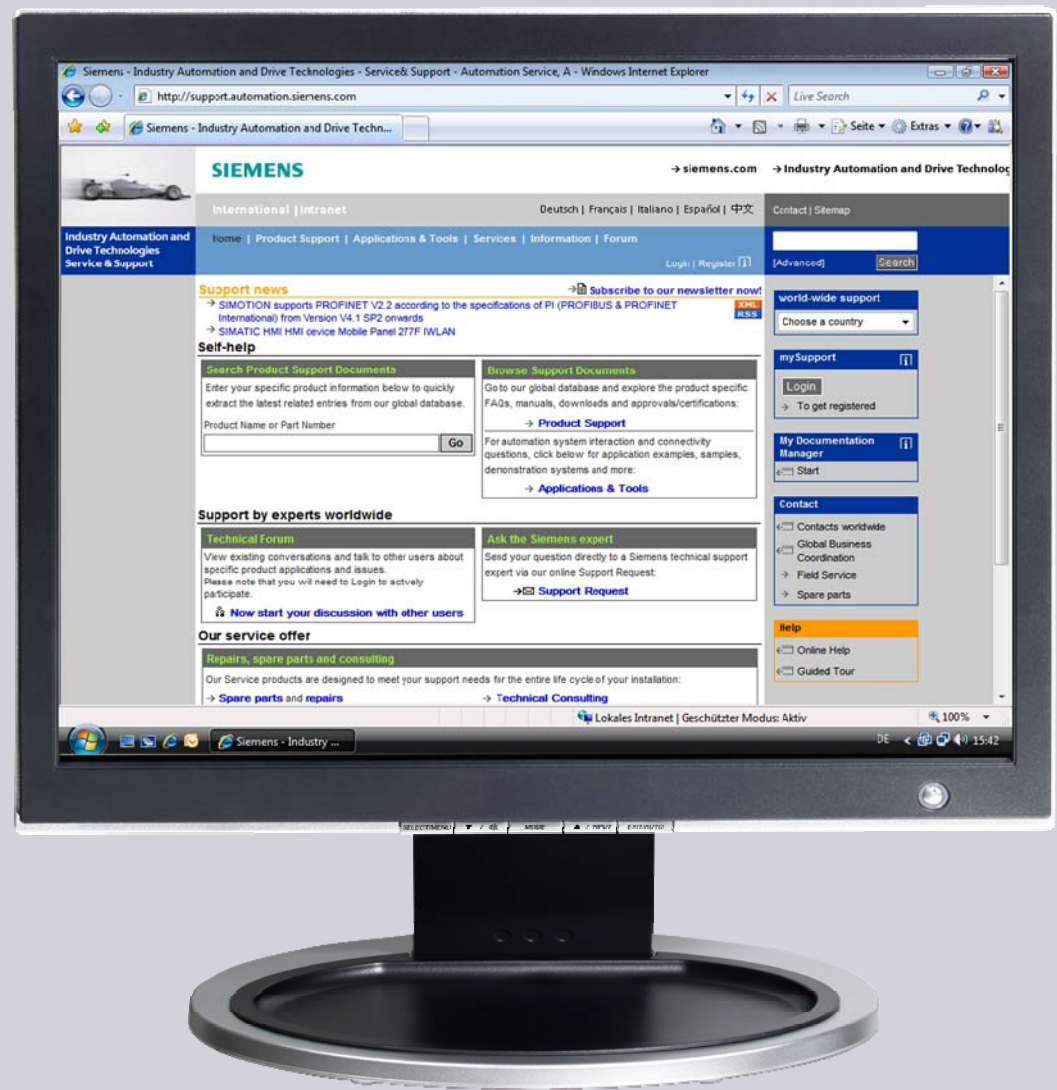# How can you establish a connection between a S7-1200 PLC and SIMATIC NET OPC?

S7-1200 PLC, SIMATIC NET OPC

FAQ • November 2009

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Question

How can you establish a connection between a S7-1200 PLC and SIMATIC NET OPC?

Answer

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

Table of content

1 Introduction

1.1 Use case

The possibility of connecting a S7-1200 with an OPC server is not mentioned in the manual given that it is not officially released by Siemens. In the following chapters you find a description on how to realize such a connection.

As it is not possible to create a PC Station with STEP 7 Basic V10.5 you need to use the NCM PC tool of SIMATIC NET Edition 2008.

Figure 1-1
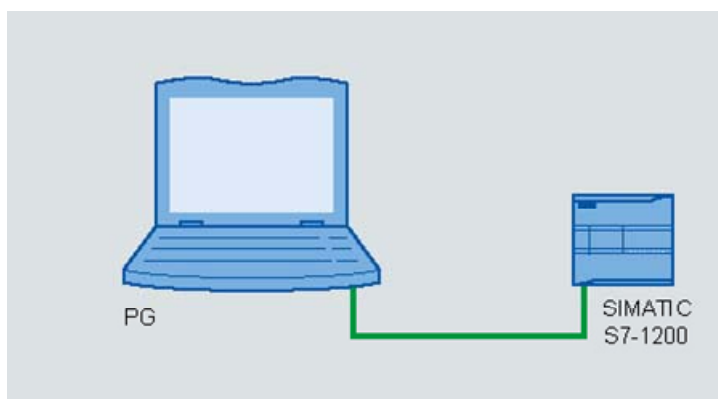
1.2 Requirements

- PG/PC
- STEP 7 Basic V10.5
- SIMATIC NET Edition 2008
  - NCM PC tool
  - OPC Server
  - OPC Scout
- S7-1200 PLC
- Ethernet Cable (Crossed)

Figure 1-2

2 Setting up your S7-1200 PLC by STEP 7 Basic

Configure your S7-1200 PLC and provide data to be watched via OPC connection.

2.1 Hardware configuration

For the hardware configuration use the project view of STEP 7 Basic V10.5.

Create project

Select the menu command **project > new...**. The dialog box **create a new project.** opens. Enter the name **S7-1200_OPC_SIMATIC-NET** in the **Project name** input field. Click the **Create** button.
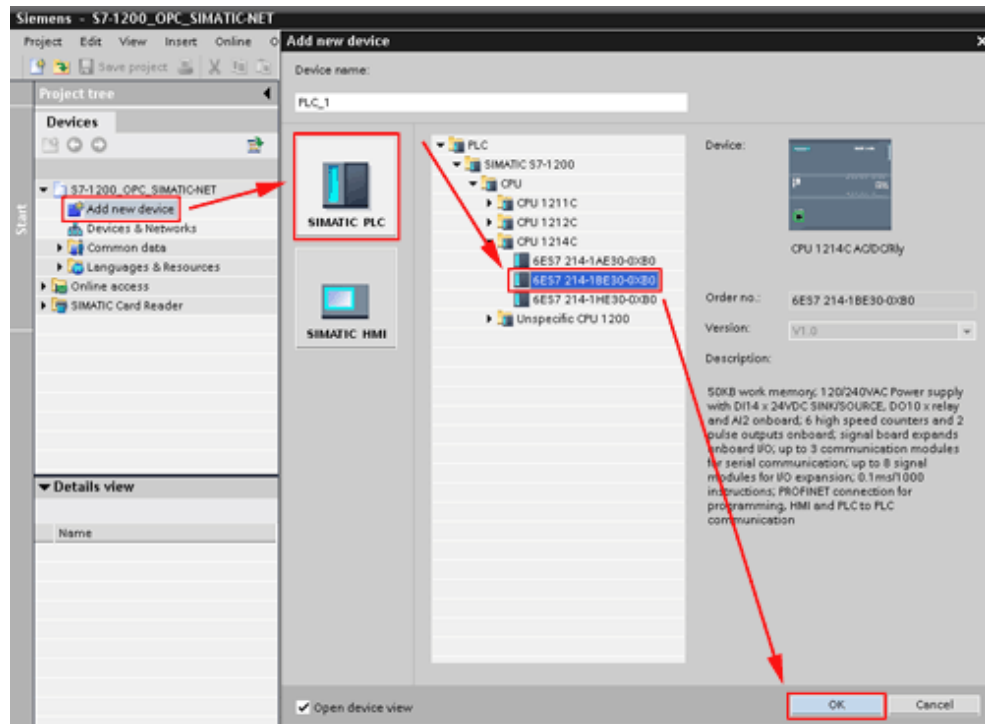
Figure 2-1
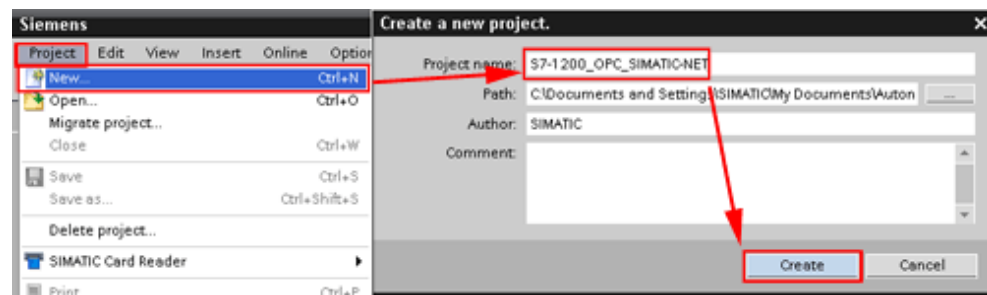
Add new PLC to project

Double click the project tree command **Add new device**. The **Add new device** dialog box opens. In the work area click the button **SIMATIC PLC** and select your PLC by clicking its MLFB. Click the **OK** button.

Figure 2-2

Change IP address of Ethernet port

Double click the command **Devices & Networks** in the project tree. In the **Devices & Networks** work area click the **Ethernet port** of your S7-1200 PLC.

In the navigation area of the **Properties** tab select the **Ethernet addresses** instruction. Define the IP address **192.168.0.110** for the Ethernet port in the **IP address** input field.

Click the **Add new subnet** button. In the **Devices & Networks** work area you find the subnet PN/IE_1 connected to your S7-1200 PLC.
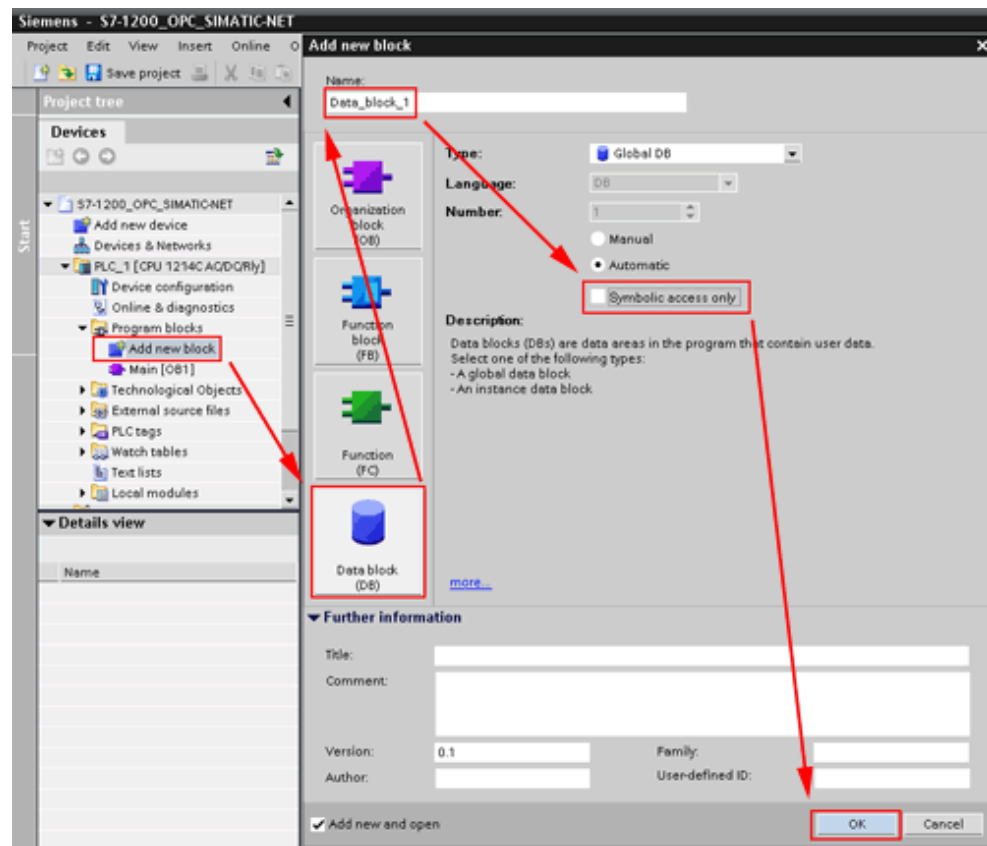
Figure 2-3
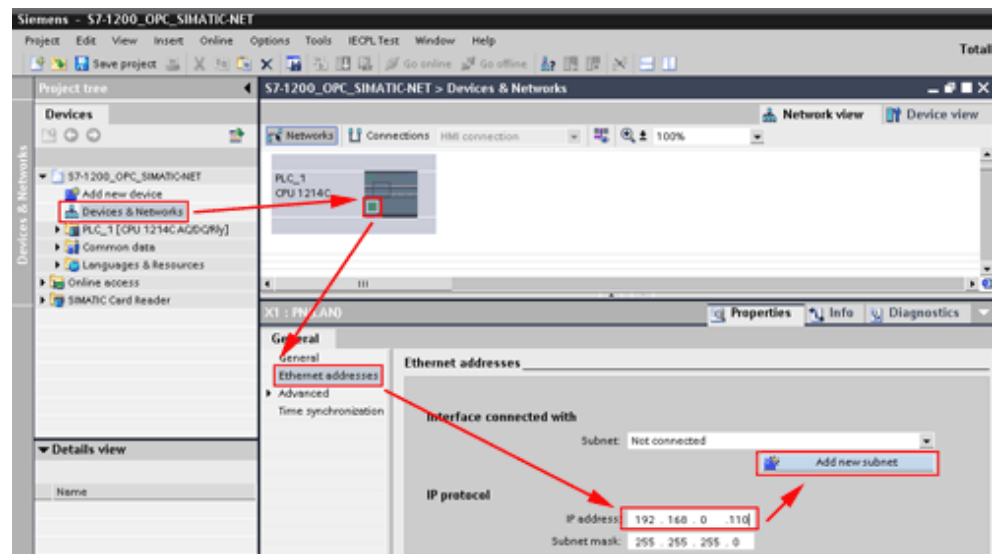
2.2   Software configuration

To see any value changes you will now create a small program in which two hardware inputs and a hardware output of your PLC are connected to a software flip-flop.

Add global data block

In the **Project tree** click the expand button of your PLC folder (e.g. **PLC_1 [CPU 12…]**). Open the sub-folder **Programm blocks** by clicking its expand button and double click the instruction **Add new block**.

In the dialog box **Add new block** select the button **Data block (DB)**, enter the name **Data_block_1** in the **Name** input field and uncheck the **Symbolic access only** check box. Click the **OK** button. The **Data_block_1** work area opens.
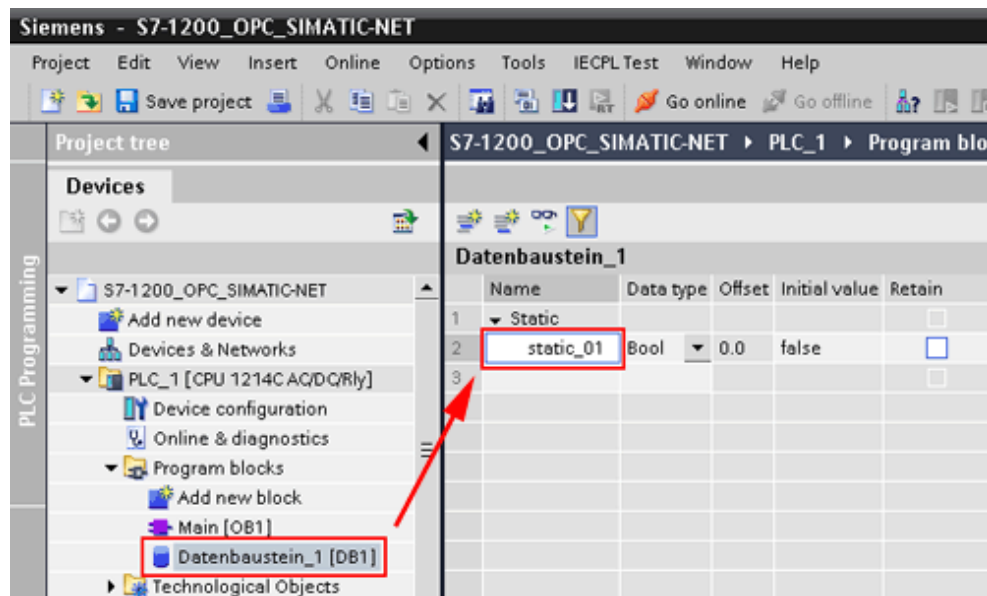
Figure 2-4

Create static data in global data block

Create a bool-typed tag named **static_01** in the **Data_block_1** work area.

Figure 2-5

Create program in Main [OB1]

In the **Program blocks** folder of your PLC double click the instruction **Main [OB1]**. Copy the program shown in the next picture.

You find the bit logic operations in the **Bit logic** folder in the **Instructions** pane on the **instructions** task card. Drag'n'Drop the "Normally open contacts", "the Output coil" and the "Set/Reset flip-flop" in **network 1** of your **Main [OB1]** work area, according to the picture shown below. Make sure the input fields are filled in the same way as shown in the picture and in the table.

Figure 2-6
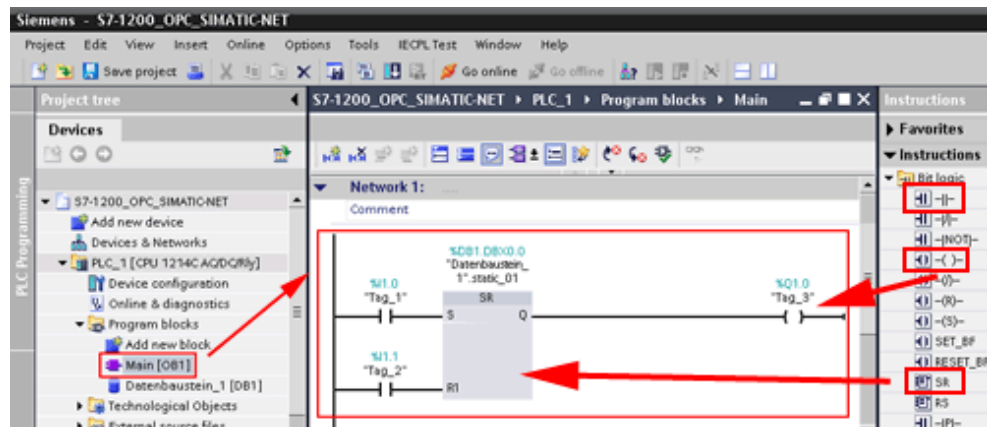
contacts

Table 2-1

SR FlipFlop input S: normally open contact	I1.0
SR FlipFlop input R: normally open contact	I1.1
SR tag	DB1.DBX0.0
SR FlipFlop output Q: output coil	Q1.0

Hint

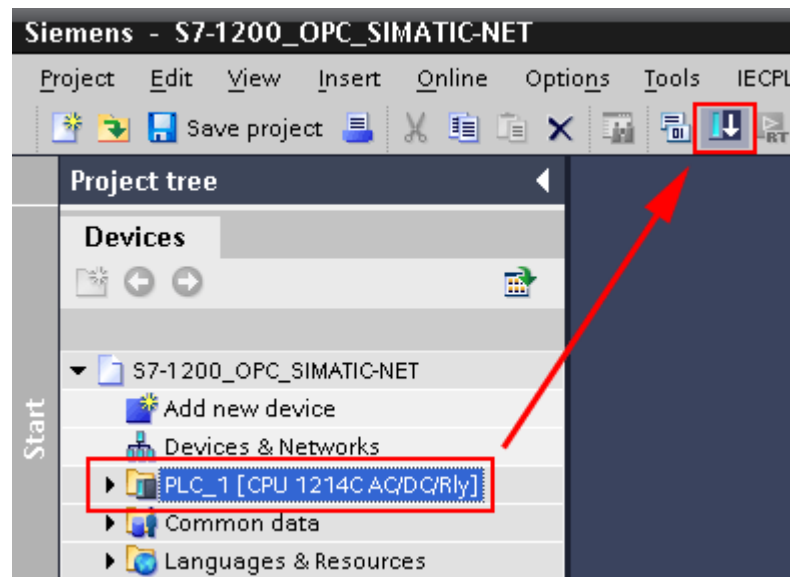The "%" in front of the addresses will be added by STEP 7 Basic V10.5 automatically.

2.3 Finalize S7-1200 PLC work

Highlight the **PLC_1 [CPU12…]** folder in your project tree in order to compile, download and run your S7-1200 PLC.
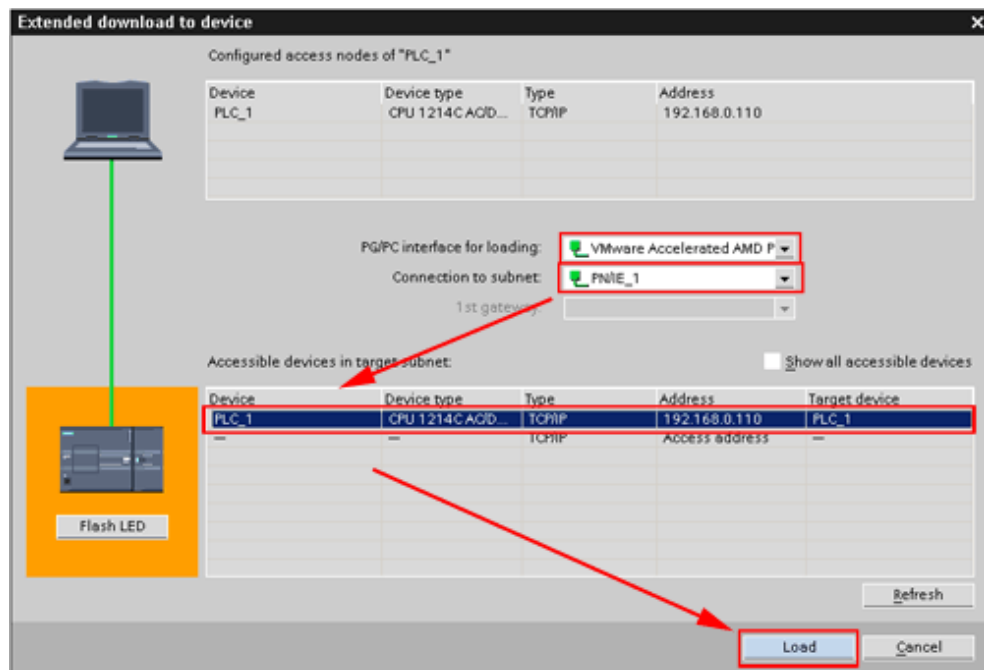
Compile and download program

Press the **Download to device** button in the Toolbar.

Figure 2-7

The **Extended download to device** dialog box opens. Make sure the selected PG/PC interface and subnet are correct. Select PLC_1. Click the **Load** Button.
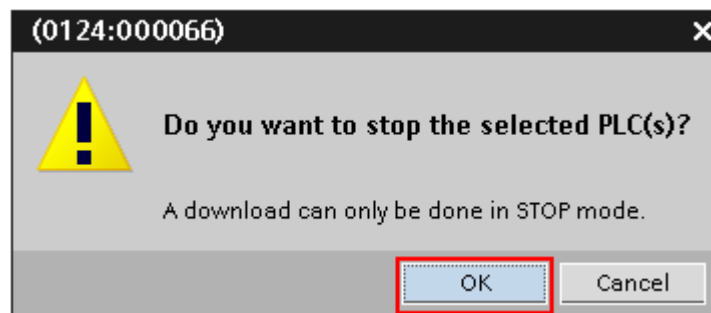
Figure 2-8

If you have downloaded your project before, the **load preview** dialog box may open instead of the **Extended download to device** dialog box.
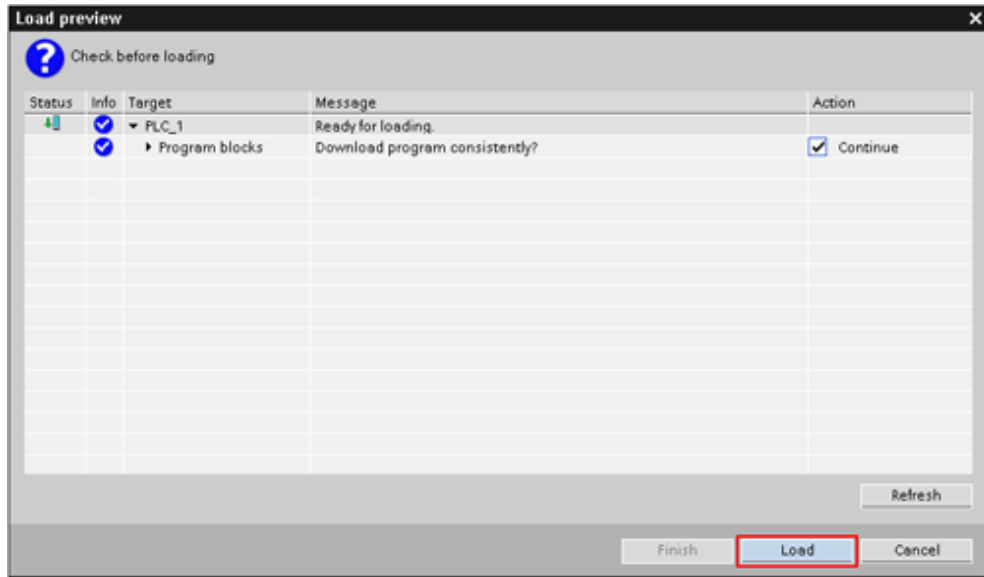
Another dialog box may open before, asking to stop the S7-1200 PLC for downloading. Ackknowledge clicking the **OK** button.

Figure 2-9

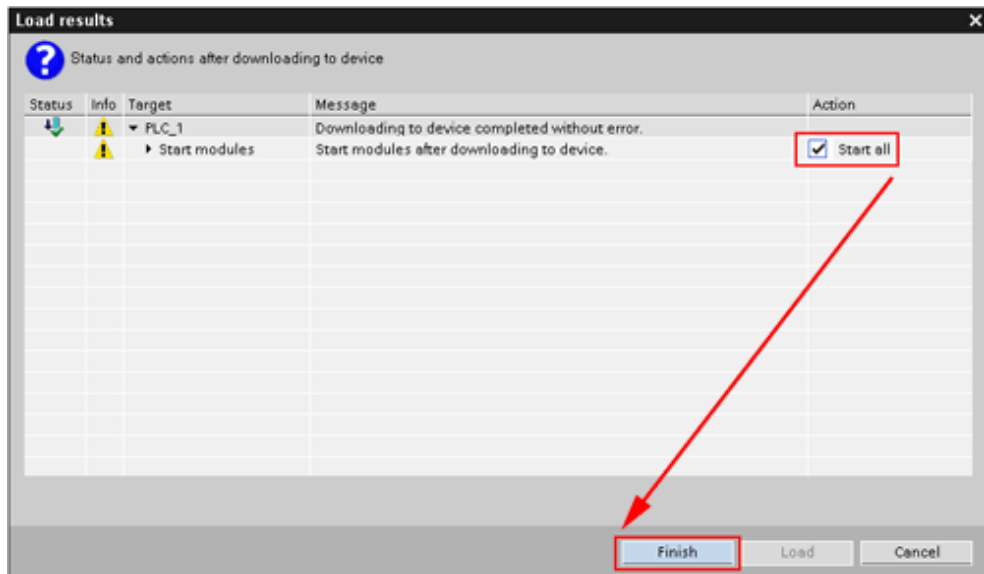The load preview dialog box opens. Click the **load** button.

Figure 2-10

Switch S7-1200 PLC to run

The load result dialog box opens. Check the **Start all** check box and press the **Finish** button. Your S7-1200 PLC status LED changes from stop to run.

Figure 2-11

3 Create and configure PC-Station

To access data of your S7-1200 PLC via OPC you have to create and configure a S7-connection in a STEP 7 project.

3.1 Create new STEP 7project

Open your SIMATIC NCM PC tool. To create a new STEP 7 project click on the menu command **File > new**. The **new project** dialog box opens. Write **S7-1200_OPC-Test** in the **name** input field. Click the **OK** button.
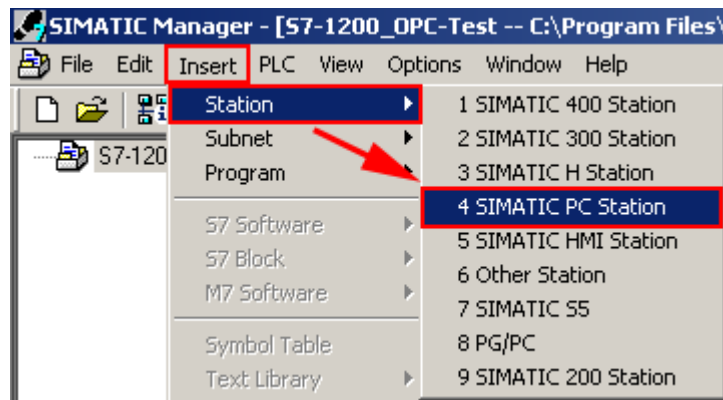
Figure 3-1
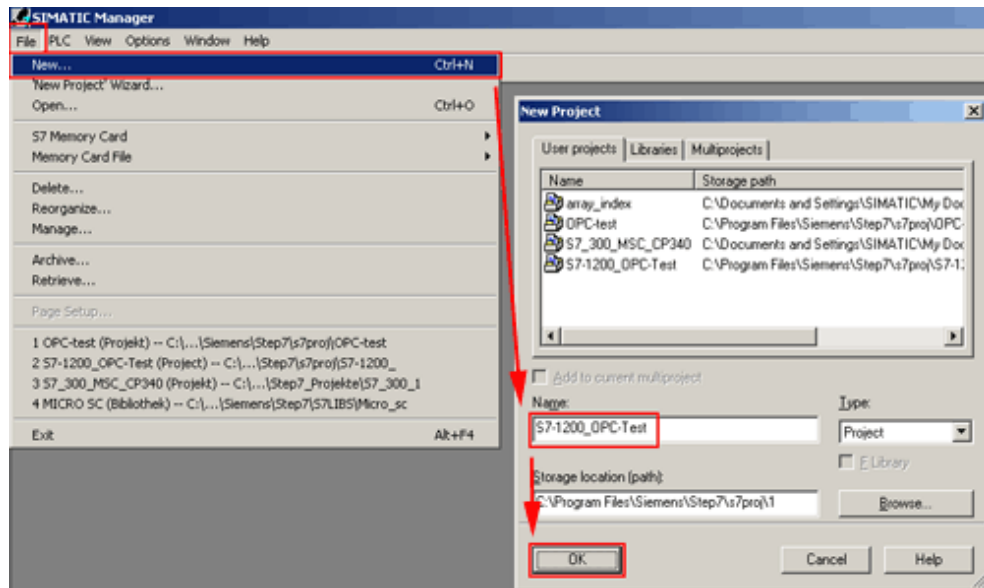
3.2 Add SIMATIC PC station

Click on the menu command **Insert > station > SIMATIC PC-Station**.

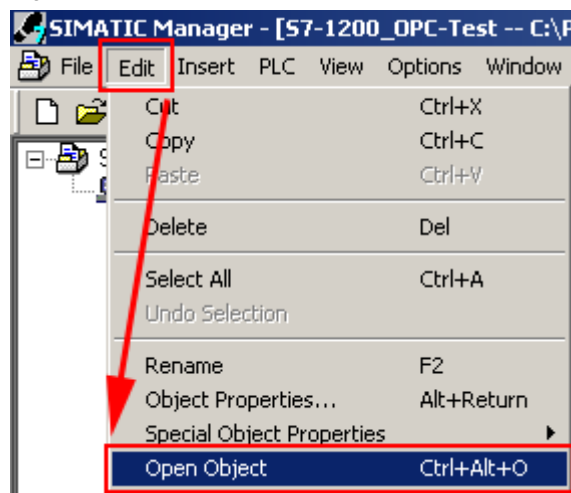A SIMATIC PC-Station is has been added to your project.

Figure 3-2

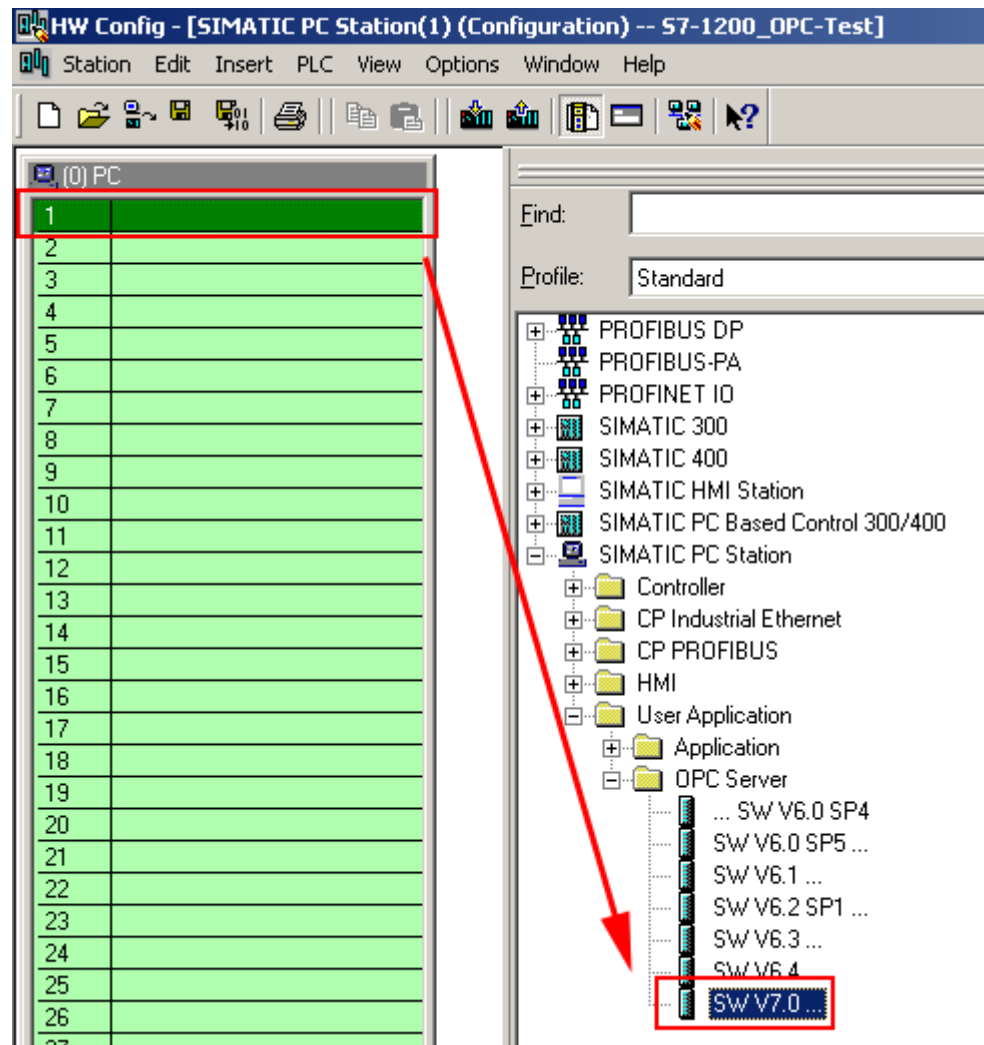## 3.3   Add OPC server

Select OPC server

Select the SIMATIC PC-Station in the project tree and click on the menu command **Edit > Open Object**. The **HW Config** dialog box opens.

Figure 3-3

Click on line one of the **(0) PC** rack in the work area. Double click on **SIMATIC PC-Station > User Application > OPC Server > SW V7.0…** in the catalog. The OPC server is inserted into line one of the rack.
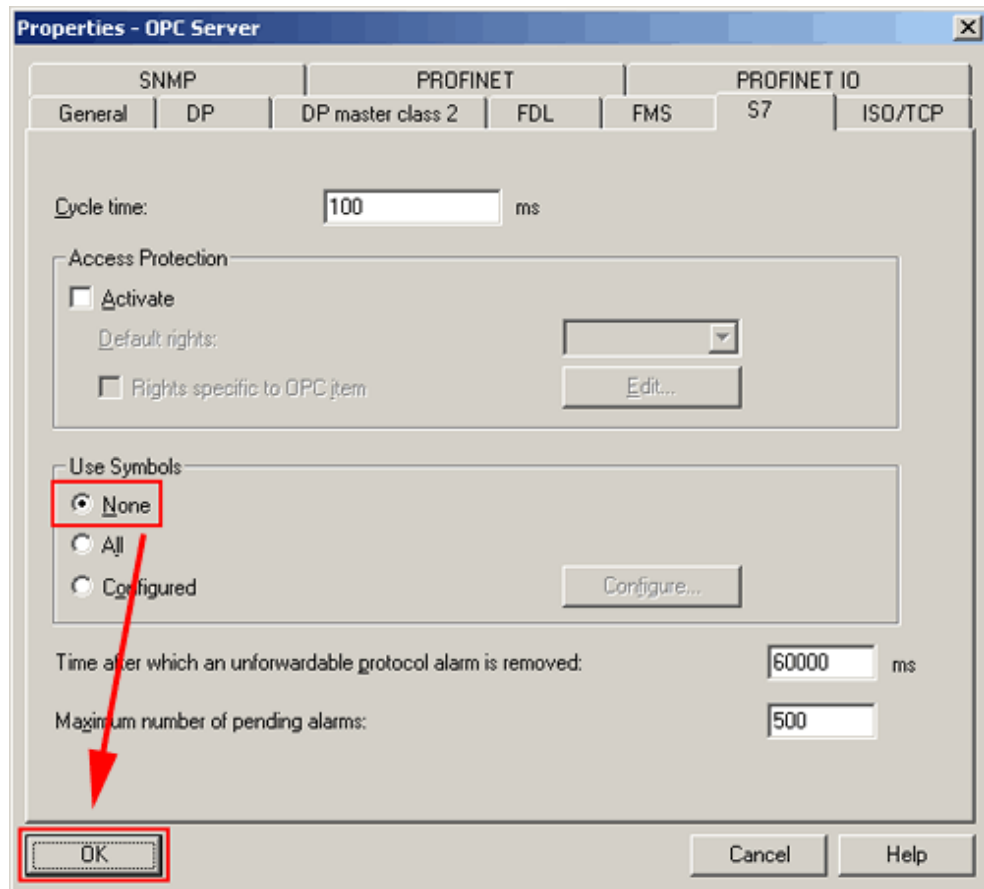
Figure 3-4

Configure OPC server properties

Double click on the **OPC Server** module in line one of the **(0) PC** rack. The
Properties dialog box opens. Click on the **S7** tab. Set the **Use Symbols** radio
button to **None**. Symbol use is not supported by S7-1200. Click the **OK** button.
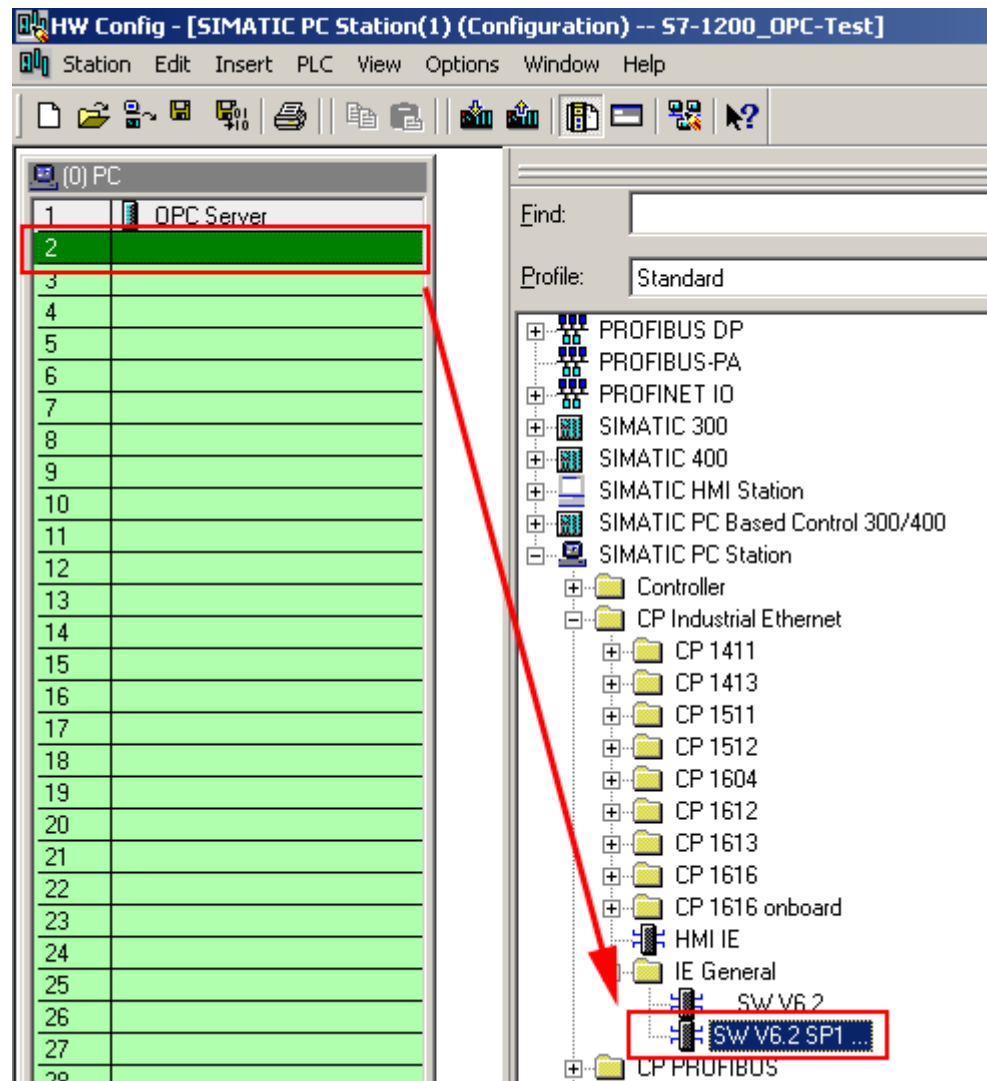
Figure 3-5

3.4 Add Ethernet interface IE General

Select Ethernet interface

Click on line two of the **(0) PC** rack in the work area. Double click on **SIMATIC PC-Station > CP Industrial Ethernet > IE General > SW V6.2 SP1…** in the catalog.
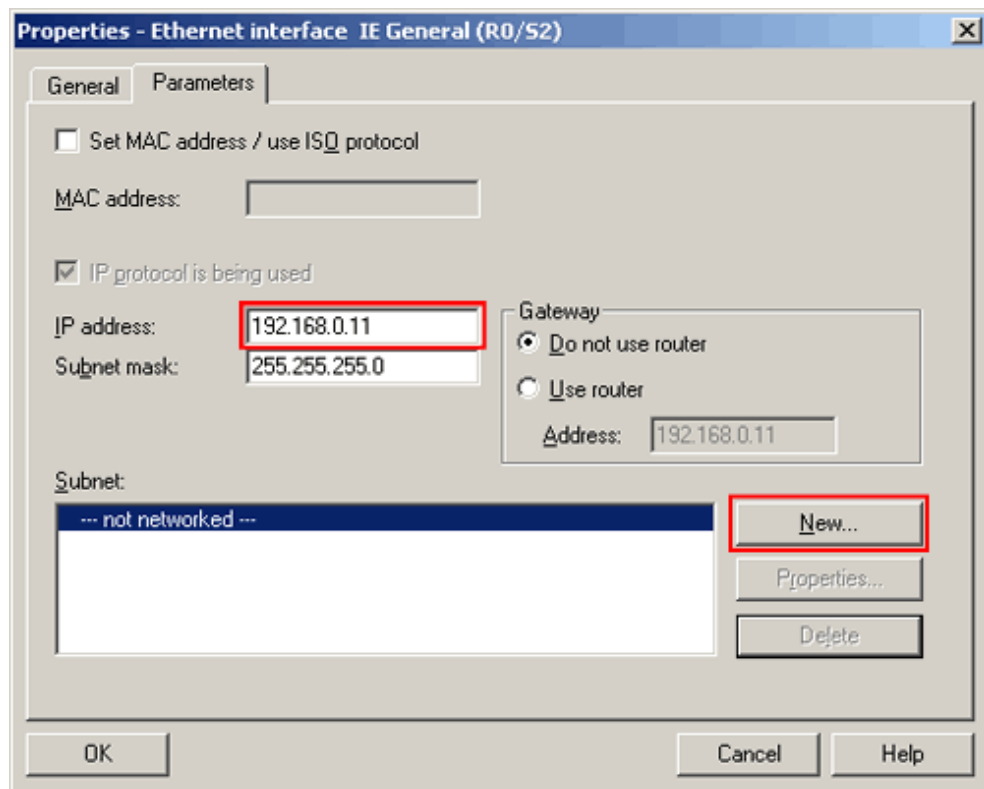
Figure 3-6

The **Properties** dialog box opens.

Enter IP address

On the **Parameters** tab enter the IP adress of yourPC in the **IP address** input field (e.g. 192.168.0.11).
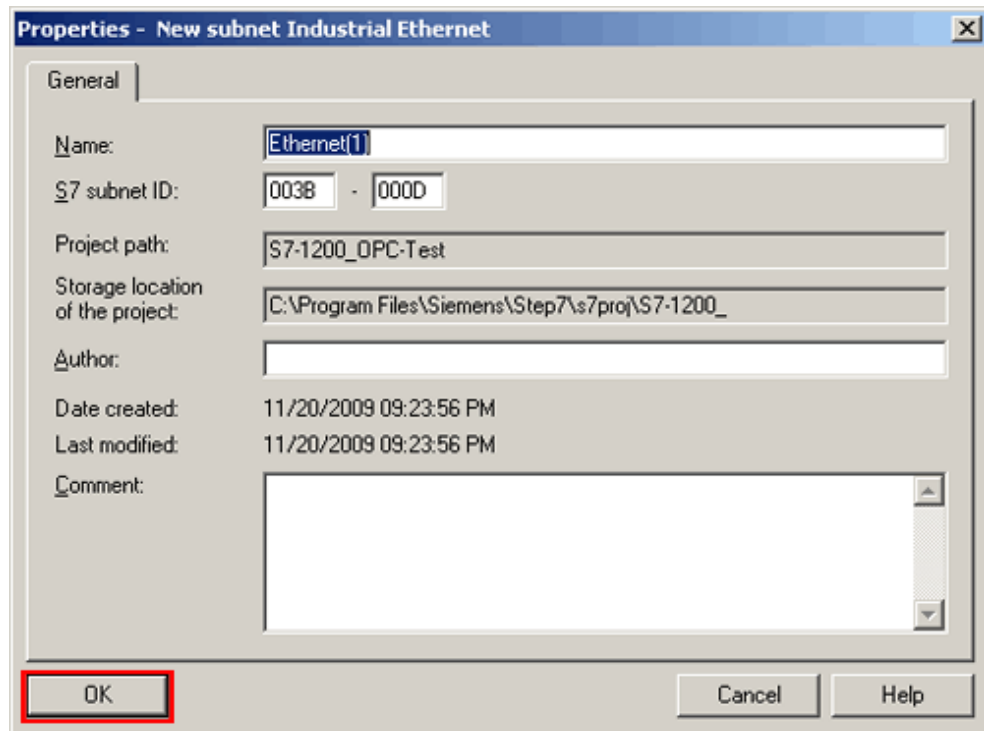
Figure 3-7

Add subnet to Ethernet Interface

Click on the Button **New…**. The **Properties** dialog box for a new subnet opens.
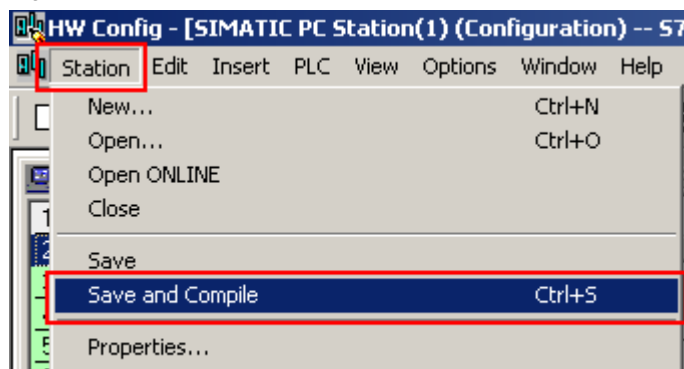
Figure 3-8

Click the **OK** button. The **subnet properties** dialog box closes. Click the **OK** button. The **ethernet interface properties** dialog box closes. The ethernet interface is inserted into line two of the rack.

3.5 Save and compile project

Click on the menu command **Station > Save and Compile**.
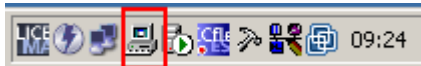
Figure 3-9

4   Setup Station Configurator

4.1   Open from start menu

Double click the **Station Configurator** symbol in the task bar. The **Station Configuration Editor** window opens.
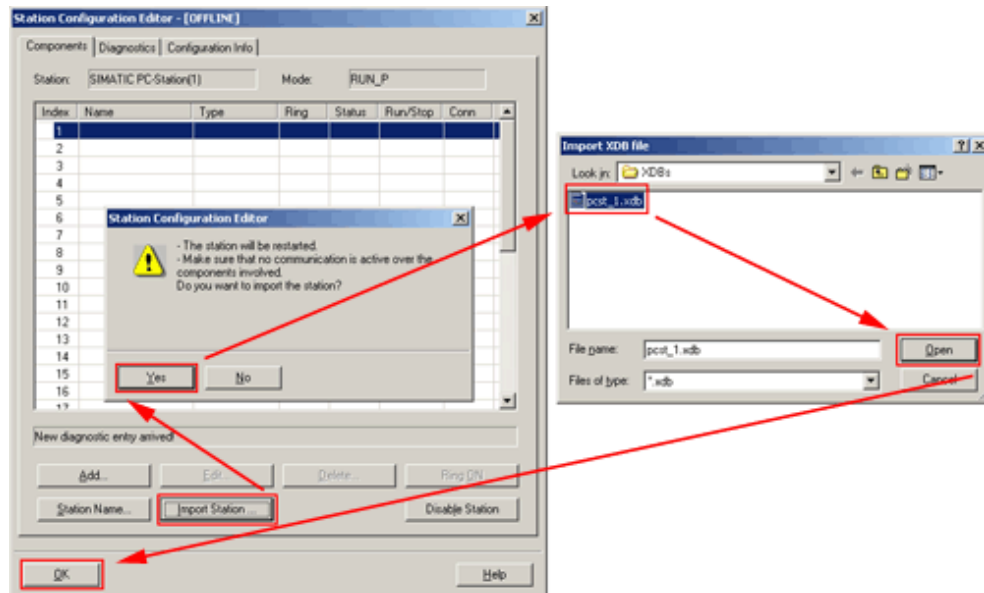
Figure 4-1

4.2   Import station from STEP 7 project

Click the **Import Station…** button. An acknowledge box opens. Click the **Yes** button. The **Import XDB file** dialog box opens. Select the file **pcst_1.xdb** and click the **Open** button. The **Configuration for XDB Import** dialog box opens.

Figure 4-2

Ignore any warning and proceed by clicking the **OK** button. The import is finished.

5 Connection in STEP 7 NetPro

5.1 Set PG/PC interface

Make sure the configuration of your PG/PC interface is correct.

Please find additional information on this topic on the internet at

http://support.automation.siemens.com/WW/view/en/11870489.

## 5.2 Download hardware configuration

Make sure your S7-1200 PLC is connected to your PG/PC. Open your **SIMATIC NCM PC** project. Select the **SIMATIC PC Station** in the project tree and click on the menu command **Edit > Open Object**. The **HW Config** dialog box opens.
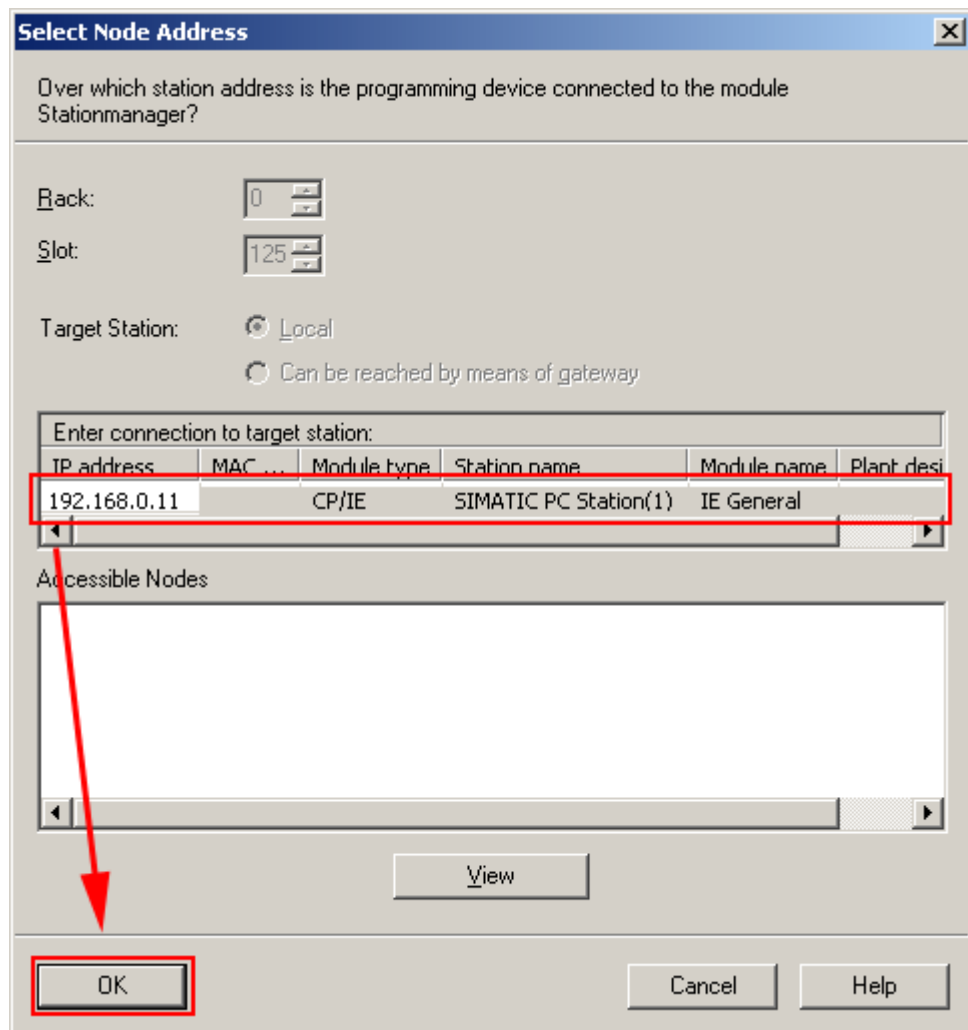
Figure 5-1
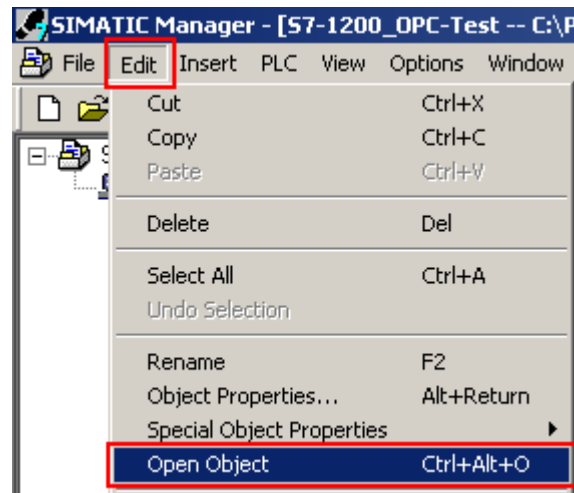
Click the **Download** button in the tool bar. Acknowledge the **Select Target Module** dialog box by clicking the **OK** button. The **Select Node Address** dialog box opens.

Figure 5-2
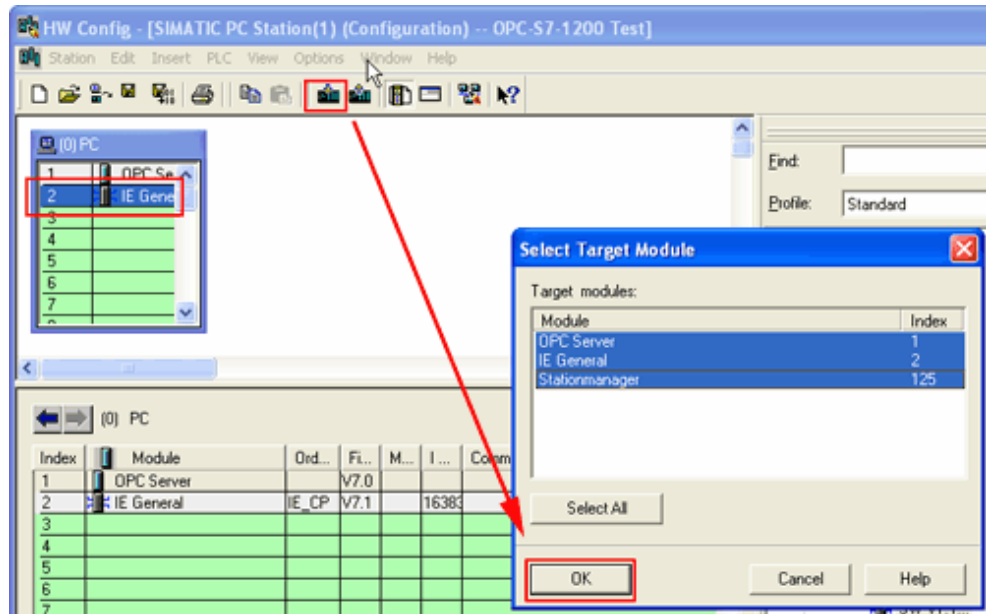
Make sure the IP address of your SIMATIC PC-Station(1) is matching the IP address of your PC. Click the **OK** button.
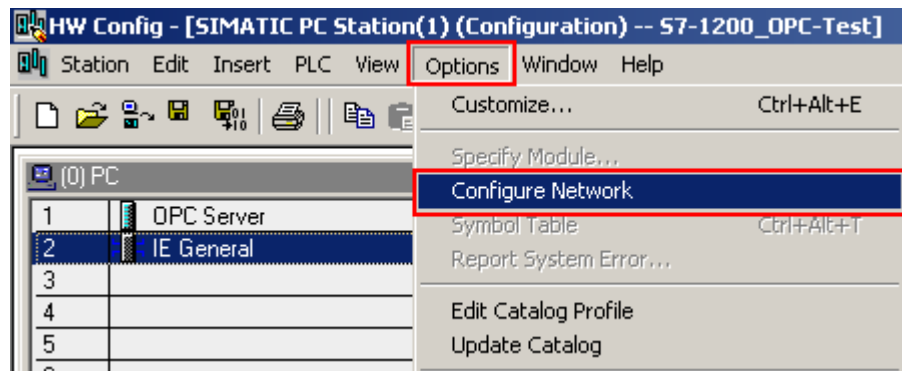
Figure 5-3

5.3 Configure network with NetPro
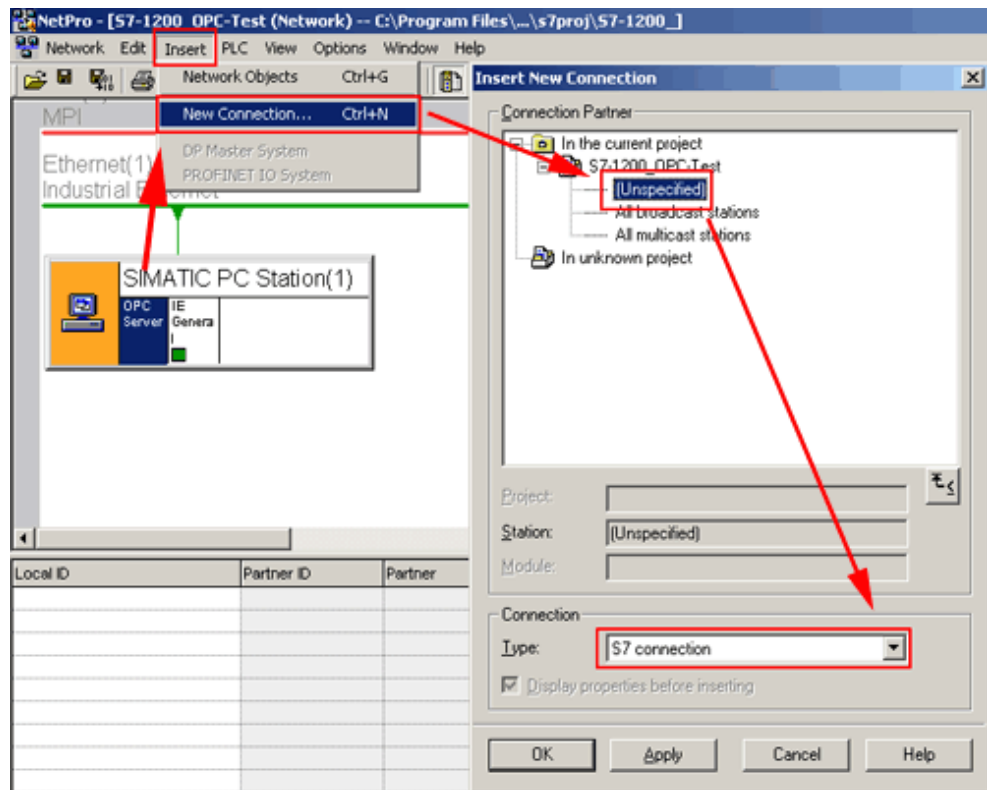
Create S7-connection

Click the menu command **Options > Configure Network**. The **NetPro** window opens.

Figure 5-4

Select the **OPC server** slot of the PC-Station(1). Click on the menu command **Insert > New Connection**. The I**nsert New Connection** dialog box opens.

Figure 5-5

Since the S7-1200 is an S7 Station we are able to use a S7-Connection. The partner should be unspecified since the S7-1200 is not available in the same Step 7 project.

Click the **OK** button. The **Properties – S7 connection** dialog box opens.

Configure S7-connection

Key the IP adress **192.168.0.110** of your S7-1200 PLC in the **Partner Adress input field** of the **Properties – S7 connection** dialog box.

Click the **Adress Details…** button. The **Adress Details** dialog box opens. Enter **0** in the **Partner Rack** input field and **1** in the **Partner Slot** input field. Click the **OK**

button. Close the **Properties – S7 connection** dialog box by clicking its **OK** button. Click the **OK** button.
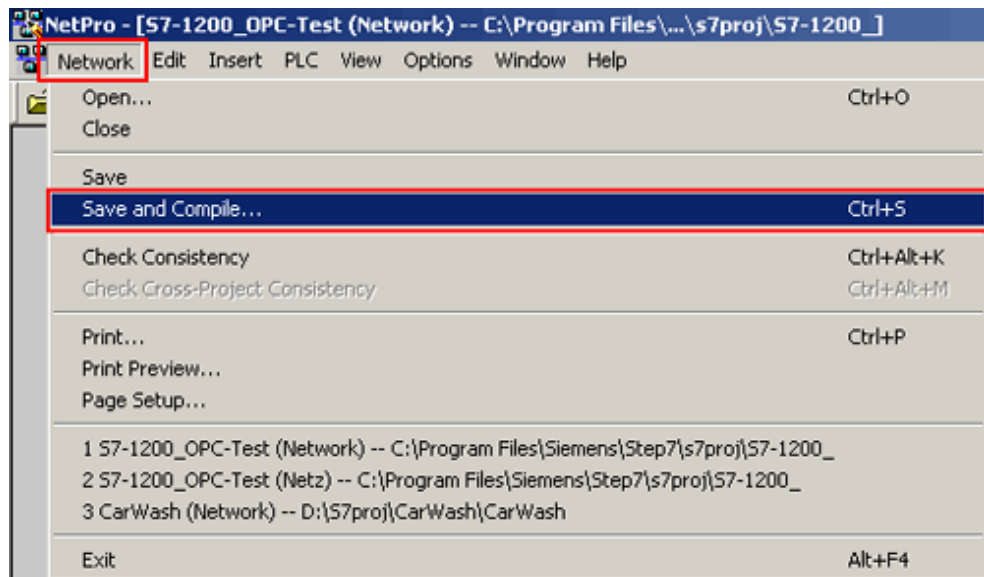
Figure 5-6
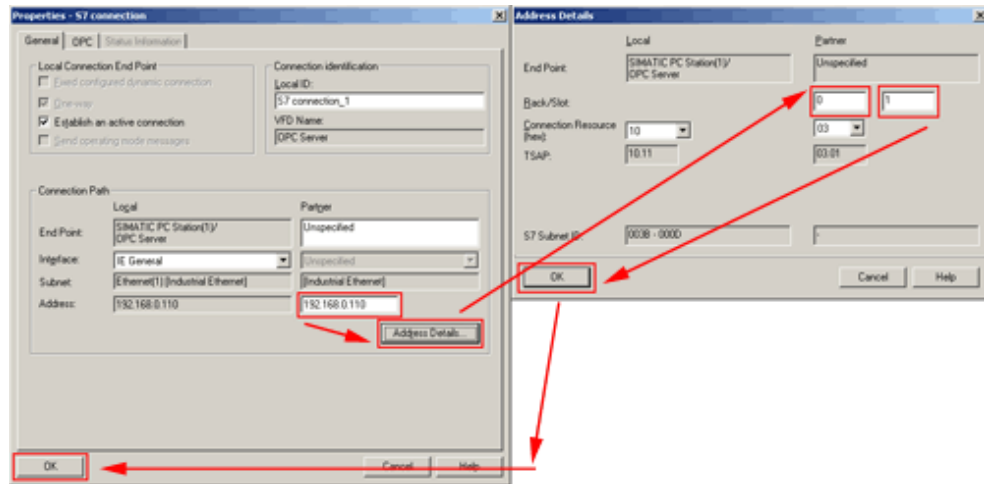
Compile project

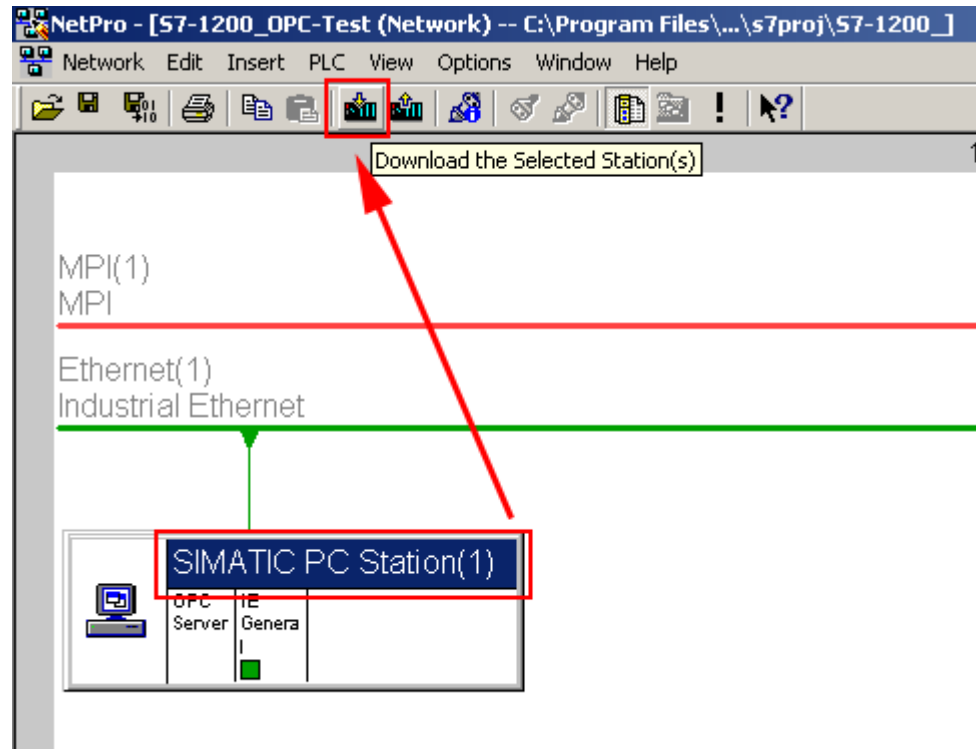Click the menu command **network > save and compile**.

Figure 5-7

Download connection

Select the **SIMATiC PC Station (1)**. Download the connection to the **SIMATiC PC Station (1)** by clicking the **Download** button. Acknowledge any opening dialog box. The connection should have been downloaded to your device yet.
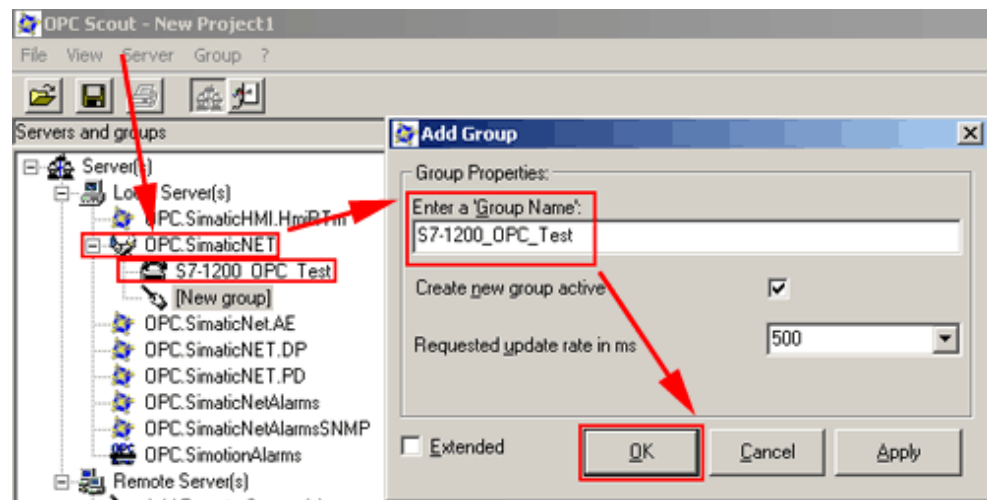
Figure 5-8

6 OPC Scout

6.1 Create new group

Open OPC Scout. Double click **OPC.SimaticNET** in the server tree. The **Add Group** dialog box opens. Enter **S7-1200_OPC_Test** in the **Group Name** input field. Click the **OK** button.
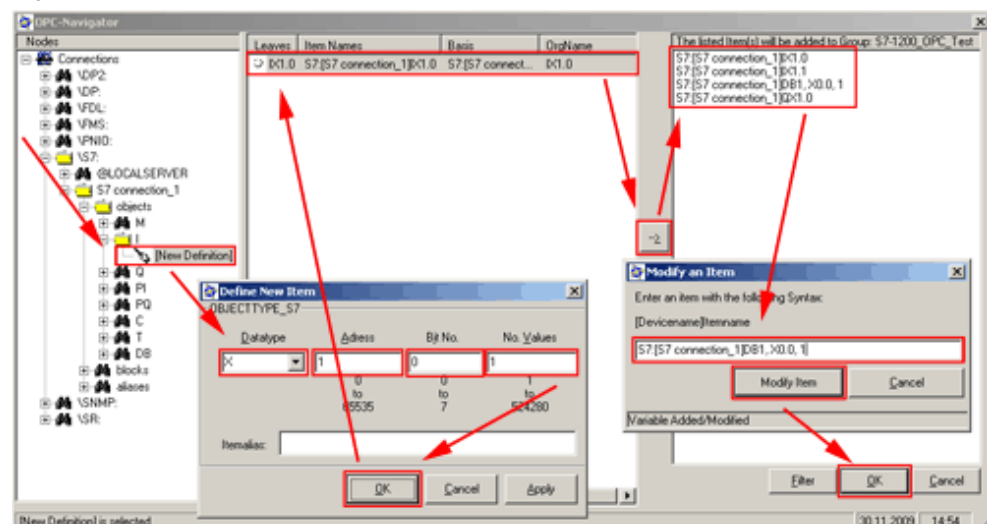
Figure 6-1

6.2 Select connection and create items

Double click the new group **S7-1200_OPC_Test**. The **OPC – Navigator** dialog box opens.

Figure 6-2

Browse the **Nodes** tree to **Connections > \S7 > S7 connection_1 > objects > I > [New Definition]**. Double click the option **[New Definition]**. The **Define New Item** dialog box opens.

Fill in the data as shown in the table 6-1.

Table 6-1

Datatype	Address	Bit No.	No. Values
X	1	0	1

Click the **OK** button. Take over the new item in the right column four times by clicking the **-->** button..

Double click on each item and modify its name as shown in table 6-2.

Table 6-2

S7:[S7 connection_1]IX1.0
S7:[S7 connection_1]IX1.1
S7:[S7 connection_1]DB1, X0.0, 1
S7:[S7 connection_1]QX1.0

Click the **OK** button to end the **OPC Navigator** window.

6.3 View values

In the **Values** column you can see the actual values of the listed items. If you are connected to your S7-1200 PLC the **Quality** of the item is listed **good**.

Figure 6-3