



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

Hilscher Gesellschaft für Systemautomation mbH

www.hilscher.com

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Table of Contents

1	INTRODUCTION.....	6
1.1	About this Manual	6
1.1.1	Descriptions of the Dialog Panes	7
1.1.2	Online Help	7
1.1.3	List of Revisions	7
1.1.4	Conventions in this Manual	8
1.2	Legal Notes.....	9
1.3	Registered Trademarks.....	12
1.4	About EtherCAT Slave DTM.....	13
1.4.1	Requirements	14
1.5	Dialog Structure of the EtherCAT Slave DTM.....	15
1.5.1	General Device Information.....	16
1.5.2	Navigation Area	16
1.5.3	Dialog Panes	17
1.5.4	OK, Cancel, Apply and Help	18
1.5.5	Table Lines	18
1.5.6	Status Bar	19
2	SAFETY	20
2.1	General Note.....	20
2.2	Intended Use.....	20
2.3	Personnel Qualification	20
2.4	Personal Injury	21
2.4.1	Communication Stop	21
2.4.2	Mismatching System Configuration	21
2.5	Property Damage	22
2.5.1	Communication Stop	22
2.5.2	Invalid Firmware	22
2.5.3	Mismatching System Configuration	22
2.6	Labeling of Safety Messages	23
2.7	References Safety.....	23
3	GETTING STARTED.....	24
3.1	Configuration Steps.....	24
3.1.1	Slave DTM at the Root-Line (Stand-Alone Slave).....	24
3.1.2	Slave DTM at the Master Busline.....	27
3.2	Safety Messages on Firmware or Configuration Download	30
4	SETTINGS	32
4.1	Overview Settings	32
4.2	Settings for Driver and Device Assignment	33

4.3	Driver	35
4.3.1	Verify or adapt Driver Settings	35
4.3.2	cifX Device Driver	37
4.3.3	netX Driver	37
4.3.4	Configuring netX Driver	38
4.3.5	netX Driver - USB/RS232 Connection	39
4.3.6	netX Driver - TCP/IP Connection	42
4.4	Device Assignment	45
4.4.1	Scanning for Devices	45
4.4.2	Selecting the Device (with or without firmware)	48
4.4.3	Selecting the Device once more (with Firmware)	49
4.5	Firmware Download	51
5	CONFIGURATION	58
5.1	Overview Configuration	58
5.1.1	General Remarks	58
5.1.2	Slave DTM at the Root-Line (Stand-Alone Slave)	58
5.1.3	Slave DTM at the Master Busline	59
5.2	Configuring Slave Parameters	60
5.2.1	Slave DTM at the Root-Line (Stand-Alone Slave)	60
5.2.2	Slave DTM at the Master Busline	61
5.3	General	62
5.4	General Settings	63
5.4.1	Interface Parameters	64
5.4.2	Ident Parameters	65
5.4.3	Data Parameters	65
5.4.4	Messages	66
5.5	Behavior	69
5.5.1	State Machine Timeout	70
5.5.2	Device Check-up	71
5.5.3	Process Data	71
5.5.4	Watchdog	72
5.5.5	Messages	73
5.6	Mailbox	76
5.6.1	CoE	76
6	DESCRIPTION	77
6.1	Overview Description	77
6.2	XML DDF Viewer	78
7	ONLINE FUNCTIONS	80
7.1	Connecting/Disconnecting Device	80
7.2	Download Configuration	82
8	DIAGNOSIS	84
8.1	Overview Diagnosis	84

8.2	General Diagnosis.....	85
8.3	Firmware Diagnosis	87
9	EXTENDED DIAGNOSIS	88
9.1	Overview Extended Diagnosis.....	88
9.2	Task Information	89
9.3	IniBatch Status.....	90
9.4	ECAT_SDO_RSC_DIAG_T.....	91
9.5	ECAT_SDO_RSC_TIMER_T	92
9.6	ECAT_ESM_RSC_DIAG_T.....	93
9.7	ECAT_MBX_RSC_DIAG_T.....	94
9.8	ECAT_MBX_RSC_TIMER_T	95
10	TOOLS	96
10.1	Overview Tools	96
10.2	Packet Monitor	97
10.2.1	Sending Packet	98
10.2.2	Receiving Packet.....	99
10.3	IO Monitor	100
11	ERROR CODES.....	101
11.1	Error Code Definition.....	101
11.2	Overview Error Codes	102
11.3	General Hardware Error Codes	103
11.3.1	RCX General Task Errors.....	103
11.3.2	RCX Common Status & Errors Codes	104
11.3.3	RCX Status & Error Codes	105
11.4	ODM Error Codes	106
11.4.1	General ODM Error Codes	106
11.4.2	General ODM Driver Error Codes	107
11.4.3	cifX Driver Specific ODM Error Codes	108
11.5	Error Codes cifX Device Driver and netX Driver	111
11.5.1	Generic Error Codes.....	111
11.5.2	Generic Driver Error Codes	112
11.5.3	Generic Device Error Codes	113
11.6	Error Codes netX Driver	114
11.6.1	CIFX API Transport Error Codes.....	114
11.6.2	CIFX API Transport Header State Error Codes	114
11.7	ODM Error Codes DBM V4	115
12	APPENDIX	119
12.1	User Rights	119
12.1.1	Settings.....	119
12.1.2	Configuration	119

Table of Contents5/125

12.2	References.....	120
12.3	List of Figures	120
12.4	List of Tables.....	121
12.5	Glossary	123
12.6	Contacts.....	125

1 Introduction

1.1 About this Manual

This manual provides information on how to set and configure the device parameters of a netX based EtherCAT Slave device within a FDT Framework using the EtherCAT Slave DTM, and what can be read from the diagnosis panes.

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

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



Note: This manual edition first provides information for the case if the EtherCAT Slave DTM is dropped to the root line (Stand-Alone Slave) and in addition important information for the case if the EtherCAT Slave DTM is dropped to the Master busline of a EtherCAT 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
Settings	Overview Settings	32
	Driver	35
	Device Assignment	45
	Firmware Download	51
Configuration	Overview Configuration	58
	General	62
	General Settings	63
	Behavior	69
	Messages	76
Description	Overview Description	77
	XML DDF Viewer	78
Diagnosis	Overview Diagnosis	84
	General Diagnosis	85
	Firmware Diagnosis	87
Extended Diagnosis	Overview Extended Diagnosis	88
Tools	Overview Tools	96
	Packet Monitor	97
	IO Monitor	100

Table 1: Descriptions Dialog Panes

1.1.2 Online Help

The EtherCAT 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	1.3.x.x 1.3.x.x	ECATSlaveDTM.dll ECATSlaveGUI.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	17-02-24	1.1000.x.x 1.1000.x.x	ECATSlaveDTM.dll ECATSlaveGUI.ocx	1.4.1	Section <i>Requirements</i> Internet access added, Windows 8.1 and Windwos 10 added.

Table 2: List of Revisions

1.1.4 Conventions in this Manual

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

Notes



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



Note: <general note>



<note, where to find further information>

Operation Instructions

1. <instruction>

2. <instruction>

or

➤ <instruction>

Results

↪ <result>

Positions in Figures

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

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1.4 About EtherCAT Slave DTM

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

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

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

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

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

Slave DTM at the Master Busline

Insert the EtherCAT Slave DTM to the Master busline of the EtherCAT 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 EtherCAT Slave DTM

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

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



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

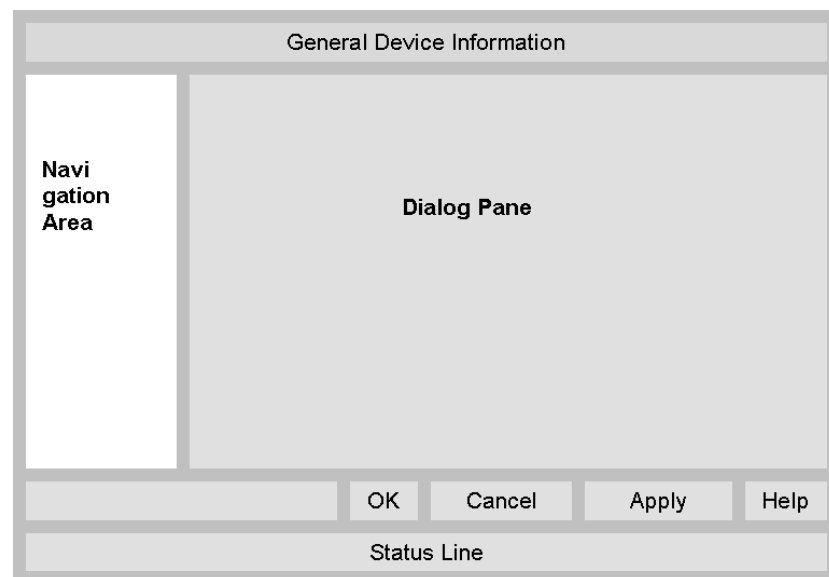


Figure 1: Dialog Structure of the EtherCAT Slave DTM

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 3: General Device Information

1.5.2 Navigation Area

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

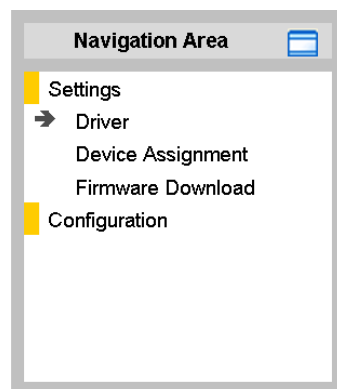


Figure 2: Navigation Area

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

Hide / display Navigation

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

1.5.3 Dialog Panes

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

Settings	
Driver	To establish a connection from the EtherCAT Slave DTM to the EtherCAT 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 35.
Device Assignment	On the pane <i>Device Assignment</i> you select the device and assign the device to the driver. For further information, refer to section <i>Device Assignment</i> on page 45.
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 51.
Configuration	
Configuration	At the <i>Configuration</i> pane <i>Configuration</i> you can perform the basic configuration tasks for the EtherCAT Slave device.
<i>General</i>	At the <i>General</i> pane EtherCAT Slave information is displayed. For further information, refer to section <i>General</i> on page 62.
<i>General Settings</i>	The <i>General Settings</i> pane displays the most important general settings.
<i>Behavior</i>	At the <i>Behavior</i> pane the parameters of the Device checkup, the Process Data and the Watchdog are described. For further information, refer to section <i>Behavior</i> on page 69.
<i>Mailbox</i>	At the <i>Mailbox</i> pane you can get information on mailbox-based data transfer and the CoE (CANopen over Ethernet) functionality. For further information, refer to section <i>Mailbox</i> on page 76.
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 84 and section <i>Overview Extended Diagnosis</i> on page 88.
Tools	
Packet Monitor/ IO Monitor	Under Tools the Packet Monitor and the IO Monitor are provided for test and diagnosis purposes. For further information, refer to section <i>Packet Monitor</i> on page 97 or section <i>IO Monitor</i> on page 100.

Table 4: Overview Dialog Panes



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



For further information, refer to section *Connecting/Disconnecting Device* on page 80.

1.5.4 OK, Cancel, Apply and Help

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

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

Table 5: OK, Cancel, Apply and Help

1.5.5 Table Lines

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

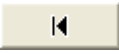
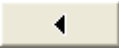

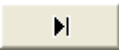


	Meaning
	To select the first line of a table use First Line .
	To select the previous line of a table use Previous Line .
	To select the next line of a table use Next Line .
	To select the last line of a table use Last Line .
	Create a new Line inserts new lines into the table.
	Delete selected Line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

Table 6: Selecting, inserting, deleting Table Line

1.5.6 Status Bar

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

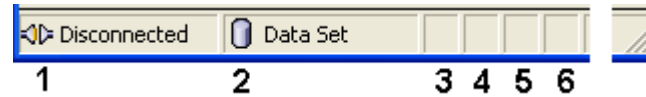
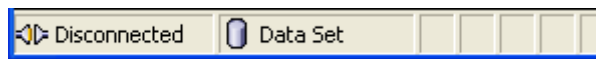


Figure 3: Status Bar – Status Fields 1 to 6

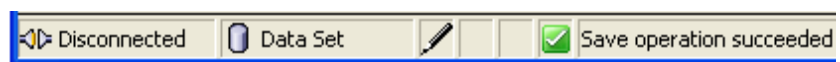
Status Field	Icon / Meaning	
1	DTM Connection States	
		Connected: Icon closed = Device is online
		Disconnected: Icon opened = Device is offline
2	Data Source States	
		Data set: The displayed data are read out from the instance data set (database).
		Device: The displayed data are read out from the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

Table 7: Status Bar Icons [1]

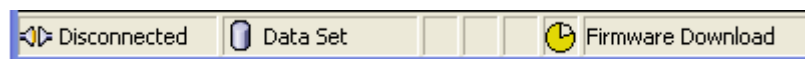
Offline State



Save operation succeeded



Firmware Download



Firmware Download successful



Online State and Diagnosis

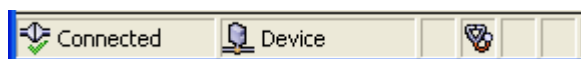


Figure 4: Status Bar Display Examples

2 Safety

2.1 General Note

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

2.2 Intended Use

The EtherCAT Slave DTM serves for configuration and diagnosis of EtherCAT 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 EtherCAT 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 51 and about the configuration download in section *Download Configuration* on page 82.

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 EtherCAT 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 8: Signal Words in Safety Messages on Personal Injury


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

Table 9: 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 EtherCAT Slave device with EtherCAT 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 .	<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 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.	<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 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 EtherCAT Slave DTM is installed on the same PC as the EtherCAT Slave device. • Use the netX Driver to establish a USB, Serial (RS232) or TCP/IP connection from the EtherCAT Slave DTM to the EtherCAT 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>	<i>Settings for Driver and Device Assignment and Driver</i>	33
		<p>- Verify that the default driver is checked. - If necessary, check another driver or multiple drivers.</p>		35
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. 	<i>Configuring netX Driver</i>	38
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>	<i>Selecting the Device (with or without firmware)</i>	48
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>	<i>Safety Messages on Firmware or Configuration Download</i> <i>Firmware Download</i>	30
				51

#	Step	Short Description	For detailed information see section	Page
9	Assign Slave device once more (with firmware and system channel) <i>For repeated download this step is omitted.</i>	In the Slave DTM configuration dialog: - select Settings > Device Assignment , - select Scan , - select the Slave device (with loaded firmware and defined system channel), - therefore check the appropriate checkbox, - select Apply , - close the Slave DTM configuration dialog via OK .	<i>Selecting the Device once more (with Firmware)</i>	49
10	Configure Slave device	Configure the Slave device. - Double click to the device icon of the Slave. - The Slave DTM configuration dialog is displayed. In the Slave DTM configuration dialog: - select Configuration > General Settings , - set the Device Settings. - close the Slave DTM configuration dialog via OK .	<i>Configuring Slave Parameter</i> <i>General Settings</i>	60 63
11	Save project	Depending of the frame application. For the configuration software: - select File > Save .	<i>(See Operating Instruction Manual of the Frame Application)</i>	-
12	Connect Slave device	Depending of the FDT Container. For netDevice: - right click to the device icon of the Slave, - select Connect .	<i>Connecting/Disconnecting Device</i>	80
13	Download Configuration	- 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. Depending of the FDT Container. For netDevice: - right click to the device icon of the Slave, - select Download .	<i>Safety Messages on Firmware or Configuration Download</i> <i>Download Configuration</i>	30 82
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>	84
15	IO Monitor	Depending of the FDT Container: For netDevice: - right click to the device icon of the Slave, - select Diagnosis , - select Tools > IO Monitor . - Check the input or output data, - close the IO Monitor dialog via OK .	<i>IO Monitor</i>	100
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>	80

Table 10: Getting Started - Configuration Steps (Slave DTM at the Root-Line (Stand-Alone Slave))

3.1.2 Slave DTM at the Master Busline

#	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 Operating Instruction Manual netDevice and netProject)	-
2	Create new project / Open existing project	Depending of the frame application. For the configuration software: - select File > New or File > Open .	(See Operating Instruction Manual of the Frame Application)	-
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.	(See Operating Instruction Manual netDevice and netProject)	-
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.	-	-
5	Verify or adapt Driver Settings	<p>In the Slave DTM configuration dialog: - select Settings > Driver.</p> <p> Note! For PC cards cifX the cifX Device Driver is preset as a default driver. For all the other Hilscher devices the netX Driver is preset as a default driver.</p> <ul style="list-style-type: none"> • Use the cifX Device Driver if the EtherCAT Slave DTM is installed on the same PC as the EtherCAT Slave device. • Use the netX Driver to establish a USB, Serial (RS232) or TCP/IP connection from the EtherCAT Slave DTM to the EtherCAT 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>	Settings for Driver and Device Assignment and Driver	33 35
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>	Configuring netX Driver	38

#	Step	Short Description	For detailed information see section	Page
6	Configure Driver (continued)	<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. 	<i>Configuring netX Driver</i>	38
7	Assign Slave device (with or without firmware)	<p>Assign the device to this driver.</p> <p>In the Slave DTM configuration dialog:</p> <ul style="list-style-type: none"> - select Settings > Device Assignment, - select a Slave device (with or without firmware), - therefore check the appropriate checkbox, - select Apply. 	<i>Selecting the Device (with or without firmware)</i>	48
8	Select and download firmware	<p>If not yet a firmware was loaded to the device:</p> <ul style="list-style-type: none"> - Adhere to the necessary safety precautions to prevent personnel injury and property damage that may occur in consequence of a communication stop. <p>In the Slave DTM configuration dialog:</p> <ul style="list-style-type: none"> - select Settings > Firmware Download, - select Browse..., - select a firmware file, - select Open, - select Download and Yes. 	<i>Safety Messages on Firmware or Configuration Download</i> <i>Firmware Download</i>	30 51
9	Assign Slave device once more (with firmware and system channel) <i>For repeated download this step is omitted.</i>	<p>In the Slave DTM configuration dialog:</p> <ul style="list-style-type: none"> - select Settings > Device Assignment, - select Scan, - select the Slave device (with loaded firmware and defined system channel), - therefore check the appropriate checkbox, - select Apply, - close the Slave DTM configuration dialog via OK. 	<i>Selecting the Device once more (with Firmware)</i>	49
10	Configure Slave device	<p>Configure the Slave device.</p> <ul style="list-style-type: none"> - Double click to the device icon of the Slave. - The Slave DTM configuration dialog is displayed. <p>In the Slave DTM configuration dialog:</p> <ul style="list-style-type: none"> - select Configuration > General Settings, - set the Device Settings. - select Configuration > Behavior, - set the Behavior. - select Configuration > Mailbox->CoE, - set the CoE Settings. - close the Slave DTM configuration dialog via OK. 	<i>Configuring Slave Parameter</i> <i>General Settings</i> <i>Behavior</i> <i>CoE</i>	60 63 69 76
11	Configure Master device	Configure the Master device via the EtherCAT Master DTM netX.	<i>(See Operating Instruction Manual DTM for EtherCAT Master devices)</i>	-
12	Save project	<p>Depending of the frame application.</p> <p>For the configuration software:</p> <ul style="list-style-type: none"> - select File > Save. 	<i>(See Operating Instruction Manual of the Frame Application)</i>	-
13	Connect Slave device	<p>Depending of the FDT Container.</p> <p>For netDevice:</p> <ul style="list-style-type: none"> - right click to the device icon of the Slave, - select Connect. 	<i>Connecting/Disconnecting Device</i>	80

#	Step	Short Description	For detailed information see section	Page
14	Download Configuration	<ul style="list-style-type: none"> - 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. Depending of the FDT Container. For netDevice: <ul style="list-style-type: none"> - right click to the device icon of the Slave, - select Download. 	<i>Safety Messages on Firmware or Configuration Download</i> <i>Download Configuration</i>	30 82
15	Diagnosis	<ul style="list-style-type: none"> Depending of the FDT Container. For netDevice: <ul style="list-style-type: none"> - 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>	84
16	IO Monitor	<ul style="list-style-type: none"> Depending of the FDT Container: For netDevice: <ul style="list-style-type: none"> - right click to the device icon of the Slave, - select Diagnosis, - select Tools > IO Monitor. - Check the input or output data, - close the IO Monitor dialog via OK. 	<i>IO Monitor</i>	100
17	Disconnect	<ul style="list-style-type: none"> Depending of the FDT Container. For netDevice: <ul style="list-style-type: none"> - right click to the device icon of the Slave, - select Disconnect. 	<i>Connecting/Disconnecting Device</i>	80

Table 11: Getting Started - Configuration Steps (Slave DTM at the Master busline)

3.2 Safety Messages on Firmware or Configuration Download

If you perform a firmware download or a configuration download via the EtherCAT 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 refer 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:

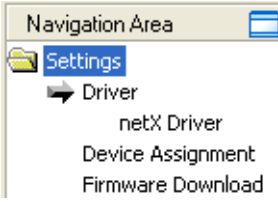
EtherCAT Slave DTM	Folder Name / Section	Subsection	Manual Page
 <p>Navigation Area – Settings (Example) Additional drivers can be displayed.</p>	Driver		35
		Verify or adapt Driver Settings	35
		cifX Device Driver	37
		netX Driver	37
		Configuring netX Driver	38
	Device Assignment		45
		Scanning for Devices	45
		Scanning for all Devices or for suitable only	47
		Selecting the Device (with or without firmware)	48
		Selecting the Device once more (with Firmware)	49
	Firmware Download		51

Table 12: 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 33.

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 EtherCAT Slave DTM to the EtherCAT 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 EtherCAT 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 EtherCAT Slave DTM is installed on the same PC as the EtherCAT Slave device.
- Use the **netX Driver** to establish an USB, Serial (RS232) or TCP/IP connection from the EtherCAT Slave DTM to the EtherCAT 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 EtherCAT 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 EtherCAT Slave device now is connected to the EtherCAT 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 EtherCAT 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 13: Driver Selection List Parameters

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

- Use the **cifX Device Driver** if the EtherCAT Slave DTM is installed on the same PC as the EtherCAT Slave device.
- Use the **netX Driver** to establish a USB, Serial (RS232) or TCP/IP connection from the EtherCAT Slave DTM to the EtherCAT 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 EtherCAT 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 EtherCAT Slave DTM is installed in the same PC as the EtherCAT 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 14: 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**.

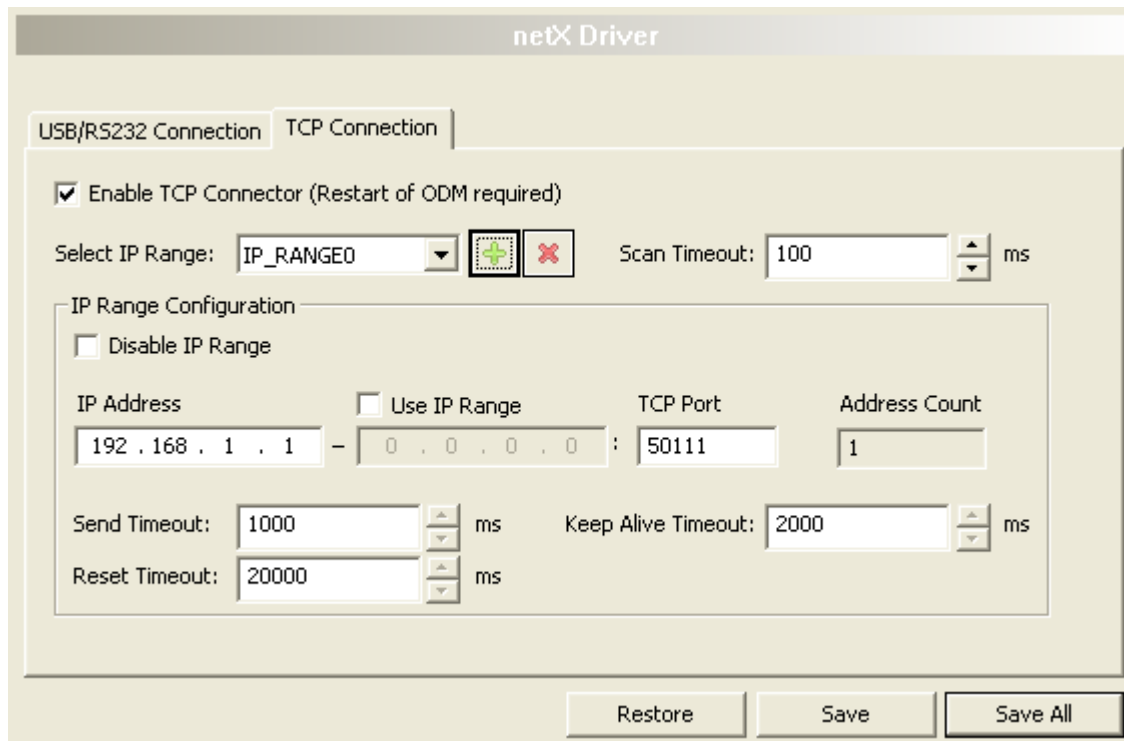





Figure 10: netX Driver > TCP Connection

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 15: 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 EtherCAT Slave device to the EtherCAT Slave DTM by checking the check box. This is essential to establish an online connection from the EtherCAT Slave DTM to the EtherCAT Slave device later, as described in section *Connecting/Disconnecting Device* on page 80.

Therefore in the **Device Assignment** dialog pane you scan for the EtherCAT 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	CIFS 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 EtherCAT 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 EtherCAT 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 16: 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**.

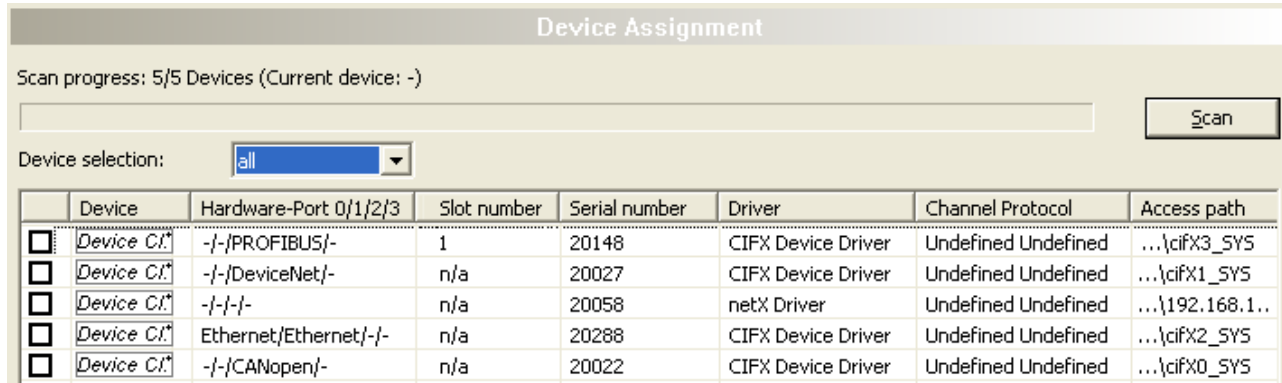


Figure 12: Device Assignment - detected Devices (* The name of the device class is displayed.) Example for Devices without Firmware

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

To select the physical EtherCAT 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 EtherCAT Slave DTM to the EtherCAT 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 to section *Firmware Download* on page 51 or to section *Selecting the Device once more (with Firmware)* on page 49.

4.4.3 Selecting the Device once more (with Firmware)



Note: For repeated download this step is omitted.

To select the EtherCAT 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 EtherCAT 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 EtherCAT Slave DTM to the EtherCAT Slave device, refer to section *Connecting/Disconnecting Device* on page 80.

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 32.

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 17: 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:

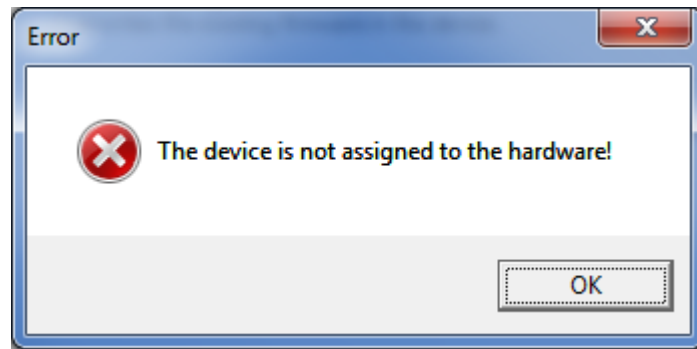


Figure 17: Error Message 'The device is not assigned to the hardware!'

- 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**.

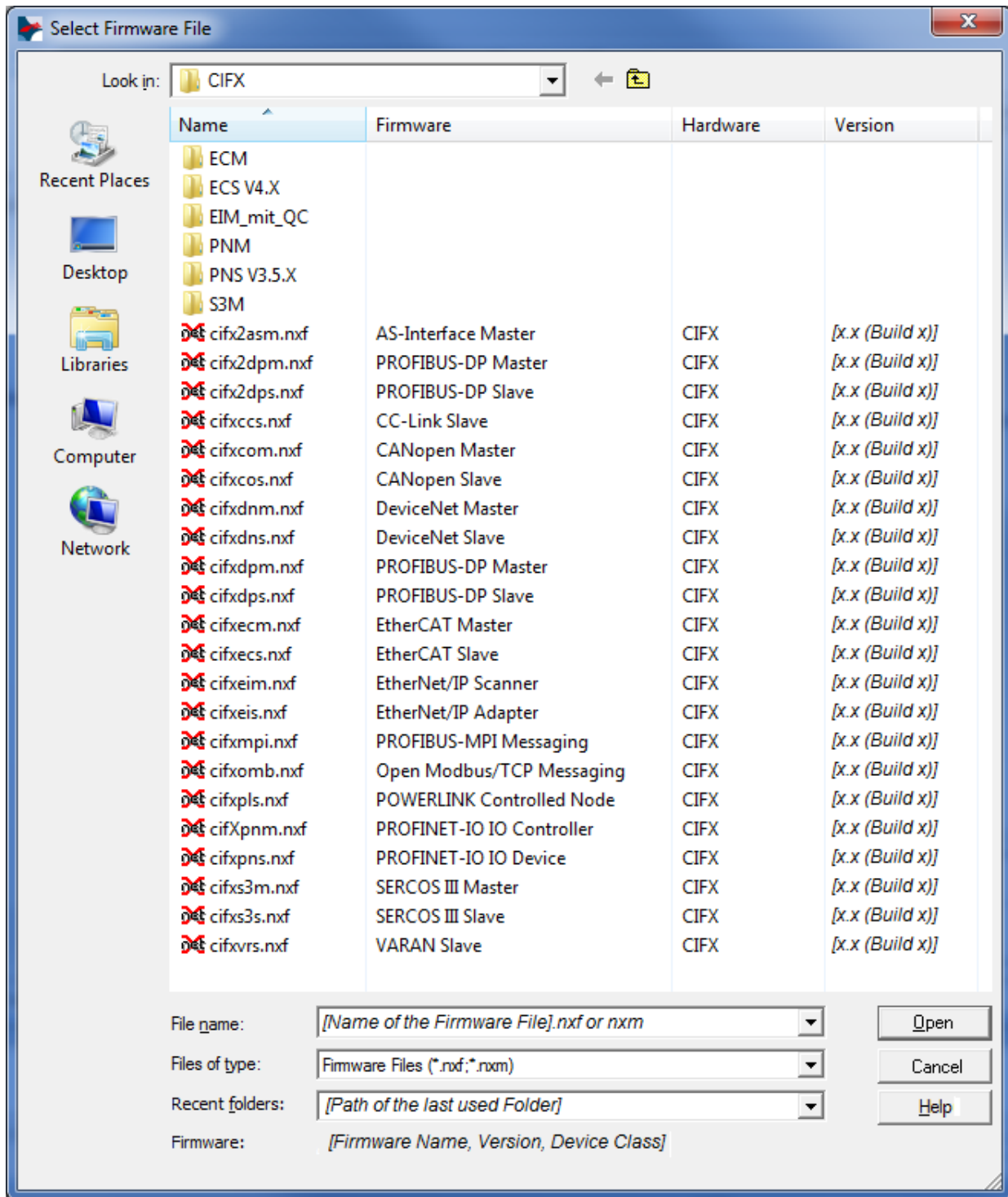


Figure 18: Window 'Select Firmware File' (Example CIFX)

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 style="border: 1px solid #ccc; padding: 5px; width: fit-content;"> 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 18: 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 EtherCAT Master DTM.

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

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

Validation

-  A validation is made, whether the selected firmware file is suitable for the EtherCAT 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.

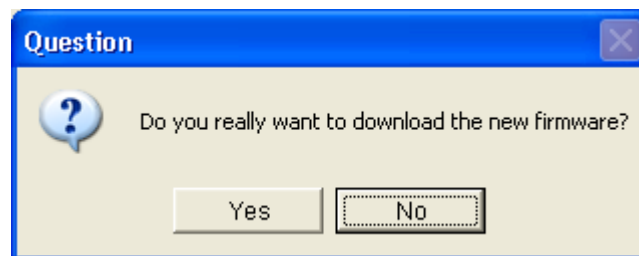


Figure 20: Request - Do you really want to download the firmware?

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.

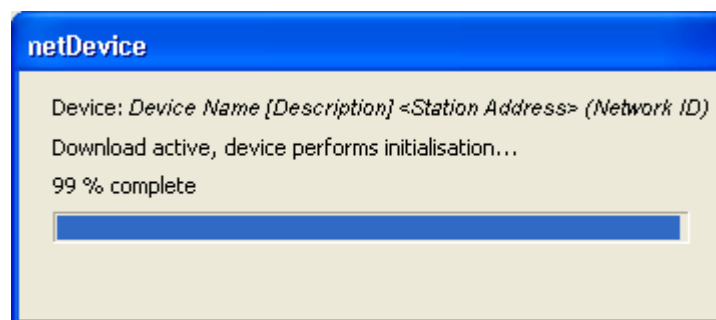


Figure 21: Firmware Download - Progress Bar

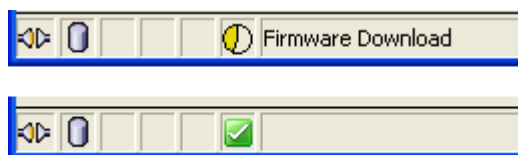


Figure 22: Clock Symbol and Hook Symbol green

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

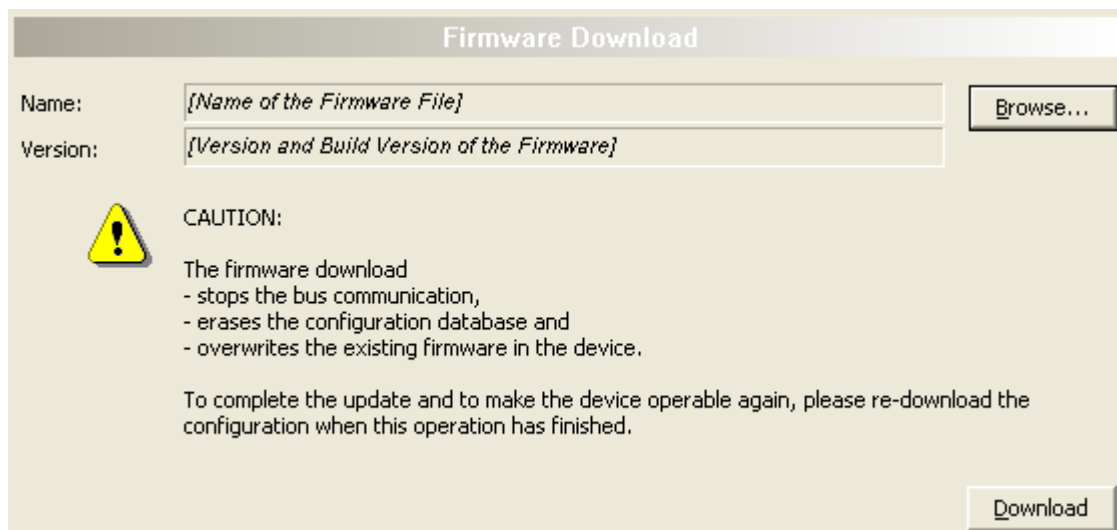


Figure 23: Firmware Download – Download

5 Configuration

5.1 Overview Configuration

5.1.1 General Remarks

The appearance of the EtherCAT Slave DTM depends on the mode of invocation, i.e. whether the EtherCAT Slave DTM has been dragged to the root line (Stand-alone Slave) or to a Master line (Slave connected to a Master).



Take care of the descriptions in the section *Configuration Steps* on page 24.



Note: In order to transfer the configuration to the EtherCAT Slave device, download the data of the configuration parameters in the EtherCAT Slave device. See section *Download Configuration* on page 82.

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

In this case of the tree view looks like:

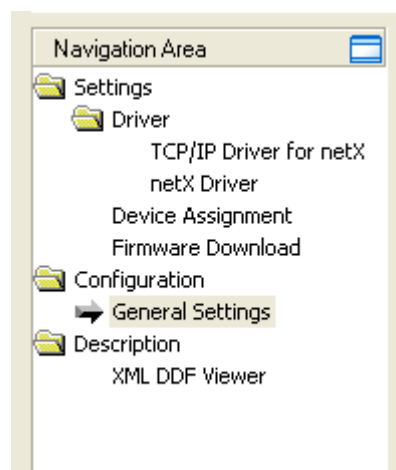


Figure 24: Configuration (Slave DTM at the Root-Line (Stand-Alone Slave))

If the EtherCAT Slave DTM is dragged to the root busline within the network project, at **Configuration** the following panes will be available:

Configuration > General Settings

Dialog Panes “Configuration”

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

Folder Name / Section	Subsection	Page
Configuration	General Settings	63

Table 19: Dialog Panes Configuration

All other descriptions given in this chapter are not applicable if the EtherCAT Slave DTM has been dragged to the root busline in the network project.

5.1.3 Slave DTM at the Master Busline

In this case of the tree view looks like:

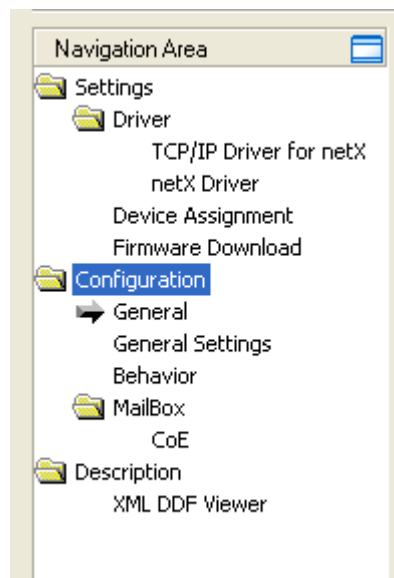


Figure 25: Configuration > General (Slave DTM at the Master busline)

If the EtherCAT Slave DTM is dragged to the Master busline of the EtherCAT Master DTM within the network project, at **Configuration** the following panes will be available:

- General pane
- General Settings pane
- Behavior pane
- Mailbox pane

Dialog Panes “Configuration”

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

Folder Name / Section	Subsection	Page
Configuration	General	62
	General Settings	63
	Behavior	69
	Mailbox	76

Table 20: Dialog Panes Configuration

5.2 Configuring Slave Parameters

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

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

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

If in the network project the EtherCAT Slave DTM is dropped to the root busline:

General Settings

1. Set the Device Settings:
 - Select **Configuration > General Settings** in the navigation area.
 - Under **Bus Startup**: Select option **Automatic** or **Application Controlled**.
 - Under **Watchdog time**: Set **Watchdog time**.

Close Slave DTM Configuration Dialog

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

Configuration Download to the EtherCAT 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 EtherCAT Slave device, download the data of the configuration parameters in the EtherCAT Slave device. See section *Download Configuration* on page 82.

Further Information



For more information refer to the section hereafter.

5.2.2 Slave DTM at the Master Busline

If in the network project the EtherCAT Slave DTM is dropped to the root busline:

General

1. Put in an optional description of the device
 - Select **Configuration > General**. If you want, you can put in a descriptive text about the slave device under **Description**.

General Settings

2. Set the Device Settings:
 - Select **Configuration > General Settings** in the navigation area.
 - Under **Bus Startup**: Select option **Automatic** or **Application Controlled**.
 - Under **Watchdog time**: Set **Watchdog time**.

Behavior

3. Make the settings concerning the behavior of the device:
 - In the navigation area, select **Configuration > Behavior** and then make your settings.

Mailbox >CoE

4. Make settings for CoE (CANopen over EtherCAT):
 - In the navigation area, select **Configuration > Mailbox >CoE** and then make your CoE settings.

Close Slave DTM Configuration Dialog

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

Configuration Download to the EtherCAT 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 EtherCAT Slave device, download the data of the configuration parameters in the EtherCAT Slave device. See section *Download Configuration* on page 82.

Further Information



For more information refer to section *General* on page 62, to section *General Settings* on page 63, to section *Behavior* on page 69 and to section *Mailbox* on page 76 of this document.

5.3 General

The **General** pane shows the **Description** of the EtherCAT Slave.

This pane is only available in case of a Slave DTM at the Master busline.



Note: The **Station Address** is set by the EtherCAT Master, therefore the corresponding data field is not editable.

Figure 26: Configuration > General

Parameter	Meaning	Editable
Description	Symbolic Name of the EtherCAT Slave station	Yes
Device type	Device type as defined in the DDF	No
Device name	Device name as defined in the DDF	No
Product revision	Product revision as defined in the DDF or E ² PROM	No
Physics	EtherCAT Port configuration: available ports and their types, see <i>Table 22: Coding of Parameter "Physics"</i> below.	No
Station Address	Station Address denominates a logical address. The station address of a slave is set in the Master DTM.	No

Table 21: General Page Parameters

Physics in the context of EtherCAT Port configuration is described by two characters indicating the physical interface of the connection. The coding is as follows:

Physics	Port type
K	E-Bus
Y	100Base-TX
F	100Base-FX

Table 22: Coding of Parameter "Physics"

5.4 General Settings

At the **General Settings** pane device related settings 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 82.

Figure 27: General Settings



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

5.4.1 Interface Parameters

5.4.1.1 Bus Startup

This parameter offers the options **Automatic** and **Application Controlled**.

If **Automatic** is selected, the EtherCAT 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.



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

5.4.1.2 Watchdog Time for Application Monitoring



Figure 28: Device Settings > Application Monitoring

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

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

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

Table 23: 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.

5.4.1.3 I/O Data Status

This parameter allows setting of the status of the input or the output data i.e. the I/O Status Enable bit (bit 1 of the system flags) and the I/O Status 8/32Bit bit (bits 2 of the system flags).

For each input and output data the following status information (in Byte) is memorized in the dual-port memory.

Currently the field is grayed out as only the option 'None' is supported.

5.4.2 Ident Parameters

The following table lists all ident parameters of the EtherCAT Stand-alone Slave DTM along with their meaning and their default values:

Parameter	Meaning	Default value	Subindex (within Object 0x1018)
VendorID	Vendor Identification number of the manufacturer of an EtherCAT device.	0xE0000044 (denoting device has been manufactured by Hilscher)	1
Product code	Product code of the device	1	2
Revision	Revision number of the device as specified by the manufacturer	0x20001	3
Serial number	Serial number of the device	0	4

Table 24: Ident Parameters

These parameters are exactly those which are also stored in EtherCATs object dictionary within the object with index 0x1018 thus the table also mentions the corresponding subindex numbers of each parameter.

The values for the parameters VendorID, Product code and Revision can be taken from the XML file which is bundled with the particular firmware. The following default value sets for the identification data have been defined:

Firmware	Vendor Id	Product Code	Revision Number
cifX	0xE0000044	0x00000001	0x00020001
comX	0xE0000044	0x00000003	0x00020001
netIC	0xE0000044	0x0000000B	0x00000000

Table 25: Values for the Ident Parameters VendorId, ProductCode and RevisionNumber

5.4.3 Data Parameters

The following table shows the data parameters of the general Settings.




Parameter	Meaning	Default value	Maximum value
Input Data Bytes	Process Data Input Size Number of data bytes used for input	200 Byte	256 Byte
Output Data Bytes	Process Data Output Size Number of data bytes used for output	200 Byte	256 Byte
Sync impulse length	Sync impulse length (in units of 10 ns)	100 (= 1000 ns)	65535 (=655350 ns)

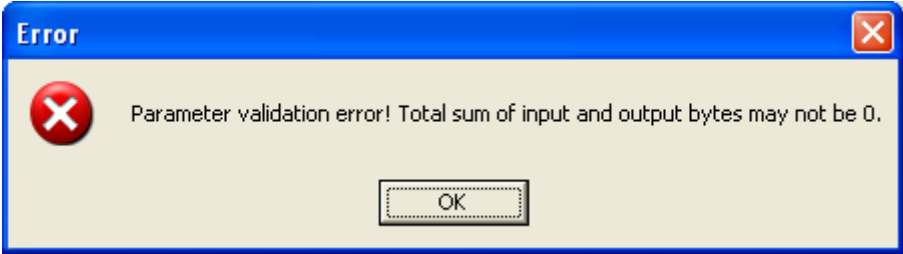
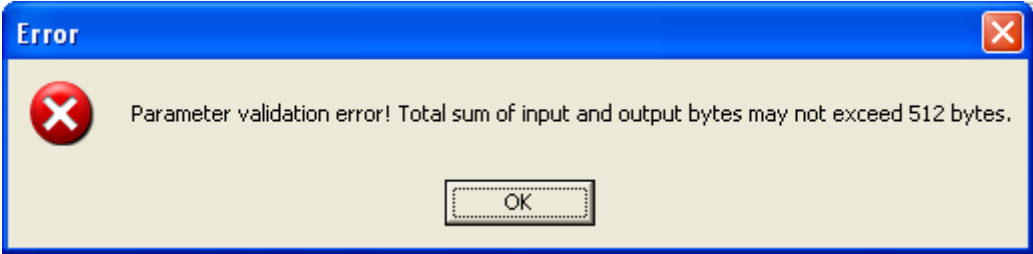

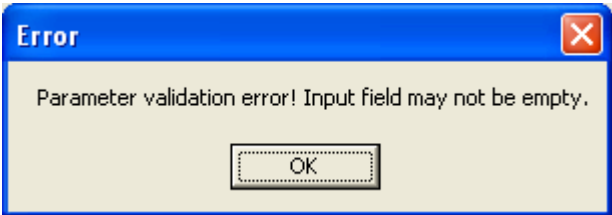
Table 26: Data Parameters

5.4.4 Messages

5.4.4.1 Errors

The following table provides an overview which error situations might occur in the "General Settings" pane.

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	This error message appears in case either a value below 20 but unequal 0 or a value exceeding 65535 is put in for the watchdog time in the configuration pane.
Action	Put in a correct the value for the watchdog time (between 20 and 65535) or switch the watchdog feature off (in order to do so, set the value of the watchdog time equal to 0)!
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	No value at all has been put in for the watchdog time in the configuration pane.
Action	Put in a correct the value for the watchdog time (between 20 and 65535) or switch the watchdog feature off (in order to do so, set the value of the watchdog time equal to 0)!
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The specified value for the length of either input or output data exceeds the upper limit of 256 bytes.
Action	Specify a lower value either for the input data length or for the output data length!
Problem	The error message

	 <p>appears.</p>
Explanation	The specified values of input data length and output data length may not be 0 at the same time.
Action	Specify at least one non-zero value either for input data length or output data length.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The sum of the specified values of input data length and output data length may exceed 512 bytes.
Action	Specify a lower value for at least one of these values so that the sum of both values does not exceed the 512 bytes limit.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	In an input field requiring a hexadecimal value, you tried to put in a character which is neither a digit nor any of the letters ("A,B,C,D,E,F"), for instance another letter.
Action	Correct your input accordingly!
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	An input field (either the input data length or the output data length) is empty.


Action	Check for the empty field. Then specify a valid value there.
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The specified value for the Sync Impulse Length exceeds the upper limit of 65535 bytes.
Action	Specify a lower value either for the Sync Impulse Length!

Table 27: Possible Error Messages issued at General Settings Pane

5.4.4.2 Warnings

The following table provides informs about which warnings might appear in the configuration pane.

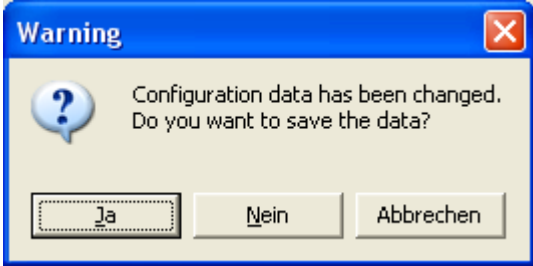
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	You have changed the configuration data.
Action	If you want to store the configuration data permanently, click at <i>Yes</i> otherwise at <i>No</i> or return to preceding screen with <i>Cancel</i> .

Table 28: Possible Warning Messages issued at General Settings Pane

5.5 Behavior

At the page **Behavior**, the parameters of

- the state machine timeout values
- the device checkup,
- the process data
- and the watchdog timer.

are set and displayed.

This pane is only available in case of a Slave DTM at the Master busline.

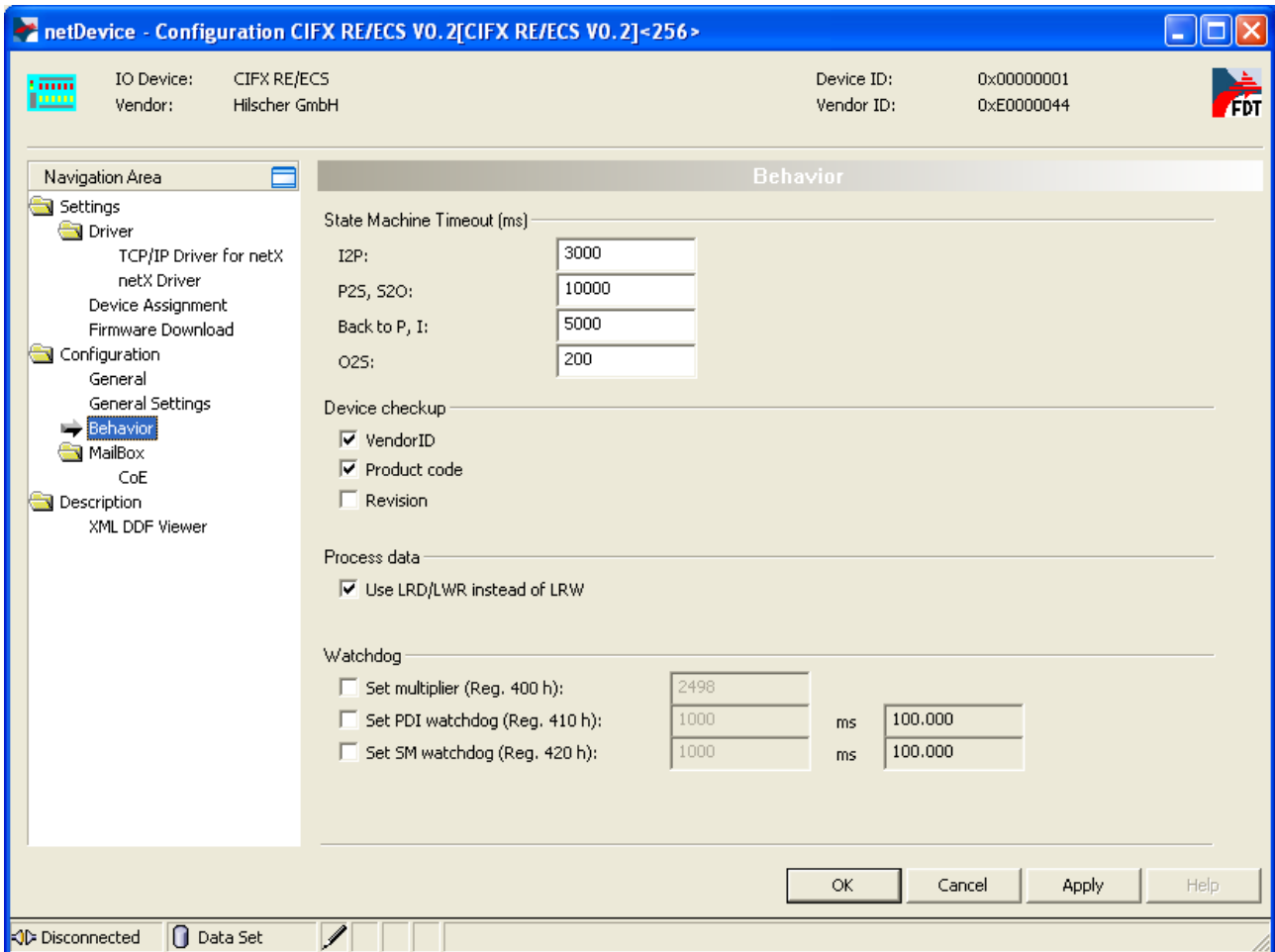


Figure 29: Configuration > Behavior

5.5.1 State Machine Timeout

For various transitions between states of the EtherCAT slave state machine the associated timeout values can be configured separately in the state machine timeout section of the 'Behavior' dialog:

- I2P

This value applies to the transition from *Init* state to *Pre-Operational* state

- P2S, S2O

This value applies to the transition from *Pre-Operational* state to *Safe-Operational* state and from *Safe-Operational* state to *Operational* state.

- Back to P, I

This value applies to the transition from any higher state back to *Pre-Operational* state or *Init* state.

- O2S

This value applies to the transition from *Operational* state to *Safe-Operational* state.



Note: These timeout values are specified in units of milliseconds.

Behavior	
State Machine Timeout (ms)	
I2P:	3000
P2S, S2O:	10000
Back to P, I:	5000
O2S:	200

Figure 30: Configuration > Behavior > State Machine Timeout - Configuration

5.5.2 Device Check-up

The *device check-up* part of the **Behavior** dialog looks like:

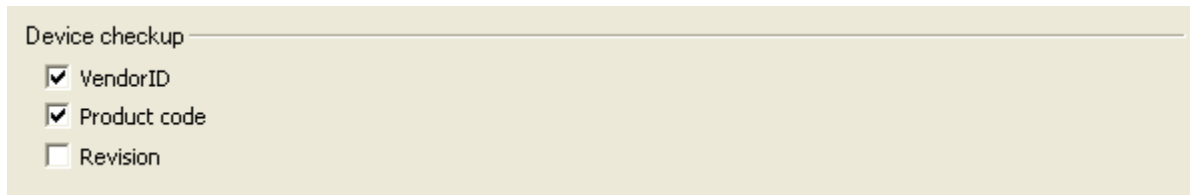


Figure 31: Configuration > Behavior > Device Check

The following table shows which items identifying the EtherCAT device can optionally be verified during device check-up if marked in the dialog accordingly.

Parameter	Meaning
VendorID	Device's vendor ID (DDF or stored device-internally)
Product code	Device's product code (DDF or stored device-internally)
Revision	Device's revision (DDF or stored device-internally)

Table 29: Parameters Behavior > Device checkup

A verification of the serial number is not available here.

The values within the DDF file are verified against the corresponding information stored in the device (for example, within an E²PROM circuit), if the according check box is marked.

5.5.3 Process Data

EtherCAT supplies different command sets for reading and writing:

- a combined read/write command (LRW)
- separate read and write commands (LRD/LWR)

This option allows to choose between these alternatives:

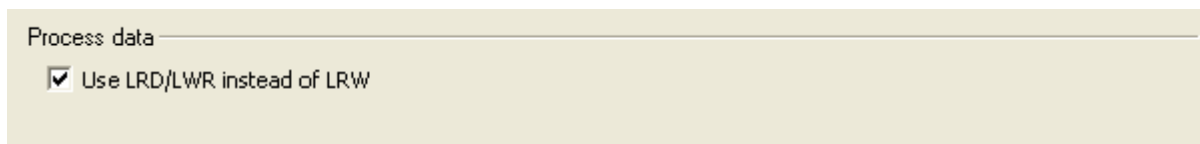


Figure 32: Configuration > Behavior > Process data

Parameter	Meaning
Use LRD/LWR instead of LRW	Logical read and write operation: If marked, separate EtherCAT read (LRD) and write (LWR) commands will be used. Otherwise, a combined EtherCAT read and write (LRW) command will be used.

Table 30: Parameters Behavior > Process data

For more information on EtherCAT read and write commands see the *EtherCAT Communication Specification*, version 1.0, section 6.2 “EtherCAT Services”, page 43.

5.5.4 Watchdog

Both the entire PDI (Process Data Interface) and all sync managers (separately) are monitored by watchdog timers.

The following rules apply for resetting the watchdog timers:

- Each access from the application controller to the EtherCAT Slave controller resets the watchdog timer of the Process Data Interface.
- Each write access to the associated memory area of a sync manager resets the sync manager's watchdog timer.

The watchdog timeout values can be calculated using the formula given below from an individually configurable value and a common multiplier.

The "Watchdog" part of the "Behavior" dialog allows specifying the multiplier and the individual values for PDI watchdog and sync manager watchdogs.

Watchdog

☐ Set multiplier (Reg. 400 h): 2498

☐ Set PDI watchdog (Reg. 410 h): 1000 ms 100.000

☐ Set SM watchdog (Reg. 420 h): 1000 ms 100.000

Figure 33: Configuration > Behavior > Watchdog

Parameter	Meaning
Set multiplier	Watchdog multiplier, content of the register 0x400
Set PDI watchdog	PDI watchdog, see note below
Set SM watchdog	SM watchdog, see note below
Include WC state Bit(s)	If this check box is marked, an input variable is added to the slave device, that shows the working counter state of the EtherCAT slave device.

Table 31: Parameters Configuration > Behavior > Watchdog



Note: The **PDI & SM** watchdog timeout values are calculated as follows.

PDI watchdog timeout =

$([\text{value of register 0x400}] + 2) * 40 * [\text{value of register 0x 410}]$

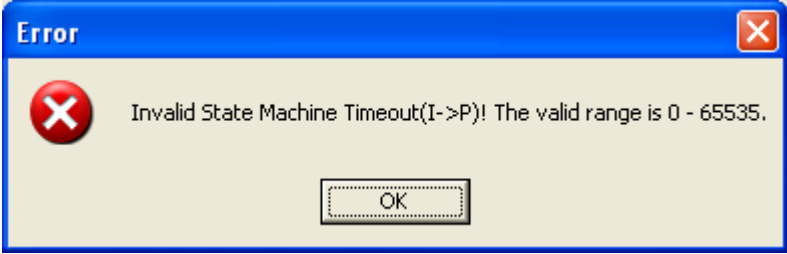
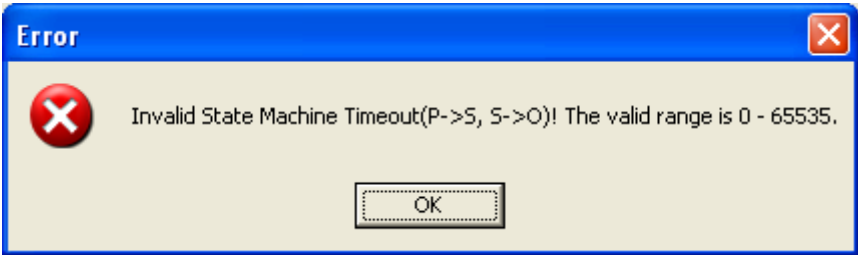
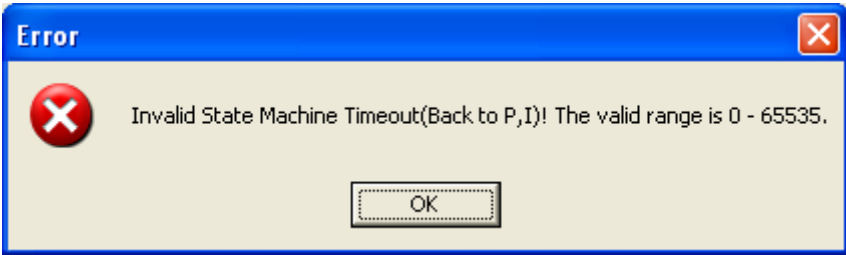
SM watchdog timeout =

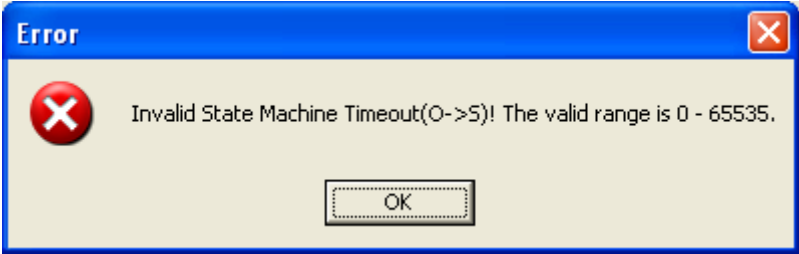



$([\text{value of register 0x 400}] + 2) * 40 * [\text{value of register 0x 420}]$

5.5.5 Messages

5.5.5.1 Errors

The following table provides an overview which error situations might occur in the "Behavior" pane.

Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The specified value for the State Machine Timeout (I->P) exceeds the upper limit of 65535 bytes.
Action	Specify a lower value than 65535 for the State Machine Timeout (I->P)!
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The specified value for the State Machine Timeout (P->S,S->O) exceeds the upper limit of 65535 bytes.
Action	Specify a lower value than 65535 for the State Machine Timeout (P->S,S->O)!
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The specified value for the State Machine Timeout (Back to P,I) exceeds the upper limit of 65535 bytes.
Action	Specify a lower value than 65535 for the State Machine Timeout (Back to P,I)!
Problem	The error message

	 <p>appears.</p>
Explanation	The specified value for the State Machine Timeout (O->S) exceeds the upper limit of 65535 bytes.
Action	Specify a lower value than 65535 for the State Machine Timeout (O->S)!
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The specified value for the Multiplier (Register 0x400) exceeds the upper limit of 65535 bytes.
Action	Specify a lower value than 65535 for the Multiplier (Register 0x400)!
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The specified value for the PDI Watchdog (Register 0x410) exceeds the upper limit of 65535 bytes.
Action	Specify a lower value than 65535 for the PDI Watchdog (Register 0x410)!
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	The specified value for the SM Watchdog (Register 0x420) exceeds the upper limit of 65535 bytes.

Action	Specify a lower value than 65535 for the SM Watchdog (Register 0x420)!
--------	------------------------------------------------------------------------

Table 32: Possible Error Messages issued at Behavior Pane

5.5.5.2 Warnings

The following table provides informs about which warnings might appear in the configuration pane.

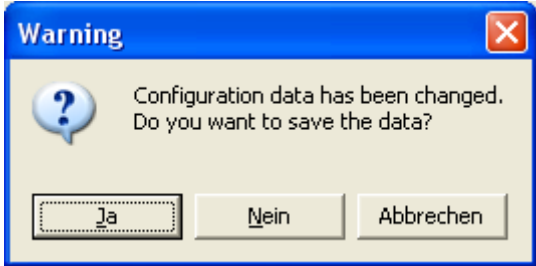
Problem	<p>The error message</p>  <p>appears.</p>
Explanation	You have changed the configuration data.
Action	If you want to store the configuration data permanently, click at Yes otherwise at No or return to preceding screen with Cancel.

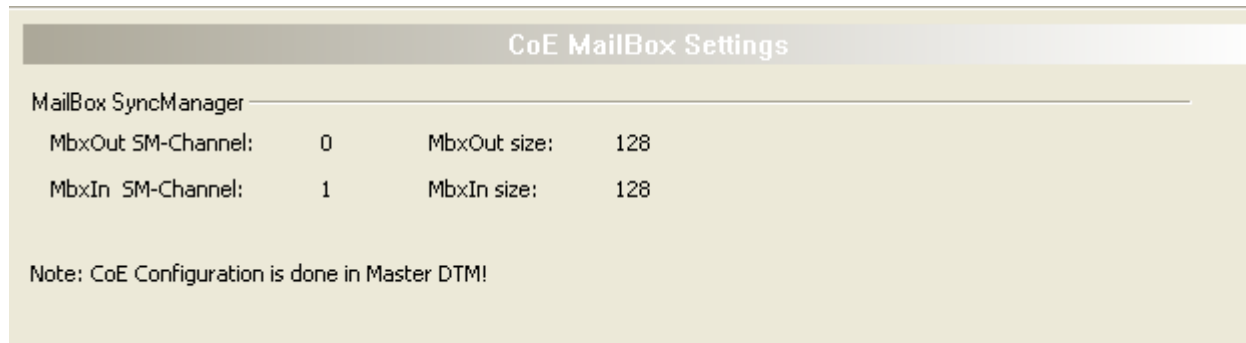
Table 33: Possible Warning Messages issued at Behavior Pane

5.6 Mailbox

This pane is only available in case of a Slave DTM at the Master busline. It has one option: CoE.

5.6.1 CoE

For slave devices supporting the CoE MailBox, the following dialog page is additionally displayed:



CoE MailBox Settings			
MailBox SyncManager			
MbxOut SM-Channel:	0	MbxOut size:	128
MbxIn SM-Channel:	1	MbxIn size:	128
Note: CoE Configuration is done in Master DTM!			

Figure 34: Configuration > Mailbox > CoE Mailbox Settings

The dialog page provides the following information:

- The channel number of the sync manager (for mailbox input and output)
- The configured mailbox size (this applies both for the input mailbox and for the output) mailbox

The complete MailBox configuration for each slave with MailBox support is done in the EtherCAT Master-DTM.

6 Description

6.1 Overview Description

The **Description** pages contain the following information:

- XML Viewer page: the devices XML file content in HTML style.

Description Dialog Panes

The table below informs about the contents of the **Description** dialog page:

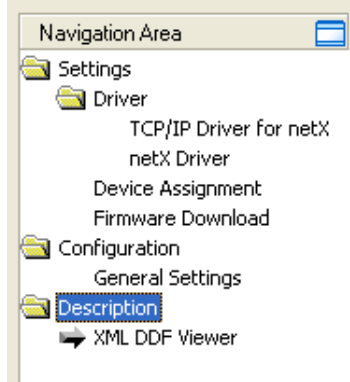
EtherCAT Slave-DTM	Folder Name / Section	Page
 <p>Navigation Area – Description</p>	XML DDF Viewer	77

Table 34: Descriptions of the Description Pages

6.2 XML DDF Viewer

The **XML DDF Viewer** displays the content of the DDF file of the device which is stored in an XML format..

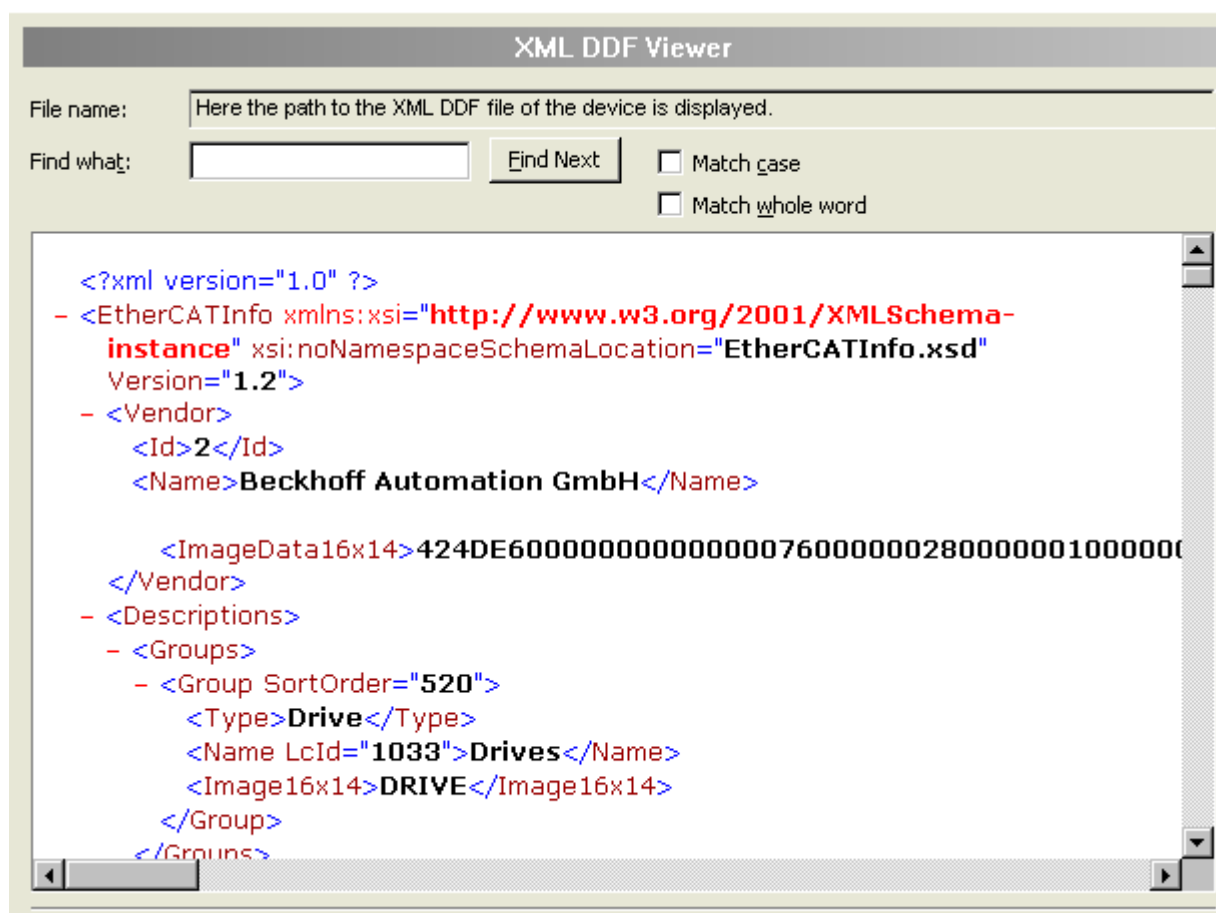


Figure 35: XML DDF Viewer

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

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

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

Table 35: Device Description – XML DDF Viewerr

The **XML DDF 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 **XML DDF Viewer** by typing **Ctrl-F** on the keyboard.

7 Online Functions

7.1 Connecting/Disconnecting Device



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

Connecting Device

The following steps are needed to establish a connection from the EtherCAT Slave DTM to a EtherCAT 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 30.

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 32.

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

↗ The EtherCAT Slave device now is connected to the EtherCAT 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 EtherCAT Slave device to a EtherCAT 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 EtherCAT 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 EtherCAT 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 EtherCAT Slave device an online connection from the EtherCAT Slave DTM to the EtherCAT Slave device is required.



Further information can be found in the *Connecting/Disconnecting Device* section on page 80.

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 EtherCAT 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?'

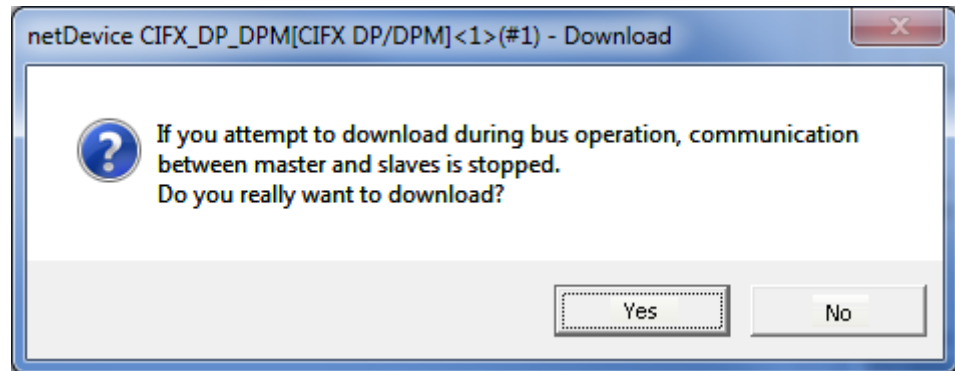


Figure 36: netDevice Message: Download



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:

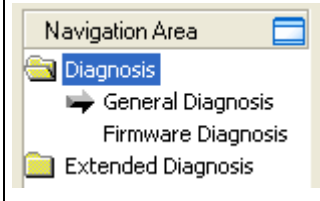
EtherCAT Slave DTM	Folder Name / Section	Manual Page
 Navigation Area - Diagnosis	General Diagnosis	85
	Firmware Diagnosis	87

Table 36: Descriptions of the Diagnosis Panes



Online Connection to the Device

Note: Accessing the **Diagnosis** panes of the EtherCAT Slave DTM requires an online connection from the EtherCAT Slave DTM to the EtherCAT Slave device. For further information refer to section *Connecting/Disconnecting Device* on page 80.

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.

a

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 88.

8.2 General Diagnosis

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

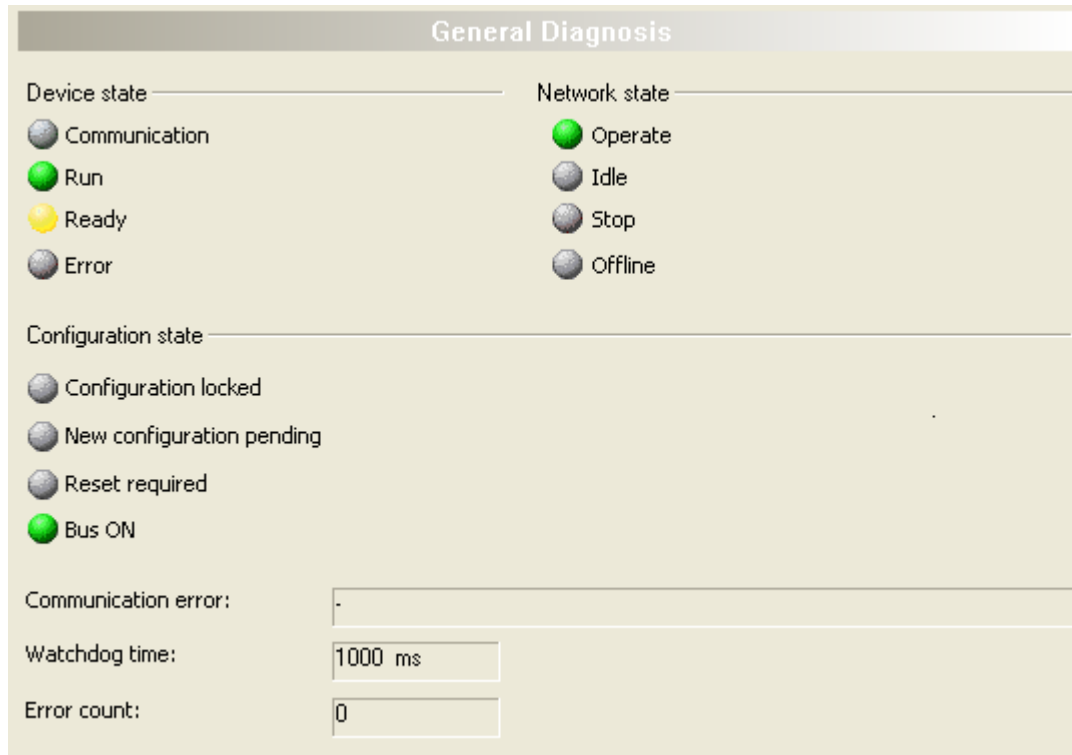














Figure 37: General Diagnosis

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













LED	Meaning	Color	State
Stop	Shows whether the EtherCAT device is in Stop state: There is no cyclic data exchange at the EtherCAT network. The EtherCAT 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 EtherCAT 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 EtherCAT 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 EtherCAT 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 EtherCAT 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 37: 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 38: Parameter General Diagnosis

8.3 Firmware Diagnosis

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

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

Task	Name of task	Version	Prio	Description	State
0	RX_IDLE	1.0	63	RX IDLE Task.	Task Status ok. (0x00000000)
1	RX_TIMER	1.0	1	rcX Timer.	Task Status ok. (0x00000000)
2	RX_SYSTEM	1.16	8	Middleware System Task.	Task Status ok. (0x00000000)
3	DPM_COMO_SMBX	1.0	50	TLR-Router DPM.	Task Status ok. (0x00000000)
4	DPM_COMO_RMBX	1.0	51	TLR-Router DPM.	Task Status ok. (0x00000000)
5	ECAT_SDO	2.5	31	EtherCAT CoE SDO Task.	Task Status ok. (0x00000000)
6	ECAT_COE	2.5	32	EtherCAT CoE Task.	Task Status ok. (0x00000000)
7	ECAT_ESM	2.5	35	EtherCAT ESM Task.	Slave is currently in state INIT. (0x00200000)
8	ECAT_MBX	2.5	34	EtherCAT Mailbox Task.	Task is currently disabled. (0x00000001)
9	ECATDPM	2.5	36	EtherCAT Slave DPM Task.	Task Status ok. (0x00000000)
10	MARSHALLER	2.0	54	Marshaller: Main Task.	Task Status ok. (0x00000000)
11	PACKET_ROUTER	2.0	49	Marshaller: Packet Router Task.	Task Status ok. (0x00000000)

Figure 38: Firmware Diagnosis (Example)

Task Information:

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

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

Table 39: Description Table Task Information

9 Extended Diagnosis

9.1 Overview Extended Diagnosis

The **Extended Diagnosis** of the EtherCAT 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:

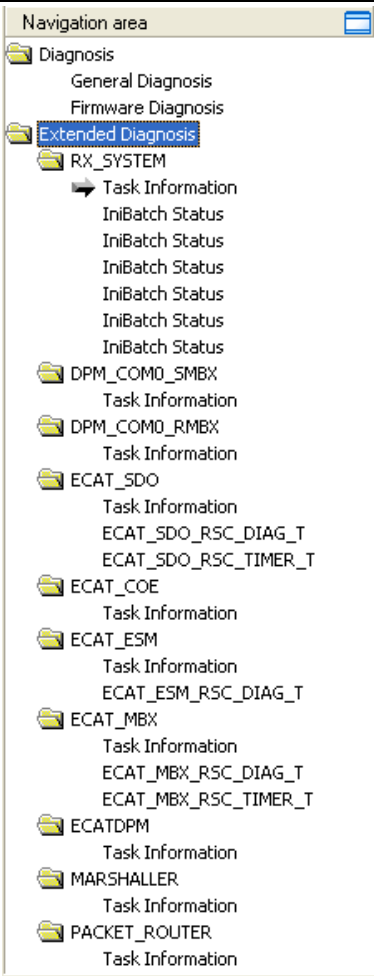
EtherCAT Slave DTM	Folder Name in the Navigation Area	Subsection	Page
	RX-SYSTEM	Task Information	89
		IniBatch Status	90
	DPM_COMO_SMBX	Task Information	89
	DPM_COMO_RMBX	Task Information	89
	ECAT_SDO	Task Information	89
		ECAT_SDO_RSC_DIAG_T	91
		ECAT_SDO_RSC_TIMER_T	92
	ECAT_COE	Task Information	89
	ECAT_ESM	Task Information	89
		ECAT_ESM_RSC_DIAG_T	93
	ECAT_MBX	Task Information	89
		ECAT_MBX_RSC_DIAG_T	94
		ECAT_MBX_RSC_TIMER_T	95
	ECAT_DPM	Task Information	89
	MARSHALLER	Task Information	89
	PACKET_ROUTER	Task Information	89
Navigation Area - Extended Diagnosis			

Table 40: Descriptions of the Dialog Panes Extended Diagnosis

Online Connection to the Device



Note: Accessing the **Extended Diagnosis** dialog panes of the EtherCAT Slave DTM requires an online connection from the EtherCAT Slave DTM to the EtherCAT Slave device. For further information refer to section *Connecting/Disconnecting Device* on page 80.

9.2 Task Information

Task Information	
Task states	
Name	Value
Identifier	
Major version	
Minor version	
Maximum Packet size	
Default Que	
Unique identifier	
Init result	

Figure 39: 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 41: 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 40: 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 42: 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 ECAT_SDO_RSC_DIAG_T

ECAT_SDO_RSC_DIAG_T	
Task states	
Name	Value
ulCompletedDownloadsServer	0
ulCompletedUploadsServer	0
ulCompletedDownloadsClient	0
ulCompletedUploadsClient	0
ulAbortedDownloadsServer	0
ulAbortedUploadsServer	0
ulAbortedDownloadsClient	0
ulAbortedUploadsClient	0
ulServerTimeouts	0
ulClientTimeouts	0

Figure 41: Extended Diagnosis > [Folder Name] > ECAT_SDO_RSC_DIAG_T Example Display

This window lists the diagnostic counters of the ECAT_SDO_RSC_DIAG_T layer. It shows in particular, which services are currently executed. (The services of the packets are described within the EtherCAT-Slave Protocol API Manual [2].)

Name	Description
ulCompletedDownloadsServer	Counter for Completed Downloads at the Server
ulCompletedUploadsServer	Counter for Completed Uploads at the Server
ulCompletedDownloadsClient	Counter for Completed Downloads at the Client
ulCompletedUploadsClient	Counter for Completed Uploads at the Client
ulAbortedDownloadsServer	Counter for Aborted Downloads at the Server
ulAbortedUploadsServer	Counter for Aborted Uploads at the Server
ulAbortedDownloadsClient	Counter for Aborted Downloads at the Client
ulAbortedUploadsClient	Counter for Aborted Uploads at the Client
ulServerTimeouts	Counter for Server Timeouts
ulClientTimeouts	Counter for Client Timeouts

Table 43: Extended Diagnosis > [Folder Name] > ECAT_SDO_RSC_DIAG_T

9.5 ECAT_SDO_RSC_TIMER_T

ECAT_SDO_RSC_TIMER_T	
Task states	
Name	Value
ulTimerCnt	8110100
ulTimerGran	100
ulSDOClientTimeout	1000
ulSDOServerTimeout	1000

Figure 42: Extended Diagnosis > [Folder Name] > ECAT_SDO_RSC_TIMER_T Example Display

Name	Description
ulTimerCnt	Timer count
ulTimerGran	Timer granularity
ulSDOClientTimeout	SDO Client Timeout
ulSDOServerTimeout	SDO Server Timeout

Table 44: Extended Diagnosis > [Folder Name] > ECAT_SDO_RSC_TIMER_T

9.7 ECAT_MBX_RSC_DIAG_T

ECAT_MBX_RSC_DIAG_T	
Task states	
Name	Value
fGotPacketWaiting	0
fActive	0
ulMessagesReceived	0
ulMessagesSent	0
ulMsgTooLong	0

Figure 44: Extended Diagnosis > [Folder Name] > ECAT_ESM_RSC_DIAG_T Example Display

This window lists the diagnostic counters of the ECAT_MBX_RSC_DIAG_T layer. It shows in particular, which services are currently executed. (The services of the packets are described within the EtherCAT-Slave Protocol API Manual [2].)

Name	Description
fGotPacketWaiting	If TRUE, a packet is still waiting
fActive	If TRUE, the ECAT_MBX task is active
ulMessagesReceived	Counter for number of received messages
ulMessagesSent	Counter for number of sent messages
ulMsgTooLong	Counter for number of too long messages

Table 46: Extended Diagnosis > [Folder Name] > ECAT_MBX_RSC_DIAG_T

9.8 ECAT_MBX_RSC_TIMER_T

ECAT_MBX_RSC_TIMER_T	
Task states	
Name	Value
ulTimerGran	50
ulTimerCnt	0
ulLowTrafficTimeout	100

Figure 45: Extended Diagnosis > [Folder Name] > ECAT_MBX_RSC_TIMER_T Example Display

Name	Description
ulTimerGran	Timer granularity
ulTimerCnt	Timer count
ulLowtrafficTimeout	Low traffic timeout

Table 47: Extended Diagnosis > [Folder Name] > ECAT_MBX_RSC_TIMER_T

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:

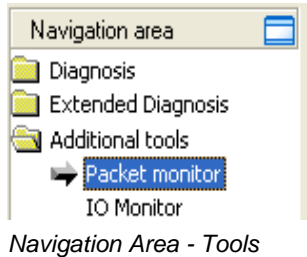
EtherCAT Slave DTM	Folder Name / Section	Manual Page
	Packet Monitor	97
	IO Monitor	100

Table 48: Descriptions of the Diagnosis Panes

Online Connection to the Device



Note: Accessing the **Tools** dialog panes of the EtherCAT Slave DTM requires an online connection from the EtherCAT Slave DTM to the EtherCAT Slave device. For further information refer to section *Connecting/Disconnecting Device* on page 80.

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 46: 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 47: 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 49: 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 48: 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 50: 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 49: 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 bis 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 bis 0x800D0013
	<i>CIFX API Transport Header State Error:</i> 0x800E0001 bis 0x800E000B
DBM	<i>ODM Error Codes:</i> 0xC004C810 to 0xC004C878

Table 51: 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 52: 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 53: 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 54: 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 55: 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 56: 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 57: 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 58: 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 59: 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 60: 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 61: 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 62: CIFS API Transport Error Codes

11.6.2 CIFS API Transport Header State Error Codes

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

Table 63: 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
CDBM_E_WRITE_NO_PARRAY	0XC004C82E	The VARIANT contains no valid [parray] element

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

ODM Error Codes DBM V4		
Error Code (Definition)	Value	Description
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
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

ODM Error Codes DBM V4		
Error Code (Definition)	Value	Description
CDBM_E_DATA_UNAVAILABLE	0XC004C85F	No data available
CDBM_E_CANT_CONVERT_INT	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
CDBM_E_KEY_INVALID	0XC004C878	The KEY is invalid for this operation

Table 64: 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 EtherCAT 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 65: 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>General Settings</i>	D	D	X	X	X
<i>Behavior</i>	D	D	X	X	X
<i>Mailbox</i>	D	D	X	X	X

Table 66: 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>
- [2] EtherCAT Communication Specification, August 2007
- [3] EtherCAT Slave Protocol API Manual, Revision 3 (V4), Hilscher GmbH 2013
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12.3 List of Figures

Figure 1: Dialog Structure of the EtherCAT Slave DTM	15
Figure 2: Navigation Area	16
Figure 3: Status Bar – Status Fields 1 to 6	19
Figure 4: Status Bar Display Examples	19
Figure 5: Default Driver ‚cifX Device Driver’ for PC cards cifX	35
Figure 6: Default Driver ‚cifX Device Driver’ for PC cards cifX (example)	35
Figure 7: Default Driver ‚netX Driver’ for Hilscher devices except for PC cards cifX (example)	35
Figure 8: Manual Selection of multiple drivers (Example)	36
Figure 9: netX Driver > USB/RS232 Connection	40
Figure 10: netX Driver > TCP Connection	43
Figure 11: Device Assignment - detected Devices (* The name of the device class is displayed.) – Example for a device without firmware	45
Figure 12: Device Assignment - detected Devices (* The name of the device class is displayed.) Example for Devices without Firmware	47
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	48
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	49
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	50
Figure 16: Firmware Download	Fehler! Textmarke nicht definiert.
Figure 17: Error Message ‘The device is not assigned to the hardware!’	Fehler! Textmarke nicht definiert.
Figure 18: Window ‘Select Firmware File’ (Example CIFX)	Fehler! Textmarke nicht definiert.
Figure 19: Request Select Firmware File - Example Invalid Firmware	Fehler! Textmarke nicht definiert.
Figure 20: Request - Do you really want to download the firmware?	Fehler! Textmarke nicht definiert.
Figure 21: Firmware Download - Progress Bar	Fehler! Textmarke nicht definiert.
Figure 22: Clock Symbol and Hook Symbol green	Fehler! Textmarke nicht definiert.
Figure 23: Firmware Download – Download	Fehler! Textmarke nicht definiert.
Figure 24: Configuration (Slave DTM at the Root-Line (Stand-Alone Slave))	58
Figure 25: Configuration > General (Slave DTM at the Master busline)	59
Figure 26: Configuration > General	62
Figure 27: General Settings	63
Figure 28: Device Settings > Application Monitoring	64
Figure 29: Configuration > Behavior	69
Figure 30: Configuration > Behavior > State Machine Timeout - Configuration	70
Figure 31: Configuration > Behavior > Device Check	71
Figure 32: Configuration > Behavior > Process data	71
Figure 33: Configuration > Behavior > Watchdog	72
Figure 34: Configuration > Mailbox > CoE Mailbox Settings	76
Figure 35: XML DDF Viewer	78
Figure 36: netDevice Message: Download	Fehler! Textmarke nicht definiert.

Figure 37: General Diagnosis	85
Figure 38: Firmware Diagnosis (Example)	87
Figure 39: Extended Diagnosis > [Folder Name] > Task Information Example Display	89
Figure 40: Extended Diagnosis > [Folder Name] > IniBatch Status Example Display	90
Figure 41: Extended Diagnosis > [Folder Name] > ECAT_SDO_RSC_DIAG_T Example Display	91
Figure 42: Extended Diagnosis > [Folder Name] > ECAT_SDO_RSC_TIMER_T Example Display	92
Figure 43: Extended Diagnosis > [Folder Name] > ECAT_ESM_RSC_DIAG_T Example Display	93
Figure 44: Extended Diagnosis > [Folder Name] > ECAT_ESM_RSC_DIAG_T Example Display	94
Figure 45: Extended Diagnosis > [Folder Name] > ECAT_MBX_RSC_TIMER_T Example Display	95
Figure 46: Packet Monitor	97
Figure 47: Send > Packet Header and Send Data	98
Figure 48: Packet Header and Receive Data	99
Figure 49: IO Monitor	100

12.4 List of Tables

Table 1: Descriptions Dialog Panes	7
Table 2: List of Revisions	7
Table 3: General Device Information	16
Table 4: Overview Dialog Panes	17
Table 5: OK, Cancel, Apply and Help	18
Table 6: Selecting, inserting, deleting Table Line	18
Table 7: Status Bar Icons [1]	19
Table 8: Signal Words in Safety Messages on Personal Injury	23
Table 9: Signal Words in Safety Messages on Property Damage	23
Table 10: Getting Started - Configuration Steps (Slave DTM at the Root-Line (Stand-Alone Slave))	26
Table 11: Getting Started - Configuration Steps (Slave DTM at the Master busline)	29
Table 12: Descriptions of the Dialog Panes Settings	32
Table 13: Driver Selection List Parameters	35
Table 14: Parameters netX Driver > USB/RS232 Connection	41
Table 15: Parameters netX Driver > TCP Connection	44
Table 16: Parameters of the Device Assignment	46
Table 17: Parameter Firmware Download	Fehler! Textmarke nicht definiert.
Table 18: Parameters Select Firmware File	Fehler! Textmarke nicht definiert.
Table 19: Dialog Panes Configuration	58
Table 20: Dialog Panes Configuration	59
Table 21: General Page Parameters	62
Table 22: Coding of Parameter "Physics"	62
Table 23: Range of Value / Value for the Watchdog time	64
Table 24: Ident Parameters	65
Table 25: Values for the Ident Parameters VendorId, ProductCode and RevisionNumber	65
Table 26: Data Parameters	65
Table 27: Possible Error Messages issued at General Settings Pane	68
Table 28: Possible Warning Messages issued at General Settings Pane	68
Table 29: Parameters Behavior > Device checkup	71
Table 30: Parameters Behavior > Process data	71
Table 31: Parameters Configuration > Behavior > Watchdog	72
Table 32: Possible Error Messages issued at Behavior Pane	75
Table 33: Possible Warning Messages issued at Behavior Pane	75
Table 34: Descriptions of the Description Pages	77
Table 35: Device Description – XML DDF Viewerr	78
Table 36: Descriptions of the Diagnosis Panes	84
Table 37: Indication General Diagnosis	86

Table 38: Parameter General Diagnosis	86
Table 39: Description Table Task Information	87
Table 40: Descriptions of the Dialog Panes Extended Diagnosis	88
Table 41: Extended Diagnosis > [Folder Name] > Task Information	89
Table 42: Extended Diagnosis > [Folder Name] > IniBatch Status	90
Table 43: Extended Diagnosis > [Folder Name] > ECAT_SDO_RSC_DIAG_T	91
Table 44: Extended Diagnosis > [Folder Name] > ECAT_SDO_RSC_TIMER_T	92
Table 45: Extended Diagnosis > [Folder Name] > ECAT_ESM_RSC_DIAG_T	93
Table 46: Extended Diagnosis > [Folder Name] > ECAT_MBX_RSC_DIAG_T	94
Table 47: Extended Diagnosis > [Folder Name] > ECAT_MBX_RSC_TIMER_T	95
Table 48: Descriptions of the Diagnosis Panes	96
Table 49: Descriptions Packet Header	98
Table 50: Descriptions Packet Header	99
Table 51: Overview Error Codes and Ranges	102
Table 52: RCX General Task Errors	103
Table 53: RCX Common Status & Errors Codes	104
Table 54: RCX Status & Error Codes	105
Table 55: RCX Status & Error Codes Slave State	105
Table 56: ODM Error Codes - General ODM Error Codes	106
Table 57: ODM Error Codes - General ODM Driver Error Codes	107
Table 58: cifX Driver Specific ODM Error Codes	110
Table 59: Generic Error Codes	111
Table 60: Generic Driver Error Codes	112
Table 61: Generic Device Error Codes	113
Table 62: CIFS API Transport Error Codes	114
Table 63: CIFS API Transport Header State Error Codes	114
Table 64: ODM Error Codes DBM V4	118
Table 65: Settings (D = Displaying, X = Editing, Configuring)	119
Table 66: Configuration (D = Displaying, X = Editing, Configuring)	119

12.5 Glossary

CoE

CANopen over EtherCAT

CoE denominates a method for accessing an object dictionary which has been adopted for use in EtherCAT from CANopen.

DDF

Device Description File.

DTM

Device Type Manager.

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

E²PROM

Electronically erasable Programmable Read-Only Memory

E-Bus

Bus system based on LVDS standard (specified in the ANSI/TIA/EIA-644-1995 standard)

EDS

Electronic Data Sheet

EtherCAT-Master

A device which is responsible for the configuration, parameterization of the EtherCAT segment, all connected devices' controllers, and cyclic process data exchange, mailbox and diagnostics services.

EtherCAT-Port

Physical type of data transmission used by EtherCAT. An EtherCAT Slave Controller can have up to 4 EtherCAT ports. Can be one of the following three alternatives:

- E-Bus
- 100Base-TX
- 100Base-FX

EtherCAT-Slave

A device which is configured by the Master, receives telegrams with output data, commands from it and provides input and status data.

FDT

Field Device Tool

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

FMMU

Fieldbus Memory Management Unit

A FMMU organizes the mapping of logical EtherCAT addresses to physical addresses.

LVDS

Low Voltage Differential Signals

A data transmission standard specified in ANSI/TIA/EIA-644-1995 and used in Beckhoff's E-Bus.

Object Dictionary

An object dictionary is a storage area for device parameter data structures. It is accessed in standardized manner very similarly as this is done in CANopen.

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.

PDO

Process Data Object

Specific data object for cyclic data communication.

SDO

Service Data Object

Specific data object for acyclic data communication, i.e. mailbox-based communication. It is typically used for accessing the object dictionary.

Sync Manager

Synchronization Manager

A sync manager synchronizes the data communication on a specific communication channel. It is configured for managing either input or output and for working either cyclically or acyclically based on mailboxes. Configuration is done within the DDF file. Up to 4 sync managers numbered 0 to 3 can be configured.

XML

Extensible Markup Language

A versatile data storage format defined by the World Wide Web Consortium (W3C). It is based on elements and attributes. In EtherCAT, it is used in device descriptions stored in DDF files.

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