Contents 14

14. Distributed I/O

At the end of the chapter the participant will ...

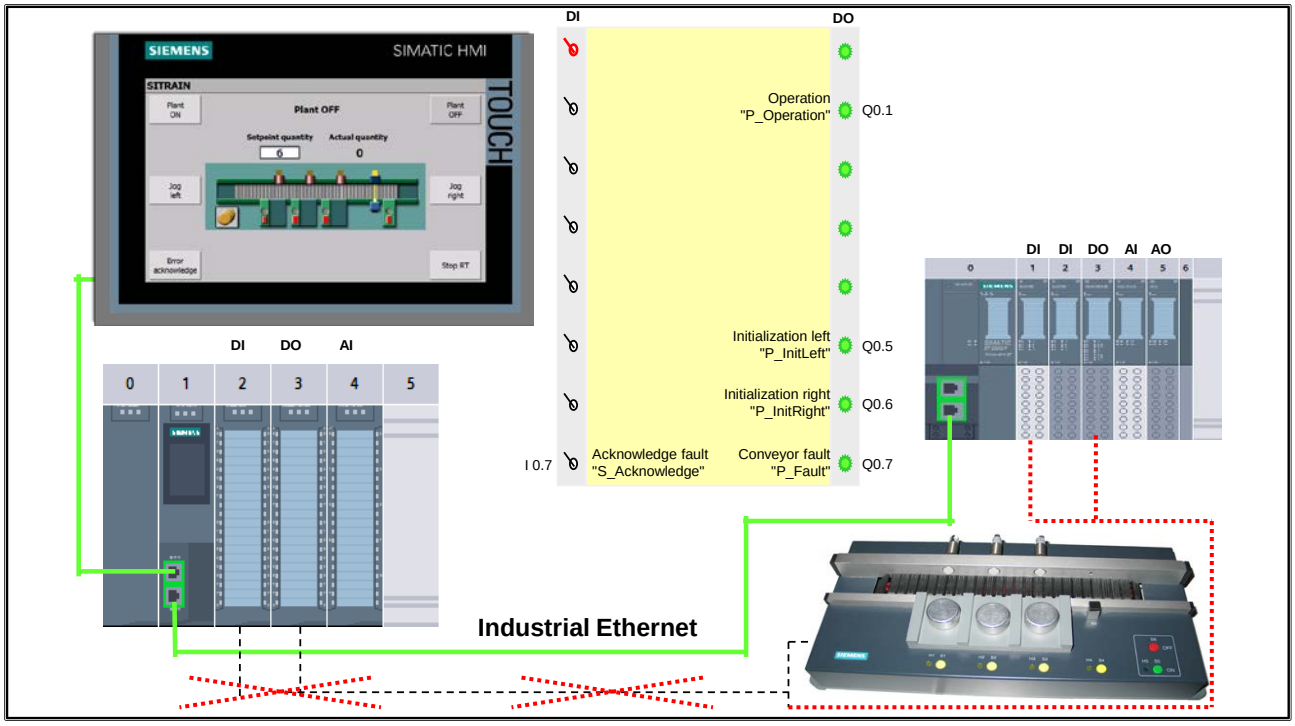
... be familiar with the various distributed I/O systems

… be familiar with the PROFINET and PROFIBUS bus systems

... be able to explain the functional principle of PROFINET

... be able to configure, network and commission a distributed PROFINET I/O station

14.1. Task Description: Operating the Conveyor Model via the ET 200SP Distributed I/O



Task Description

- The conveyor model is no longer to be controlled via the DI/DO modules of the S7-1500 central device, but is to be controlled via the DI and DO modules of the distributed ET 200SP station.
- For this, the ET 200SP must be networked with the central S7-1500 station via PROFINET and the S7 program has to be adjusted.

14.2. Distributed I/O Systems

SIMATIC ET 200M
High functionality, S7-300 modules
…PROFIBUS or PROFINET (up to 12 modules per station)

SIMATIC ET 200MP
I/O modules in the S7-1500 design
…the multi-channel and multi-functional I/O of the S7-1500

SIMATIC ET 200S
Discretely modular and multi-functional
Hot Swapping and fixed wiring
Installation up into Ex-Zone 2

SIMATIC ET 200SP
Compact I/O modules for variable design
…the scalable I/O with largest portfolio and smallest space requirement

SIMATIC ET 200pro
Modular and multi-functional: Power modules, Motor starters, RFID modules, Fail-safe modules, CPU, Frequency inverters

SIMATIC ET 200iSP
- Intrinsically safe (Ex i) and modular
- Fail-safe modules (SIL3/Cat.4/PLe)
- PROFIBUS

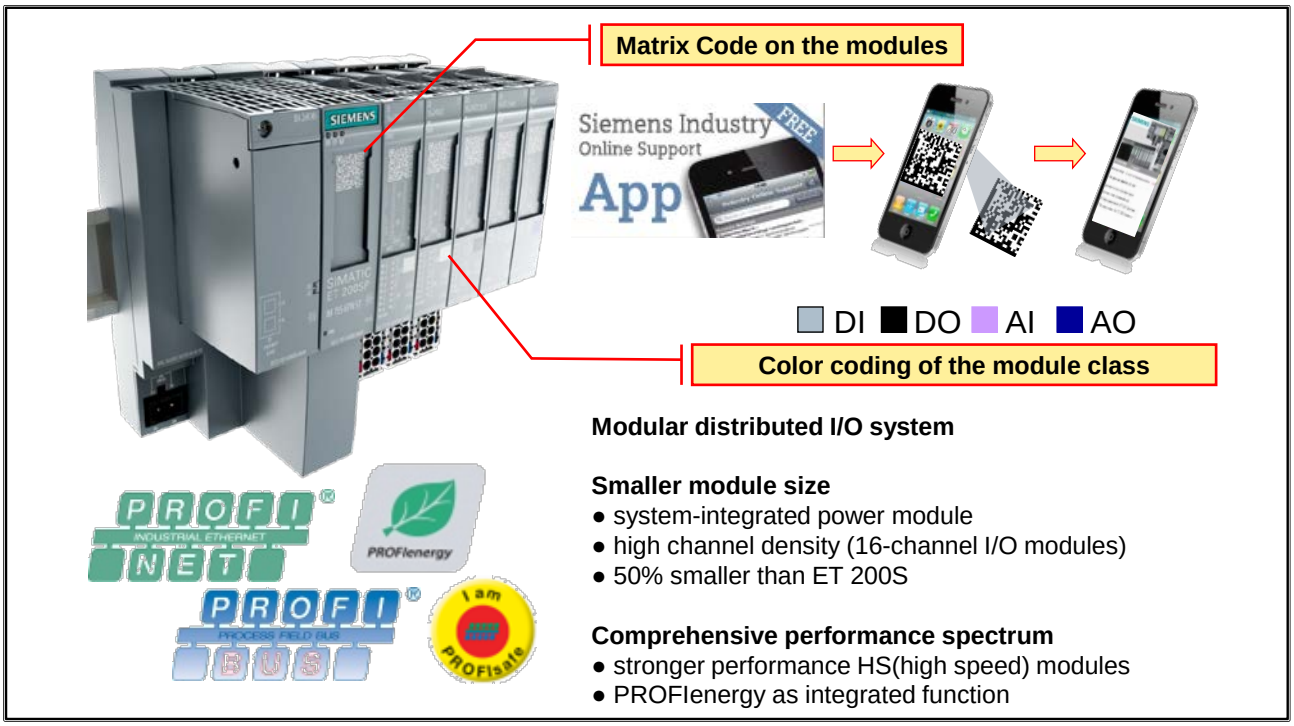
SIMATIC ET 200pro CPU
… the power of the S7-1500 in the compact design of the ET 200pro

SIMATIC ET 200SP CPU
…the power of the S7-1500 in the compact design of the ET 200SP

SIMATIC ET 200AL
I/O modules for IP65/67
…the robust I/O for the easiest assembly anywhere

SIMATIC ET 200eco and ET 200eco PN
Compact block I/O for IP65/66/67
… for demanding applications

14.2.1. ET 200SP



2d Matrix Code (Data Matrix)

This code is used for identifying modules and can be photographed or decoded by Smart Phones, PDAs, and the like.

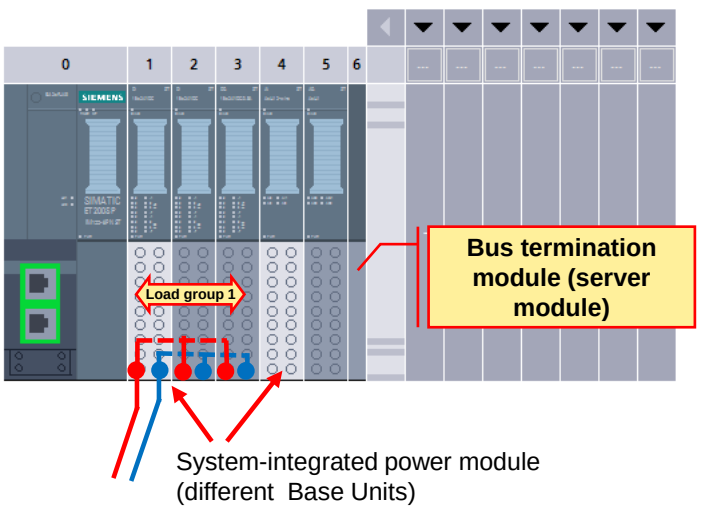
With the ET 200SP modules, the code contains an Internet link to the product page of the associated module.

14.2.1.1. ET 200SP: Configuration and Maximum Number of Modules

Diagnostic LEDs on every module

Wiring with
push-in terminals

Maximum 64 modules *including* interface module



System-integrated power module
(different Base Units)
no separate power modules, since it is possible to supply voltage to the load and potential group using a terminal block at every module

14.2.2. ET 200 MP

Modular distributed I/O system

S7-1500 modules can be used
- digital/analog modules, TM, CP/CM, system power supplies (PS)
- high channel density
  e.g. 32 DI or 32 DO per module

Comprehensive performance spectrum
- low channel costs due to high channel density
- fast response times
- module diagnostics

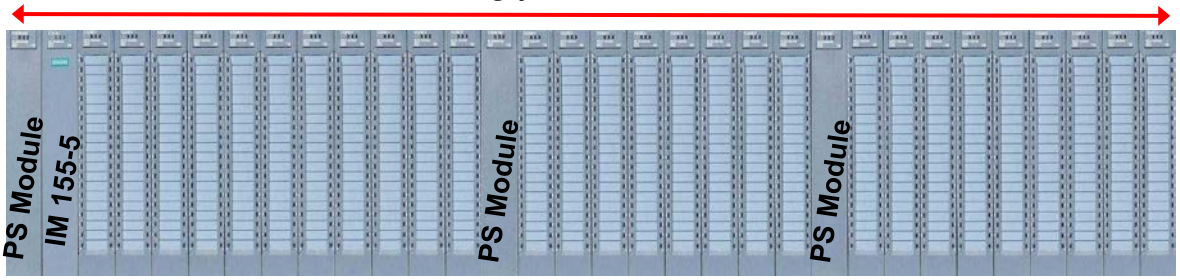
The ET 200MP enables the distributed connection of S7-1500 series central I/O modules. Connection is made using an interface module.

14.2.2.1. ET 200MP: Configuration and Maximum Number of Modules

- Maximum of 32 modules
  → 1st. module = system power supply (PS)
  → 2nd. module = interface modules
  → 3rd.-32nd. module = max. of any 30 I/O modules of the S7-1500

- Formation of load groups through additional voltage supplies
  (similar to centralized configuration of S7-1500)

Maximum 32 modules *including* power modules and interface module



(optional)

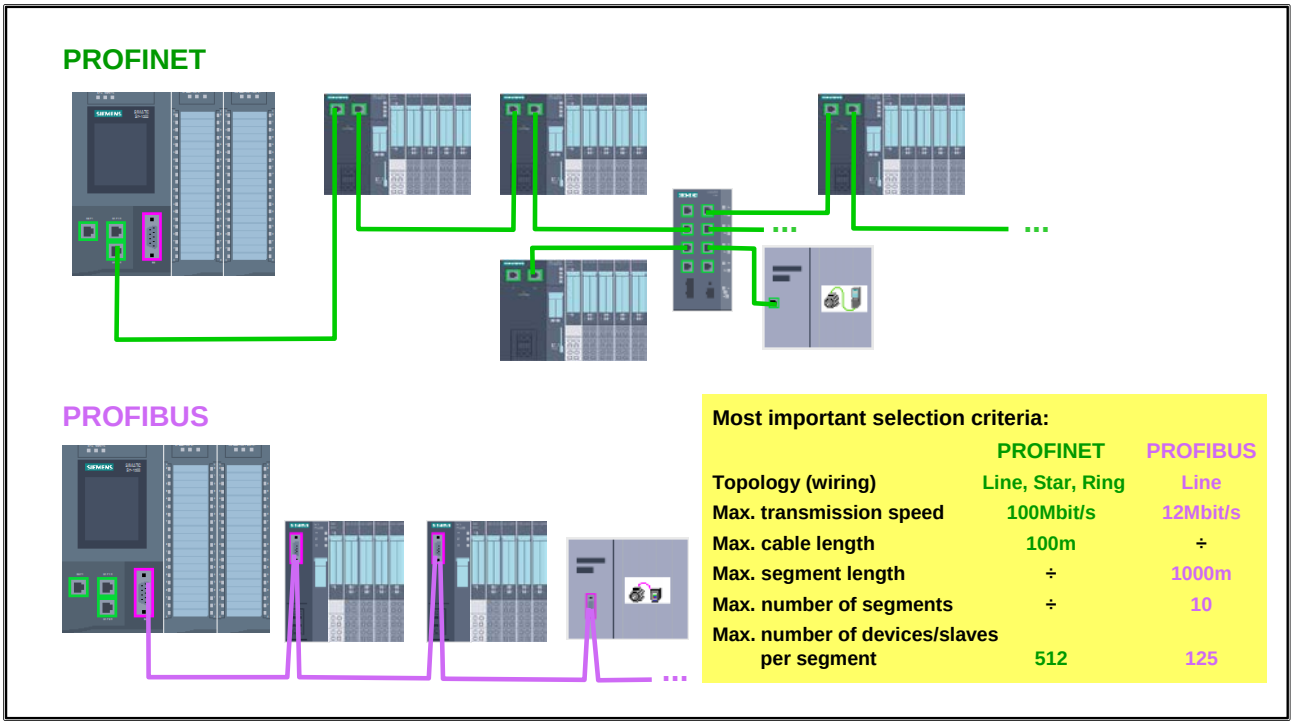
14.2.3. Overview: Distributed Signal Modules

	ET 200SP	ET 200MP	ET 200S	ET 200M	ET 200pro
DI/DQ	✓	✓	✓	✓	✓
AI/AQ	✓	✓	✓	✓	✓
F-DI/F-DQ	✓	✓	✓	✓	✓
F-AI	✗		✗	✓	✗

The ET 200SP and ET 200MP product range will be expanded in the next years such that these two product lines completely cover the applications of the ET 200S and ET 200M.

The ET 200pro (interface modules for connection to PROFINET or PROFIBUS) in the degree of protection IP65/67 for use directly at the machine will continue to be offered.

14.3. Fieldbus Systems for SIMATIC S7



Fieldbus Systems for SIMATIC S7

To connect distributed I/Os, there are different bus systems.
The most important for SIMATIC S7 are:

- PROFINET
  As the standard for communication applications at the field level it enables the connection of distributed field devices via Industrial Ethernet.
  The Industrial Ethernet network is a local area network (LAN) according to the international Standard IEEE 802.3 (Ethernet) and is designed for the industrial sector. It enables open and comprehensive network solutions with a high transmission performance.
- PROFIBUS
  It is the bus system for local area networks (LANs) with only a few participants. Through its fulfillment of requirements according to EN 50170, PROFIBUS ensures openness for the connection of standard-conforming components of all manufacturers.

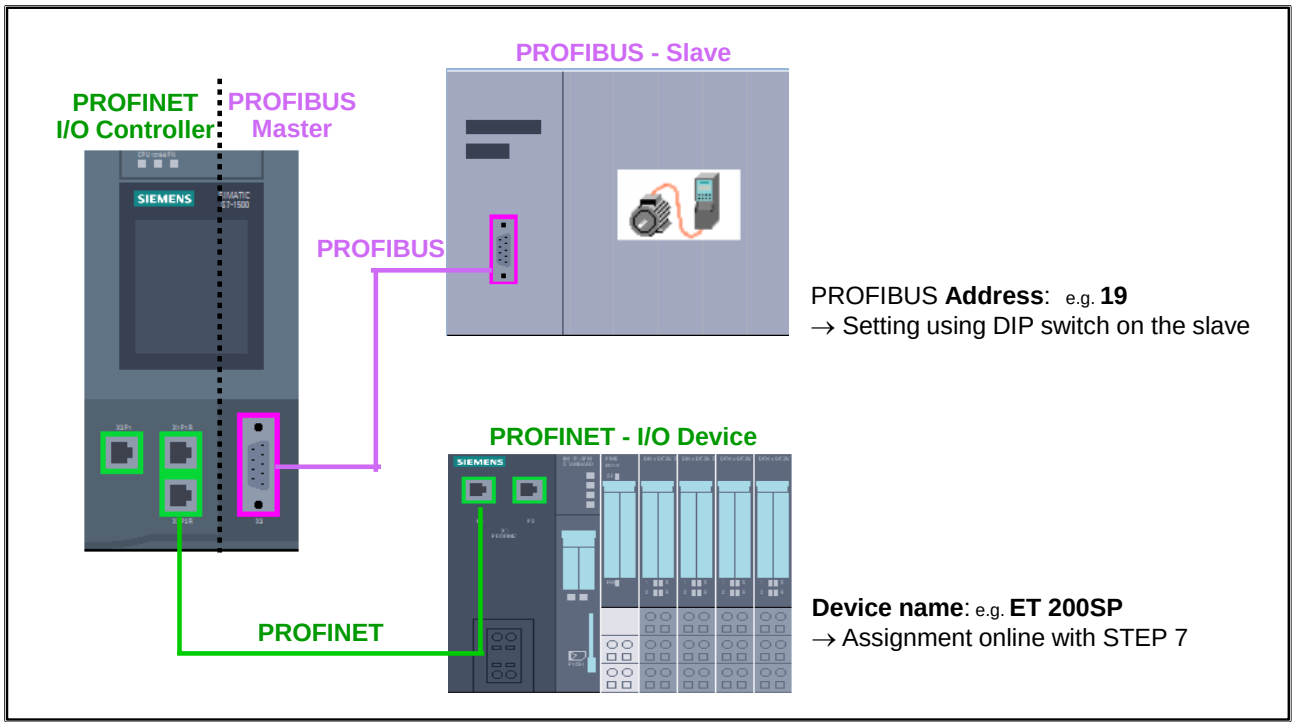
Due to the physical and communication-related differences of the two bus systems, there are various criteria which are used for the selection of the most suitable bus system.

Cable Length, Segment Length

For PROFIBUS, a module line has to be reinforced after 100-1000m (depending on the transmission speed used); otherwise, the maximum bus length is reached.

For PROFINET, every connected component takes over this function. For that reason, only the cable length between two modules is relevant here.

14.3.1. Identification of Distributed I/O Devices



Distributed I/O Devices

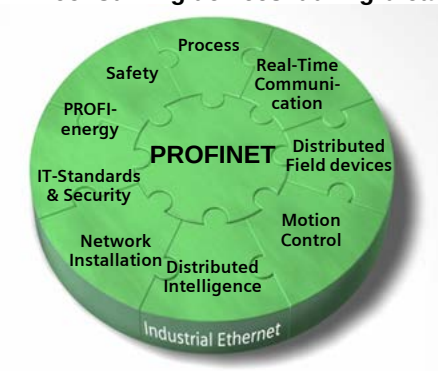
During start-up, the CPU searches the configured PNIO devices or DP slaves and parameterizes these according to the loaded device configuration.

Both fieldbus systems use different methods for identifying I/O modules:

- PROFIBUS
  The set PROFIBUS address is used to search for the configured DP slave.
  The setting is typically made through the DIP switch on the slave.
- PROFINET
  The assigned device name is used to search for the configured PNIO device.
  The assignment of the device name (device initialization) is done from the STEP 7 engineering through an online function.
  The parameterized IP address is then assigned to the PNIO device by the PNIO controller (CPU).

14.3.2. Components of the PROFINET Standard

PROFINET IO	**Integration of distributed field devices via Industrial Ethernet**
PROFIdrive	**Applications profile for drives connected to PROFIBUS and PROFINET**
PROFIsafe	**Integration of fail-safe technology (fail-safe controllers / communication) in the PROFINET standard**
PROFIenergy	**Coordinated and centrally controlled switch-off of power consuming devices during break times**



PROFINET

It completely covers the requirements of automation. PROFINET brings together the expertise of PROFIBUS and Industrial Ethernet. The utilization of the open standard, the easy handling and the integration of existing parts of a system (e.g. a plant) determined the definition of PROFINET right from the beginning.

PROFINET IO

With PROFINET IO, the integration of distributed field devices takes place directly on the Ethernet. For that, the Master-Slave procedure from PROFIBUS DP is carried over into a Provider-Consumer model. From the communication point of view, all devices on the Ethernet have equal rights. Through the configuration, however, the field devices are assigned to a central controller. The distributed I/O device reads-in the I/O signals and transfers them to the controller. The controller processes them and transfers the outputs back to the distributed I/O device.

PROFIdrive

With PROFIdrive, very fast, clock-synchronous drive controls for high performance Motion Control applications are implemented.

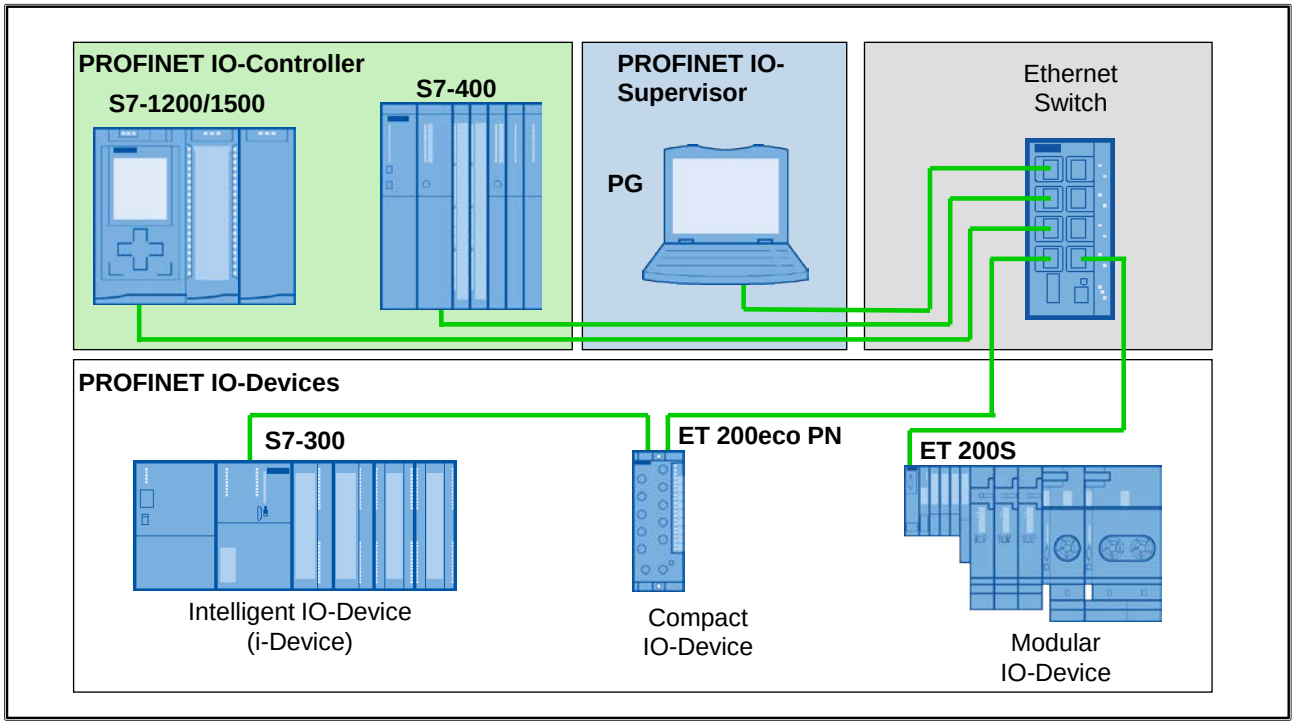
PROFIsafe

With PROFIsafe, the network infrastructure already existing for standard communication can also be used at the same time for fail-safe communication. The existing bus protocols, such as, PROFIBUS and PROFINET (so-called "black channel") are used to transport fail-safe data as additional data (so-called PROFIsafe layer).

PROFIenergy

PROFIenergy permits a coordinated and centrally controlled switch off of power consuming devices during break times. In this way, the process uses only the absolute necessary energy. The process itself saves the majority of the energy, the PROFINET device itself only has a savings potential of several watts. For PROFIenergy, this operating state is called "Pause".

14.3.2.1. PROFINET IO Device Types



PROFINET IO-Controller

The IO-Controller (typically the PLC) establishes a logical connection to the connected IO-Devices after Power-On and subsequently parameterizes these (module parameters, address, etc.). (This corresponds to the function of a Class 1 Master in PROFIBUS).

PROFINET IO-Device

An IO-Device is a distributed IO device that is connected via PROFINET IO (this corresponds to the function of a slave in PROFIBUS).

Differentiation is made for the following IO-Device types:

- Compact IO-Device: Fixed degree of expansion.
- Modular IO-Device: Variable degree of expansion; can be expanded or reduced as required.
- Intelligent IO-Device: A PLC is configured not as an IO-Controller but as an IO-Device and provides a higher-level controller with I/O data.

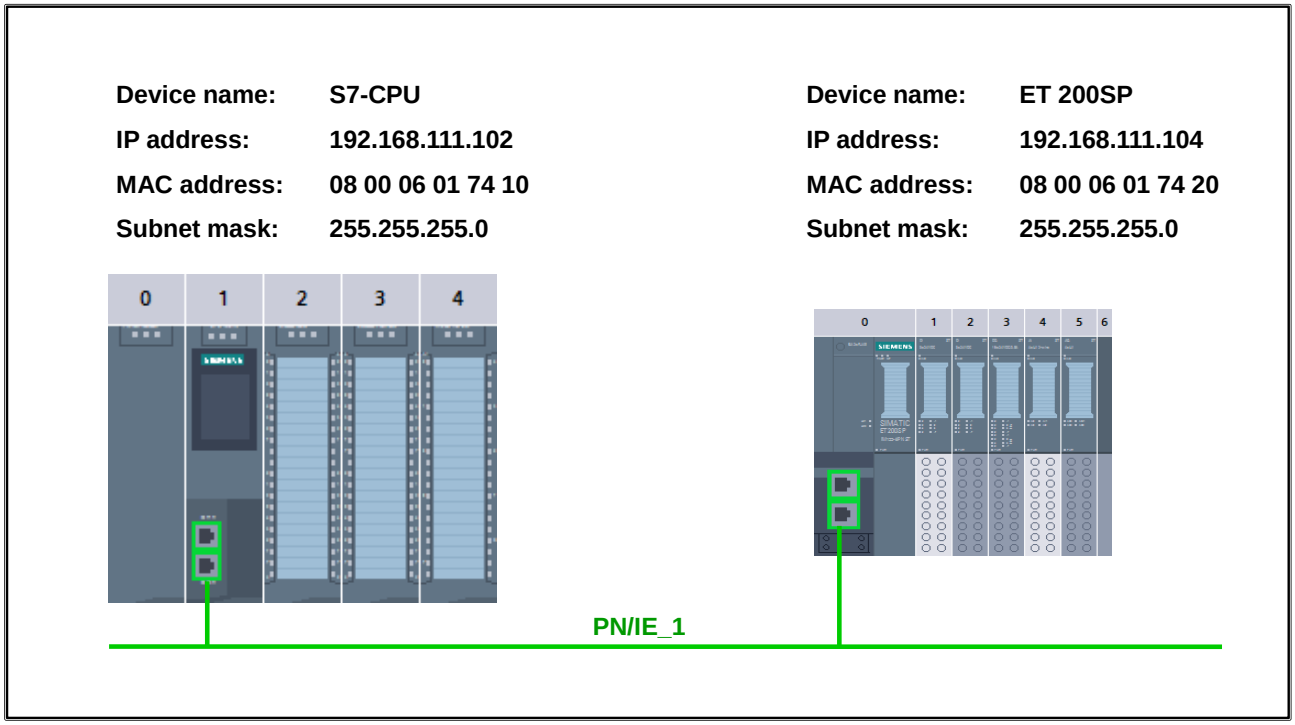
IO-Supervisor

This can be a programming device (PG), personal computer (PC) or Human Machine Interface (HMI) for commissioning or diagnostic purposes. (This corresponds to a Class 2 Master in PROFIBUS).

Ethernet Switch

PROFINET is based on Ethernet. For that reason, switches are always used as "network distributors". Every node is connected to a switch via a so-called "point-to-point" connection. This is also referred to as a **"Switched Ethernet"**. In most PROFINET devices, a 2 or multi-port switch is already integrated so that it is very easy to establish a line structure (comparable to PROFIBUS).

14.3.2.2. PROFINET Addresses



Internet Protocol

The **I**nternet **P**rotocol (**IP**) is the basis for all TCP/IP networks. It creates the so-called datagrams (data packets specially tailored to the Internet protocol) and handles their transport within the local subnet or their "routing" (forwarding) to other subnets.

IP Addresses

IP addresses consist of 4 bytes. With the dot notation, each byte of the IP address is expressed by a decimal number between 0 and 255. The four decimal numbers are separated from one another through dots (see picture).

PROFINET Device Name

In PROFINET, each RT / IRT device must be assigned a unique device name that is retentively stored in the device. A module exchange without PG/PC is made possible through the device names.

MAC Address

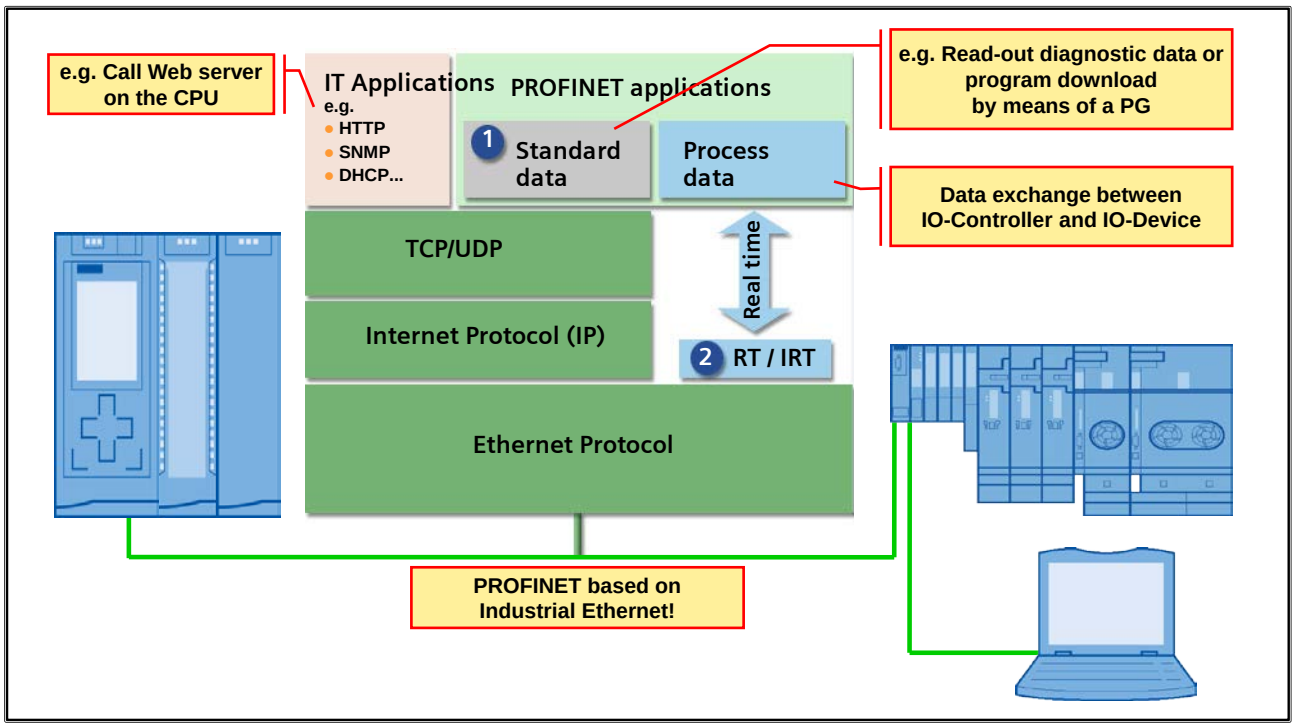
Every Ethernet interface is assigned a fixed address by the manufacturer that is unique worldwide. This address is referred to as the hardware or MAC address (**M**edia **A**ccess **C**ontrol). It is stored on the network card and uniquely identifies the Ethernet interface in a local network. Cooperation among the manufacturers ensures that the address is unique worldwide.

Subnet Mask

The subnet mask specifies which IP addresses in the local network can be accessed. It separates the IP address into the network and device part.

Only IP addresses whose network part is the same can be accessed.
e.g.: Subnet mask = **255.255.255.0** and IP address = **192.168.111.10**
accessible IP addresses: **192.168.111.1** to **192.168.111.254**

14.3.2.3. PROFINET Communication Model



Real-time Channel

To be able to fulfill real-time requirements in automation, an optimized real-time communication channel, the Realtime Channel (RT Channel), was specified in PROFINET. It uses Ethernet (Layer 2) as a base.

The addressing of the data packets does not take place in this case via an IP address, rather by means of the MAC addresses of the participating devices. Such a solution minimizes the throughput times in the communications stack considerably and leads to an increase in performance with regards to the updating rate of automation data.

IRT Channel

Isochronous Real-time (IRT) as a further development with the following features:

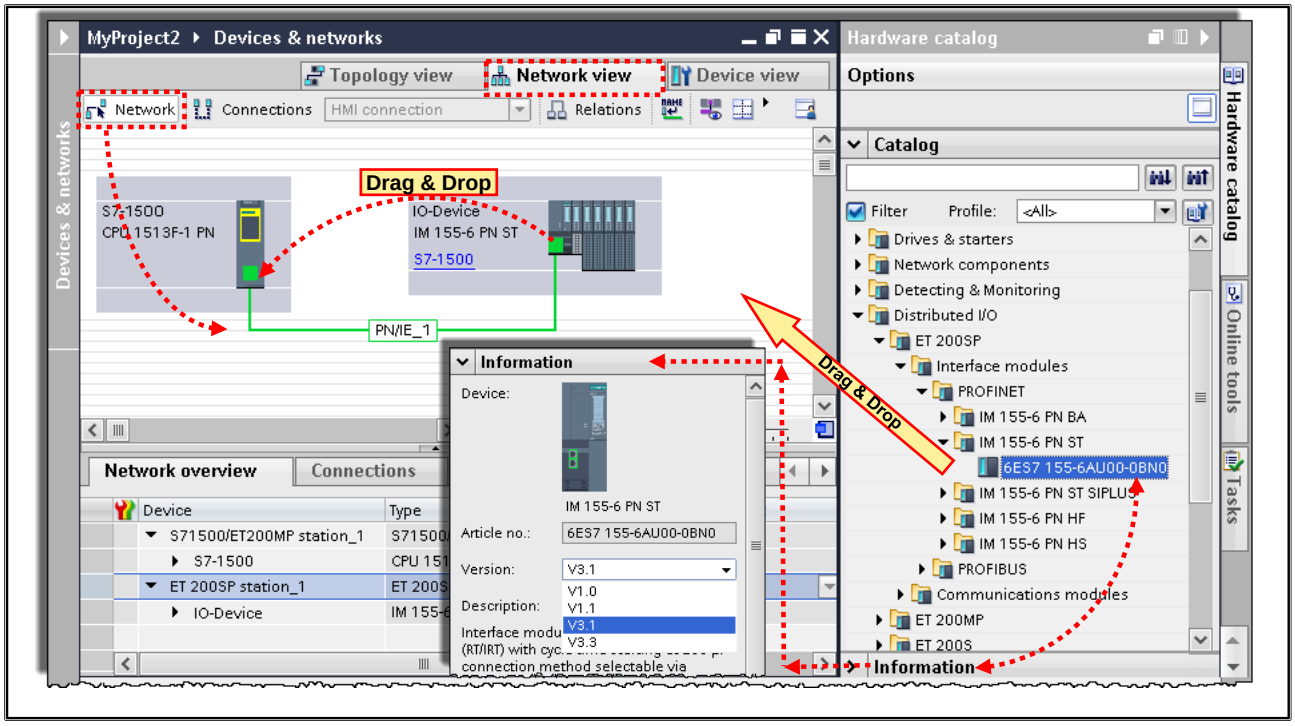
- Clock-synchronous data transmission
- Cycle times <1ms with jitter accuracy <1µs
- Typical field of application is Motion Control

IT Standards

The design of PROFINET WEB Integration focuses on commissioning and diagnostics. Access to a PROFINET device from the Internet or Intranet is done with standard protocols (for example, http). The data is transmitted in standard formats such as HTML or XML and can be presented with standard browsers such as Opera or Internet Explorer.

This worldwide accessibility makes it easy for the application manufacturer to support the user with commissioning, device diagnostics etc. Access to the data is done via Web servers which are integrated in the modules.

14.4. Inserting and Networking Distributed I/O



Inserting Distributed I/O

PROFINET IO-Devices are added in the Network view. Here, you can insert the relevant devices into the project by dragging & dropping them from the Hardware catalog. The correct Firmware must also be selected here before the device is inserted.

The new device (ET 200SP) is stored in the "Ungrouped devices" folder.

Furthermore, there is a link to the ET 200SP in the "Unassigned devices" folder since it is not yet assigned to a controller.

Networking Distributed I/O

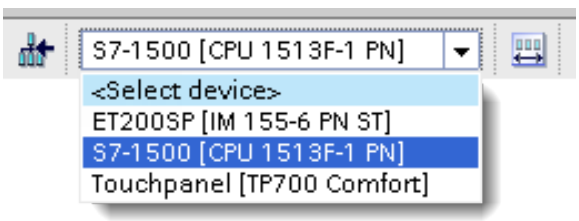
After the ET 200SP IO-Device is added, it must be assigned to an IO-Controller or networked with a CPU. In case there are several CPUs in the network, a co-ordination or monitoring of the I/O addresses by the IO-Controller and IO-Device can only be done through this unique assignment.

If the ET 200SP is assigned to a Controller, the link is stored in the "Distributed I/O" subfolder of the Controller.

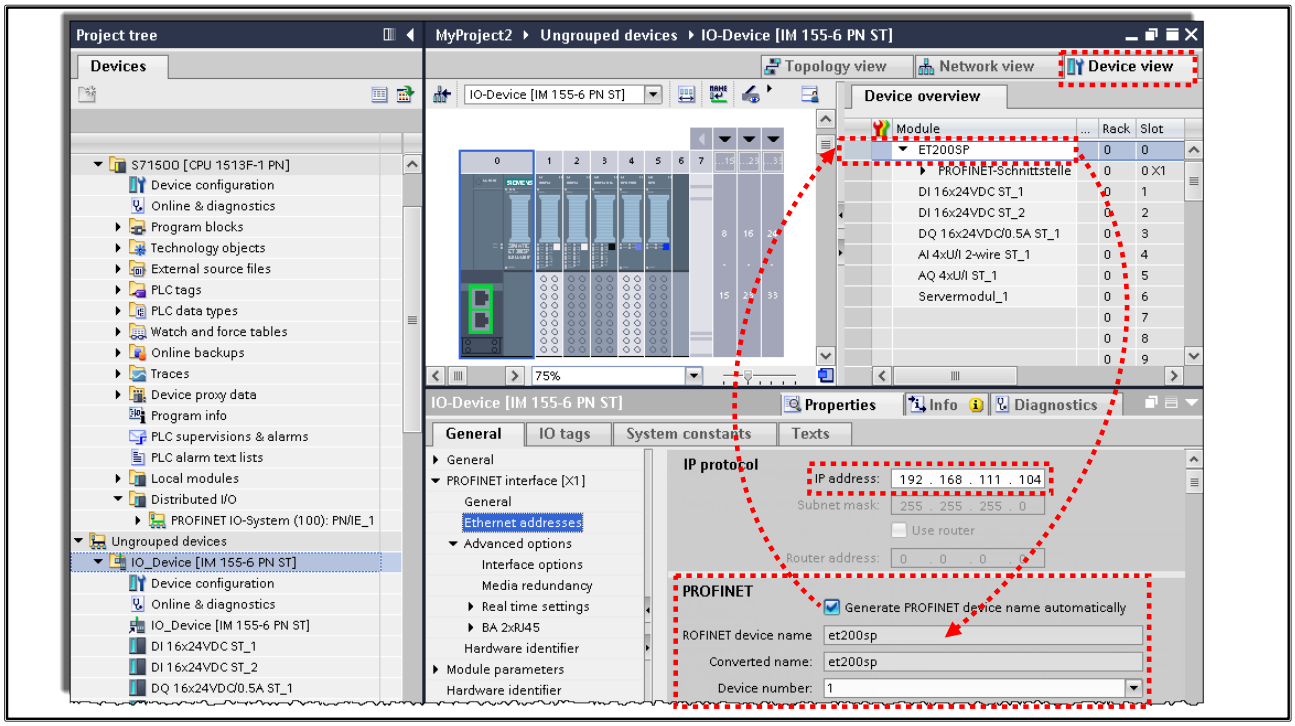
The actual device is still stored in the "Unassigned devices" folder.

I/O Modules

Just as for a CPU, the individual input and output modules can be configured and assigned parameters in the Device view. For this, the device is selected and the Device view opened or in the Device view, the relevant device is selected via the selection menu.



14.4.1. PROFINET IO Device ET 200SP: Assigning the IP Address and Device Name OFFLINE



IP Address, Subnet Mask and PROFINET Device Name

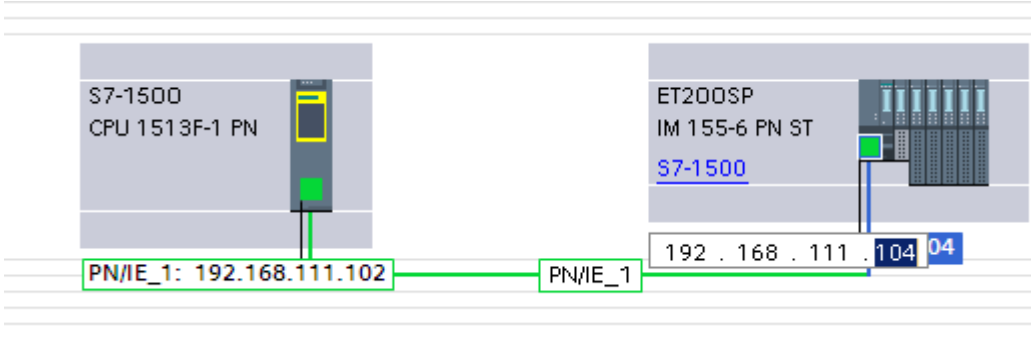
For communication with the IO-Controller, a PROFINET device name must be assigned to the IO-Device (ET 200SP) OFFLINE. The IO-Controller then assigns the IO-Device a valid IP address. If the IO-Device is assigned an IP address OFFLINE, this IP address is adopted. These parameters are downloaded to the IO-Controller (CPU) with the programming device. The IO-Controller (CPU) then transfers these and other parameters (such as, the I/O addresses) to the IO-Device (ET 200SP).

Attention:

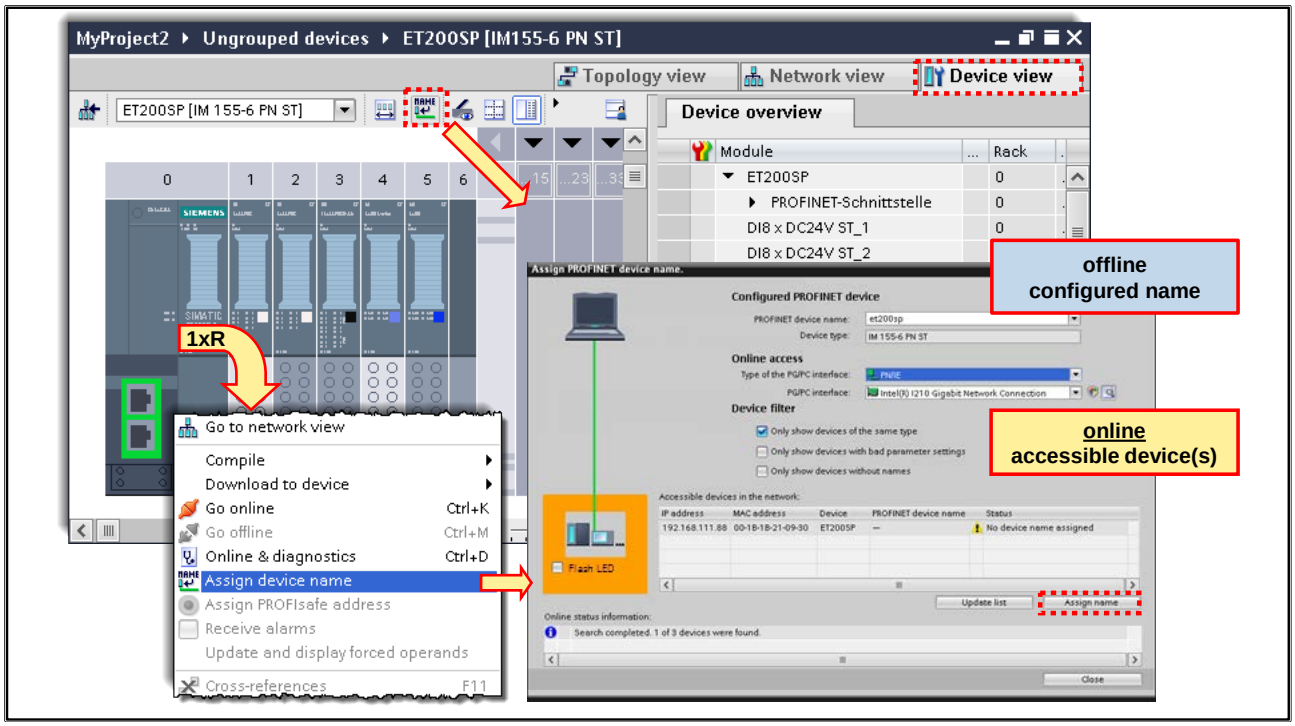
Only the PROFINET device name is relevant for the transmission of the offline configuration into the online device (Controller), not the IP address. The offline configured PROFINET device name and the online existing PROFINET device name must match. If the IO-Device has a different PROFINET device name or doesn't have a name at all, the IO-Controller cannot transfer the hardware configuration or the hardware parameter assignments to the IO-Device thus preventing a PROFINET system startup.

Note:

The IP addresses can also be entered directly in the Network view in the graphic area. For this, the IP addresses must be displayed with the  button.



14.4.2. PROFINET IO Device ET 200SP: Assigning the Device Name ONLINE



IP Address and PROFINET Device Name

The PROFINET device name of the IO-Device configured offline and the device name existing online must match since the IO-Controller first checks the device names of the connected IO-Devices and then assigns the configured IP addresses during system startup. If an IO-Device is not accessible under its configured device name, the IO-Controller cannot establish a connection to the IO-Device.

The IP address of the IO-Device configured offline and the address existing online do not have to match. The PROFINET name is relevant for the downloading of the hardware configuration. If it exists, the online existing IP address is overwritten with the offline configured IP address.

Ways of Assigning a Name Online

In principle, there are two ways of assigning a PROFINET device name to an IO-Device online:

Version 1 (safe, since there is no chance of typing errors)

The assignment of the device name is triggered from the device configuration of the IO-Device.

Device configuration of IO-Device → Right-click on the Interface module (Slot 0) → Assign device name (see picture).

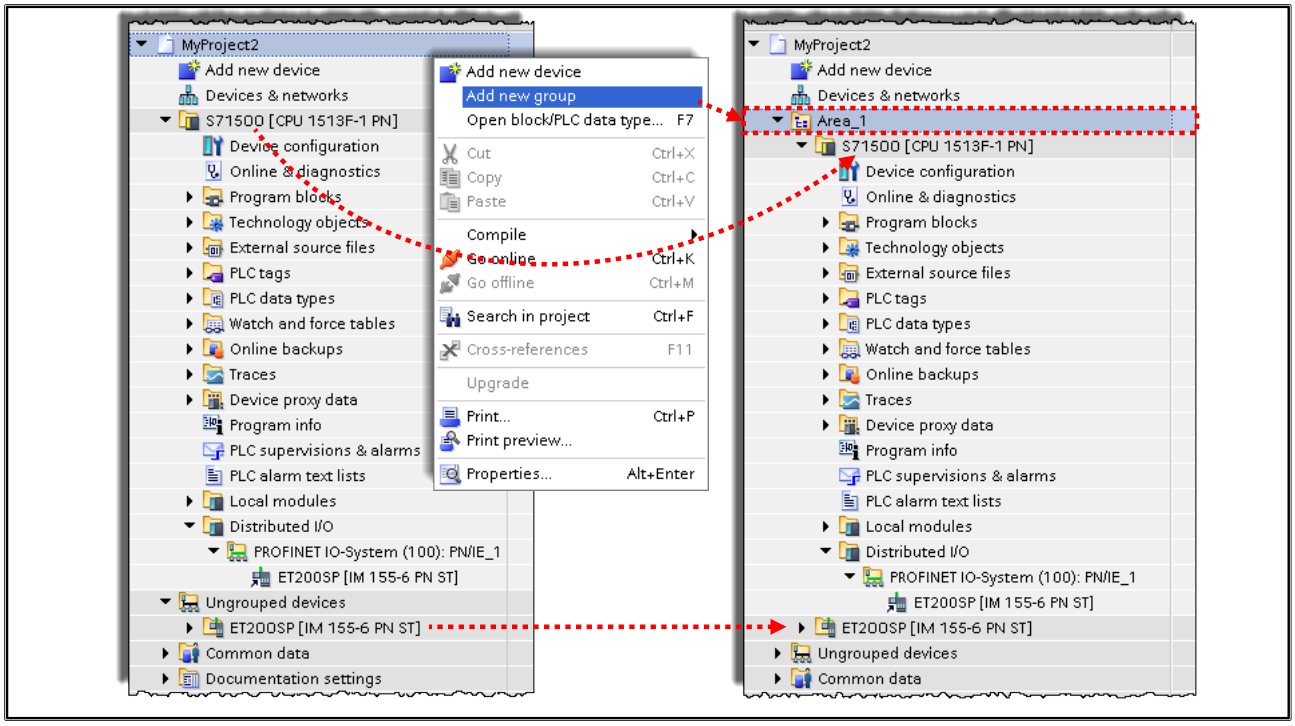
The advantage of this version is that the offline configured device name is adopted 1:1 and so no typing errors can be made.

Version 2 (typing errors possible)

The assignment of the device name is triggered via "Online access":

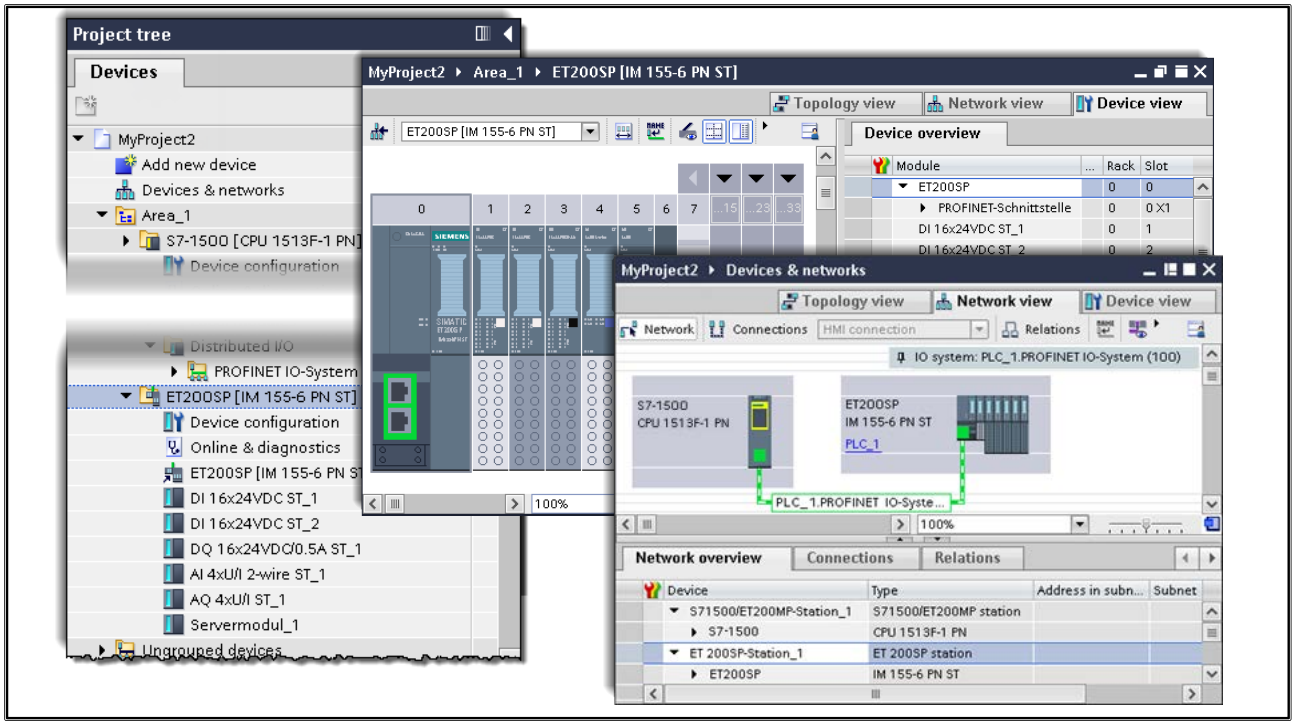
Project tree → Online access → Ethernet interface → IO-Device → Online & diagnostics → Functions → Assign name

14.5. Grouping Devices



The individual devices (distributed I/O as well) can all be stored directly in the project. For better readability of the project, it is recommended to group the individual devices. For this, device groups can be created in which the individual devices can be stored using drag & drop.

14.6. Task Description: Commissioning the ET 200SP



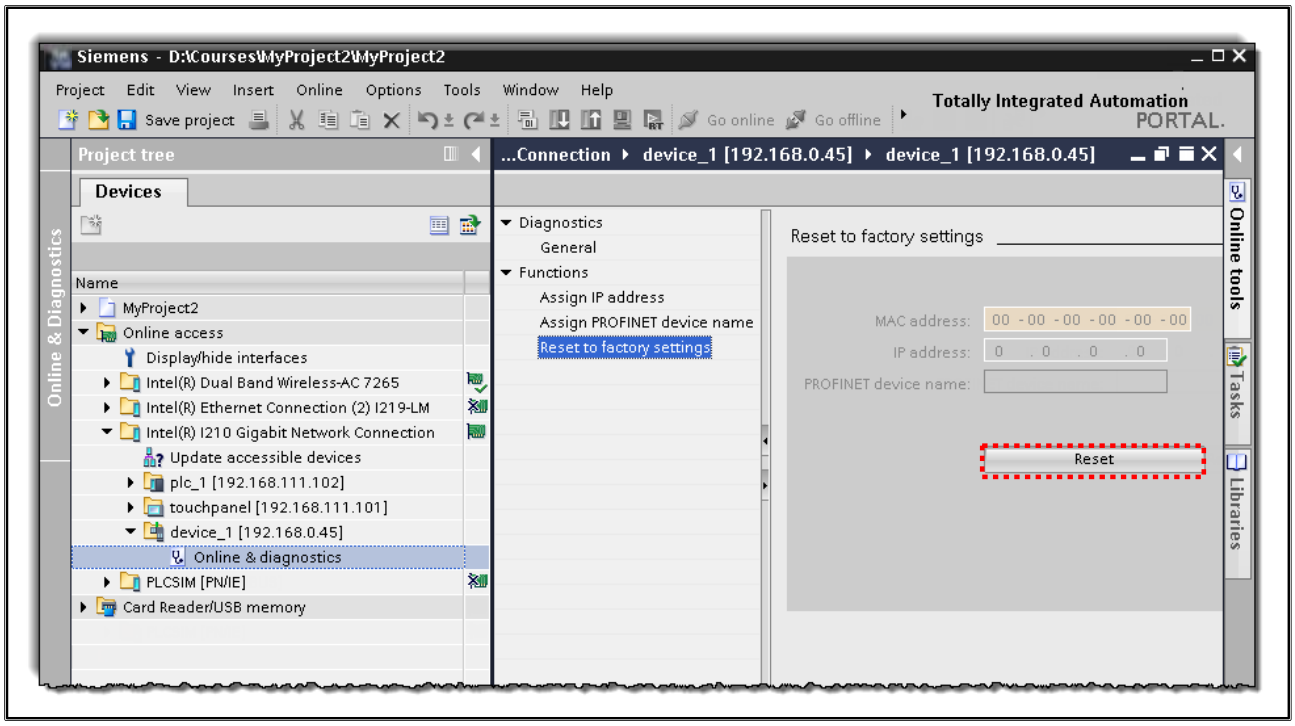
Task Description

The ET 200SP distributed I/O station is to be commissioned since the conveyor model is later to be controlled via its input and output modules.

For this, the ET 200SP station must be configured, assigned parameters and networked with the S7-1500 station in the offline project.

After compiling the new hardware configuration, it must be downloaded into the CPU. In the function of an I/O Controller, the CPU then automatically undertakes the parameterization of the ET 200SP I/O-device.

14.6.1. Exercise 1: ET 200SP: Reset to Factory Settings



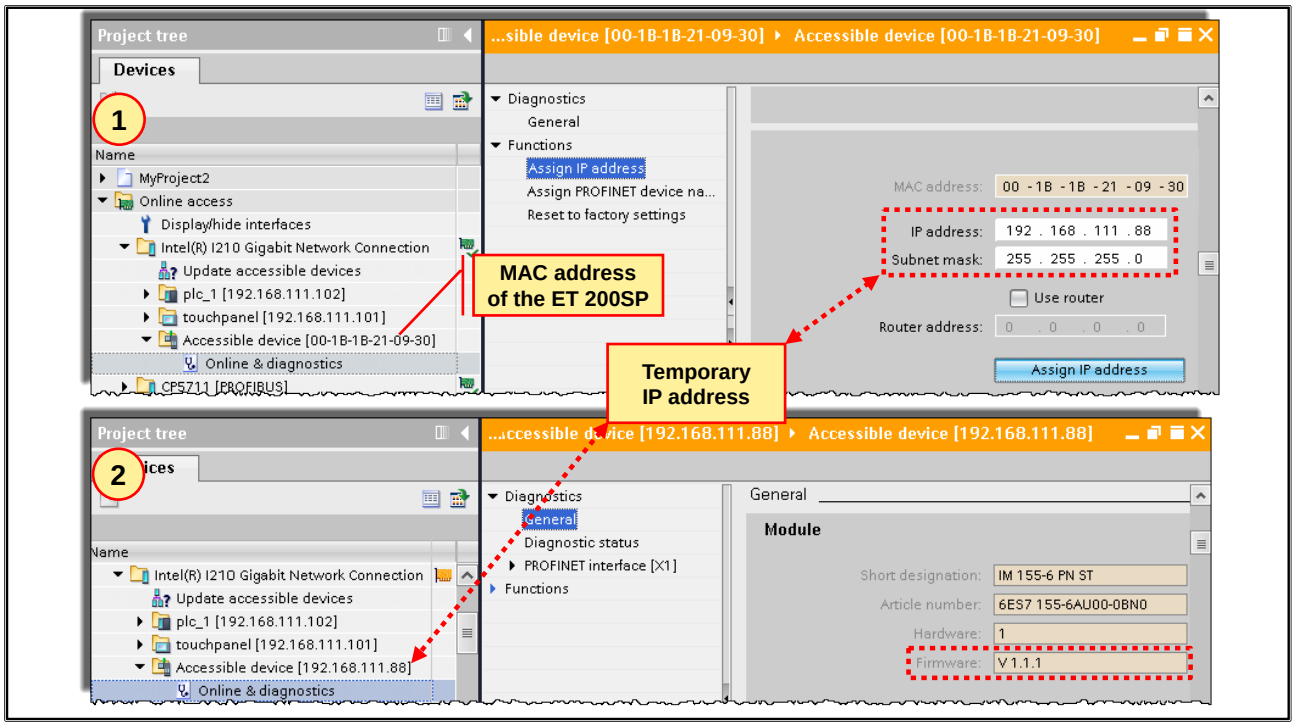
Task

All settings so far (IP address, subnet mask and PROFINET name) of the Interface module and the memory card of the ET 200SP station are to be deleted through a "Reset to factory settings". In the following exercises, you will then transfer your own settings onto the ET 200SP station.

What to Do:

1. Open the Online access and there select the interface that is connected to your training case.
2. Activate it by double-clicking on "Update accessible devices" and wait until the list is completed. This is indicated by a green checkmark by the interface.
3. Open the ET 200SP and there activate the function "Online & diagnostics" by double-clicking on it.
4. In the "Online & diagnostics" window, open the menu "Functions > Reset to factory settings".
5. Start the "Reset" function and confirm the follow-up dialog with "Yes".
6. Close the "Online & diagnostics" window.
7. Check the success of the reset in the Inspector window under “INFO > General”. In addition, after updating the accessible devices, you will find the ET 200SP in the list without an IP address and without a device name.
8. Leave all windows open for the next exercise.

14.6.2. Exercise 2: Reading-out the Firmware Version of the ET 200SP



Task

In the following exercises, in order to be able to configure an ET 200SP in the offline project which corresponds exactly to that of the training device, you now have to read out the Firmware version of the ET 200SP online.

Problem

Due to the previous "Reset to factory settings", the ET 200SP now no longer has a PROFINET device name nor an IP address, only a MAC address (see top picture). The Firmware version, however, cannot be read out via the MAC address, since an IP address is required for this diagnostic service.

What to Do

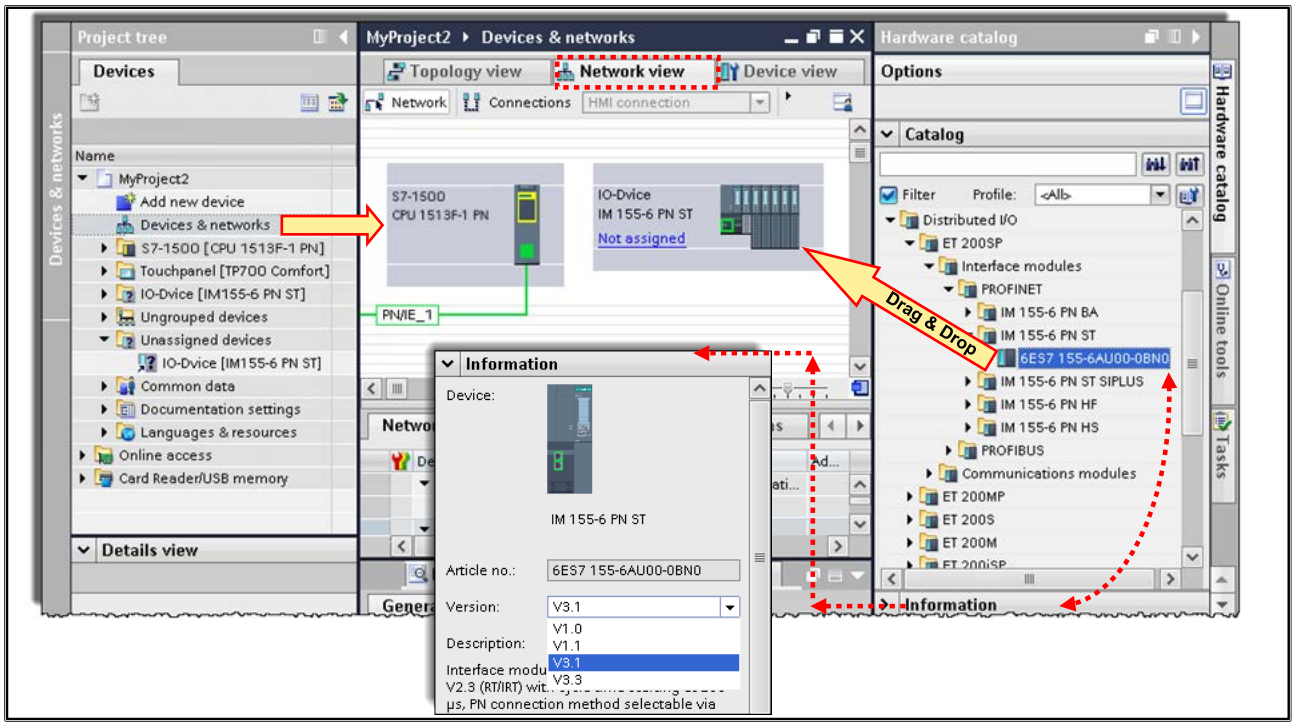
1

1. Open the ET 200SP and, with a double-click, activate the "Online & diagnostics" function and there check whether the ET 200SP Firmware version is displayed in the menu "Diagnostics -> General".
2. No Firmware version is displayed since the ET 200SP doesn't have an IP address. To assign a temporary IP address, switch to the "Functions -> Assign IP address" menu. There enter the temporary IP address as well as the subnet mask shown in the picture and adopt the entry by clicking "Assign IP address" (see top picture)

2

3. In the Project tree, once again "Update" the list of "accessible devices".
4. In the device list, the ET 200SP is now displayed as a device with Order number and IP address. Once again activate "Online & diagnostics" (see bottom picture).
5. Make note of the Firmware version shown in the "Diagnostics -> General" tab.
6. Close the window and then, in the Project tree, the "Online access".

14.6.3. Exercise 3: Offline Project: Adding the ET 200SP



Task

An ET 200SP is to be inserted into the project as a distributed I/O station.

PROFINET IO-Devices are added in the Network view. Here, you can insert the relevant devices into the project by dragging & dropping them from the Hardware catalog.

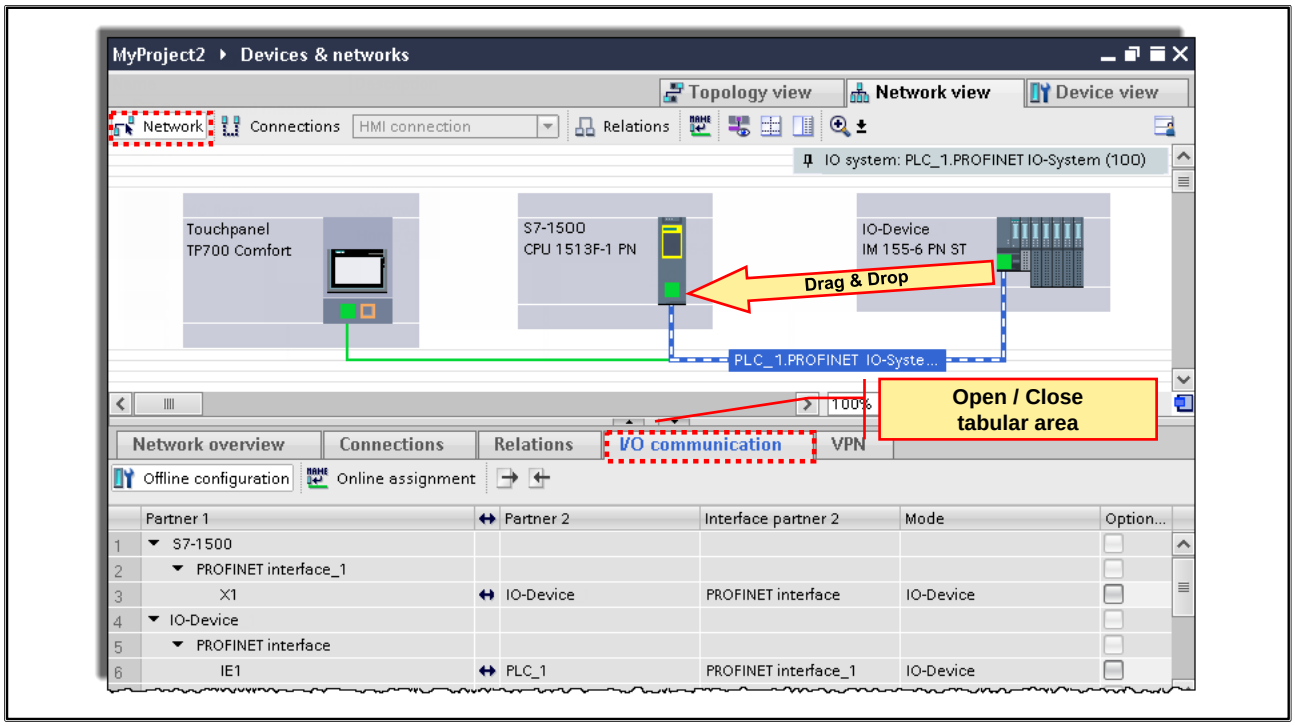
The newly added ET 200SP is stored in the Project tree in the "Ungrouped devices" folder and since it initially is not assigned to any controller, a reference is entered in the "Unassigned devices" folder.

What to Do

1. In the Project tree, open the "Hardware and Network editor" by double-clicking on it.
2. Open the Hardware catalog Task Card and there
   Distributed I/O -> ET 200SP -> Interface modules -> PROFINET -> IM155-6PN ST
3. Select the IM module used in your training device, open the Information window and there select the previously read out Firmware version of your IM module.
4. Using drag & drop, drag the IM module into the "Hardware and Network editor" (see picture).

Leave all windows open because they are still needed for the next exercises!

14.6.4. Exercise 4: Networking the ET 200SP



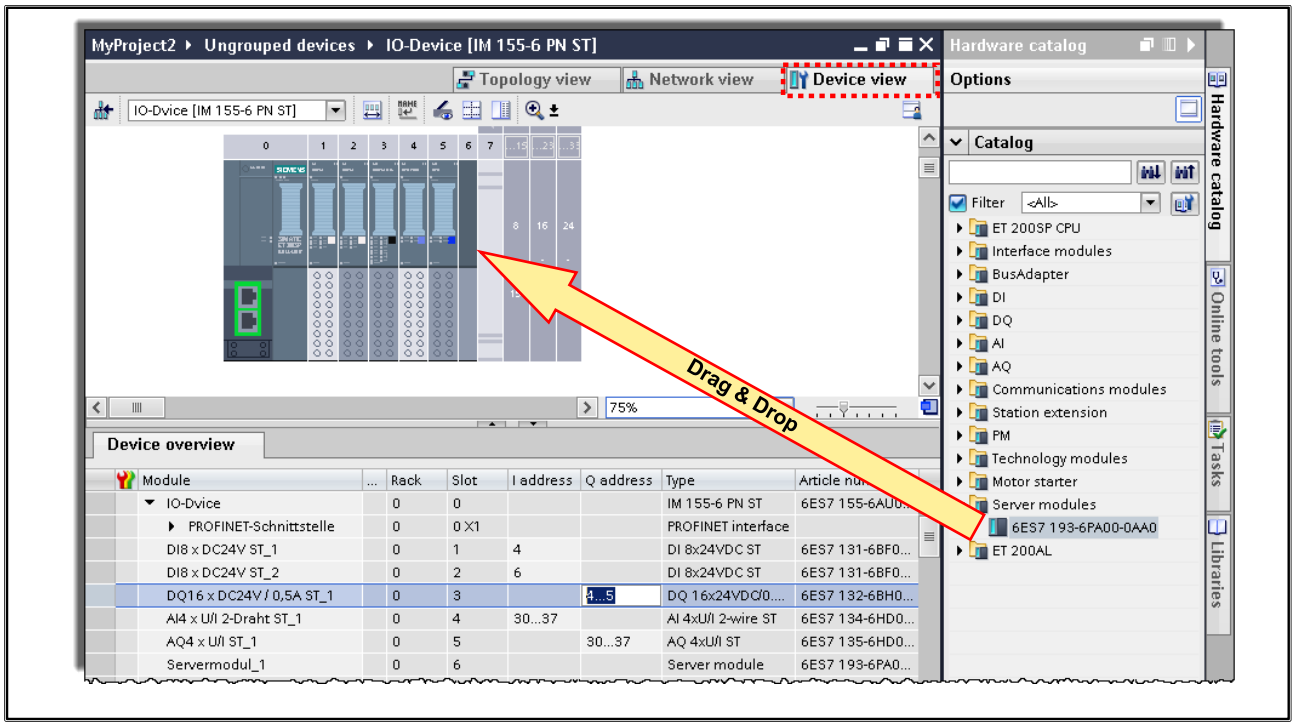
Task

After the ET 200SP IO-Device is added, it must now be assigned to an IO-Controller or networked with a CPU. In case there are several CPUs in the network, a co-ordination or monitoring of the I/O addresses by the IO-Controller and IO-Device can only be done through this unique assignment.

What to Do

1. In the "Hardware and Network editor", select the Network view and there click "Network" in the menu bar.
2. Network the ET 200SP with the CPU by connecting the Ethernet interface of the ET 200SP with the Ethernet interface of the CPU using drag & drop.
3. Select the newly created PROFINET IO system and, in the Inspector window under "I/O communication", check the generated communication partners.

14.6.5. Exercise 5: Configuring and Parameterizing the ET 200SP



Task

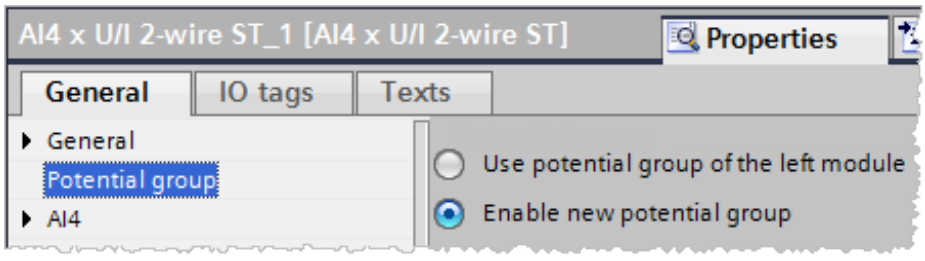
The configuration of the ET 200SP in the offline project must match exactly with the configuration of your training device. Attention should be given in particular to the order numbers and versions of the modules.

The ET 200SP has digital and analog input and output modules to which the conveyor model is to be connected in the following. The address assignment can be made in the Properties of the individual module, or, as can be seen in the picture, in the "tabular area" of the "Device view".

What to Do

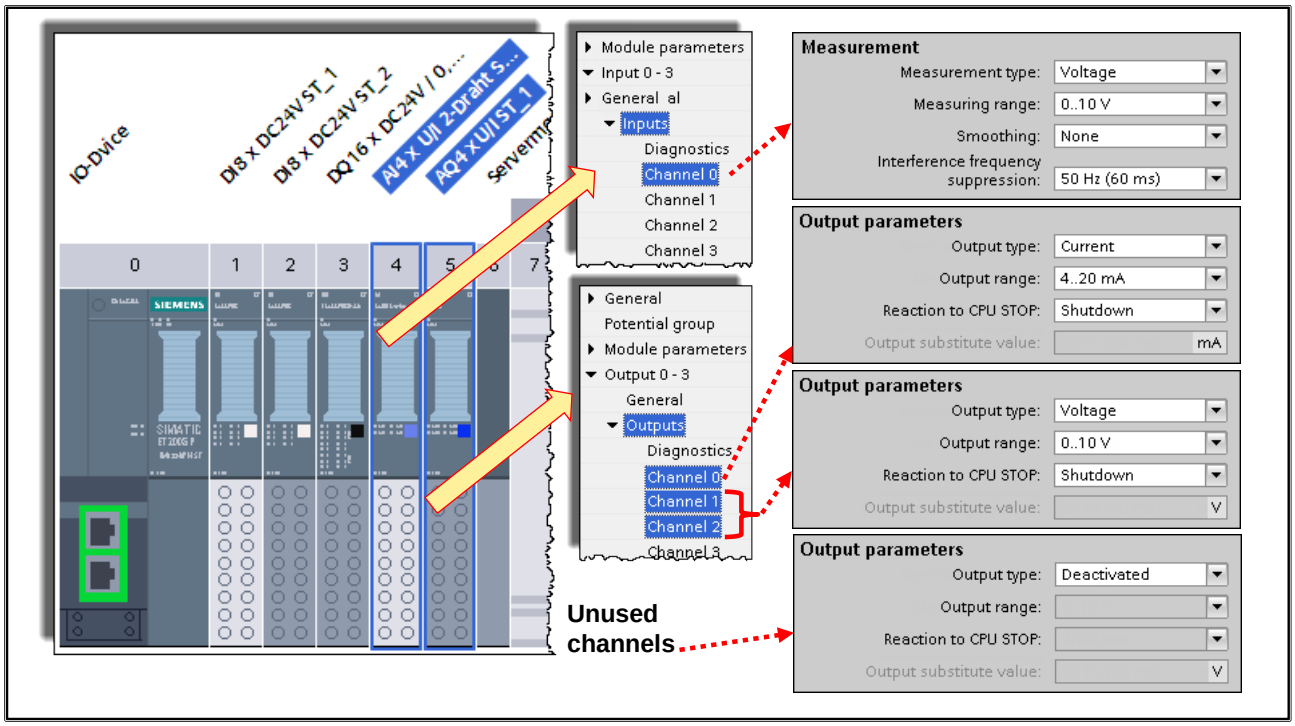
1. In the "Hardware and Network editor", select the "Device view" of the ET 200SP.
2. In the Task Cards, open the "Hardware catalog".
3. Configure the ET 200SP station according to your training device.

   Make sure that a new potential group is opened with the AI module on Slot 4 and set this in the Properties:



4. Open the tabular area of the "Device overview" (see picture) and, in the table, enter the I/O addresses shown in the picture.
5. Save your project.

14.6.6. Exercise 6: Setting the Channel Parameters of the Analog Modules

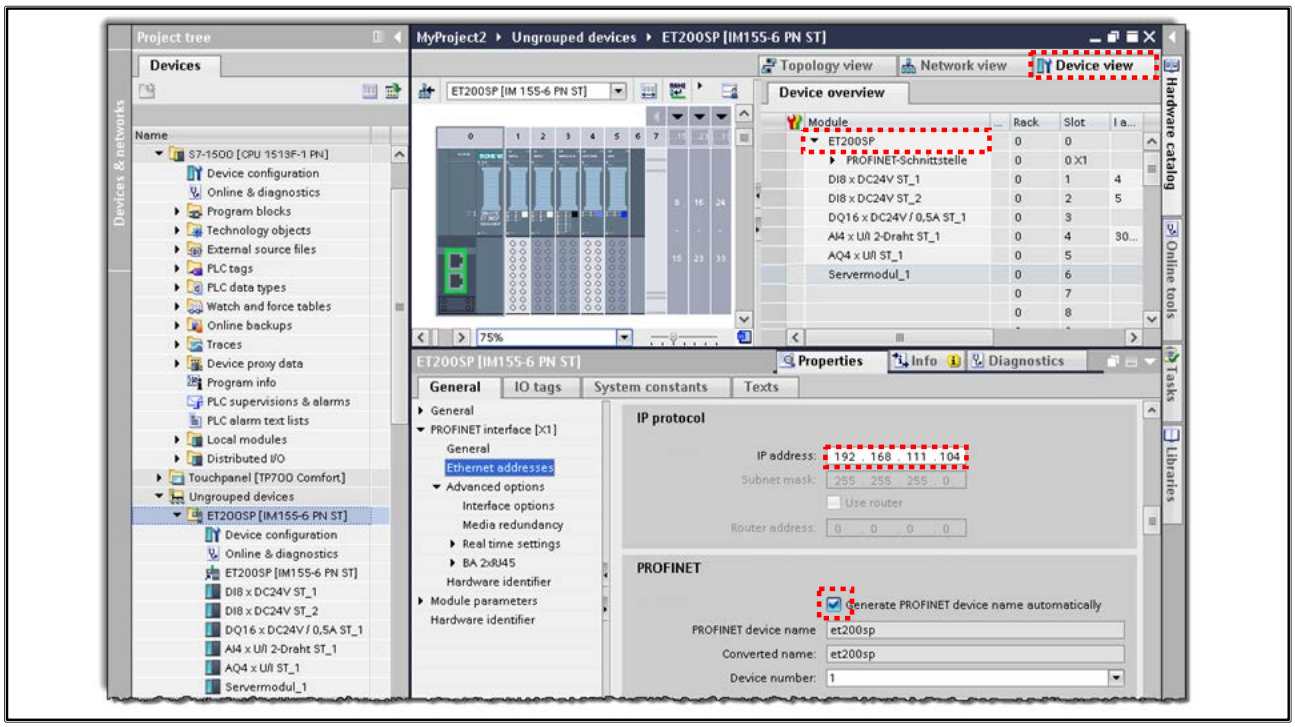


Task and What to Do:

Set the analog channels to the relevant parameters:

- Inputs
  Channel 0 → Voltage 0..10V
- Outputs
  Channel 0 → Current 4..20mA
  Channel 1 → Voltage 0..10V
  Channel 2 → Voltage 0..10V
- Deactivate all unused analog inputs and outputs.

14.6.7. Exercise 7: ET 200SP: Assigning the IP Address / PROFINET Name OFFLINE



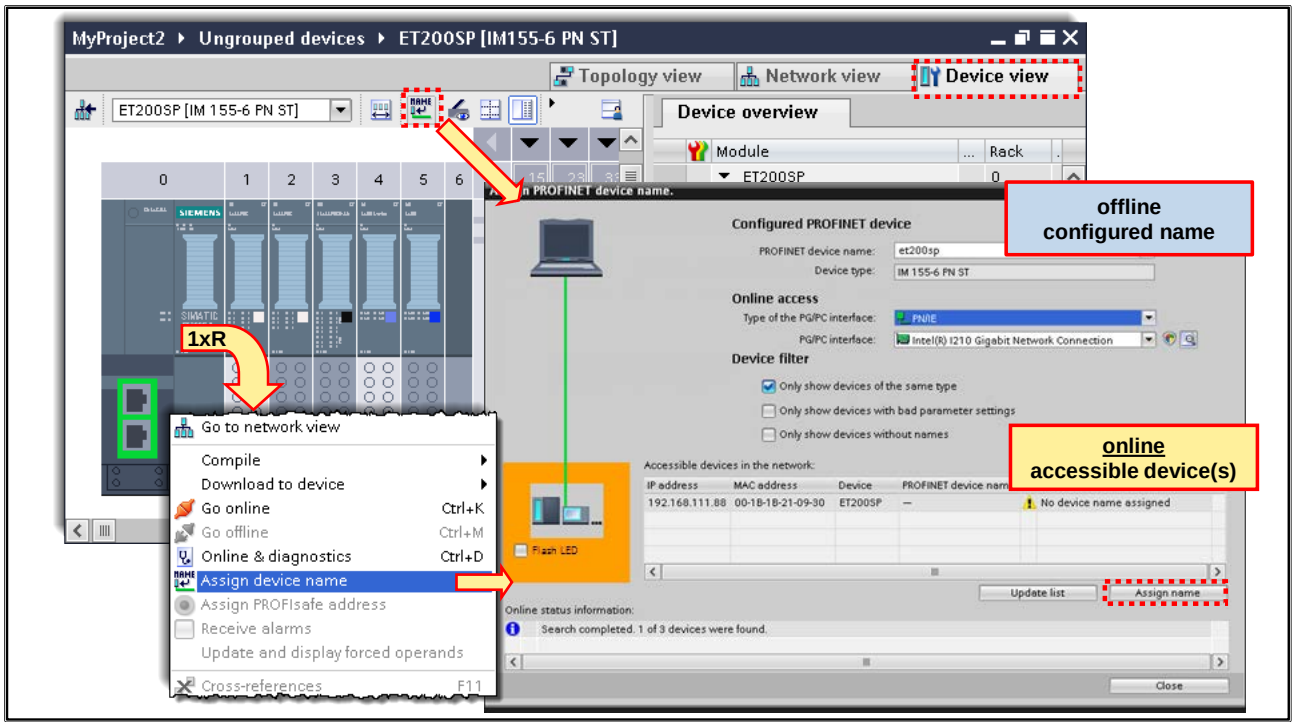
Task

The ET 200SP station is later to work with the IP address, subnet mask and PROFINET device name shown in the picture above.

What to Do

1. In the "Hardware and Network" editor, select the "Device view" of the ET 200SP.
2. Select the IM module on Slot 0 and open the "Properties" tab in the Inspector window.
3. There, in the "General" tab, select the "General" menu and under "Name" enter the PROFINET device name.
4. Then select the "Ethernet addresses" menu and under "IP protocol" enter the IP address and subnet mask shown (see picture). In the same menu you will also find the PROFINET device name that you previously edited in the "General" menu. If the property "Generate PROFINET device name automatically" is activated, it cannot be changed here.
5. Save your project.

14.6.8. Exercise 8: ET 200SP: Assigning the PROFINET Name ONLINE



Task

The PROFINET device name previously assigned offline must now be assigned to the ET 200SP online, so that the IO-Controller or the CPU can assign the offline-configured IP address during system startup of the ET 200SP.

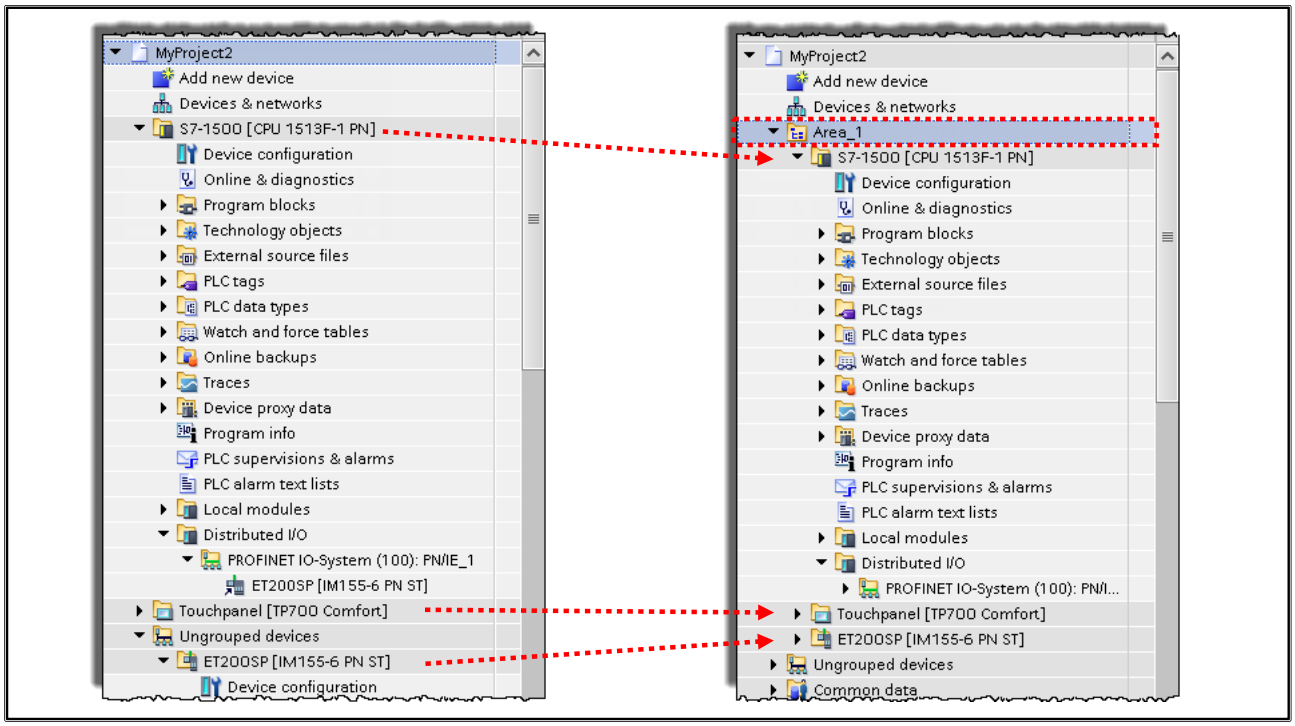
What to Do

1. In the "Hardware and Network editor", select the "Device view" of the ET 200SP.
2. Right-click on the Interface module or the module on Slot 0 and in the menu that appears, activate the item "Assign device name".
3. In the dialog that appears, check the (offline) PROFINET device name.
4. Under "Type of the PG/PC interface", select the interface through which you are connected to the PROFINET.
5. In the dialog table, select (highlight) the (online) "Accessible devices in the network" with the IP address which you assigned in Exercise 2 or (if known) with the relevant MAC address and assign it the OFFLINE name via the button "Assign name".

Note:

If the function “Flash LED” is selected in the dialog, then all LEDs on the device selected in the table flash. For a Panel, the screen would flash.

14.6.9. Exercise 9: Creating a New Device Group and Grouping Devices



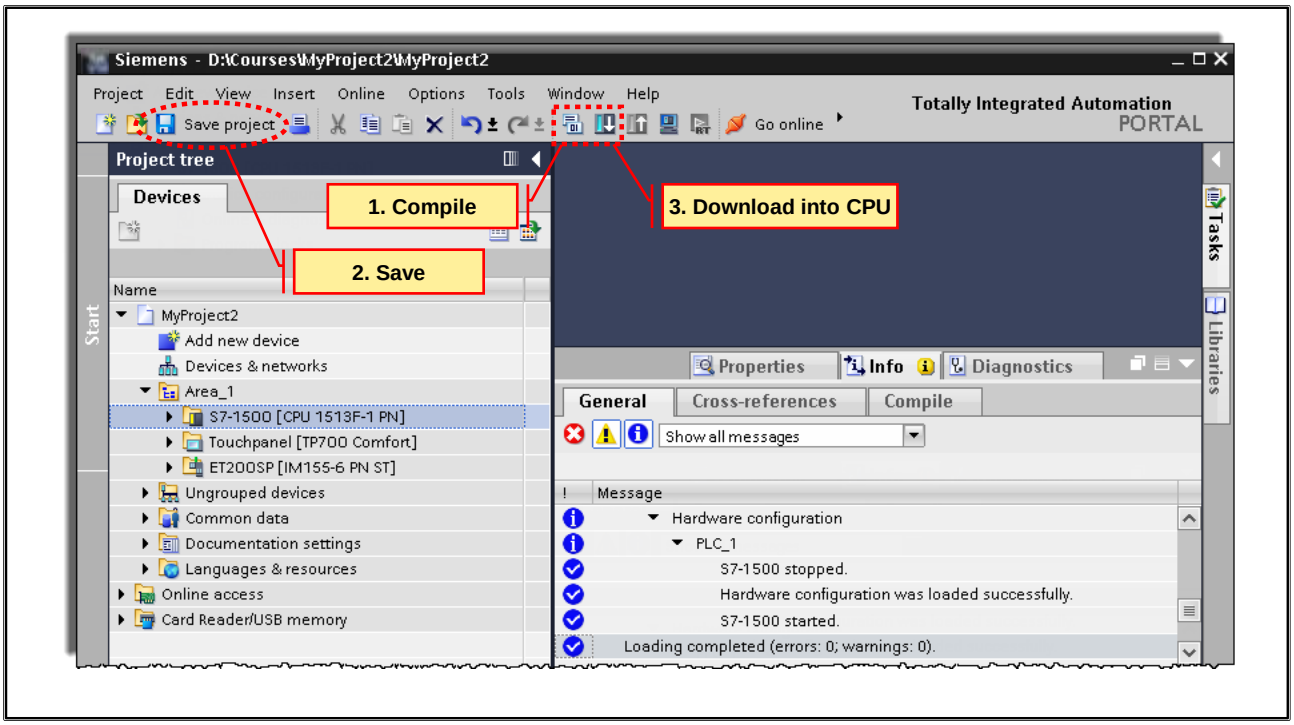
Task:

The devices (Controller, HMI and IO-Device) are to be stored in a common group.

What to Do:

1. Select the Project name and, through the context menu, insert a new device group.
2. Rename it “Area_1”.
3. Move the Controller “S7-1500”, the HMI “Touchpanel” and the IO-Device “ET 200SP” into the folder “Area_1”.
4. Save your project.

14.6.10. Exercise 10: Compiling the Changes and Downloading them into the Device



Task

Now that the PROFINET I/O system is completely configured and parameterized, the project is to be compiled, saved and downloaded into the CPU.

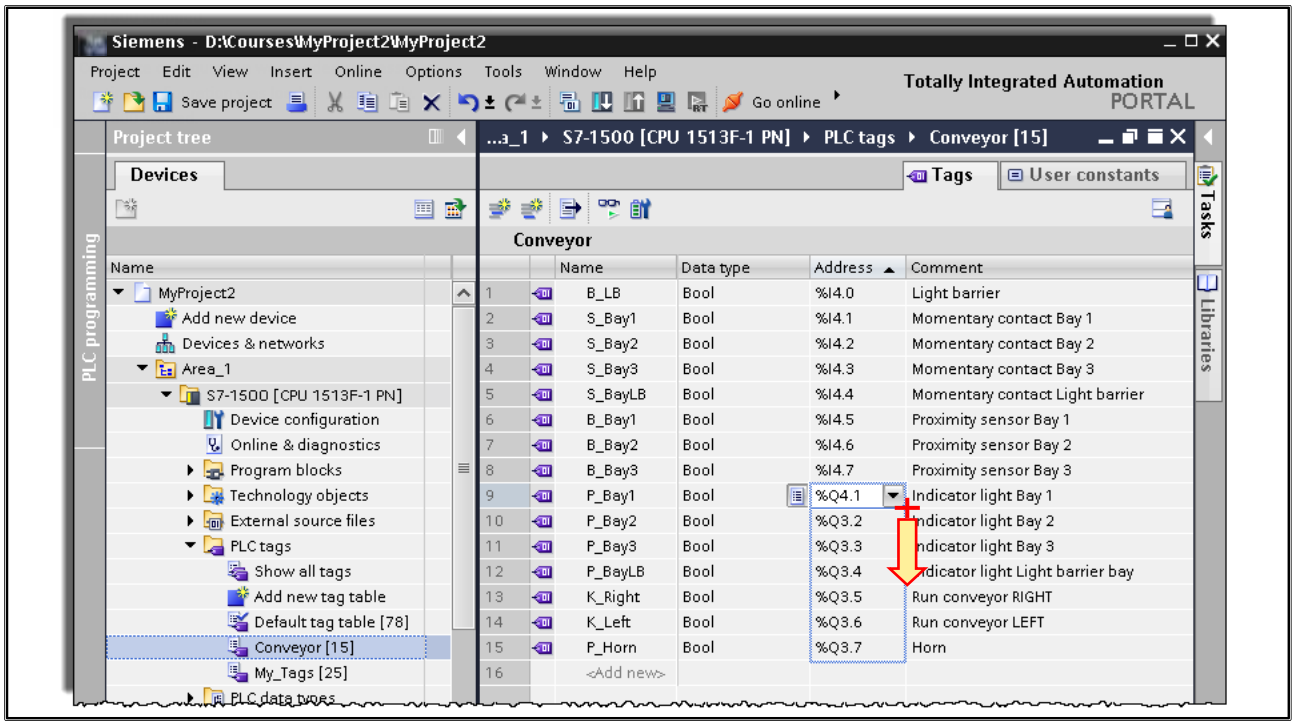
What to Do

1. Compile the changes by selecting the S7-1500 station in the Project tree and then clicking on the Compile button (see picture). In the Inspector window under "Info", check whether the compilation was successful. Should errors have occurred, correct them.
2. Save your project.
3. Download the entire station into the CPU by clicking on the Download button (see picture). In the Inspector window under "Info", check whether the loading was successful.
4. Check the module LEDs of your training device: Only green LEDs should be lit and not flashing!!!
5. Save your project.

Result:

Only green LEDs should be lit on the CPU as well as on all modules of the ET 200SP!

14.6.11. Exercise 11: Adjusting the S7 Program via "Rewiring"



Adjusting the S7 Program via "Rewiring"

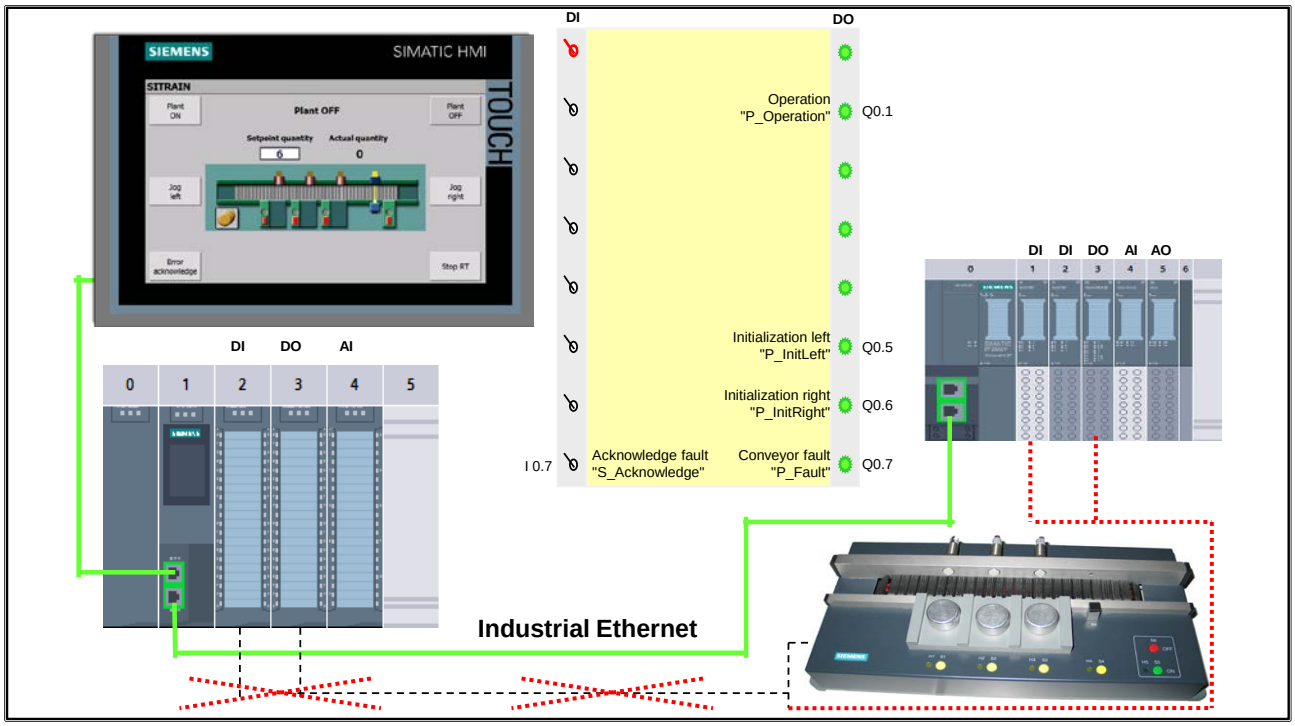
So that the conveyor model can be operated via the ET 200SP, the PLC tags (input and output addresses 3) used in the S7 program must be "rewired" to the I/O addresses of the ET 200SP modules (input and output addresses 4).

The "rewiring" can be carried out directly on the tag in the Blocks editor or, as shown in the picture, via the PLC tag table. All "rewiring" done here has immediate effect in the entire program.

What to Do:

1. Open the PLC tag table "Conveyor".
2. Sort the view according to addresses.
3. Change the address of the PLC tag "B_LB" from I 3.0 to I 4.0 and complete the entry with Return.
4. Select the address field, whereby a small square appears in the lower right corner.
5. Position the mouse pointer on this square so that the square changes to a cross (shown in the picture in red).
6. With the mouse pointer pressed down, drag the small square onto the address fields below it so that the change of the byte address is also adopted there.
7. Do the same for rewiring the outputs.
8. Save your project.
9. Compile, save and download the adjusted S7 program.

14.6.12. Exercise 12: Function Test with Conveyor Model via Distributed I/O



Task:

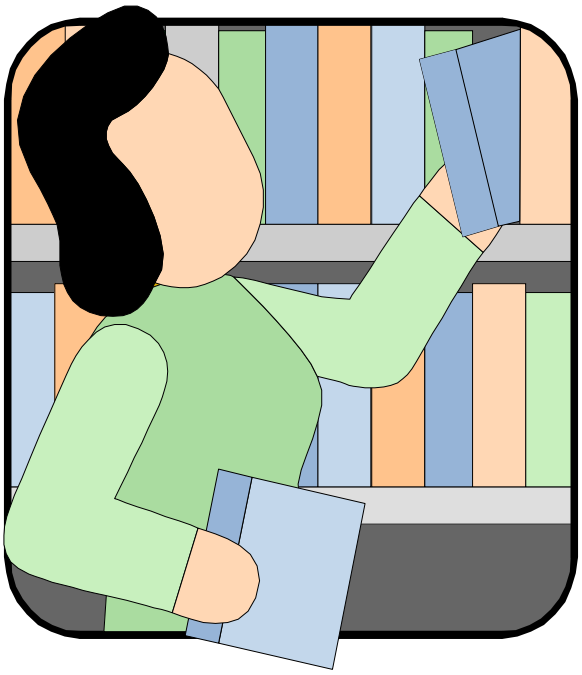
The conveyor model is now to be operated via the ET 200SP station. For this, the conveyor model connector cable must be connected to the SUB-D connector of the ET 200SP station on the backside of the training case.

With successful commissioning of the ET 200SP IO-Device and rewiring of the S7 program, the control of the conveyor model should function unchanged.

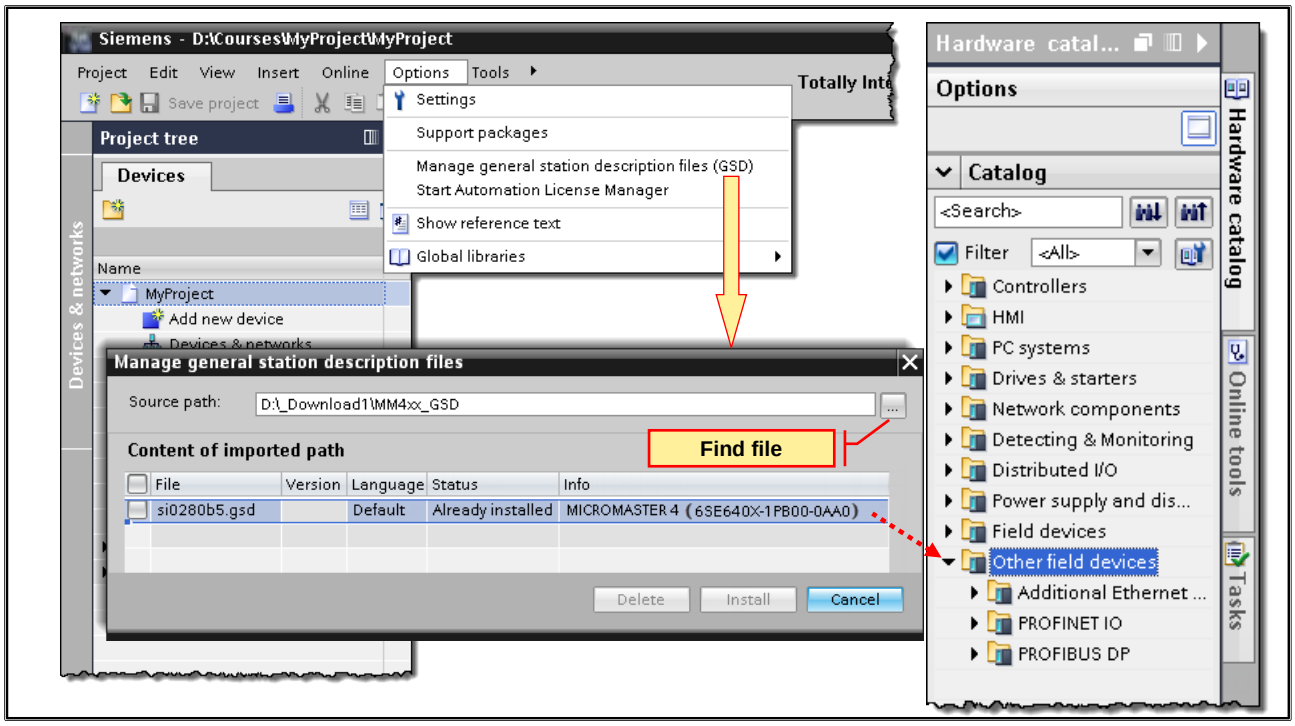
What to Do

1. Remove the conveyor model connector cable from the connector “S7-1500 DI/DO” on the backside of the training case and insert it in the connector “ET 200 DI/DO”.
2. Check whether your system functions unchanged.

14.7. Additional Information



14.7.1. Installing Distributed Peripheral Components Later On via GSD



GSD (General Station Description) File

STEP 7 requires a GSD or a type file for every distributed peripheral slave so that the module can be configured from the Hardware catalog.

GSD files contain all necessary communication properties of a distributed peripheral module according to the PROFIBUS/PROFINET standard.

A GSD file is normally supplied with distributed peripheral modules or is available as a download from the Internet.

Many SIEMENS modules are already generally a part of the Hardware catalog.

Modules Added to the Hardware Catalog

Following installation, these are entered in the "Other field devices" section and are available there for the configuration.