

Profinet IO Quick Start Guide – Platform & Hardware

This quick start guide describes how to install and monitor the CG Drives & Automation VSD (VFX/FDU) device with the Step 7 HW Configurator.

The versions of hardware and software we have used in the example are:

Step 7 Version: 5.4 + SP5

Revision Level: K5.4.5.0

Simatic S7-300, CPU315-2PN/DP (315-2EH14-0AB0)

Profinet IO 1-Port option, Firmware V.1.12-1

Profinet IO 2-Port option Firmware V.1.23

GSDML-V2.2-HMS-ABCC-PRT-20111011.XML (1-Port module)

GSDML-V2.25-HMS-ABCC-PRT2P-20111117.XML (2-Port Module)

Open the example project:

Retrieve the example project *Cgprofin.zip*.

Open the **SIMATIC Manager**.

Go to **File → Retrieve**, and select the archived zip file.

Install the GSD file

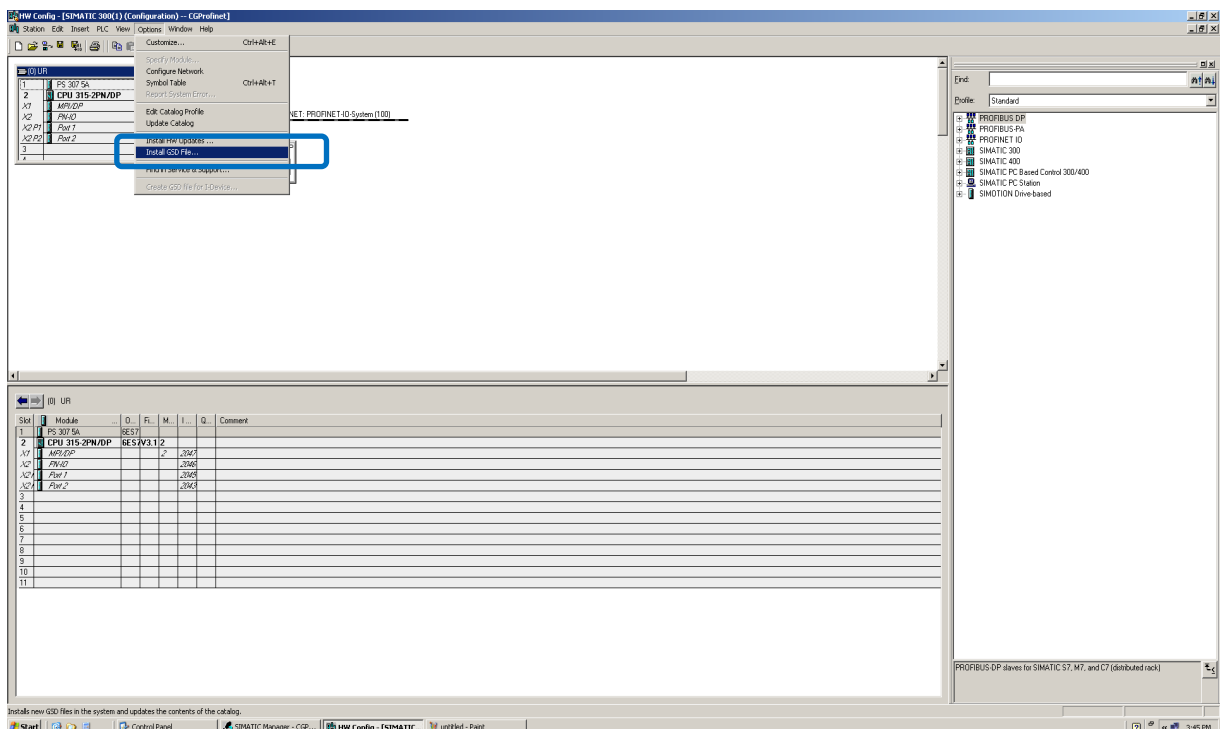
Install the GSD file *GSDML-V2.2-HMS-ABCC-PRT-20111011.XML* for one port device or the *GSDML-V2.25-HMS-ABCC-PRT2P-20111117.XML* for the two port device (or newer version if available).

Open the Hardware Configurator:

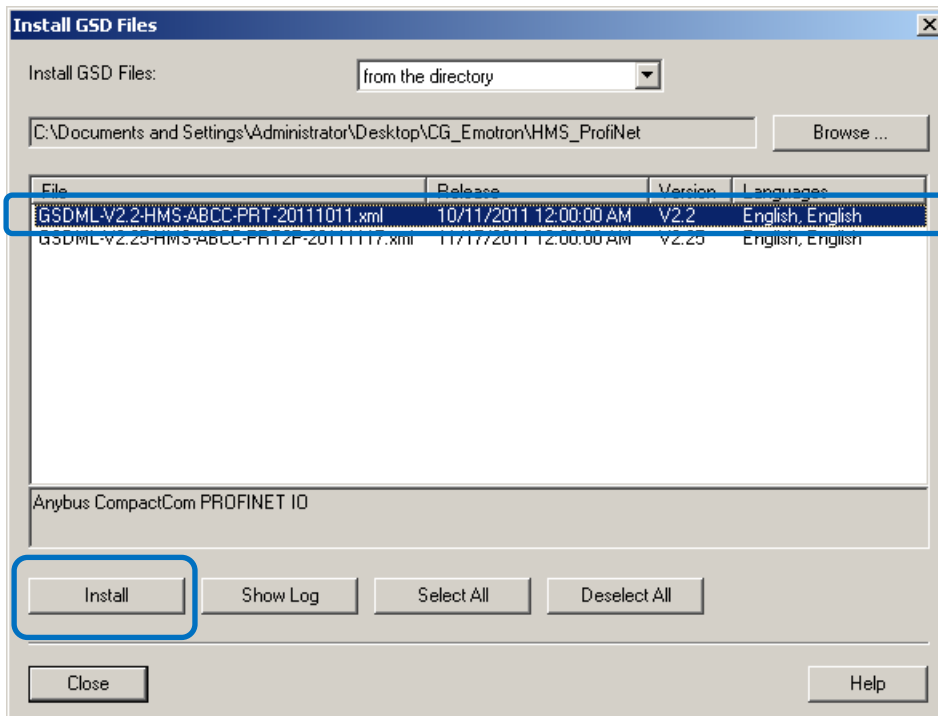
Select **SIMATIC 300** in the explorer node tree. Open the hardware configurator by double clicking or right clicking on **Hardware**, and selecting **Open Object**.

Install the GSDML file:

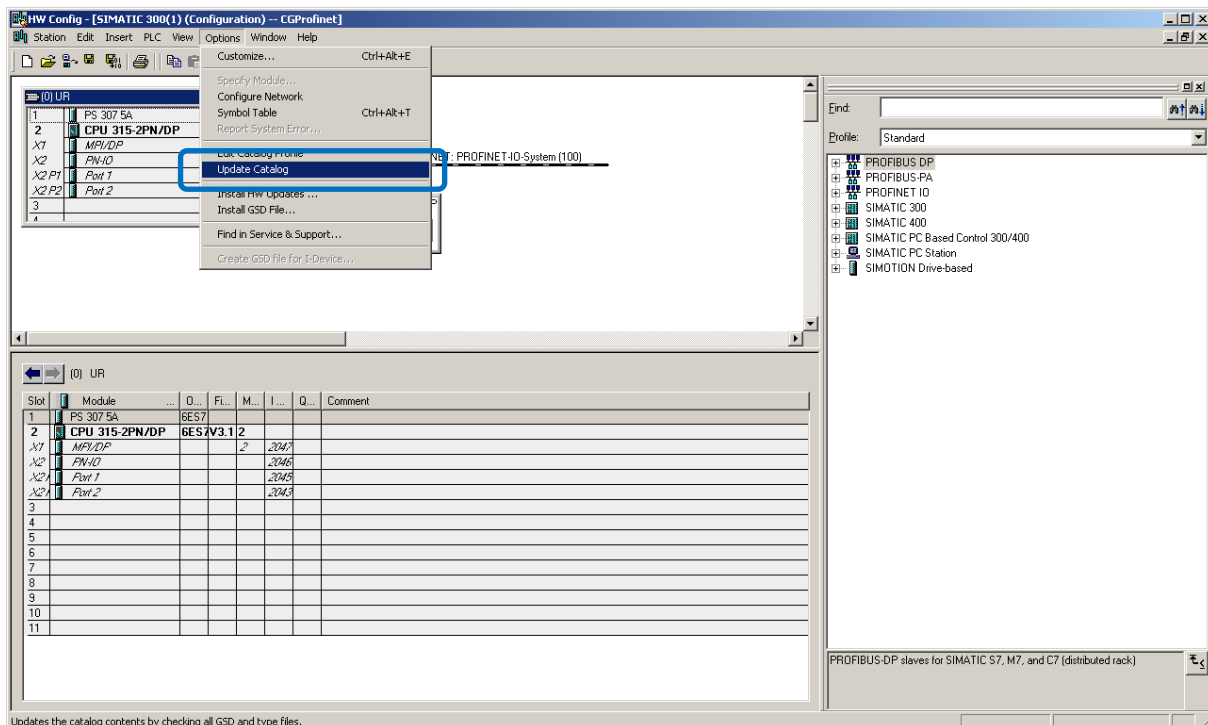
In the **Options** menu, select **Install GSD File...**



Select the file to install and click **Install**. In the dialog box, click Yes. When the installation is completed close the “Install GSD Files” window and do an update of the catalog, see below.



Update the hardware catalog:
In the Options menu, select Update Catalog.

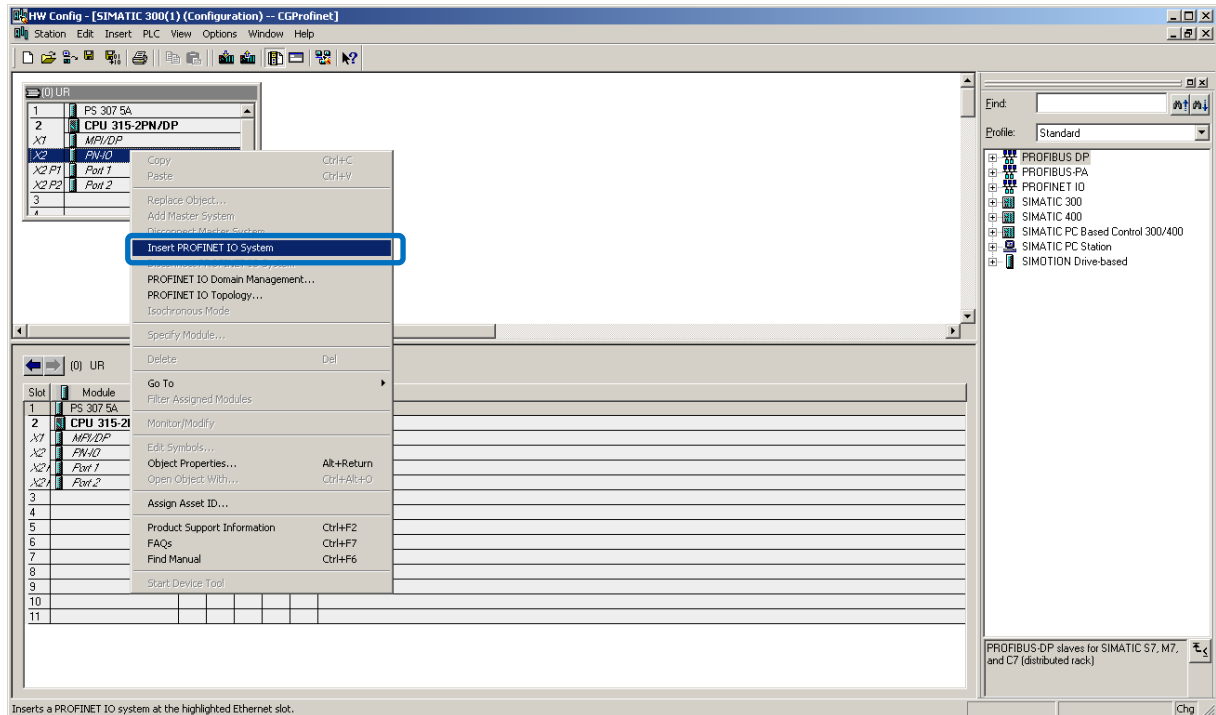


Setup a new device

To setup a new device from the Hardware Configurator you need to setup a Profinet IO network.

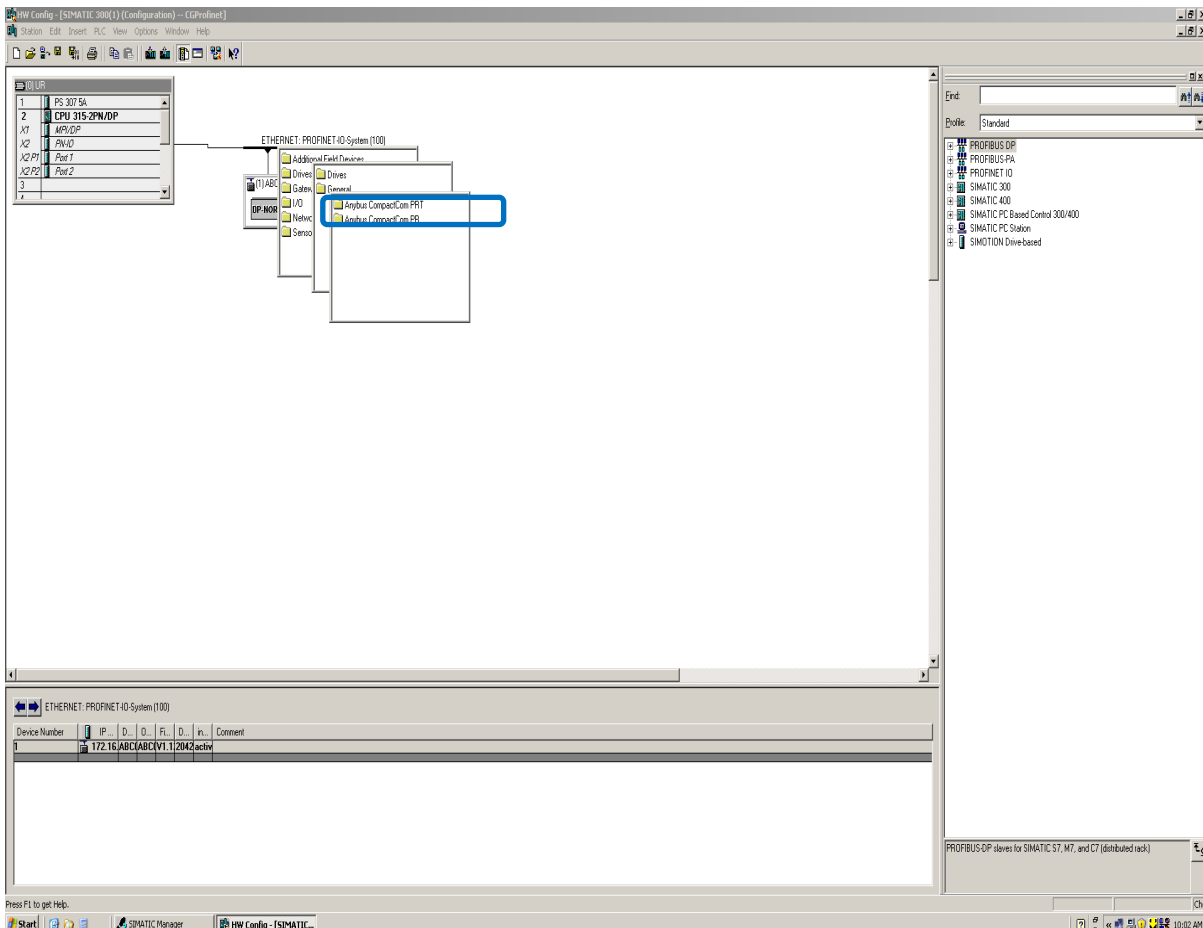
To set up a Profinet IO network:

Selection of the PROFINET IO controller module PN-IO and definition of a new PROFINET IO network: Right click on **PN-IO** and select **Insert PROFINET IO System**.



To insert the device:

1. Right click on the Profinet IO system network line, in this example *[ETHERNET:PROFINET -IO-System (100)]*, and select **Insert Object**.
2. Open directory **PROFINET IO → Additional Field Devices → General → Anybus CompactCom PRT (1-Port)**.
3. Select the device configuration depending on the version of the device and the controller you are using (See further info about DAP version below).



DAP version on controller

Make sure that the controller you are using supports the right DAP versions. DAP (Device Access Point) is a mandatory module in slot 0 of the device. The module in slot 0 describes the interface itself, e.g. what cycle times can be used, what communication methods are supported, what physical interface is available, etc. To be backward compatible with all kinds of controllers we provide different DAP versions.

For an IO controller with DAP V2.0 (most common on newer PLCs), please use the **Hardware Configuration** tool to select the device named **RT** in directory **PROFINET IO → Additional Field Devices → General → Anybus Compact Com PRT**.

For IO controller with DAP1.X, use the subfolder **Migration** and the device named **RT (FW>Y.XX)** if your current firmware is Y.XX or newer (see VSD menu [2695] Firmware). For older firmware than Y.XX use the one named **RT** only.

How to verify that the correct GSD file is referenced:

To verify that the right GSD file is referenced to the device, use the catalog explorer panel and navigate to the device you are using. Highlight the device and read the information in the lower right corner of the window to verify that the correct GSD file is referenced.

HW Config - [SIMATIC 300(1) (Configuration) -- CGProfinet]

Station Edit Insert PLC View Options Window Help

Find: Standard

Profile: Standard

PROFIBUS DP
PROFIBUS-PA
PROFIBUS IO
Additional Field Devices
Drives
General
Anybus CompactCom PRT
Migration
RT
RT (Fw >= 1.12)
Anybus CompactCom PRT 2-Port

ABCC-PRT
HMS Industrial Networks
This Device Access Point supports RT communication
GSDML-V2.2-HMS-ABCC-PRT-20111011.xml

Slot	Module	Order number ...	I ...	Q ...	D ...	Comment
0	ABCC-PRT	ABCC-PRT			2042	
1	Input 1 byte	ABCC-PRT	256			
2	Input 1 byte	ABCC-PRT	257			
3	Input 1 byte	ABCC-PRT	258			
4	Input 1 byte	ABCC-PRT	259			
5	Output 1 byte	ABCC-PRT		256		
6	Output 1 byte	ABCC-PRT		257		
7	Output 1 byte	ABCC-PRT		258		
8	Output 1 byte	ABCC-PRT		259		
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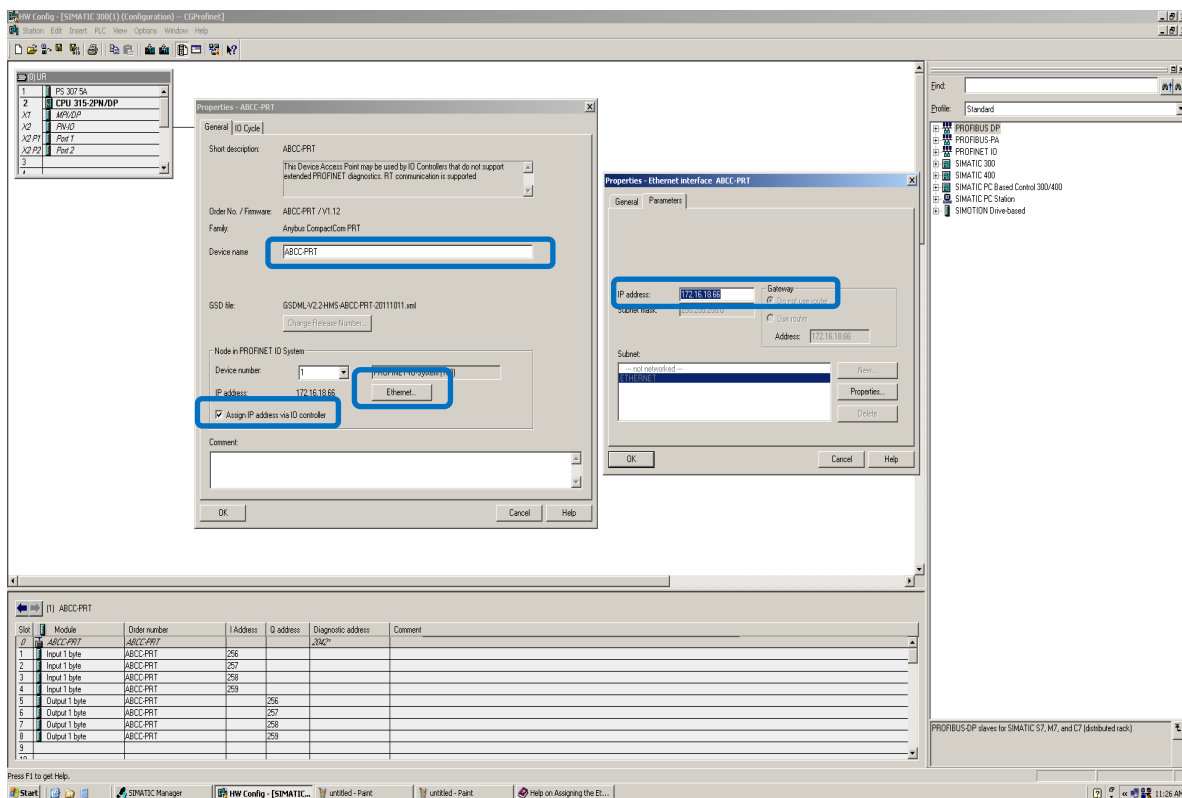
Press F1 to get Help.

Configure parameters to the device name:

When the VSD device is to be used for the first time in the network, a device name needs to be set. The device name must be unique within the network. The name assigned in this example is *ABCC-PRT*. The following procedure is done to configure the project address setting, i.e. not the actual physical address setting of each device.

Before you assign the IP address and the name physically to the device, you should ideally save the parameters in the Hardware Configuration tool, using the properties dialog to have the same parameter setup in your project.

1. Right click on the device and select **Object Properties**.
2. Change the device name as desired (in this example we use the name *ABCC-PRT*).
3. In the same window, select the check box **Assign IP address via IO controller**, and click the **Ethernet** button to open the Ethernet properties dialog box.
4. Change the IP address to fit your configuration, and click OK.

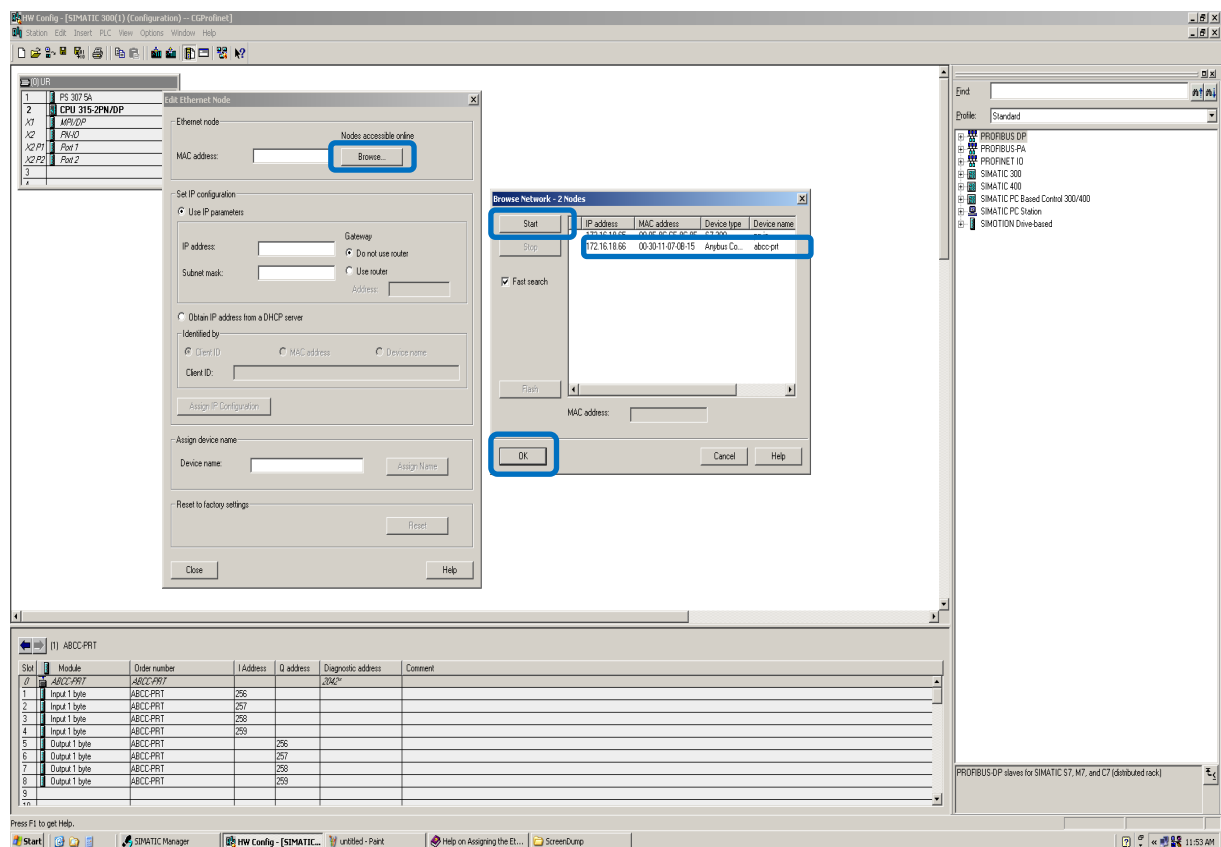


Assign the IP address and the device name:

You need to do a physical online access to assign an IP address and a device name to your VSD.

1. In the **PLC** menu, select **Ethernet → Edit Ethernet Node**.
2. Click the **Browse** button to open the **Browse Network** dialog box. If the scanning of the network does not start automatically, click the Start button.
3. Select the desired node to edit and click OK.

The module is easily identified by the MAC address and the device type. You will find the MAC address in the VSD menu [2652]. Each device has a MAC address and every port has its own MAC address. The port MAC addresses is not available for the user and is only used internally by PROFINET IO.



In this example we will manually assign both the IP address and the IP parameters for the device:

4. In the **Edit Ethernet Node** dialog box, select option **Use IP Parameters**.
5. Edit the IP parameters.
6. Click the **Assign IP Configuration** button to confirm.
7. Go to the **Device name** field to edit the device name (e.g. ABCC-PRT).
8. Click on **Assign Name** to confirm.

Observe that both the IP address and the device name need to be the same as the names that were given in the Object Properties dialog. Click Close to exit the dialog box.

Edit Ethernet Node

Ethernet node

MAC address: 00-30-11-07-0B-15 Browse...

Nodes accessible online

Set IP configuration

☒ Use IP parameters

IP address: 172.16.18.66 Subnet mask: 255.255.255.0

Gateway

☒ Do not use router ☐ Use router

Address: 172.16.18.66

☐ Obtain IP address from a DHCP server

Identified by

☒ Client ID ☐ MAC address ☐ Device name

Client ID:

Assign IP Configuration

Assign device name

Device name: abcc-prt Assign Name

Reset to factory settings

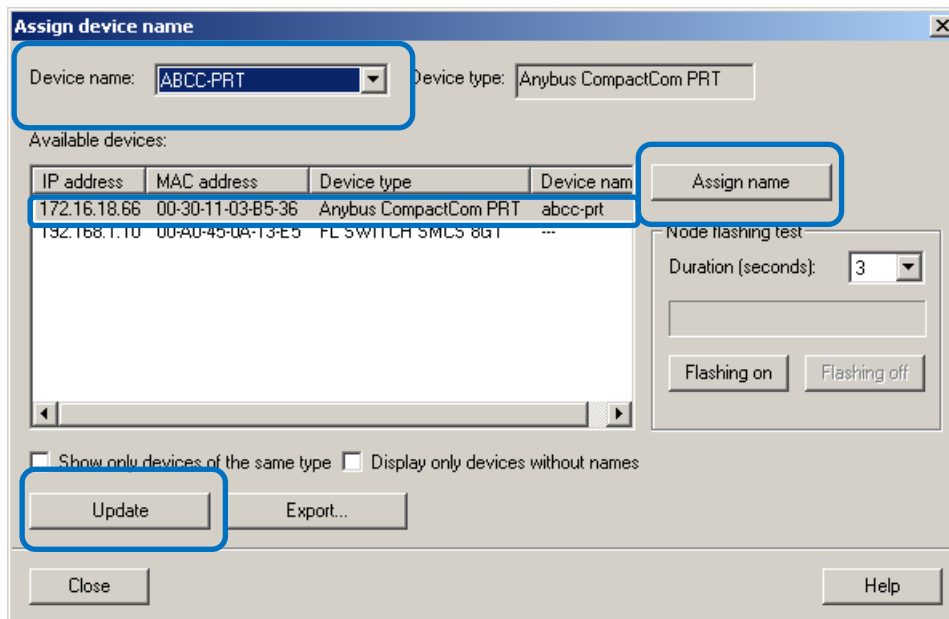
Reset

Close Help

An alternative configuration is to obtain the IP Address from the DHCP server in your network.

Follow the description below to manually assign the device name from the **Assign Device Name** dialog. The manual assignment procedure minimizes the risk of getting a mismatch between the device name and the MAC address:

1. Go to the **Hardware Configuration** menu.
2. In the **PLC** menu, select **Ethernet → Assign Device Name**.
3. In the **Assign device name** dialog, highlight the device in the list of **Available devices**.
4. Click on the **Assign name** button to change the configuration of the highlighted device.
5. Update by clicking the **Update** button.



IO Configuration

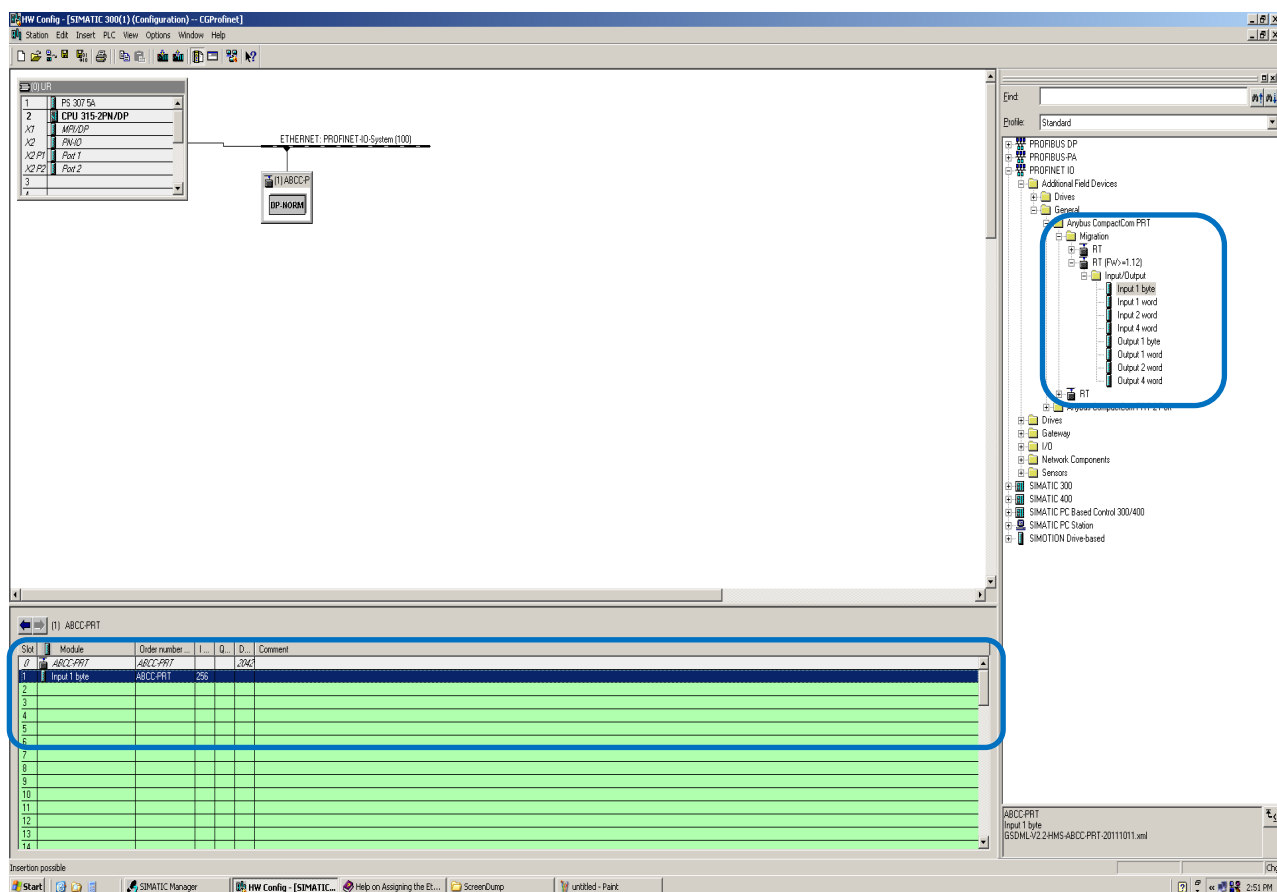
By default the VSD (VFX/FDU) supports 4 bytes inputs and 4 bytes output of basic cyclic process data.

This can be further expanded by using “*additional process values*”, see detailed description in the *Fieldbus manual*.

Expand the **Anybus CompactCom** tree (see screenshot below, to the right). Select the device you have assigned to the Profinet IO network to expand the node, and select input 1 byte module. Add 4 input byte modules and 4 output 1 byte modules to the device. It is important to add the input modules first, and then the output modules, not to get a mismatching configuration. This is an example with VSD menu [2632] PrData mode set to *Basic* and menu [2634] AddPrValues set to 0.

Click on the slot number to highlight the row in the grid, and then double click on the module in the node tree to the right.

NOTE: Both the data type and the logical order for modules are important to achieve a correct configuration.

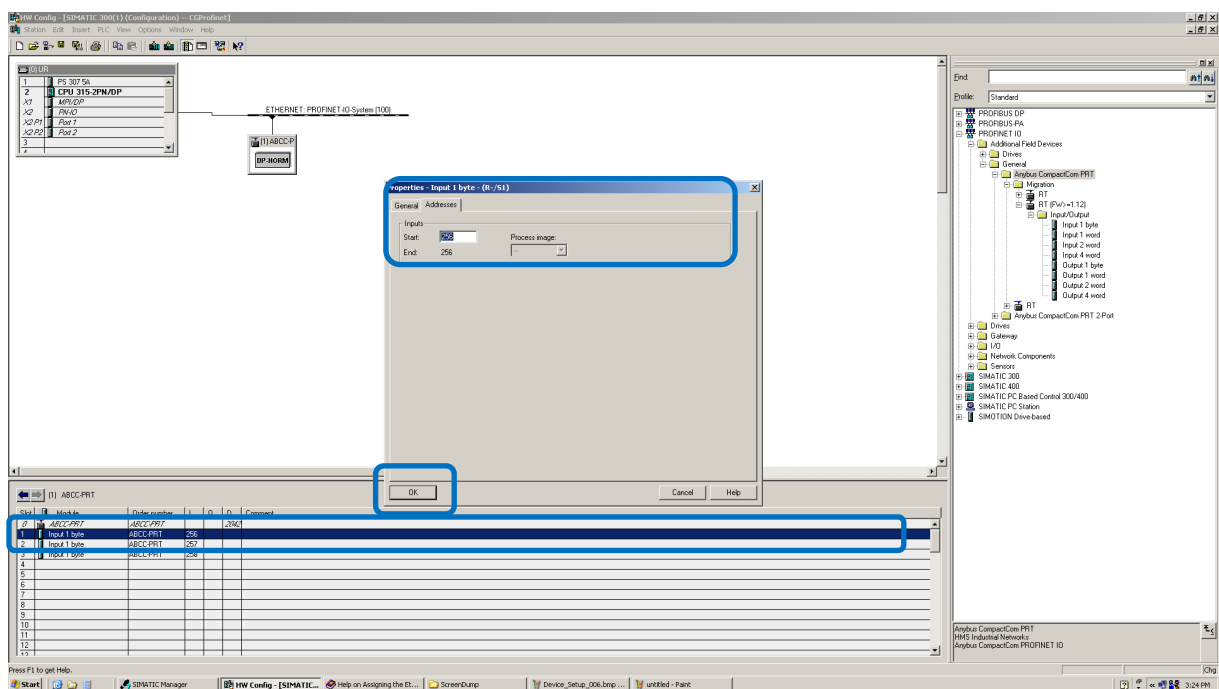


Module address setting

Set the offset address for each module. You can either use the default setting or manually change address for each module. In the example project we use the automatically allocated address 256-259 for the input modules and 256-259 for the output modules.

The diagnostic address for the mandatory module in slot 0 is 2042 (automatically allocated by the hardware configuration tool). You have to manually change the addresses if the default address setting is not suitable for your application. The diagnostic address is used to access acyclic data process data and diagnostic data. You can either use the default addressing for the diagnostic address (automatically allocated by the Hardware Configuration tool) or you can set your own address space to fit your design. However, we recommend that you let the tool manage and archive the diagnostic address.

Double click on the slot number to show the **Properties** dialog box. Change the address and the module name if needed. Click OK to confirm.

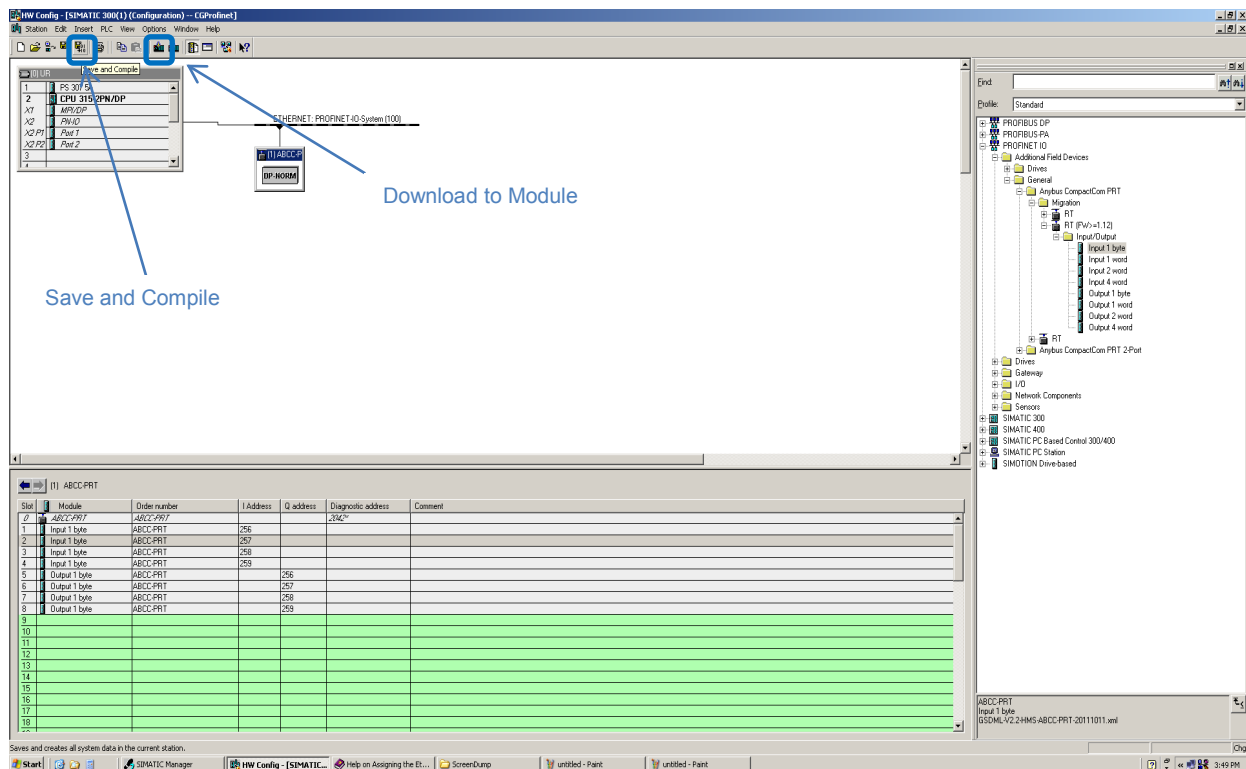


Compile and download the settings to the controller:

When all the above settings are done, it is possible to perform a download of the configuration to the controller. After the download of the Profinet network configuration, the PLC will start a data exchange immediately (if the PLC is set to run mode).

Select the **Save and Compile** icon.

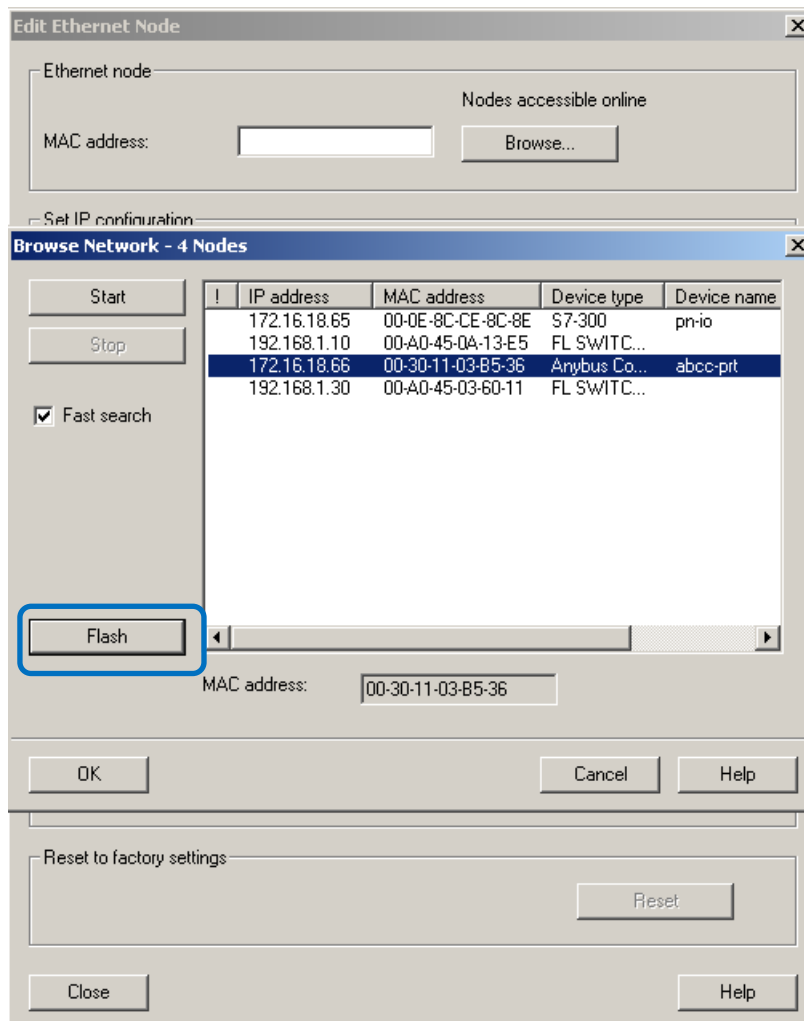
Select the **Download to Module** icon. Choose your target controller module from the dialogs and download the configuration.



Identify the device

To identify the device on the field use the flash test function. This function allows you check that a module and its interface are correctly assigned. When activating the flash function, the selected device will start a blinking sequence with 2 flashes using the green Module Status (MS) LED.

1. Go to the **Hardware Configuration** menu.
2. In the **PLC** menu, select **Ethernet → Edit Ethernet Node**.
3. Click the **Browse** button to open the **Browse Network** dialog box. If the scanning does not automatically begin, click the Start button to start the scan of the network.
4. Highlight the node (device) you want to check/locate.
5. Click the **Flash** button to activate or deactivate the LED flash of the module (flash test).



Monitor online to verify the device status

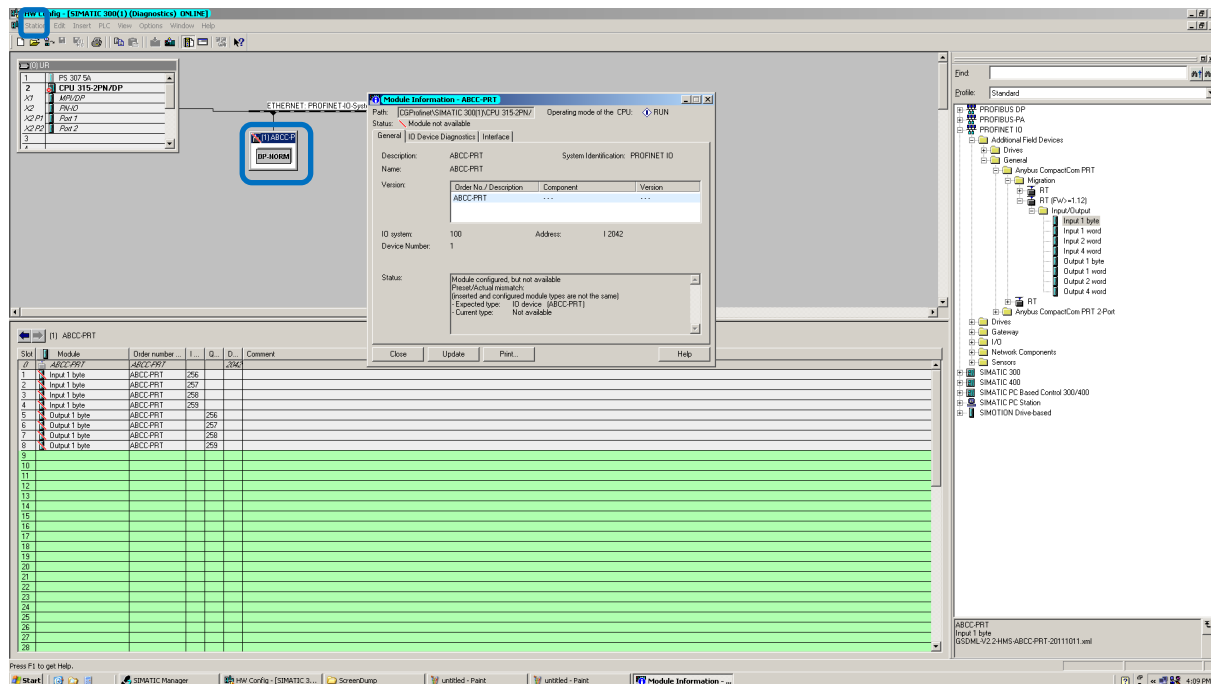
To verify that the device is functioning and that the Profinet IO network is up and running, you need to go online:

1. Select the station and open this in the HW configuration menu.
2. In the **Station** menu, select **Open ONLINE** to show the module information if faulted.
3. Right click on the device or module, and select **Module Information**.

If there is any problem in the system, this will be indicated by a red marking across the module icon for the Profinet IO network or the device. Information about the problem can be found in the module information dialogs in the **General** tab, and detailed information is found in the **IO Device Diagnostics** tab.

Common problems and errors are that the Device Name of the VSD does not match the Device Name set in the Hardware Configuration tool (your application), or that an incorrect GSDML-file has been used to configure the VSD device. All errors of this kind will be shown in the online diagnostics with a detailed description.

In the example view below, the Module Information is indicating that the device is offline.



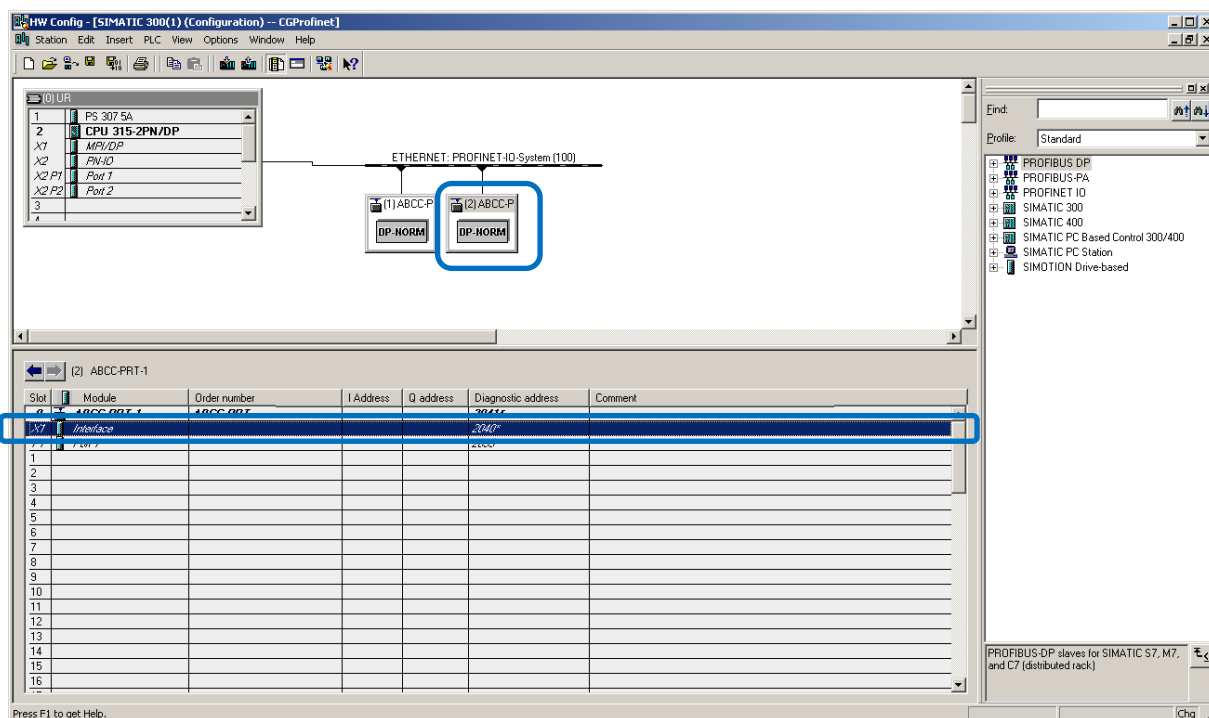
Prioritized/fast startup

The Prioritized startup function enables PROFINET IO devices that are connected to the network to initialize rapidly at power-up. This is useful in motion applications, where e.g. a rapid retooling is necessary. This function is supported by CG Drives & Automation and can be activated during configuration of the VSD (VFX/FDU) device.

Observe that within a PROFINET IO system, you can only prioritize a certain maximum number of IO devices, depending on the IO controller you are using.

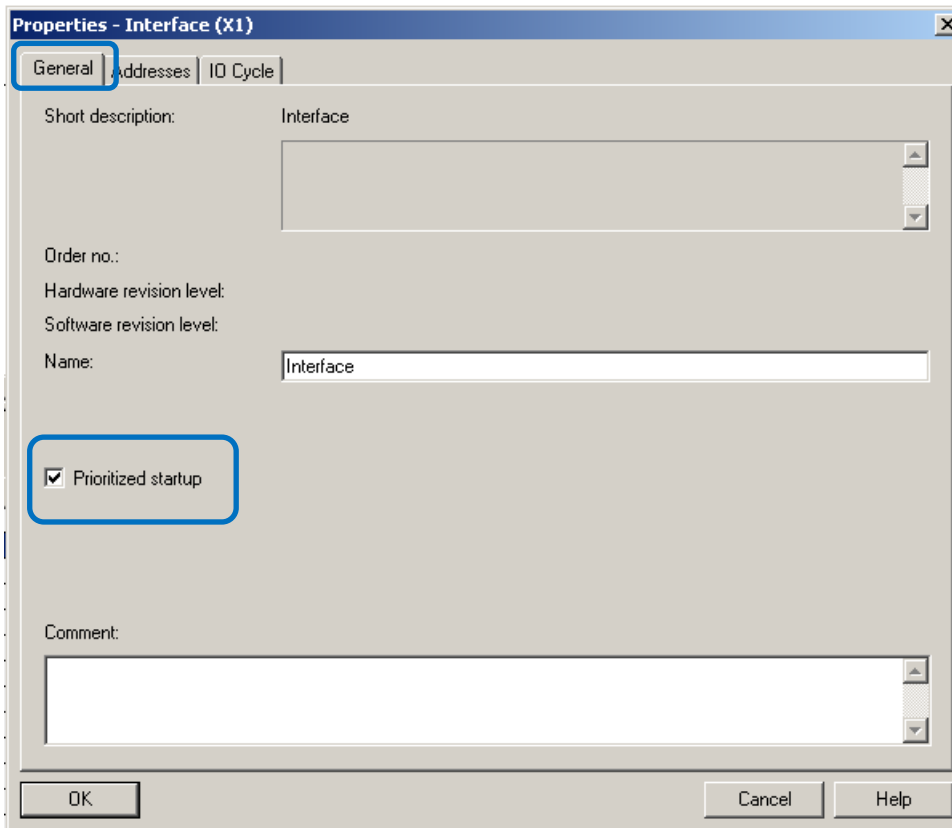
Activation of Prioritized startup:

1. Open the **Hardware Configuration** tool.
2. Double click on the row for *X1 - Interface* to open the **Properties** dialog box.



3. Go to tab **General** and select the check box for **Prioritized startup** .

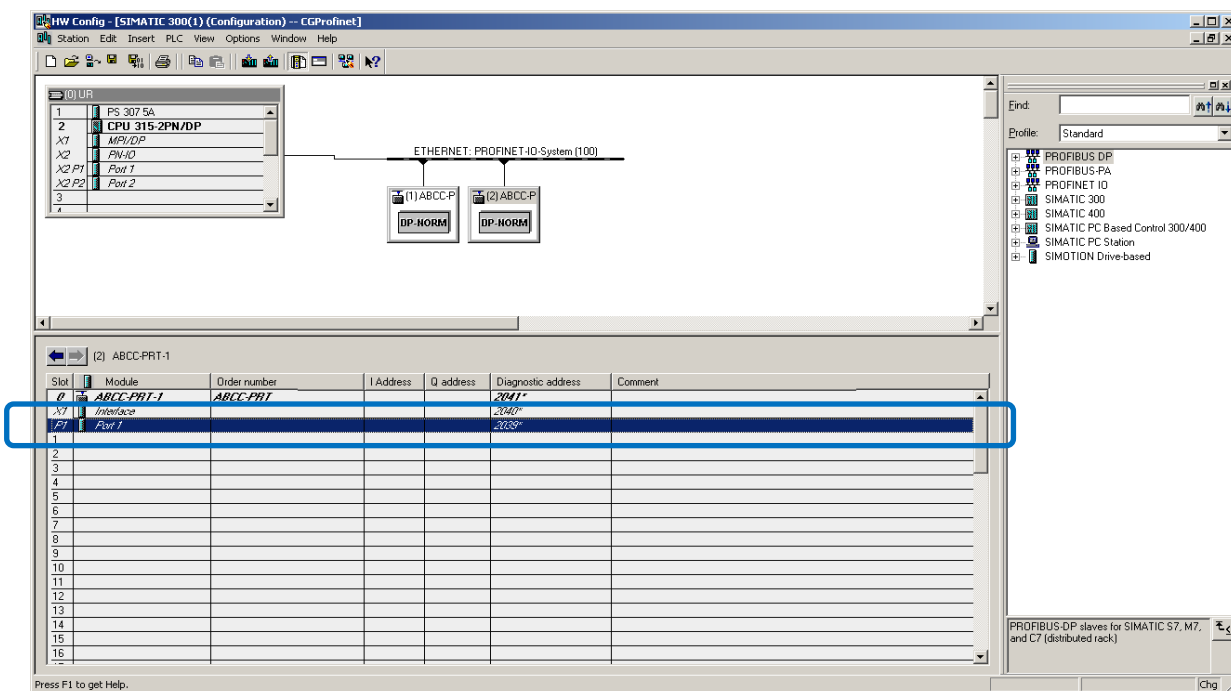
The check box can only be selected if the IO controller can prioritize selected IO devices during startup; and the device must also support prioritization. Both Profinet IO options (1- and 2-port) supplied by CG Drives & Automation support this feature.



Force transmission port:

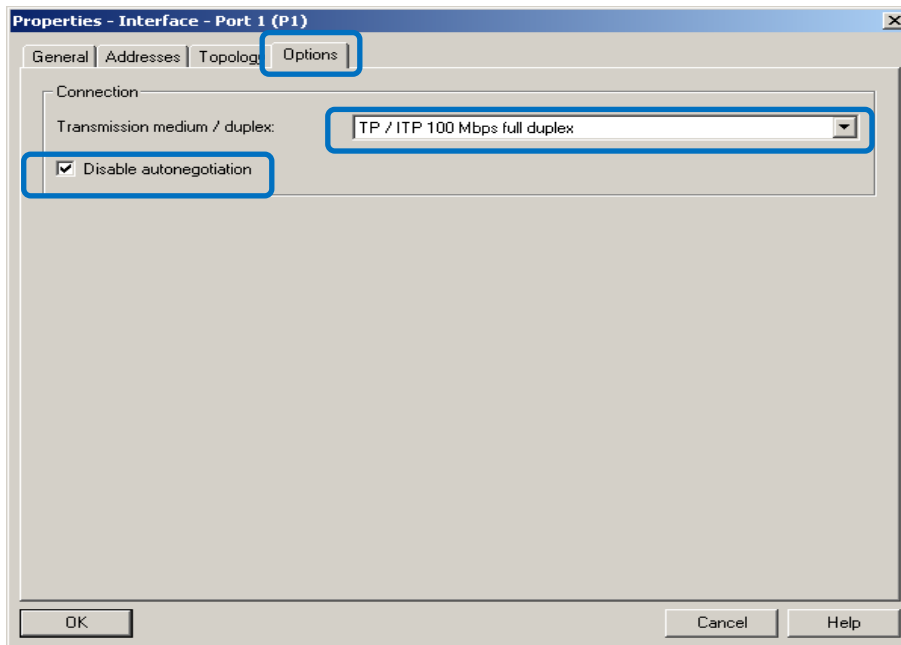
The total initialization time of the device must be taken into account when determining the total start-up time of the device. You need to disable the auto-negotiation and select a concrete transmission medium (for example TP/ITP at 100 Mbps full duplex).

1. Open the **Hardware Configuration** tool.
2. Double click on the row in the grid for the selected slot *P1* - *Port 1* to open the **Properties** dialog box.



3. In the **Properties** dialog box, go to the **Options** tab.
4. Select a concrete transmission medium (for example TP/ITP at 100 Mbps full duplex), and select the **Disable auto-negotiation** check box.

This can save a couple of seconds in startup time.



When the check box **Disable auto-negotiation** is selected, the defined setting of the port is forced, as is required for a quick start of the IO device. You need to ensure that the partner port has the same settings, and that the cabling is adapted to the functionality.