



**Operating Instruction Manual**  
**Generic DTM for PROFINET IO-Devices**  
**Configuration of PROFINET IO-Devices**

**Hilscher Gesellschaft für Systemautomation mbH**

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# Table of Contents

|       |   |    |
|-------|---|----|
| 1     | INTRODUCTION.....   | 4  |
| 1.1   | About this Manual .....   | 4  |
| 1.1.1 | Online Help .....   | 4  |
| 1.1.2 | List of Revisions .....   | 4  |
| 1.1.3 | Conventions in this Manual .....                                | 5  |
| 1.2   | Legal Notes.....  | 6  |
| 1.3   | Registered Trademarks.....                                      | 9  |
| 1.4   | About Generic PROFINET IO-Device DTM.....                       | 10 |
| 1.4.1 | Requirements .....  | 11 |
| 1.5   | Dialog Structure of the Generic PROFINET IO-Device DTM .....    | 12 |
| 1.5.1 | General Device Information.....                                 | 13 |
| 1.5.2 | Navigation Area .....   | 13 |
| 1.5.3 | Dialog Panes .....  | 14 |
| 1.5.4 | OK, Cancel, Apply and Help.....                                 | 14 |
| 1.5.5 | Table View and Handling .....                                   | 15 |
| 1.5.6 | Status Bar .....  | 16 |
| 2     | GETTING STARTED AND INSTRUCTIONS STEP BY STEP .....             | 17 |
| 2.1   | Configuration Steps.....  | 17 |
| 2.2   | PROFINET IO-Device Instance .....                               | 18 |
| 3     | CONFIGURATION .....   | 19 |
| 3.1   | Overview Configuration .....                                    | 19 |
| 3.2   | Configuring Device Parameters.....                              | 19 |
| 3.3   | General .....   | 20 |
| 3.4   | Modules .....   | 21 |
| 3.4.1 | Modules Table .....   | 22 |
| 3.4.2 | Indication of the Firmware Version of the Device Instance ..... | 29 |
| 3.4.3 | Configure Modules .....   | 29 |
| 3.4.4 | Configuration Info .....  | 32 |
| 3.4.5 | Submodules Details.....   | 33 |
| 4     | DESCRIPTION.....  | 34 |
| 4.1   | Overview Description .....                                      | 34 |
| 4.2   | Device Info .....   | 35 |
| 4.3   | Module Info .....   | 36 |
| 4.4   | GSDML Viewer .....  | 37 |
| 5     | APPENDIX .....  | 38 |
| 5.1   | User Rights .....   | 38 |
| 5.1.1 | Configuration .....   | 38 |

Table of Contents3/43

---

|     |                       |    |
|-----|-----------------------|----|
| 5.2 | References.....       | 38 |
| 5.3 | List of Figures ..... | 39 |
| 5.4 | List of Tables.....   | 39 |
| 5.5 | Glossary.....         | 40 |
| 5.6 | Contacts.....         | 43 |

# 1 Introduction

## 1.1 About this Manual

This manual provides information on how to set up PROFINET IO-Device devices described with GSDML files. These devices can be configured with the generic PROFINET IO-Device DTM within an FDT Framework.

### Dialog Panes

The table below gives an overview for the individual dialog panes descriptions:

| Section              | Subsection                    | Page |
|----------------------|-------------------------------|------|
| <i>Configuration</i> | <i>Overview Configuration</i> | 19   |
|                      | <i>General</i>                | 20   |
|                      | <i>Modules</i>                | 21   |
| <i>Description</i>   | <i>Overview Description</i>   | 34   |
|                      | <i>Device Info</i>            | 35   |
|                      | <i>Module Info</i>            | 36   |
|                      | <i>GSDML Viewer</i>           | 37   |

Table 1: Descriptions Dialog Panes

### 1.1.1 Online Help

The PROFINET IO-Device DTM contains an integrated online help facility.

- To open the online help, click on **Help** or press **F1**.

### 1.1.2 List of Revisions

| Index | Date     | Version                   | Component                              | Chapter     | Revisions   |
|-------|----------|---------------------------|--|-------------|---|
| 9     | 15-05-28 | 1.12.x.x,<br>1.12.x.x     | PNIOGenDevDTM.dll<br>PNIOGenDevGUI.ocx | 3.3,<br>3.4 | Sections <i>General</i> and <i>Modules</i> updated: Descriptions about the PROFINET function "Shared Device" added. |
| 10    | 15-10-28 | 1.100.x.x,<br>1.100.x.x   | PNIOGenDevDTM.dll<br>PNIOGenDevGUI.ocx | 3.3         | Sections <i>Modules</i> updated.  |
| 11    | 17-02-24 | 1.1000.x.x,<br>1.1000.x.x | PNIOGenDevDTM.dll<br>PNIOGenDevGUI.ocx | 1.4.1       | Section <i>Requirements</i> Internet access added, Windows 8.1 and Windows 10 added.                                |

### 1.1.3 Conventions in this Manual

Notes, operation instructions and results of operation steps are marked as follows:

#### Notes



---

**Important:** <important note you must follow to avoid malfunction>

---



---

**Note:** <general note>

---



---

<note, where to find further information>

---

#### Operation Instructions

1. <instruction>
2. <instruction>

or

- <instruction>

#### Results

↪ <result>



---

**Note:** The PROFINET IO specification defines the designations "Controller" instead of "Master" and "Device" instead of "Slave". In this manual "Controller" and "Device" are used with the PROFINET IO-Device or the DTM. In connection with general questions about the Master or the Slave functionality, the terms "Master" and "Slave" are used, as in the network configuration on the Master bus line or the „Stand-Alone-Slave“.

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operating regulations or against rules of good electrical engineering practice, or if our request to return the defective object is not promptly complied with.

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## 1.4 About Generic PROFINET IO-Device DTM

You can use the generic PROFINET IO-Device DTM to configure the PROFINET IO-Devices described with GSDML files within a FDT Framework.

The information necessary for the configuration of the PROFINET IO-Devices is stored within the PROFINET IO-Controller when using the generic PROFINET IO-Device DTM and thus the PROFINET IO-Controller is configured.

## 1.4.1 Requirements

### System Requirements

- PC with 1 GHz processor or higher
- Windows® XP SP3,  
Windows® Vista (32 bit) SP2,  
Windows® 7 (32 bit und 64-Bit) SP1,  
Windows® 8 (32-Bit und 64-Bit),  
Windows® 8.1 (32-Bit und 64-Bit),  
Windows® 10 (32-Bit und 64-Bit)
- Administrator privilege required for installation
- Internet Explorer 5.5 or higher
- RAM: min. 512 MByte, recommended 1024 MByte
- Graphic resolution: min. 1024 x 768 pixel
- Keyboard and Mouse
- Restriction: Touch screen is not supported.



**Note:** If the project file is used on another PC,

- the other PC must also comply to these system requirements,
- the device description files of the devices used in the project must be imported to the configuration software SYCON.net on the other PC,
- respectively the DTMs of the devices used in the project must be installed on the other PC.

### Requirements PROFINET IO Generic Device DTM

Requirements for working with the PROFINET IO generic Device DTM are:

- Installed FDT/DTM V 1.2 compliant frame application
- Installed PROFINET IO-Controller DTM
- GSDML file of the devices to be configured
- The user needs to reload the Device Catalog

### Loading GSDML files

To add devices to the **netDevice** device catalog, you must import the GSDML file of the used device via **netDevice** menu **Network > Import Device Descriptions ....** into the GSDML folder of the DTM. Then the Device Cataloge must be reloaded. The folder GSDML inclusively Windows® XP is located in the application data directory (All Users) of the configuration software (or from with Windows® 7 on in the *C:\ProgramData\SYCONnet* directory).



For further information refer to section *Configuration Steps* on page 17 , under step 1 and 2.

## 1.5 Dialog Structure of the Generic PROFINET IO-Device DTM

The graphical user interface of the DTM is composed of different areas and elements listed hereafter:

1. A header area containing the **General Device Information**,
2. The **Navigation Area** (area on the left side),
3. The **Dialog Pane** (main area on the right side),
4. **OK, Cancel, Apply, Help**,
5. The **Status Line** containing information e. g. the online-state of the DTM.

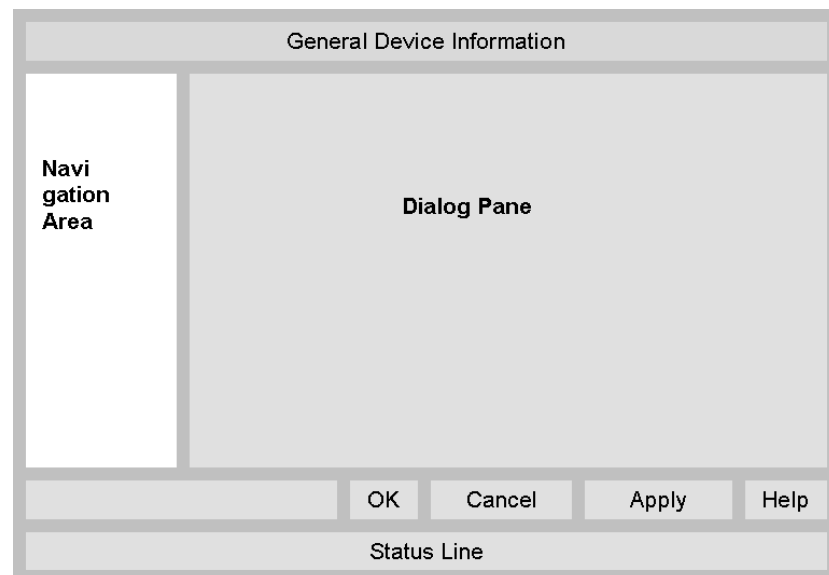


Figure 1: Dialog Structure of the Generic PROFINET IO-Device DTM

## 1.5.1 General Device Information

| Parameter | Meaning                             |
|-----------|-------------------------------------|
| IO Device | Name of the device                  |
| Vendor    | Vendor name of the device           |
| Device ID | Identification number of the device |
| Vendor ID | Identification number of the vendor |

Table 2: General Device Information

## 1.5.2 Navigation Area

The **Navigation Area** contains folders and subfolders to open the dialog panes of the DTM.

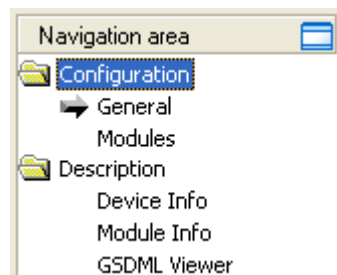


Figure 2: Navigation Area

- Select the required folder and subfolder.
- The corresponding Dialog pane is displayed.

### Hide / display Navigation

|                      |   |
|----------------------|---|
|                      | Hiding the navigation area (above right side).        |
| Show navigation area | <b>Opening</b> the navigation area (below left side). |

### 1.5.3 Dialog Panes

At the dialog pane the **Configuration** or **Description** panes are opened via the corresponding folder in the navigation area.

| Configuration |  |
|---------------|--|
| General       | On the pane General PROFINET IO-Device information is displayed. For further information, refer to section <i>General</i> on page 20.  |
| Modules       | On the Modules pane modules, submodules and parameters can be selected or configured, which are read from the GSDML file. For further information, refer to section <i>Modules</i> on page 21. |
| Description   |  |
| Device        | The Device Info pane contains the manufacturer information about the device. For further information, refer to section <i>Device Info</i> on page 35.  |
| Module Info   | The Module Info pane shows information for the available modules of this device. For further information, refer to section <i>Module Info</i> on page 36.                                      |
| GSDML         | By use of the GSDML-Viewer a GSDML file can be viewed and searched through. For further information, refer to section <i>GSDML Viewer</i> on page 37.  |

Table 3: Overview Dialog Panes

### 1.5.4 OK, Cancel, Apply and Help

**OK, Cancel, Apply and Help** you can use as described hereafter.

|               | Meaning   |
|---------------|---|
| <b>OK</b>     | To confirm your latest settings, click <b>OK</b> . All changed values will be applied on the frame application database.<br><i>The dialog then closes.</i>  |
| <b>Cancel</b> | To cancel your latest changes, click <b>Cancel</b> .<br>Answer to the safety query <b>Configuration data has been changed. Do you want to save the data?</b> by <b>Yes</b> , <b>No</b> or <b>Cancel</b> .<br><b>Yes:</b> The changes are saved or the changed values are applied on the frame application database.<br><i>The dialog then closes.</i><br><b>No:</b> The changes are <u>not</u> saved or the changed values are not applied on the frame application database.<br><i>The dialog then closes.</i><br><b>Cancel:</b> <i>Back to the DTM.</i> |
| <b>Apply</b>  | To confirm your latest settings, click <b>Apply</b> . All changed values will be applied on the frame application database.<br><i>The dialog remains opened.</i>  |
| <b>Help</b>   | To open the DTM online help, click <b>Help</b> .  |

Table 4: OK, Cancel, Apply and Help

## 1.5.5 Table View and Handling

### Table elements

Table data can be static or editable or can be filled to special fields (e. g. for an IP address). Table rows can be displayed or hidden on the plus and minus symbols.

- Static: The table data is static.
- Editable: The table data can be edited using an integrated editor.
- Input fields for specific data (eg. as the IP address)
- Plus (+) / minus (-): Display / hide table rows
- Drop-down list (selection list): To click or select an item

### Display / hide table rows

|     | Slot | Sub Slot | ! | Module                                | Full Access |
|-----|------|----------|---|---------------------------------------|-------------|
| ▶ + | 0    |          | ⚙ | CIFX RE/PNS V3.5.35 - V3.x [1250.100] |             |
| +   | 1    |          |   | 1 Byte Input                          |             |
| +   | 2    |          |   | 1 Byte Input                          |             |

Figure 3: Hidden table rows

➤ Click on the + sign or press the spacebar.

➤ Additional table rows are displayed.

|     | Slot | Sub Slot | ! | Module                                | Full Access                         |
|-----|------|----------|---|---------------------------------------|-------------------------------------|
| ☐   | 0    |          | ⚙ | CIFX RE/PNS V3.5.35 - V3.x [1250.100] |                                     |
|     |      | 1        | ⚙ | CIFX RE/PNS V3.5.35 - V3.x            | <input checked="" type="checkbox"/> |
|     |      | 32768    | ⚙ | PN-IO                                 | <input checked="" type="checkbox"/> |
|     |      | 32769    | ⚙ | Port 1                                | <input checked="" type="checkbox"/> |
|     |      | 32770    | ⚙ | Port 2                                | <input checked="" type="checkbox"/> |
| ☐   | 1    |          |   | 1 Byte Input                          |                                     |
|     |      | 1        | ⚙ | 1 Byte Input                          | <input checked="" type="checkbox"/> |
| ▶ ☐ | 2    |          |   | 1 Byte Input                          |                                     |

Figure 4: Additional table rows displayed

### Drop-down list

➤ To select an entry from the drop-down list, click the appropriate field in the interactive table and select the required entry.

|     | Slot | Sub Slot | ! | Module                                | Full Access |
|-----|------|----------|---|---------------------------------------|-------------|
| +   | 0    |          | ⚙ | CIFX RE/PNS V3.5.35 - V3.x [1250.100] |             |
| ▶ + | 1    |          |   | 1 Byte Input                          |             |
| +   | 2    |          |   | 1 Byte Input                          |             |
|     |      |          |   | 2 Bytes Input                         |             |
|     |      |          |   | 3 Bytes Input                         |             |
|     |      |          |   | 4 Bytes Input                         |             |
|     |      |          |   | 8 Bytes Input                         |             |
|     |      |          |   | 12 Bytes Input                        |             |

Figure 5: Drop-down list

## 1.5.6 Status Bar

The **Status Bar** displays information about the current state of the DTM. The current activity, e.g. the DTM connection state, is signaled graphically via icons in the status bar.

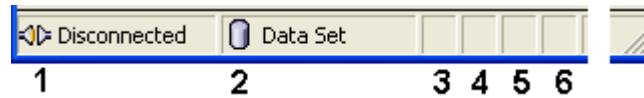


Figure 6: Status Bar – Status Fields 1 to 6






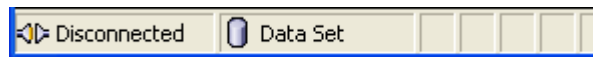
| Status Field | Icon / Meaning   |   |
|--------------|--|---|
| 1            | <b>DTM Connection States</b>   |   |
|              |   | <b>Connected:</b> Icon closed = Device is online  |
|              |   | <b>Disconnected:</b> Icon opened = Device is offline                                    |
| 2            | <b>Data Source States</b>  |   |
|              |   | <b>Data set:</b> The displayed data are read out from the instance data set (database). |
|              |   | <b>Device:</b> The displayed data are read out from the device.                         |
| 3            | <b>States of the instance Date Set</b>   |   |
|              |  | <b>Valid Modified:</b> Parameter is changed (not equal to data source).                 |

Table 5: Status Bar Icons [1]

Offline State



Online State

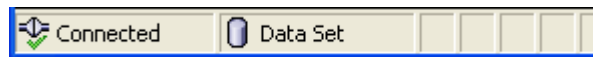


Figure 7: Status Bar Display Example



## 2 Getting started and Instructions Step by Step

### 2.1 Configuration Steps

The following table describes the steps to configure a PROFINET IO-Device device with the PROFINET IO generic Device DTM as it is typical for many cases. At this time it is presupposed that the PROFINET IO-Controller DTM installation was already done.


| # | Step   | Short Description   | For detailed information see section  | Page         |
|---|--|---|---|--------------|
| 1 | Add PROFINET IO-Device in the Device Catalog   | Add the Device in the Device Catalog by importing the device description file to the Device Catalog.<br>Depending of the FDT Container.<br>For netDevice:<br>- <b>Network &gt; Import Device Descriptions.</b>  | (See Operating Instruction Manual netDevice and netProject)   | -            |
| 2 | Load device catalog                            | Depending of the FDT Container:<br>For netDevice:<br>- select <b>Network &gt; Device Catalog</b> ,<br>- select button <b>Reload Catalog</b> .   | (See Operating Instruction Manual netDevice and netProject)   | -            |
| 3 | Create new project / Open existing project     | Depending of the frame application.<br>For the configuration software:<br>- select <b>File &gt; New</b> or <b>File &gt; Open</b> .  | (See Operating Instruction Manual of the Frame Application)   | -            |
| 4 | Insert Controller or Device into configuration | Depending of the FDT Container:<br>For netDevice:<br>- in the Device Catalog click to the Controller,<br>- and insert the device via drag and drop <b>to the line</b> in the network view,<br>- in the Device Catalog click to the Device or to the correct <b>device instance</b> .<br>- Check under <b>Device &gt; Info</b> the info about the feature set of the single device instances.<br><br> <b>Rule 1:</b> Use a device instance (in the Controller and in the Device) that is supported by the used PROFINET IO-Device firmware.<br><br><b>Rule 2:</b> The device instance that is configured in the Controller for the Device must match the device instance configured in the Device.<br><br>- Insert the Device or the device instance via drag and drop <b>to the Controller bus line</b> in the network view. | (See Operating Instruction Manual netDevice and netProject)<br><br><i>PROFINET IO-Device Instance</i> | 18           |
| 5 | Configure Device                               | Configure the Device.<br>- Double click to the device icon of the Device.<br>- The Generic Device DTM configuration dialog is displayed.<br>In the Generic Device DTM configuration dialog:<br>- select <b>Configuration &gt; Modules</b> ,<br>- configure the PROFINET IO-Device modules.<br>- close the Generic Device DTM configuration dialog via the button <b>OK</b> .  | <i>Configuring Device Parameters</i><br><br><i>Modules</i>  | 19<br><br>21 |
| 6 | Configuration Steps Controller device          | Configure the Controller device via PROFINET IO-Controller DTM.<br>Important: Enter the name of station and the IP settings of the PROFINET IO-Device station.  | (See Operating Instruction Manual DTM for PROFINET IO-Controller devices)                             | -            |
| 7 | Save project                                   | Depending of the frame application.<br>For the configuration software:<br>- select <b>File &gt; Save</b> .  | (See Operating Instruction Manual of the Frame Application)   | -            |

Table 6: Getting started - Configuration Steps



For information to further steps as **Download Configuration** or **Diagnosis**, refer to the Operating Instruction Manual *DTM for PROFINET IO-Controller devices*.

## 2.2 PROFINET IO-Device Instance

For PROFINET IO > ‚Slave‘ (Generic Device) in the device catalog all device instances of *one* device description file appear as separate devices. To distinguish the device instances originating from the same device description file, the device name is followed by the *firmware version* or the *range of the firmware versions* the device instance is valid for.

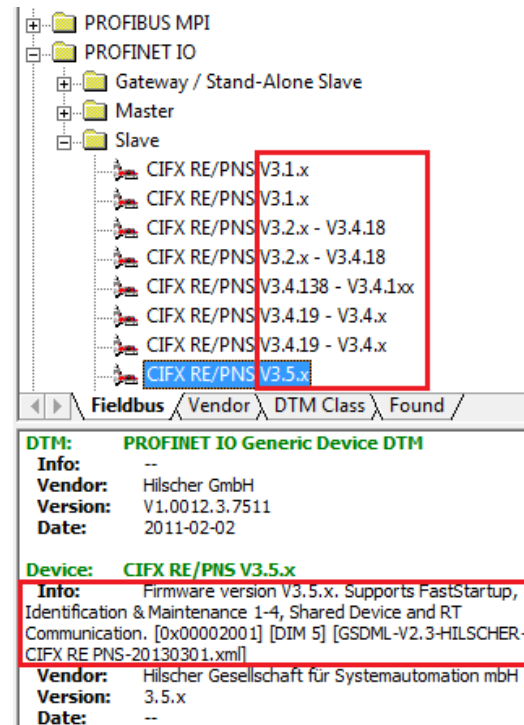


Figure 8: PROFINET IO-Device Instance Slave (Example)

Under **Device** > **Info** additional information is given about the selected device instance, such as the *firmware version*, the *feature set* or the *name of the device description file*.

The device instance must be selected according to the used *firmware version* and *device type*. According to the version of the PROFINET IO-Device firmware the device instance specifies, which features the Device has. The device instance is a module of the GSDML to describe the device parameters device specific.

**Rule 1:** Use a device instance (in the Controller and in the Device) that is supported by the used PROFINET IO-Device firmware.

*Example to Rule 2:* If you use a Device with the latest firmware, you can use any available device instances. Your Device will work properly then.

**Rule 2:** The device instance that is configured in the Controller for the Device must match the device instance configured in the Device.

*Example to Rule 1:* If you use a Device with an earlier firmware and if you select in addition the latest device instance, your system will not work properly.

## 3 Configuration

### 3.1 Overview Configuration

#### Dialog Panes “Configuration”

The table below gives an overview about the available **Configuration** dialog panes descriptions:

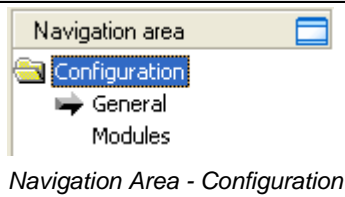
| PROFINET IO-generic Device DTM   | Folder Name / Section | Subsection | Page |
|--|-----------------------|------------|------|
| <br>Navigation area<br>Configuration<br>General<br>Modules<br>Navigation Area - Configuration | Configuration         | General    | 20   |
|  |                       | Modules    | 21   |

Table 7: Descriptions of the Dialog Panes Configuration



Notice the descriptions in the section *Configuring Device Parameters* on page 19 .

### 3.2 Configuring Device Parameters

The following steps are needed to configure the device parameters using the Generic PROFINET IO-Device DTM:

#### Station Name and IP Settings PROFINET IO-Device Station

1. In the PROFINET IO-Controller DTM enter the name of station and the IP settings of the PROFINET IO-Device station.

#### Modules

2. Configure the modules of the PROFINET IO-Device.

Therefore you can add either modules or submodules to the configuration or you can change modules. Furthermore you can assign or change slot numbers.

If your device supports the ‘Shared Device’ function, you can specify to which PROFINET IO-Controller each submodule shall be assigned to.

#### Close Generic Device DTM Configuration Dialog

3. Click **OK** in order to close the Generic Device configuration dialog and to store your configuration.

#### Further Information



For more information refer to the Operating Instruction Manual *DTM for PROFINET IO-Controller devices* or to section *Modules* on page 21.

### 3.3 General

The **General** dialog pane shows the **Name of Station** of the PROFINET IO-Device and its IP settings. These values are set in the PROFINET IO-Controller.

To access to the **General** dialog pane:

- Select **Configuration > General** in the navigation area.

Figure 9: Configuration > General

| Parameter  | Meaning  | Range of Value / Default Value |
|--|--|--------------------------------|
| Name of Station                                      | Network name of the PROFINET IO-Device station. (1 - 240 characters).<br>The name of station is set in the PROFINET IO-Controller DTM. Here it is only displayed. The PROFINET IO-Controller uses the name of station to identify the PROFINET IO-Device via the PROFINET network and to build up communication.<br>The name of station displayed here must match with the name of station set in the PROFINET IO-Device.<br>The name of station must be explicit in the PROFINET network. | 1 - 240 characters             |
| Description  | Symbolic Name of the PROFINET IO-Device station.   |                                |
| <b>IP Settings of the PROFINET IO-Device station</b> |  |                                |
| IP Address   | The IP address of the PROFINET IO-Device station is set in the PROFINET IO-Controller DTM. Here it is only displayed.<br>The PROFINET IO-Controller device transmits the IP address of the PROFINET IO-Device during startup via the PROFINET network to the PROFINET IO-Device and thereby configures the PROFINET IO-Device.   | valid IP Address               |
| Network Mask   | The Network mask of the PROFINET IO-Device station is set in the PROFINET IO-Controller DTM. Here it is only displayed.<br>The PROFINET IO-Controller device transmits the Network mask of the PROFINET IO-Device during startup via the PROFINET network to the PROFINET IO-Device and thereby configures the PROFINET IO-Device.   | valid Network Mask             |
| Gateway Address                                      | The Gateway address of the PROFINET IO-Device station is set in the PROFINET IO-Controller DTM. Here it is only displayed.<br>The PROFINET IO-Controller device transmits the Gateway address of the PROFINET IO-Device during startup via the PROFINET network to the PROFINET IO-Device and thereby configures the PROFINET IO-Device.   | valid Gateway Address          |

| Parameter                 | Meaning  | Range of Value / Default Value   |
|---------------------------|--|--|
| <b>Supported Features</b> |  |  |
| Shared Device             | <p>Display for PROFINET function 'Shared Device'.</p> <p>Whether the 'Shared Device' function is supported by the PROFINET IO-Device is defined in the GSDML file. The 'Shared Device' display can not be changed by the user.</p> <p>Via the PROFINET function 'Shared Device' multiple PROFINET IO-Controllers can have access to one PROFINET IO-Device. Different submodules of one PROFINET IO-Device can be assigned to different PROFINET IO-Controllers. Each submodule can be assigned to exactly <u>one</u> PROFINET IO-Controller. The schematic diagram listed below illustrates this.</p> <p>Note: The PROFINET function 'Shared input' is not supported.</p> | <p>Checked, unchecked</p> <p>Default:<br/>The setting is read from the GSDML file.</p> |

Table 8: General Pane Parameters

## 3.4 Modules

On the **Modules** pane the configured modules of a PROFINET IO-Device are displayed. To configure the modules:

- Select **Configuration > Modules** in the navigation area.

| Slot | Sub Slot | Module                       | Full Access                         |
|------|----------|------------------------------|-------------------------------------|
| 0    |          | CIFX RE/PNS V3.5x [1250.100] |                                     |
|      | 1        | CIFX RE/PNS V3.5x            | <input checked="" type="checkbox"/> |
|      | 32768    | PN-IO                        | <input checked="" type="checkbox"/> |
|      | 32769    | Port 1                       | <input checked="" type="checkbox"/> |
| 1    |          | 1 Byte Input                 |                                     |
|      | 1        | 1 Byte Input                 | <input checked="" type="checkbox"/> |
| 2    |          | 1 Byte Input                 |                                     |

☐ Alpha-sorted module selection

Use of slots: 3/256

State of data length: Input 8/1440 Octets, Output 6/1440 Octets, In-Output 14/2880 Octets

Submodule details

Dataset:  Display mode:

| Direction | Consistence | Data type   | Text ID | Length |
|-----------|-------------|-------------|---------|--------|
| INPUT     | --          | OctetString | Inputs  | 1      |

Figure 10: Configuration &gt; Modules Pane

### 3.4.1 Modules Table

The modules table allows to configure the modules of a PROFINET IO-Device. I. e., modules or submodules can be added, changed or removed.

| Modules |      |          |   |                              |                                     |
|---------|------|----------|---|------------------------------|-------------------------------------|
|         | Slot | Sub Slot | ! | Module                       | Full Access                         |
|         | 0    |          | ⚡ | CIFX RE/PNS V3.5x [1250.100] |                                     |
|         |      | 1        | ⚡ | CIFX RE/PNS V3.5x            | <input checked="" type="checkbox"/> |
|         |      | 32768    | ⚡ | PN-IO                        | <input checked="" type="checkbox"/> |
|         |      | 32769    | ⚡ | Port 1                       | <input checked="" type="checkbox"/> |
|         |      | 32770    | ⚡ | Port 2                       | <input checked="" type="checkbox"/> |
|         | 1    |          |   | 1 Byte Input                 |                                     |
|         |      | 1        | ⚡ | 1 Byte Input                 | <input checked="" type="checkbox"/> |
|         | 2    |          |   | 1 Byte Input                 |                                     |

☐ Alpha-sorted module selection

Figure 11: Configuration > Modules Table (\* The Name of the device is displayed.)

| Parameter                     | Meaning  |
|-------------------------------|--|
| Slot                          | Shows the current <b>Slot</b> number assigned to a module. When clicking the slot field, the automatically updated drop-down list of the free and allowed <b>Slot</b> numbers is displayed.<br>By changing the slot number, the sequence of the modules can be changed.  |
| Sub Slot                      | Shows the current <b>Sub Slot</b> assigned to a submodule. When clicking the sub slot field, the automatically updated drop-down list of the free and allowed <b>Sub Slot</b> numbers is displayed.<br>By changing the slot number, the sequence of the modules can be changed.  |
| !                             | Slot icon tag: indicates the usage of the (sub-)module.<br>⚡: Slot number, subslot number and module name are <u>not</u> changeable.<br>no icon: Slot number, subslot number and module name are changeable.   |
| Module                        | Module name as defined in the GSDML file.  |
| Full Access                   | <b>One PROFINET IO-Controller has access to the PROFINET IO-Device:</b> If the PROFINET IO-Device function 'Shared Device' is not supported, 'Full Access' <input checked="" type="checkbox"/> is always checked (and gray). <u>One</u> PROFINET IO-Controller has access to all the submodules.<br><b>Several PROFINET IO-Controller can access the PROFINET IO-Device:</b> In the configuration of the PROFINET IO-Devices that support the 'Shared Device' function, the access is allocated on submodule level. The PROFINET IO-Controller to which a submodule is assigned in the configuration and for which the check mark 'Full Access' is set, has full access to the submodule.<br>The default setting for access to the submodule level is 'Full Access' checked.<br>For information on the configuration requirements are listed in section <i>Requirements ,Shared Device' Configuration</i> on page 24 |
|                               | The arrow symbol shows the current line in the table. This line is the reference for <b>Add Module</b> , <b>Add Submodule</b> and <b>Remove</b> .  |
| 'Add Module'                  | Use <b>Add Module</b> to add a module to the device configuration below the current line .   |
| 'Add Submodule'               | Use <b>Add Submodule</b> to add a submodule to the selected module of the device configuration below the current line .  |
| 'Remove'                      | Use <b>Remove</b> to remove the selected (sub-)module from the configuration below the current line .  |
| Alpha-sorted module selection |  |

Table 9: Modules Pane Parameters

### 3.4.1.1 'Shared Device' Principle

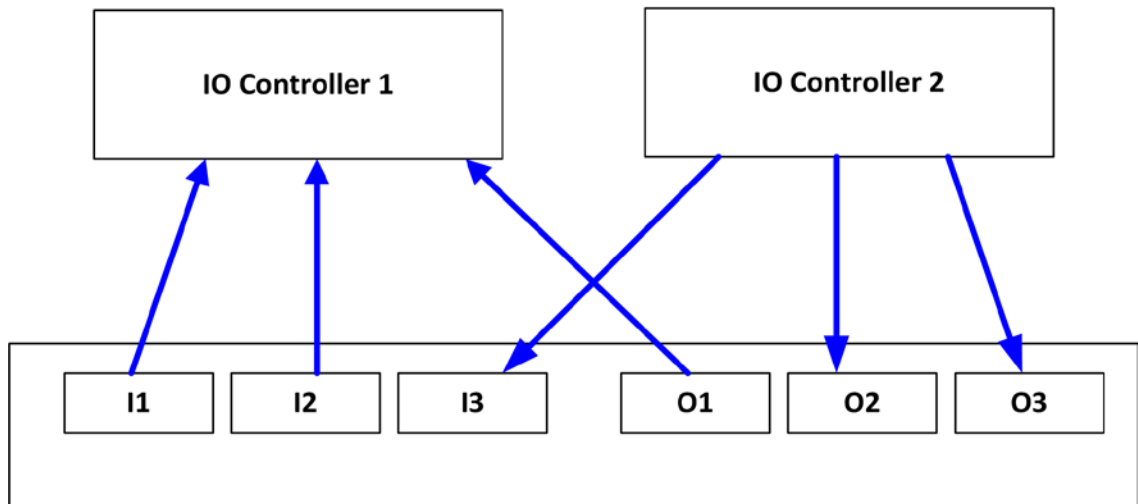


Figure 12: Schematic diagram 'Shared Device' - Submodules I1 to I3 and O1 to O3 (I = Input, O= Output)

### 3.4.1.2 Requirements ‚Shared Device’ Configuration

If a PROFINET IO-Device shall communicate with more than one PROFINET IO-Controller and you want to use the ‚shared Device’ function, note the following requirements:

#### **1. Full Access to a Submodule**

Make sure that only one PROFINET IO-Controller receives full access to a submodule.



**Important!** In the PROFINET IO-Controller DTMs which have access to the submodules of an PROFINET IO-Device used as ‚shared device’, the ‚IP address’ and ‚station name’ settings for the ‚shared device’ must be identical.

The user must ensure the unique assignment of the submodules to the PROFINET IO-Controllers. The check mark ‚Full Access’ can be set at only one PROFINET IO-Controller.

#### **2. Submodule of a PDev**



Refer to the description of the used PROFINET IO-Device device, whether the submodules of a PDev (= physical device in slot 0) must be assigned to exactly one PROFINET IO-Controller or whether they can be assigned to various PROFINET IO-Controllers.

Depending on the configuration software used, the PDev submodules must be assigned to exactly one or can be assigned to several PROFINET IO-Controllers. If a choice is possible, it is generally advisable to accurately assign all submodules of the PDev to exactly one PROFINET IO-Controller.

### 3.4.1.3 Different Forms of Project Configuration

A PROFINET IO-Device used as ‚Shared Device’ can be configured via PROFINET IO-Controller, which are

- In one project or
- in several projects in a network configuration or
- in projects of different configuration tools.

Therefore the steps listed in the section *Examples for the ‚Shared Device’ Configuration* in SYCON.net on page 25 following here, are only an example of the specified case.



### 3.4.1.4 Examples for the 'Shared Device' Configuration in SYCON.net

#### Example for two PROFINET IO-Controllers within one Project

1. Create a project with two PROFINET IO-Controllers.

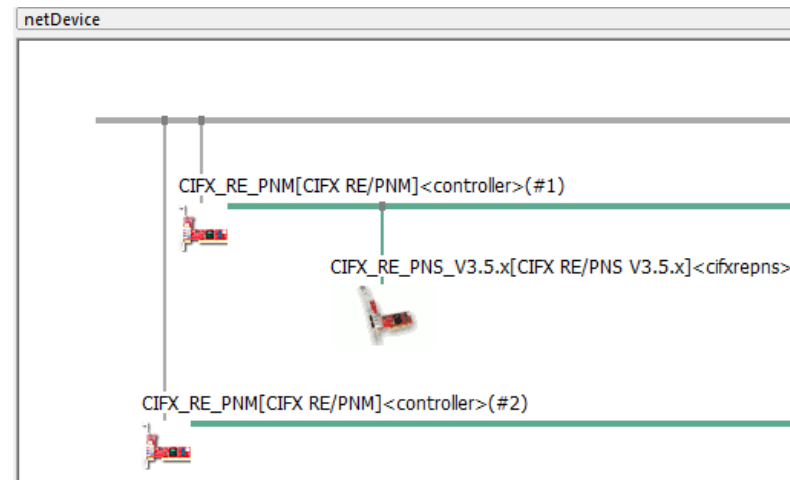


Figure 13: 'Shared Device' Configuration in SYCON.net (Example)

2. Observe that the sharing PROFINET IO-Controllers get assigned different 'IP addresses' and 'Name of stations'.
  3. To one PROFINET IO-Controller add the generic PROFINET IO-Device that you intend to configure as 'shared device' ('cifxrepns' in the example).
- Check on the generic PROFINET IO-Device DTM's **General** pane for the 'Shared Device' feature support.

Figure 14: Supported Features – Shared Device

4. **Note:** The 'Shared Device' feature must be supported!
  5. Open the generic PROFINET IO-Device DTM and configure the shared device.
- Perform all device configuration steps as listed in section *Configuring Device Parameters* on page 19.
  - On the generic PROFINET IO-Device DTM's **Modules** pane check **Full Access** for all submodules which are required to be assigned to the first PROFINET IO-Controller.

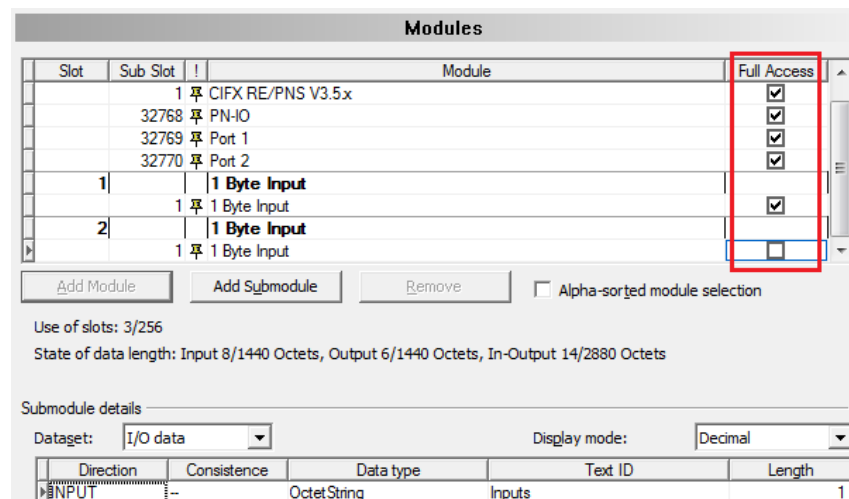


Figure 15: Shared Device – Full Access PROFINET IO-Controller1

6. Copy the PROFINET IO-Device to be shared.

- Select the PROFINET IO-Device to be configured as 'shared device'.
- Click **Copy** from the context menu.

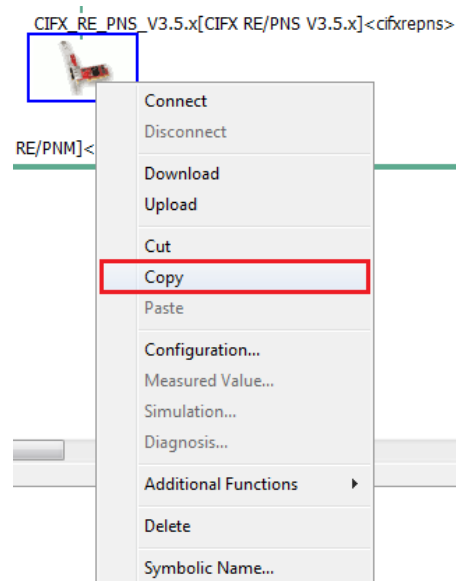


Figure 16: Shared Device - Copying

7. Select the second PROFINET IO-Controller.

8. Paste the copied PROFINET IO-Device here.

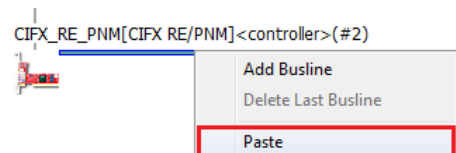


Figure 17: Shared Device – Pasting

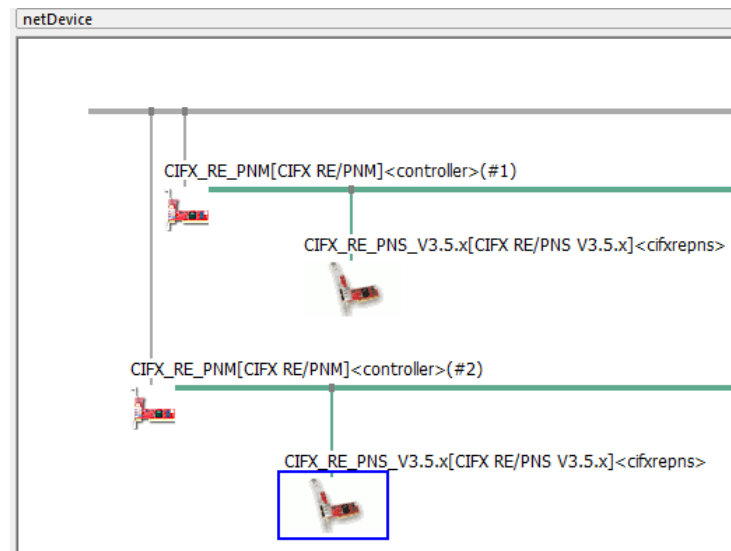


Figure 18: Shared Device – Pasting PROFINET IO-Device DTM

- Open the first and second PROFINET IO-Controller DTM pane and configure each PROFINET IO-Controller as well as the 'IP address' and the 'Name of station' of the shared device.
- Make sure that
  - the 'IP address' and
  - the 'Name of station' for the shared device is the same in both configurations with the different PROFINET IO-Controller.
  - Furthermore the module configurations each must contain the submodules required for the associated PROFINET IO-Controller.
- 9. Configure the access to the submodules in both PROFINET IO-Controller DTM instances according to the requirement that each submodule must be checked only for one PROFINET IO-Controller. Observe that the two PROFINET IO-Controllers get full access to mutually exclusive submodules' sets.
- Open the copied generic PROFINET IO-Device DTM and configure the shared device.
- On the generic PROFINET IO-Device DTM's **Modules** pane check **Full Access** for all submodules which are required to be assigned to the second PROFINET IO-Controller.

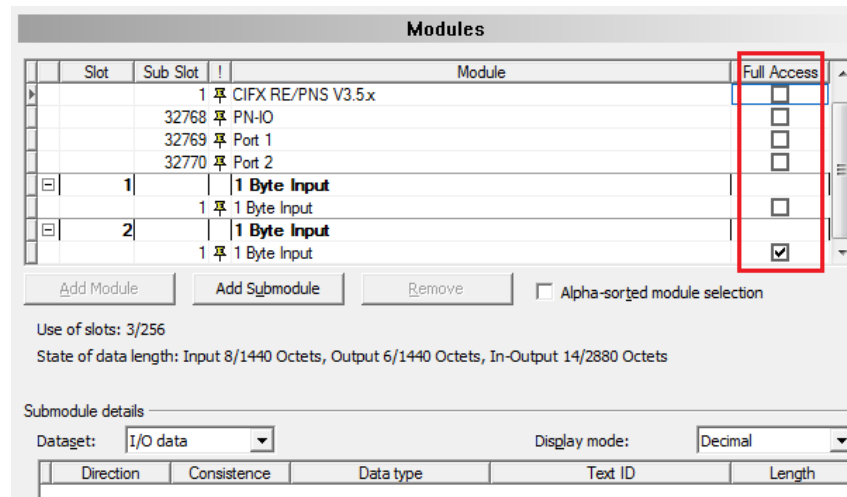


Figure 19: Shared Device – Full Access PROFINET IO-Controller2

10. Save the configuration.

11. Test your configurations with real PROFINET networks with the devices you have configured.

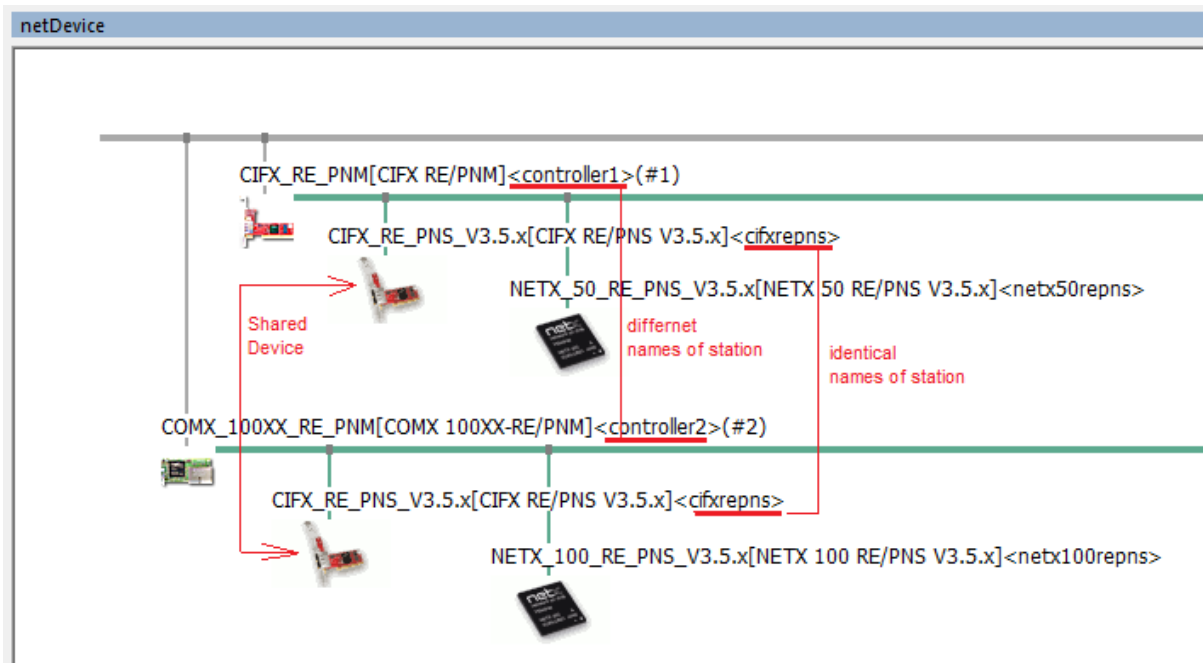


Figure 20: 'Shared Device' - Configuration in SYCON.net (Example)

### **Example for two PROFINET IO-Controllers within two Projects**

**Note:** You can create separate projects for each PROFINET IO-Controller. In this case

1. Create a project with one PROFINET IO-Controller.
2. Proceed with steps 2..5 above (step 5 copying the PROFINET IO-Device DTM configuration into the clipboard).
3. Open/create the project with the second PROFINET IO-Controller.
4. Proceed with steps 6..9 above (step 7 pasting the copied PROFINET IO-Device DTM configuration from the clipboard).

### 3.4.2 Indication of the Firmware Version of the Device Instance



**Note:** If during the creation of the network configuration for the PROFINET IO-Device a specific device instance was selected, in the top line of the module table, behind the module name, the firmware version of the selected device instance appears.

| Modules |      |          |   |                                     |                                     |
|---------|------|----------|---|-------------------------------------|-------------------------------------|
|         | Slot | Sub Slot | ! | Module                              | Full Access                         |
|         | 0    |          |   | CIFX RE/PNS <b>V3.5x</b> [1250.100] |                                     |
|         |      | 1        |   | CIFX RE/PNS V3.5x                   | <input checked="" type="checkbox"/> |
|         |      | 32768    |   | PN-IO                               | <input checked="" type="checkbox"/> |
|         |      | 32769    |   | Port 1                              | <input checked="" type="checkbox"/> |
|         |      | 32770    |   | Port 2                              | <input checked="" type="checkbox"/> |
|         | 1    |          |   | 1 Byte Input                        |                                     |
|         |      | 1        |   | 1 Byte Input                        | <input checked="" type="checkbox"/> |
|         | 2    |          |   | 1 Byte Input                        |                                     |

Figure 21: Indication of the Firmware Version of the Device Instance (Example)



For details about the PROFINET IO-Device instance refer to section *PROFINET IO-Device Instance* on page 18.

### 3.4.3 Configure Modules

To configure the modules of a PROFINET IO-Device, first consider the following description on how to proceed:



**Note:** For devices with GSDML XML schema version = 1.0, every module has one submodule assigned. No additional submodules can be added, and the assigned submodule can not be removed. For devices with GSDML XML version = 2.0, you can configure the submodules, and these submodules can be added or removed from the corresponding module.

Modules description in GSDML file differentiates between *fixed in slot*, *used in slot* and *allowed in slot* modules. *Fixed in slot* and *used in slot* modules are automatically configured, *allowed in slot* modules can be configured.

#### 3.4.3.1 1. Adding Modules or Submodules to the Configuration

To add additional available modules or submodules:

1. Select the line to insert a module or submodule.
2. Click Add Module or Add Submodule.
- Starting from the selected line, additional modules or submodules are added at the next free slot or sub slot.
3. Click **Apply** or **OK** to confirm your changes, or cancel to skip.

### 3.4.3.2 2. Changing Modules Configuration / remove Module

If you want to change the configuration, follow these steps.

1. Select the line of the module or submodule.
2. Open the modules' drop-down list.
- The modules' drop-down list shows all available modules or submodules for the respective slot.

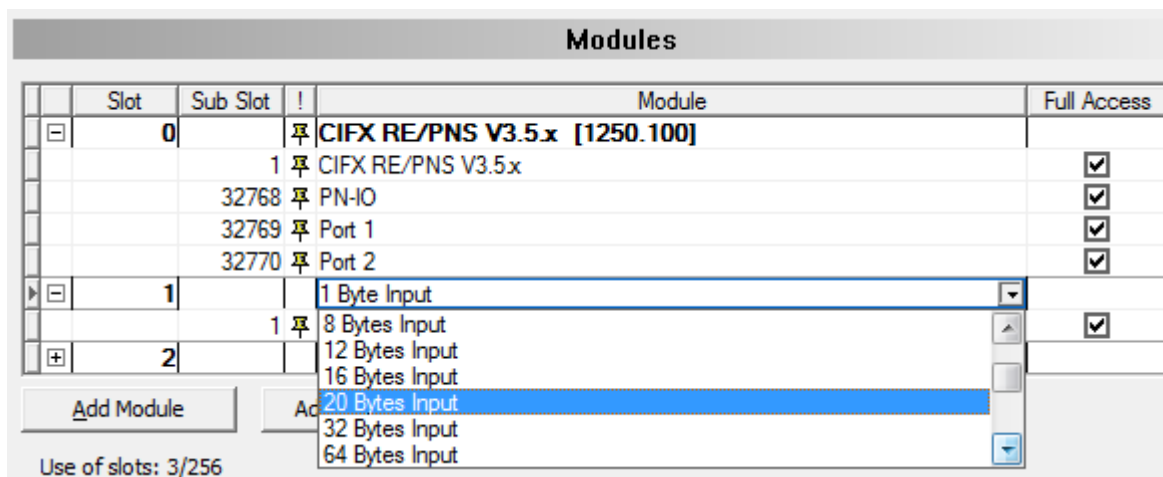


Figure 22: Changing Modules using Drop-Down Control (\* The Name of the device is displayed.)



**Note:** If no appropriate and allowed modules or submodules are displayed in the modules' drop-down list of a slot, then only to the following next free slot modules or submodules can be added .

3. Select the next available and allowed module or submodule.
4. Click on **Apply** or **OK** to confirm your changes, or cancel to skip.


To remove modules or submodules:

- Use **Remove** or press **DELETE** to remove the selected module or submodule from the configuration.

*Fixed in slot* modules can not be removed.

### 3.4.3.3 3. Changing Slots



**Note:** Slot or sub slot numbers for  *fixed in slot* modules or submodules can not be changed.

To change the **Slot** or **SubSlot** numbers of a configured module or submodule:

1. Select the cell of the available slot/sub slot to be changed.
- The drop-down list shows all free and allowed slots or sub slots of the module or submodule.

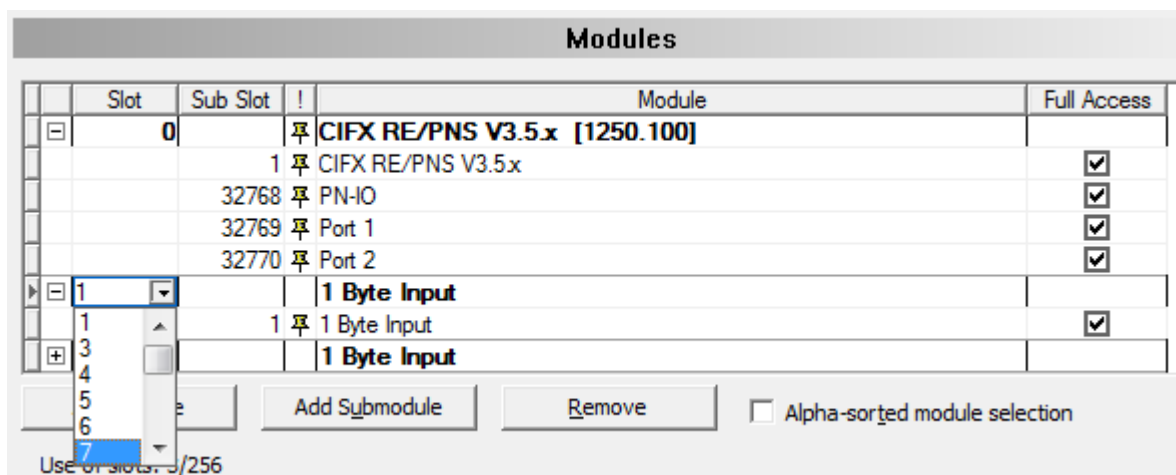


Figure 23: Assigning (Sub) Slots to Modules using Drop-Down Control (\* The Name of the device is displayed.)

2. Select the desired slot/sub slot number.
3. Click on **Apply** or **OK** to confirm your changes, or cancel to skip.

### 3.4.4 Configuration Info

Use of slots: 3/256

State of data length: Input 8/1440 Octets, Output 6/1440 Octets, In-Output 14/2880 Octets

Figure 24: Configuration > Modules - Configuration Info

The configuration is validated regarding the maximum number of input/output bytes and modules.

| Parameter             | Meaning  |
|-----------------------|--|
| Use of slots:         | Number of configured modules / max. allowed modules.   |
| State of data length: | Indicates state of data.<br>Input: Current number of input data / max. allowed number of input data.<br>Output: Current number of output data / max. allowed number of output data.<br>In-/Output: Current number of input/output data / max. allowed number of input/output data. |

Table 10: Modules Pane Parameters - Configuration Info



### 3.4.5 Submodules Details

The **Submodule details** configuration area displays the details of the current selected module.

The screenshot shows the 'Submodule details' window with the 'Dataset' dropdown set to 'I/O data' and the 'Display mode' dropdown set to 'Decimal'. Below these are two tables. The first table has columns: Direction, Consistence, Data type, Text ID, and Length. It contains one row with 'INPUT' in the Direction column, a dashed line in the Consistence column, 'OctetString' in the Data type column, 'Inputs' in the Text ID column, and '1' in the Length column. The second table is empty.

Figure 25: Configuration > Modules - Submodules Details > Dataset: I/O data

The screenshot shows the 'Submodule details' window with the 'Dataset' dropdown set to 'Parameter' and the 'Display mode' dropdown set to 'Decimal'. Below these are two tables. The first table has columns: Name, Value, Data type, and Data range. It is currently empty. The second table is also empty.

Figure 26: Configuration > Modules - Submodules Details > Dataset: Parameter

| Parameter                 | Meaning   |
|---------------------------|---|
| Dataset                   | Displayed dataset: I/O data or Parameter  |
| Display mode              | Under <b>Display Mode</b> the display mode of the module configuration data is predefined decimally or hex decimally. |
| <b>Dataset: I/O data</b>  |   |
| Direction                 | Input/output direction of the PROFINET IO-Data  |
| Consistence               | Specifies the input characteristics of a submodule.<br>By default the data are transmitted coherently. [2]            |
| Data type                 | Defines the data type of the data signal. [2]   |
| Text ID                   | Text ID of the submodule from the GSDML file.   |
| Length                    | Length of IO-Data.  |
| <b>Dataset: Parameter</b> |   |
| Name                      | Defines the name of the parameter.  |
| Value                     | Indicates the value of the parameter.   |
| Datatype                  | Defines the data type of the parameter.   |
| Data range                | Defines the range of the parameter value.   |

Table 11: Modules Pane Parameters - Submodules Details

## 4 Description

### 4.1 Overview Description

#### Description Dialog Panes

The table below gives an overview for the individual **Description** dialog panes descriptions:

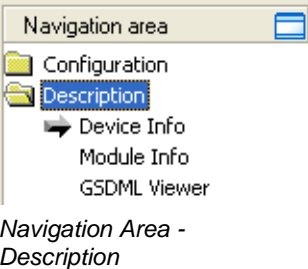
| PROFINET IO-generic<br>Device DTM   | Folder Name / Section | Page |
|---|-----------------------|------|
|  <p>Navigation area</p> <p>Configuration</p> <p>Description</p> <p>Device Info</p> <p>Module Info</p> <p>GSDML Viewer</p> <p>Navigation Area -<br/>Description</p> | Device Info           | 35   |
|   | Module Info           | 36   |
|   | GSDML Viewer          | 37   |

Table 12: Descriptions of the Description Panes

## 4.2 Device Info

The **Device Info** pane displays manufacturer information about the device, which is defined in the GSDML file.

| Name                        | Value  |
|-----------------------------|--|
| Main family                 | Attribute of the GSDML family element. It contains the assignment of the device to a function class.<br>One of the following values are allowed: General Drives, Switching devices, I/O, Valves, Controllers, HMI, Encoders, NC/RC, Gateway, Programmable Logic Controllers, Ident systems, PROFIBUS PA Profile, Network Components Sensors.   |
| Product family              | Attribute of the GSDML family element. It contains the vendor specific assignment of the device to a product family. In addition to the main family a device can be assigned to a vendor specific product family.  |
| DAP vendor name             | Attribute of the GSDML ModuleInfo/VendorName element. The VendorName element contains the name of the device vendor.<br>The device access point (DAP) is a module of the GSDML to describe the device parameters device specific. The device access point object contains most of the device related keywords.   |
| DAP hardware release        | Attribute of the GSDML ModuleInfo/HardwareRelease element. The HardwareRelease element contains the hardware release of the DAP.   |
| DAP software release        | Attribute of the GSDML ModuleInfo/SoftwareRelease element. The SoftwareRelease element contains the software release of the DAP.   |
| Extended address assignment | Attribute of the GSDML DeviceAccessPointItem element. It depends from the protocol for the assignment of the IP addresses supported by the DAP.<br>Default: "false", for the Discovery and Configuration (DCP),<br>"true" for the Dynamic Host Configuration Protocol (DHCP)   |
| Physical slots              | Attribute of the GSDML DeviceAccessPointItem element. This list describes which slots are supported by the DAP. The Slot number of the DAP itself shall be part of the list.   |
| Max. IO data length         | Attribute of the GSDML DeviceAccessPointItem IOConfigData element. It contains the maximum length of the output and input data in octets. MaxDataLength shall not be less than the highest value of MaxInputLength or MaxOutputLength. It shall not be greater than the sum of MaxInputLength and MaxOutputLength. If this keyword is not provided, the maximum length is the sum of MaxInputLength and MaxOutputLength. |
| Max. input data length      | Attribute of the GSDML DeviceAccessPointItem IOConfigData element. It contains the maximum length of the data in octets which can be transferred from the IO Device to the IO Controller. This length is defined by the sum of the input data of all used submodules, the corresponding IO producer status and the IO consumer status of the used output submodules.   |
| Max. output data length     | Attribute of the GSDML DeviceAccessPointItem IOConfigData element. It contains the maximum length of the data in octets which can be transferred from the IO Controller to the IO Device. This length is defined by the sum of the output data of all used submodules, the corresponding IO producer status and the IO consumer status of the used input submodules.   |
| Info text                   | GSDML ModuleInfo/InfoText element. This element contains human readable additional text information about the device.  |

Table 13: Device Info

## 4.3 Module Info

On the **Module Info** pane the **Select module** drop-down list displays all available modules described in the GSDML file.

In the table below the corresponding information for the current selection (Vendor ID, Main family, ... ) is displayed.

| Control       | Meaning  |
|---------------|--|
| Select module | Drop-down list, displays all available modules described in the GSDML file. In the table below the corresponding information for the current selection is displayed. |

| Name               | Value  |
|--------------------|--|
| Vendor ID          | Identification number of the vendor.   |
| Main family        | Attribute of the GSDML family element. It contains the assignment of the device to a function class.<br><br>One of the following values are allowed: General Drives, Switching devices, I/O, Valves, Controllers, HMI, Encoders, NC/RC, Gateway, Programmable Logic Controllers, Ident systems, PROFIBUS PA Profile, Network Components Sensors. |
| Product family     | Attribute of the GSDML family element. It contains the vendor specific assignment of the device to a product family. In addition to the main family a device can be assigned to a vendor specific product family.  |
| Modules identifier | Identification number of the module.   |
| Order number       | GSDML ModuleInfo/OrderNumber element. It contains the order number of a module.  |
| Hardware release   | GSDML ModuleInfo/HardwareRelease element. It contains the hardware release of a module.  |
| Software release   | GSDML ModuleInfo/SoftwareRelease element. It contains the software release of a module.  |
| Info text          | GSDML ModuleInfo/InfoText element. This element contains human readable additional text information about the module.  |

*Table 14: Module Information*

## 4.4 GSDML Viewer

The **GSDML Viewer** displays the content of the GSDML file of the device in HTML style in a text view.

Under **Filename** the absolute file directory path and the file name of the displayed GSDML file is displayed. **Find what** offers a search feature to search for text contents within the text of the GSDML file.

In the GSDML Viewer window the entries show the GSDML file in text format.

| Parameter        | Meaning   |
|------------------|---|
| Filename         | File directory path and the file name of the displayed GSDML file.            |
| Find what        | Search feature to search for text contents within the text of the GSDML file. |
| Match case       | Search option   |
| Match whole word | Search option   |

*Table 15: Device Description – GSDML Viewer*

## 5 Appendix

### 5.1 User Rights

User-rights are set within the FDT-container. Depending on the level the configuration is accessible by the user or read-only.

To access the **Configuration** and **Description** panes of the Generic PROFINET IO-Device DTM you do not need special user rights.



**Note:** To edit, set or configure the parameters of the **Configuration** panes, you need user rights for *Maintenance*, for *Planning Engineer* or for *Administrator*.

The following tables give an overview of the user right groups and which user rights you need to configure the single parameters.

#### 5.1.1 Configuration

|                | Observer | Operator | Maintenance | Planning Engineer | Administrator |
|----------------|----------|----------|-------------|-------------------|---------------|
| <i>General</i> | D        | D        | X           | X                 | X             |
| <i>Modules</i> | D        | D        | X           | X                 | X             |

Table 16: Configuration (D = Displaying, X = Editing, Configuring)

### 5.2 References

- [1] Device Type Manager (DTM) Style Guide, Version 1.0 ; FDT-JIG - Order No. <0001-0008-000>
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- [3] PROFINET IO-Device Protocol API Manual (V3.4), Revision 13, Hilscher GmbH 2013  
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- [4] PROFINET IO-RT Controller Protocol API Manual, Revision 18, Hilscher GmbH 2013
- [5] Application Layer protocol for decentralized periphery and distributed automation, Technical Specification for PROFINET, Version 2.3Ed2MU2, February 2015, Order No: 2.722, PROFIBUS Nutzerorganisation e.V., Karlsruhe

## 5.3 List of Figures

|  |    |
|--|----|
| Figure 1: Dialog Structure of the Generic PROFINET IO-Device DTM   | 12 |
| Figure 2: Navigation Area  | 13 |
| Figure 3: Hidden table rows  | 15 |
| Figure 4: Additional table rows displayed  | 15 |
| Figure 5: Drop-down list   | 15 |
| Figure 6: Status Bar – Status Fields 1 to 6  | 16 |
| Figure 7: Status Bar Display Example   | 16 |
| Figure 8: PROFINET IO-Device Instance Slave (Example)  | 18 |
| Figure 9: Configuration > General  | 20 |
| Figure 10: Configuration > Modules Pane  | 21 |
| Figure 11: Configuration > Modules Table (* The Name of the device is displayed.)                            | 22 |
| Figure 12: Schematic diagram 'Shared Device' - Submodules I1 to I3 and O1 to O3 (I = Input, O= Output)       | 23 |
| Figure 13: 'Shared Device' Configuration in SYCON.net (Example)  | 25 |
| Figure 14: Supported Features – Shared Device  | 25 |
| Figure 15: Shared Device – Full Access PROFINET IO-Controller1   | 26 |
| Figure 16: Shared Device - Copying   | 26 |
| Figure 17: Shared Device – Pasting   | 26 |
| Figure 18: Shared Device – Pasting PROFINET IO-Device DTM  | 27 |
| Figure 19: Shared Device – Full Access PROFINET IO-Controller2   | 28 |
| Figure 20: 'Shared Device' - Configuration in SYCON.net (Example)  | 28 |
| Figure 21: Indication of the Firmware Version of the Device Instance (Example)                               | 29 |
| Figure 22: Changing Modules using Drop-Down Control (* The Name of the device is displayed.)                 | 30 |
| Figure 23: Assigning (Sub) Slots to Modules using Drop-Down Control (* The Name of the device is displayed.) | 31 |
| Figure 24: Configuration > Modules - Configuration Info  | 32 |
| Figure 25: Configuration > Modules - Submodules Details > Dataset: I/O data                                  | 33 |
| Figure 26: Configuration > Modules - Submodules Details > Dataset: Parameter                                 | 33 |

## 5.4 List of Tables

|  |    |
|--|----|
| Table 1: Descriptions Dialog Panes                                 | 4  |
| Table 2: General Device Information                                | 13 |
| Table 3: Overview Dialog Panes                                     | 14 |
| Table 4: OK, Cancel, Apply and Help                                | 14 |
| Table 5: Status Bar Icons [1]                                      | 16 |
| Table 6: Getting started - Configuration Steps                     | 17 |
| Table 7: Descriptions of the Dialog Panes Configuration            | 19 |
| Table 8: General Pane Parameters                                   | 21 |
| Table 9: Modules Pane Parameters                                   | 22 |
| Table 10: Modules Pane Parameters - Configuration Info             | 32 |
| Table 11: Modules Pane Parameters - Submodules Details             | 33 |
| Table 12: Descriptions of the Description Panes                    | 34 |
| Table 13: Device Info  | 35 |
| Table 14: Module Information                                       | 36 |
| Table 15: Device Description – GSDML Viewer                        | 37 |
| Table 16: Configuration (D = Displaying, X = Editing, Configuring) | 38 |

## 5.5 Glossary

### DCP

Discovery and Configuration Protocol.

The Discovery and basic Configuration Protocol (DCP) is a protocol for identifying and configuring devices which is defined within the PROFINET specification.

### Device Instance

According to the version of the PROFINET IO-Device firmware the device instance specifies, which features the device has. The device instance is a module of the GSDML to describe the device parameters device specific.

In **netDevice** in the device catalog under 'Stand-Alone-Slave' or 'Slave' all device instances that derive from the same device description file, appear as separate devices.

### DNS

Domain Name Service.

### DTM

Device Type Manager.

The Device Type Manager (DTM) is a software module with graphical user interface for the configuration or for diagnosis of device.

### Ethernet

A networking technology used both for office and industrial communication via electrical or optical connections. It has been developed and specified by the Intel, DEC and XEROX. It provides data transmission with collision control and allows various protocols. As Ethernet is not necessarily capable for real-time application, various real-time extensions have been developed (Industrial Ethernet, Real-Time Ethernet).

### FDT

Field Device Tool

FDT specifies an interface, in order to be able to use DTM (Device Type Manager) in different applications of different manufacturers.

### GSDML

GSDML = General Station Description Markup Language.

### IP

Internet Protocol.

IP belongs to the TCP/IP family of protocols and is defined in RFC791. It is based on layer 3 of the ISO/OSI 7 layer model of networking.



It is a connectionless protocol, i.e. you do not need to open a connection to a computer before sending an IP data packet to it. Therefore IP is not able to guarantee that the IP data packets really arrive at the recipient. On IP level neither the correctness of data nor the consistence and completeness are checked.

IP defines special addressing mechanisms, see IP Address.

## IP Address

An IP address is an address identifying a device or a computer within a network using the IP protocol. IP addresses are defined as a 32 bit number. Usually, for ease of notation the IP address is divided into four 8 bit numbers which are represented in decimal notation and separated by points:

a.b.c.d

where a.b.c.d are each integer values between 0 and 255.

Example: 192.168.30.15

However, not all combinations are allowed, some are reserved for special purposes.

The IP address 0.0.0.0 is defined as invalid.

## MAC-ID

MAC = Media Access Control

A MAC-ID is on delivery a unique (physical) Ethernet address of the device.

MAC-IDs are defined as a 48 bit number. Usually, for ease of notation the MAC-ID address is divided into six 8 bit numbers which are represented in hexadecimal notation and separated by "minus"-signs (-):

A-B-C-D-E-F

where A-B-C-D-E-F are each integer values between 0 and 255.

Example: 00-02-A2-20-91-18

## Module

Hardware or logical component of a physical device.

## Name of Station

The **Name of Station** is defined by the DNS compatible device name in the GSDML file. It can be modified according to the DNS name specification. If the PROFINET IO-Device does use the name baptism the **Name of Station** is set by the PROFINET IO-Device.

## PROFINET

A communication system for Industrial Ethernet designed and developed by PROFIBUS & PROFINET International (PI). It uses some mechanisms similar to those of the PROFIBUS field bus.

## PROFINET IO-Controller

A PROFINET control unit responsible for the defined run-up of an I/O subsystem and the cyclic or acyclic data exchange.

**PROFINET IO-Device**

A PROFINET field device that cyclically receives output data from its IO-Controller and responds with its input data.

**Shared Device**

Via the PROFINET function 'Shared Device' multiple PROFINET IO-Controllers can have access to one PROFINET IO-Device. Different submodules of one PROFINET IO-Device can be assigned to different PROFINET IO-Controllers. Each submodule can be assigned to exactly one PROFINET IO-Controller.

**Slot**

Address of a structural unit within a PROFINET IO-Device.

**Subslot**

Subslot address of a structural unit within a slot.

**Submodule**

Hardware or logical component of a module

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