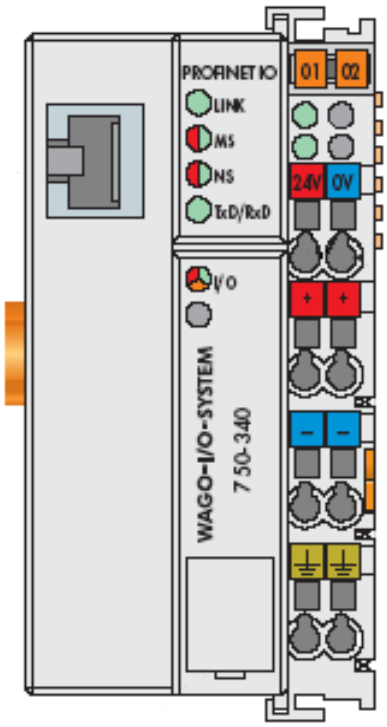
WAGO I/O SYSTEM 750

Using the WAGO 750-340 PROFINET Coupler as Remote I/O with a Siemens S7 PLC



Application note

A115400, English
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WAGO®
INNOVATIVE CONNECTIONS

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Every conceivable measure has been taken to ensure the correctness and completeness of this documentation. However, as errors can never be fully excluded we would appreciate any information or ideas at any time.

We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally trademark or patent protected.

TABLE OF CONTENTS

1 Important comments

To ensure fast installation and start-up of the units described in this manual, we strongly recommend that the following information and explanation is carefully read and adhered to.

1.1 Legal principles

1.1.1 Copyright

This manual is copyrighted, together with all figures and illustrations contained therein. Any use of this manual which infringes the copyright provisions stipulated herein, is not permitted. Reproduction, translation and electronic and photo-technical archiving and amendments require the written consent of WAGO Kontakttechnik GmbH & Co. KG. Non-observance will entail the right of claims for damages.

1.1.2 Personnel qualification

The use of the product detailed in this manual is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the valid standards. WAGO Kontakttechnik GmbH & Co. KG declines all liability resulting from improper action and damage to WAGO products and third party products due to non-observance of the information contained in this manual.

1.1.3 Intended use

For each individual application, the components supplied are to work with a dedicated hardware and software configuration. Modifications are only admitted within the framework of the possibilities documented in the manuals. All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on part of WAGO Kontakttechnik GmbH & Co. KG.

Please direct any requirements pertaining to a modified and/or new hardware or software configuration directly to WAGO Kontakttechnik GmbH & Co. KG.

1.2 Range of validity

This application note is based on the stated hardware and software of the specific manufacturer as well as the correspondent documentation. This application note is therefore only valid for the described installation.

New hardware and software versions may need to be handled differently. Please note the detailed description in the specific manuals.

1.3 Symbols

Danger
Always observe this information to protect persons from injury.

Warning
Always observe this information to prevent damage to the device.

Attention
Marginal conditions must always be observed to ensure smooth operation.

ESD (Electrostatic Discharge)
Warning of damage to the components by electrostatic discharge. Observe the precautionary measure for handling components at risk.

Note
Routines or advice for efficient use of the device and software optimization.

More information
References to additional literature, manuals, data sheets and INTERNET pages

2 Description

The purpose of this application note is to provide a step-by-step example of interfacing a Siemens S7 PLC with PROFINET Scanner to the WAGO 750-340 PROFINET Coupler.

3 Reference Material

This procedure has been tested with, but is not limited to, the following hardware and software:

Siemens CPU315F-2 PN/DP Processor/PROFINET Scanner

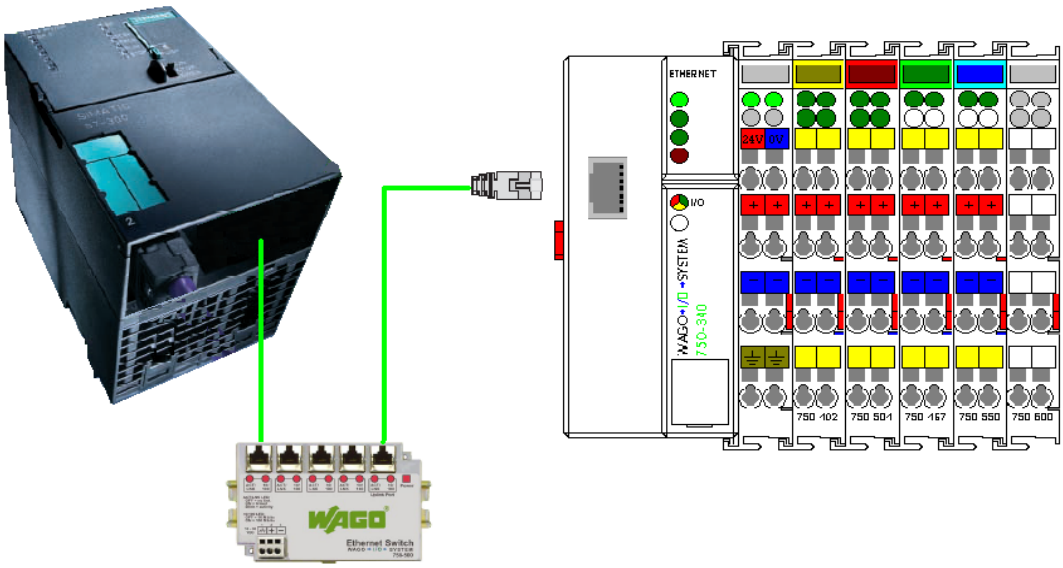
Siemens SIMATIC Manager STEP 7 Software, Version V5.3 + SP3, Rev K5.3.3.0

gsdml-v2.0-wago-series750_753-20070115.xml (PROFINET GSD File)

WAGO 758-500 5-Port Ethernet Switch

WAGO PROFINET Node consisting of:

WAGO 750-340 PROFINET Coupler
750-402 4Ch 24VDC Digital Input Module (4 Bits Digital Inputs)
750-504 4Ch 24VDC Digital Output Module (4 Bits Digital Outputs)
750-467 2Ch 0-10VDC Analog Input Module (2 Words Analog Inputs)
750-550 2Ch 0-10VDC Analog Output Module (2 Words Analog Outputs)
750-600 End Module



4 Solution

This document assumes that you have an overall understanding of the Siemens S7 hardware and software. It focuses on the basics of configuring the WAGO 750-340 PROFINET Coupler in the STEP 7 HW-Configuration tool. After the hardware configuration is complete, the WAGO 750-340 is available for use as distributed I/O in a STEP 7 project.

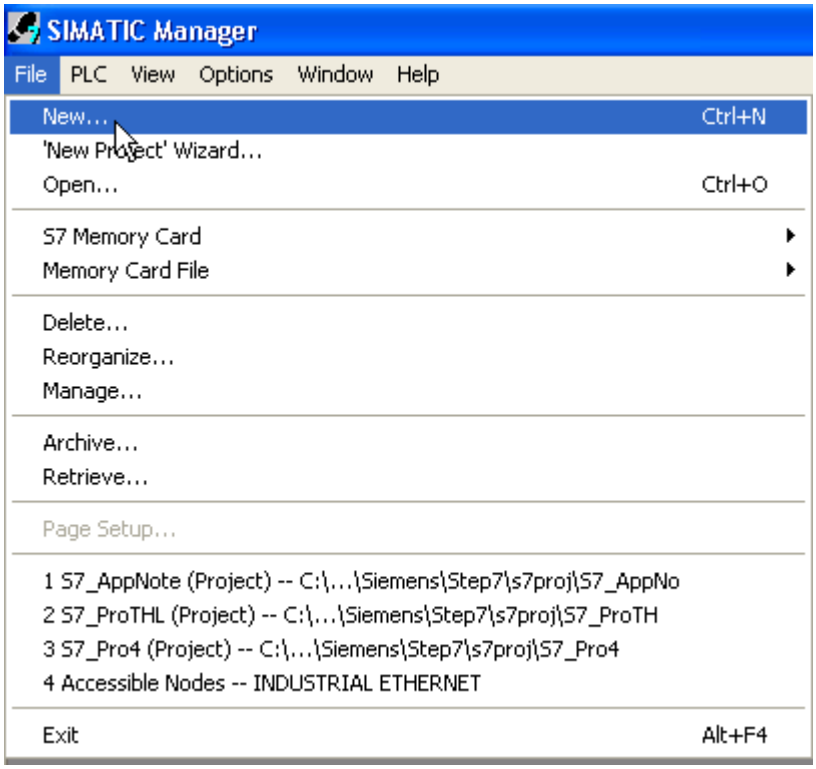
This procedure is divided into the following steps:

- Configure the S7 PLC in the STEP 7 HW-Configuration
- Install the WAGO 750-340 GSD file
- Configure the WAGO 750-340 in the STEP 7 HW-Configuration
- Assign a Device Name to the WAGO 750-340 in the STEP 7 HW-Configuration
- Download the hardware configuration to the S7 PLC
- Test the WAGO 750-340 in the ONLINE mode of the STEP 7 HW-Configuration

4.1 Configure the S7 PLC in the STEP 7 HW-Configuration

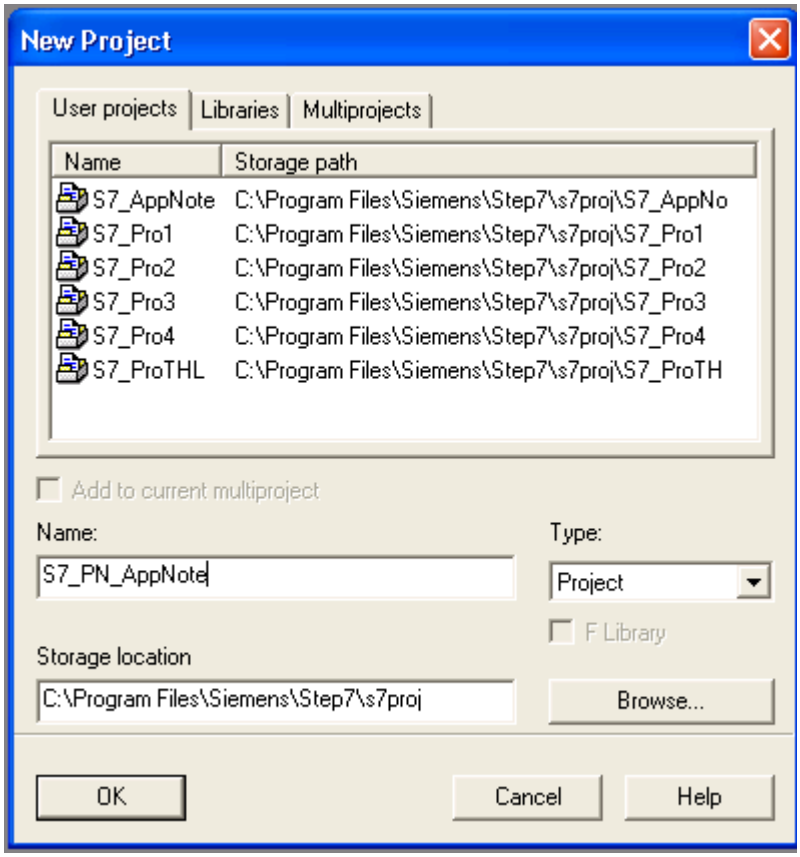
In this section the Siemens CPU315F-2 PN/DP Processor/PROFINET Scanner is added to the STEP 7 HW-Configuration. The PROFINET scanner is assigned an IP address and a PROFINET subnet is created.

Launch SIMATIC Manager and create a new project.



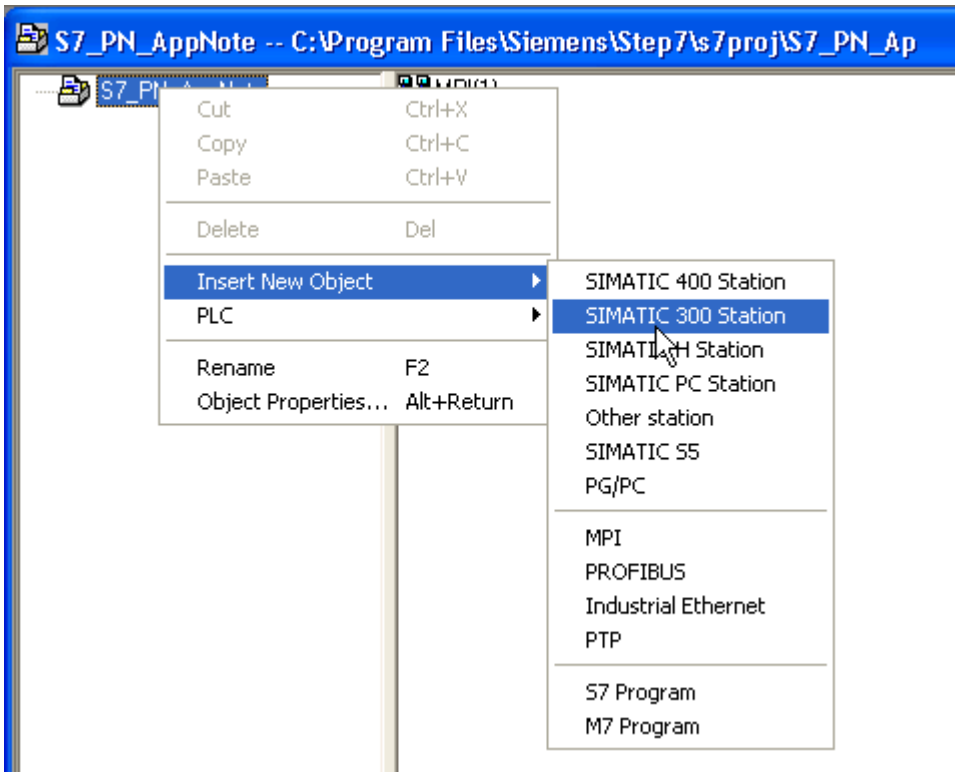
In the *New Project* dialog box enter the name of the project.

Example: **S7_PN_AppNote**

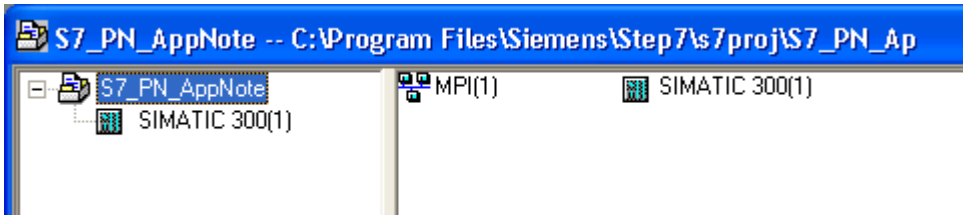


Click **OK**. The project name appears in the project organizer.

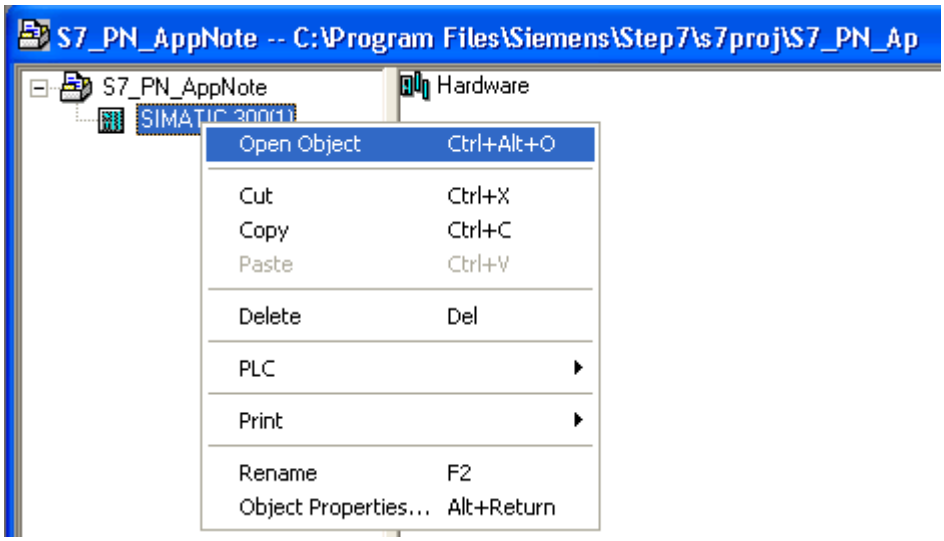
Right-click on the project name and select **Insert New Object > SIMATIC 300 Station** from the menu list as shown below.



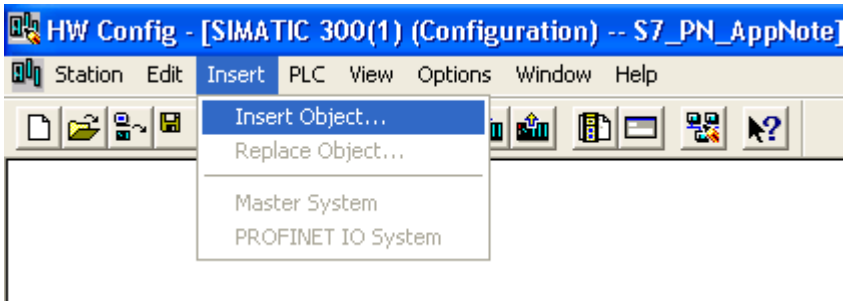
The project organizer is displayed.



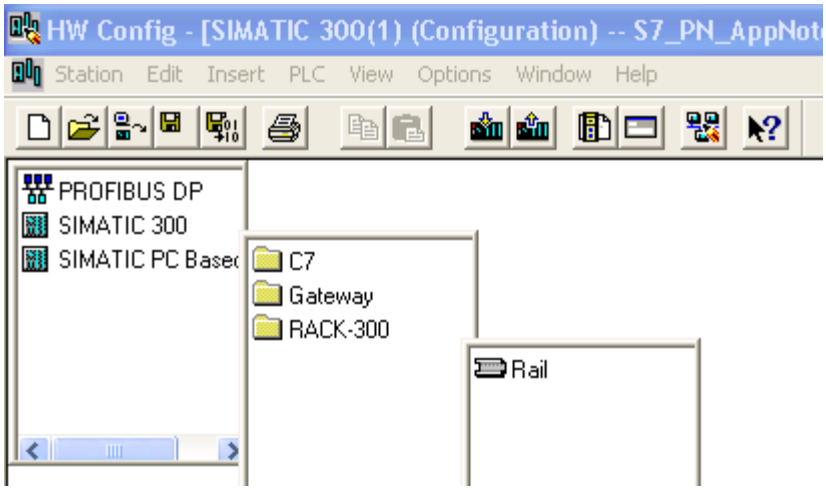
Right-click on **SIMATIC 300(1)** and select **Open Object**.



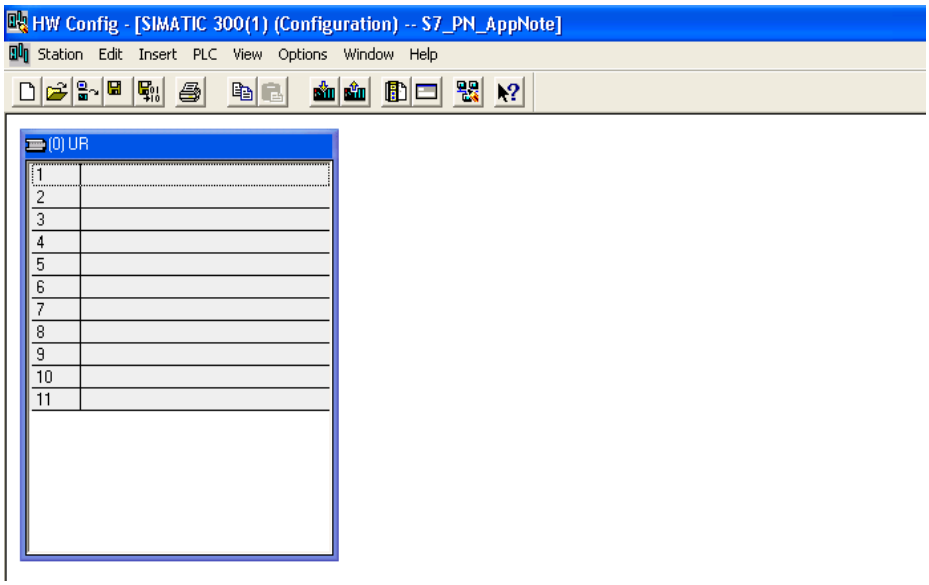
The *HW Config* window appears. Select the menu command **Insert > Insert Object...**



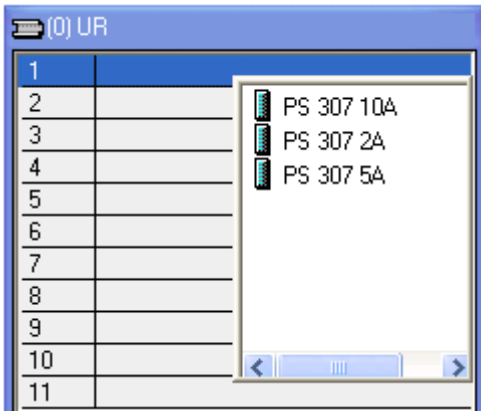
From the list select **SIMATIC 300 > RACK-300 > Rail**.



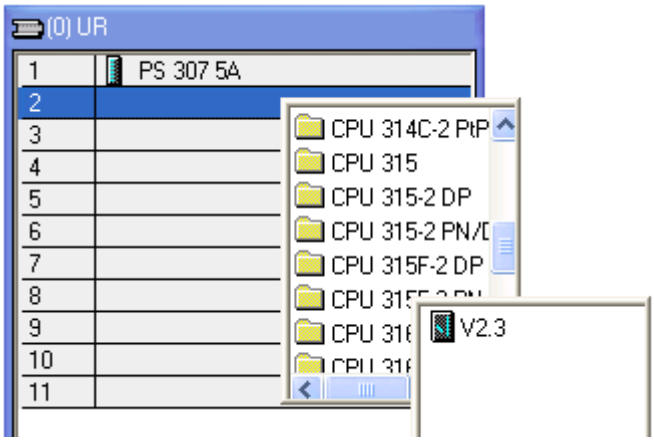
An empty station grid is displayed. The components of the local PLC rack need to be added to the grid, which in this case includes a power supply and the CPU.



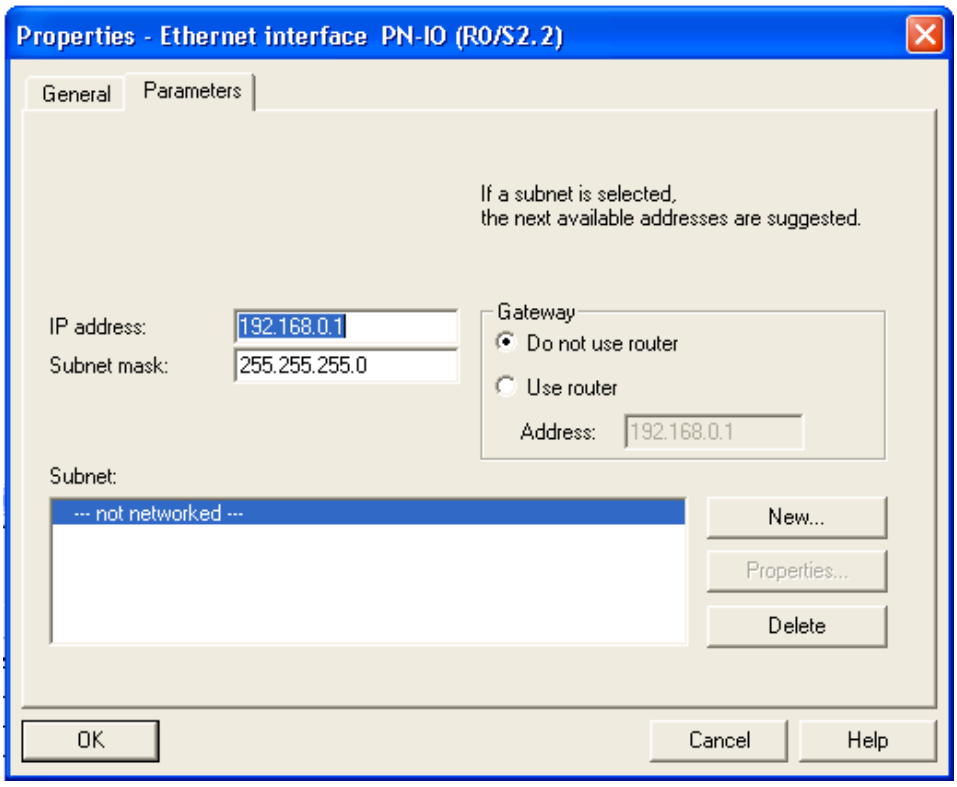
Right-click on Slot 1 and select **Insert Object...**. Then select the power supply for your system.



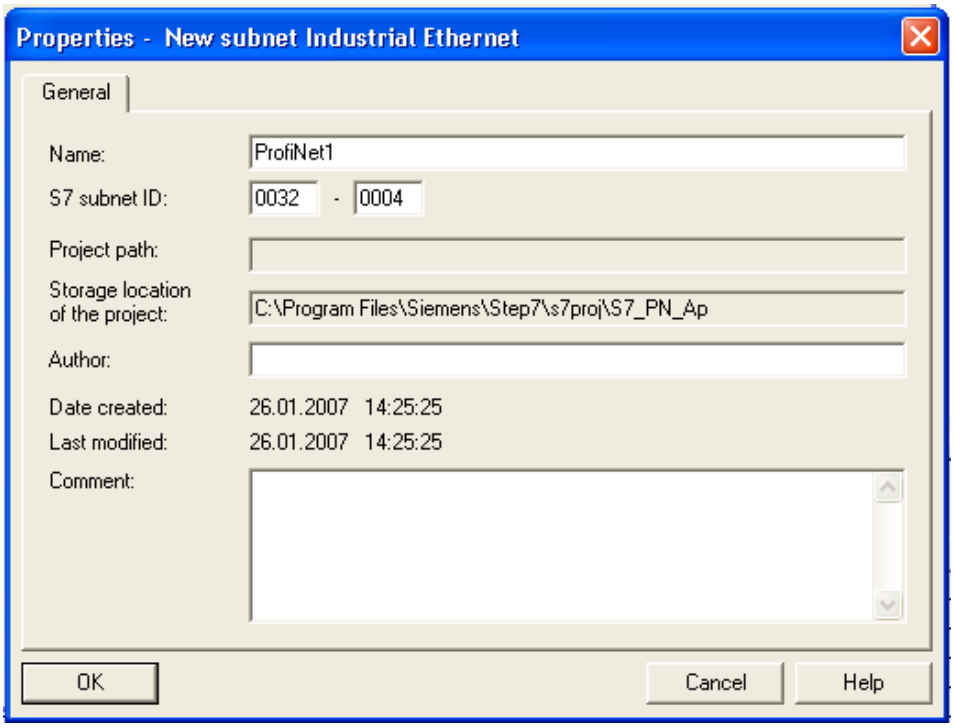
Right-click on Slot 2 and select **Insert Object…**. Then select the model and version of the CPU.



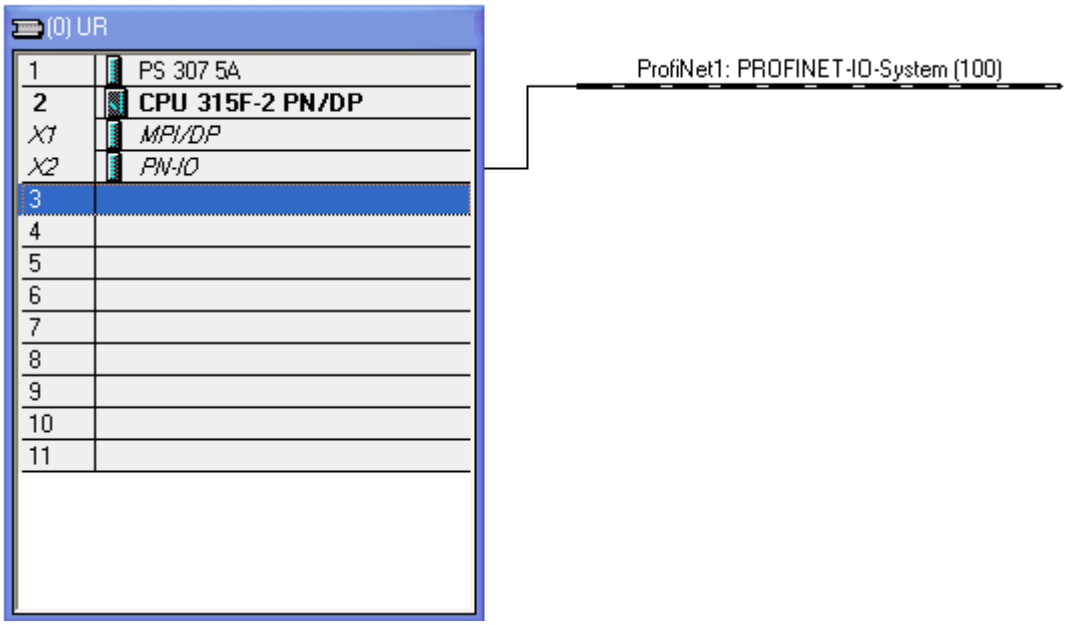
A *Properties* dialog box is displayed for defining the Ethernet interface. Enter the **IP address** and **Subnet mask** of the PROFINET Scanner. When this is complete, click **New...**.



Another *Properties* dialog box is displayed for defining a new subnet. Enter a name for the PROFINET network, such as **ProfiNet1** and click **OK**. Click **OK** a second time to exit the *Properties* window.



The S7 PLC and PROFINET scanner are now configured in the STEP 7 HW-Configuration. The SIMATIC Manager will display a network similar to the one shown below:

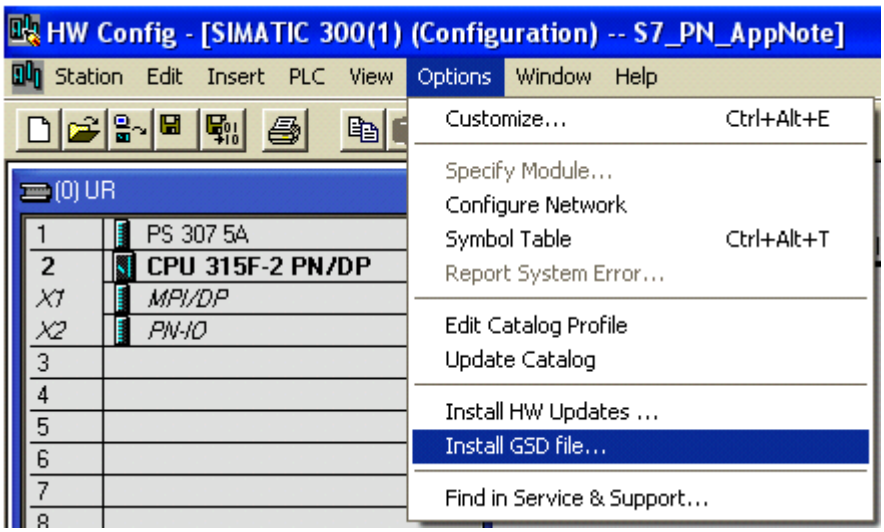


4.2 Install the WAGO 750-340 GSD File

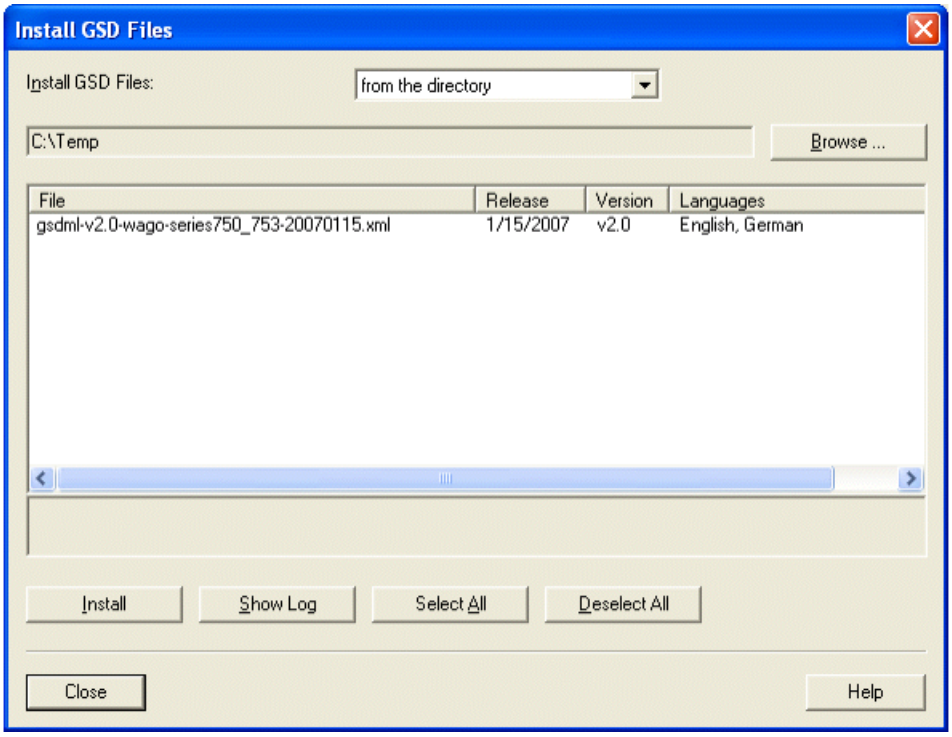
A GSD file (Generic Station Description), which is supplied by the device manufacturer, contains a description of the PROFINET device. A GSD file provides a simple way to import a device's profile into a PROFINET configuration tool, like the STEP 7 HW-Configuration tool.

The current revision of the WAGO 750-340 GSD file is named "gsdml-v2.0-wago-series750(753)-20060703.xml". This file can be obtained from the download area of the WAGO website (www.wago.com) or by contacting WAGO Technical Support.

To stall the WAGO 750-340 GSD file in STEP 7 HW-Configuration, select the menu command **Options > Install GSD file…**.



The following dialog box appears. Click **Browse…** and navigate to the folder where the WAGO 750-340 GSD file is stored. Select the GSD file in the list box and click **Install.**



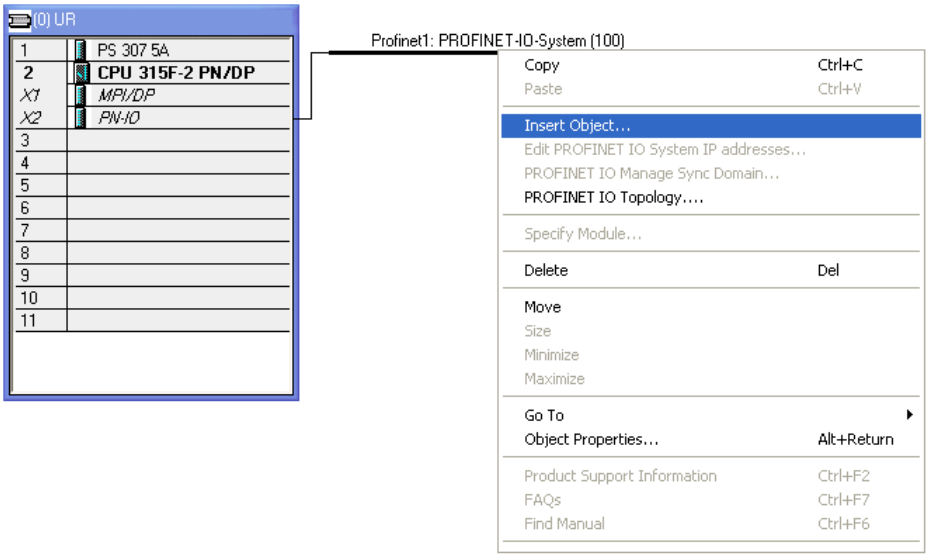
After successfully installing the WAGO 750-340 GSD file, its profile is available for the STEP 7 HW-Configuration tool.

4.3 Configure the WAGO 750-340 in the STEP 7 HW-Configuration

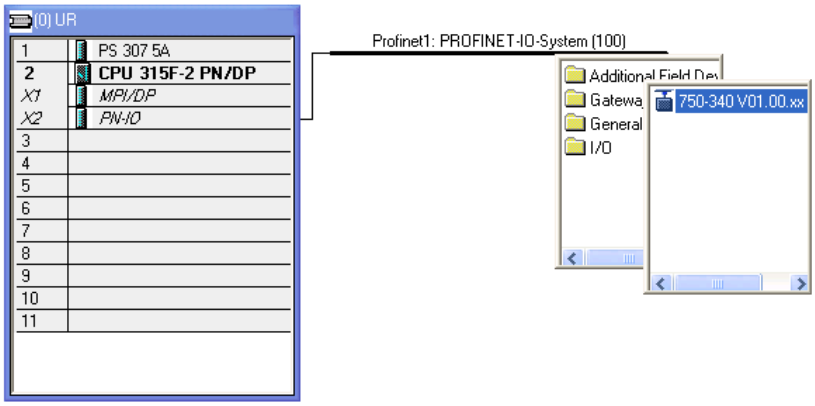
In this section, the WAGO 750-340 PROFINET Coupler is added to the STEP 7 HW-Configuration. WAGO I/O modules are then added to the configuration in the order in which they are physically located in the node.

Click on the PROFINET network.

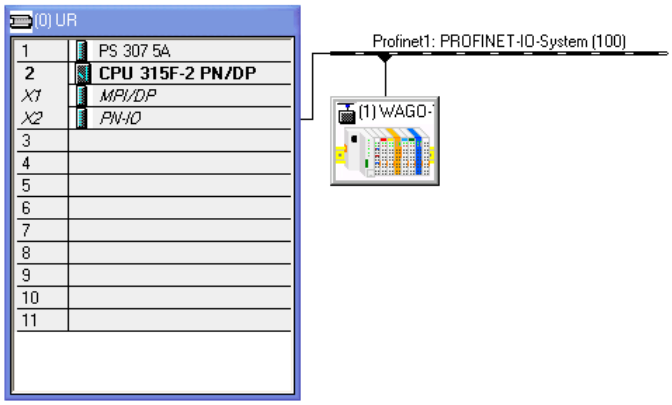
Then right-click on it to bring up the menu shown below. Select the menu command **Insert Object…**



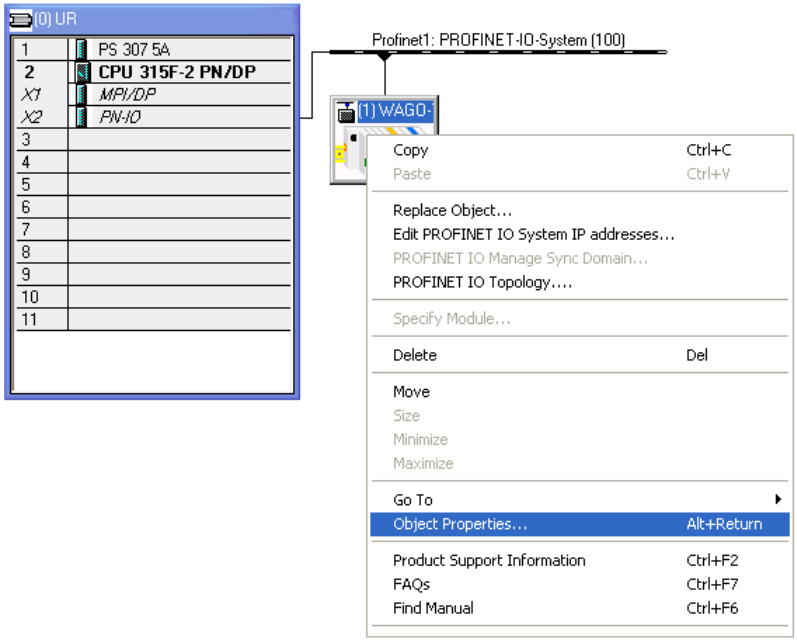
From the menu, select **Additional Field Device**. A list of installed devices is displayed. Select the **750-340 V01.00.xx**.



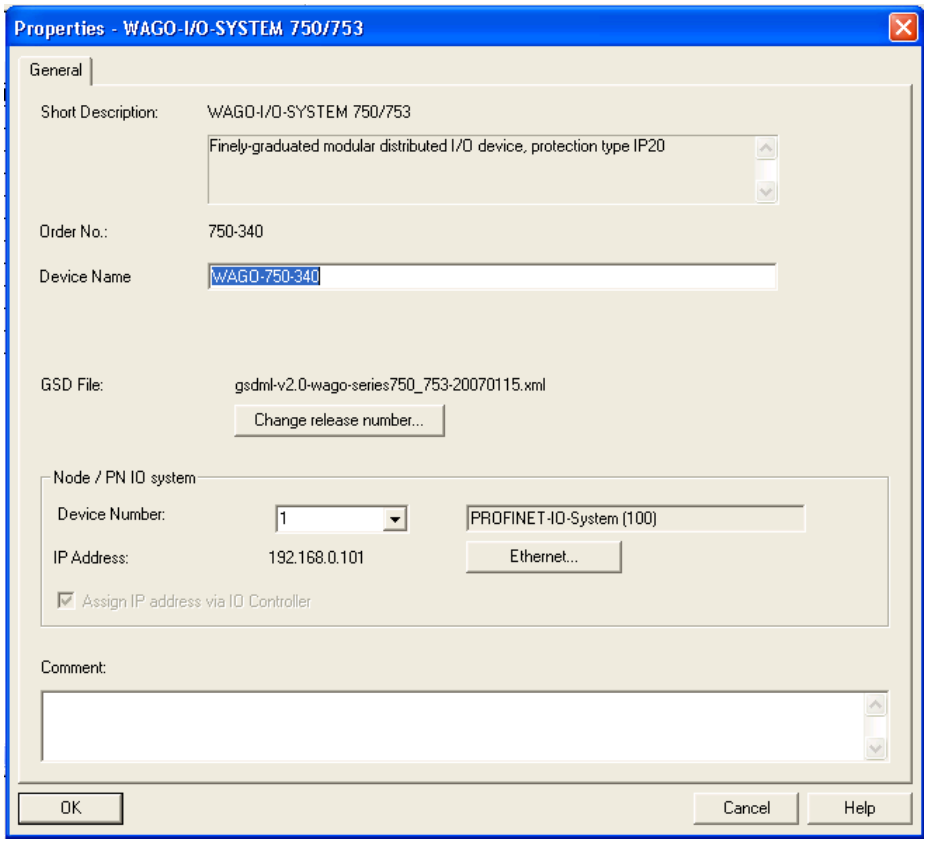
The WAGO 750-340 is added to the network as shown below.



Right-click on the WAGO node and select **Object Properties…**.



A *Properties* dialog box is displayed. The default Device Name and Device Number are displayed for the WAGO 750-340. The STEP 7 HW-Configuration automatically generates these values from the device profile. These values can be change if desired. Click **OK** to continue.



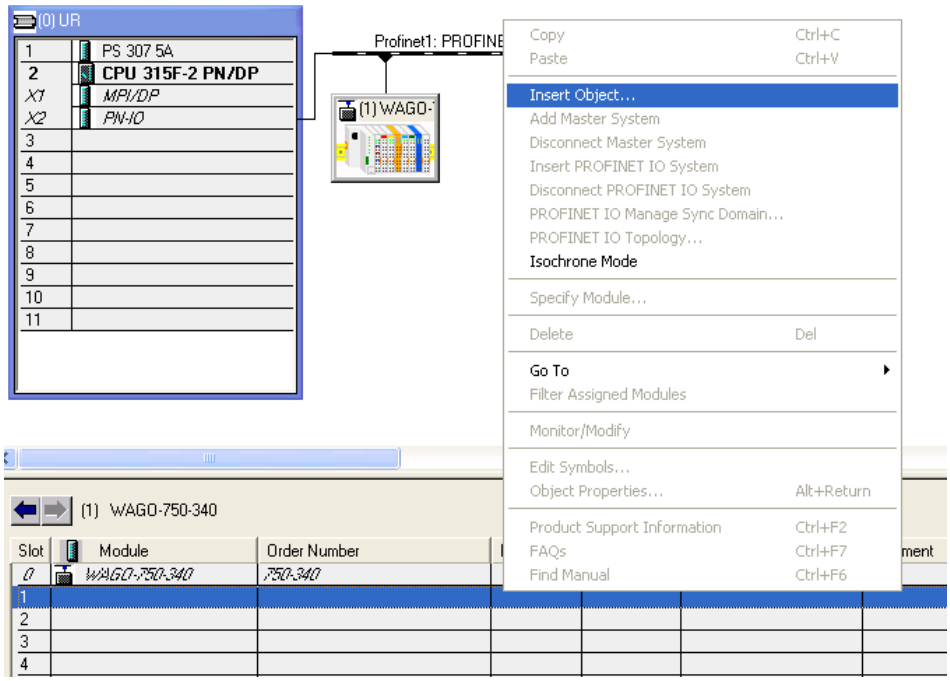
Note: All devices on an Ethernet subnet must have a unique Device Name. The Device Names must also satisfy DNS naming conventions.

Note: The STEP 7 HW-Configuration automatically assigns an IP address to the WAGO 750-340. Starting with the IP address of the IO controller, STEP 7 HW-Configuration searches for the next available IP address.

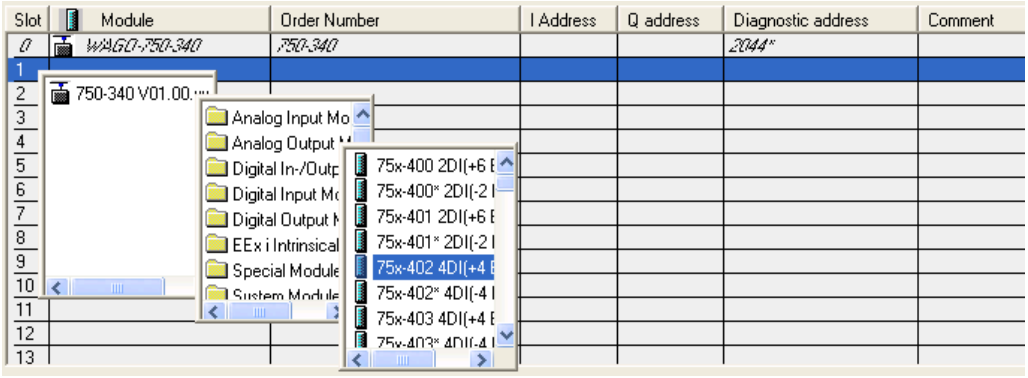
Next the STEP 7 HW-Configuration tool is used to assign the I/O modules in the WAGO 750-340 PROFINET node. All modules are entered in the order in which they are physically located in the node.

Click on the WAGO node.

The I/O grid for the WAGO 750-340 is displayed at the bottom of the screen. Right-click on slot 1 and select **Insert Object...**



Select the **750-340… > Digital Input Module > 75x-402 4DI(+4 BIT 1)**



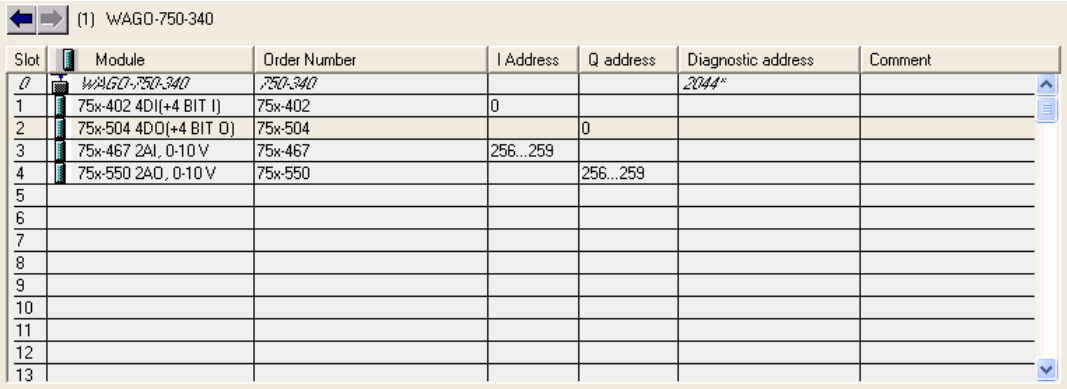
Note: There are two parts that start with the 75x-402 part number. The **75x-402 4DI (+4Bit 0)** is used when 75x-402 module starts a new byte in the input process image. This module only uses the first 4 bits of the byte. If a second 75x-402 module is needed, the **75x-402* 4DI (-4Bit 0)** part is used. This part serves as a placeholder and fills-in the last 4 bits of the existing byte.

Right-click on slot 2 and select **Insert Object...** Then select the **750-340… > Digital Output Module > 75x-504 4DO(+4 Bit 0)**.

Right-click on slot 3 and select **Insert Object...** Then select the **750-340… > Analog Input Module > 75x-467 2AI, 0-10V**.

Right-click on slot 4 and select **Insert Object...** Then select the **750-340… > Analog Output Module > 75x-550 2AO, 0-10V**.

When all the I/O modules are added, the grid should appear as below:


(1) WAGO-750-340

Slot	Module	Order Number	I Address	Q address	Diagnostic address	Comment
0	WAGO-750-340	750-340			2044*	
1	75x-402 4DI(+4 BIT I)	75x-402	0			
2	75x-504 4DO(+4 BIT O)	75x-504		0		
3	75x-467 2AI, 0-10 V	75x-467	256...259			
4	75x-550 2AO, 0-10 V	75x-550		256...259		
5						
6						
7						
8						
9						
10						
11						
12						
13						

The addresses of the I/O modules are automatically assigned and displayed in the grid. These addresses can now be use in the S7 project.

Input Process Image Map

Input Device	IEC-61131 Address
750-402 Channel 1	I 0.0
750-402 Channel 2	I 0.1
750-402 Channel 3	I 0.2
750-402 Channel 4	I 0.3
750-467 Channel 1	IW 256
750-467 Channel 1	IW 258

Output Process Image Map

Output Device	IEC-61131 Address
750-504 Channel 1	Q 0.0
750-504 Channel 2	Q 0.1
750-504 Channel 3	Q 0.2
750-504 Channel 4	Q 0.3
750-550 Channel 1	QW 256
750-550 Channel 1	QW 258

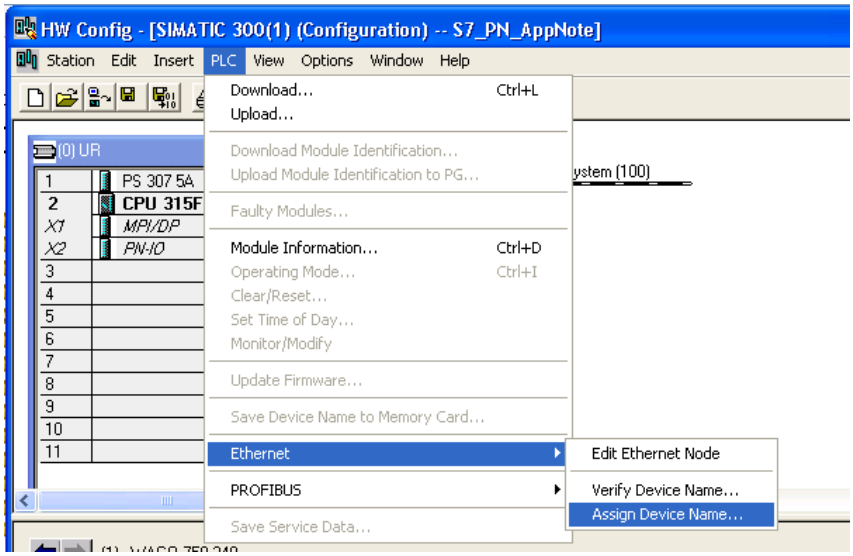
Note: Only the modules that produce or consume data should be added to the I/O grid. Some modules, such as the 750-600 end module and some power feed modules, do not send or receive data. Modules such as these should not be included in the I/O grid.

4.4 Assign a Device Name to the WAGO 750-340

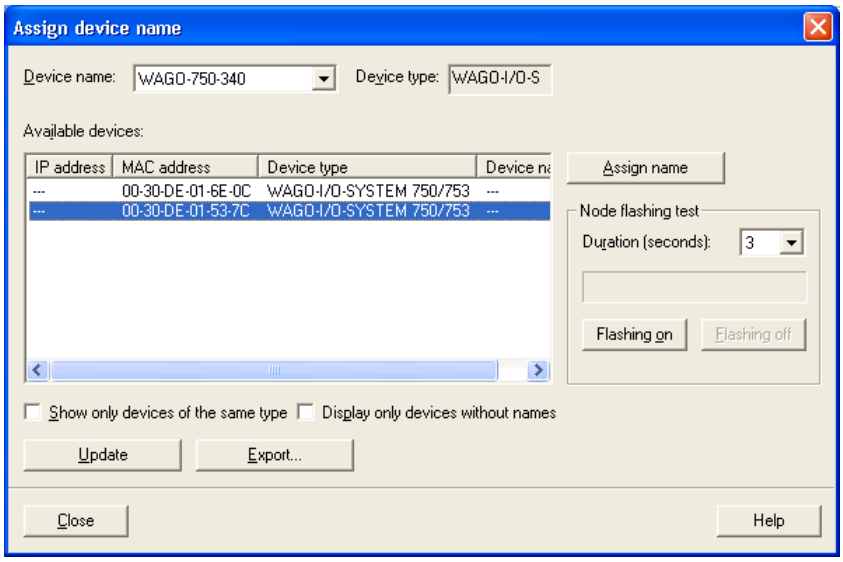
The *Assign device name* dialog box is used to assign a Device Name to a remote I/O device. This dialog box displays all devices available on the Ethernet subnet along with their IP address (if available) and their MAC address, as well as the device type determined online.

In the STEP 7 HW-Configuration select the WAGO 750-340 node by clicking on it.

Then select **PLC >Ethernet > Assign Device Name…** from the menu.



The device name for the selected WAGO 750-340 node is displayed in the *Device name* list box (in the example below the device name is also called "WAGO 750-340"). To assign this configuration to a physical device, select the physical device from the *Available devices* list, and click the **Assign Name** button.

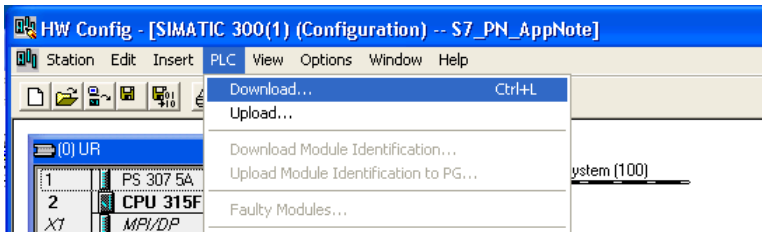


Click **Close** when complete.

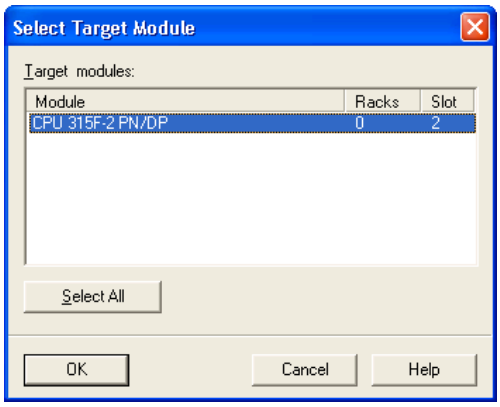
4.5 Download the hardware configuration to the S7 PLC

In this section the STEP 7 HW-Configuration tool is used to download the off-line configuration to the S7 PLC.

In the STEP 7 HW-Configuration window, select the menu command **PLC > Download…**.

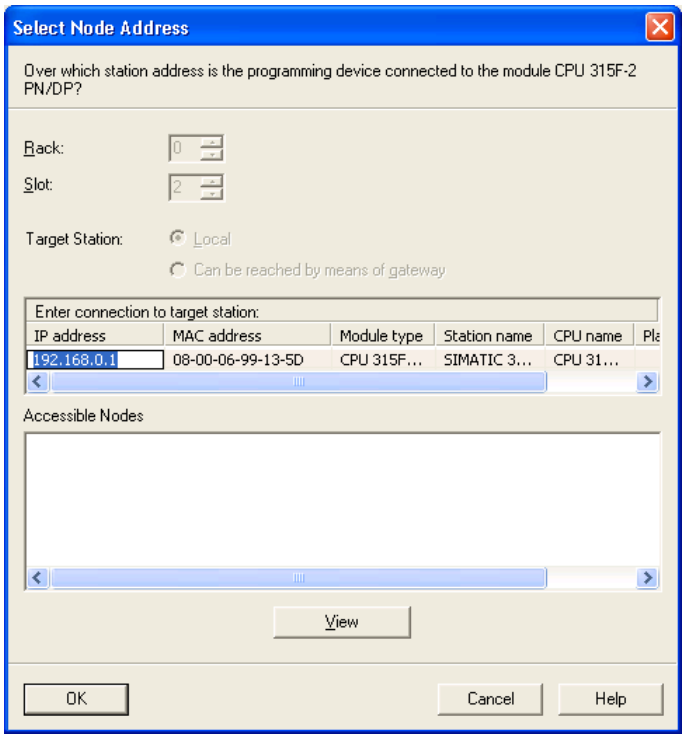


The *Select Target Module* dialog box is displayed.



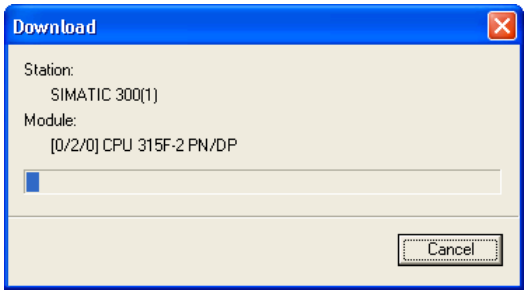
Select the device type from the *Target modules* list and click **OK**.

The *Select Node Address* dialog box is displayed.



Changes can be made to the target station if required. Click **OK** to continue.

A *Download* dialog box is displayed showing the progress of the download.

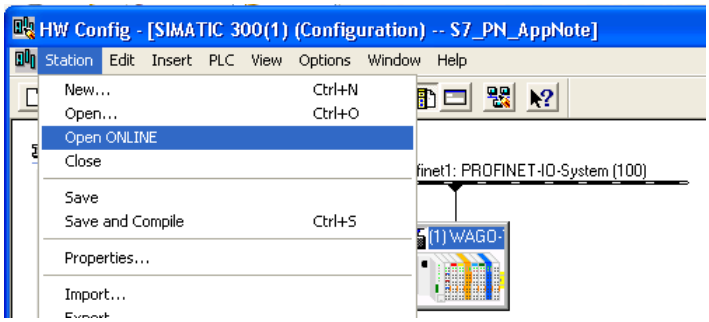


When the download is complete, the dialog box disappears.

4.6 Testing the WAGO 750-340 in the ONLINE Mode

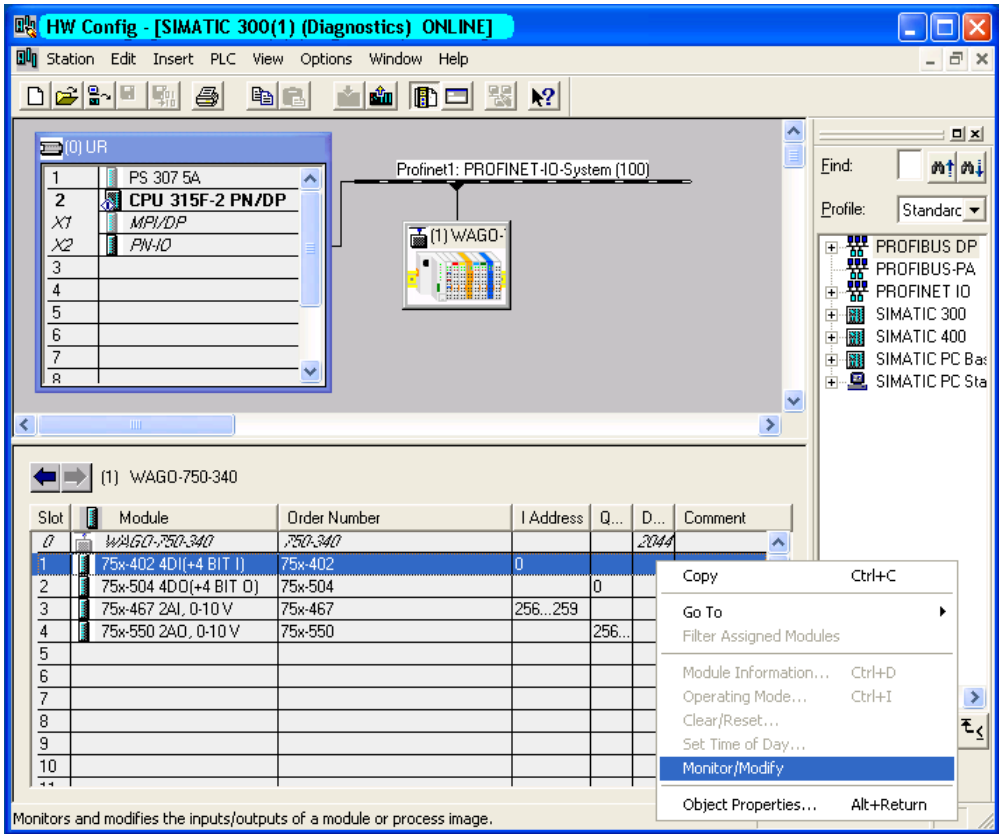
The STEP 7 HW-Configuration can be used in ONLINE mode to test the IO configuration.

To start ONLINE mode, select the menu command **Open ONLINE**.

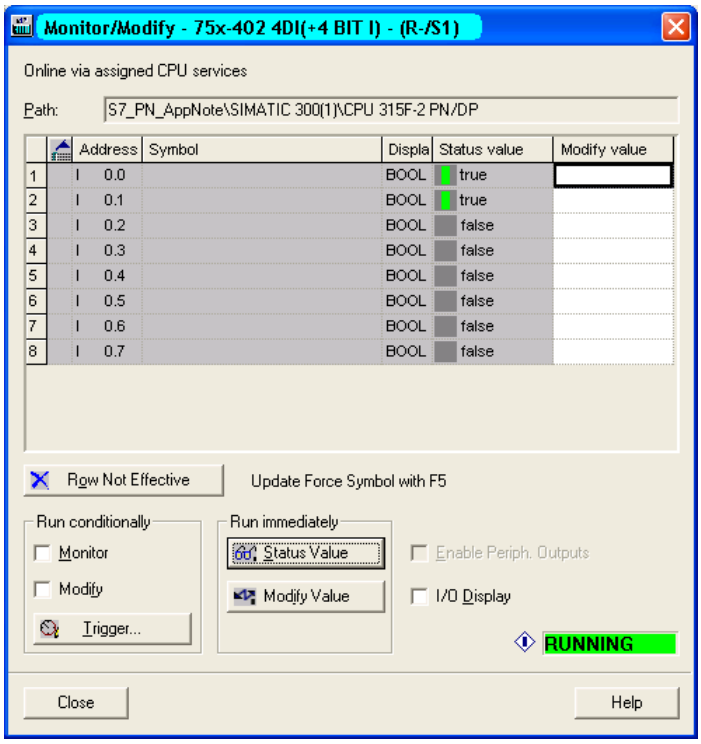


Select WAGO 750-340 node by clicking on it.

Then right-click on module you want to monitor or control. For this example, right-click on slot 1, the WAGO 750-402, and select **Monitor/Modify**



The *Monitor/Modify*…dialog box displays the inputs of the 750-402 module in table format. Click on the **Status Value** button to refresh the screen.



The digital input and output modules are displayed in binary format and analog modules are in word format.

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