SIEMENS

SIMATIC

PROFINET IO
Getting Started: Collection

**CPU 317-2 PN/DP:
Configuring PROFINET
interface X2**

**CPU 317-2 PN/DP:
Configuring an ET 200S
as PROFINET IO device**

**CP 443-1 Advanced:
Configuration of the PROFINET
interface with IE/PB-Link
and ET 200B**

This manual is part of the documentation packages
6ES7398-8FA10-8BA0
6ES7151-1AA10-8BA0

Edition 08/2004
A5E00329019-02

Safety Guidelines

This manual contains notices intended to ensure personal safety, as well as to protect the products and connected equipment against damage. These notices are highlighted by the symbols shown below and graded according to severity by the following texts:

Danger

indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.

Warning

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.

Caution

indicates that minor personal injury can result if proper precautions are not taken.

Caution

indicates that property damage can result if proper precautions are not taken.

Notice

draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

Qualified Personnel

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct Usage

Note the following:

Warning

This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

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A5E00329019-02

SIMATIC

S7-300 Automation System

Getting Started Release 08/2004

CPU 317-2 PN/DP: Configuring PROFINET interface X2

Introduction

In this tutorial you program PROFINET interface X2 of CPU 317-2 PN/DP.
This takes about one to two hours, depending on your experience.

Range of applicability

Product	Order number	Is an MMC required for operation?	as of version	
			Firmware	Hardware
CPU 317-2 PN/DP	6ES7317-2EJ10-0AB0	Yes	V2.3	02

Requirements

- Basic knowledge of electronic and electrical systems engineering.
- Knowledge in the area of network engineering would be of advantage.
- You already worked with the STEP 7 programming software.
- We assume that you have experience working with the Microsoft® Windows™ operating system.

Warning

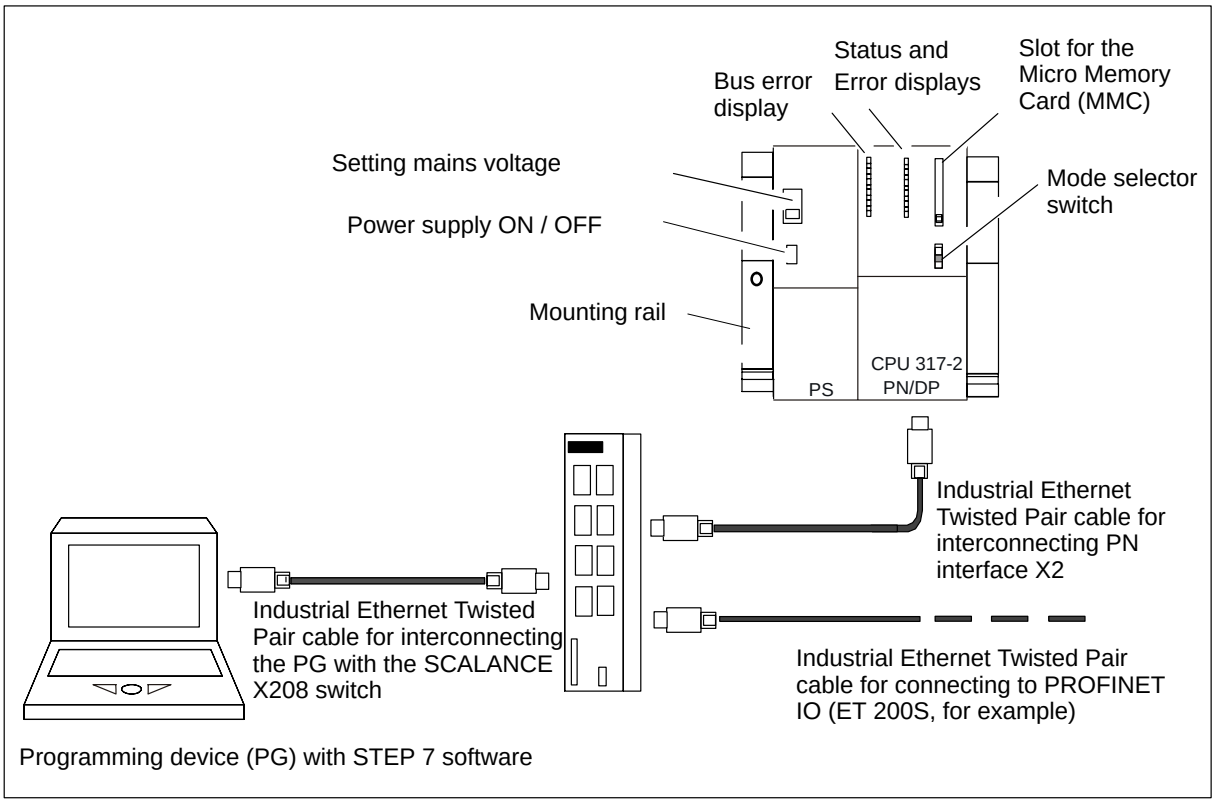
Depending on the field of application, the operation of an S7-300 in a plant or system is subject to special rules and regulations. This includes current safety regulations and directives for the prevention of accidents, such as IEC 204 (EMERGENCY-OFF equipment.)

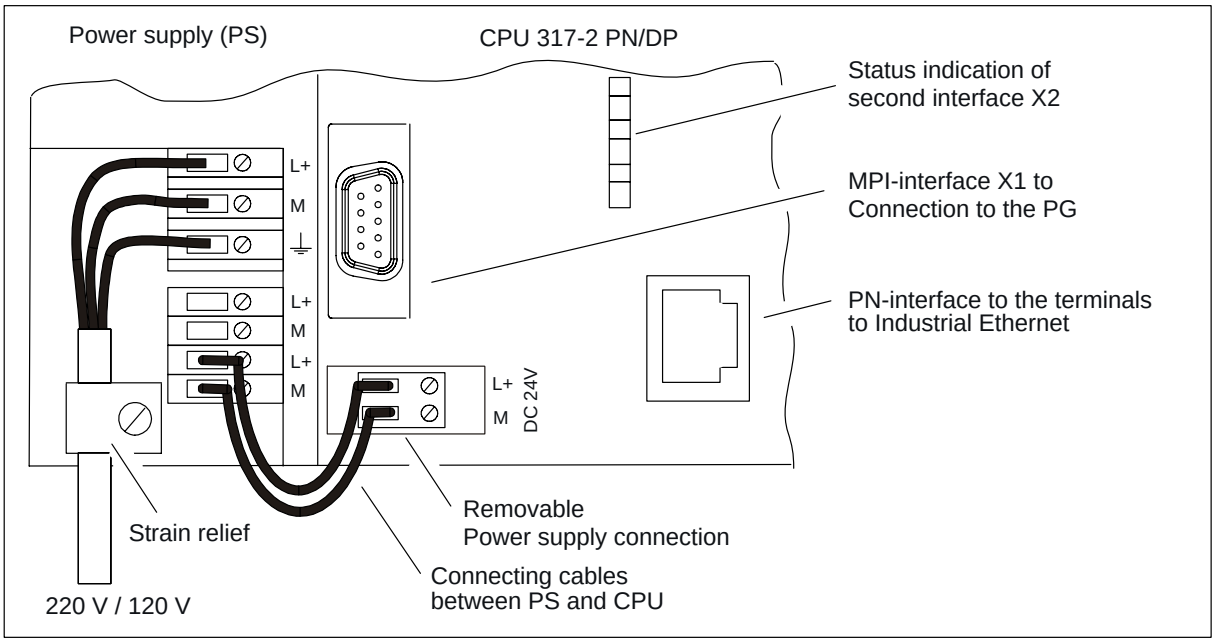
If these regulations are ignored, serious injury and damage to machines and equipment are to be expected.

Material and tools required

Quantity	Article	Order number (Siemens)
1	Mounting rail	for example, 6ES7 390-1AE80-0AA0
1	Power supply (PS)	for example, 6ES7 307-1EA00-0AA0
1	CPU 317-2 PN/DP, V2.3 or higher	6ES7317-2EJ10-0AB0
1	Micro Memory Card (MMC) Note: The MMC is absolutely required for operation.	for example, 6ES7 953-8LL11-0AA0
1	• Programming device (PG), or PC with Ethernet NIC, 100 Mbps full duplex • Installed software, STEP 7**,** firmware version 5.3. SP1 or higher	depending on the configuration
1	Switch for example, SCALANCE X208	6GK5 208-0BA00-2AA3
2	Industrial Ethernet Twisted Pair cable (Cat5) with RJ45 connectors (Patch cable TP Cord RJ45/RJ45, length = 6 m)	for example, 6XV1 850-2GH60
diverse	M6 screws and nuts (lengths depend on place of installation) and matching wrench / screwdriver	commonly available
1	Screwdriver with 3.5 mm blade	commonly available
1	Screwdriver with 4.5 mm blade	commonly available
1	Side cutters and wire stripper	commonly available
1	Crimp tool for wire ferrules	commonly available
0.5 m	Single-pole flexible cable, conductor cross-section 1 mm^2, with wire end ferrules, for connecting the power supply and CPU	commonly available
X m	Cable for grounding the mounting rail with a conductor cross-section of 10 mm^2 and cable lug matching M6 connectors, and with a length matching local conditions	commonly available
X m	3-wire flexible power cable (AC 230/120 V) with Schuko-style plug, with a length matching local conditions, and matching wire end ferrules with collar.	commonly available

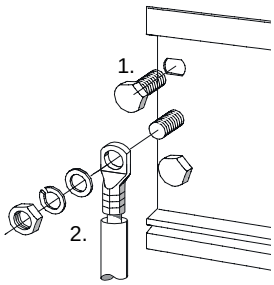
Installation

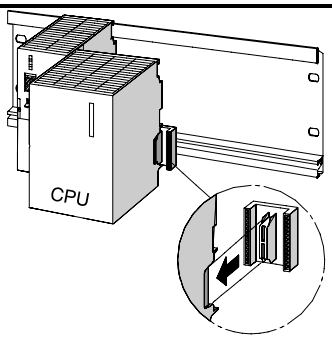
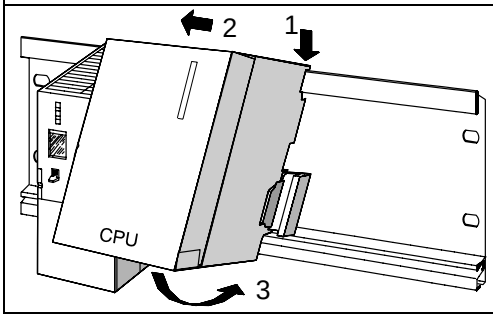
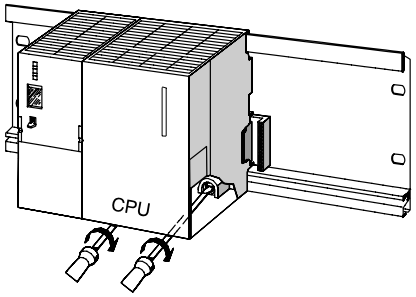




Wire the power supply and the CPU (front panel covers are open.)

1. Installation

Graphic	Install and ground the mounting rail
	1. Screw on the mounting rail (screw size: M6). Make sure to maintain a minimum clearance of 40 mm above and below the mounting rail. When mounting it on a grounded steel panel or on a grounded device mounting panel made of steel sheet, ensure a low-impedance contact between the mounting rail and the mounting surface. 2. Connect the mounting rail with the protective conductor. An M6 protective conductor screw is provided on the mounting rail for this purpose. Stipulated cross-section of the cable connection to the protective conductor: 10 mm^2

Graphic	Installing modules on the mounting rail
	1. In the first step, insert the power supply module. Slide it to the left until it meets the grounding screw of the mounting rail and then screw it on. 2. To connect further modules, insert a bus connector into the CPU (see drawing section)
	3. Hang in the CPU (1). 4. Slide it up to the left module (2). 5. You can then swing it down (3).
	6. Screw-tighten the modules on the mounting rail. 7. Insert the MMC into its slot on your CPU: The MMC is absolutely required for operation! **Note:** **To use an MMC with unknown content, erase it on the PG before doing so..**

2. Wiring

Warning

There is a risk of contact to live power cables. Always isolate the S7-300 from power before you wire it.

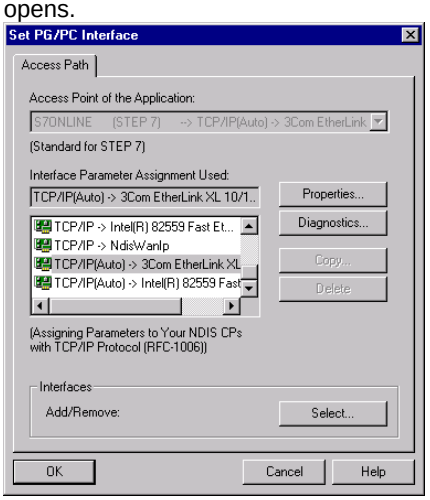
Wiring the power supply module and the CPU

Step	Wiring the power supply and CPU
1	Open the front panel covers of the power supply module and CPU.
2	Unscrew the strain relief clamp of the power supply.
3	Strip the flexible power cable, dress it with crimped wire ferrules, then connect it to the power supply module (blue on terminal M, black on terminal L1, protective conductor on terminal PE)
4	Screw down the clamp of the cable strain relief.
5	Next, wire the power supply to the CPU. Use flexible cable with a conductor cross-section of 1 mm^2. Strip the ends to a length of approx. 6 mm, the crimp on the wire end ferrules. Next, interconnect the terminals L+ and M of the power supply and CPU 200B.
6	Verify that the setting of the selector switch matches your mains voltage. The default line voltage setting for the power supply module is 230 VAC. To change this setting: Remove the protective cap with a screwdriver, set the selector switch to match your line voltage, then insert the protective cap again.

3. Commissioning the hardware

Step	Activity	Result
1	Connect the PG/PC to the switch. Use the twisted-pair cables with RJ45 connectors.	The PG/PC is connected to the switch.
2	Connect the switch to PROFINET interface of your X2 CPU with Industrial Ethernet. Use the twisted-pair cables with RJ45 connectors.	The CPU is connected to the switch.
3	Interconnect the PROFINET IO device (ET 200S, for example) with the switch. Use the twisted-pair cables with RJ45 connectors.	The IO device is connected to the switch.
4	Verify the MMC is inserted in the CPU slot.	
5	Close the front panel cover of the CPU, then set the mode selector switch on the CPU to *STOP.*	
6	Connect mains, then switch on the power supply module.	The *DC24V* LED on the power supply is lit. The CPU performs a lamp test; after this, the *SF* and *DC5V* LEDs stay lit. The *STOP* LED then flashes rapidly when the CPU performs an automatic memory reset. After completion, the STOP LED is lit.
7	Start your PG/PC, then run SIMATIC Manager from your Windows Desktop.	A window opens with SIMATIC Manager.

4. Set up the PG/PC interface

Step	Activity	Result
1	Select **Start > SIMATIC > STEP 7> Customize PG/PC interface**	The dialog box for setting the PG/PC opens. 
2	Select the access path, and set the TCP/IP(Auto) protocol for the network card used. Click “Properties.” Set the “Assign project-specific IP address” option in the “Properties” dialog box. Confirm twice with OK.	Your PG/PC settings are applied.

5. Create a new project and configure the hardware

Create a new project in STEP 7:

Step	Activity	Result
1	In SIMATIC Manager, select **File > New...** Enter a project name and confirm with OK.	A new project is created.

Adding an S7-300 station

Step	Activity	Result
1	In SIMATIC Manager, select **Insert > Station > SIMATIC 300 Station**.	On the right side of the window you can see the selected SIMATIC 300(1) symbol.

Adding a mounting rail

Step	Activity	Result
1	On the right side of the window, double-click the SIMATIC 300(1) icon, then click the hardware icon.	This opens HW Config.
2	Add your HW components using the hardware catalog. If there screen does not show any catalogs, open the relevant catalog by clicking **View > Catalog**. In the hardware catalog, select SIMATIC 300 and then Rack 300. Drag-and-drop the mounting rail to the upper part of the HW Config window	This pastes the mounting rail into the upper section of the HW Config window.

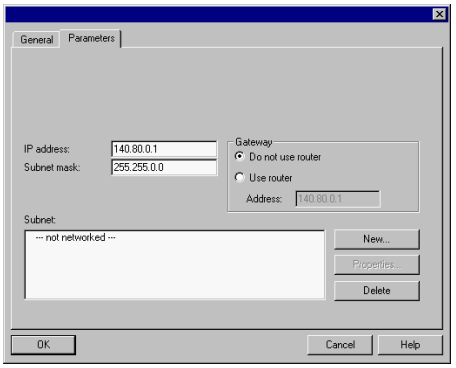
Adding the power supply:

Step	Activity	Result
1	Select PS-300 from the hardware catalog. Drag-and-drop your power supply to slot 1 of the mounting rail. **Note:** You can click the power supply module to view its order number. The order number appears in the bar below the catalog.	The power supply module is now inserted at slot 1.

To insert CPU 317-2 PN/DP and assign it an IP address:

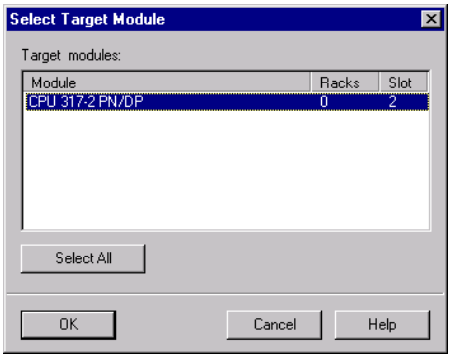
Each Ethernet node is identified by an international unique address.
The manufacturer assigns this so-called MAC address. You can not change this address.

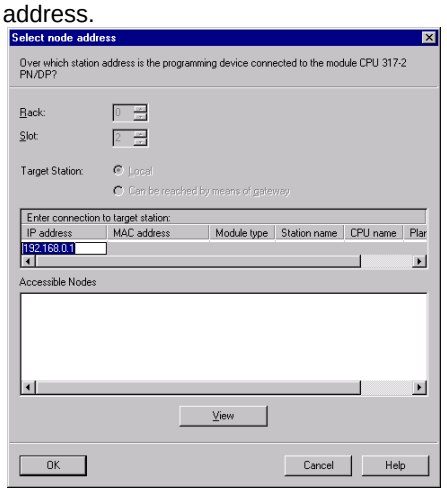
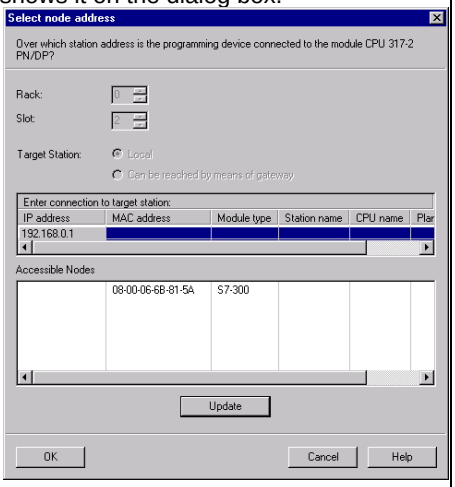
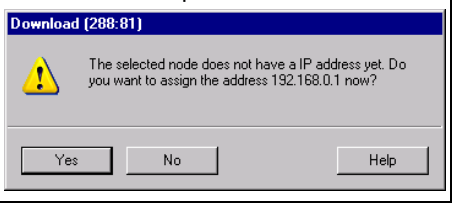
In the next steps you are shown how to assign an Ethernet IP address to this physical address.

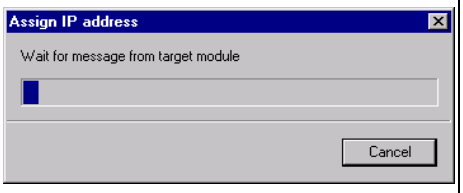
Step	Activity	Result
1	Select CPU-300 from the hardware catalog. Drag-and-drop the CPU 317-2 PN/DP V2.3 to slot 2 of the mounting rail.	CPU 317-2 PN/DP is now inserted at slot 2, and the properties view of the PROFINET interface X2 appears. 
2	Enter the IP address and the subnet mask. When working on a corporate network, contact your network administrator for information about this address.	
3	If you setup a router connection, you must also enter the address of the router. When working on a corporate network, contact your network administrator for information about this address.	
4	Click “New”, then assign a name for a new Industrial Ethernet subnet. Confirm your entries with “OK.”	You created a new Industrial Ethernet subnet.

Step	Activity	Result
5	Click “OK.”	The properties window of PROFINET interface X2 for CPU 317-2 PN/DP closes.
6	You can now customize the PROFINET interface options in HW Config: In HW Config, select CPU 317-2 PN/DP and double-click PROFINET interface X2. Change to the “Options” tab. There you can customize network settings. Default is “Automatic Settings”, which is usually sufficient for error-free communication. Communication problems (connections fail, or frequent network errors, for example) may be caused by faulty settings, or by a faulty automatic network settings. In this case, adjust your network settings to match you network configuration.	Individual network settings can be made in HW Config.

Saving and compiling the configuration:

Step	Activity	Result
1	Select the **Station > Save and Compile** command.	Your hardware configuration is now compiled and saved.
2	Select **PLC > Download to module**	In the next dialog box, select the destination module.  CPU 317-2PN/DP is already select.

Step	Activity	Result
3	Confirm the dialog with “OK.”	In the next dialog box, select the node address.  The CPU is not shown under “available nodes” yet.
4	Click “View.”	The PG reads the MAC address and shows it on the dialog box. 
5	Select the line containing the MAC address of the CPU, and confirm with OK	The alarm view opens 

Step	Activity	Result
6	Confirm this alarm with “Yes”	This assigns the IP address to the CPU and initiates the configuration download. 
7	Select **Station > Close** to exit HW Config, and confirm the save request with *Yes.*	HW Config is closed. In SIMATIC Manager, the CPU is now visible in the station.

6. Commissioning

Step	Activity	Result
1	Set the mode selector switch of the CPU to *RUN.*	The *STOP* LED is switched off. The *RUN* LED starts to flash and then assumes a continuous signal. The LINK LED indicates a physical Ethernet connection. The RX/TX LED is lit or flashes when data are transmitted / received via Ethernet.

Result

You completed the STEP 7 configuration of PROFINET interface X2 of your CPU 317-2 PN/DP.

- Other nodes can now access the CPU on the Ethernet subnet using the IP address.
- The new functions now allow you to configure your project, or to reconfigure it, via the integrated PROFINET interface of the CPU.
- All PG/OP functions and other communication functions of CPU 317-2 PN/DP are now available via integrated PROFINET interface.

Reference

For detailed information on address assignment for the PROFINET interface, refer to the STEP 7 Online Help.

Diagnostics / troubleshooting

Wrong operation, faulty wiring or a faulty hardware configuration may cause errors which the CPU, CP or IE/PB-Link indicate with the *SF* group error LED after CPU memory reset.

For information on how to analyze such errors and alarms, refer to the CPU 31xC and CPU 31x operating instructions.

Manuals containing further information

- Getting Started*: Getting Started and Exercises with* ***STEP 7 V5.3***.
- Manual: *SIMATIC NET: Twisted Pair and Fiber Optic Networks*
- Manual: *Communication with SIMATIC*

Service & Support on the Internet

In addition to our documentation, we offer a comprehensive online knowledge base on the Internet at:

http://www.siemens.com/automation/service&support

There you can find:

- The Newsletter containing the latest information on your products.
- The documents you need using our Service & Support search engine.
- A bulletin board where users and specialists exchange experiences worldwide
- Contacts for Automation & Drives are listed in the contact partner database.
- Information about on-site services, repairs and spare parts. Lots more is available on the “Services” page.

SIMATIC

S7-300 Automation System

Getting Started Release 08/2004

CPU 317-2 PN/DP: Configuring an ET 200S as PROFINET IO device

Introduction

In this tutorial you configure an ET 200S for operation as PROFINET IO device. This takes about one to two hours, depending on your experience.

Range of applicability

Product	Order number	Is an MMC required for operation?	From version	
			Firmware	Hardware
CPU 317-2 PN/DP	6ES7317-2EJ10-0AB0	Yes	V2.3	02
IM 151-3 PN	6ES7151-3AA00-0AB0	Yes	V1.0	01

Requirements

- Your S7 station consists of a power supply module and of a CPU 317-2 PN/DP, installed and configured as shown in Getting Started “CPU 317-2PN/DP: Configuring PROFINET interface X2.”
- *STEP 7* V 5.3 + ServicePack 1 or higher is installed on your PG. You know how to work with *STEP 7*.
- The PG is connected to PROFINET IO.

Warning

Depending on the field of application, the operation of an S7-300 in a plant or system is defined by special rules and regulations. This includes current safety regulations and directives for the prevention of accidents, such as IEC 204 (EMERGENCY-OFF equipment.)

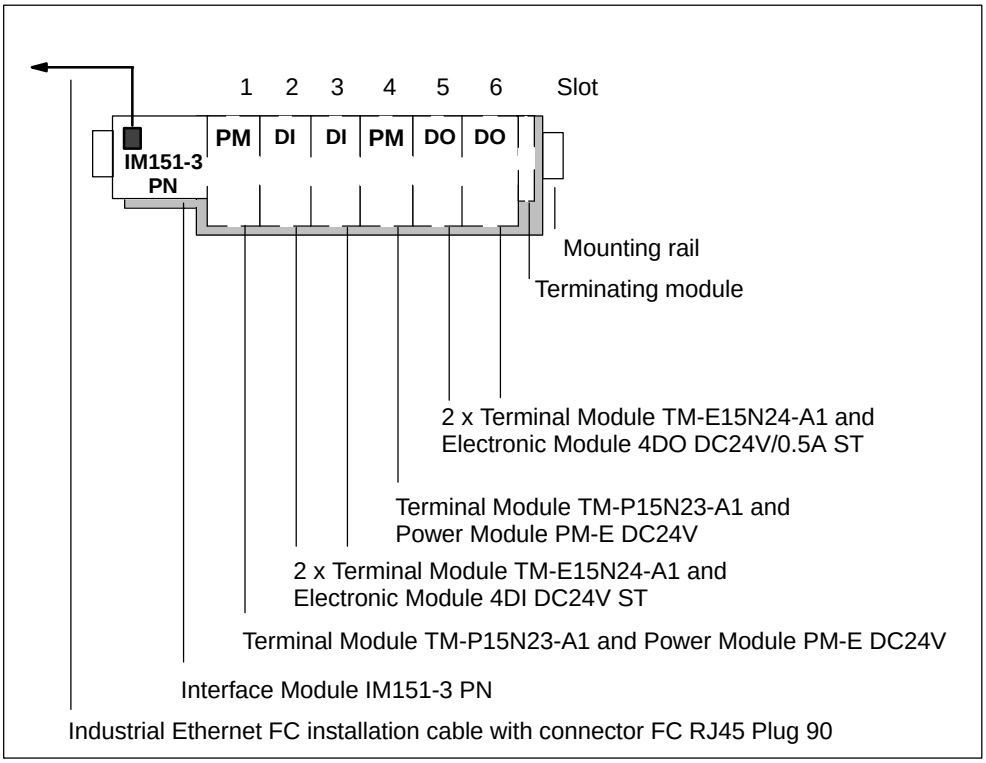
If these regulations are ignored, serious injury and damage to machines and equipment are to be expected.

Material and tools required

Quantity	Article	Order number (Siemens)
1	Standard mounting rail 35 mm (length = 483 mm, for example)	6ES5 710-8MA11
1	Interface module IM151-3 PN and terminating module, 1 piece	6ES7 151-3AA00-0AB0
1	Micro Memory Card (MMC)	For example, 6ES7 953-8LF11-0AA0
2	Fast Connect terminal module TM-P15N23-A1, 1 piece	6ES7 193-4CC70-0AA0
2	Fast Connect terminal module TM-P15N23-A1, 5 pieces	6ES7 193-4CA70-0AA0
2	PM-E DC24V, 1 piece	6ES7 138-4CA00-0AA0
1	4DI DC24V ST, 5 pieces	6ES7 131-4BD00-0AB0
1	4DO DC24V/0.5A ST, 5 pieces	6ES7 132-4BD00-0AB0
1	Industrial Ethernet FC RJ45 connector 90, 10 pieces	6GK1 901-1BB20-2AB0
1	Industrial Ethernet FC stripping tool	6GK1 901-1GA00
	Suitable installation cables: • FC Standard Cable • FC Trailing Cable • FC Marine Cable	 6XV1 840-2AH10 6XV1 840-3AH10 6XV1 840-4AH10

Installation

The figure below shows which ET 200S components you require for the example on the PROFINET IO:

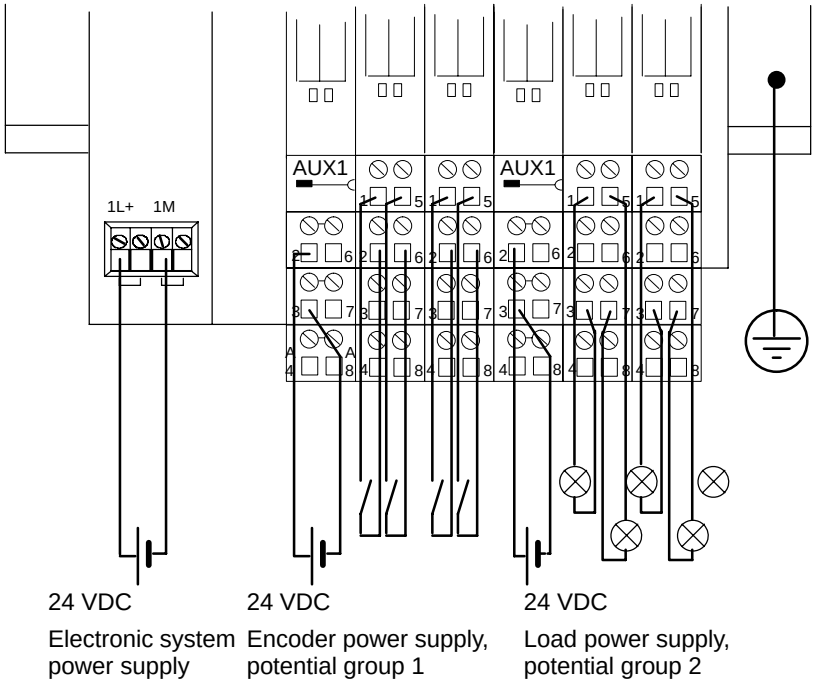


Components for the example on PROFINET IO

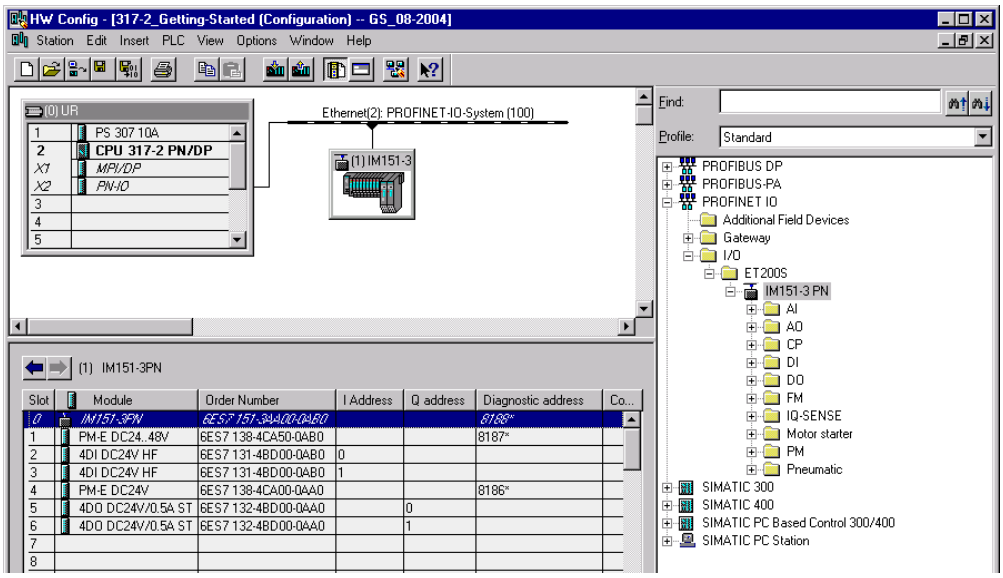
1. Installation

Step	Tasks
1	Install the mounting rail (35 x 7.5 mm or 15 mm, length = at least 210 mm) on a solid surface.
2	Connect the mounting rail with the protective conductor. Minimum conductor cross-section: 10 mm^2
3	Mount the various modules onto the rail, starting on the left side (hang in – swivel down – slide to left.) Follow this sequence: • Interface module IM151-3 PN • Terminal module TM-P15N23-A1 • 2 x terminal module TM-E15N24-A1 • Terminal module TM-P15N23-A1 • 2 x terminal module TM-E15N24-A1 • Terminating module

2. Wiring and assembly

Step	Activity
1	Wire the ET 200S as shown below: 
2	Use the RJ45 connector to interconnect the ET 200S (IO device) with the I/O controller via switch. The PROFINET interface is installed at IM151-3 PN.
3	Insert the power supply and electronic modules into the terminal modules.

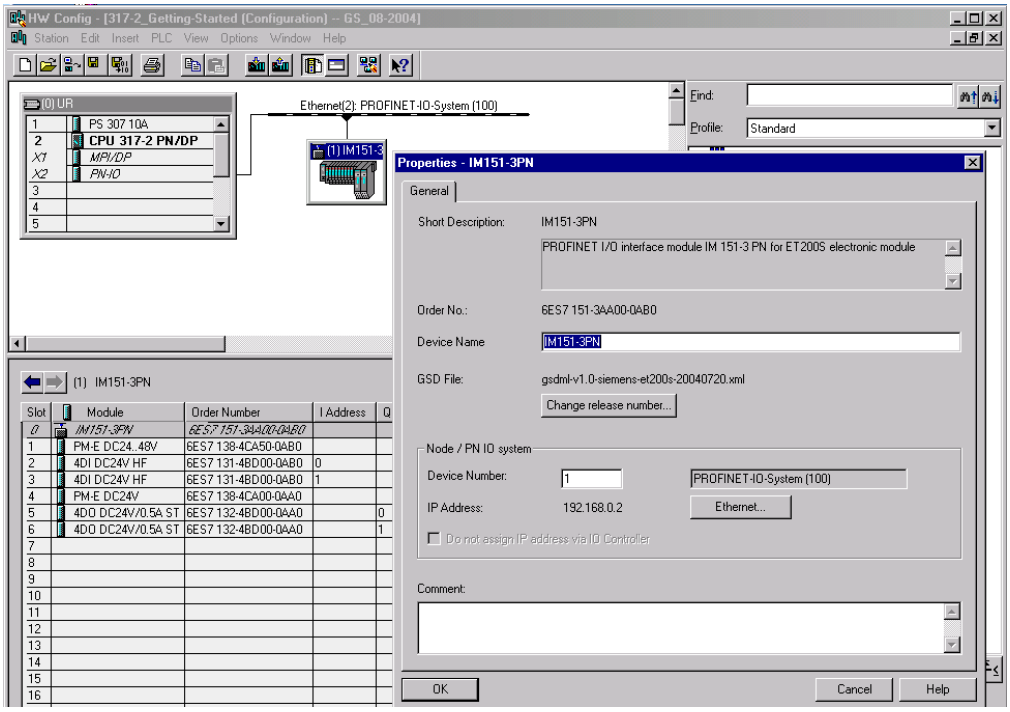
3. Configuring

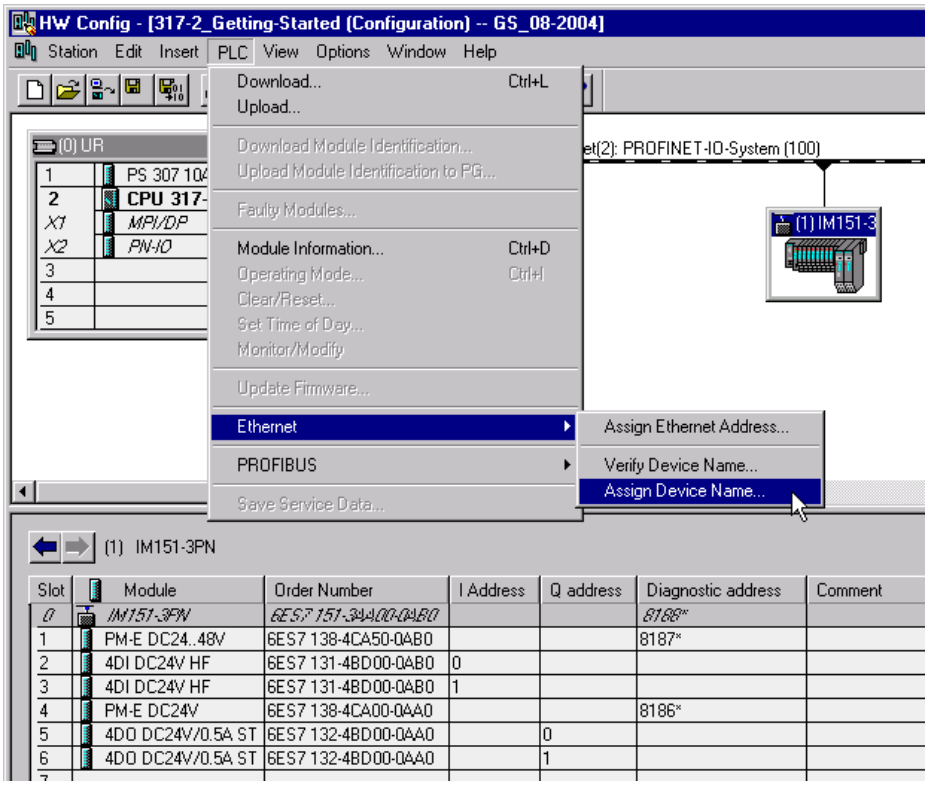
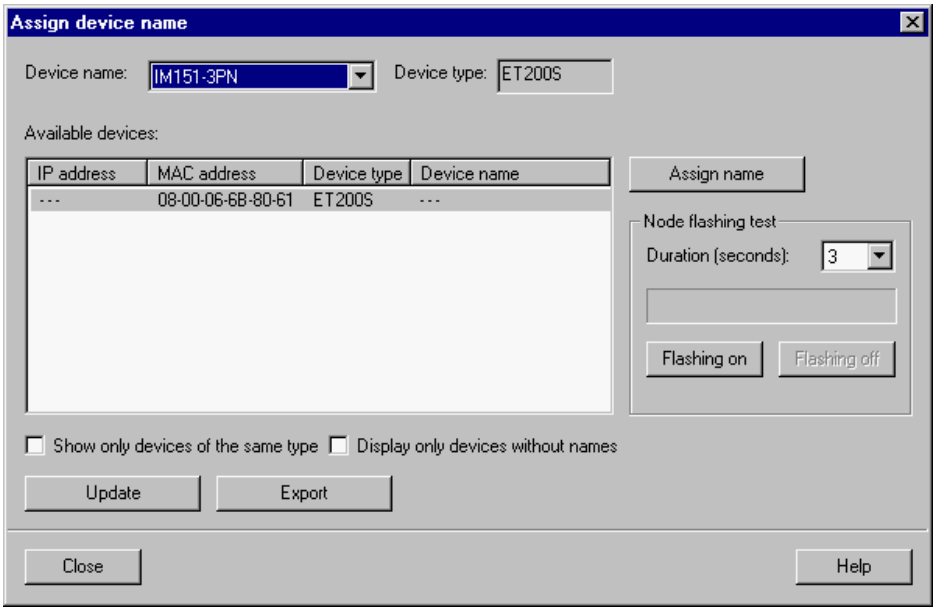
Step	Activity
1	Run SIMATIC Manager, then open the project you created in Getting Started “CPU 317-2 PN/DP: Configuring PROFINET interface X2.”
2	Drag-and-drop IM151-3 PN from the PROFINET IO > I/O > ET 200S catalog to the PROFINET IO system.
3	Drag-and-drop the various ET 200S modules into the configuration table, according to the physical installation of the PROFINET IO devices. 
4	Save and compile the HW configuration. Select **Station > Save and compile**

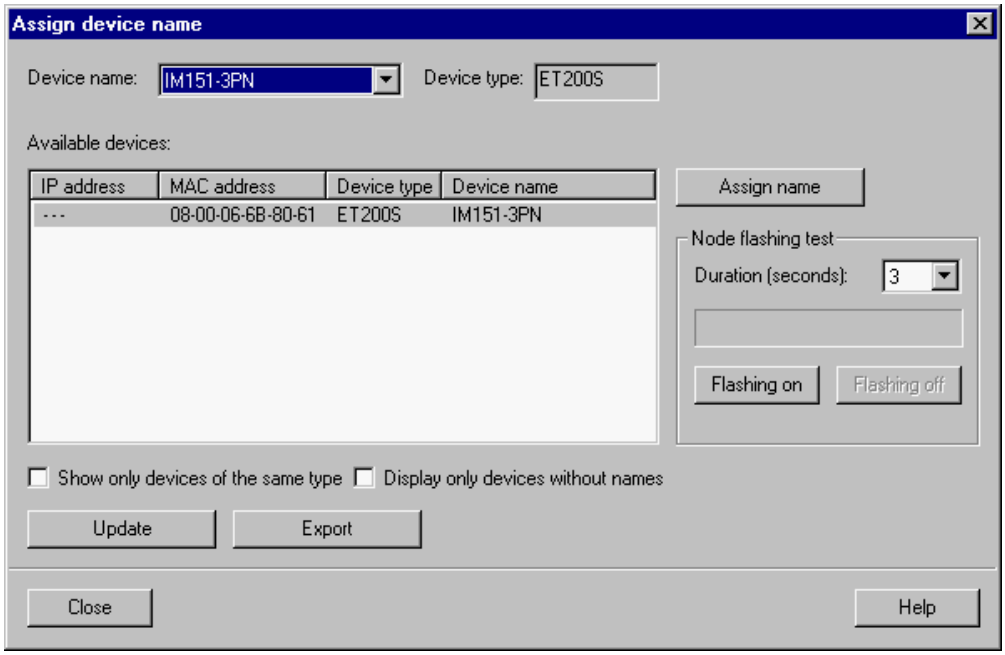
4. Insert the MMC and switch on the device.

Step	Activity	Result
1	Insert the MMC into IM151-3 PN.	The MMC is absolutely required for operation! **Note:** **To us an MMC with unknown content, erase it on the PG before doing so.**
2	Switch on the power supply for the switch.	The switch starts up and the power LED is lit.
3	Switch on the power supply for CPU 317-2 PN/DP.	Reaction of the status LED on the CPU 317-2 PN/DP: • DC 5V → is lit • SF → is off
4	Switch on the power supply for the IM151-3 PN and PM-E.	Reaction of the status LED on the IM 151-3: • BF → flashes • ON → is lit • LINK → is lit The SF LEDs of all electronic modules are also lit.

5. Assign a name to the IO device

Step	Activity
1	In HW Config, open the **Properties – IM151-3 PN** dialog box and enter the device name for your IO device. 
2	Save and compile the HW configuration. Select **Station > Save and compile**

Step	Activity
3	To transfer the name configuration to IM151-3 PN, you need an online PROFINET connection between the PG and the IO device via a switch. Select **PLC > Ethernet > Assign device name** to transfer the device name to IM151-3 PN. 
4	When using more than one IO device, the system shows all of those in the **Assign device name** dialog box. In this case, compare the MAC address of the device with the indicated MAC address, then select the relevant IO device. On the **Assign device name** dialog box, click **Assign name** The device name is saved to the MMC at interface module IM151-3 . 

Step	Activity
5	The dialog box indicates the device name you assigned. 
6	Download the HW configuration to CPU 317-2 PN/DP. Select **PLC > Download to module.** The CPU automatically assigns an IP address to the IO device after it has received this download. The IO device is ready for cyclic data exchange after the subnet is properly installed and the configuration corresponds with the physical structure of the I/O device. The BF2 LED of the CPU flashes after you downloaded the HW configuration. The BF2 LED on the CPU and the flashing BF LED of the IO device are switched off when the CPU has accepted the IO device. Leave the CPU in STOP until you have written the user program and downloaded it to the CPU.

6. Download the user program and configuration to the CPU

Step	Activity
1	Create the OB 1 user program in the LAD/STL/FBD editor. Example 1: Reading an input and controlling an output: **STL** `U I 0.0` — When input bit 0.0 and `U M 2.0` — flag bit 2.0 are set, `S Q 0.0` — set output bit 0.0 Example 2: Transferring an input byte to an output byte: **STL** `L PIB 0` — Load accu with bits 0.0 to 0.7 of IO input byte 0 `T POB 0` — Write bits 0.0 to 0.7 from accu to IO input byte 0
2	Save the user program (OB1) and close the LAD/STL/FBD editor
3	Select the “Blocks” folder, then download all blocks to the CPU. Select **PLC > Download**

7. Switch the CPU to RUN and monitor the functions

Step	Activity
1	Switch the CPU to RUN.
2	Status of some of the important LEDs on the CPU 317-2, ET200S and switch after commissioning has been completed: • CPU 317-2 PN/DP DC 5V: lit SF: off BF2: off LINK: flashes • ET 200S: SF: off BF: off ON: lit LINK: lit • Switch: LED of used ports: lit
3	Verify the station functions and debug the user program.

Diagnostics / Troubleshooting

Wrong operation, faulty wiring or a faulty hardware configuration may cause errors which the CPU, CP or IE/PB-Link indicate with the *SF* group error LED after CPU memory reset.

For information on how to analyze such errors and alarms, refer to the CPU 31xC and CPU 31x operating instructions.

Manuals containing further information

- Getting Started*: Getting Started and Exercises with* ***STEP 7*** *V5.3*.
- Manual: *SIMATIC NET: Twisted Pair and Fiber Optic Networks*
- Manual: *Communication with SIMATIC*

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SIMATIC

S7-400 Automation System

Getting Started Release 08/2004

CP 443-1 Advanced: Configuration of the PROFINET interface with IE/PB-Link and ET 200B

Introduction

In this example you configure an a CP 443-1 Advanced with PROFInet interface to an IE/PB-Link which is interconnected with an ET 200B (DP V0 slave) via PROFIBUS DP for use in an existing S7-400 automation system.

This takes about two to four hours, depending on your experience.

Range of applicability

CPU	Order number	Is a memory module required?	From version	
			Firmware	Hardware
CP 443-1 Advanced	6GK7 443-1GX20-0XE0	Yes, C-Plug	V2.0	V1.0
IE/PB Link PN IO	6GK1 411-0AB00	No	V1.0	V1.0

Requirements

- Basic knowledge of electronic and electrical systems engineering.
- Knowledge in the area of network engineering would be of advantage.
- You already worked with the STEP 7 programming software STEP 7.
- We assume that you are firm in handling the MS Windows operating system.

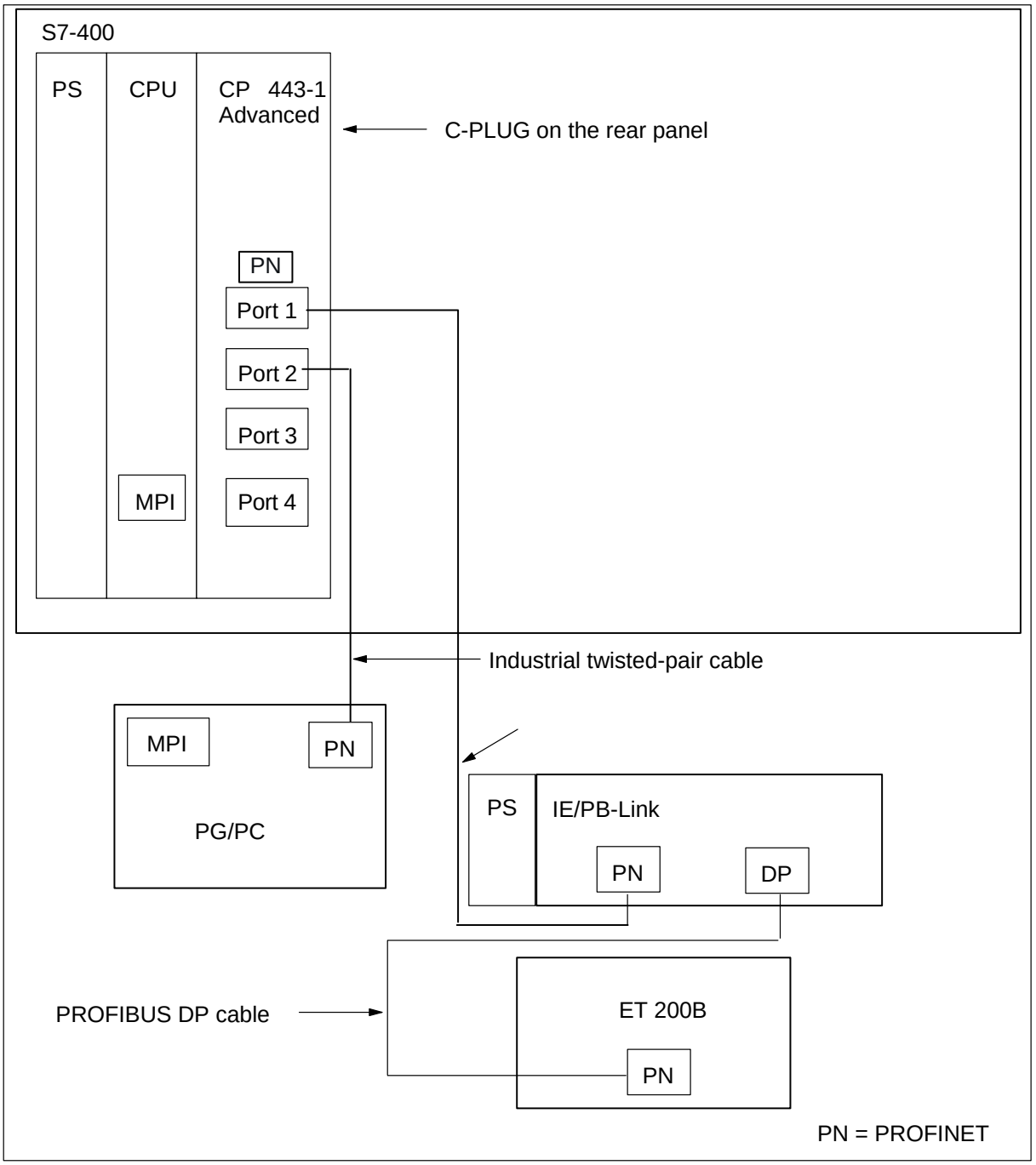
Warning

When implementing the S7-400, IE/PB-Link and ET 200B in plants or system, you need to conform to special rules and regulations. This includes current safety regulations and directives for the prevention of accidents, such as IEC 204 (EMERGENCY-OFF equipment.) If these regulations are ignored, serious injury and damage to machines and equipment are to be expected.

Material and tools required

Quantity	Module	Order number
1	A functional S7-400 PLC consists of the rack, a power supply module, and of a CPU approved fro operation with a CP 443-1 Advanced Advanced module	depending on the configuration
1	CP 443-1 Advanced with C-PLUG	6GK7 443-1GX20-0XE0
1	IE/PB Link PN IO	6GK1 411-0AB00
1	Rails	6ES7 390-1AE80-0AA0, for example
1	An ET 200, for example, ET 200B, consisting of a terminal block and electronic block	6ES7 133-0BH0-0XB0, for example
1	DIN rail	commonly available
2	Power supply (PS) modules	6ES7 307-1BA00-0AA0, for example
1	• Programming device (PG) or PC with corresponding MPI interface card and Ethernet NIC • PG cable • installed STEP 7 software**,** firmware version 5.3 SP 1	depending on the configuration
1	Screwdriver with 3,5 mm blade	commonly available
1	Screwdriver with 4.5 mm blade	commonly available
1	Sidecutters and wire stripper	commonly available
1	Crimp tool for wire ferrules	commonly available
X m	Cable for grounding the mounting rail with a conductor cross-section of 10 mm^2 and cable lug matching M6 connectors, and with a length matching local requirements	commonly available
X m	3-wire flexible power cable (AC 230/120 V) with Schuko-style plug, with a length matching local conditions, and matching cable ferrules with collar.	commonly available
X m	Two Ethernet cables with RJ45 connector	commonly available
X m	PROFIBUS cable with Profibus connector and integrated terminating resistors	commonly available

installation

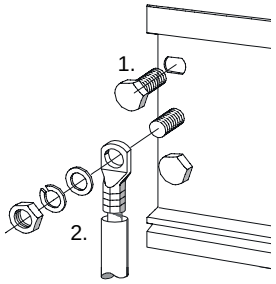


1. Installation

CP in S7-400

Graphic	Installation of the CP 443-1 Advanced in S7-400
	1. Insert the C-PLUG into slot on the rear panel the CP
	2. Insert the CP at the top. 3. Swing the CP down.
	4. Screw-tighten the module on the rack

IE/PB-Link

Graphic	Install and ground the mounting rail
	1. Screw on the mounting rail (screw size: M6). Make sure to maintain a minimum clearance of 40 mm above and below the mounting rail. When mounting it on a grounded steel panel or on a grounded device mounting panel made of steel sheet, make sure you have a low impedance connection between the mounting rail and the mounting surface. 2. Connect the mounting rail with the protective conductor. An M6 protective conductor screw is provided on the mounting rail for this purpose. Stipulated cross-section of the cable connection to the protective conductor: 10 mm^2

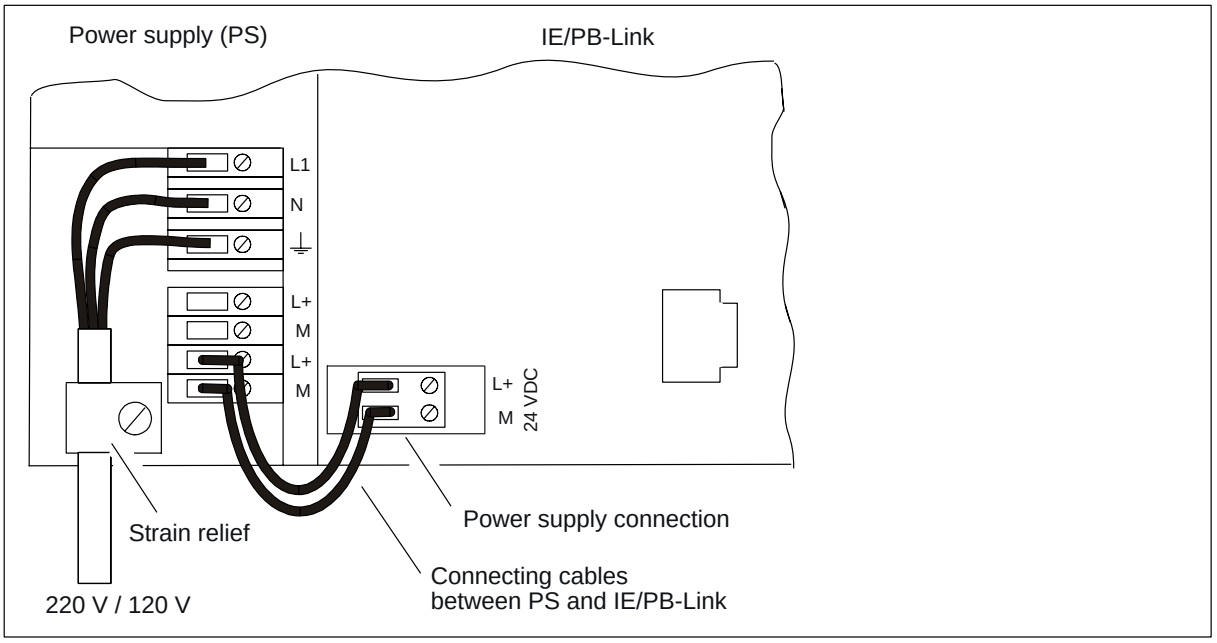
Installing modules on the rail
1. In the first step, insert the power supply module. Slide it to the left until it meets the grounding screw of the mounting rail and then screw it on.
2. Insert the IE/PB-Link at the top. 3. Slide it up to the left module. 4. You can then swing it down.
5. Screw-tighten the modules on the mounting rail.

2. Wiring

Warning

There is a risk of contact to live power cables. Always disconnect power to the S7-400, IE/PB-Link and ET 200B before you start wiring.

Wiring the power supply and IE/PB-Link modules



Wire the power supply and the IE/PB-Link (front panel flaps are open.)

Step	Wire the power supply and the IE/PB-Link
1	Open the front flaps of the power supply and IE/PB-Link modules.
2	Unscrew the strain relief clamp of the power supply.
3	Strip the flexible power cable, .dress it with crimped wire ferrules, then connect it to the power supply module (blue on terminal N, black on terminal L1, protective conductor on terminal PE)
4	Screw down the clamp of the cable strain relief.
5	Next, wire the power supply line to the IE/PB-Link. Use flexible cable with a conductor cross-section of 1 mm^2. Strip the ends to a length of approx. 6 mm, the crimp on the wire end ferrules. Next, interconnect the terminals L+ and M of the power supply and IE/PB-Link modules.
6	Verify that the setting of the selector switch matches your mains voltage. The default line voltage setting for the power supply module is 230 VAC. To change this setting, proceed as follows: Remove the protective cap with a screwdriver, set the selector switch to match your line voltage, then insert the protective cap again.

Wiring the power supply module and the ET 200B

Step	Wiring the power supply and the ET 200B
1	Open the front panel flaps of the power supply module.
2	Unscrew the strain relief clamp of the power supply.
3	Strip the flexible power cable, dress it with crimped wire ferrules, then connect it to the power supply module (blue on terminal N, black on terminal L1, protective conductor on terminal PE).
4	Screw down the clamp of the cable strain relief.
5	Next, wire the power supply to the ET 200B. Use flexible cable with a conductor cross-section of 1 mm^2. Strip the ends to a length of approx. 6 mm, the crimp on the wire end ferrules. Next, interconnect the terminals L+ and M of the power supply and ET 200B modules.
6	Verify that the setting of the selector switch matches your mains voltage. The default line voltage setting for the power supply module is 230 VAC. To change this setting, proceed as follows: Remove the protective cap with a screwdriver, set the selector switch to match your line voltage, then insert the protective cap again.
7	Set the PROFIBUS address using the two index switches. See the ET 200B description.
8	Wire the 24 V power supply for the I/O according to the description in the ET 200B manual.

Commissioning the hardware of the S7-400 PLC

Step	Tasks	Result
1	Connect the PG cable to the PG/PC and to the CPU. When using a cable with PROFIBUS connectors, switch on the integrated terminating resistors. Close the front panel flap of the CPU, then set the mode selector switch on the CPU to *STOP*.	The PG/PC is interconnected with the CPU via MPI.
2	Connect any Ethernet port of your CP with Industrial Ethernet. Use the twisted-pair cables with RJ45 connectors. Set the mode selector switch of the CPU to *STOP*.	The CP is connected to the Industrial Ethernet
3	Connect any Ethernet port of your CP with your PG. Use the twisted-pair cables with RJ45 connectors.	The CP is interconnected with the PG via Ethernet.
4	Connect the mains cable, then switch on the power supply module of the S7-400.	When the S7-400 is connected to power, the 24 V and 5 V power supply LEDs are lit. The CPU performs a brief lamp test on all LEDs, and then sets only the *EXTF* and *STOP* LEDs. This test is also performed on the LEDs of the CP, and the *INTF* and *STOP* LEDs are then set.
5	Start your PG/PC, then run SIMATIC Manager from your Windows Desktop.	A window opens with SIMATIC Manager.

Commissioning the hardware of the IE/PB-Link

Step	Tasks	Result
1	Connect the PROFINET interface of your IE/PB-Link to Industrial Ethernet. Use the twisted-pair cables with RJ45 connectors.	IE/PB-Link is interconnected with the CP 443-1 Advanced Advanced via Industrial Ethernet
2	Connect the PROFIBUS cable to the PROFIBUS interface of the IE-PB Link. Switch on the integrated terminating resistors of the PROFIBUS connector if the PROFIBUS terminates at the connector.	IE/PB-Link is connected to PROFIBUS DP
3	Close the front panel flaps of the IE/PB-Link.	
4	Connect the mains cable, then switch on the power supply module of the IE/PB-Link.	The 24 VDC power supply LED is lit on the power supply module. Several LEDs light up briefly on the IE/PB-Link, and after a delay time of approx. 5 s, the *SF* and *STOP* LEDs are lit.

Commissioning the ET 200B hardware

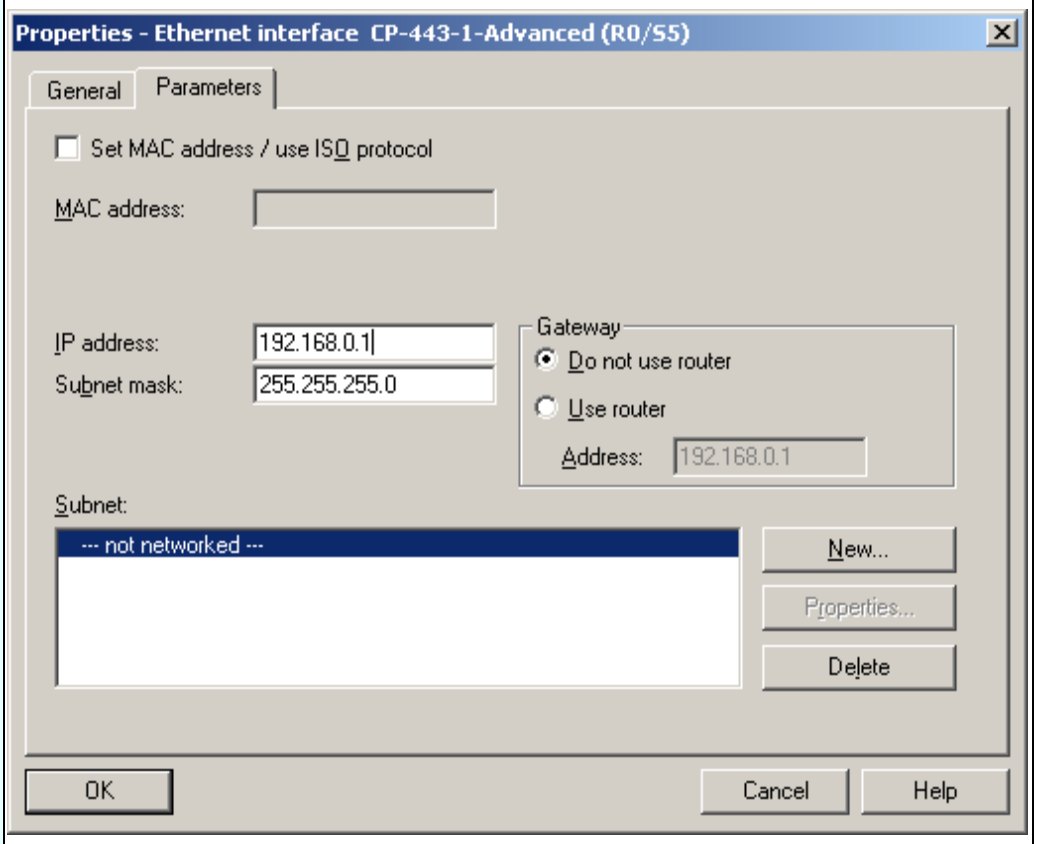
Step	Tasks	Result
1	Connect the PROFIBUS cable to the PROFIBUS interface of the ET 200B. Switch on the integrated terminating resistors of the PROFIBUS connector if the PROFIBUS terminates at the connector.	The ET 200B is connected to PROFIBUS DP
2	Connect mains, then switch on the power supply module.	The 24 VDC power supply LED is lit on the power supply module. The *RUN*, *BF* and *L1+* LEDs are lit on the ET 200B module.

4. Configuring the hardware in HW Config of STEP 7

Open an existing project with S7-400:

Step	Tasks	Result
1	In SIMATIC Manager, select **File > Open** to open your project.	A window with two panes appears with the title of your project.
2	On the right pane, double-click the icon of the existing SIMATIC 400, then click the hardware icon.	HW Config of the existing S7-400 opens.
3	You can insert your hardware components from the hardware catalog shown in the left pane. If this catalog is not shown, open it by selecting the **View > Catalog** command.	

Installing the CP 443-1 Advanced Advanced in S7-400:

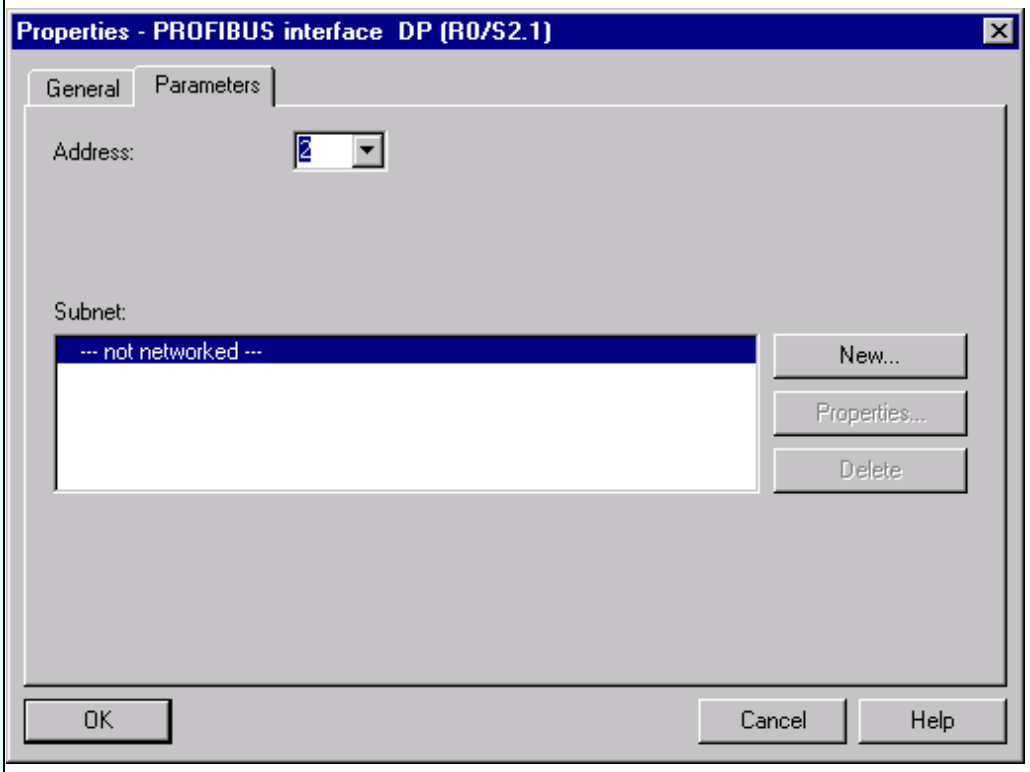
Step	Tasks	Result
1	Select the rack slot for the CP 443-1 Advanced. In the hardware catalog, navigate to “CP-400”, “Industrial Ethernet”, “**CP 443-1 Advanced Advanced” “V2.0”**. Double-click (on V2.0) the CP 443-1 Advanced to insert it into S7-400.	The CP 443-1 Advanced is installed in the selected slot. The properties dialog box of the Ethernet port is shown.
2		
3	Enter the IP address and the subnet mask. Your network administrator provides you with this information.	
4	If you integrate a router into your communication system, you also need to specify its address. This information is also provided by your network administrator	
5	Click “New”, then assign a name for a new Industrial Ethernet subnet. Confirm your entries with “OK.”	You created a new Industrial Ethernet subnet.

Step	Tasks	Result
6	Confirm your entries with “OK.”	This closes the dialog box of the Ethernet interface of your CP 443-1 Advanced.
7	Right-click to select CP 443-1 Advanced, then select “Object properties...) from the shortcut menu.	The properties dialog box of your CP 443-1 Advanced opens.
8	Change to the “Port Parameters” tab. There you can customize the network settings. Default is “Automatic Settings”, which is usually sufficient for error-free communication. Communication problems (connections fail, or frequent network errors, for example) may be caused by faulty settings, or by the automatic network settings. If this happens, tune the settings to match your network configuration.	You have made user-specific network settings in HW Config.
9	Click “OK.”	This closes the properties dialog box of your CP 443-1 Advanced.

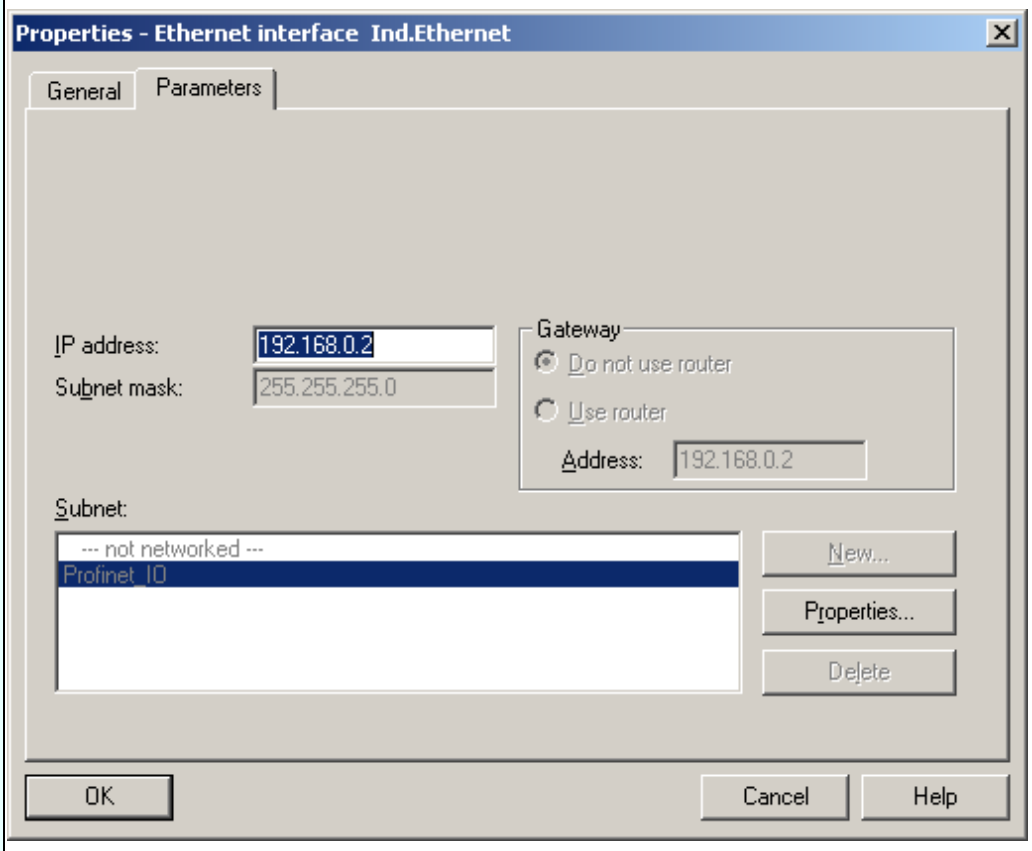
Connecting the PROFINET IO system to CP 443-1 Advanced Advanced

Step	Tasks	Result
1	Right-click CP 443-1 Advanced, then select “**Insert PROFINET IO system.”**	The bus segment of the PROFINET IO subnet is visible in the graphic view.

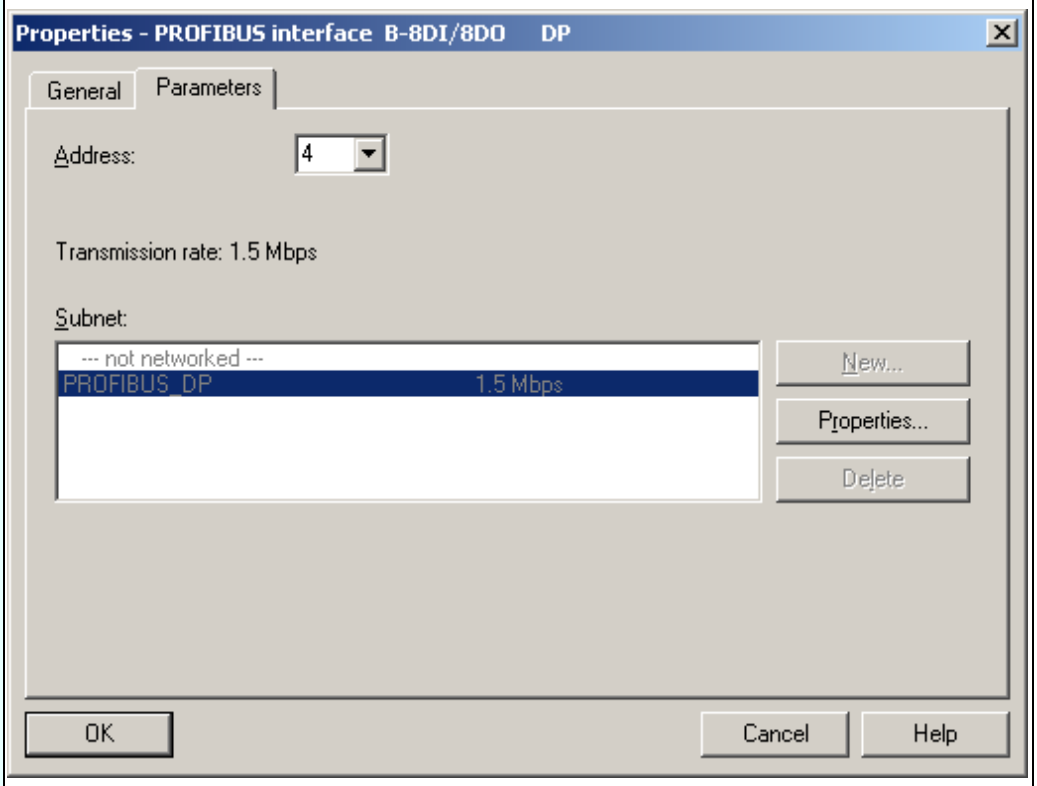
Connecting IE/PB-Link to the PROFINET IO system

Step	Tasks	Result
1	Select “PROFINET IO system” in the graphic view. In the hardware catalog, navigate to “PROFINET IO” > “Network Node” > “**IE/PB Link PN IO” “V1.0”**. Double-click (on V1.0) IE/PB-Link to add it to the configuration.	The properties dialog box of the PROFIBUS interface is shown.
		
2	Set the PROFIBUS address.	The DP master address is set at the PROFIBUS.
3	Click “New”, then assign a name for a new PROFIBUS subnet. Confirm your entries with “OK.”	

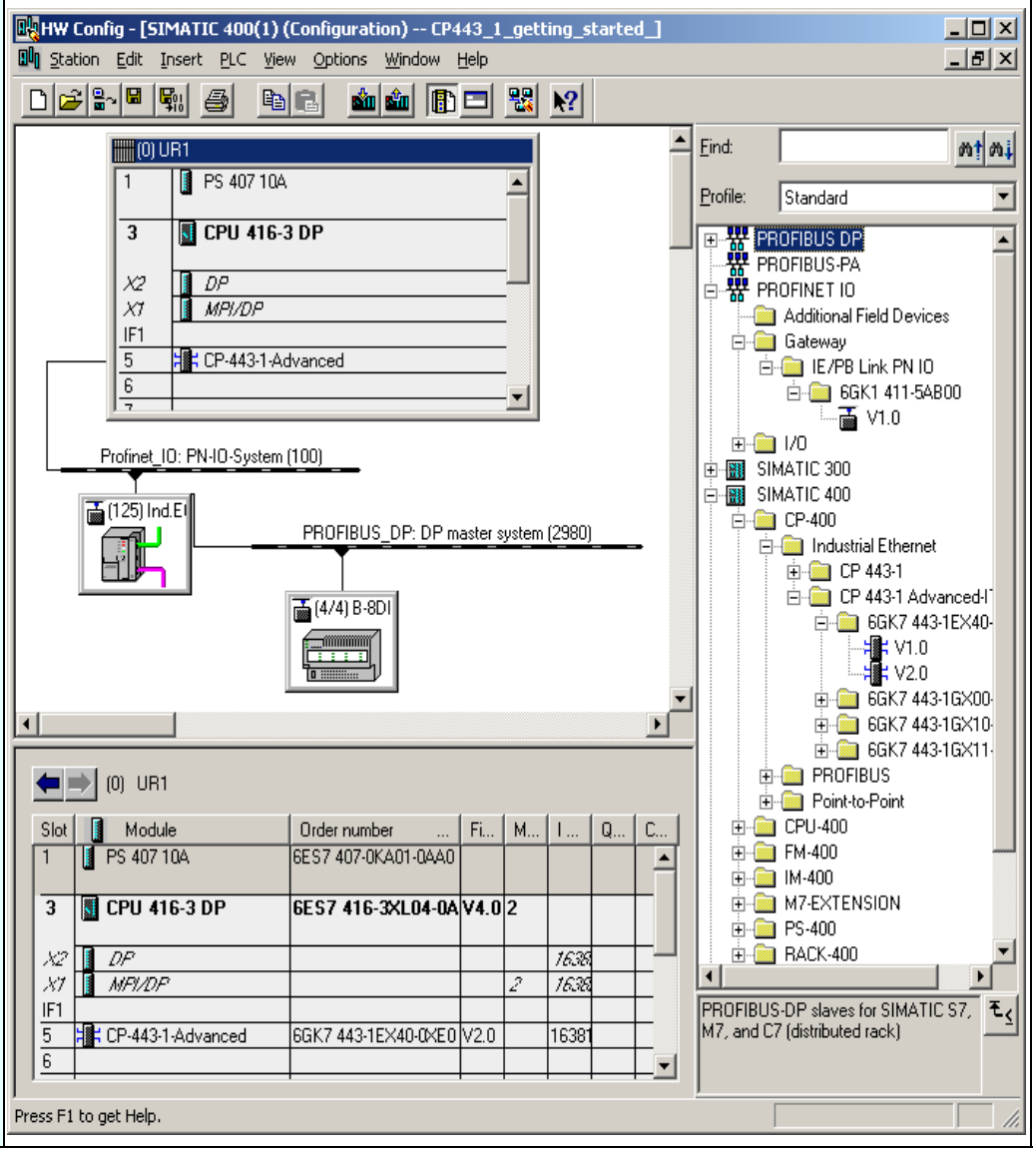
Step	Tasks	Result
4	To customize your network settings, click “Properties”, then click “Network Settings.” The default transmission rate with DP profile is “1.5 Mbps”, which is usually sufficient for error-free communication. Communication problems (connections fail, or frequent network errors, for example) may be caused by faulty settings, or by the automatic network settings. If this happens, tune the settings to match your network configuration and then click “OK.”	You have made user-specific network settings in HW Config.
5	Confirm your entries with “OK.”	This closes the properties dialog box of the PROFIBUS interface of your IE/PB-Link. The PROFIBUS DP subnet appears in the graphic view.
6	Right-click the IE/PB-Link, then select “Object properties...” from the shortcut menu.	The properties dialog box of the IE/PB-Link opens
7	Customize the device name as required. Make a note of this name, because you are going to need it for commissioning.	You assigned a user-specific name for the IE/PB-Link.

Step	Tasks	Result
8	Click “Ethernet...”	The properties dialog box of the Ethernet interface is shown.
		
9	Enter the IP address in the “Properties - Ethernet Interface” screen form. You network administrator provides this information. Confirm your entries with “OK.”	This closes the properties dialog box of the Ethernet interface.
10	Click “OK.”	This closes the properties dialog box of the IE/PB-Link

Connecting the ET 200B to PROFIBUS

Step	Tasks	Result
1	Select the PROFIBUS subnet in the graphic view. In the hardware catalog, navigate to PROFIBUS DP > ET 200B and to the required module. Insert this module into HW Config with double-click.	The properties dialog box of the PROFIBUS interface is shown.
		
2	Type in the PROFIBUS address. Confirm your settings with “OK.”	This closes the properties dialog box of the PROFIBUS interface of the ET 200B. The ET 200B appears in the graphic view.
3	In HW Config, double-click “8DQ” in the “DP ID” column of the lower table. In the “Start” box of the properties dialog box, type in the start address of the outputs. Confirm your entries with “OK.”	You defined the start address of outputs

Step	Tasks	Result
4	In HW Config, double-click “8DI” in the “DP ID” column of the lower table. In the “Start” box of the properties dialog box, type in the start address of the inputs. Confirm your entries with “OK.”	You defined the start address of inputs



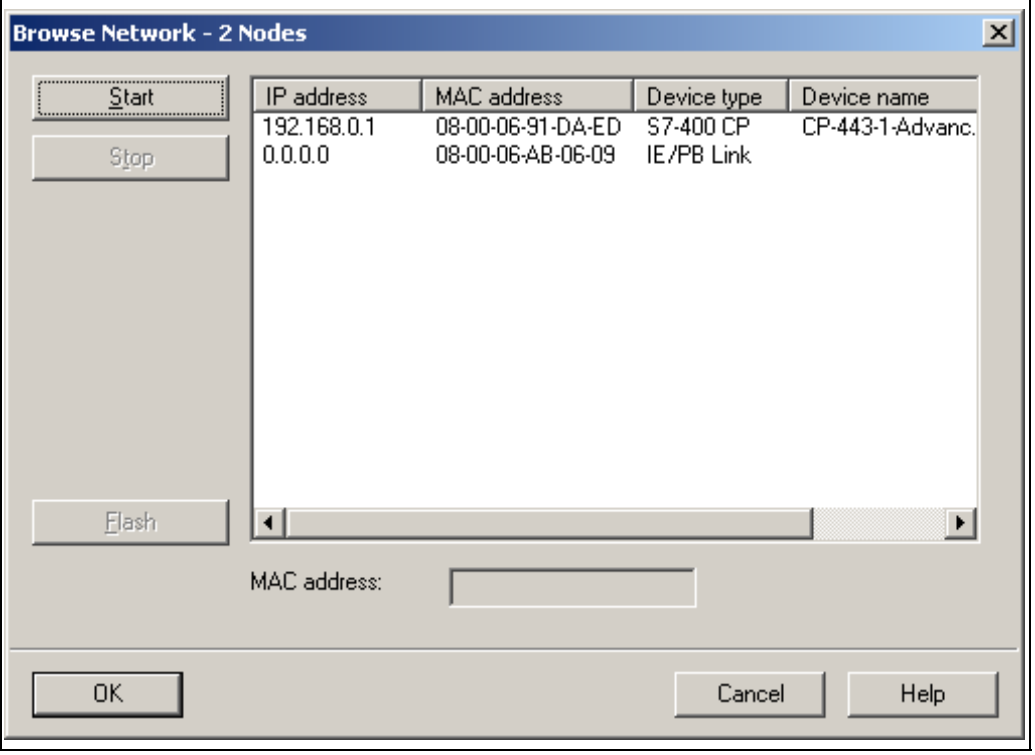
Saving and compiling the configuration:

Step	Tasks	Result
1	Select the **Station > Save and Compile** command.	Your hardware configuration is now compiled and saved.
2	Select **Station > Exit** to close HW Config.	The editor is closed.

5. Commissioning

Assigning a device name at the Ethernet of the IE/PB-Link

Step	Tasks	Result
1	Connect your PG to the Ethernet subnet of the IE/PB-Link. The IP address of the PG must lie within the same address space and subnet mask. This can be set in Microsoft Windows under Network Connections.	You connected the PG to the IE/PB-Link
2	In STEP 7, select **Options > Customize PG/PC interface** to set the TCP/IP protocol for your PG/PC interface.	You assigned a TCP/IP configuration to the PG interface.
3	In SIMATIC Manager, select **PLC > Assign Ethernet Address**. The Assign Ethernet Address dialog box opens. Click “Search...” .	The “Scan network” dialog box opens



Step	Tasks	Result
4	From the list of Ethernet nodes found, select the line containing the station type “IE/PB Link”, then click “OK.”	This closes the “Scan network” screen form and enters the MAC address of the IE/PB-Link at the previous “Assign Ethernet Address” screen form.
5	In the “Device name” box of the “Assign Ethernet Address” screen form, enter the same name you assigned in HW Config to the IE/PB-Link. Click “Assign Name.”	A window opens with this text: “Name assigned successfully.”
6	Click “OK” on the message window.	This closes the message window.

Assigning an IP address to the CP 443-1 Advanced Advanced

Step	Tasks	Result
1	Click “Search...” on the “Assign Ethernet Address” screen form.	The “Scan network” dialog box opens
2	From the list of Ethernet nodes found, select the line containing the station type “S7-400 CP”, then click “OK.”	This closes the “Scan network” screen form and enters the MAC address of the CP 443-1 at the previous “Assign Ethernet Address” screen form.
3	Enter the same IP address in the “IP Address” box of the “Assign Ethernet Address” screen form, and the same subnet mask in the “Subnet Mask” box you assigned in HW Config to CP 443-1 Advanced Advanced. Click “Assign IP Configuration.”	A window opens with this text: “The parameter was successfully transferred.”
4	Click “OK” on the message window.	This closes the message window.
5	Next, click “Close.”	This closes the “Assign Ethernet Address” window

Downloading HW Config to the S7-400

Step	Tasks	Result
1	Select the S7-400 in SIMATIC Manager	
2	Select **PLC > Download**. Confirm all windows with *Yes*. You could also stay in offline with your PG, and first write the hardware configuration to the Flash Card. Insert the Flash Card into the CPU if this is the case.	The PG downloads the configuration to the CPU.
3	Set the mode selector switches of the CPU, CP and IE/PB-Link to *RUN.*	The *STOP* LED is switched off. The *RUN* LED starts to flash and then assumes a continuous signal. When a physical connection to the Ethernet is established, the *LINK* LED is lit on the CP 443-1 Advanced. The *RX/TX* LED flashes or is lit permanently when data are transferred via Ethernet.

Result

You installed a CP 443-1 Advanced Advanced in an S7-400, and interconnected an ET 200B with the PROFINET interface of the CP by means of IE/PB-Link.

- The CPU of the S7-400 PLC can now access the process data of the ET200 via PROFINET.
- Other nodes on the Ethernet subnet can now access the S7-400 PLC by means of the CP 443-1 Advanced.
- You can now also configure / reconfigure data using any port of the Ethernet interface of the CP.

Further Information

For detailed information on address assignment to the PROFINET interface of the CP or IE/PB-Link, refer to the HW Config Online Help for IE/PB-Link or CP 443-1 Advanced Advanced.

Diagnostics / Troubleshooting

Wrong operation, faulty wiring or a faulty hardware configuration may cause errors which the CPU, CP or IE/PB-Link indicate with the *SF* group error LED after a CPU memory reset.

For information on the analysis of such errors and alarms, refer to the CPU, CP 343-1 Advanced, IE/PB-Link or ET 200B operating instructions.

Manuals containing further information

- Getting Started*: Getting Started and Exercises with STEP 7 V5.3*.
- Manual: *SIMATIC NET: Twisted Pair and Fiber Optic Networks*
- Manual: *Communication with SIMATIC*
- Manual: *S7-CPs for Industrial Ethernet* (contains CP 443-1 Advanced, IE/PB-Link)
- Manual: *ET 200B Distributed I/O Station*

Service & Support on the Internet

In addition to our documentation, we offer a comprehensive online knowledge base on the Internet at: http://www.siemens.com/automation/service&support

There you can find:

- The Newsletter containing the latest information on your products.
- The documents you need using our Service & Support search engine.
- A bulletin board where users and specialists exchange experiences worldwide
- Your local contact partner for Automation & Drives
- Database
- Information about on-site services, repairs and spare parts. Lots more is available on the “Services” page.