

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

S7-1200 PLC, SIMATIC NET OPC

FAQ • November 2009



Service & Support

Answers for industry.

SIEMENS

This entry is from the Service&Support portal of Siemens AG, Sector Industry, Industry Automation and Drive Technologies. The general terms of use (http://www.siemens.com/terms_of_use) apply.

Clicking the link below directly displays the download page of this document.

<http://support.automation.siemens.com/WW/view/en/39960679>

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	4
1.1	Use case	4
1.2	Requirements	4
2	Setting up your S7-1200 PLC by STEP 7 Basic	5
2.1	Hardware configuration	5
2.2	Software configuration.....	7
2.3	Finalize S7-1200 PLC work.....	10
3	Create and configure PC-Station	13
3.1	Create new STEP 7project.....	13
3.2	Add SIMATIC PC station.....	13
3.3	Add OPC server	14
3.4	Add Ethernet interface IE General	16
3.5	Save and compile project.....	19
4	Setup Station Configurator	20
4.1	Open from start menu	20
4.2	Import station from STEP 7 project	20
5	Connection in STEP 7 NetPro	21
5.1	Set PG/PC interface	21
5.2	Download hardware configuration.....	21
5.3	Configure network with NetPro	23
6	OPC Scout	27
6.1	Create new group.....	27
6.2	Select connection and create items	27
6.3	View values	28

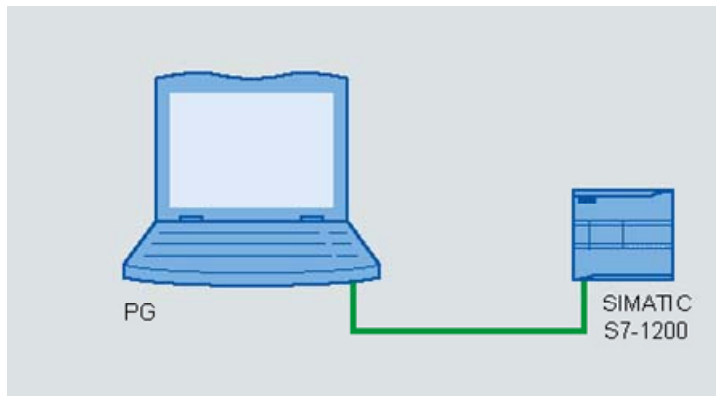
1 Introduction

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.

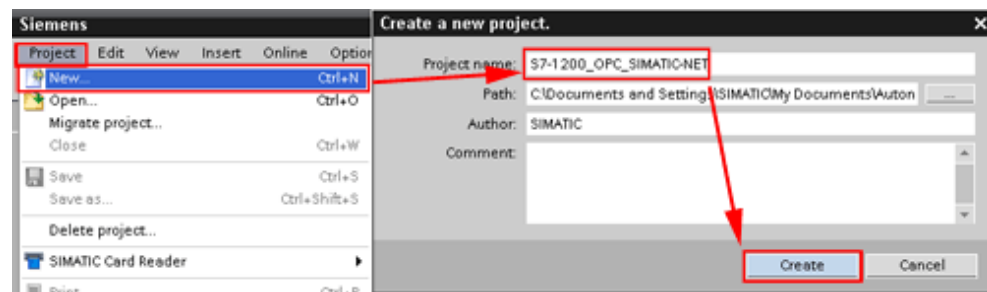
2.1 Hardware configuration

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.

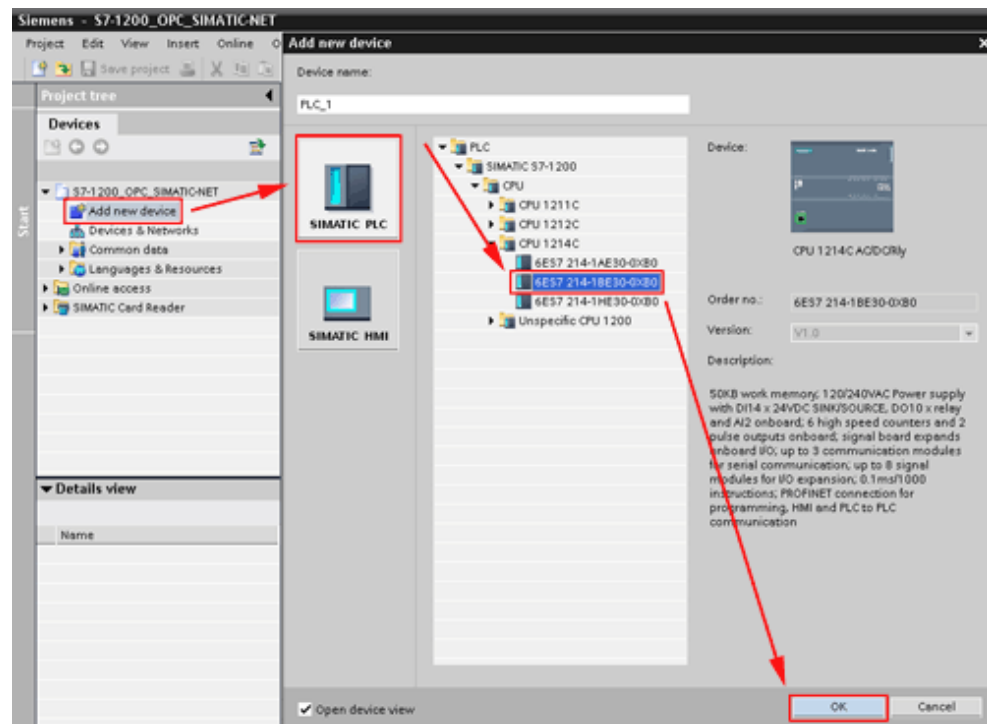
Figure 2-1



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



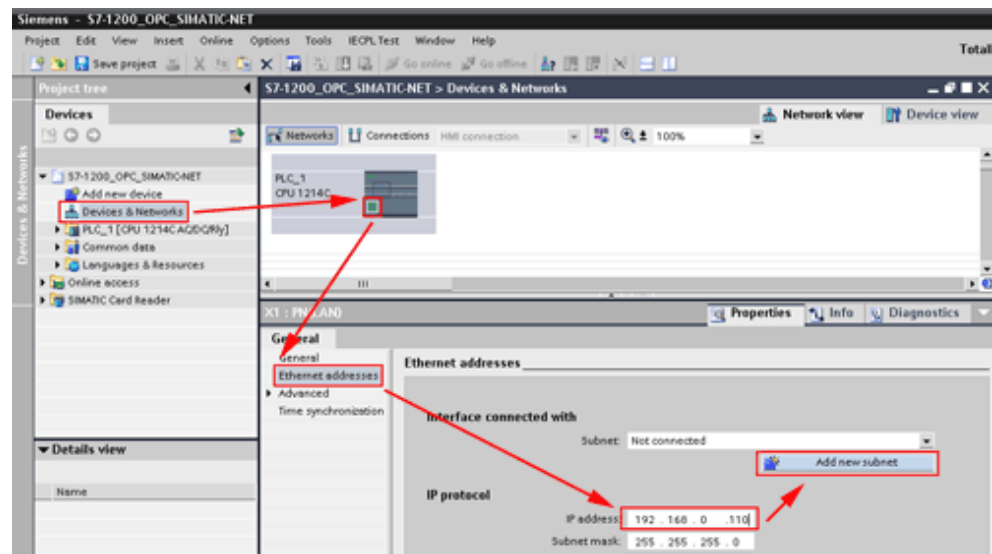
Change IP address of Ethernet port

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

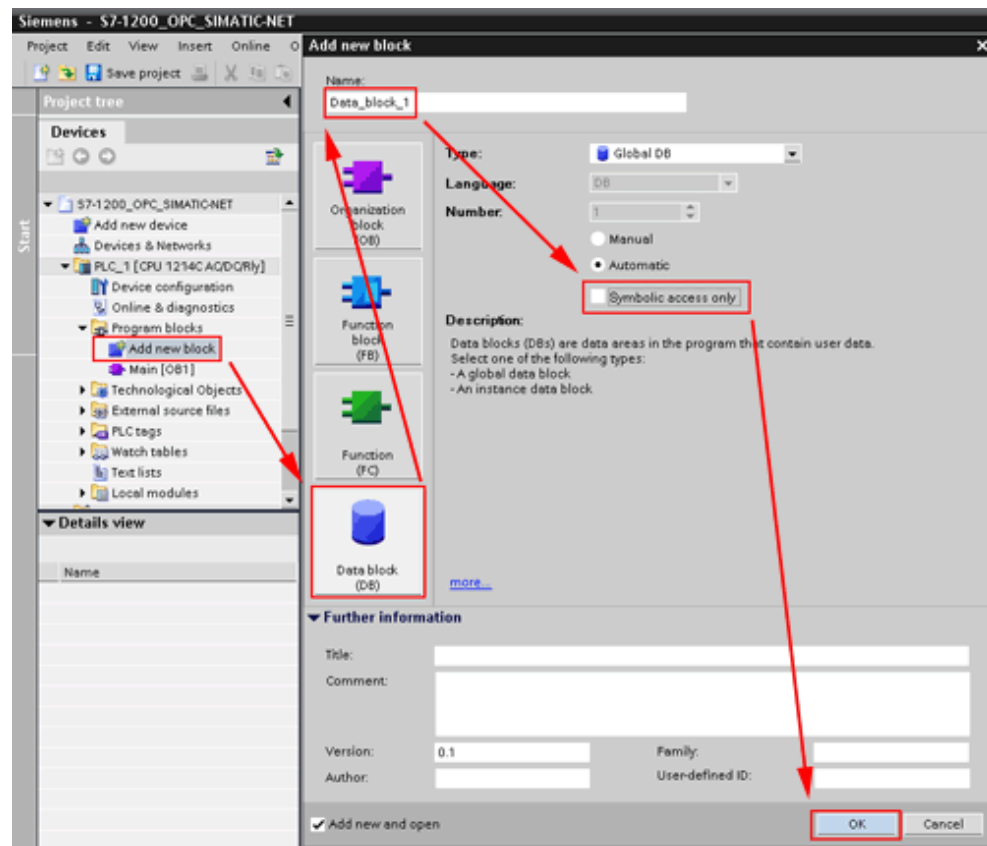
To see any value changes you will now create a small program in which two hardware inputs and a hardware output of your PLC are connected to a software flip-flop.

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.

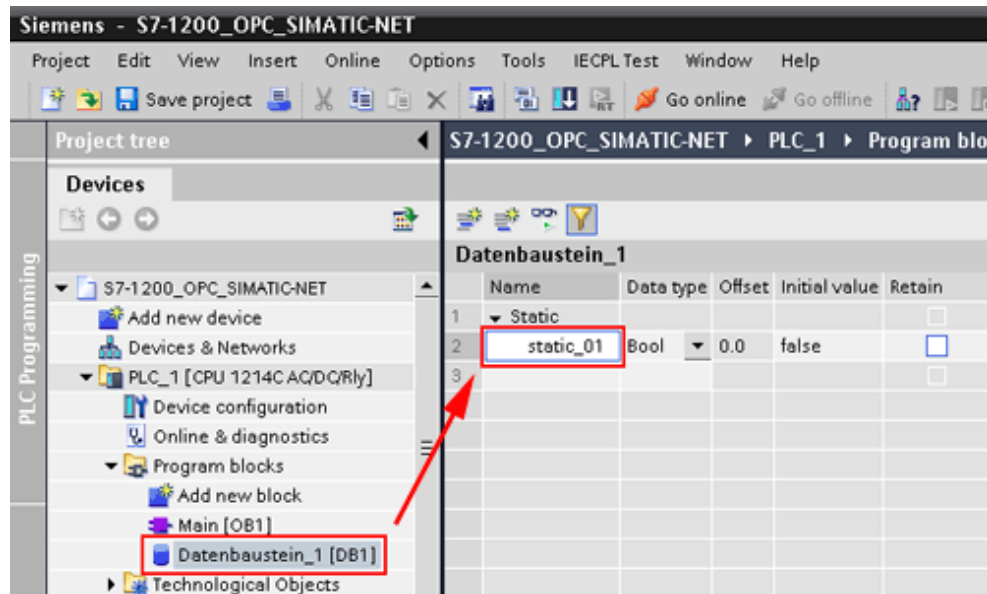
Figure 2-4



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

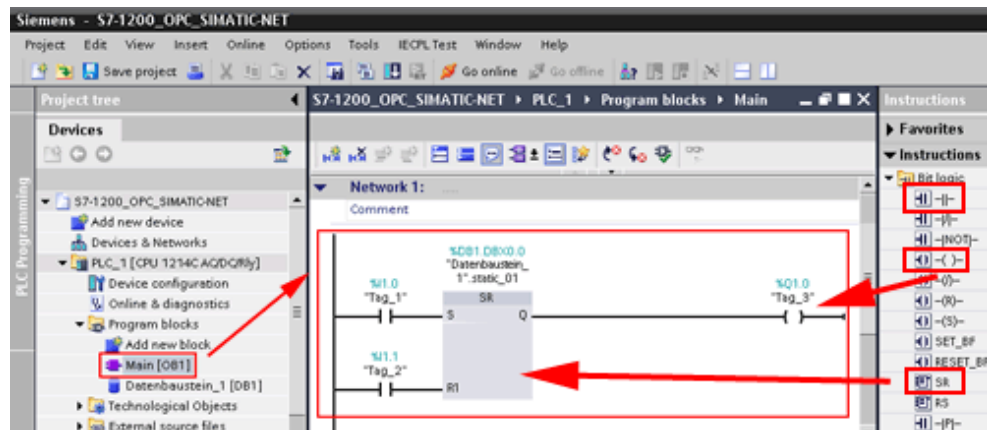


Create program in Main [OB1]

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.

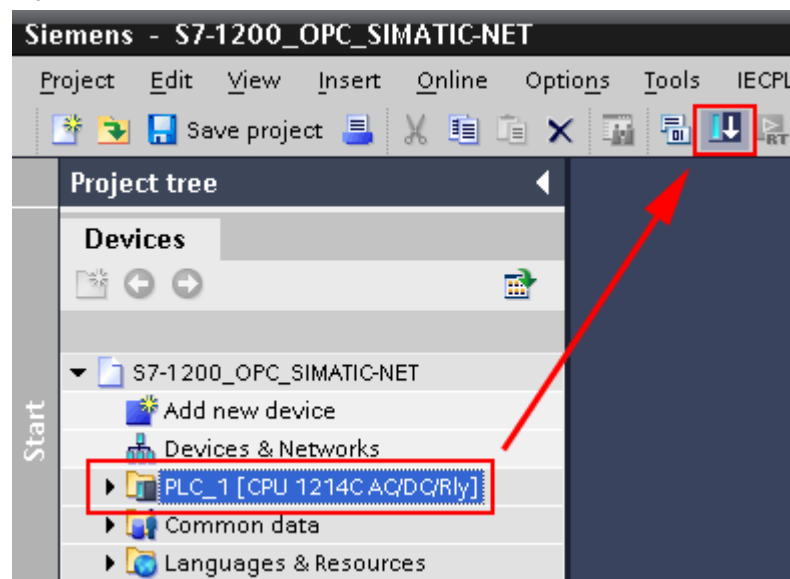
2.3 Finalize S7-1200 PLC work

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

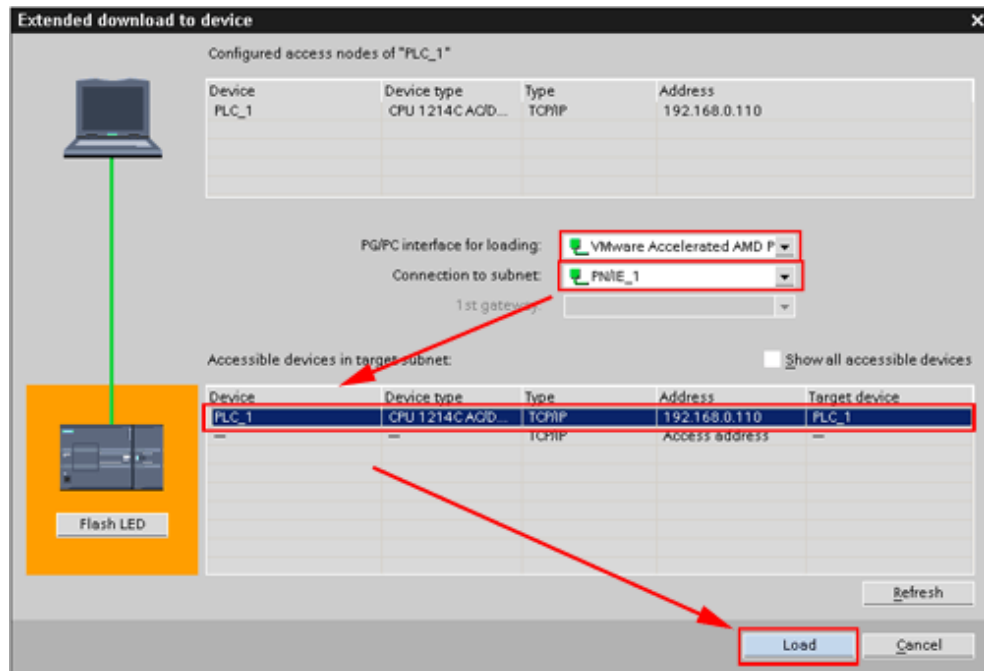
Press the **Download to device** button in the Toolbar.

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.

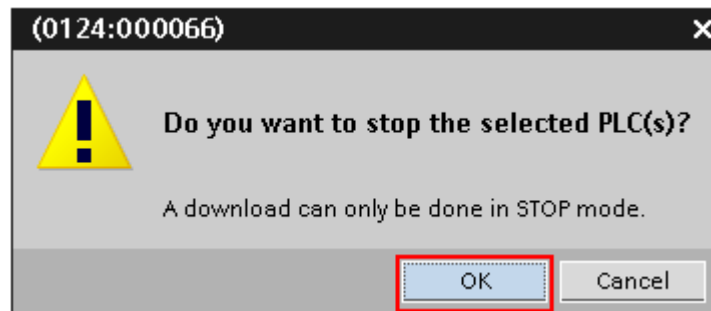
Figure 2-8



If you have downloaded your project before, the **load preview** dialog box may open instead of the **Extended download to device** dialog box.

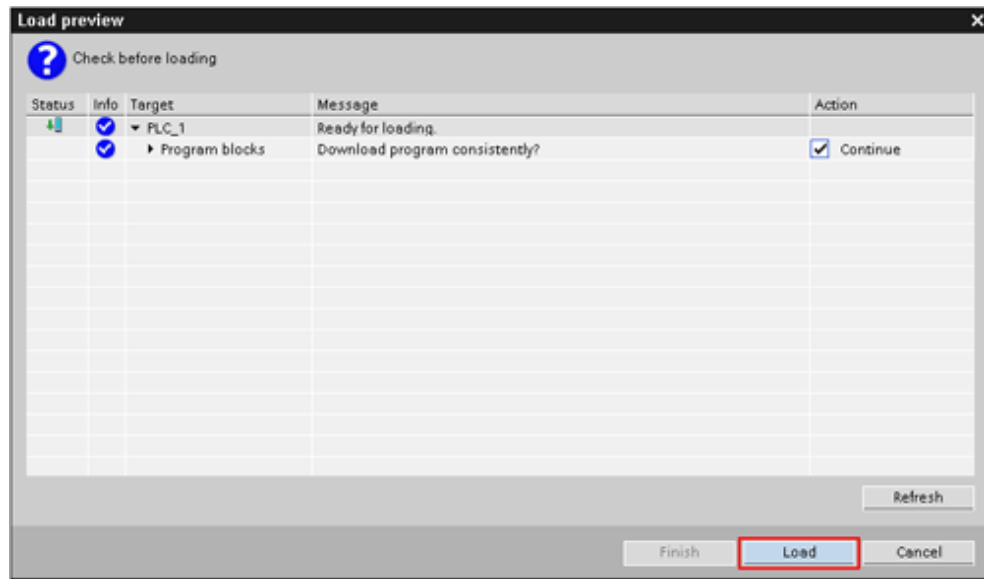
Another dialog box may open before, asking to stop the S7-1200 PLC for downloading. Acknowledge clicking the **OK** button.

Figure 2-9



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

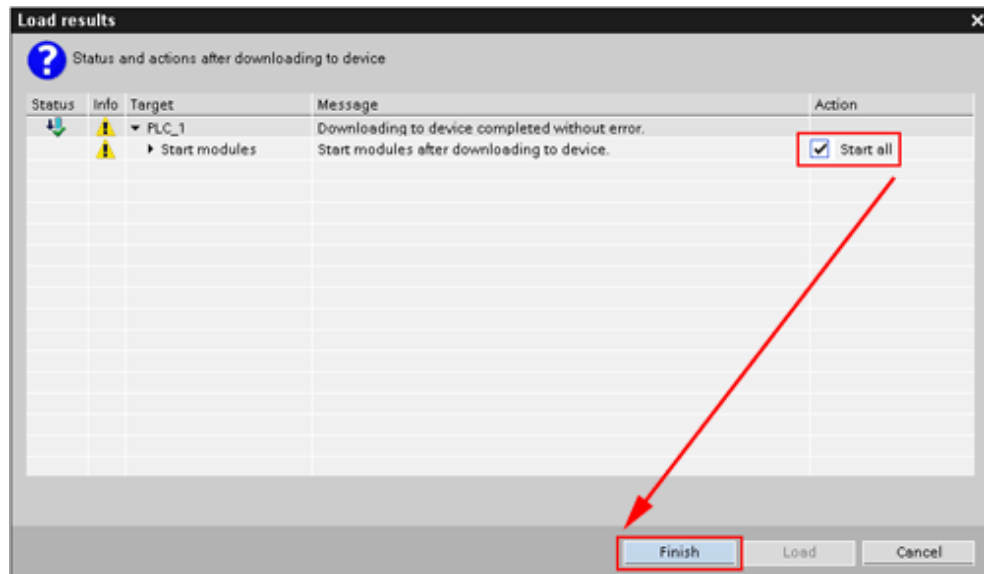
Figure 2-10



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



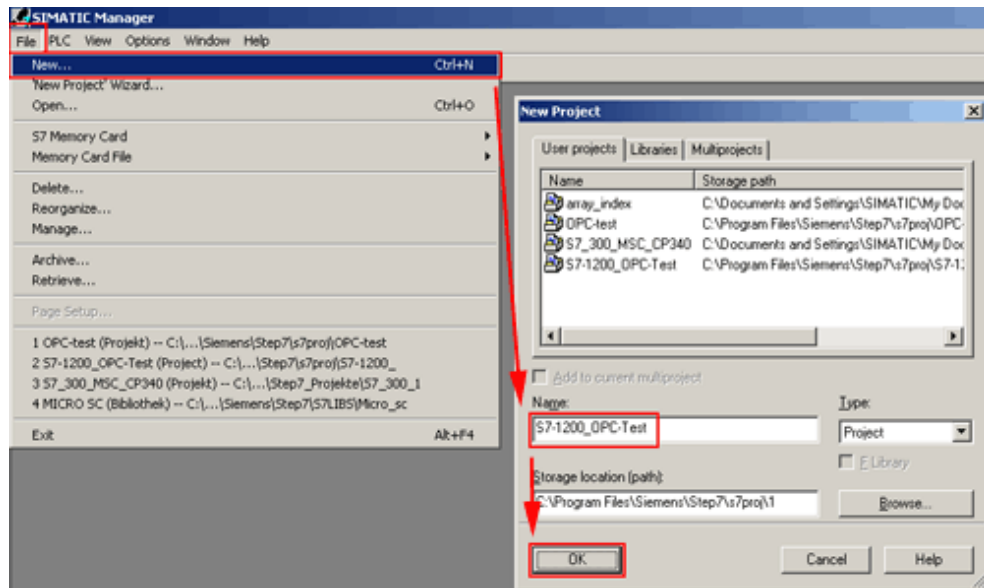
3 Create and configure PC-Station

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 7 project

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

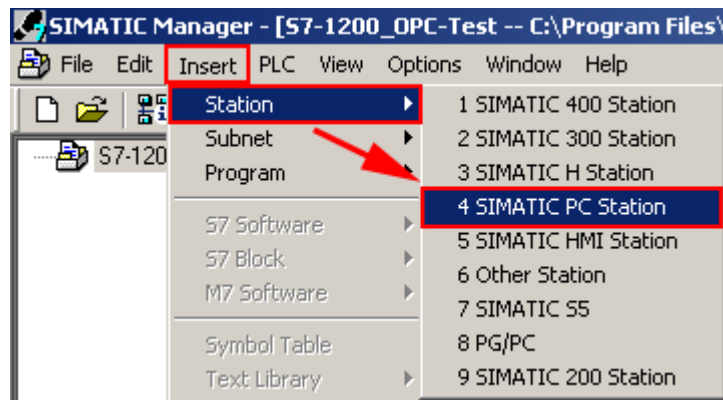


3.2 Add SIMATIC PC station

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

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

Figure 3-2

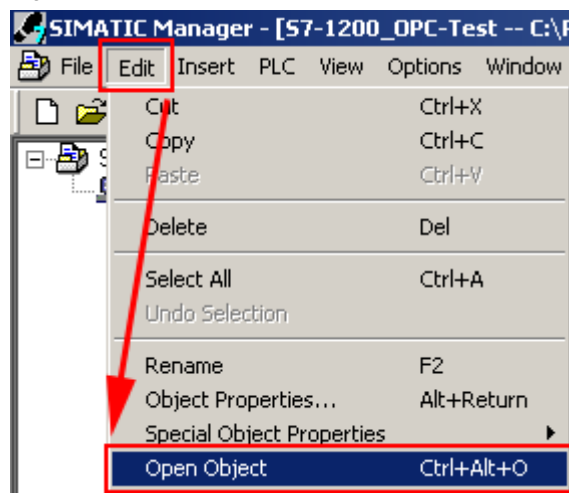


3.3 Add OPC server

Select OPC server

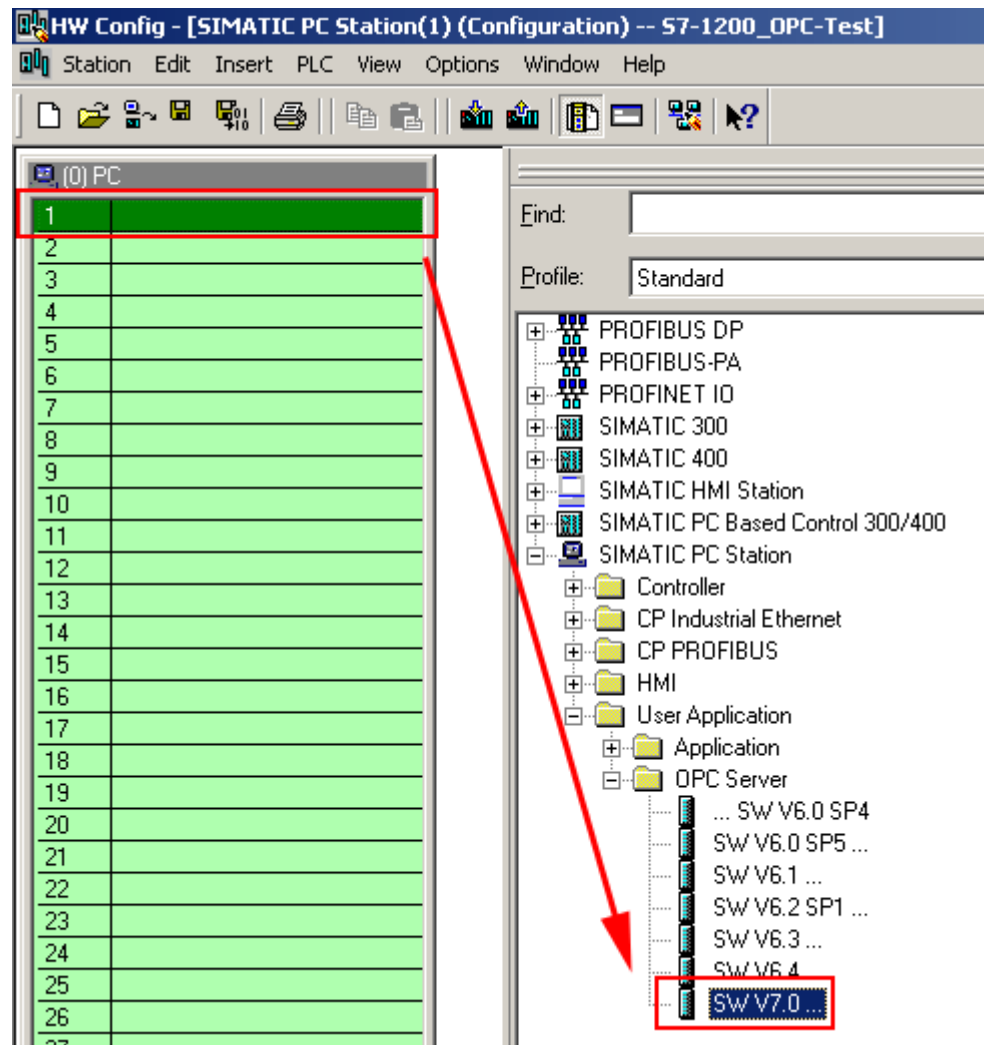
Select the SIMATIC PC-Station in the project tree and click on the menu command **Edit > Open Object**. The **HW Config** dialog box opens.

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.

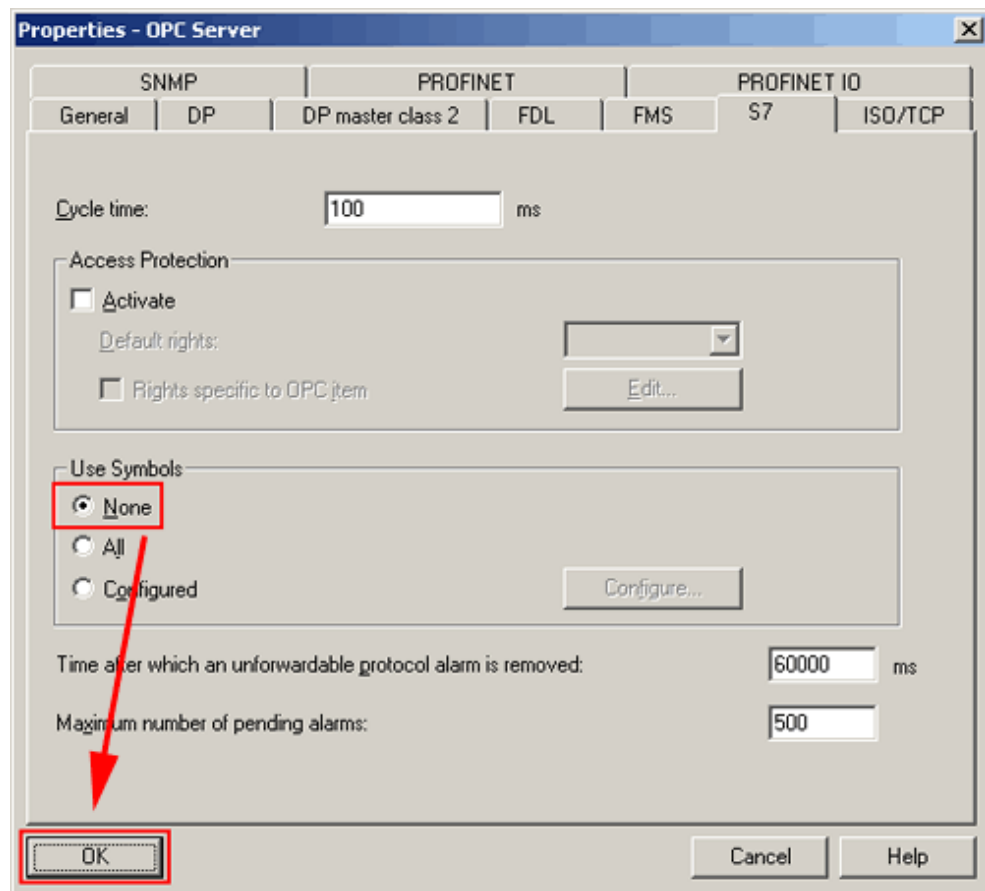
Figure 3-4



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

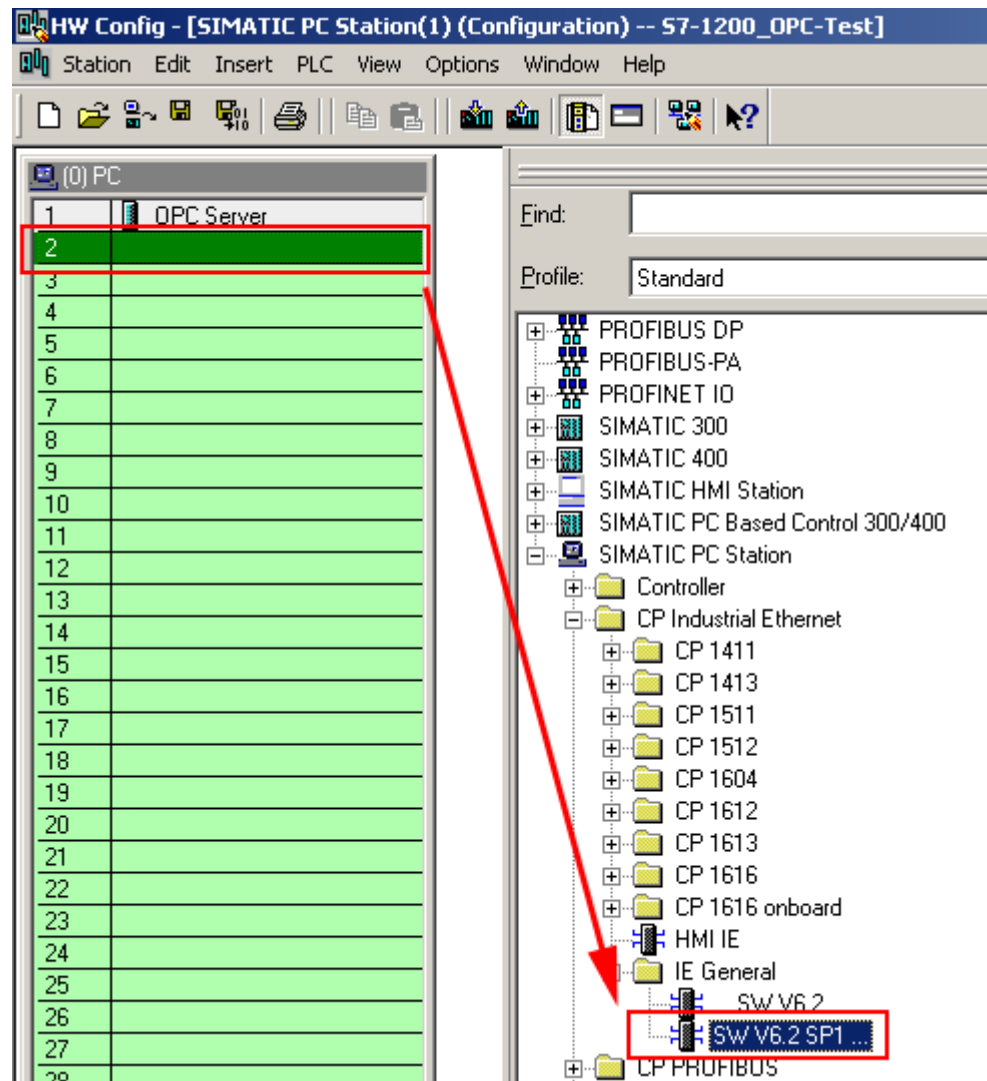


3.4 Add Ethernet interface IE General

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

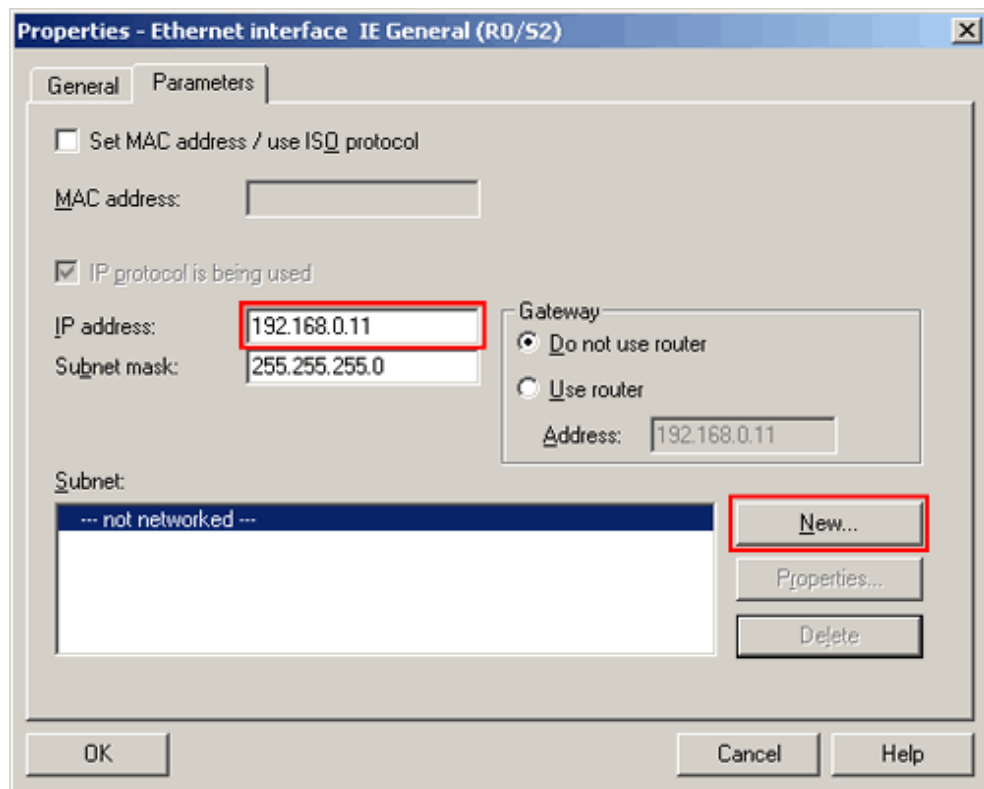


The **Properties** dialog box opens.

Enter IP address

On the **Parameters** tab enter the IP address of your PC in the **IP address** input field (e.g. 192.168.0.11).

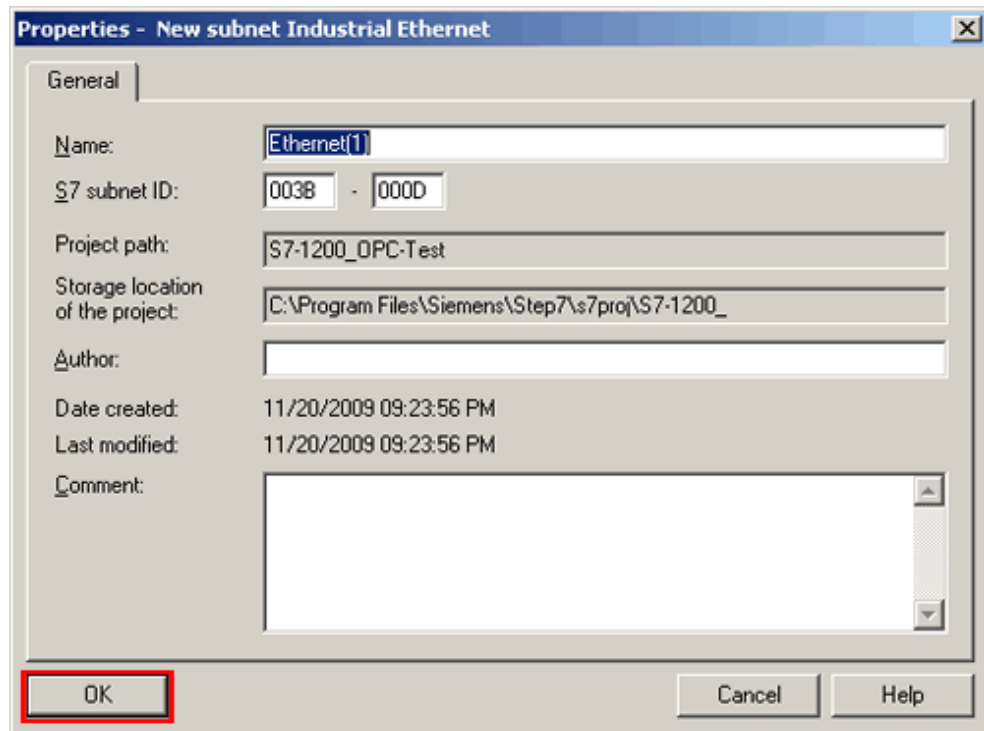
Figure 3-7



Add subnet to Ethernet Interface

Click on the Button **New....** The **Properties** dialog box for a new subnet opens.

Figure 3-8

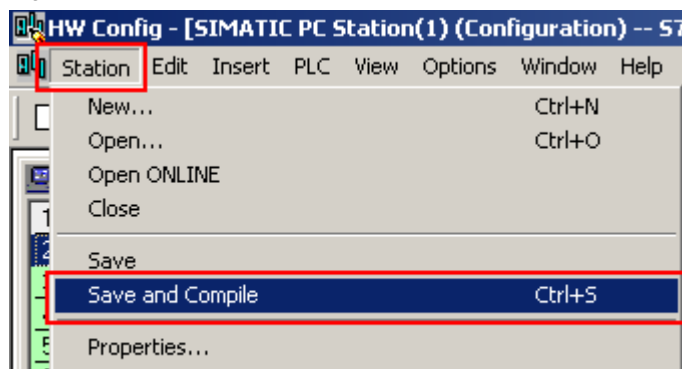


Click the **OK** button. The **subnet properties** dialog box closes. Click the **OK** button. The **ethernet interface properties** dialog box closes. The ethernet interface is inserted into line two of the rack.

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.

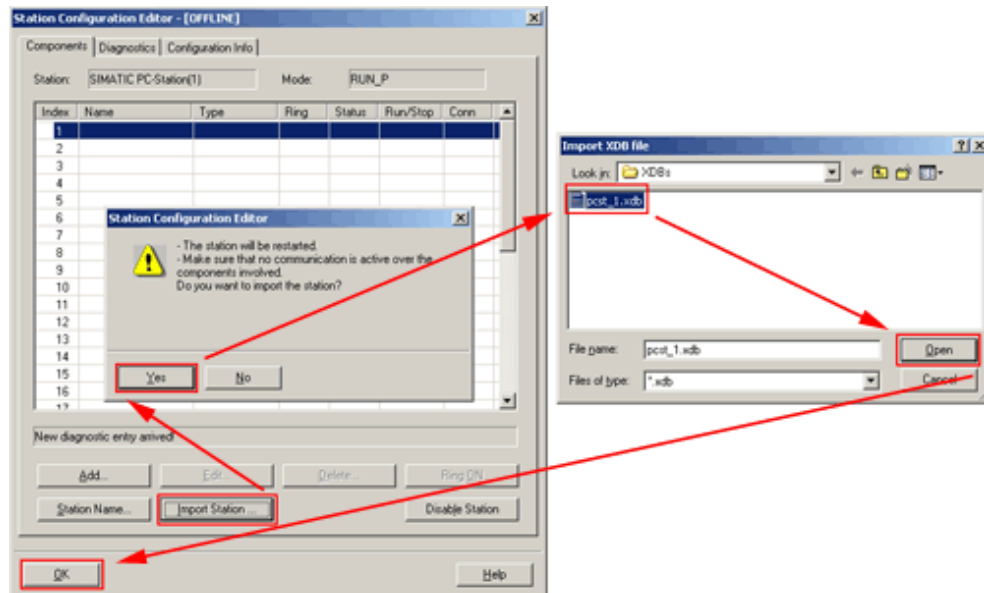
Figure 4-1



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

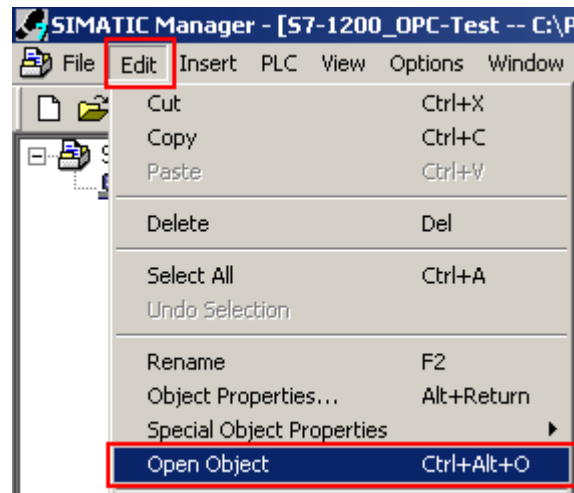
5.1 Set PG/PC interface

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

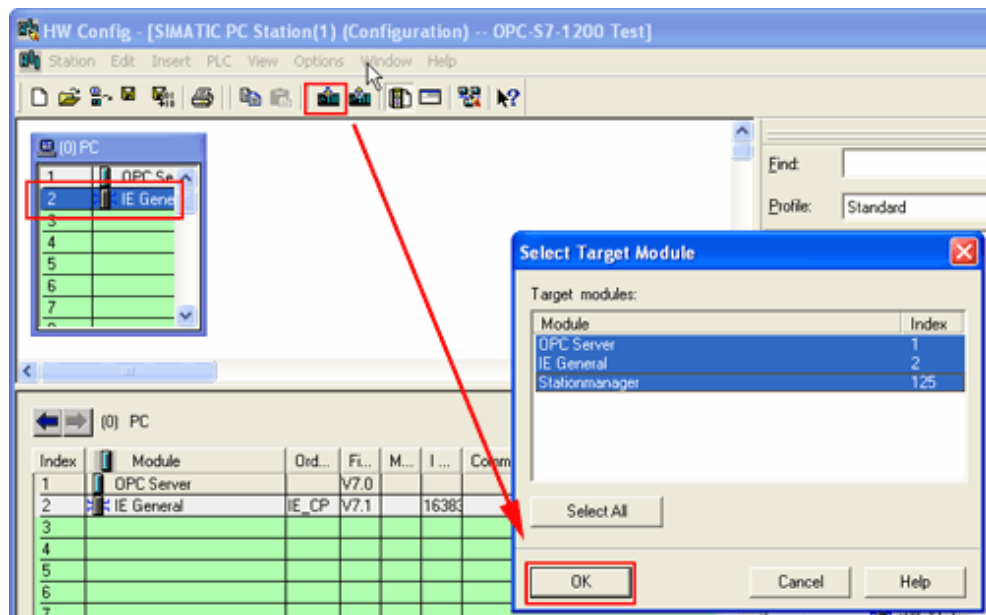
Make sure your S7-1200 PLC is connected to your PG/PC. Open your **SIMATIC NCM PC** project. Select the **SIMATIC PC Station** in the project tree and click on the menu command **Edit > Open Object**. The **HW Config** dialog box opens.

Figure 5-1



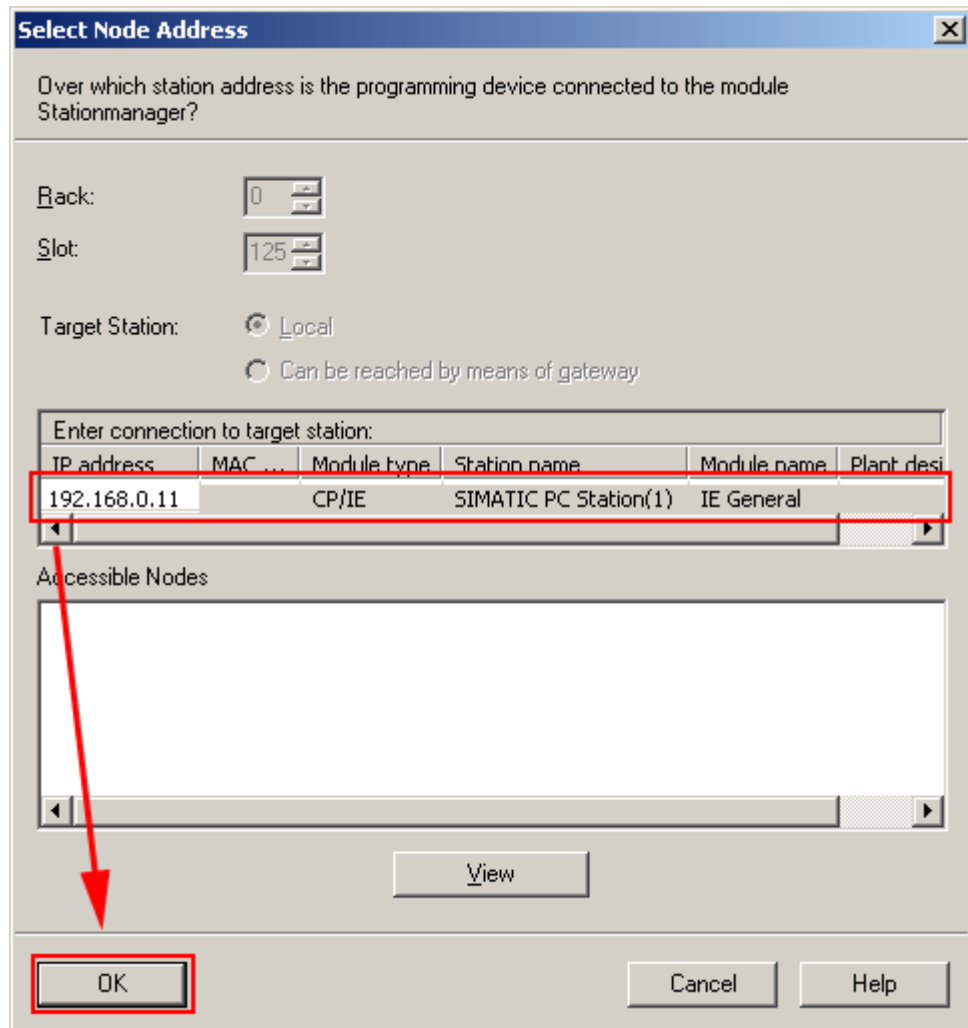
Click the **Download** button in the tool bar. Acknowledge the **Select Target Module** dialog box by clicking the **OK** button. The **Select Node Address** dialog box opens.

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

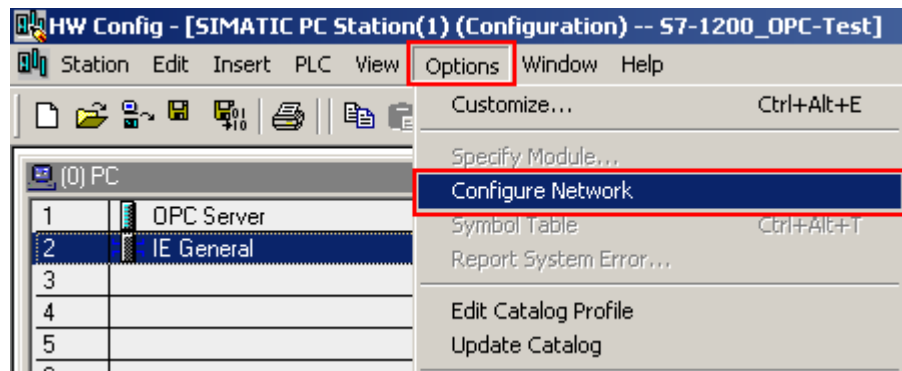


5.3 Configure network with NetPro

Create S7-connection

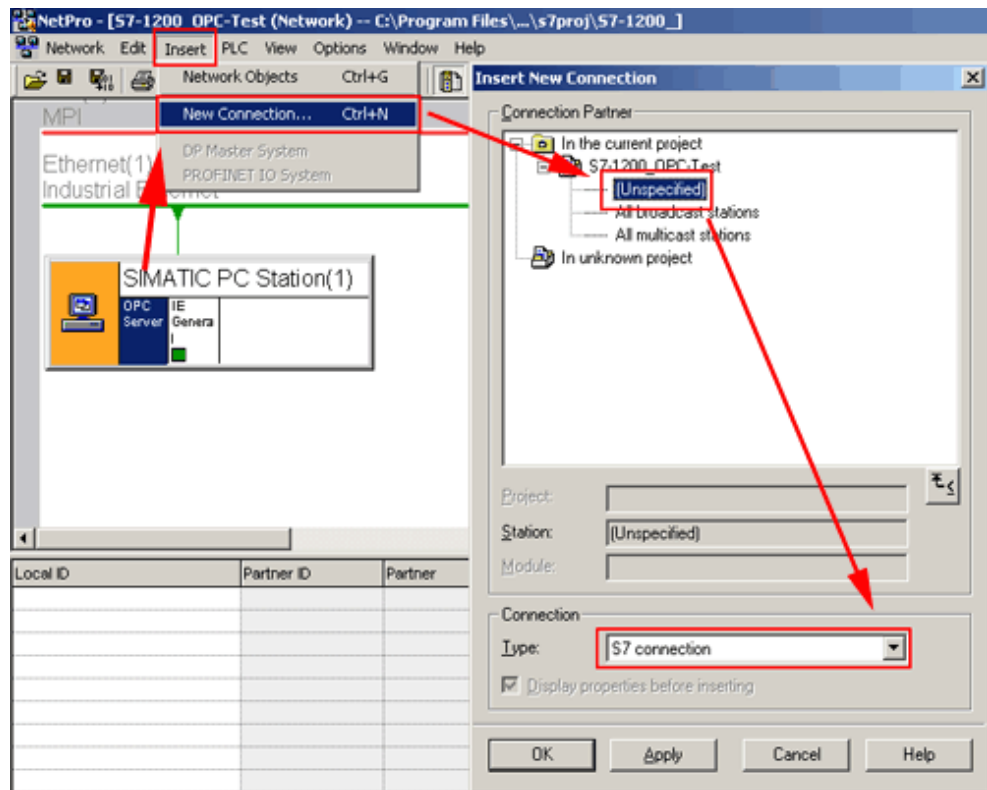
Click the menu command **Options > Configure Network**. The **NetPro** window opens.

Figure 5-4



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

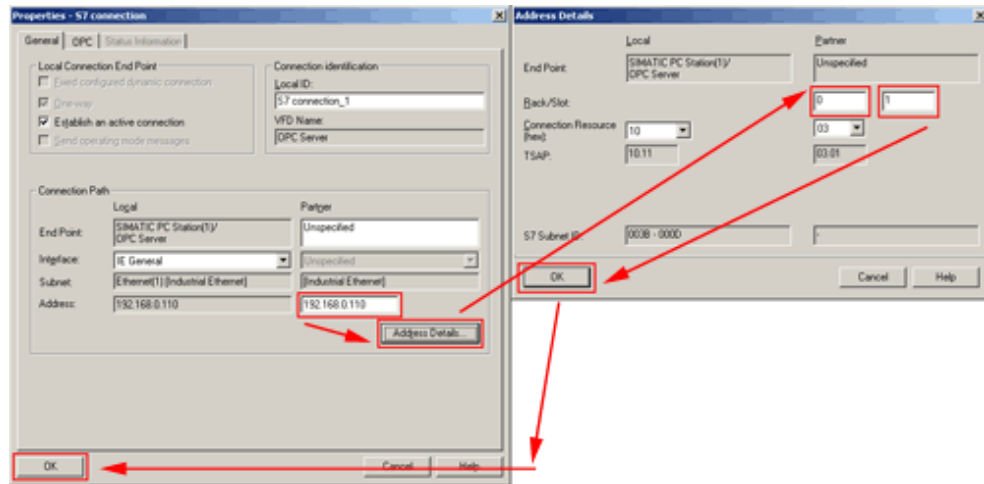
Configure S7-connection

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

Click the **Address Details...** button. The **Address 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.

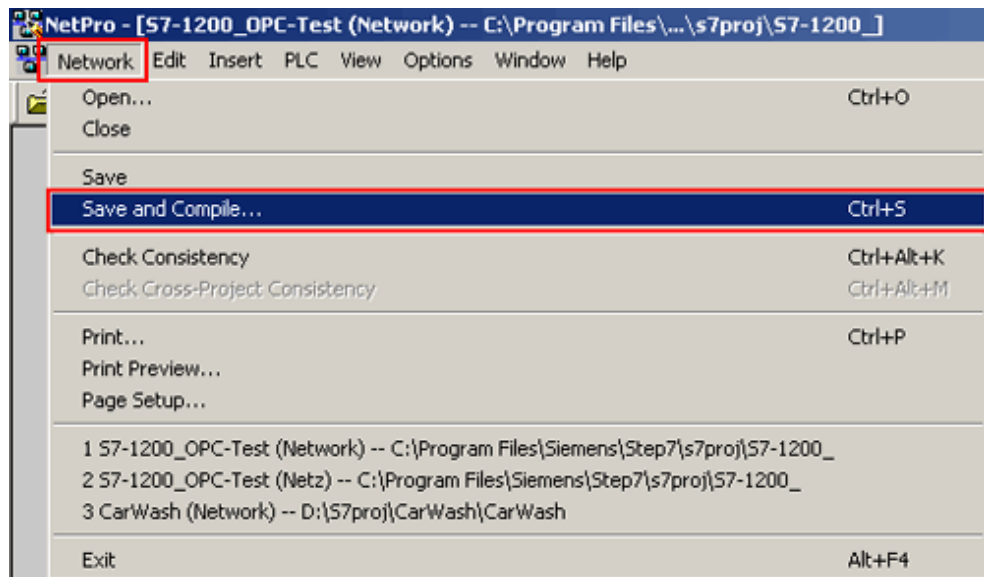
Figure 5-6



Compile project

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

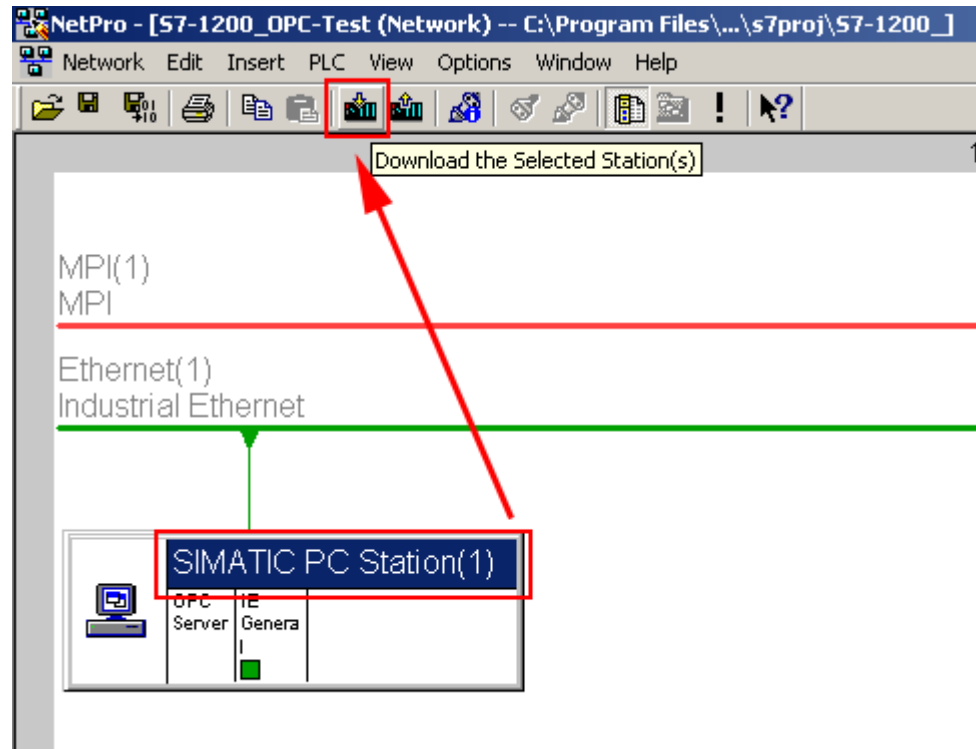
Figure 5-7



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

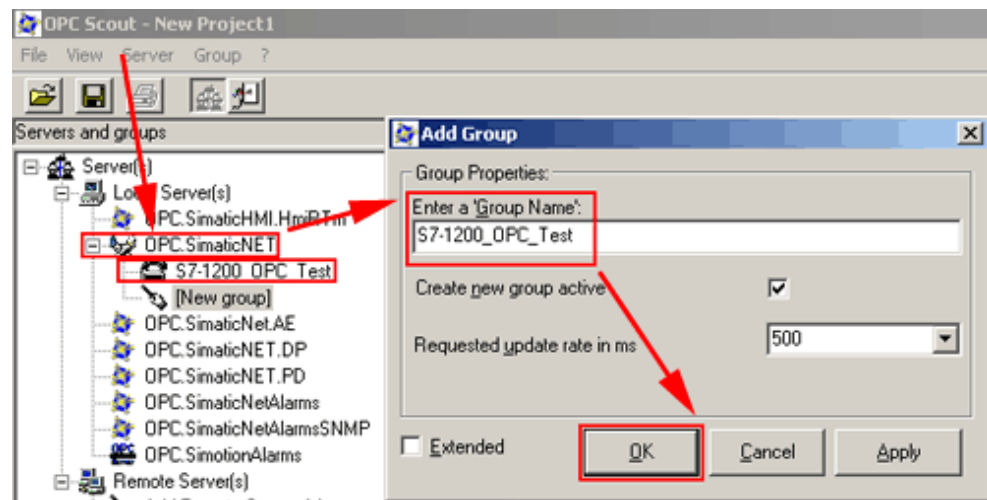


6 OPC Scout

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.

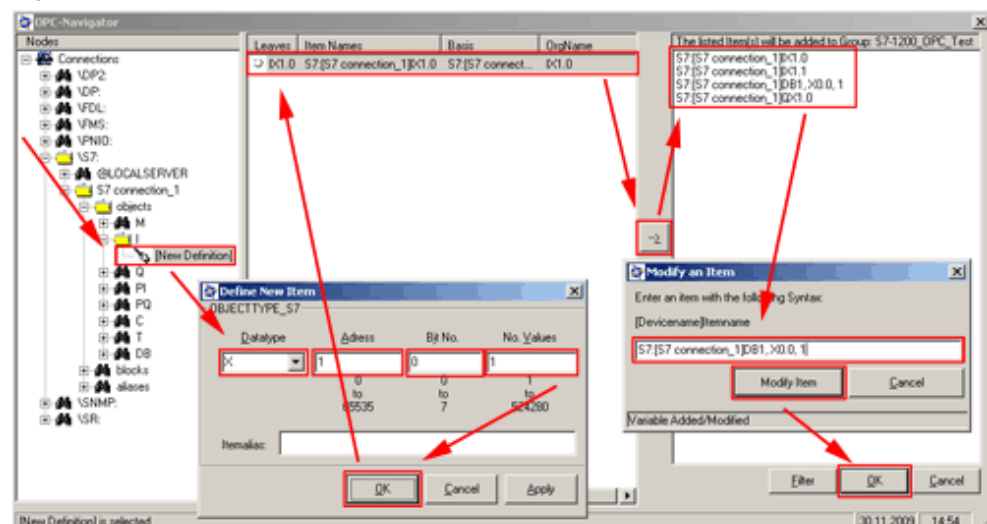
Figure 6-1



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

