



Operating Instruction Manual
DTM for Hilscher Sercos Slave Device
Configuration of Hilscher Slave Devices

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 Sercos Slave device within a FDT Framework using the Sercos Slave DTM, and what can be read from the diagnosis panes.

In a network project the Sercos Slave DTM can be dropped:

- to the root line (Stand-Alone Slave),
- or to the Master busline of a Sercos Master DTM.



Note: This manual edition first provides information for the case if the Sercos Slave DTM is dropped to the root line (Stand-Alone Slave) and in addition important information for the case if the Sercos Slave DTM is dropped to the Master busline of a Sercos Master DTM.

1.1.1 Descriptions of the Dialog Panes

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

Section	Subsection	Manual Page
<i>Settings</i>	<i>Overview Settings</i>	33
	<i>Driver</i>	36
	<i>Device Assignment</i>	46
	<i>Firmware Download</i>	52
<i>Offline Parameterization</i>	<i>Support for Multi-Slave Devices</i>	59
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Table 1: Descriptions Dialog Panes

1.1.2 Online Help

The Sercos Slave DTM contains an integrated online help facility.

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

1.1.3 List of Revisions

Index	Date	Version	Component	Chapter	Revision
3	15-10-22	1.4.x.x 1.4.x.x	SIISlaveDTM.dll, SIISlaveGUI.ocx	2, 3.2, 4.5, 6	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. Chapter <i>Online Functions</i> : Safety messages according to firmware and configuration download added.
4	17-02-17	1.1000.x.x, 1.1000.x.x	SIISlaveDTM.dll, SIISlaveGUI.ocx	1.4.1	Section <i>Requirements</i> Internet access added, Windows 8.1 and Windows 10 added. Terminology adapted to current Sercos convention ("sercos" => "Sercos").

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>

Positions in Figures

The *Positions* ①, ②, ③ ... or ①, ②, ③ ... or ①, ②, ③ ... 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 Sercos Slave DTM

You can use the Sercos Slave DTM to configure Sercos Slave devices within a FDT Framework and to view the device diagnosis.

In a network project the Sercos Slave DTM can be dropped:

- to the root line (Stand-Alone Slave),
- or to the Master busline of a Sercos Master DTM.

Slave DTM at the Root-Line (Stand-Alone Slave)

Insert the Sercos Slave DTM to the root busline if you intend to configure only one single Sercos Slave device.

Slave DTM at the Master Busline

Insert the Sercos Slave DTM to the Master busline of the Sercos Master DTM if within the network project the Slave device and the Master device are used, i. e. if you intend to configure the Slave device and the Master device.

1.4.1 Requirements

System Requirements

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



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

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

Requirements Sercos Slave DTM

To configure the Sercos Slave device with the Sercos Slave DTM the following requirements have to be accomplished:

- Completed hardware installation of a netX based DTM-compatible Sercos Slave device, inclusive loaded firmware and loaded configuration file
- Installed FDT/DTM V 1.2 compliant frame application
- Installed Sercos Master DTM (If Slave DTM is dropped to the Master busline.)
- Loaded DTM in the Device Catalog of the FTD Framework



Note: If the Sercos Slave DTM and the Sercos Slave 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.

1.5 Dialog Structure of the Sercos Slave 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.

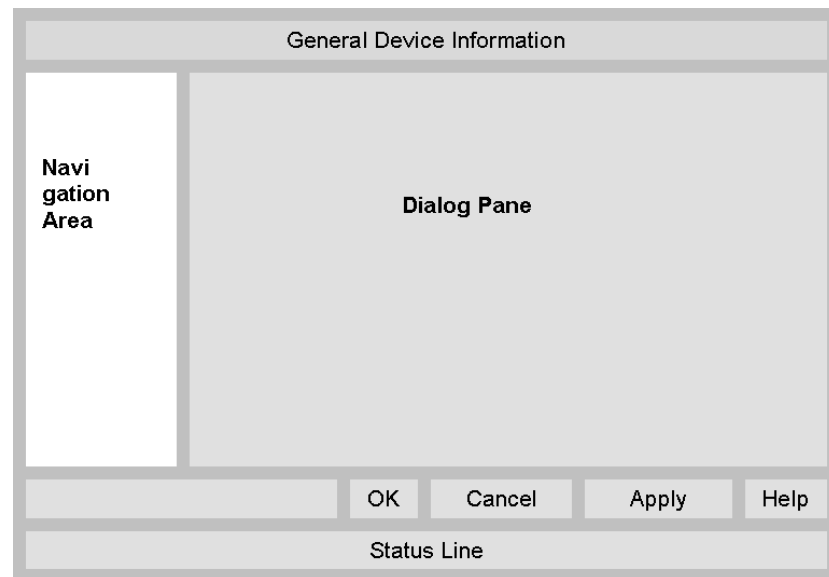


Figure 1: Dialog Structure of the Sercos Slave DTM

1.5.1 General Device Information

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

Table 2: General Device Information

1.5.2 Navigation Area

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

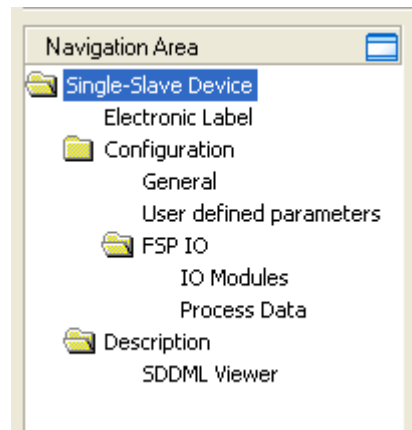


Figure 2: Navigation Area

- To access a DTM dialog pane select the respective item of the navigation tree structure.
- 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 Sercos Slave DTM to the Sercos Slave 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 36.
Device Assignment	On the pane Device Assignment you select the device and assign the device to the driver. For further information, refer to section <i>Device Assignment</i> on page 46.
Firmware Download	The dialog on the pane Firmware Download is used to load a new firmware into the device. A detailed description can be found in section <i>Firmware Download</i> on page 52.
Offline Parameterization	
Electronic Label	At the Electronic Label pane all information about the device which has been stored in the electronic label can be displayed. These are mainly identification data. More information on this topic is available in section <i>Electronic Label</i> on page 64 .
General	At the pane General the current Station Address of the Sercos Slave device is displayed. Further the information whether the device has a fixed or a variable configuration can be found there. You can find more about these topics in section <i>General</i> on page 68 .
Configuration	On the pane Configuration you can access a lot of Sercos specific configuration parameters. Read more in section <i>Configuration</i> on page 69.
User-defined Parameters	The User-defined Parameters pane displays information on the IDN parameter sets of different communication phases. See section <i>User-defined Parameters</i> on page 95.
FSP IO	The FSP IO pane allows it to change the parameter settings of the modules. This window is only present if supported by the device profile. You find a detailed description in section <i>FSP IO</i> on page 104.
FSP Drive	At the FSP Drive pane you can access inputs and outputs. This window is only present if supported by the device profile. It is described in detail in section <i>FSP Drive</i> on page 118.
Online Parameterization	
... Online Parameterization	The online configuration window is divided in two parts. <ul style="list-style-type: none"> • The upper part is described in section <i>Upper Part of Dialog Pane</i> at page 131. • The lower part is described in section <i>Lower Part of Dialog Pane</i> at page 139..
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 146.

Table 3: Overview Dialog Panes



Note: Accessing the **Diagnosis** panes of the Sercos Slave DTM requires an online connection from the Sercos Slave DTM to the Sercos Slave DTM.



For further information, refer to section *Connecting/Disconnecting Device* on page 142.

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 4: OK, Cancel, Apply and Help

1.5.5 Table Lines

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

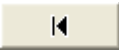
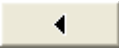

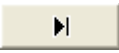


	Meaning
	To select the first line of a table use First Line .
	To select the previous line of a table use Previous Line .
	To select the next line of a table use Next Line .
	To select the last line of a table use Last Line .
	Create a new Line inserts new lines into the table.
	Delete selected Line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

Table 5: 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.

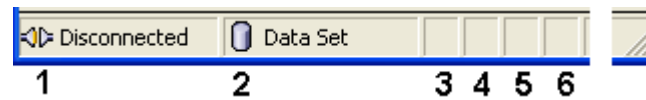
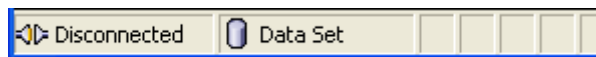


Figure 3: Status Bar – Status Fields 1 to 6

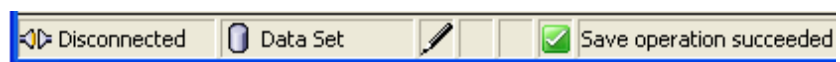
Status Field	Icon / Meaning	
1	DTM Connection States	
		Connected: Icon closed = Device is online
		Disconnected: Icon opened = Device is offline
2	Data Source States	
		Data set: The displayed data are read out from the instance data set (database).
		Device: The displayed data are read out from the 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 6: Status Bar Icons [1]

Offline State



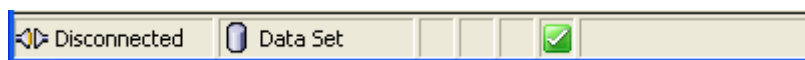
Save operation succeeded



Firmware Download



Firmware Download successful



Online State and Diagnosis

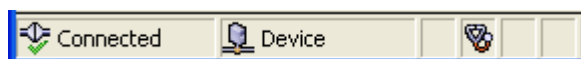


Figure 4: Status Bar Display Examples

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 Sercos Slave DTM serves for configuration and diagnosis of Sercos Slave 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 Personal Injury

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 configure your system.

2.4.1 Communication Stop

If you perform a firmware download or a configuration download via the Sercos Slave DTM be aware of the following:

- Together with the firmware download, an automated device reset is performed that will interrupt all network communications and established connections will drop.
- If you attempt to download the configuration during bus operation, the communication between Master and Slaves is stopped.
- Unexpected equipment operation may cause personal injury.
- Stop the application program before starting upgrading the firmware or downloading the configuration.
- Make sure that your equipment operates under conditions that prevent personal injury. All network devices should be placed in a fail-safe mode before upgrading the firmware or downloading a configuration.

You find the description about the firmware download in section *Firmware Download* on page 52 and about the configuration download in section *Download Configuration* on page 144.

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.

2.5 Property Damage

To avoid property damage respectively device destruction 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 Communication Stop

If you perform a firmware download or a configuration download via the Sercos Slave DTM be aware of the following:

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

Damage of Equipment

- Unexpected equipment operation may cause property damage.
- Stop the application program before starting upgrading the firmware or downloading the configuration.
- Make sure that your equipment operates under conditions that prevent property damage. All network devices should be placed in a fail-safe mode before upgrading the firmware or downloading a configuration.

Loss of Device Parameters

- Both the firmware download and the configuration download erase the configuration data base. The firmware download overwrites the existing firmware in the network device.
- Device parameters that have not been saved non-volatile are getting lost during the reset.
- To complete the firmware update and to make the device operable again, re-download the configuration when the firmware update has been finished.

2.5.2 Invalid Firmware

Loading invalid firmware files could render your module unusable.

2.5.3 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 damage of equipment.

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 kind of danger is specified exactly 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 as consequence death or grievous bodily harm if it isn't 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 as consequence death or (grievous) bodily harm if it isn't 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 as consequence simple battery if it isn't avoided.	Indicates a Hazardous Situation Which if not Avoided, may Result in Minor or Moderate Injury.

Table 7: Signal Words in Safety Messages on Personal Injury


Signal Word	Meaning (international and USA)
 NOTICE	Indicates a Property Damage Message.

Table 8: Signal Words in Safety Messages on 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 reference safety [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 Z535.6-2006 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 Sercos Slave device with Sercos Slave 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*.

The following two cases are considered:

- Slave DTM at the Root-Line (Stand-Alone Slave)
- and Slave DTM at the Master busline.

3.1.1 Slave DTM at the Root-Line (Stand-Alone Slave)

#	Step	Short Description	For detailed information see section	Page
1	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>)	-
2	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>)	-
3	Insert Slave into configuration	Depending of the FDT Container: For netDevice: - in the Device Catalog under Gateway / Stand-Alone Slave click to the Slave, - and insert the Slave via drag and drop to the root line in the network view.	(See <i>Operating Instruction Manual netDevice and netProject</i>)	-
4	Open the Slave DTM configuration dialog	Open the Slave DTM configuration dialog. - Double click to the device icon of the Slave. - The Slave DTM configuration dialog is displayed.	-	-

#	Step	Short Description	For detailed information see section	Page
5	Verify or adapt Driver Settings	<p>In the Slave DTM configuration dialog: - select Settings > Driver.</p>  <ul style="list-style-type: none"> • 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 Sercos Slave DTM is installed on the same PC as the Sercos Slave device. • Use the netX Driver to establish a USB, Serial (RS232) or TCP/IP connection from the Sercos Slave DTM to the Sercos Slave 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><i>Settings for Driver and Device Assignment and Driver</i></p>	34
		<p>- Verify that the default driver is checked. - If necessary, check another driver or multiple drivers.</p>		36
6	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: - 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> <p>Adjust the driver parameters netX Driver USB/RS232 only if they differ from the default settings.</p>  <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>	39
7	Assign Slave device (with or without firmware)	<p>Assign the device to this driver.</p> <p>In the Slave DTM configuration dialog: - select Settings > Device Assignment, - select a Slave device (with or without firmware), - therefore check the appropriate checkbox, - select Apply.</p>	<p><i>Selecting the Device (with or without firmware)</i></p>	49
8	Select and download firmware	<p>If not yet a firmware was loaded to the device: - Adhere to the necessary safety precautions to prevent personnel injury and property damage that may occur in consequence of a communication stop.</p> <p>In the Slave DTM configuration dialog: - select Settings > Firmware Download, - select Browse.., - select a firmware file, - select Open, - select Download and Yes.</p>	<p><i>Safety Messages on Firmware or Configuration Download</i></p>	31
			<p><i>Firmware Download</i></p>	52




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#	Step	Short Description	For detailed information see section	Page
14	Diagnosis	Depending of the FDT Container. For netDevice: - right click to the device icon of the Slave, - select Diagnosis . - The Slave 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 Slave DTM diagnosis dialog via OK .	<i>Overview Diagnosis</i>	146
16	Disconnect	Depending of the FDT Container. For netDevice: - right click to the device icon of the Slave, - select Disconnect .	<i>Connecting/Disconnecting Device</i>	142

Table 9: Getting started - Configuration Steps (Slave DTM at the Root-Line (Stand-Alone Slave))

3.1.2 Slave DTM at the Master bus line

#	Step	Short Description	For detailed information see section	Page
1	Load device catalog	Depending of the FDT Container: For netDevice: - select Network > Device Catalog , - select Reload Catalog .	<i>(See Operating Instruction Manual netDevice and netProject)</i>	-
2	Create new project / Open existing project	Depending of the frame application. For the configuration software: - select File > New or File > Open .	<i>(See Operating Instruction Manual of the Frame Application)</i>	-
3	Insert Master or Slave into configuration	For netDevice: - in the Device Catalog click to the Master, - and insert the device via drag and drop to the root line in the network view, - in the Device Catalog click to the Slave, - and insert the device via drag and drop to the Master bus line in the network view.	<i>(See Operating Instruction Manual netDevice and netProject)</i>	-
4	Open the Slave DTM configuration dialog	Open the Slave DTM configuration dialog. - Double click to the device icon of the Slave. - The Slave DTM configuration dialog is displayed.	-	-

#	Step	Short Description	For detailed information see section	Page
5	Verify or adapt Driver Settings	<p>In the Salve DTM configuration dialog: - select Settings > Driver.</p>  <ul style="list-style-type: none"> • 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 Sercos Slave DTM is installed on the same PC as the Sercos Slave device. • Use the netX Driver to establish a USB, Serial (RS232) or TCP/IP connection from the Sercos Slave DTM to the Sercos Slave 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>34</p> <p>36</p>
6	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: - 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> <p>Adjust the driver parameters netX Driver USB/RS232 only if they differ from the default settings.</p>  <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>39</p>
7	Assign Slave device (with or without firmware)	<p>Assign the device to this driver.</p> <p>In the Slave DTM configuration dialog: - select Settings > Device Assignment, - select a Slave device (with or without firmware), - therefore check the appropriate checkbox, - select Apply.</p>	<p><i>Selecting the Device (with or without firmware)</i></p>	<p>49</p>
8	Select and download firmware	<p>If not yet a firmware was loaded to the device: - Adhere to the necessary safety precautions to prevent personnel injury and property damage that may occur in consequence of a communication stop.</p> <p>In the Slave DTM configuration dialog: - select Settings > Firmware Download, - select Browse.., - select a firmware file, - select Open, - select Download and Yes.</p>	<p><i>Safety Messages on Firmware or Configuration Download</i></p> <p><i>Firmware Download</i></p>	<p>31</p> <p>52</p>

[illegible]

#	Step	Short Description	For detailed information see section	Page
15	Diagnosis	Depending of the FDT Container. For netDevice: - right click to the device icon of the Slave, - select Diagnosis . - The Slave 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 Slave DTM diagnosis dialog via OK .	<i>Overview Diagnosis</i>	146
16	Disconnect	Depending of the FDT Container. For netDevice: - right click to the device icon of the Slave, - select Disconnect .	<i>Connecting/Disconnecting Device</i>	142

Table 10: Getting started - Configuration Steps (Slave DTM at the Master bus line)

3.2 Safety Messages on Firmware or Configuration Download

If you perform a firmware download or a configuration download via the Sercos Slave DTM adhere to the necessary safety precautions to prevent personnel injury and property damage that may occur in consequence of a communication stop or in consequence of a mismatching system configuration. Also invalid or non-authorized firmware can damage your device.

Personnel Injury



Communication Stop

- Together with the firmware download, an automated device reset is performed that will interrupt all network communications and established connections will drop.
- If you attempt to download the configuration during bus operation, the communication between Master and Slaves is stopped.
- Unexpected equipment operation may cause personal injury.
- Stop the application program before starting upgrading the firmware or downloading the configuration.
- Make sure that your equipment operates under conditions that prevent personal injury. All network devices should be placed in a fail-safe mode before upgrading the firmware or downloading a configuration.

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.
-

For more refere to next page.

Property Damage

NOTICE**Communication Stop**

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

Damage of Equipment

- Unexpected equipment operation may cause property damage.
- Stop the application program before starting upgrading the firmware or downloading the configuration.
- Make sure that your equipment operates under conditions that prevent property damage. All network devices should be placed in a fail-safe mode before upgrading the firmware or downloading a configuration.

Loss of Device Parameters

- Both the firmware download and the configuration download erase the configuration data base and overwrites the existing firmware in the device.
- Device parameters that have not been saved non-volatile such as a temporary IP address are getting lost during the reset.
- Before you initiate firmware or a configuration download make sure that your project configuration data are saved non-volatile in order to prevent loss of configuration data.
- To complete the update and to make the device operable again, please re-download the configuration when this operation has finished.

Invalid or non-authorized Firmware

- Loading invalid or non authorized firmware files could render your module unusable. Only proceed with a authorized firmware update.

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 property damage.
-

4 Settings

4.1 Overview Settings

Settings Dialog Panes

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

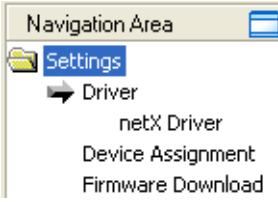
Sercos Slave DTM	Folder Name / Section	Subsection	Manual Page
 <p>Navigation Area – Settings (Example) Additional drivers can be displayed.</p>	Driver		36
		Verify or adapt Driver Settings	36
		cifX Device Driver	38
		netX Driver	38
		Configuring netX Driver	39
	Device Assignment		46
		Scanning for Devices	46
		Scanning for all Devices or for suitable only	48
		Selecting the Device (with or without firmware)	49
		Selecting the Device once more (with Firmware)	50
	Firmware Download		52

Table 11: 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 34.

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 Sercos Slave DTM to the Sercos Slave 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 Sercos Slave 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 Sercos Slave DTM is installed on the same PC as the Sercos Slave device.
- Use the **netX Driver** to establish an USB, Serial (RS232) or TCP/IP connection from the Sercos Slave DTM to the Sercos Slave 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 Slave 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 Sercos Slave device icon.
9. Select the **Connect** command from the context menu.
- In the network view the device description at the device icon of the Slave is displayed with a green colored background. The Sercos Slave device now is connected to the Sercos Slave 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 Sercos Slave 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 12: Driver Selection List Parameters

To establish a connection from the Sercos Slave DTM to the Sercos Slave 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 with 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 Sercos Slave DTM to the Sercos Slave device must be supported by the device and must be available for the device.

- Use the **cifX Device Driver** if the Sercos Slave DTM is installed on the same PC as the Sercos Slave device.
 - Use the **netX Driver** to establish a USB, Serial (RS232) or TCP/IP connection from the Sercos Slave DTM to the Sercos Slave 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 Sercos Slave-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 Sercos Slave DTM is installed in the same PC as the Sercos Slave device.



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

Figure 9: netX Driver > USB/RS232 Connection

Parameter	Meaning	Range of Value / Default Value
Enable USB/RS232 Connector (Restart of ODM required)	checked: The netX Driver can communicate via the USB/RS232 interface. unchecked: The netX Driver can <u>not</u> communicate via the USB/RS232 interface. If the check mark for Enable USB/RS232 Connector is set or removed, then the ODM server must be restarted ¹ , to make the new setting valid. ¹ Restart the ODM server via the ODMV3 Tray Application : - In the foot line click on  using the right mouse key. - In the context menu select Service > Start .	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	checked: No connection. unchecked: The netX Driver tries to establish a connection using the configured USB/RS232 interface.	checked, unchecked (Default)
Baud rate	Transfer rate: number of bits per second. The device must support the baud rate.	9.6, 19.2, 38.4, 57.6 or 115.2 [kBit/s]; Default (RS232): 115.2 [kBit/s]

Parameter	Meaning	Range of Value / Default Value
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	In the error detection in data transmission using parity bits, "parity" describes the number of bits occupied with 1 in the transmitted information word. No Parity: no parity bit Odd Parity: The parity is "odd" if the number of bits occupied with 1 in the transmitted information word will be odd. Even parity: The parity is "even" if the number of bits occupied with 1 in the transmitted information word will be even. Mark Parity: if the parity bit is always 1, this will be named mark-parity (the bit does not contain any information). Space Parity: if the parity bit always 0, this will be named space-parity (the bit represents an empty space).	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 13: 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**.

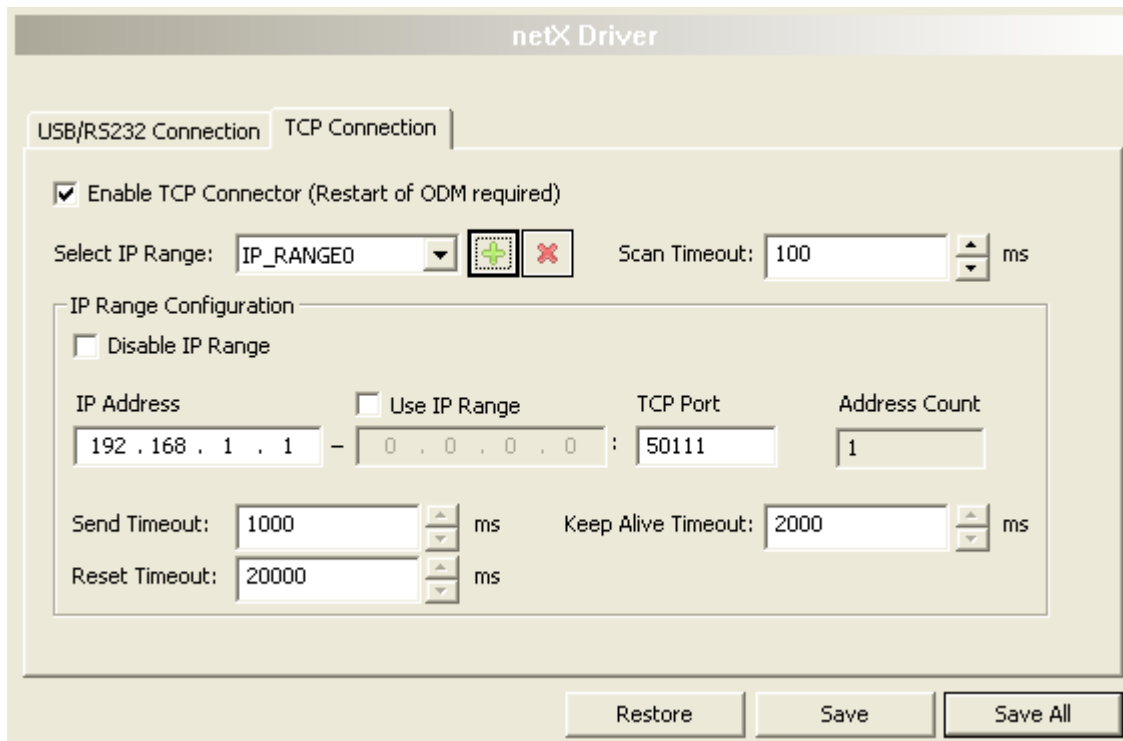





Figure 10: netX Driver > TCP Connection

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 14: 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 Sercos Slave device to the Sercos Slave DTM by checking the check box. This is essential to establish an online connection from the Sercos Slave DTM to the Sercos Slave device later, as described in section *Connecting/Disconnecting Device* on page 142.

Therefore in the **Device Assignment** dialog pane you scan for the Sercos Slave 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	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

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 Sercos Slave 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 Sercos Slave 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 15: 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**.

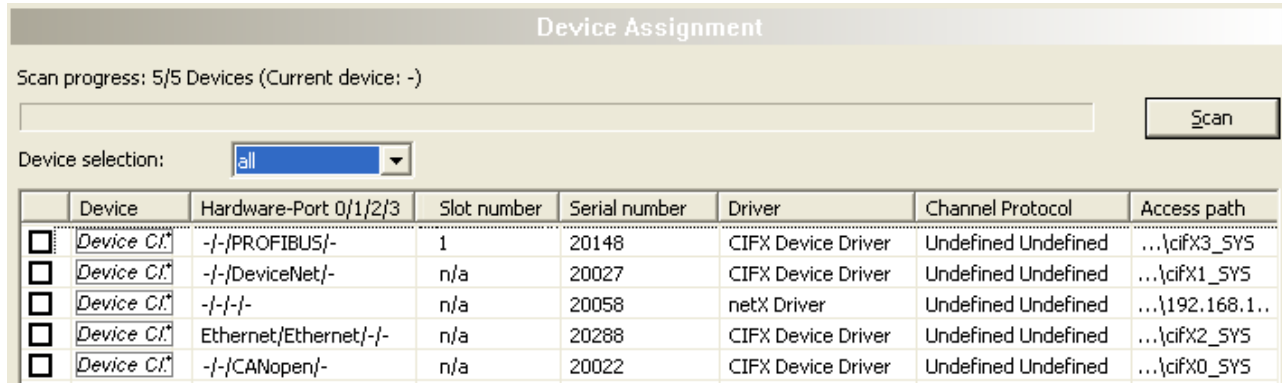


Figure 12: Device Assignment - detected Devices (* The name of the device class is displayed.) Example for Devices without Firmware

- ⇒ 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 Sercos Slave 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 Sercos Slave DTM can only be established with one Sercos Slave device.

To select the physical Sercos Slave device (with or without firmware):

1. 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 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 Sercos Slave DTM to the Sercos Slave 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 52 or to section *Selecting the Device once more (with Firmware)* on page 50.

4.4.3 Selecting the Device once more (with Firmware)



Note: For repeated download this step is omitted.

To select the Sercos Slave 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 Sercos Slave 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 Sercos Slave DTM to the Sercos Slave device, refer to section *Connecting/Disconnecting Device* on page 142.

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 Slave device (with or without firmware) and the device must be assigned to the hardware.



For further information refer to section *Overview Settings* on page 33.

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 16: Parameter Firmware Download

➤ 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:

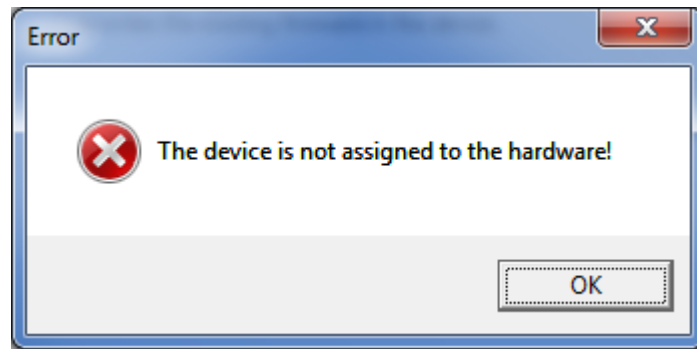


Figure 17: Error Message 'The device is not assigned to the hardware!'

- Click **OK** and select and assign the Master 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**.

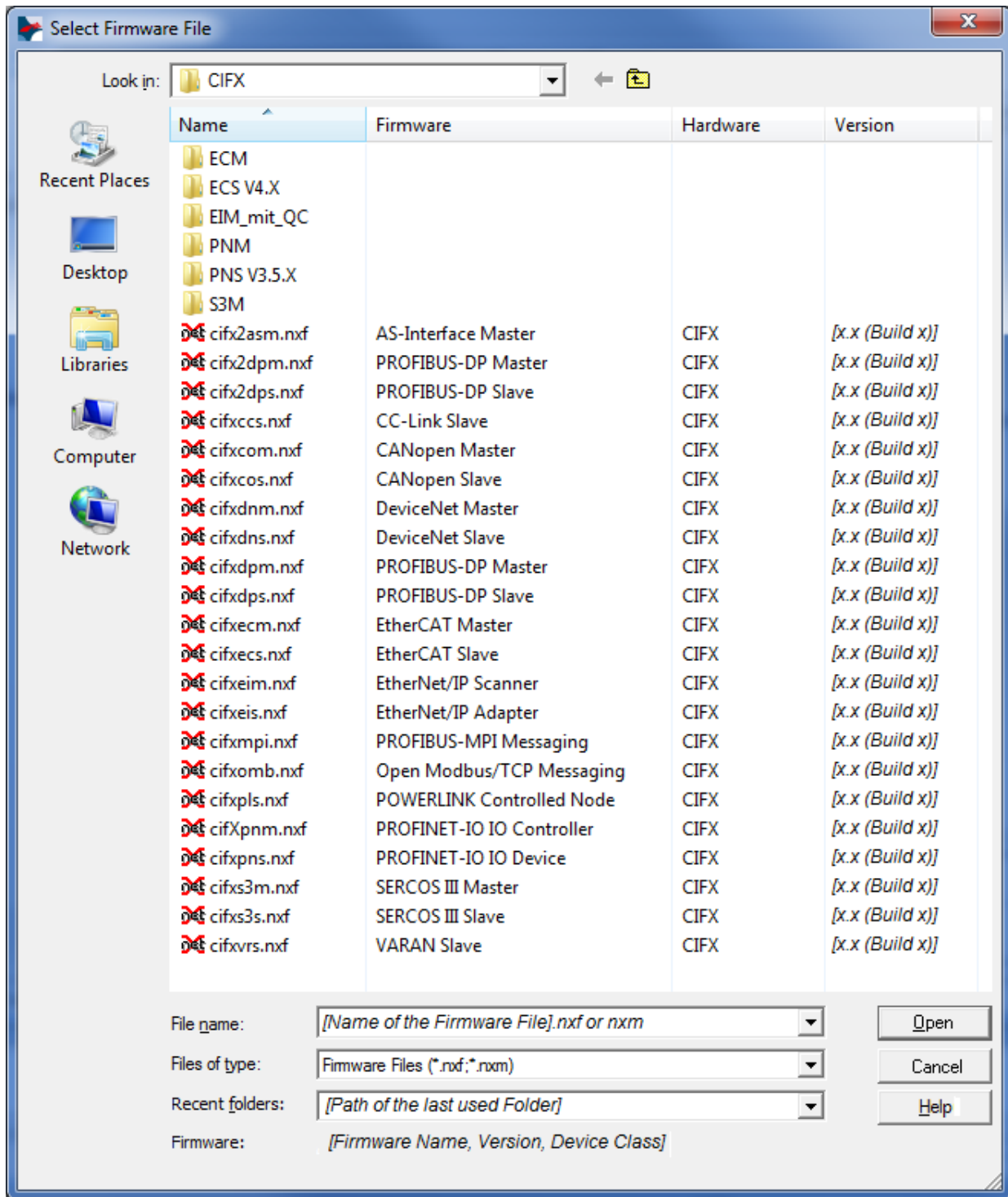


Figure 18: Window 'Select Firmware File' (Example CIFX)

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 <i>all</i> 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 17: 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 Sercos Master 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 Sercos Master device.

Invalid Firmware

NOTICE

Device Destruction caused by invalid Firmware

Loading invalid firmware files could render your device unusable.

- 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

Personnel Injury in Consequence of a Communication Stop

- Stop your application program before starting upgrading the firmware.
- Make sure that your equipment operates under conditions that prevent personal injury. All network devices should be placed in a fail-safe mode before upgrading the firmware.
- Unexpected equipment operation may cause personal injury.

NOTICE**Damage of Equipment and Loss of Device Parameters in Consequence of a Communication Stop**

- Stop your application program before starting upgrading the firmware.
- Make sure that your equipment operates under conditions that prevent property damage. All network devices should be placed in a fail-safe mode before upgrading the firmware.
- Unexpected equipment operation may cause property damage.
- Before you initiate firmware download make sure that your project configuration data are saved non-volatile in order to prevent loss of configuration data.

Invalid or non-authorized Firmware

- Loading invalid or non authorized firmware files could render your module unusable. Only proceed with a authorized firmware update.
- 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.

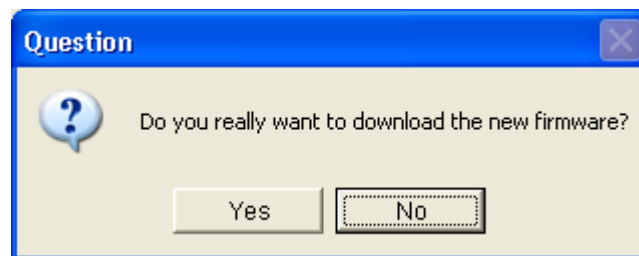


Figure 20: Request - Do you really want to download the firmware?

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.

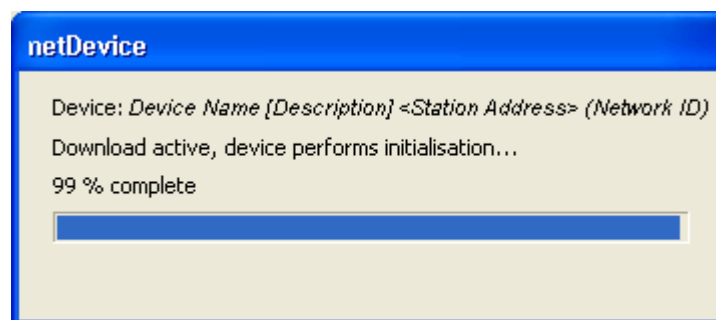


Figure 21: Firmware Download - Progress Bar



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.

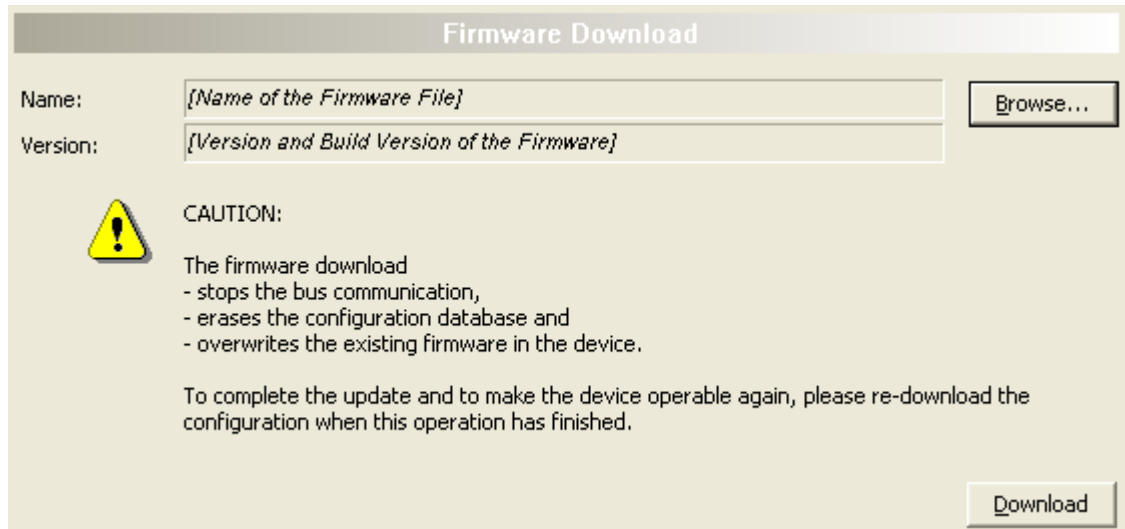


Figure 23: Firmware Download – Download

5 Offline Parameterization

Device configuration is done by first clicking at the device in the netDevice frame with the right mouse button and afterwards selecting option “**Configuration->Offline Parameterization**” on the menu appearing then.

5.1 Support for Multi-Slave Devices

The Sercos Slave DTM supports Multi-Slave Devices with multiple slaves within one single device.

The information that will be displayed at the top of the navigation area will depend on the number of slaves integrated within the IO Device.

If the device contains only one single slave (for instance, a compact IO device), at the top level of the navigation pane there will be an entry “**Single-Slave Device**”

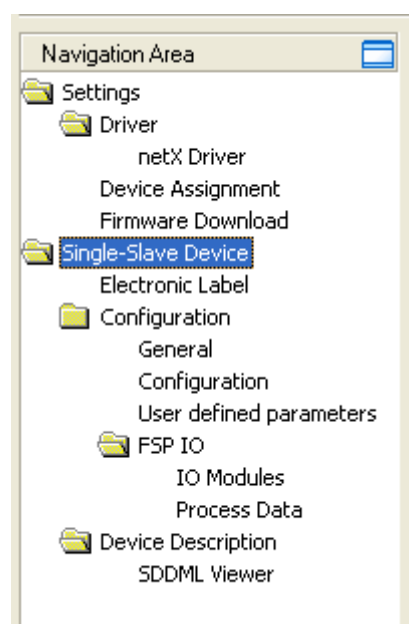


Figure 24: Navigation Area for Single-Slave Devices

The corresponding dialog pane for a single slave device looks like:

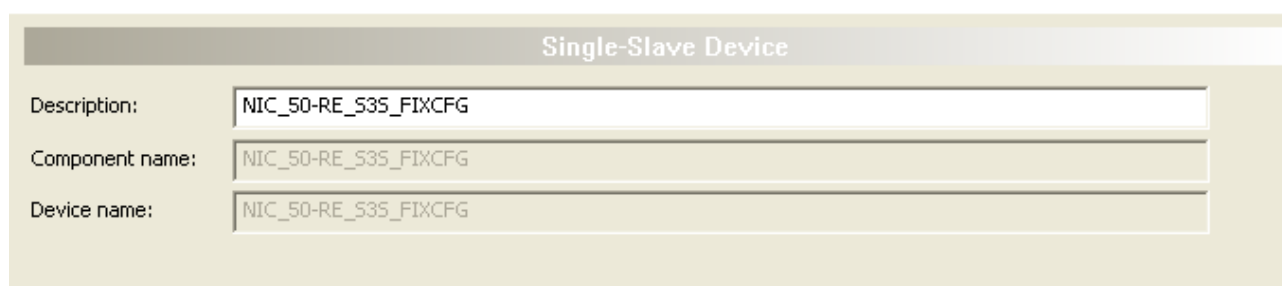


Figure 25: Dialog Pane - Single-Slave Device

Contrary to this, for a multi-slave device, in the topmost line there will be written **“Device with x Slaves”** where x is the number of slaves of the device. It must be at least 2.

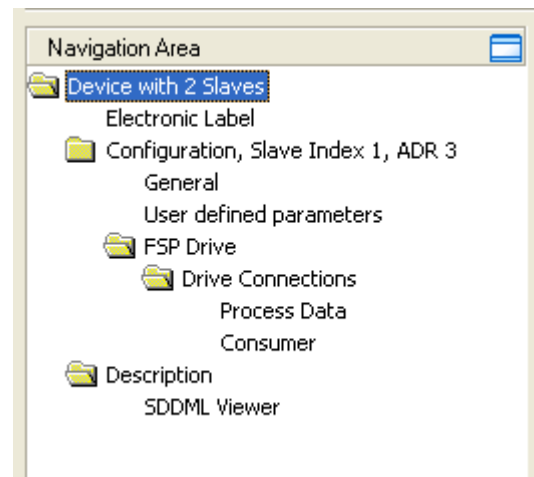


Figure 26: Navigation Area for Multi-Slave Devices

There is another difference compared to the single slave device: In the third line, the entry “Configuration” is extended by the index and address of the slave having been selected.

Selection of the slave device to parameterize in devices containing multiple slaves is done by the slave selection selection list appearing in the Devices with x Slaves window, see figure below:

Figure 27: Dialog Pane - Multi-Slave Device - Slave Selection

In the example above, it is possible to choose between a slave with index 0 at address 2 and a slave with index 1 at address 3.

The following items are displayed in the dialog pane both in the single-slave and the multi-slave case:

Name	Meaning
Description	Contains a description of the device
Component name	Contains the name of the component
Device name	Contains the name of the device

Table 18: Contents of Dialog Pane Single Slave Device /Multi Slave Device

5.2 Setting Slave Parameters

The steps provided in the following two sections are alternatively required for the two cases listed hereafter, to set the parameters of the Sercos Slave device using the Sercos Slave DTM:

- Slave DTM at the Root-Line (Stand-Alone Slave)
- and Slave DTM at the Master bus line.

5.2.1 Slave DTM at the Root-Line (Stand-Alone Slave)

If in the network project the Sercos Slave DTM is dropped to the root bus line, the following steps are needed to set the Slave device parameters using the Sercos Slave DTM:

Electronic Label

1. Check device specific information about the Slave:
 - Select **Electronic Label** in the navigation area.

General Parameters: Sercos Address

2. Check the Sercos address:
 - Select **Configuration > General** in the navigation area.

Interface, Ident and Slave-specific and Bus Parameters

3. Set the Interface, Ident and Slave-specific parameters and check the Bus parameters
 - Select **Configuration > Configuration** in the navigation area.

User-defined Parameters

4. Set user-defined parameters of the device:
 - Select **Configuration > User-defined Parameters** in the navigation area.

FSP IO Parameters

5. Only in case of an FSP IO Device:
 - Set some essential parameters for FSP IO Devices:
 - Select **Configuration > FSP IO** in the navigation area.

FSP Drive Parameters

6. Only in case of an FSP Drive
 - Set some essential parameters for FSP Drives:
 - Select **Configuration > FSP Drive** in the navigation area.

Close Slave DTM Configuration Dialog

- Click **OK** in order to close the Slave DTM configuration dialog and to store your configuration.

Configuration Download to the Sercos Slave Device

Adhere to the necessary safety precautions to prevent personnel injury and property damage that may occur in consequence of a communication stop or in consequence of a mismatching system configuration.



Note: In order to transfer the configuration to the Sercos Slave device, download the data of the configuration parameters in the Sercos Slave device. See section *Download Configuration* on page 144.

Further Information



For more information refer to section *Electronic Label* on page 64, to section *General* on page 68, to section *Configuration* on page 69, to section *User-defined Parameters* on page 95, to section *FSP IO* on page 104 and to section *FSP Drive* on page 118 of this document.

5.2.2 Slave DTM at the Master bus line

If in the network project the Sercos Slave DTM is dropped to the Master bus line of the Sercos Master DTM, the following steps are needed to set the Slave device parameters using the Sercos Slave DTM:

Electronic Label

1. Check device specific information about the Slave:
 - Select **Electronic Label** in the navigation area.

General Parameters: Sercos Address

2. Check the Sercos address:
 - Select **Configuration > General** in the navigation area.

Interface, Ident and Slave-specific and Bus Parameters

3. Set the Interface, Ident and Slave-specific parameters and check the Bus parameters
 - Select **Configuration > Configuration** in the navigation area.

User-defined Parameters

4. Set user-defined parameters of the device:
 - Select **Configuration > User-defined Parameters** in the navigation area.

FSP IO Parameters

5. Only in case of an FSP IO Device:
 - Set some essential parameters for FSP IO Devices:
 - Select **Configuration > FSP IO** in the navigation area.

FSP Drive Parameters

6. Only in case of an FSP Drive

Set some essential parameters for FSP Drives:

- Select **Configuration > FSP Drive** in the navigation area.

Close Slave DTM Configuration Dialog

- Click **OK** in order to close the Slave DTM configuration dialog and to store your configuration.

Configuration Download to the Sercos Slave Device

Adhere to the necessary safety precautions to prevent personnel injury and property damage that may occur in consequence of a communication stop or in consequence of a mismatching system configuration.



Note: In order to transfer the configuration to the Sercos Slave device, download the data of the configuration parameters in the Sercos Slave device. See section *Download Configuration* on page 144.

Further Information



For more information refer to section *Electronic Label* on page 64, to section *General* on page 68, to section *Configuration* on page 69, to section *User-defined Parameters* on page 95, to section *FSP IO* on page 104 and to section *FSP Drive* on page 118 of this document.

5.3 Electronic Label

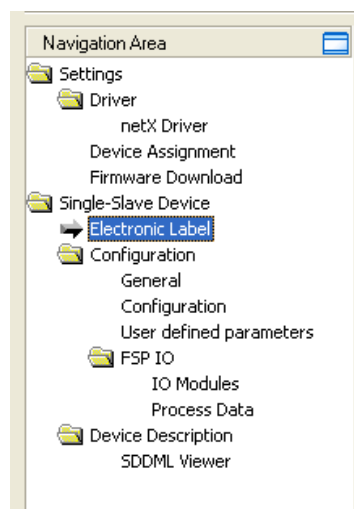


Figure 28: Navigation Area - Electronic Label

The menu entry **Configuration > Electronic Label** is available at all Sercos Slave modules independently of being a FSP IO or FSP Drive module. It reflects the “Electronic Label” of the Sercos device as defined in IDN S-0-1300 according to the specification of Sercos in the third generation.

A screenshot of the 'Electronic Label' configuration window. The title bar says 'Electronic Label'. The window contains a list of fields, each with a checkbox on the left and a text input field on the right. The fields are: Vendor ID (checkbox), Device ID (checkbox), Vendor name (checkbox), Component name (checkbox), Revision (checkbox), Hardware revision (checkbox), Software revision (checkbox), Firmware loader revision (checkbox), and Serial number (checkbox). The values entered in the input fields are: 1000, NXIO_50-RE_S3S_FIXCFG, Hilscher GmbH, NXIO_50-RE_S3S_FIXCFG, 0, (empty), (empty), (empty), and 0.

Field	Value
<input type="checkbox"/> Vendor ID	1000
<input type="checkbox"/> Device ID	NXIO_50-RE_S3S_FIXCFG
<input type="checkbox"/> Vendor name	Hilscher GmbH
<input type="checkbox"/> Component name	NXIO_50-RE_S3S_FIXCFG
<input type="checkbox"/> Revision	0
<input type="checkbox"/> Hardware revision	
<input type="checkbox"/> Software revision	
<input type="checkbox"/> Firmware loader revision	
<input type="checkbox"/> Serial number	0

Figure 29: Configuration > Electronic Label

The following items are displayed:

Name	Meaning
Vendor ID	Vendor Code as defined in IDN S-0-1300.x.03
Device ID	Device ID as defined in IDN S-0-1300.x.05
Vendor name	Vendor name as defined in IDN S-0-1300.x.02
Component name	Component name as defined in IDN S-0-1300.x.01
Revision	Revision as defined in IDN S-0-1300.x.07
Hardware revision	Hardware revision as defined in IDN S-0-1300.x.08
Software revision	Software revision as defined in IDN S-0-1300.x.09
Firmware loader revision	Firmware loader revision as defined in IDN S-0-1300.x.10
Serial number	Serial number as defined in IDN S-0-1300.x.12

Table 19: Device > Electronic Label

For each item an associated check button can be checked (located at the most left part of the window):

If this button is checked, the master will check this item for correctness, otherwise the master will assume the correctness without performing a check.

- The Vendor ID is a 16 bit wide unique code introduced for identification of devices within the Sercos network.
- If the value differs from 0, the device comes from a registered vendor which has been assigned to that code by Sercos international.
- If the value is 0, the device comes from an unregistered vendor.
- The Device ID is a unique string managed by the vendor for separating the various types of devices the vendor offers.
- The component name contains the name of the device as it would for instance be published in vendor's price list.
- The revision is an integer numeric value (16 bit) which should be incremented each time when there is a significant change in the function of the device (i.e. a functional correction of the device).
- The hardware revision identifies the version number of the hardware of the device. This value is specified by the manufacturer.
- The software revision identifies the version number of the software or firmware of the device. This value is specified by the manufacturer.
- The firmware loader revision identifies the version number of the firmware loader which may be contained in the device. This value is specified by the manufacturer.
- The serial number. It identifies the unique number of the individual device which has been assigned to the device at the manufacturer.
-

5.4 Overview Configuration

Dialog Panes “Configuration”

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

Folder Name / Section	Subsection	Manual Page
Configuration	General	68
	Configuration	69
	FSP IO	104
	IO Modules	105
	Process Data	116
	FSP Drive	118

Table 20: Dialog Panes Configuration

The Sercos device model covers drives, IO devices and hybrid devices whereas the latter is the combination of drive and IO.

- Sercos drive implements FSP Drive according to specification “Function Specific Profile Drives V1.1.2.11” (Reference #8)
- Sercos IO device implements FSP IO according to specification “Function Specific Profile IO V1.1.2.1.3, (Reference #7)
- Sercos hybrid device implements both FSP Drive and FSP IO.

FSP IO Devices

For FSP IO devices, the **Configuration** dialog pane looks like:

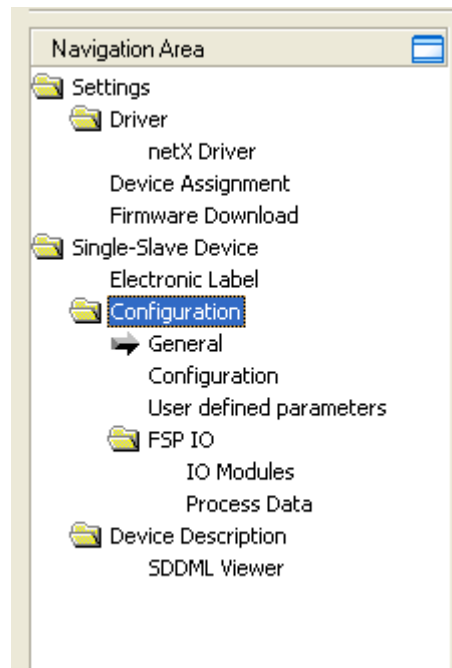


Figure 30: Navigation Area - Configuration for FSP IO Modules

FSP Drive

For drives according to FSP Drive, the **Configuration** dialog pane appears like:

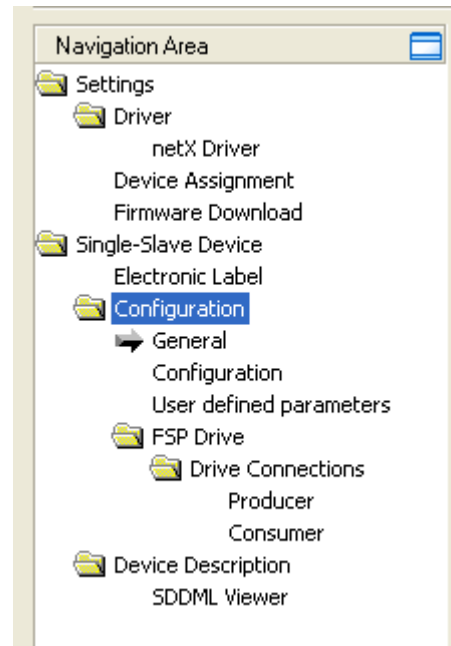


Figure 31: Navigation Area - Configuration for FSP Drive Modules

In both example figures a device with 2 slaves has been used. There would be no difference except the top level entry, if a single slave device would have been used.

5.5 General

Figure 32: Configuration > General

On a single slave device the headline is only “General“, on a device with multiple slaves additionally index and address of the selected slave are stated there (such as displayed in *Figure 32: Configuration > General*).

The menu entry **Configuration > General** is available at all Sercos Slave modules independently of being a FSP IO or FSP Drive module.

The following items are displayed:

Name	Meaning
Sercos address	Contains the Sercos address

Table 21: Configuration > General

The following checkboxes are present:

Optional:

indicates that the item is optional and may be omitted.

VAR_CFG:

indicates that variable configuration is allowed (i.e. the user may at least partly change the configuration originating from the SDDML file of the device).

5.6 Configuration

At the **Configuration** pane device related settings for Sercos can be made. These settings are assigned with the download of the configuration.



Information about the download you find in section *Download Configuration* on page 144.

Configuration

Interface

Bus Startup: Automatic

Watchdog Time: 1000 ms

Ident

Device ID: CIFX_RE_S3S_VARCFG
Version of SCP Sync: 0

Vendor Code: 1000
Version of SCP NRT: 0

Bus

IP Address: 0 . 0 . 0 . 0 ☐ Enable

Netmask: 0 . 0 . 0 . 0 ☐ Enable

Gateway: 0 . 0 . 0 . 0 ☐ Enable

TCP Flags: ☐ BootP ☐ DHCP

Controller Clock Length: 1000 ns
Count Register: 2

Time Divided Control Clock: 20000 ns
Divided Control Clock Output: High Active

Delay Time of Divided Clock: 20000 ns
Divided Control Clock Mode: Mode 1

Divided Control Clock Length: 1000 ns
Controller Clock Output: High Active

Slave Configuration

Number of Slaves: 8

Slave 1 | Slave 2 | Slave 3 | Slave 4 | Slave 5 | Slave 6 | Slave 7 | Slave 8

SERCOS III Address: 1
FSP Type: IO V1
SCP Configuration Type: Fix. Version 1.1.1
Output Data Size for Fixed Configuration: 2
Input Data Size for Fixed Configuration: 2

User SCP Types:

SCP_WD Version 1.1.1
SCP_Diag Version 1.1.1
SCP_RTb Version 1.1.1
SCP_Mux Version 1.1.1
SCP_Sig Version 1.1.1

Slave Flags:
☐ Set up a Default OD
☒ Non Stack Objects Are Deleted
☒ SERCOS Address May not be Changed by the Master

Slave Connections

	1	2	3	4
Connection Control Offset:	0	0	0	0
Real Time Data Process Image Offset:	2	2	0	0
Real Time Data Maximum Length:	198	198	0	0

Export SDDML

Default

Figure 33: Dialog Pane "Configuration"



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

5.6.1 Interface Parameters

The screenshot shows a dialog box titled 'Interface'. It contains two settings: 'Bus Startup' with a dropdown menu currently showing 'Automatic', and 'Watchdog Time' with a text input field containing '1000' followed by 'ms'.

Figure 34: Interface Parameters

Bus Startup

This parameter contains information on the bus startup method. It offers the options **Automatic** and **Application Controlled**.

If **Automatic** is selected, the Sercos Master device starts with the data exchange on the bus after the initializing has been ended.

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



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

Watchdog Time for 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, then the watchdog is deactivated and the application program monitoring is also deactivated.

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

Table 22: Range of Value / Value for the Watchdog time



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

If a (non-zero) watchdog time outside of the above mentioned permissible range of 20 up to 65535 ms is specified, [an according error message will be issued](#).

5.6.2 Ident Parameters

Configuration

Interface

Bus Startup: Automatic
Watchdog Time: 1000 ms

Ident

Device ID: CIFX_RE_S3S_VARCFG Version of SCP Sync: 0
Vendor Code: 1000 Version of SCP NRT: 0

Bus

IP Address: 0 . 0 . 0 . 0 ☐ Enable
Netmask: 0 . 0 . 0 . 0 ☐ Enable
Gateway: 0 . 0 . 0 . 0 ☐ Enable
TCP Flags: ☐ BOOTP ☐ DHCP

Controller Clock Length: 1000 ns Count Register: 2
Time Divided Control Clock: 20000 ns Divided Control Clock Output: High Active
Delay Time of Divided Clock: 20000 ns Divided Control Clock Mode: Mode 1
Divided Control Clock Length: 1000 ns Controller Clock Output: High Active

Slave Configuration

Number of Slaves: 8

Slave 1 | Slave 2 | Slave 3 | Slave 4 | Slave 5 | Slave 6 | Slave 7 | Slave 8

SERCOS III Address: 1
FSP Type: ID V1
SCP Configuration Type: Fix. Version 1.1.1
Output Data Size for Fixed Configuration: 2
Input Data Size for Fixed Configuration: 2
Slave Flags: ☐ Set up a Default OD
☒ Non Stack Objects Are Deleted
☒ SERCOS Address May not be Changed by the Master

User SCP Types:

SCP_WD Version 1.1.1
SCP_Diag Version 1.1.1
SCP_RTb Version 1.1.1
SCP_Mux Version 1.1.1
SCP_Sig Version 1.1.1

Slave Connections

	1	2	3	4
Connection Control Offset:	0	0	0	0
Real Time Data Process Image Offset:	2	2	0	0
Real Time Data Maximum Length:	198	198	0	0

Export SDDML Default

Figure 35: Ident Parameters

The ident parameters of the Sercos Stand-alone Slave DTM are:

Device ID

This parameter contains the Device ID as defined in IDN S-0-1300.x.05. Possible values are:

- CIFX_RE_S3S_FIXCFG (for fixed configurations)
- CIFX_RE_S3S_VARCFG (for variable configurations)

The value for parameter Device ID can be taken from the XML file which is bundled with the particular firmware.

Vendor Code

This parameter contains the Vendor code: as defined in IDN S-0-1300.x.03. The allowed range of values extends from 1 to 65535. The default value is 1000 (denoting "Hilscher GmbH").

According to reference #5, the vendor code is a unique number assigned to each vendor of Sercos devices assigned by Sercos international and can be used to identify Sercos devices. Use 1000 (0x3E8) for "Hilscher GmbH".

The value for the parameter Vendor Code can be taken from the XML file which is bundled with the particular firmware.

If an invalid Vendor code outside of the above mentioned permissible range of 0 up to 65535 ms is specified, [an according error message will be issued](#).

Version of SCP Sync

This parameter contains the version number of the SCP Sync profile as defined in IDN S-0-1000 The allowed range of values extends from 0 to 255. The default value is 0.

If 0 is chosen, all fields related to SCP Sync within the Bus Parameters section of the Configuration screen will be deactivated and grayed out. These are the values in the lower part of the Bus Parameters section beginning with "*Controller Clock Length*".

If an invalid version number of the SCP Sync profile outside of the above mentioned permissible range of 0 up to 255 is specified, [an according error message will be issued](#).

Version of SCP NRT

This parameter contains the Version number of SCP NRT profile as defined in IDN S-0-1000 The allowed range of values extends from 0 to 255. The default value is 0.

If 0 is chosen, all fields related to SCP NRT within the Bus Parameters section of the Configuration screen will be deactivated and grayed out. These are the values in the upper part of the Bus Parameters section up to "*TCP Flags*".

If an invalid version number of the SCP NRT profile outside of the above mentioned permissible range of 0 up to 255 is specified, [an according error message will be issued](#).

5.6.3 Bus Parameters

Configuration

Interface

Bus Startup: Automatic
 Watchdog Time: 1000 ms

Ident

Device ID: CIFX_RE_S3S_VARCFG Version of SCP Sync: 0
 Vendor Code: 1000 Version of SCP NRT: 0

Bus

IP Address: 0 . 0 . 0 . 0 ☐ Enable
 Netmask: 0 . 0 . 0 . 0 ☐ Enable
 Gateway: 0 . 0 . 0 . 0 ☐ Enable
 TCP Flags: ☐ BootP ☐ DHCP

Controller Clock Length: 1000 ns Count Register: 2
 Time Divided Control Clock: 20000 ns Divided Control Clock Output: High Active
 Delay Time of Divided Clock: 20000 ns Divided Control Clock Mode: Mode 1
 Divided Control Clock Length: 1000 ns Controller Clock Output: High Active

Slave Configuration

Number of Slaves: 8

Slave 1 | Slave 2 | Slave 3 | Slave 4 | Slave 5 | Slave 6 | Slave 7 | Slave 8

SERCOS III Address: 1 User SCP Types:

SCP_WD Version 1.1.1
SCP_Diag Version 1.1.1
SCP_RTb Version 1.1.1
SCP_Mux Version 1.1.1
SCP_Sig Version 1.1.1

 FSP Type: IO V1
 SCP Configuration Type: Fix. Version 1.1.1
 Output Data Size for Fixed Configuration: 2
 Input Data Size for Fixed Configuration: 2
 Slave Flags: ☐ Set up a Default OD
 ☒ Non Stack Objects Are Deleted
 ☒ SERCOS Address May not be Changed by the Master

Slave Connections

	1	2	3	4
Connection Control Offset:	0	0	0	0
Real Time Data Process Image Offset:	2	2	0	0
Real Time Data Maximum Length:	198	198	0	0

Export SDDML Default

Figure 36: Bus Parameters

The following are the bus parameters of the **Configuration** pane.

IP Address

This parameter contains the IP Address of the device. You must specify a valid IP Address. The default is 0.0.0.0.

The IP Address input field can be switched on and off by the check button *Enable IP Address*. Note, that switching off *Enable IP Address* will also switch off *Enable Net Mask* and *Enable Gateway*.

If no valid IP address according to the IP address rules is specified, [an according error message is issued](#).

Net mask

This parameter contains the net mask of the device. You must specify a valid net mask. The default is 0.0.0.0.

The Net Mask input field can be switched on and off by the check button *Enable Net Mask*. Note, that switching on *Enable Net Mask* will also activate *Enable IP Address* if grayed out previously.

If no valid net mask is specified, [an according error message is issued](#).

Gateway

This parameter contains the IP Address of the gateway, if any is used. You must then specify a valid IP Address. The default is 0.0.0.0.

The Gateway input field can be switched on and off by the check button *Enable Gateway*. Note, that switching on *Enable Gateway* will also activate *Enable IP Address* if grayed out previously.

If no valid IP address for a gateway is specified, [an according error message is issued](#).

There are two TCP flags:

BOOTP Flag

The BOOTP Flag decides whether IP address is tried to be fetched from a BOOTP server. Note, that switching on the *BOOTP Flag* will deactivate *Enable IP Address*, *Enable Net Mask* and *Enable Gateway*.

DHCP Flag

The DHCP Flag decides whether IP address is tried to be fetched from a DHCP server. Note, that switching on the *BOOTP Flag* will deactivate *Enable IP Address*, *Enable Net Mask* and *Enable Gateway*.



Note: All subsequently described timing values specified in nanoseconds are handled as multiple of 10 ns (e. g. Controller Clock Length = 1005 ns is handled as 1000 ns).

Controller Clock Length

This parameter contains the *Controller Clock Length* specified in nanoseconds.

Values must be larger or equal to 1000. The maximum valid value of Controller Clock Length depends on the configured cycle time. In general: the signal must go to inactive again before the next cycle starts.

The default value is 1000.

If an invalid *Controller Clock Length* outside of the range of 1000 up to 10,000,000 ns is specified, [an according error message will be issued](#).

This field is grayed out in case of *Controller Clock Output* set to "Disabled".

Time Divided Control Clock

This parameter contains the *Time Divided Control Clock* specified in nanoseconds. The allowed range of values extends from 0 to 0xFFFFFFFF. The default value is 20000.

If an invalid *Time Divided Control Clock* outside of the permissible range of 0 up to 16,777,210 ns is specified, [an according error message will be issued](#).

This field is grayed out in case of *Divided Control Clock Output* set to "Disabled".

Delay Time of Divided Clock

This parameter contains the *Delay Time of Divided Control Clock* specified in nanoseconds. The allowed range of values extends from 0 to 0x3FFFFFFF. The default value is 20000.

If an invalid *Delay Time of Divided Control Clock* outside of the permissible range of 0 up to 67,108,860 ns is specified, [an according error message will be issued](#).

This parameter is ignored in Mode 1 (see below). Therefore, this field is grayed out in case of *Divided Control Clock Mode* set to 1.

Divided Control Clock Length

This parameter contains the *Divided Control Clock Length* specified in nanoseconds. The allowed range of values extends from 1000 to 20000. The default value is 1000.

If an invalid *Divided Control Clock Length* outside of the permissible range of 1000 up to 20,000 ns is specified, [an according error message will be issued](#).

This field is grayed out in case of *Divided Control Clock Output* set to "Disabled".

Count Register

This parameter contains the Count Register. It contains the number of pulses (Mode 0) or cycles (Mode 1). Concerning Mode 0 and Mode 1, refer to *Divided Control Clock Mode*.

The default value is 2.

If an invalid *Count Register* value outside of the permissible range of 0 up to 255 is specified, [an according error message will be issued](#).

Divided Control Clock Output

This selection list decides whether the Divided Control Clock Signal is inactive or active on high level or low level.

The possible options to choose are:

Disabled

High active

Low active

The default is *High active*. If *Disabled* is chosen, the fields *Time Divided Control Clock* and *Divided Control Clock Length* are inactive and grayed out.

Divided Control Clock Mode

This selection list selects the Divided Control Clock Mode. The possible options to choose are:

Mode 0

Mode 1

The default is Mode 1. In Mode 1, the input field *Delay Time of Divided Control Clock* is grayed out.

For an explanation of Mode 0 and Mode 1, see subsection “*Divided Control Clock Modes*” below!

Controller Clock Output

This selection list decides whether the Controller Clock Signal is active on high or low level. The possible options to choose are:

Disabled

High active

Low active

The default is *High active*.

5.6.3.1 Divided Control Clock Modes

Divided Control Clock Mode 0 – N-times within one communication cycle

The Divided Control Clock Signal (Div_Clk) becomes active several times within a communication cycle. The delay time for the first pulse is provided with the *Time Divided Control Clock* parameter. The distance between two pulses is provided with the *Delay Time of Divided Control Clock* parameter. The number of pulses within a communication cycle is provided with the *Count Register* parameter. The pulse length of the Div_Clk is provided with *Divided Control Clock Length*. The following condition must be fulfilled in mode 0: $\text{Divided Control Clock Length} + 100 \leq \text{Delay Time of Divided Control Clock}$.

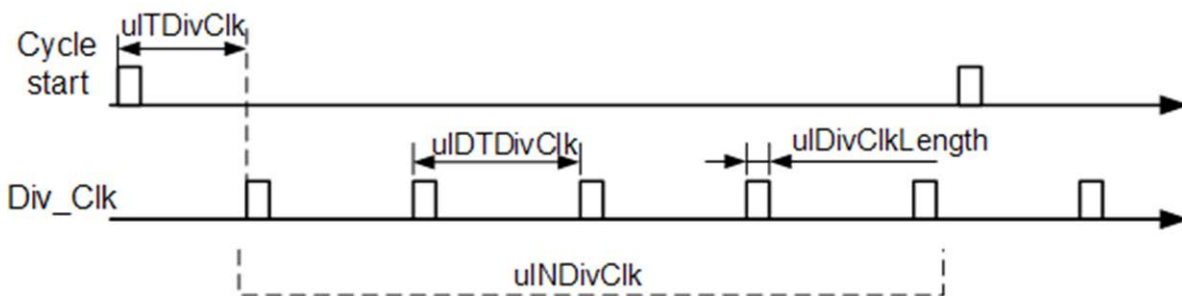


Figure 37: Div_Clk in Mode 0

Divided Control Clock Mode 1 – once after N communication cycles

Div_Clk signal becomes active once after N communication cycles. The delay time for the first pulse is provided with *Time Divided Control Clock* parameter. The number of communication cycles is provided with the *Count Register* parameter. The pulse length of the Div_Clk is provided with the *Divided Control Clock Length* parameter.

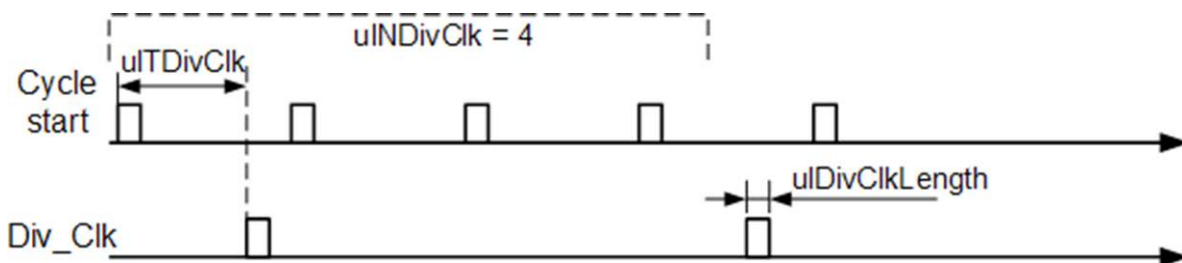


Figure 38: Div_Clk in Mode 1

5.6.4 Slave-specific Parameters

Configuration

Interface

Bus Startup: Automatic

Watchdog Time: 1000 ms

Ident

Device ID: CIFX_RE_S3S_VARCFG

Vendor Code: 1000

Version of SCP Sync: 0

Version of SCP NRT: 0

Bus

IP Address: 0 . 0 . 0 . 0 ☐ Enable

Netmask: 0 . 0 . 0 . 0 ☐ Enable

Gateway: 0 . 0 . 0 . 0 ☐ Enable

TCP Flags: ☐ BootP ☐ DHCP

Controller Clock Length: 1000 ns

Time Divided Control Clock: 20000 ns

Delay Time of Divided Clock: 20000 ns

Divided Control Clock Length: 1000 ns

Count Register: 2

Divided Control Clock Output: High Active

Divided Control Clock Mode: Mode 1

Controller Clock Output: High Active

Slave Configuration

Number of Slaves: 8

Slave 1 | Slave 2 | Slave 3 | Slave 4 | Slave 5 | Slave 6 | Slave 7 | Slave 8

SERCOS III Address: 1

FSP Type: IO V1

SCP Configuration Type: Fix. Version 1.1.1

Output Data Size for Fixed Configuration: 2

Input Data Size for Fixed Configuration: 2

Slave Flags:

☐ Set up a Default OD

☒ Non Stack Objects Are Deleted

☒ SERCOS Address May not be Changed by the Master

Slave Connections

	1	2	3	4
Connection Control Offset:	0	0	0	0
Real Time Data Process Image Offset:	2	2	0	0
Real Time Data Maximum Length:	198	198	0	0

User SCP Types:

SCP_WD Version 1.1.1
SCP_Diag Version 1.1.1
SCP_RTb Version 1.1.1
SCP_Mux Version 1.1.1
SCP_Sig Version 1.1.1

Export SDDML

Default

Figure 39: Slave-specific Parameters

5.6.4.1 Number of Slaves

The number of slaves (the allowed values range from 1 to 8) can be specified in the input field *Number of Slaves*. For each slave, a register card is created within the card register quite below, so there are up to 8 cards named Slave 1 up to Slave 8 available depending on your input in this field.

If a number of slaves outside of the above mentioned permissible range of 1 up to 8 is specified, [an according error message will be issued](#).

5.6.4.2 Contents of Register Card for one single Slave

The register card for a single slave consists of the following elements:

- 5 input fields/ selection lists for slave parameter settings
- 3 Slave Flags
- A list field for up to 20 entries (for the User SCP Types)
- An array of input fields to configure 4 connections with 3 input fields per connection

5.6.4.3 Slave Parameter Settings

Sercos Address

This input field contains the Sercos address used to uniquely identify the Sercos slave device within the Sercos network. Allowed values range from 0 to 511.

If a Sercos address outside of the above mentioned permissible range of 0 up to 511 is specified, [an according error message will be issued](#).

FSP Type

This selection list contains the FSP Type according to IDN S-0-1302.x.01 (FSP Type & Version) (in this context FSP means Function Specific Profile). Possible values are:

- IO V1 (Default)
- Drive V1

Use IO V1 when the device is an IO device according to the FSP IO Specification (Reference #7) and Drive V1 when the device is a drive according to the FSP Drive Specification (Reference #8)

SCP Configuration Type

This selection list contains the SCP configuration type according to specification of Sercos in the third generation. It is defined in IDN S-0-1000 (SCP Type & Version). It can have the following values:

- SCP_FixCFG Version 1.1.1
- SCP_VarCFG Version 1.1.1
- SCP_VarCFG Version 1.1.3

The default depends on the device description file.

Output Size for Fixed Configuration

This input field contains the output data in bytes (SCP configuration type FixCFG only, master->slave) (excluding connection control and I/O Control). The default value is 2.

The output size may not exceed the value 200. Otherwise, [an according message is issued](#).

The output size may not be odd. Otherwise, [an according message is issued](#).

The total sum of all input data must not exceed a value depending on the used netX processor (for example: 252 for netX 50, 126 for netX 100/500)

If this limit is violated, [an according message is issued](#).

Input Size for Fixed Configuration

This input field contains the Input data in bytes (SCP configuration type FixCFG only, slave->master) (excluding connection control and I/O Status). The default value is 2.

The input size may not exceed the value 200. Otherwise, [an according message is issued](#).

The input size may not be odd. Otherwise, [an according message is issued](#).

The total sum of all input data must not exceed a value depending on the used netX processor (for example: 252 for netX 50, 126 for netX 100/500).

If this limit is violated, [an according message is issued](#).

5.6.4.4 Slave Flags

The following Slave Flags can be set on the **Configuration** pane:

Setup a Default OD

This Slave Flag decides whether or not a default object dictionary is set up.

If this flag is „set“, a default object dictionary is set up which is only available for SCP_FixCFG. This only makes sense if non-stack objects are deleted on Channel Init, see just below. The default is „not set“.

Non-stack objects are deleted

This Slave Flag decides whether or not non-stack objects are deleted on Channel Init. If this flag is „set“, non stack objects will be deleted in case a Channel Init of the netX processor occurs. The default is „not set“.

Sercos Address may not be changed by Master

This Slave Flag decides whether or not the Sercos master may change the Sercos address. If this flag is „set“, the Sercos Address may not be changed by Master. The default is „not set“.

5.6.4.5 List Field User SCP Types

There is a list field displaying up to 20 User SCP Types. Currently, the following User SCP types may appear in this list:

- SCP_WD Version 1.1.1 for monitoring connections
- SCP_Diag Version 1.1.1 for bus-diagnosis
- SCP_RTb Version 1.1.1 for using real time bits
- SCP_Mux Version 1.1.1 for multiplexed cyclic data
- SCP_Sig Version 1.1.1 for using signal status/control words

5.6.4.6 Connection Configuration

For each slave, four slave connections can be configured at maximum. For each slave connection the following parameters can be adjusted.

Configuration

Interface

Bus Startup: Automatic

Watchdog Time: 1000 ms

Ident

Device ID: CIFX_RE_S3S_VARCFG

Vendor Code: 1000

Version of SCP Sync: 0

Version of SCP NRT: 0

Bus

IP Address: 0 . 0 . 0 . 0 ☐ Enable

Netmask: 0 . 0 . 0 . 0 ☐ Enable

Gateway: 0 . 0 . 0 . 0 ☐ Enable

TCP Flags: ☐ BooP ☐ DHCP

Controller Clock Length: 1000 ns

Time Divided Control Clock: 20000 ns

Delay Time of Divided Clock: 20000 ns

Divided Control Clock Length: 1000 ns

Count Register: 2

Divided Control Clock Output: High Active

Divided Control Clock Mode: Mode 1

Controller Clock Output: High Active

Slave Configuration

Number of Slaves: 8

Slave 1 | Slave 2 | Slave 3 | Slave 4 | Slave 5 | Slave 6 | Slave 7 | Slave 8

Slave 1

SERCOS III Address: 1

FSP Type: IO V1

SCP Configuration Type: Fix Version 1.1.1

Output Data Size for Fixed Configuration: 2

Input Data Size for Fixed Configuration: 2

Slave Flags:

- ☐ Set up a Default OD
- ☒ Non Stack Objects Are Deleted
- ☒ SERCOS Address May not be Changed by the Master

User SCP Types:

- SCP_WD Version 1.1.1
- SCP_Diag Version 1.1.1
- SCP_RTB Version 1.1.1
- SCP_Mux Version 1.1.1
- SCP_Sig Version 1.1.1

Slave Connections

	1	2	3	4
Connection Control Offset:	0	0	0	0
Real Time Data Process Image Offset:	2	2	0	0
Real Time Data Maximum Length:	198	198	0	0

Export SDDML Default

Figure 40: Connection Configuration

Connection Control Offset

This parameter specifies the position of the offset of connection control in the process image within the Dual Port Memory. It relates to IDN S-0-1050.x.03 Telegram Assignment.

Allowed values range from 0 to 5758. The default value is 0.

Real Time Data Process Image Offset

This parameter contains the Process Image Offset of Real Time Data. Notes 1 and 2 below apply.

Real Time Data Maximum Length

This parameter contains the Maximum Length of Real Time Data. Notes 1, 2 and 3 below apply.

For the range of values of the parameters *Real Time Data Process Image Offset* and *Real Time Data Maximum Length* the following applies:

- **Note 1:** The lower limit for each of Real Time Data Process Image Offset and Real Time Data Maximum Length is 0.
- **Note 2:** The sum of Real Time Data Process Image Offset and Real Time Data Maximum Length must be less than or equal to 5760.
- **Note 3:** Compute the value of Real Time Data Maximum Length according to the following rules:
 - The overall sum of the input data of all connections of all slaves must not exceed 255 bytes.
 - Similarly, the overall sum of the output data of all connections of all slaves must not exceed 255 bytes.

5.6.5 Messages of Configuration Pane

5.6.5.1 Errors in Interface Section

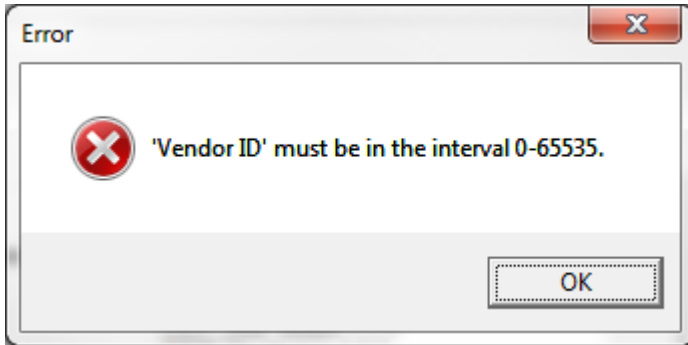
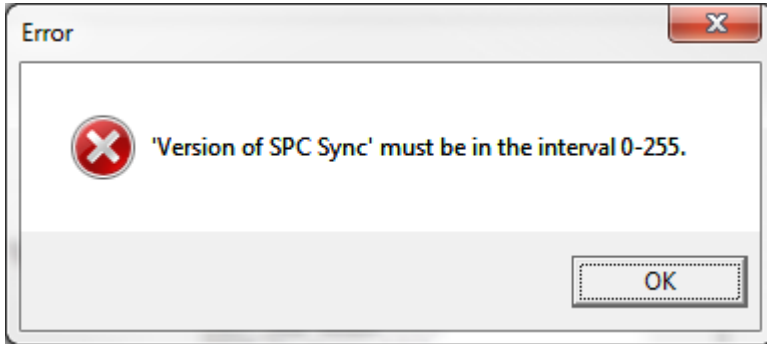
The following table provides an overview which error situations might occur in the *Interface* section of the “**Configuration**” pane.

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	<p>The watchdog time interval is not adjusted correctly. Allowed values include:</p> <p>0: Watchdog functionality is switched off 20-65535: The watchdog time interval is set to the specified value.</p>
Action	Set correct value for watchdog time in interface section of configuration pane.

Table 23: Possible Error Messages issued at Configuration Pane

5.6.5.2 Errors in Ident Section

The following table provides an overview which error situations might occur in the *Ident* section of the “**Configuration**” pane.

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The Vendor ID has not been specified correctly. Allowed values range from 0 to 65535:
Action	Set correct value for Vendor ID in ident section of configuration pane.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The version of SCP Sync has not been specified correctly. Allowed values range from 0 to 255.
Action	Set correct value for version of SCP Sync in ident section of configuration pane.

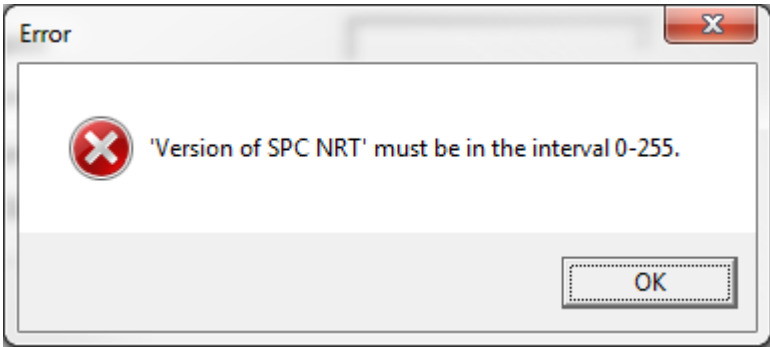
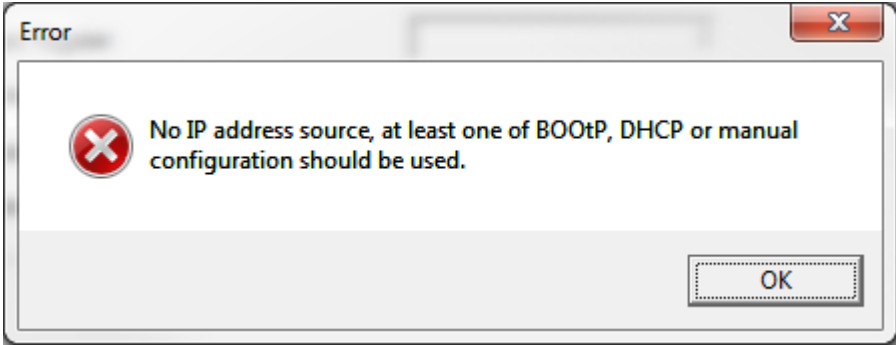
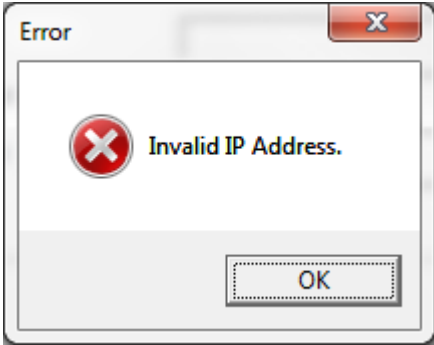
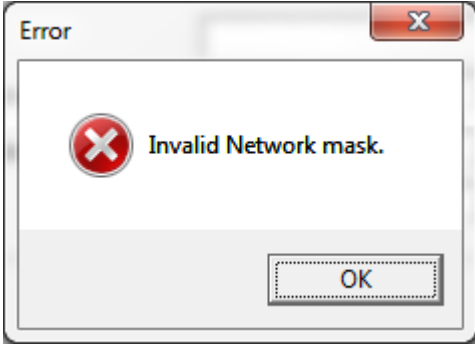
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The version of SCP NRT has not been specified correctly. Allowed values range from 0 to 255.
Action	Set correct value for version of SCP NRT in ident section of configuration pane.

Table 24: Possible Error Messages issued at Configuration Pane

5.6.5.3 Errors in Bus Section (IP Configuration)

The following table provides an overview which error situations related to IP configuration might occur in the Bus section “**Configuration**” pane.

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	Either BOOTP or DHCP must be selected or the IP configuration must be performed manually (by specifying IP address, net mask and gateway address)s.
Action	Activate either BOOTP or DHCP by the respective check button or manually perform complete IP configuration.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The IP address has not been specified correctly. Specify an IP address according to the applicable rules for IP addresses.
Action	Specify valid IP address in IP address field of bus section of configuration pane.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The network mask has not been specified correctly. Specify an IP address according to the applicable rules for IP addresses used as network mask.

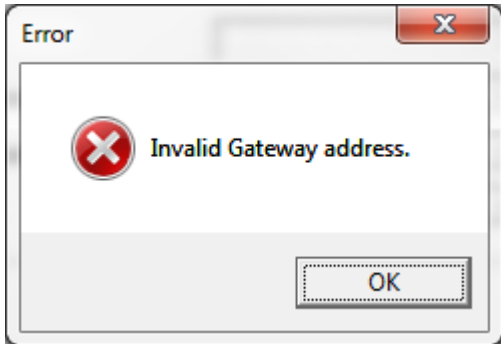
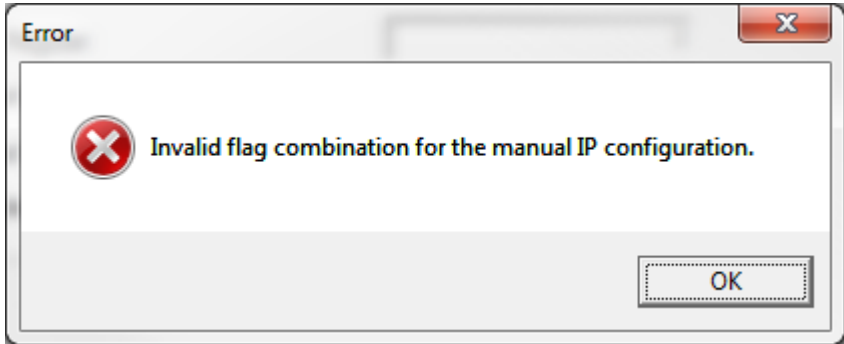
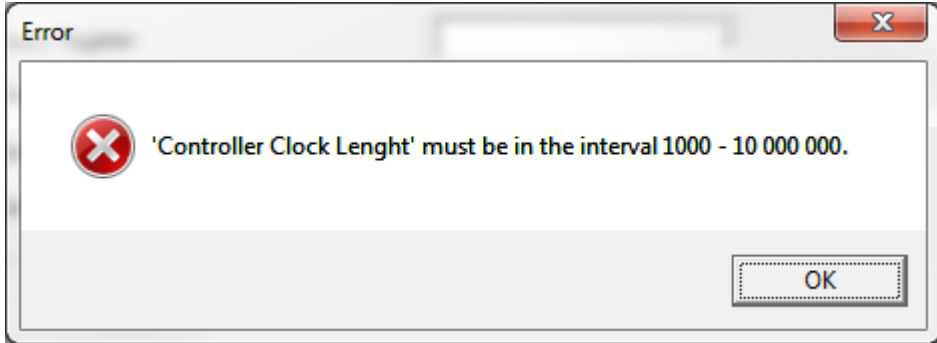
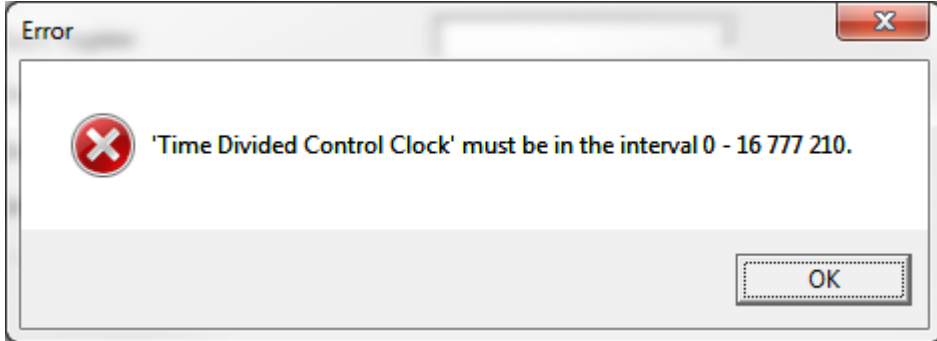
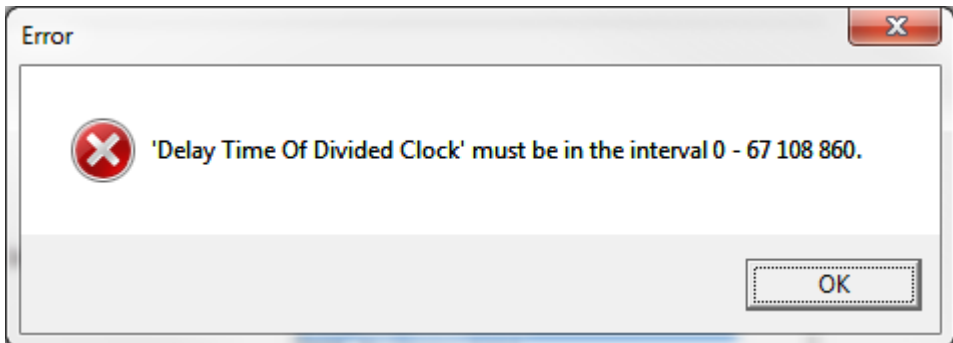
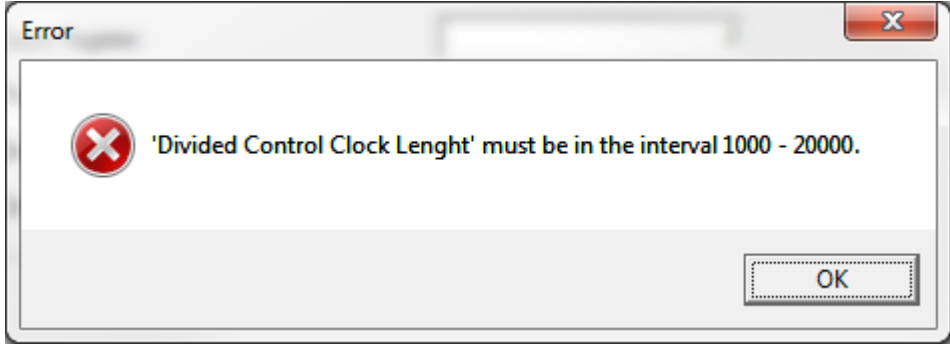
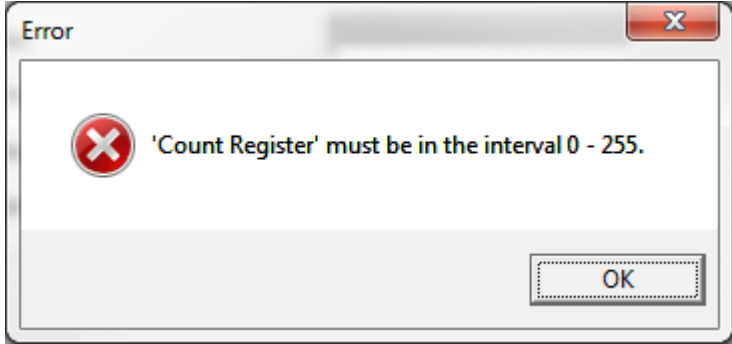
Action	Specify valid network mask in <i>Net Mask</i> field of bus section of configuration pane.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The IP address of the gateway to be used has not been specified correctly. Specify an IP address according to the applicable rules for IP addresses.
Action	Specify valid IP address of the gateway in <i>Gateway</i> field of bus section of configuration pane.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The combination of flags chosen for manual IP configuration is not allowed.
Action	Choose an allowed combination of flags.

Table 25: Possible Error Messages issued at Configuration Pane

5.6.5.4 Errors in Bus Section (Sync Configuration)

The following table provides an overview which error situations might occur in the “**Configuration**” pane.

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The <i>Controller Clock Length</i> has not been specified correctly. Allowed values range from 1000 to 10,000,000.
Action	Set correct value for <i>Controller Clock Length</i> in bus section of configuration pane.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The <i>Time Divided Control Clock</i> has not been specified correctly. Allowed values range from 0 to 16,777,210.
Action	Set correct value for <i>Time Divided Control Clock</i> in bus section of configuration pane.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The <i>Delay Time of Divided Control Clock</i> has not been specified correctly. Allowed values range from 0 to 67,108,860.

Action	Set correct value for the <i>Delay Time of Divided Control Clock</i> in bus section of configuration pane.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The <i>Divided Control Clock Length</i> has not been specified correctly. Allowed values range from 1000 to 20,000.
Action	Set correct value for <i>Divided Control Clock Length</i> in bus section of configuration pane.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The <i>Count Register</i> has not been specified correctly. Allowed values range from 0 to 255.
Action	Set correct value for <i>Count Register</i> in bus section of configuration pane.

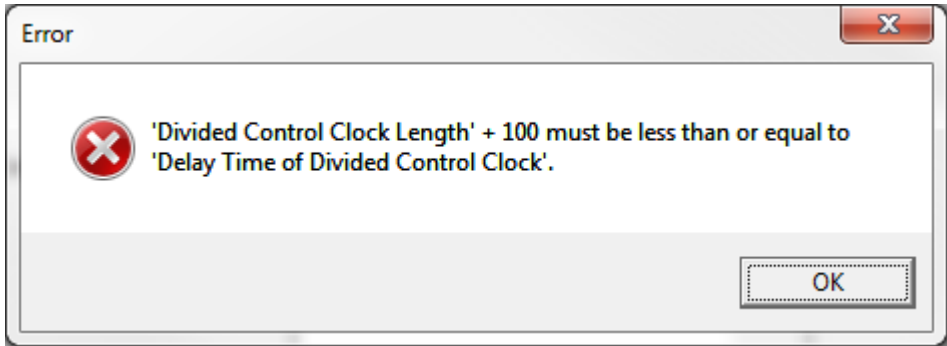
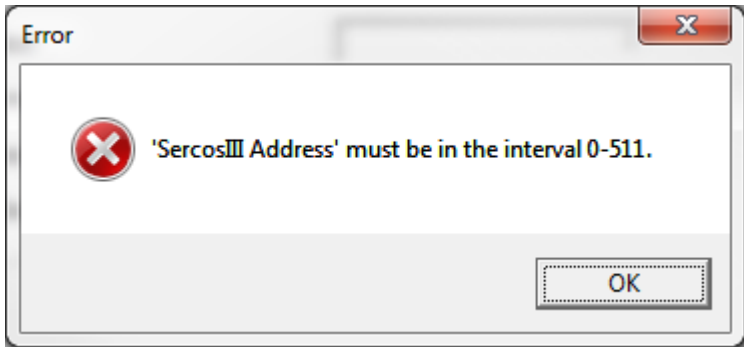
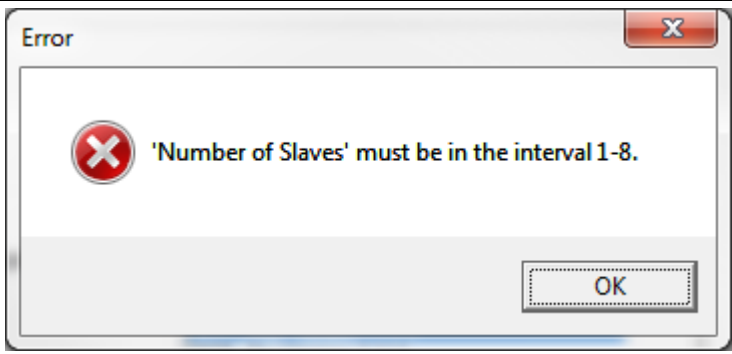
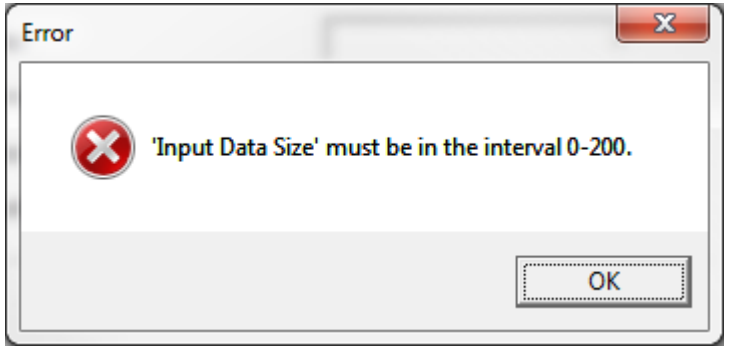
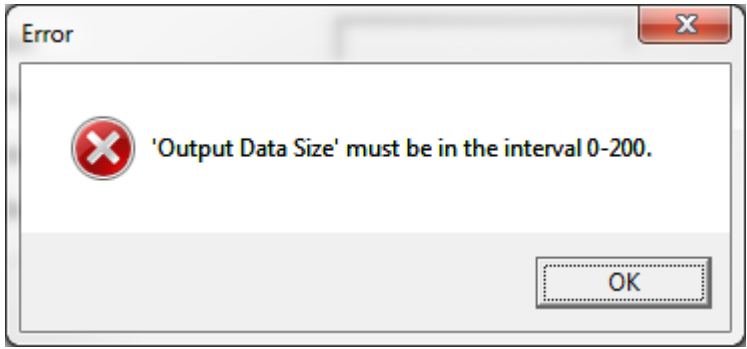
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The sum of the values for <i>Divided Control Clock Length</i> and 100 must be less than or equal to the <i>Delay Time of the Divided Control Clock</i> . This limit has been exceeded.
Action	Adapt the <i>Divided Control Clock Length</i> accordingly to meet this requirement.

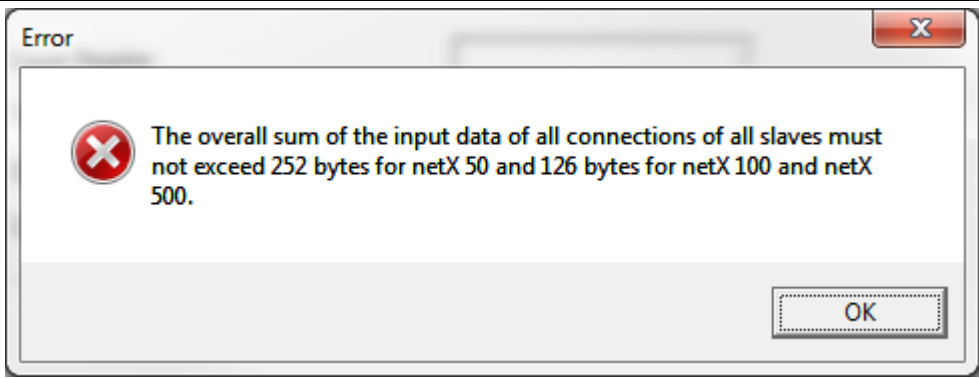
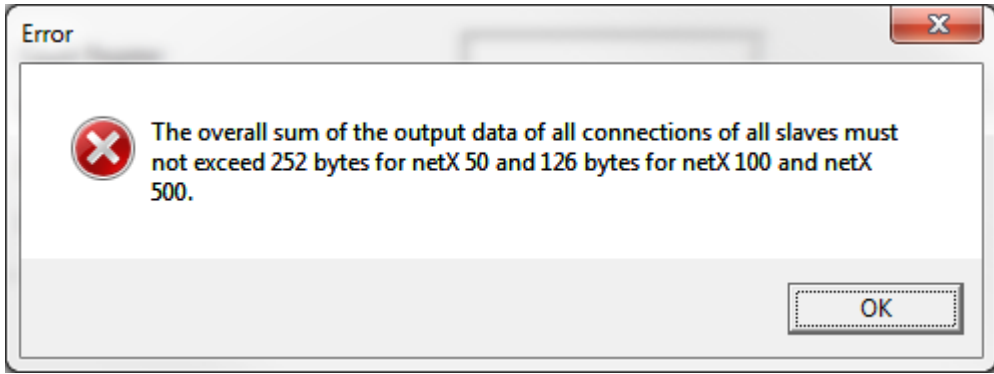
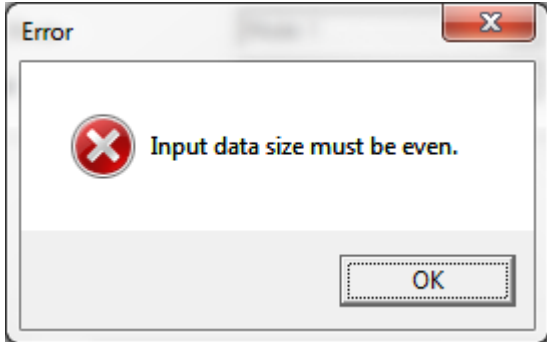
Table 26: Possible Error Messages issued at Configuration Pane

5.6.5.5 Errors in the Slave Configuration section

The following table provides an overview which error situations might occur in the *Slave Configuration* section **“Configuration”** pane.

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The Sercos address of the slave has not been specified correctly. Allowed values range from 0 up to 511.
Action	Set correct value for the Sercos address in the slave configuration section of configuration pane.
Problem	The error message

	 <p>appears.</p>
Explanation	The number of slaves has not been specified correctly. Allowed values range from 1 to 8.
Action	Set correct value for the number of slaves in slave configuration section of configuration pane.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The input data size has not been specified correctly. Allowed values range from 0 to 200.
Action	Set correct value for input data size in the slave configuration section of configuration pane.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The output data size has not been specified correctly. Allowed values range from 0 to 200.
Action	Set correct value for output data size in the slave configuration section of configuration pane.
Problem	The error message

	 <p>appears.</p>
Explanation	The total sum of input data sizes of all connections of all configured slaves exceeds the netX-chip –dependent upper limit.
Action	Choose lower data sizes for some input connections / slaves in order to decrease the total sum so that the limit is not exceeded.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The total sum of output data sizes of all connections of all configured slaves exceeds the netX-chip –dependent upper limit.
Action	Choose lower data sizes for some output connections / slaves in order to decrease the total sum so that the limit is not exceeded.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	You specified an odd value for an input data size. This is not allowed.
Action	Specify an even value instead.
Problem	The error message

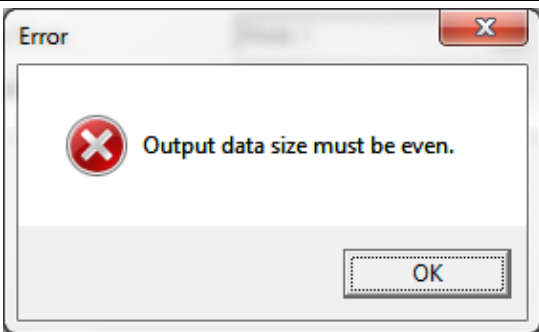
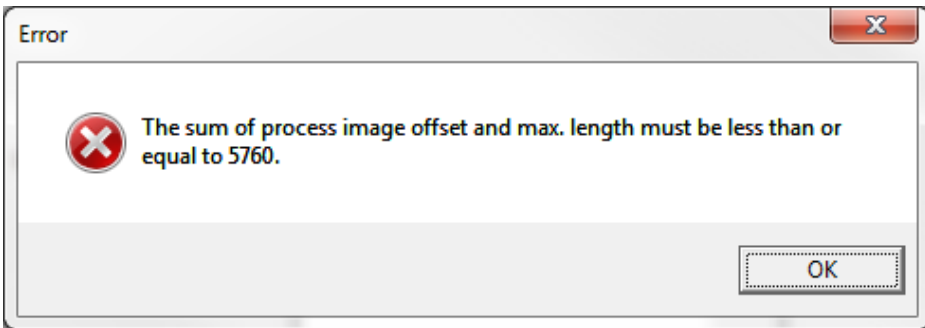
	 <p>appears.</p>
Explanation	You specified an odd value for an input data size. This is not allowed.
Action	Specify an even value instead.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The sum of the values for <i>Real Time Data Process Image Offset</i> and for <i>Real Time Data Maximum Length</i> must be less than or equal to 5760. This limit has been exceeded.
Action	Change one of these values in such a way that the sum is not larger than 5760.

Table 27: Possible Error Messages issued at Configuration Pane

5.7 User-defined Parameters

This dialog pane displays information on the IDN parameter sets associated to different communication phases.

User defined parameters, Slave Index 0, ADR 2

Parameter list for: CP2

IDN	Action	Format	Data Length	Value
S-0-1050.0.6	WR	IDN	4 octet list	S-0-1500.0.2;S-0-1500.0.9
S-0-1050.1.6	WR	IDN	4 octet list	S-0-1500.0.1;S-0-1500.0.5
S-0-1050.1.1	WR	Unsigned decimal	2 octet	32768
S-0-1050.1.10	WR	Unsigned decimal	4 octet	2000000
S-0-1300.0.1	WR	Text	1 octet list	NXIO_50-RE_S3S_VARCFG
S-0-1300.0.2	WR	Text	1 octet list	Hilscher GmbH
S-0-1300.0.4	WR	Text	1 octet list	NXIO_50-RE_S3S_VARCFG
S-0-1300.0.5	WR	Text	1 octet list	NXIO_50-RE_S3S_VARCFG
S-0-1502.0.3	WR	Unsigned decimal	2 octet	32
S-0-1502.0.4	WR	Unsigned decimal	2 octet	1

Existing data

Show standard parameters Select entry

IDN	Format	Data Length	Name	Min. Value	Max. Value	Value	Unit	CP
S-0-1050								
Structure Instance 0								
S-0-1050.0.1	Unsigned	2 octet	Connection setup			49152	2; 3; 4	
S-0-1050.0.5	Unsigned	2 octet	Actual Length of C			8	2; 3; 4	
S-0-1050.0.6	IDN	4 octet list	Configuration List			S-0-15	2; 3; 4	
S-0-1050.0.10	Unsigned	4 octet	Producer Cycle Ti			200000	2; 3; 4	
Structure Instance 1								
S-0-1050.1.1	Unsigned	2 octet	Connection setup			32768	2; 3; 4	
S-0-1050.1.5	Unsigned	2 octet	Actual Length of C			8	2; 3; 4	
S-0-1050.1.6	IDN	4 octet list	Configuration List			S-0-15	2; 3; 4	
S-0-1050.1.10	Unsigned	4 octet	Producer Cycle Ti			200000	2; 3; 4	

Figure 41: User-defined Parameters Dialog Pane (for FSP IO)

This dialog pane mainly consists of two tables:

The upper table contains a list of parameters that are set during CP2, CP3 or CP4.

The contents of the upper table depends on the choice of the selection list just above the table (which offers CP2, CP3 and CP4 as alternatives).

The lower table is described in section 'Columns of the lower Tree-List Grid' on page 102 of this document.

5.7.1 Columns of upper Table

The columns within the upper table have the following meaning:

IDN

This column identifies the IDN (including Structure Index and Structure Element) to be processed in CP2, CP3 or CP4.

Action

Here the action to be performed with the IDN has to be specified. The choice between three alternatives is offered here:

Action code	Performed action
WR	Write
RDCMP	Read and compare
EXEC	Execution of Procedure Command

Table 28: Possible Actions to be performed with chosen IDN

Format

This column contains the information about the data type of the data associated with the IDN. The possible data types available for your choice are:

- Binary
- Unsigned decimal
- Signed decimal
- Hex
- Text
- IDN
- Float

Data Length

This column contains the length of the data associated with the IDN.

Possible values are:

- 2 Octets
- 4 Octets
- 8 Octets
- 1 Octet List
- 2 Octet List
- 4 Octet List
- 8 Octet List



Note: An octet corresponds to a byte in this context.

Not all combinations may be applied. The following table shows which combinations may be chosen:

Data type	2 Octets	4 Octets	8 Octets	1 Octet List	2 Octet List	4 Octet List	8 Octet List
Binary	X	X	X		X	X	x
Unsigned decimal	X	X	X	X	X	X	X
Signed decimal	X	X	X		X	X	X
Hex	X	X	X	X	X	X	X
Text				x			
IDN	X	X			X	X	
Float		X	X			X	X

Table 29: Allowed Data Length Value in Dependence of Format/Data Type

An incorrect choice of the data length which does not match with the selected value of *Format* will be marked with a red exclamation mark in the cell where the incorrect choice was made. This looks like:

 1 octet list

Value

This column contains

- The value to be written into the IDN (in case of *Action code* = *WR*, see below)
- The value to be compared with the contents of the IDN (in case of *Action code* = *RDCMP*, see below)
- In case of *Action code* = *EXEC*, there is no need to fill in a value here.



The allowed input to be specified in column 'value' depends on the values specified in columns '*Format*' and '*Data Length*' according to the rules subsequently described in subsection *Rules for Input in Column 'Value'* of upper Table on page 99 of this document.

If the value put in here is not compatible with the values specified at *Format* and *Data Length*, this will be indicated by

 Undefined

You should then fill in a correct value.

For an explanation of the navigation buttons see section "*Navigation Area*" of this document.

If data cells have been recognized as faulty (marked with a red exclamation mark such as  1 octet list) or not sufficiently precise (such as  Undefined), a more precise error description can be obtained via „tool tip“.

- In order to obtain a detailed problem or error description, move the cursor of the mouse to the according problem or error icon, for which you want to have an explanation. Please wait for about a second.
- The desired explanation appears at the location of the cursor.

5.7.2 Rules for Input in Column 'Action' of upper Table

EXEC is applicable only in case the IDN contains a Procedure Command. On the other hand, WR and RDCMP are applicable only if the IDN does not contain a Procedure Command. The following Sercos IDNs are assigned to a procedure command:

IDN	Name (abbreviation)
S-0-0099	Reset class 1 diagnostic
S-0-0127	CP3 transition check
S-0-0128	CP4 transition check
S-0-0139	Park axis procedure command
S-0-0146	Control unit controlled homing procedure command
S-0-0148	Drive controlled homing procedure command
S-0-0149	Positive stop drive procedure command
S-0-0152	Position spindle procedure command
S-0-0170	Probing cycle procedure command
S-0-0171	Calculate displacement procedure command
S-0-0172	Displacement to the referenced system procedure command
S-0-0190	Drive controlled gear engaging procedure command
S-0-0191	Cancel reference point procedure command
S-0-0197	Set coordinate system procedure command
S-0-0199	Shift coordinate system procedure command
S-0-0216	Switch parameter set procedure command
S-0-0223	Drive controlled synchronous operation procedure command
S-0-0262	Load defaults procedure command
S-0-0263	Load working memory procedure command
S-0-0264	Backup working memory procedure command
S-0-0276	Return to Module range procedure command
S-0-0293	Selectively backup working memory procedure command
S-0-0420	Activate parameterization level 1 procedure command (PL1)
S-0-0422	Exit parameterization level procedure command
S-0-0447	Set absolute position procedure command
S-0-1024	SYNC delay measuring procedure command

Table 30: List of commonly available Procedure Commands

Additional IDNs assigned to procedure commands may also be contained in Sercos profiles. For more information refer to the documentation of all Sercos profiles you use.

- Use action code EXEC only with IDNs mentioned in *Table 30: List of commonly available Procedure Commands* on page 98 and with those IDNs which have been defined by Sercos Profiles and relate to procedure commands (according to the profile specification).
- Use action codes WR and RDCMP only with IDNs not mentioned in *Table 30: List of commonly available Procedure Commands* on page 98 and with those IDNs which have been defined by Sercos Profiles and do not relate to procedure commands (according to the profile specification).

5.7.3 Rules for Input in Column 'Value' of upper Table

The following rules apply for input into the column 'Value' of the upper table.

Rule for data type *Float*:

When working with floating point values, the integer part and the fractional part have to be separated by a decimal point, not by a comma.

1. Rule for data type *List*:

Single entries within list data types have to be separated by a semicolon.

2. Rule for input of single values

For all data types besides list data types, no data may be separated with a semicolon as a semicolon would be interpreted as an error in such a case.

3. Rule for input of binary values:

Values specified as *Binary* should also be represented in the binary format such as 10111000011100, for instance.

4. Rule for input of hexadecimal values:

Hexadecimal values can be specified with but also without a preceding „0x“ such as „222“. This will be interpreted as „0x222“.

5. Rule for input of decimal values:

Decimal values may not be specified in hexadecimal format. For instance, 0x1234 would cause an error.

6. Rule for input of IDN values:

IDN values must be specified only in the format [S/P]-X-XXXX or [S/P]-X-XXXX.X.X.

7. Rule for input of negative values:

Input of negative values (usage of minus sign) is only possible when using data type *Signed Decimal*.



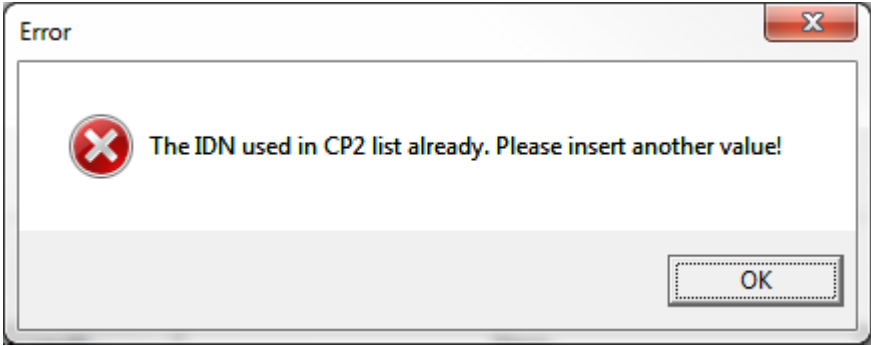
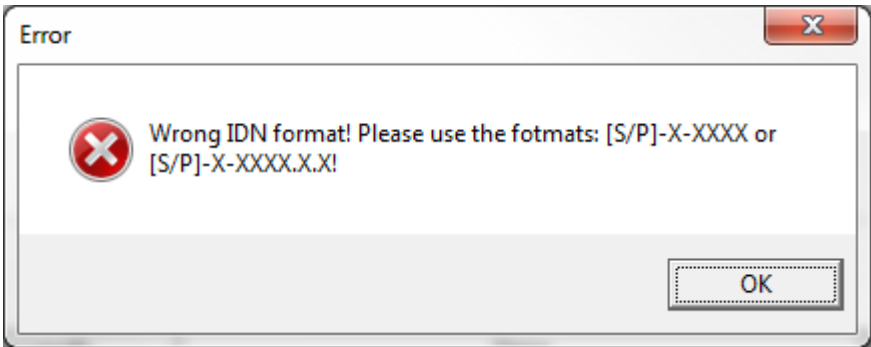
Note:

Even syntactically correct entries may cause an error if one (or more) element(s) of these entries has (have) an incorrect data length.

5.7.4 Messages Issued when Editing the Upper Table

5.7.4.1 Errors

The following table provides an overview which error situations might occur in the “**User-defined Parameters**” pane.

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	<p>IDN Duplicate Error</p> <p>A duplicate IDN has been used in the currently selected list (CP2, CP3 or CP4 list). If the same IDN is entered twice for the same communication phase, this error message box will appear.</p> <p>The example picture applies to CP2. Similarly, the message box will also appear for CP3 and CP4 instead of CP2 used in the example.</p>
Action	Use another IDN that has not been used in the CP2, CP3 or CP4 list already!
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	<p>IDN Format Error</p> <p>At input of an IDN different from the given format, this message appears. It indicates that the format has been specified in neither of the two permitted formats:</p> <ul style="list-style-type: none"> • [S/P]-X-XXXX • [S/P]-X-XXXX.X.X
Action	<p>Use one of the correct formats for the IDN as specified!</p> <p>Only the two IDN formats [S/P]-X-XXXX or [S/P]-X-XXXX.X.X will be accepted as valid.</p> <p>Here:</p>

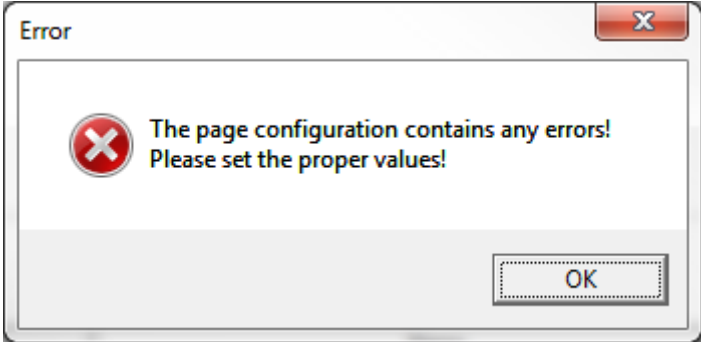
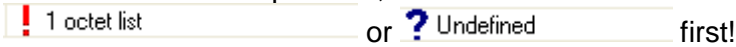
	<p>[S/P] denotes either “S” or “P”.</p> <p>x denotes a number in the range 0 to 7.</p> <p>xxxx denotes a value in the range 0000 up to 4095.</p>
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	<p>Common Error</p> <p>This message box will appear, if you try to store data although already errors are currently indicated.</p>
Action	<p>In order to solve the problem, correct the errors indicated by</p>  <p>The problem needs to be solved in exactly the column and line where the exclamation mark or the question mark are displayed by typing in a correct value, i.e. a value within the allowed range in the correct format.</p>

Table 31: Possible Error Messages issued at User-defined Parameters Pane

5.7.5 Columns of the lower Tree-List Grid

The lower tree-list grid is used as tool for easily filling the upper table with standard data. It is not editable.

It contains representations of lists of proposed IDNs and their Structure Instances and Structure Elements:

At first, the lower tree-list grid contains nothing.

Clicking the button “*Show standard parameters*” right above the lower tree-list grid will fill the tree-list grid with a list of the applicable functions (structured by their IDNs, Structure Instance and Structure Element).

At the top of each such list, there is one line representing the entire IDN. In the first column there is a symbol allowing to expand or collapse the list of that IDN. Besides this column, there is only one column filled, namely the IDN column containing the complete denomination of the IDN.

Under each IDN list entry, you can find one or more *Structure Instance* entries. These also have a node symbol in the structure tree in the first column which again can be expanded or collapsed. (These node symbols are shifted a bit to the right compared to the node symbols of the IDN list entries.) Besides this column, there is only one column filled, namely the IDN column containing the text *Structure Instance* and the number of the Structure Instance.

Under each *Structure Instance* entry, you can find one or more *Structure Element* entries. Only these contain the relevant information to be selected and only for these the columns *Format*, *Data Length*, *Name*, *Min.Value*, *Max.Value*, *Value*, *Unit*, *CP* may be filled with data.

In order to transfer the data of a single *Structure Element* entry of the lower tree-list grid to the upper table for the currently chosen communication phase:

- either click the button “Select entry ” , when the desired line of the lower tree-list grid is marked,
- or double click at the desired line of the lower tree-list grid.



Note: It is not allowed to select more than one single line in the lower tree-list grid.

The columns within the lower tree-list grid have the following meaning:

IDN

This column identifies the IDN (including Structure Index and Structure Element) of the function proposed in the current line. For FSP Drives, only structure instances and structure elements of IDN **S-0-1300** are available.

Format

This column contains the information about the data type of the data associated with the IDN. The possible data types allowed here are:

- Binary
- Unsigned decimal
- Signed decimal
- Hex

- Text
- IDN
- Float

Data Length

This column contains the length of the data associated with the IDN.

The possible data types that may appear here:

- 2 Octets
- 4 Octets
- 8 Octets
- 1 Octet List
- 2 Octet List
- 4 Octet List
- 8 Octet List



Note: An octet represents a byte in this context.

Name

This column contains a descriptive text for the function associated with the IDN.

Min. Value

If the range of allowed values for this IDN is restricted, this column contains the minimum allowed value.

Max. Value

If the range of allowed values for this IDN is restricted, this column contains the maximum allowed value.

Value

This column contains the stored standard value of the respective IDN originating from the SDDML file.

Unit

This column contains a unit associated with the value, if one has been specified.

CP

This column contains the numbers of the communication phases, when the respective IDN is applicable. Allowed values are 2, 3 and 4 denoting the communication phases CP2, CP3 and CP4.

5.8 FSP IO

In Sercos there are three kinds of IO devices according to the FSP IO specification (reference [7]):

- Compact IO Devices

A compact IO device contains one or more fixed IO functions, for instance a 16 bit digital input module could be considered to be a compact IO device. It is not structured into separate modules.

- Modular IO Devices

A modular IO device contains a complex or variable configurable device which is structured into separate modules.

- Hybrid IO Devices

A hybrid IO device combines an IO device with a drive.

A function group within a Sercos IO device is defined as a group of identical IO functions, such as a 16 bit digital input module or 4 bit analog output module. A function group is usually denominated like the associated IDN, see list below.

Example of a Compact IO Device

For example, a compact device may contain 16 digital Outputs according to FG S-0-1502 and 16 digital Inputs according to FG S-0-1503. So the bus head includes the function groups FG S-0-1500, FG S-0-1502 and FG S-0-1503.

Example of a Modular IO Device

For example, a modular device may contain

Module 1	8 digital Outputs according to FG S-0-1502
Module 2	16 digital Outputs according to FG S-0-1502
Module 3	4 analog Inputs according to FG S-0-1505 and 4 analog outputs according to FG S-0-1504
Module 4	16 digital Inputs according to FG S-0-1503

So the bus head includes exactly one function group FG S-0-1500 and there are four modules with together 5 function groups.

Module 3 contains 2 function groups (FG S-0-1505 and FG S-0-1504) while all other modules only contain one single function group (Module 1 and module 2: FG S-0-1502, Module 4: FG S-0-1503)

5.8.1 IO Modules

At the pane **IO Modules** compact or modular devices can be configured.

For instance, the figure displays the configuration of a compact device consisting of digital input and output.

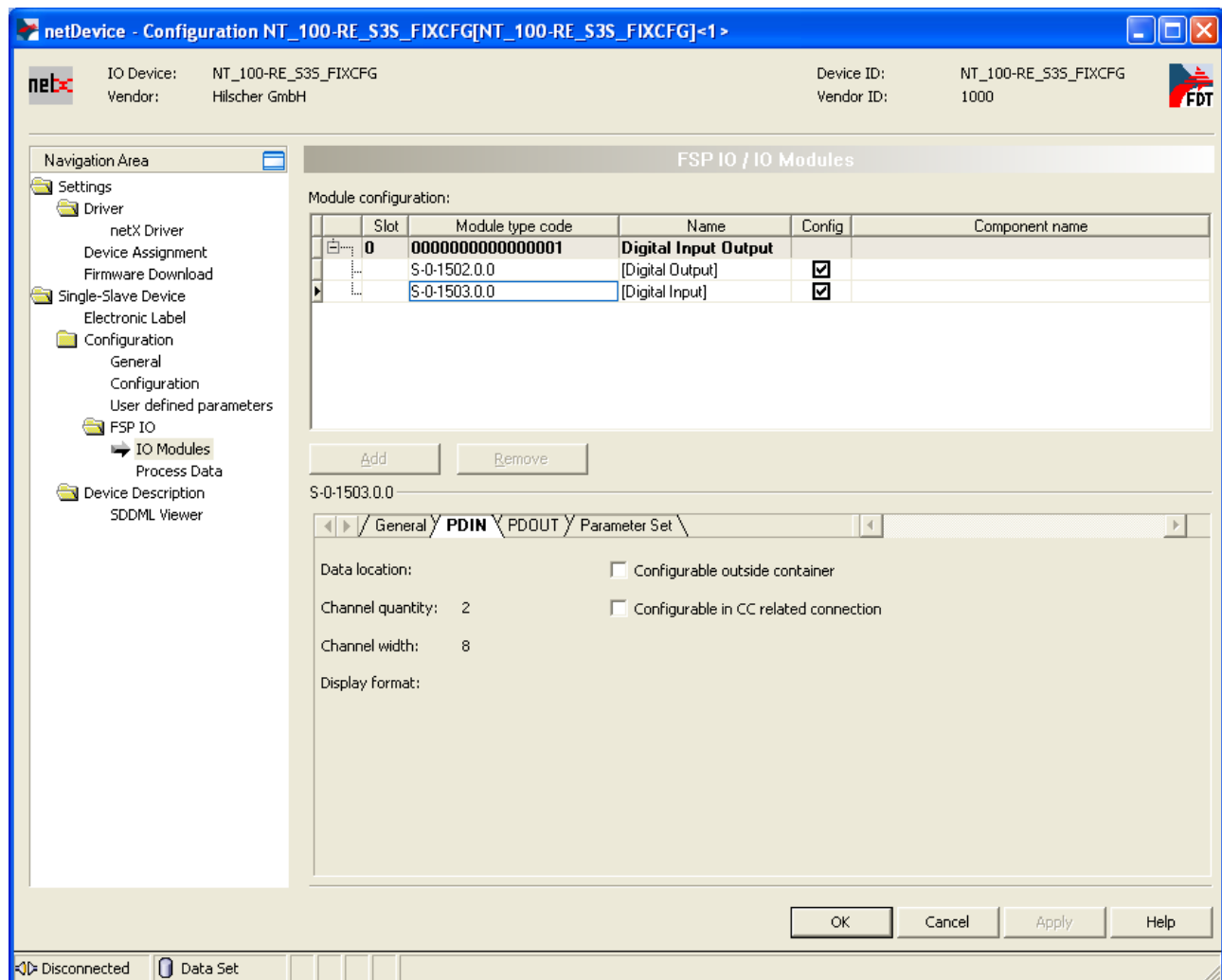


Figure 42: IO Modules Pane

Upper part

The upper part of the screen contains the module table, see section IO Modules - Module Configuration Table on page 107.

The buttons have the following meaning:

	Meaning
Add	A new slot is added in the configuration below the marked slot
Remove	The marked slot is being removed.

Table 32: Buttons for Slots in Module Configuration

The values of the slot numbers must be included in the range from 0 and 255. Each slot number can be assigned only once. For modular devices, this is already taken into account within the selection lists opening when

clicking at the fields of column *Slot*. Thus, the choice of an already used slot number is prohibited.

Changes of the slot number immediately cause the list to be sorted again.

- For modular IO devices, clicking at a field of column Name also opens a selection list allowing changing the module.
- For compact IO devices there is no possibility to select any other numbers than the preselected slot numbers. There is also no possibility to change the module.

Lower part

The content of the lower part of the screen is a card register whose content depends on:

- The module selected in the upper part of the screen (in the example: Digital Input IDN S-0-1503).
- The selected card of the card register

There are four register cards available:

- Register Card 'General'
- Register Card 'PDIN'
- Register Card 'PDOOUT'
- Register Card 'Parameter Set'

5.8.2 IO Modules - Module Configuration Table

The upper part of the screen displays the module configuration table: Details may depend on whether the device is a compact or modular device.

Slot	Module type code	Name	Config	Component name
0	0000000000000001	Digital Input Output		
	S-0-1502.0.0	[Digital Output]	<input checked="" type="checkbox"/>	
	S-0-1503.0.0	[Digital Input]	<input checked="" type="checkbox"/>	

Add Remove

S-0-1503.0.0

Figure 43: Configuration > Modules (Upper Part)

The meaning of the various columns is the following:

Slot

The slot number where the module is plugged (indicating the order of modules). The value 0 is reserved for the bus head. If a compact device is shown, there will be only slot 0 as it only consists of a bus head.

Module type code

A code uniquely assigned to a specific module type of the list in section *IO Modules* on page 105. (Module type code relates only to the upper line.)

Name

The name of the module or function group associated with the selected row of the module configuration table.

Config

Boolean value indicating whether or not the function group is configured.

Component Name

The component name as defined in the Electronic Label.

The module configuration table is organized as follows:

- Each line, which is printed in **strong** and is not empty in the Slot column, represents an IO module in the sense of Sercos FSP IO.
- Each other line (no entry in slot column, normally printed) represents a single function group (such as Digital Output and Digital Input in the example) within the IO module mentioned in the strongly printed line above.

The following function groups are defined within the Sercos FSP IO specification (see reference 7):

IDN	Name of Function Group
S-0-1501	Unknown
S-0-1502	Digital Output
S-0-1503	Digital Input
S-0-1504	Analog Output
S-0-1505	Analog Input
S-0-1506	Counter
S-0-1507	Complex Protocol
S-0-1508	Sub bus Master
S-0-1509	Sub bus Slave
S-0-1510	Safety Output
S-0-1511	Safety Input
S-0-1512	Module-PLC
S-0-1513	Motor starter
S-0-1514	PWM
S-0-1515	Positioning
S-0-1516	Passive

Table 33: Available Function Groups for IO Modules

5.8.3 IO Modules - Register Card '*General*'

This register card displays general information on the selected function group.

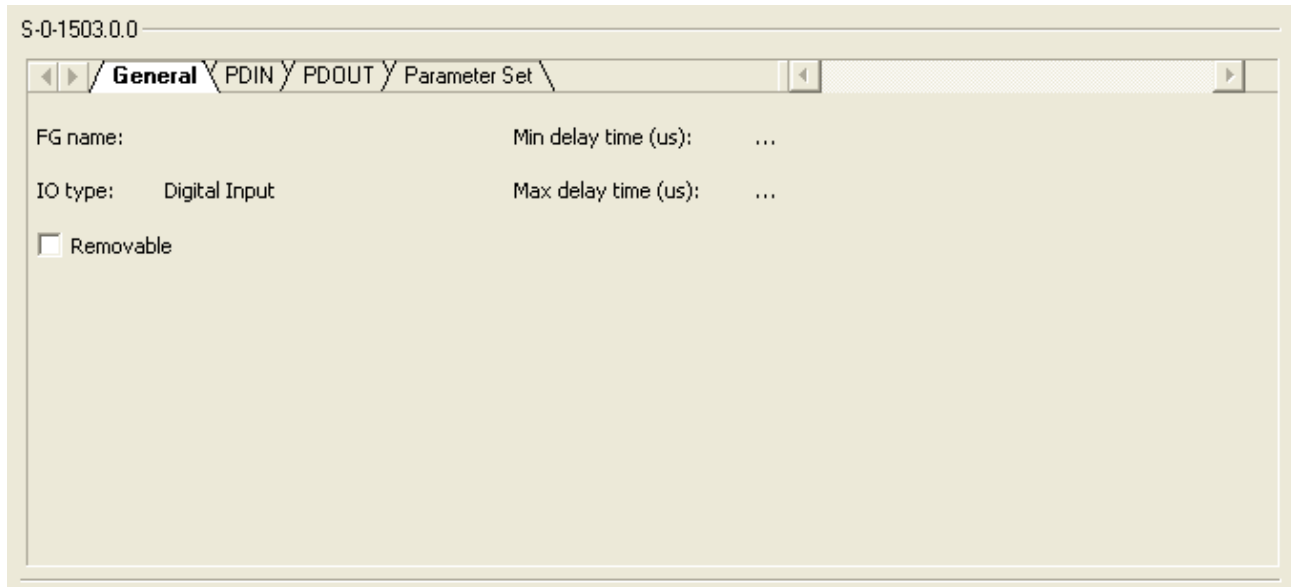


Figure 44: Configuration > Modules (Lower Part), Register Card '*General*'

In detail, the following information is displayed:

IDN of Function Group

The IDN assigned to a specific function group of the list in *Table 33: Available Function Groups for IO Modules* on page 108 as defined by the Sercos FSP IO specification.

FG Name

The name of the function group associated with the selected line of the *IO Modules - Module Configuration Table* on page 107 is displayed here.

IO Type

Here the IO Type corresponding to the selected function group is listed.

Min delay time (μ s)

This value represents the minimum configurable delay time. The value is optional, so it may be missing as in the example above.

Max delay time (μ s)

This value represents the maximum configurable delay time. The value is optional, so it may be missing as in the example above.

Removable

The Boolean value indicates whether the function group is removable from a module.

If this value is true, then user is allowed to change the “Config” flag of this function group upper Module Configuration Table. Please note that removable flag is only a configuration concept, a function group can not be physically removed from a module.

5.8.4 IO Modules - Register Card 'PDIN'

This register card displays information on the PDIN data area of the selected function group.

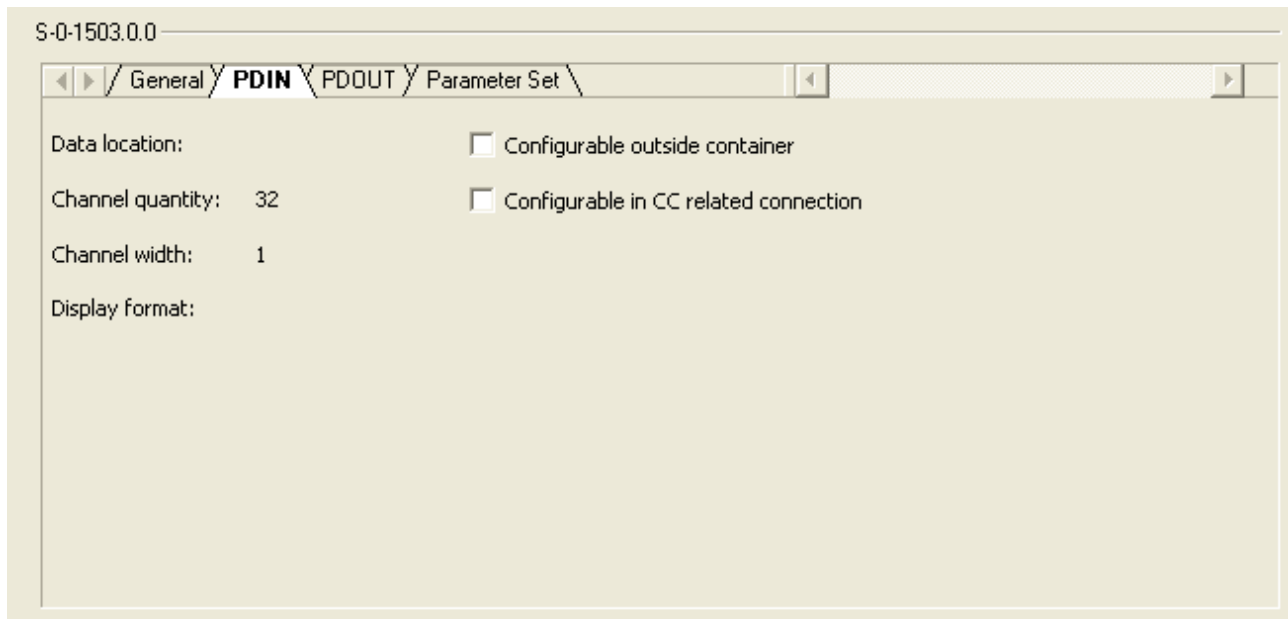


Figure 45: Configuration > Modules (Lower Part), Register Card 'PDIN'

In detail, the following information is displayed:

IDN of Function Group

This is the IDN assigned to a specific function group of the list in *Table 33: Available Function Groups for IO Modules* on page 108 as defined by the Sercos FSP IO specification. See upper left corner.

Channel quantity

This item is configured within the SDDML file of the device. It contains the number of channels of the Process Data Input PDIN.

Channel width

This item is configured within the SDDML file of the device. It contains the number of bits within one channel of the Process Data Input PDIN.

Configurable outside container

This Boolean value is configured within the SDDML file of the device. It indicates whether the device is also configurable outside of the input data container or not.

Configurable in CC related connection

This Boolean value is configured within the SDDML file of the device. It indicates whether the device is also configurable in a connection related to cross communication.

If the selected item has no inputs, the register card 'PDIN' is completely grayed out.

5.8.5 IO Modules - Register Card 'PDOOUT'

This register card displays information on the PDOOUT data area of the selected function group.

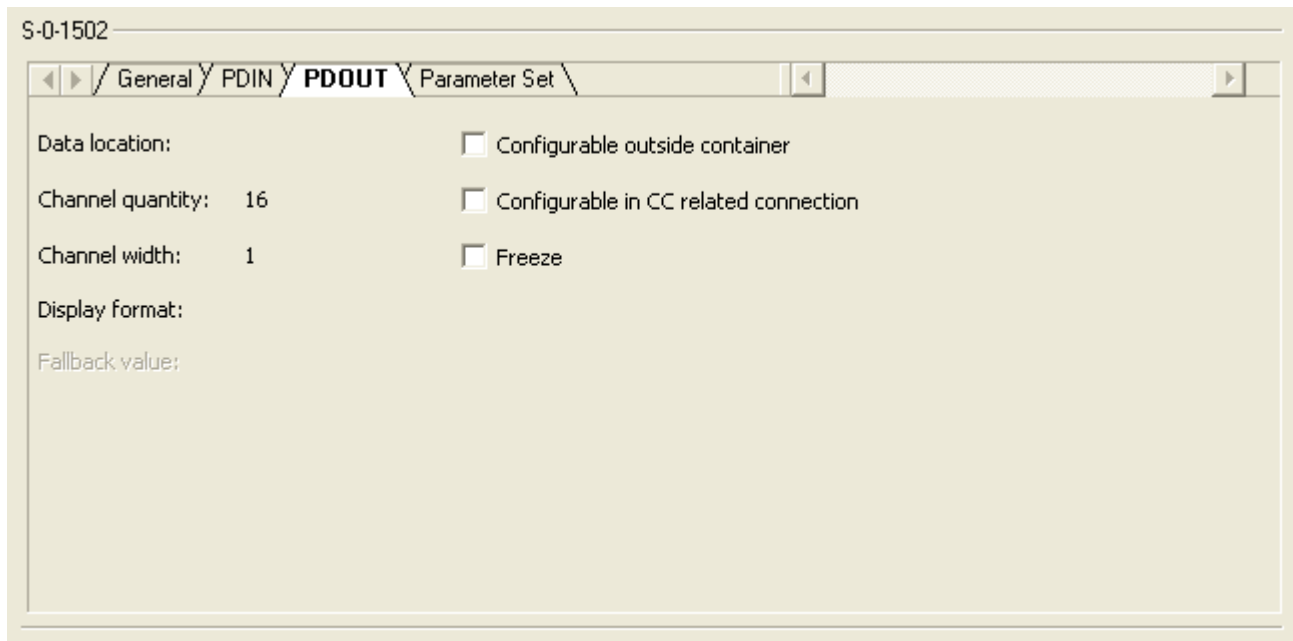


Figure 46: Configuration > Modules (Lower Part), Register Card 'PDOOUT'

In detail, the following information is displayed:

IDN of Function Group

This is the IDN assigned to a specific function group of the list in *Table 33: Available Function Groups for IO Modules* on page 108 as defined by the Sercos FSP IO specification. See upper left corner.

Channel quantity

This item is configured within the SDDML file of the device. It contains the number of channels of the Process Data Output PDOOUT.

Channel width

This item is configured within the SDDML file of the device. It contains the number of bits within one channel of the Process Data Output PDOOUT.

Configurable outside container

This Boolean value is configured within the SDDML file of the device. It indicates whether the device is also configurable outside of the output data container or not.

Configurable in CC related connection

This Boolean value is configured within the SDDML file of the device. It indicates whether the device is also configurable in a connection related to cross communication.

Freeze

The Boolean value indicates the fall-back behavior of the device concerning the output data, i.e. whether the data will be frozen, or set to 0.

If the selected item has no outputs, the register card 'PDOOUT' is completely grayed out.

5.8.6 IO Modules - Register Card 'Parameter Set'

This register card displays information on the parameter set of selected function group.

Figure 47: Configuration > Modules (Lower Part), Register Card 'Parameter Set'

The following information is accessible on the upper part of this register card:

Frame:

IDN of Function Group

The IDN assigned to a specific function group of the list in section *IO Modules - Module Configuration Table* as defined by the Sercos FSP IO specification.

Text fields in upper part:

IDN

This text field contains the number of the IDN.

Phase

This text field contains the affected communication phase.

Length

This text field contains the total length.

Checkboxes:

Editable

This checkbox decides whether only editable parameters of function groups or all parameters are displayed.

Visible

This checkbox decides whether only visible parameters of function groups or all parameters are displayed.

Download

The following information is accessible on the lower part of this register card:

Table in lower part

The meaning of the various columns of the table in the lower part is the following:

Name

This column contains the name of the parameter associated with the selected line of the parameter set table.

Length

This column contains the length (specified in units of bits) of the parameter associated with the selected line of the parameter set table.

Byte offset

This value contains the position, i.e. the offset in bytes within the data container (for input or output data, respectively) of the data selected with this line.

Bit offset

This value is always 1 if the data are byte aligned. Otherwise it contains the bit offset within the respective byte.

Value

The numeric value of the data of the selected function group.

Description

This column contains a description of the meaning of the selected function group.

Visible

This Boolean value indicates whether the selected function group is visible or not.

Editable

This Boolean value indicates whether the selected function group is editable or not.

5.9 Process Data

This dialog pane displays information on the process data (both input and output data) sorted according to modules and function groups.



























FSP I0 / Process Data						
PD IN:						
	Type	Tag	Local Offset	Length	Comment	
	Digital Input Output <SI>	Digital Input Output				
	Digital Input	Digital Input				
	PDIN <Channel 0>	Slot0_Input00	0	8		
	PDIN <Channel 1>	Slot0_Input01	8	8		
	PDIN <Channel 2>	Slot0_Input02	16	8		
	PDIN <Channel 3>	Slot0_Input03	24	8		
	PDIN <Channel 4>	Slot0_Input04	32	8		
	PDIN <Channel 5>	Slot0_Input05	40	8		
	PDIN <Channel 6>	Slot0_Input06	48	8		
	PDIN <Channel 7>	Slot0_Input07	56	8		
	PDIN <Channel 8>	Slot0_Input08	64	8		
	PDIN <Channel 9>	Slot0_Input09	72	8		
	PDIN <Channel 10>	Slot0_Input10	80	8		
PD OUT:						
	Type	Tag	Local Offset	Length	Comment	
	Digital Input Output <SI>	Digital Input Output				
	Digital Output	Digital Output				
	PDOOUT <Channel 0>	Slot0_Output00	0	8		
	PDOOUT <Channel 1>	Slot0_Output01	8	8		
	PDOOUT <Channel 2>	Slot0_Output02	16	8		
	PDOOUT <Channel 3>	Slot0_Output03	24	8		
	PDOOUT <Channel 4>	Slot0_Output04	32	8		
	PDOOUT <Channel 5>	Slot0_Output05	40	8		
	PDOOUT <Channel 6>	Slot0_Output06	48	8		
	PDOOUT <Channel 7>	Slot0_Output07	56	8		
	PDOOUT <Channel 8>	Slot0_Output08	64	8		
	PDOOUT <Channel 9>	Slot0_Output09	72	8		
	PDOOUT <Channel 10>	Slot0_Output10	80	8		

Figure 48: Process Data Pane

This pane consists mainly of two tables:

- The upper table contains a list of channels defined for PDIN.
- The lower table contains a list of channels defined for PDOOUT.

Both tables have the same structure.

The columns have the following meaning:

Type

This column shows the type of the channel. It is not editable.

Tag

This column shows a tag (short name) of the channel. This column is the only editable one in this table.

Local offset

This column shows the local offset of the channel as a numeric value. It is not editable.

Length

This column shows the length of the channel (i.e. the number of bits contained within the channel) as a numeric value in units of bits. It is not editable.

Comment

This column may contain a comment (originating from the SDDML file). It is not editable.

5.10 FSP Drive

5.10.1 Producer Connections

In order to configure producer connections for drives, the pane **Producer** can be used:

Producer, Slave Index 1, ADR 3

Configure producer connections:

	IDN	Byte Length	Producer Cycle Time (μs)
Connections List		10	
▶	Connection Instance #1	6	2000
	S-0-0135	2	
	S-0-0040	4	
▶	Connection Instance #2	4	4000
	S-0-0051	4	

✂ 📋

Connection Setup (IDN/S-0-1050.x.1)

Usage of configuration (D15): used

Function within connection (D14): Producer

Source of connection configuration (D12-D13): master

Type of configuration (D4-D5): variable configuration of IDNs

Mechanism of producing (D3): producer cycle synchronous

Mechanism of monitoring (D0-D1): producer cycle synchronous operation

Figure 49: Drive Connections > Producer

The upper part of the dialog pane displays a table containing all configured producer connections. Each entry in the table corresponds to a configured producer connection which can be selected.

The columns of this table have the following meaning:

IDN

The symbolic notation of a 4-byte IDN.

Byte length

If a row represents an IDN, the value in this column is the length of IDN.

If a row represents a connection, the value in this column is the total IDN data length of this connection. Please note, the current connection length (IDN S-0-1050.x.5) contains this total data length plus 2 byte connection control word.

If a row represents a connections' list, the value in this column is the total data length of all connections.

Producer Cycle Time

The producer cycle time (t_{Pcyc} , IDN S-0-1050.x.10). Each connection has a producer cycle time, which should be an integer multiple of the communication cycle time (t_{Scyc}) according to the following formula:

$$t_{Pcyc} = t_{Scyc} \times n$$

where n is a natural number.

The navigation buttons within the upper part of the dialog pane allow creation and deletion of producer connection entries. For a detailed explanation of the navigation buttons also see section "*Table Line*" on page 18.

Within the lower part of the dialog pane (this is below the title 'Connection Setup') you can adjust and configure the following settings related to the selected producer connection (according to IDN S-0-1050.x.1) via a separate selection list each:

Usage of configuration (D15)

Possible choices for this selection list are *Used* and *Not used*.

- Used :

If this option is chosen, the connection is allowed to be used by the Sercos Slave.

- Not used :

If this option is chosen, the Sercos Slave will not use the connection.

Function within connection (D14)

This selection list is fixed to the value *Producer*.

Source of connection configuration (D12-D13)

The only allowed choice for this selection list is currently *Master*.

Type of configuration (D4-D5)

Possible choices for this selection list are *variable configuration of IDNs*, *configuration with connection length* and *standard telegram*.

- variable configuration of IDNs

This choice means that the producer connection is configured with variable length using IDN S-0-1050.x.6.

- configuration with connection length

This choice means that the producer connection is configured with fixed length using C-CON IO-Control (IDN S-0-1500.x.5) and IO-Status (IDN S-0-1500.x.9). However, IDN S-0-1050.x.6 is not used in this case.

- standard telegram

This choice means that a standard telegram according to IDN S-0-0015 is used to configure the producer connection.

Mechanism of producing (D3)

Possible choices for this selection list are: *producer cycle synchronous* and *asynchronous*.

- producer cycle synchronous
- This choice means the producing mechanism works synchronously to the cycle of the producer.
- asynchronous
- This choice means the producing mechanism works asynchronously.

Mechanism of monitoring (D0-D1)

Possible choices for this selection list are *producer cycle synchronous operation*, *asynchronous operation with watchdog* and *asynchronous operation without watchdog*.

- producer cycle synchronous operation

Monitoring takes place synchronously to the cycle of the producer.

- asynchronous operation with watchdog

There is an asynchronous monitoring mechanism with a watchdog timer. The timeout value of the watchdog time corresponds to the producer cycle time (IDN S-0-1050.x.10) of this connection.

- asynchronous operation without watchdog




There is an asynchronous monitoring mechanism without any watchdog timer.



5.10.2 Consumer Connections

In order to configure consumer connections for drives, the pane **Consumer** can be used:

Consumer, Slave Index 1, ADR 3

Configure consumer connections:

	IDN	Byte Length	Allowed Data Losses	Producer Cycle Time (μs)
	Connections List	10		
▶ 	Connection Instance #0	6	1	4000
	S-0-0134	2		
	S-0-0036	4		
	Connection Instance #3	4	1	2000
	S-0-0047	4		

Connection Setup (IDN/S-0-1050.x.1)

Usage of configuration (D15):

Function within connection (D14):

Source of connection configuration (D12-D13):

Type of configuration (D4-D5):

Mechanism of producing (D3):

Mechanism of monitoring (D0-D1):

Figure 50: Drive Connections > Consumer

The upper part of the dialog pane displays a table containing all configured consumer connections. Each entry in the table corresponds to a configured consumer connection which can be selected.

The columns of this table have the following meaning:

IDN

The symbolic notation of 4-byte IDN.

Byte length

If a row represents an IDN, the value in this column is the length of IDN.

If a row represents a connection, the value in this column is the total IDN data length of this connection. Please note, the current connection length (IDN S-0-1050.x.5) contains this total data length plus 2 byte connection control word.

If a row represents connections list, the value in this column is the total data length of all connections.

Allowed Data Losses

This value represents the allowed number of consecutive data loss events for the chosen connection before it will be interrupted. It corresponds to IDN S-0-1050.x.11.

Producer Cycle Time

The producer cycle time (t_{Pcyc} , IDN S-0-1050.x.10). Each connection has a producer cycle time, which should be an integer multiple of the communication cycle time (t_{Scyc}) according to the following formula:

$$t_{Pcyc} = t_{Scyc} \times n$$

where n is a natural number.

The navigation buttons within the upper part of the dialog pane allow creation and deletion of consumer connection entries. For a detailed explanation of the navigation buttons also see section “*Table Line*” on page 6 .

Within the lower part of the dialog pane (this is below the title ‘Connection Setup’) you can adjust and configure the following settings related to the selected producer connection (according to IDN S-0-1050.x.1) via a separate selection list each:

Usage of configuration (D15)

Possible choices for this selection list are *Used* and *Not used*.

- Used:

If this option is chosen, the connection is allowed to be used by the Sercos Slave.

- Not used:

If this option is chosen, the Sercos Slave will not use the connection.

Function within connection (D14)

This selection list is fixed to the value *Consumer*.

Source of connection configuration (D12-D13)

The only allowed choice for this selection list is currently *Master*.

Type of configuration (D4-D5)

Possible choices for this selection list are *variable configuration of IDNs*, *configuration with connection length* and *standard telegram*.

- variable configuration of IDNs

This choice means that the consumer connection is configured with variable length using IDN S-0-1050.x.6.

- configuration with connection length

This choice means that the consumer connection is configured with fixed length using C-CON IO-Control (IDN S-0-1500.x.5) and IO-Status (IDN S-0-1500.x.9). However, IDN S-0-1050.x.6 is not used in this case.

- standard telegram

This choice means that a standard telegram according to IDN S-0-0015 is used to configure the consumer connection.

Mechanism of producing (D3)

Possible choices for this selection list are: *producer cycle synchronous* and *asynchronous*.

- producer cycle synchronous
- This choice means the producing mechanism works synchronously to the cycle of the producer.
- asynchronous
- This choice means the producing mechanism works asynchronously.

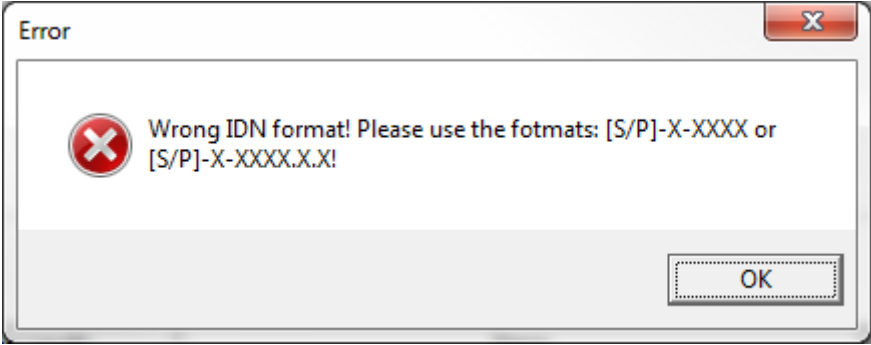

Mechanism of monitoring (D0-D1)

Possible choices for this selection list are *producer cycle synchronous operation*, *asynchronous operation with watchdog* and *asynchronous operation without watchdog*.

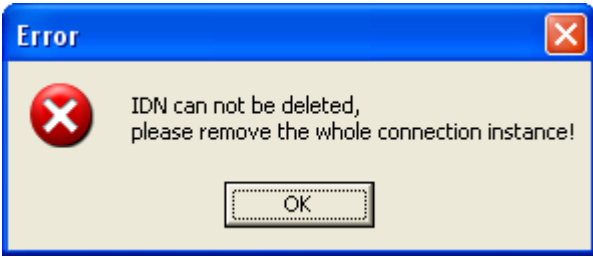

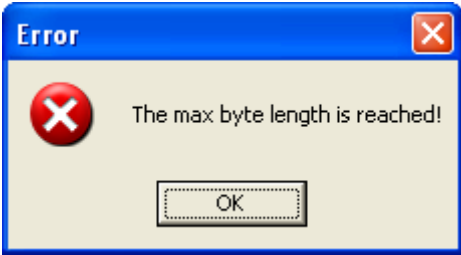
- producer cycle synchronous operation
- Monitoring takes place synchronously to the cycle of the producer.
- asynchronous operation with watchdog
- There is an asynchronous monitoring mechanism with a watchdog timer. The timeout value of the watchdog time corresponds to the producer cycle time (IDN S-0-1050.x.10) of this connection.
- asynchronous operation without watchdog
- There is an asynchronous monitoring mechanism without any watchdog timer.

5.10.3 Error Messages when Editing Producer or Consumer Dialog Pane


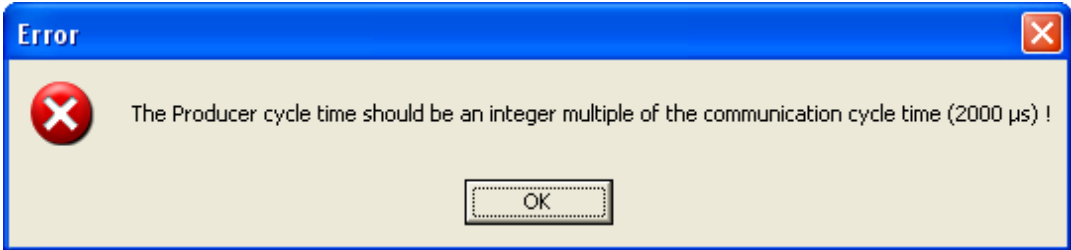
When editing either in the producer or consumer dialog pane, the following error situations might occur:

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	<p>IDN Format Error</p> <p>If deviations between the specified IDN and the expected format occur, this error message will appear.</p>
Action	<p>Correct the IDN format error then!</p> <p>Only the two IDN formats <code>[S/P]-X-XXXX</code> or <code>[S/P]-X-XXXX.X.X</code> will be accepted as valid.</p> <p>Here:</p> <p><code>[S/P]</code> denotes either "S" or "P".</p> <p><code>x</code> denotes a number in the range 0 to 7.</p> <p><code>xxxx</code> denotes a value in the range 0000 up to 4095.</p>
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	<p>Duplicate IDN Error</p> <p>If multiple identical IDNs are specified, you will receive this message.</p>
Action	<p>Use another IDN that has not already been used in the connection list!</p>

(to be continued on next page)

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	<p>Last Connection IDN Error</p> <p>If there is only one single IDN configured below a connection instance and you try to delete the line representing this IDN, you will receive this error message:</p>
Action	No action required – just leave at least one IDN below the connection instance.
Problem	<p>The error message</p>  <p>appears.</p> <p>(The upper value of the range mentioned here might vary in the range between 1 and 1480 depending on how much bytes have already been used by other entries.)</p>
Explanation	<p>Range Error (concerning Byte Length)</p> <p>If an incorrect value for the byte length has been specified, this error message is issued.</p>
Action	Specify a value not exceeding the limits mentioned in the error message.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	<p>Range Error (concerning Total Byte Length)</p> <p>If you try to add another line although the sum of the length of all present entries already have a byte length equal to the maximum (1480 bytes), this error message is issued.</p>
Action	No action required – just do not add more lines. If you still intend to add another line, the Byte Length specified in at least one of the lines needs to be decreased.

(to be continued on next page)

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	<p>Range Error (concerning Producer Cycle Time or Allowed Number of Lost Cycles)</p> <p>This error message will be displayed only when editing the Consumer dialog pane. When entering either the value of the Producer Cycle Time or the allowed number of lost cycles on the Consumer dialog pane, incorrect input might cause this error message to be displayed.</p>
Action	Specify a value not exceeding the limits mentioned in the error message.
Problem	<p>The error message</p>  <p>appears.</p> <p>(The microseconds value within the brackets might vary depending on the chosen value of the communication cycle time!)</p>
Explanation	<p>Producer Cycle Time Error</p> <p>This error message will be displayed only when editing the Producer dialog pane. When entering the value of the Producer Cycle Time on the Producer dialog pane, values which are no integer multiple of the communication cycle time will cause this error message box to be displayed.</p>
Action	As stated in the message, specify only integer multiples of the currently specified value of the communication cycle time.

(to be continued on next page)

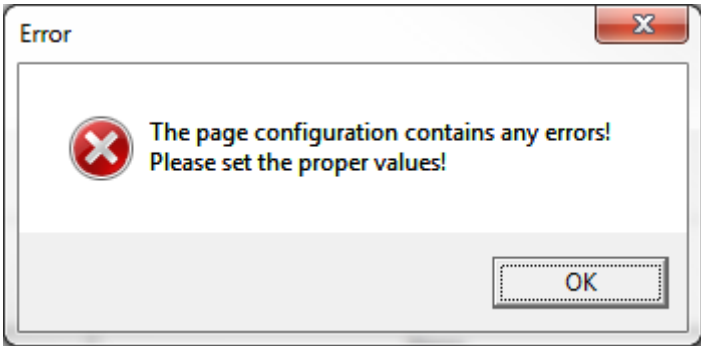
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	<p>Common Error</p> <p>If you try to store data although currently errors are indicated, this message box will appear.</p>
Action	<p>In order to solve the problem, correct the errors indicated by</p> <p>! 1 octet list or ? Undefined first!</p>

Table 34: Possible Error Messages issued at Producer or Consumer Dialog Pane

5.11 Device Description

The Slave DTM for Sercos allows to directly view the device description file by its integrated SDDML Viewer.

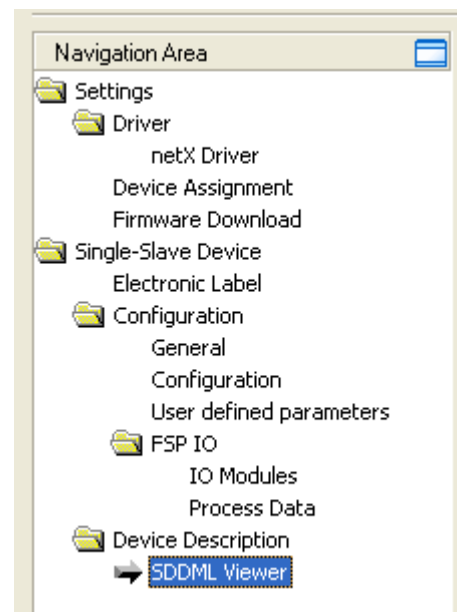


Figure 51: Navigation Area - Device Description

5.11.1 SDDML Viewer

The **SDDML Viewer** shows the content of the SDDML file in a text view.

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

In the SDDML Viewer window on the left side, the line number is displayed for simple overview, the further entries show the SDDML file in text format.

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

Table 35: Device Description – SDDML Viewer

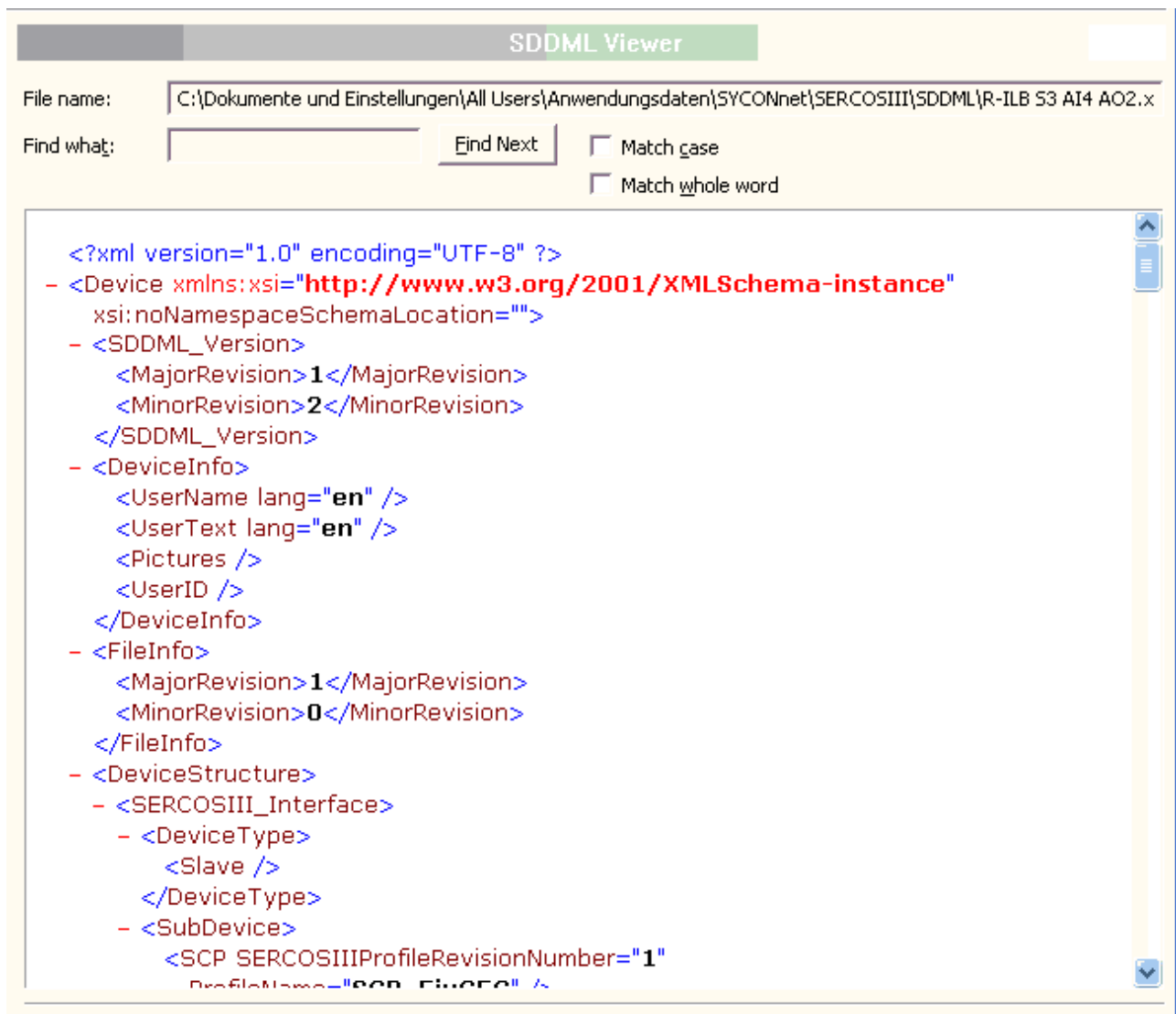


Figure 52: SDDML Viewer

The **SDDML Viewer** page consists of the following elements:

- **File name** shows the absolute path of the DDF file.
- **Find what** offers searching for specific text within the DDF file.
- Using the **Find Next** button allows you to jump to the next occurrence of the text to be searched for within the XML DDF file.
- Check **Match case** if you want to perform a case-sensitive search.
- Check **Match whole word** if only entire words should match and fragments of words should be excluded from matching.



Note: You can also access the search functionality of the **SDDML Viewer** by typing **Ctrl-F** on the keyboard.

6 Online Parameterization

You can access this dialog pane via right clicking on the slave device icon and selecting the menu entry **Configuration > Online Parameterization** if the device has already been connected correctly.

This dialog pane offers you the opportunity to manually read and write parameter data and to execute procedure commands associated with certain IDNs.

In detail, it looks like this:

Online Parameterization

List IDNs: S-0-0017 Current phase: CP2

☐ Data ☒ Attribute ☐ Name ☐ Unit ☐ Min.,Max.

IDN	Attribute	Format	Data Length	Value	Name	Min. ...	Max. ...	Unit
S-0-1002	Encoded Data			0				
S-0-1003	Encoded Data			0				
S-0-1009	S-0-1011	0x60310001	Hex	2 octet	0000	-	-	-
S-0-1010	Encoded Data			0x0000				
S-0-1011	S-0-1012	0x60150001	Unsigned decimal	2 octet list	0800080000000000	-	-	-
S-0-1012	Encoded Data			0				
S-0-1013	Encoded Data			0				
S-0-1014	Encoded Data			0				
S-0-1017	Encoded Data			0				
S-0-1026	S-0-1013	0x60110001	Unsigned decimal	2 octet	0000	-	-	-
S-0-1035	Encoded Data			0				
S-0-1040	S-0-1014	0x60110001	Unsigned decimal	2 octet	0000	-	-	-
S-0-1050.0.3	Encoded Data			0				
S-0-1050.0.5	S-0-1017	0x63160001	Unsigned decimal	4 octet list	0800080010EB09	-	-	-
S-0-1050.1.3	Encoded Data			650000				

Upload selected parameters Select IDN

Single parameter access

Action: Read ☒ Data ☒ Name ☒ Unit ☒ Min.,Max.

IDN: S-0-1012

Attribute: 0x60150001

Display format: Unsigned decimal

Data length: 2 octet list

Procedure Command: No

Writable in: CP2

IDN	DB Element	Value	Status
S-0-1012			OK
	Data	080008000000000000000000	OK
	Encoded Data	0	
	Encoded Data	0	
	Encoded Data	0	
	Encoded Data	0	
	Name	Lengths of ATs	OK
	Min. Value	-	Error
	Max. Value	-	Error

Figure 53: Configuration->Online Parameterization

6.1 Upper Part of Dialog Pane

In the upper left corner of the dialog pane, you can find a selection list titled *List IDNs*.



This selection list provides the following selection of IDN lists ordered by their List IDNs:

List IDN	Associated IDN List
S-0-0017	IDN-list of all operation data
S-0-0021	IDN-list of invalid operation data for CP2
S-0-0022	IDN-list of invalid operation data for CP3
S-0-0025	IDN-list of all procedure commands
S-0-0187	IDN-list of configurable data as producer
S-0-0188	IDN-list of configurable data as consumer
S-0-0192	IDN-list of all backup operation data
S-0-0219	IDN-list of parameter set
S-0-0270	IDN list of selected backup operation data
S-0-0279	IDN list of password protected data
S-0-0327	IDN list of checksum parameter
S-0-0398	IDN list of configurable real-time/status bits
S-0-0399	IDN list of configurable real-time/control bits
S-0-0423	IDN-list of invalid data for parameterization level
S-0-0428	IDN list of configurable measuring data
S-0-0444	IDN-list of configurable data in the AT data container
S-0-0445	IDN-list of configurable data in the MDT data container

Table 36: Available IDN Lists

The listed items are “List IDNs” i.e. IDNs really containing a list of other IDN numbers. These IDN numbers are listed in the list box below if you click on the *Upload List* button right below the *List IDNs* selection list.

In order to fill the table in the left upper part of the dialog pane with the listed IDNs associated to that List IDN, perform the following:

- Choose one of these List IDNs from the selection list mentioned above.
- Click on button *Upload list* to upload the list associated with the chosen List IDN.



- The table in the left upper part of the dialog pane with the listed IDNs is filled with the IDN numbers of all IDNs currently listed within the chosen List IDN.

In the next step, you may choose which IDNs should be displayed in detail in the large table in the upper right part of the dialog pane. This done by checking or unchecking the check boxes just left of the IDN numbers.

You may choose none, a single, multiple or all IDN numbers for display in the large table on the upper right part of the dialog pane.

To select all IDNs,

- check the check box at the List IDN itself (serving as the root item of the displayed tree view), and all subordinated IDNs will be checked as well immediately.

To exclude all IDNs from selection,

- uncheck the List IDN itself similarly.

To select or unselect a single IDN,

- only check or uncheck the check box located at that IDN.

In order to display those selected IDNs,

- Just click the button *Upload Selected Parameters*.

- The large table in the upper right part of the dialog pane will now be filled with all relevant information about the selected IDNs. It looks like:

<input checked="" type="checkbox"/> Data <input checked="" type="checkbox"/> Attribute <input type="checkbox"/> Name <input type="checkbox"/> Unit <input type="checkbox"/> Min.,Max.									
	IDN	Attribute	Format	Data Length	Value	Name	Min. ...	Max. ...	Unit
	Encoded Data				0				
	Encoded Data				0				
<input type="checkbox"/>	S-0-1011	0x60310001	Hex	2 octet	0000	-	-	-	-
	Encoded Data				0x0000				
<input checked="" type="checkbox"/>	S-0-1012	0x60150001	Unsigned decimal	2 octet list	0800080000000000	-	-	-	-
	Encoded Data				0				
	Encoded Data				0				
	Encoded Data				0				
	Encoded Data				0				
<input type="checkbox"/>	S-0-1013	0x60110001	Unsigned decimal	2 octet	0000	-	-	-	-
	Encoded Data				0				
<input type="checkbox"/>	S-0-1014	0x60110001	Unsigned decimal	2 octet	0000	-	-	-	-
	Encoded Data				0				
<input type="checkbox"/>	S-0-1017	0x63160001	Unsigned decimal	4 octet list	0800080010EB09	-	-	-	-
	Encoded Data				650000				

Figure 54: Upper right Part of the Dialog Pane

The columns provide the following information about each IDN:

IDN

The IDN whose information is displayed on the same line in the other columns.

Attribute

The numerical value of the attribute. This item is only displayed if the check box *Attribute* above the table has been checked.

Format

The format (i.e. the data representation) in which the data contained in the IDN are stored (such as hexadecimal or unsigned decimal storage).

Data Length

The reserved length for storage of that data.

Value

The stored value of the IDN itself. This item is only displayed if the check box *Data* above the table has been checked.

Name

The name of the IDN, if available. This item is only displayed if the check box *Name* above the table has been checked.

Min.

The minimum allowed value of the value of the IDN. This item is only displayed if the check box *Min.,Max.* above the table has been checked.

Max.

The maximum allowed value of the value of the IDN. This item is only displayed if the check box *Min.,Max.* above the table has been checked.

Unit

The unit associated with the value of the IDN, if any is associated at all. This item is only displayed if the check box *Unit.* above the table has been checked.

For each displayed IDN, the table contains one line containing the above mentioned information about the IDN itself, and, if necessary, one or more additional lines for possibly present data (depending on the chosen IDN). In these additional lines, only the columns *IDN* and *Value* are filled.

Some additional information on these columns follow here:

6.1.1 Attribute

This column contains additional information required for administrative purposes. It is mandatory.

It is a 32-bit wide bit mask to be interpreted according to the subsequent table:

**Note:**

UTF8 is supported.

Coding of Attribute Information in IDN

D31	D30	D29	D28	D27-D24	D23	D22-D20	D19	D18-D16	D15-D0
									Conversion factor used for conversion of data to display format, specified as unsigned integer. Use 1 if not required (for instance for binary, character string or floating point number data)
									Data length (required for correct termination of data transmission on the service channel)
								000	Reserved
								001	Two bytes of operation data
								010	Four bytes of operation data

D31	D30	D29	D28	D27-D24	D23	D22-D20	D19	D18-D16	D15-D0
								011	Eight bytes of operation data
								100	Length is variable/ 1-byte data strings
								101	Length is variable/ 2-byte data strings
								110	Length is variable/ 4-byte data strings
								111	Length is variable/ 8-byte data strings
							Function		
							0	Operation data/parameter	
							1	Command	
						Coding for data type and display format			
							Data type		Display format
						000	Binary value		Binary
						001	Unsigned integer		Decimal
						010	Signed integer		Decimal + sign
						011	Unsigned integer		Hexadecimal
						100	Extended character set		Text
						101	Unsigned integer		IDN
						110	ANSI 754-1985 floating point number (single precision)		Decimal value with exponent (fraction after decimal point is not taken into account)
						111	Reserved		Reserved
					Reserved				
				Position of decimal point for input and display (not applicable to floating point data)					
				0000	No places following the decimal point				
				...					
				1111	15 places following the decimal point				
			Write protection in CP2						
			0	Write protection not effective for operation data					
			1	Write protection effective for operation data					
		Write protection in CP3							
		0	Write protection not effective for operation data						
		1	Write protection effective for operation data						
	Write protection in CP4								
	0	Write protection not effective for operation data							
	1	Write protection effective for operation data							
Reserved									

Table 37: Coding of Attribute Information in IDN

The display format and the data length must match. Corresponding combinations are marked in the table below:

Data Length	Binary	Unsigned decimal	Signed decimal	Hex	Text	IDN	Float	Time
2 octet	Yes	Yes	Yes	Yes	No	No	No	No
4 octet	Yes	Yes	Yes	Yes	No	Yes	Yes	No
8 octet	Yes	Yes	Yes	Yes	No	No	Yes	Yes
1 octet	No	Yes	No	Yes	Yes	No	No	No
2 octet list	Yes	Yes	Yes	Yes	No	No	No	No
4 octet list	Yes	Yes	Yes	Yes	No	Yes	Yes	No
8 octet list	Yes	Yes	Yes	Yes	No	No	Yes	Yes

Table 38: Allowed Combinations of Display Format and Data Length

For more information on the extended character set see the specification of Sercos in the third generation, appendix E.

6.1.2 Value

This column contains the stored value of the IDN itself.



Note:

This item is only displayed if the check box Data above the table has been checked.

There are 3 formats defined in the Sercos standard which can be applied here:

- Fixed length format with 2 bytes
- Fixed length format with 4 bytes
- Variable length format with support for up theoretically up to 65532 bytes (limited to 1368 bytes in the current implementation of the Sercos firmware.)

In case of the variable length format these bytes are structured as follows:

- The first two bytes contain the hexadecimally coded value of the current length of the data. This is the text the master proposes to the slave. If these two bytes are 0, no other data are required and a zero-length datum will be defined therefore.
- The next two bytes contain the hexadecimally coded value of the maximum allowed length of data if the slave is permitted to change the text. (If this length is equal to 0, the slave is not permitted to do so.)
- Beginning from the fifth byte there is a string consisting of up to 1368 bytes (characters) space for the data of the object assigned to the IDN. Characters exceeding the amount specified in the length bytes should be truncated by the Sercos slaves.

6.1.3 Name

This column holds the name of the operational data which are stored under the respective IDN. It is optional.

The length is limited to at most 64 bytes. At least 2 bytes need to be used.

These bytes are structured as follows:

- The first two bytes contain the hexadecimally coded value of the length of the programmed text. This is the text the master proposes to the slave. If these two bytes are 0, no other data are required and a zero-length name will be defined therefore.
- The next two bytes contain the hexadecimally coded value of the maximum allowed length of this text if the slave is permitted to change the text. (If this length is equal to 0, the slave is not permitted to do so.)
- Beginning from the fifth byte there is a string consisting of up to 60 bytes (characters) space for the actual name of the object assigned to the IDN. Characters exceeding the amount specified in the length bytes should be truncated by the Sercos slaves.

Also see *Figure 1: Name structure* of the Sercos Spec:

For more information, refer to the specification of Sercos in the third generation.

6.1.4 Min.

This column holds the minimum value allowed for the operational data which are stored under the respective IDN. It is optional.

Lower values cannot be processed by the slave, i.e. when a write request occurs with a lower value, the original value will not be changed..

The length is fixed to 64 bytes.

In the following cases this element is not applicable:

- Working with binary numbers
- Working with character strings
- Operation data have variable length



Note:

This item is only displayed if the check box *Min.,Max.* above the table has been checked!

6.1.5 Max.

This column holds the maximum value allowed for the operational data which are stored under the respective IDN. It is optional.

Higher values cannot be processed by the slave, i.e. when a write request occurs with a higher value, the original value will not be changed.

The length is fixed to 64 bytes.

In the following cases this element is not applicable:

- Working with binary numbers
- Working with character strings
- Operation data have variable length



Note:

This item is only displayed if the check box *Min.,Max.* above the table has been checked!

6.1.6 Unit

This column holds the name of unit to be applied to the operational data which are stored under the respective IDN. It is optional.

**Note:**

This item is only displayed if the check box *Unit.* above the table has been checked!

For each displayed IDN, the table contains one line containing the above mentioned information about the IDN itself, and, if necessary, one or more additional lines for eventually present data (depending on the chosen IDN). In these additional lines, only the columns *IDN* and *Value* are filled.

The length is limited to at most 16 bytes. At least 2 bytes need to be used.

These bytes are structured as follows:

- The first two bytes contain the hexadecimally coded value of the length of the programmed text. This is the text the master proposes to the slave. If these two bytes are 0, no other data are required and a zero-length name will be defined therefore.
- The next two bytes contain the hexadecimally coded value of the maximum allowed length of this text if the slave is permitted to change the text. (If this length is equal to 0, the slave is not permitted to do so.)
- Beginning from the fifth byte there is a string consisting of up to 12 bytes (characters) space for the actual unit of the object assigned to the IDN. Characters exceeding the amount specified in the length bytes should be truncated by the Sercos slaves.

When the data type is either binary or character string, the data has no unit.

Also see *Figure 2: Unit structure* of the specification of Sercos in the third generation.



Note: As the service channel transfers data in a word-aligned manner, it is recommended to use even values for the two length specifications described in this context.

For more information, refer to the specification of Sercos in the third generation.

6.2 Lower Part of Dialog Pane

You can highlight one single line of the large table in the upper right part of the dialog pane representing one specific IDN in order to be accessed within lower part of the dialog pane. (In the example given above in section 'Upper Part of Dialog Pane', this specific IDN is IDN S-0-1012.)

Three kinds of actions can be performed with a single parameter of an IDN:

In order to select a single parameter of a specific IDN for accessing, do the following:

- Highlight the line of your choice in the large table in the upper right part of the dialog pane.
- Click on the button Select IDN in the center of the dialog pane.



Figure 55: Button 'Select IDN'

- The IDN associated to the chosen line is selected for single parameter access. Which specific IDN has been chosen is now displayed on the left side at IDN.

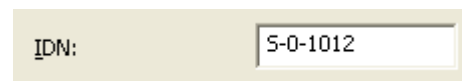


Figure 56: IDN Display

- Everything displayed within the lower part of the dialog pane i.e. below the line with the text "Single parameter access" now just relates to this chosen IDN.
- The table on the right side of the lower part of the dialog pane is now filled with current data. It allows you to enter the data to be changed.

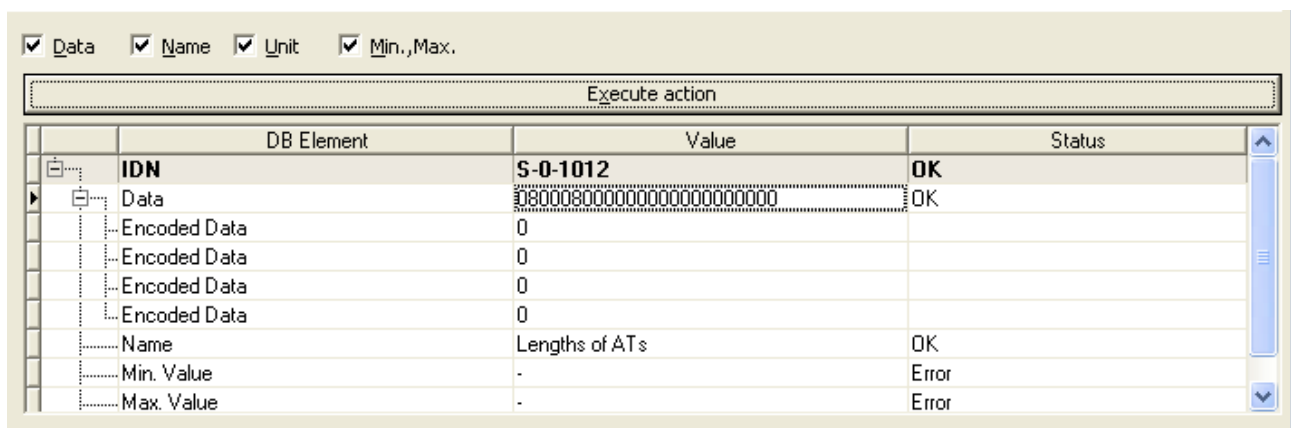


Figure 57: Lower Part of the Dialog Pane

The selection list Action on the left side of the lower part of the dialog pane allows you now to decide whether to read, write or execute the IDN

A screenshot of a software interface titled "Single parameter access". It contains a label "Action:" followed by a dropdown menu. The dropdown menu is open, showing the word "Read" as the selected option.

Figure 58: Selection list 'Action'

The *IDN* field shows the selected IDN according to the procedure described above:

 A screenshot of a software interface showing a label "IDN:" followed by a text input field. The input field contains the text "5-0-1012".

Figure 59: IDN field

This field is editable.

The *Attribute* field shows the attribute data of the selected IDN in hexadecimal representation. It is interpreted according to the procedure described in section *Attribute*.

This field is not editable.

The field *Display format* informs about the data format in which the data are stored and display depending on the data type. The following display formats are possible:

- Binary
- Unsigned decimal
- Signed decimal
- Hex
- Text
- IDN
- Float
- Time

This field is not editable.

The field *Data length* informs about the data length of the data associated with the IDN. The following values are possible:

- 2 octet
- 4 octet
- 8 octet
- 1 octet
- 2 octet list
- 4 octet list
- 8 octet list

This field is not editable.

The field *Procedure command* shows whether the IDN contains a procedure command which can be executed by selecting *Execute* in the *Action* selection list, or not. This field is not editable.

The field *Writable in* displays the communication phase(s), when the IDN is writable. This field is not editable.

7 Online Functions

This section describes how to connect to or disconnect from a device and how to download a configuration.

7.1 Connecting/Disconnecting Device



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

Connecting Device

The following steps are needed to establish a connection from the Sercos Slave DTM to a Sercos Slave 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 that may occur in consequence of a communication stop. For more refer to section *Safety Messages on Firmware or Configuration Download* on page 31.

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 33.

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 Sercos Slave device icon.
10. Select the **Connect** command from the context menu.

↗ The Sercos Slave device now is connected to the Sercos Slave DTM via an online connection. In the network view the device description at the device icon of the Slave is displayed with a green colored background.

Disconnecting Device

To disconnect an online connection from the Sercos Slave device to a Sercos Slave 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 Sercos Slave device icon.
 3. Select the **Disconnect** command from the context menu.
- ⇒ In the network view the device description at the device icon of the Slave is not any more displayed with a green colored background. Now the Sercos Slave device is disconnected from the DTM.

7.2 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 Sercos Slave device an online connection from the Sercos Slave DTM to the Sercos Slave device is required.



Further information can be found in the *Connecting/Disconnecting Device* section on page 142.

Safety Precautions

Adhere to the necessary safety precautions to prevent personnel injury and property damage that may occur in consequence of a communication stop or in consequence of a mismatching system configuration.

⚠ WARNING

Personnel Injury in Consequence of a Communication Stop

- Stop the application program before starting a configuration download.
- Make sure that your equipment operates under conditions that prevent personal injury. All network devices should be placed in a fail-safe mode before downloading a configuration.
- Unexpected equipment operation may cause personal injury.

Personnel Injury as a result of 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.

NOTICE

Damage of Equipment and Loss of Device Parameters in Consequence of a Communication Stop

- Stop the application program before starting a configuration download.
- Make sure that your equipment operates under conditions that prevent property damage. All network devices should be placed in a fail-safe mode before downloading a configuration.
- Unexpected equipment operation may cause property damage.
- Before you initiate a configuration download make sure that your current project configuration data are saved non-volatile in order to prevent loss of configuration data.

Damage of Equipment as a result of 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 damage of equipment.

Download Steps

To transfer the configuration with the corresponding parameter data to the Sercos Slave 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?'

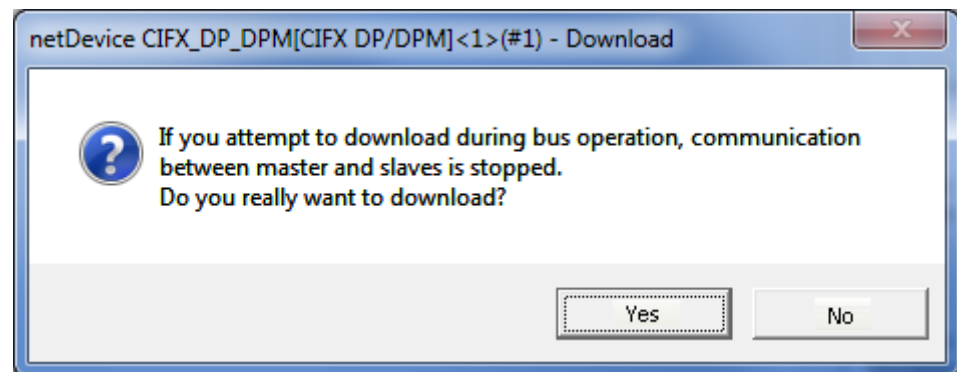


Figure 63: netDevice Message: Download



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**.

8 Diagnosis

8.1 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:

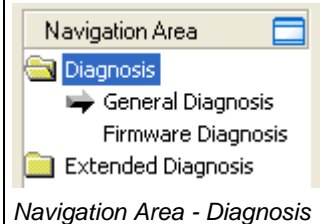
Sercos Slave DTM	Folder Name / Section	Manual Page
	<i>General Diagnosis</i>	147
	<i>Firmware Diagnosis</i>	149

Table 39: Descriptions of the Diagnosis Panes



Online Connection to the Device

Note: Accessing the **Diagnosis** panes of the Sercos Slave DTM requires an online connection from the Sercos Slave DTM to the Sercos Slave device. For further information refer to section *Connecting/Disconnecting Device* on page 142.

How to proceed

1. In the Slave 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 150.

8.2 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 64: General Diagnosis

LED	Meaning	Color	State
Device State			
Communication	Shows whether the Sercos device executes the network communication.	 (green)	In COMMUNICATION state
		 (gray)	Not in COMMUNICATION state
Run	Shows whether the Sercos device has been configured correctly.	 (green)	Configuration OK
		 (gray)	Configuration not OK
Ready	Shows whether the Sercos device has been started correctly. The Sercos device waits for a configuration.	 (yellow)	Device READY
		 (gray)	Device not READY
Error	Shows whether the Sercos 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 Sercos device is in data exchange. In a cyclic data exchange the input data or the output data of the Sercos Slave are transmitted to the Sercos Master.	 (green)	In OPERATION state
		 (gray)	Not in OPERATION state
Idle	Shows whether the Sercos device is in idle state.	 (yellow)	In IDLE state
		 (gray)	Not in IDLE state













LED	Meaning	Color	State
Stop	Shows whether the Sercos device is in Stop state: There is no cyclic data exchange at the Sercos network. The Sercos 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 Sercos Slave 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 Sercos 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 Sercos 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 Sercos 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 40: 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 41: Parameter General Diagnosis

9 Extended Diagnosis

9.1 Overview Extended Diagnosis

The **Extended Diagnosis of the Sercos Slave 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:

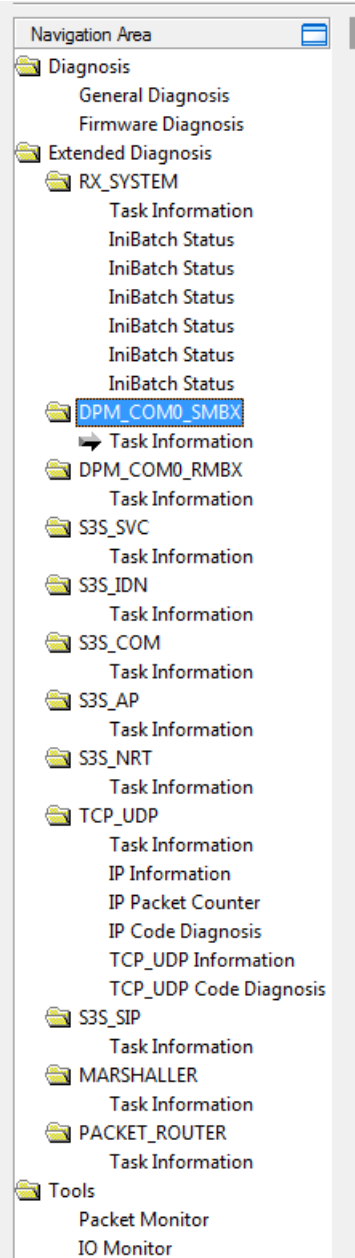
Sercos Slave DTM	Folder Name in the Navigation Area	Dialog Pane	Page
	RX-SYSTEM	Task Information	151
		IniBatch Status	152
	DPM_COM0_SMBX□	Task Information	151
	DPM_COM0_RMBX□	Task Information	151
	S3S_SVC	Task Information	151
	S3S_IDN	Task Information	151
	S3S_COM	Task Information	151
	S3S_AP	Task Information	151
	S3S_NRT	Task Information	151
	TCP_UDP	Task Information	151
		IP Information	153
		IP Packet Counter	154
		IP Code Diagnosis	154
		TCP_UDP Information	155
		TCP_UDP Code Diagnosis	155
	S3S_SIP	Task Information	151
	MARSHALLER	Task Information	151
	PACKET_ROUTER	Task Information	151
Navigation Area - Extended Diagnosis			

Table 43: Descriptions of the Dialog Panes Extended Diagnosis

Online Connection to the Device



Note: Accessing the **Extended Diagnosis** dialog panes of the Sercos Slave DTM requires an online connection from the Sercos Slave DTM to the Sercos Slave device. For further information refer to section *Connecting/Disconnecting Device* on page 142.

9.2 Task Information

Task Information	
Task states	
Name	Value
Identifier	
Major version	{The displayed values depend from the corresponding task}
Minor version	
Maximum Packet size	
Default Que	
Unique identifier	
Init result	

Figure 66: 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 44: Extended Diagnosis > [Folder Name] > Task Information

9.3 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 67: Extended Diagnosis > [Folder Name] > IniBatch Status Example Display

Name	Description
Communication Channel	Number of the communication channel used by the device.
Current State	0 = Idle; 1 = IniBatch packets in progress; 2 = Retrying to send last packet; 3 = Error
IniBatch Result	0 = Ok; 1 = No DBM file; 2 = No Packet table; 3 = No data set available; 4 = Data set is shorter than packet length; 5 = Packet Buffer is shorter than Packet length; 6 = Invalid packet destination; 7 = Logical queue not defined 8 = Send packet failed; 9 = Too many retries; 10 = 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 45: Extended Diagnosis > [Folder Name] > IniBatch Status

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

9.4 TCP_UDP

9.4.1 IP Information

IP Information	
Task states	
Name	Value
Task State	1
Error Counter	6
Last Error	0xC00800C8
IP Address	0.0.0.0
Net Mask	0.0.0.0
Gateway	0.0.0.0
Flags (Value from Database)	0
IP Address (Value from Database)	0.0.0.0
Net Mask (Value from Database)	0.0.0.0
Gateway (Value from Database)	0.0.0.0
IP Config source	Database, Warmstart packet

Figure 68: 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.
IP config source	IP configuration is done through the following sources: None (receive no configuration), DHCP server, BOOTP server, Database, warm-start packet, ICMP (ping) (not supported), Hilscher NetIdent protocol

Table 46: Extended Diagnosis > TCP_UDP > IP-Information

9.4.2 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 69: Extended Diagnosis > TCP_UDP > 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 47: Extended Diagnosis > TCP_UDP > Packet Counter

9.4.3 IP Code Diagnosis

IP Code Diagnosis	
Task states	
Name	Value
Information Counter	0
Warning Counter	0
Error Counter	0
Severity Level	None
Code	0
Parameter	0
Module	
Line Number	0

Figure 70: Extended Diagnosis > TCP_UDP > IP Code Diagnosis

Name	Description
Info Counter	Counter for information reports
Warning Counter	Counter for warning reports
Error Counter	Counter for errors
Severity Level	Level of the last occurred error: Values: "None", "Information", "Warning", "Error", "Fatal Error"
Code	Code of the last occurred error
Parameter	Additional information to the error
Module	Software module
Line number	Line number inside the software module

Table 48: Extended Diagnosis > TCP_UDP > IP Code Diagnosis

9.4.4 TCP_UDP Information

TCP_UDP Information	
Task states	
Name	Value
Task State	1
Error Counter	6
Last Error	0xC00800C8

Figure 71: 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 49: Extended Diagnosis > TCP_UDP > TCP_UDP Information

9.4.5 TCP_UDP Code Diagnosis

TCP_UDP Code Diagnosis	
Task states	
Name	Value
Information Counter	0
Warning Counter	0
Error Counter	0
Severity Level	None
Code	0
Parameter	0
Module	
Line Number	0

Figure 72: Extended Diagnosis > TCP_UDP > TCP_UDP Code Diagnosis

Name	Description
Information Counter	Counter for information reports
Warning Counter	Counter for warning reports
Error Counter	Counter for errors
Severity Level	Level of the last occurred error: Values: "None", "Information", "Warning", "Error", "Fatal Error"
Code	Code of the last occurred error
Parameter	Additional information to the error
Module	Software module
Line Number	Line number inside the software module

Table 50: Extended Diagnosis > TCP_UDP > TCP_UDP Code Diagnosis

10 Tools

10.1 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:

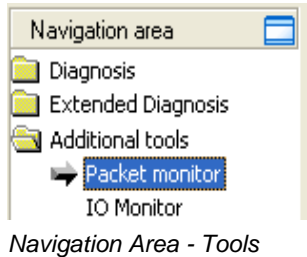
Sercos Slave DTM	Folder Name / Section	Manual Page
	Packet Monitor	157
	IO Monitor	160

Table 51: Descriptions of the Diagnosis Panes

Online Connection to the Device



Note: Accessing the **Tools** dialog panes of the Sercos Slave DTM requires an online connection from the Sercos Slave DTM to the Sercos Slave device. For further information refer to section *Connecting/Disconnecting Device* on page 142.

10.2 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 73: 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.

10.2.1 Sending Packet

The screenshot shows a 'Send' dialog box with two main sections: 'Packet header' and 'Send data'.

Packet header:

- Dest:** 00000001 (dropdown menu)
- Src:** 00000000
- State:** 00000000
- Dest ID:** 00000000
- Cmd:** 00002F00
- Src ID:** 00000000
- Ext:** 00000000
- Len:** 00000012
- Rout:** 00000000
- ID:** 00000001
- Auto Increment ID:** ☒

Send data:

Counter: 0

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

Buttons: Put cyclic, Put packet

Figure 74: 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 52: 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**.

10.2.2 Receiving Packet

Figure 75: 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 53: 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.

10.3 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 76: 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.

11 Error Codes

11.1 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.

11.2 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
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 54: Overview Error Codes and Ranges



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

11.3 General Hardware Error Codes

11.3.1 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 55: RCX General Task Errors

11.3.2 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 56: RCX Common Status & Errors Codes

11.3.3 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 57: RCX Status & Error Codes

11.3.3.1 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 58: RCX Status & Error Codes Slave State

11.4 ODM Error Codes

11.4.1 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 59: ODM Error Codes - General ODM Error Codes

11.4.2 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 60: ODM Error Codes - General ODM Driver Error Codes

11.4.3 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 61: cifX Driver Specific ODM Error Codes

11.5 Error Codes cifX Device Driver and netX Driver

11.5.1 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 62: Generic Error Codes

11.5.2 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 63: Generic Driver Error Codes

11.5.3 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 64: Generic Device Error Codes

11.6 Error Codes netX Driver

11.6.1 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 65: CIFS API Transport Error Codes

11.6.2 CIFS API Transport Header State Error Codes

Error Code (Definition)	Value	Description
CIFS_TRANSPORT_ERROR_UNKNOWN	0x800E0001	Unknown error code in transport header
CIFS_TRANSPORT_CHECKSUM_ERROR	0x800E0002	CRC16 checksum failed
CIFS_TRANSPORT_LENGTH_INCOMPLETE	0x800E0003	Transaction with incomplete length detected
CIFS_TRANSPORT_DATA_TYPE_UNKNOWN	0x800E0004	Device does not support requested data type
CIFS_TRANSPORT_DEVICE_UNKNOWN	0x800E0005	Device not available unknown
CIFS_TRANSPORT_CHANNEL_UNKNOWN	0x800E0006	Channel not available unknown
CIFS_TRANSPORT_SEQUENCE	0x800E0007	Sequence error detected
CIFS_TRANSPORT_BUFFER_OVERFLOW	0x800E0008	Buffer overflow detected
CIFS_TRANSPORT_RESOURCE	0x800E0009	Device signals out of resources
CIFS_TRANSPORT_KEEPA_LIVE	0x800E000A	Device connection monitoring error (Keep alive)
CIFS_TRANSPORT_DATA_TOO_SHORT	0x800E000B	Received transaction data too short

Table 66: CIFS API Transport Header State Error Codes

11.7 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

ODM Error Codes DBM V4		
Error Code (Definition)	Value	Description
CDBM_E_WRITE_NO_PARRAY	0XC004C82E	The VARIANT contains no valid [parray] element
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 67: ODM Error Codes DBM V4

12 Appendix

12.1 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**, **Device Description** and **Diagnosis** panes of the Sercos Slave 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 **Device Description** panes do not contain any editable elements. The indicated values in are only for information purposes.

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

12.1.1 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

Table 68: Settings (D = Displaying, X = Editing, Configuring)

12.1.2 Configuration

	Observer	Operator	Maintenance	Planning Engineer	Administrator
<i>General</i>	D	D	X	X	X
<i>Electronic Label</i>	D	D	X	X	X
<i>Configuration</i>	D	D	X	X	X
<i>User-defined Parameters</i>	D	D	X	X	X
<i>FSP IO</i>	D	D	X	X	X
<i>FSP Drive</i>	D	D	X	X	X

Table 69: Configuration (D = Displaying, X = Editing, Configuring)

12.2 References

- [1] Device Type Manager (DTM) Style Guide, Version 1.0 ; FDT-JIG - Order No. <0001-0008-000>
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- [3] Sercos international: Sercos General Overview and Architecture V 1.3-1.3, 2011
- [4] Sercos international: Sercos Communication V 1.3-1.9, 2012
- [5] Sercos international: Sercos Parameter V 1.3-1.3, 2011
- [6] Sercos international: Sercos Generic Device Profile V 1.3-1.2, 2011
- [7] Sercos international: Sercos Function Specific Profile IO V 1.3-1.5, 2011
- [8] Sercos international: Sercos Function Specific Profile Drives V 1.3-2.15 ,2011

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12.5 Glossary

AT

Acknowledge Telegram

(originally *Antriebstelegramm* which is the German expression for “*Drive Telegram*”))

The Acknowledge Telegram (AT) is a special telegram used for transmission of real-time data from the slaves to the master and to other slave devices (if cross communication is used). The format of the AT is predefined within the specification of Sercos in the third generation.

BOOTP

Boot Protocol

A protocol for automatic assignment of IP addresses to devices in a network.

Bus Head

The part of an [IO Device](#) which couples the device to the bus and does not belong to any function group. In the *IO Modules - Module Configuration Table*, the bus head is always located at slot 0.

CC

[Cross communication](#) between two slaves

Communication phase

During getting operational, a Sercos device runs through various phases. These are called communication phases.

For a detailed description see references [3] and [4].

Compact IO Device

A compact IO device is an [IO Device](#) which contains one or more fixed IO functions, for instance a 16 bit digital input module could be considered to be a compact IO device. It is not structured into separate function groups or modules.

Consumer

The consumer of a connection is a participant in unidirectional communication who receives (“consumes”) data. Within a producer-consumer model, each connection can have one or multiple consumers.

CP

See [Communication phase](#)

Cross communication

Communication between participants which are not in a master-slave-relation, for instance between 2 slaves or between 2 masters.

Device Type Manager

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

DHCP

Dynamic Host Configuration Protocol

A protocol for automatic assignment of IP addresses to devices in a network.

DTM

See [Device Type Manager](#)

Drive

A drive is a (electromechanical) device according to FSP Drive specification.

Electronic Label

For each Sercos device an electronic label holds device-related information. It can be accessed via IDN S-0-1300. The following items may be stored in the electronic label:

- S-0-1300.x.01 Component Name
- S-0-1300.x.02 Vendor Name
- S-0-1300.x.03 Vendor Code
- S-0-1300.x.04 Device Name
- S-0-1300.x.05 Vendor Device ID
- S-0-1300.x.06 Connected to sub-device
- S-0-1300.x.07 Function revision
- S-0-1300.x.08 Hardware Revision
- S-0-1300.x.09 Software Revision
- S-0-1300.x.10 Firmware Loader Revision
- S-0-1300.x.11 Order number
- S-0-1300.x.12 Serial Number
- S-0-1300.x.13 Manufacturing Date
- S-0-1300.x.14 QS Date
- S-0-1300.x.20 Operational Hours
- S-0-1300.x.21 Service Date
- S-0-1300.x.22 Calibration Date
- S-0-1300.x.23 Calibration Due Date

Field Device Tool

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

FDT

See [Field Device Tool](#)

FSP Drive

A specification for mechanical drives to be controlled by Sercos, see reference [8].

FSP IO

A specification for IO Devices to be controlled by Sercos, see reference [7].

Function Group

A function group combines related functions of a module within a modular IO Device. For instance, all digital input channels of a specific module would set up a function group "*Digital Inputs*" for that module.

Hybrid IO Device

A hybrid IO device combines an IO device (compact or modular IO Device) with a drive.

IDN

An IDN is a unique identification number for a parameter or procedure command within Sercos. For a list of generally applicable IDNs see reference [5].

IO Device

An IO Device is a Sercos device according to the FSP IO specification (reference [7])

In Sercos there are three kinds of IO devices defined, see there:

- Compact IO Devices
- Modular IO Devices
- Hybrid IO Devices

IP Address

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

a.b.c.d

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

Example: 192.168.30.15

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

The IP address 0.0.0.0 is defined as invalid.

Master

Sercos Master devices initiate the data traffic on the bus. In the Sercos protocol Master devices are called active participants. A master may send messages without external request.

MDT

Master Data Telegram

The Master Data Telegram (MDT) is a special telegram used for transmission of real-time data from the master to the slaves. The format of the MDT is predefined within the specification of Sercos in the third generation.

Modular IO Device

A modular IO device contains a complex or variable configurable device which is structured into separate modules. For these modules, there are separate function groups defined.

Multi-Slave Device

A multi-slave device contains multiple slaves in one device in a common housing which can be separately accessed but commonly administered.

Object Dictionary (OD)

An object dictionary is a storage area for device parameter data structures and procedure commands within Sercos. It contains numerous data sets which can be accessed via their IDN.

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.

PDIN

This is an area in which process data input is stored.

PDOUT

This is an area in which process data output is stored.

Procedure Command

Some IDNs do not store values, but are connected to an action (the execution of a command). These are denominated as command procedures.

Producer

The producer of a connection is a participant in unidirectional communication who sends ("produces") data. Within a producer-consumer model, each connection can have only one unique producer.

Producer Cycle Time

The (constant) time period between two directly subsequent data transmissions of a producer (within the producer-consumer model).

RS232

An interfacing standard for serial communication on data lines defined by EIA (Electronic Industries Alliance) in *ANSI/EIA/TIA-232-F-1997*.

SDDML

SDDML = Sercos Device Description Markup Language

The device description file describes the technical characteristics of a device type in an exactly defined format. SDDML descriptions are generated by the device manufacturer individually for each device type and provided to the user as SDDML files.

As the file format is standardized, the projecting system can easily access the description and take these data into account during system configuration.

Sercos**SE**rial **Re**altime **CO**munication **S**ystem

A communication system for industrial Ethernet designed and developed by Bosch-Rexroth GmbH and supported by the user organization Sercos international e.V. (SI) located in Süssen, Germany. It provides a standardized interface for collision-free real time communication between up to 511 participants. It is especially suited for hard real-time requirements.

Sercos address

A Sercos address is a numerical value in the range between 0 and 511, which is used for unique identification of a device within the Sercos network.

Slave

Slave devices are peripheral devices, like for example I/O devices or drives. Slave devices are also called passive participants. They do not receive the bus access authorization. That means, they may only accept received messages from the Master or send a message to the Master after enquiry of the Master.

Structure Element

A structure instance may be divided in one or multiple structure elements.

Structure Instance

An IDN may be divided in one or multiple structure instances. Each structure instance may contain one or multiple structure elements

TCP/IP

Transmission Control Protocol/Internet Protocol

A pair of protocols widely used in the Internet

USB

Universal Serial Bus

Watchdog Timer

A watchdog timer provides an internal supervision mechanism of a communication system. It supervises that an important event happens within a given timeframe (the watchdog time which can be adjusted accordingly, for instance by a parameter in the “Set Configuration” message) and causes an alarm otherwise (usually this is accomplished by changing the operational state of the communication system to a more safe state).

12.6 Contacts

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