ProfinetIO Device

straton user guide – Rev.8

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CP_R31_006_H

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Content

1. Overview

This document describes how to start with the straton Profinet Device Driver.

Referring to the Profinet standard the units of a Profinet network are named as IO Controllers (Masters) and IO Devices (Slaves).

2. Requirement and setup

The Profinet protocol requires special access to the Ethernet board. On Linux, think to start the Runtime in administrator mode. On Windows, this is done through a COPA-DATA driver called "COPA-DATA Multiple Network Protocol Driver". This driver is installed by the product setup. This can be checked from the Windows Control Panel > Install/Uninstall a program.

3. Create and configure an application

The Editor contains a fully integrated configurator for Profinet IO RT Device.

3.1. Create configuration in straton Editor

The Runtime manages a mapping table which contains the Profinet IO Inputs and Outputs.

An appropriate configuration tool is integrated in the Editor.

Open the IO Drivers window ( ), insert a configuration ( ) and select the Profinet IO device driver.
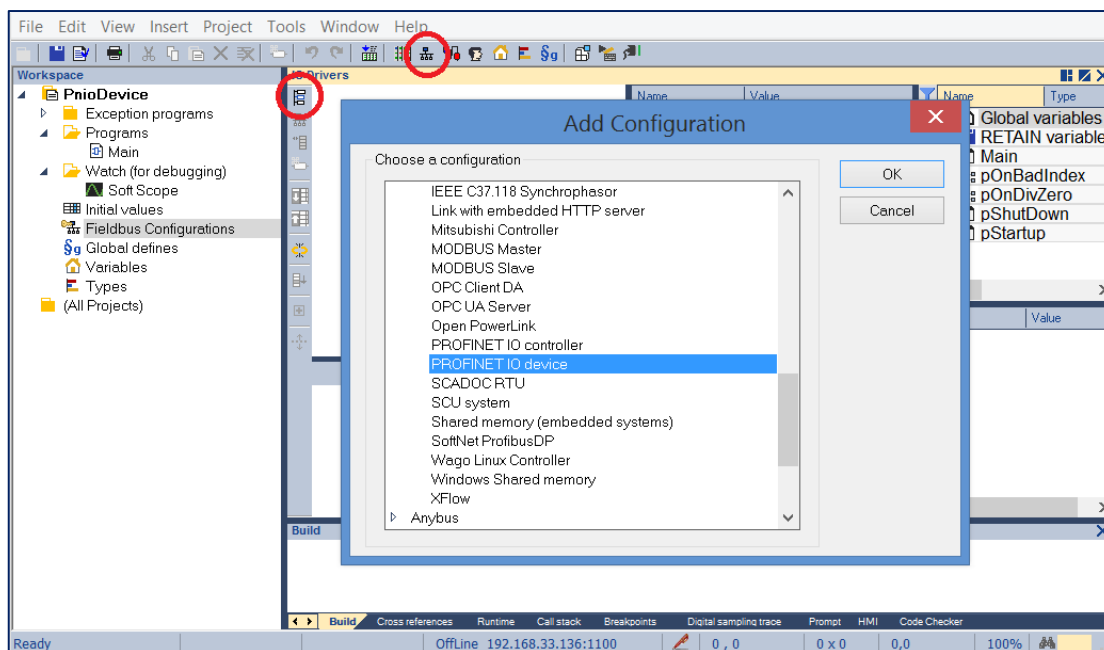
The configuration is represented as a tree:

Profinet IO Configuration

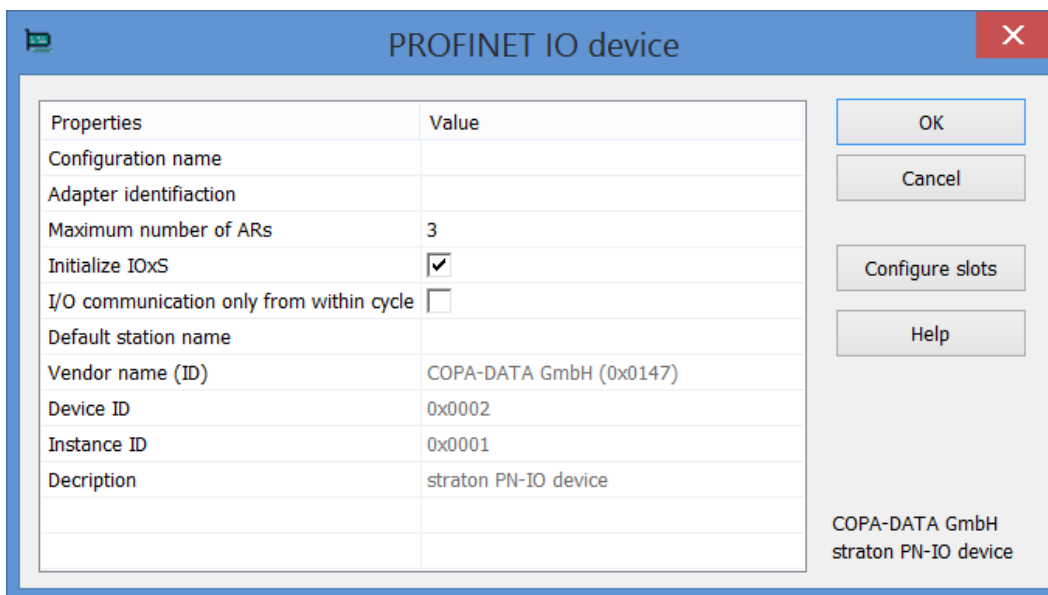▶ Profinet IO device (*)

▪ Group (*)

– Variable (*)

(*) These items can appear several times in the configuration (depending on the bus topology).

3.2. Configuration

I/Os of the Profinet network must be connected to the variables via a Profinet IO device configuration.

Start the declaration of a Profinet device inserting a Master/Port (⬛)
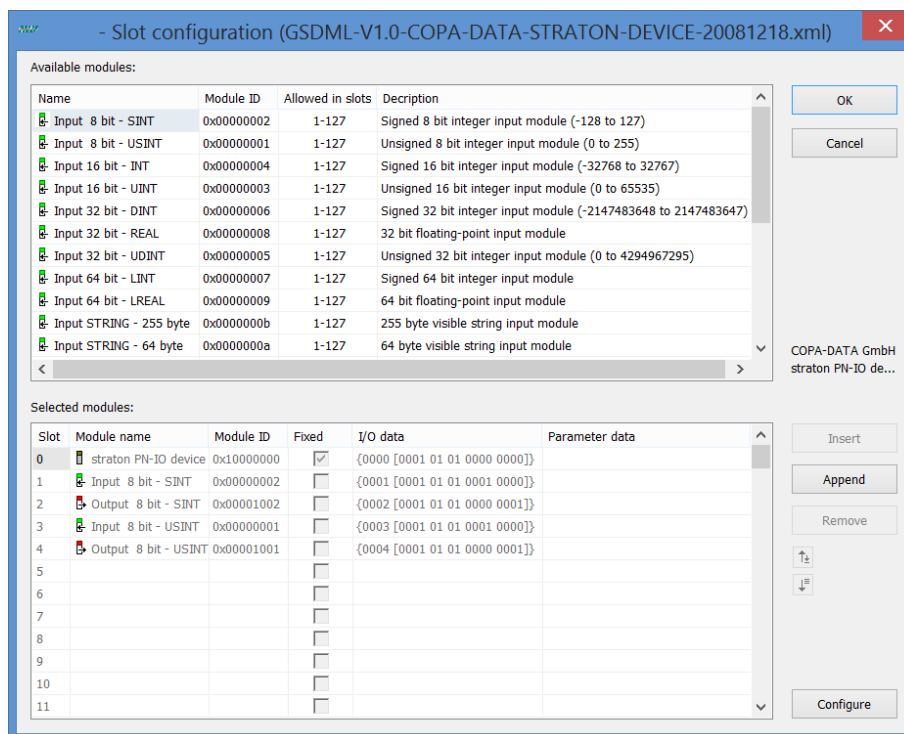
The following window opens:

Set the different parameters according to your device. See the online help for more details.
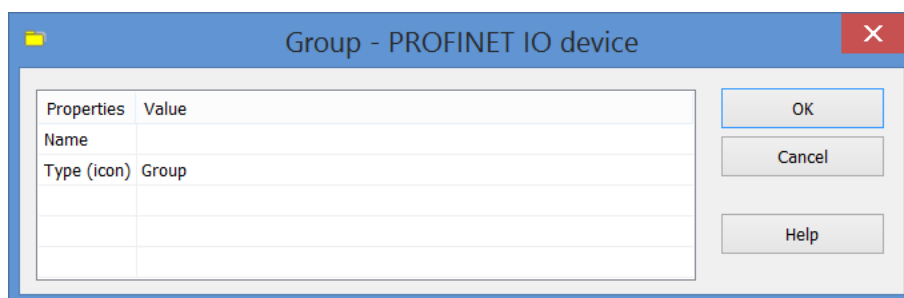
Then click on "Configure slots".

Select the modules in the upper list. With the buttons **Insert** and **Append** the modules are copied to the lower list.

Only modules with parameter data can be configured. Select the according module in the lower list and click the **Configure** button.

Select the device and insert a Slave/Datablock (⬚) to add a group.

From now variables can be linked with I/Os.

There are two ways to declare the variables in the configuration.

The easiest way is to right click on the device and to choose "Create variables".

In the "Create variables" window it is possible to pack bits (Right click on a variable > pack bits)
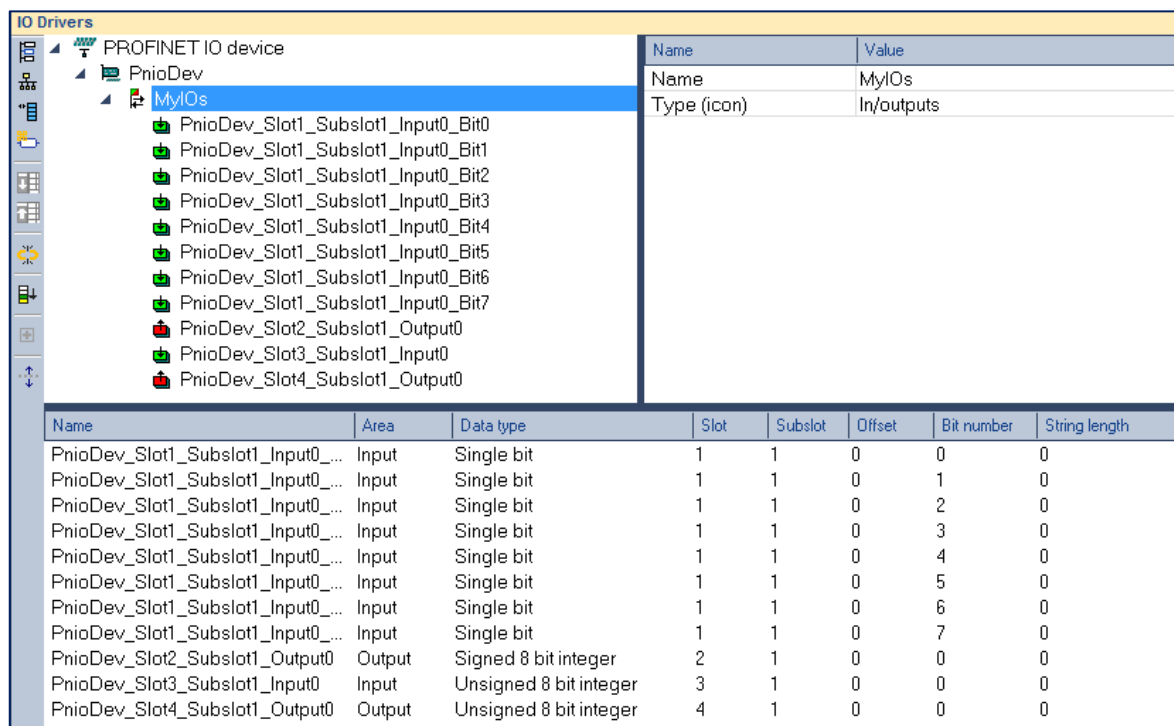
The second way is to manually insert variables ( ) in order to append a variable to a device.
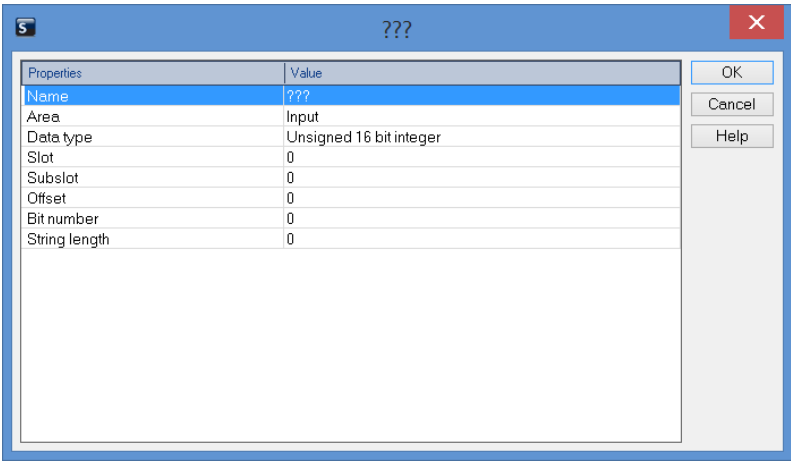
Parameter	Description
Variable name	Variable name following the IEC 61131-3 syntax.
Area	Output, Output IOCS, Output IOPS, Input, Input IOCS, Input IOPS, device status.
Format	Single bit, Signed 8 bit integer, Signed 16 bit integer, Signed 32 bit integer, Signed 64 bit integer, Unsigned 8 bit integer, Unsigned 16 bit integer, Unsigned 32 bit integer, 32 bit float, 64 bit float, Visible string
Slot	Slot Number
Subslot	Subslot Number
Offset	Offset
Bit number	Bit number
String length	In the case where the data is a Visible string

Note: The offset of a variable is relative to a sub module. Thus, also depending on a slot and subslot. The offset of the first variable of a sub module is always 0.

All settings can be changed in the grid too. Click on View > Grid in order to show/hide the grid. The displayed information refers to the items below the selection in the configuration tree.

If the Editor is online with a target system then the grid shows the variables' value.

3.3. Data types

You can connect variables of any data type to Profinet I/Os. The Runtime converts I/Os values to the variable's type.

3.4. Additional features

Browse network adapters

This command is available in the context menu of the Profinet IO configuration item. All available network adapters are listed up.
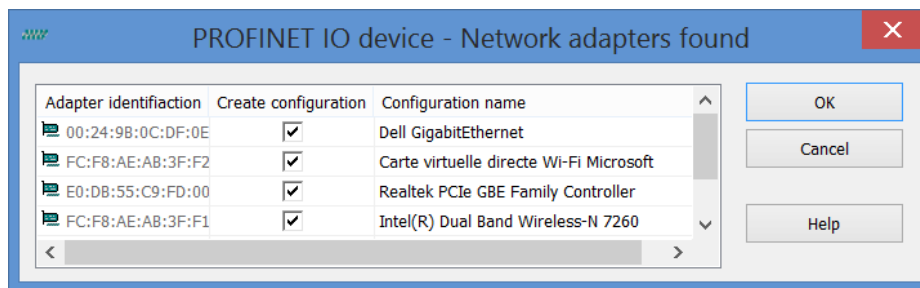
Select the right network adapter and click on OK. When starting the application, the driver will open the adapter you chose.

Create variables

This command is available in the context menu of the configuration's second level (PNIO device). Based on the defined device modules the referring variables are generated.

Within the same dialog it is possible to define the variables for:

▶ Device diagnosis

▶ IOxS

Device diagnosis

Based on the Profinet standard the referring variables can be generated:

▶ InputCRCount   [UINT]

▶ OutputCRCount   [UINT]

Create IOxsS for Slave modules

Based on the defined device modules the referring IOPS- and IOCS-variables are generated.

3.5. How to resolve errors

DEVICE IS NOT FOUND BY THE CONTROLLER:

Check if the application is in RUN mode and the Ethernet adapter is the right one.

Check the network connection.

Check the "Default station name" on the device. If empty, the "Configuration name" is automatically used.

ERROR SETTING IN THE IP CONFIGURATION:

Ensure that the IP configuration is valid and appropriate for your network

Ensure the VLAN ID is setup correctly in the device settings

CL-RPC LOOKUP (< 6.22 SP0 BUILD 3):

TIMEOUT ERROR:

Ensure that the IP configuration is valid and appropriate for your network

Increase the IP configuration delay

OTHER ERRORS:

Ensure you use the correct device name

Ensure you have chosen the correct GSDML file (also check if the GSDML file version is appropriate for the firmware version of the device)

CONNECT RESPONSE ERROR:

Timeout error (> 6.22 SP0 Build 3):

Ensure that the IP configuration is valid and appropriate for your network

Increase the IP configuration delay

MODULE CONFIGURATION IS DIFFERENT:

Ensure you have configured the modules present on the device (If you have read the module configuration from the device, ensure you have selected the correct modules in the resolve ambiguous modules dialog displayed after selecting the GSDML file).

Ensure you have chosen the correct GSDML file (also check if the GSDML file version is appropriate for the firmware version of the device).

CONNECT RESPONSE ERROR:

Depending on the PNIO status error check, if the settings listed in the table below are set appropriate for your device.

PNIO status	Check the specified setting
1C010003	Slave\ObjectUUID (correct GDML file)
DB81010A	Master\Activity timeout factor
DB81010B	Master\Controller name
DB81010C	Master\Controller name
DB810207	Master\RT-Class
DB81020A	Master\Send clock factor
DB81020B	Slave\Reduction ratio
DB81020C	Slave\Phase
DB81020F	Master\Watchdog factor
DB810210	Master\Watchdog factor
DB8103,*	Slave\Module IDs,IOs
DB810407	Master\Alarm timeout
DB810408	Master\Alarm retries

Table: PNIO status error codes on connect and the related settings in the configuration

WRITING PARAMETERIZATION ERROR (WITH STATUS 0xDF80*):

Ensure you have configured the modules present on the device (if you have read the module configuration from the device, ensure you have selected the correct modules in the resolve ambiguous modules dialog displayed after selecting the GSDML file).

Ensure you have chosen the correct GSDML file (also check if the GSDML file version is appropriate for the firmware version of the device).

If your error could not be resolved using the hints above, update the firmware of your device and the GSDML file to the latest version and try again.

For further analyses record the PNIO communication using Wireshark. Start Wireshark and select Capture\Options from the menu. Choose the network interface used for the PNIO communication and enter the Capture filter below:

```
ether proto 0x8892 or (ether proto 0x8100 and ether[16:2]=0x8892) or udp
port 0x8894
```

Then click start. Start the straton RT with you application several times and then stop the Wireshark capturing by selecting Capture\Stop from the menu. You can save your recorded traffic by selecting File\Save from the menu.

3.6. Coding of PNIO status

The PNIO status is a 32 bit unsigned value. It is composed of 4 byte values, which define the meaning of the status. For positive responses PNIO status has a value of zero.

Bit	Meaning
24-31	ErrorCode
16-23	ErrorDecode
8-15	ErrorCode1
0-7	ErrorCode2

Refer to the Editor's online help and/or to the Profinet standard for more details. Some errors elements are dependent from each other.

Eg. ErrorCode1 (bits 8-15) have a different meaning depending on ErrorDecode's value (bits 16-23).

4. Frequently Asked Questions

How to configure the adapter identification parameter?

The adapter name must follow this syntax:

- ▶ VxWorks: fxp0, fxp1, …
- ▶ Linux: eth0, eth1, …
- ▶ QNX: gei0…
- ▶ Windows: Mac address of the Ethernet card

How to use a different GSDML file for the Device?

The default GSDML file is the COPA-DATA one (COPA-DATA GmbH straton PNIO device)

It is possible to change the GSDML file but some special features, proper to the GSDML provider, may not be available in the Editor (eg. the Alarm management).

To change this file, open the Fieldbus Configuration, right-click on the device and choose to "Use special station description". Then select the GSDML file to use.

IMPORTANT: the previous device configuration will not be valid anymore, think to delete all the Slave/Datablock as well as the variables, then re-create the configuration.

How to ALWAYS use a different GSDML file for the Device?

If when creating a new Device, a specific one must be used, then you must open the Editor's data and add a specific file.

From the menu Help > About, click on the […] button.

In the GSDML folder, put the GSDML file you want to use and check its VendorID and DeviceID.

In the same directory, add a **PNIODevice.ini** file with the IDs in decimal inside it, following this example:

```
[PNIODevice]
VendorID=261
DeviceID=16
```