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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

<table>
<thead>
<tr>
<th>Index</th>
<th>Date</th>
<th>Version</th>
<th>Component</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>2022-09-02</td>
<td>1.1100</td>
<td>PNIOGenDevDTM.dll</td>
<td>Document revised.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.1100</td>
<td>PNIOGenDevGUI.ocx</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: List of revisions

1.2 Overview use cases

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

<table>
<thead>
<tr>
<th>Use case</th>
<th>Description</th>
<th>Chapter, section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device start up</td>
<td>• Creating project configuration</td>
<td>Create project configuration</td>
</tr>
<tr>
<td>Configuring device</td>
<td>• General device settings</td>
<td>General [[ page 16]</td>
</tr>
<tr>
<td>parameters</td>
<td>• Module configuration</td>
<td>Modules [[ page 17]</td>
</tr>
<tr>
<td></td>
<td>• Shared Device</td>
<td>&quot;PROFINET Shared Device&quot; [[ page 20]</td>
</tr>
<tr>
<td>Descriptions</td>
<td>• Device information</td>
<td>Device info [[ page 36]</td>
</tr>
<tr>
<td></td>
<td>• Module information</td>
<td>Module info [[ page 37]</td>
</tr>
<tr>
<td></td>
<td>• GSDLM viewer</td>
<td>GSDLM viewer [[ page 37]</td>
</tr>
<tr>
<td>User rights</td>
<td>Definition of access rights</td>
<td>User rights [[ page 39]</td>
</tr>
</tbody>
</table>

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.

![Diagram of the DTM dialog structure](image)

**Figure 1: Dialog structure PROFINET IO-Controller DTM**

1.6.1 General device information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO device</td>
<td>Device name</td>
</tr>
<tr>
<td>Vendor</td>
<td>Vendor name of the device</td>
</tr>
<tr>
<td>Device ID</td>
<td>Identification number of the device</td>
</tr>
<tr>
<td>Vendor ID</td>
<td>Identification number of the vendor</td>
</tr>
</tbody>
</table>

**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.

![Navigation area](image)

- 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:

<table>
<thead>
<tr>
<th>Description</th>
<th>OK</th>
<th>Cancel</th>
<th>Apply</th>
<th>Help</th>
</tr>
</thead>
</table>
| OK | To confirm your latest settings, click OK. All changed values will be applied on the frame application database. The dialog then closes. | 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. | To confirm your latest settings, click Apply. All changed values will be applied on the frame application database. The dialog remains opened. | 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 (e.g. 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

<table>
<thead>
<tr>
<th>Slot</th>
<th>Sub Slot</th>
<th>Module</th>
<th>Full Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>CIFX RE/PNS V3.5.35 - V3.x [1250.100]</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>1 Byte Input</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>1 Byte Input</td>
<td></td>
</tr>
</tbody>
</table>

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.

Figure 4: Drop-down list
1.6.6 Status bar

In the status bar, graphical icons display the current DTM state (e.g., connection status, or other activities).

![Status bar – status fields 1 to 6](image)

**Figure 5: Status bar – status fields 1 to 6**

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

**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.                                              | PROFINET IO-Device instance [‡ page 13]                                                                                                                                                                                            |
| Create / open project                           | - Select File > New or File > Open.                                                                  |                                                                                                                                                                                                                                |
| 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. | Modules [‡ page 17]  
“PROFINET Shared Device”[‡ page 20]                                                                                                                                                                                                 |
| 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. | (See operating instruction manual DTM for PROFINET IO-Controller devices)                                                                                                                                                        |
| 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. |                                                                                                                                                                                                                                |
| 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)](image)

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*

<table>
<thead>
<tr>
<th>Navigation area</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Configuration" /></td>
</tr>
<tr>
<td><img src="image" alt="General" /></td>
</tr>
<tr>
<td><img src="image" alt="Modules" /></td>
</tr>
</tbody>
</table>

**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].
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.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value / range of value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of station</td>
<td>Network name of the PROFINET IO-Device station. (1 - 240 characters).</td>
<td>1 - 240 characters</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Symbolic Name of the PROFINET IO-Device station.</td>
<td></td>
</tr>
<tr>
<td>IP settings of the PROFINET IO-Device station</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP address</td>
<td>The IP 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 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.</td>
<td>valid IP address</td>
</tr>
<tr>
<td>Network mask</td>
<td>The network mask 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 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.</td>
<td>valid network mask</td>
</tr>
</tbody>
</table>

Figure 8: Configuration > General
### Configuration

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.

### 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.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value / range of value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gateway address</td>
<td>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.</td>
<td>valid gateway address</td>
</tr>
</tbody>
</table>

**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](image)

**Generic PROFINET IO-Device DTM | Configuration of PROFINET IO-Devices**

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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)](image)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot</td>
<td>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.</td>
</tr>
<tr>
<td>Subslot</td>
<td>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.</td>
</tr>
<tr>
<td>!</td>
<td>Slot icon tag: indicates the usage of the (sub-)module. <img src="image" alt="Slot number, subslot number and module name are not changeable." /> No icon: Slot number, subslot number and module name are changeable.</td>
</tr>
<tr>
<td>Module</td>
<td>Module name as defined in the GSDML file.</td>
</tr>
<tr>
<td>Full access</td>
<td><strong>One PROFINET IO-Controller has access to the PROFINET IO-Device:</strong> If the PROFINET IO-Device function “Shared Device” is not supported, “Full Access” is always checked (gray). One PROFINET IO-Controller has access to all the submodules. <strong>Several PROFINET IO-Controller can access the PROFINET IO-Device:</strong> 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. 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.</td>
</tr>
<tr>
<td>Add Module</td>
<td>The arrow symbol shows the current line in the table. This line is the reference for Add module, Add submodule and Remove.</td>
</tr>
<tr>
<td>Add Submodule</td>
<td>Use Add module to add a module to the device configuration below the current line.</td>
</tr>
<tr>
<td>Remove</td>
<td>Use Remove to remove the selected (sub-)module from the configuration below the current line.</td>
</tr>
</tbody>
</table>

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**, the modules or submodules appear in the selection list in the order in which they are listed in the GSDML-Daei.

- If you check **Alpha-sorted module selection**, the modules or submodules appear in the selection list sorted alphabetically.

![Figure 11: Alpha-sorted module selection - unchecked](image1)

![Figure 12: Module order in the selection list as in GSDML file](image2)

![Figure 13: Alpha-sorted module selection - checked](image3)

![Figure 14: Module sequence in the selection list sorted alphabetically](image4)
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

![Diagram showing connections between IO Controller 1 and IO Controller 2 with submodules I1 to I3 and O1 to O3.](image)

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.

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.
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.

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.
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.
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](image)

11. Save the configuration.
12. Test the configuration.

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

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" ("cifxreps" 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](image)

**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).
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.

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.
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.
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 project2)*
4.3.4  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.

![Module Table](image)

*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)](image)

**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.

Select the desired slot/subslot number.
- Click on **Apply** or **OK** to confirm your changes, or **Cancel** to skip.

4.3.6 Configuration information

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of slots:</td>
<td>Number of configured modules / max. allowed modules.</td>
</tr>
</tbody>
</table>
| 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.

![Submodule details configuration area](image)

Configuration > Modules – Submodules details > Dataset: I/O data

![Dataset: I/O data configuration](image)

![Dataset: Parameter configuration](image)

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

*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.

![Navigation area - Description](image)

*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.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main family</td>
<td>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.</td>
</tr>
<tr>
<td>Product family</td>
<td>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.</td>
</tr>
<tr>
<td>DAP vendor name</td>
<td>Attribute of the GSDML ModuleInfo/VendorName element. The VendorName element contains the name of the device vendor.</td>
</tr>
<tr>
<td>DAP hardware release</td>
<td>Attribute of the GSDML ModuleInfo/HardwareRelease element. The HardwareRelease element contains the hardware release of the DAP.</td>
</tr>
<tr>
<td>DAP software release</td>
<td>Attribute of the GSDML ModuleInfo/SoftwareRelease element. The SoftwareRelease element contains the software release of the DAP.</td>
</tr>
<tr>
<td>Physical slots</td>
<td>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.</td>
</tr>
<tr>
<td>Max. IO data length</td>
<td>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.</td>
</tr>
<tr>
<td>Max. input data length</td>
<td>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.</td>
</tr>
<tr>
<td>Max. output data length</td>
<td>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 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.</td>
</tr>
<tr>
<td>Info text</td>
<td>GSDML ModuleInfo/InfoText element. This element contains human readable additional text information about the device.</td>
</tr>
</tbody>
</table>

*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.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor ID</td>
<td>Identification number of the vendor.</td>
</tr>
<tr>
<td>Main family</td>
<td>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.</td>
</tr>
<tr>
<td>Product family</td>
<td>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.</td>
</tr>
<tr>
<td>Modules identifier</td>
<td>Identification number of the module.</td>
</tr>
<tr>
<td>Order number</td>
<td>GSDML ModuleInfo/OrderNumber element. It contains the order number of a module.</td>
</tr>
<tr>
<td>Hardware release</td>
<td>GSDML ModuleInfo/HardwareRelease element. It contains the hardware release of a module.</td>
</tr>
<tr>
<td>Software release</td>
<td>GSDML ModuleInfo/SoftwareRelease element. It contains the software release of a module.</td>
</tr>
<tr>
<td>Info text</td>
<td>GSDML ModuleInfo/InfoText element. This element contains human readable additional text information about the module.</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filename</td>
<td>File directory path and the file name of the displayed GSDML file.</td>
</tr>
<tr>
<td>Find what</td>
<td>Search feature to search for text contents within the text of the GSDML file.</td>
</tr>
<tr>
<td>Match case</td>
<td>Search option</td>
</tr>
<tr>
<td>Match whole word</td>
<td>Search option</td>
</tr>
</tbody>
</table>

Table 14: Device Description – GSDML Viewer
6 Appendix

6.1 References


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

<table>
<thead>
<tr>
<th>General [† page 16]</th>
<th>Observer</th>
<th>Operator</th>
<th>Maintenance</th>
<th>Planning engineer</th>
<th>Administrator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D</td>
<td>D</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Modules [† page 17]</td>
<td>D</td>
<td>D</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Sign</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢</td>
<td>General note</td>
</tr>
<tr>
<td>❗</td>
<td>Important note that must be followed to prevent malfunctions.</td>
</tr>
<tr>
<td>📖</td>
<td>Reference to further information</td>
</tr>
</tbody>
</table>

Table 16: Signs
6.4 Legal notes

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Costs of support, maintenance, customization and product care

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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 (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.
Contacts

HEADQUARTER

Germany
Hilscher Gesellschaft für Systemautomation mbH
Rheinstraße 15
65795 Hattersheim
Phone: +49 (0) 6190 9907-0
Fax: +49 (0) 6190 9907-50
E-mail: info@hilscher.com

Support
Phone: +49 (0) 6190 9907-990
E-mail: hotline@hilscher.com

SUBSIDIARIES

China
Hilscher Systemautomation (Shanghai) Co. Ltd.
200010 Shanghai
Phone: +86 (0) 21-6355-5161
E-mail: info@hilscher.cn

Support
Phone: +86 (0) 21-6355-5161
E-mail: cn.support@hilscher.com

France
Hilscher France S.a.r.l.
69800 Saint Priest
Phone: +33 (0) 4 72 37 98 40
E-mail: info@hilscher.fr

Support
Phone: +33 (0) 4 72 37 98 40
E-mail: fr.support@hilscher.com

India
Hilscher India Pvt. Ltd.
Pune, Delhi, Mumbai, Bangalore
Phone: +91 8888 750 777
E-mail: info@hilscher.in

Support
Phone: +91 8108884011
E-mail: info@hilscher.in

Italy
Hilscher Italia S.r.l.
20090 Vimodrone (MI)
Phone: +39 02 25007068
E-mail: info@hilscher.it

Support
Phone: +39 02 25007068
E-mail: it.support@hilscher.com

Japan
Hilscher Japan KK
Tokyo, 160-0022
Phone: +81 (0) 3-5362-0521
E-mail: info@hilscher.jp

Support
Phone: +81 (0) 3-5362-0521
E-mail: jp.support@hilscher.com

Republic of Korea
Hilscher Korea Inc.
13494, Seongnam, Gyeonggi
Phone: +82 (0) 31-739-8361
E-mail: info@hilscher.kr

Support
Phone: +82 (0) 31-739-8363
E-mail: kr.support@hilscher.com

Austria
Hilscher Austria GmbH
4020 Linz
Phone: +43 732 931 675-0
E-mail: sales.at@hilscher.com

Support
Phone: +43 732 931 675-0
E-mail: at.support@hilscher.com

Switzerland
Hilscher Swiss GmbH
4500 Solothurn
Phone: +41 (0) 32 623 6633
E-mail: info@hilscher.ch

Support
Phone: +41 (0) 32 623 6633
E-mail: support.swiss@hilscher.com

USA
Hilscher North America, Inc.
Lisle, IL 60532
Phone: +1 630-505-5301
E-mail: info@hilscher.us

Support
Phone: +1 630-505-5301
E-mail: us.support@hilscher.com