User Manual

# CIFX Cards Real Time Ethernet

## Installation, Operation and Hardware Description

Language: English

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# Table of Contents

# 1 Introduction

## 1.1 About the User Manual

This user manual contains descriptions of the installation, operation and hardware of Real Time Ethernet cifX cards under Windows® 2000/Windows®.

## 1.1.1 List of Revisions

| Index | Date | Chapter | Revisions |
|---|---|---|---|
| 1 | 17 May 2006 | all | created |
| 2 | 13 June 2007 | 2, 4, 7<br><br>1, 3, 4, 7, 8 | actualized according to ANSI Z 535.6,<br>LED description actualized<br>Descriptions for the cards CIFX 50E-RE, CIFX 90-RE, CIFX 104C-RE, CIFX 104C-RE-R, CIFX 104C-RE\F, CIFX 104C-RE-R\F completed,<br>Descriptions for SERCOS III Slave added |
| 3 | 27.06.07 | 7.1.3 | Description MS and NS LED EtherNet/IP Adapter (Slave) adapted |
| 4 | 01.08.07 | all<br>3.4 – 3.11 | EtherCAT Master, EtherNet/IP Scanner (Master) added,<br>Notice to LED at RJ45 socket added |
| 5 | 15.08.07 | 1.2, 1.3, 1.8, 3.1, 3.3, 5.1, 6<br>1.8<br>2.1., 7.1.1, 8.1, 8.2.1, 8.2.2<br>8.2.3 | Information and description to the System configurator SYCON.net added,<br><br><br>Information for Master license added,<br>Information for PROFINET IO-RT-Controller added,<br><br><br>Protocol data for EtherCAT-Master added. |
| 6 | 15.02.08 | All<br>1<br>2.1<br>2.4<br>3<br>4<br>5.4<br>6<br><br>7<br>8<br>9.1.1<br>9.1.2<br>10.2 | Descriptions, data and drawings for the CIFX 80-RE card Descriptions<br>Chapter „Introduction“ actualized,<br>Section „Intended Use“ actualized,<br>Section „Safety Instructions“ actualized,<br>Chapter „Description and Requirements“ adapted,<br>Chapter „Getting Startet“ added,<br>Section “CIFX 104C-RE and CIFX 104C-RE-R” adapted,<br>Chapter „Installing Software“ descriptions to the cifX Device Driver and cifX Driver Setup inserted,<br>Chapter „Troubleshooting “actualized,<br>Chapter „Device Drawings and Connections“ here inserted and actualized,<br>Section „LED PROFINET IO-RT Controller“ adapted.<br>Section „ LEDs PROFINET IO-RT-Device “ actualized.<br>Section „Protocols“ actualized, |
| 7 | 05.05.08 | All<br><br><br>1<br>2.1<br>3<br>4<br>5<br>6<br>7<br>11<br>12<br>14 | Descriptions for Powerlink, Open Modbus/TCP and SERCOS III Slave added;<br>Descriptions to the cifX Driver Setup erased,<br>Descriptions to the netX Configuration and Diagnostic Utility inserted,<br>Chapte „Introductionl“ actualized,<br>Section „Intended Use“ actualized,<br>Chapter „Description and Requirements“ actualized,<br>Chapter „Getting startet“ actualized,<br>Chapter „Installing CIFX Cards“ actualized,<br>Chapter „Installing Software“ actualized,<br>Chapter „netX Configuration and Diagnostic Utility“ added and actualized.<br>Chapter „Technical Data“ actualized,<br>Chapter „Configuration Parameter“ added and actualized.<br>Glossary added |
| 8 | 21.05.08 | 1<br>3<br>4<br>5<br>6<br>7<br>10 | Chapte „Introductionl“ actualized,<br>Chapter „Description and Requirements“ actualized,<br>Chapter „Getting startet“ actualized,<br>Chapter „Installing CIFX Cards“ actualized,<br>Chapter „Installing Software“ actualized,<br>Chapter „netX Configuration and Diagnostic Utility“ added and actualized.<br>Chapter „LED“ actualized |
| 9 | 09.06.08 | 4.2<br>9.11.3<br>10.1.7<br>11.2<br>12 | Section “Steps how to install and configure cifX Master Devices” actualized,<br>Section “Use of Hubs and Switches” actualized,<br>Section “LED Powerlink Controlled Node / Slave” actualized,<br>Section “Protocols” actualized,<br>Configuration parameters Real-Time-Ethernet-Systems actualized., |

*Table 1: List of Revisions*

## 1.1.2 Reference on Hardware and Software

| Card Type | Device |
|---|---|
| CIFX 50-RE | Revision 2 |
| CIFX 50E-RE | Revision 1 |
| CIFX 80-RE | Revision 1 |
| CIFX 90-RE | Revision 2 |
| CIFX 104C-RE | Revision 3 |
| CIFX 104C-RE-R | Revision 3 |
| CIFX 104C-RE\F | Revision 3 |
| CIFX 104C-RE-R\F | Revision 3 |
| AIFX-RE | Revision 2 |
| AIFX-DIAG | Revision 1 |

*Table 2: Reference on Hardware*

**Software**

| Software | Software Version |
|---|---|
| netX Configuration and Diagnostic Utility-Setup: netXSetup.exe | 1.1.0.49 |

*Table 3: Reference on Software*

## 1.1.3 Conventions in this Manual

Operating Instructions, a result of an operation step or notes are marked as follows:

**Operating Instructions:**

➢ <instruction>

Or

1. <instruction>
2. <instruction>

**Results:**

<result>

**Notes:**

**Note:** <note>

# 1.2 Contents of the Product CD

The Product CD for the Communication InterFaces cifX contains:

- **cifX Device Driver**
- **netX Configuration and Diagnostic Utility setup** including the loadable Firmware
- System configurator **SYCON.net**
- Device Description Files (GSDML, EDS, XML, XDD)
- Documentation

## 1.2.1 Directory Structure of the CD

All manuals on this CD are delivered in the Adobe Acrobat® Reader format (PDF).

| Directory Name | Description |
|---|---|
| API | Toolkit, Header Files and cifX32DLL.lib |
| Documentation | Documentation in the Acrobat® Reader Format (PDF) |
| Driver | cifX Device Driver |
| EDS | Device Description File |
| Firmware | Loadable Firmware |
| Software | cifX Configuration and Diagnostic Utility,<br>**System Configurator** SYCON.net (configuration and diagnostic program) |

*Table 4: Directory Structure of the CD*

### 1.2.1.1 Device Description Files

The CD Rom includes the device description files for the following Slave devices:

| Real Time Ethernet | Name / Extension |
|---|---|
| EtherCAT Slave | DDF, XML |
| EtherNet/IP Adapter (Slave) | EDS |
| Powerlink Controlled Node / Slave | XDD |
| PROFINET IO-RT-Device | GSDML/XML |

*Table 5: Device Description Files*

## 1.2.2 Documentations cifX Cards

The following documentation overview gives information, for which items you can find further information in which manual.

| Manual | Contents | Document name |
|---|---|---|
| User Manual, CIFX Cards Real Time Ethernet | Installation, Operation and Hardware Description | CIFX-RE_usermanual_en.pdf |
| Operating Instruction Manual | SYCON.net Frame Application | SYCONnet_netFrame_en.pdf |
| Operating Instruction Manual | FDT Container | SYCONnet_netDevice_en.pdf |
| Operating Instruction Manual | DTM for EtherCAT Master | EtherCAT_Master_DTM_en.pdf* |
| Operating Instruction Manual | Generic EtherCAT Slave DTM for EtherCAT Slave Devices | EtherCAT_Slave_DTM_en.pdf* |
| Operating Instruction Manual | DTM for EtherNet/IP Scanner Devices | EtherNetIP_Scanner_DTM_en.pdf |
| Operating Instruction Manual | DTM for EtherNet/IP Adapter Devices | EtherNetIP_Adapter_DTM_en.pdf |
| Operating Instruction Manual | Generic EtherNet/IP Adapter DTM for EtherNet/IP Adapter Devices and Modular Generic EtherNet/IP Adapter DTM for modular EtherNet/IP Adapter Devices | EtherNetIP_GenericAdapter_DTM_en.pdf |
| Operating Instruction Manual | DTM for Hilscher PROFINET IO-Controller | PROFINET_IO_Controller_DTM_en.pdf |
| Operating Instruction Manual | DTM for Hilscher PROFINET IO-Devices | PROFINET_IO_Device_DTM_en.pdf |
| Operating Instruction Manual | Generic DTM for PROFINET IO Devices | PROFINET_IO_GenericDevice_DTM_en.pdf |

*Table 6: Documentations cifX Devices Real Time Ethernet*

# 1.3 Legal Notes

## 1.3.1 Guarantee

Although the cifX cards CIFX 50-RE, CIFX 50E-RE, CIFX 80-RE, CIFX 90-RE, the devices of the family CIFX 104C-RE and the AIFX-RE and AIFX-DIAG interfaces as well as the driver program have been developed with great care and has been thoroughly tested, Hilscher Gesellschaft für Systemautomation mbH cannot guarantee the suitability of these boards for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damage which may have arisen from the use of this hard and software or its documentation shall be limited to cases of intent.

## 1.3.2 Registered Trademarks

Windows® 2000 / Windows® XP are registered trademarks of Microsoft Corporation.

# 1.4 Licenses

If a cifX card is used as a slave, neither for the firmware nor for the configurator SYCON.net a license is required.

Licenses are required, if the cifX card is used with

- a firmware with master functionality*,
- an OPC server.

* The master license includes the card operating as master and the license for the configurator SYCON.net for the respective card.

# 2 Safety

## 2.1 Intended Use

The cifX cards

- CIFX 50-RE, CIFX 50E-RE
- CIFX 80-RE
- CIFX 90-RE
- CIFX 104C-RE, CIFX 104C-RE-R
- CIFX 104C-RE\F, CIFX 104C-RE-R\F

described in this user manual are PC cards for real-time Ethernet communication. Depending from the loaded firmware, the real time Ethernet systems listed hereafter can be realized using the cifX card:

- EtherCAT Master
- EtherCAT Slave
- EtherNet/IP Scanner (Master)
- EtherNet/IP Adapter (Slave)
- Open Modbus/TCP
- Powerlink Controlled Node / Slave
- PROFINET IO-RT-Controller
- PROFINET IO-RT-Device
- SERCOS III Slave

The interfaces

- AIFX-RE
- AIFX-DIAG

are used for connection to the CIFX 90-RE card or the devices of the family CIFX 104C-RE.

## 2.2 Personnel Qualification

The cifX card must only be installed, configured and removed by qualified personnel.

## 2.3 Labeling of Safety Instructions

The safety instructions are pinpointed particularly. The instructions are highlighted with a specific safety symbol, a warning triangle and a signal word according to the degree of endangerment. Inside the note the danger is exactly named. Instructions to a property damage message do not contain a warning triangle.

| Symbol | Sort of Warning or Principle |
|---|---|
|  | Safety symbol for the warning to personal injury |
|  | Warning of danger by electrical current |
|  | Warning of damages by electrostatic discharge |

*Table 7: Safety Symbols and Sort of Warning or Principle*

### 2.3.1.1 Signal Words

| Signal Word | Meaning |
|---|---|
| **DANGER** | indicates a direct hazard with high risk, which will have as consequence death or grievous bodily harm if it isn't avoided.<br>The use of this signal word shall be restricted to extremely hazard.<br>Remark: The signal word may not be used in case of danger of pure property damages. |
| **WARNING** | indicates a possible hazard with medium risk, which will have as consequence death or (grievous) bodily harm if it isn't avoided.<br>Remark: The signal word may not be used in case of danger of pure property damages. |
| **CAUTION** | indicates a minor hazard with medium risk, which could have as consequence simple battery if it isn't avoided. |
| **Note** | Indicates an important note in the manual. |

*Table 8: Signal Words*

### 2.3.1.2 Signal Words USA

| Signal Word | Meaning |
|---|---|
| **DANGER** | Indicates a Hazardous Situation Which, if not Avoided, will Result in Death or Serious Injury. |
| **WARNING** | Indicates a Hazardous Situation Which, if not Avoided, could Result in Death or Serious Injury. |
| **CAUTION** | Indicates a Hazardous Situation Which, if not Avoided, may Result in Minor or Moderate Injury. |
| **NOTICE** | Indicates a Property Damage Message. |
| **Note** | Indicates an Important Note in the Manual. |

*Table 9: Signal Words according to ANSI*

# 2.4 Safety Instructions

This manual contains instructions which must be observed to ensure your own personal safety and to avoid damage to devices.

## 2.4.1 Electrical Current

**WARNING!**

**Electrocution**

- Disconnect the power plug of the PC and make sure, that the PC is current-free.
- Only after disconnecting power open the PC cabinet and install or remove the cifX card.

**CAUTION!**

**Device Destruction!**

- Use only 3.3 V for power supply to operate the card.
  Operation with 5 V power supply leads to device destruction.
  Also all I/O signals are only 3.3V tolerant.

The cifX card may not be powered by a 5 V power supply! The cifX card may only be powered by a 3.3 V power supply. The use of a higher supply voltage than 3.3V may result in severe damage to the cifX card! Further, all signal pins require 3.3V signaling voltage and are not 5 V tolerant!

## 2.4.2 Electrostatic Discharge

Adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge (EN 61340-5-1 und EN 61340-5-2 as well as IEC 61340-5-1 und IEC 61340-5-2).

**CAUTION!**

**Electrostatic Discharge**

This equipment is sensitive to electrostatic discharge, which cause internal damage and affect normal operation. Follow guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.
- When not in use, store the equipment in appropriate static-safe packaging.

# 2.5 Safety Instructions USA

This manual contains instructions which must be observed to ensure your own personal safety and to avoid damage to devices.

## 2.5.1 Electrical Current

**CAUTION**

**Electrocution**

- Disconnect the power plug of the PC and make sure, that the PC is current-free.
- Only after disconnecting power open the PC cabinet and install or remove the cifX card.

**NOTICE**

**Device Destruction!**

- Use only 3.3 V for power supply to operate the card.
  Operation with 5 V power supply leads to device destruction.
  Also all I/O signals are only 3.3V tolerant.

The cifX card may not be powered by a 5 V power supply! The cifX card may only be powered by a 3.3 V power supply. The use of a higher supply voltage than 3.3V may result in severe damage to the cifX card! Further, all signal pins require 3.3V signaling voltage and are not 5 V tolerant!

## 2.5.2 Electrostatic Discharge

Adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge (EN 61340-5-1 und EN 61340-5-2 as well as IEC 61340-5-1 und IEC 61340-5-2).

**NOTICE**

**Electrostatic Discharge**

This equipment is sensitive to electrostatic discharge, which cause internal damage and affect normal operation. Follow guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.
- When not in use, store the equipment in appropriate static-safe packaging.

# 3 Description and Requirements

## 3.1 Description

The cifX devices described in this user manual are PC cards for real-time Ethernet communication. Depending of the loaded firmware, the cifX card proceeds the communication of one of the following real time Ethernet systems:

- EtherCAT Master
- EtherCAT Slave
- EtherNet/IP Scanner (Master)
- EtherNet/IP Adapter (Slave)
- Open Modbus/TCP
- Powerlink Controlled Node / Slave
- PROFINET IO-RT-Controller
- PROFINET IO-RT-Device
- SERCOS III Slave

The cifX handles the complete data exchange between the connected Ethernet devices and the PC. The data exchange is proceeded via dual-port memory.

## 3.2 System Requirements

1. Windows® 2000 / Windows® XP
2. PC with PCI connector (3.3 V)

| Type of Card | PCI Connector |
|---|---|
| CIFX 50-RE | PCI slot (3,3 V) |
| CIFX 50E-RE | PCI Express X1 slot (3,3 V),<br>X1 = Single Lane |
| CIFX 80-RE | Compact PCI (3,3 V) |
| CIFX 90-RE | Mini PCI Socket (3,3 V), Type III System Connector |
| CIFX 104C-RE<br>CIFX 104C-RE-R<br>CIFX 104C-RE\F<br>CIFX 104C-RE-R\F | PCI Slot for PC/104 cards (3,3 V) |

*Table 10: PCI Connector for cifX cards*

3. CD ROM drive
4. Graphic resolution: min. 1024 x 768 pixel or higher
5. Keyboard and Mouse

# 3.3 Requirements for Operation

## 3.3.1 cifX Slave Device

For cifX Slave device operation the following requirements must be fulfilled:

| | |
|---|---|
| **Protocols** | EtherCAT-Slave,<br>EtherNet/IP-Adapter (Slave),<br>Open Modbus/TCP,<br>Powerlink Controlled Node / Slave,<br>PROFINET IO-Device,<br>SERCOS III-Slave |
| **Software Installation** | 1. The **cifX Device Driver** must be installed (from V0.933).<br>2. The **netX Configuration and Diagnostic Utility** program must be installed. |
| **Firmware-Download** | 3. Using the **netX Configuration and Diagnostic Utility** program, the user must select the firmware which is to be loaded to the cifX Slave device. |
| **Parameter Setting** | 4. The cifX Slave device must be parameterized using one of the following options:<br>• **netX Configuration and Diagnostic Utility** program<br>• Application program (programming required) |
| **Communication** | 5. For the communication a Master for the respective communication system is required. |

*Table 11: Requirements for cifX Slave Device Operation*

## 3.3.2 cifX Master Device

For cifX Master device operation the following requirements must be fulfilled:

| | |
|---|---|
| **Protocols** | EtherCAT-Master,<br>EtherNet/IP-Scanner (Master),<br>PROFINET IO-Controller |
| **Software Installation** | 1. The **cifX Device Driver** must be installed (from V0.933). |
| **Firmware-Download** | 3. Using the system configurator **SYCON.net**, the user must select the firmware which is to be loaded to the cifX Master device. |
| **Configuration** | 4. The cifX Master device must be configured using one of the following options:<br>• System configurator **SYCON.net**<br>• Application program (programming required) |
| **Communication** | For communication slave devices for the used communcation system are required. |

*Table 12: Preconditions for cifX Master Device Operation*

# 4 Getting Startet

## 4.1 Steps how to install and configure cifX Slave Devices

The following table describes the steps to configure a cifX Slave device as it is typical for many cases.

| # | Step | Description | For detailed information see section | Page |
|---|---|---|---|---|
| 1 | Hardware Installation | Installing cifX Slave device:<br>Disconnect the power plug of the PC.<br>Open the cabinet of the PC.<br>If necessary, glue enclosed sticker on the front plate.<br>Plug in and mount the cifX Slave device.<br>If necessary, connect a connection or a diagnosis interface.<br>Close the PC casing.<br>Connect the PC to the power supply and switch on the PC. | *Installing cifX Card* | *21* |
| 2 | cifX Device Driver Installation | Windows® recognizes a new hardware and requires the device driver, which is on the CD-ROM cifX.<br>Enter the CD-ROM cifX in the PC and follow to the instructions of the installation wizard, to install the driver. | *Installing cifX Device Driver* | *28* |
| 3 | netX Configuration and Diagnostic Utility Installation | Start the **netX Utility setup** program to install the **netX Configuration and Diagnostic Utility**. | *Installing the netX Configuration and Diagnostic Utility* | *33* |
| 4 | Setting cifX Slave Device Parameters | In the **netX Configuration and Diagnostic Utility**:<br>- Select the language,<br>- Select and download the firmware,<br>- Setting the cifX Slave Device parameters. | *Configuration Steps cifX Card* | *34* |

*Table 13: Installation and Configuration Steps cifX Slave Device*

## 4.2 Steps how to install and configure cifX Master Devices

The following table describes the steps to configure a cifX Master device as it is typical for many cases.

| # | Step | Description | For detailed information see section | Page |
|---|---|---|---|---|
| 1 | Hardware Installation | Installing cifX Master device:<br>Disconnect the power plug of the PC.<br>Open the cabinet of the PC.<br>If necessary, glue enclosed sticker on the front plate.<br>Plug in and mount the cifX Master device.<br>If necessary, connect a connection or a diagnosis interface.<br>Close the PC casing.<br>Connect the PC to the power supply and switch on the PC. | *Installing cifX Card* | *21* |
| 2 | cifX Device Driver Installation | Windows® recognizes a new hardware and requires the device driver, which is on the CD-ROM cifX.<br>Enter the CD-ROM cifX in the PC and follow to the instructions of the installation wizard. | *Installing cifX Device Driver* | *28* |
| 3 | SYCON.net Installation | Run the SYCON.net-Setup. | *Installing SYCON.net* | *33* |
| 4 | Firmware Download | - Start system configurator **SYCON.net**.<br>- Select driver and assign device.<br>- Select and download the firmware. | See corresponding user manual under *Documentations cifX Cards* | *10* |
| 5 | Configuration cifX Master device | - Configure the cifX Master device. | | |
| 6 | Download Configuration | - Download the configuration to the cifX Master device *.<br>(*EtherCAT-Master, EtherNet/IP-Scanner (Master), PROFINET IO-Controller) | | |
| 7 | Diagnostic | - Righclick on device symbol.<br>- Select context menu entry **Diagnosis**,<br>- then select **Diagnosis > Station Diagnosis** or **Master Diagnosis**. | | |
| 8 | I/O Monitor | - Righclick on device symbol.<br>- Select context menu entry **Diagnosis**,<br>- then **Additional Tools > IO Monitor**.<br>- Check the input or output data. | | |

*Table 14: Installation and Configuration Steps cifX Master Device*

# 5 Installing cifX Card

## 5.1 Safety Advices

Obey to the following safety advices, when installing the cifX card.

**WARNING!**

**Electrocution**

- Disconnect the power plug of the PC and make sure, that the PC is current-free.
- Only after disconnecting power open the PC cabinet and install or remove the cifX card.

**CAUTION!**

**Device Destruction!**

- Use only 3.3 V for power supply to operate the card.
  Operation with 5 V power supply leads to device destruction.
  Also all I/O signals are only 3.3V tolerant.

**CAUTION!**

**Damage from electrostatic Discharge**

- To prevent damage to the PC and the cifX, make sure, that the cifX card is grounded via the endplate and the PC and make sure, that you are discharged when you mount/demount the cifX card.

### 5.1.1 Safety Advices USA

Obey to the following safety advices, when installing the cifX card.

**CAUTION**

**Electrocution**

- Disconnect the power plug of the PC and make sure, that the PC is current-free.
- Only after disconnecting power open the PC cabinet and install or remove the cifX card.

**NOTICE**

**Device Destruction!**

- Use only 3.3 V for power supply to operate the card.
  Operation with 5 V power supply leads to device destruction.
  Also all I/O signals are only 3.3V tolerant.

**NOTICE**

**Damage from electrostatic Discharge**

- To prevent damage to the PC and the cifX, make sure, that the cifX card is grounded via the endplate and the PC and make sure, that you are discharged when you mount/demount the cifX card.

## 5.2 CIFX 50-RE and CIFX 50E-RE

For installation of the CIFX 50-RE or CIFX 50E-RE card handle as follows:

1. Use the sticker according to the firmware and glew it on the front of the CIFX 50-RE or CIFX 50E-RE card (see section *Fix Front Plate Sticker* on page 23).
2. Disconnect the power plug of the PC.
3. Open the cabinet of the PC.
4. Plug in the CIFX 50-RE card on a free PCI slot,
   or plug in the CIFX 50E-RE card on a free PCI express slot.
5. Fix the CIFX 50-RE or CIFX 50E-RE card using the hole intended.
6. Close the PC casing.
7. Connect the PC to the power supply and switch on the PC.

### 5.2.1 Fix Front Plate Sticker

**Note:** Your cifX card set contains a set of front plate stickers (6 different stickers). Depending from the loaded firmware the label on each sticker indicates the names of the respective system and communication status LED or of the LED of the RJ45 Ethernet female connector. (Further information to this question you find also in section *LED Real Time Ethernet Systems* beginning from page 58.)

**Front Plate Stickers for CIFX 50-RE and CIFX 50E-RE:**

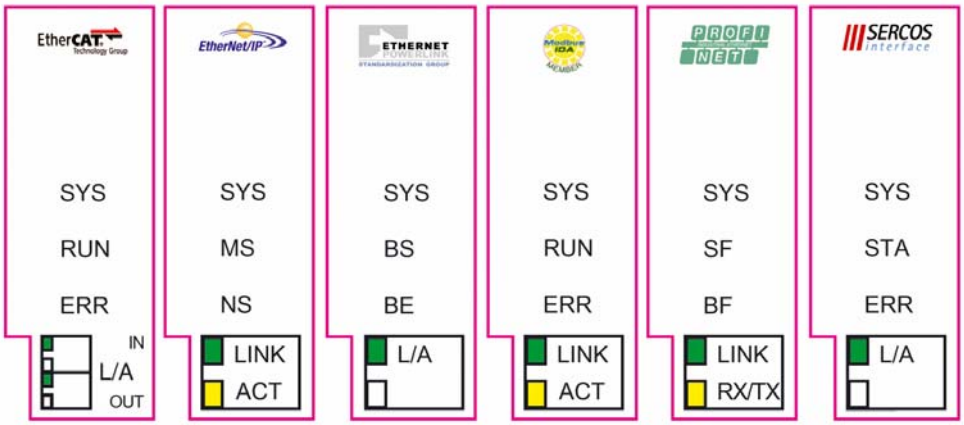



*Figure 1: Front Plate Stickers for CIFX 50-RE and CIFX 50E-RE for the labeling of the card LED or of the LED of the Ethernet female connector*

| cifX-LED | | EtherCAT Master | EtherCAT Slave | EtherNet/IP | Powerlink | Open Modbus/TCP | PROFINET IO | SERCOS III |
|---|---|---|---|---|---|---|---|---|
| SYS (yellow / green) | | SYS | SYS | SYS | SYS | SYS | SYS | SYS |
| COM 0 (red/ green) | | RUN | RUN | MS | BS | RUN | SF | STA |
| COM 2 (red/ green) | | ERR | ERR | NS | BE | ERR | BF | ERR |
| RJ45 Ch0 | green | LINK | L/A IN | LINK | L/A | LINK | LINK | L/A |
| | yellow | ACT | - | ACT | - | ACT | RX/TX | - |
| RJ45 Ch1 | green | - | L/A OUT | LINK | L/A | LINK | LINK | L/A |
| | yellow | - | - | ACT | - | ACT | RX/TX | - |

*Table 15: cifX LED Labeling depending of the loaded Firmware*

➢ Use the sticker according to the firmware and glew it on the front of the CIFX 50-RE or CIFX 50E-RE card.

## 5.3 CIFX 80-RE

For installation of the CIFX 80-RE card handle as follows:

1. Use the sticker according to the firmware and glew it on the front of the CIFX 80-RE card (see section *Fix Front Plate Sticker* on page 25).
2. Disconnect the power plug of the PC.
3. Open the cabinet of the PC and remove blank plate.
4. Put down the ejection lever at the CIFX 80-RE card.
5. Plug in the CIFX 80-RE card to a free compact PCI slot.
6. Fasten the CIFX 80-RE card.

- Tip up the lever and click in.
- Screw the CIFX 80-RE card with two screws onto the wholes above and below.

7. Close the PC casing.
8. Connect the PC to the power supply and switch on the PC.

Note: To remove the CIFX 80-RE card from the compact PCI slot, first press the grey button at the ejection lever and then press the ejection lever downwards.

### 5.3.1 Fix Front Plate Sticker

**Note:** Your cifX card set contains a set of front plate stickers (6 different stickers). Depending from the loaded firmware the label on each sticker indicates the names of the respective system and communication status LED or of the LED of the RJ45 Ethernet female connector. (Further information to this question you find also in section *LED Real Time Ethernet Systems* beginning from page 58.)

| cifX-LED | | EtherCAT Master | EtherCAT Slave | EtherNet/IP | Powerlink | Open Modbus/TCP | PROFINET IO | SERCOS III |
|---|---|---|---|---|---|---|---|---|
| SYS (yellow / green) | | SYS | SYS | SYS | SYS | SYS | SYS | SYS |
| COM 0 (red/ green) | | RUN | RUN | MS | BS | RUN | SF | STA |
| COM 1 (red/ green) | | ERR | ERR | NS | BE | ERR | BF | ERR |
| RJ45 Ch0 | green | LINK | L/A IN | LINK | L/A | LINK | LINK | L/A |
| | yellow | ACT | - | ACT | - | ACT | RX/TX | - |
| RJ45 Ch1 | green | - | L/A OUT | LINK | L/A | LINK | LINK | L/A |
| | yellow | - | - | ACT | - | ACT | RX/TX | - |

*Table 16: cifX LED Labeling depending of the loaded Firmware*

- Use the sticker according to the firmware and glew it on the front of the CIFX 80-RE card.

## 5.4 CIFX 90-RE

For installation of the CIFX 90-RE card handle as follows:

1. Disconnect the power plug of the PC.
2. Open the cabinet of the PC.
3. Plug in the CIFX 90-RE card in the Mini PCI socket (Type III System Connector) on the mainboard.
4. Press the clamps at the Mini PCI socket until they snap in, to fasten the CIFX 90-RE card to the mainboard.

To connect the AIFX-RE connection interface:

5. Connect the cable connector X1 on the AIFX-RE connection interface with the cable.
6. Connect the cable connector X4 on the CIFX 90-RE card with the cable.
7. Mount the AIFX-RE on the PC cabinet.

Only then:

8. Close the PC casing.
9. Connect the PC to the power supply and switch on the PC.

## 5.5 CIFX 104C-RE and CIFX 104C-RE-R

For installation of the CIFX 104C-RE card handle as follows:

1. Disconnect the power plug of the PC.
2. Open the cabinet of the PC.
3. Plug in the CIFX 104C-RE card on a free PCI slot for PC 104 cards.
4. Fix the CIFX 104C-RE card to the mainboard using 4 spacing bolts and screws intended. The scope of delivery does not include spacing bolts and screws.
5. Close the PC casing.
6. Connect the PC to the power supply and switch on the PC.

## 5.6 CIFX 104C-RE\F and CIFX 104C-RE-R\F

For installation of the CIFX 104C-RE card handle as follows:

1. Disconnect the power plug of the PC.
2. Open the cabinet of the PC.
3. Plug in the CIFX 104C-RE card on a free PCI slot for PC 104 cards.
4. Fix the CIFX 104C-RE card to the mainboard using 4 spacing bolts and screws intended. The scope of delivery does not include spacing bolts and screws.

To connect the connection interface AIFX-RE:

5. Connect the cable connector Ethernet X 1 on the connection interface AIFX-RE with the cable.
6. Connect the cable connector Ethernet X 4 (or X304) on the CIFX 104C-RE card with the cable.
7. Mount the AIFX-RE on the PC cabinet.

To connect the Diagnosis Interface AIFX-DIAG:

8. Connect the cable connector DIAG X 1 on the Diagnosis Interface AIFX-DIAG with the cable.
9. Connect the cable connector DIAG X 3 (or X303) on the CIFX 104C-RE card with the cable.
10. Mount the AIFX-DIAG on the PC cabinet.

After that:

11. Close the PC casing.
12. Connect the PC to the power supply and switch on the PC.

# 6 Installing Software

## 6.1 Installing cifX Device Driver

To install the **cifX Device Driver** proceed as described hereafter:

1. After installation of the cifX card restart your PC.

Windows® 2000 / Windows® XP recognize the cifX card automatically.

➪ The message **Found New Hardware** is displayed and the **Found new Hardware Wizard** is started.

2. Select Install from a list or specific location (Advanced).

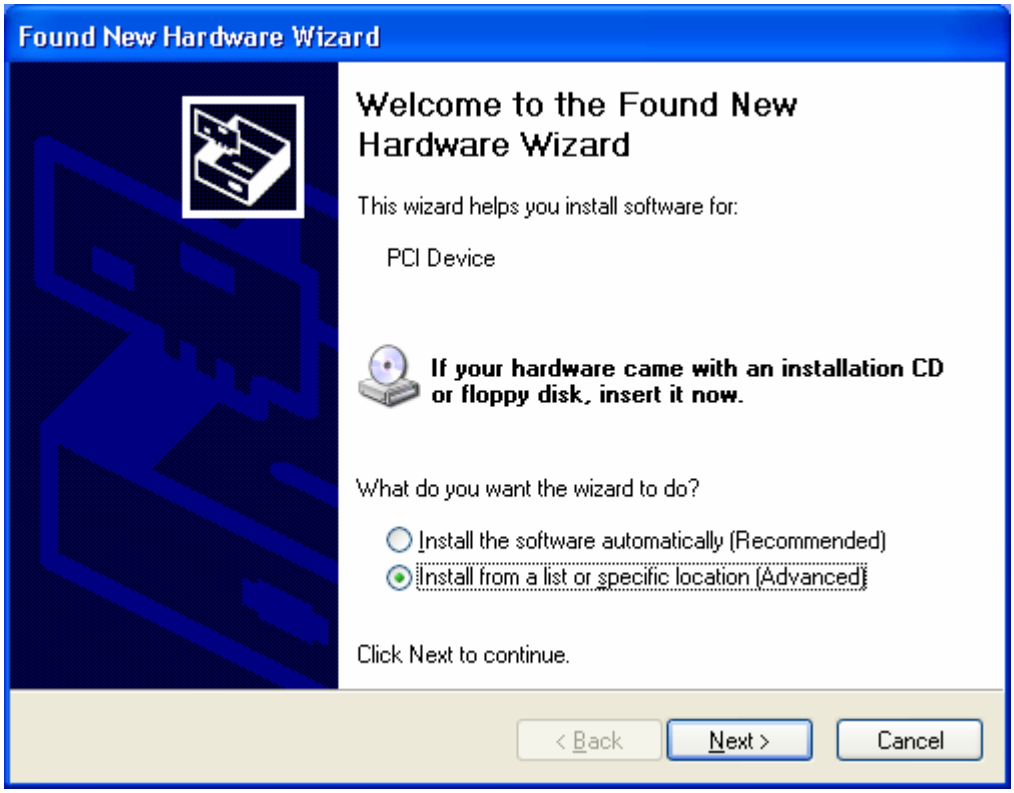



*Figure 2: Found new Hardware Wizard - Indicate Software Source*

3. Insert the installation CD now.
4. Click to the button **Next >**.

➪ The **Found new Hardware Wizard** asks you to select the research- and installation options.

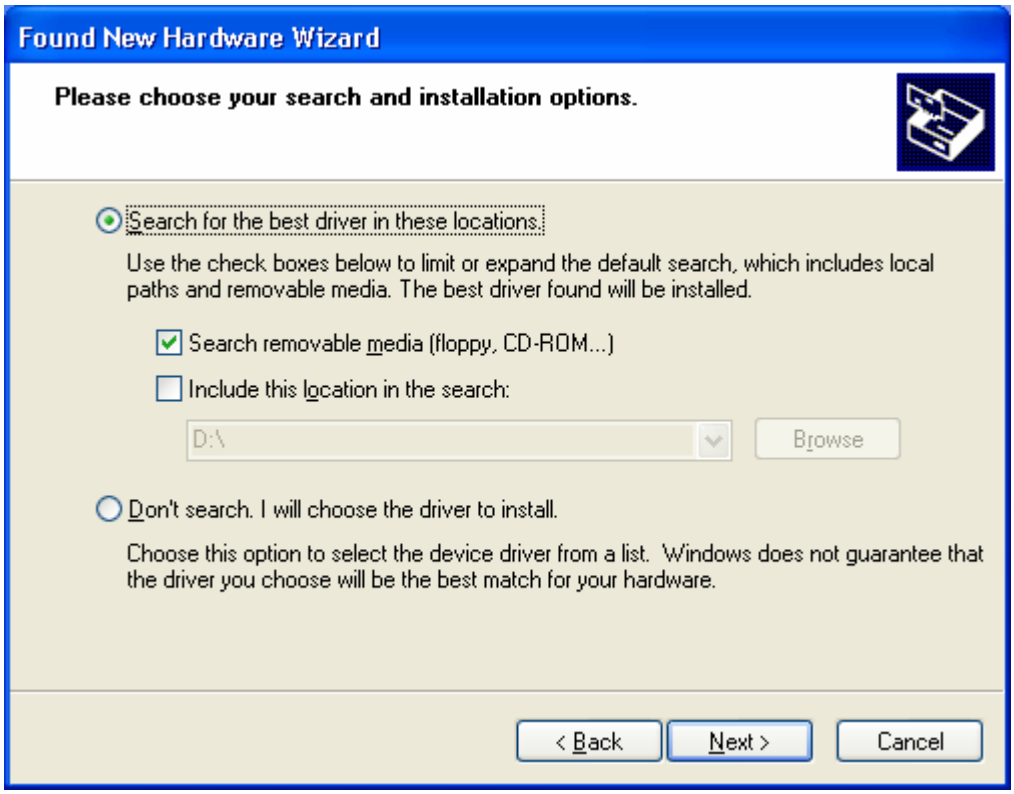



*Figure 3: Found new Hardware Wizard - Select research- and installation options*

5. Select Search for the best driver in these locations.
6. Activate the checkbox Search removable media (floppy, CD-ROM...).
7. Click to the button **Next >**.

➮ The driver software for the **cifX Device Driver** gets installed.

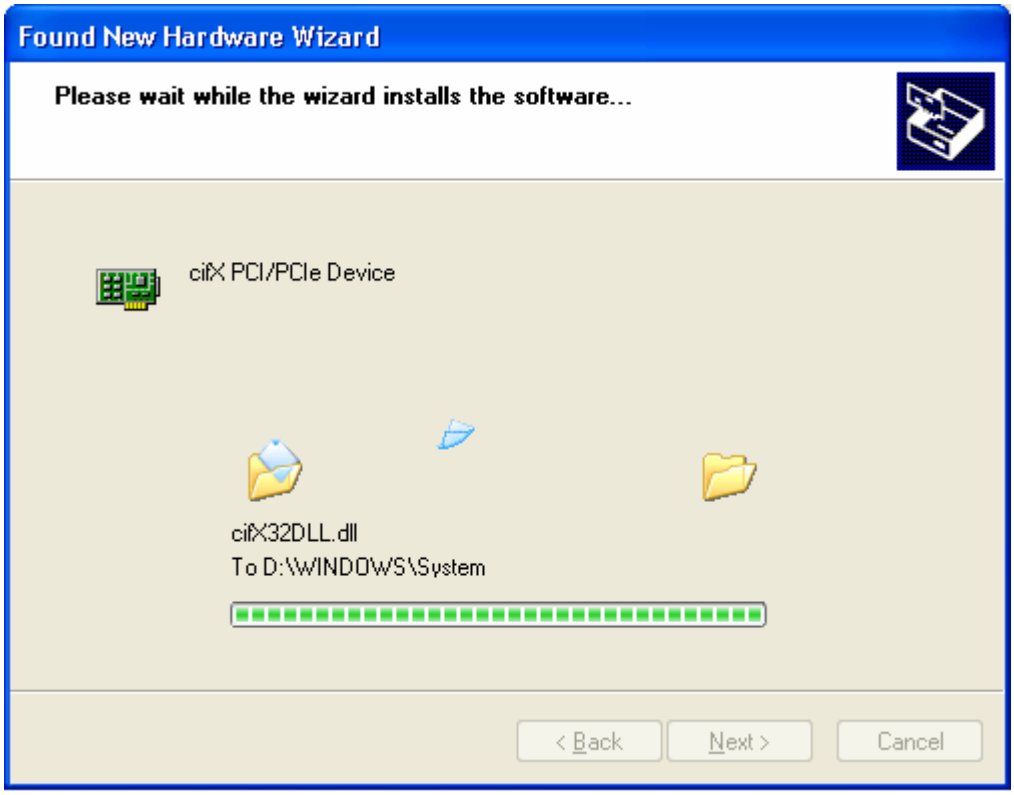



*Figure 4: Found new Hardware Wizard - Software gets installed*

➮ The **Found new Hardware Wizard** indicates the **cifX PCI/PCIe Device** software installation is complete.

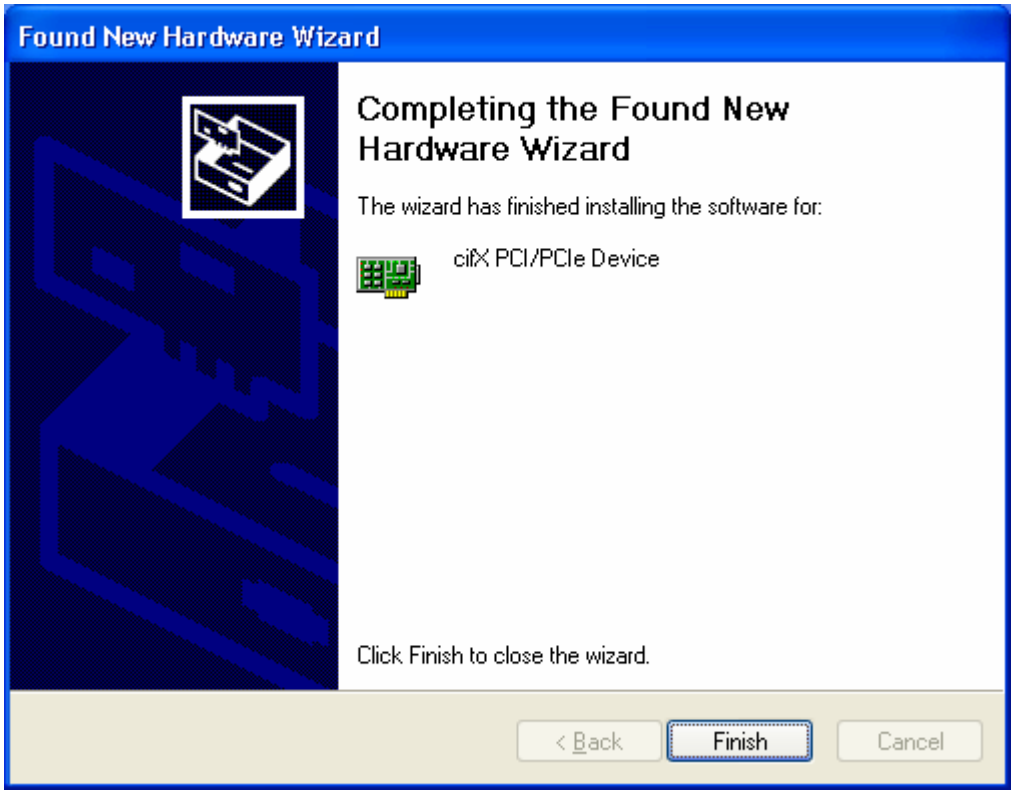



*Figure 5: Found new Hardware Wizard - Software installation has been completed*

8. Click in Found new Hardware Wizard > Completing the Found new Hardware Wizard to the button Finish.

➮ The installation of the **cifX Device Driver** is complete.

9. Check in the **Computer Manager**, if your cifX card installed correctly.

➢ Therefore open the **Computer Manager** as follows: Desktop symbol **My Computer >** rightclick **Properties >** window **System Properties >** tab **Hardware >** button **Computer Manager**.

➢ Check, if the view of your **Computer Manager** corresponds to the marked area in the view hereafter.

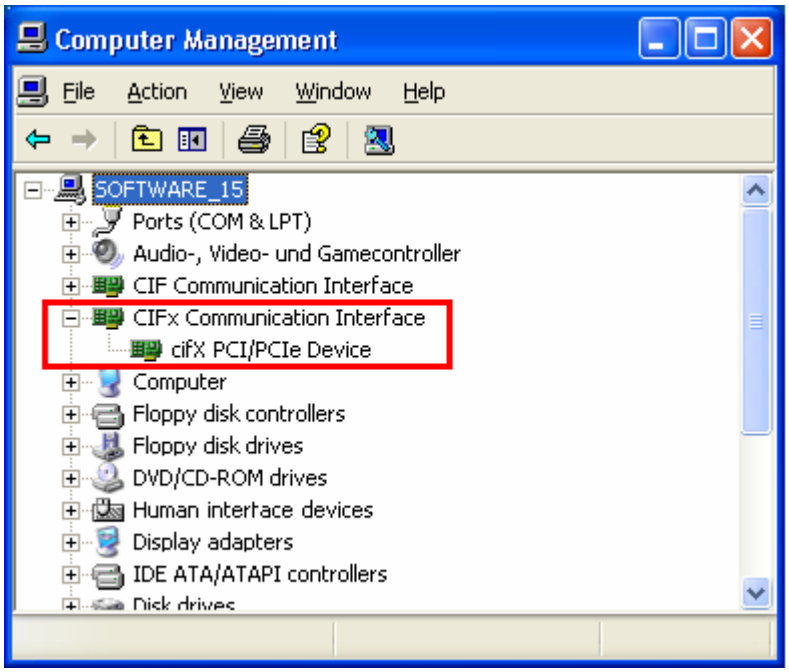



*Figure 6: Device Manager > cifXPCI/PCIe Device - correctly installed*

**Note:** The cifX card has to be configured.

## 6.2 Installing the netX Configuration and Diagnostic Utility

After the **cifX Device Driver** is installed start the netX Utility setup program to install the **netX Configuration and Diagnostic Utility**:

Therefore:

- Close all application programs on the system!
- Insert the cifX CD to the local CD ROM drive.
- Start in the directory **Software** the netX Utility setup program and execute the installation steps according to the instructions at the screen.

Or:

- Select **netX Configuration and Diagnostic Utility** of the autostart menu.

## 6.3 Installing SYCON.net

To install the system configurator **SYCON.net**:

- Close all application programs on the system!
- Insert the cifX CD to the local CD ROM drive.
- Start in the directory **Software** the SYCON.net setup program *SYCONnet netX setup.exe*.

Or:

- Select **SYCON.net** of the autostart menu.

**Note:** Administrator privileges are required on Windows® 2000/ Windows® XP systems for installation!

- Choose **System Installation** from the start screen.
- The installation program asks for the components to be installed.
- Answer these questions with **Yes** or **No**.

# 7 netX Configuration and Diagnostic Utility

## 7.1 Configuration Steps cifX Card

The chapter **netX Configuration and Diagnostic Utility** provides information on how to configure the device parameters of a real-time Ethernet or a fieldbus Slave and what can be read from the diagnostic window.

**Configuration Steps**

The following table describes the main steps how to configure a cifX device if the cifX device driver is already installed.

| # | Action | Short Description | For detailed information see section | Page |
|---|---|---|---|---|
| 1 | Starting the netX Utility | Start the netX Configuration and Diagnostic Utility. | *Starting netX Configuration and Diagnostic Utility* | *35* |
| 2 | Selecting the Language | Select the language of the netX Configuration and Diagnostic Utility graphical user interface. | *Selecting Language / Firmware, downloading Firmware* | *40* |
| 3 | Selecting the Firmware Protocol and downloading the Firmware | Select the firmware protocol.<br>Download the firmware via **Apply**. | *Selecting Language / Firmware, downloading Firmware* | *40* |
| 4 | Set and download the Parameters | Set the configuration parameters for the Slave to be used and download this one to the cifX card. | *Configuration* | 41 |
| 5 | cifX Diagnosis | Check cifX communication. | *Diagnostics* | *43* |

*Table 17: Configuration Steps / USB Device Driver already installed*

## 7.2 Starting netX Configuration and Diagnostic Utility

➢ Start the **netX Configuration and Diagnostic Utility** via **Start > Programs > netX Setup > netX Setup Program**.

➮ The utility detects the type of the connected cifX, for Real-Time-Ethernet or for fieldbusses.

To read more on how to configure the cifX and to use its diagnostic features refer to the descriptions hereafter.

## 7.3 Introduction to the Dialog Structure

The graphical user interface of the **netX Configuration and Diagnostic Utility** is divided in five main areas:

- A header with the **Select Network and Language Bar**
- A second header with the **Device Identification**
- The **Navigation Area** (left side)
- The **Configuration Window** (middle)
- The **Diagnostic Window** (right side)

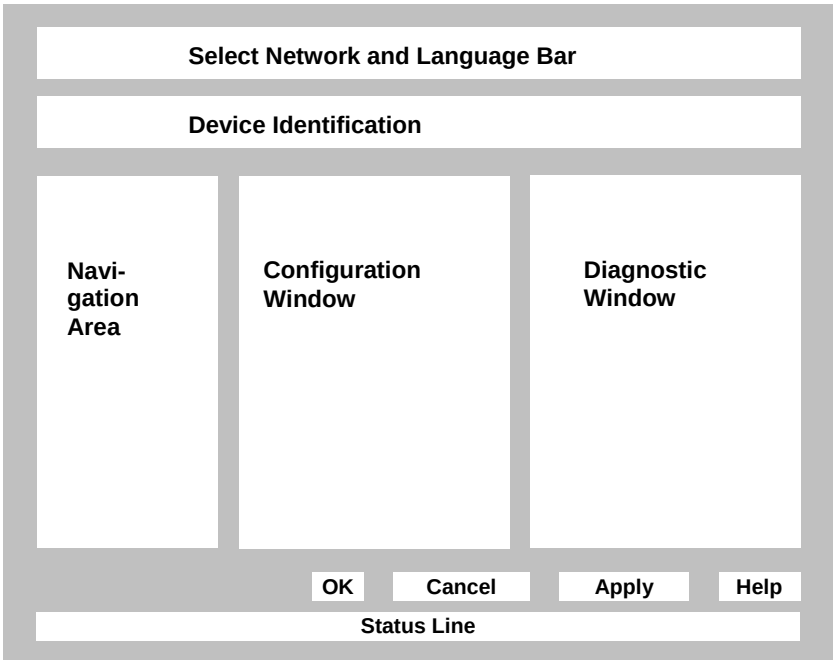



*Figure 7: Dialog Structure of netX Configuration and Diagnostic Utility*

Additional information e. g. online-state of the **netX Configuration and Diagnostic Utility** can be found in the **Status Line**.

Explanations to general dialog elements like buttons can be found in the subsection *General Buttons* on page 37.

### Select Network / Language Icon Bar


*Figure 8: Select Network Icon Bar*

*Figure 9: Select Language Icon Bar (only English yet)*

### Device Identification

The **Device Identification** shows the information about the connected cifX.

| Parameter | Meaning |
|---|---|
| IO Device | Name of the device |
| Vendor | Vendor name of the device |
| Firmware | Name of the currently loaded firmware |
| Device ID | Identification number of the device |
| Vendor ID | Identification number of the vendor |
| Version | Version of the currently loaded firmware |

*Table 18: Device Identification*

### Navigation Area, Configuration and Diagnostic Window

The **Navigation Area** at the left side of the **netX Configuration and Diagnostic Utility** shows the installed drivers and devices as a folder structure. The **Navigation Area** can be hidden via the symbol ✕ or it can be displayed again via the symbol ☐.

The actual parameters of the currently loaded firmware are displayed in the **Configuration** window of the **netX Configuration and Diagnostic Utility** and can be edited there.

In the **Diagnostic** window system and communication diagnosis is displayed. With the **Start COM** button the communication to the Master can be started respectively can be stopped with the **Stop COM** button. The device can also be reset with the **Reset** button.

### 7.3.1 General Buttons

The table below explains the general buttons in the **netX Configuration and Diagnostic Utility** user interface.

| Button | Meaning |
|---|---|
| **OK** | 1. *Configuration modified - The firmware and Configuration are downloaded:* If the configuration has been changed and you click to the **OK** button, the firmware/configuration is downloaded to the cifX.<br>2. *Configuration has not been modified* - If the configuration has not been changed and you click to the **OK** button, you are asked if you want to download the firmware/configuration, if you want to quit the netX Configuration and Diagnostic Utility or if you want to cancel. |
| **Cancel** | If the configuration has been changed and you click to the **Cancel** button, you are asked if you want to save the configuration. If you answer this question with yes, the configuration will be saved but it will not been downloaded to the cifX. |
| **Apply** | If the configuration has been changed and you click to the **Apply** button, the firmware/configuration is directly downloaded to the cifX and the **Apply** button is greyed out again.<br>The **Apply** button is greyed out, if the offline and the online configuration are identical. |
| **Help** | To open the netX Configuration and Diagnostic Utility online help, click on the **Help** button. |

*Table 19: General Buttons*

### 7.3.2 Help

- To open the help in **netX Configuration and Diagnostic Utility**, click on the **Help** button or press the **F1** key.

### 7.3.3 Status Line

The **Status Line** displays information about the current state of the netX Configuration and Diagnostic Utility. The download or any other activity is signaled in the status line.

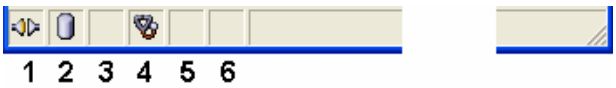



*Figure 10: Status Line – Status Fields 1 to 6*

| Number | Meaning | Icon |
|---|---|---|
| 1 | **Connection State:** | |
| | Icon going closed = Device is going online | |
| | Icon closed = Device is online | |
| | Icon going opened = Device is going offline | |
| | Icon opened = Device is offline | |
| | Icon with lightening = Device communication disturbed | |
| 2 | **Data Source States** | |
| | The displayed data are read out from the instance data set (database). | |
| | The displayed data are read out from the instance data set (database). Database is locked with password. | |
| | The displayed data are read out from the device. | |
| | The displayed data are read out from the device. Device is locked with password. | |
| 3 | **States of the instance Data Set** | |
| | All data loaded | - |
| | Valid Modified = Parameter is changed (not equal) to data source. | |
| | Invalid Modified = Invalid value (e. g. not plausible) | |
| | Initial data set = Parameter value is equal to data source value (data base or fieldbus device). | - |
| 4 | **Changes directly made on the Device** | |
| | Changes have only an impact on the device and not on the instance data set. Instance data set and device may not be consistent any more. | |
| | Load Configure and Diagnosis Parameters | |

*Table 20: Status Line Icons*

## 7.4 Working with netX Configuration and Diagnostic Utility

After the **netX Configuration and Diagnostic Utility** has been started, the **Select Network / Language Icon Bar** is activated. All the other firmware / language buttons are greyed out. The **Device Identification** shows the information about the connected cifX.

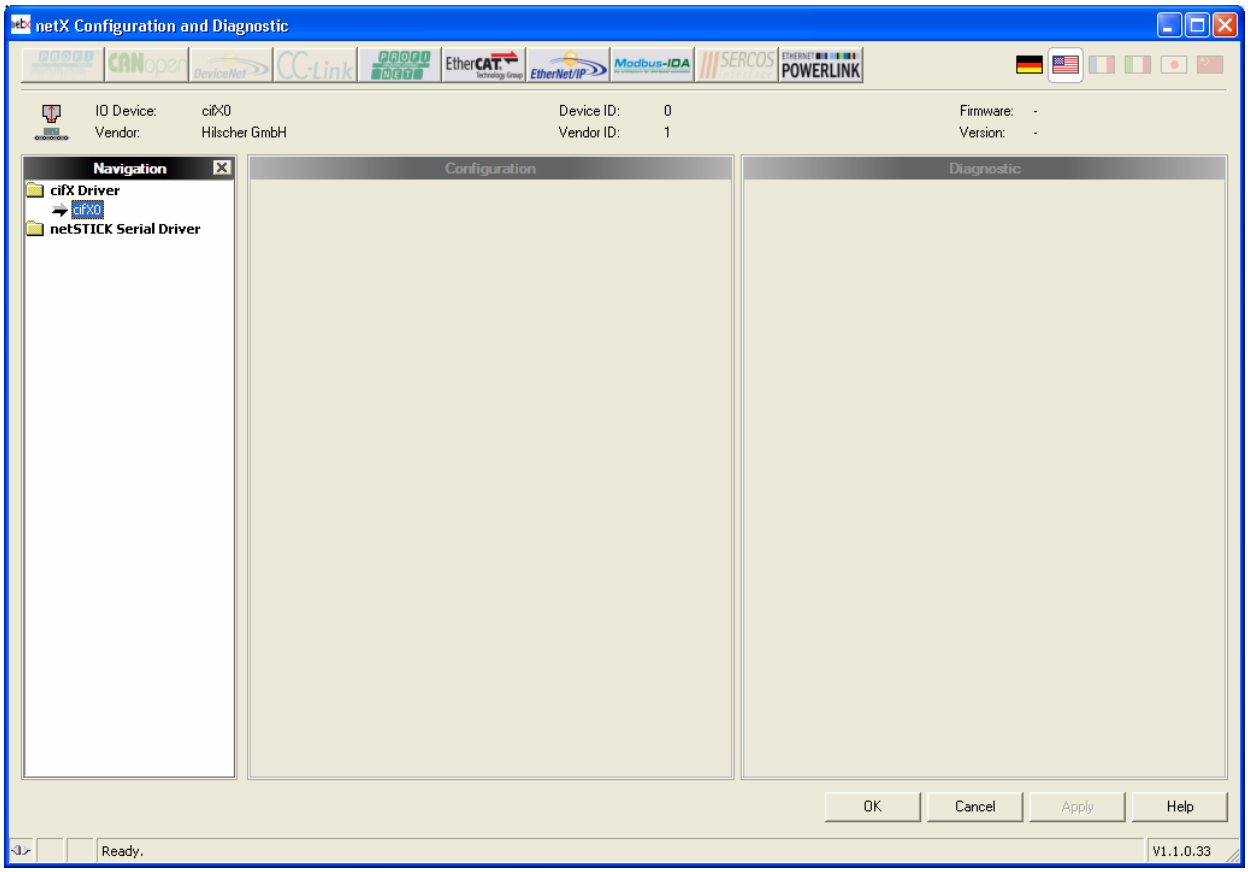



*Figure 11: netX Configuration and Diagnostic Utility*

### 7.4.1 Selecting Language / Firmware, downloading Firmware

1. In the **Select Language Icon Bar** select the language icon for the language in which the graphical user interface shall be displayed.

| Icon | Language |
|---|---|
|  | English |
|  | Japanese |
|  | Italian |
|  | French |
|  | German |
|  | Chinese |

*Table 21: Select Language Icon Bar (only English yet)*

➪ The graphical user interface of the **netX Configuration and Diagnostic Utility** is displayed in the corresponding language.

2. Selecting Firmware Protocol.

**Real-Time Ethernet**

| Firmware Button | Firmware |
|---|---|
|  | EtherNet/IP-Adapter (Slave) |
|  | Powerlink Controlled Node / Slave |
|  | PROFINET IO-Device |
|  | EtherCAT-Slave |
|  | SERCOS III Slave |
|  | Open Modbus/TCP |

**Fieldbus**

| Firmware Button | Firmware |
|---|---|
|  | PROFIBUS DP-Slave |
|  | CC-Link Slave |
|  | DeviceNet Slave |
|  | CANopen Slave |

*Table 22: Select Network Icon Bar: Firmware Buttons Real-Time Ethernet and Fieldbus System*

➢ Select in the **Select Network Icon Bar** the firmware button for the Slave device you intend to use with the cifX.

3. Set parameters.

4. Download Firmware.

➢ Activate the **Apply** button.

➪ The selected firmware/configuration is directly downloaded to the cifX device. The download is signaled in the status line.

### 7.4.2 Configuration

The actual parameters of the selected firmware protocol are displayed in the **Configuration** window. The configuration parameters can be edited. With the **Default** button the parameters can be reset to the default state.

➢ Click to the **Configuration** window to put the focus on it.

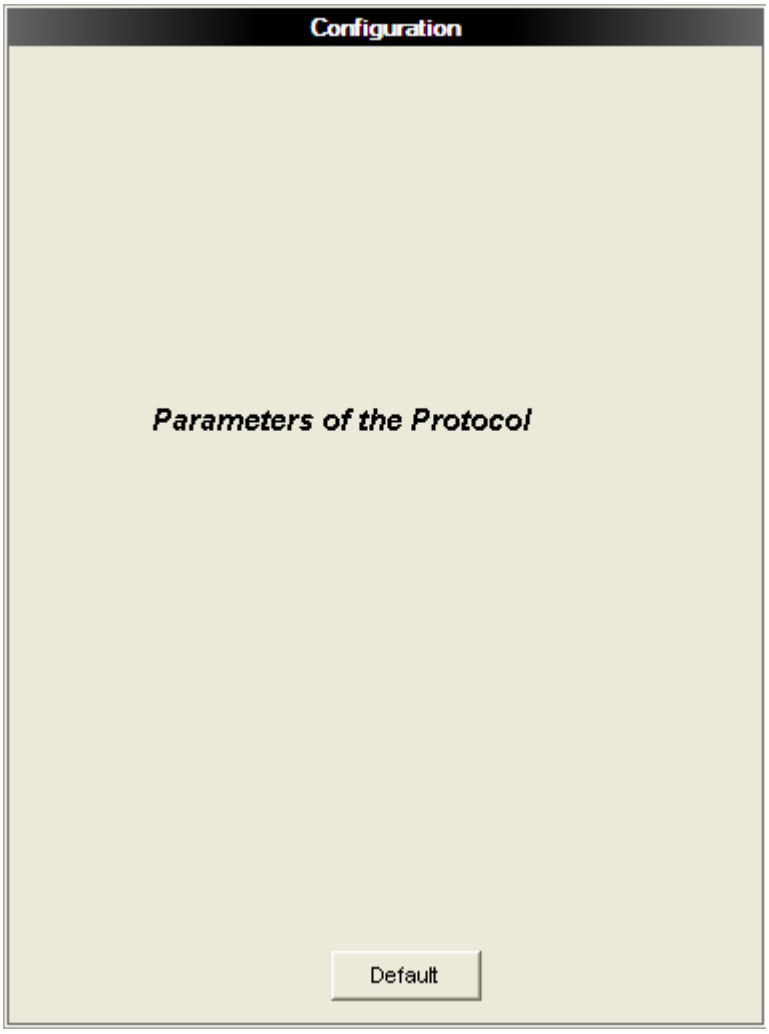



*Figure 12: Configuration Window*

**Note:** For the description of the single parameters refer to section ***Fehler! Verweisquelle konnte nicht gefunden werden.*** on page **Fehler! Textmarke nicht definiert.**.

| Section | Subsection | Manual Page |
|---|---|---|
| ***Fehler! Verweisquelle konnte nicht gefunden werden.*** | *EtherCAT Slave Parameters* | *81* |
| | *EtherNet/IP Adapter Parameters* | *82* |
| | *Open Modbus/TCP Parameters* | *84* |
| | *Powerlink Controlled Node / Slave Parameters* | *86* |
| | *PROFINET IO-Device Parameters* | *88* |
| | *SERCOS III Slave Parameters* | *89* |

*T able 23: Descriptions Configuration Windows*

### 7.4.3 Diagnostics

The **Diagnostic** window displays:

- **System** and **Communicating** status information,
- 16 Bit **Input** / **Output** data,
- the **SYS** and **COM** LED status,
- and the buttons for the functions: **Start COM** Start Communication, **Stop COM** Stop Communication and **Reset** Reset Device.

➢ Click to the **Diagnostic** window to put the focus on it.

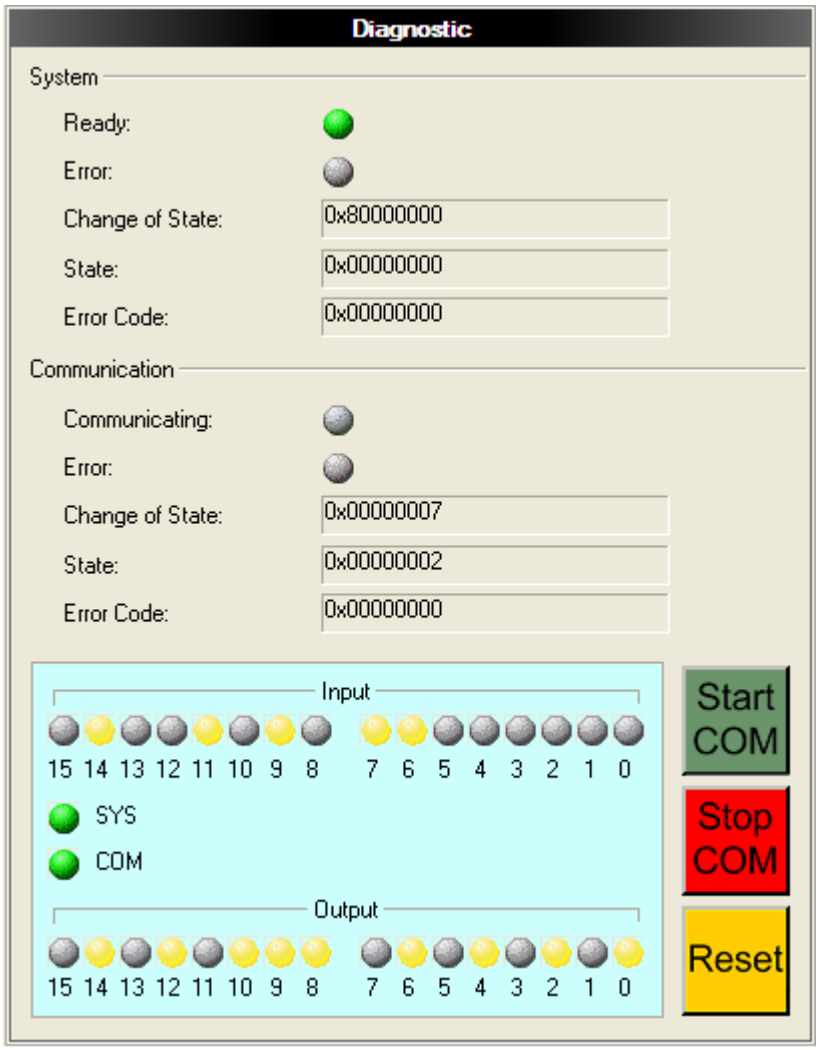



*Figure 13: Diagnostic Window*

### 7.4.3.1 Diagnostic: System

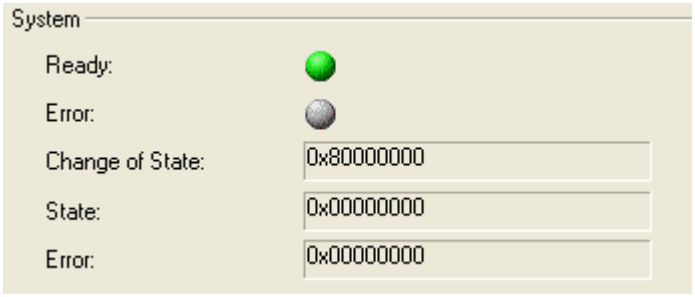



*Figure 14: Diagnostic Window > System*

| Display | Meaning |
|---|---|
| Ready  | Indicates, that the firmware has been started correctly. The firmware waits for a configuration. |
| Error  | Indicates, that the firmware reports an error. |
| Change of State | The system change of state field contains information of the current operating status of the communication channel. |
| State | The system status field holds information regarding netX operating system rcX. The value indicates the current state the rcX has. |
| Error | The system error field holds information about the general status of the netX firmware stacks. An error code of zero indicates a faultless system. |

*Table 24: Diagnostic Window > System*

### 7.4.3.2 Diagnostic: Communication

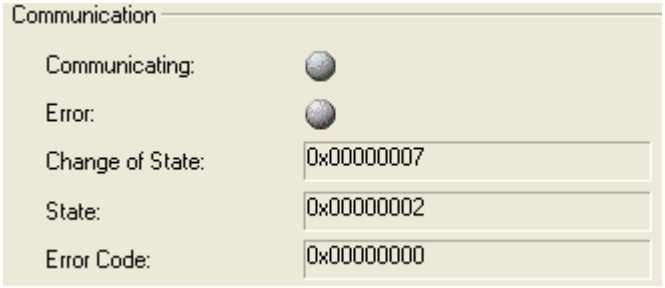



*Figure 15: Diagnostic Window > Communication*

| Display | Meaning |
|---|---|
| Communicating  | Indicates, that the cifX takes part in the network communication. |
| Error  | Indicates, that the firmware reports an error. |
| Change of State | The communication change of state register contains information about the current operating status of the communication channel and its firmware. |
| State | The communication state field contains information regarding the current network status of the communication channel. |
| Error | This field holds the current error code of the communication channel. If the cause of error is resolved, the communication error field is set to zero again. |

*Table 25: Diagnostic Window > System, Communication*

### 7.4.3.3 Diagnostic: Input / Output, SYS / COM

**Input / Output**

Under **Input / Output** the state of the respective input or output signal is displayed for the first two Byte of the transmitted data.

➢ To set the inputs, click to the corresponding input symbol.

➪ The input symbol is displayed in the corresponding color.

If the Master sends data, the outputs are set.

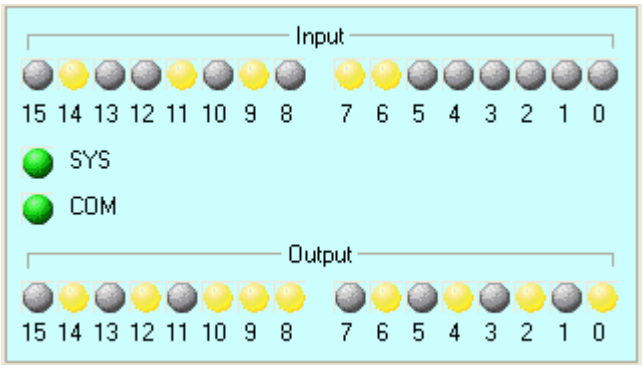



*Figure 16: Diagnostic Window > Input, Output, Start COM, Stop COM, Reset*

**SYS / COM**

Under SYS / COM the state of the respective LED is displayed.

Further information to this you find in section *LED Real Time Ethernet Systems* beginning from page 58

### 7.4.3.4 Diagnostic: Start COM, Stop COM, Reset

| Button | Meaning |
|---|---|
| Start COM | With the **Start COM** button the communication to the Master can be started. |
| Stop COM | With the **Stop COM** button the communication to the Master can be stopped. |
| Reset | With the **Reset** button the device can be reset. |

*Table 26: Start COM, Stop COM, Reset*

# 8 Troubleshooting

**General**

➢ Check, if the requirements for cifX card operation are served:

Further information to this you find in section *Requirements for Operation* on page 18.

**LINK-LED**

➢ Check using the LINK LED status, if a connection to the Ethernet is established.

Further information to this you find in chapter *LED Real Time Ethernet Systems* on page 58.

**Cable**

➢ Check that the pin occupation of the used cable is correct.

**Configuration**

➢ Check the configuration in the Master and the Slave device. The configuration has to match.

**Diagnostic using the netX Configuration and Diagnostic Utility (Slave)**

With the menu **netX Configuration and Diagnostic Utility > Diagnostics** the diagnosis information of the Slave device is shown. The shown diagnostic information depends on the used protocol.

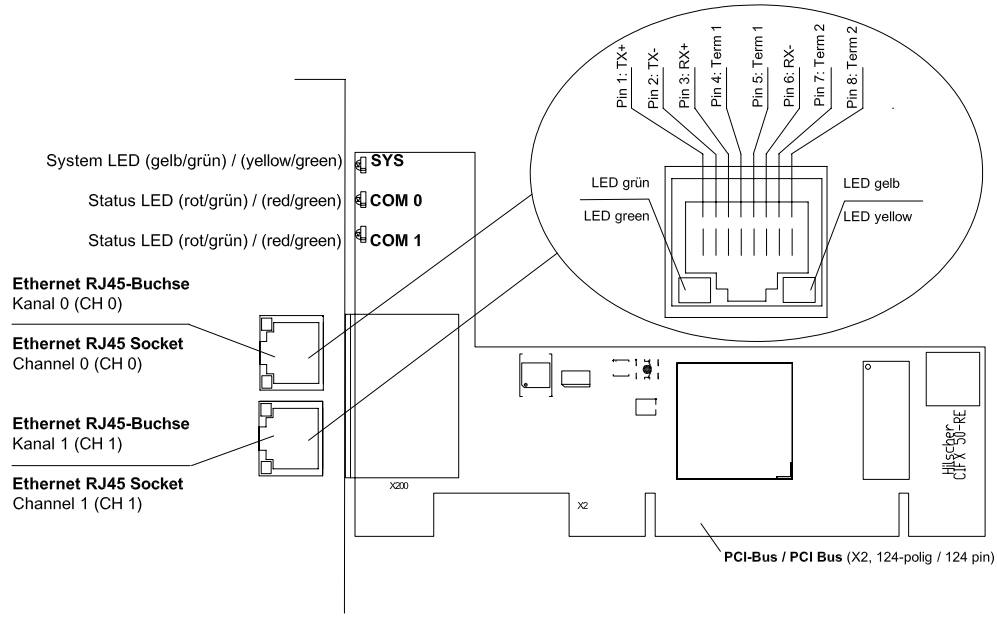
**Diagnostic using the System Configurator SYCON.net (Master)**

With the menu **Online > Diagnosis** the diagnosis information of the Master device is shown. The shown diagnostic information depends on the used protocol.

**Note:** More information about the device diagnosis and its functions you find in the operating manual of the corresponding Real Time Ethernet system. Therefore refer to section *Documentations cifX Cards* on page 10.

# 9 Device Drawings and Connections

## 9.1 Device Drawing CIFX 50-RE




**Note:**

Device supports Auto Crossover Function

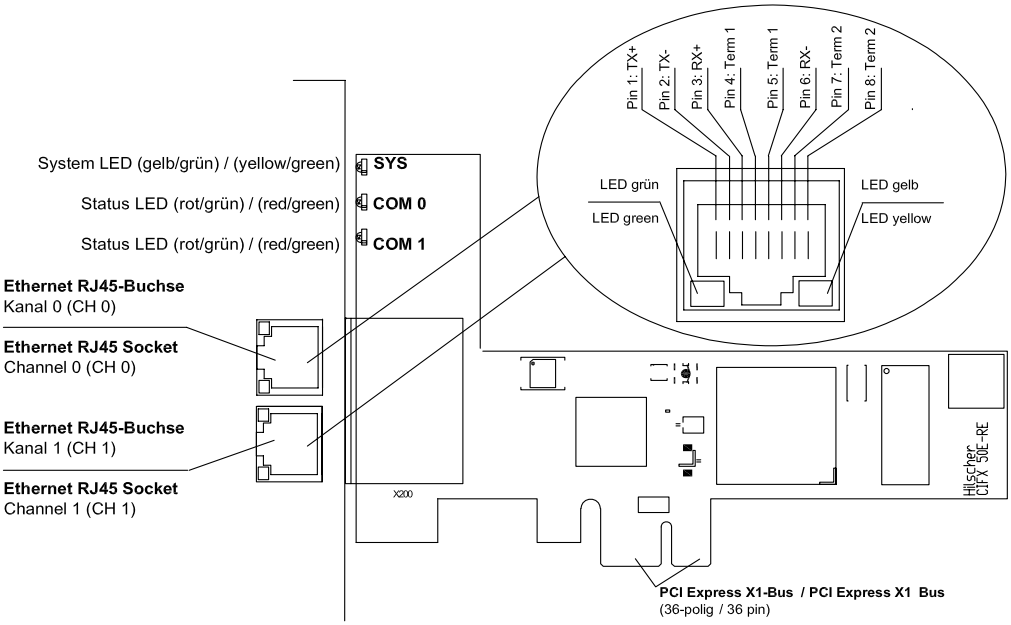
**Note:**

With loaded EtherNet/IP-Adapter, Scanner or EtherCAT Master firmware only channel 0 can be used, channel 1 is deactivated.

*Figure 17: Device Drawing CIFX 50-RE*

The meaning of the yellow and green LED at the RJ45 socket depends from the loaded firmware. See section *LED Real Time Ethernet Systems* beginning from page 58.

## 9.2 Device Drawing CIFX 50E-RE




**Note:**

Device supports Auto Crossover Function

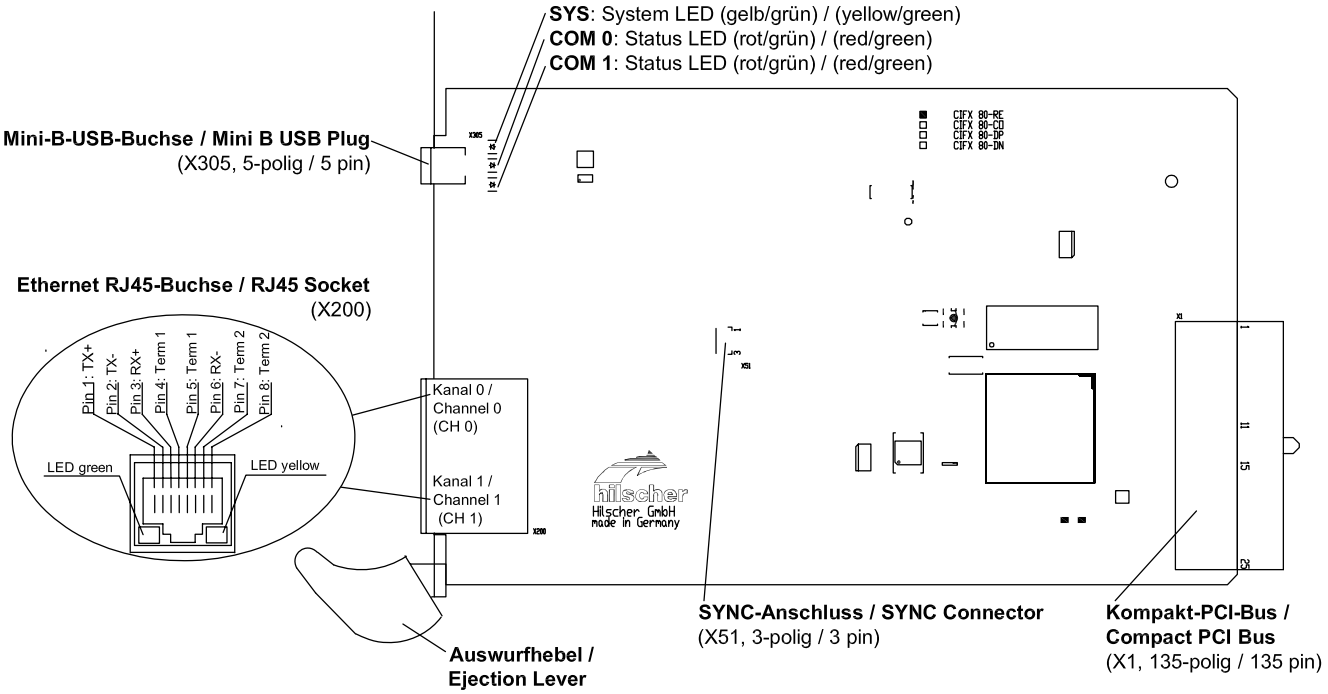
**Note:**

With loaded EtherNet/IP-Adapter, Scanner or EtherCAT Master firmware only channel 0 can be used, channel 1 is deactivated.

*Figure 18: Device Drawing CIFX 50E-RE*

The meaning of the yellow and green LED at the RJ45 socket depends from the loaded firmware. See section *LED Real Time Ethernet Systems* beginning from page 58.

# 9.3 Device Drawing CIFX 80-RE




**Note: Device supports Auto Crossover Function**

**Note:** With loaded EtherNet/IP-Adapter, Scanner or EtherCAT Master firmware only channel 0 can be used, channel 1 is deactivated.

*Figure 19: Device Drawing CIFX 80-RE*

The meaning of the yellow and green LED at the RJ45 socket depends from the loaded protocol. See section *LED Real Time Ethernet Systems* beginning from page 58.

# 9.4 Device Drawing CIFX 90-RE

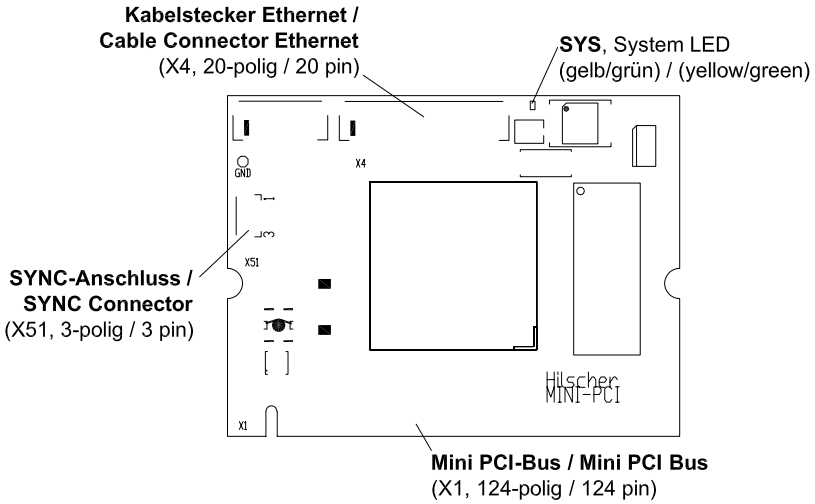
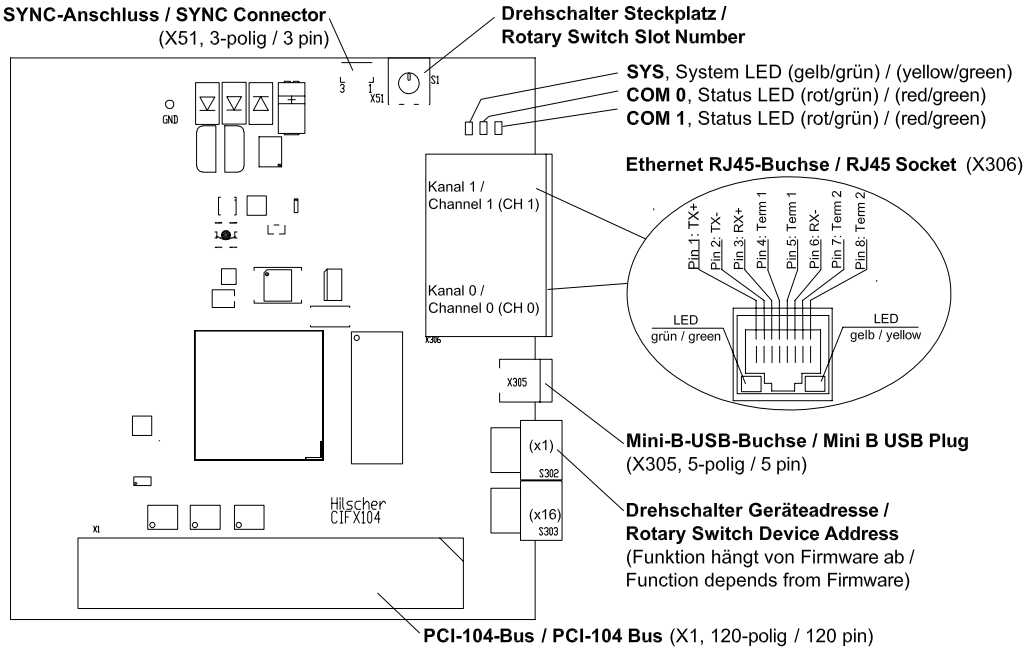



*Figure 20: Device Drawing CIFX 90-RE*

# 9.5 Device Drawing CIFX 104C-RE




**Note:**

Device supports Auto Crossover Function

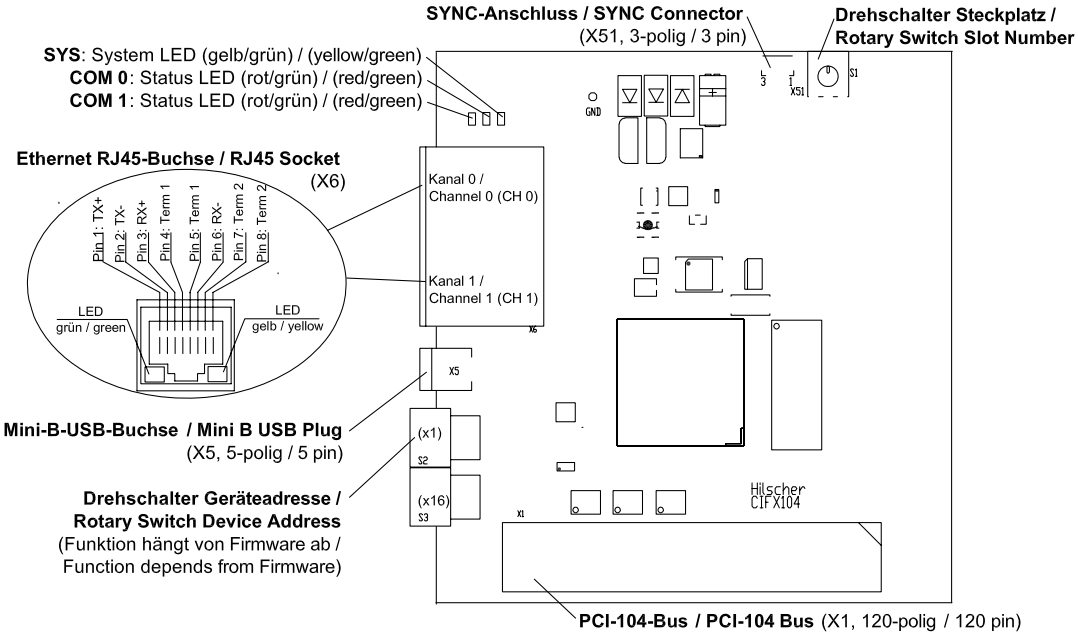
**Note:**

With loaded EtherNet/IP-Adapter, Scanner or EtherCAT Master firmware only channel 0 can be used, channel 1 is deactivated.

*Figure 21: Device Drawing CIFX 104C-RE*

The meaning of the yellow and green LED at the RJ45 socket depends from the loaded firmware. See section *LED Real Time Ethernet Systems* beginning from page 58.

# 9.6 Device Drawing CIFX 104C-RE-R




**Note:**

Device supports Auto Crossover Function

**Note**

With loaded EtherNet/IP-Adapter, Scanner or EtherCAT Master firmware only channel 0 can be used, channel 1 is deactivated.

*Figure 22: Device Drawing CIFX 104C-RE-R*

The meaning of the yellow and green LED at the RJ45 socket depends from the loaded firmware. See section *LED Real Time Ethernet Systems* beginning from page 58.

# 9.7 Device Drawing CIFX 104C-RE\F

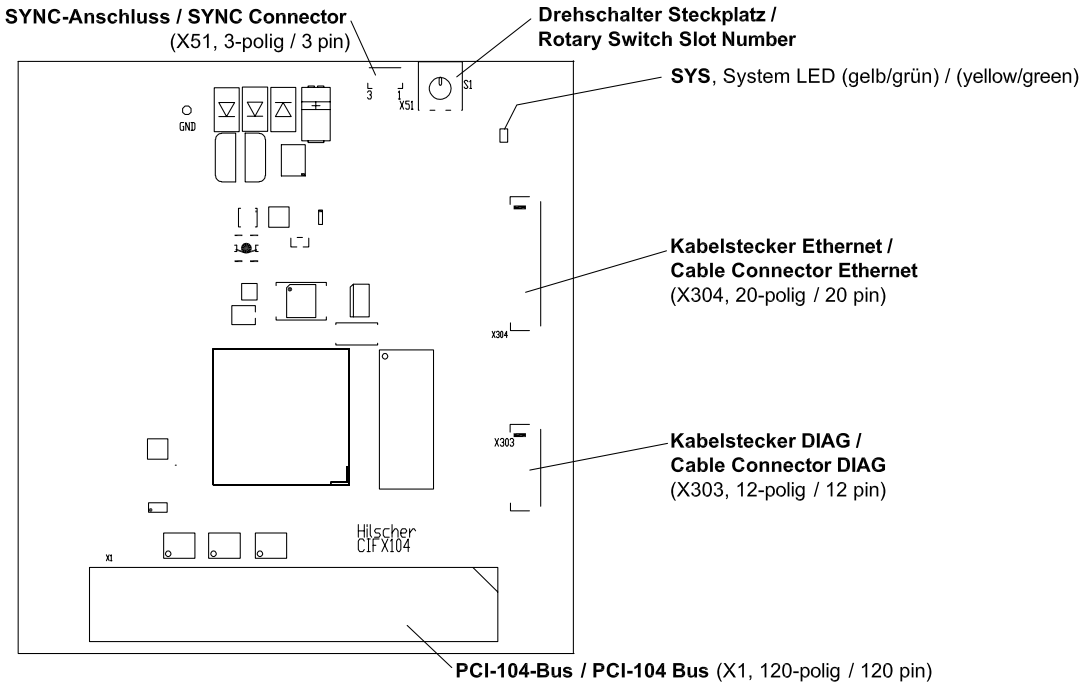



*Figure 23: Device Drawing CIFX 104C-RE\F*

# 9.8 Device Drawing CIFX 104C-RE-R\F

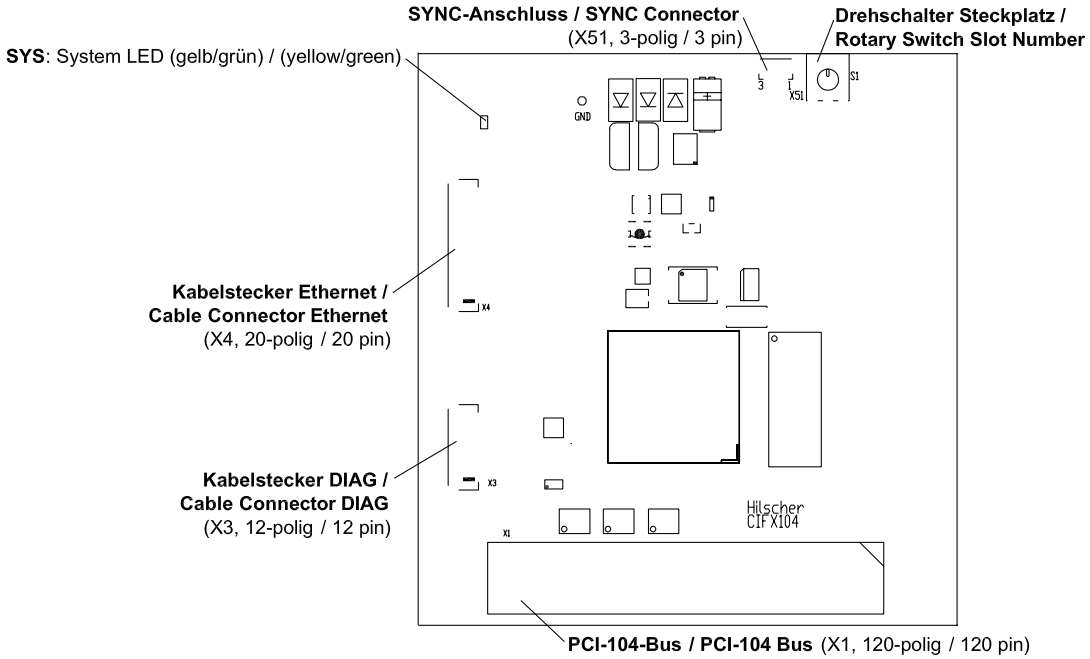
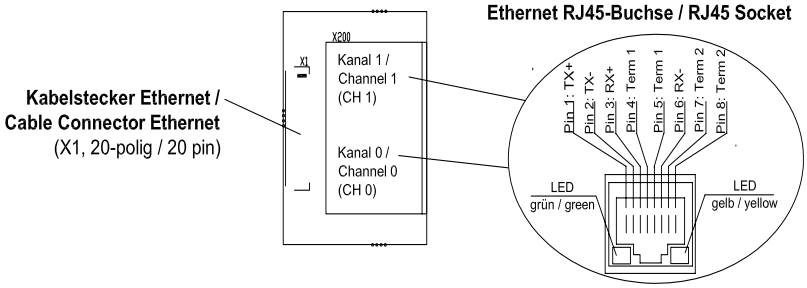



*Figure 24: Device Drawing CIFX 104C-RE-R\F*

# 9.9 Device Drawing Connection Interface AIFX-RE

Only for CIFX 104C-RE\F, CIFX 104C-RE-R\F and CIFX 90-RE.




**Note:**

Device supports Auto Crossover Function

**Note**

With loaded EtherNet/IP-Adapter, Scanner or EtherCAT Master firmware only channel 0 can be used, channel 1 is deactivated.

*Figure 25: Device Drawing Connection Interface AIFX-RE*

The meaning of the yellow and green LED at the RJ45 socket depends from the loaded firmware. See section *LED Real Time Ethernet Systems* beginning from page 58.

# 9.10 Device Drawing Diagnosis Interface AIFX-DIAG

Only for CIFX 104C-RE\F and CIFX 104C-RE-R\F.

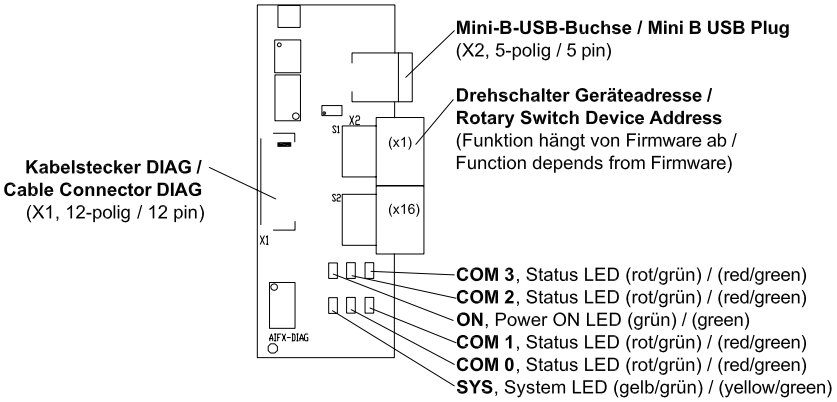



*Figure 26: Device Drawing Diagnosis Interface AIFX-DIAG*

# 9.11 Ethernet Interface

For the Ethernet interface use RJ45 plugs and twisted pair cable of category 5 (CAT5) or higher, which consists of 4 twisted cores and has a maximum transmission rate of 100 MBit/s (CAT5).

## 9.11.1 Ethernet pinning at the RJ45 Socket

**Note:** The device supports the Auto Crossover function. Due to this fact RX and TX can be switched. The following figure shows the RJ45 standard pinning.

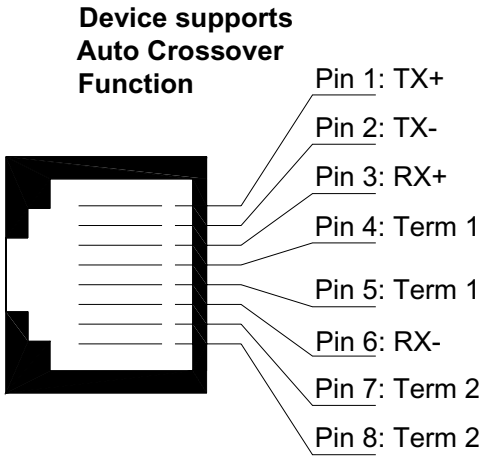



*Figure 27: Ethernet pinning at the RJ45 Socket*

| Pin | Signal | Meaning |
|---|---|---|
| 1 | TX+ | Transmit Data + |
| 2 | TX– | Transmit Data – |
| 3 | RX+ | Receive Data + |
| 4 | Term 1 | Connected to each other and terminated to PE through RC circuit* |
| 5 | Term 1 | |
| 6 | RX– | Receive Data – |
| 7 | Term 2 | Connected to each other and terminated to PE through RC circuit* |
| 8 | Term 2 | |
| * Bob Smith Termination | | |

*Table 27: Ethernet pinning at the RJ45 Socket*

## 9.11.2 Ethernet Connection Data

| | |
|---|---|
| Medium | 2 x 2 Twisted-Pair cupric cable, CAT5 (100 MBit/s) |
| Length of cable | max. 100 m |
| Transmission rate | 10 MBit/s / 100 MBit/s |

*Table 28: Ethernet Connection Data*

### 9.11.3 Use of Hubs and Switches

For the corresponding communication systems the use of hubs and switches is forbidden or applicable. The following table shows the use of hubs and switches by communication system:

| Communication System | Hub | Switch |
|---|---|---|
| **EtherCAT** | forbidden | applicable only between Master and 1. participant |
| **PROFINET IO** | forbidden | applicable only, if the switch supports ‘priority tagging’ (100 MBit/s, Full duplex) |
| **EtherNet/IP** | allowed | applicable (10 MBit/s / 100 MBit/s, Full or Half Duplex, Auto-Negotiation) |
| **SERCOS III** | forbidden | forbidden |

*Table 29: Use of Hubs and Switches*

## 9.12 Mini-B USB Connector (5 Pin)

Only for CIFX 80-RE, CIFX 104C-RE, CIFX 104C-RE-R.
For CIFX 104C-RE\F, CIFX 104C-RE-R\F when using the AIFX-DIAG.

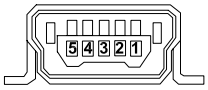



*Figure 28: Mini-B USB Connector (5 Pin), S302*

| Pin | Name | Description |
|---|---|---|
| 1 | USB_EXT | USB Bus Power (+5 V, supplied externally) |
| 2 | D- | Data - |
| 3 | D+ | Data + |
| 4 | ID | Not connected |
| 5 | GND | Ground |

*Table 30: Pin out, S302*

## 9.13 Rotary Switch for Slot Number

Only for CIFX 104C devices

The *Rotary Switch for Slot Number* is used for setting the physical slot number. Max. 4 modules can be plugged on each other. Each slot setting can be used only one time. The module next to the host controller gets the CLK 0, the following modules get the next higher CLK number.

| Switch Position | Module No. Slot | CLK | ID Select | INT |
|---|---|---|---|---|
| 0, 4, 8 | 1 | CLK 0 | IDSEL 0 | INTA |
| 1, 5, 9 | 2 | CLK 1 | IDSEL 1 | INTB |
| 2, 6 | 3 | CLK 2 | IDSEL 2 | INTC |
| 3, 7 | 4 | CLK 3 | IDSEL 3 | INTD |

*Table 31: Rotary Switch for Slot Number, S1*

# 9.14 Cable Connector

## 9.14.1 Pinning for Cable Connector Ethernet

Only for CIFX 104C-RE\F (X304), CIFX 104C-RE-R\F (X4) and CIFX 90-RE (X4).

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +3V3 Analog |
| 3 | STA0_green |
| 4 | STA0_red |
| 5 | XM0_TX |
| 6 | STA1_green |
| 7 | CH0_LINKn |
| 8 | CH0_ACTIVITY |
| 9 | AIFINIT |
| 10 | STA1_red |
| 11 | CH0_TXP |
| 12 | CH0_TXN |
| 13 | CH0_RXP |
| 14 | CH0_RXN |
| 15 | CH1_TXP |
| 16 | CH1_TXN |
| 17 | CH1_RXP |
| 18 | CH1_RXN |
| 19 | CH1_LINKn |
| 20 | CH1_ACTIVITY |

*Table 32: Pinning for Cable Connector Ethernet X4 or X304 – Cable 20 pin Ethernet + Status LED*

### 9.14.2 Pinning for Cable Connector DIAG

Only for CIFX 104C-RE\F (X303), CIFX 104C-RE-R\F (X3).

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +3V3 |
| 3 | STA2 |
| 4 | STA3 |
| 5 | USB_POS |
| 6 | USB_NEG |
| 7 | RDYn |
| 8 | RUNn |
| 9 | STA0_green |
| 10 | STA0_red |
| 11 | STA1_green |
| 12 | STA1_red |

*Table 33: Pinning for Cable connector DIAG X3 or X303 - Cable 12 pin USB + Status LED*

### 9.14.3 Pinning for SYNC Connector, X51

Only for CIFX 80-RE, CIFX 90-RE, CIFX 104C-RE, CIFX 104C-RE-R, CIFX 104C-RE\F, CIFX 104C-RE-R\F.

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | IO_0 XMAC3 |
| 3 | IO_1 XMAC3 |

*Table 34: Pinning for SYNC Connector, X51*

# 10 LED

## 10.1 LED Real Time Ethernet Systems

### 10.1.1 LED Names for each Real Time Ethernet System

**Note:** Depending from the loaded cifX firmware the cifX LED are configured to the corresponding real-time Ethernet system.

| cifX-LED | | EtherCAT Master | EtherCAT Slave | EtherNet/IP | Powerlink | Open Modbus/TCP | PROFINET IO | SERCOS III |
|---|---|---|---|---|---|---|---|---|
| SYS (yellow / green) | | SYS | SYS | SYS | SYS | SYS | SYS | SYS |
| COM 0 (red/ green) | | RUN | RUN | MS | BS | RUN | SF | STA |
| COM 1 (red/ green) | | ERR | ERR | NS | BE | ERR | BF | ERR |
| RJ45 Ch0 | green | LINK | L/A IN | LINK | L/A | LINK | LINK | L/A |
| | yellow | ACT | - | ACT | - | ACT | RX/TX | - |
| RJ45 Ch1 | green | - | L/A OUT | LINK | L/A | LINK | LINK | L/A |
| | yellow | - | - | ACT | - | ACT | RX/TX | - |

*Table 35: LED Names for each Real Time Ethernet System*

| LED | Name | Meaning |
|---|---|---|
| System Status | SYS | System |
| Communication Status | RUN | Run |
| | ERR | Error |
| | STA | Status |
| | SF | System Failure |
| | BF | Bus Failure |
| | MS | Module Status |
| | NS | Network Status |
| | BS | Bus Status |
| | BE | Bus Error |
| RJ45 | LINK, L | Link |
| | ACT, A | Activity |
| | L/A | Link/Activity |
| | L/A IN | Link/Activity Input |
| | L/A OUT | Link/Activity Output |

*Table 36: Meaning LED Names*

## 10.1.2 LED EtherCAT Master

| LED | Color | State | Meaning |
|---|---|---|---|
| **SYS** | green | On | Operating System running |
| | yellow | Flashing cyclic with 1Hz | Device indicates boot error |
| | yellow | static | Bootloader is waiting for booting procedure |
| | - | Off | Power supply for the device is missing or hardware defect |
| **RUN** | - | Off | **INIT:** The device is in state INIT |
| | green | Blinking | **PRE-OPERATIONAL:** The device is in state PRE-OPERATIONAL |
| | green | Flickering | **BOOT:** Device is in Boot mode |
| | green | Single Flash | **SAFE-OPERATIONAL:** The device is in state SAFE-OPERATIONAL |
| | green | On | **OPERATIONAL:** The device is in state OPERATIONAL |
| **ERR** | - | Off | Master has no errors |
| | red | On | Master has detected a communication error. The error is indicated in the DPM |
| **LINK** / RJ45 Ch0 & Ch1 | green | On | A link is established |
| | - | Off | No link established |
| **ACT** / RJ45 Ch0 & Ch1 | yellow | Flashing | The device sends/receives Ethernet frames |

*Table 37: EtherCAT Master*

**RUN and ERR LED Indicator States EtherCAT Master:**

| Indicator state | Definition |
|---|---|
| On | The indicator is constantly on. |
| Off | The indicator is constantly off. |
| Blinking | The indicator turns on and off phase with a frequency of 2,5 Hz: on for 200 ms followed by off for 200 ms. |
| Flickering | The indicator turns on and off phase with a frequency of approximately 10 Hz: on for approximately 50 ms followed by off for 50 ms. |
| Single Flash | The indicator shows one short flash (200 ms) followed by a long off phase (1,000 ms). |
| Double Flash | The indicator shows a sequence of two short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms). |

*Table 38: Indicator States EtherCAT Master*

### 10.1.3 LED EtherCAT Slave

| LED | Color | State | Meaning |
|---|---|---|---|
| **SYS** | green | On | Operating System running |
| | yellow | Flashing cyclic with 1Hz | Device indicates boot error |
| | yellow | static | Bootloader is waiting for booting procedure |
| | - | Off | Power supply for the device is missing or hardware defect |
| **RUN** | - | Off | **INIT:** The device is in state INIT |
| | green | Blinking | **PRE-OPERATIONAL:** The device is in state PRE-OPERATIONAL |
| | green | Single Flash | **SAFE-OPERATIONAL:** The device is in state SAFE-OPERATIONAL |
| | green | On | **OPERATIONAL:** The device is in state OPERATIONAL |
| **ERR** | - | Off | **No error:** The EtherCAT communication of the device is in working condition |
| | red | Blinking | **Invalid Configuration:** General Configuration Error (Example: State change commanded by master is impossible due to register or object settings.) |
| | red | Single Flash | **Unsolicited State Change:** Slave device application has changed the EtherCAT state autonomously: Parameter "Change" in the AL status register is set to 0x01:change/error (Example: Synchronization Error, device enters Safe-Operational automatically.) |
| | red | Double Flash | **Application Watchdog Timeout:** An application watchdog timeout has occurred. (Example: Sync Manager Watchdog timeout) |
| | red | On | **PDI Watchdog Timeout:** A PDI Watchdog timeout has occurred (Example: Application controller is not responding any more) |
| **L/A IN** / RJ45 Ch0 & Ch1 | green | On | A link is established |
| | green | Flashing | The device sends/receives Ethernet frames |
| | - | Off | No link established |
| **L/A OUT** / RJ45 Ch0 & Ch1 | yellow | - | - |

*Table 39: EtherCAT Slave*

**RUN and ERR LED Indicator States EtherCAT Slave:**

| Indicator state | Definition |
|---|---|
| On | The indicator is constantly on. |
| Off | The indicator is constantly off. |
| Blinking | The indicator turns on and off phase with a frequency of 2,5 Hz: on for 200 ms followed by off for 200 ms. |
| Single Flash | The indicator shows one short flash (200 ms) followed by a long off phase (1,000 ms). |
| Double Flash | The indicator shows a sequence of two short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms). |

*Table 40: Indicator States EtherCAT Slave*

### 10.1.4 LED EtherNet/IP Scanner (Master)

| LED | Color | State | Meaning |
|---|---|---|---|
| **SYS** | green | On | Operating System running. |
| | yellow | Flashing cyclic with 1Hz | Device indicates boot error. |
| | yellow | static | Bootloader is waiting for booting procedure. |
| | - | Off | Power supply for the device is missing or hardware defect. |
| **MS** | green | On | **Device operational:** If the device is operating correctly, the module status indicator shall be steady green. |
| | green | Flashing | **Standby:** If the device has not been configured, the module status indicator shall be flashing green. |
| | red | On | **Major fault:** If the device has detected a non-recoverable major fault, the module status indicator shall be steady red. |
| | red | Flashing | **Minor fault*:** If the device has detected a recoverable minor fault, the module status indicator shall be flashing red. NOTE: An incorrect or inconsistent configuration would be considered a minor fault. (*for future use ) |
| | red / green | Flashing | **Self-test:** While the device is performing its power up testing, the module status indicator shall be flashing green / red. |
| | - | Off | **No power:** If no power is supplied to the device, the module status indicator shall be steady off. |
| **NS** | green | On | **Connected:** If the device has at least one established connection (even to the Message Router), the network status indicator shall be steady green. |
| | green | Flashing | **No connections:** If the device has no established connections, but has obtained an IP address, the network status indicator shall be flashing green. |
| | red | On | **Duplicate IP*:** If the device has detected that its IP address is already in use, the network status indicator shall be steady red. (*For future use ) |
| | red | Flashing | **Connection timeout:** If one or more of the connections in which this device is the target has timed out, the network status indicator shall be flashing red. This shall be left only if all timed out connections are reestablished or if the device is reset. |
| | red / green | Flashing | **Self-test:** While the device is performing its power up testing, the network status indicator shall be flashing green / red. |
| | - | Off | **Not powered, no IP address:** If the device does not have an IP address (or is powered off), the network status indicator shall be steady off. |
| **LINK** / RJ45 Ch0 & Ch1 | green | On | A connection to the Ethernet exists |
| | - | Off | The device has no connection to the Ethernet |
| **ACT** / RJ45 Ch0 & Ch1 | yellow | Flashing | The device sends/receives Ethernet frames |

*Table 41: EtherNet/IP Scanner (Master)*

### 10.1.5 LED EtherNet/IP Adapter (Slave)

| LED | Color | State | Meaning |
|---|---|---|---|
| **SYS** | green | On | Operating System running. |
| | yellow | Flashing cyclic with 1Hz | Device indicates boot error. |
| | yellow | static | Bootloader is waiting for booting procedure. |
| | - | Off | Power supply for the device is missing or hardware defect. |
| **MS** | green | On | **Device operational:** If the device is operating correctly, the module status indicator shall be steady green. |
| | green | Flashing | **Standby:** If the device has not been configured, the module status indicator shall be flashing green. |
| | red | On | **Major fault:** If the device has detected a non-recoverable major fault, the module status indicator shall be steady red. |
| | red | Flashing | **Minor fault*:** If the device has detected a recoverable minor fault, the module status indicator shall be flashing red. NOTE: An incorrect or inconsistent configuration would be considered a minor fault. (* For future use) |
| | red / green | Flashing | **Self-test:** While the device is performing its power up testing, the module status indicator shall be flashing green / red. |
| | - | Off | **No power:** If no power is supplied to the device, the module status indicator shall be steady off. |
| **NS** | green | On | **Connected:** If the device has at least one established connection (even to the Message Router), the network status indicator shall be steady green. |
| | green | Flashing | **No connections:** If the device has no established connections, but has obtained an IP address, the network status indicator shall be flashing green. |
| | red | On | **Duplicate IP*:** If the device has detected that its IP address is already in use, the network status indicator shall be steady red. (* For future use) |
| | red | Flashing | **Connection timeout:** If one or more of the connections in which this device is the target has timed out, the network status indicator shall be flashing red. This shall be left only if all timed out connections are reestablished or if the device is reset. |
| | red / green | Flashing | **Self-test:** While the device is performing its power up testing, the network status indicator shall be flashing green / red. |
| | - | Off | **Not powered, no IP address:** If the device does not have an IP address (or is powered off), the network status indicator shall be steady off. |
| **LINK /** RJ45 Ch0 & Ch1 | green | On | A connection to the Ethernet exists |
| | - | Off | The device has no connection to the Ethernet |
| **ACT /** RJ45 Ch0 & Ch1 | yellow | Flashing | The device sends/receives Ethernet frames |

*Table 42: EtherNet/IP Adapter (Slave)*

### 10.1.6 LED Open Modbus/TCP

| LED | Color | State | Meaning |
|---|---|---|---|
| **SYS** | green | On | Operating System running. |
| | yellow | Flashing cyclic with 1Hz | Device indicates boot error. |
| | yellow | static | Bootloader is waiting for booting procedure. |
| | - | Off | Power supply for the device is missing or hardware defect. |
| **RUN** | - | Off | **Not Ready**<br>OMB task is not ready |
| | green | Flashing cyclic with 1Hz | **Ready, not configured yet**<br>OMB task is ready and not configured yet |
| | green | Flashing cyclic with 5Hz | **Waiting for Communication:**<br>OMB task is configured |
| | green | On | **Connected:**<br>OMB task has communication – at least one TCP connection is established |
| **ERR** | - | Off | No communication error |
| | red | Flashing cyclic with 2Hz (On/Off Ratio = 25 %) | System error |
| | red | On | Communication error active |
| **LINK** / RJ45 Ch0 & Ch1 | green | On | A connection to the Ethernet exists |
| | - | Off | The device has no connection to the Ethernet |
| **ACT** / RJ45 Ch0 & Ch1 | yellow | Flashing | The device sends/receives Ethernet frames |

*Table 43: LED Open Modbus/TCP*

## 10.1.7 LED Powerlink Controlled Node / Slave

| LED | Color | State | Meaning |
|---|---|---|---|
| **SYS** | green | On | Operating System running. |
| | yellow | Flashing cyclic with 1Hz | Device indicates boot error. |
| | yellow | static | Bootloader is waiting for booting procedure. |
| | - | Off | Power supply for the device is missing or hardware defect. |
| **BS** | - | Off | Slave initializing |
| | green | Flickering | Slave is in Basic Ethernet state |
| | | Single Flash | Slave is in Pre-Operational 1 |
| | | Double Flash | Slave is in Pre-Operational 2 |
| | | Triple Flash | Slave is in ReadyToOperate |
| | | On | Slave is Operational |
| | | Blinking | Slave is Stopped |
| **BE** | - | Off | Slave has no error |
| | red | On | Slave has detected an error |
| **L/A** / RJ45 Ch0 & Ch1 | green | On | **Link**: A connection to the Ethernet exists |
| | green | Flashing | **Activity**: The device sends/receives Ethernet frames |
| | - | Off | The device has no connection to the Ethernet |
| RJ45 Ch0 & Ch1 | yellow | - | - |

*Table 44: LED Powerlink Controlled Node / Slave*

**RUN / ERR LED Indicator Powerlink Controlled Node / Slave:**

| Indicator state | Definition |
|---|---|
| On | The indicator is constantly on. |
| Off | The indicator is constantly off. |
| Flickering | The indicator turns on and off phase with a frequency of approximately 10 Hz: on for approximately 50 ms followed by off for 50 ms. Red and green LED shall be on alternately. |
| Blinking | The indicator turns on and off phase with a frequency of approximately 2,5 Hz: on for approximately 200 ms followed by off for 200 ms. Red and green LED shall be on alternately. |
| Single Flash | The indicator shows one short flash (approximately 200 ms) followed by a long off phase (approximately 1,000 ms). |
| Double Flash | The indicator shows a sequence of two short flashes (each approximately 200 ms), separated by a short off phase (approximately 200 ms). The sequence is finished by a long off phase (approximately 1,000 ms). |
| Triple Flash | The indicator shows a sequence of three short flashes (each approximately 200 ms), separated by a short off phase (approximately 200 ms). The sequence is finished by a long off phase (approximately 1,000 ms). |

*Table 45: Indicator States Powerlink Controlled Node / Slave*

### 10.1.8 LED PROFINET IO-RT Controller

| LED | Color | State | Meaning |
|---|---|---|---|
| **SYS** | green | On | Operating System running |
| | yellow | Flashing cyclic at 1Hz | Device indicates boot error |
| | yellow | Static | Bootloader is waiting for booting procedure |
| | - | Off | Power supply for the device is missing or hardware defect |
| **SF** | red | On | *(***together** *with BF „red ON“)*<br>**No valid Master license** |
| | red | Flashing cyclic at 2 Hz | **System error**: Invalid configuration |
| | - | Off | No error |
| **BF** | red | On | **No Connection:** No Link.<br>*or (***together** *with SF „red ON“)*<br>**No valid Master license** |
| | red | Flashing cyclic at 2 Hz | **Configuration fault:** not all configured IO-Devices are connected. |
| | - | Off | No error |
| **LINK** / RJ45 Ch0 & Ch1 | green | On | A connection to the Ethernet exists |
| | - | Off | The device has no connection to the Ethernet |
| **RX/TX** / RJ45 Ch0 & Ch1 | yellow | Flashing | The device sends/receives Ethernet frames |

*Table 46: PROFINET IO-RT Controller*

### 10.1.9 LED PROFINET IO-RT-Device

| LED | Color | State | Meaning |
|---|---|---|---|
| **SYS** | green | On | Operating System running |
| | yellow | Flashing cyclic at 1Hz | Device indicates boot error |
| | yellow | static | Bootloader is waiting for booting procedure |
| | - | Off | Power supply for the device is missing or hardware defect |
| **SF** | red | On | Watchdog timeout; channel, generic or extended diagnosis present; system error |
| | red | Flashing cyclic at 2 Hz (for 3 sec.) | DCP signal service is initiated via the bus |
| | - | Off | No error |
| **BF** | red | On | No configuration; or low speed physical link; or no physical link |
| | red | Flashing cyclic at 2 Hz | No data exchange |
| | - | Off | No error |
| **LINK** / RJ45 Ch0 & Ch1 | green | On | A connection to the Ethernet exists |
| | - | Off | The device has no connection to the Ethernet |
| **RX/TX** / RJ45 Ch0 & Ch1 | yellow | Flashing | The device sends/receives Ethernet frames |

*Table 47: PROFINET IO-RT-Device*

## 10.1.10 LED SERCOS III Slave

| LED | Color | State | Meaning |
|---|---|---|---|
| **SYS** | green | On | Operating System running. |
| | yellow | Flashing cyclic with 1Hz | Device indicates boot error. |
| | yellow | static | Bootloader is waiting for booting procedure. |
| | - | Off | Power supply for the device is missing or hardware defect. |
| **STA** | green | Blinking | **CP0:** Communication phase 0 |
| | green | Single Flash | **CP1:** Communication phase 1 |
| | green | Double Flash | **CP2:** Communication phase 2 |
| | green | Triple Flash | **CP3:** Communication phase 3 |
| | green | On | **CP4:** Communication phase 4 |
| | - | Off | **NRT:** Non Real-time Mode |
| **ERR** | red | On | Error |
| | - | Off | No error |
| **L/A** / RJ45 Ch0 & Ch1 | green | On | Link: A connection to the Ethernet exists |
| | green | Flashing | Activity: The device sends/receives Ethernet frames |
| | - | Off | The device has no connection to the Ethernet |
| RJ45 Ch0 & Ch1 | yellow | - | - |

*Table 48: SERCOS III Slave*

**RUN and STA LED Indicator States SERCOS III Slave:**

| Indicator state | Definition |
|---|---|
| On | The indicator is constantly on. |
| Off | The indicator is constantly off. |
| Blinking | The indicator turns on and off phase with a frequency of 2,5 Hz: on for 200 ms followed by off for 200 ms. |
| Single Flash | The indicator shows one short flash (200 ms) followed by a long off phase (1,000 ms). |
| Double Flash | The indicator shows a sequence of two short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms). |
| Triple Flash | The indicator shows a sequence of three short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms). |

*Table 49: Indicator States SERCOS III Slave*

# 11 Technical Data

## 11.1 Technical Data cifX Real-Time Ethernet Cards

**Note:** All technical data are temporarily and can be altered without notice.

### 11.1.1 CIFX 50-RE

| Item | CIFX 50-RE |
|---|---|
| **System Interface** | PCI, 32-Bit Dual-Port Memory |
| **Dual-Port Memory Size** | 64 KBytes |
| **Function** | Real-Time-Ethernet |
| **Communication** | Determined by the loaded firmware |
| **Protocols** | EtherCAT-Master, EtherCAT-Slave,<br>EtherNet/IP-Scanner (Master), EtherNet/IP-Adapter (Slave),<br>Open Modbus/TCP,<br>Powerlink Controlled Node / Slave,<br>PROFINET IO-Controller, PROFINET IO-Device,<br>SERCOS III-Slave |
| **Ethernet Frame Types** | Ethernet II |
| **Processor** | netX 500 |
| **LED** | SYS, COM 0, COM 1, 2x Link, 2x Activity |
| **GUI cifX** | netX Configuration and Diagnostic Utility |
| **Transmission Rate** | 10/100 MBit/s, Auto-Negotiation, Cross-Over,<br>Halfduplex/Fullduplex (100 MBit/s)<br>Depending on used firmware |
| **Ethernet Interface** | RJ45 Socket, 10 Base-T, 100 Base-TX, potential free |
| **Power Supply** | +3,3 V ±5 % / 600 mA |
| **Dimensions (L x W x D)** | 120,0 x 73,2 x 18,5 mm |
| **Operating Temperature** | 0 °C ... 55 °C |

*Table 50: Technical Data CIFX 50-RE*

### 11.1.2 CIFX 50E-RE

| Item | CIFX 50E-RE |
|---|---|
| **System Interface** | PCI-Express, Single-Lane Port, 32-Bit Dual-Port Memory |
| **Dual-Port Memory Size** | 64 KBytes |
| **Function** | Real-Time-Ethernet |
| **Communication** | Determined by the loaded firmware |
| **Protocols** | EtherCAT-Master, EtherCAT-Slave,<br>EtherNet/IP-Scanner (Master), EtherNet/IP-Adapter (Slave),<br>Open Modbus/TCP,<br>Powerlink Controlled Node / Slave,<br>PROFINET IO-Controller, PROFINET IO-Device,<br>SERCOS III-Slave |
| **Ethernet Frame Types** | Ethernet II |
| **Processor** | netX 500 |
| **LED** | SYS, COM 0, COM 1, 2x Link, 2x Activity |
| **GUI cifX** | netX Configuration and Diagnostic Utility |
| **Transmission Rate** | 10/100 MBit/s, Auto-Negotiation, Cross-Over,<br>Halfduplex/Fullduplex (100 MBit/s)<br>Depending on used firmware |
| **Ethernet Interface** | RJ45 Socket, 10 Base-T, 100 Base-TX, potential free |
| **Power Supply** | +3,3 V ±5 % / 600 mA |
| **Dimensions (L x W x D)** | 120,0 x 77,6 x 18,5 mm |
| **Operating Temperature** | 0 °C ... 55 °C |

*Table 51: Technical Data CIFX 50E-RE*

### 11.1.3 CIFX 80-RE

| Item | CIFX 80-RE |
|---|---|
| **System Interface** | Compact PCI (3,3 V) |
| **Dual-Port Memory Size** | 64 KBytes |
| **Function** | Real-Time-Ethernet |
| **Communication** | Determined by the loaded firmware |
| **Protocols** | EtherCAT-Master, EtherCAT-Slave,<br>EtherNet/IP-Scanner (Master), EtherNet/IP-Adapter (Slave),<br>Open Modbus/TCP,<br>Powerlink Controlled Node / Slave,<br>PROFINET IO-Controller, PROFINET IO-Device,<br>SERCOS III-Slave |
| **Ethernet Frame Types** | Ethernet II |
| **Processor** | netX 500 |
| **LED** | SYS, COM 0, COM 1, 2x Link, 2x Activity |
| **GUI cifX** | netX Configuration and Diagnostic Utility |
| **Transmission Rate** | 10/100 MBit/s, Auto-Negotiation, Cross-Over,<br>Halfduplex/Fullduplex (100 MBit/s) |
| **Ethernet Interface** | RJ45 Socket, 10 Base-T, 100 Base-TX, potential free |
| **Power Supply** | +3,3 V ±5 % / 600 mA |
| **Dimensions (L x W x D)** | 100,0 x 160,0 x 9,4 mm |
| **Operating Temperature** | -20 °C ... 55 °C |

*Table 52: Technical Data CIFX 80-RE*

### 11.1.4 CIFX 90-RE

| Item | CIFX 90-RE |
|---|---|
| **System Interface** | Mini-PCI-Socket (3,3 V), Type III System Connector |
| **Dual-Port Memory Size** | 64 KBytes |
| **Function** | Real-Time-Ethernet |
| **Communication** | Determined by the loaded firmware |
| **Protocols** | EtherCAT-Master, EtherCAT-Slave,<br>EtherNet/IP-Scanner (Master), EtherNet/IP-Adapter (Slave),<br>Open Modbus/TCP,<br>Powerlink Controlled Node / Slave,<br>PROFINET IO-Controller, PROFINET IO-Device,<br>SERCOS III-Slave |
| **Ethernet Frame Types** | Ethernet II |
| **Processor** | netX 500 |
| **LED** | SYS |
| **GUI cifX** | netX Configuration and Diagnostic Utility |
| **Transmission Rate** | 10/100 MBit/s, Auto-Negotiation, Cross-Over,<br>Halfduplex/Fullduplex (100 MBit/s)<br>Depending on used firmware |
| **Interface AIFX-RE** | Cable Connector Ethernet<br>for connecting connection interface AIFX-RE |
| **Power Supply** | +3,3 V ±5 % / 600 mA |
| **Dimensions (L x W x D)** | 60,0 x 44,6 x 9,4 mm |
| **Operating Temperature** | -20 °C ... 70 °C |

*Table 53: Technical Data CIFX 90-RE*

### 11.1.5 CIFX 104C-RE, CIFX 104C-RE-R, CIFX 104C-RE\F, CIFX 104C-RE-R\F

| Item | CIFX 104C-RE, CIFX 104C-RE-R,<br>CIFX 104C-RE\F, CIFX 104C-RE-R\F |
|---|---|
| **System Interface** | PCI Slot for PC/104 cards (3,3 V) |
| **Dual-Port Memory Size** | 64 KBytes |
| **Function** | Real-Time-Ethernet |
| **Communication** | Determined by the loaded firmware |
| **Protocols** | EtherCAT-Master, EtherCAT-Slave,<br>EtherNet/IP-Scanner (Master), EtherNet/IP-Adapter (Slave),<br>Open Modbus/TCP,<br>Powerlink Controlled Node / Slave,<br>PROFINET IO-Controller, PROFINET IO-Device,<br>SERCOS III-Slave |
| **Ethernet Frame Types** | Ethernet II |
| **Processor** | netX 500 |
| **LED** | SYS, COM 0, COM 1, 2x Link, 2x Activity |
| **GUI cifX** | netX Configuration and Diagnostic Utility |
| **Transmission Rate** | 10/100 MBit/s, Auto-Negotiation, Cross-Over,<br>Halfduplex/Fullduplex (100 MBit/s)<br>Depending on used firmware |
| **Ethernet Interface** | For CIFX 104C-RE, CIFX 104C-RE-R :<br>RJ45 Socket, 10 Base-T, 100 Base-TX, potential free |
| **Interface AIFX-RE** | For CIFX 104C-RE\F, CIFX 104C-RE-R\F :<br>Cable Connector Ethernet for connecting AIFX-RE |
| **Diagnostic Interface** | For CIFX 104C-RE\F, CIFX 104C-RE-R\F :<br>Cable Connector DIAG |
| **Power Supply** | +3,3 V ±5 % / 600 mA |
| **Dimensions (L x W x D)** | 96,0 x 90,2 x 26,5 mm |
| **Operating Temperature** | -20 °C ... 55 °C |

*Table 54: Technical Data CIFX 104C-RE, CIFX 104C-RE-R, CIFX 104C-RE\F, CIFX 104C-RE-R\F*

### 11.1.6 AIFX-RE

| | |
|---|---|
| **Item** | AIFX-RE |
| **Function** | Connection Interface Ethernet |
| **Interface cifX-RE Cards** | For CIFX 90-RE, CIFX 104C-RE\F, CIFX 104C-RE-R\F : Cable Connector Ethernet for connecting AIFX-RE |
| **Ethernet Interface** | RJ45 Socket, 10 Base-T, 100 Base-TX, potential free |
| **Transmission Rate** | 10/100 MBit/s, Auto-Negotiation, Cross-Over, Halfduplex/Fullduplex (100 MBit/s) Depending on used firmware |
| **Dimensions (L x W x D)** | 42,5 x 30,6 x 18,5 mm |
| **Operating Temperature** | -20 °C ... 70 °C |

*Table 55: Technical Data AIFX-RE*

### 11.1.7 AIFX-DIAG

| | |
|---|---|
| **Item** | AIFX-DIAG |
| **Function** | Diagnostic Interface |
| **Diagnostic Interface** | For CIFX 104C-RE\F, CIFX 104C-RE-R\F : Cable Connector DIAG |
| **Dimensions (L x W x D)** | 53,5 x 23,3 x 14,7 mm |
| **Operating Temperature** | -20 °C ... 70 °C |
| **LED** | SYS, COM 0, COM 1, COM 2, COM 3, ON |

*Table 56: Technical Data AIFX-DIAG*

# 11.2 Protocols

## 11.2.1 EtherCAT Master

| Parameter | Description |
|---|---|
| Maximum number of cyclic input data | 5760 bytes |
| Maximum number of cyclic output data | 5760 bytes |
| Minimum bus cycle time | 500 microseconds |
| Acyclic communication | CoE (CANopen over EtherCAT)<br>CoE-Upload, CoE-Download<br>max. 1500 bytes |
| Functions | Get OD List<br>Emergency<br>Slave diagnostics |
| Topology | Line |
| Baud rate | 100 MBit/s |
| Data transport layer | Ethernet II, IEEE 802.3 |
| Configuration File | Max. 1 MByte |

*Table 57: EtherCAT Master*

## 11.2.2 EtherCAT Slave

| Parameter | Description |
|---|---|
| Maximum number of cyclic input data | 400 bytes (netX 100/netX 500) |
| Acyclic communication | SDO<br>SDO Master-Slave<br>SDO Slave-Slave (depending on Master capability) |
| Type | Complex Slave |
| Functions | Emergency |
| FMMUs | 3 (netX 100/netX 500) |
| SYNC Manager | 4 (netX 100/500) |
| Baud rate | 100 MBit/s |
| Data transport layer | Ethernet II, IEEE 802.3 |

*Table 58: EtherCAT Slave*

### 11.2.3 EtherNet/IP Scanner (Master)

| Parameter | Description |
|---|---|
| Maximum number of total cyclic input data | 5760 bytes |
| Maximum number of total cyclic output data | 5760 bytes |
| Maximum number of supported connections | 64 connections for implicit and explicit |
| Maximum number of cyclic input data | 504 bytes/slave/telegram |
| Maximum number of cyclic output data | 504 bytes/slave/telegram |
| IO Connection type | Cyclic, minimum 2 ms * |
| Maximum number of unscheduled data | 1400 bytes per telegram |
| UCMM, Class 3 | supported |
| Explicit Messages, Client and Server Services | Get_Attribute_Single/All<br>Set_Attribute_Single/All |
| Predefined standard objects | Identity Object<br>Message Route Object<br>Assembly Object<br>Connection Manager<br>Ethernet Link Object<br>TCP/IP Object |
| Maximal number of user specific objects | 20 |
| DHCP | supported |
| BOOTP | supported |
| Baud rates | 10 and 100 MBit/s |
| Data transport layer | Ethernet II, IEEE 802.3 |
| * depending on used number of connections and used number of input and output data | |

*Table 59: EtherNet/IP Scanner (Master)*

### 11.2.4 EtherNet/IP Adapter (Slave)

| Parameter | Description |
|---|---|
| Maximum number of input data | 504 bytes |
| Maximum number of output data | 504 bytes |
| IO Connection | 1 explicit owner, up to 2 listen only |
| IO Connection type | Cyclic, minimum 2 ms |
| Explicit Messages | Get_Attribute, Set_Attribute |
| UCMM | supported |
| Max. number of user specific objects | 20 |
| Max. number of connections | 8, explicit and implicit connections |
| Predefined standard objects | Identity Object<br>Message Route Object<br>Assembly Object<br>Connection Manager<br>Ethernet Link Object<br>TCP/IP Object |
| DHCP | supported |
| BOOTP | supported |
| Baud rates | 10 and 100 MBit/s |
| Data transport layer | Ethernet II, IEEE 802.3 |

*Table 60: EtherNet/IP Adapter (Slave)*

### 11.2.5 Open Modbus/TCP

| Parameter | Description |
|---|---|
| Maximum number of input data | 5760 bytes |
| Maximum number of output data | 5760 bytes |
| Acyclic communication | Read/Write Register, Max. 125 Registers per Read Telegram (FC 3, 4, 23), Max. 121 Registers per Write Telegram (FC 23), Max. 123 Registers per Write Telegram (FC 6)<br>Read/Write Coil, Max. 2000 Coils per Read Telegram (FC 1, 2), Max. 1968 Coils per Write Telegram (FC 15) |
| Modbus Function Codes | 1, 2, 3, 4, 5, 6, 7, 15, 16, 23 |
| Mode | Message Mode: Client, Server (I/O data area is not used in this mode)<br>I/O Mode: Server |
| Baud rates | 10 and 100 MBit/s |
| Data transport layer | Ethernet II, IEEE 802.3 |

*Table 61: Open Modbus/TCP*

### 11.2.6 Powerlink Controlled Node / Slave

| Parameter | Description |
|---|---|
| Maximum number of cyclic input data | 1490 bytes |
| Maximum number of cyclic output data | 1490 bytes |
| Acyclic data transfer | SDO Upload/Download |
| Functions: | SDO over ASND and UDP |
| Baud rate | 100 MBit/s, half-duplex |
| Data transport layer | Ethernet II, IEEE 802.3 |
| Ethernet Powerlink version | V 2 |

*Table 62: Powerlink Controlled Node / Slave*

### 11.2.7 PROFINET IO-RT-Controller

| Parameter | Description |
|---|---|
| Maximum number of total cyclic input data | 3072 bytes |
| Maximum number of total cyclic output data | 3072 bytes |
| Maximum number of cyclic input data | 1024 bytes per device (= IOCR data length) |
| Maximum number of cyclic output data | 1024 bytes per device (= IOCR data length) |
| Maximum number of configured devices | 128 |
| Acyclic communication | Read/Write Record<br>Limited to 1392 bytes per telegram<br>Limited to 4096 bytes per request |
| Alarm processing | yes |
| DCP | supported |
| Context management by CL-RPC | |
| Minimum cycle time | 1ms<br>Different IO-Devices can be configured with different cycle times |
| Baud rate | 100 MBit/s<br>Full-Duplex mode |
| Data transport layer | Ethernet II, IEEE 802.3 |
| Configuration File | Max. 1 MByte |
| Limitations | RT over UDP not supported<br>Multicast communication not supported<br>DHCP is not supported (neither for PROFINET IO-Controller nor for the IO-Devices)<br>Only one IOCR per IO-Device<br>Using cycle time of less than 4ms reduces the maximum amount of connected devices to 25<br>NameOfStation of IO-Controller CANNOT be set using the DCP SET NameOfStation service but only at start-up while configuring the IO-Controller<br>SNMP not supported<br>LLDP not supported |

*Table 63: PROFINET IO-RT-Controller*

### 11.2.8 PROFINET IO-RT-Device

| Parameter | Description |
|---|---|
| Maximum number of cyclic input data | 1024 bytes |
| Maximum number of cyclic output data | 1024 bytes |
| Maximum number of all submodules | 80 |
| Maximum slot address | 300 |
| Maximum subslot address | 100 |
| Acyclic communication | Read/Write Record, max. 1024 bytes/telegram |
| Alarm Types | Process Alarm, Diagnostic Alarm, Return of SubModule, Plug Alarm, Pull Alarm |
| DCP | supported |
| Used Protocols (subset) | UDP, IP, ARP, ICMP (Ping) |
| Topology recognition | LLDP, SNMP V1, MIB2, physical device |
| VLAN- and priority tagging | yes |
| Context Management by CL-RPC | |
| Minimum cycle time | 1ms<br>IO-Device can be configured with different cycle times |
| Baud rate | 100 MBit/s |
| Data transport layer | Ethernet II, IEEE 802.3 |

*Table 64: PROFINET IO-RT-Device*

### 11.2.9 SERCOS III Slave

| Parameter | Description |
|---|---|
| Maximum number of cyclic input data | 200 bytes (including Device Control, Connection Control) |
| Maximum number of cyclic output data | 200 bytes (including Device Status, Connection Control) |
| Maximum number of applicable device addresses | 1 |
| Minimum cycle time | 250µs |
| Topology | Line and ring |
| Acyclic communication (Service Channel) | Read/Write/Standard Commands |
| NRT Channel supported | yes |
| Communication phases | NRT, CP0, CP1, CP2, CP3, CP4 |
| Baud rate | 100 MBit/s |
| Data transport layer | Ethernet II, IEEE 802.3 |
| Supported SERCOS III version: | Communication Specification Version 1.1 |
| Supported SERCOS Communication Profiles | SCP_VarCFG, SCP_NRT, SCP_Sync |

*Table 65: SERCOS III Slave*

**Note:** The Firmware is based on the SERCOS III specification V1.1.

# 12 Configuration Parameters

## 12.1.1 EtherCAT Slave Parameters

| Parameter | Meaning | Range of Value / Value |
|---|---|---|
| **Interface** | | |
| Bus Startup | Communication start application controlled or automatic | Application controlled, Automatic |
| Watchdog Time [ms] | Watchdog time within which the device watchdog must be retriggered from the application program while the application program monitoring is activated. When the watchdog time value is equal to 0 the watchdog respectively the application program monitoring is deactivated. | [0, 20 … 65535] ms, default = 1000 ms, 0 = Off |
| I/O Data Status | Status of the input or the output data.<br>For each input and output date the following status information (in Byte) is memorized in the dual-port memory:<br>Status 0 = None (default)<br>Status 1 = 1 Byte (for future use)<br>Status 2 = 4 Byte (for future use) | None, (1 Byte, 4 Byte) |
| **Ident** | | |
| Vendor ID | Identification number of the manufacturer | 0 … ($2^{32}$ - 1), Hilscher: 044 (hex) |
| Product Code | Product code of the device | 0 … ($2^{32}$ - 1), Default: CIFX RE ECS: 0x00000001 NXSTK 50-RE ECS: 0x00000008 |
| Revision Number | Revision number of the device | 0 … ($2^{32}$ - 1), Default: CIFX RE ECS: 0x00020000 NXSTK 50-RE ECS: 0x00000000 |
| Serial Number | Serial number of the device | 0 … ($2^{32}$ - 1) |
| **Data** | | |
| Input Length | Length of the input data in Byte | 0 … 400* Byte Default: 4 Byte |
| Output Length | Length of the output data in Byte | 0 … 400* Byte Default: 4 Byte |
| * Sum: The length of input and of output is equal 400 Bytes, | | |

*Table 66: EtherCAT Slave Parameters*

**Note:** To configure the Master a XML file (device description file) is required. The settings in the used Master must comply with the settings in the Slave, to establish a communication. Important parameters are: Vendor ID, Product Code, Serial Number, Revision Number, Output and Input length.

## 12.1.2 EtherNet/IP Adapter Parameters

| Parameter | Meaning | Range of Value / Value |
|---|---|---|
| **Interface** | | |
| Bus Startup | Communication start application controlled or automatic | Application controlled, Automatic |
| Watchdog Time [ms] | Watchdog time within which the device watchdog must be retriggered from the application program while the application program monitoring is activated. When the watchdog time value is equal to 0 respectively the application program monitoring is deactivated. | [0, 20 … 65535] ms, default = 1000 ms, 0 = Off |
| I/O Data Status | Status of the input or the output data.<br>For each input and output date the following status information (in Byte) is memorized in the dual-port memory:<br>Status 0 = None (default)<br>Status 1 = 1 Byte (for future use)<br>Status 2 = 4 Byte (for future use) | None, (1 Byte, 4 Byte) |
| **Ident** | | |
| Vendor ID | Identification number of the manufacturer | 283 |
| Product Type | Communication Adapter | 12 |
| Product Code | Product code of the device | CIFX RE EIS:<br>101 (hex), 257<br>NXSTK 50-RE:<br>101 (hex), 257 |
| Major Rev | Major Revision | 1 |
| Minor Rev | Minor Revision | 1 |
| Device name | Device name of the device station,<br>e. g. EtherNet/IP Adapter (Slave) | Character string,<br>0 - 31 characters |
| **Bus** | | |
| IP Address | IP address for the device | |
| Netmask | Network mask for the device | |
| Gateway | Gateway address for the device | |
| Flags | BootP:<br>If set, the device obtains its IP Address, Netmask, Gateway Address from a BOOTP server.<br>DHCP:<br>If set, the device obtains its IP Address, Netmask, Gateway Address from a DHCP server.<br>100Mbit: Speed Selection,<br>If set, the device will operate at 100 Mbit/s, else at 10 Mbit/s. This parameter will not be in effect, when auto-negotiation is active.<br>FullDuplex: Duplex Operation,<br>If set, full-duplex operation will be used. The device will operate in half-duplex mode, if this parameter is set to zero. This parameter will not be in effect, when auto-negotiation is active.<br>Auto-neg.: Auto-Negotiation,<br>If set, the device will auto-negotiate link parameters with the remote hub or switch. | Default: DHCP |
| **Data** | | |
| Input Length | Length of the input data in Byte | 0 … 504 Byte<br>Default: 2 Byte |
| Output Length | Length of the output data in Byte | 0 … 504 Byte<br>Default: 2 Byte |

*Table 67: EtherNet/IP Adapter Parameters*

**Note:** To configure the Scanner/Master an EDS file (device description file) is required. The settings in the used Scanner/Master must comply with the settings in the Adapter/Slave, to establish a communication. Important parameters are: Input, Output length, Vendor ID, Product Type, Product Code, Major Rev, Minor Rev, IP Address and Netmask.

## 12.1.3 Open Modbus/TCP Parameters

| Parameter | Meaning | Range of Value / Value |
|---|---|---|
| **Interface** | | |
| Bus Startup | Communication start application controlled or automatic | Application controlled, Automatic |
| Watchdog Time [ms] | Watchdog time within which the device watchdog must be retriggered from the application program while the application program monitoring is activated. When the watchdog time value is equal to 0 the watchdog respectively the application program monitoring is deactivated. | [0, 20 … 65535] ms, default = 1000 ms, 0 = Off |
| Mode | Mode of data exchange.<br>0: Message-Mode<br>1: IO-Mode | 0 ... **1** |
| Swap | Data-storage mode<br>0: Data will not be swapped.<br>1: Data will be swapped. | **0** ... 1 |
| **Bus** | | |
| Open Server Sockets | Server Connections<br>Number of sockets to provide for server requests*<br>*A value of 0 means that the Open Modbus/TCP task exclusive works as Client, while a Value of 16 means that the Open Modbus/TCP task exclusive works as Server in Message-Mode.<br>The parameters Send Timeout, Connect Timeout and Close Timeout are for the Timeout between the Open Modbus/TCP Task and the TCP Task. | 0 ... **4** ... 16 |
| Omb Open Time | Connection remain open time<br>Only for client jobs in message-mode. The connection to the destination-device stays open, until timeout is expired. Value is multiplied with 100 ms.<br>Note: This timeout starts, after receiving the answer to a command | 1 ... **10** ... 60000 |
| Answer Timeout | Telegram Timeout<br>Only for client jobs in message-mode. After expiration of this time, the job will be canceled and an error is send to the application. Value is multiplied with 100 ms.<br>Note: This timeout starts after command is send to the destination device via TCP | 1 ... **20** ... 60000 |
| Send Timeout | TCP Task SendTimeout Parameter<br>Parameter for TCP task (in milliseconds) . Used OMB task internal. It specifies the timeout for trying to send messages via TCP/IP<br>0 is the default value of 31000 milliseconds | **0** ...<br>2.000.000.000 |
| Connect Timeout | TCP Task Connect Timeout Parameter<br>Parameter for TCP task (in milliseconds). Used OMB task internal. It specifies the timeout for trying to establish a connection with the TCP task.<br>0 is the default value of 31000 milliseconds | **0** ...<br>2.000.000.000 |
| Close Timeout | TCP Task Close Timeout Parameter<br>Parameter for TCP task (in milliseconds). Used OMB task internal. It specifies the timeout for trying to close a connection with the TCP task.<br>0 is the default Value of 13000 milliseconds | **0** ...<br>2.000.000.000 |
| IP Address | IP address for the device. | Valid IP address |

*For more see next page*

| Parameter | Meaning | Range of Value / Value |
|---|---|---|
| Net Mask | Netmask for the subnet of the device. | Valid netmask |
| Gateway | IP address of the default gateway. | Valid IP address |
| Flags | BootP:<br>If set, the device obtains its IP Address, Netmask, Gateway Address from a BOOTP server.<br>DHCP:<br>If set, the device obtains its IP Address, Netmask, Gateway Address from a DHCP server. | 0 … 63 |

*Table 68: Open Modbus/TCP Parameters*

## 12.1.4 Powerlink Controlled Node / Slave Parameters

| Parameter | Meaning | Range of Value / Value |
|---|---|---|
| **Interface** | | |
| Bus Startup | Communication start application controlled or automatic | Application controlled, Automatic |
| Watchdog Time [ms] | Watchdog time within which the device watchdog must be retriggered from the application program while the application program monitoring is activated. When the watchdog time value is equal to 0 the watchdog respectively the application program monitoring is deactivated. | [0, 20 … 65535] ms, default = 1000 ms, 0 = Off |
| I/O Data Status | Status of the input or the output data.<br>For each input and output date the following status information (in Byte) is memorized in the dual-port memory:<br>Status 0 = None (default)<br>Status 1 = 1 Byte (for future use)<br>Status 2 = 4 Byte (for future use) | None, (1 Byte, 4 Byte) |
| Disable Host-Triggered Input Data Exchange | Bit 0 of the stack configuration flags controls the host-triggered input data exchange:<br>0 = Host-Triggered Update enabled<br>1 = Host-Triggered Update disabled | Default: Host-Triggered Update enabled |
| Disable Host-Triggered Output Data Exchange | Bit 1 of the stack configuration flags controls the host-triggered output data exchange:<br>0 = Host-Triggered Update enabled<br>1 = Host-Triggered Update disabled | Default: Host-Triggered Update enabled |
| **Ident** | | |
| Vendor ID | Identification number of the manufacturer | 44 hex |
| Serial Number | Serial number of the device | CIFX-RE: 0x00000000-0xFFFFFFFF<br>Default: 0 |
| Product Code | Product code of the device | CIFX RE PLS: 0x00000000-0xFFFFFFFF,<br>Default:1 |
| Revision Number | Revision number of the device as specified by the manufacturer | CIFX RE PLS: 0x00000000-0xFFFFFFFF<br>Default: 0 |
| **Bus** | | |
| Node Id | EPL Node ID (EPL = Ethernet Powerlink) | 1...239 |
| DNS Node Name | DNS-compatible name of the Powerlink Controlled Node / Slave | |
| Gateway Address | Gateway address for IP stack | |

*For more see next page*

| Parameter | Meaning | Range of Value / Value |
|---|---|---|
| **Data** | | |
| Input Data Bytes | Length of the input data in byte | 1… 1490 Byte,<br>Default: 4 Byte |
| Output Data Bytes | Length of the output data in byte | 1… 1490 Byte,<br>Default: 4 Byte |
| Disable PdDOMapping Version Check | Bit 4 of the stack configuration flags controls whether the mapping version field in the PReq will be checked:<br>0 = Check PReq PDO mapping version<br>1 = Do not check PReq PDO mapping version | Default: Do not check PReq PDO mapping version |
| Configure Default Objects | Bit 2 of the stack configuration flags controls whether the default objects have to be configured:<br>0 = Do not create default objects<br>1 = Create default objects<br>If the objects will be created, the old set of previously existing objects will be cleared | Default: Create default objects |
| Delete Application Objects | Bit 3 of the stack configuration flags controls whether all application objects are to be deleted.<br>0 = Do not delete application objects<br>1 = Delete application-specific objects | Default: Delete application specific objects |

*Table 69: Powerlink Controlled Node / Slave Parameters*

**Note:** To configure the Managing Node/Master a XDD file (device description file) is required. The settings in the used Managing Node/Master must comply with the settings in the Controlled Node/Slave, to establish a communication. Important parameters are: Vendor ID, Product Code, Serial Number, Revision Number, Node ID, Output and Input length.

### 12.1.5 PROFINET IO-Device Parameters

| Parameter | Meaning | Range of Value / Value |
|---|---|---|
| **Interface** | | |
| Bus Startup | Communication start application controlled or automatic | Application controlled, Automatic |
| Watchdog Time [ms] | Watchdog time within which the device watchdog must be retriggered from the application program while the application program monitoring is activated. When the watchdog time value is equal to 0 respectively the application program monitoring is deactivated. | [0, 20 … 65535] ms, default = 1000 ms, 0 = Off |
| I/O Data Status | Status of the input or the output data.<br>For each input and output date the following status information (in Byte) is memorized in the dual-port memory:<br>Status 0 = None (default)<br>Status 1 = 1 Byte (for future use)<br>Status 2 = 4 Byte (for future use) | None, (1 Byte, 4 Byte) |
| **Ident** | | |
| Vendor ID | Identification number of the manufacturer, assigned by PROFIBUS Nutzerorganisation e. V. | 0 … ($2^{32}$ - 1), Hilscher: 011E (hex) |
| Device ID | Identification number of the device, freely eligibly by the manufacturer, fixed for every device. | 0 … ($2^{16}$ - 1),<br>CIFX RE PNS:<br>103 (hex), Dez 259<br>NXSTK 50-RE PNS:<br>105 (hex), Dez 261 |
| Device Type | Description of the device type, freely eligible | Character string,<br>0 - 25 characters |
| Order ID | Hilscher device number ( e. g. 1610 100) or order description of the customer for its device | Character string,<br>0 - 20 characters |
| Name of Station | Station name of the PROFINET IO-Device station. It has to match the station name configured in the PROFINET IO-Controller for this device. Must be DNS compatible name. | Character string,<br>1 - 240 characters,<br>Default:<br>See GSDML-File |
| Type of Station | Type name of the PROFINET station; name can be assigned freely. | Character string,<br>1 - 240 characters<br>Default:<br>See GSDML-File |
| **Data** | | |
| Input Data Length | Length of the input data in Byte | 0 … 1024 Byte<br>Default: 2 Byte |
| Output Data Length | Length of the output data in Byte | 0 … 1024 Byte<br>Default: 2 Byte |

*Table 70: PROFINET IO-Device Parameters*

**Note:** To configure the Controller a GSDML file (device description file) is required. The settings in the used Controller must comply with the settings in the Device, to establish a communication. Important parameters are: Station Name, Vendor ID, Device ID, Input and Output data length.

**Note:** Under **Name of Station** the name must be typed in, which was also used in the configuration file of the master of this device. If no name chosen freely is used in the configuration file, then the name from the GSDML file is used.

### 12.1.6 SERCOS III Slave Parameters

| Parameter | Meaning | Range of Value / Value |
|---|---|---|
| Bus Startup | Communication start application controlled or automatic | Application controlled, Automatic |
| Watchdog Time [ms] | Watchdog time within which the device watchdog must be retriggered from the application program while the application program monitoring is activated. When the watchdog time value is equal to 0 respectively the application program monitoring is deactivated. | [0, 20 … 65535] ms, default = 1000 ms, 0 = Off |
| I/O Data Status | Status of the input or the output data.<br>For each input and output date the following status information (in Byte) is memorized in the dual-port memory:<br>Status 0 = None<br>Status 1 = 1 Byte<br>Status 2 = 4 Byte | None, 1 Byte, 4 Byte |
| Device Address | Address for the SERCOS III Slave.<br>The address range is from 1 to 127. | [1 … 127] |
| Object Dictionary | Location of the Object Dictionary for Service Channel: local or Host | local, Host<br>0= local<br>1= Host (not supported yet)<br>Default = 0 |
| IP Address | Flag for IP address of the SERCOS III Slave station | Default: none |
| Netmask | Flag for Network mask of the SERCOS III Slave station | Default: none |
| Gateway | Flag for Gateway address of the SERCOS III Slave station | Default: none |
| Flags | BootP:<br>If set, the device obtains its configuration from a BOOTP server.<br>DHCP:<br>If set, the device obtains its configuration from a DHCP server. | Default: none |

*Table 71: SERCOS III Slave Parameters*

# 13 Lists

## 13.1 List of Figures

## 13.2 List of Tables

# 14 Glossary

**CIFX**

**C**ommunication **I**nter**F**ace based on net**X**

**DPM**

Dual-Port Memory

**EDS**

Electronic Data Sheet

XML based device description file.

**GSDML**

General Station Description Markup Language

XML based device description file.

**netX Configuration and Diagnostic Utility**

The netX Configuration and Diagnostic Utility allows to operate cifX or netX based devices in different networks. Its graphical user interface serves as configuration tool for the installation, configuration and diagnosis of the devices.

**netX**

networX on chip, next generation of communication controllers

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