



Operating Instruction Manual
DTM for Hilscher PROFINET IO-Controller Devices
Configuration of Hilscher Controller Devices
V1.1100

Hilscher Gesellschaft für Systemautomation mbH

www.hilscher.com

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1 Introduction

1.1 About this Manual

This manual provides information on how to set and configure the device parameters of a netX based PROFINET IO-Controller device using the PROFINET IO-Controller DTM, and what can be read from the diagnosis panes.

1.1.1 Descriptions of the Dialog Panes

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

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Table 1: Descriptions Dialog Pages

1.1.2 Online Help

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

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

1.1.3 List of Revisions

In-dex	Date	Version	Chapter	Revision
14	17-02-24	1.201 (und 1.0201)	2, 3.2, 4.5, 5.6, 5.9, 6, 7.4	Safety information added throughout the document.: Chapter <i>Safety</i> , section <i>Safety Messages on Firmware or Configuration Download</i> , section <i>Firmware Download</i> and further safety messages according to firmware and configuration download. Section <i>Process Data</i> revised. Section <i>Stations Timing</i> revised, Chapter <i>Online Functions</i> : Note 'Getting Access to SYCON.net Online Functions' added and safety messages according to firmware and configuration download. Section <i>Station Diagnosis</i> added.
15	17-02-24	1.1000	1.4.1	Section <i>Requirements</i> Internet access added, Windows 8.1 and Windwos 10 added.
16	18-02-16	1.1000	2.5.1, 3.2, 4.5, 6.3	Versioning information revised (title page and this section). Safety Message or warning added: Sections <i>Power Disconnect while downloading Firmware or Configuration</i> , <i>Safety Messages on Firmware or Configuration Download</i> , <i>Firmware Download</i> and <i>Download Configuration</i> . Safety communication in the document revised in general.
17	19-04-03	1.1100	5.3, 6.2	Section <i>Controller Network Settings</i> : Name coding added. Section ' <i>Network Scan</i> ' and ' <i>Upload</i> ' updated.

Table 2: List of Revisions

1.1.4 Conventions in this Manual

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

Notes



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



Note: <general note>



<note, where to find further information>

Operation Instructions

1. <instruction>

2. <instruction>

or

➤ <instruction>

Results

↗ <result>



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

Positions in Figures

The *Positions* ①, ②, ③ ... or a, b, c ... or A, B, C ... refer to the figure used in that section. If the numbers reference to a section outside the current section then a cross reference to that section and figure is indicated.

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1.4 About PROFINET IO-Controller DTM

You can use the PROFINET IO-Controller DTM to configure the PROFINET IO-Controller device within a FDT Framework.

1.4.1 Requirements

System Requirements

- PC with 1 GHz processor or higher
- Windows® XP SP3,
Windows® Vista (32-Bit) SP2,
Windows® 7 (32-Bit 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.

Requirements PROFINET IO-Controller DTM

To configure the PROFINET IO-Controller device with the PROFINET IO-Controller DTM the following requirements have to be accomplished:

- Completed hardware installation of a netX based DTM-compatible PROFINET IO-Controller device, inclusive loaded firmware, license and loaded cifX configuration file
- Installed FDT/DTM V 1.2 compliant frame application
- Loaded DTM in the Device Catalog of the FTD Framework



Note: If the PROFINET IO-Controller DTM and the PROFINET IO-Controller device are installed on the same PC, the **cifX Device Driver** must be installed on that PC, as you can connect the DTM to the device.



For more information to the hardware installation, please refer to the corresponding **User Manual** of your device.

To get information on how to order and to download the license to the device, please refer to section *Licenses* on page 112.

1.5 Dialog Structure of the PROFINET IO-Controller DTM

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

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

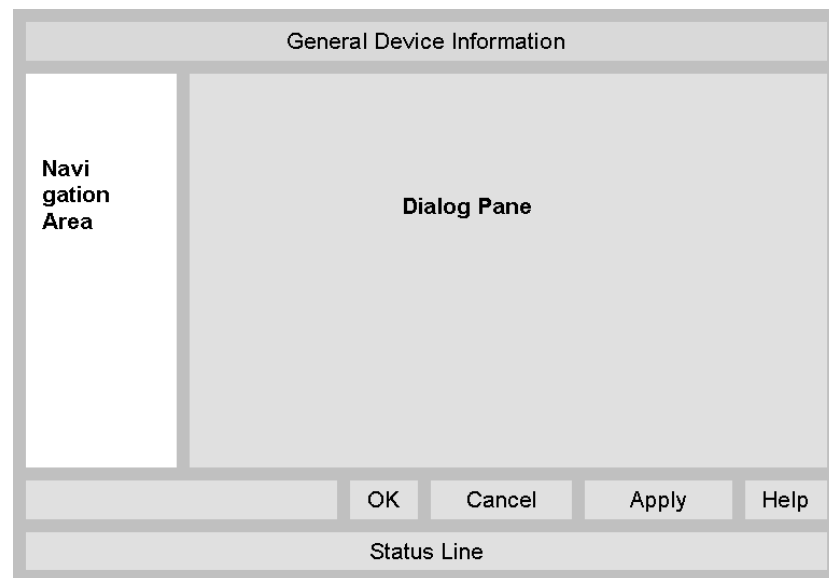


Figure 1: Dialog Structure of the PROFINET IO-Controller DTM

1.5.1 General Device Information

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

Table 3: General Device Information

1.5.2 Navigation Area

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

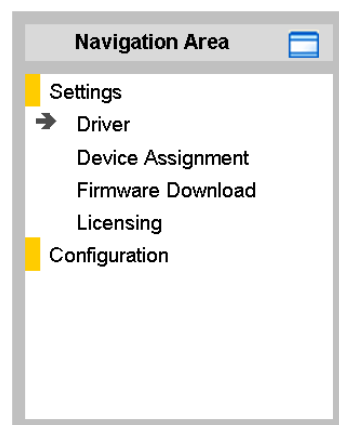


Figure 2: Navigation Area

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

Hide / display Navigation

	Hiding the navigation area (above right side).
Show navigation area	Opening the navigation area (below left side).

1.5.3 Dialog Panes

At the dialog pane the **Settings**, **Configuration**, **Diagnosis/Extended Diagnosis** or the **Tools** panes are opened via the corresponding folder in the navigation area.

Settings	
Driver	To establish a connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device, on the pane Driver you can verify if the default driver is checked and respectively check another driver or multiple drivers. For further information, refer to section <i>Driver</i> on page 33.
Device Assignment	On the Device Assignment pane you select the device and assign the device to the driver. For further information, refer to section <i>Device Assignment</i> on page 42.
Firmware Download	The dialog on the Firmware Download pane is used to load a new firmware into the device. A detailed description can be found in section <i>Firmware Download</i> on page 48.
Licensing	Using the license dialog, you can order licenses for Master protocols or Utilities and download them to your device. A detailed description can be found in section <i>Licenses</i> on page 112.
Ethernet Devices	The dialog on the Ethernet Devices pane is used to adjust the device name (=Name of Station) or the IP address at Ethernet-capable devices or to use existing values therefore. A detailed description can be found in section <i>Ethernet Devices</i> on page 56.
Configuration	
Controller Network Settings	The Controller Network Settings pane displays general PROFINET IO-Controller information. Here you must set the name of station and the IP settings for the PROFINET IO-Controller. For further information, refer to section <i>Controller Network Settings</i> on page 75.
Device Table	The Device Table displays the list of all configured PROFINET IO-Device devices. Here you must set the network name for the PROFINET IO-Device station. For further information, refer to section <i>Device Table</i> on page 76.
IP Address Table	The IP Address Table pane displays communication data of the devices associated with the PROFINET IO-Controller. Here you must make the IP settings for the PROFINET IO-Device station. For further information, refer to section <i>IP Address Table</i> on page 78.
Process Data	The Process Data pane serves for the PROFINET IO-Controller DTM as an external process data interface. For further information, refer to section <i>Process Data</i> on page 80.
Address Table	The Address Table pane shows a list of all dpram addresses used in the process data image. Here you must set the address. For further information, refer to section <i>Address Table</i> on page 81.
FSU/Port Settings	On the FSU/Port Settings pane you set in the PROFINET IO-Controller device, whether a PROFINET IO-Device must use a fast start up (FSU) connection to establish the cyclic data exchange. For further information, refer to section <i>FSU/Port-Settings</i> on page 85.
Stations Timing	On the Stations Timing pane you can select or set station global settings. For further information, refer to section <i>Stations Timing</i> on page 87.
Controller Settings	At the Controller Settings pane device related settings can be made. For further information, refer to section <i>Controller Settings</i> on page 88.
Diagnosis	
Diagnosis/Extended Diagnosis	At the Diagnosis panes information can be read for troubleshooting. For further information, refer to section <i>Overview Diagnosis</i> on page 125 or section <i>Overview Extended Diagnosis</i> on page 131.
Tools	
Packet Monitor/IO Monitor/Process Image Monitor	Under Tools the Packet Monitor and the IO Monitor are provided for test and diagnosis purposes. For further information, refer to section <i>Packet Monitor</i> on page 148, section <i>IO Monitor</i> on page 151 or section <i>Process Image Monitor</i> on page 152.

Table 4: Overview Dialog Panes



Note: Accessing the **Diagnosis** panes of the PROFINET IO-Controller DTM requires an online connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device.



For further information, refer to section *Connecting/Disconnecting Device* on page 93.

1.5.4 OK, Cancel, Apply and Help

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

	Meaning
OK	To confirm your latest settings, click OK . All changed values will be applied on the frame application database. <i>The dialog then closes.</i>
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. <i>The dialog then closes.</i> No: The changes are <u>not</u> saved or the changed values are not applied on the frame application database. <i>The dialog then closes.</i> Cancel: <i>Back to the DTM.</i>
Apply	To confirm your latest settings, click Apply . All changed values will be applied on the frame application database. <i>The dialog remains opened.</i>
Help	To open the DTM online help, click Help .

Table 5: OK, Cancel, Apply and Help

1.5.5 Table Lines

In the DTM dialog pane table lines can be selected, inserted or deleted.

	Meaning
	To select the first line of a table use First Line .
	To select the previous line of a table use Previous Line .
	To select the next line of a table use Next Line .
	To select the last line of a table use Last Line .
	Create a new Line inserts new lines into the table.
	Delete selected Line deletes the selected line from the table.

Table 6: Selecting, inserting, deleting Table Line

1.5.6 Status Bar

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

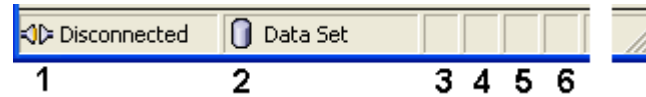
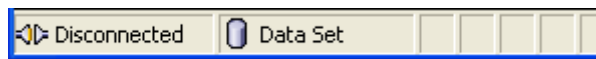


Figure 3: Status Bar – Status Fields 1 to 6

Status Field	Icon / Meaning	
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 are read out from the instance data set (database).
		Device: The displayed data are read out from the device.
3	States of the instance Date Set	
		Valid Modified: Parameter is changed (not equal to data source).
4	Changes directly made on the Device	
		Load/configure diagnosis parameters: Diagnosis is activated.
6	Device Diagnosis Status	
		Save operation succeeded: The save operation has been successful. Further messages due to successful handling of device data.
		Firmware Download: Firmware Download is running
		Save operation failed: The save operation has failed. Further fail operation messages due to incorrect communication due to malfunction in the field device or its peripherals.

Table 7: Status Bar Icons [1]

Offline State



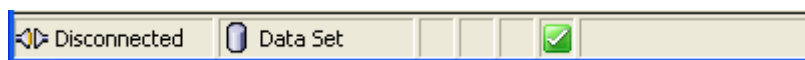
Save operation succeeded



Firmware Download



Firmware Download successful



Online State and Diagnosis

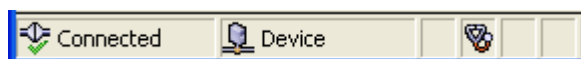


Figure 4: Status Bar Display Examples

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 educated 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 PROFINET IO-Controller DTM serves for configuration and diagnosis of PROFINET IO-Controller 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.

2.4 Safety Instructions

To ensure your own personal safety and to avoid personal injury, you necessarily must read, understand, and comply with the safety instructions and safety messages in this manual before you install and operate your system.

For cases if both, personal injury as well as property damage (damage of equipment or device) may occur together, you find the safety instructions in this section.

2.4.1 Communication Stop during Firmware or Configuration Download

If you want to perform either a firmware update (as a download) or a configuration download, both via the PROFINET IO-Controller DTM, be aware of the following:

- Together with the firmware download, an automated reset to the device is performed that will interrupt all network communication and all established connections will drop.
- If you download the configuration during bus operation, the communication between master and slaves is stopped.

Possible faulty System Operation

- An unpredictable and unexpected behavior of machines and plant components may cause personal injury and property damage.
- Stop the application program, before starting the firmware update or before downloading the configuration.
- Make sure that your equipment operates under conditions that prevent personal injury or property damage. All network devices should be placed in a fail-safe mode, before starting the firmware update or before downloading a configuration.

Loss of Device Parameters, Overwriting of Firmware

- Both the firmware download and the configuration download erase the configuration data base. The firmware download overwrites the existing firmware in the network device.
- To complete the firmware update and to make the device operable again, re-load the configuration after the firmware update has been finished.
- Device parameters that have been saved volatile, e. g. as the temporarily set IP address parameters, are getting lost during the reset.
- In order to prevent loss of configuration data, make sure that your project configuration data are saved non-volatile, before you initiate a firmware update or download the configuration.

2.4.2 Mismatching System Configuration

Mismatching system configuration loaded into the device could result in faulty data mapping in the application program and thus unexpected equipment operation may cause personal injury or damage of equipment.

- In the device use only a configuration suitable for the system.

2.5 Property Damage

To avoid property damage and damage to your system or to your equipment, you necessarily must read, understand, and comply with the safety instructions and safety messages in this manual before you configure your system.

2.5.1 Power Disconnect while downloading Firmware or Configuration

If during the process of downloading a firmware or configuration

- the power supply to a PC with the software application is interrupted,
- or the power supply to the PROFINET IO-Controller device is interrupted,
- or a reset to the device is performed,

this may lead to the following consequences:

Loss of Device Parameters, Firmware Corruption

- The firmware download or the configuration download will be interrupted and remains incomplete.
- The firmware or the configuration database will be corrupted and device parameters will be lost.
- Device damage may occur as the device cannot be rebooted.

Whether these consequences occur depends on when the power disconnect occurs during the download.

- During configuration download process, do not interrupt the power supply to the PC, or to the device and do not perform a reset!

Otherwise you might be forced to return your device for repair.

Power Drop during Write and Delete Accesses in the File System

The FAT file system in the netX firmware is subject to certain limitations in its operation. Write and delete accesses in the file system (firmware update, configuration download etc.) can destroy the FAT (File Allocation Table) if the accesses cannot be completed if the power drops. Without a proper FAT, a firmware may not be found and cannot be started.

Make sure that the power supply to the device is not interrupted during write and delete accesses in the file system (firmware update, configuration download, etc.).

2.5.2 Invalid Firmware

Loading invalid firmware files could render your device unusable.

- Only download firmware files to the device that are valid for this device.

Otherwise you might be forced to return your device for repair.

2.6 Labeling of Safety Messages

- The **Section Safety Messages** at the beginning of a chapter are pinpointed particularly and highlighted by a signal word according to the degree of endangerment. The type of danger is specified by the safety message text
- The **Integrated Safety Messages** within an instruction description are highlighted with a signal word according to the degree of endangerment. The kind of danger is specified exactly by the safety message text.





Signal Word	Meaning (International)	Meaning (USA)
 DANGER	Indicates a direct hazard with high risk, which will have a consequence of death or grievous bodily harm if it is not avoided.	Indicates a hazardous situation which if not avoided, will result in death or serious injury.
 WARNING	Indicates a possible hazard with medium risk, which will have a consequence of death or (grievous) bodily harm if it is not avoided.	Indicates a hazardous situation which if not avoided, could result in death or serious injury.
 CAUTION	Indicates a minor hazard with medium risk, which could have a consequence of minor or moderate bodily harm if it is not avoided.	Indicates a hazardous situation which if not avoided, may result in minor or moderate injury.
 NOTICE	Indicates a property damage message.	Indicates a property damage message.

Table 8: Signal Words



Note: The ANSI Z535.6 standard specifies in section 4.8: "Messages about hazards that could result in both, physical injury and property damage are considered safety messages, not property damage messages." Thus depending of the type of danger and its consequences, warning messages marked by a signal word DANGER, WARNING or CAUTION may include both, messages on physical injury and property damage.

In this document all Safety Instructions and Safety Messages are designed according both to the international used safety conventions as well as to the ANSI Z535.6 standard, refer to safety reference [S1].

In this document the signal words 'WARNING', 'CAUTION' and 'NOTICE' are used according to ANSI Z535.6 standard. The meaning given in ISO/IEC 26514 [S4] section '11.11 Contents of warnings and cautions' is not relevant in this manual.

2.7 References Safety


- [S1] ANSI Z535.6-2011 American National Standard for Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials
- [S4] 26514-2010 - IEEE Standard for Adoption of ISO/IEC 26514:2008 Systems and Software Engineering--Requirements for Designers and Developers of User Documentation




3 Getting started

3.1 Configuration Steps

The following overview provides to you the step sequence on how to configure a netX based PROFINET IO-Controller device with PROFINET IO-Controller DTM as it is typical for many cases. At this time it is presupposed that the hardware installation was done.

The overview lists all the steps in a compressed form. For detailed descriptions of each step refer to the sections noted in the column *For detailed information see section*.

#	Step	Short Description	For detailed information see section	Page
1	Add PROFINET IO-Device in the Device Catalog	Add the Device in the Device Catalog by importing the device description file to the Device Catalog. Depending of the FDT Container. For netDevice: - Network > Import Device Descriptions .	(See <i>Operating Instruction Manual netDevice and netProject</i>)	-
2	Load device catalog	Depending of the FDT Container: For netDevice: - select Network > Device Catalog , - select Reload Catalog .	(See <i>Operating Instruction Manual netDevice and netProject</i>)	-
3	Create new project / Open existing project	Depending of the frame application. For the configuration software: - select File > New or File > Open .	(See <i>Operating Instruction Manual of the Frame Application</i>)	-
4	Insert Controller or Device into configuration	Depending of the FDT Container: For netDevice:  Important! 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 window. When sorting by <i>Fieldbus</i> multiple devices with identical names by different vendors can be displayed. - in the Device Catalog click to the Controller, - and insert the device via drag and drop to the line in the network view, - in the Device Catalog click to the Device,* - and insert the device via drag and drop to the Controller bus line in the network view.* (*This step won't be necessary if the network structure is scanned automatically. See <i>step 18</i> .)	(See <i>Operating Instruction Manual netDevice and netProject</i>)	-
5	Open the Controller DTM configuration dialog	Open the Controller DTM configuration dialog. - Double click to the device icon of the Controller. - The Controller DTM configuration dialog is displayed.	-	-

6	Verify or adapt Driver Settings	<p>In the Master DTM configuration dialog: - select Settings > Driver.</p> <div data-bbox="499 226 571 297">  </div> <p>Note! For PC cards cifX the cifX Device Driver is preset as a default driver. For all the other Hilscher devices the netX Driver is preset as a default driver.</p> <ul style="list-style-type: none"> • Use the cifX Device Driver if the PROFINET IO-Controller DTM is installed on the same PC as the PROFINET IO-Controller device. • Use the netX Driver to establish a USB, Serial (RS232) or TCP/IP connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device. • The 3SGateway Driver for netX (V3.x) is used only in relationship with CODESYS. <p>To search for devices you can check one or multiple drivers simultaneously.</p> <p>- Verify that the default driver is checked. - If necessary, check another driver or multiple drivers.</p>	<p><i>Settings for Driver and Device Assignment and Driver</i></p>	<p>31</p> <p>33</p>
7	Configure Driver	<p>If you use the netX Driver, you respectively must configure it.</p> <p>For netX Driver and communication via TCP/IP set the IP address of the device:</p> <ul style="list-style-type: none"> - Select Settings > Driver > netX Driver > TCP Connection. - Via  add an IP range. - Under IP Address enter the IP Address of the device or an IP range. - Click Save. <p>Adjust the driver parameters netX Driver USB/RS232 only if they differ from the default settings.</p> <div data-bbox="499 1294 571 1366">  </div> <p>Note!</p> <ul style="list-style-type: none"> • The cifX Device Driver requires no configuration. • The configuration of the 3SGateway Driver for netX (V3.x) is carried out via the CODESYS surface. 	<p><i>Configuring netX Driver</i></p>	<p>36</p>
8	Assign Controller device (with or without firmware)	<p>Assign the device to this driver.</p> <p>In the Controller DTM configuration dialog:</p> <ul style="list-style-type: none"> - select Settings > Device Assignment, - select a Controller device (with or without firmware), - therefore check the appropriate checkbox, - select Apply. 	<p><i>Selecting the Device (with or without firmware)</i></p>	<p>45</p>
9	Select and download firmware	<p>If not yet a firmware was loaded to the device:</p> <ul style="list-style-type: none"> - Adhere to the necessary safety precautions to prevent personnel injury and property damage. <p>In the Controller DTM configuration dialog:</p> <ul style="list-style-type: none"> - select Settings > Firmware Download, - select Browse.., - select a firmware file, - select Open, - select Download and Yes. 	<p><i>Safety Messages on Firmware or Configuration Download</i></p> <p><i>Firmware Download</i></p>	<p>29</p> <p>48</p>

10	Assign Controller device once more (with firmware and system channel) <i>For repeated download this step is omitted.</i>	In the Controller DTM configuration dialog: - select Settings > Device Assignment , - select Scan , - select the Controller device (with loaded and defined system channel), - therefore check the appropriate checkbox, - select Apply , - close the Controller DTM configuration dialog via OK .	<i>Selecting the Device once more (with Firmware)</i>	46
11	Configuring Ethernet Device* (*This step won't be necessary if the network structure is scanned automatically. See step 18.)	In the Controller DTM configuration dialog: - select Settings > Ethernet Devices , - click Devices Online > Search devices , - under Devices Online click the line for the device to be configured. - Respectively check Use Configuration of and select a device, the configuration of which shall be used. - Set the device name (=Name of Station) newly or overtake it, - click Set Name , - set the IP address, subnet mask and gateway address newly or overtake them, - click Set Address , - click Search devices once more to display the newly adjusted current values, - close the Controller DTM configuration dialog via OK .	<i>Ethernet Devices</i>	56
12	Configure Device* (*This step won't be necessary if the network structure is scanned automatically. See step 18.)	Configure the Device. In the DTM device configuration dialog: - select Configuration > Modules , - configure the PROFINET IO-Device modules, - select Configuration > Device Settings , - set the Device Settings . - Close the DTM device configuration dialog via OK .	<i>(See Operating Instruction Manual DTM for PROFINET IO-Devices)</i>	-
13	Configure Controller device For Device device: Set Name of Station and IP settings.	Configure the Controller device. - Double click to the device icon of the Controller. In the Controller DTM configuration dialog: - select Configuration > Controller Network Settings , - set the name of station for the Controller, - make the IP settings for the Controller, - select Configuration > Device Table , - select the PROFINET IO-Device required, - Enter the name of station of the PROFINET IO-Device station, - select Configuration > IP Address Table , - Enter the IP settings of the PROFINET IO-Device station. - select Configuration > Process data , - set symbolic names for the configured modules or signals. - select Configuration > Address Table , - activate or deactivate auto addressing, - for manual addressing: enter the addresses, - select Configuration > FSU/Port-Settings , chose the FSU-Port settings. Therefore check FSU for the appropriate device(s) and for each port set the MAU-Type. - select Configuration > Stations Timing , - select the appropriate station, - make the station global settings for the PROFINET IO-Device stations, - select Configuration > Controller Settings , - set the Controller Settings (including the	<i>Configuring Device Parameters</i> <i>Controller Network Settings</i> <i>Device Table</i> <i>IP Address Table</i> <i>Process Data</i> <i>Address Table</i> <i>FSU/Port-Settings</i> <i>Stations Timing</i> <i>Controller Settings</i>	72 75 76 78 80 81 85 87 88

		Port Settings for the Controller device and IOPS interface configuration). - close the Controller DTM config. dialog via OK .		-
14	Save project	Depending of the frame application. For the configuration software: - select File > Save .	<i>(See Operating Instruction Manual of the Frame Application)</i>	-
15	Connect Controller device	Depending of the FDT Container. For netDevice: - right click to the device icon of the Controller, - select Connect .	<i>Connecting/Disconnecting Device</i>	93
16	Licensing	How to order licenses later and how to transfer them to the device.	<i>Licenses</i>	112
17	Download Configuration	- Adhere to the necessary safety precautions to prevent personnel injury and property damage. Depending of the FDT Container. For netDevice: - right click to the device icon of the Controller, - select Download .	<i>Safety Messages on Firmware or Configuration Download</i> <i>Download Configuration</i>	29 109
18	Network Scan / Upload	As an alternative to manually configure the Device, you can automatically scan the network structure by using the context menu Network Scan . Then confirm the query whether the module configuration of the Device shall be generated and download the configuration to the Controller device. Important: For the generation of the module configuration, you first must manually assign the IP settings to the Device in the PROFINET IO Controller DTM. Proceed the steps as follows: 1. Start the Network Scan function. 2. Make the settings in the Scan Response dialog of the Master DTM. 3. Click Create devices . 4. Assign the IP address of the Device in the Controller DTM manually 5. Download of the configuration to the Controller device (Download). 6. Upload of the Device configuration and generate the module configuration. 7. Download the Device configuration to the Controller device (Download).	<i>'Network Scan' and 'Upload'</i>	95
19	Diagnosis	Depending of the FDT Container. For netDevice: - right click to the device icon of the Controller, - select Diagnosis . - The Controller DTM diagnosis dialog is displayed. (1) Check whether the communication is OK: Diagnosis > General Diagnosis > Device status "Communication" must be green! (2) "Communication" is green: Open the IO Monitor and test the input or output data. (3) "Communication" is not green: Use Diagnosis and Extended diagnosis for troubleshooting. - close the Controller DTM diagnosis dialog via OK .	<i>Overview Diagnosis</i>	125

20	IO Monitor	Depending of the FDT Container: For netDevice: - right click to the device icon of the Controller, - select Diagnosis , - select Tools > IO Monitor . - Check the input or output data, - close the IO Monitor dialog via OK .	<i>IO Monitor</i>	151
21	Disconnect	Depending of the FDT Container. For netDevice: - right click to the device icon of the Controller, - select Disconnect .	<i>Connecting/Disconnecting Device</i>	93

Table 9: Getting started - Configuration Steps

3.2 Safety Messages on Firmware or Configuration Download

If you perform a firmware download or a configuration download via the PROFINET IO-Controller DTM be aware of the following:

⚠ WARNING**Communication Stop caused by Firmware or Configuration Download**

Initiating a firmware or configuration download process during bus operation will stop the communication and a subsequent plant stop may cause unpredictable and unexpected behavior of machines and plant components, possibly resulting in personal injury and damage to your equipment.

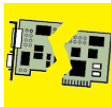
The firmware download overwrites the existing firmware. The communication stop may cause loss of device parameters and possible device damage may occur.

- Stop the application program, before you start the firmware or configuration download.
 - Make sure that all network devices are placed in a fail-safe condition.
-

⚠ WARNING**Mismatching System Configuration**

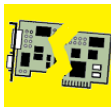
Mismatching system configuration loaded into the device could result in faulty data mapping in the application program and thus unexpected equipment operation may cause personal injury or damage of equipment.

- In the device use only a configuration suitable for the system.
-

NOTICE**Power Disconnect while downloading Firmware or Configuration**

If the power supply to the PC or device is interrupted while the firmware or configuration is being downloaded, the download will be aborted, the firmware may be corrupted, the device parameters may be lost, and the device may be damaged.

- During firmware or configuration download process do not interrupt the power supply to the PC, or to the device and do not perform a reset to the device!
-

NOTICE**Invalid Firmware**

Loading invalid firmware files could render your device unusable.

- Only proceed with a firmware version valid for your device.
-

4 Settings

4.1 Overview Settings

Settings Dialog Panes

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

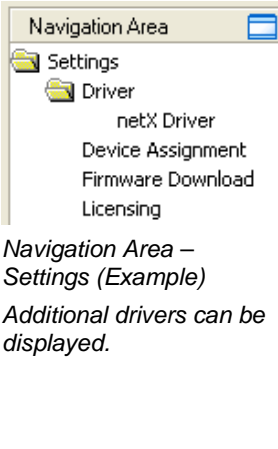
PROFINET IO-Controller DTM	Folder Name / Section	Subsection	Manual Page
	Driver		33
		Verify or adapt Driver Settings	33
		cifX Device Driver	35
		netX Driver	35
		Configuring netX Driver	36
	Device Assignment		42
		Scanning for Devices	42
		Scanning for all Devices or for suitable only	44
		Selecting the Device (with or without firmware)	45
		Selecting the Device once more (with Firmware)	46
	Firmware Download		48
	Licenses		112

Table 10: Descriptions of the Dialog Panes Settings



Note: To edit the **Settings** dialog panes you need *User Rights* for “Maintenance”.



Notice the descriptions in the section *Settings for Driver and Device Assignment* on page 31.

To access to the online help with the descriptions of the drivers:

- Select **Settings > Driver > [Name of the assigned driver]**.
- Press the **F1** key.

4.2 Settings for Driver and Device Assignment

The following steps are needed to establish a connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device:

Verifying or adapting Driver Settings

Verify the Driver Settings and adapt them if necessary.

1. Open the DTM configuration dialog.
 - In the FDT container **netDevice** double click to the PROFINET IO-Controller device icon.
2. Verify that the default driver is checked and respectively check another or multiple drivers.
 - Select **Settings > Driver**.



Note! For PC cards cifX the **cifX Device Driver** is preset as a default driver. For all the other Hilscher devices the **netX Driver** is preset as a default driver.

- Use the **cifX Device Driver** if the PROFINET IO-Controller DTM is installed on the same PC as the PROFINET IO-Controller device.
- Use the **netX Driver** to establish an USB, Serial (RS232) or TCP/IP connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device.
- The **3SGateway Driver for netX (V3.x)** is used only in relationship with CODESYS.

To search for devices on the network you can check one or multiple drivers simultaneously.

- Verify that the default driver for your device is checked.
- If necessary, check another driver or multiple drivers.

Configuring Driver



Note!

- The **cifX Device Driver** requires no configuration.
- The configuration of the **3SGateway Driver for netX (V3.x)** is carried out via the CODESYS surface.

If you use the **netX Driver**, you respectively must configure it.

3. Configure the **netX Driver** if necessary.

For the driver **netXDriver** an individual driver dialog window can be opened where you can configure the driver.

- Select **Settings > Driver > netX Driver**.
- For netX Driver and communication via TCP/IP set the IP address of the device.

Adjust the driver parameters **netX Driver USB/RS232** only if they differ from the default settings.

Assigning the Controller device to the DTM

4. Scan for and select the devices (with or without firmware).
 - Select **Settings > Device Assignment**.
 - Under **Device selection** select *suitable only* or *all* and then **Scan**.
 - In the table check the required devices.
 - Select **Apply**.

Selecting and downloading the Firmware

5. If not yet a firmware was loaded to the device, select and download the firmware.
 - Select **Settings > Firmware Download**.
 - Select and download the firmware via **Download**.
 - Select **Apply**.
6. Scan for and select the devices (with firmware and defined system channel) once more.

For repeated download this step is omitted.

 - Select **Settings > Device Assignment**.
 - Select **Scan**.
 - In the table check the required device.
7. Close the DTM configuration dialog via **OK**.

Connecting the Device

8. In **netDevice** put a right-click on the PROFINET IO-Controller device icon.
9. Select the **Connect** command from the context menu.
- In the network view the device description at the device icon of the Controller is displayed with a green colored background. The PROFINET IO-Controller device now is connected to the PROFINET IO-Controller DTM via an online connection.

Further Information



For descriptions about these steps refer to the sections following hereafter.

4.3 Driver

The **Driver** dialog pane displays the drivers to be used for a PROFINET IO-Controller DTM to establish a device communication connection.



Note! A **default driver** is set in the configuration software.

Driver			
	Driver	Version	ID
<input checked="" type="checkbox"/>	CIFX Device Driver	1.101.1.9801	{368BEC5B-0E92-4C0E-B4A9-64F62AE7AAFA}
<input type="checkbox"/>	3SGateway Driver for netX (V3.x)	0.9.1.2	{787CD3A9-4CF6-4259-8E4D-109B6A6BEA91}
<input type="checkbox"/>	netX Driver	1.103.2.5183	{B54C8CC7-F333-4135-8405-6E12FC88EE62}

Figure 5: Default Driver 'CIFX Device Driver' for PC cards cifX

Parameter	Meaning
Driver	Name of the driver (for more details see descriptions hereafter)
Version	ODMV3 Version of the respective driver
ID	ID of the driver (driver identification)

Table 11: Driver Selection List Parameters

To establish a connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device, verify if the default driver is checked and respectively check another driver or multiple drivers.

4.3.1 Verify or adapt Driver Settings

Proceed as follows:

1. Select **Settings > Driver** in the navigation area.
- The **Driver** dialog pane is displayed with the available drivers and the setting for the default driver.

Driver			
	Driver	Version	ID
<input checked="" type="checkbox"/>	CIFX Device Driver	1.101.1.9801	{368BEC5B-0E92-4C0E-B4A9-64F62AE7AAFA}
<input type="checkbox"/>	3SGateway Driver for netX (V3.x)	0.9.1.2	{787CD3A9-4CF6-4259-8E4D-109B6A6BEA91}
<input type="checkbox"/>	netX Driver	1.103.2.5183	{B54C8CC7-F333-4135-8405-6E12FC88EE62}

Figure 6: Default Driver 'CIFX Device Driver' for PC cards cifX (example)

Driver			
	Driver	Version	ID
<input type="checkbox"/>	CIFX Device Driver	1.101.1.9801	{368BEC5B-0E92-4C0E-B4A9-64F62AE7AAFA}
<input type="checkbox"/>	3SGateway Driver for netX (V3.x)	0.9.1.2	{787CD3A9-4CF6-4259-8E4D-109B6A6BEA91}
<input checked="" type="checkbox"/>	netX Driver	1.103.2.5183	{B54C8CC7-F333-4135-8405-6E12FC88EE62}

Figure 7: Default Driver 'netX Driver' for Hilscher devices except for PC cards cifX (example)

2. Verify that the default driver is checked.
- Verify that the default driver for your device is checked.

Default Driver (Pre-settings in the Configuration Software): For PC cards cifX the **cifX Device Driver** is preset as a default driver. For all the other Hilscher devices the **netX Driver** is preset as a default driver.

3. Respectively check another driver.



Note! The driver used for the connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device must be supported by the device and must be available for the device.

- Use the **cifX Device Driver** if the PROFINET IO-Controller DTM is installed on the same PC as the PROFINET IO-Controller device.
- Use the **netX Driver** to establish a USB, Serial (RS232) or TCP/IP connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device.
- The **3SGateway Driver for netX (V3.x)** is used only in relationship with CODESYS. The version V3.x refers to the driver version defined by 3S-Smart Software Solutions GmbH.

➤ Check the checkbox for the driver in the selection list.

4. Respectively check multiple drivers.

To search for devices on the network you can check multiple drivers simultaneously.

Driver			
	Driver	Version	ID
<input checked="" type="checkbox"/>	CIFX Device Driver	1.101.1.9801	{368BEC5B-0E92-4C0E-B4A9-64F62AE7AAFA}
<input type="checkbox"/>	3SGateway Driver for netX (V3.x)	0.9.1.2	{787CD3A9-4CF6-4259-8E4D-109B6A6BEA91}
<input checked="" type="checkbox"/>	netX Driver	1.103.2.5183	{B54C8CC7-F333-4135-8405-6E12FC88EE62}

Figure 8: Manual Selection of multiple drivers (Example)

4.3.2 cifX Device Driver

In the PROFINET IO Controller DTM for the **cifX Device Driver** no driver dialog pane is available, since for the **cifX Device Driver** no driver settings are required.

The **cifX Device Driver** will be used if the PROFINET IO Controller DTM is installed in the same PC as the PROFINET IO Controller device.



Note: To establish a connection from a DTM to a Controller device via the **cifX Device Driver**, the **cifX Device Driver** must be installed and the driver must have access to the Controller device.

4.3.3 netX Driver

The **netX Driver** is used to connect the DTM to the device via different connection types. The DTM communicates with the device via an USB connection, a serial (RS232) connection or a TCP/IP connection. The **netX Driver** establishes

- via the USB interface of the device and the USB port of the PC an USB connection to the device,
- via the RS232 interface of the device and the COM port of the PC a serial connection (RS232) to the device
- and via Ethernet a TCP/IP connection to the device.

To connect the DTM to the physical layer of the device the **netX Driver** software works in combination with the software components:

- “USB/COM connector” for the USB connection and for the serial connection (RS232) and
- “TCP/IP connector” for the Ethernet connection.

4.3.4 Configuring netX Driver

The following steps are required to configure the netX Driver:

USB/RS232 Connection

To set the driver parameters for an USB/RS232 connection note:




Note: Adjust the driver parameters netX Driver USB/RS232 only if they differ from the default settings. After saving the changed driver parameters, these parameters are used for the device assignment when scanning devices.

For setting the driver parameters for an USB connection or a serial connection:

1. Select **Settings > Driver > netX Driver > USB/RS232 Connection**.
 - Set the driver netX Driver USB/RS232 parameters.

TCP/IP Connection

For setting the driver parameters for a TCP/IP connection:

1. Select **Settings > Driver > netX Driver > TCP Connection**.
2. Set IP Address of the device:
 - Add an IP Range via **Select IP Range** .
3. Under **IP Range Configuration > IP Address** enter the IP Address of the device (**Use IP Range** is unchecked).

Or

4. Set IP Range:
 - Check **Use IP Range**.
 - Under **IP Range Configuration > IP Address** enter the start address (left side) and the ending address of the IP scanning range (right side).
 5. Click **Save**, to save the IP address or the IP range.
- After saving the changed driver parameters, these parameters are used for the device assignment when scanning devices.

4.3.5 netX Driver - USB/RS232 Connection

The communication from the DTM to the device via an **USB/RS232 Connection** is used when the DTM is installed on a PC and between the PC and the device

- an USB connection
- or a serial connection (RS232) exists.

The DTM accesses the device via the USB interface or via the RS232 interface. This requires either to connect an USB port of the PC to the USB interface of the device using an USB cable or to connect a physical COM port of the PC to the RS232 interface of the device via a serial cable.

The **netX Driver / USB/RS232 Connection** supports all physical and virtual COM ports available on the PC.

Via the RS232 interface or USB interface, the device is configured or diagnosis is performed.

4.3.5.1 Driver Parameters for netX Driver - USB/RS232 Connection

The settings of the driver parameters for the USB/RS232 connection are made via the **netX Driver / USB/RS232 Connection** configuration dialog.

- Open the **USB/RS232 Connection** dialog via navigation area **Settings > Driver > netX Driver**.

- The **USB/RS232 Connection** dialog is displayed:

The screenshot shows the 'netX Driver' configuration window with the 'USB/RS232 Connection' tab selected. The 'TCP Connection' tab is also visible. The 'Enable USB/RS232 Connector (Restart of ODM required)' checkbox is checked. The 'Select Port:' dropdown is set to 'COM1'. The 'Port Configuration' section includes a 'Disable Port' checkbox (unchecked) and several settings: 'Baud Rate' (115.2 kBit/s), 'Byte Size' (8 Byte), 'Stop Bits' (1 Stopbit), 'Parity' (No Parity), 'Send Timeout' (1000 ms), 'Reset Timeout' (10000 ms), and 'Keep Alive Timeout' (2000 ms). At the bottom, there are 'Restore', 'Save', and 'Save All' buttons.

Figure 9: netX Driver > USB/RS232 Connection


Parameter	Meaning	Range of Value / Default Value
Enable USB/RS232 Connector (Restart of ODM required)	<p>checked: The netX Driver can communicate via the USB/RS232 interface.</p> <p>unchecked: The netX Driver can <u>not</u> communicate via the USB/RS232 interface.</p> <p>If the check mark for Enable USB/RS232 Connector is set or removed, then the ODM server must be restarted¹, to make the new setting valid.</p> <p>¹ Restart the ODM server via the ODMV3 Tray Application:</p> <p>- In the foot line click on  using the right mouse key.</p> <p>- In the context menu select Service > Start.</p>	checked, unchecked; Default: unchecked
Select Port	Depending on the COM ports (interfaces) available on the PC, they will be listed under Select Port .	COM 1 to COM N
Port Configuration		
Disable Port	<p>checked: No connection.</p> <p>unchecked: The netX Driver tries to establish a connection using the configured USB/RS232 interface.</p>	checked, unchecked (Default)
Baud rate	<p>Transfer rate: number of bits per second.</p> <p>The device must support the baud rate.</p>	9.6, 19.2, 38.4, 57.6 or 115.2 [kBit/s]; Default (RS232): 115.2 [kBit/s]
Stop bits	Number of stop bits sent after the transfer of the send data for synchronization purposes to the receiver.	Stop bit: 1, 1.5, 2; Default (RS232): 1
Send Timeout	Maximum time before the transfer of the transmission data is canceled, when the send process fails, for example, because of the transfer buffer is full.	100 ... 60.000 [ms]; Default (RS232 and USB): 1000 ms
Reset Timeout	Maximum time for a device reset, including the re-initialization of the physical interface used for the communication.	100 ... 60.000 [ms]; Default (RS232 and USB): 5000 ms
Byte size	Number of bits per byte by byte specification	7 Bit, 8 Bit; Default (RS232): 8 Bit
Parity	<p>In the error detection in data transmission using parity bits, "parity" describes the number of bits occupied with 1 in the transmitted information word.</p> <p>No Parity: no parity bit</p> <p>Odd Parity: The parity is "odd" if the number of bits occupied with 1 in the transmitted information word will be odd.</p> <p>Even parity: The parity is "even" if the number of bits occupied with 1 in the transmitted information word will be even.</p> <p>Mark Parity: if the parity bit is always 1, this will be named mark-parity (the bit does not contain any information).</p> <p>Space Parity: if the parity bit always 0, this will be named space-parity (the bit represents an empty space).</p>	No Parity, Odd Parity, Even Parity, Mark Parity, Space Parity; Default (RS232): No Parity
Keep Alive Timeout	The "Keep Alive" mechanism is used to monitor whether the connection to the device is active. Connection errors are detected using a periodic heartbeat mechanism. The heartbeat mechanism will be initiated after the set time has elapsed if the communication has failed.	100 ... 60.000 [ms]; Default (RS232 and USB): 2000 ms
Restore	Resets all settings in the configuration dialog to the default values.	
Save	Saving all settings made in the configuration dialog netX Driver > Save USB/RS232 Connection , i. e. only for the selected connection type.	
Save All	Saving all settings made in the configuration dialog netX Driver , i. e. for all connection types.	

Table 12: Parameters netX Driver > USB/RS232 Connection

4.3.6 netX Driver - TCP/IP Connection

The communication from the DTM to the device via a **TCP/IP Connection** is used in the following two typical applications:

Application 1: The device has its own Ethernet interface. The DTM is installed on a PC and the TCP/IP connection is established from this PC to the stand-alone device. The IP address of the device is used.

Application 2: The device is installed in a remote PC. The DTM is installed on an additional PC and the TCP/IP connection is established from this PC to the remote PC. The IP address of the remote PC is used. For the TCP/IP connection is made, on the remote PC the cifX TCP/IP server must be started. The cifX TCP/IP server allows the remote access to the device via a TCP/IP connection.



Note: An exe file for the cifXTCP/IP server is provided on the product CD in the *Tools* directory.

Via the TCP/IP interface of the device or of the remote PC, the device is configured or diagnosis is performed.




4.3.6.1 Driver Parameters for netX Driver - TCP/IP Connection

The settings of the driver parameters for the TCP/IP connection are made via the **netX Driver / TCP Connection** configuration dialog.

- Open the **TCP Connection** dialog via navigation area **Settings > Driver > netX Driver**.
- The dialog **netX Driver** is displayed:
- Select **TCP Connection**.

The screenshot shows the 'netX Driver' configuration window with the 'TCP Connection' tab selected. The 'Enable TCP Connector (Restart of ODM required)' checkbox is checked. The 'Select IP Range' dropdown is set to 'IP_RANGED', with '+' and '-' icons next to it. The 'Scan Timeout' is set to 100 ms. Below, the 'IP Range Configuration' section has a 'Disable IP Range' checkbox. The 'IP Address' field shows '192.168.1.1', and the 'Use IP Range' checkbox is unchecked. The 'TCP Port' is set to 50111 and the 'Address Count' is 1. The 'Send Timeout' is 1000 ms, 'Reset Timeout' is 20000 ms, and 'Keep Alive Timeout' is 2000 ms. At the bottom are 'Restore', 'Save', and 'Save All' buttons.

Figure 10: netX Driver > TCP Connection

Parameter	Meaning	Range of Value / Default Value
Enable TCP Connector (Restart of ODM required)	<p>checked: The netX Driver can communicate via the TCP/IP interface.</p> <p>unchecked: The netX Driver can <u>not</u> communicate via the TCP/IP interface.</p> <p>If the check mark for Enable TCP Connector is set or removed, then the ODM server must be restarted¹, to make the new setting valid.</p> <p>¹ Restart the ODM server via the ODMV3 Tray Application:</p> <ul style="list-style-type: none"> - In the foot line click on  using the right mouse key. - In the context menu select Service > Start. 	checked, unchecked; Default: unchecked
Select IP Range	<p>Via Select IP Range already created IP ranges can be selected.</p> <p>Via  an additional IP range can be added.</p> <p>Via  an IP range can be deleted.</p>	

Parameter	Meaning	Range of Value / Default Value
Scan Timeout [ms]	With Scan Timeout can be set, how long to wait for a response while a connection is established.	10 ... 10000 [ms]; Default: 100 ms
IP Range Configuration		
Disable IP Range	checked: No connection. unchecked: The netX Driver tries to establish a connection using the configured TCP/IP interface.	checked, unchecked (Default)
IP Address (left)	Enter the IP address of the device, (if Use IP Range is not checked). Enter the start address of the IP scanning range, (if Use IP Range is checked).	valid IP address; Default: 192.168.1.1
Use IP Range	checked: An IP address range is used. unchecked: Only one IP address is used.	checked, unchecked; Default: unchecked
IP Address (right)	Enter the ending address of the IP scanning range, (only if Use IP Range is checked).	valid IP address; Default: 0.0.0.0
Address Count	Displays the scanning range address count, depending on the selected IP-start or IP-end address. (For this read the note given below.)	recommended: 10
TCP Port	Identifies the endpoint of a logical connection or addresses a specific endpoint on the device or PC.	0 - 65535; Default Hilscher device: 50111
Send Timeout [ms]	Maximum time before the transfer of the transmission data is canceled, when the send process fails, for example, because of the transfer buffer is full.	100 ... 60.000 [ms]; Default (TCP/IP): 1000 ms
Reset Timeout [ms]	Maximum time for a device reset, including the re-initialization of the physical interface used for the communication.	100 ... 60.000 [ms]; Default (TCP/IP): 2000 ms
Keep Alive Timeout [ms]	The "Keep Alive" mechanism is used to monitor whether the connection to the device is active. Connection errors are detected using a periodic heartbeat mechanism. The heartbeat mechanism will be initiated after the set time has elapsed if the communication has failed.	100 ... 60.000 [ms]; Default (TCP/IP): 2000 ms
Restore	Resets all settings in the configuration dialog to the default values.	
Save	Saving all settings made in the configuration dialog netX Driver > Save TCP/IP Connection , i. e. only for the selected connection type.	
Save All	Saving all settings made in the configuration dialog netX Driver , i. e. for all connection types.	

Table 13: Parameters netX Driver > TCP Connection



Note: Do not use large IP ranges in combination with a low scan timeout. Microsoft introduced in Windows® XP SP2 a limit of concurrent half-open outbound TCP/IP connections (connection attempts) to slow the spread of virus and malware from system to system. This limit makes it impossible to have more than 10 concurrent half-open outbound connections. Every further connection attempt is put in a queue and forced to wait. Due to this limitation a large IP range used in combination with a low scan timeout could prevent the connection establishment to a device.

4.4 Device Assignment



Note: In the **Device Assignment** dialog pane you first must assign the PROFINET IO-Controller device to the PROFINET IO-Controller DTM by checking the check box. This is essential to establish an online connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device later, as described in section *Connecting/Disconnecting Device* on page 92.

Therefore in the **Device Assignment** dialog pane you scan for the PROFINET IO-Controller device and select it.

If the device did not get a firmware or shall get a new firmware:

1. first you scan for the device (with or without firmware) and select the device,
2. then you download a firmware to the device and
3. subsequently you scan for the device (with firmware) once more and select the device again.

4.4.1 Scanning for Devices

1. Select **Settings > Device Assignment** in the navigation area.

➤ The dialog pane **Device Assignment** is displayed.

Device Assignment

Scan progress: 3/5 Devices (Current device: -)

Device selection: suitable only

	Device	Hardware Port 0/1/2/3	Slot number	Serial number	Driver	Channel Protocol	Access path
<input checked="" type="checkbox"/>	Device Cl*	-{}/PROFIBUS{}/	1	20148	CIFX Device Driver	Undefined Undefined	...\cifX3_SYS

Access path:

Figure 11: Device Assignment - detected Devices (* The name of the device class is displayed.) – Example for a device without firmware

2. Under **Device Selection** select *suitable only*.
3. Select **Scan**, to start the scanning process.

➤ In the table all devices are displayed, which can be connected to the PROFINET IO-Controller DTM via the preselected driver.



Note: For devices, which have been found via the **cifX Device Driver** in the column **Access path** the indication **...\cifX[0toN]_SYS** is displayed. This is correct, as long as a device did not get a firmware. After the firmware download has been completed, in the column **Access path** the indication **...\cifX[0toN]_Ch[0to3]** is displayed.

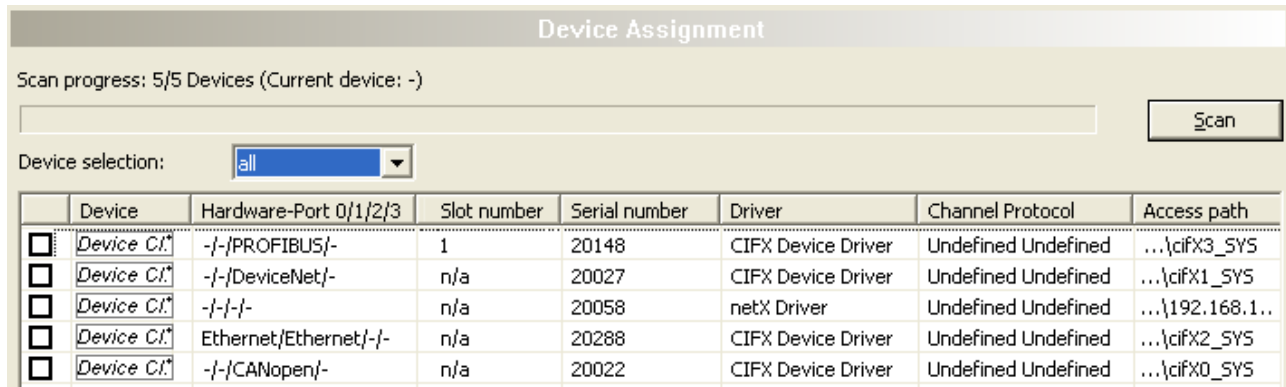
Parameter	Meaning	Range of Value / Default Value
Device selection	Selecting suitable only or all devices.	suitable only, all
Device	Device class of the PROFINET IO-Controller Devices.	
Hardware Port 0/1/2/3	Shows, which hardware is assigned to which communication interface.	
Slot number	Shows the Slot Number (Card ID) preset at the PC card cifX via the Rotary Switch Slot Number (Card ID) . The indication n/a means that no Slot-Nummer (Card ID) exists. This will occur if the PC card cifX is not equipped with a Rotary Switch Slot Number (Card ID) or for PC cards cifX equipped with a Rotary Switch Slot Number (Card ID) if the rotary switch is set to the value 0 (zero).	1 to 9, n/a
Serial number	Serial number of the device	
Driver	Name of the driver	
Channel Protocol	Shows, which firmware is loaded to which device channel. The data for the used channel consists of the protocol class and the communication class. a.) For devices without firmware: Undefined Undefined, b.) For devices with firmware: Protocol name corresponding to the used Firmware	
Access path (last column on the right)	Depending on the used driver in the column Access path different data to the device are displayed. For the cifX Device Driver the following data are displayed: a.) For devices without firmware: ...\\cifX[0toN]_SYS, b.) For devices with firmware: ...\\cifX[0toN]_Ch[0to3]. cifX[0toN] = Board number 0 to N Ch[0to3] = Channel number 0 to 3	Depending on the device and on the driver: board or channel number, IP address or COM interface
Access path (at the lower side of the dialog pane)	If in the table a device is checked, under Access path (at the lower side of the dialog pane) the driver identification or depending on the used driver additional data to the device will be displayed. For the cifX Device Driver the following data are displayed: a.) For devices without firmware: ...\\cifX[0toN]_SYS, b.) For devices with firmware: ...\\cifX[0toN]_Ch[0to3]. cifX[0toN] = Board number 0 to N Ch[0to3] = Channel number 0 to 3	driver identification (ID) depending on the device and on the driver: board or channel number, IP address or COM interface

Table 14: Parameters of the Device Assignment

4.4.1.1 Scanning for all Devices or for suitable only

all

1. Under **Device Selection** select *all*.
2. Select **Scan**.



Device Assignment

Scan progress: 5/5 Devices (Current device: -)

Device selection: all

	Device	Hardware-Port 0/1/2/3	Slot number	Serial number	Driver	Channel Protocol	Access path
<input type="checkbox"/>	Device Cl.*	-/-/PROFIBUS/-	1	20148	CIFX Device Driver	Undefined Undefined	...\cifX3_SYS
<input type="checkbox"/>	Device Cl.*	-/-/DeviceNet/-	n/a	20027	CIFX Device Driver	Undefined Undefined	...\cifX1_SYS
<input type="checkbox"/>	Device Cl.*	-/-/-/-	n/a	20058	netX Driver	Undefined Undefined	...\192.168.1..
<input type="checkbox"/>	Device Cl.*	Ethernet/Ethernet/-/-	n/a	20288	CIFX Device Driver	Undefined Undefined	...\cifX2_SYS
<input type="checkbox"/>	Device Cl.*	-/-/CANopen/-	n/a	20022	CIFX Device Driver	Undefined Undefined	...\cifX0_SYS

Figure 12: Device Assignment - detected Devices (* The name of the device class is displayed.) Example for Devices without Firmware

- ⇒ In the table all devices are displayed, which are attainable in the network and which can be connected to a single DTM each via the preselected drivers.



Note: During a subsequent firmware download in the selection window **Select Firmware File** all files from the selected folder are displayed, under **Files of Type** „All Files (*.*)“ is displayed and the check box **Validate the selected firmware file.** is unchecked.

suitable only

1. Under **Device Selection** select *suitable only*.
2. Select **Scan**.

- ⇒ In the table all devices are displayed, which can be connected to the PROFINET IO-Controller DTM via the preselected drivers.



Note: During a subsequent firmware download in the selection window **Select Firmware File** only firmware files from the selected folder are displayed, under **Files of Type** „Firmware Files (*.nxm)“ or „Firmware Files (*.nxf)“ is displayed and the check box **Validate the selected firmware file.** is checked.

4.4.2 Selecting the Device (with or without firmware)



Note: A connection with the PROFINET IO-Controller DTM can only be established with one PROFINET IO-Controller device.

To select the physical PROFINET IO-Controller device (with or without firmware):

1. Check the appropriate device.

Device Assignment

Scan progress: 5/5 Devices (Current device: -)

Device selection:

	Device	Hardware Port 0/1/2/3	Slot number	Serial number	Driver	Channel Protocol	Access path
<input checked="" type="checkbox"/>	Device Cl.	-/-/PROFIBUS/-	1	20148	CIFX Device Driver	PROFIBUS Master	...{cifx3_SYS

Access path: {368BEC5B-0E92-4C0E-B4A9-64F62AE7AAFA}{cifx3_SYS

Figure 13: Device Assignment - Selecting the Device (* The name of the device class is displayed.) – Example for a device without firmware / one Device is selected

- Under **Access path** (below in the dialog pane) the access path to the device, e. g. the driver identification, or depending on the used driver additional access data of the device are displayed.

2. Select **Apply**, to apply the selection.



Note: Before an online connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device can be established, a firmware must be loaded to the device and the device must be selected once more.



For further information refer to section *Firmware Download* on page 48 or to section *Selecting the Device once more (with Firmware)* on page 46.

4.4.3 Selecting the Device once more (with Firmware)



Note: For repeated download this step is omitted.

To select the PROFINET IO-Controller device (with firmware and defined system channel) once more, proceed as described hereafter:

all

1. Under **Device Selection** select *all*.
2. Select **Scan**.
 - In the table all devices are displayed, which are attainable in the network and which can be connected to a DTM via the preselected drivers.
3. Check the appropriate device.

Device Assignment

Scan progress: 5/5 Devices (Current device: -)

Device selection: all Scan

	Device	Hardware-Port 0/1/2/3	Slot number	Serial number	Driver	Channel Protocol	Access path
<input checked="" type="checkbox"/>	Device Cl.*	-/-/PROFIBUS/-	1	20148	CIFX Device Driver	PROFIBUS-DP Master	...\cifX3_Ch0
<input type="checkbox"/>	Device Cl.*	-/-/DeviceNet/-	n/a	20027	CIFX Device Driver	DeviceNet Master	...\cifX1_Ch0
<input type="checkbox"/>	Device Cl.*	-/-/-/-	n/a	20058	netX Driver	Undefined Undefined	...\192.168....
<input type="checkbox"/>	Device Cl.*	Ethernet/Ethernet/-/-	n/a	20288	CIFX Device Driver	PROFINET IO Device	...\cifX2_Ch0
<input type="checkbox"/>	Device Cl.*	-/-/CANopen/-	n/a	20022	CIFX Device Driver	Undefined Undefined	...\cifX0_SYS

Access path: {368BEC5B-0E92-4C0E-B4A9-64F62AE7AAFA}\cifX3_Ch0

Figure 14: Device Assignment - Selecting the Device (* The name of the device class is displayed.) – Example for Devices with and without Firmware / one Device is selected



Note: After the firmware download has been completed, for the devices which have been detected via the **cifX Device Driver** the following data are displayed:

- In the column **Channel Protocol**: the data for the firmware for the used channel
- In the column **Access path** or under **Access path** (below in the dialog pane): the data: ...cifX[0toN]_Ch[0to3].
 cifX[0toN] = board number 0 to N
 Ch[0to3] = channel number 0 to 3

4. Select **Apply**, to apply the selection.
5. Or select **OK**, to apply the selection and to close the DTM interface dialog.
6. Connect the DTM to the device using the context menu (right mouse click).

Or:

suitable only

1. Under **Device Selection** select *suitable only*.
2. Select **Scan**.
- In the table all devices are displayed, which can be connected to the PROFINET IO-Controller DTM via the preselected drivers.
3. Check the appropriate device.

Device Assignment

Scan progress: 5/5 Devices (Current device: -)

Device selection: suitable only Scan

	Device	Hardware Port 0/1/2/3	Slot number	Serial number	Driver	Channel Protocol	Access path
<input checked="" type="checkbox"/>	Device Cl*	-/-/PROFIBUS/-	1	20148	CIFX Device Driver	PROFIBUS-DP Master	...\cifX3_Ch0

Access path: {368BEC5B-0E92-4C0E-B4A9-64F62AE7AAFA}\cifX3_Ch0

Figure 15: Device Assignment - Selecting the Device (* The name of the device class is displayed.) – Example for a device with firmware / one Device is selected



Note: After the firmware download has been completed, for the devices which have been detected via the **cifX Device Driver** the following data are displayed:

- In the column **Channel Protocol**: the data for the firmware for the used channel
- In the column **Access path** or under **Access path** (below in the dialog pane): the data: ...\\cifX[0toN]_Ch[0to3].
cifX[0toN] = board number 0 to N
Ch[0to3] = channel number 0 to 3

4. Select **Apply**, to apply the selection.
5. Or select **OK**, to apply the selection and to close the DTM interface dialog.
6. Connect the DTM to the device using the context menu (right mouse click).



For further information how to establish an online connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device, refer to section *Connecting/Disconnecting Device* on page 93.

4.5 Firmware Download

Using the **Firmware Download** dialog a firmware can be transferred to the device.



Note: Prior to the firmware download, you must select the driver and the Controller device (with or without firmware) and the device must be assigned to the hardware.



For further information refer to section **Overview Settings** on page 30.

To load the firmware to the device:

1. In the navigation area select **Settings > Firmware Download**.

➤ The dialog **Firmware-Download** pane is displayed.

Figure 16: Firmware Download

Element	Meaning
Name	The path and name of the firmware file selected are displayed.
Version	The version and build version of the firmware file selected are displayed.
Browse...	Via 'Browse...' you can select the firmware file for the download.
Download	Via 'Download' you can download the firmware to the device.

Table 15: Parameter Firmware Download

2. Select the firmware file.

➤ Select **Browse**.

Device is not assigned to the Hardware

If the device is not assigned to the Hardware, the error message 'The device is not assigned to the hardware!' is displayed:

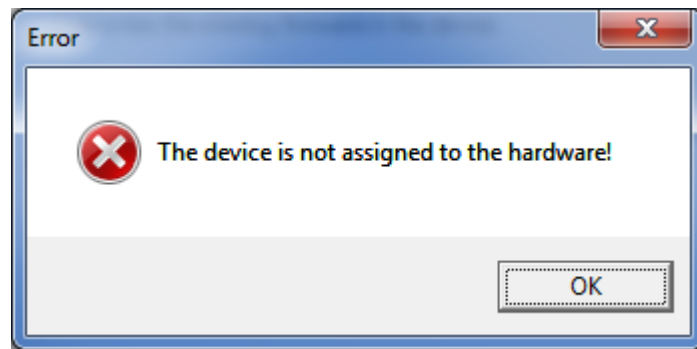


Figure 17: Error Message 'The device is not assigned to the hardware!'

- Click **OK** and select and assign the Controller device as described in section *Device Assignment*.

Device is assigned to the Hardware

- The selection window **Select Firmware File** is displayed.
- Enlarge the selection window to view the columns **Hardware** and **Version**.

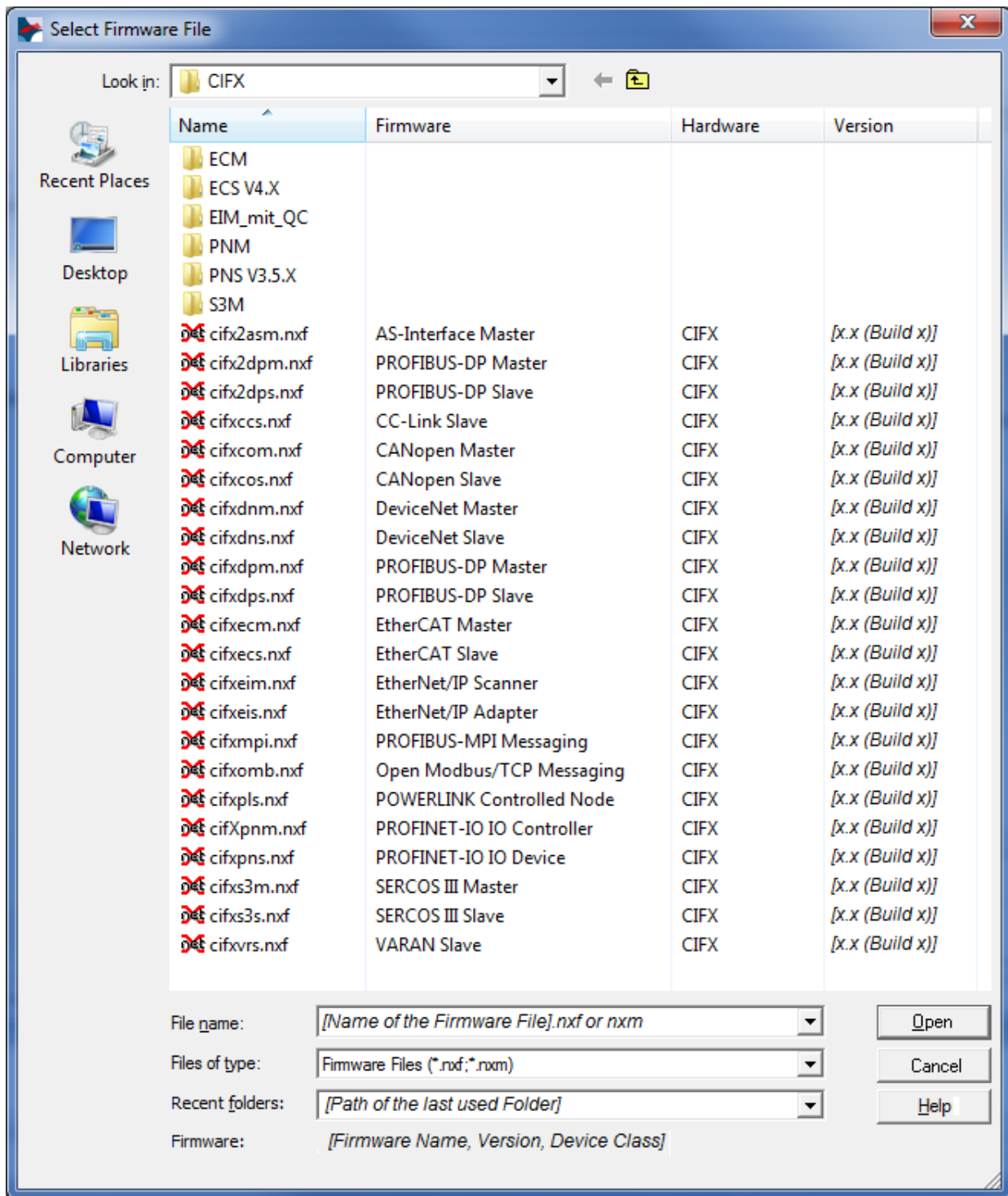


Figure 18: Window 'Select Firmware File' (Example CIFX)

Parameter	Meaning	Range of Value / Default Value
Column Name	File name of the firmware file To sort the entries of the window Select Firmware File by name click to the column head Name .	nxf, nxm
Column Firmware	Name of the firmware (consisting of the protocol name and protocol class)	
Column Hardware	Device class of the associated hardware	e. g. CIFX, COMX, COMX 51, NETJACK 10, NETJACK 50, NETJACK 51,

		NETJACK 100, NETTAP 50 (Gateway), NETTAP 100 (Gateway), NETBRICK 100 (Gateway)
Column Version	Firmware version	x.x (build x)
Tooltip	To view the tooltip information move with the mouse pointer over the selected firmware line. <div> Type: Hilscher firmware file for netX-based targets (NXF) Size: 563 KB Date of change: 2013/03/26 11:10 </div>	
Files of Type	„All Files (*.*)“ if before in the Device Assignment pane under Device selection all was selected. „Firmware Files (*.nxm)“ or <i>Firmware Files (*.nxf)</i> if before in the Device Assignment pane under Device selection <i>suitable only</i> was selected.	All Files (*.*), Firmware Files (*.nxm), Firmware Files (*.nxf)
Recent folders	Path of the recently opened folder	
Firmware	As soon as the firmware file has been selected, under Firmware the name, the version and the build version as well as the device class for the selected firmware is displayed.	Name, Version, Build Version, Device Class for the selected firmware
Help	Button, to open the online help of the DTM.	

Table 16: Parameters Select Firmware File



Further descriptions to the selection window **Select Firmware File** are included in the context sensitive help (**F1** key) of the Microsoft Corporation.



Note: After in the **Device Assignment** pane under **Device selection** *all* or *suitable only* has been set, during a subsequent firmware download in the selection window **Select Firmware File** the following data are displayed or set:

(for list box entry →)	all	suitable only
In the selection window Select Firmware File :	all files from the selected folder	only firmware files from the selected folder
Under Files of Type *:	„All Files (*.*)“	„Firmware Files (*.nxm)“, „Firmware Files (*.nxf)“
Validation:	A restricted validation will be performed if the selected firmware is applied for the download.	A validation is made whether the firmware file is suitable for the PROFINET IO-Controller DTM.

*These settings in the selection window **Select Firmware File** can also be changed manually.

3. In the selection window mark the firmware file to be loaded using the mouse.

➤ In the selection window under **Firmware** the name and the version of the firmware are displayed.

4. In the selection window select the **Open** button.

Validation

➤ A validation is made, whether the selected firmware file is suitable for the PROFINET IO-Controller device.

Invalid Firmware

NOTICE

Invalid Firmware

Loading invalid firmware files could render your device unusable.

➤ Only proceed with a firmware version valid for your device.

- ⇒ If a firmware file is selected, which is not valid for the assigned device, the request **Select Firmware File** will be displayed.
'Invalid firmware for assigned device!
[detailed explication]
Shall firmware file nevertheless be applied for the download?'



Figure 19: Request Select Firmware File - Example Invalid Firmware

- Answer to the request with **No** and select a valid firmware.
- ⇒ The selection window is closed.

Valid Firmware

➤ The selection window is directly closed (without dialog).

5. Start firmware upgrade.

⚠ WARNING

Communication Stop caused by Firmware Update, faulty System Operation possible, Overwriting of Firmware or Loss of Device Parameters

Before you initiate a firmware download process, while the bus is still in operation status:

- Stop the application program.
- Make sure that all network devices are placed in a fail-safe condition.

NOTICE

Firmware Corruption or Loss of Parameters caused by Power Disconnect during Firmware Download

- During firmware download process, do not interrupt the power supply to the PC, or to the device and do not perform a reset to the device!
- In the dialog pane **Firmware Download** click to the **Download** button, to download the firmware.
- The request **Do you really want to download the firmware?** is displayed.

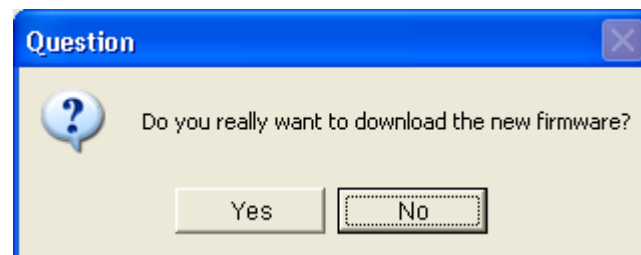


Figure 20: Request - Do you really want to download the firmware?

6. Click **Yes**.

- If you are sure, that you have selected the appropriate firmware file answer to the request with **Yes** otherwise with **No**.
- During the download a progress bar is displayed ('Download active, device performs initialization...'), in the status line a clock / green hook symbol is displayed and in the dialog pane **Firmware Download** Download is grayed out.

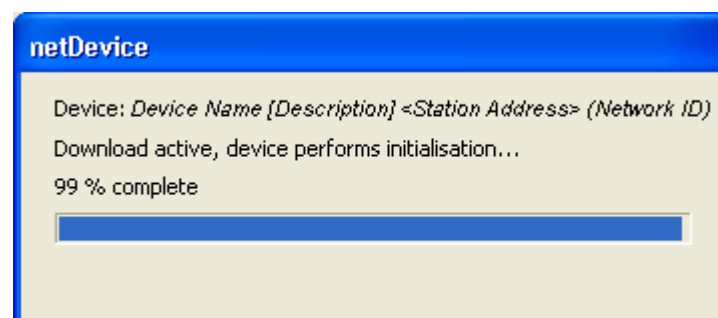


Figure 21: Firmware Download - Progress Bar

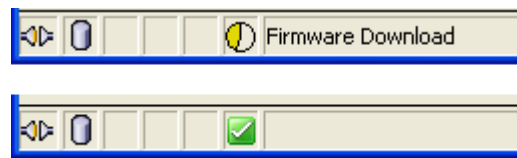


Figure 22: Clock Symbol and Hook Symbol green

- In the **Firmware-Download** dialog pane the path and name as well as the version of the selected firmware file are displayed.

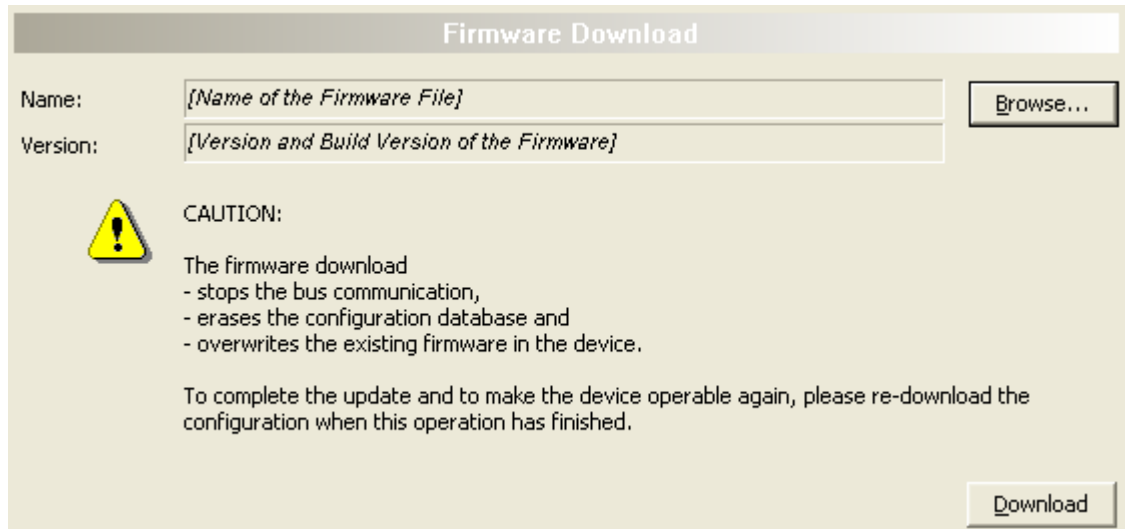


Figure 23: Firmware Download – Download

4.6 Licensing

To open the Licensing pane:

1. In the navigation area select **Settings > Licensing**.
- The dialog **Licensing** pane is displayed.

Licensing

License Type

	Existing	Order
Master protocols		
One General Master License	NO	<input type="checkbox"/>
Two General Master Licenses	NO	<input type="checkbox"/>
PROFIBUS Master	YES	<input type="checkbox"/>
CANopen Master	YES	<input type="checkbox"/>
DeviceNet Master	YES	<input type="checkbox"/>
AS-Interface Master	YES	<input type="checkbox"/>
PROFINET IO RT Controller	YES	<input type="checkbox"/>

Request Form, please fill out

Name	Value
License type	User Single Device License
Manufacturer*	00000001
Article number*	01250510
Serial number*	00020086
Chiptype*	00000002
Step*	00000000
Romcode revision*	00000002

Fields marked with "*" are mandatory.

Hilscher Germany

E-mail... license@hilscher.com

Print Fax Form... +49 6190 9907-50

Telephone... +49 6190 9907-0

Export License Request...

Download License

Figure 24: Licensing



For a detailed description refer to section *Licenses* on page 112.

4.7 Ethernet Devices

In the dialog **Ethernet Devices** the **Device Name** or the **IP address** at Ethernet-capable devices can be adjusted. The device name must match to the PROFINET IO specification [3] for the “Name of Station”.

Alternatively a **Device Name** or **IP address** can be used that was set in the configuration under **Configuration > Device Table > Name of Station** or under **Configuration > IP Address Table > IP Address** for a different device.



For more information refer to section *Device Table* on page 76, and to section *IP Address Table* on page 78.

The identification of devices is done via the *DCP protocol*, which is supported by PROFINET compatible devices.

4.7.1 Overview Ethernet Devices

- Select **Settings > Ethernet Devices**.

Ethernet Devices

Use Network Connections for Scan: **A**

Device	Port
<input checked="" type="checkbox"/> Broadcom NetXtreme Gigabit Ethernet Driver (Micro...	\Device\NPF_{DF10B663-7D6C-41A3-A5B3-CDF99...}
<input checked="" type="checkbox"/> VMware Virtual Ethernet Adapter	\Device\NPF_{70F0A330-6C60-47DB-86EA-C9DE3...}
<input checked="" type="checkbox"/> VMware Virtual Ethernet Adapter	\Device\NPF_{B181D0D4-83F4-4DFE-B245-ACD7F...}

Devices Online Find:

MAC Address	Device Type	Device Name	IP Address	Protocol	Device ID	Vendor ID	Device role

B

☐ Use Configuration of:

Set Name **C** Set IP Address Other Functions

Device name:

New device name:

☐ temporary

Figure 25: Ethernet Devices Pane
(The figure shows example devices.)

In the window **Ethernet Devices** you can.

1. Select Network Devices

Under **Use Network Connections for Scan** ^(A) the network devices at the PC are displayed. Here you must select the network devices at the PC are to be used at the scan.

2. Search and select Devices

Under **Devices Online** ^(B) the devices are displayed, which are found in the Ethernet network connected to the PC via the *DCP protocol*. The device to be configured must be selected here.

3. Configure Devices

The selected device is to be configured in the area below ^(C). Therefore the configuration for the device can be performed here or a configuration of an other device can be used.

4.7.2 Selecting Network Devices for Scan



Note: Using the *DCP protocol* to scan for devices, the network devices to be used for the scan must be selected manually.

Under **Use Network Connections for Scan** the network devices at the PC are displayed.

Use Network Connections for Scan:	
Device ⁽²⁾	Port ⁽³⁾
<input checked="" type="checkbox"/> Broadcom NetXtreme Gigabit Ethernet Driver (Microso...	{Device}\NPF_{DF10B663-7D6C-41A3-A5B3-CDF99A833D82}
<input checked="" type="checkbox"/> VMware Virtual Ethernet Adapter	{Device}\NPF_{70F0A330-6C60-47DB-86EA-C9DE362F3D5F}
<input checked="" type="checkbox"/> VMware Virtual Ethernet Adapter	{Device}\NPF_{B181D0D4-83F4-4DFE-B245-ACD7F20DE72A}

Figure 26: Ethernet Devices Pane - Selection of the Ethernet Connection
(The figure shows example devices.)

Here you must select the network devices to be used at the scan via the *DCP protocol*.

- Under **Device** ⁽¹⁾ check the network devices to be used with the *DCP protocol* at the scan.
- Under **Device** ⁽²⁾ the *name* and under **Port** ⁽³⁾ the *port number* of the network devices of your PC are displayed.

4.7.3 Searching and selecting Devices

- To search for devices, click **Devices Online > Search Devices** (refer to position 12 in the following figure).
- The Ethernet network connected to the PC is searched for devices reacting to the *DCP protocol*. If devices are found, they are listed in the following manner:

Devices Online

Find:

next

previous

MAC Address	Device Type	Device Name	IP Address	Protocol	Device ID	Vendor ID	Device role
00-02-A2-20-91...	NXIO 50	nxio50repn...	0.0.0.0	DCP	0x010C	0x011E	Device
00-02-A2-20-91...	NXIO 50	nxio50repn...	0.0.0.0	DCP	0x010C	0x011E	Device
00-02-A2-20-91...	NXIO 50	nxio50repn...	0.0.0.0	DCP	0x010C	0x011E	Device
00-02-A2-20-71...	cifx /pnm	controller	192.168.0.1	DCP	0x0203	0x011E	Controller
4	5	6	7	8	9	10	11

12

Search Devices

Figure 27: Ethernet Devices Pane - Searching and selecting Devices
(The figure shows example devices.)

In the table in the figure above you can find the following information:

Item	Position in Figure	Meaning	Value / Range of Value
MAC Address	4	The MAC Address (=MAC-ID) is on delivery the unique (physical) Ethernet address of the device fixed by the manufacturer of the device.	
Device type	5	Name for the device that is stored non-volatile on the device.	
Device name	6	Device name that can be set in the Ethernet Device dialog. The device name must match to the PROFINET IO specification [3] for the "Name of Station".	Character string, 1 ... 240 characters
IP-Address	7	IP-Address of the device that can be set in the Ethernet Device dialog. The IP address must be unique and must fit to the used network. The IP address 0.0.0.0 indicates that no IP address has been adjusted yet.	valid IP-Address
Protocol	8	Protocol by which the device has been found.	DCP
Device ID	9	Identification number of the device, is fixed by the manufacturer for every device.	0x00000000 ... 0xFFFFFFFF (hex)
Vendor ID	10	Identification number of the vendor, assigned by PROFIBUS Nutzerorganisation e. V.	0x00000000 ... 0xFFFFFFFF (hex)
Device Role	11	Textual description on the function the device has on the network.	"Device", "Controller", "Multidevice", "Supervisor"

Table 17: Parameters of found Devices

4.7.3.1 Search Device within Table

How to proceed:

- Put in the string to be searched at **Find** ①.

If the table is large, you can search within the table for any sequence of characters appearing within one single column.

The screenshot shows a web interface titled 'Devices Online'. At the top, there is a 'Find:' input field (labeled ①) and two buttons: 'next' (labeled ②) and 'previous' (labeled ③). Below this is a table with the following data:

MAC Address	Device Type	Device Name	IP Address	Protocol	Device ID	Vendor ID	Device role
00-02-A2-20-91...	NXIO 50	nxio50reprn...	0.0.0.0	DCP	0x010C	0x011E	Device
00-02-A2-20-91...	NXIO 50	nxio50reprn...	0.0.0.0	DCP	0x010C	0x011E	Device
00-02-A2-20-91...	NXIO 50	nxio50reprn...	0.0.0.0	DCP	0x010C	0x011E	Device
00-02-A2-20-71...	cifx /pnm	controller	192.168.0.1	DCP	0x0203	0x011E	Controller

At the bottom right of the interface is a button labeled 'Search Devices'.

Figure 28: Ethernet Devices Pane - Search Device within Table
(The figure shows example devices.)

- Using **next** ② you can find the next entry in the table matching the search string (Direction of search: downwards).
- Using **previous** ③ you can find the next entry in the table matching the search criteria (Direction of search: upwards).

Sorting the Table

By a mouse click at a field at the head line of the table, you can force sorting the lines in alphanumerically ascending or descending order according to the entries of the selected column.

4.7.3.2 Selecting Device

- To select a device to be configured click the corresponding line in the table **Devices Online**.

Devices Online Find:

MAC Address	Device Type	Device Name	IP Address	Protocol	Device ID	Vendor ID	Device role
00-02-A2-20-91...	NXIO 50	nxio50repn...	0.0.0.0	DCP	0x010C	0x011E	Device
00-02-A2-20-91...	NXIO 50	nxio50repn...	0.0.0.0	DCP	0x010C	0x011E	Device
00-02-A2-20-91...	NXIO 50	nxio50repn...	0.0.0.0	DCP	0x010C	0x011E	Device
00-02-A2-20-71...	cifx /pnm	controller	192.168.0.1	DCP	0x0203	0x011E	Controller

Figure 29: Ethernet Devices Pane - Selecting Device
(The figure shows example devices.)

4.7.4 Configuring Device

Using the *DCP protocol* you can newly assign the **Device Name** or the **IP Address** of a device or you can change an already configured device name or IP address. For configuring a device there are the two possibilities:

- The configuration for the device can be created newly.
- Alternatively a configuration already existing can be used, which has been created / set at another place in the configuration software for another device.

4.7.4.1 Overview on Configuration

For configuring Ethernet capable devices when using the DCP protocol in the **Ethernet Devices** dialog there are the following options:

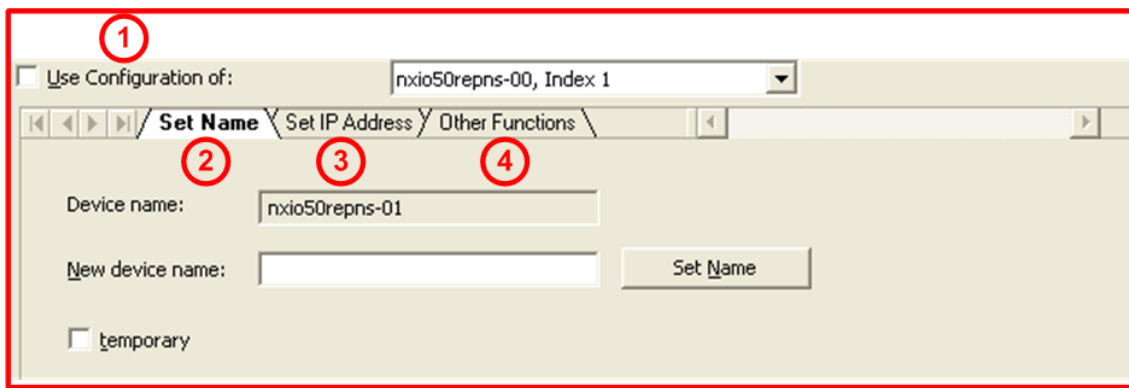


Figure 30: Ethernet Devices Pane - Overview on Configuration
(The figure shows example devices.)

- Under **Use Configuration of** ① it is possible to define whether the configuration for a device shall be created newly or whether a configuration shall be used, that has been created /set at another place of the configuration software for another device
- Under **Set Name** ② the device name read out from the device can be displayed and respectively be changed or set newly. The device name must match to the PROFINET IO specification [3] for the “Name of Station”.
- Under **Set IP Address** ③ the IP Address can be set or changed.
- Under **Other Funktionen** ④ for Ethernet capable devices there are the configuration possibilities **Signal** and **Reset to factory defaults**.



Note: For PROFINET IO-Controller devices a change of the device name or the IP address can be rejected. Then an error message is displayed.

4.7.4.2 Creating new Configuration or using from Device



Important: As a configuration that was made in the configuration software elsewhere for a PROFINET IO device (Controller or Device) can be applied to another device, the already configured PROFINET IO device must be configured in the FDT container (here netDevice) as a PROFINET IO DTM.

Under **Use Configuration of** can be defined whether

- the configuration for a device must be created newly,
- or for configuring a device a configuration is to be used, which was set in the configuration software elsewhere for another device. The existing configuration can be used for the selected device and must be sent to this device.

How to proceed:

1.

If the configuration shall be created newly:

- Uncheck **Use Configuration of** ①.
- Or check **Use Configuration of** ①, when an already created configuration will be used.
- Select the device ② whose configuration will be used for the device to be configured newly.

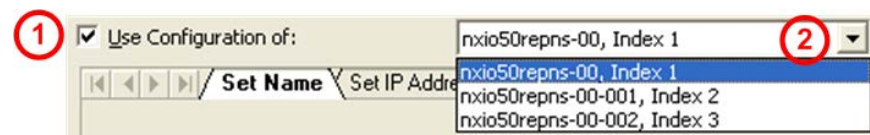


Figure 31: Ethernet Devices Pane - Use Configuration of
(The figure shows example devices.)

2. Configure the device name and the IP address as described hereafter.
 3. Click **Devices Online > Search Devices** once more.
- Only then the used values are displayed as current values.

4.7.4.3 Creating new Configuration / Setting new Device Name



Note: The device name must comply with the PROFINET IO specification [3]. Forbidden signs (e. g. blanks) must not be used in the name.

How to proceed:

1. Uncheck **Use Configuration of** ①.
2. Click the **Set Name** ③ tab.

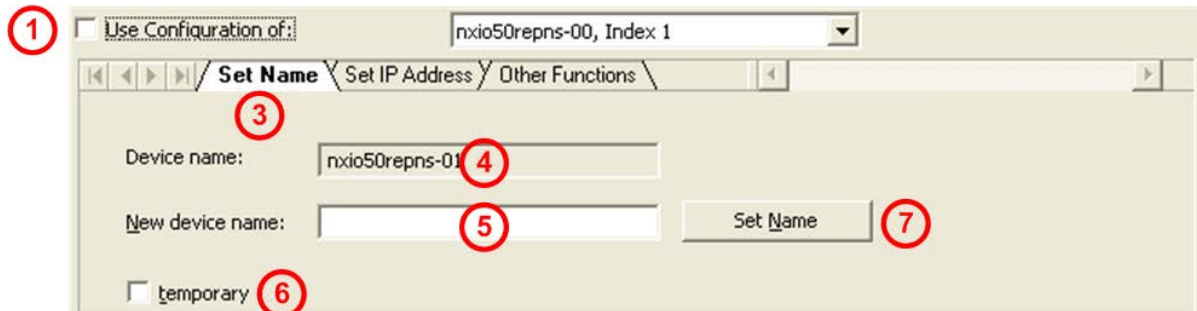


Figure 32: Ethernet Devices Pane - Setting new Device Name
(The figure shows example devices.)

3. For the PROFINET IO device (Controller or Device):
 - The current device name is displayed under **Device Name** ④.
 - To **New device name** ⑤ type a new device name according to the PROFINET IO specification [3].
4. To set the device name "temporary" or "permanent":
 - Check **temporary** ⑥, if the device name is to be saved only temporarily (as far as the used device supports this functionality).
 - Or uncheck **temporary** ⑥, if the device name should be set permanently (if the device supports this choice).
5. Set Device Name:
 - Click **Set Name** ⑦.
 - The new device name will be transferred to the used device.
6. Click **Devices Online > Search Devices** once more.
 - The newly set device name is displayed under **Device Name** ④ as the current device name.



Note: For PROFINET IO-Controller devices a change of the device name can be rejected. Then an error message is displayed.

4.7.4.4 Device Name according to PROFINET „Name of Station“ Specification

The device name must comply with the coding rules following excerpt from the PROFINET IO specification [3] for the „Name of Station“.

A Name of Station:

- has a **length** of 1 ... 240 *characters*.
- may consist of one or more **labels**, which are 1 ... 63 *characters* long and which are separated by dots.
- must contain only **valid characters**:
 - a – z** *lower case letters*,
 - 0 – 9** *digits*,
 - *Minus sign*,
 - .** *Point*.

The *point* is the separator between labels.

The *minus sign* must not be used as the start or end character.

The *minus sign* must not be used before or after a dot.

The *Name of Station* must not begin or end with a point.

Invalid characters are, for example, capital letters and spaces.

Source [3] (see section *References* on page 196): *PNO document 2722*, section 4.3.1.4.15.1, on page 10073f.

4.7.4.5 Use Configuration / Use Device Name

How to proceed:

1. Check **Use Configuration of** ①.
2. Select the device ② whose configuration will be used for the device to be configured newly.
3. Click the **Set Name** ③ tab.

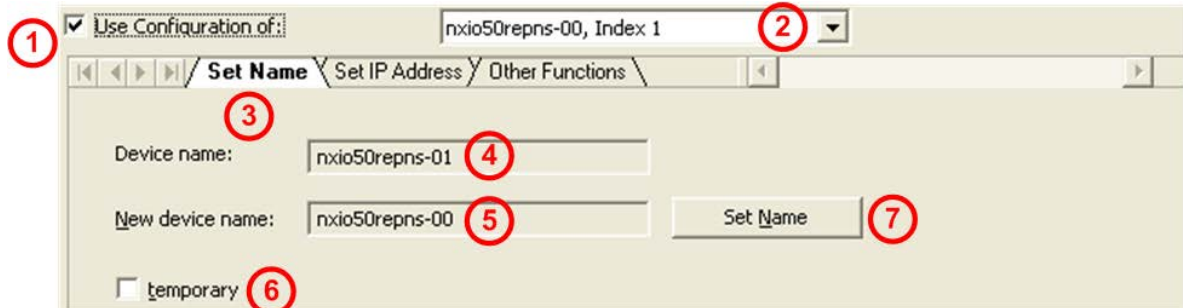


Figure 33: Ethernet Devices Pane - Use Name of Station
(The figure shows example devices.)

4. For the PROFINET IO device (Controller or Device):
 - The current device name is displayed under **Device Name** ④.
 - Under **New device name** ⑤ the device name is displayed that was already entered in the configuration software as the „Name of Station“. This one must not be entered again, but can be sent as a new device name to the used device.
5. To set the Device Name "temporary" or "permanent":
 - Check **temporary** ⑥, if the device name is to be saved only temporarily (as far as the used device supports this functionality).
 - Or uncheck **temporary** ⑥, if the device name should be set permanently (if the device supports this choice).
6. Set Device Name:
 - Click **Set Name** ⑦.
 - The device name to be used will be transferred to the used device and is displayed under **Device name** ④ as the current device name.
7. Click **Devices Online > Search Devices** once more.
 - The used device name is displayed under **Device Name** ④ as the current device name.



Note: For PROFINET IO-Controller devices a change of the device name can be rejected. Then an error message is displayed.

4.7.4.6 Creating new Configuration / Setting new IP Address

The IP address is statically during the configuration. Later on, the PROFINET IO-Controller will assign an IP address via the „Name of Station“. If the used device supports the IP address assignment via a DHCP server (*for future application*), you can choose between static IP address assignment and taking over the IP address from a DHCP server.

How to proceed:

1. Uncheck Use Configuration of ①.
2. Click the **Set IP Address** ③ tab.

The screenshot shows the 'Ethernet Devices Pane' with the 'Set IP Address' tab selected. The 'Use Configuration of' checkbox is unchecked (1). The 'Set IP Address' tab is highlighted (3). The 'Use static IP Address' radio button is selected (4). The 'Current IP Address' field is highlighted (8). The 'Current Subnet mask' field is highlighted (9). The 'Current Gateway' field is highlighted (10). The 'IP Address' field is highlighted (5). The 'Subnet mask' field is highlighted (6). The 'Gateway' field is highlighted (7). The 'Get IP Address via DHCP' radio button is highlighted (11). The 'Authentication method' dropdown is highlighted (12). The 'Client ID' field is highlighted (13). The 'Set Address' button is highlighted (15). The 'Store settings temporary' checkbox is highlighted (14).

Figure 34: Ethernet Devices Pane - Setting new IP Address
(The figure shows example devices.)

3. Select **Use static IP Address** ④ (default setting).
Or select **Get IP Address via DHCP** ⑪ (*for future application*).

- If under point 3. **Use static IP Address** was selected, continue as follows:

4. For the PROFINET IO device (Controller or Device):

- Under **IP Address** ⑤ enter the IP address.
- Under **Subnet Mask** ⑥ enter the subnet mask.
- Under **Gateway** ⑦ enter the gateway address.

The screenshot shows the 'Ethernet Devices Pane' with the 'Set IP Address' tab selected. The 'Use static IP Address' radio button is selected. The 'Current IP Address' field is highlighted (8). The 'Current Subnet mask' field is highlighted (9). The 'Current Gateway' field is highlighted (10). The 'IP Address' field is highlighted (5) and contains '192 . 168 . 0 . 2'. The 'Subnet mask' field is highlighted (6) and contains '255 . 255 . 255 . 0'. The 'Gateway' field is highlighted (7) and contains '0 . 0 . 0 . 0'.

Figure 35: Ethernet Devices Pane – Enter new IP Address, Subnet Mask and Gateway Address

- If under *point 3.* **Get IP Address via DHCP** (for future application) was selected, continue as follows:

➤ The area to specify the static IP address is grayed out.

4.

- Under **Authentication method** ¹² select how to identify the device, via *MAC Address*, *Device Name* or by *Client ID*.
- For the authentication method *Client ID*: set the Client ID under **Client ID** ¹³.

- For both possibilities of *point 3.*, continue as follows:

5. To set the IP address, the subnet mask and the gateway address "temporary" or "permanent":

- Check **Store settings temporary** ¹⁴.



Note: If the IP address, subnet mask and gateway address are set "only temporarily", after a device reset the settings are no longer stored in the device.

- Or uncheck **Store settings temporary** ¹⁴, to set the IP address, the subnet mask and the gateway address permanently (if the device supports this choice).



Note: The PROFINET IO-Controller can assign a new IP address to the PROFINET IO-Device during the start of the PROFINET network.

6. Set the Address:

- Click **Set Address** ¹⁵.



Figure 36: Ethernet Devices Pane – Set Address

➤ The new IP address, subnet mask and gateway address will be transferred to the used device. The transfer may take up to 40 seconds depending by the device.

7. Click **Devices Online > Search Devices** once more.

- Under **Current IP Address** ⁸, **Current Subnet Mask** ⁹ or **Current Gateway** ¹⁰ the new current IP Address, Subnet Mask and Gateway Address are displayed.

Figure 37: Ethernet Devices Pane – The new current IP Address, Subnet Mask and Gateway Address are shown.



Note: For PROFINET IO-Controller devices a change of the IP address can be rejected. Then an error message is displayed.

4.7.4.7 Use Configuration / Use IP Address

The IP address is statically during the configuration. Later on, the PROFINET IO-Controller will assign an IP address via the „Name of Station“. If the used device supports the IP address assignment via a DHCP server (*for future application*), you can choose between static IP address assignment and taking over the IP address from a DHCP server.

How to proceed:

1. Check **Use Configuration of** ①.
2. Select the device ② whose configuration will be used for the device to be configured newly.
3. Click the **Set IP Address** ③ tab.

Figure 38: Ethernet Devices Pane - Use IP Address
(The figure shows example devices.)

3. Select **Use static IP Address** ④ (*default setting*).
Or select **Get IP Address via DHCP** ⑪ (*for future application*).
- If under *point 3.* **Use static IP Address** was selected, continue as follows:
4. For the PROFINET IO device (Controller or Device):
 ➤ Under **IP Address** ⑤, **Subnet Mask** ⑥ or **Gateway** ⑦ the IP address, subnet mask and gateway address to be used are displayed, which were already entered in the configuration software. These need not to be entered again, but can be sent as a new IP address, subnet mask and gateway address to the used device.

- If under *point 3.* **Get IP Address via DHCP** (for future application) was selected, continue as follows:

➤ The area to specify the static IP address is grayed out.

4.

- Under **Authentication method** ¹² select how to identify the device, via *MAC Address*, *Device Name* or by *Client ID*.
- For the authentication method *Client ID*: set the Client ID under **Client ID** ¹³.

- For both possibilities of *point 3.*, continue as follows:

5. To set the IP address, the subnet mask and the gateway address "temporary" or "permanent":

- Check **Store settings temporary** ¹⁴.



Note: If the IP address, subnet mask and gateway address are set "only temporarily", after a device reset the settings are no longer stored in the device.

- Or uncheck **Store settings temporary** ¹⁴, to set the IP address, the subnet mask and the gateway address permanently (if the device supports this choice).



Note: The PROFINET IO-Controller can assign a new IP address to the PROFINET IO-Device during the start of the PROFINET network.

6. Set the Address:

- Click **Set Address** ¹⁵.



Figure 39: Ethernet Devices Pane – Set Address

➤ The IP address, subnet mask and gateway address to be used will be transferred to the used device. The transfer may take up to 40 seconds depending by the device.

7. Click **Devices Online** > **Search Devices** once more.

- Under **Current IP Address** ⁸, **Current Subnet Mask** ⁹ or **Current Gateway** ¹⁰ the new current values are displayed.

Figure 40: Ethernet Devices Pane – The new current IP Address, Subnet Mask and Gateway Address are shown.



Note: For PROFINET IO-Controller devices a change of the IP address can be rejected. Then an error message is displayed.

4.7.4.8 Signal, Factory Defaults

The tab **Other Functions** provides the functions **Signal** and **Reset to factory defaults**.

How to proceed:

1. Do not check **Use configuration of** ①.
2. Click **Other Functions** ②.

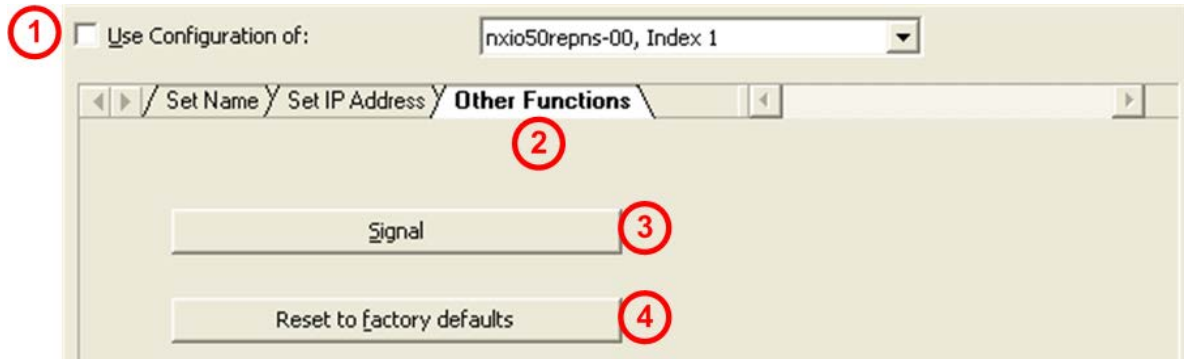


Figure 41: Ethernet Devices Pane - Signal, Factory Defaults
(The figure shows example devices.)

3. For the PROFINET IO device (Controller or Device):
 - Click **Signal** ③.
 - The LED on the selected device blinks. This allows to clearly identifying the device among others.
 - Click **Reset to factory defaults** ④.
 - Adjustments made at the device are reset to the factory defaults.

5 Configuration

5.1 Overview Configuration

Configuration Dialog Panes

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

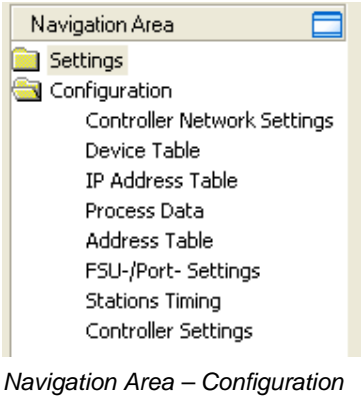
PROFINET IO-Controller DTM	Folder Name / Section	Page
 <p>Navigation Area</p> <ul style="list-style-type: none"> Settings Configuration <ul style="list-style-type: none"> Controller Network Settings Device Table IP Address Table Process Data Address Table FSU-/Port- Settings Stations Timing Controller Settings <p>Navigation Area – Configuration</p>	Controller Network Settings	75
	Device Table	76
	IP Address Table	78
	Process Data	80
	Address Table	81
	FSU/Port-Settings	85
	Stations Timing	87
	Controller Settings	88

Table 18: Descriptions of the Dialog Panes Configuration



Notice the descriptions in the section *Configuration Steps* on page 24.

5.2 Configuring Device Parameters

The following steps are required to configure the parameters of the PROFINET IO-Controller device using the PROFINET IO-Controller DTM:

Controller Network Settings

1. Set the name of station and the IP settings for the PROFINET IO-Controller.
 - Select **Configuration > Controller Network Settings**.
 - Set the name of station for the Controller.
 - Make the IP settings for the Controller.

Device Table

2. Select the PROFINET IO-Device devices required for communication:
 - Select **Configuration > Device Table** in the navigation area.
 - Select the required device/s.
 - In the column **Activate** check the corresponding checkbox.
3. Set the **Name of station** of the PROFINET IO-Device station.



Note: 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. It must be a DNS compatible name.

- In the column **Name of station** set the network name of the PROFINET IO-Device station.

IP Address Table

4. Make the **IP settings** of the PROFINET IO-Device station.

Set the **IP Address** of the PROFINET IO-Device Station:

- Select **Configuration > IP Address Table** in the navigation area.
- In the column **IP Address** set the IP address of the PROFINET IO-Device station.

Set the **Network Mask** and the **Gateway Address** of the PROFINET IO-Device station:



Note: The fields **Network Mask** and **Gateway Address** are only editable, if the checkbox **Inherit** is unchecked.

- Uncheck the checkbox **Inherit**.
- In the column **Network Mask** set the network mask of the PROFINET IO-Device station.
- In the column **Gateway Address** set the gateway address of the PROFINET IO-Device station.

Or

- Check the checkbox **Inherit**.

- The **Network Mask** and the **Gateway Address** of the PROFINET IO-Controller Station are taken also for the PROFINET IO-Device associated.

Process Data

5. Set the process data:
- Select **Configuration > Process Data** in the navigation area.
 - Set symbolic names for the configured modules or signals.

Address Table

6. Set the device address:
- Select **Configuration > Address Table** in the navigation area.
 - Activate or deactivate **Auto Addressing**.
 - For manual addressing: Enter the addresses.

FSU/Port-Settings

7. Choose the **FSU-Port settings**.
- Select **Configuration > FSU/Port-Settings** in the navigation area.
 - Check **FSU** for those PROFINET IO-Devices, which must use a fast start up (FSU) connection to establish the cyclic data exchange.

Stations Timing

8. Set the **Module Settings** of the PROFINET IO-Device station:
- Select **Configuration > Stations Timing** in the navigation area.

Under **Name of Station**:

- Select the appropriate station associated with the PROFINET IO-Controller.
- Double-click on the **Name of Station** list to edit it and select the station.

Controller Settings

9. Set the **Controller Settings**:
- Select **Configuration > Controller Settings** in the navigation area.
 - Under **Start of Bus Communication**: Select **Automatically by device** or **Controlled by application** option.
 - Under **Application Monitoring**: Set **Watchdog time**.
 - Under **Module Alignment**: Set **Byte boundaries** or **2 Byte boundaries** option.
 - Under **Port Settings**: Under **Port 1** or **Port 2** each set the port setting required.
 - Under **IO State Information**: Configure the IOPS interface. Therefore select under **Input Provider** or **Output Provider** the mode 'Disabled', 'Bit' or 'Byte'.

Close Master DTM Configuration Dialog

10. Click **OK** in order to close the Controller DTM configuration dialog and to store your configuration.

Configuration Download to the PROFINET IO Controller Device

- Adhere to the necessary safety precautions to prevent personnel injury and property damage.



Note: In order to transfer the configuration to the PROFINET IO Controller device, download the data of the configuration parameters in the PROFINET IO Controller device. See section *Download Configuration* on page 109.

Further Information



For more information refer to the sections *Controller Network Settings* on page 75, *Device Table* on page 76, *IP Address Table* on page 78, *Process Data* on page 80, *Address Table* on page 81, *FSU/Port-Settings* on page 85, *Stations Timing* on page 87 and *Controller Settings* on page 88.

5.3 Controller Network Settings

The **Controller Network Settings** dialog page shows the current **Name of Station** and the IP settings of the PROFINET IO-Controller, which can be changed here.

To edit the current controller network settings:

- Select **Configuration > Controller Network Settings** in the navigation area.
- Set the name of station and the IP settings for the PROFINET IO-Controller.

Figure 42: Configuration > Controller Network Settings (*The name of the PROFINET IO-Controller device is displayed.)

Parameter	Meaning	Range of Value / Value
Name of Station (editable)	Network name of the PROFINET IO-Controller station. The name of station can be edited here. It must be DNS compatible. For further information refer to section <i>Device Name according to PROFINET „Name of Station“ Specification</i> on page 64. For invalid inputs a red exclamation mark and an error message will appear. The name of station of the PROFINET IO-Controller station can be edited in the 'Device properties' of the 'Topology Editor' too. For information on the approved marks, see section <i>Name encoding</i> on page 196.	1 - 240 characters
Description (editable)	Symbolic Name of the PROFINET IO-Controller DTM.	
IP Settings of the PROFINET IO-Controller Station (editable)		
IP Address	IP address of the PROFINET IO-Controller station.	valid IP Address
Network Mask	Network mask of the PROFINET IO-Controller station.	valid Network Mask
Gateway Address	Gateway address of the PROFINET IO-Controller station.	valid Gateway Address

Table 19: Controller Network Settings Pane Parameters

5.4 Device Table

The **Device Table** dialog pane shows the list of all PROFINET IO-Devices configured in the PROFINET IO-Controller configuration.

Follow the steps described hereafter:

1. Activate the required device/s:
 - Select **Configuration > Device Table** in the navigation area.
 - Select the required device/s.
 - In the column **Activate** check the corresponding checkbox.
2. Set the **Name of station** of the PROFINET IO-Device station.



Note: 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. It must be a DNS compatible name.

- In the column **Name of station** set the network name of the PROFINET IO-Device station.

Device Table						
Activate	Index ▲	Name of station	Device	Description	Vendor	
<input checked="" type="checkbox"/>	1	Device*-00	Device*	Device*	{Vendor Name}	
<input checked="" type="checkbox"/>	2	Device*-00-001	Device*	Device*	{Vendor Name}	
<input checked="" type="checkbox"/>	3	Device*-00-002	Device*	Device*	{Vendor Name}	

Figure 43: Configuration > Device Table (*The name of the PROFINET IO-Device is displayed.)

Parameter	Meaning	Range of Value / Value
Activate	<p>Checkbox, to activate / deactivate a station.</p> <p>If the Activate checkbox is checked, process memory in the controller is reserved for this device and the controller makes a data exchange on the bus to this device.</p> <p>If the Activate checkbox is deactivated, the controller reserves memory in the process data image for this device, but no data exchange to this device is made on the bus.</p>	Checked, unchecked Default: checked
Index (editable)	About the index it is possible to set an user-defined sequence for the devices configured in the PROFINET IO-Controller.	1 ... n

Parameter	Meaning	Range of Value / Value
Name of Station (editable)	<p>Network name of the PROFINET IO-Device station.</p> <p>The name of station is set here. In the PROFINET IO-Device-DTM device it is only displayed or otherwise it must be set directly in the configuration tool of the PROFINET IO-Device.</p> <p>The name of station set here must match with the name of station set in the PROFINET IO-Device. The PROFINET IO-Controller uses the name of station to identify the PROFINET IO-Device via the PROFINET network and to build up communication.</p> <p>The name of station must be explicit in the PROFINET network. It must be a DNS compatible name. For further information refer to section <i>Device Name according to PROFINET „Name of Station“ Specification</i> on page 64. For invalid inputs a red exclamation mark and an error message will appear.</p> <p>The name of station of the PROFINET IO-Device station can be edited in the 'Device properties' of the 'Topology Editor' too.</p>	<p>Unique network name of the device according to the PROFINET specification (PNO document 2722).</p> <p>1 - 240 characters</p>
Device	The name of the physical device. Name for the device that is stored non-volatile on the device.	
Description	The symbolic name of the device.	
Vendor	Name of the vendor of the device.	

Table 20: Device Table Pane Parameters

5.5 IP Address Table

The name of station and the IP settings of the PROFINET IO-Devices associated with the PROFINET IO Controller are displayed in the **IP Address Table**.

The IP settings of the PROFINET IO-Devices can be edited or set here.


IP Address Table				
Name of station	IP address 	Inherit	Network mask	Gateway address
► Device -00	192.168.0.2	<input checked="" type="checkbox"/>	255.255.255.0	0.0.0.0
Device -00-001	192.168.0.3	<input checked="" type="checkbox"/>	255.255.255.0	0.0.0.0
Device -00-002	192.168.0.4	<input checked="" type="checkbox"/>	255.255.255.0	0.0.0.0

Figure 44: Configuration > IP Address Table (*The name of the PROFINET IO-Device is displayed.)

Parameter	Meaning	Range of Value / Value
Name of Station	Network name of the PROFINET IO-Device station. The name of station is set in the Device Table in the PROFINET IO Controller DTM. Here it is only displayed (refer to section <i>Device Table</i> on page 76) or otherwise it must be set directly in the configuration tool of the PROFINET IO-Device.	1 - 240 characters
IP Settings of the PROFINET IO Device Station		
IP Address (editable)	IP address of the PROFINET IO-Device station. The IP address of the PROFINET IO-Device station is set here in the IP Address Table . In the PROFINET IO-Device DTM 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.	valid IP Address
Inherit	Shows, if the Network Mask and the Gateway Address are taken from the Controller.	Checked, unchecked Default: checked
Network Mask (editable)	Network mask of the PROFINET IO-Device station The Network mask of the PROFINET IO-Device station is set here in the IP Address Table . In the PROFINET IO-Device DTM 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.	valid Network Mask
Gateway Address (editable)	Gateway address of the PROFINET IO-Device station The Gateway address of the PROFINET IO-Device station is set here in the IP Address Table . In the PROFINET IO-Device DTM 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

Table 21: IP Address Table Pane Parameters

5.5.1 Set the IP Settings of the PROFINET IO-Device Station

To set the IP settings of the PROFINET IO-Device station follow the steps described hereafter:

1. Set the **IP Address** of the PROFINET IO-Device Station.
 - Select **Configuration > IP Address Table** in the navigation area.
 - In the column **IP Address** set the IP address of the PROFINET IO-Device station.
2. Set the **Network Mask** and the **Gateway Address** of the PROFINET IO-Device Station.



Note: The fields **Network Mask** and **Gateway Address** are only editable, if the checkbox **Inherit** is unchecked.

- Uncheck the checkbox **Inherit**.
- In the column **Network Mask** set the network mask of the PROFINET IO-Device station.
- In the column **Gateway Address** set the gateway address of the PROFINET IO-Device station.

Or

- Check the checkbox **Inherit**.
- The **Network Mask** and the **Gateway Address** of the PROFINET IO-Controller Station are taken also for the the PROFINET IO-Devices associated.

5.6 Process Data

For the PROFINET IO-Controller DTM the **Process Data** pane serves as an external process data interface, e. g. for data transfer to a PLC unit. The process data pane lists the Device devices connected to the Controller, as well as the configured modules or input or output signals of the devices. This makes the fieldbus structure visible.

For the configured modules or signals names can be set (Column *Tag*).

In addition signal data available to the OPC server can be checked (Column *SCADA*).


















Process Data				
	Type	Tag	SCADA	
	Device	Device	<input checked="" type="checkbox"/>	
	1 Byte Input <Slot 1>	1 Byte Input <Slot 1>	<input checked="" type="checkbox"/>	
	1 Byte Input <Subslot 1>	1 Byte Input <Subslot 1>	<input checked="" type="checkbox"/>	
	(1 bytes) OctetString input	Inputs	<input checked="" type="checkbox"/>	
	1 Byte Input <Slot 2>	1 Byte Input <Slot 2>	<input checked="" type="checkbox"/>	
	1 Byte Input <Subslot 1>	1 Byte Input <Subslot 1>	<input checked="" type="checkbox"/>	
	(1 bytes) OctetString input	Inputs	<input checked="" type="checkbox"/>	
	1 Byte Input <Slot 3>	1 Byte Input <Slot 3>	<input type="checkbox"/>	
	1 Byte Input <Subslot 1>	1 Byte Input <Subslot 1>	<input type="checkbox"/>	
	(1 bytes) OctetString input	Inputs	<input type="checkbox"/>	
	Device	Device	<input checked="" type="checkbox"/>	
	1 Byte Input <Slot 1>	1 Byte Input <Slot 1>	<input checked="" type="checkbox"/>	
	1 Byte Input <Subslot 1>	1 Byte Input <Subslot 1>	<input checked="" type="checkbox"/>	
	(1 bytes) OctetString input	Inputs	<input checked="" type="checkbox"/>	
	1 Byte Input <Slot 2>	1 Byte Input <Slot 2>	<input type="checkbox"/>	
	1 Byte Input <Subslot 1>	1 Byte Input <Subslot 1>	<input type="checkbox"/>	
	(1 bytes) OctetString input	Inputs	<input type="checkbox"/>	

Figure 45: Process Data (*The name of the Device device is displayed.)








Column	Symbol	Meaning
Type	 device	Device labeling* provided by the hardware followed by the device's name of station in pointy brackets
	 module, submodule	Description of the modules or input or output signals configured to the device (not editable)
	 I/O signal	
Tag	 device	Symbolic name* of the device
	 module, submodule	Symbolic name for the modules or for the input or output signals configured to the device (editable)
	 I/O signal	
	 warning	Duplicate Tag at the same level can cause errors by use of OPC!
SCADA	Option which module or signal data shall be provided for the OPC server. „SCADA“ (= Supervisory Control and Data Acquisition), here used with the meaning „to provide for visualizing purposes“.	
*Depending on the protocol, either the device name or the symbolic name can be edited via the device symbol context menu.		

Table 22: Process Data

5.7 Address Table

The **Address Table** dialog pane shows a list of all addresses used in the process data image. The displayed addresses refer to the used PROFINET IO-Controller.

The **Address Table** displays which input module respectively output module (respectively sub module) is assigned to which address in the process data image. The start address of the input module respectively output module (respectively sub module) is displayed each time.

To display the address data:

- Select **Configuration > Address Table** in the navigation area.

Address Table

☒ Auto addressing Display mode: Hexadecimal CSV Export

Inputs:

Name of station	Module	Submodule	Type	Length	Address
Device*	4 Bit Input	0x00000002	IB	0x0001	0x0000
Device*	4 Bit Input	0x00000002	IB	0x0001	0x0001
Device*	4 Bit Input	0x00000002	IB	0x0001	0x0002

Outputs:

Name of station	Module	Submodule	Type	Length	Address
Device*	4 Bit Output	0x00000101	QB	0x0001	0x0000
Device*	4 Bit Output	0x00000101	QB	0x0001	0x0001
Device*	4 Bit Output	0x00000101	QB	0x0001	0x0002

Figure 46: Configuration > Address Table (*The name of the PROFINET IO-Controller device is displayed.)

5.7.1 Auto Addressing, Display Mode, CSV Export

Auto Addressing

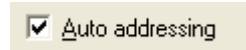


Figure 47: Configuration > Address Table - Auto Addressing

The **Auto Addressing** is used by default. For manual addressing the check-box must be unchecked and the user has to enter the addresses for input and output data.

Display Mode

- Use the **Display Mode** drop-down list to select data display mode decimal or hexadecimal.



Figure 48: Configuration > Address Table - Display Mode

CSV Export

The **CSV Export** option allows to export input- and output addresses as CSV file (CSV = comma separated value). Therefore:

- Click to the **CSV Export** button.
- A file saving dialog opens.
- Save the data as *.CSV file.

You can open the generated data by means of a spreadsheet application.

5.7.2 Inputs / Outputs

If manual addressing is allowed, you assign the input or output addresses of the modules manually:

- Click on an address of a module.
- Edit the field and type in a new address.

Figure 49: Configuration > Address Table – Input / Output (*The name of the PROFINET IO-Device is displayed.)

Parameter	Meaning	Range of Value / Value
Name of Station	Network name of the PROFINET IO-Device station. The name of station is set in the Device Table in the PROFINET IO Controller DTM. Here it is only displayed (refer to section <i>Device Table</i> on page 76) or otherwise it must be set directly in the configuration tool of the PROFINET IO-Device.	1 - 240 characters
Module	Module name	
Submodule	Submodule name	
Type	Data type (QB,QW,IB, IW)	
Length	Length of the Module / Submodule in Bytes.	
Address	Data offset address.	

Table 23: Address Table Pane Parameters - Inputs / Outputs

- Confirm your modifications by clicking on the **OK** button.
- The manually changed address is now set.

- The configuration software reports an error if an address overlapping in the process data image was detected. The configuration software reports the first address overlapping, which was detected. The display includes the Name of Station, the module, the submodule and especially the start address and the length of the overlapping modules.

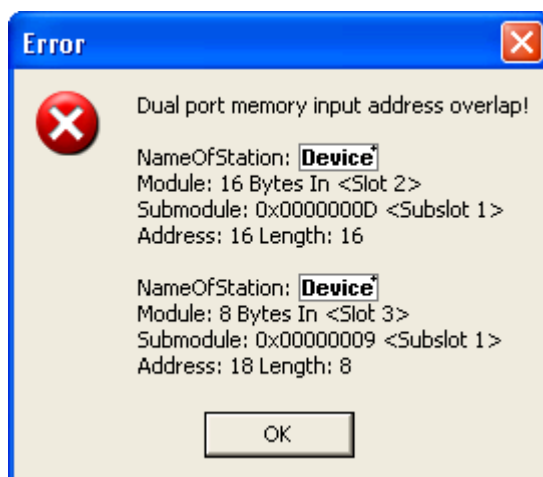


Figure 50: Configuration > Address Table – Address Overlap

*The name of the PROFINET IO-Device is displayed.

- Correct the address for one of the two modules and enter an unused address.
- Confirm your modifications by clicking on the **OK** respectively **Apply** button.

Sort Addresses

- To sort the address data, click on the respective column header.

5.8 FSU/Port-Settings

The **FSU/Port Settings** pane is used to set in the PROFINET IO-Controller device whether a PROFINET IO-Device must use a fast start up (FSU) connection to establish the the cyclic data exchange. For this, all existing Ethernet connections from the PROFINET IO-Controller to PROFINET IO-Devices are displayed, including all existing ports at each Device.

By the **MAU Type** for each PROFINET IO Device and for each port is to be set, whether the Device should establish the connection automatically or whether fixed parameters are to be used.



Important: If you check **FSU** (fast start up) to establish a fast connection for a port, use only the **MAU Type** "100BASETXFD". For the "AUTO" setting the *Auto negotiation* and *Auto crossover* effects will prevent establishing a fast Ethernet connection.

- Select **Configuration > FSU/Port-Settings**.
- Check **FSU** for those PROFINET IO-Devices, which must use a fast start up (FSU) connection to establish the cyclic data exchange.

FSU-/Port- Settings				
		Name	Name of station	MAU Type
		Device name*	Station name Device**	
		Interface 1 - Port1		AUTO
		Interface 1 - Port2		AUTO
		Device name*	Station name Device**	
		Interface 1 - Port1		AUTO
		Interface - Port2		AUTO

Figure 51: FSU/Port-Settings (*The name /**Name of Station of the Device device is displayed.)

Parameter	Meaning	Range of Value / Value
Name	The symbolic name of the PROFINET IO-Device station.	
Name of Station	Network name of the PROFINET IO-Device station. The name of station is set in the Device Table in the PROFINET IO Controller DTM. Here it is only displayed (refer to section <i>Device Table</i> on page 76) or otherwise it must be set directly in the configuration tool of the PROFINET IO-Device.	1 - 240 characters


Parameter	Meaning	Range of Value / Value
MAU Type	<p>The MAU-Type (MAU = Medium Attachment Unit) defines the physical settings (PHY) on the PROFINET IO-Device. For each port at the device the MAU type must be set separately.</p> <p>„<i>AUTO</i>“: For this setting, the connection between adjacent Devices is negotiated automatically. It may take 2-3 seconds for the physical connection is established.</p> <p>„<i>100BASETXFD</i>“ [4]: For this setting, the connection between adjacent Devices is fixed with 100 MBit /Full duplex.</p> <hr/> <p> Important for Hardware Wiring!</p> <p>(1) Make wiring only between ports with the same port setting (MAU-Type configuration). Otherwise no connection can be established between the Devices or only in half duplex mode.</p> <p>(2) Connect only ports with each other, which have different cross-over settings. Otherwise a connection between the devices can not be established. Refer to the manual of the end device manufacturer to get information which crossover settings are set on the used device. Respectively use crossover cables.</p>	<i>AUTO</i> , <i>100BASETXFD</i>
FSU	In the PROFINET IO-Controller device must be configured for each PROFINET IO-Device, whether the Device must use a fast start up (FSU) connection to establish the cyclic data exchange.	checked, unchecked

Table 24: FSU/Port-Settings

5.9 Stations Timing

The **Stations Timing** dialog pane displays the timing of the station. To configure the stations timing settings:

- Select **Configuration > Stations Timing** in the navigation area.

Figure 52: Configuration > Stations Timing (*The name of the PROFINET IO-Device is displayed.)

Parameter	Meaning	Range of Value / Value
Name of station	Network name of the PROFINET IO-Controller station. Under Name of station all devices are displayed, which are connected to the PROFINET IO-Controller. The corresponding name of station is set in the Device Table in the PROFINET IO Controller DTM (refer to section <i>Device Table</i> on page 76) or otherwise it must be set directly in the configuration tool of the PROFINET IO-Device.	1 - 240 characters
Updating Time [ms]	Eligible (total) cycle time of the device to exchange data.	All values that are defined in the GSDML file are selectable.
Watchdog Time [ms]	Time, after which a device reports the absence of cyclic telegrams and passes over to the error state. The value must be an integer multiple of the cycle time (updating time), (with restrictions from the GSDML file).	Integer multiple of 'Updating time'

Table 25: Parameters in the 'Stations Timing' Pane

- Select the PROFINET IO-Device station from the **Name of Station** drop-down list.

For the station selected:

- Adjust the value for **Updating Time** manually.
- Adjust the value for **Watchdog Time** manually.
- Apply the settings made or complete the configuration via **OK**.

5.10 Controller Settings

At the **Controller Settings** pane device related settings can be made. These settings only become active after the configuration was downloaded to the device.



Information about the download you find in section *Download Configuration* on page 109).

Controller Settings

Start of bus communication

- ☒ Automatically by device
- ☐ Controlled by application

Module Alignment

- ☒ Byte boundaries
- ☐ 2 Byte boundaries

Application monitoring

Watchdog time: ms

Process image storage format

- ☒ Big Endian (MSB first)
- ☐ Little Endian (LSB first)

Port Settings

Port 1:

Port 2:

IO State Information

Input Provider:

Output Provider:

Figure 53: Configuration > Controller Settings



Note: The setting options at the dialog pane **Controller Settings** for client specific variants of the configuration software can differ from the setting options displayed here.

5.10.1 Start of Bus Communication

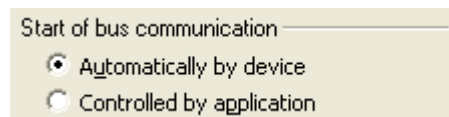


Figure 54: Controller Settings > Start of Bus Communication

If **Automatically by device** is selected, the PROFINET IO-Controller device will start with the data exchange on the bus after the initialization has been ended.

When **Controlled by application** is selected, the application program must activate the data exchange on the bus.



Note: The setting options under **Start of Bus Communication** for client specific variants of the configuration software can differ from the setting options displayed here.

5.10.2 Application Monitoring

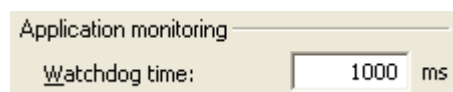


Figure 55: Controller Settings > Application Monitoring

The **Watchdog time** determines the time within which the device watchdog must be re-triggered from the application program while the application program monitoring is activated. When the watchdog time value is equal to 0 the watchdog is deactivated and the application program monitoring is deactivated too.

The permissible range of values of the watchdog time is 20 to 65535. By default the watchdog time value equals to 1000 ms.

Watchdog time	Range of Value / Default Value
Permissible range of values	20 ... 65535 ms
Default	1000 ms
The software watchdog is deactivated.	0 ms

Table 26: Range of Value / Value for the Watchdog time



Note: The setting options under **Application Monitoring** for client specific variants of the configuration software can differ from the setting options displayed here.

5.10.3 Process Image Storage Format

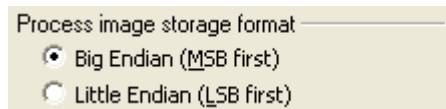


Figure 56: Controller Settings > Process Image Storage Format

The **Process Image Storage Format** determines how the data words are stored in the process image.

For the data type Word it is possible to choose **Big Endian** or **Little Endian**.

Storage format (word module)	
Big Endian	MSB/LSB = higher/lower = Motorola format = Big Endian
Little Endian	LSB/MSB = lower/higher = Intel format = Little Endian

Table 27: Controller Settings Pane Parameters - Process Image Storage Format



Note: The setting options under **Process Image Storage Format** for client specific variants of the configuration software can differ from the setting options displayed here.

5.10.4 Module Alignment

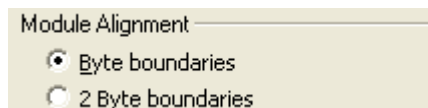


Figure 57: Controller Settings > Module Alignment

The **Module Alignment** defines the addressing mode of the process data image. The addresses (offsets) of the process data are always interpreted as byte addresses. The **Module Alignment** then defines the addressing mode, **Byte boundaries** or **2 Byte boundaries**.

Parameter	Meaning
Byte boundaries	The module address can start at any byte offset.
2 Byte boundaries	The module address can only start at even byte offsets.

Table 28: Parameters Controller Settings > Module Alignment



Note: The setting options under **Module Alignment** for client specific variants of the configuration software can differ from the setting options displayed here.

5.10.5 Port Settings

For each port must be configured, whether the PROFINET IO-Controller device should establish the connection automatically (setting: „*AUTO*“) or whether fixed parameters are to be used (setting: „*100BASETXFD*“).

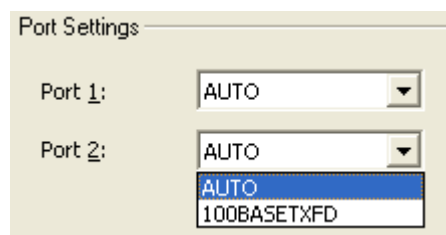


Figure 58: Controller Settings > Port Settings

Parameter	Meaning	Range of Value / Value
Port Settings Port 1, Port 2	<p>Port Settings is to be set for each port (Port 1, Port 2) of the PROFINET IO-Controller separately.</p> <p>„<i>AUTO</i>“: For this setting, the connection between adjacent Devices is negotiated automatically. It may take 2-3 seconds for the physical connection is established.</p> <p>„<i>100BASETXFD</i>“ [4]: For this setting, the between connection adjacent Devices is fixed with 100 MBit /Full duplex.</p>	<i>AUTO</i> , <i>100BASETXFD</i>

Table 29: Parameters Port Settings



Important for Hardware Wiring!

(1) Make wiring only between ports with the same port setting. Otherwise no connection can be established between the Devices or only in half duplex mode.

(2) Connect only ports with each other, which have different cross-over settings. Otherwise a connection between the devices can not be established. Refer to the manual of the end device manufacturer to get information which crossover settings are set on the used device. Respectively use crossover cables.



Note: The setting options under **Port Settings** for client specific variants of the configuration software can differ from the setting options displayed here.

5.10.6 IO State Information

Reference to Firmware: The option **IO State Information** was implemented since PROFINET IO-Controller Firmware Version 2.6.x.x.

Under **IO State Information** you can configure the IOPS interface. If configured, the PROFINET Input/Output Object Provider State (IOPS) allows to the PROFINET IO-Controller application program to detect, whether the data received from the PROFINET IO-Device devices are valid or not and to declare its output data sent to the PROFINET IO-Device devices valid or invalid.

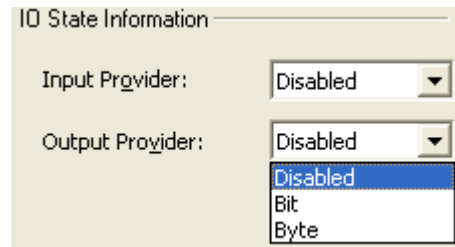


Figure 59: Controller Settings > IO State Information

Parameter	Meaning	Range of Value / Value
Input Provider	IOPS interface for input direction	Disabled, Bit, Byte; Default: Disabled
Output Provider	IOPS interface for output direction	Disabled, Bit, Byte; Default: Disabled

Table 30: Parameters IO State Information

You can select the three IOPS interface modes 'Disabled', 'Bit' and 'Byte'. The modes for input and output direction can be configured independently.

- **Disabled:** The PROFINET IO-Controller application program can not detect, whether the data received from the PROFINET IO-Device devices are valid or declare its output data sent to the PROFINET IO-Device devices valid or invalid.
- **Bit:** In the Dual-Port Memory (DPM) of the PROFINET IO-Controller device the IOPS is handled as a bit list. Each submodule description is represented by a single bit. If this bit is set to 1 the data is valid, if the bit is set to 0 the data is invalid.

Note: Submodules with input and output data at the same time have IOPS in input and output direction.

- **Byte:** In the Dual-Port Memory (DPM) of the PROFINET IO-Controller device the IOPS is handled as a byte array. Each submodule description is represented by a byte. If the byte is set to 0x80 the data is valid, otherwise it is invalid. In this mode the whole IOPS-byte is directly copied from / to the cyclic frame giving the PROFINET IO-Controller application program the possibility to access all bits of IOPS. Typically only the first bit of this IOPS byte is interesting as it stated valid or invalid.



Further information on the IOPS Interface is comprised in the *PROFINET IO Controller Protocol API Manual*, in section *IOPS Interface* (e. g. *Revision 16* of the API manual, in section 4.6.).

6 Online Functions

Getting Access to SYCON.net Online Functions



Note! If under 'Configuration' > 'Master Settings' > 'Start of bus communication' > 'Controlled by application' is selected, after 'Power on Reset' the Master device is in 'Offline' state! In this state you can not use the SYCON.net online function 'Network Scan'. To get access to this online function in case the Master device is used together with an application program, you must make sure that the application program will start the communication. Alternatively you can start the communication manually from the context menu 'Start communication' of the the Master device.

6.1 Connecting/Disconnecting Device



Note: Several PROFINET IO-Controller DTM functions e. g. **Diagnosis** or the configuration download in the FDT Framework require an online connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device.

Connecting Device

The following steps are needed to establish a connection from the PROFINET IO-Controller DTM to a PROFINET IO-Controller device:

Under **Settings** in the **Driver** pane:

1. Verify that the default driver is checked and respectively check another or multiple drivers.
2. Configure the driver if necessary.

Under **Settings** in the **Device Assignment** pane:

3. Scan for the devices (with or without firmware).
4. Select the device (with or without firmware) and apply the selection.



Before you download the firmware adhere to the necessary safety precautions to prevent personnel injury and property damage. For more refer to section *Safety Messages on Firmware or Configuration Download* on page 29.

Under **Settings** in the **Firmware Download** pane if not yet a firmware was loaded to the device:

5. Select and download the firmware.

Under **Settings** in the **Device Assignment** pane if not yet a firmware was loaded to the device:

6. Scan for the device (with firmware) once more.
7. Select the device (with firmware) once more.



An overview of the descriptions for these steps you find in the section *Overview Settings* on page 30.

8. In the DTM interface dialog select the **OK** button, to apply the selection and to close the DTM interface dialog.
 9. Put a right-click on the PROFINET IO-Controller device icon.
 10. Select the **Connect** command from the context menu.
- ⇒ The PROFINET IO-Controller device now is connected to the PROFINET IO-Controller DTM via an online connection. In the network view the device description at the device icon of the Controller is displayed with a green colored background.

Disconnecting Device

To disconnect an online connection from the PROFINET IO-Controller device to a PROFINET IO-Controller DTM take the following steps:

1. In the DTM interface dialog select the **OK** button, to close the DTM interface dialog.
 2. Right-click on the PROFINET IO-Controller device icon.
 3. Select the **Disconnect** command from the context menu.
- ⇒ In the network view the device description at the device icon of the Controller is not any more displayed with a green colored background. Now the PROFINET IO-Controller device is disconnected from the DTM.

6.2 'Network Scan' and 'Upload'

With the function **Network Scan...** of the PROFINET IO-Controller DTM you can find out automatically which PROFINET IO-Devices are attached to the PROFINET IO-Controller device and how these devices are configured. During the network scan the Controller device requests the ident codes of the Device devices found at the bus. For each connected Device device its ident code is read out.

In the **Scan Response** dialog of the Controller DTM, the assigned device description files or DTM devices are displayed. Exactly one ident code is assigned to each device description file and to each DTM device. Different versions (also language versions) of the same device description file are defined by the same ident code. For every identified device you can select the assigned DTM device according to the firmware loaded in that Device device. Via **Create Devices** for each Device device the selected DTM device is created. The IP settings of the Device device can be set manually in the Controller DTM if necessary.



Note: The IP settings of the Device device must be downloaded to the Controller device, before uploading the module configuration is started.

The configuration is uploaded after a network scan. Via the **Upload** function of the PROFINET IO-Device DTM, data for module configuration can be uploaded from the individual PROFINET IO-Device devices via the PROFINET IO-Controller device and the PROFINET IO-Controller DTM into the PROFINET IO-Device DTMs.

Requirements

The PROFINET IO-Controller device must be configured.



Important: The configuration of the Controller device must be downloaded in the Controller device. For more see section *Configuration Steps* on page 24.

Overview of the Steps

1. Start the **Network Scan** function of the Controller DTM.
2. Make settings in the **Scan Response** dialog of the Controller DTM.
3. Click **Create Devices**.
4. Use the **Download** function of the Controller DTM to download the IP settings of the Device device to the Controller device.
5. Use the **Upload** function to upload the device configuration of each Device device to the Device DTM.
6. Use the **Download** function of the Controller DTM to download the device configuration of the Device devices to the Controller device.

6.2.1 Starting 'Network Scan'

1. Start the **Network Scan** function of the Controller DTM.

- In netDevice: right-click on the device symbol of the PROFINET IO-Controller DTM.
- Select **Network Scan...** from the context menu.

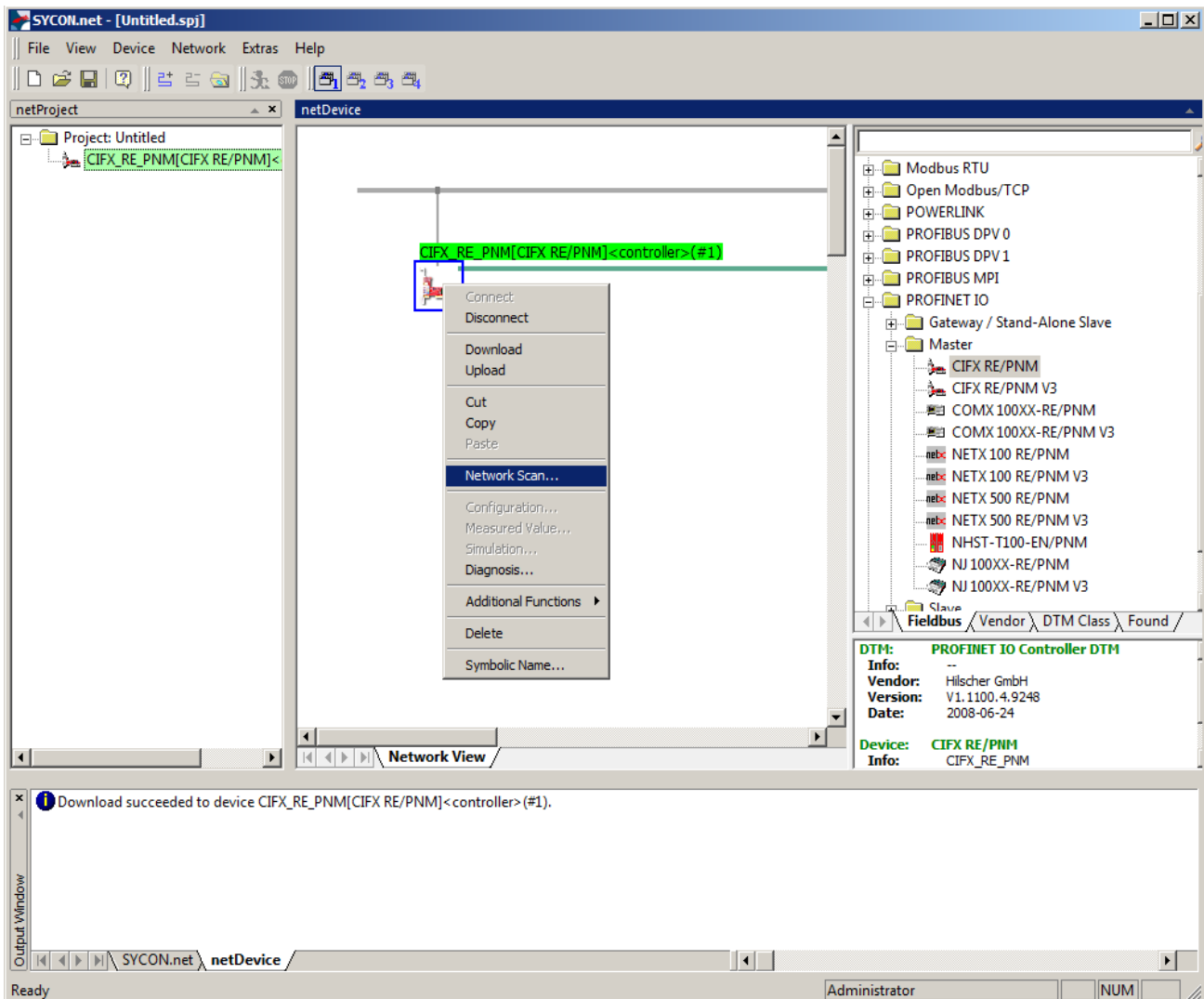


Figure 60: Starting 'Network Scan' (Example)

- Wait for a short time.



Note: It can last some seconds, until the **Network Scan...** dialog is displayed.

Via **Network Scan...** an online connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device is established. The configuration software scans, which PROFINET IO-Devices are attached to the PROFINET network or to the PROFINET IO-Controller device.

➤ The **Scan Response** dialog of the Controller DTM is displayed.

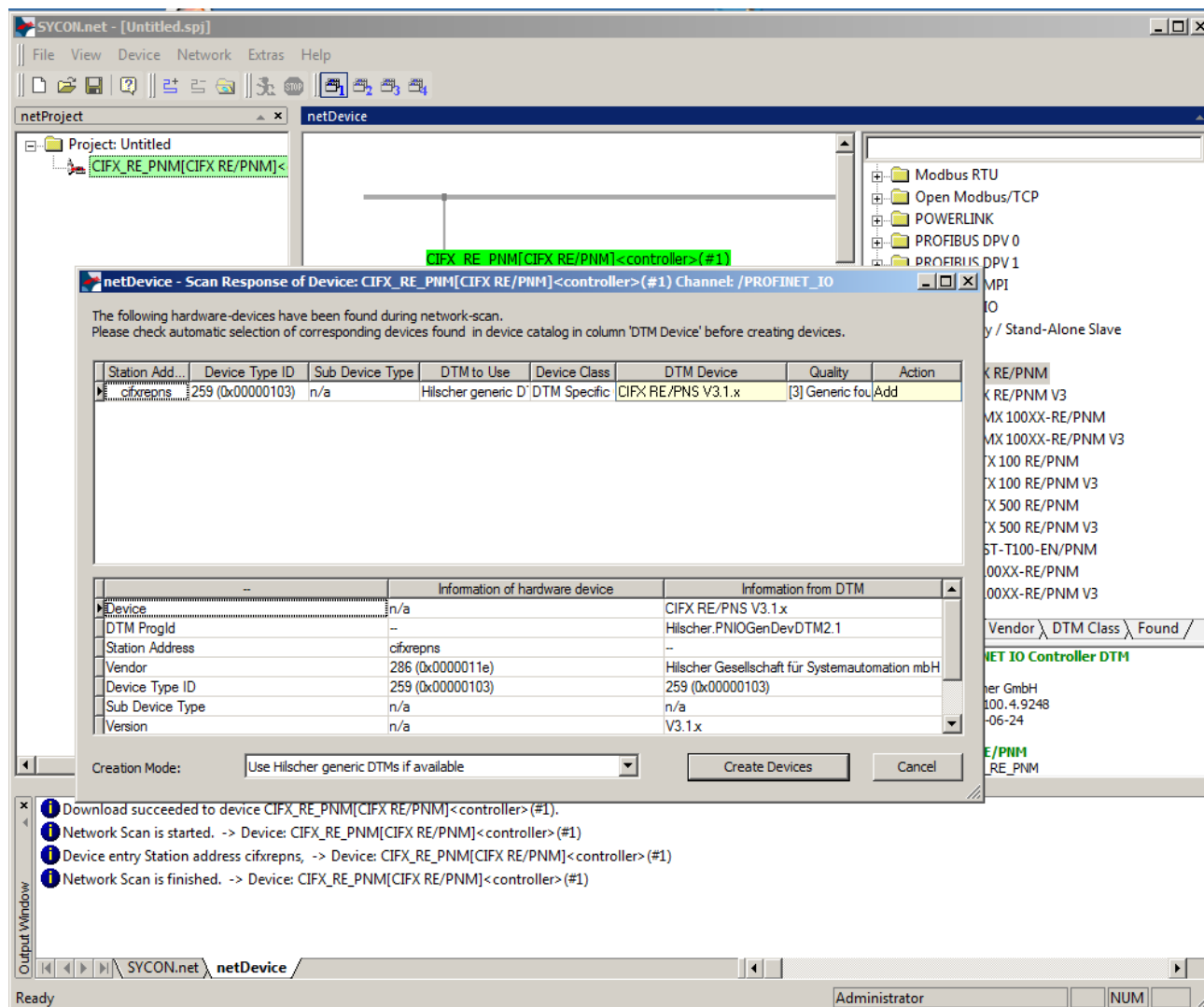


Figure 61: Scan Response dialog of the Controller DTM (Example)

6.2.2 Settings in the Scan Response Dialog of the Controller DTM

2. Make settings in the **Scan Response** dialog of the Controller DTM.

➤ In the **DTM to Use** column the DTM devices assigned to the found ident codes appear.

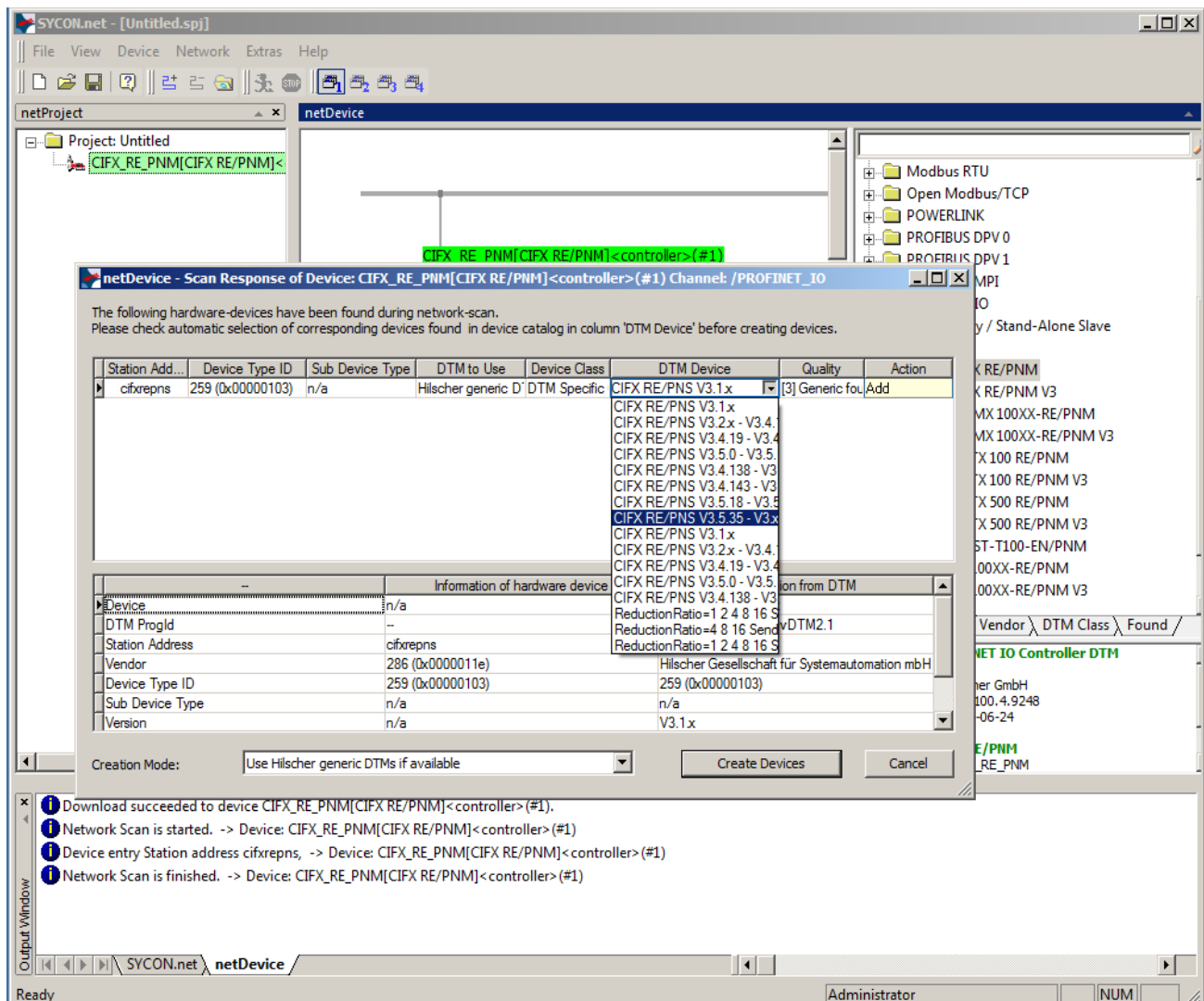


Figure 62: Scan Response dialog of the Controller DTM (Example)

- In the **DTM Device** column, select for every identified device the DTM device corresponding to the firmware loaded in this Device device.
- If in the **DTM Device** column no DTM device or a DTM device not desired is displayed, add the required DTM devices to the device catalog.
- or adapt the creation mode under **Creation Mode**.
- In the **Action** column select, whether the found DTM device shall be:
 - *added* or *skipped*.
(if a device is not yet present in the project),
 - *replaced* or *skipped*.
(if a device is already present in the project)

6.2.3 Description on the Scan Response dialog of the Controller DTM

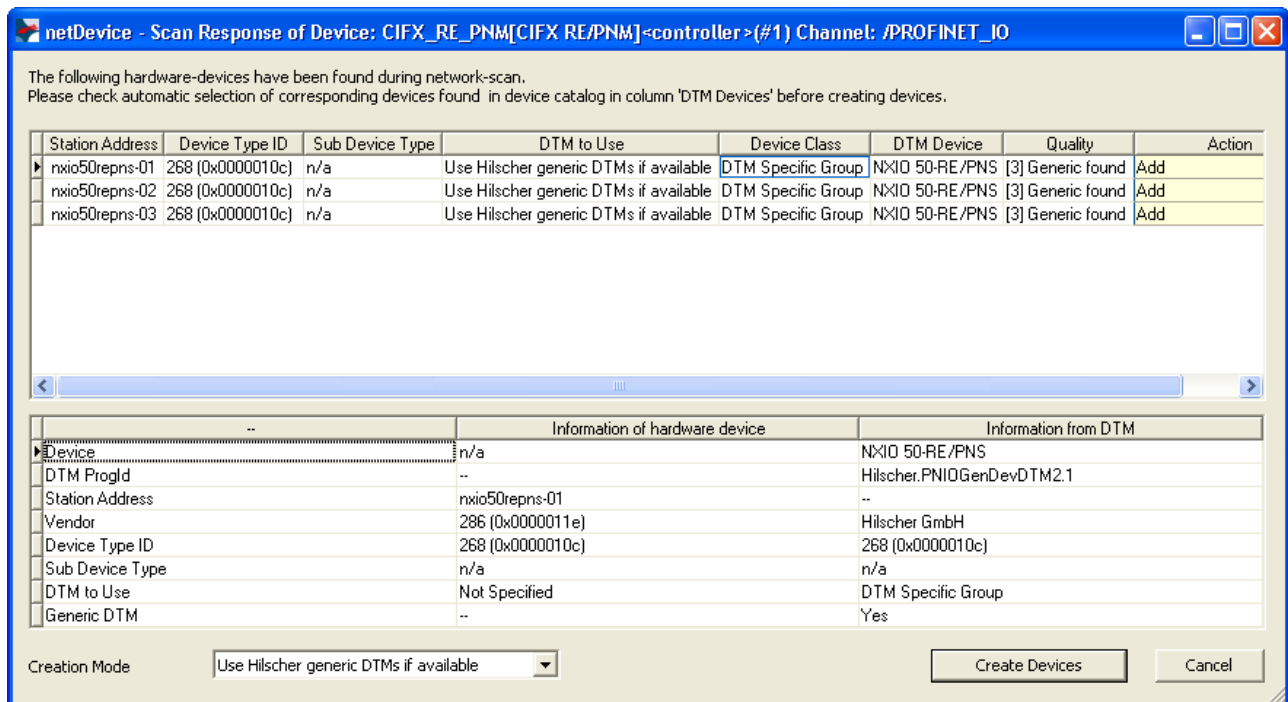


Figure 63: Scan Response dialog of the Controller DTM (Example)

In the following table you find a description about the **Scan Response** dialog of the Controller DTM.

Column	Description
Title Bar	With the text: <i>Symbolic Name of the Controller Device [Device Description] <Device Address> (#Network ID) channel/PROFINET_IO.</i>
Instruction	In the Network Scan window the instruction text is displayed: The following hardware-devices have been found during network scan. Please check automatic selection of corresponding devices found in device catalog in column 'DTM Devices' before creating devices.
Station Address	PROFINET IO station address, which displays the logical sequence of the devices within a PROFINET network.
Colors	Meaning of colors in the Scan Response dialog of the Controller DTM: <div style="display: flex; align-items: center;"> <div style="width: 30px; height: 20px; background-color: red; margin-right: 5px;"></div> Red If a field marked in red appears in column Station address, the respective DTM device is already present on the network. </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 30px; height: 20px; background-color: yellow; margin-right: 5px;"></div> Yellow If a field appears marked in yellow, a selection can be made by a combo box. </div>
Device Type ID	Identification (ID): Ident code read out from each device (Unique Identifier)
Sub Device Type	Sub type of the device type, if applicable
DTM to Use	Display of the DTM devices, which are assigned to the ident codes found during scanning: If <u>Use Hilscher generic DTM's if available</u> is displayed <i>without color marking</i> , there is no selection possibility. If <u>Use Hilscher generic DTM's if available</u> is displayed <i>marked in yellow</i> , the following selection can be made: <div style="border: 1px solid black; padding: 2px; margin: 5px 0;"> Use Hilscher generic DTM's if available [v] Use Hilscher generic DTM's if available Use vendors DTM's if available </div> (In the figure shown example DTM's are displayed.) A selection will only be displayed if under Creation Mode > Choose for each device was selected and if another DTM has been found for the respective device.
Device Class	Device class of the PROFINET IO-Device device.


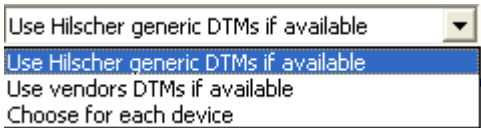
Column	Description
DTM Device	<p>Found Device-DTM (the device name as taken from the DTM)</p> <p>Only the device description files or DTM devices can be displayed within the column DTM Devices:</p> <ul style="list-style-type: none"> Which are available in the device catalog for the scanned ident code, Respectively, which belong to the selection made under Creation Mode and which belong to the selection made under Creation Mode > Choose for each device under DTM to create. <p>For each device type ID in the column DTM Device the following is displayed:</p> <ul style="list-style-type: none"> <u>no</u> device, <u>one</u> single device or <u>multiple</u> devices (within a combobox). <p>This means, within the device catalog of netDevice for the found ident code and the selected Creation Mode these alternatives are available:</p> <ul style="list-style-type: none"> no DTM A device description file or a DTM device of the manufacturer One or more device description files or DTM devices of a manufacturer
Quality	<p>Associated quality information</p> <p>Display: [1] DTM found, [3] Generic found</p>
Action	<p>The action to be performed with the corresponding device during the process of device creation.</p> <ul style="list-style-type: none"> If no device is present within the current project, the selection Add/Skip will appear. If there is already a device present within the current project, the selection Replace/Skip will appear. <p>Add adds a new instance for the selected DTM during the process of creation of a device.</p> <p>Skip skips the process of creation of a device for the respective device address.</p> <p>Replace erases the instance of the DTM currently located at this address during the process of creation of a device, and replaces it with the instance of the chosen DTM.</p>
Table below	<p>The lower table in the Scan Response dialog of the Controller DTM shows a comparison of possible differences in device information taken from:</p> <ul style="list-style-type: none"> The hardware device (displayed in central column of 3) and the DTM (displayed in right column of 3) <p>The left column contains which information is compared between the information sources 'Hardware Device' and 'DTM'.</p> <p> Note: If a field contains the text 'n/a', the corresponding information is not applicable in the current context (fieldbus).</p>
Creation Mode	<p>Under Creation Mode one of the following options can be selected:</p> <ul style="list-style-type: none"> User Hilscher generic DTM if available Use vendors DTMs if available Choose for each device <div data-bbox="379 1541 861 1668">  </div> <p><i>Scan Response dialog of the Controller DTM > 'Creation Mode'</i></p>
Create Devices	<p>About Create Devices ...</p> <ul style="list-style-type: none"> for each Device device the previously selected DTM device is created. an upload of the Device configuration can be proceeded.
Cancel	Click Cancel to leave the dialog without creating a device.

Table 31: Description on the Scan Response dialog of the Controller DTM

6.2.4 Creating Devices

3. Click **Create Devices**

➤ In the **Scan Response** dialog of the Controller DTM click **Create Devices**.

➤ The dialog **Devices Network Scan - Creating Device** appears. The dialog shows the progress of the device creation process.



Note: Depending on the device manufacturer, a different dialog may also be displayed.

➤ The question appears **“The current module and submodule configuration of the connected device will be read out now. Do you want to apply the read-out module and submodule configuration?”**
“Yes”/“No”

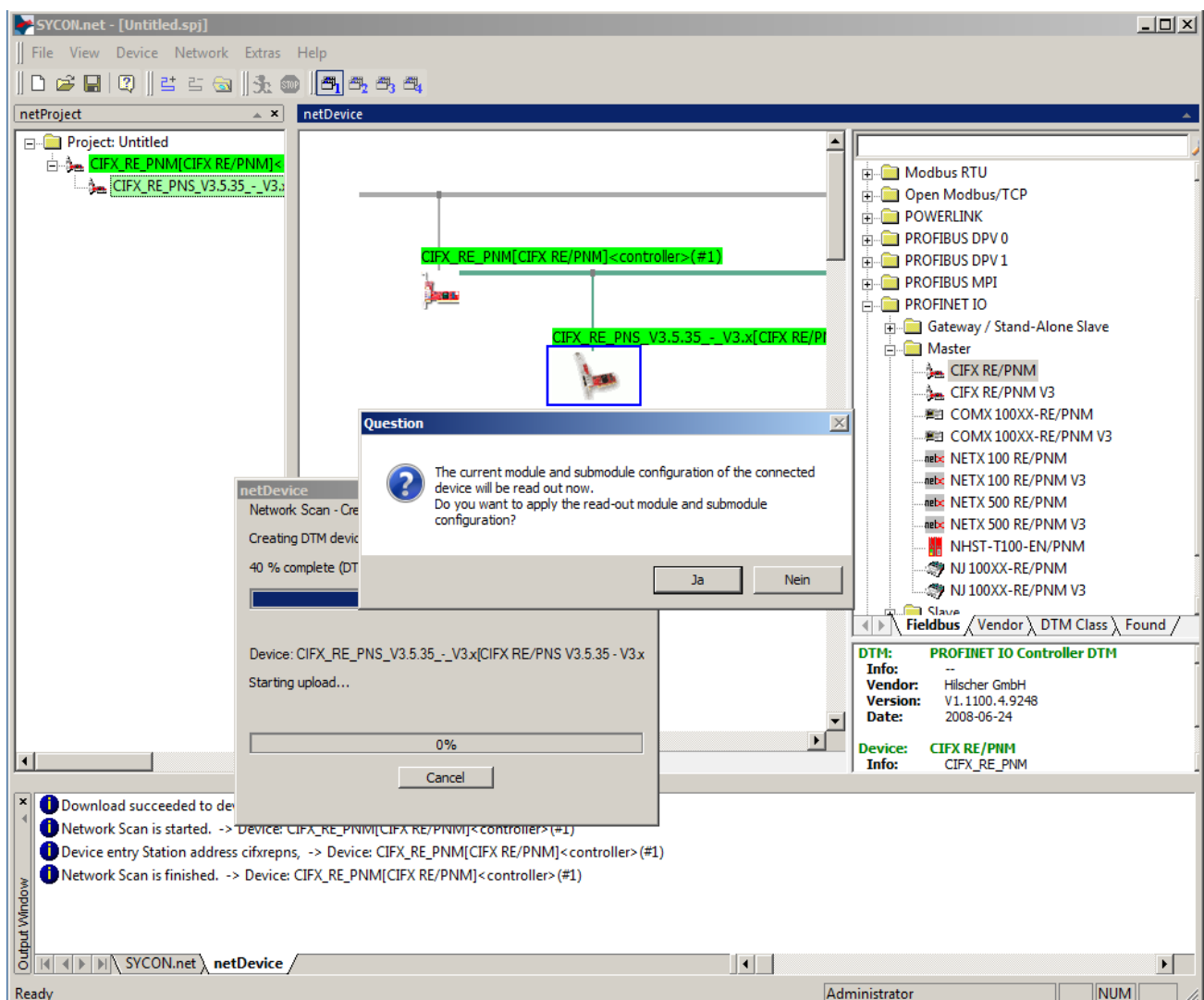


Figure 64: Query for generating the module configuration (Example)

➤ Click **“No”**.

➤ For each Device device the previously selected DTM device is created.

6.2.5 Download to the PROFINET IO-Controller Device



Adhere to the necessary safety precautions to prevent personnel injury and property damage. For more refer to section *Safety Messages on Firmware or Configuration Download* on page 29.

4. Use the **Download** function of the Controller DTM to download the IP settings of the Device device to the Controller device.

- In **netDevice**: right-click on the device symbol of the PROFINET IO-Controller DTM.
- Select **Download** from the context menu.

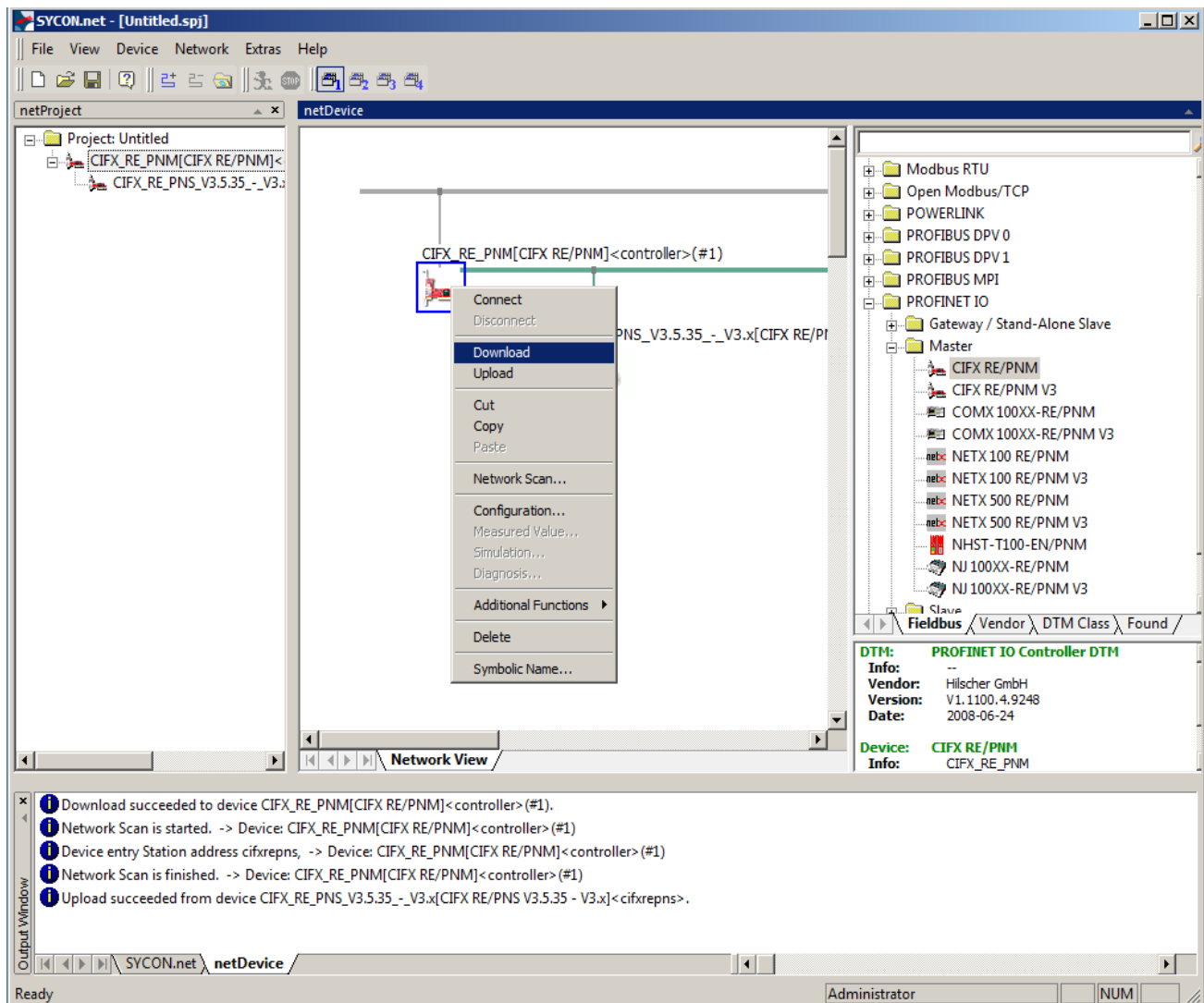


Figure 65: 'Download' current Configuration to PROFINET IO-Controller (Example)

➤ The Dialog **netDevice - Download** appears:

If you attempt to download during bus operation, communication between master and slaves is stopped.

Do you really want to download?

➤ Click **Yes**.

➤ The dialog **netDevice** appears showing the progress bar **Download**

active, device performs initialisation...

- The **netDevice** window shows the message (example): **Download succeeded to device CIFS_RE_PNM[CIFS RE/PNM]<# 1>.**

6.2.6 Running 'Upload' and generating Module Configuration

5. Use the **Upload** function to upload the device configuration of each Device device to the Device DTM.
- In **netDevice**: right-click on the device symbol of the PROFINET IO-Device DTM.
 - Select **Upload** from the context menu.

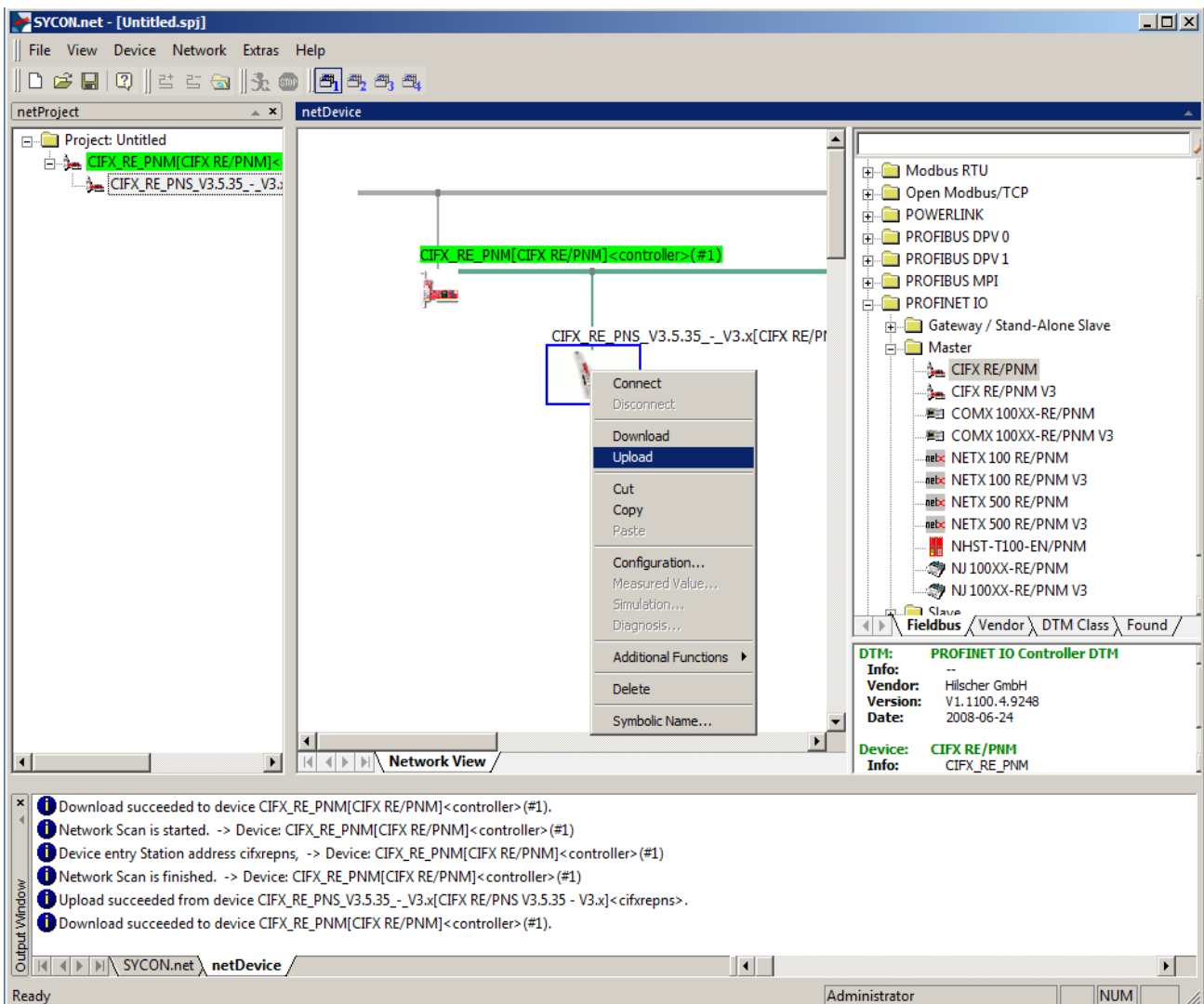


Figure 66: 'Upload' the Device Configuration (Example)

- The dialog **Devices Symbolic Name of the Controller Device [Device Description] <Device Address> Starting Upload ...** appears. The dialog shows the progress of the upload process.



Note: Depending on the device manufacturer, a different dialog may also be displayed.

- The question appears **"The current module and submodule**

configuration of the connected device will be read out now. Do you want to apply the read-out module and submodule configuration?"
 "Yes"/"No"

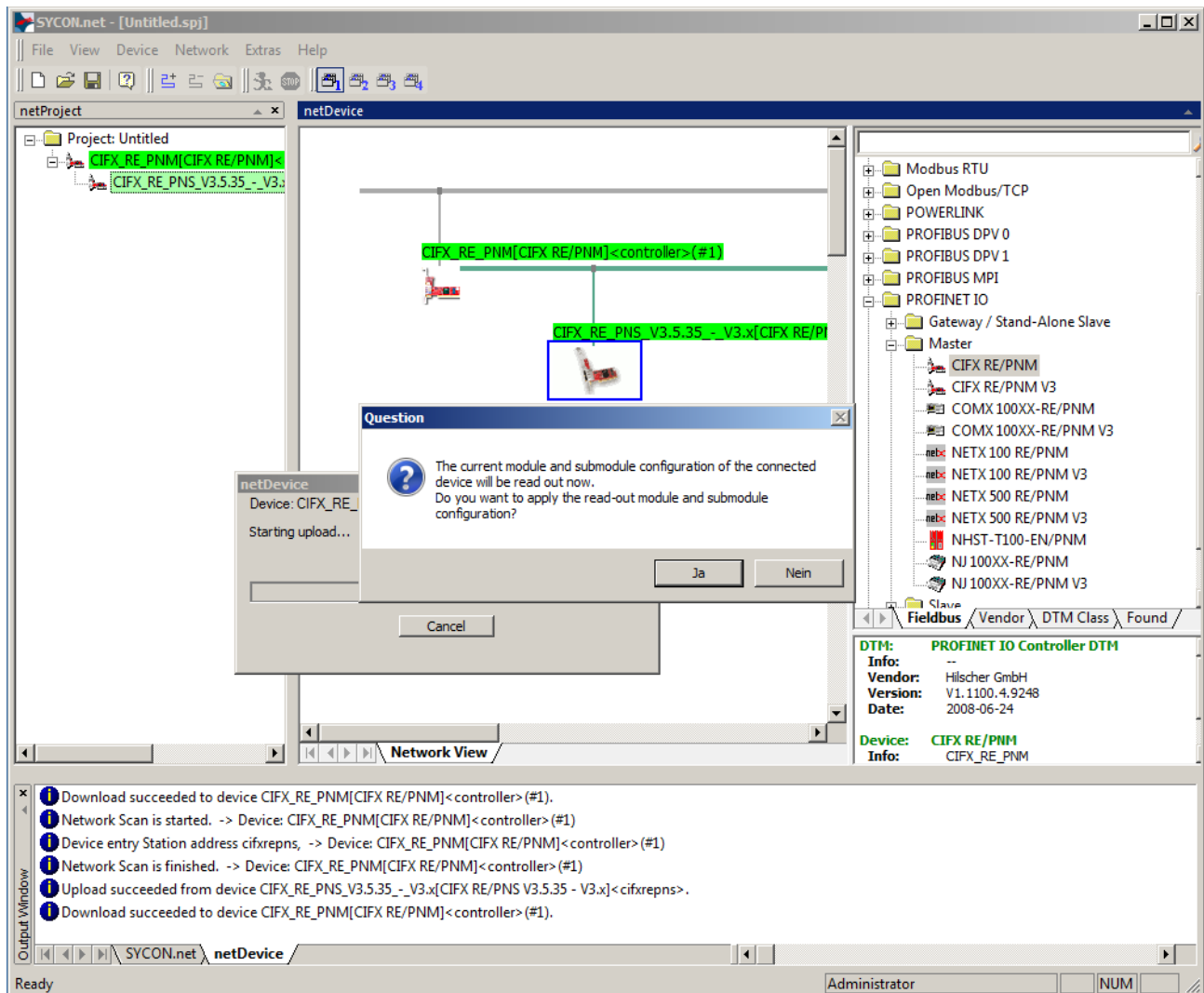


Figure 67: Query for generating the module configuration (Example)

- Click "Yes".
- For the Device its current configuration is uploaded via the Controller DTM to the Device DTM.
- The successful progress for the upload procedure is reported in the output window.



Note: If you start the **Upload** function and you have not yet assigned the IP address to a reinstalled Device, you will receive the following error message: **Upload failed from device**. For further information on this, refer to section *Upload failed from device* on page 108.

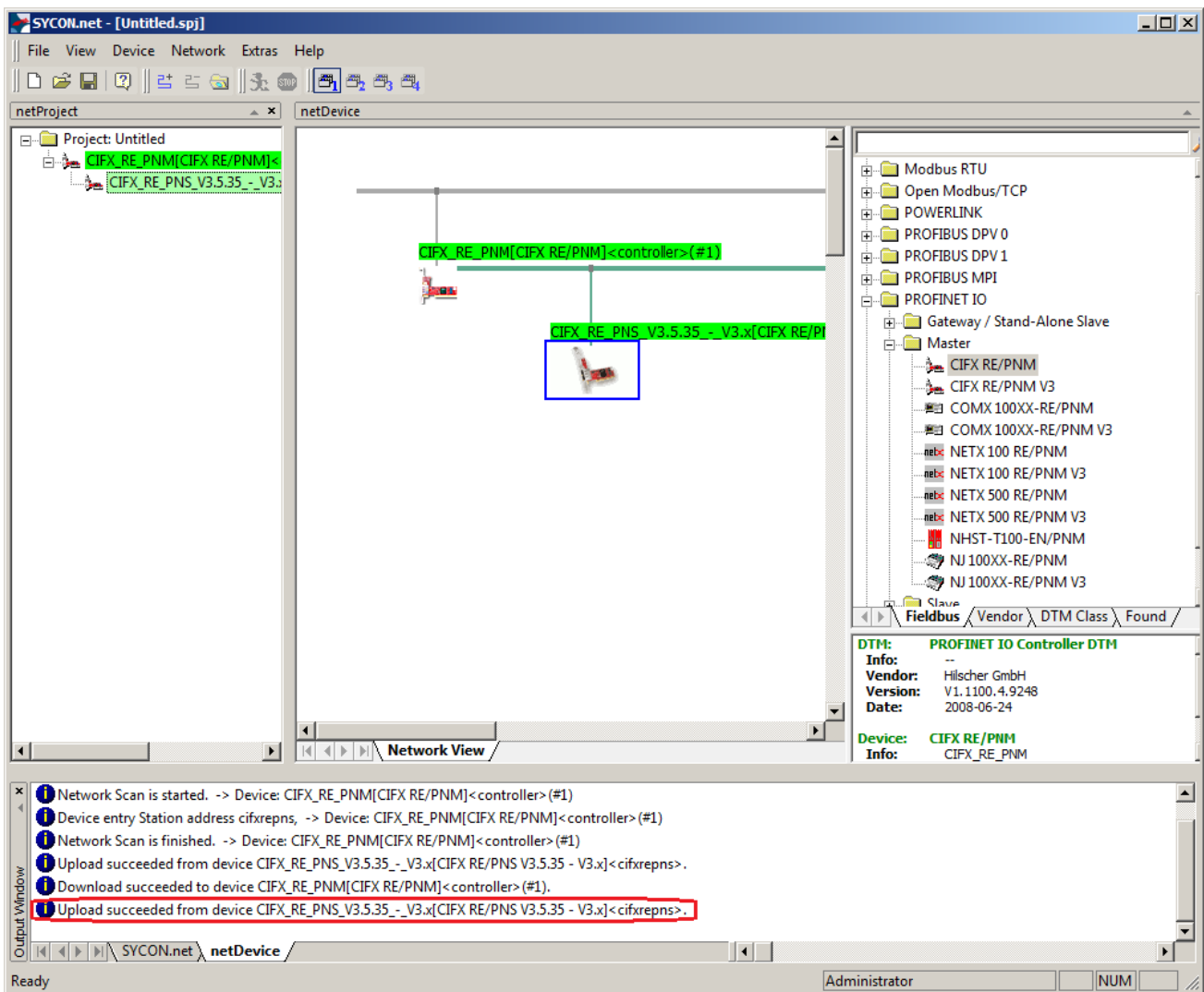


Figure 68: Upload succeeded (Example)

After the module configuration of the PROFINET IO-Device has been created, you can display the uploaded modules by double-clicking the Device symbol.

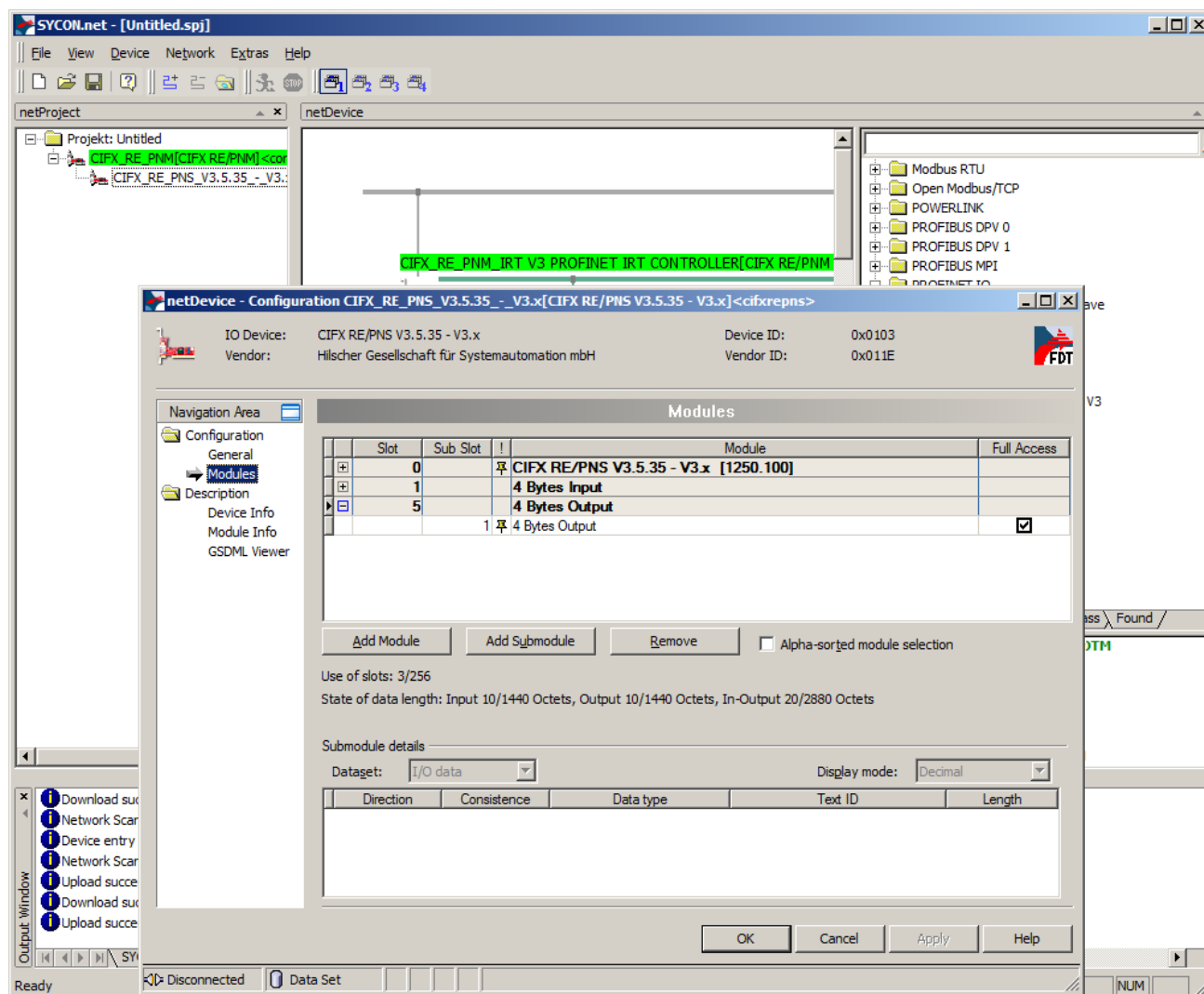


Figure 69: Uploaded Modules (Example)

6.2.7 Download to the PROFINET IO-Controller Device



Adhere to the necessary safety precautions to prevent personnel injury and property damage. For more refer to section *Safety Messages on Firmware or Configuration Download* on page 29.

6. Use the **Download** function of the Controller DTM to download the device configuration of the Device devices to the Controller device.

➤ In netDevice: right-click on the device symbol of the PROFINET IO-Controller DTM.

➤ Select **Download** from the context menu.

⇒ The Dialog **netDevice - Download** appears:

If you attempt to download during bus operation, communication between master and slaves is stopped.

Do you really want to download?

➤ Click **Yes**.

⇒ The dialog **netDevice** appears showing the progress bar **Download active, device performs initialisation...**

⇒ The **netDevice** window shows the message (example): **Download succeeded to device CIFS_RE_PNM[CIFS RE/PNM]<>(# 1).**

6.2.8 Upload failed from device

- If you start the **Upload** function and you have not yet assigned the IP address to a reinstalled Device, you receive the following error message: **Upload failed from device** *Symbolic Name of the Device* *[Device Description]* *<Device Address>* You might find additional information in the output window.

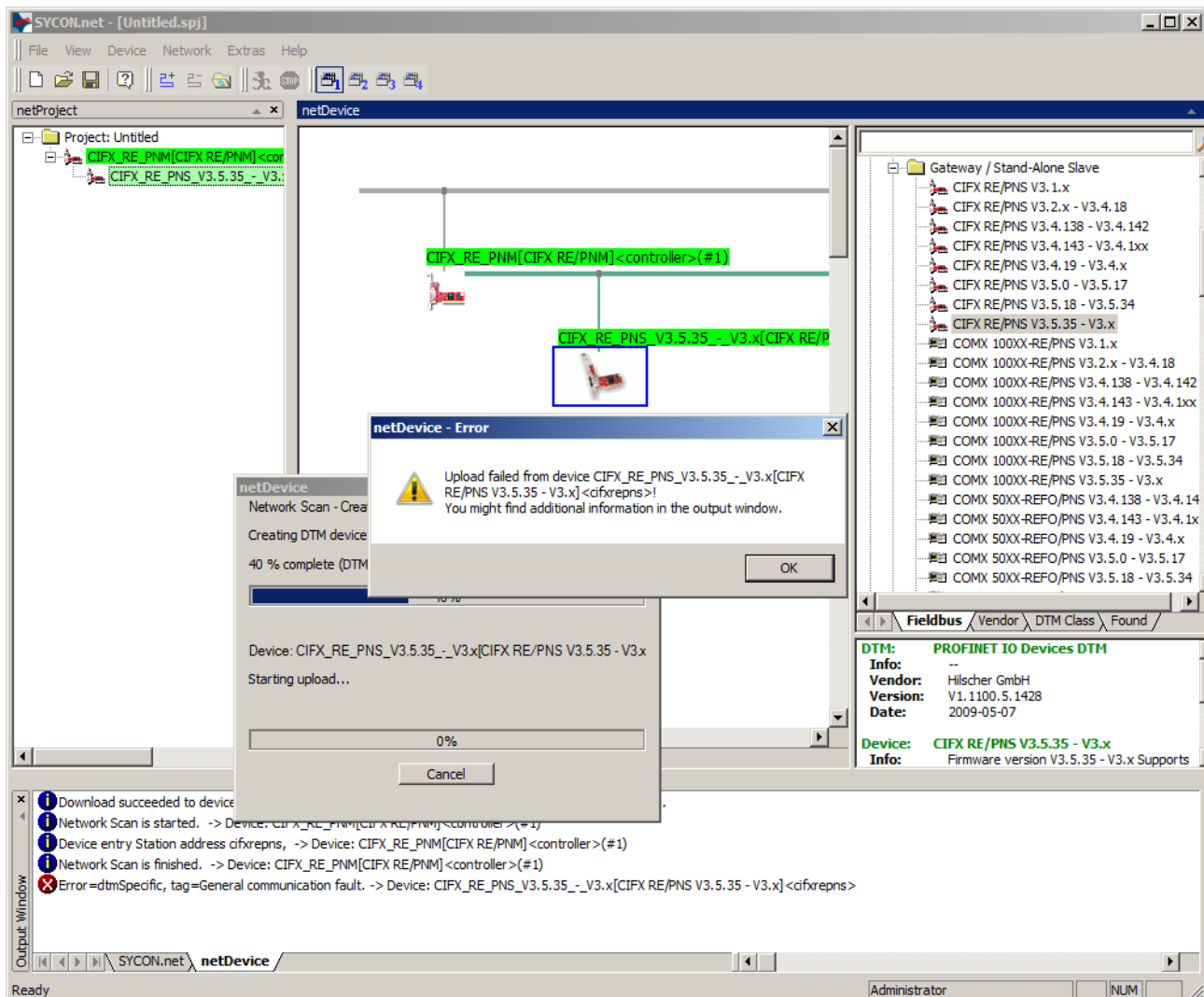


Figure 70: Upload failed from device (Example)

- In this case assign the IP settings.
- Then download the current configuration to the Controller device and
- restart the **Upload** function.

6.3 Download Configuration

The device configuration is created *offline* in the DTM (application program). A download to the device is required, to transfer the configuration with the parameter data to the device.



Note: To download configuration parameter data to the PROFINET IO-Controller device an online connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device is required. Further information can be found in the *Connecting/Disconnecting Device* section on page 93.

Safety Precautions

If you plan to perform a configuration download via the PROFINET IO-Controller DTM be aware of the following:

⚠ WARNING

Communication Stop due to Configuration Download, Faulty System Operation possible or Loss of Device Parameters

Before you initiate a configuration download process, while the bus is still in operation status:

- Stop the application program.
- Make sure that all network devices are placed in a fail-safe condition.

⚠ WARNING

Mismatching System Configuration, faulty System or Device Operation possible

- In the device use only a configuration suitable for the system.

NOTICE

Loss of Parameters caused by Power Disconnect during Configuration Download

- During configuration download process, do not interrupt the power supply to the PC, or to the device and do not perform a reset to the device!

For more see next page.

Download Steps

To transfer the configuration with the corresponding parameter data to the PROFINET IO-Controller device you download the data using the frame application of the configuration software.

For netDevice the download is made via **Device > Download** or use the context menu with **Download**.

1. Select **Download** in the context menu of the device.

⇒ If the download is started as long as the Slave devices are connected to the Master device, the following message is displayed: 'If you attempt to download during bus operation, communication between Master and Slaves is stopped. Do you really want to download?'

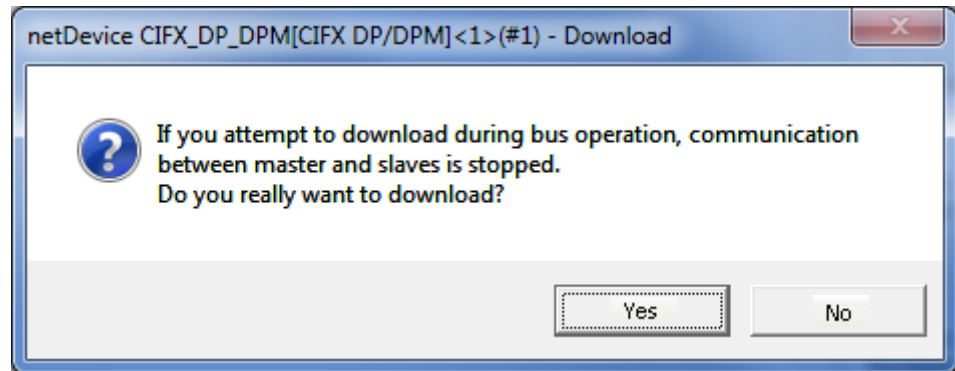


Figure 71: netDevice Message: Download



Important: If the communication between the Master and the Slave devices is stopped, the data exchange between the Master device and the Slave devices is stopped.

2. Click to **Yes** if you intend to download the configuration.

⇒ Then the current configuration in the application program is downloaded to the device.

3. Otherwise click to **No**.

6.4 Start /Stop Communication

You can manually start or stop the communication between a PROFINET IO-Controller device and PROFINET IO-Device devices.

- **Start Communication** can be enabled if the communication was stopped before or if the configuration requires this (Controlled release of communication).
 - **Stop Communication** can be enabled if the communication was started.
- To start or to stop the communication, proceed as follows:

Start Communication

1. Connecting device:



Note: To start the communication of the device at the bus manually, an online connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device is required. Further information can be found in the *Connecting/Disconnecting Device* section on page 93.

2. Select **Additional Functions > Service > Start Communication** from the context menu (right mouse click).
- The device communicates at the bus.

Stop Communication

WARNING

Faulty System Operation possible, Overwriting of Firmware or Loss of Device Parameters

Before you stop the communication:

- Stop the application program.
 - Make sure that all network devices are placed in a fail-safe condition.
1. Select **Additional Functions > Service > Stop Communication** from the context menu (right mouse click).
- The communication of the device at the bus is stopped.

6.5 Licenses

Using the license dialog, you can order licenses for **Master protocols** or **Utilities** and download them to your device.

6.5.1 Open License Dialog

You first open the **License** window.



Note: You first need to assign the Controller device to the DTM. Only then, the device data and the licenses already present in the device are displayed in the **License** dialog.

How to proceed:

A.) Assigning the Controller device to the DTM

1. Open the DTM configuration dialog.
 - In the FDT container **netDevice** double click to the device icon.
2. Select one or several drivers.
 - Select **Settings > Driver**.
 - Check the drivers.
3. Configure the driver if necessary.
 - Select **Settings > Driver > [Name of the assigned driver]**.
 - Configure the driver settings.
4. Scan for and select the devices.
 - Select **Settings > Device Assignment**.
 - Under **Device selection** select *suitable only* or *all* and then **Scan**.
 - In the table, check the required devices.
 - Select **Apply**.
5. Close the DTM configuration dialog via **OK**.



For details to the device assignment, refer to section *Device Assignment* in this manual.

B.) Open the License pane

- In the FDT container **netDevice** right click to the device icon.
- From the context menu select **Additional Functions > License**.
- The **License pane** opens.

6.5.2 License Dialog

In the **License**¹ pane you can:

- check, which licenses for Master protocols or Utilities are present in the device (Position ① in the figure below),
- order licenses (Positions ② to ⑪),
- transfer licenses to the device ⑫.

License Type

	Existing	Order
Master protocols		
One General Master License	NO	<input type="checkbox"/>
Two General Master Licenses	NO	<input type="checkbox"/>
PROFIBUS Master	YES	<input type="checkbox"/>
CANopen Master	YES	<input type="checkbox"/>
DeviceNet Master	YES	<input type="checkbox"/>
AS-Interface Master	YES	<input type="checkbox"/>
PROFINET IO RT Controller	YES	<input type="checkbox"/>

Request Form, please fill out

Name	Value
License type	User Single Device License
Manufacturer*	0x0001
Article number*	1251100
Serial number*	20007
Chiptype*	0x00000001
Step*	0x00000000
Romcode revision*	0x00000000

Fields marked with "*" are mandatory.

Buttons: ④ (dropdown), ⑤ (E-mail...), ⑥ (Print Fax Form...), ⑦ (Telephone...), ⑧ (Export License Request...), ⑨ (dropdown), ⑩ (dropdown), ⑪ (dropdown), ⑫ (Download License), Close, Help.

Figure 72: License Pane



Note: To display further entries under **License Type**, move the scroll box ① downwards or upwards. To display further entries under **Request Form, please fill out**, move the scroll box ② downwards or upwards.

¹ The title bar contains the notation of the **device description**:
Symbolic Name [Device Description] <Station Address> (#Network ID).

6.5.3 Which Licenses are present in the Device?

Check, which licenses are present in the device.

How to proceed:

- Open the **License** pane as described.



Figure 73: License Pane - License Type

- Under **License Type** click at **Master protocols**.

➤ The **Master protocols** overview opens:

	Existing	Order
One General Master License	NO	<input type="checkbox"/>
Two General Master Licenses	NO	<input type="checkbox"/>
PROFIBUS Master	YES	<input type="checkbox"/>
CANopen Master	YES	<input type="checkbox"/>
DeviceNet Master	YES	<input type="checkbox"/>
AS-Interface Master	YES	<input type="checkbox"/>
PROFINET IO RT Controller	YES	<input type="checkbox"/>

Figure 74: License Pane – License Type / Master protocols

- Or click at **Utilities**.

➤ The **Utilities** overview opens:

	Existing	Order
OPC Server	NO	<input type="checkbox"/>
SYCON.net	NO	<input type="checkbox"/>
QVis Minimum Size	NO	<input type="checkbox"/>
QVis Standard Size	NO	<input type="checkbox"/>
QVis Maximum Size	NO	<input type="checkbox"/>
CoDeSys Minimum Size	NO	<input type="checkbox"/>

Figure 75: License Pane – License Type / Utilities

➤ The column **Existing** indicates which licenses are present in the device.

Yes = License is present in the device.

No = License is not present in the device.



Note: In newer versions of the present configuration software under **License Type** may be displayed additional licenses or other protocols that can be ordered later.

6.5.3.1 License for Master Protocols

One General Master License:

On the device maximally 1 communication protocol with master function can be implemented.

Two General Master Licenses:

On the device maximally 2 communication protocols with master function can be implemented.

The license includes the following Master protocols:

- AS-Interface Master
- CANopen Master
- DeviceNet Master
- EtherCat Master
- EtherNet/IP Scanner
- PROFIBUS Master
- PROFINET IO RT Controller
- sercos Master

6.5.3.2 License for Utilities

- SYCON.net
- OPC Server
- QVis Minimum Size
- QVis Standard Size
- QVis Maximum Size
- CoDeSys Minimum Size
- CoDeSys Standard Size
- CoDeSys Maximum Size

For the utilities QVis and CoDeSys, only one license each may be chosen alternatively as:

- *Minimum Size,*
- *Standard Size or*
- *Maximum Size.*



6.5.4 How to order a License

To order a license, proceed as follows:

	<i>Refer to Section:</i>	<i>Page</i>
1. Open the license dialog.	<i>Open License Dialog</i>	112
2. Select the required licenses.	<i>Selecting License</i>	116
3. Enter the ordering data.	<i>Ordering Data</i>	117
4. Place your order.	<i>Ordering the License</i>	119

6.5.5 Selecting License(s)

You can select licenses for Master protocols and / or utilities.

1. Selecting license(s) for Master protocol(s):
 - Under **License Type** click  at **Master protocols** in the **License** pane.
 - Under **Order** check as many licenses must run simultaneously on your device:
One General Master License or
Two General Master Licenses.
2. And/or select license(s) for utility(utilities):
 - In the **License** pane under **License Type** click  at **Utilities**.
 - Under **Order** check the required utility(utilities) (*single or several*)²:
 - SYCON.net
 - OPC Server
 - QVis Minimum Size*
 - QVis Standard Size*
 - QVis Maximum Size*
 - CoDeSys Minimum Size**
 - CoDeSys Standard Size**
 - CoDeSys Maximum Size**

2 For *) and **) minimum size, standard size or maximum size can be selected only as an alternative.

6.5.6 Ordering Data

1. Device Information

➤ The *Device Information* required for the order are read from the device and automatically filled in the order.

2. Ordering Data

Enter the *Ordering Data* into the **License** pane.

➤ Enter the **Data to manage the Order**.

6.5.6.1 Device Information (Ordering data read from the Device)

The following ordering data are read from the device and displayed in the **License** pane:

- Manufacturer
- Device number
- Serial number
- Chiptype
- Step (chip revision)
- Romcode revision
- Checksum (checksum of the device data)

➤ The gray fields under **Request Form, please fill out** contain the ordering data read from the device:

Request Form, please fill out

Name	Value
Manufacturer*	0x0001
Article number*	1251100
Serial number*	20007
Chiptype*	0x00000001
Step*	0x00000000
Romcode revision*	0x00000000
Checksum*	G

Fields marked with '*' are mandatory.

Figure 76: License Pane - Request Form, please fill out / Device Information

➤ These ordering data read out from the device are displayed automatically from the device.

6.5.6.2 Data to manage the Order (License Information)

For your order you must enter the following data to the **License** pane:

1. License Type (User Single Device License).

Name	Value
License type	User Single Device License

Figure 77: License Pane - Request Form, please fill out / License Type

- Select the license type under **Request Form, please fill out > Value**, (for future application, currently only *User Single Device License* can be selected).
- 2. Mandatory data to the order request (editable fields):
 - First Name
 - Surname
 - E Mail (address, to which the license download link shall be send.)
 - Telephone
 - Company
 - Address
 - Country
 - City, State, Zip

Name	Value
First name*	John
Surname*	Doe
E-Mail*	License@doe.com
Telephone*	0011223344-55
Fax	0011223344-100
Customer number	123456789
Company*	Doe Example LTD

Fields marked with '*' are mandatory.

Figure 78: License Pane - Request Form, please fill out / Mandatory data

- Enter all mandatory fields under **Request Form, please fill out > Value** (marked with*).
- 3. Additional order data, not mandatory (editable fields):
 - Fax
 - Customer Number
 - Order Number
 - Value added tax identification number
- Under **Request Form, please fill out > Value** enter all fields for the additional data, which are not mandatory.

6.5.7 Ordering the License

Place your order in the **License** pane. Therefore:



Figure 79: License Pane – Selecting the Subsidiary / Ordering / Contacts

1. Select the **Subsidiary** (4), to which the order shall be send.
2. Place the order:

- | | <i>Refer to Section:</i> | <i>Page</i> |
|---|---|-------------|
| • by E-Mail (5), | <i>Ordering the License <u>by E Mail</u></i> | 120 |
| • or by Fax (6)
or by Telephone (7), | <i>Ordering the License <u>by Fax or by Telephone</u></i> | 121 |
| • or in a File (8). | <i><u>Exporting License Request to a File</u></i> | 123 |
- The **Contact Data** of the selected subsidiary are displayed under Position (9), (10) and (11).

6.5.7.1 Ordering the License by E Mail

You can place your order by e-mail.



Figure 80: License Pane – placing the order by E-mail

- Click **E-mail...** 5.
- The order E-mail **License request** opens:

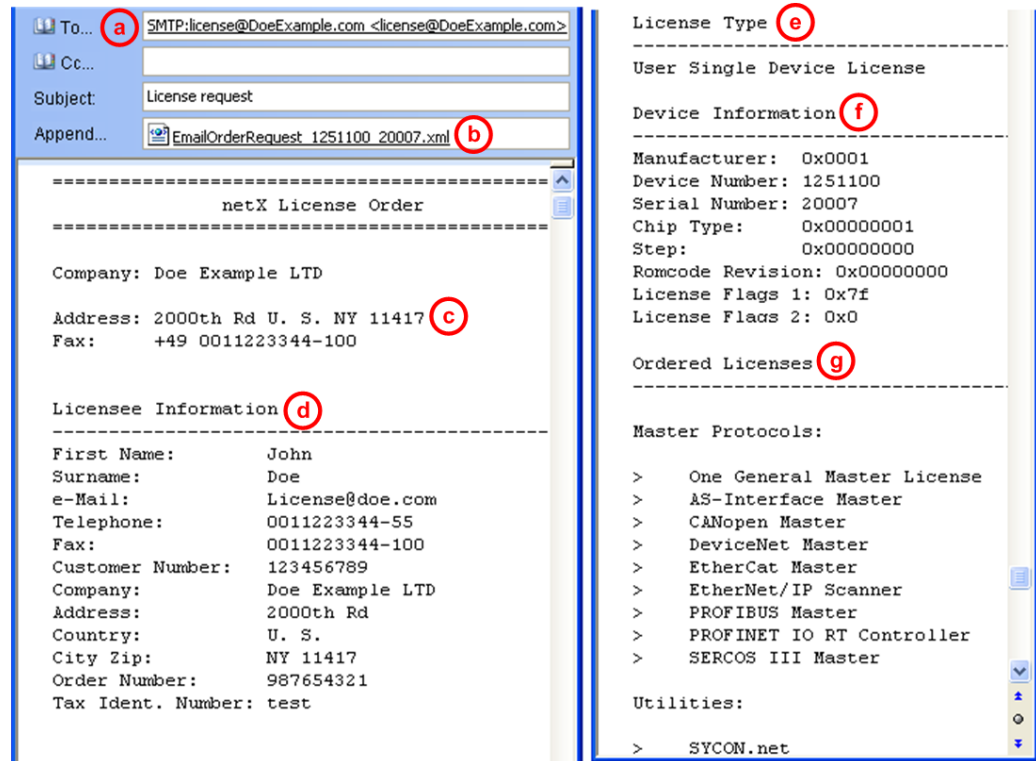


Figure 81: Example: Order E-Mail License request

- The order e-mail **License request** contains:
 - the **E-mail...** of the selected subsidiary (a),
 - the automatically generated **XML file** (b) *EmailOrderRequest_[Devicenumbrer]_[Serialnumber].xml* with a summary info of the **order information**,
 - the **Order Address** (c),
 - the **License Information** (d),
 - the **License Type** (e),
 - the **Device Data** (f),
 - the **ordered Licenses** (g).
- Send the order e-mail **License request**.
- The order process is complete.

6.5.7.2 Ordering the License by Fax or by Telephone

You can place your order by Fax or by Telephone.



Figure 82: License Pane - placing the order by Fax or by Telephone

- Click **Print Fax Form** ⑥ or **Telephone...** ⑦.
- The summary of the ordering data *PrintOrderRequest_[Devicenum-ber]_[Serialnumber].html* is opened in a browser window.



Note: If your browser does not display the order data or the window **Move Element** or **Copy Element** are displayed, check the safety settings of your system.

netX License Order Form

Doe Example LTD
2000th Rd
NY 11417
U. S.
fax: +11223344-100

Licensee Information ④

<i>First Name:</i>	John
<i>Surname:</i>	Doe
<i>e-Mail:</i>	License@doe.com
<i>Telephone:</i>	0011223344-55
<i>Fax:</i>	0011223344-100
<i>Customer No:</i>	123456789
<i>Company:</i>	Doe Example LTD
<i>Address:</i>	2000th Rd
<i>Country:</i>	U. S.
<i>City Zip:</i>	NY 11417
<i>Order Number:</i>	987654321
<i>Tax Ident. Number:</i>	test

License Type ⑤

User Single Device License

Device Information ⑥

<i>Manufacturer:</i>	0x0001
<i>Device Number:</i>	1251100
<i>Serial Number:</i>	20007
<i>Chip Type:</i>	0x00000001
<i>Step:</i>	0x00000000
<i>Romcode Revision:</i>	0x00000000
<i>License Flags 1:</i>	0x7f
<i>License Flags 2:</i>	0x0

Ordered Licenses ⑧

Master Protocols

- One General Master License
- Sercos III Master

Utilities

- SYCON.net

Date: _____

Signature: _____

Figure 83: Example: Order Data Form *PrintOrderRequest*

- The order data form contains:
- the **Order Address** ^c,
- the **License Information** ^d,
- the **License Type** ^e,
- the **Device Data** ^f,
- the **ordered Licenses** ^g.
- Print the order data form, sign it and send it by Fax.



Figure 84: License Pane – Fax Number of the selected Subsidiary

- Use the Fax number ¹⁰, which is displayed after the subsidiary was selected in the **License** pane.

Or:

- Keep ready the order data form and communicate the order data via telephone.



Figure 85: License Pane – Telephone Number of the selected Subsidiary

- Use the telephone number ¹¹, which is displayed after the subsidiary was selected in the **License** pane.
- The order process is complete.

6.5.7.3 Exporting License Request to a File

If you are working on a process computer without an e-mail client, you can export your order information to a file, save the file to a removable disk and place your order manually via e-mail from a different PC.



Figure 86: License Pane - Ordering by exported File and E-Mail

- Click **Export License Request...** 8.
- The window **Browse For Folder** is displayed.
- Choose for or create a new folder on a removable disk.
- Save the automatically generated **XML file** *EmailOrderRequest_- [Devicenumbrer]_[Serialnumber].xml* with a summary info of the **order information** to this folder.
- Send this file from a PC with an e-mail client manually via e-mail.
- Therefore, use an e-mail address, which is displayed after the subsidiary was selected in the **License** pane (see Position 9 Figure *License Pane*).
- The order process is complete.

6.5.8 How to get the License and transfer it to the Device



Note: License files can only be delivered via e-mail. The e-mail contains a link to download the license file.

According to the license you ordered, you will receive an e-mail containing a **Link to download the License File**. This leads to a server PC on which the license file is provided. Using the received link you will have to save the license file on your PC and then transfer the license to your device. If your e-mail client is on another PC as your device, you must save your license file e. g. to an USB stick.

Steps how to proceed


1. Save the license file to a PC or a disk.
 - Click to the **Link to download the License File** in the e-mail.
 - Save the license file *.nxl to a PC or a removable disk.
2. Download the license file to the device.
 - Respectively connect the removable disk with the license file to the PC, which is connected to your device.
 - Click **Download License**  in the **License** pane in the configuration software.



Figure 87: License Pane - Download License

- The File selection window **Open** is displayed.
 - Therein select the license file *netX License Files (*.nxl)*.
 - Click **Open**.
 - The license file is transferred to the device.
 - After this the license is present in the device and is activated with the next device reset.
3. Activate Device Reset



Hint: To activate the license in the first device, a device reset is required.

- To check whether the license has been activated, follow the steps in section *Which Licenses are present in the Device?*

7 Diagnosis

7.1 Overview Diagnosis

The dialog **Diagnosis** serves to diagnose the device behavior and communication errors. For diagnosis the device must reside in online state.

Diagnosis Panes

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

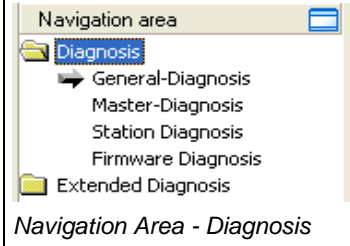
PROFINET IO-Controller DTM	Folder Name / Section	Manual Page
	<i>General Diagnosis</i>	126
	<i>Master Diagnosis</i>	128
	<i>Station Diagnosis</i>	129
	<i>Firmware Diagnosis</i>	130

Table 32: Descriptions of the Diagnosis Panes



Online Connection to the Device

Note: Accessing the **Diagnosis** panes of the PROFINET IO Controller DTM requires an online connection from the PROFINET IO Controller DTM to the PROFINET IO Controller device. For further information refer to section *Connecting/Disconnecting Device* on page 92.

How to proceed

1. In the Controller DTM diagnosis dialog check whether the communication is OK:

Diagnosis > General Diagnosis > Device status "Communication" must be green!

2. **"Communication"** is green: Open the **IO Monitor** and test the input or output data..
3. **"Communication"** is not green: Use **Diagnosis** and **Extended diagnosis** for troubleshooting.

Extended Diagnosis

The **Extended Diagnosis** helps to find communication and configuration errors, when default diagnosis fails. For further information refer to section *Overview Extended Diagnosis* on page 131.

7.2 General Diagnosis

Information regarding the Device State and other general diagnosis parameters are displayed in the **General Diagnosis** dialog.

General Diagnosis

Device state

- ☐ Communication
- ☒ Run
- ☐ Ready
- ☐ Error

Network state

- ☒ Operate
- ☐ Idle
- ☐ Stop
- ☐ Offline

Configuration state













- ☐ Configuration locked
- ☐ New configuration pending
- ☐ Reset required
- ☒ Bus ON

Communication error:

Watchdog time:

Error count:

Figure 88: General Diagnosis

LED	Meaning	Color	State
Device State			
Communication	Shows whether the PROFINET IO device executes the network communication.	 (green)	In COMMUNICATION state
		 (gray)	Not in COMMUNICATION state
Run	Shows whether the PROFINET IO device has been configured correctly.	 (green)	Configuration OK
		 (gray)	Configuration not OK
Ready	Shows whether the PROFINET IO device has been started correctly. The PROFINET IO device waits for a configuration.	 (yellow)	Device READY
		 (gray)	Device not READY
Error	Shows whether the PROFINET IO device records a device status error. For further information about the error characteristics and the number of counted errors refer to the extended diagnosis.	 (red)	ERROR
		 (gray)	No ERROR
Network State			
Operate	Shows whether the PROFINET IO device is in data exchange. In a cyclic data exchange the input data or the output data of the PROFINET IO Controller are transmitted to the PROFINET IO Device.	 (green)	In OPERATION state
		 (gray)	Not in OPERATION state
Idle	Shows whether the PROFINET IO device is in idle state.	 (yellow)	In IDLE state
		 (gray)	Not in IDLE state













LED	Meaning	Color	State
Stop	Shows whether the PROFINET IO device is in Stop state: There is no cyclic data exchange at the PROFINET IO network. The PROFINET IO device was stopped by the application program or it changed to the Stop state because of a bus error.	 (red)	In STOP state
		 (gray)	Not in STOP state
Offline	The PROFINET IO Controller is offline as long as it does not have a valid configuration.	 (yellow)	In OFFLINE state
		 (gray)	Not in OFFLINE state
Configuration State			
Configuration locked	Shows whether the PROFINET IO device configuration is locked, to avoid the configuration data are typed over.	 (yellow)	Configuration LOCKED
		 (gray)	Configuration not LOCKED
New Configuration pending	Shows whether a new PROFINET IO device configuration is available.	 (yellow)	New Configuration pending
		 (gray)	No new Configuration pending
Reset required	Shows whether a firmware reset is required as a new PROFINET IO device configuration has been loaded into the device.	 (yellow)	RESET required
		 (gray)	No RESET required
Bus ON	Shows whether the bus communication was started or stopped. I. e., whether the device is active on the bus or no bus communication to the device is possible and no response telegrams are sent.	 (green)	Bus ON
		 (gray)	Bus OFF

Table 33: Indication General Diagnosis

Parameter	Meaning
Communication Error	Shows the name of the communication error. If the cause of error is resolved, the value will be set to zero again.
Watchdog time	Shows the watchdog time in ms.
Error Count	This field holds the total number of errors detected since power-up, respectively after reset. The protocol stack counts all sorts of errors in this field no matter whether they were network related or caused internally.

Table 34: Parameter General Diagnosis

7.3 Master Diagnosis



Note: The PROFINET IO specification defines the designations "Controller" instead of "Master" and "Device" instead of "Slave". The master diagnosis is a general diagnostic function by the configuration software and therefore uses the designations "Master" and "Slave".

Information regarding the Slave State, slave errors and slaves configured, active or in diagnostic are displayed in the **Master Diagnosis** dialog.

Master Diagnosis	
Slave state	failed
Slave error log indicator	available
Configured slaves	2
Active slaves	0
Slaves with diagnostic	2

Figure 89: Master Diagnosis

Parameter	Meaning	Range of Value / Default Value
Slave state	Shows whether slave state is ok or not. The Slave state field for Master diagnosis shows whether the Master is in cyclic data exchange to all configured slaves. In case there is at least one slave missing or if the slave has a diagnostic request pending, the status will be set to FAILED. For protocols that support non-cyclic communication only, the slave state is set to OK as soon as a valid configuration is found.	UNDEFINED, OK, FAILED
Slave error log indicator	Shows whether the Slave Error Log Indicator is available. The error log indicator field holds the number of entries in the internal error log. If all entries are read from the log, the field will be set to zero.	EMPTY, AVAILABLE
Configured slaves	Shows number of configured slaves. Number of configured slaves in the network according to the slave list derived from the configuration database created by the configuration software. The list includes the slaves to which the Master has to open a connection.	
Active slaves	Shows number of active slaves. Number of slaves in data exchange mode. The list includes the slaves to which the Master has successfully opened a connection.	
Slaves with diagnostic	Shows number of slaves with diagnostic. Number of Slaves with diagnosis or error slaves.	

Table 35: Parameter Master Diagnosis

7.4 Station Diagnosis

In the Station diagnosis all disposal PROFINET stations (1 ... 128) and their states are shown. If the device is connected, the DTM will update this display cyclically.

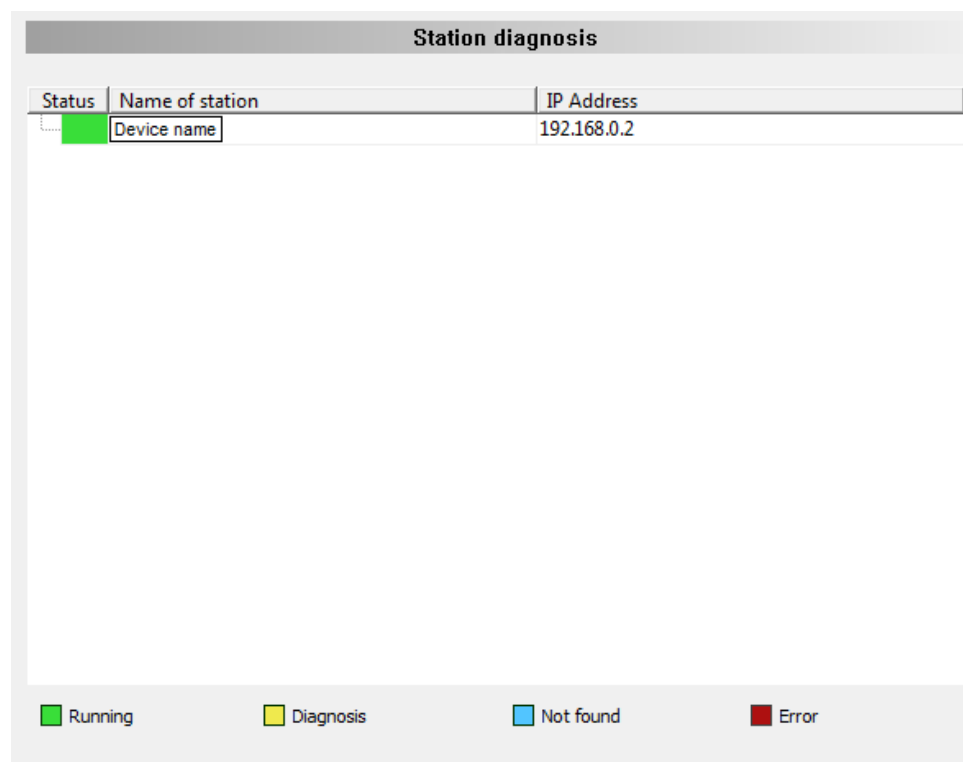


Figure 90: Station diagnosis

Parameter	Meaning	Range of Value / Default Value
Status	Indication of whether the device connected to this station address is running, whether diagnostic data are pending, whether the device was not found or whether there is an error message for this device.	Running, Diagnosis, Not found, Error
Name of stations	Network name of the PROFINET IO-Device station.	1 - 240 characters
IP Address	The IP address of the PROFINET IO-Device station. If the device was not found, or if a diagnosis or an error message for the device is pending, no IP address appears.	Valid IP address

Table 36: Parameters for Station diagnosis

The legend below describes the possible values for the state of a device, which is assigned to a station address.

Color	Name	Meaning
green	Running	The device associated with this station address is running.
yellow	Diagnosis	Diagnosis is available for the device associated with this station address.
blue	Not found	The device associated with this station address was parameterized, but not found.
red	Error	An error message is available for the device associated with this station address. For the status, 'error' additionally a textual error messages can appear.

Table 37: Possible Values for the Status

7.5 Firmware Diagnosis

In the dialog **Firmware Diagnosis** the current task information of the firmware is displayed.

Under **Firmware** or **Version** the name of the firmware and version (including the date) are indicated.

Firmware Diagnosis

Firmware:

PROFINET IO Controller

Version:

2.6.0 (Build 5)

Date:

3.2.2012

Task information:

Task	Name of task	Version	Prio...	Description	State
0	RX_IDLE	1.0	63	RX IDLE Task.	Task Status ok. (0x00000000)
1	RX_TIMER	1.0	1	rcX Timer.	Task Status ok. (0x00000000)
2	RX_SYSTEM	1.16	32	Middleware Syste...	Task Status ok. (0x00000000)
3	DPM_COMO...	1.0	50	TLR-Router DPM.	Task Status ok. (0x00000000)
4	DPM_COMO...	1.0	51	TLR-Router DPM.	Task Status ok. (0x00000000)
5	TlrTimer	0.0	17	The task identifier ...	Task Status ok. (0x00000000)
6	MARSHALLER	2.0	59	Marshaller: Main T...	Task Status ok. (0x00000000)
7	T_PNIO_EDD	1.0	16	PROFINET IO EDD...	Task Status ok. (0x00000000)
8	T_PNIO_ACP	1.0	18	PROFINET IO ACP...	Task Status ok. (0x00000000)
9	T_PNIO_DCP	1.0	19	PROFINET IO DCP...	Task Status ok. (0x00000000)
10	T_PNIO_MGT	1.0	20	PROFINET IO Man...	Task Status ok. (0x00000000)
11	TCP_UDP	2.16	21	TCPUDP task (TCP...	Task Status ok. (0x00000000)
12	T_RPC	4.0	22	RPC Task.	Task Status ok. (0x00000000)
13	T_PNIO_CM...	1.0	23	PROFINET IO-Con...	Task Status ok. (0x00000000)
14	T_PNIO_AP...	1.0	24	PROFINET IO-Con...	Task Status ok. (0x00000000)
15	T_PNIO_AP...	1.0	25	PROFINET IO-Con...	Task Status ok. (0x00000000)
16	SNMP-Server	4.1	29	SNMP Server Task.	Task Status ok. (0x00000000)
17	Mib-Database	4.1	30	MIB Database for ...	Task Status ok. (0x00000000)
18	LLDP-Task	4.2	27	LLDP protocol task	Task Status ok. (0x00000000)
19	PACKET_RO...	2.0	60	Marshaller: Packet...	Task Status ok. (0x00000000)

Figure 91: Firmware Diagnosis (Example)

Task Information:

The table **Task Information** is listing the task information of the single firmware tasks.

Column	Meaning
Task	Task number
Name of task	Name of the task
Version	Version number of the task
Prio	Priority of the task
Description	Description of the task
Status	Current status of the task

Table 38: Description Table Task Information

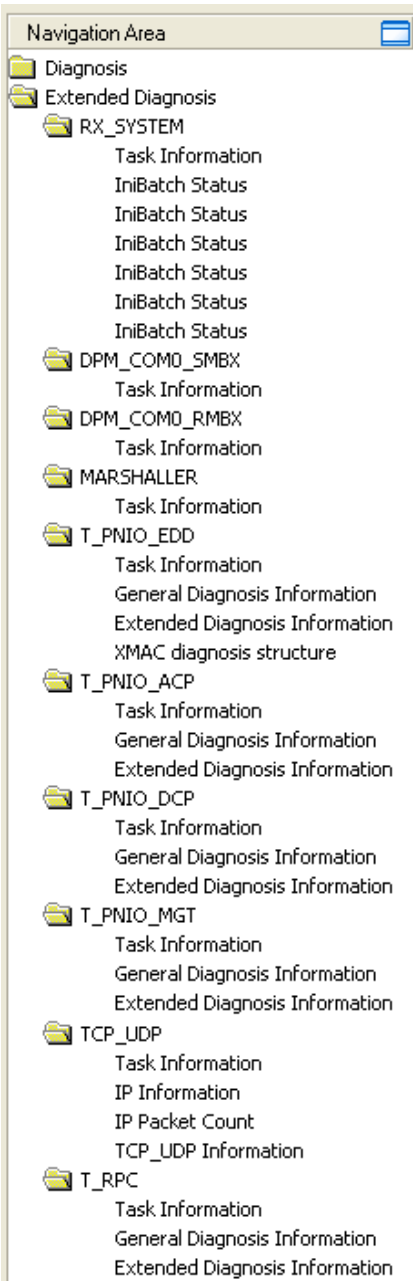
8 Extended Diagnosis

8.1 Overview Extended Diagnosis

The **Extended Diagnosis** of the PROFINET IO-Controller DTM helps to find communication and configuration errors. Therefore it contains a list of diagnosis structures as online counter, states and parameters.

Dialog Panes “Extended Diagnosis”

The table below gives an overview for the **Extended Diagnosis** dialog panes descriptions:

PROFINET IO-Controller DTM	Folder Name in the Navigation Area	Dialog Pane	Manual Page
 <p>Navigation Area</p> <ul style="list-style-type: none"> Diagnosis <ul style="list-style-type: none"> Extended Diagnosis <ul style="list-style-type: none"> RX_SYSTEM <ul style="list-style-type: none"> Task Information IniBatch Status IniBatch Status IniBatch Status IniBatch Status IniBatch Status IniBatch Status DPM_COMO_SMBX <ul style="list-style-type: none"> Task Information DPM_COMO_RMBX <ul style="list-style-type: none"> Task Information MARSHALLER <ul style="list-style-type: none"> Task Information T_PNIO_EDD <ul style="list-style-type: none"> Task Information General Diagnosis Information Extended Diagnosis Information XMAC diagnosis structure T_PNIO_ACP <ul style="list-style-type: none"> Task Information General Diagnosis Information Extended Diagnosis Information T_PNIO_DCP <ul style="list-style-type: none"> Task Information General Diagnosis Information Extended Diagnosis Information T_PNIO_MGT <ul style="list-style-type: none"> Task Information General Diagnosis Information Extended Diagnosis Information TCP_UDP <ul style="list-style-type: none"> Task Information IP Information IP Packet Count TCP_UDP Information T_RPC <ul style="list-style-type: none"> Task Information General Diagnosis Information Extended Diagnosis Information 	RX-SYSTEM	Task Information	133
		IniBatch Status	134
	DPM_COMO_SMBX	Task Information	133
	DPM_COMO_RMBX	Task Information	133
	MARSHALLER	Task Information	133
	T_PNIO_EDD	Task Information	133
		General Diagnosis Information	135
		Extended Diagnosis Information	136
		XMAC Diagnosis Structure	137
	T_PNIO_ACP	Task Information	133
		General Diagnosis Information	135
		Extended Diagnosis Information	138
	T_PNIO_DCP	Task Information	133
		General Diagnosis Information	135
		Extended Diagnosis Information	139
	T_PNIO_MGT	Task Information	133
		General Diagnosis Information	135
		Extended Diagnosis Information	140
	TCP_UDP	Task Information	133
		IP Information	141
		IP Packet Counter	142
		TCP_UDP Information	142
	T_RPC	Task Information	133
		General Diagnosis Information	135
		Extended Diagnosis Information	143
	T_PNIO_CMCTL	Task Information	133
		General Diagnosis Information	135
		Extended Diagnosis Information	144
	T_PNIO_APCTL	Task Information	133
		General Diagnosis Information	135
		Extended Diagnosis Information	145
	T_PNIO_APCFG	Task Information	133
		General Diagnosis Information	135








PROFINET IO-Controller DTM	Folder Name in the Navigation Area	Dialog Pane	Manual Page
 T_PNIO_CMCTL Task Information General Diagnosis Information Extended Diagnosis Information  T_PNIO_APCTL Task Information General Diagnosis Information Extended Diagnosis Information  T_PNIO_APCFG Task Information General Diagnosis Information Extended Diagnosis Information  SNMP-Server Task Information  Mib-Database Task Information  LLDP-Task Task Information  PACKET_ROUTER Task Information		<i>Extended Diagnosis Information</i>	146
	<i>SNMP-Server</i>	<i>Task Information</i>	133
	<i>MiB Database</i>	<i>Task Information</i>	133
	<i>LLDP-Task</i>	<i>Task Information</i>	133
	<i>PACKET_ROUTER</i>	<i>Task Information</i>	133
<i>Navigation Area - Extended Diagnosis</i>			

Table 39: Descriptions of the Dialog Panes Extended Diagnosis

Online Connection to the Device



Note: Accessing the **Extended Diagnosis** dialog panes of the PROFINET IO-Controller DTM requires an online connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device. For further information refer to section *Connecting/Disconnecting Device* on page 93.

8.2 Task Information

Task Information	
Task states	
Name	Value
Identifier	
Major version	<i>[The displayed values depend from the corresponding task]</i>
Minor version	
Maximum Packet size	
Default Que	
Unique identifier	
Init result	

Figure 92: Extended Diagnosis > [Folder Name] > Task Information Example Display

Name	Description
Identifier	Identification number of the task
Major version	Task version, contains incompatible changes
Minor version	Task version, contains compatible changes
Maximum packet size	Maximum packet size, which the task sends
Default Queue	Queue handle, which is accessible via DPM by mailbox.
UUID	Unique user ID, 16 Byte indicator used for task identification and its affiliation e. g. to a stack (therein different identification data are coded in).
Init result	Error Code, 0= no Error The description of the error codes can be found in this manual or in the corresponding software reference manuals.

Table 40: Extended Diagnosis > [Folder Name] > Task Information

8.3 IniBatch Status

IniBatch-Status	
Task states	
Name	Value
Communication Channel	0
Current State	Error
IniBatch Result	No DBM file
OpenDbm Result	24975
SendPacket Result	0
Confirmation Result	0
Last Packet Number	0
Last Packet Command	0
Last Packet Length	0
Last Packet Destination	0

Figure 93: Extended Diagnosis > [Folder Name] > IniBatch Status Example Display

Name	Description
Communication Channel	Number of the communication channel used by the device.
Current State	Idle; IniBatch packets in progress; Retrying to send last packet; Error
IniBatch Result	Ok; No DBM file; No Packet table; No data set available; Data set is shorter than packet length; Packet Buffer is shorter than Packet length; Invalid packet destination; Logical queue not defined Send packet failed; Too many retries; Error in confirmation packet status
OpenDbm Result	Error when opening the IniBatch data base Under "OpenDbm Result" the error code is typed in, when "IniBatch Result" == "No DBM file" (1) is.
SendPacket Result	Error when sending a packet Under "SendPacket Result" the error code is typed in, when "IniBatch Result" == "send packet failed" (8) is.
Confirmation Result	Confirmation error when sending packets Under "Confirmation Result" the packet specific error code from the ulSta is typed in, when "IniBatch Result" == "Error in confirmation packet status" (10) is.
Last Packet Number	Value depends by the communication system.
Last Packet Command	Value depends by the communication system.
Last Packet Length	Value depends by the communication system.
Last Packet Destination	Value depends by the communication system.

Table 41: Extended Diagnosis > [Folder Name] > IniBatch Status

The task status "Confirmation Result" is bus specific. The other task statuses are rcx-related error codes.

8.4 General Diagnosis Information

general Diagnosis Information	
Task states	
Name	Value
Last TLR error code	Operation succeeded.
Last PNIO error code	Operation succeeded.
TLR Error Counter (may count single error several times!)	0
PNIO Error Counter (may count single error several times!)	0
active PM Counter	0
Send Packet Error Counter	0
Malloc Error Counter	0
ErrExternal (Received unsupported Requests)	0
ErrInternal (Received unsupported Confirmations)	0
maximum Pool usage	0
current Pool usage	0

Figure 94: Extended Diagnosis > [Folder Name] > General Diagnosis Information

Name	Description
Last TLR error code	Error code of the last internally occurred error.
Last PNIO error code	Error code of the last externally occurred error which has been reported by an IO Device.
TLR Error Counter (may count single error several times!)	Counts the number of occurred TLR error codes.
PNIO Error Counter (may count single error several times!)	Counts the number of occurred PNIO error codes.
Active PM Counter	Counter of the active protocol machines in the task.
Send Packet Error Counter	Counts how often a task sends a packet to another task and this fails.
Malloc Error Counter	Counts how often storage capacity is requested in the operating system and the operating system cannot follow this demand.
ErrExternal (Received unsupported Requests)	Counts how often an unknown request packet was received.
ErrInternal (Received unsupported Confirmations)	Counts how often an unknown confirmation packet was received.
maximum Pool usage*	Counts how many pool elements were used simultaneously as a maximum.
current Pool usage*	Counts how many pool elements are used currently.
*Not used for the diagnosis task „T_RPC“.	

Table 42: Extended Diagnosis > [Folder Name] > General Diagnosis Information

8.5 T_PNIO_EDD

8.5.1 Extended Diagnosis Information

extended Diagnosis Information	
Task states	
Name	Value
Cyclic Frames sent	0
missing cyclic Frames counter (CPM)	0

Figure 95: Extended Diagnosis > T_PNIO_EDD > Extended Diagnosis Information

Name	Description
Cyclic Frames sent	Counts the sent cyclical frames.
Missing cyclic Frames counter (CPM)	Counts the missing cyclical frames agreed on.

Table 43: Extended Diagnosis > T_PNIO_EDD > Extended Diagnosis Information

8.5.2 XMAC Diagnosis Structure

XMAC diagnosis structure	
Task states	
Name	Value
FramesTransmittedOk	0
SingleCollisionFrames	0
MultipleCollisionFrames	0
LateCollisions	0
LinkDownDuringTransmission	0
UtxUnderflowDuringTransmission	0
FramesReceivedOk	0
FrameCheckSequenceErrors	0
AlignmentErrors	0
FrameTooLongErrors	0
RuntFramesReceived	0
CollisionFragmentsReceived	0
FramesDroppedDueLowResource	0
FramesDroppedDueUrxOverflow	0

Figure 96: Extended Diagnosis > T_PNIO_EDD > XMAC Diagnosis Structure

The values of the XMAC diagnosis structure are read every 2 seconds from the XMACs (hardware).

Name	Description	Value / Range of Values
FramesTransmittedOk	Number of the correctly received Ethernet frames	0..4294967295
SingleCollisionFrames	Number of the frames involved in a collision	0..4294967295
MultipleCollisionFrames	Number of frames involved in several collisions	0..4294967295
LateCollisions	Number of clashed frames after at least 512bit of the frame have been transmitted	0..4294967295
LinkDownDuringTransmission	Number of frames sent during a broken connection	0..4294967295
UtxUnderflowDuringTransmission	Number of frames sent erroneously because of buffer underflow	0..4294967295
FramesReceivedOk	Number of correctly received frames	0..4294967295
FrameCheckSequenceErrors	Number of corruptly received frames (FCS check failed)	0..4294967295
AlignmentErrors	Number of frames received in which its length is not an even number of Bytes	0..4294967295
FrameTooLongErrors	Number of frames received in which its length exceeds the maximum permitted frame length	0..4294967295
RuntFramesReceived	Number of frames received undamaged with a length of 42..63 Bytes. (Under run of the minimum permitted frame length)	0..4294967295
CollisionFragmentsReceived	Number of frames received corruptly with a length of 42..63 Bytes. (FCS check failed)	0..4294967295
FramesDroppedDueLowResource	Number of frames lost because of memory deficiency	0..4294967295
FramesDroppedDueUrxOverflow	Number of frames sent because of buffer underflow	0..4294967295

Table 44: Extended Diagnosis > T_PNIO_EDD > XMAC Diagnosis Structure

8.6 T_PNIO_ACP

8.6.1 Extended Diagnosis Information

extended Diagnosis Information	
Task states	
Name	Value
Received unsupported Frames	0
active Consumer Protocol Machines	0
active Provider State Machines	0
received high priority alarms	0
received low priority alarms	0

Figure 97: Extended Diagnosis > T_PNIO_ACP > Extended Diagnosis Information

Name	Description
Received unsupported Frames	Frames which can not be used by the consumer.
active Consumer Protocol Machines	Number of state machines supervised by the cyclical communication consumer = receiver (supervises frames of the IO devices received)
active Provider State Machines	Number of state machines, the frames transmit to the devices
received high priority alarms	Number of high priority alarms for PROFINET IO
received low priority alarms	Number of low priority alarms for PROFINET IO

Table 45: Extended Diagnosis > T_PNIO_ACP > Extended Diagnosis Information

8.7 T_PNIO_DCP

8.7.1 Extended Diagnosis Information

extended Diagnosis Information	
Task states	
Name	Value
Active Application Timers Counter	0
Erroneous Frames received	0
Ident Request sent Counter	0
Ident Response received Counter	0
DCP Set Requests sentcounter	0
Positiv DCP Set Responses	0
Negativ DCP Set Responses	0
DCP Hello Requests Received	0
Hello reported to NRPM	0

Figure 98: Extended Diagnosis > T_PNIO_DCP > Extended Diagnosis Information

Name	Description
Active Application Timers Counter	Software timer actually running in the task
Erroneous Frames received	Counter for erroneous frames received
Ident Request sent Counter	Counter for Ident Requests sent
Ident Response received Counter	Counter for Ident Responses received
DCP Set Requests sentcounter	Counter for DCP Set Requests sent
Positive DCP Set Responses	Counter for Positive DCP Set Responses
Negative DCP Set Responses	Counter for Negative DCP Set Responses
DCP Hello Requests Received	Counter for DCP Hello Requests received
Hello reported to NRPM	Counter for Hello reported to the NRPM state machine

Table 46: Extended Diagnosis > T_PNIO_DCP > Extended Diagnosis Information

8.8 T_PNIO_MGT

8.8.1 Extended Diagnosis Information

extended Diagnosis Information	
Task states	
Name	Value
Ident Requests Sent	0
Ident Responses received (Conflict)	0
Ident Responses received (Forbid)	0
Ident Responses received (Permid)	0
Identify Q Indications received (Multiple)	0
Identify Q Indications received (Forbid)	0
Identify Q Indications received (Permid)	0
NRPM Init Request Counter	0
NRPM Init Confirmation Counter	0
NRPM Init Error Counter	0
Identify Q Indications received (Ident ALL)	0

Figure 99: Extended Diagnosis > T_PNIO_MGT > Extended Diagnosis Information

Name	Description
Ident Requests Sent	PROFINET IO specific service
Ident Responses received (Conflict)	Status of the internal status machines in the controller
Ident Responses received (Forbid)	
Ident Responses received (Permid)	
Identify Q Indications received (Multiple)	Status of the internal status machines in the controller
Identify Q Indications received (Forbid)	
Identify Q Indications received (Permid)	
NRPM Init Request Counter	Counter for special PROFINET IO services
NRPM Init Confirmation Counter	Counter for special PROFINET IO services
NRPM Init Error Counter	Counter for special PROFINET IO services
Identify Q Indications received (Ident ALL)	Counter for special PROFINET IO services

Table 47: Extended Diagnosis > T_PNIO_MGT > Extended Diagnosis Information

8.9 TCP_UDP

8.9.1 IP Information

IP Information	
Task states	
Name	Value
Task State	3
Error Count	2
Last Error	0xC0000101
IP Address	0.0.0.0
Net Mask	0.0.0.0
Gateway	0.0.0.0

Figure 100: Extended Diagnosis > TCP_UDP > IP-Information

Name	Description
Task State	Actual state of the protocol process: 0 = Task not initialized 1 = Task is running 2 = Task initialized 3 = Initialization error
Error Counter	Counter for errors
Last Error	Last occurred error (Description see appropriate manual)
IP Address	IP address of the PROFINET IO-Device station.
Net Mask	Network mask of the PROFINET IO-Device station.
Gateway	Gateway address of the PROFINET IO-Device station.

Table 48: Extended Diagnosis > TCP_UDP > IP-Information

8.9.2 IP Packet Counter

IP Packet Counter	
Task states	
Name	Value
Packet Recv TCP	0
Packet Recv UDP	0
Packet Recv ICMP	0
Packet Recv IP Header Err	0
Packet Recv ARP	0
Packet Recv Unknown	0

Figure 101: Extended Diagnosis > TCP_UDP > IP Packet Counter

Name	Description
Packet Recv TCP	Counter for received TCP packets
Packet Recv UDP	Counter for received UDP packets
Packet Recv ICMP	Counter for received ICMP packets
Packet Recv IP Header Err	Counter for received IP packets with errors
Packet Recv ARP	Counter for received ARP packets
Packet Recv Unknown	Counter for received packets of an unknown type

Table 49: Extended Diagnosis > TCP_UDP > IP Packet Counter

8.9.3 TCP_UDP Information

TCP_UDP Information	
Task states	
Name	Value
Task State	3
Error Counter	2
Last Error	0xC0080032

Figure 102: Extended Diagnosis > TCP_UDP > TCP_UDP Information

Name	Description
Task State	Actual state of the protocol process: 0 = Task not initialized 1 = Task is running 2 = Task initialized 3 = Initialization error
Error Count	Counter for errors
Last Error	Last occurred error (Description see appropriate manual)

Table 50: Extended Diagnosis > TCP_UDP > TCP_UDP Information

8.10 T_RPC

8.10.1 Extended Diagnosis Information

extended Diagnosis Information	
Task states	
Name	Value
PINGs sent	0
PINGs received	0
WORKINGs sent	0
WORKINGs received	0
NOCALLs sent	0
NOCALLs received	0
CANCELS sent	0
CANCELS received	0
REJECTs sent	0
REJECTs received	0
Requests sent	0
Requests received	0
Responses sent	0
Responses received	0
Fragments sent	0
Fragments received	0
Active Application Timers	0

Figure 103: Extended Diagnosis > T_RPC > Extended Diagnosis Information

The parameters under *T_RPC > Extended Diagnosis Information* represent PROFINET IO specific counters.

For further information refer to the PROFINET IO specification. [2], [3]

8.11 T_PNIO_CMCTL

8.11.1 Extended Diagnosis Information

extended Diagnosis Information	
Task states	
Name	Value
Release Request Counter	0
Received RPC RequestsCounter	0
Sent RPC Requests Counter	0
Module Diff Block Counter	0
Connect Request Counter	0
NRPM Init Request Counter	0
Positive NRPM Init Response Counter	0
Negativ NRPM Init Response Counter	0
Get Device Information counter	0
Read Request counter	0
Positive Read Response Counter	0
Negativ Read Response Counter	0
Write Request counter	0
Positive Write Response Counter	0
Negativ Write Response Counter	0

Figure 104: Extended Diagnosis > T_PNIO_CMCTL > Extended Diagnosis Information

The parameters under *T_PNIO_CMCTL > Extended Diagnosis Information* represent PROFINET IO specific counters.

For further information refer to the PROFINET IO specification. [2], [3]

8.12 T_PNIO_APCTL

8.12.1 Extended Diagnosis Information

extended Diagnosis Information	
Task states	
Name	Value
active Application Timers	2
Received Alarms	0
Received Diagnosis Alarms	0
Diagnosis entries read by Application	0
Alarms indicated to Application	0
Counter for packets that could not be sent to application	0
Flags	0x00000002

Figure 105: Extended Diagnosis > T_PNIO_APCTL > Extended Diagnosis Information

Name	Description
Active Application Timer	Number of active software timer
Received Alarms	Alarms read by the application
Received Diagnosis Alarms	
Diagnosis entries read by Application	
Alarms indicated to Application	
Counter for packets that could not be sent to application	Counts how often packets are sent from the firmware to the application and this fails.
Flags	Cached status data

Table 51: Extended Diagnosis > T_PNIO_APCTL > Extended Diagnosis Information

8.13 T_PNIO_APCFG

8.13.1 Extended Diagnosis Information

extended Diagnosis Information	
Task states	
Name	Value
Overhead for database	1716 Byte
Amount of configured IO-Devices	3
Amount of configured IOCRs	6
Amount of configured APIs	3
Amount of configured Modules	9
Amount of configured Submodules	18
Amount of configured SubmoduleDescriptions	18
Amount of configured Data Records	0
Amount of active IO-Devices	3
Amount of configured InterfaceSubmoduleItems	3
Amount of configured PortSubmoduleItems	6

Figure 106: Extended Diagnosis > T_PNIO_APCFG > Extended Diagnosis Information

The parameters under *T_PNIO_APCFG > Extended Diagnosis Information* represent PROFINET IO specific parameters.

9 Tools

9.1 Overview Tools

Under **Tools** the Packet Monitor and the IO Monitor are provided for test and diagnosis purposes.

Tools Panes

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

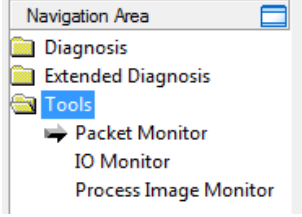
PROFINET IO-Controller DTM	Folder Name / Section	Manual Page
 <p>Navigation Area - Tools</p>	Packet Monitor	148
	IO Monitor	151
	Process Image Monitor	152

Table 52: Descriptions of the Diagnosis Panes

Online Connection to the Device



Note: Accessing the **Tools** dialog panes of the PROFINET IO-Controller DTM requires an online connection from the PROFINET IO-Controller DTM to the PROFINET IO-Controller device. For further information refer to section *Connecting/Disconnecting Device* on page 92.

9.2 Packet Monitor

The **Packet Monitor** serves for test and diagnosis purposes.

Data packets, i. e. messages are self-contained blocks of defined data length. The packets are used to communicate with the firmware and they are exchanged between the application (configuration software) and the firmware in the device. Packets can be sent once or cyclically to the connected device controlled by the user and packets received can be displayed.

Data packets comprise from a **Packet Header** and the **Send Data** or from a **Packet Header** and the **Receive Data**. The packet header can be evaluated by the receiver of the packet and contain the sender and receiver address, the data length, an ID number, status and error messages and the command or response code. The minimum packet size amounts 40 Byte for the packet header. The sending and receiving data are added.



For further information to the packet description refer to the *Protocol API Manual*.

- Open the **Packet Monitor** via **Tools > Packet Monitor**.

Figure 107: Packet Monitor

Display Mode switches the representation of the send and reception data between decimal and hexadecimal.

- Select **Reset Counter** to reset the packet counter.

9.2.1 Sending Packet

Figure 108: Send > Packet Header and Send Data

Packet Header

Under **Send > Packet Header** the elements of the packet header of the sending packet are displayed, which is transmitted from the application (configuration software) to the device. The packet header of the sending packets contain the elements described in the following table.

Element	Description	
Dest	Destination Queue Handle	Contains the identifier of the receiver for the packet (destination task queue of the firmware).
Src	Source Queue Handle	Contains the identifier of the sender of the packet (sending task).
Dest ID	Destination Queue Reference	Contains an identifier for the receiver of unsolicited sent packets from the firmware to the application (configuration software).
Src ID	Source Queue Reference	Contains an identifier of the sender.
Len	Packet Data Length (in Bytes)	Length of the send respectively receive data.
ID	Packet Identification As Unique Number	Identifies identical data packets among each other.
State	Status / Error Code	Transmits status or error codes to the packet sender.
Cmd	Command / Response Code	Command or respond code.
Ext	Extension	Field for extensions (reserved).
Rout	Routing Information	Internal value of the firmware.

Table 53: Descriptions Packet Header

- Under **Dest** select the receiver (*destination task queue*).
- Under **Cmd** select the command identification (*Request*).

Auto Increment ID is an increment for the identifier of the data packets and increments the ID by 1 for each newly sent packet.

Send Data

- Under **Send > Send data** enter the send data of the packet, which shall be transmitted from the application (configuration software) to the mailbox of the device. The meaning of the transmitted data depends on the command or response code.

Sending Packets once or cyclic

- To send packet once, select **Put packet**.
- To send packet cyclic, select **Put cyclic**.

9.2.2 Receiving Packet

The screenshot shows a software interface for receiving packets. On the left, under 'Receive', is the 'Packet header' section with fields for:

- Dest: 00000001
- Src: 00000000
- Dest ID: 00000000
- Src ID: 00000000
- Len: 00000012
- ID: 0000003E
- State: 00000000
- Cmd: 00002F01
- Ext: 00000000
- Rout: 00000000

 On the right, under 'Receive data:', is a table with columns 0-9 and a 'Counter: 0' label. The data is displayed in a grid where each row represents a byte offset (0 to 60) and each column represents a bit (0 to 9). The first row (offset 0) shows bit 0 as 1 and bit 4 as 0, with other bits being 0. Subsequent rows show various bit patterns.

Figure 109: Packet Header and Receive Data

Packet Header

Under **Receive > Packet Header** the elements of the packet header of the receiving packet are displayed, which are transmitted back from the device to the application (configuration software). The packet header of the receiving packets contain the elements described in the following table.

Element		Description
Dest	Destination Queue Handle	Contains the identifier of the receiver for the packet (destination task queue of the firmware).
Src	Source Queue Handle	Contains the identifier of the sender of the packet (sending task).
Dest ID	Destination Queue Reference	Contains an identifier for the receiver of unsolicited sent packets from the firmware to the application (configuration software).
Src ID	Source Queue Reference	Contains an identifier of the sender.
Len	Packet Data Length (in Bytes)	Length of the send respectively receive data.
ID	Packet Identification As Unique Number	Identifies identical data packets among each other.
State	Status / Error Code	Transmits status or error codes to the packet sender.
Cmd	Command / Response Code	Command or respond code.
Ext	Extension	Field for extensions (reserved).
Rout	Routing Information	Internal value of the firmware.

Table 54: Descriptions Packet Header

Receive Data

Under **Receive > Receive Data** the receiving data of the packet, which is transmitted back from the device to the application (configuration software) are displayed.

9.3 IO Monitor

The **IO Monitor** serves for test and diagnosis purposes. It provides to view data of the process data image and to change output data easily. The display is always in a Byte manner.



Note: Only change and write output data if you know that no plant disturbances are caused by this. All output data written by the IO Monitor are transmitted at the bus and have effect on subordinate drives, IO etc.

IO Monitor

Columns: 10 Display mode: Decimal

Input data

Offset: 0 Go

	0	1	2	3	4	5	6	7	8	9
0	227	207	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0
60	n	n	n	n	n	n	n	n	n	n

Output data

Offset: 0 Go

	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0
60	n	n	n	n	n	n	n	n	n	n

Update

Figure 110: IO Monitor

Columns switches the number of columns.

Display mode switches the representation of the input and output data between decimal and hexadecimal.

Offset / Go moves the indication of the data to the entered offset value.

➤ Enter the output value and select **Update**.

➤ Always the data of the process image are displayed, also when these Bytes have not been reserved by the configuration.

9.4 Process Image Monitor

The window **Process Image Monitor** lists the Device devices connected to the Controller, as well as the configured modules or input or output signals of the devices. This makes visible the fieldbus structure and the data structure of the device's input and output data transmitted at the bus. Furthermore the values of the signal data provided to the OPC server are displayed here.

➤ Open **Tools > Process Image Monitor**.

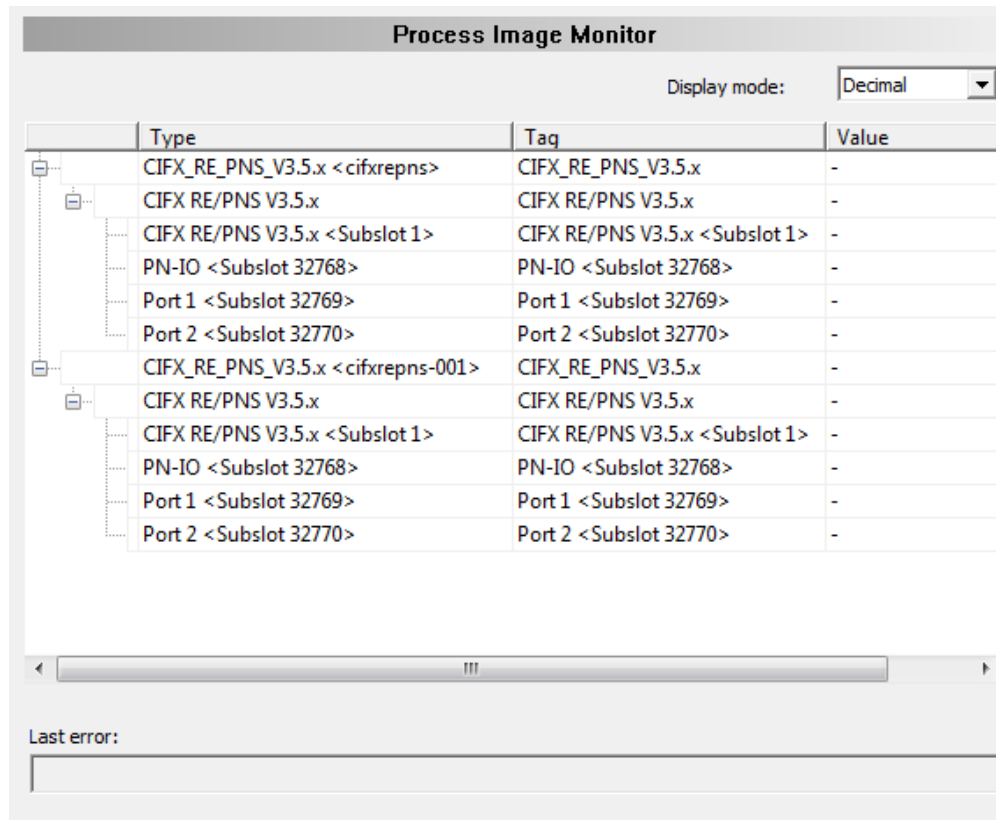
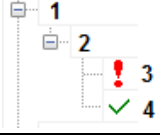





Figure 111: Window 'Process Image Monitor'

Parameter	Meaning	Range of Value / Value
Display Mode	Display of the values in the column Value in decimal or hexadecimal mode.	Decimal (Default), Hexadecimal
	The tree shows the structure of the devices (1), modules (2) and the input data (3) and output data (4).	
	Display when the input and output data are not completely read and analyzed.	
	Display when the input and output data are not valid.	
	Display when the input and output data are valid.	
Typ	Device labeling provided by the hardware: Also description of the modules or input or output signals configured to the device.	
TAG	Device name provided by the hardware (not changeable in the FDT container) or symbolic name for the modules configured to the device or for the input or output signals (changeable in the window Configuration > Process Data).	

Parameter	Meaning	Range of Value / Value
Value	Display of the valid input and output data values.	
Last Error	Last occurred error (Description see appropriate Application Programming Manual)	

Table 55: Notes to the Window 'Process Image Monitor'

10 Error Codes

10.1 Error Code Definition

For COM based application, like the ODM Server and ODM drivers, a common error definition is used, similar to the Microsoft Windows® HRESULT definition.

Error Code Structure:

COM Errors are HRESULTs, which are 32 bit values using the following layout:

```

3 3 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1
1 0 9 8 7 6 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0
+---+---+-----+-----+
|Sev|C|R|   Facility   |           Code           |
+---+---+-----+-----+
```

where

Sev - is the severity code:

00 - Success

01 - Informational

10 - Warning

11 - Error

C - is the Customer code flag

R - is a reserved bit

Facility - is the facility code

Code - is the facility's status code

In this common error definition, several error code regions are already reserved by Windows® itself, the ODM and some other modules.

10.2 Overview Error Codes

Overview Error Codes	Range
General Hardware Errors RCX Operating System	<i>RCX General Task:</i> 0xC02B0001 to 0xC02B4D52
	<i>RCX Common Status & Errors Codes::</i> 0x00000000 to 0xC002000C
	<i>RCX Status & Error Codes:</i> 0x00000000 to 0xC0000008
PROFINET IO Controller / Packet Status/Error Codes	<i>PNIO APCTL Status/Error Codes:</i> 0xC00C0001 to 0xC00C0053
	<i>PNIO APCFG Status/Error Codes:</i> 0xC0140001 to 0xC0140021
	Standard Error Codes: 0xC0140030 to 0xC0140031
	<i>PNIO CTL Status/Error Codes:</i> CMCTL-Task Status Codes: 0xC00A0001 to 0xC00A00A3 EDD Task Status/Error Codes: 0xC00E0001 to 0xC00E0002 ACP Task Status/Error Codes: 0xC0110010 to 0xC0110014 DCP Task Status/Error Codes: 0xC012000A to 0xC0120025 MGT Task Status/Error Codes: 0xC0130001 to 0xC0130111
	<i>PNIO CTL Diagnosis-Codes:</i> CMCTL-Task Diagnosis-Codes: 0xC00AF000 to 0xC00A F007 EDD Task Diagnosis-Codes: 0xC00EF001 to 0xC00EF010 ACP Task Diagnosis-Codes: 0xC011F001 to 0xC011F019 DCP Task Diagnosis-Codes: 0xC012F001 to 0xC012F014 MGT-Task Diagnosis-Codes: 0xC013F001 to 0xC013F015
	<i>RPC Task Status/Error Codes:</i> 0xC02E0001 to 0xC02E060B
	<i>RPC Task Diagnostic Codes:</i> 0xC02E0010 to 0xC02E0016
	<i>Other relevant PNIO Status/Error Codes:</i> 0xC0110020 to 0xC0110089
ODM Server	<i>General ODM Error Codes:</i> 0x8004C700 to 0x8004C761
	<i>General ODM Driver Error Codes:</i> 0x8004C7A0 to 0x8004C7C2
ODM Drivers	<i>cifX Driver Specific ODM Error:</i> 0x8004C001 to 0x8004C0A4
cifX Device Driver and netX Driver	<i>Generic Error:</i> 0x800A0001 to 0x800A0017
	<i>Generic Driver Error:</i> 0x800B0001 bis 0x800B0042
	<i>Generic Device Error:</i> 0x800C0010 bis 0x800C0041
netX Driver	<i>CIFX API Transport:</i> 0x800D0001 to 0x800D0013
	<i>CIFX API Transport Header State Error:</i> 0x800E0001 to 0x800E000B
DBM	<i>ODM Error Codes:</i> 0xC004C810 to 0xC004C878

Table 56: Overview Error Codes and Ranges



Further fieldbus specific error codes are described in the manuals of the corresponding protocol tasks.

10.3 General Hardware Error Codes

10.3.1 RCX General Task Errors

Error Code (Definition)	Value	Description
RCX_E_QUE_UNKNOWN	0xC02B0001	Unknown Queue
RCX_E_QUE_INDEX_UNKNOWN	0xC02B0002	Unknown Queue Index
RCX_E_TASK_UNKNOWN	0xC02B0003	Unknown Task
RCX_E_TASK_INDEX_UNKNOWN	0xC02B0004	Unknown Task Index
RCX_E_TASK_HANDLE_INVALID	0xC02B0005	Invalid Task Handle
RCX_E_TASK_INFO_IDX_UNKNOWN	0xC02B0006	Unknown Index
RCX_E_FILE_XFR_TYPE_INVALID	0xC02B0007	Invalid Transfer Type
RCX_E_FILE_REQUEST_INCORRECT	0xC02B0008	Invalid File Request
RCX_E_TASK_INVALID	0xC02B000E	Invalid Task
RCX_E_SEC_FAILED	0xC02B001D	Security EEPROM Access Failed
RCX_E_EEPROM_DISABLED	0xC02B001E	EEPROM Disabled
RCX_E_INVALID_EXT	0xC02B001F	Invalid Extension
RCX_E_SIZE_OUT_OF_RANGE	0xC02B0020	Block Size Out Of Range
RCX_E_INVALID_CHANNEL	0xC02B0021	Invalid Channel
RCX_E_INVALID_FILE_LEN	0xC02B0022	Invalid File Length
RCX_E_INVALID_CHAR_FOUND	0xC02B0023	Invalid Character Found
RCX_E_PACKET_OUT_OF_SEQ	0xC02B0024	Packet Out Of Sequence
RCX_E_SEC_NOT_ALLOWED	0xC02B0025	Not Allowed In Current State
RCX_E_SEC_INVALID_ZONE	0xC02B0026	Security EEPROM Invalid Zone
RCX_E_SEC_EEPROM_NOT_AVAIL	0xC02B0028	Security EEPROM Eeprom Not Available
RCX_E_SEC_INVALID_CHECKSUM	0xC02B0029	Security EEPROM Invalid Checksum
RCX_E_SEC_ZONE_NOT_WRITEABLE	0xC02B002A	Security EEPROM Zone Not Writeable
RCX_E_SEC_READ_FAILED	0xC02B002B	Security EEPROM Read Failed
RCX_E_SEC_WRITE_FAILED	0xC02B002C	Security EEPROM Write Failed
RCX_E_SEC_ACCESS_DENIED	0xC02B002D	Security EEPROM Access Denied
RCX_E_SEC_EEPROM_EMULATED	0xC02B002E	Security EEPROM Emulated
RCX_E_INVALID_BLOCK	0xC02B0038	Invalid Block
RCX_E_INVALID_STRUCT_NUMBER	0xC02B0039	Invalid Structure Number
RCX_E_INVALID_CHECKSUM	0xC02B4352	Invalid Checksum
RCX_E_CONFIG_LOCKED	0xC02B4B54	Configuration Locked
RCX_E_SEC_ZONE_NOT_READABLE	0xC02B4D52	Security EEPROM Zone Not Readable

Table 57: RCX General Task Errors

10.3.2 RCX Common Status & Errors Codes

Error Code (Definition)	Value	Description
RCX_S_OK	0x00000000	Success, Status Okay
RCX_E_FAIL	0xC0000001	Fail
RCX_E_UNEXPECTED	0xC0000002	Unexpected
RCX_E_OUTOFMEMORY	0xC0000003	Out Of Memory
RCX_E_UNKNOWN_COMMAND	0xC0000004	Unknown Command
RCX_E_UNKNOWN_DESTINATION	0xC0000005	Unknown Destination
RCX_E_UNKNOWN_DESTINATION_ID	0xC0000006	Unknown Destination ID
RCX_E_INVALID_PACKET_LEN	0xC0000007	Invalid Packet Length
RCX_E_INVALID_EXTENSION	0xC0000008	Invalid Extension
RCX_E_INVALID_PARAMETER	0xC0000009	Invalid Parameter
RCX_E_WATCHDOG_TIMEOUT	0xC000000C	Watchdog Timeout
RCX_E_INVALID_LIST_TYPE	0xC000000D	Invalid List Type
RCX_E_UNKNOWN_HANDLE	0xC000000E	Unknown Handle
RCX_E_PACKET_OUT_OF_SEQ	0xC000000F	Out Of Sequence
RCX_E_PACKET_OUT_OF_MEMORY	0xC0000010	Out Of Memory
RCX_E_QUE_PACKETDONE	0xC0000011	Queue Packet Done
RCX_E_QUE_SENDPACKET	0xC0000012	Queue Send Packet
RCX_E_POOL_PACKET_GET	0xC0000013	Pool Packet Get
RCX_E_POOL_GET_LOAD	0xC0000015	Pool Get Load
RCX_E_REQUEST_RUNNING	0xC000001A	Request Already Running
RCX_E_INIT_FAULT	0xC0000100	Initialization Fault
RCX_E_DATABASE_ACCESS_FAILED	0xC0000101	Database Access Failed
RCX_E_NOT_CONFIGURED	0xC0000119	Not Configured
RCX_E_CONFIGURATION_FAULT	0xC0000120	Configuration Fault
RCX_E_INCONSISTENT_DATA_SET	0xC0000121	Inconsistent Data Set
RCX_E_DATA_SET_MISMATCH	0xC0000122	Data Set Mismatch
RCX_E_INSUFFICIENT_LICENSE	0xC0000123	Insufficient License
RCX_E_PARAMETER_ERROR	0xC0000124	Parameter Error
RCX_E_INVALID_NETWORK_ADDRESS	0xC0000125	Invalid Network Address
RCX_E_NO_SECURITY_MEMORY	0xC0000126	No Security Memory
RCX_E_NETWORK_FAULT	0xC0000140	Network Fault
RCX_E_CONNECTION_CLOSED	0xC0000141	Connection Closed
RCX_E_CONNECTION_TIMEOUT	0xC0000142	Connection Timeout
RCX_E_LONELY_NETWORK	0xC0000143	Lonely Network
RCX_E_DUPLICATE_NODE	0xC0000144	Duplicate Node
RCX_E_CABLE_DISCONNECT	0xC0000145	Cable Disconnected
RCX_E_BUS_OFF	0xC0000180	Network Node Bus Off
RCX_E_CONFIG_LOCKED	0xC0000181	Configuration Locked
RCX_E_APPLICATION_NOT_READY	0xC0000182	Application Not Ready
RCX_E_TIMER_APPL_PACKET_SENT	0xC002000C	Timer App Packet Sent

Table 58: RCX Common Status & Errors Codes

10.3.3 RCX Status & Error Codes

Error Code (Definition)	Value	Description
RCX_S_OK	0x00000000	SUCCESS, STATUS OKAY
RCX_S_QUE_UNKNOWN	0xC02B0001	UNKNOWN QUEUE
RCX_S_QUE_INDEX_UNKNOWN	0xC02B0002	UNKNOWN QUEUE INDEX
RCX_S_TASK_UNKNOWN	0xC02B0003	UNKNOWN TASK
RCX_S_TASK_INDEX_UNKNOWN	0xC02B0004	UNKNOWN TASK INDEX
RCX_S_TASK_HANDLE_INVALID	0xC02B0005	INVALID TASK HANDLE
RCX_S_TASK_INFO_IDX_UNKNOWN	0xC02B0006	UNKNOWN INDEX
RCX_S_FILE_XFR_TYPE_INVALID	0xC02B0007	INVALID TRANSFER TYPE
RCX_S_FILE_REQUEST_INCORRECT	0xC02B0008	INVALID FILE REQUEST
RCX_S_UNKNOWN_DESTINATION	0xC0000005	UNKNOWN DESTINATION
RCX_S_UNKNOWN_DESTINATION_ID	0xC0000006	UNKNOWN DESTINATION ID
RCX_S_INVALID_LENGTH	0xC0000007	INVALID LENGTH
RCX_S_UNKNOWN_COMMAND	0xC0000004	UNKNOWN COMMAND
RCX_S_INVALID_EXTENSION	0xC0000008	INVALID EXTENSION

Table 59: RCX Status & Error Codes

10.3.3.1 RCX Status & Error Codes Slave State

Error Code (Definition)	Value	Description
RCX_SLAVE_STATE_UNDEFINED	0x00000000	UNDEFINED
RCX_SLAVE_STATE_OK	0x00000001	OK
RCX_SLAVE_STATE_FAILED	0x00000002	FAILED (at least one slave)

Table 60: RCX Status & Error Codes Slave State

10.4 Status /Error Codes PROFINET IO Controller

10.4.1 PNIO APCTL Status/Error Codes

PNIO APCTL Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_APCTL_COMMAND_INVALID	0xC00C0001	Invalid command.
TLR_E_PNIO_APCTL_RSC_OUTOFMEMORY	0xC00C0002	Insufficient memory to handle the request.
TLR_E_PNIO_APCTL_HIF_IDENT	0xC00C0003	Error identifying HIF.
TLR_E_PNIO_APCTL_AREA_IDENT	0xC00C0004	Unable to identify requested DPM Channel.
TLR_E_PNIO_APCTL_GETAREA_IDENT	0xC00C0005	Unable to identify DPM section "STD INPUT".
TLR_E_PNIO_APCTL_SETAREA_IDENT	0xC00C0006	Unable to identify DPM section "STD OUTPUT".
TLR_E_PNIO_APCTL_SETAREA_INFO_GET	0xC00C0007	Unable to get configuration for DPM section "STD OUTPUT".
TLR_E_PNIO_APCTL_TOHOST_MBX_NAME_GET	0xC00C0008	Unable to identify DPM section "TOHOST MBX".
TLR_E_PNIO_APCTL_TOHOST_MBX_INFO_GET	0xC00C0009	Unable to get configuration for DPM section "TOHOST MBX".
TLR_E_PNIO_APCTL_MIDSYS_QUE_IDENT	0xC00C000A	Unable to identify queue to MidSys.
TLR_E_PNIO_APCTL_ENABLE_BUSON_CBK	0xC00C000B	Enabling callback function for ApplicationCOS.BUS_ON bit did not succeed.
TLR_E_PNIO_APCTL_ENABLE_APPREADY_CBK	0xC00C000C	Enabling callback function for ApplicationCOS.APP_READY bit did not succeed.
TLR_E_PNIO_APCTL_COMMONAREA_IDENT	0xC00C000D	Unable to identify DPM section "COMMON STATUS".
TLR_E_PNIO_APCTL_STATUSAREA_IDENT	0xC00C000E	Unable to identify DPM section "EXTENDED STATUS".
TLR_E_PNIO_APCTL_CONTROLAREA_IDENT	0xC00C000F	Unable to identify DPM section "CONTROL".
TLR_E_PNIO_APCTL_GETAREA_INT_ENBL	0xC00C0010	Unable to enable DPM section "STD INPUT".
TLR_E_PNIO_APCTL_SETAREA_INT_ENBL	0xC00C0011	Unable to enable DPM section "STD OUTPUT".
TLR_E_PNIO_APCTL_ENABLE_INIT_CBK	0xC00C0012	Enabling callback function for ApplicationCOS.INITIALIZATION bit did not succeed.
TLR_E_PNIO_APCTL_VOL_IDENT	0xC00C0013	Unable to identify SysVolume.
TLR_E_PNIO_APCTL_VOL_MOUNT	0xC00C0014	Unable to mount SysVolume
TLR_E_PNIO_APCTL_FAT_FRMT	0xC00C0015	Unable to format SysVolume.
TLR_E_PNIO_APCTL_QUE_CREATE	0xC00C0016	The Queue for APCTL task could not be created.
TLR_E_PNIO_APCTL_CMCTL_QUE_IDENT	0xC00C0017	The Queue for CMCTL task could not be identified.
TLR_E_PNIO_APCTL_MGT_QUE_IDENT	0xC00C0018	The Queue for MGT task could not be identified.
TLR_E_PNIO_APCTL_ACP_QUE_IDENT	0xC00C0019	The Queue for ACP task could not be identified.
TLR_E_PNIO_APCTL_GETAREA_INFO_GET	0xC00C001A	Unable to get configuration for DPM section "STD INPUT".

PNIO APCTL Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_APCTL_CLR_PCK_GET	0xC00C001B	Unable to get a free packet from packet pool to unregister DPM channel from rcX.
TLR_E_PNIO_APCTL_SET_PCK_GET	0xC00C001C	Unable to get a free packet from packet pool to register DPM channel from rcX.
TLR_E_PNIO_APCTL_IDENT_QUE_MIDSYS	0xC00C001D	The Queue of rcX MidSys task could not be identified.
TLR_E_PNIO_APCTL_CREATE_TIMER_SET	0xC00C001E	The timer for firmware-controlled handling of IO-data in DPM could not be created.
TLR_E_PNIO_APCTL_MEMALLOC_TIMER_SET	0xC00C001F	Not enough free memory available for firmware-controlled handling of IO-data in DPM.
TLR_E_PNIO_APCTL_WDG_INIT	0xC00C0020	The Watchdog timer could not be initialized.
TLR_E_INFO_FIELD_ONE_CREATE_FAILED	0xC00C0021	The field for extended APCTL task status information could not be created.
TLR_E_INFO_FIELD_TWO_CREATE_FAILED	0xC00C0022	An undefined field could not be created (unused).
TLR_E_PNIO_APCTL_POOL_CREATE	0xC00C0023	The packet pool for APCTL task could not be created.
TLR_E_PNIO_APCTL_IOCRLIST	0xC00C0024	The number of the input IOCRLs is not equal to the number of the output IOCRLs.
TLR_E_PNIO_APCTL_DPM	0xC00C0025	The requested function is not supported because DPM is not initialized.
TLR_E_PNIO_APCTL_ENABLE_LOCKCONFIG_CBK	0xC00C0026	Enabling callback function for ApplicationCOS.LOCK_CONFIGURATION bit did not succeed.
TLR_E_PNIO_APCTL_LED_CREATE	0xC00C0027	The LED could not be initialized.
TLR_E_PNIO_APCTL_RPC_REQUEST_LIMIT_REACHED	0xC00C0030	Too many outstanding RPC-requests for this IO-Device.
TLR_E_PNIO_APCTL_PACKET_SEND_FAILED	0xC00C0031	Error while sending internal message to another task.
TLR_E_PNIO_APCTL_INVALID_CMCTL_HANDLE	0xC00C0032	The handle used for IO-Device is wrong.
TLR_E_PNIO_APCTL_INVALID_NAME_OF_STATION_LENGTH	0xC00C0033	The name to be set has incorrect length.
TLR_E_PNIO_APCTL_DCP_REQUEST_LIMIT_REACHED	0xC00C0034	Too many outstanding DCP-requests for this IO-Device.
TLR_E_PNIO_APCTL_OTHER_CONFIG_PACKET_IN_PROCESS	0xC00C0035	An other configuration packet is in process wait for its confirmation packet.
TLR_E_PNIO_APCTL_APCFG_QUE_IDENT	0xC00C0036	Identification of APCFG queue in remote resources failed.
TLR_E_PNIO_APCTL_UNKNOWN_ALARM_SPECIFIER	0xC00C0037	The Alarmspecifier is unknown to IO-Controller.
TLR_E_PNIO_APCTL_APPLICATION_ALREADY_REGISTERED	0xC00C0040	There is already an Application registered to APCTL-Task.
TLR_E_PNIO_APCTL_NO_APPLICATION_REGISTERED	0xC00C0041	There is no Application registered to APCTL-Task.
TLR_E_PNIO_APCTL_UNREGISTER_APPLICATION_IMPOSSIBLE	0xC00C0042	It is impossible to unregister the Application in APCTL-Task. Either there is no Application registered or the Unregister Request was not send by the registered Application.

PNIO APCTL Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_APCTL_CHANNEL_INIT_REQUESTED	0xC00C0050	The request is rejected because a Channel Init was requested.
TLR_E_PNIO_APCTL_BUS_STATE_OFF	0xC00C0051	The request is rejected because bus state is set OFF or a running request was interrupted by setting bus state to OFF.
TLR_E_PNIO_APCTL_CYCLIC_WATCHDOG_ERROR	0xC00C0052	The connection to an IO-Device was closed because too many cyclic frames were missing.
TLR_E_PNIO_APCTL_CONNECTION_CLOSED_BY_IODEVICE	0xC00C0053	The connection was shutdown by an IO-Device.

Table 61: PNIO APCTL Status/Error Codes

10.4.2 PNIO APCFG Status/Error Codes

PNIO APCFG Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_APCFG_COMMAND_INVALID	0xC0140001	Invalid command.
TLR_E_PNIO_APCFG_DBM_UNKNOWN_VERSION	0xC0140002	Unknown DBM version.
TLR_E_PNIO_APCFG_DBM_NO_DATASET	0xC0140003	No dataset existing.
TLR_E_PNIO_APCFG_DBM_WRONG_SIZE_OF_DATASET	0xC0140004	Wrong size of DBM dataset.
TLR_E_PNIO_APCFG_DBM_WRONG_LEN_TYPEOFSTATION	0xC0140005	Type of station is too large.
TLR_E_PNIO_APCFG_DBM_WRONG_LEN_NAMEOFSTATION	0xC0140006	Name of station is too large.
TLR_E_PNIO_APCFG_DBM_UNKNOWN_IOCR_KEY	0xC0140007	Unknown IOCRR relationship in submodule description.
TLR_E_PNIO_APCFG_DBM_IOCRA_ALREADY_IN_USE	0xC0140008	IOCRR is in use by another IO-Device.
TLR_E_PNIO_APCFG_DBM_WRONG_IOCRA_IN_SUBMDESCR	0xC0140009	Wrong IO-Type of IOCRR in submodule description.
TLR_E_PNIO_APCFG_DBM_WRONG_DATALEN_IN_SUBMDESCR	0xC014000A	Wrong data length in submodule description.
TLR_E_PNIO_APCFG_DBM_WRONG_DATADESCR_IN_SUBMDESCR	0xC014000B	Wrong IO-type in data description of the submodule description.
TLR_E_PNIO_APCFG_DBM_UNEXP_SUBMDESCR	0xC014000C	Unexpected submodule description.
TLR_E_PNIO_APCFG_DBM_MISSING_SUBMDESCR	0xC014000D	Missing submodule description.
TLR_E_PNIO_APCFG_DBM_ASSERTION_FAILED	0xC014000E	Assertion failed.
TLR_E_PNIO_APCFG_PKT_UNEXP_TREE_IDENTIFICATION	0xC014000F	Wrong sequence/numbering in the tree identification numbers.
TLR_E_PNIO_APCFG_PKT_OVERWRITING_CONSISTING_DATA	0xC0140010	Addressed dataset is already existing and would be overwritten.
TLR_E_PNIO_APCFG_PKT_MISSING_IOCRA	0xC0140011	Input or output IOCRR of module is missing.
TLR_E_PNIO_APCFG_PKT_WRONG_IO_TYPE_IN_IOCRA	0xC0140012	Wrong input or output type in IOCRR.
TLR_E_PNIO_APCFG_PKT_WRONG_SEQUENCE_OF_FRAGMENTED_PACKETS	0xC0140013	Wrong sequence of fragmented packets.

PNIO APCFG Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_APCFG_PKT_WRONG_FRAGMENT_IDENTIFIER	0xC0140014	Wrong fragment identifier in fragmented packets.
TLR_E_PNIO_APCFG_PKT_CONFIGURATION_IS_ALREADY_DONE_VIA_DBM	0xC0140015	Configuration is already done via DBM configuration packets are not accepted.
TLR_E_PNIO_APCFG_DBM_INCOMPLETE_CONFIGURATION	0xC0140016	Incomplete configuration - not all devices are fully developed until submodule descriptions.
TLR_E_PNIO_APCFG_PKT_DOWNLOAD_ALREADY_FINISHED	0xC0140017	Packet download is already finished by download finish request.
TLR_E_PNIO_APCFG_DBM_UNEXP_NUMBER_OF_RECORDS_IN_PNIOC_TABLES	0xC0140018	More than one entry for one key was found in the tables of the fieldbus specific data.
TLR_E_PNIO_APCFG_DBM_UNEXP_SIGNAL_ATTRIBUT	0xC0140019	Unexpected parameter Signal_Attrib in SIGNALS table.
TLR_E_PNIO_APCFG_DBM_IMPROPER_DPM_OFFSETS_AND_DATA_LENGTHS_IN_SIGNALS	0xC014001A	Improper DPM offset and data length in SIGNALS.
TLR_E_PNIO_APCFG_DBM_WRONG_TEST_DATA	0xC0140020	Wrong test data.
TLR_E_PNIO_APCFG_DBM_INVALID_IO_DEVICE_AMOUNT	0xC0140021	Too many IO-Devices are configured.

Table 62: PNIO APCFG Status/Error Codes

10.4.2.1 Standard Error Codes

Error Code (Definition)	Value	Description
TLR_E_PNIO_APCFG_RESOURCE_OUT_OF_MEMORY	0xC0140030	Not enough memory available for current request.
TLR_E_PNIO_APCFG_PACKET_SEND_FAILED	0xC0140031	Error while sending internal message to another task.

Table 63: PNIO APCFG Status/Error Codes - Standard Error Codes

10.4.3 PNIO CTL Status/Error Codes

10.4.3.1 CMCTL-Task Status Codes

CMCTL-Task Status Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_CMCTL_COMMAND_INVALID	0xC00A0001	Received invalid command in CMCTL task.
TLR_E_PNIO_STATUS	0xC00A0002	Generic error code. See packets data-status code for details.
TLR_E_PNIO_CMCTL_INIT_PARAM_INVALID	0xC00A0010	Invalid parameter in CMCTL_ResourceInit().
TLR_E_PNIO_CMCTL_RESOURCE_LIMIT_EXCEEDED	0xC00A0011	No more CMCTL protocol machines possible.
TLR_E_PNIO_CMCTL_RESOURCE_OUT_OF_MEMORY	0xC00A0012	Insufficient memory for this request to CMCTL.
TLR_E_PNIO_CMCTL_CLOSED	0xC00A0013	This CMCTL protocol machine was closed.
TLR_E_PNIO_CMCTL_STATE_CONFLICT	0xC00A0014	This request can not be served in current CMCTL state.
TLR_E_PNIO_CMCTL_CONFIG_PENDING	0xC00A0015	The state of CMCTL's managment resource is pending.
TLR_E_PNIO_CMCTL_CONFIG_STATE_INVALID	0xC00A0016	The state of CMCTL's managment resource is invalid.
TLR_E_PNIO_CMCTL_PACKET_OUT_OF_MEMORY	0xC00A0017	Insufficient memory to create a packet in CMCTL task.
TLR_E_PNIO_CMCTL_PACKET_SEND_FAILED	0xC00A0018	Error while sending a packet to another task in CMCTL.
TLR_E_PNIO_CMCTL_CONN_REQ_LEN_INVALID	0xC00A0019	The length of the Connect-Packet in CMCTL_Connect_req() is invalid.
TLR_E_PNIO_CMCTL_NAME_LEN_INVALID	0xC00A001A	The length of the name for IO-Device does not match to the name in CMCTL_Connect_req().
TLR_E_PNIO_CMCTL_BLKNUM_UNEXPECTED	0xC00A001B	The Connect-Confirmation contains an incorrect amount of blocks.
TLR_E_PNIO_CMCTL_BLKNUM_UNEXPECTED_MEMORY_FAULT	0xC00A001C	The Connect-Confirmation contains an incorrect amount of blocks but may be received correctly in RPC-layer. CMCTL protocol-machine has not reserved enough memory for the whole confirmation.
TLR_E_PNIO_CMCTL_INVALID_FRAMEID_RECEIVED	0xC00A001D	The Connect-Response from IO-Device specified an invalid FrameID to use for IO-Controllers OutputCR.
TLR_E_PNIO_CMCTL_BLKTYPE_UNEXPECTED	0xC00A0020	The connect-confirmation contains an unexpected block.
TLR_E_PNIO_CMCTL_BLKTYPE_UNEXPECTED_INIT	0xC00A0021	CMCTL_Connect_req() expected an INIT-block that is missing.
TLR_E_PNIO_CMCTL_BLKTYPE_UNEXPECTED_IODW_REQ	0xC00A0022	CMCTL_RMWrite_req() expected a WriteReq-block that is missing.
TLR_E_PNIO_CMCTL_BLKTYPE_UNEXPECTED_IODW_DATA	0xC00A0023	CMCTL_RMWrite_req() expected a WriteData-block that is missing.

CMCTL-Task Status Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_CMCTL_BLKLEN_INVALID_INIT	0xC00A0030	INIT-block length for CMCTL_Connect_req() is invalid.
TLR_E_PNIO_CMCTL_BLKLEN_INVALID_IODW_REQ	0xC00A0031	WriteReq-block's length for CMCTL_RMWrite_req() is invalid.
TLR_E_PNIO_CMCTL_BLKLEN_INVALID_IODW_DATA	0xC00A0032	WriteData-block's length for CMCTL_RMWrite_req() is invalid.
TLR_E_PNIO_CMCTL_INVALID_PM_INDEX	0xC00A0040	The index of CMCTL protocol-machine is invalid.
TLR_E_PNIO_CMCTL_INVALID_PM	0xC00A0041	The CMCTL protocol-machine corresponding to index is invalid.
TLR_E_PNIO_CMCTL_INVALID_CMCTL_HANDLE	0xC00A0042	The handle to CMCTL protocol-machine is invalid.
TLR_E_PNIO_CMCTL_DEVICE_NOT_RESPONDING	0xC00A0050	The IO-Device which shall be connected does not answer.
TLR_E_PNIO_CMCTL_DUPLICATE_DEVICE_NAME_DETECTED	0xC00A0051	More than one IO-Device with the specified NameOfStation exists; a connection can not be established.
TLR_E_PNIO_CMCTL_DEVICE_IP_ADDRESS_ALREADY_IN_USE	0xC00A0052	The IP-address the controller shall use for the IO-Device is already in use by another network device; a connection can not be established.
TLR_E_PNIO_CMCTL_RPC_CONNECT_FAILED	0xC00A0060	The Connect-Response of IO-Device contained an error code; a connection could not be established.
TLR_E_PNIO_CMCTL_RPC_WRITE_PARAM_FAILED	0xC00A0061	The Write_Param-Response of IO-Device contained an error code; a connection could not be established.
TLR_E_PNIO_CMCTL_RPC_WRITE_FAILED	0xC00A0062	The Write-Response of IO-Device contained an error code.
TLR_E_PNIO_CMCTL_RPC_READ_FAILED	0xC00A0063	The Read-Response of IO-Device contained an error code.
TLR_E_PNIO_CMCTL_AR_BLOCKTYPE	0xC00A0070	The expected configuration block for AR in CMCTL_RMConnect_req_LoadAr() is missing.
TLR_E_PNIO_CMCTL_AR_BLOCKLEN	0xC00A0071	The expected configuration block for AR in CMCTL_RMConnect_req_LoadAr() has an invalid length.
TLR_E_PNIO_CMCTL_AR_TYPE	0xC00A0072	The configuration block for AR in CMCTL_RMConnect_req_LoadAr() has an invalid type.
TLR_E_PNIO_CMCTL_AR_UUID	0xC00A0073	The configuration block for AR in CMCTL_RMConnect_req_LoadAr() has an invalid UUID.
TLR_E_PNIO_CMCTL_AR_PROPERTY	0xC00A0074	The configuration block for AR in CMCTL_RMConnect_req_LoadAr() has an invalid network properties value.
TLR_E_PNIO_CMCTL_AR_REF_UNEXPECTED	0xC00A0075	The AR-Reference for CMCTL protocol-machine is invalid.
TLR_E_PNIO_CMCTL_AR_UUID_COMP_FAILED	0xC00A0076	The UUID inside IO-Device's Connect-Confirmation is incorrect.

CMCTL-Task Status Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_CMCTL_AR_KEY_COMP_FAILED	0xC00A0077	The session-key inside IO-Device's Connect-Confirmation is incorrect.
TLR_E_PNIO_CMCTL_AR_MAC_COMP_FAILED	0xC00A0078	The MAC-address of IO-Device is incorrect.
TLR_E_PNIO_CMCTL_ALCR_BLOCKTYPE	0xC00A0080	The expected configuration block for Alarm-CR in CMCTL_RMConnect_req_LoadAlcr() is missing.
TLR_E_PNIO_CMCTL_ALCR_BLOCKLEN	0xC00A0081	The expected configuration block for Alarm-CR in CMCTL_RMConnect_req_LoadAlcr() has an invalid length.
TLR_E_PNIO_CMCTL_ALCR_TYPE	0xC00A0082	The configuration block for Alarm-CR in CMCTL_RMConnect_req_LoadAlcr() has an invalid type.
TLR_E_PNIO_CMCTL_ALCR_PROPERTY	0xC00A0083	The configuration block for Alarm-CR in CMCTL_RMConnect_req_LoadAlcr() has an invalid network properties value.
TLR_E_PNIO_CMCTL_ALCR_RTA_FACTOR	0xC00A0084	The configuration block for Alarm-CR in CMCTL_RMConnect_req_LoadAlcr() has an invalid RTA-factor.
TLR_E_PNIO_CMCTL_ALCR_RTA_RETRY	0xC00A0085	The configuration block for Alarm-CR in CMCTL_RMConnect_req_LoadAlcr() has an invalid value for RTA-retry.
TLR_E_PNIO_CMCTL_IOCRR_BLOCKLEN	0xC00A0090	The expected configuration block for IOCR in CMCTL_RMConnect_req_LoadIocr() has an invalid length.
TLR_E_PNIO_CMCTL_IOCRR_TYPE_UNSUPPORTED	0xC00A0091	The type of IOCR is unsupported.
TLR_E_PNIO_CMCTL_IOCRR_TYPE_UNKNOWN	0xC00A0092	The type of IOCR is unknown.
TLR_E_PNIO_CMCTL_IOCRR_RTCCLASS_UNSUPPORTED	0xC00A0093	The RTC-class is unsupported.
TLR_E_PNIO_CMCTL_IOCRR_RTCCLASS_UNKNOWN	0xC00A0094	The RTC-class is unknown.
TLR_E_PNIO_CMCTL_IOCRR_IFTYPE_UNSUPPORTED	0xC00A0095	The expected configuration block for IOCR in CMCTL_RMConnect_req_LoadIocr() has an unsupported interface-type.
TLR_E_PNIO_CMCTL_IOCRR_SCSYNC_UNSUPPORTED	0xC00A0096	The expected configuration block for IOCR in CMCTL_RMConnect_req_LoadIocr() has an unsupported value for SendClock.
TLR_E_PNIO_CMCTL_IOCRR_ADDRESS_UNSUPPORTED	0xC00A0097	The expected configuration block for IOCR in CMCTL_RMConnect_req_LoadIocr() has an unsupported Address-Resolution.
TLR_E_PNIO_CMCTL_IOCRR_REDUNDANCY_UNSUPPORTED	0xC00A0098	The expected configuration block for IOCR in CMCTL_RMConnect_req_LoadIocr() has an unsupported Media-Redundancy.
TLR_E_PNIO_CMCTL_IOCRR_REFERENCE	0xC00A0099	No IOCR could be found or created.
TLR_E_PNIO_CMCTL_IOCRR_OBJECT_IOD	0xC00A009A	The expected configuration block for IOCR in CMCTL_RMConnect_req_LoadIocr() does not contain any IO-Data.
TLR_E_PNIO_CMCTL_IOCRR_OBJECT_IOS	0xC00A009B	The expected configuration block for IOCR in CMCTL_RMConnect_req_LoadIocr() does not contain any IO-Status.

CMCTL-Task Status Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_CMCTL_IOCRR_API	0xC00A009C	The expected configuration block for IOCRR in CMCTL_RMConnect_req_LoadIocrr() does not contain any API.
TLR_E_PNIO_CMCTL_EXPS_BLOCKLEN	0xC00A00A0	The expected configuration block for Expected-Submodules in CMCTL_RMConnect_req_LoadExps() has an invalid length.
TLR_E_PNIO_CMCTL_EXPS_API	0xC00A00A1	The expected configuration block for Expected-Submodules in CMCTL_RMConnect_req_LoadExps() does not contain any API.
TLR_E_PNIO_CMCTL_EXPS_SUBMODULE	0xC00A00A2	The expected configuration block for Expected-Submodules in CMCTL_RMConnect_req_LoadExps() does not contain any submodules.
TLR_E_PNIO_CMCTL_EXPS_DATADESCRIPTION	0xC00A00A3	The expected configuration block for Expected-Submodules in CMCTL_RMConnect_req_LoadExps() does not contain the expected amount of data-descriptions.

Table 64: PNIO CTL Status/Error Codes - CMCTL-Task

10.4.3.2 EDD Task Status/Error Codes

Error Code (Definition)	Value	Description
TLR_E_PNIO_EDD_PROCESS_END	0xC00E0001	Return value of EDD_Scheduler_PreProcess().
TLR_E_PNIO_EDD_PARAM_INVALID_EDD	0xC00E0002	Invalid parameter for EDD_Scheduler_Start_req().

Table 65: PNIO CTL Status/Error Codes- EDD Task

10.4.3.3 ACP Task Status/Error Codes

Error Code (Definition)	Value	Description
TLR_E_PNIO_ACP_PHASE_OUT_OF_MEMORY	0xC0110010	Insufficient memory to initialize ACP-phase.
TLR_E_PNIO_ACP_PHASE_REDUCTION_RATIO	0xC0110011	Invalid reduction-ratio (uiMaxRatio) in ACP_PhaseInit().
TLR_E_PNIO_ACP_PHASE_SEND_CLOCK_FACTOR	0xC0110012	Invalid sendClock-factor (uiScFact) in ACP_PhaseInit().
TLR_E_PNIO_ACP_PHASE_FRAME_RESOURCES	0xC0110013	Invalid parameter (uiMaxFrame) in ACP_PhaseInit().
TLR_E_PNIO_ACP_PACKET_SEND_FAILED	0xC0110014	Error sending a packet to another task in ACP task.

Table 66: PNIO CTL Status/Error Codes – ACP Task

10.4.3.4 DCP Task Status/Error Codes

DCP Task Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_DCP_PARAM_INVALID_EDD	0xC012000A	Invalid parameter in Start-Edd-packet for DCP_StartEDD_req().
TLR_E_PNIO_DCPMCR_INIT_PARAM_INVALID	0xC0120010	Invalid parameter (uiMaxMcr) in DCPMCR_ResourceInit().
TLR_E_PNIO_DCPMCR_INIT_OUT_OF_MEMORY	0xC0120011	Insufficient memory to initialize DCPMCR protocol machines in DCPMCR_ResourceInit().
TLR_E_PNIO_DCPMCR_RESOURCE_LIMIT_EXCEEDED	0xC0120012	The index of DCPMCR's protocol machine is invalid.
TLR_E_PNIO_DCPMCR_RESOURCE_OUT_OF_MEMORY	0xC0120013	Insufficient memory for request in DCPMCR_Activate_req().
TLR_E_PNIO_DCPMCR_RESOURCE_STATE_INVALID	0xC0120014	The state of DCPMCR protocol machine is incorrect for current request.
TLR_E_PNIO_DCPMCR_RESOURCE_HANDLE_INVALID	0xC0120015	The handle to DCPMCR protocol machine is invalid.
TLR_E_PNIO_DCPMCR_TIMER_CREATE_FAILED	0xC0120016	DCPMCR_Activate_req() was unable to create a TLR-timer.
TLR_E_PNIO_DCPMCR_TIMER_OUT_OF_MEMORY	0xC0120017	Insufficient memory for DCPMCR_Identify_ind() to allocate a timer-indication packet.
TLR_E_PNIO_DCPMCR_PACKET_OUT_OF_MEMORY	0xC0120018	Insufficient memory to allocate a packet to be send to another task in DCPMCR.
TLR_E_PNIO_DCPMCR_PACKET_SEND_FAILED	0xC0120019	Error while sending a packet to another task in DCPMCR.
TLR_E_PNIO_DCPMCR_FRAME_OUT_OF_MEMORY	0xC012001A	DCPMCR was not able to get an Edd_FrameBuffer for sending a packet.
TLR_E_PNIO_DCPMCR_FRAME_SEND_FAILED	0xC012001B	An error occurred while DCPMCR was trying to send an Edd_Frame.
TLR_E_PNIO_DCPMCR_WAIT_ACK	0xC012001C	DCPMCR could not be closed because it is still waiting for an ACK.
TLR_E_PNIO_DCPMCS_INIT_PARAM_INVALID	0xC0120100	Invalid parameter (uiMaxMcs) in DCPMCS_ResourceInit().
TLR_E_PNIO_DCPMCS_INIT_OUT_OF_MEMORY	0xC0120101	Insufficient memory to initialize DCPMCS protocol machines in DCPMCS_ResourceInit().
TLR_E_PNIO_DCPMCS_RESOURCE_LIMIT_EXCEEDED	0xC0120102	There are too many outstanding DCPMCS requests. New requests will not be accepted.
TLR_E_PNIO_DCPMCS_RESOURCE_OUT_OF_MEMORY	0xC0120103	Insufficient memory for request in DCPMCS_Activate_req().
TLR_E_PNIO_DCPMCS_RESOURCE_STATE_INVALID	0xC0120104	The state of DCPMCS protocol machine is incorrect for current request.
TLR_E_PNIO_DCPMCS_RESOURCE_HANDLE_INVALID	0xC0120105	The handle to DCPMCS protocol machine is invalid.
TLR_E_PNIO_DCPMCS_TIMER_CREATE_FAILED	0xC0120106	DCPMCS_Activate_req() was unable to create a TLR-timer.
TLR_E_PNIO_DCPMCS_TIMER_OUT_OF_MEMORY	0xC0120107	Insufficient memory for DCPMCS_Identify_req() to allocate a timer-indication packet.

DCP Task Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_DCPMCS_PACKET_OUT_OF_MEMORY	0xC0120108	Insufficient memory to allocate a packet to be send to another task in DCPMCS.
TLR_E_PNIO_DCPMCS_PACKET_SEND_FAILED	0xC0120109	Error while sending a packet to another task in DCPMCS.
TLR_E_PNIO_DCPMCS_FRAME_OUT_OF_MEMORY	0xC012010A	DCPMCS was not able to get an Edd_FrameBuffer for sending a packet.
TLR_E_PNIO_DCPMCS_FRAME_SEND_FAILED	0xC012010B	An error occurred while DCPMCS was trying to send an Edd_Frame.
TLR_E_PNIO_DCPUCR_INIT_PARAM_INVALID	0xC0120200	Invalid parameter (uiMaxUcr) in DCPUCR_ResourceInit().
TLR_E_PNIO_DCPUCR_INIT_OUT_OF_MEMORY	0xC0120201	Insufficient memory to initialize DCPUCR protocol machines in DCPUCR_ResourceInit().
TLR_E_PNIO_DCPUCR_RESOURCE_LIMIT_EXCEEDED	0xC0120202	The index of DCPUCR's protocol machine is invalid.
TLR_E_PNIO_DCPUCR_RESOURCE_OUT_OF_MEMORY	0xC0120203	Insufficient memory for request in DCPUCR_Activate_req().
TLR_E_PNIO_DCPUCR_RESOURCE_STATE_INVALID	0xC0120204	The state of DCPUCR protocol machine is incorrect for current request.
TLR_E_PNIO_DCPUCR_RESOURCE_HANDLE_INVALID	0xC0120205	The handle to DCPUCR protocol machine in invalid.
TLR_E_PNIO_DCPUCR_TIMER_CREATE_FAILED	0xC0120206	DCPUCR_Activate_req() was unable to create a TLR-timer.
TLR_E_PNIO_DCPUCR_TIMER_OUT_OF_MEMORY	0xC0120207	Insufficient memory to allocate a timer-indication packet.
TLR_E_PNIO_DCPUCR_PACKET_OUT_OF_MEMORY	0xC0120208	Insufficient memory to allocate a packet to be send to another task in DCPUCR.
TLR_E_PNIO_DCPUCR_PACKET_SEND_FAILED	0xC0120209	Error while sending a packet to another task in DCPUCR.
TLR_E_PNIO_DCPUCR_FRAME_OUT_OF_MEMORY	0xC012020A	DCPUCR was not able to get an Edd_FrameBuffer for sending a packet.
TLR_E_PNIO_DCPUCR_FRAME_SEND_FAILED	0xC012020B	An error occurred while DCPUCR was trying to send an Edd_Frame.
TLR_E_PNIO_DCPUCR_SERVICE_INVALID	0xC012020C	The DCP-command of received response does not match the outstanding request in DCPUCR.
TLR_E_PNIO_DCPUCR_WAIT_ACK	0xC012020D	DCPUCR could not be closed because it is still waiting for an ACK.
TLR_E_PNIO_DCPUCS_INIT_PARAM_INVALID	0xC0120300	Invalid parameter (uiMaxUcs) in DCPUCS_ResourceInit().
TLR_E_PNIO_DCPUCS_INIT_OUT_OF_MEMORY	0xC0120301	Insufficient memory to initialize DCPUCS protocol machines in DCPUCS_ResourceInit().
TLR_E_PNIO_DCPUCS_RESOURCE_LIMIT_EXCEEDED	0xC0120302	There are too many outstanding DCPUCS requests. New requests will not be accepted.
TLR_E_PNIO_DCPUCS_RESOURCE_OUT_OF_MEMORY	0xC0120303	Insufficient memory for request in DCPUCS_Activate_req().

DCP Task Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_DCPUCS_RESOURCE_STATE_INVALID	0xC0120304	The state of DCPUCS protocol machine is incorrect for current request.
TLR_E_PNIO_DCPUCS_RESOURCE_HANDLE_INVALID	0xC0120305	The handle to DCPUCS protocol machine is invalid.
TLR_E_PNIO_DCPUCS_TIMER_CREATE_FAILED	0xC0120306	DCPUCS_Activate_req() was unable to create a TLR-timer.
TLR_E_PNIO_DCPUCS_TIMER_OUT_OF_MEMORY	0xC0120307	Insufficient memory for DCPUCS_DataSend_req() to allocate a timer-indication packet.
TLR_E_PNIO_DCPUCS_PACKET_OUT_OF_MEMORY	0xC0120308	Insufficient memory to allocate a packet to be send to another task in DCPUCS.
TLR_E_PNIO_DCPUCS_PACKET_SEND_FAILED	0xC0120309	Error while sending a packet to another task in DCPUCS.
TLR_E_PNIO_DCPUCS_FRAME_OUT_OF_MEMORY	0xC012030A	DCPUCS was not able to get an Edd_FrameBuffer for sending a packet.
TLR_E_PNIO_DCPUCS_FRAME_SEND_FAILED	0xC012030B	An error occurred while DCPUCS was trying to send an Edd_Frame.
TLR_E_PNIO_DCPUCS_FRAME_TIMEOUT	0xC012030C	DCPUCS did not get a response to an Edd_Frame send .
TLR_E_PNIO_DCPUCS_DCP_OPTION_UNSUPPORTED	0xC0120320	The DCP option to set is not supported by IO-Device.
TLR_E_PNIO_DCPUCS_DCP_SUBOPTION_UNSUPPORTED	0xC0120321	The DCP suboption to set is not supported by IO-Device.
TLR_E_PNIO_DCPUCS_DCP_SUBOPTION_NOT_SET	0xC0120022	The DCP suboption to set was not set inside IO-Device.
TLR_E_PNIO_DCPUCS_DCP_RESOURCE_ERROR	0xC0120023	An internal resource error occurred in IO-Device while performing a DCP request.
TLR_E_PNIO_DCPUCS_DCP_SET_IMPOSSIBLE_LOCAL_REASON	0xC0120024	The DCP (sub)option could not be set inside IO-Device for IO-Device internal reasons.
TLR_E_PNIO_DCPUCS_DCP_SET_IMPOSSIBLE_WHILE_OPERATION	0xC0120025	The DCP (sub)option could not be set inside IO-Device because IO-Device is in operation.

Table 67: PNIO CTL Status/Error Codes – DCP Task

10.4.3.5 MGT Task Status/Error Codes

MGT Task Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_MGT_PACKET_SEND_FAILED	0xC0130001	ACP_EDDStartDCP_req() was unable to send request packet to DCP-Task.
TLR_E_PNIO_NRPM_PARAM_INVALID_INIT	0xC0130010	Invalid parameter (uiMaxNrpm) in NRPM_ResourceInit().
TLR_E_PNIO_NRPM_HANDLE_INVALID	0xC0130011	The handle to NRPM protocol machine is invalid.
TLR_E_PNIO_NRPM_STATE_INVALID	0xC0130012	The state of NRPM protocol machine is invalid.
TLR_E_PNIO_NRPM_IDENTIFY_FLAG_INVALID	0xC0130013	The identify-flag in NRPM_Init_req() is invalid.
TLR_E_PNIO_NRPM_RESOURCE_LIMIT_EXCEEDED	0xC0130014	The requested number of NRPM protocol machines exceeds the highest possible number in NRPM_Init_req().
TLR_E_PNIO_NRPM_RESOURCE_OUT_OF_MEMORY	0xC0130015	Insufficient memory in NRPM_Init_req().
TLR_E_PNIO_NRPM_PACKET_SEND_FAILED	0xC0130016	Error while sending a packet to another task in NRPM.
TLR_E_PNIO_NRPM_PACKET_OUT_OF_MEMORY	0xC0130017	Insufficient memory to allocate a packet in NRPM.
TLR_E_PNIO_NRPM_DCP_TYPE_INVALID	0xC0130018	Received request with invalid type of DCP request in NRPM.
TLR_E_PNIO_NRPM_NAME_OF_STATION_INVALID	0xC0130019	The requested NameOfStation is invalid. Either it has an invalid length or it contains invalid characters.
TLR_E_PNIO_NRPM_DCP_SET_ERROR	0xC013001A	The requested DCP Set operation failed.
TLR_E_PNIO_NRPM_DEVICE_IP_ADDRESS_ALREADY_IN_USE	0xC013001B	The IP-address the controller shall set for the IO-Device is already in use by another network device.
TLR_E_PNIO_RMPM_HANDLE_INVALID	0xC0130101	The handle to RMPM is invalid.
TLR_E_PNIO_RMPM_STATE_INVALID	0xC0130102	The state of RMPM is invalid for current request.
TLR_E_PNIO_RMPM_STATE_CLOSING	0xC0130103	The state of RMPM is closed
TLR_E_PNIO_RMPM_RESOURCE_LIMIT_EXCEEDED	0xC0130104	The number of RMPM state-machines is too high.
TLR_E_PNIO_RMPM_RESOURCE_OUT_OF_MEMORY	0xC0130105	Insufficient memory to fulfill the current request in RMPM.
TLR_E_PNIO_RMPM_PACKET_SEND_FAILED	0xC0130106	Error while sending a packet to another task in RMPM.
TLR_E_PNIO_RMPM_PACKET_OUT_OF_MEMORY	0xC0130107	Insufficient memory to allocate a packet in RMPM.
TLR_E_PNIO_RMPM_ROLE_UNSUPPORTED	0xC0130108	The parameter "role" is unsupported in RMPM_Init_req_ParameterRole() .
TLR_E_PNIO_RMPM_ROLE_UNKNOWN	0xC0130109	The parameter "role" is unknown in RMPM_Init_req_ParameterRole() .

MGT Task Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_RMPM_ROLE_IN_USE	0xC013010A	The parameter "role" is already in use in RMPM_Init_req_ParameterRole() .
TLR_E_PNIO_RMPM_CONFIG_SEQUENCE	0xC013010B	Incorrect sequence of configuration in RMPM_ConfigSet_req().
TLR_E_PNIO_RMPM_CONFIG_INVALID_VENDOR_ID	0xC013010C	Incorrect configuration of Vendor-ID in RMPM_ConfigSet_req().
TLR_E_PNIO_RMPM_CONFIG_INVALID_NAME	0xC013010D	Incorrect name of station in RMPM_ConfigSet_req().
TLR_E_PNIO_RMPM_CONFIG_INVALID_TYPE	0xC013010E	Incorrect name of type in RMPM_ConfigSet_req().
TLR_E_PNIO_RMPM_DUPLICATE_NAME_OF_STATION	0xC0130110	The NameOfStation of IO-Controller is in use by another network device.
TLR_E_PNIO_RMPM_DUPLICATE_IP	0xC0130111	The IP-address the IO-Controller shall use is in use by another network device.

Table 68: PNIO CTL Status/Error Codes – MGT Task

10.4.4 PNIO CTL Diagnosis-Codes

10.4.4.1 CMCTL-Task Diagnosis-Codes

Error Code (Definition)	Value	Description
TLR_DIAG_E_CMCTL_TASK_RESOURCE_INIT_FAILED	0xC00AF000	Initializing CMCTL's task-resources failed.
TLR_DIAG_E_CMCTL_TASK_CREATE_QUE_FAILED	0xC00AF001	Failed to create message-queue for CMCTL.
TLR_DIAG_E_CMCTL_TASK_CREATE_SYNC_QUE_FAILED	0xC00AF002	Failed to create synchronous message-queue for CMCTL.
TLR_DIAG_E_CMCTL_TASK_RPC_INIT_FAILED	0xC00AF003	Failed to initialize CMCTL's local RPC-resources.
TLR_DIAG_E_CMCTL_TASK_IDENT_ACP_QUE_FALIED	0xC00AF004	Failed to get handle to ACP message-queue in CMCTL.
TLR_DIAG_E_CMCTL_TASK_IDENT_MGT_QUE_FALIED	0xC00AF005	Failed to get handle to MGT message-queue in CMCTL.
TLR_DIAG_E_CMCTL_TASK_IDENT_RPC_QUE_FALIED	0xC00AF006	Failed to get handle to RPC message-queue in CMCTL.
TLR_DIAG_E_CMCTL_TASK_IDENT_TCP_QUE_FALIED	0xC00AF007	Failed to get handle to TCP/IP message-queue in CMCTL .

Table 69: PNIO CTL Diagnosis-Codes - CMCTL-Task

10.4.4.2 EDD Task Diagnosis-Codes

Error Code (Definition)	Value	Description
TLR_E_PNIO_EDD_COMMAND_INVALID	0xC00EF001	Received invalid command in EDD task.
TLR_DIAG_E_EDD_TASK_INIT_LOCAL_FAILED	0xC00EF010	Failed to initialize EDD's local resources.

Table 70: PNIO CTL Diagnosis-Codes- EDD Task

10.4.4.3 ACP Task Diagnosis-Codes

Error Code (Definition)	Value	Description
TLR_E_PNIO_ACP_COMMAND_INVALID	0xC011F001	Received invalid command in ACP task.
TLR_DIAG_E_ACP_TASK_ACP_PHASE_INIT_FAILED	0xC011F010	Failed to initialize ACP Phase.
TLR_DIAG_E_ACP_TASK_ALARM_INIT_FAILED	0xC011F011	Failed to initialize Alarm-machines.
TLR_DIAG_E_ACP_TASK_APMR_INIT_FAILED	0xC011F012	Failed to initialize APMR.
TLR_DIAG_E_ACP_TASK_APMS_INIT_FAILED	0xC011F013	Failed to initialize APMS.
TLR_DIAG_E_ACP_TASK_CPM_INIT_FAILED	0xC011F014	Failed to initialize CPM.
TLR_DIAG_E_ACP_TASK_PPM_INIT_FAILED	0xC011F015	Failed to initialize PPM.
TLR_DIAG_E_ACP_TASK_CREATE_QUE_FAILED	0xC011F016	Failed to create message-queue for ACP.
TLR_DIAG_E_ACP_TASK_IDENT_EDD_FAILED	0xC011F017	Failed to identify Drv_EDD.
TLR_DIAG_E_ACP_TASK_IDENT_EDD_QUE_FAILED	0xC011F018	Failed to get handle to EDD message-queue.
TLR_DIAG_E_ACP_TASK_IDENT_DCP_QUE_FAILED	0xC011F019	Failed to get handle to DCP message-queue.

Table 71: PNIO CTL Diagnosis-Codes – ACP Task

10.4.4.4 DCP Task Diagnosis-Codes

Error Code (Definition)	Value	Description
TLR_E_PNIO_DCP_COMMAND_INVALID	0xC012F001	Received invalid command in DCP task.
TLR_DIAG_E_DCP_TASK_UCS_RESOURCE_INIT_FAILED	0xC012F010	Failed to initialize DCPUCS.
TLR_DIAG_E_DCP_TASK_UCR_RESOURCE_INIT_FAILED	0xC012F011	Failed to initialize DCPUCR.
TLR_DIAG_E_DCP_TASK_MCS_RESOURCE_INIT_FAILED	0xC012F012	Failed to initialize DCPMCS.
TLR_DIAG_E_DCP_TASK_MCR_RESOURCE_INIT_FAILED	0xC012F013	Failed to initialize DCPMCR.
TLR_DIAG_E_DCP_TASK_CREATE_QUE_FAILED	0xC012F014	Failed to create message-queue for DCP task.

Table 72: PNIO CTL Diagnosis-Codes – ACP Task

10.4.4.5 MGT-Task Diagnosis-Codes

Error Code (Definition)	Value	Description
TLR_E_PNIO_MGT_COMMAND_INVALID	0xC013F001	Received invalid command in MGT task.
TLR_DIAG_E_MGT_TASK_RMPM_RESOURCE_INIT_FAILED	0xC013F010	Failed to initialize RMPM.
TLR_DIAG_E_MGT_TASK_NRPM_RESOURCE_INIT_FAILED	0xC013F011	Failed to initialize NRPM.
TLR_DIAG_E_MGT_TASK_CREATE_QUEUE_FAILED	0xC013F012	Failed to create message-queue for MGT task.
TLR_DIAG_E_MGT_TASK_IDENT_TCPUDP_QUEUE_FAILED	0xC013F013	Failed to get handle to TCP/IP task in MGT task.
TLR_DIAG_E_MGT_TASK_IDENT_DCP_QUEUE_FAILED	0xC013F014	Failed to get handle to DCP task in MGT task.
TLR_DIAG_E_MGT_TASK_IDENT_EDD_FAILED	0xC013F015	Failed to identify Drv_EDD in MGT task.

Table 73: PNIO CTL Diagnosis-Codes – MGT Task

10.4.5 RPC Task Status/Error Codes

RPC Task Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_RPC_TASK_COMMAND_INVALID	0xC02E0001	Received packet with invalid command.
TLR_DIAG_E_RPC_TASK_CLIENT_RESOURCE_INIT_FAILED	0xC02E0010	Initiating CLRPC-Client failed. (CLRPC_Client_Initialize())
TLR_DIAG_E_RPC_TASK_SERVER_RESOURCE_INIT_FAILED	0xC02E0011	Initiating CLRPC-Server failed (CLRPC_Server_Initialize()).
TLR_DIAG_E_RPC_TASK_EPMAP_RESOURCE_INIT_FAILED	0xC02E0012	Initiating CLRPC-Endpoint-Mapper failed (CLRPC_Mapper_Initialize()).
TLR_DIAG_E_RPC_TASK_INIT_LOCAL_CREATE_QUEUE_FAILED	0xC02E0013	Creating message queue failed.
TLR_DIAG_E_RPC_TASK_INIT_REMOTE_IDENT_EDD_FAILED	0xC02E0014	Identifying Drv_EDD failed.
TLR_DIAG_E_RPC_TASK_INIT_REMOTE_GET_MAC_FAILED	0xC02E0015	Getting the MAC address failed.
TLR_DIAG_E_RPC_TASK_INIT_REMOTE_IDENT_TCPUDP_QUEUE_FAILED	0xC02E0016	Getting queue handle to TCPIP-Task failed.
TLR_E_RPC_STATUS	0xC02E0100	Generic RPC-error code. See Profinet-status code for details.
TLR_E_RPC_CONNECT_OUT_OF_MEMORY	0xC02E0101	There was not enough memory allocated to receive the whole IO-Device's Connect-Response PDU. Most likely it contains a very large ModuleDiff-Block.
TLR_E_CLRPC_PACKET_SEND_FAILED	0xC02E0200	Error while sending internal message to another task.
TLR_E_CLRPC_TIMER_OUT_OF_MEMORY	0xC02E0201	Creating a TLR-Timer-packet in RPC task failed due to insufficient memory.
TLR_E_CLRPC_MAPPER_INIT_FAILED	0xC02E00300	The parameter "uiMaxReg" (maximum amount of RPC-mapper registrations) is invalid in CLRPC_EPMap_Initialize().

RPC Task Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_CLRPC_MAPPER_RESOURCE_LIMIT_EXCEEDED	0xC02E0301	The requested Endpoint-Mapper index is invalid.
TLR_E_CLRPC_MAPPER_RESOURCE_OUT_OF_MEMORY	0xC02E0302	Insufficient memory for this request.
TLR_E_CLRPC_MAPPER_STATUS_INVALID	0xC02E0303	The state of Endpoint-Mapper is invalid for this request.
TLR_E_CLRPC_MAPPER_STATUS_CLOSING	0xC02E0304	The Endpoint-Mapper is waiting for close-confirmation and therefore its status is invalid for this request.
TLR_E_CLRPC_MAPPER_STATUS_UNKNOWN	0xC02E0305	The status of Endpoint-Mapper is unknown.
TLR_E_CLRPC_MAPPER_STATUS_CONFLICT	0xC02E0306	The status of Endpoint-Mapper is not "Ready" and therefore request CLRPC_EPMap_Deregister_req() is invalid.
TLR_E_CLRPC_MAPPER_PARAMETER_FAILED	0xC02E0307	Invalid parameter in CLRPC_EPMap_Register_req_Compare().
TLR_E_CLRPC_MAPPER_SERVER_REGISTERED	0xC02E0308	CLRPC_EPMap_Deregister_req() is not allowed because at least one RPC-Server is registered to this Endpoint-Mapper.
TLR_E_CLRPC_SERVER_INIT_FAILED	0xC02E0400	An error occurred in CLRPC_Server_Initialize().
TLR_E_CLRPC_SERVER_RESOURCE_LIMIT_EXCEEDED	0xC02E00401	The maximum number of registered RPC-Servers is exceeded or the maximum number of outstanding requests is exceeded.
TLR_E_CLRPC_SERVER_TIMER_CREATE_FAILED	0xC02E0402	Creating TLR-Timer for RPC-Server failed.
TLR_E_CLRPC_SERVER_NO_SERVER_REGISTERED	0xC02E00403	There is no RPC-Server registered that could be deregistered (CLRPC_ServerDeregister_req()).
TLR_E_CLRPC_SERVER_RESOURCE_OUT_OF_MEMORY	0xC02E0404	Insufficient memory to create an instance of RPC-Server.
TLR_E_CLRPC_SERVER_MAPPER_HANDLE_INVALID	0xC02E0405	The handle to Endpoint-Mapper in CLRPC_ServerRegister_req() is invalid.
TLR_E_CLRPC_SERVER_MAPPER_STATUS_INVALID	0xC02E0406	The status of Endpoint-Mapper in CLRPC_ServerRegister_req() is invalid.
TLR_E_CLRPC_SERVER_HANDLE_INVALID	0xC02E0407	The handle to RPC-Server instance is invalid.
TLR_E_CLRPC_SERVER_OBJECT_REGISTERED	0xC02E0408	There is at least one object registered to RPC-Server instance. CLRPC_ServerDeregister_req() can not proceed.
TLR_E_CLRPC_SERVER_PARAM_RECV_INVALID	0xC02E0409	Invalid parameter "ulMaxRecv" in request-packet in CLRPC_ServerRegister_req().
TLR_E_CLRPC_SERVER_PARAM_SEND_INVALID	0xC02E040A	Invalid parameter "ulMaxSend" in request-packet in CLRPC_ServerRegister_req().
TLR_E_CLRPC_SERVER_ELEMENT_INVALID	0xC02E040B	Invalid RPC-Server element "ptElem". Internal RPC-Error.
TLR_E_CLRPC_SERVER_REQUEST_CANCELED	0xC02E040C	This RPC-Request was canceled.

RPC Task Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_CLRPC_OBJECT_RESOURCE_OUT_OF_MEMORY	0xC02E0500	Insufficient memory to create an RPC-Object instance in CLRPC_ObjectRegister_req().
TLR_E_CLRPC_OBJECT_SERVER_HANDLE_INVALID	0xC02E0501	The handle to RPC-Server instance in CLRPC_ObjectRegister_req() is invalid.
TLR_E_CLRPC_OBJECT_SERVER_STATUS_INVALID	0xC02E0502	The status of RPC-Server instance in CLRPC_ObjectRegister_req() is invalid.
TLR_E_CLRPC_OBJECT_HANDLE_INVALID	0xC02E0503	The handle to RPC-Object instance in CLRPC_ObjectDeregister_req() is invalid.
TLR_E_CLRPC_CLIENT_INIT_FAILED	0xC02E0600	One of the parameters "uiMaxReg" or "uiMaxReq" in CLRPC_Client_Initialize() is invalid.
TLR_E_CLRPC_CLIENT_RESOURCE_LIMIT_EXCEEDED	0xC02E0601	The maximum number of parallel RPC-Client instances in reached in CLRPC_ClientRegister_req()
TLR_E_CLRPC_CLIENT_TIMER_CREATE_FAILED	0xC02E0602	Creating the TLR-Timer for RPC-Client instance in CLRPC_ClientRegister_req() failed.
TLR_E_CLRPC_CLIENT_RESOURCE_OUT_OF_MEMORY	0xC02E0603	Insufficient memory for this request.
TLR_E_CLRPC_CLIENT_MAPPER_STATUS_INVALID	0xC02E0604	The state of Endpoint-Mapper is invalid for this request.
TLR_E_CLRPC_CLIENT_HANDLE_INVALID	0xC02E0605	The handle to RPC-Client instance is invalid.
TLR_E_CLRPC_CLIENT_REQUEST_LIMIT_EXCEEDED	0xC02E0606	The maximum amount of outstanding RPC-Requests for this RPC-Clients instance is reached.
TLR_E_CLRPC_CLIENT_OPCODE_SEQUENCE	0xC02E0607	RPC-Client instances can only connect to an IO-Device if there are no outstanding RPC-Requests. Currently at least one RPC-Request is outstanding.
TLR_E_CLRPC_CLIENT_DEREGISTERED	0xC02E0608	The RPC-Client instance you tried to use is going to deregister right now. Aborting your Request !
TLR_E_CLRPC_CLIENT_ELEMENT_INVALID	0xC02E0609	Invalid RPC-Client instance element "ptElem". Internal RPC-Error.
TLR_E_CLRPC_CLIENT_LONG_TIMEOUT_HIT	0xC02E060A	The LONG timeout TLR-timer for an outstanding RPC-Request hit. Used internally in RPC only.
TLR_E_CLRPC_CLIENT_RESPONSE_SEQUENCE_NUMBER	0xC02E060B	Invalid sequence number in RPC-Message received by RPC-Client instance.

Table 74: RPC Task Status/Error Codes

10.4.6 RPC Task Diagnostic Codes

Error Code (Definition)	Value	Description
TLR_DIAG_E_RPC_TASK_CLIENT_RESOURCE_INIT_FAILED	0xC02E0010	Initiating CLRPC-Client failed. (CLRPC_Client_Initialize()).
TLR_DIAG_E_RPC_TASK_SERVER_RESOURCE_INIT_FAILED	0xC02E0011	Initiating CLRPC-Server failed (CLRPC_Server_Initialize()).
TLR_DIAG_E_RPC_TASK_EPMAP_RESOURCE_INIT_FAILED	0xC02E0012	Initiating CLRPC-Endpoint-Mapper failed (CLRPC_Mapper_Initialize()).
TLR_DIAG_E_RPC_TASK_INIT_LOCAL_CREATE_QUE_FAILED	0xC02E0013	Creating message queue failed.
TLR_DIAG_E_RPC_TASK_INIT_REMOTE_IDENT_EDD_FAILED	0xC02E0014	Identifying Drv_EDD failed.
TLR_DIAG_E_RPC_TASK_INIT_REMOTE_GET_MAC_FAILED	0xC02E0015	Getting the MAC address failed.
TLR_DIAG_E_RPC_TASK_INIT_REMOTE_IDENT_TCPUDP_QUE_FAILED	0xC02E0016	Getting queue handle to TCPIP-Task failed.

Table 75: RPC Task Diagnostic Codes

10.4.7 Other relevant PNIO Status/Error Codes

Other relevant PNIO Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_ALARM_PARAM_INVALID_INIT	0xC0110020	Invalid parameter "uiMaxAlpm" in Alarm_ResourceInit().
TLR_E_PNIO_ALARM_RESOURCE_OUT_OF_MEMORY	0xC0110021	Insufficient memory in Alarm_ResourceInit().
TLR_E_PNIO_ALPMR_PRIORITY_INVALID	0xC0110030	Invalid alarm priority in request packet of ALPMR_AlarmAck_req().
TLR_E_PNIO_ALPMR_RESOURCE_LIMIT_EXCEEDED	0xC0110031	The requested number of ALPMR protocol machines exceeds the highest possible number in ALPMR_Init_req().
TLR_E_PNIO_ALPMR_RESOURCE_OUT_OF_MEMORY	0xC0110032	Insufficient memory in ALPMR_Init_req().
TLR_E_PNIO_ALPMR_HANDLE_INVALID	0xC0110033	The ALPMR protocol-machine corresponding to the index in request packet is invalid.
TLR_E_PNIO_ALPMR_STATE_INVALID	0xC0110034	The ALPMR protocol-machine state is invalid for the current request.
TLR_E_PNIO_ALPMR_PACKET_SEND_FAILED	0xC0110035	Sending an Alarm-Indication-packet to another task failed in ALPMR.
TLR_E_PNIO_ALPMR_PACKET_OUT_OF_MEMORY	0xC0110036	Creating an Alarm-Indication-packet to be send to another task failed due to insufficient memory.
TLR_E_PNIO_ALPMR_RESOURCE_INDEX_INVALID	0xC0110037	The index of ALPMR's protocol machine is invalid.

Other relevant PNIO Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_APMR_PARAM_INVALID_INIT	0xC0110040	The parameter uiMaxApmr (maximum number of parallel APMR protocol-machines) in APMR_ResourceInit() is invalid.
TLR_E_PNIO_APMR_RESOURCE_OUT_OF_MEMORY	0xC0110041	Insufficient memory in APMR_ResourceInit() to create the APMR protocol machines.
TLR_E_PNIO_APMR_HANDLE_INVALID	0xC0110042	The APMR protocol machine or its index is invalid.
TLR_E_PNIO_APMR_STATE_INVALID	0xC0110043	The state of APMR protocol machine is invalid for current request.
TLR_E_PNIO_APMR_FRAME_SEND_FAILED	0xC0110044	Sending an ACK or NAK in response to a received Alarm-PDU failed.
TLR_E_PNIO_APMS_PARAM_INVALID_INIT	0xC0110050	The parameter uiMaxApms (maximum number of parallel APMS protocol-machines) in APMS_ResourceInit() is invalid.
TLR_E_PNIO_APMS_RESOURCE_OUT_OF_MEMORY	0xC0110051	Insufficient memory in APMS_ResourceInit() to create the APMS protocol machines.
TLR_E_PNIO_APMS_HANDLE_INVALID	0xC0110052	The APMS protocol machine or its index is invalid.
TLR_E_PNIO_APMS_STATE_INVALID	0xC0110053	The state of APMS protocol machine is invalid for current request.
TLR_E_PNIO_APMS_FRAME_OUT_OF_MEMORY	0xC0110054	APMS was not able to get an Edd_FrameBuffer for sending a packet.
TLR_E_PNIO_APMS_FRAME_SEND_FAILED	0xC0110055	An error occurred while APMS was trying to send an Edd_Frame.
TLR_E_PNIO_APMS_TIMER_CREATE_FAILED	0xC0110056	APMS_Activate_req() was not able to create a TLR-Timer.
TLR_E_PNIO_APMS_TIMER_OUT_OF_MEMORY	0xC0110057	Insufficient memory for APMS_Send_req_Data() to allocate a timer-indication packet.
TLR_E_PNIO_CPM_PARAM_INVALID_INIT	0xC0110060	The parameter uiMaxCpmRtc1 and/or uiMaxCpmRtc2 of CPM_ResourceInit() is invalid.
TLR_E_PNIO_CPM_PARAM_INVALID_CLASS	0xC0110061	The requested RTC-class is invalid in CPM_Init_req().
TLR_E_PNIO_CPM_RESOURCE_LIMIT_EXCEEDED	0xC0110062	The requested amount of CPM protocol machines is higher than the highest possible value.
TLR_E_PNIO_CPM_RESOURCE_OUT_OF_MEMORY	0xC0110063	Insufficient memory for current request in CPM.
TLR_E_PNIO_CPM_HANDLE_INVALID	0xC0110064	The handle to CPM protocol machine is invalid.
TLR_E_PNIO_CPM_STATE_INVALID	0xC0110065	The state of CPM protocol machine is incorrect for current request.
TLR_E_PNIO_CPM_PHASE_LIMIT_EXCEEDED	0xC0110066	Invalid phase found in Init-request-packet in CPM_Init_req() or in ACP_PhaseCpmAdd_req() or ACP_PhaseCpmRemove_req().
TLR_E_PNIO_CPM_SEND_CLOCK_LIMIT_EXCEEDED	0xC0110067	The SendClock-factor in Init-request-packet to CPM does not match the one in ACP_Tasks' resources.

Other relevant PNIO Status/Error Codes		
Error Code (Definition)	Value	Description
TLR_E_PNIO_CPM_DATALEN_LIMIT_EXCEEDED	0xC0110069	Packet size to receive is too big. Error is detected in CPM_Init_req().
TLR_E_PNIO_CPM_PACKET_SEND_FAILED	0xC011006A	Error while sending a packet to another task in CPM.
TLR_E_PNIO_PPM_PARAM_INVALID_INIT	0xC0110080	The parameter "uiMaxPPMRtc1" and/or "uiMaxPPMRtc2" of PPM_ResourceInit() is invalid.
TLR_E_PNIO_PPM_PARAM_INVALID_CLASS	0xC0110081	The requested RTC-class is invalid in PPM_Init_req().
TLR_E_PNIO_PPM_RESOURCE_LIMIT_EXCEEDED	0xC0110082	The requested amount of PPM protocol machines is higher than the highest possible value.
TLR_E_PNIO_PPM_RESOURCE_OUT_OF_MEMORY	0xC0110083	Insufficient memory for current request in PPM.
TLR_E_PNIO_PPM_HANDLE_INVALID	0xC0110084	The handle to PPM protocol machine is invalid.
TLR_E_PNIO_PPM_STATE_INVALID	0xC0110085	The state of PPM protocol machine is incorrect for current request.
TLR_E_PNIO_PPM_PHASE_LIMIT_EXCEEDED	0xC0110086	Invalid phase found in Init-request-packet in PPM_Init_req() or in ACP_PhasePPMAdd_req() or ACP_PhasePPMRemove_req().
TLR_E_PNIO_PPM_SEND_CLOCK_LIMIT_EXCEEDED	0xC0110087	The SendClock-factor in PPMs Init-request-packet does not match the one in ACP_Tasks' resources.
TLR_E_PNIO_PPM_DATALEN_LIMIT_EXCEEDED	0xC0110089	Packet size to send is too big. Error is detected in PPM_Init_req().

Table 76: Other relevant PNIO Status/Error Codes

10.5 ODM Error Codes

10.5.1 General ODM Error Codes

Error Code (Definition)	Value	Description
CODM3_E_INTERNALERROR	0x8004C700	Internal ODM Error
ODM3_E_DESCRIPTION_NOTFOUND	0x8004C701	Description not found in ODM database
CODM3_E_WRITEREGISTRY	0x8004C710	Error writing to the registry
CODM3_E_BAD_REGULAR_EXPRESSION	0x8004C711	Invalid regular expression
CODM3_E_COMCATEGORIE_MANAGER_FAILED	0x8004C712	Component Category Manager could not be instantiated
CODM3_E_COMCATEGORIE_ENUMERATION_FAILED	0x8004C713	Driver could not be enumerated by the Category Manager
CODM3_E_CREATE_LOCAL_BUFFER	0x8004C714	Error creating local buffers
CODM3_E_UNKNOWNHANDLE	0x8004C715	Unknown handle
CODM3_E_QUEUE_LIMIT_REACHED	0x8004C717	Queue size limit for connection reached
CODM3_E_DATASIZE_ZERO	0x8004C718	Zero data length passed
CODM3_E_INVALID_DATA	0x8004C719	Invalid data content
CODM3_E_INVALID_MODE	0x8004C71A	Invalid mode
CODM3_E_DATABASE_READ	0x8004C71B	Error reading database
CODM3_E_CREATE_DEVICE_THREAD	0x8004C750	Error creating device thread
CODM3_E_CREATE_DEVICE_THREAD_STOP_EVENT	0x8004C751	Error creating device thread stop event
CODM3_E_CLIENT_NOT_REGISTERED	0x8004C752	Client is not registered at the ODM
CODM3_E_NO_MORE_CLIENTS	0x8004C753	Maximum number of clients reached
CODM3_E_MAX_CLIENT_CONNECTIONS_REACHED	0x8004C754	Maximum number of client connections reached
CODM3_E_ENTRY_NOT_FOUND	0x8004C755	Driver/device not found
CODM3_E_DRIVER_NOT_FOUND	0x8004C757	The requested driver is unknown to the ODM
CODM3_E_DEVICE_ALREADY_LOCKED	0x8004C758	Device is locked by another process
CODM3_E_DEVICE_UNLOCKED_FAILED	0x8004C759	Device could not be unlocked, lock was set by another process
CODM3_E_DEVICE_LOCK_NECESSARY	0x8004C75A	Operation requires a device lock to be set
CODM3_E_DEVICE_SUBSCRIPTIONLIMIT	0x8004C75B	Maximum number of servers registered for this device reached
CODM3_E_DEVICE_NOTSUBSCRIBED	0x8004C75C	Process is not registered as a server on this device
CODM3_E_DEVICE_NO_MESSAGE	0x8004C75D	No message available
CODM3_E_TRANSFERTIMEOUT	0x8004C760	Message transfer timeout
CODM3_E_MESSAGE_INSERVICE	0x8004C761	Message in service

Table 77: ODM Error Codes - General ODM Error Codes

10.5.2 General ODM Driver Error Codes

Error Code (Definition)	Value	Description
CODM3_E_DRV_OPEN_DEVICE	0x8004C7A0	Packet type unsupported by driver
CODM3_E_DRV_INVALID_IDENTIFIER	0x8004C7A1	Invalid device identifier
CODM3_E_DRV_DEVICE_PARAMETERS_MISMATCH	0x8004C7A3	Parameters differ from requested device
CODM3_E_DRV_BROWSE_NO_DEVICES	0x8004C7A4	No devices found
CODM3_E_DRV_CREATE_DEVICE_INST	0x8004C7A5	Device instance could not be created
CODM3_E_DRV_DEVICE_NOMORE_TX	0x8004C7A6	Device connection limit reached
CODM3_E_DRV_DEVICE_DUPLICATE_TX	0x8004C7A7	Duplicate transmitter ID
CODM3_E_DRV_DEVICE_NOT_CONFIGURED	0x8004C7A8	Device is not configured
CODM3_E_DRV_DEVICE_COMMUNICATION	0x8004C7A9	Device communication error
CODM3_E_DRV_DEVICE_NO_MESSAGE	0x8004C7AA	No message available
CODM3_E_DRV_DEVICE_NOT_READY	0x8004C7AB	Device not ready
CODM3_E_DRV_INVALIDCONFIGURATION	0x8004C7AC	Invalid driver configuration
CODM3_E_DRV_DLINVALIDMODE	0x8004C7C0	Invalid download mode
CODM3_E_DRV_DLINPROGRESS	0x8004C7C1	Download is active
CODM3_E_DRV_ULINPROGRESS	0x8004C7C2	Upload is active

Table 78: ODM Error Codes - General ODM Driver Error Codes

10.5.3 cifX Driver Specific ODM Error Codes

cifX Driver Specific ODM Error Codes		
Error Code (Definition)	Value	Description
DRV_E_BOARD_NOT_INITIALIZED	0x8004C001	DRIVER Board not initialized
DRV_E_INIT_STATE_ERROR	0x8004C002	DRIVER Error in internal init state
DRV_E_READ_STATE_ERROR	0x8004C003	DRIVER Error in internal read state
DRV_E_CMD_ACTIVE	0x8004C004	DRIVER Command on this channel is active
DRV_E_PARAMETER_UNKNOWN	0x8004C005	DRIVER Unknown parameter in function
DRV_E_WRONG_DRIVER_VERSION	0x8004C006	DRIVER Version is incompatible with DLL
DRV_E_PCI_SET_CONFIG_MODE	0x8004C007	DRIVER Error during PCI set configuration mode
DRV_E_PCI_READ_DPM_LENGTH	0x8004C008	DRIVER Could not read PCI dual port memory length
DRV_E_PCI_SET_RUN_MODE	0x8004C009	DRIVER Error during PCI set run mode
DRV_E_DEV_DPM_ACCESS_ERROR	0x8004C00A	DEVICE Dual port ram not accessible(board not found)
DRV_E_DEV_NOT_READY	0x8004C00B	DEVICE Not ready (ready flag failed)
DRV_E_DEV_NOT_RUNNING	0x8004C00C	DEVICE Not running (running flag failed)
DRV_E_DEV_WATCHDOG_FAILED	0x8004C00D	DEVICE Watchdog test failed
DRV_E_DEV_OS_VERSION_ERROR	0x8004C00E	DEVICE Signals wrong OS version
DRV_E_DEV_SYSERR	0x8004C00F	DEVICE Error in dual port flags
DRV_E_DEV_MAILBOX_FULL	0x8004C010	DEVICE Send mailbox is full
DRV_E_DEV_PUT_TIMEOUT	0x8004C011	DEVICE PutMessage timeout
DRV_E_DEV_GET_TIMEOUT	0x8004C012	DEVICE GetMessage timeout
DRV_E_DEV_GET_NO_MESSAGE	0x8004C013	DEVICE No message available
DRV_E_DEV_RESET_TIMEOUT	0x8004C014	DEVICE RESET command timeout
DRV_E_DEV_NO_COM_FLAG	0x8004C015	DEVICE COM-flag not set. Check if Bus is running
DRV_E_DEV_EXCHANGE_FAILED	0x8004C016	DEVICE I/O data exchange failed
DRV_E_DEV_EXCHANGE_TIMEOUT	0x8004C017	DEVICE I/O data exchange timeout
DRV_E_DEV_COM_MODE_UNKNOWN	0x8004C018	DEVICE I/O data mode unknown
DRV_E_DEV_FUNCTION_FAILED	0x8004C019	DEVICE Function call failed
DRV_E_DEV_DPMSIZE_MISMATCH	0x8004C01A	DEVICE DPM size differs from configuration
DRV_E_DEV_STATE_MODE_UNKNOWN	0x8004C01B	DEVICE State mode unknown
DRV_E_DEV_HW_PORT_IS_USED	0x8004C01C	DEVICE Output port already in use
DRV_E_USR_OPEN_ERROR	0x8004C01E	USER Driver not opened (device driver not loaded)
DRV_E_USR_INIT_DRV_ERROR	0x8004C01F	USER Can't connect to device
DRV_E_USR_NOT_INITIALIZED	0x8004C020	USER Board not initialized (DevInitBoard not called)
DRV_E_USR_COMM_ERR	0x8004C021	USER IOCTL function failed
DRV_E_USR_DEV_NUMBER_INVALID	0x8004C022	USER Parameter DeviceNumber invalid
DRV_E_USR_INFO_AREA_INVALID	0x8004C023	USER Parameter InfoArea unknown
DRV_E_USR_NUMBER_INVALID	0x8004C024	USER Parameter Number invalid
DRV_E_USR_MODE_INVALID	0x8004C025	USER Parameter Mode invalid
DRV_E_USR_MSG_BUF_NULL_PTR	0x8004C026	USER NULL pointer assignment
DRV_E_USR_MSG_BUF_TOO_SHORT	0x8004C027	USER Message buffer too small

cifX Driver Specific ODM Error Codes		
Error Code (Definition)	Value	Description
DRV_E_USR_SIZE_INVALID	0x8004C028	USER Parameter Size invalid
DRV_E_USR_SIZE_ZERO	0x8004C02A	USER Parameter Size with zero length
DRV_E_USR_SIZE_TOO_LONG	0x8004C02B	USER Parameter Size too long
DRV_E_USR_DEV_PTR_NULL	0x8004C02C	USER Device address null pointer
DRV_E_USR_BUF_PTR_NULL	0x8004C02D	USER Pointer to buffer is a null pointer
DRV_E_USR_SENDSIZE_TOO_LONG	0x8004C02E	USER Parameter SendSize too large
DRV_E_USR_RECVSIZE_TOO_LONG	0x8004C02F	USER Parameter ReceiveSize too large
DRV_E_USR_SENDBUF_PTR_NULL	0x8004C030	USER Pointer to send buffer is a null pointer
DRV_E_USR_RECVBUF_PTR_NULL	0x8004C031	USER Pointer to receive buffer is a null pointer
DRV_E_DMA_INSUFF_MEM	0x8004C032	DMA Memory allocation error
DRV_E_DMA_TIMEOUT_CH4	0x8004C033	DMA Read I/O timeout
DRV_E_DMA_TIMEOUT_CH5	0x8004C034	DMA Write I/O timeout
DRV_E_DMA_TIMEOUT_CH6	0x8004C035	DMA PCI transfer timeout
DRV_E_DMA_TIMEOUT_CH7	0x8004C036	DMA Download timeout
DRV_E_DMA_DB_DOWN_FAIL	0x8004C037	DMA Database download failed
DRV_E_DMA_FW_DOWN_FAIL	0x8004C038	DMA Firmware download failed
DRV_E_CLEAR_DB_FAIL	0x8004C039	DMA Clear database on the device failed
DRV_E_DEV_NO_VIRTUAL_MEM	0x8004C03C	DMA USER Virtual memory not available
DRV_E_DEV_UNMAP_VIRTUAL_MEM	0x8004C03D	DMA USER Unmap virtual memory failed
DRV_E_GENERAL_ERROR	0x8004C046	DRIVER General error
DRV_E_DMA_ERROR	0x8004C047	DRIVER General DMA error
DRV_E_WDG_IO_ERROR	0x8004C048	DRIVER I/O WatchDog failed
DRV_E_WDG_DEV_ERROR	0x8004C049	DRIVER Device Watchdog failed
DRV_E_USR_DRIVER_UNKNOWN	0x8004C050	USER Driver unknown
DRV_E_USR_DEVICE_NAME_INVALID	0x8004C051	USER Device name invalid
DRV_E_USR_DEVICE_NAME_UNKNOWN	0x8004C052	USER Device name unknown
DRV_E_USR_DEVICE_FUNC_NOTIMPL	0x8004C053	USER Device function not implemented
DRV_E_USR_FILE_OPEN_FAILED	0x8004C064	USER File could not be opened
DRV_E_USR_FILE_SIZE_ZERO	0x8004C065	USER File size zero
DRV_E_USR_FILE_NO_MEMORY	0x8004C066	USER Not enough memory to load file
DRV_E_USR_FILE_READ_FAILED	0x8004C067	USER File read failed
DRV_E_USR_INVALID_FILETYPE	0x8004C068	USER File type invalid
DRV_E_USR_FILENAME_INVALID	0x8004C069	USER Invalid filename
DRV_E_FW_FILE_OPEN_FAILED	0x8004C06E	USER Firmware file could not be opened
DRV_E_FW_FILE_SIZE_ZERO	0x8004C06F	USER Not enough memory to load firmware file
DRV_E_FW_FILE_NO_MEMORY	0x8004C070	USER Not enough memory to load firmware file
DRV_E_FW_FILE_READ_FAILED	0x8004C071	USER Firmware file read failed
DRV_E_FW_INVALID_FILETYPE	0x8004C072	USER Firmware file type invalid
DRV_E_FW_FILENAME_INVALID	0x8004C073	USER Firmware file name not valid
DRV_E_FW_DOWNLOAD_ERROR	0x8004C074	USER Firmware file download error
DRV_E_FW_FILENAME_NOT_FOUND	0x8004C075	USER Firmware file not found in the internal table
DRV_E_FW_BOOTLOADER_ACTIVE	0x8004C076	USER Firmware file BOOTLOADER active

cifX Driver Specific ODM Error Codes		
Error Code (Definition)	Value	Description
DRV_E_FW_NO_FILE_PATH	0x8004C077	USER Firmware file no file path
DRV_E_CF_FILE_OPEN_FAILED	0x8004C078	USER Configuration file could not be opened
DRV_E_CF_FILE_SIZE_ZERO	0x8004C079	USER Configuration file size zero
DRV_E_CF_FILE_NO_MEMORY	0x8004C07A	USER Not enough memory to load configuration file
DRV_E_CF_FILE_READ_FAILED	0x8004C07B	USER Configuration file read failed
DRV_E_CF_INVALID_FILETYPE	0x8004C07C	USER Configuration file type invalid
DRV_E_CF_FILENAME_INVALID	0x8004C07D	USER Configuration file name not valid
DRV_E_CF_DOWNLOAD_ERROR	0x8004C07E	USER Configuration file download error
DRV_E_CF_FILE_NO_SEGMENT	0x8004C07F	USER No flash segment in the configuration file
DRV_E_CF_DIFFERS_FROM_DBM	0x8004C080	USER Configuration file differs from database
DRV_E_DBM_SIZE_ZERO	0x8004C083	USER Database size zero
DRV_E_DBM_NO_MEMORY	0x8004C084	USER Not enough memory to upload database
DRV_E_DBM_READ_FAILED	0x8004C085	USER Database read failed
DRV_E_DBM_NO_FLASH_SEGMENT	0x8004C086	USER Database segment unknown
DEV_E_CF_INVALID_DESCRIPTOR_VERSION	0x8004C096	CONFIG Version of the descriptor table invalid
DEV_E_CF_INVALID_INPUT_OFFSET	0x8004C097	CONFIG Input offset is invalid
DEV_E_CF_NO_INPUT_SIZE	0x8004C098	CONFIG Input size is 0
DEV_E_CF_MISMATCH_INPUT_SIZE	0x8004C099	CONFIG Input size does not match configuration
DEV_E_CF_INVALID_OUTPUT_OFFSET	0x8004C09A	CONFIG Invalid output offset
DEV_E_CF_NO_OUTPUT_SIZE	0x8004C09B	CONFIG Output size is 0
DEV_E_CF_MISMATCH_OUTPUT_SIZE	0x8004C09C	CONFIG Output size does not match configuration
DEV_E_CF_STN_NOT_CONFIGURED	0x8004C09D	CONFIG Station not configured
DEV_E_CF_CANNOT_GET_STN_CONFIG	0x8004C09E	CONFIG Cannot get the Station configuration
DEV_E_CF_MODULE_DEF_MISSING	0x8004C09F	CONFIG Module definition is missing
DEV_E_CF_MISMATCH_EMPTY_SLOT	0x8004C0A0	CONFIG Empty slot mismatch
DEV_E_CF_MISMATCH_INPUT_OFFSET	0x8004C0A1	CONFIG Input offset mismatch
DEV_E_CF_MISMATCH_OUTPUT_OFFSET	0x8004C0A2	CONFIG Output offset mismatch
DEV_E_CF_MISMATCH_DATA_TYPE	0x8004C0A3	CONFIG Data type mismatch
DEV_E_CF_MODULE_DEF_MISSING_NO_SI	0x8004C0A4	CONFIG Module definition is missing,(no Slot/Idx)

Table 79: cifX Driver Specific ODM Error Codes

10.6 Error Codes cifX Device Driver and netX Driver

10.6.1 Generic Error Codes

Error Code (Definition)	Value	Description
CIFX_INVALID_POINTER	0x800A0001L	Invalid pointer (NULL) passed to driver
CIFX_INVALID_BOARD	0x800A0002L	No board with the given nameindex available
CIFX_INVALID_CHANNEL	0x800A0003L	No channel with the given index available
CIFX_INVALID_HANDLE	0x800A0004L	Invalid handle passed to driver
CIFX_INVALID_PARAMETER	0x800A0005L	Invalid parameter
CIFX_INVALID_COMMAND	0x800A0006L	Invalid command
CIFX_INVALID_BUFFERSIZE	0x800A0007L	Invalid buffer size
CIFX_INVALID_ACCESS_SIZE	0x800A0008L	Invalid access size
CIFX_FUNCTION_FAILED	0x800A0009L	Function failed
CIFX_FILE_OPEN_FAILED	0x800A000AL	File could not be opened
CIFX_FILE_SIZE_ZERO	0x800A000BL	File size is zero
CIFX_FILE_LOAD_INSUFF_MEM	0x800A000CL	Insufficient memory to load file
CIFX_FILE_CHECKSUM_ERROR	0x800A000DL	File checksum compare failed
CIFX_FILE_READ_ERROR	0x800A000EL	Error reading from file
CIFX_FILE_TYPE_INVALID	0x800A000FL	Invalid file type
CIFX_FILE_NAME_INVALID	0x800A0010L	Invalid file name
CIFX_FUNCTION_NOT_AVAILABLE	0x800A0011L	Driver function not available
CIFX_BUFFER_TOO_SHORT	0x800A0012L	Given buffer is too short
CIFX_MEMORY_MAPPING_FAILED	0x800A0013L	Failed to map the memory
CIFX_NO_MORE_ENTRIES	0x800A0014L	No more entries available
CIFX_CALLBACK_MODE_UNKNOWN	0x800A0015L	Unkown callback handling mode
CIFX_CALLBACK_CREATE_EVENT_FAILED	0x800A0016L	Failed to create callback events
CIFX_CALLBACK_CREATE_RECV_BUFFER	0x800A0017L	Failed to create callback receive buffer

Table 80: Generic Error Codes

10.6.2 Generic Driver Error Codes

Error Code (Definition)	Value	Description
CIFX_DRV_NOT_INITIALIZED	0x800B0001L	Driver not initialized
CIFX_DRV_INIT_STATE_ERROR	0x800B0002L	Driver init state error
CIFX_DRV_READ_STATE_ERROR	0x800B0003L	Driver read state error
CIFX_DRV_CMD_ACTIVE	0x800B0004L	Command is active on device
CIFX_DRV_DOWNLOAD_FAILED	0x800B0005L	General error during download
CIFX_DRV_WRONG_DRIVER_VERSION	0x800B0006L	Wrong driver version
CIFX_DRV_DRIVER_NOT_LOADED	0x800B0030L	CIFx driver is not running
CIFX_DRV_INIT_ERROR	0x800B0031L	Failed to initialize the device
CIFX_DRV_CHANNEL_NOT_INITIALIZED	0x800B0032L	Channel not initialized (xOpenChannel not called)
CIFX_DRV_IO_CONTROL_FAILED	0x800B0033L	IOControl call failed
CIFX_DRV_NOT_OPENED(0x800B0034L	Driver was not opened
CIFX_DRV_DOWNLOAD_STORAGE_UNKN OWN	0x800B0040L	Unknown download storage type (RAMFLASH based) found
CIFX_DRV_DOWNLOAD_FW_WRONG_CHA NNEL	0x800B0041L	Channel number for a firmware download not supported
CIFX_DRV_DOWNLOAD_MODULE_NO_BAS EOS	0x800B0042L	Modules are not allowed without a Base OS firmware

Table 81: Generic Driver Error Codes

10.6.3 Generic Device Error Codes

Error Code (Definition)	Value	Description
CIFX_DEV_DPM_ACCESS_ERROR	0x800C0010L	Dual port memory not accessible (board not found)
CIFX_DEV_NOT_READY	0x800C0011L	Device not ready (ready flag failed)
CIFX_DEV_NOT_RUNNING	0x800C0012L	Device not running (running flag failed)
CIFX_DEV_WATCHDOG_FAILED	0x800C0013L	Watchdog test failed
CIFX_DEV_SYSERR	0x800C0015L	Error in handshake flags
CIFX_DEV_MAILBOX_FULL	0x800C0016L	Send mailbox is full
CIFX_DEV_PUT_TIMEOUT	0x800C0017L	Send packet timeout
CIFX_DEV_GET_TIMEOUT	0x800C0018L	Receive packet timeout
CIFX_DEV_GET_NO_PACKET	0x800C0019L	No packet available
CIFX_DEV_MAILBOX_TOO_SHORT	0x800C001AL	Mailbox too short
CIFX_DEV_RESET_TIMEOUT	0x800C0020L	Reset command timeout
CIFX_DEV_NO_COM_FLAG	0x800C0021L	COM-flag not set
CIFX_DEV_EXCHANGE_FAILED	0x800C0022L	IO data exchange failed
CIFX_DEV_EXCHANGE_TIMEOUT	0x800C0023L	IO data exchange timeout
CIFX_DEV_COM_MODE_UNKNOWN	0x800C0024L	Unknown IO exchange mode
CIFX_DEV_FUNCTION_FAILED	0x800C0025L	Device function failed
CIFX_DEV_DPMSIZE_MISMATCH	0x800C0026L	DPM size differs from configuration
CIFX_DEV_STATE_MODE_UNKNOWN	0x800C0027L	Unknown state mode
CIFX_DEV_HW_PORT_IS_USED	0x800C0028L	Device is still accessed
CIFX_DEV_CONFIG_LOCK_TIMEOUT	0x800C0029L	Configuration locking timeout
CIFX_DEV_CONFIG_UNLOCK_TIMEOUT	0x800C002AL	Configuration unlocking timeout
CIFX_DEV_HOST_STATE_SET_TIMEOUT	0x800C002BL	Set HOST state timeout
CIFX_DEV_HOST_STATE_CLEAR_TIMEOUT	0x800C002CL	Clear HOST state timeout
CIFX_DEV_INITIALIZATION_TIMEOUT	0x800C002DL	Timeout during channel initialization
CIFX_DEV_BUS_STATE_ON_TIMEOUT	0x800C002EL	Set Bus ON Timeout
CIFX_DEV_BUS_STATE_OFF_TIMEOUT	0x800C002FL	Set Bus OFF Timeout
CIFX_DEV_MODULE_ALREADY_RUNNING	0x800C0040L	Module already running
CIFX_DEV_MODULE_ALREADY_EXISTS	0x800C0041L	Module already exists

Table 82: Generic Device Error Codes

10.7 Error Codes netX Driver

10.7.1 CIFS API Transport Error Codes

Error Code (Definition)	Value	Description
CIFS_TRANSPORT_SEND_TIMEOUT	0x800D0001L	Time out while sending data
CIFS_TRANSPORT_RECV_TIMEOUT	0x800D0002L	Time out waiting for incoming data
CIFS_TRANSPORT_CONNECT	0x800D0003L	Unable to communicate to the device no answer
CIFS_TRANSPORT_ABORTED	0x800D0004L	Transfer has been aborted due to keep alive timeout or interface detachment
CIFS_CONNECTOR_FUNCTIONS_READ_ERROR	0x800D0010L	Error reading the connector functions from the DLL
CIFS_CONNECTOR_IDENTIFIER_TOO_LONG	0x800D0011L	Connector delivers an identifier longer than 6 characters
CIFS_CONNECTOR_IDENTIFIER_EMPTY	0x800D0012L	Connector delivers an empty identifier
CIFS_CONNECTOR_DUPLICATE_IDENTIFIER	0x800D0013L	Connector identifier already used

Table 83: CIFS API Transport Error Codes

10.7.2 CIFS API Transport Header State Error Codes

Error Code (Definition)	Value	Description
CIFS_TRANSPORT_ERROR_UNKNOWN	0x800E0001L	Unknown error code in transport header
CIFS_TRANSPORT_CHECKSUM_ERROR	0x800E0002L	CRC16 checksum failed
CIFS_TRANSPORT_LENGTH_INCOMPLETE	0x800E0003L	Transaction with incomplete length detected
CIFS_TRANSPORT_DATA_TYPE_UNKNOWN	0x800E0004L	Device does not support requested data type
CIFS_TRANSPORT_DEVICE_UNKNOWN	0x800E0005L	Device not available unknown
CIFS_TRANSPORT_CHANNEL_UNKNOWN	0x800E0006L	Channel not available unknown
CIFS_TRANSPORT_SEQUENCE	0x800E0007L	Sequence error detected
CIFS_TRANSPORT_BUFFER_OVERFLOW	0x800E0008L	Buffer overflow detected
CIFS_TRANSPORT_RESOURCE	0x800E0009L	Device signals out of resources
CIFS_TRANSPORT_KEEPALIVE	0x800E000AL	Device connection monitoring error (Keep alive)
CIFS_TRANSPORT_DATA_TOO_SHORT	0x800E000BL	Received transaction data too short

Table 84: CIFS API Transport Header State Error Codes

10.8 ODM Error Codes DBM V4

ODM Error Codes DBM V4		
Error Code (Definition)	Value	Description
CDBM_E_MD5_INVALID	0XC004C810	Checksum invalid
CDBM_E_INTERNALERROR	0XC004C811	Internal Error
CDBM_W_WRITEREGISTRY	0X8004C812	Error writing to the registry
CDBM_E_UNEXPECTED_VALUE_IN_OLD_HEADER_FORMAT	0XC004C813	Error in a file containing the old DBM Header format.
CDBM_E_CHECKSUM_INVALID	0XC004C814	The Checksum of the old Header is invalid
CDBM_E_DB_ALREADY_LOADED_FORMAT	0XC004C815	A database is already loaded
CDBM_E_NO_VALID_TRANSACTION	0XC004C816	No valid transaction handle given
CDBM_E_STD_STRUCT_ERROR	0XC004C817	An error occurred during validation of data
CDBM_E_UNSUPPORTED_DATA_TYPE_FORMAT	0XC004C818	Unsupported DataType
CDBM_W_CLASS_DELETED_FORMAT	0X8004C819 (Warning)	Using an Object which is marked as deleted
CDBM_W_CLIENT_DISCONNECTED	0X8004C81A (Warning)	A Client has already an outstanding connection to a Table. The connection is now destroyed.
CDBM_E_STRUCTURE_DEFINITION_INVALID	0XC004C81B	A structure definition of an Element in a Table is invalid
CDBM_E_NO_DATA_AVAILABLE	0XC004C81C	No data available for this operation
CDBM_E_NO_VALID_STRUCTURE	0XC004C81D	No valid structure available for this operation
CDBM_E_NO_TOGGLE_STRING_FOUND	0XC004C81E	No Toggle string found for this number
CDBM_E_ELEMENT_OUT_OF_RANGE	0XC004C81F	An element wasn't found in the Record of a Table
CDBM_E_ELEMENT_NOT_IN_TABLE	0XC004C820	The element is not part of the Table
CDBM_E_CANNOT_CONVERT_INTO_CLIENT_TYPE	0XC004C821	The data can't be converted into the Client type
CDBM_E_TRANSACTION_ALREADY_OPEN	0XC004C822	A transaction is already open. Please close this one first before opening a new one.
CDBM_I_OLD_WITHOUT_HEADER	0X4004C823 (Informational)	Use of an old DBM file Format without Header
CDBM_E_HR_FROM	0XC004C824	An HRESULT was received from a Subroutine
CDBM_E_PARAMETER	0XC004C825	A Parameter is invalid
CDBM_E_NOTIMPL	0XC004C826	Method is currently not implemented
CDBM_E_OUTOFMEMORY	0XC004C827	Out of memory
CDBM_E_NO_OPEN_TRANSACTION	0XC004C828	No transaction open
CDBM_E_NO_CONTENTS	0XC004C829	No contents available
CDBM_REC_NO_NOT_FOUND	0XC004C82A	Record not found
CDBM_STRUCTURE_ELEMENT_NOT_FOUND	0XC004C82B	Element of the Structure not found
CDBM_E_NO_MORE_RECORDS_IN_TABTYPE	0XC004C82C	Table type 3 can contain only one record
CDBM_E_WRITE	0XC004C82D	The data in the VARIANT must be given in a SafeArray
CDBM_E_WRITE_NO_PARRAY	0XC004C82E	The VARIANT contains no valid [parray] element

ODM Error Codes DBM V4		
Error Code (Definition)	Value	Description
CDBM_E_WRITE_CANT_ACCESS_DATA	0XC004C82F	Unable to access SafeArray Data in the VARIANT
CDBM_E_WRITE_DATA	0XC004C830	To write the data of this Element it must be given as a BSTR, or as an Array of VT_UI1/VT_I1
CDBM_E_WRITE_BSTR_E1	0XC004C831	The BSTR string must have an even length.
CDBM_E_WRITE_BSTR_E2	0XC004C832	The BSTR string must contain only hex digits (0..9 and a/A..f/F).
CDBM_E_WRITE_CANT_INTERPRET_ARRAY	0XC004C833	Unable to interpret data in the SafeArray.
CDBM_E_WRITE_VT_ERROR	0XC004C834	Data type in the SafeArray is not VT_UI1 or VT_I1.
CDBM_E_WRITE_LENGTH	0XC004C835	Data length is invalid for write operation of this type.
CDBM_WRITE_ELEMENT	0XC004C836	Element not found in the Record of the Table
CDBM_MIN_MAX_ERROR	0XC004C837	Can't write data because of min underflow or max overflow
CDBM_TABLE_EXIST	0XC004C838	Table already exist in the database
CDBM_MIN_MAX_INVALID	0XC004C839	The Min value is greater than the Max Value
CDBM_DEF_MIN_MAX_INVALID	0XC004C83A	The Default Value is not in the range between the Min value and the Max Value
CDBM_CANT_CHANGE_STRUCTURE_WHILE_RECORDS_EXIST	0XC004C83B	It's not allowed to change the structure while Records exist in the Table
CDBM_NEW_STRUCT_NEEDS_TYPE	0XC004C83C	In a newly added structure the data type must be set also
CDBM_VALUE_ERROR	0XC004C83D	Range error while validating a value
CDBM_DATATYPE_UNSUPPORTED_IN_RCS	0XC004C83E	The data type is unsupported in the RCS file format
CDBM_I_COUNT_OF_TABLES_EXCEEDS_RCS_RANGE	0X4004C83F (Informational)	The count of Tables exceeds the RCS range of Tables. This can cause problems if the file is downloaded to RCS Systems
CDBM_I_COUNT_OF_TABLES_EXCEEDS_OLDDBM_RANGE	0X4004C840 (Informational)	The count of Tables exceeds the DBM32.DLL range of Tables. This can cause problems if the file is used with older Tools using the DBM32.DLL
CDBM_UNSUPPORTED_DATATYPE_IN_RCS_MODE	0XC004C841	The Data type is not compatible with the old database format
CDBM_WRITE_UNSTRUCTURED_1	0XC004C842	The data of an unstructured record can only be written with the 'Write' Method not with 'WriteElement'.
CDBM_READ_UNSTRUCTURED_1	0XC004C843	The data of an unstructured record can only be read with the 'Read' Method not with 'ReadElement'
CDBM_WRITE_DATA_LENGTH_INVALID	0XC004C844	The given data length doesn't correspond with the expected data length.
CDBM_UNKNOWN_VIEW_MODE	0XC004C845	The View Mode is unknown.
CDBM_E_DIAG_TABLE	0XC004C846	It doesn't make much sense to add or delete records from a diagnostic table because those changes are never saved.

ODM Error Codes DBM V4		
Error Code (Definition)	Value	Description
CDBM_E_ADR_STRING_ERROR	0XC004C847	The given Address string doesn't fit the required format of this type where all address bytes must be in the range between 0 and FF
CDBM_ERROR_FROM_VAR_CHANGE_TYPE	0XC004C848	Function VariantChangeType return an error when trying to convert the Parameter
CDBM_E_MINERROR	0XC004C849	Error while comparing the Value with the lower range
CDBM_E_MAXERROR	0XC004C84A	Error while comparing the Value with the upper range
CDBM_E_RANGE_ERROR	0XC004C84B	Value out of Range
CDBM_E_TABLE_TYPE1	0XC004C84C	Table type 1 doesn't have a unique record length over all records
CDBM_E_TABLE_TYPE3_ADDREC	0XC004C84D	Table type 3 doesn't allow to insert more than one Record
CDBM_E_TABTYPE1	0XC004C84E	It's not allowed to insert more Records than structure definitions in Table Type 1
CDBM_E_TOGGLE_NOT_FOUND	0XC004C84F	Could not find the string for this value in the list of valid toggle strings
CDBM_E_TOGGLE_VALUE_IS_EMPTY_STRING	0XC004C850	The toggle string for this value is empty.
CDBM_VARIANT2BYTEARRAY_ERROR	0XC004C851	Error during conversion of Variant to byte array
CDBM_E_SET_ELEM_PROP_DEPENDENCY	0XC004C852	The Toggle Type needs also the additional string and the additional number entries in the Method
CDBM_E_TABTYPE1_REC_DOESNT_CORRESPOND_WITH_ELEMENT	0XC004C853	When reading the records of Table type 1 elementwise the record number must correspond with the element number
CDBM_TABTYPE1_NO_DATA_FOUND_FOR_RECORD	0XC004C854	When reading the records of Table type 1 and structure definitions are present it's assumed that for each structure element a corresponding record must exist
CDBM_E_TABTYPE1_WRITE_ELEMENT_NE_RECORD	0XC004C855	When writing the records of Table type 1 elementwise and structure definitions are present it's only allowed to write the corresponding element number in each record
CDBM_E_TABTYPE1_WRITE_ELEMENT_NOT_FOUND	0XC004C856	When writing the records of Table type 1 with an array and structure definitions are present it's assumed that a corresponding element number of this record exist
CDBM_I_TABLE_NAME_EXCEEDS_RCS_RANGE	0X4004C857 (Informational)	The Table name exceeds the maximum length of RCS compatible Table names
CDBM_W_CUT_STRING	0X8004C858 (Warning)	The string exceeds the maximum length and will be limited to the maximum length
CDBM_I_STRING_TOO_SHORT	0X4004C859 (Informational)	The string is below the minimum length. The minimum length will be reduced.
CDBM_I_STRING_TOO_LONG	0X4004C85A (Informational)	The string is exceeding the maximum. The maximum length will be extended.
CDBM_E_STRING_TOO_SHORT	0XC004C85B (Error)	The string is below the minimum length.
CDBM_E_STRING_TOO_LONG	0XC004C85C (Error)	The string is exceeding the maximum length

ODM Error Codes DBM V4		
Error Code (Definition)	Value	Description
CDBM_E_WRONG_TYPE_FOR_WRITE	0XC004C85D	Writing on the Element type with the given Data type is not implemented
CDBM_E_NO_APPEND_IN_STRUCTURED_RECORDS	0XC004C85E	Method IDbmRecord::AppendData is not allowed for structured records
CDBM_E_DATA_UNAVAILABLE	0XC004C85F	No data available
CDBM_E_CANT_CONVERT_INTO	0XC004C860	Unable to convert the value into the Element type
CDBM_E_DBM_FILE_OVERFLOW	0XC004C861	You try to write a RCS like database which needs too much bytes
CDBM_E_PW_ERROR	0XC004C862	Password not correct
CDBM_E_FILELENGTH_CORRUPT	0XC004C863	The file length doesn't correspond to the length given in the Header.
CDBM_E_STRUCT_TYPE	0XC004C864	Error in the file.
CDBM_E_MD5SUM_INVALID	0XC004C865	MD5 sum invalid
CDBM_E_STRUCT_LENGTH	0XC004C866	Error in the expected and given structure length at a specific offset in the file.
CDBM_E_APPEND	0XC004C867	Append of data is only allowed if the Record contains only one data field and the field type will support this
CDBM_APPEND_NOT_SUPPORTED	0XC004C868	Append of Data not supported by this filed type
CDBM_DATA_TYPE_APPEND_ERROR	0XC004C869	Can't append Data of this type.
CDBM_E_UNSTRUCTURED_TABLE_DOESNT_SUPPORT_LENGTH	0XC004C86A	A Table without structure information doesn't support a record length
CDBM_E_DISABLED_WHILE_TRANSACTION_IS_OPEN	0XC004C86B	The Method is disabled while a transaction is open. Please close this one first and call the Method again.
CDBM_E_UNABLE_TO_CALL_READ_ON_LINKED_LIST	0XC004C86C	The Method is disabled on a LinkedList type. Please use the IRecordCollection on this type.
CDBM_E_ELEMENT_HAS_NO_SUBSTRUCTURE	0XC004C86D	An Element from a Table has no substructure
CDBM_STRUCT_ERROR_FROM_VAR_CHANGE_TYPE	0XC004C86E	Error from calling VariantChangeType
CDBM_E_FOREIGNKEY_DEF	0XC004C86F	The definition of a FOREIGNKEY must contain the name of the related Table in the description and this Table must exist at this time
CDBM_E_FOREIGNKEY_REF_TAB	0XC004C870	The description of a FOREIGNKEY must refer to a Table of type 'eDbmTableTypeLinkedList'
CDBM_E_KEY	0XC004C871	To create a Record Collection with a KEY it's necessary to have the data type KEY at the first position in all Records of the searched Table
CDBM_E_KEY_TABLE_TYPE	0XC004C872	This Method needs a Table of type 'eDbmTableTypeLinkedList'
CDBM_DATATYPE_NOT_IMPLEMENTED	0XC004C873	This data type is currently not implemented
CDBM_INSERT_POS_NOT_FOUND	0XC004C874	The position of the Record where the new one should be inserted wasn't found
CDBM_E_INSERT_REC_QI	0XC004C875	Error during insertion of a Record
CDBM_E_TAB_PROP	0XC004C876	Invalid Property in Table
CDBM_E_KEY_NOT_FOUND	0XC004C877	The KEY wasn't found in the Table

ODM Error Codes DBM V4		
Error Code (Definition)	Value	Description
CDBM_E_KEY_INVALID	0XC004C878	The KEY is invalid for this operation

Table 85: ODM Error Codes DBM V4

11 Appendix

11.1 User Rights

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

To access the **Settings**, **Configuration** and **Diagnosis** panes of the PROFINET IO Controller 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.

11.1.1 Settings

	Observer	Operator	Maintenance	Planning Engineer	Administrator
<i>Driver</i>	D	D	X	X	X
<i>Verify or adapt Driver Settings</i>	-	-	X	X	X
<i>Configuring netX Driver</i>	-	-	X	X	X
<i>Device Assignment</i>	D	D	X	X	X
<i>Scanning for Devices</i>	-	-	X	X	X
<i>Selecting the Device (with or without firmware)</i>	-	-	X	X	X
<i>Selecting the Device once more (with Firmware)</i>	-	-	X	X	X
<i>Firmware Download</i>	D	D	X	X	X
<i>Ethernet Devices</i>	D	D	X	X	X

Table 86: Settings (D = Displaying, X = Editing, Configuring)

11.1.2 Configuration

	Observer	Operator	Maintenance	Planning Engineer	Administrator
<i>Controller Network Settings</i>	D	D	X	X	X
<i>Device Table</i>	D	D	X	X	X
<i>IP Address Table</i>	D	D	X	X	X
<i>Process Data</i>	D	D	X	X	X
<i>Address Table</i>	D	D	X	X	X
<i>FSU/Port-Settings</i>	D	D	X	X	X
<i>Stations Timing</i>	D	D	X	X	X
<i>Controller Settings</i>	D	D	X	X	X

Table 87: Configuration (D = Displaying, X = Editing, Configuring)

11.2 Name encoding

The name is an OctetString with 1 to 240 octets. A name can contain one or more labels separated by a dot [.].

The definition of IETF RFC 5890 and the following syntax applies:

- 1 or more labels, separated by [.]
- Total length is 1 to 240
- Label length is 1 to 63
- Labels consist of [a-z0-9-]
- Labels do not start with [-]
- Labels do not end with [-]
- Labels do not use multiple concatenated [-] except for IETF RFC 5890
- The first label does not have the form "port-xyz" or "port-xyz-abcde" with a, b, c, d, e, x, y, z = 0..9, to avoid wrong similarity with the field AliasNameValue
- Station names do not have the form a.b.c.d with a, b, c, d = 0...999

11.3 References

- [1] Device Type Manager (DTM) Style Guide, Version 1.0 ; FDT-JIG - Order No. <0001-0008-000>
- [2] PROFINET IO RT Controller Protocol API Manual, Revision 18, Hilscher GmbH 2013
- [3] Application Layer protocol for decentralized periphery and distributed automation, Technical Specification for PROFINET, Version 2.3Ed2MU2, February 2015, Order No: 2.722, PROFIBUS Nutzerorganisation e.V., Karlsruhe
- [4] RFC 4836; ("Request For Comments"; <http://tools.ietf.org/rfc/rfc4836.txt>)

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11.6 Glossary

DCP

Discovery and Configuration Protocol.

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

DNS

Domain Name Service.

DTM

Device Type Manager.

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

Ethernet

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

FDT

Field Device Tool

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

Gateway Address

The IP address of a gateway

GSDML

GSDML = Generic Station Description Markup Language.

IP

Internet Protocol.

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

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

IP defines special addressing mechanisms, see IP Address.

IP Address

Address within IP (the Internet Protocol, part of TCP/IP).

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

a.b.c.d

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

Example: 192.168.30.15

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

The IP address 0.0.0.0 is defined as invalid.

MAC-ID

MAC = Media Access Control

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

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

A-B-C-D-E-F

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

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

MAU

Medium Attachment Unit

Module

Hardware or logical component of a physical device.

Name of Station

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

Network Mask

Bit mask for separation between network part and device part in IP addresses in the network protocol IPv4.

The network part must be the identical for all devices of the corresponding network, while the device part is different.

This is used to specify whether the device searches for a given IP address in its own network (device part) or can reach the IP address in other networks via router (network part).

See also https://en.wikipedia.org/wiki/IPv4_subnetting_reference

Example: 255.255.255.0 (network part 255 255 255, device part 0)

ODMV3

The Online-Data-Manager Version 3 (ODMV3) is an application interface. The ODMV3 works as a server, which can be run as an out-proc server or system service. Its task is to provide different applications (e. g. SYCON.net), access to multiple devices and even share one device amongst several applications.

PROFINET

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

PROFINET IO

PROFINET IO (Input - Output) has been created for the connection of decentralized peripherals to a controller.

PROFINET IO Controller

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

PROFINET IO Device

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

RPC

Remote Procedure Call

Mechanism for calling up a code on another computer in the network (standard used by PROFINET)

SCADA

Supervisory Control and Data Acquisition

A concept for control and data acquisition of technical processes

Slot

Address of a structural unit within a PROFINET IO device.

Subslot

Subslot address of a structural unit within a slot.

Submodule

Hardware or logical component of a module.

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