Operating Instruction Manual

Generic DTM for PROFINET IO-Devices

Configuration of PROFINET IO-Devices

V1.1100

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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.

1.1.1 Online help

The PROFINET IO-Controller DTM contains an integrated online help.

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

1.1.2 List of revisions

Index	Date	Version	Component	Changes
13	2022-09-02	1.1100	PNIOGenDevDTM.dll	Document revised.
		1.1100	PNIOGenDevGUI.ocx	

Table 1: List of revisions

1.2 Overview use cases

In the table below you find an overview of the applicable use cases.

Use case	Description	Chapter, section
Device start up	• Creating project configuration	*Create project configuration* [▷ page 14]
Configuring device parameters	• General device settings	*General* [▷ page 16]
	• Module configuration	*Modules* [▷ page 17]
	• Shared Device	*"PROFINET Shared Device"* [▷ page 20]
Descriptions	• Device information	*Device info* [▷ page 36]
	• Module information	*Module info* [▷ page 37]
	• GSDLM viewer	*GSDML viewer* [▷ page 37]
User rights	Definition of access rights	*User rights* [▷ page 39]

Table 2: Overview use cases

1.3   System requirements

- PC with 1 GHz processor or higher

- Windows® XP SP3,
  Windows® Vista (32-Bit) SP2,
  Windows® 7 (32-Bit and 64-Bit) SP1,
  Windows® 8 (32-Bit and 64-Bit),
  Windows® 8.1 (32-Bit and 64-Bit),
  Windows® 10 (32-Bit and 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 a further PC,
> - this PC must also comply with the above system requirements,
> - the device description files of the devices used in the project must be imported into the configuration software SYCON.net on the new PC,
> - and the DTMs of the devices used in the project must also be installed on that further PC.

1.4   About the generic PROFINET IO-Device DTM

Using the generic PROFINET IO-Device DTM you can:

- configure Device within an FDT frame application whose settings are defined via GSDML files;

- store the information required for configuring the Device in the controller and thus configure the controller device.

1.5   Requirements generic PROFINET IO-Device-DTM

The following requirements apply when working with a generic PROFINET IO-Device DTM:

- Installed FDT/DTM frame application (V1.2 compliant)

- Installed PROFINET IO-Controller DTM

- GSDML files of the devices to be configured

- The DTM must be loaded into the device catalog.

- Loading GSDML files

To add devices to the netDevice device catalog, the GSDML files of the used devices must be imported via **Network** > **Import device descriptions** .... into the folder `C:\ProgramData\ SYCONnet\[`*protocol name*`]\GSDML` and the device catalog must be reloaded.

1.6   DTM dialog structure

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.
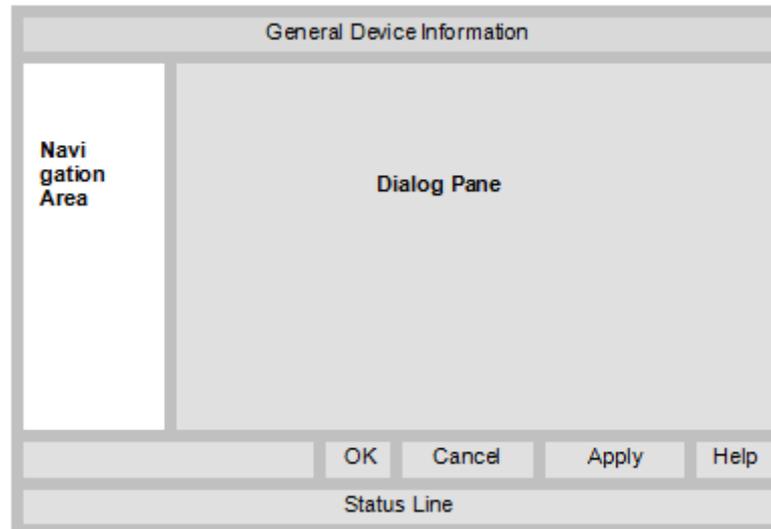
Figure 1: Dialog structure PROFINET IO-Controller DTM

1.6.1   General device information

Parameter	Description
IO device	Device name
Vendor	Vendor name of he device
Device ID	Identification number of the device
Vendor ID	Identification number of the vendor

Table 3: General device information

1.6.2 Navigation area

In the navigation area, you can select the individual dialog panes via the folder structure of the DTM.
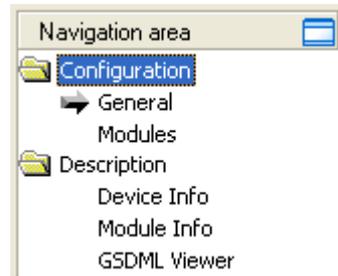
Figure 2: Navigation area

➢ Select the required folder and subfolder.

⇨ The corresponding dialog pane appears.

➢ Click ☐, to hide or to open the navigation area.

1.6.3 Dialog panes

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

1.6.4 OK, Cancel, Apply, Help,

In the configuration software SYCON.net the following is valid:

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

Table 4: OK, Cancel, Apply, Help

1.6.5   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

Display / hide table rows

➢ Click on the + sign or press the spacebar.

↳ Additional table rows are 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 4: Drop-downl list

1.6.6   Status bar

In the status bar, graphical icons display the current DTM state (e. g., connection status, or other activities).
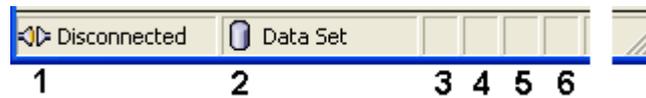
Figure 5: Status bar – status fields 1 to 6

Status field	Icon / description	
1	**DTM connection states**	
		Connected: Icon closed = Device is online
		Disconnected: Icon opened = Device is offline
2	**Data source states**	
		Data set: The displayed data is read out from the instance data set (database).
		Device: The displayed data is read out from the device.
3	**States of the instance date set**	
		Valid Modified: Parameter is changed (not equal to data source).

Table 5: Status bar icons [1]

Offline state
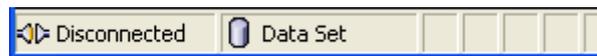
Online state
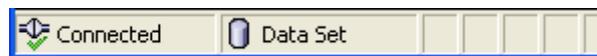
Table 6: Status bar display examples

2   Safety

2.1   General note

The documentation in the form of a user manual, an operating instruction manual or other manual types, as well as the accompanying texts, have been created for the use of the products by qualified personnel. When using the products, all Safety Messages, Integrated Safety Messages, Property Damage Messages and all valid legal regulations must be obeyed. Technical knowledge is presumed. The user has to assure that all legal regulations are obeyed.

2.2   Intended use

The generic PROFINET IO-Device DTM serves for configuration and diagnosis of PROFINET IO-Devices.

2.3   Personnel qualification

Personnel responsible for the application of the network system shall be aware of the system behavior and shall be trained in using the system.

3   Device start up

3.1   Configuration steps

The following overview provides to you the step sequence on how to configure a PROFINET IO-Device with a generic PROFINET IO-Device DTM as it is typical for many cases. It is assumed at this point that the installation of the PROFINET IO-Controller DTM has been completed.

Step	Brief description	Further information
Add PROFINET IO-Device in the device catalog	- Open configuration software SYCON.net. - **Network** > **Import device descriptions**. - Import the device description.	Section *Create project configuration* [▶ page 14], or operating instruction manual "SYCON.net" and operating instruction manual "netDevice and netProject"
Load device catalog	- Select **Network > Device catalog**, - **Reload catalog**.	
Create / open project	- Select **File > New** or **File > Open**.	*PROFINET IO-Device instance* [▶ page 13]
Insert the controller device and the Device and into configuration	- In the **Device catalog**, select the controller device and insert the device via drag & drop **to the line** in the network view. - In the **Device catalog**, select the Device or the correct device instance. - Attend to the functional scope of the individual device instances (at the bottom of the device catalog window) under **Device** > **Info**. **Rule 1**: Use a device instance (in the Controller and in the Device) supported by the PROFINET IO-Device firmware used. **Rule 2**: The device instance set in the Controller configuration for the Device must be the same device instance set in the Device. - Insert the Device or the device instance via drag and drop **to the master bus line** in the network view.	
Configure Device	- Select **Configuration** > **Modules**. - Configure the PROFINET IO-Device modules. If necessary, add modules or submodules to the configuration, adapt modules or 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 the dialog via **OK**.	*Modules* [▶ page 17] *"PROFINET Shared Device"* [▶ page 20]
Configure Controller device	Configure the Controller device via the PROFINET IO-Controller DTM netX. Important: Enter the name of station and the IP settings for the PROFINET IO-Device station.	(*See operating instruction manual DTM for PROFINET IO-Controller devices*)
Save project	- Select **File** > **Save**.	Operating instruction manual "SYCON.net"

Table 7: Getting started – Configuration steps

3.2   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.
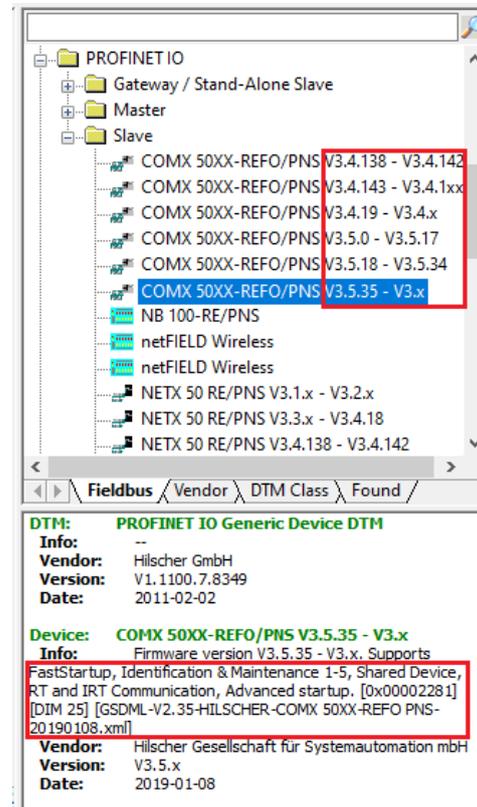
Figure 6: PROFINET IO-Device Instance Stand-Alone Slave (Example)

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.

3.3   Create project configuration

1. Complete the Device in the device catalog.
   - ➢ Select **Network** > **Import device descriptions**.
   - ➢ Import the device description file.

2. Load device catalog
   - ➢ Select **Network** > **Device catalog**.
   - ➢ Select **Reload catalog**.

3. Create or open a project.
   - ➢ Create new project / open existing project:
   - ➢ Select **File** > **New** or **File** > **Open**.

4. Insert Device to the configuration.
   - ➢ In the device catalog, select the controller device, and insert it via drag and drop **to the line** in the network view.
   - ➢ In the device catalog, under **Slave**, select the Device.
   - ➢ Or, select the correct device instance for the Device. For more information, see section *PROFINET IO-Device instance* [▶ page 13].
   - ➢ Insert the Device via drag and drop **to the master bus line**.

Notes

> **Note:**
> In order to select the desired device in the device catalog, note the details about the DTM and the device at the bottom of the device catalog window. When sorting by fieldbus, several devices with the same name from different vendors can be displayed.

> For further information, see operating instruction manual "SYCON.net" or "netDevice and netProject".

4 Configuration

4.1 Overview configure device parameters

- The **General** dialog pane shows the current name of station and the IP settings of the PROFINET IO-Device.

- In the **Modules** dialog pane you can configure the modules of the PROFINET IO-Device.
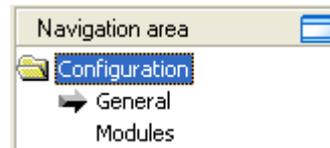
Figure 7: Navigation area – configuration

> **Note:**
> To edit the dialog panes under **Configuration**, you need the user rights for "Maintenance".

For further information about configuration, see section *Modules* [▶ page 17].

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4.2   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.

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

Figure 8: Configuration > General

Parameter	Description	Value / rang of value
Name of station	Network name of the PROFINET IO-Device station. (1 - 240 characters).	1 - 240 characters
	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.	
	The name of station displayed here must match with the name of station set in the PROFINET IO-Device.	
	The name of station must be explicit in the PROFINET network.	
	For information on the approved marks, see section Name encoding.	
Description	Symbolic Name of the PROFINET IO-Device station.	
IP settings of the PROFINET IO-Device station		
IP address	The IP address of the PROFINET IO-Device station is set in the PROFINET IO-Controller DTM. Here it is only displayed.	valid IP address
	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.	
Network mask	The network mask of the PROFINET IO-Device station is set in the PROFINET IO-Controller DTM. Here it is only displayed.	valid network mask
	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.	

Parameter	Description	Value / rang of value
Gateway address	The gateway address of the PROFINET IO-Device station is set in the PROFINET IO-Controller DTM. Here it is only displayed. 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
Supported features		
Shared Device	Display for PROFINET function "Shared Device". Whether the "Shared Device" function is supported by the PROFINET IO-Device, is defined in the GSDML file. The "Shared Device" display cannot be changed by the user. 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. The schematic diagram listed in section *"PROFINET Shared Device"* [▶ page 20] illustrates this. **Note:** The PROFINET function "Shared input" is not supported.	Checked, unchecked Default: The setting is read from the GSDML file.

Table 8: General pane parameters

4.3   Modules

The **Modules** pane shows configured modules of a PROFINET IO-Device. You can make module configuration here.

➢ Select **Configuration** > **Modules** in the navigation area.
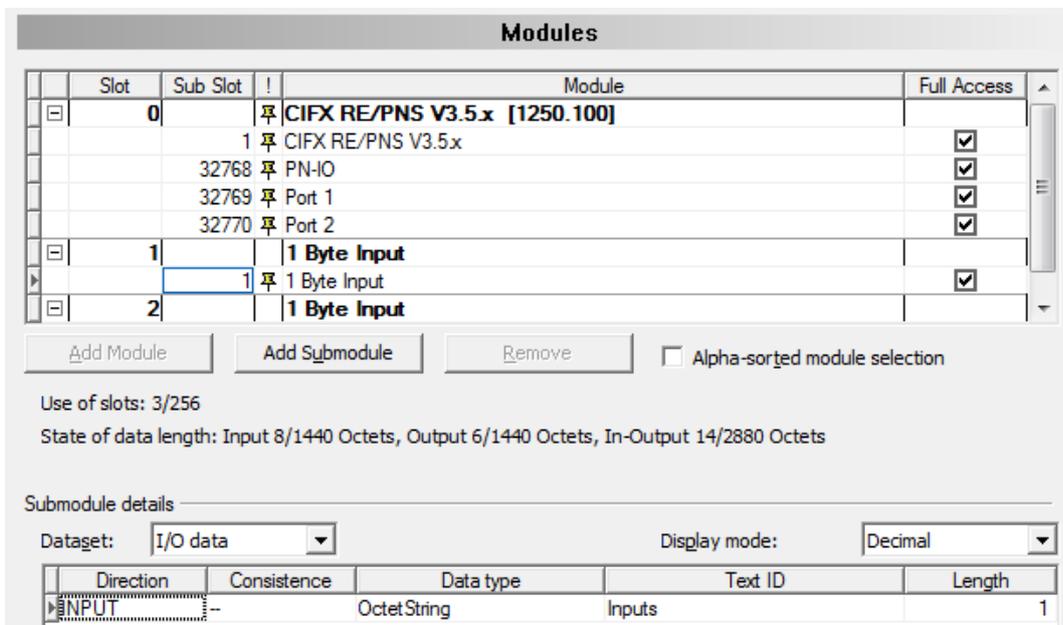
Figure 9: Configuration > Modules

4.3.1 Module table

In the module table, you can add, change or remove modules or submodules of a PROFINET IO-Device.

*Figure 10: Modules table (example, * name of the device)*

Parameter	Description
Slot	Shows the current **Slot** number assigned to a module. When clicking the slot field, the automatically updated drop-down list of the free and allowed Slot numbers is displayed.
	By changing the slot number, the sequence of the modules can be changed.
Subslot	Shows the current **Subslot** assigned to a submodule. When clicking the subslot field, the automatically updated drop-down list of the free and allowed **Subslot** numbers is displayed.
	By changing the slot number, the sequence of the modules can be changed.
!	Slot icon tag: indicates the usage of the (sub-)module.
	⚲: Slot number, subslot number and module name are *not* changeable.
	No icon: Slot number, subslot number and module name are changeable.
Module	Module name as defined in the GSDML file.
Full access	**One PROFINET IO-Controller has access to the PROFINET IO-Device**: If the PROFINET IO-Device function "Shared Device" is not supported, "Full Access" ☑ is always checked (and gray). One PROFINET IO-Controller has access to all the submodules.
	Several PROFINET IO-Controller can access the PROFINET IO-Device: In the configuration of the PROFINET IO-Devices that support the "Shared Device" function, the access is allocated on submodul 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.
	The default setting for access to the submodule level is "Full Access" checked.
	For information on the configuration, requirements are listed in section *Requirements "Shared Device" configuration* [▷ page 20].
▶	The arrow symbol shows the current line in the table. This line is the reference for **Add module**, **Add submodule** and **Remove**.
Add Module	Use **Add module** to add a module to the device configuration below the current line ▶.
Add Submodule	Use **Add submodule** to add a submodule to the selected module of the device configuration below the current line ▶.
Remove	Use **Remove** to remove the selected (sub-)module from the configuration below the current line ▶.

Table 9: Modules pane parameters

4.3.2   Alpha-sorted module selection

Via **Alpha-sorted module selection** you can define in which order the modules or submodules should be displayed in the module selection list.

➢ If you do not check **Alpha-sorted module selection**,

☐ Alpha-sorted module selection
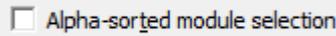
Figure 11: Alpha-sorted module selection - unchecked

↳ the modules or submodules appear in the selection list in the order in which they are listed in the GSDML-Daei.
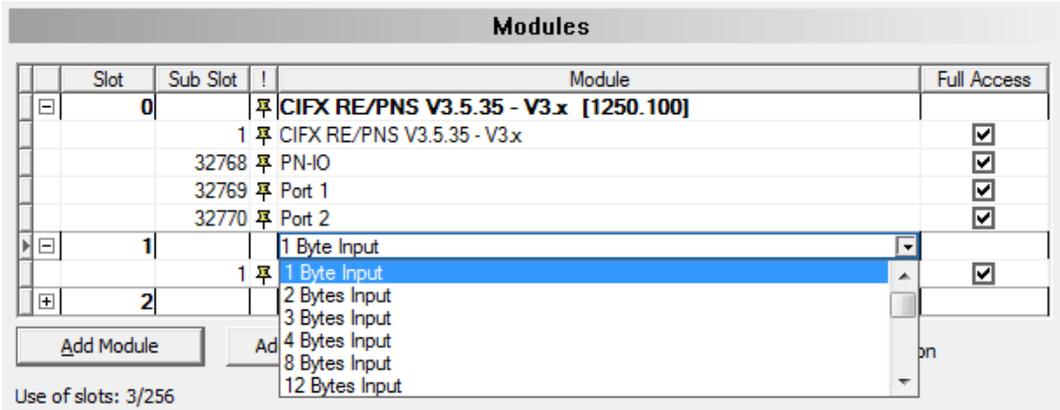
Figure 12: Module order in the selection list as in GSDML file

➢ If you check **Alpha-sorted module selection**,

☑ Alpha-sorted module selection

Figure 13: Alpha-sorted module selection -checked

↳ the modules or submodules appear in the selection list sorted alphabetically.
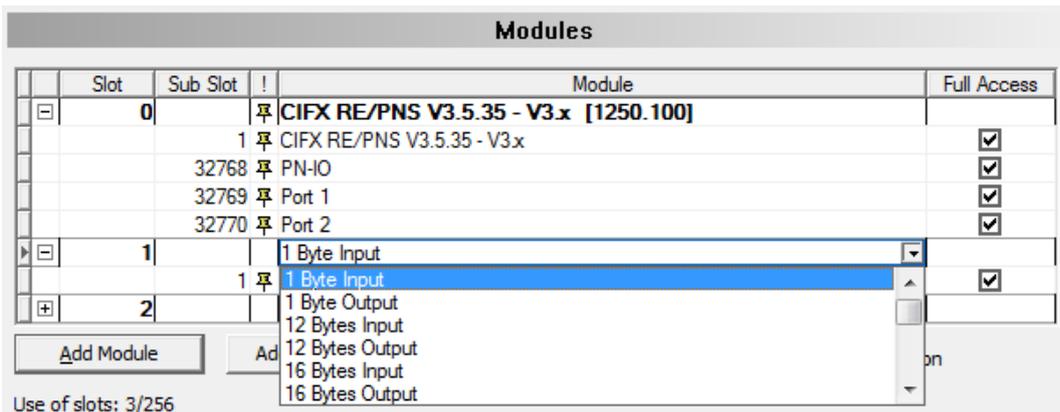
Figure 14: Module sequence in the selection list sorted alphabetically

4.3.3   "PROFINET Shared Device"

"PROFINET Shared Device" offers the ability for a device to support connections to more than one controller at the same time.

Principle
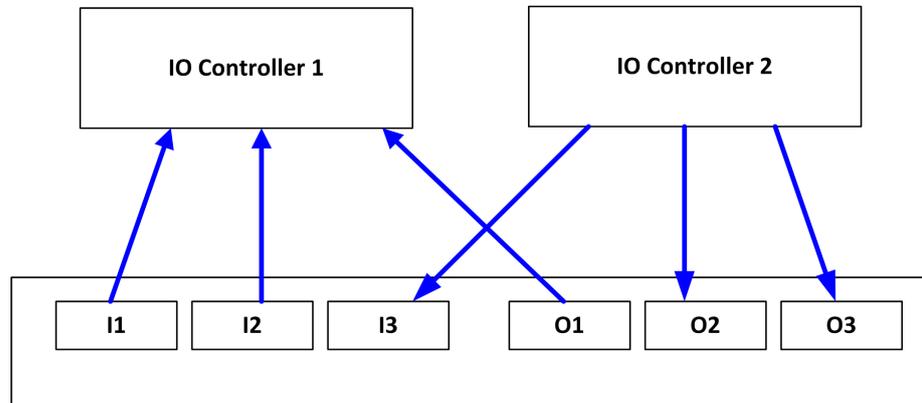
Figure 15: Schematic diagram "Shared Device" - submodules I1 to I3 and O1 to O3 (I = Input, O= Output)

4.3.3.1   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.

> **Note:**
>
> 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 "name of station" 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.

4.3.3.2 Different forms of project configuration

A PROFINET IO-Device used as "Shared Device", you can configure via PROFINET IO-Controller, which are

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

In the following sections, you will find example descriptions of this.

4.3.3.3 Examples with one project

The following example shows a "Shared Device" configuration in SYCON.net with two PROFINET IO-Controllers in one project.

1. Create project.
   ➢ Create a project with two PROFINET IO-Controllers.
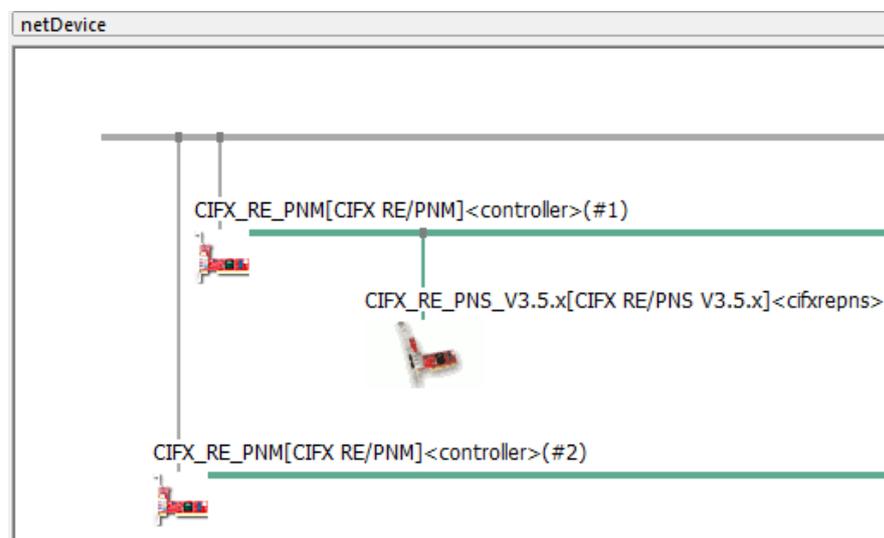
Figure 16: "Shared Device" configuration in SYCON.net (example, project with PROFINET IO-Controller1 and 2)

2. Check IP settings of the PROFINET IO-Controllers.
   ➢ Make sure that you have assigned different "IP addresses" and "names of station" to the sharing PROFINET IO-Controllers.

3. Import the device description of the "Shared Device".
   ➢ To one PROFINET IO-Controller, add the generic PROFINET IO-Device that you intend to configure as a "Shared Device" ("cifxrepns" in the example).

4. Check the "Shared Device" property.
   ➢ Open the generic PROFINET IO-Device DTM dialog.
   ➢ On the **General** pane, check for the "Shared Device" feature support.

Figure 17: Supported features – Shared Device

> **Note:**
> The "Shared Device" feature must be supported!

5. Configure the „Shared Device".

   ➢ In the **Modules** dialog pane, create the device configuration with the configuration of the modules and submodules as described in the section *Configure modules* [▶ page 31].

   ➢ Check **Full access** for all submodules, which are to be assigned to the first PROFINET IO-Controller.

Figure 18: Shared Device – full access PROFINET IO-Controller1

   ➢ Close the generic PROFINET IO-Device DTM dialog via **OK**.

6. Copy the „Shared Device".

   ➢ In the network configuration view, select the generic PROFINET IO-Device, which is to be used as a „Shared Device" and is to be configured accordingly.

   ➢ Click **Copy** in the context menu.

Figure 19: Shared Device – copy

7. Select PROFINET IO-Controller2.

8. Insert the copied generic PROFINET IO-Device in the project.

   ➢ Insert the „Shared Device" at the master bus line of the PROFINET IO-Controller2.
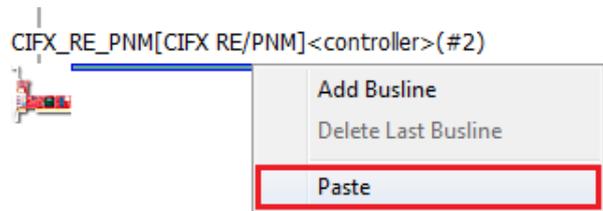
Figure 20: Shared Device – paste
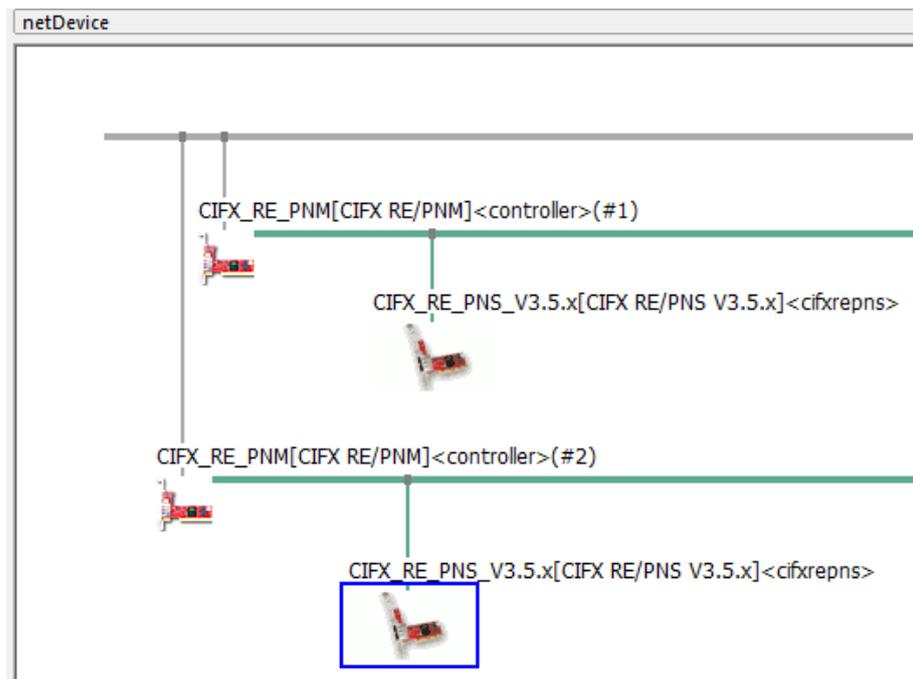
Figure 21: Shared Device – pasting generic PROFINET IO-Device DTM

9. Configure both PROFINET IO-Controllers (IP settings of the shared generic PROFINET IO-Device and module configuration).

   ➢ Open the DTM dialog of the first respectively the second PROFINET IO-Controller one after the other and configure both PROFINET IO-Controllers 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" are identical in both configurations of the PROFINET IO-Controllers.

   • Furthermore, each module configuration must contain the submodules required for the associated PROFINET IO-Controller.

10. Configure access to the submodules for both PROFINET IO-Controller DTM instances.

   ➢ 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. Make sure that both PROFINET IO-Controllers have full access to the mutually exclusive submodule sets.

   ➢ Open the DTM dialog of the copied generic PROFINET IO-Device and configure the „Shared Device".

   ➢ In the **Modules** dialog pane, check **Full access** for all submodules, which must be assigned to the second PROFINET IO-Controller.
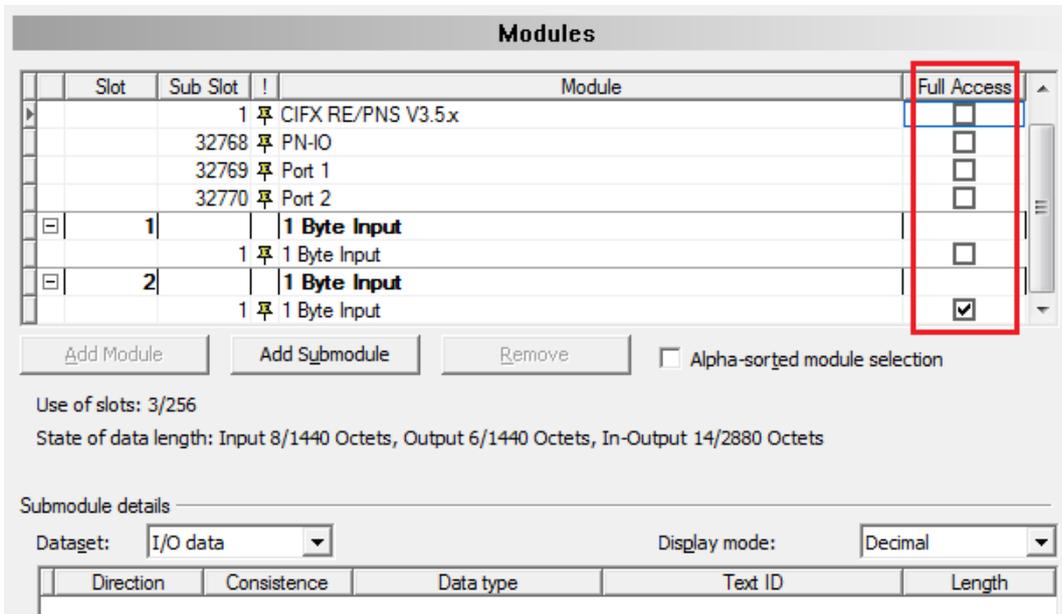
Figure 22: Shared Device – Full access PROFINET IO-Controller2

11. Save the configuration.

12. Test the configuration.

   ➢ Test your configurations with real PROFINET networks with the devices you have configured.
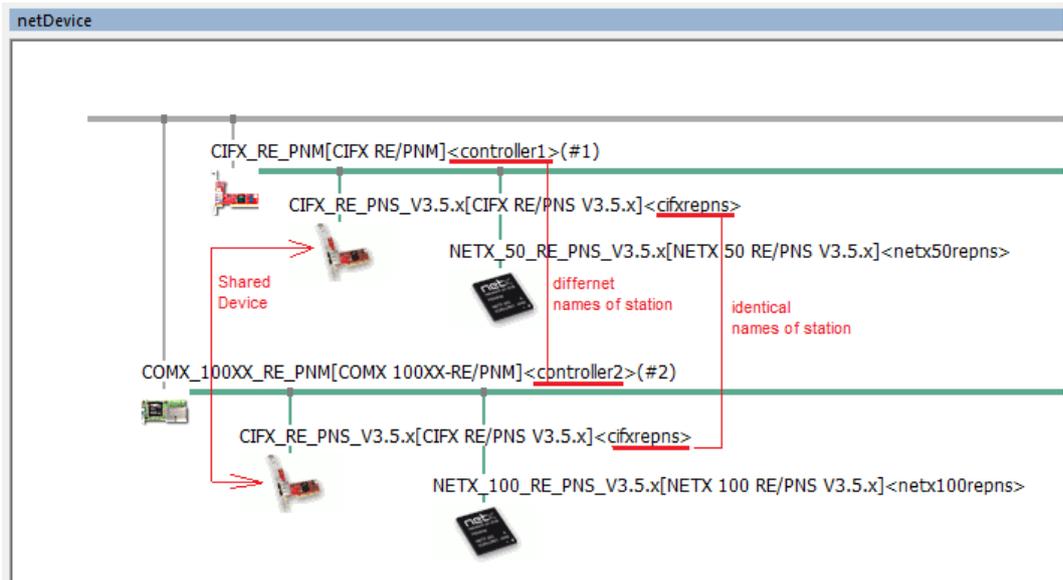
Figure 23: Shared Device - configuration in SYCON.net (example, project with two controller)

4.3.3.4   Examples with two projects

> **Note:**
> You can create a separate project for each PROFINET IO-Controller.

The following example describes a "Shared Device" configuration in SYCON.net with two PROFINET IO-Controllers in two projects.

1. Create projects.
   - ➢ Create project1 with PROFINET IO-Controller1 and project2 with PROFINET IO-Controller2.
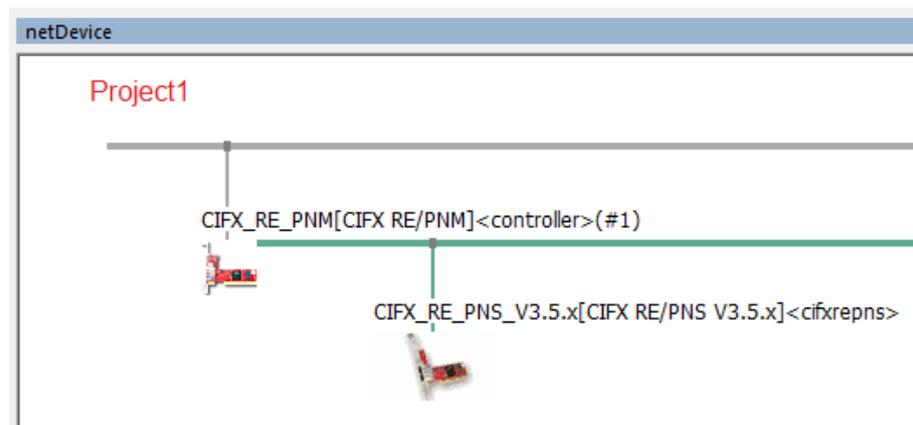
Figure 24: Shared Device configuration in SYCON.net (example, project1 with PROFINET IO-Controller1)

2. Check IP settings of the PROFINET IO-Controllers.
   - ➢ Make sure that you have assigned different "IP addresses" and "names of station" to the sharing PROFINET IO-Controllers.

3. Import the device description of the "Shared Device".

   ➢ Add in project1 at PROFINET IO-Controller1 the generic PROFINET IO-Device, which you want to configure as "Shared Device" ("cifxrepns" in the example).

4. Check the "Shared Device" property.

   ➢ Open the generic PROFINET IO-Device DTM dialog.

   ➢ On the **General** pane, check for the "Shared Device" feature support.

Figure 25: Supported features – Shared Device

> **Note:**
> The "Shared Device" feature must be supported!

5. Configure the "Shared Device".

   ➢ In the **Modules** dialog pane, create the device configuration with the configuration of the modules and submodules as described in the section *Configure modules* [▶ page 31].

   ➢ Check **Full access** for all submodules, which are to be assigned to PROFINET IO-Controller1 (in project1).
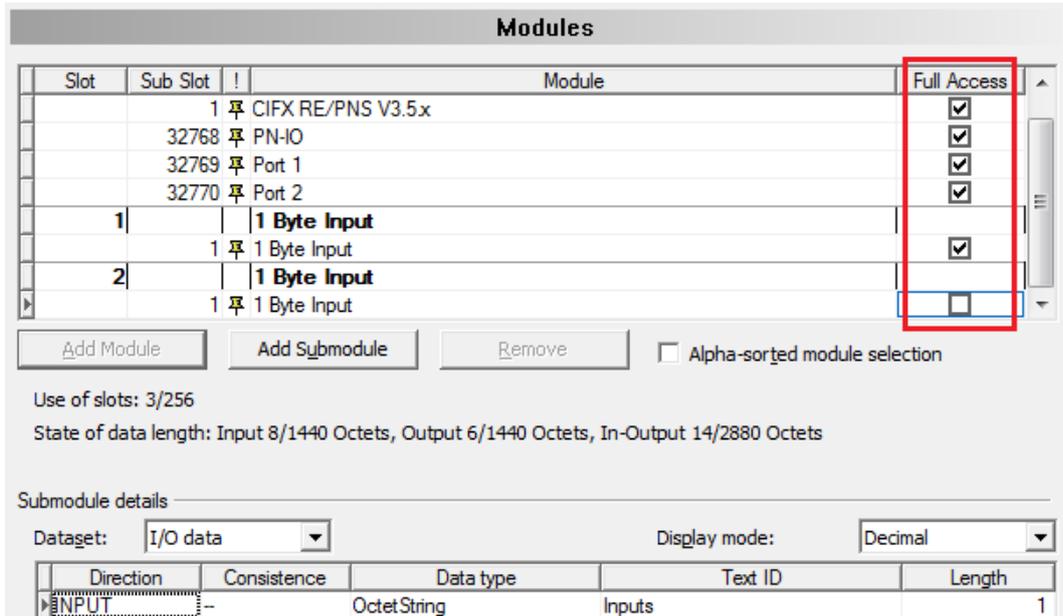
Figure 26: Shared Device – full access PROFINET IO-Controller1 (in project1)

> ➢ Close the DTM dialog via **OK**.

6. Copy the "Shared Device".

> ➢ In the network configuration view (in project1), select the generic PROFINET IO-Device, which is to be used as a "Shared Device" and is to be configured accordingly.

> ➢ Click **Copy** in the context menu.
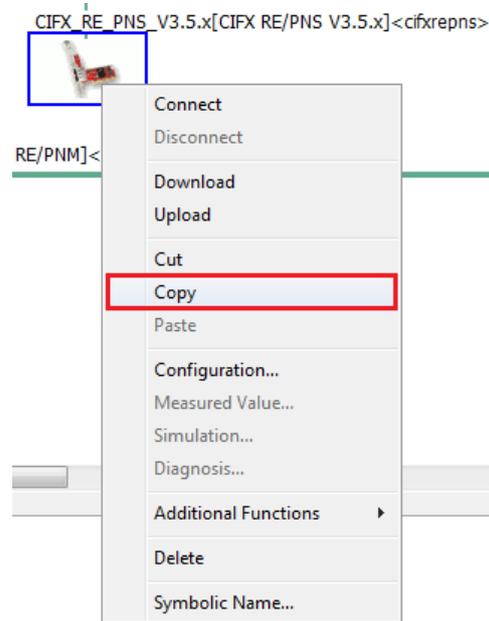
Figure 27: Shared Device – copy

7. Close project1 and open project2.

8. Select PROFINET IO-Controller2 in project2.

9. Insert the copied generic PROFINET IO-Device in project2.

> ➢ Insert the "Shared Device" at the master bus line of the PROFINET IO-Controller2.

Configuration   28/49
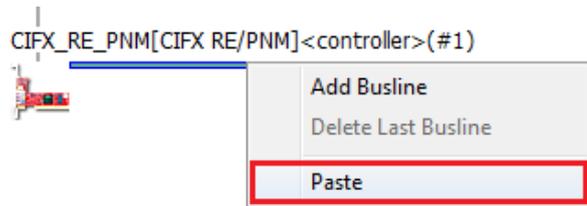
Figure 28: Shared Device – paste (in project2)
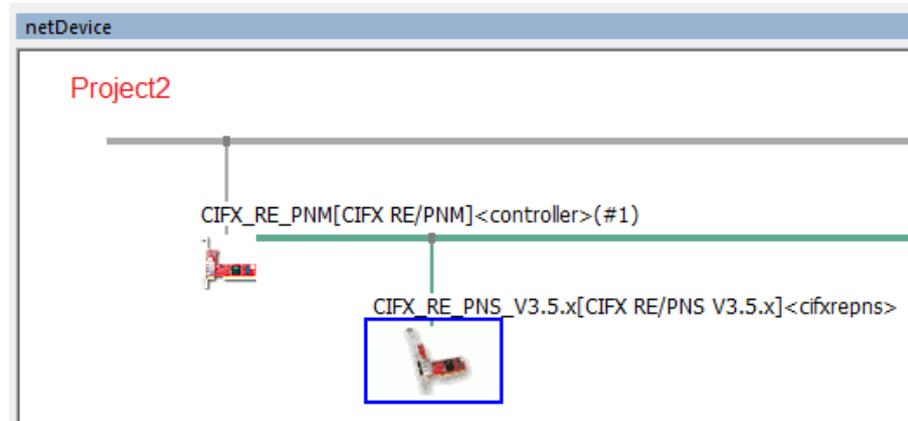
Figure 29: Shared Device – pasting generic PROFINET IO-Device DTM (in project2)

10. Configure PROFINET IO-Controller1 in project 1 and PROFINET IO-Controller2 in project2 (IP settings of the shared generic PROFINET IO-Device and module configuration).

➢ Open successively the respective DTM dialog, in project1 of the first respectively in project2 of the second PROFINET IO-Controller and configure both PROFINET IO-Controllers 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" are identical in both configurations of the PROFINET IO-Controllers.

• Furthermore, each module configuration must contain the submodules required for the associated PROFINET IO-Controller.

11. Configure access to the submodules for both PROFINET IO-Controller DTM instances.

➢ 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. Make sure that both PROFINET IO-Controllers have full access to the mutually exclusive submodule sets.

➢ Open the copied generic PROFINET IO-Device and configure the „Shared Device".

➢ In the **Modules** dialog pane, check **Full access** for all submodules, which must be assigned to the second PROFINET IO-Controller.

Generic PROFINET IO-Device DTM | Configuration of PROFINET IO-Devices   © Hilscher xxxx – 2022
DOC060305OI013EN | Revision | English | 2022-09 | Released | Public

Figure 30: Shared Device – Full access PROFINET IO-Controller2 (in project2)

12. Save the configuration.

13. Test the configuration.

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

Figure 31: Shared Device - configuration in SYCON.net (example, project1 und projct2)

4.3.4   Firmware version of the device instance

> **Note:**
> If during the creation of the network configuration for the PROFI¬NET 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.

Figure 32: 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* [▶ page 13].

4.3.5   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 cannot 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.

4.3.5.1   1. Add modules or submodules to the configuration

To add additional available modules or submodules:

➢ Select the line to insert a module or submodule.

➢ Click the **Add module** or **Add submodule**.

↳ Starting from the selected line, additional modules or submodules are added at the next free slot or subslot.

➢ Click **Apply** or **OK** to confirm your changes, or **Cancel** to skip.

4.3.5.2   2. Change module configuration / remove modules

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

➢ Select the line of the module or submodule.

➢ Open the modules' drop-down list.

↳ The modules' drop-down list shows all available modules or submodules for the respective slot.
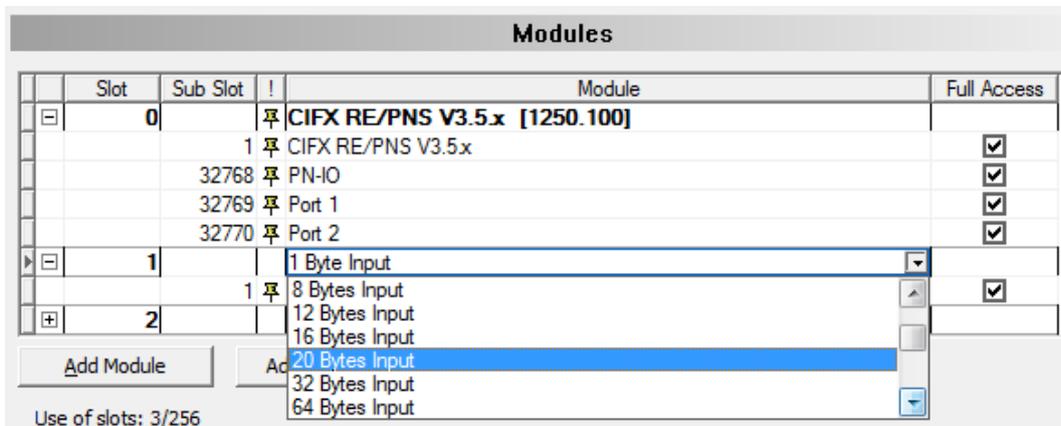
*Figure 33: Changing modules using drop-down list (example, *device name)*

> **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.

➢ Select the next available and allowed module or submodule.

➢ 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 cannot be removed.

4.3.5.3   3. Change slots

> **→** **Note:**
> Slot or subslot numbers for fixed in slot modules or submodules cannot be changed.

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

➢ Select the cell of the available slot/subslot to be changed.

↳ The drop-down list shows all free and allowed slots or subslots of the module or submodule.
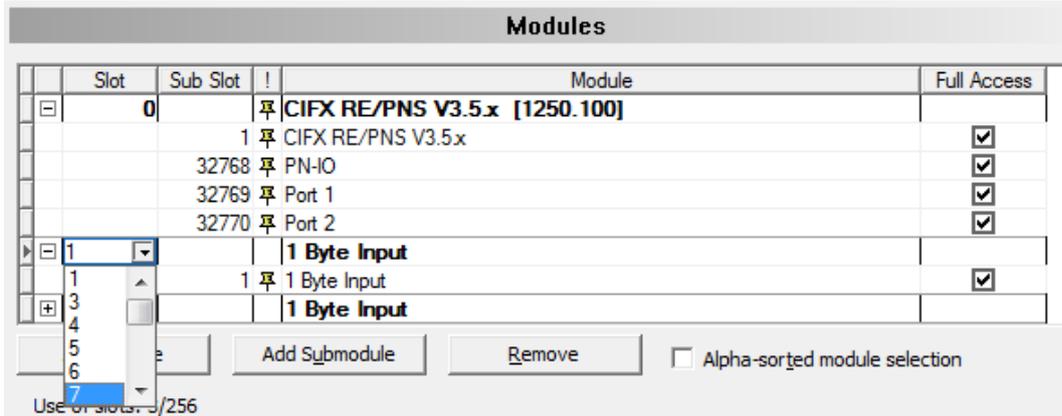
Figure 34: Assigning (sub) slots to modules using drop-down list (example)

➢ Select the desired slot/subslot number.

➢ Click on **Apply** or **OK** to confirm your changes, or **Cancel** to skip.

4.3.6   Configuration information

Use of slots: 3/256

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

Figure 35: Configuration > modules - configuration info

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

Parameter	Description
Use of slots:	Number of configured modules / max. allowed modules.
State of date length:	Indicates state of data.
	Input: Current number of input data / max. allowed number of input data.
	Output: Current number of output data / max. allowed number of output data.
	In-/Output: Current number of input/output data / max. allowed number of input/output data.

Table 10: Modules pane parameters - Configuration Info

4.3.7   Submodul details

The **Submodule details** configuration area displays the details of the current selected module.
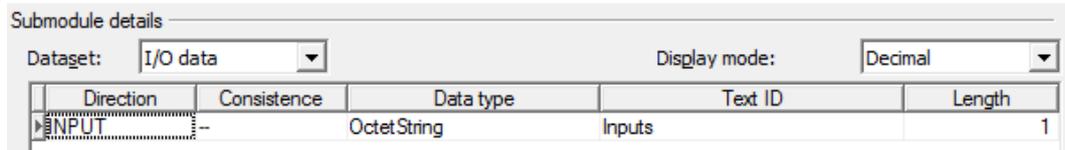
Configuration > Modules – Submodules details > Dataset: I/O data
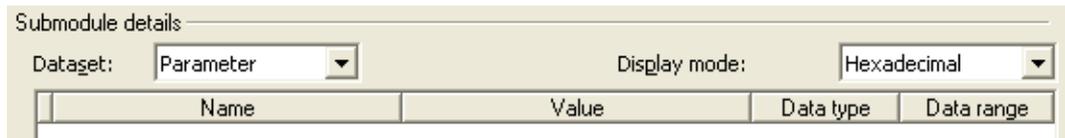
Figure 36: Configuration > Modules – Submodules details > Dataset: Parameter

Parameter	Description
Dataset	Displayed dataset: I/O data or Parameter
Display mode	Under Display Mode the display mode of the module configuration data is predefined decimally or hex decimally.
Dataset: I/O data	
Direction	Input/output direction of the PROFINET IO-Data
Consistence	Specifies the input characteristics of a submodule. 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.
Dataset: Parameter	
Name	Defines the name of the parameter.
Value	Indicates the value of the parameter.
Datatype	Defines the datatype of the parameter.
Data range	Defines the range of the parameter value.

Table 11: Modules pane parameters - Submodules details

5 Description

5.1 Overview description

- The **Device information** dialog contains manufacturer information about the device defined in the GSDML file.

- The **Module information** dialog displays all available modules described in the GSDML file in the **Select module** drop-down list.

- The **GSDML viewer** displays the contents of the GSDML file of the device in HTML style in a text display window.

Figure 37: Navigation area - Description

5.2   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.
	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.
	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. Default: "false", for the Discovery and Configuration (DCP), "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 Slotnumber 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 12: Device info

5.3   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.

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.
	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 13: Module information

5.4   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 pane the entries show the GSDML file in text format.

Parameter	Description
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 14: Device Description – GSDML Viewer

6   Appendix

6.1   References

[1] FDT Joint Interest Group (www.fdt-jig.org, FDT-JIG Working Group): Device Type Manager (DTM) Style Guide, Version 1.0; FDT-JIG - Order No. <0001-0008-000>, English, 2005.

[2] PROFIBUS Nutzerorganisation e.V., Karlsruhe: GSDML Specification for PROFINET IO, Version 2.10, Order No: 2.352, English, August 2006.

[3] Hilscher Gesellschaft für Systemautomation mbH: Protocol API, PROFINET IO-Device V3.4, Protocol API Manual, Revision 14, DOC081102API14EN, English, 2013-10.

Hilscher Gesellschaft für Systemautomation mbH: Protocol API, PROFINET IO-Device V3.14, Protocol API Manual, Revision 19, DOC111110API19EN, English, 2019-04.

[4] Hilscher Gesellschaft für Systemautomation mbH: Protocol API, PROFINET IO-Controller V2.7, Protocol API Manual, Revision 19, DOC050901API19EN, English, 2015-05.

[5] PROFIBUS Nutzerorganisation e.V., Karlsruhe: Application Layer protocol for decentralized periphery and distributed automation, Technical Specification for PROFINET, Version 2.3Ed2MU2, Order No: 2.722, English, February 2015.

[6] Hilscher Gesellschaft für Systemautomation mbH: API, Hilscher status and error codes, Firmware and driver, Revision 5, DOC100802API05EN, English, 2019-11.

6.2 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 **Settings**, **Configuration** and **Diagnosis** panes of the generic PROFINET IO-Device DTM you do not need special user rights. Also all users can select the decimal or hexadecimal Display mode or sort table entries.

> **Note:**
> To edit, set or configure the parameters of the **Settings** and **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.

6.2.1 Configuration

	Observer	Operator	Maintenance	Planning engineer	Adminis-trator
General [▷ page 16]	D	D	X	X	X
Modules [▷ page 17]	D	D	X	X	X

Table 15: User rights configuration (D = displaying, X = editing, configuring)

6.3 Conventions in this manual

Instructions

1. Operation purpose
2. Operation purpose
   ➢ Instruction

Results

⤳ Intermediate result

⇨ Final result

Signs

Sign	Note
→	General note
❗	Important note that must be followed to prevent malfunctions.
📖	Reference to further information

Table 16: Signs

6.4   Legal notes

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List of figures

List of tables

Glossary

Device	Type of device that is configured by the controller and which then performs the communication
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 specifically. In netDevice, in the device catalog under "Stand-Alone-Slave" or "Slave", all device instances deriving from the same device description file, appear as separate devices.
DTM	Device Type Manager: Software module with graphical user interface for the configuration and/or for diagnosis of devices
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	Generic Station Description Markup Language
GSDML file	A special kind of XML-based Device Description File used by PROFINET. (GSDML = General Station Description Markup Language).
IP	Internet Protocol: Belongs to the TCP/IP family of protocols and is defined in RFC791 (available on http://www.ietf.org/rfc/rfc791.txt). It is based on layer 3 of the ISO/OSI 7 layer model of networking and 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	Identifies a device or a computer within an IP-based network and is defined in the Internet Protocol Version 4 (IPv4) as a 32-bit number. For ease of notation, the address is usually divided into four 8-bit numbers represented in decimal notation and separated by points: a.b.c.d. Each letter stands for an integer value between 0 and 255, e.g. 192.168.30.16. However, not all combinations are allowed, some are reserved for special purposes. The IP address 0.0.0.0 is defined as invalid.
Module	Hardware or logical component of a physical device
Name of station	Is specified by the DNS-compatible name (DNS = Domain Name Service) for the device from the GSD file, which can be changed according to the DNS name specification, or is set by the PROFINET IO-Controller if the PROFINET IO-Device uses the name baptism.
PROFINET	Communication system for Industrial Ethernet, designed and developed by PROFIBUS & PROFINET International (PI), which uses some mechanisms similar to those of the PROFIBUS field bus

PROFINET IO	PROFINET IO (Input - Output) has been created for the connection of remote peripheral to a controller
PROFINET IO-Controller	PROFINET control unit responsible for the defined run-up of an I/O subsystem and the cyclic or acyclic data exchange
PROFINET IO-Device	PROFINET field device that cyclically receives output data from its IO-Controller and responds with its input data
Shared Device	PROFINET function via which multiple PROFINET IO-Controllers can access 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
Submodule	Hardware or logical component of a physical device.
Subslot	Subslot address of a structural unit within a slot

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