



User Manual

netJACK Communication Module Installation, Operation and Hardware Description



Hilscher Gesellschaft für Systemautomation mbH
www.hilscher.com

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1 Introduction

1.1 About this manual

1.1.1 Description of the contents

This manual describes the Hilscher netJACK communication modules for Real-Time Ethernet and Fieldbus networks.

Here you will find information on how to install, configure and operate the netJACK modules.

The netJACK communication modules are designed to be part of an “embedded system”, which means that they are to be mounted and integrated into other electronic devices or systems. In this document, the hosting electronic device, into which the netJACK is to be mounted, is referred to as “host system” of the netJACK.

The physical design of the embedded system is not described in this document. The physical design is discussed in full detail in a separate document, the *netJack Design Guide*.

A list of further documents that are relevant for the user of the netJACK is provided in section *Documentation overview* [► page 15].

**Important:**

- To avoid personal injuries or damage to electrical devices, please read this manual carefully before installing and using the netJACK communication modules.
 - Please first read the *Safety* [► page 73] chapter.
-

1.1.2 List of revisions

Index	Date	Revision
5	2017-03-30	Structure and layout of document revised.
		Versions of firmware, device description files, software tools and drivers updated.
		NJ 50D-RE removed from document.
		NJ 51D-RE for POWERLINK Controlled Node added.
		Information about new firmware versions for PROFINET IO Controller and EtherCAT Master in section <i>Important changes</i> [▶ page 9] added.
		Section <i>Contents of the product DVD</i> [▶ page 13] updated.
		Section <i>Descriptions of the LEDs</i> [▶ page 135] revised.
		Warning against implementing a separate voltage switch for netJACKs with PCI express added in section <i>Safety messages</i> [▶ page 94].
		Section <i>System requirements SYCON.net</i> [▶ page 84] revised.
		Warnung vor <i>Exceeding the maximum number of permitted write and delete accesses</i> [▶ page 77] added.
		Warnung vor <i>Power drop during write and delete accesses in the file system</i> [▶ page 77] added.
		Technical data of devices NJ 51D-RE, NJ 100DN-RE, NJ 100DN-CO and NJ 100DN-DN updated.
		Technical data of the following protocols in section <i>Technical Data of the Real-Time Ethernet Systems</i> [▶ page 178] updated: PROFINET IO Controller V3 EtherCAT Master V4 POWERLINK Controlled Node V3 PROFINET IO Device V3.10 Sercos Slave EtherNet/IP Scanner EtherNet/IP Adapter Open Modbus/TCP
6	2017-08-30	Identification of input/output channels of VARAN Client in section <i>Front view of netJACK with VARAN Client</i> [▶ page 132] added.
		Information about new firmware version for POWERLINK Controlled Node in section <i>New firmware version V3 for POWERLINK Controlled Node</i> added.

Index	Date	Revision
7	2021-06-23	<p>NJ 52D-DPS added in document.</p> <p>NJ 10D-COS, NJ 10D-CCS, NJ 10D-DNS and NJ 10D-DPS removed from document.</p> <p>netX Configuration Tool removed from document.</p> <p>Sections <i>Front view netJACK with CC-Link</i>, <i>LEDs CC-Link Slave</i>, <i>Pinning CC-Link interface</i> and <i>Technical data CC-Link Slave</i> removed.</p> <p>Section <i>Important changes</i> [▶ page 9] updated.</p> <p>Section <i>New firmware version V3 for PROFINET IO Controller</i> removed.</p> <p>Section <i>New firmware version V4 for EtherCAT Master</i> removed.</p> <p>Section <i>New firmware version 4.6 for EtherCAT Slaves</i> removed.</p> <p>Section <i>New firmware version V3 for POWERLINK Controlled Node</i> removed.</p> <p>Section <i>Devices and firmware</i> [▶ page 11] updated.</p> <p>Section <i>Software tools</i> [▶ page 13] updated.</p> <p>Section <i>Drivers</i> [▶ page 13] updated.</p> <p>Section <i>Contents of the product DVD</i> [▶ page 13] revised.</p> <p><i>Documentation overview</i> [▶ page 15] revised.</p> <p>Section <i>LEDs EtherNet/IP Adapter</i> [▶ page 142] updated.</p> <p>Section <i>LEDs PROFIBUS DP Slave</i> [▶ page 158] corrected.</p> <p>Technical Data <i>NJ 52D-DPS</i> [▶ page 168] added.</p> <p>Technical Data of NJ 10D-COS, NJ 10D-CCS, NJ 10D-DNS and NJ 10D-DPS removed.</p> <p>Section <i>Technical Data of the Real-Time Ethernet Systems</i> [▶ page 178] updated.</p> <p>Section <i>Technical Data of the Fieldbus Systems</i> [▶ page 192] updated.</p>
8 (preliminary)	2021-10-28	<p>netJACK Communication Modules NJ 52D-COS, NJ 52D-CCS and NJ 52D-DNS added in document.</p> <p>Section <i>Device description files</i> [▶ page 14] updated.</p> <p>Section <i>netJACK as CC-Link Slave</i> added in chapter <i>Documentation overview</i>.</p> <p>Section <i>Front view of netJACK with CC-Link</i> added.</p> <p>Section <i>LEDs CC-Link Slave</i> added.</p> <p>Section <i>Pinning CC-Link interface</i> added.</p> <p>Preliminary technical data of the netJACK Communication Modules <i>NJ 52D-COS</i> [▶ page 166], <i>NJ 52D-CCS (preliminary)</i> and <i>NJ 52D-DNS</i> [▶ page 167] added.</p> <p>Technical data of the Fieldbus System <i>CANopen Slave</i> [▶ page 193] updated.</p> <p>Technical data of the Fieldbus System <i>CC-Link Slave</i> added.</p>
8 (released)	2022-03-14	<p>netJACK Communication Module <i>NJ 52D-CCS</i> and related sections (<i>CC-Link Slave</i>) removed from document (device discontinued).</p>

Table 1: List of revisions

1.1.3 Conventions in this document

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

Notes



Note:
<important note>



Note:
<simple note>



<note, where to find further information>

Operation instructions

1. <operational step>

➤ <instruction>

➤ <instruction>

2. <operational step>

➤ <instruction>

➤ <instruction>

Results

↻ <intermediate result>

⇒ <final result>

For a description of the labeling of **Safety Messages**, see section *Labeling of safety messages* [➤ page 78].

1.2 Versions of devices, firmware, software tools and drivers

1.2.1 Overview

The hardware revisions and the versions of the firmware, the drivers and the configuration software functionally belong together. This means that certain revisions of netJACK hardware need certain versions of firmware, software and drivers in order to function properly. This section lists the hardware revisions and the versions of the firmware, the configuration software and the drivers which functionally belong together and to which all instructions in this manual refer.

1.2.2 Important changes

netJACK 10 replaced by netJACK 52

The following devices were discontinued:

- NJ 10D-DPS
- NJ 10D-DNS
- NJ 10D-COS
- NJ 10D-CCS

They have been replaced by the following devices:

- NJ 52D-DPS
- NJ 52D-DNS
- NJ 52D-COS

Note: netJACK CC-Link Slave modules have been discontinued.

You will find a *Migration Guide netJACK 10 to netJACK 52* in the `Documentation\netJACK_Manuals` directory of the *Communication Solutions-DVD*.

New firmware version 4.5 for PROFINET IO-Device

The PROFINET IO-Device firmware has been revised and is now available as V4.5 .

Use the PROFINET IO-Device firmware V4.5 for a new installation when creating or developing your application program for the first time.

If you want to change from an older firmware version to the latest version in an existing system, please refer to the *Migration Guide*, which is available under <https://kb.hilscher.com/x/lRyRBg>.

New firmware version 3.6 for EtherNet/IP-Adapter

The EtherNet/IP-Adapter firmware has been revised and is now available as V3.6.

Use the EtherNet/IP-Adapter firmware V3.6 for a new installation when creating or developing your application program for the first time.

If you want to change from firmware version 3.3 to version 3.5, please refer to the *Migration Guide* under <https://kb.hilscher.com/x/NqhTC>.

New firmware version 3.1 for Open Modbus/TCP

The Open Modbus/TCP firmware has been revised and is now available as V3.1.

Use the Open Modbus/TCP firmware V3.1 for a new installation when creating or developing your application program for the first time.

The Packet API V3.x is compatible to V2.x

1.2.3 Devices and firmware

This manual refers to the following hardware revisions and firmware versions:

netJACK device type name	Host interface	Protocol	Part number	Hardware revision	Firmware	Firmware version
NJ 51D-RE	Dual-Port Memory 60 Pin	EtherCAT Slave	1662.100/ECS	1	J060F000.nxf	4.8
		EtherNet/IP Adapter	1662.100/EIS	1	J060H000.nxf	3.6
		Open Modbus/TCP	1662.100/OMB	1	J060L000.nxf	3.1
		POWERLINK Controlled Node	1662.100/PLS	1	J060K000.nxf	3.5
		PROFINET IO Device	1662.100/PNS	1	J060D000.nxf	4.5
		Sercos Slave	1662.100/S3S	1	J060J000.nxf	3.5
NJ 52D-COS	Dual-Port-Memory (60 Pin)	CANopen Slave	1672.540/COS	1	J0705000.nxf	3.8
NJ 52D-DNS	Dual-Port-Memory (60 Pin)	DeviceNet Slave	1672.520/DNS	1	J0707000.nxf	2.7
NJ 52D-DPS	Dual-Port-Memory (60 Pin)	PROFIBUS DP Slave	1672.420/DPS	2	J0702000.nxf	2.11
NJ 100DN-RE	Dual-Port Memory 80 Pin	EtherCAT Master	1623.100/ECM	1	J020E000.nxf	4.5
		EtherCAT Slave	1623.100/ECS	1	J020F000.nxf	4.8
		EtherNet/IP Scanner	1623.100/EIM	1	J020G000.nxf	2.11
		EtherNet/IP Adapter	1623.100/EIS	1	J020H000.nxf	3.6
		Open Modbus/TCP	1623.100/OMB	1	J020L000.nxf	3.1
		POWERLINK Controlled Node	1623.100/PLS	1	J020K000.nxf	3.5
		PROFINET IO Controller	1623.100/PNM	1	J020C000.nxf	3.3
		PROFINET IO Device	1623.100/PNS	1	J020D000.nxf	4.5
		Sercos Master	1623.100/S3M	1	J020I000.nxf	2.1
		Sercos Slave	1623.100/S3S	1	J020J000.nxf	3.5
		VARAN Client	1623.100/VRS	1	J020T000.nxf	1.1
NJ 100DN-CO	Dual-Port Memory 80 Pin	CANopen Master	1623.500/COM	1	J0204000.nxf	2.14
		CANopen Slave	1623.500/COS	1	J0205000.nxf	3.8
NJ 100DN-DN	Dual-Port Memory 80 Pin	DeviceNet Master	1623.510/DNM	1	J0206000.nxf	2.4
		DeviceNet Slave	1623.510/DNS	1	J0207000.nxf	2.7
NJ 100DN-DP	Dual-Port Memory 80 Pin	PROFIBUS DP Master	1623.400/DPM	1	J0201000.nxf	2.8
		PROFIBUS DP Slave	1623.400/DPS	1	J0202000.nxf	2.11

netJACK device type name	Host interface	Protocol	Part number	Hardware revision	Firmware	Firmware version
NJ 100EN-RE	PCI Express 40 Pin	EtherCAT Master	1625.100/ECM	1	J020E000.nxf	4.5
		EtherCAT Slave	1625.100/ECS	1	J020F000.nxf	4.8
		EtherNet/IP Scanner	1625.100/EIM	1	J020G000.nxf	2.11
		EtherNet/IP Adapter	1625.100/EIS	1	J020H000.nxf	3.6
		Open Modbus/TCP	1625.100/OMB	1	J020L000.nxf	3.1
		POWERLINK Controlled Node	1625.100/PLS	1	J020K000.nxf	3.5
		PROFINET IO Controller	1625.100/PNM	1	J020C000.nxf	3.3
		PROFINET IO Device	1625.100/PNS	1	J020D000.nxf	4.5
		Sercos Master	1625.100/S3M	1	J020I000.nxf	2.1
		Sercos Slave	1625.100/S3S	1	J020J000.nxf	3.5
		VARAN Client	1625.100/VRS	1	J020T000.nxf	1.1
NJ 100EN-CO	PCI Express 40 Pin	CANopen Master	1625.500/COM	1	J0204000.nxf	2.14
		CANopen Slave	1625.500/COS	1	J0205000.nxf	3.8
NJ 100EN-DN	PCI Express 40 Pin	DeviceNet Master	1625.510/DNM	1	J0206000.nxf	2.4
		DeviceNet Slave	1625.510/DNS	1	J0207000.nxf	2.7
NJ 100EN-DP	PCI Express 40 Pin	PROFIBUS DP Master	1625.400/DPM	1	J0201000.nxf	2.8
		PROFIBUS DP Slave	1625.400/DPS	1	J0202000.nxf	2.11

Table 2: Reference to hardware and firmware

1.2.4 Software tools

This manual refers to the following software versions:

Software	File name	Version
SYCON.net	SYCONnet netX setup.exe	1.500.x.x or higher

Table 3: Reference to software tools

1.2.5 Drivers

This manual refers to the following driver versions:

Driver	File name	Version
cifX Device Driver	cifX Device Driver Setup.exe	2.5
USB Driver Windows	Setup.exe	-

Table 4: Reference to Drivers

1.3 Contents of the product DVD

1.3.1 Overview

The **Communication Solutions DVD** contains the necessary software and documentation that you need for your netJACK communication module:

- Installation programs for SYCON.net and other tools
- Firmware
- Drivers
- Device description files (GSD, GSDML, EDS, XML, XDD)
- Documentation

You can download the DVD as ZIP file from our website

<http://www.hilscher.com> on the netJACK product page under “Downloads”.

A *Release Note* PDF stating important new features as well as a *Getting Started* PDF containing brief instructions for installing the required software components can be found in the root directory of the DVD.

1.3.2 Device description files

On the DVD, you will find the device description files of the netJACK devices in the EDS respectively DeviceDescription folder in the directory: `Firmware_EDS_Examples_Webpages\Firmware_EDS\COMSOL-[Protokoll] Vx.x.x.x`.

netJACK serving as Real-Time Ethernet slave

Real-Time Ethernet protocol	Name of device description file	Required to configure
EtherCAT Slave V4.8	Hilscher NJ 51XX RE ECS V4.8.X.xml Hilscher NJ 100XX RE ECS V4.8.X.xml	EtherCAT Master
EtherNet/IP Adapter (Slave)	HILSCHER NJ 51XX-RE EIS V1.1.EDS HILSCHER NJ 100XX-RE EIS V1.1.EDS	EtherNet/IP Scanner
POWERLINK Controlled Node / Slave	00000044_NJ 51XX RE PLS.xdd 00000044_NJ 100XX RE PLS.xdd	POWERLINK Managing Node
PROFINET IO Device V3.14 (Slave)	GSDML-V2.35-HILSCHER-NJ 51X-RE PNS-YYYYMMDD.xml GSDML-V2.35-HILSCHER-NJ 100XX-RE PNS-YYYYMMDD.xml (YYYY = year, MM = month, DD = day)	PROFINET IO Controller (Master)
PROFINET IO Device V4.5 (Slave)	GSDML-V2.35-HILSCHER-NJ 51X-RE PNS-YYYYMMDD.xml GSDML-V2.35-HILSCHER-NJ 100XX-RE PNS-YYYYMMDD.xml (YYYY = year, MM = month, DD = day)	
Sercos Slave (V3)	SDDML#v3.0#Hilscher#NJ_51X_RE-FIXCFG_FSPIO#2017-06-28.xml SDDML#v3.0#Hilscher#NJ_100XX_RE-FIXCFG_FSPIO#2017-06-28.xml Note: If you use a Sercos Master which is using SDDML files for configuration, and one of the defaults for vendor code, device ID, input data size or output data size was changed, then you have to export a new updated SDDML file from SYCON.net and import this SDDML file into the configuration software for the Sercos Master.	Sercos Master

Table 5: Device description files for netJACK serving as Real-Time Ethernet slave



Note:

The Real-Time Ethernet systems Open Modbus/TCP and VARAN do not use device description files.

netJACK serving as fieldbus slave

Fieldbus protocol	Name of device description file	Required to configure
CANopen Slave	NJ 52XX-COS COS.eds	CANopen Master
	NJ 100XX-CO COS.eds	
DeviceNet Slave	NJ_52X-DNS_DNS.EDS	DeviceNet Master
	NJ_100XX-DN_DNS.EDS	
PROFIBUS DP Slave	HIL_1164.GSD (NJ 52)	PROFIBUS DP Master
	HIL_0D83.GSD (NJ 100xx)	

Table 6: Device description files for netJACK serving as fieldbus slave

netJACK Serving as Real-Time Ethernet master

Real-Time Ethernet	Name of device description file
EtherNet/IP Scanner (Master)	HILSCHER NJ 100XX-RE EIM V1.0.eds

Table 7: Device description files for netJACK serving as Real-Time Ethernet master



Note:

The device description file for the EtherNet/IP Master device is needed when an additional EtherNet/IP Master device is to communicate with a Hilscher EtherNet/IP Master device via EtherNet/IP.

1.3.3 Documentation overview

1.3.3.1 Basic documents

Title	Contents	Document ID	Path on Communication Solutions-DVD
<i>User Manual - netJACK Communication Module (this document)</i>	Installation, commissioning and hardware description of the netJACK communication modules as well as technical data.	DOC110504UMxxEN	Documentation\netJACK_Manuals\netJACK Kommunikationsmodul UM xx DE
<i>Design Guide - netJACK Communication Module</i>	Design-in guide for hardware developer	DOC101101DGxxEN	Documentation\netJACK_Manuals\netJACK Communication Module Design Guide DG xx EN
<i>Migration Guide - netJACK 10 to netJACK 52</i>	Information for migrating from netJACK 10 to netJACK 52	DOC210701MGxxEN	Documentation\netJACK_Manuals\nMigration from netJACK 10 to netJACK 52 MG xx EN

Table 8: Basic documents netJACK

1.3.3.2 netJACK as EtherCAT Master

Configuration

To configure the netJACK as EtherCAT Master you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher EtherCAT Master Device</i>	DOC080404OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\EtherCAT Master DTM OI xx EN
	<i>Operating Instruction Manual - Generic Slave DTM for EtherCAT Slave Devices</i>	DOC071202OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\EtherCAT Generic Slave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
Wiring instructions	<i>User Manual - Wiring Instructions - EtherCAT</i>	DOC121104UMxxEN	Documentation\netJACK_Manuals \Wiring Instructions EtherCAT UM xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN

Table 9: Configuration documents netJACK EtherCAT Master

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API - EtherCAT Master V4</i>	DOC150601APIxxEN	Documentation \Programming_Manuals\Protocol API\EtherCAT Master V4\EtherCAT Master V4 Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual- Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CFX API</i>	DOC121201PRxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\Second Stage Boot Loader netX FD xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \\Programming_Manuals\\Error Codes\\Hilscher status and error codes API xx EN

Table 10: Developer documents netJACK as EtherCAT Master

1.3.3.3 netJACK as EtherCAT Slave

Configuration

To configure the netJACK as EtherCAT Slave you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher EtherCAT Slave Device</i>	DOC110702OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\EtherCAT Slave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
Wiring instructions	<i>User Manual - Wiring Instructions - EtherCAT</i>	DOC121104UMxxEN	Documentation\netJACK_Manuals \Wiring Instructions EtherCAT UM xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN

Table 11: Configuration documents netJACK EtherCAT Slave

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API - EtherCAT Slave</i>	DOC110909APIxxEN	Documentation \Programming_Manuals\Protocol API\EtherCAT Slave V4\EtherCAT Slave V4 Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual- Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Driver Toolkit Serial DPM (applicable for netJACK 51 only)	<i>Programming Reference Guide - netX 51/52</i>	DOC120215PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \netX 51 52 Programming Reference Guide PRG xx EN
	<i>Getting Started Guide - Serial Dual-Port Memory Interface with netX</i>	DOC120210GSxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \Serial DPM interface with netX GS xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 12: Developer documents netJACK as EtherCAT Slave

1.3.3.4 netJACK as EtherNet/IP Scanner

Konfiguration

To configure the netJACK as netJACK EtherNet/IP Scanner you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for EtherNet/IP Scanner Devices</i>	DOC061201OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\EtherNetIP Scanner DTM OI xx EN
	<i>Operating Instruction Manual - Generic, Modular Generic DTM from EDS File for non-modular and modular EtherNet/IP Adapter Devices</i>	DOC100221OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\EtherNetIP Generic Adapter DTM EDS OI xx EN
	<i>Operating Instruction Manual - Generic DTM for EtherNet/IP Adapter Devices and Modular Generic DTM for modular EtherNet/IP Adapter Devices</i>	DOC070203OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\EtherNetIP Generic Adapter DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN
Integrated WebServer (optional)	<i>Application Note - Functions of the Integrated WebServer</i>	DOC091203ANxxEN	Documentation \Configuration_Manuals\Integrated WebServer\Functions of the Integrated WebServer AN xx EN
Training material (optional)	<i>Training Manual - EtherNet/IP Scanner - CIFS, COMX and netJACK - Configuration and Testing - Step by Step</i>	DOC121002TMxxEN	Documentation\Training_Material\EtherNetIP Scanner - Configuration and Testing TM xx EN

Table 13: Configuration documents netJACK EtherNet/IP Scanner

Development

As developer, you need the following documents:

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Protocol API	<i>Protocol API - EtherNet/IP Scanner</i>	DOC050702APIxxEN	Documentation \Programming_Manuals\Protocol API\EtherNetIP Scanner \EtherNetIP Scanner Protocol API xx EN
	<i>Protocol API - TCP/IP - Packet Interface (optional)</i>	DOC050201APIxxEN	Documentation \Programming_Manuals\Protocol API\EtherNetIP Scanner\TCP IP - Packet Interface API xx EN
	<i>Protocol API - Ethernet - Packet Interface (optional)</i>	DOC060901APIxxEN	Documentation \Programming_Manuals\Protocol API\EtherNetIP Scanner\Ethernet Packet interface API xx EN
Device Driver	<i>Driver Manual cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide CIFS API</i>	DOC121201PRxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\Second Stage Boot Loader netX FD xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \\Programming_Manuals\\Error Codes\\Hilscher status and error codes API xx EN

Table 14: Developer documents netJACK as EtherNet/IP Scanner

1.3.3.5 netJACK as EtherNet/IP Adapter

Configuration

To configure the netJACK as EtherNet/IP Adapter you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for EtherNet/IP Adapter Devices</i>	DOC061202OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\EtherNetIP Adapter DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN
Integrated WebServer (optional)	<i>Application Note - Functions of the Integrated WebServer</i>	DOC091203ANxxEN	Documentation \Configuration_Manuals\Integrated WebServer\Functions of the Integrated WebServer AN xx EN

Table 15: Configuration documents netJACK as EtherNet/IP Adapter

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API – EtherNet/IP Adapter (V3)</i>	DOC150401APIxxEN	Documentation \Programming_Manuals\Protocol API\EtherNetIP Adapter V3\EtherNetIP Adapter V3 Protocol API xx EN
	<i>Protocol API – EtherNet/IP Adapter (V2)</i>	DOC060301APIxxEN	Documentation \Programming_Manuals\Protocol API\EtherNetIP Adapter V2\EtherNetIP Adapter Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual- Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Driver Toolkit Serial DPM (applicable for netJACK 51 only)	<i>Programming Reference Guide - netX 51/52</i>	DOC120215PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \netX 51 52 Programming Reference Guide PRG xx EN
	<i>Getting Started Guide - Serial Dual-Port Memory Interface with netX</i>	DOC120210GSxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \Serial DPM interface with netX GS xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 16: Developer documents netJACK as EtherNet/IP Adapter

1.3.3.6 netJACK with Open Modbus/TCP

Configuration

To configure the netJACK with Open Modbus/TCP you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - netSLAVE DTM for Hilscher netX Slave Devices</i>	DOC080801OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\netSlave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN
Integrated WebServer (optional)	<i>Application Note - Functions of the Integrated WebServer</i>	DOC091203ANxxEN	Documentation \Configuration_Manuals\Integrated WebServer\Functions of the Integrated WebServer AN xx EN

Table 17: Configuration documents netJACK with Open Modbus/TCP

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API – Open Modbus/TCP</i>	DOC071103APIxxEN	Documentation \Programming_Manuals\Protocol API\Open Modbus TCP \OpenModbusTCP Protocol API xx EN
	<i>Protocol API - TCP/IP - Packet Interface (optional)</i>	DOC050201APIxxEN	Documentation \Programming_Manuals\Protocol API\EtherNetIP Scanner\TCP IP - Packet Interface API xx EN
	<i>Protocol API - Ethernet - Packet Interface (optional)</i>	DOC060901APIxxEN	Documentation \Programming_Manuals\Protocol API\EtherNetIP Scanner\Ethernet Packet interface API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Driver Toolkit Serial DPM (applicable for netJACK 51 only)	<i>Programming Reference Guide - netX 51/52</i>	DOC120215PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \netX 51 52 Programming Reference Guide PRG xx EN
	<i>Getting Started Guide - Serial Dual-Port Memory Interface with netX</i>	DOC120210GSxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \Serial DPM interface with netX GS xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 18: Developer documents netJACK with Open Modbus/TCP

1.3.3.7 netJACK as POWERLINK Controlled Node

Configuration

To configure the netJACK as POWERLINK Controlled Node you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - netSLAVE DTM for Hilscher netX Slave Devices</i>	DOC080801OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\netSlave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN

Table 19: Configuration documents netJACK netJACK as POWERLINK Controlled Node

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API – Ethernet POWERLINK Controlled Node</i>	DOC160504APIxxEN	Documentation \Programming_Manuals\Protocol API\POWERLINK Controlled Node V3\POWERLINK Controlled Node V3 Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Driver Toolkit Serial DPM (applicable for netJACK 51 only)	<i>Programming Reference Guide - netX 51/52</i>	DOC120215PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \netX 51 52 Programming Reference Guide PRG xx EN
	<i>Getting Started Guide - Serial Dual-Port Memory Interface with netX</i>	DOC120210GSxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \Serial DPM interface with netX GS xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 20: Developer documents netJACK as POWERLINK Controlled Node

1.3.3.8 netJACK as PROFINET IO Controller

Configuration

To configure the netJACK as PROFINET IO Controller you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher PROFINET IO-Controller Devices</i>	DOC060302OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\PROFINET IO Controller DTM OI xx EN
	<i>Operating Instruction Manual - DTM for Hilscher PROFINET IO-Controller Devices</i>	DOC150704OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\PROFINET IO IRT-Controller DTM OI xx EN
	<i>Operating Instruction Manual - Generic DTM for PROFINET IO-Devices</i>	DOC060305OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\PROFINET IO Generic Device DTM IO xx EN
	<i>Operating instruction manual - Topology Editor</i>	DOC150705OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\Topology Editor OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN
Training material (optional)	<i>Training Manual - PROFINET IO Controller - CIFS, COMX and netJACK - Configuration and Testing - Step by Step</i>	DOC121001TMxxEN	Documentation\Training_Material \PROFINET IO Controller - Configuration and Testing TM xx EN

Table 21: Configuration documents netJACK PROFINET IO Controller

Development

As developer, you need the following documents:

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Protocol API	<i>Protocol API – PROFINET IO Controller</i>	DOC150403APIxxEN	Documentation \Programming_Manuals\Protocol API\PROFINET IO Controller V3\PROFINET IO Controller V3 Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 22: Developer documents netJACK as PROFINET IO Controller

1.3.3.9 netJACK as PROFINET IO Device

Configuration

To configure the netJACK as PROFINET IO Device you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher PROFINET IO-Device</i>	DOC060303OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\PROFINET IO Device DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN
Integrated WebServer (optional)	<i>Application Note - Functions of the Integrated WebServer</i>	DOC091203ANxxEN	Documentation \Configuration_Manuals\Integrated WebServer\Functions of the Integrated WebServer AN xx EN

Table 23: Configuration documents netJACK PROFINET IO Device

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API – PROFINET IO-Device (V3.14)</i>	DOC111110APIxxEN	Documentation \Programming_Manuals\Protocol API\PROFINET IO Device V3.14\PROFINET IO-Device V3.14 Protocol API xx EN
	<i>Protocol API – PROFINET IO-Device (V4.5)</i>	DOC171101APIxxEN	Documentation \Programming_Manuals\Protocol API\PROFINET IO Device V4.5\PROFINET IO-Device V4 Protocol API xx EN
Migration Guide	<i>Migration Guide - PROFINET IO-Device - Migration from V3.x to V4.x and V5.x</i>	DOC190604MGxxEN	Documentation \Programming_Manuals\Protocol API\PROFINET IO Device V4.5\PROFINET IO Device - Migration from Version 3.x to 4.x and 5.x MG xx EN
	<i>Migration Guide - PROFINET IO Device - Migration from V4.x to V4.5</i>	DOC171102MGxxEN	Documentation \Programming_Manuals\Protocol API\PROFINET IO Device V4.5\PROFINET IO Device - Migration from Version 4.x to 4.5 MG xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
	<i>Getting Started Guide - cifXNDIS Device Driver</i>	DOC120212GSxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifXNDIS Device Driver - Windows GS xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual- Port Memory Interface DPM xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport\Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport\Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport\Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport\Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation\Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation\Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation\Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation\Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Driver Toolkit Serial DPM (applicable for netJACK 51 only)	<i>Programming Reference Guide - netX 51/52</i>	DOC120215PRGxxEN	Documentation\Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM\netX 51 52 Programming Reference Guide PRG xx EN
	<i>Getting Started Guide - Serial Dual-Port Memory Interface with netX</i>	DOC120210GSxxEN	Documentation\Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM\netX Serial DPM interface with netX GS xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation\Programming_Manuals>Error Codes\Hilscher status and error codes API xx EN

Table 24: Developer documents netJACK PROFINET IO Device

1.3.3.10 netJACK as Sercos Master

Configuration

To configure the netJACK as netJACK Sercos Master you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher Sercos Master Devices</i>	DOC090301OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\Sercos Master DTM OI xx EN
	<i>Operating Instruction Manual - Generic Slave DTM for Sercos Slave Devices</i>	DOC090302UMxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\Sercos Generic Slave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN

Table 25: Configuration documents netJACK Sercos Master

Development

As developer, you need the following documents:

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Protocol API	<i>Protocol API - sercos Master</i>	DOC081103APIxxEN	Documentation \Programming_Manuals\Protocol API\Sercos Master\Sercos Master Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 26: Developer documents netJACK Sercos Master

1.3.3.11 netJACK as Sercos Slave

Configuration

To configure the netJACK as Sercos Slave you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher Sercos Slave Device</i>	DOC110701OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\Sercos Slave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN
Integrated WebServer (optional)	<i>Application Note - Functions of the Integrated WebServer</i>	DOC091203ANxxEN	Documentation \Configuration_Manuals\Integrated WebServer\Functions of the Integrated WebServer AN xx EN

Table 27: Configuration documents netJACK Sercos Slave

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API – Sercos Slave</i>	DOC100205APIxxEN	Documentation \Programming_Manuals\Protocol API\Sercos Slave\Sercos Slave Protocol API xx EN
	<i>Protocol API - TCP/IP - Packet Interface</i>	DOC050201APIxxEN	Documentation \Programming_Manuals\Protocol API\Sercos Slave\TCP IP - Packet Interface API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Driver Toolkit Serial DPM (applicable for netJACK 51 only)	<i>Programming Reference Guide - netX 51/52</i>	DOC120215PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \netX 51 52 Programming Reference Guide PRG xx EN
	<i>Getting Started Guide - Serial Dual-Port Memory Interface with netX</i>	DOC120210GSxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \Serial DPM interface with netX GS xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 28: Developer documents netJACK Sercos Slave

1.3.3.12 netJACK as VARAN Client

Configuration

To configure the netJACK as VARAN Client you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - netSLAVE DTM for Hilscher netX Slave Devices</i>	DOC080801OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\netSlave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
LAN network scanner-tool (optional)	<i>Operating Instruction Manual - Ethernet Device Configuration - Address Setting for Ethernet capable Hilscher Devices</i>	DOC050402OIxxEN	Documentation \Configuration_Manuals\LAN Network Scanner Tool\Ethernet Device Configuration OI xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN
Integrated WebServer (optional)	<i>Application Note - Functions of the Integrated WebServer</i>	DOC091203ANxxEN	Documentation \Configuration_Manuals\Integrated WebServer\Functions of the Integrated WebServer AN xx EN

Table 29: Configuration documents netJACK VARAN Client

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API – VARAN Client (Slave)</i>	DOC100613APIxxEN	Documentation \Programming_Manuals\Protocol API\VARAN Client\VARAN Client Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Driver Toolkit Serial DPM (applicable for netJACK 51 only)	<i>Programming Reference Guide - netX 51/52</i>	DOC120215PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \netX 51 52 Programming Reference Guide PRG xx EN
	<i>Getting Started Guide - Serial Dual-Port Memory Interface with netX</i>	DOC120210GSxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \Serial DPM interface with netX GS xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 30: Developer documents netJACK VARAN Client

1.3.3.13 netJACK as CANopen Master

Configuration

To configure the netJACK as CANopen Master you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher CANopen Master Devices</i>	DOC070402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\CANopen Master DTM OI xx EN
	<i>Operating Instruction Manual - Generic Slave DTM for CANopen Slave Devices</i>	DOC060203OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\CANopen Generic Slave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
Wiring instructions	<i>User Manual - Wiring Instructions PROFIBUS, CANopen, DeviceNet, AS-Interface, CompoNet, CC-Link</i>	DOC120208UMxxEN	Documentation\netJACK_Manuals \Wiring Instructions UM xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN

Table 31: Configuration documents netJACK CANopen Master

Development

As developer, you need the following documents:

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Protocol API	<i>Protocol API – CANopen Master</i>	DOC070501APIxxEN	Documentation \Programming_Manuals\Protocol API\CANopen Master\CANopen Master Protocol API xx EN
	Protocol API - CAN Data Link - Packet Interface	DOC110207APIxxEN	Documentation \Programming_Manuals\Protocol API\CANopen Master\CAN Data Link - Packet Interface API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 32: Developer documents netJACK CANopen Master

1.3.3.14 netJACK as CANopen Slave

Configuration

To configure the netJACK as CANopen Slave you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher CANopen Slave device</i>	DOC091002OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\CANopen Slave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
Wiring instructions	<i>User Manual - Wiring Instructions PROFIBUS, CANopen, DeviceNet, AS-Interface, CompoNet, CC-Link</i>	DOC120208UMxxEN	Documentation\netJACK_Manuals \Wiring Instructions UM xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN

Table 33: Configuration documents netJACK CANopen Slave

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API – CANopen Slave</i>	DOC111001APIxxEN	Documentation \Programming_Manuals\Protocol API\CANopen Slave\CANopen Slave V3 Protocol API xx EN
	<i>Protocol API - CAN Data Link - Packet Interface (optional)</i>	DOC110207APIxxEN	Documentation \Programming_Manuals\Protocol API\CANopen Slave\CAN Data Link - Packet Interface API xx EN
	<i>Protocol API - Object Dictionary for CANopen and EtherCAT (optional)</i>	DOC110106APIxxEN	Documentation \Programming_Manuals\Protocol API\CANopen Slave\Object Dictionary V3 API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual- Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_& Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Driver Toolkit Serial DPM (applicable for netJACK 52 only)	<i>Programming Reference Guide - netX 51/52</i>	DOC120215PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \netX 51 52 Programming Reference Guide PRG xx EN
	<i>Getting Started Guide - Serial Dual-Port Memory Interface with netX</i>	DOC120210GSxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \Serial DPM interface with netX GS xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 34: Developer documents netJACK CANopen Slave

1.3.3.15 netJACK as DeviceNet Master

Configuration

To configure the netJACK as DeviceNet Master you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher DeviceNet Master Devices</i>	DOC070403OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\DeviceNet Master DTM OI xx EN
	<i>Operating Instruction Manual - Generic Slave DTM for DeviceNet Slave Devices</i>	DOC041201OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\DeviceNet Generic Slave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
Wiring instructions	<i>User Manual - Wiring Instructions PROFIBUS, CANopen, DeviceNet, AS-Interface, CompoNet, CC-Link</i>	DOC120208UMxxEN	Documentation\netJACK_Manuals \Wiring Instructions UM xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN

Table 35: Configuration documents netJACK DeviceNet Master

Development

As developer, you need the following documents:

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Protocol API	<i>Protocol API – DeviceNet Master</i>	DOC080301APIxxEN	Documentation \Programming_Manuals\Protocol API\DeviceNet Master\DeviceNet Master Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 36: Developer documents netJACK DeviceNet Master

1.3.3.16 netJACK as DeviceNet Slave

Configuration

To configure the netJACK as DeviceNet Slave you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher DeviceNet Slave Devices</i>	DOC091003OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\DeviceNet Slave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
Wiring instructions	<i>User Manual - Wiring Instructions PROFIBUS, CANopen, DeviceNet, AS-Interface, CompoNet, CC-Link</i>	DOC120208UMxxEN	Documentation\netJACK_Manuals \Wiring Instructions UM xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN

Table 37: Configuration documents netJACK DeviceNet Slave

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API – DeviceNet Slave</i>	DOC060202APIxxEN	Documentation \\Programming_Manuals\\Protocol API\\DeviceNet Slave\\DeviceNet Slave Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \\Programming_Manuals\\Device Driver (NXDRV-WIN)\\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \\Programming_Manuals\\Device Driver (NXDRV-WIN)\\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_& Toolkit\\netX Diagnostics and Remote Access (NXDIAG)\\netXTransport \\Documentation\\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_& Toolkit\\netX Diagnostics and Remote Access (NXDIAG)\\netXTransport \\Documentation\\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_& Toolkit\\netX Diagnostics and Remote Access (NXDIAG)\\netXTransport \\Documentation\\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_& Toolkit\\netX Diagnostics and Remote Access (NXDIAG)\\netXTransport \\Documentation\\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\Second Stage Boot Loader netX FD xx EN
Driver Toolkit Serial DPM (applicable for netJACK 52 only)	<i>Programming Reference Guide - netX 51/52</i>	DOC120215PRGxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\Serial DPM \\netX 51 52 Programming Reference Guide PRG xx EN
	<i>Getting Started Guide - Serial Dual-Port Memory Interface with netX</i>	DOC120210GSxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\Serial DPM \\Serial DPM interface with netX GS xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \\Programming_Manuals\\Error Codes\\Hilscher status and error codes API xx EN

Table 38: Developer documents netJACK DeviceNet Slave

1.3.3.17 netJACK as PROFIBUS DP Master

Configuration

To configure the netJACK as PROFIBUS DP Master you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher PROFIBUS DP Master Devices</i>	DOC070401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\PROFIBUS DP Master DTM OI xx DE
	<i>Operating Instruction Manual - Generic Slave DTM for PROFIBUS DP Slave Devices</i>	DOC031001OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\PROFIBUS DP Generic Slave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
Wiring instructions	<i>User Manual - Wiring Instructions PROFIBUS, CANopen, DeviceNet, AS-Interface, CompoNet, CC-Link</i>	DOC120208UMxxEN	Documentation\netJACK_Manuals \Wiring Instructions UM xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN
Training material (optional)	<i>Training Manual - PROFIBUS DP Master - CIFS, COMX and netJACK - Configuration and Testing - Step by Step</i>	DOC121003TMxxEN	Documentation\Training_Material \PROFIBUS DP Master - Configuration and Testing TM xx EN

Table 39: Configuration documents netJACK PROFIBUS DP Master

Development

As developer, you need the following documents:

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Protocol API	<i>Protocol API – PROFIBUS DP-Master</i>	DOC061001APIxxEN	Documentation \Programming_Manuals\Protocol API\PROFIBUS DP Master\PROFIBUS DP Master Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\netX Dual-Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_&Toolkit\netX Diagnostics and Remote Access (NXDIAG)\netXTransport \Documentation\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Pfad auf der Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 40: Developer documents netJACK PROFIBUS DP Master

1.3.3.18 netJACK as PROFIBUS DP Slave

Configuration

To configure the netJACK as PROFIBUS DP Slave you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
SYCON.net fundamentals	<i>Operating Instruction Manual - SYCON.net - Frame Application</i>	DOC040402OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netFrame OI xx EN
	<i>Operating Instruction Manual - netDevice and netProject - FDT Container</i>	DOC040401OIxxEN	Documentation \Configuration_Manuals\SYCON.net Fundamentals\SYCONnet netDevice OI xx EN
SYCON.net protocol-specific configuration dialogs	<i>Operating Instruction Manual - DTM for Hilscher PROFIBUS DP Slave Device</i>	DOC091001OIxxEN	Documentation \Configuration_Manuals\SYCON.net Protocol Specific\PROFIBUS DP Slave DTM OI xx EN
Driver installation	<i>Operating Instruction Manual - cifX Device Driver - Installation and Operation for Windows XP/Vista/7/8/10</i>	DOC060601OIxxEN	Documentation \Programming_Manuals\Device Driver (NXDRV-WIN)\Installation \cifX Device Driver Installation for Windows xx EN
Wiring instructions	<i>User Manual - Wiring Instructions PROFIBUS, CANopen, DeviceNet, AS-Interface, CompoNet, CC-Link</i>	DOC120208UMxxEN	Documentation\netJACK_Manuals \Wiring Instructions UM xx EN
cifX TCP Server (optional)	<i>Operating Instruction Manual - cifX TCP/IP Server - Remote Connection via Ethernet</i>	DOC100610OIxxEN	Documentation \Configuration_Manuals\cifX TCP Server\cifX TCP-IP Server OI xx EN

Table 41: Configuration documents netJACK PROFIBUS DP Slave

Development

As developer, you need the following documents:

Type	Title	Document ID	Path on Communication Solutions DVD
Protocol API	<i>Protocol API – PROFIBUS-DP Slave</i>	DOC050401APIxxEN	Documentation \\Programming_Manuals\\Protocol API\\PROFIBUS DP Slave\\PROFIBUS DP Slave Protocol API xx EN
Device Driver	<i>Driver Manual - cifX Device Driver - Windows 2000/XP/Vista/7/8/10</i>	DOC060701DRVxxEN	Documentation \\Programming_Manuals\\Device Driver (NXDRV-WIN)\\cifX Device Driver - Windows DRV xx EN
	<i>Programming Reference Guide - CIFS API</i>	DOC121201PRxxEN	Documentation \\Programming_Manuals\\Device Driver (NXDRV-WIN)\\cifX API PR xx EN
Dual-Port Memory Interface Manual	<i>Dual-Port Memory Interface Manual - netX Dual-Port Memory Interface</i>	DOC060302DPMxxEN	Documentation \\Programming_Manuals\\Driver Toolkit (NXDRV-TKIT)\\netX Dual- Port Memory Interface DPM xx EN
Diagnostics and Remote Access (optional)	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Fundamentals</i>	DOC090703PRxxEN	Driver_& Toolkit\\netX Diagnostics and Remote Access (NXDIAG)\\netXTransport \\Documentation\\netX Diagnostic and Remote Access - Fundamentals PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Host Device</i>	DOC100407PRxxEN	Driver_& Toolkit\\netX Diagnostics and Remote Access (NXDIAG)\\netXTransport \\Documentation\\netX Diagnostic and Remote Access - Host Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - Target Device</i>	DOC090701PRxxEN	Driver_& Toolkit\\netX Diagnostics and Remote Access (NXDIAG)\\netXTransport \\Documentation\\netX Diagnostic and Remote Access - Target Device PR xx EN
	<i>Programming Reference Guide - netX Diagnostic and Remote Access - netXTransport Toolkit</i>	DOC130704PRGxxEN	Driver_& Toolkit\\netX Diagnostics and Remote Access (NXDIAG)\\netXTransport \\Documentation\\netX Diagnostic and Remote Access - netXTransport Toolkit PR xx EN

Type	Title	Document ID	Path on Communication Solutions DVD
Driver Toolkit	<i>Programming Reference Guide - cifX/netX Application Programmer's Guide</i>	DOC130709PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Application Programmers Guide PRG xx EN
	<i>Programming Reference Guide - CIFX API</i>	DOC121201PRxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX API PR xx EN
	<i>Toolkit Manual - cifX/netX Toolkit – DPM (optional)</i>	DOC090203TKxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\cifX netX Toolkit - DPM TK xx EN
	<i>Function Description - Second Stage Boot Loader - netX 10/50/51/52/100/500 (optional)</i>	DOC070301FDxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Second Stage Boot Loader netX FD xx EN
Driver Toolkit Serial DPM (applicable for netJACK 52 only)	<i>Programming Reference Guide - netX 51/52</i>	DOC120215PRGxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \netX 51 52 Programming Reference Guide PRG xx EN
	<i>Getting Started Guide - Serial Dual-Port Memory Interface with netX</i>	DOC120210GSxxEN	Documentation \Programming_Manuals\Driver Toolkit (NXDRV-TKIT)\Serial DPM \Serial DPM interface with netX GS xx EN
Error Codes (optional)	<i>API - Hilscher status and error codes - Firmware and driver</i>	DOC100802APIxxEN	Documentation \Programming_Manuals\Error Codes\Hilscher status and error codes API xx EN

Table 42: Developer documents netJACK PROFIBUS DP Slave

1.4 Ensuring access security

The firmware of the protocols

- EtherNet/IP Scanner
- EtherNet/IP Adapter
- Open Modbus/TCP
- PROFINET IO Device
- Sercos Slave

include an integrated web server. The access to the device by the integrated web server via Internet and Intranet brings with it the danger of misuse. You should therefore always protect the access to the device with passwords. Beyond this also restrict access to your network with suitable security mechanisms.



Important:

In any case change the default password, otherwise you allow everyone the right to execute functions without authorization.

To protect the device from unauthorized access, you can restrict access to authorized users. How you set up an own user authentication is described in the Application Note *Functions of the Integrated WebServer* in the *User Authentication* chapter.

1.5 Legal notes

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- Vehicle control systems used in passenger transport

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2 Safety

2.1 General note

The user manual, the accompanying texts and the documentation are written for the use of the products by educated personnel. When using the products, all safety instructions, property damage messages and all valid legal regulations have to be obeyed. Technical knowledge is presumed. The user has to assure that all legal regulations are obeyed.

2.2 Intended use

The netJACK communication module described in this user manual serves as an interface between a host system, into which the netJACK is integrated, and a network system.

The netJACK communication module may only be operated as part of a communication system to create connections in one of the following networks:

netJACK device type name	Part number	Network/Protocol / device functioning as	Host interface
NJ 51D-RE	1662.100/ECS	EtherCAT Slave	Dual-Port-Memory (60 Pin)
	1662.100/EIS	EtherNet/IP Adapter	
	1662.100/OMB	Open Modbus/TCP	
	1662.100/PLS	POWERLINK Controlled Node	
	1662.100/PNS	PROFINET IO Device	
	1662.100/S3S	Sercos Slave	
NJ 52D-COS	1672.540/COS	CANopen Slave	Dual-Port-Memory (80 Pin)
NJ 52D-DNS	1672.520/DNS	DeviceNet Slave	
NJ 52D-DPS	1672.420/DPS	PROFIBUS DP Slave	
NJ 100DN-RE	1623.100/ECM	EtherCAT Master	Dual-Port-Memory (80 Pin)
	1623.100/ECS	EtherCAT Slave	
	1623.100/EIM	EtherNet/IP Scanner	
	1623.100/EIS	EtherNet/IP Adapter	
	1623.100/OMB	Open Modbus/TCP	
	1623.100/PLS	POWERLINK Controlled Node	
	1623.100/PNM	PROFINET IO Controller	
	1623.100/PNS	PROFINET IO Device	
	1623.100/S3M	Sercos Master	
	1623.100/S3S	Sercos Slave	
	1623.100/VRS	VARAN Client	
NJ 100DN-CO	1623.500/COM	CANopen Master	Dual-Port-Memory (80 Pin)
	1623.500/COS	CANopen Slave	
NJ 100DN-DN	1623.510/DNM	DeviceNet Master	
	1623.510/DNS	DeviceNet Slave	
NJ 100DN-DP	1623.400/DPM	PROFIBUS DP Master	
	1623.400/DPS	PROFIBUS DP Slave	

netJACK device type name	Part number	Network/Protocol / device functioning as	Host interface
NJ 100EN-RE	1625.100/ECM	EtherCAT Master	PCI-Express (40 Pin)
	1625.100/ECS	EtherCAT Slave	
	1625.100/EIM	EtherNet/IP Scanner	
	1625.100/EIS	Ethernet/IP Adapter	
	1625.100/OMB	Open Modbus/TCP	
	1625.100/PLS	POWERLINK Controlled Node	
	1625.100/PNM	PROFINET IO Controller	
	1625.100/PNS	PROFINET IO Device	
	1625.100/S3M	Sercos Master	
	1625.100/S3S	Sercos Slave	
	1625.100/VRS	VARAN Client	
NJ 100EN-CO	1625.500/COM	CANopen Master	
	1625.500/COS	CANopen Slave	
NJ 100EN-DN	1625.510/DNM	DeviceNet Master	
	1625.510/DNS	DeviceNet Slave	
NJ 100EN-DP	1625.400/DPM	PROFIBUS DP Master	
	1625.400/DPS	PROFIBUS DP Slave	

Table 43: Which netJACK can be used for which protocol and host interface?

The netJACK communication module may only be installed and operated in a host system which has been constructed according to the specifications given in the netJACK Design Guide.

2.3 Personnel qualification

The netJACK Communication Module must only be installed, configured and removed by qualified personnel. Job-specific technical skills for people professionally working with electricity must be present concerning the following issues:

- Safety and health at work
- Mounting and connecting of electrical equipment
- Measurement and Analysis of electrical functions and systems
- Evaluation of the safety of electrical systems and equipment
- Installing and Configuring IT systems

2.4 References safety

- [S1] ANSI Z535.6-2006 American National Standard for Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials
- [S2] IEC 60950-1, Information technology equipment - Safety - Part 1: General requirements, (IEC 60950-1:2005, modified); German Edition EN 60950-1:2006
- [S3] EN 61340-5-1 and EN 61340-5-2 as well as IEC 61340-5-1 and IEC 61340-5-2

2.5 Safety instructions to avoid personal injury

To ensure your own personal safety and to avoid personal injury, you must read, understand and follow the following safety instructions in this manual and all warning messages about danger causing personal injury, before you install and operate the netJACK communication module.

2.5.1 Electrical shock hazard

The danger of a lethal electrical shock caused by parts with more than 50V may occur if you work at the host system or open the housing of the host system.

- Hazardous voltage may be present inside the host device, into which the netJACK communication module is to be integrated. Therefore read and follow the safety instructions of the manufacturer of the host device.
- First disconnect the power plug of the host device, before you mount or remove the netJACK communication module.
- Make sure, that the power supply is off at the host device.
- Mount or remove the netJACK communication module only after disconnecting the power at the host system.

An electrical shock is the result of a current flowing through the human body. The resulting effect depends on the intensity and duration of the current and on its path through the body. Currents in the range of approximately ½ mA can cause effects in persons with good health, and indirectly cause injuries resulting from startle responses. Higher currents can cause more direct effects, such as burns, muscle spasms, or ventricular fibrillation.

In dry conditions permanent voltages up to approximately 42.4 V peak or 60 V DC are not considered as dangerous, if the contact area is equivalent to a human hand.

Reference Safety [S2]

2.6 Safety instructions to avoid property damage

To avoid damage to your netJACK communication module or to your host system, you must read, understand and follow the following safety instructions and all safety instructions and warnings in this manual concerning property damage, before you install and operate your netJACK communication module.

2.6.1 Device destruction by exceeding allowed supply voltage

The netJACK communication module may only be operated with the specified supply voltage.

- Make sure that the limits of the allowed range for the supply voltage are not exceeded. A supply voltage above the upper limit can cause severe damage to the netJACK!
- A supply voltage below the lower limit can cause malfunction of the netJACK!

The allowed range for the supply voltage is indicated in section *Technical Data of the netJACK Communication Modules* [► page 163].

2.6.2 Device destruction by exceeding allowed signaling voltage

To avoid damage to your netJACK communication module due to high signaling voltage, you must observe the following instructions:

- All I/O signal pins of the netJACK tolerate only a specified signaling voltage!
- Operation with a signaling voltage other than the specified signaling voltage may lead to severe damage to the netJACK!

The allowed range for the signaling voltage is indicated in section *Technical Data of the netJACK Communication Modules* [► page 163].

2.6.3 Electrostatic sensitive devices

The netJACK communication module is sensitive to electrostatic discharge, which can cause internal damage and affect its normal operation. Therefore adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge when you install or replace the netJACK. Follow the guidelines listed hereafter when you handle the netJACK:

- Touch a grounded object to discharge potential static before you handle the netJACK.
- Wear an approved grounding wriststrap.
- Do not touch the connector pins located on the underside of the netJACK.
- If possible, use a static-safe workstation.
- When not in use, store the equipment in appropriate static-safe packaging.

Reference Safety [S3]

2.6.4 Exceeding the maximum number of permitted write and delete accesses

This device uses a serial flash chip to store remanent data such as firmware storage, configuration storage, etc. This device allows a maximum of 100,000 write/delete accesses that are sufficient for standard operation of the device. However, writing/deleting the chip excessively (e.g. changing the configuration or changing the name of station) leads to the maximum number of permitted write/delete accesses being exceeded and to device damage. For example, if the configuration is changed once an hour, the maximum number is reached after 11.5 years. If the configuration is changed even more frequently, for example once a minute, the maximum number is reached after approx. 69 days.

Avoid exceeding the maximum permitted write/delete accesses by writing too often.

2.6.5 Power drop during write and delete accesses in the file system

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

- Make sure, that the power supply of the device does not drop during write and delete accesses in the file system (firmware update, configuration download etc.).

2.7 Labeling of safety messages

In this document, the safety instructions and property damage messages are designed according both to the internationally used safety conventions as well as to the ANSI standard.

- The **Section Safety Messages** at the beginning of a chapter are pinpointed particularly. They are highlighted by a specific safety symbol and a signal word according to the degree of endangerment. In the safety message, the nature of the hazard is indicated.
- The **Integrated Safety Messages** embedded in operating instructions are highlighted by a signal word according to the degree of endangerment and possibly by a safety symbol. In the safety message, the nature of the hazard is indicated.





Safety symbol	Safety symbol USA	Sort of warning or principle
		Warning of lethal electrical shock
		Warning of damages by electrostatic discharge
		Principle: Disconnect the power plug

Table 44: Safety symbols and sort of warning or principle

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

Table 45: Signal words

3 Device description

3.1 Overview

The products of the netJACK family are communication modules for automation devices in Real-Time Ethernet or Fieldbus networks.

Being part of an embedded system, the netJACK communication modules are integrated into a host device or host system in order to provide I/O data via Dual-Port Memory or PCI Express interface.

netJACKs are based on netX technology and are endowed with physically complete bus interfaces for all leading Fieldbus or Real-Time Ethernet protocols.

The following table shows, which netJACK communication module is currently available for which network protocol/system and host interface.

netJACK device type name	Part number	Network/Protocol	Host interface
NJ 51D-RE	1662.100/ECS	EtherCAT Slave	Dual-Port-Memory (60 Pin)
	1662.100/EIS	EtherNet/IP Adapter	
	1662.100/OMB	Open Modbus/TCP	
	1662.100/PLS	POWERLINK Controlled Node	
	1662.100/PNS	PROFINET IO Device	
	1662.100/S3S	Sercos Slave	
NJ 52D-COS	1672.540/COS	CANopen Slave	
NJ 52D-DNS	1672.520/DNS	DeviceNet Slave	
NJ 52D-DPS	1672.420/DPS	PROFIBUS DP Slave	
NJ 100DN-RE	1623.100/ECM	EtherCAT Master	Dual-Port-Memory (80 Pin)
	1623.100/ECS	EtherCAT Slave	
	1623.100/EIM	EtherNet/IP Scanner	
	1623.100/EIS	EtherNet/IP Adapter	
	1623.100/OMB	Open Modbus/TCP	
	1623.100/PLS	POWERLINK Controlled Node	
	1623.100/PNM	PROFINET IO Controller	
	1623.100/PNS	PROFINET IO Device	
	1623.100/S3M	Sercos Master	
	1623.100/S3S	Sercos Slave	
	1623.100/VRS	VARAN Client	
NJ 100DN-CO	1623.500/COM	CANopen Master	
	1623.500/COS	CANopen Slave	
NJ 100DN-DN	1623.510/DNM	DeviceNet Master	
	1623.510/DNS	DeviceNet Slave	
NJ 100DN-DP	1623.400/DPM	PROFIBUS DP Master	
	1623.400/DPS	PROFIBUS DP Slave	

netJACK device type name	Part number	Network/Protocol	Host interface
NJ 100EN-RE	1625.100/ECM	EtherCAT Master	PCI-Express (40 Pin)
	1625.100/ECS	EtherCAT Slave	
	1625.100/EIM	EtherNet/IP Scanner	
	1625.100/EIS	Ethernet/IP Adapter	
	1625.100/OMB	Open Modbus/TCP	
	1625.100/PLS	POWERLINK Controlled Node	
	1625.100/PNM	PROFINET IO Controller	
	1625.100/PNS	PROFINET IO Device	
	1625.100/S3M	Sercos Master	
	1625.100/S3S	Sercos Slave	
	1625.100/VRS	VARAN Client	
NJ 100EN-CO	1625.500/COM	CANopen Master	
	1625.500/COS	CANopen Slave	
NJ 100EN-DN	1625.510/DNM	DeviceNet Master	
	1625.510/DNS	DeviceNet Slave	
NJ 100EN-DP	1625.400/DPM	PROFIBUS DP Master	
	1625.400/DPS	PROFIBUS DP Slave	

Table 46: Which netJACK for Which Protocol and Host Interface?

3.2 Firmware, drivers and configuration software

The firmware of the netJACK supports both Dual-Port Memory and PCI Express-based host Interfaces.

For communication between netJACK and host system, you can use the Hilscher standard cifX Device Driver or a cifX Toolkit-based driver.

The SYCON.net configuration software allows you to configure master and slaves.

If a USB interface has been implemented on the carrier board of the netJACK or if you are using an Evaluation Board, you can access the netJACK from a Windows PC via USB cable. For this purpose, USB drivers are provided by Hilscher.



Note:

Firmware, drivers, configuration software and cifX Toolkit are provided on the Communication Solutions DVD. Brief instructions for installing the drivers and the configuration software can be found in the *Getting Started* PDF, which is stored in the root directory of the Communication Solutions DVD.

3.3 netJACK as embedded system

netJACK communication modules are part of an embedded system, i. e. they are mounted on a carrier board which is provided by the OEM as part of the host system.

Note therefore, that certain functions of the netJACK communication modules – like the USB diagnostic interface and the serial diagnostic interface for netJACK with Dual-Port Memory – are only available, if the necessary hardware components (connectors, wiring) have been implemented on the carrier board by the OEM.

On the other hand, there is no need for the OEM to implement LEDs on the carrier board, since the status LEDs have already been integrated into the casing of the netJACK by Hilscher.

The compact casings of the netJACK communication modules all share the same dimensions, regardless of what network system or host interface they are intended to be used with. Only the connecting parts and electrical components differ according to network and interface.

Due to their uniform design, the netJACK communication modules can be mounted just-in-time before being put into operation at customer site. Changing network systems is made easy, because the netJACK can be mounted or dismounted quickly without having to use any tools, since the netJACK is frontloaded and then fixed to the host system by brackets and a sliding latch. Specially designed guiding rails on the netJACK and cut-outs on the carrier board prevent mounting a netJACK that is not compatible with the interface of the host system.

When constructing the carrier board of the host system, the manufacturer must take into account, that at least one of the two diagnostic interfaces suited for firmware update must be implemented according to the specifications given in the netJACK Design Guide. This diagnostic interface should be accessible from the outside of the host system.

A host system with PCI Express interface has a USB interface for diagnostic interface, a host system with Dual-Port Memory interface has a USB or a serial interface for diagnostic interface.

These interfaces do not only make updating the firmware easier, they also provide extensive diagnosis possibilities via the System Configurator SYCON.net (see sections „*Diagnosis*“ and „*Extended Diagnosis*“ of the SYCON.net DTM manuals), which is a sophisticated and powerful diagnostic tool, or via the cifX test application, which is an easy to use lean and compact tool.

If neither the serial interface nor the USB interface have been implemented on the carrier board of the host system, the netJACK firmware can only be updated by removing the netJACK from the host system and connecting it to an external PC via Hilscher Evaluation Board (for Dual-Port Memory: NJEB-D, Hilscher part number 1600.000; for PCI Express: NJEB-E, Hilscher part number 1600.010).

For details on firmware update, please refer to chapter *Updating Firmware* [► page 106].

4 Prerequisites for operation

The following prerequisites must be fulfilled to operate netJACK communication modules:

4.1 Hardware host system

- Mechanical connection: For proper mounting of the netJACK, all necessary cut-outs in the front panel of the housing and on the carrier board of the host system must be implemented according to the specifications given in the netJACK Design Guide.
- Power supply: The netJACK needs a power supply via the pins of the SAMTEC connector according to the specifications given in the netJACK Design Guide. The voltage must always be in the range of $3.3\text{ V} \pm 5\%$
- Electrical connection: The netJACK is electrically connected to the carrier board of the host system via SAMTEC connector. The pins of the connector on the carrier board must be implemented and wired according to the specifications given in the netJACK Design Guide and according to the host interface which is being used (PCI Express or Dual-Port Memory).
- Diagnostic interface: For using the USB diagnostic interface or the serial diagnostic interface (only netJACK with Dual-Port Memory), the necessary hardware components (connectors, wiring) must be implemented on the carrier board of the host system according to the specifications given in the netJACK Design Guide.

4.2 Firmware and drivers

- The netJACK communication module must be loaded with the appropriate firmware for the used network protocol. You will find a mapping of the netJACK devices to the appropriate firmware for the concerned protocol in section *Devices and firmware* [► page 11].
- For communication between a netJACK communication module and a host system not running under Microsoft Windows®, a cifX Toolkit-based driver must be installed on the host system. If the host system runs under Windows or if the netJACK is to be connected to a PC via Hilscher Evaluation Board, the cifX Device Driver must be installed.
- The netJACK communication module must be properly configured as master or slave. You can use the SYCON.net configuration software for this purpose.
- If you want to access the netJACK from a Windows PC via USB interface, you first have to install the USB drivers on the PC.

4.3 System requirements SYCON.net

You need internet access in order to download the product DVD.

- PC with 1 GHz processor or higher
- Windows® 7 (32 bit and 64 bit) SP1, Windows® 8 (32 bit and 64 bit), Windows® 8.1 (32 bit and 64 bit), Windows® 10 (32 bit and 64 bit)
- Administrator privilege required for installation
- Microsoft .NET Framework 4.0
- Internet Explorer 5.5 or higher
- Free disk space: ca. 400 MByte
- RAM: min. 512 MByte, 1024 MByte recommended
- Graphic resolution: min. 1024 x 768 pixel
- Keyboard and mouse
- USB, serial or Ethernet interface
- Restriction: Touch screens are not supported



Note:

If the project file is used on another PC,

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

4.4 Communication partner in the network

- If you use the netJACK communication module as slave device, a corresponding master device must be present in the network.
- If you use the netJACK communication module as master device, a corresponding slave device must be present in the network.

5 Getting started

5.1 Overview

The following table provides an overview of the necessary steps for installing drivers, software and hardware, and for configuring the netJACK communication module (as master or slave) for typical use cases.



Note:

netJACK communication modules are shipped with their firmware already loaded.

For information on how to update netJACK firmware, please refer to chapter *Updating Firmware* [▶ page 106].

#	Step	Description	For details see
1	Installing Drivers and Software		
1.1	Installing drivers	You need to install drivers for the host interface and the diagnostic interface on the host system:	
1.1.1	Installing driver for the host interface	<p>If a Windows® operating system runs on the host system or if you want to install the netJACK for testing or diagnostic purposes via Evaluation Board in a PC running under Windows®, you need to install the cifX Device Driver.</p> <p>If no Windows® operating system runs on the host system, a custom driver created by the cifX Driver Toolkit has to be installed on the host system.</p>	<p><i>Getting Started</i> PDF in root directory of DVD</p> <p>Toolkit Manual <i>cifX/netX Toolkit DPM</i></p>
1.1.2	Installing driver for the diagnostic interface	<p>If the host system provides a USB interface for the netJACK communication module, and you want to use this USB interface for diagnosing, configuring or updating the firmware of the netJACK, you need to install the USB Driver.</p> <p>Note: A netJACK with Dual-Port Memory can also be diagnosed, configured or have its firmware updated by using a serial interface, if the serial interface is provided by the host system. For the serial interface, no driver needs to be installed.</p>	<i>Getting Started</i> PDF in root directory of DVD
1.2	Installing configuration software	If no suitable configuration software has yet been installed on the host system, you need to install a configuration software in order to be able to configure the netJACK as master or slave device:	
1.2.1	Installing configuration software for netJACK as master device	<p>If a Windows® operating system runs on the host system or if you want to install the netJACK for testing or diagnostic purposes via Evaluation Board in a PC running under Windows®, you need to install the SYCON.net configuration software on the host system, respectively on the PC.</p> <p>If no Windows® operating system runs on the host system and/or you want to use an external PC to configure the netJACK via USB or serial interface (serial interface is only available for netJACKs with Dual-Port Memory), you need to install SYCON.net on the external PC.</p>	<i>Getting Started</i> PDF in root directory of DVD
1.2.2	Installing configuration software for netJACK as slave device	<p>If a Windows® operating system runs on the host system or if you want to install the netJACK for testing or diagnostic purposes via Evaluation Board in a PC running under Windows®, you need to install the SYCON.net configuration software on the host system, respectively on the PC.</p> <p>If no Windows® operating system runs on the host system and/or you want to use an external PC to configure the netJACK via USB or serial interface (serial interface is only available for netJACKs with Dual-Port Memory), you need to install SYCON.net on the external PC.</p>	<i>Getting Started</i> PDF in root directory of DVD

#	Step	Description	For details see
2	Installing Hardware		
2.1	Preparing Hardware Installation		
2.1.1	Take safety precautions	<p>Carefully read the documentation of the host system into which the netJACK is to be mounted. Strictly obey all safety rules given by the manufacturer of the device.</p> <p>⚠ WARNING Lethal Electrical Shock caused by parts with more than 50V!</p> <ul style="list-style-type: none"> ➤ First disconnect the power plug of the host system before mounting the netJACK! ➤ Make sure that the power supply is off at the device! 	Section <i>Electrical Shock Hazard</i> [▶ page 75]
2.1.2	Prepare netJACK for mounting	<p>Remove the cardboard cover from the underside of the netJACK and pull the sliding latch into mounting position.</p> <p>NOTICE Electrostatic Sensitive Device</p> <ul style="list-style-type: none"> ➤ After removing the cover, make sure you do not touch the metal pins of the SAMTEC connector located on the underside of the netJACK communication module. 	Chapter <i>Mounting netJACK</i> [▶ page 96]
2.2	Mounting netJACK	Mount netJACK in host system	
2.2.1	Insert netJACK	Fix netJACK onto the carrier board of the host system.	Chapter <i>Mounting netJACK</i> [▶ page 96]
2.2.2	Lock netJACK in host system	Push the sliding latch into the netJACK.	
2.3	Connect cables and power supply		
2.3.1	Connect cable to the network communication partner (master or slave)	<p>Note: Use the RJ45 socket only for LAN, not for telecommunication circuits.</p> <p>Important: Note for netJACK PROFINET IO Controller (Master): Connect only ports with each other which have different cross-over settings. Otherwise, a connection between the devices can not be established. If the port settings of the netJACK PROFINET IO Controller are not set to AUTO, then Port0 is switched uncrossed and Port1 crossed.</p>	User manual of the corresponding protocol
2.3.2	Reconnect power supply	Connect the host system with the power supply and switch it on.	User manual of the host system
3	Configuring netJACK		
3.1	Configuring netJACK slave	You can use SYCON.net to configure the netJACK as slave device.	
3.1.1	Configuring slave by using SYCON.net	<ul style="list-style-type: none"> ➤ Start configuration software SYCON.net. ➤ Create new project /Open existing project. ➤ Add slave to configuration. ➤ To open the configuration window, double click device symbol or choose Configuration entry from the context menu. ➤ Select driver and assign device. ➤ If it is necessary to update the firmware, select and download the firmware. ➤ Configure netJACK Slave. 	<p>Operating Instruction Manual for the DTM of the concerned protocol</p> <p>also</p> <p>Section <i>Device Names in SYCON.net</i> [▶ page 90]</p> <p>,</p> <p>also</p> <p>Section <i>Instructions for Updating Firmware with SYCON.net</i> [▶ page 115]</p> <p>,</p>

#	Step	Description	For details see
3.1.2	Downloading Slave configuration	Download the netJACK (Slave) configuration.	
3.2	Configuring netJACK master	You can use SYCON.net to configure the netJACK as master device. Use the corresponding Master DTM in SYCON.net .	
3.2.1	Configuring master by using SYCON.net	<ul style="list-style-type: none"> ➤ Start configuration software SYCON.net. ➤ Create new project /Open existing project. ➤ Add master to configuration. ➤ To open the configuration window, double click device symbol or choose Configuration entry from the context menu. ➤ Select driver and assign device. ➤ If it is necessary to update the firmware, select and download the firmware. ➤ Configure netJACK Master. 	Operating Instruction Manual for the DTM of the protocol concerned also Sections <i>Notes on Configuring Master Devices</i> [▶ page 88] and <i>Device Names in SYCON.net</i> [▶ page 90]
3.2.2	Downloading Master configuration	Download the netJACK (Master) configuration.	
4	Diagnosis		
4.1	Slave diagnosis	You can use SYCON.net for diagnostic purposes with a netJACK slave device.	
4.1.1	Slave diagnosis by using SYCON.net	Diagnosis, I/O Data Use the corresponding Slave DTM in the configuration software SYCON.net	
	Diagnosis	<ul style="list-style-type: none"> ➤ Right click on device symbol. ➤ In the context menu, select Diagnosis entry, ➤ Then select Diagnosis > General or Firmware Diagnosis or select Diagnosis > Extended Diagnosis. 	Operating Instruction Manual for the DTM of the protocol concerned
	I/O Monitor	<ul style="list-style-type: none"> ➤ Right click on device symbol. ➤ In the context menu, select Diagnosis entry. ➤ Select Tools > I/O Monitor. ➤ Check the input or output data. 	
4.2	Master diagnosis	You can use SYCON.net for diagnostic purposes with a netJACK master device.	
4.2.1	Master diagnosis by using SYCON.net	Diagnosis, I/O Data Use the corresponding Master DTM in the configuration software SYCON.net	
	Diagnosis	<ul style="list-style-type: none"> ➤ Right click on device symbol. ➤ In the context menu, select Diagnosis entry. ➤ Select Diagnosis > General or Firmware Diagnosis or Master Diagnosis or select Diagnosis > Extended Diagnosis. 	Operating Instruction Manual for the DTM of the protocol concerned
	I/O Monitor	<ul style="list-style-type: none"> ➤ Right click on device symbol. ➤ In the context menu, select Diagnosis entry. ➤ Select Tools > I/O Monitor. ➤ Check the input or output data. 	

Table 47: Steps for Installing Soft- and Hardware, configuring and Diagnosing a netJACK Communication Module (Master and Slave)

5.2 Notes on configuring master devices

To configure the Master, a device description file of a netJACK slave is required. Please observe the following notes:

Real-Time Ethernet system	Notes
<i>EtherCAT Slave</i>	<p>To configure the Master, an XML file (device description file) is required. The settings in the used Master must comply with the settings in the Slave to establish communication. Important parameters are: Vendor ID, Product Code, Serial Number, Revision Number, Output/Input Data Bytes.</p> <p>The loadable firmware supports for the number of cyclic input data and for cyclic output data in total up to 512 bytes. If more than 256 bytes for input data or for output data should be exchanged via EtherCAT, then a customer specific XML file is necessary. Additionally the following formula applies: $(\text{number of input bytes} + 3)/4 + (\text{number of output bytes} + 3)/4$ must be less or equal to 128.</p>
<i>EtherNet/IP-Adapter</i>	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 communication. Important parameters are: Input, Output Data Bytes, Vendor ID, Product Type, Product Code, Major Rev, Minor Rev, IP Address and Netmask.
<i>POWERLINK-Controlled-Node/Slave</i>	To configure the Managing Node/Master, an 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 communication. Important parameters are: Vendor ID, Product Code, Serial Number, Revision Number, Node ID, Output and Input length.
<i>PROFINET IO-Device (Slave)</i>	<p>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 communication. Important parameters are: Station Name, Vendor ID, Device ID, Input and Output Data Bytes.</p> <p>Under Name of Station, the name must be typed 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.</p>
<i>Sercos Slave</i>	<p>The Sercos Master uses the Sercos address to communicate with the slave. Some Masters verify Device ID, Vendor Code, Input Data Size and Output Data Size and do further communication to the slave only if all these values match. Therefore the master reads these parameters from the slave and compares them with the configuration stored in the master.</p> <p>The parameters Device ID, Vendor Code, Input Data Size and Output Data Size are part of the SDDML device description file. If for the configuration of the Sercos Master SDDML files are used and a default value of one of these parameters was changed, then a SDDML file must be created in the configuration software via Export SDDML and then used in the configuration of the SERCOS Master.</p>

Table 48: Notes on configuring RTE master device

Fieldbus system	Notes
<i>CANopen Slave</i>	To configure the Master, an EDS file (device description file) is required. The settings in the used Master must comply with the settings in the Slave to establish communication. Important parameters are: Node Address and Baudrate.
<i>DeviceNet Slave</i>	To configure the Master, an EDS file (device description file) is required. The settings in the used Master must comply with the settings in the Slave to establish communication. Important parameters are: MAC ID, Baudrate, Produced Size, Consumed Size, Vendor ID, Product Type, Product Code, Major Rev, Minor Rev.
<i>PROFIBUS DP Slave</i>	To configure the Master, a GSD file (device description file) is required. The settings in the used Master must comply with the settings in the Slave to establish communication. Important parameters are: Station Address, Ident Number, Baudrate and Config Data (the configuration data for the output and input length).

Table 49: Notes on configuring fieldbus master device



For further information on device description files, see section *Device Description Files* [▶ page 14].

5.3 Device names in SYCON.net

The following table shows the device names which are displayed in the SYCON.net configuration software for the individual netJACK device types and the used protocol.

netJACK device type name	Protocol	DTM specific group	Device name in SYCON.net
NJ 51D-RE	EtherCAT Slave V4.8	Gateway/Stand-Alone Slave	NJ 51X-RE/ECS V4.2
	EtherNet/IP Adapter/Slave	Gateway/Stand-Alone Slave	NJ 51X-RE/EIS
	Open Modbus/TCP	Gateway/Stand-Alone Slave	NJ 51X-RE/OMB V3
	POWERLINK Controlled Node	Gateway/Stand-Alone Slave	NJ 51X-RE/PLS V3
	PROFINET IO Device V3 (Slave)	Gateway/Stand-Alone Slave	NJ 51X-RE/PNS V3.5.35 - V3.x
	PROFINET IO Device V4.5 (Slave)	Gateway/Stand-Alone Slave	NJ 51X-RE/PNS V4.5.0.0 - V4.x
	Sercos Slave	Gateway/Stand-Alone Slave	NJ_51X-RE_S3S_FIXCFG
NJ 52D-COS	CANopen Slave	Gateway/Stand-Alone Slave	NJ 52X-COS/COS
NJ 52D-DNS	DeviceNet Slave	Gateway/Stand-Alone Slave	NJ 52X-DNS/DNS
NJ 52D-DPS	PROFIBUS DP Slave	Gateway/Stand-Alone Slave	NJ 52X-DPS/DPS
NJ 100DN-DP	PROFIBUS DP Master	Master	NJ 100XX-DP/DPM
NJ 100EN-DP	PROFIBUS DP Slave	Gateway/Stand-Alone Slave	NJ 100XX-DP/DPS
NJ 100DN-RE NJ 100EN-RE	EtherCAT Master	Master	NJ 100XX-RE/ECM
	EtherCAT Slave V4.8	Gateway/Stand-Alone Slave	NJ 100XX-RE/ECS V4.2
	EtherNet/IP Scanner/Master	Master	NJ 100XX-RE/EIM
	EtherNet/IP Adapter/Slave	Gateway/Stand-Alone Slave	NJ 100XX-RE/EIS
	Open Modbus/TCP	Gateway/Stand-Alone Slave	NJ 100XX-RE/OMB V3
	POWERLINK Controlled Node	Gateway/Stand-Alone Slave	NJ 100XX-RE/PLS V3
	PROFINET IO Controller V3 (Master)	Master	NJ 100XX-RE/PNM V3
	PROFINET IO Device V3 (Slave)	Gateway/Stand-Alone Slave	NJ 100XX-RE/PNS V3.5.35 - V3.x
	PROFINET IO Device V4.5 (Slave)	Gateway/Stand-Alone Slave	NJ 100XX-RE/PNS V4.5.0.0 - V4.x
	Sercos Master	Master	NJ 100XX-RE/S3M
	Sercos Slave	Gateway/Stand-Alone Slave	NJ_100XX-RE_S3S_FIXCFG
	VARAN Client	Gateway/Stand-Alone Slave	NJ 100XX-RE/VRS
NJ 100DN-CO	CANopen Master	Master	NJ 100XX-CO/COM
NJ 100EN-CO	CANopen Slave	Gateway/Stand-Alone Slave	NJ 100XX-CO/COS (NJ 100XX-CO COS.eds)

netJACK device type name	Protocol	DTM specific group	Device name in SYCON.net
NJ 100DN-DN	DeviceNet Master	Master	NJ 100XX-DN/DNM
NJ 100EN-DN	DeviceNet Slave	Gateway/Stand-Alone Slave	NJ 100XX-DN/DNS (NJ_100XX-DN_DNS.EDS)

Table 50: Device names in SYCON.net by communication protocol

6 Software overview

**Note:**

Firmware, drivers and configuration software are provided on the Communication Solutions DVD.

Brief instructions for installing drivers and software can be found in the *Getting Started* PDF, which is stored in the root directory of the Communication Solutions DVD.

The USB interface, the serial interface as well as the cifX Device Driver may only be used exclusively by **one** software, that is

- the SYCON.net configuration software (with integrated ODMV3) or
- the cifX Test Application or
- the cifX Driver Setup Utility or
- the application program.

Never use the listed software simultaneously, otherwise this will result in communication problems with the device.

If the SYCON.net configuration software was used on the PC, then stop the ODMV3 service before you use one of the other software listed above. Therefore, select **Service > Stop** from the context menu of the ODMV3 system tray icon.

6.1 Software for downloading firmware

netJACK communication modules are shipped with their firmware already loaded. You can update the firmware, if necessary.

In the *Reference to Hardware and Firmware* [► page 11] section, you will find a list of up-to-date firmware files which are stored on the Communication Solutions DVD.

When using a Microsoft Windows® operating system, you need the following software to update your firmware:

- Up-to-date firmware file
- SYCON.net (contains the Online Data Manager ODMV3)
- cifX Device Driver or, if you want to update the netJACK via USB or serial interface (serial interface only available for netJACKs with Dual-Port Memory), the netX Driver or the netX Transport DLL. The netX Driver is included in the SYCON.net setup and does not need to be installed separately. The netX Transport DLL is also included in the SYCON.net setup and does not need to be installed separately either.
- If you want to update the netJACK via USB interface, you also need an installed USB driver.

You will find detailed information on the hardware needed for updating firmware and step-by-step instructions on how to update firmware with SYCON.net in chapter *Updating Firmware* [► page 106].

If you are not using a Microsoft Windows® operating system, you need the following software to update your firmware:

- Up-to-date firmware file
- Native application program which is able to download firmware
- Customized driver (based on cifX Toolkit)

**Note:**

You can not only update the firmware, but also load a different firmware to your netJACK, e. g. if you want to change to another protocol or if you want to switch the netJACK from slave to master device (or vice versa).

6.2 Software for configuration and diagnosis

When using a Microsoft Windows® operating system and a netJACK as **master device**, you need the following software to configure or diagnose your netJACK:

- SYCON.net (contains the Online Data Manager ODMV3)
- cifX Device Driver or, if you want to configure or diagnose the netJACK via USB or serial interface, the netX Driver (serial interface only available for netJACKs with Dual-Port Memory). The netX Driver is included in the SYCON.net installation and does not need to be installed separately.
- If you want to configure or diagnose the netJACK via USB interface, you also need to install the USB driver.

When using a Microsoft Windows® operating system and a netJACK as **slave device**, you need the following software to configure or diagnose your netJACK:

- SYCON.net (contains the Online Data Manager ODMV3)
- cifX Device Driver or, if you want to configure or diagnose the netJACK via USB or serial interface (serial interface only available for netJACKs with Dual-Port Memory), the netX Driver or the netX Transport DLL. The netX Driver is included in the SYCON.net setup and does not need to be installed separately. The netX Transport DLL is also included in SYCON.net setup and does not need to be installed separately.
- If you want to configure or diagnose the netJACK via USB interface, you also need to install the USB driver.

If you are not using a Microsoft Windows® operating system, you need the following software to configure or diagnose your netJACK:

- Native application program which is able to configure and diagnose the netJACK
- Customized driver (based on cifX Toolkit)

7 Mounting/removing netJACK

7.1 Safety messages

Please note the following safety messages:



⚠ WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!



Hazardous voltages may be present inside the device, into which the netJACK communication module is integrated. Strictly obey all safety rules provided in the documentation of the host device's manufacturer!

- First disconnect the power plug of the device.
- Make sure that the power supply is off at the device.
- Open the housing and install or remove the netJACK communication module only after disconnecting power!



⚠ WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!



Hazardous voltages may be present inside the device, into which the netJACK communication module is integrated. Strictly obey all safety rules provided in the documentation of the host device's manufacturer!

- First disconnect the power plug of the device.
- Make sure that the power supply is off at the device.
- Open the housing and install or remove the netJACK communication module only after disconnecting power!

NOTICE

Device destruction caused by short-circuit !

netJACK communication modules, the Evaluation Boards and the Adapter Board are not designed for „hot-plugging“. Therefore, only mount or remove the netJACK if no voltage is applied to the entire system.



NOTICE

Electrostatic Sensitive Device !

The netJACK communication module is sensitive to electrostatic discharge, which can cause internal damage and affect its normal operation. Therefore adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge, if you install or replace the netJACK.

- Do not touch the metal pins of the SAMTEC connector on the underside of the netJACK!
- Touch a grounded object to discharge potential static.
- Wear an approved grounding wrist strap.
- If available, use a static-safe workstation.
- When not in use, store the device in an appropriate static-safe packaging.

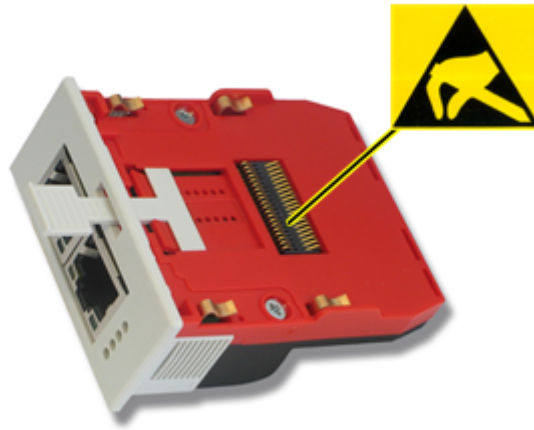


Figure 1: Elektrostatic Sensitive Device



Important:

netJACK communication modules for PCI Express must be powered on/off together with the entire host system. This is to ensure the necessary re-booting of the PCI Express bus when restarting the netJACK. Re-booting of the PCI Express bus is necessary for the netJACK to establish communication with the host. Therefore note that implementing a separate power on/off switch for the netJACK can lead to malfunctioning of the module.

7.2 Mounting principle netJACK

For mounting the netJACK communication modules, no tools are required. Simply insert the netJACK through the cut-out in the front panel of the housing of the host system, engage it to the carrier board, and finally lock it to the carrier board by using the sliding latch.

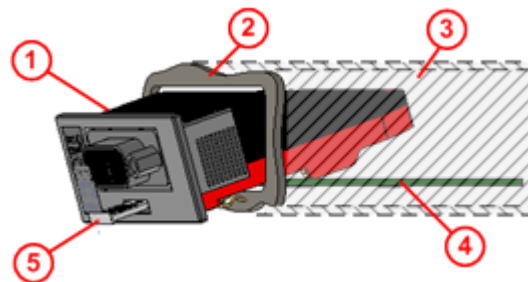


Figure 2: Monting Principle of the netJACK

- ① netJACK communication module
- ② Cut-out at front panel of the host system
- ③ housing of host system
- ④ Carrier board of host system
- ⑤ Sliding latch

7.3 Mounting netJACK

To mount the netJACK communication module into the host system, proceed as follows:



⚠ WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!

- First disconnect the power plug of the host system before mounting the netJACK.
- Make sure that the power supply is off at the device.



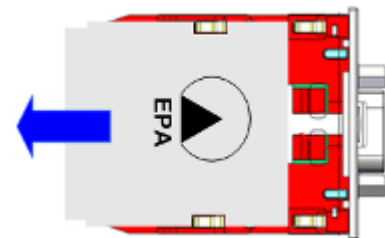
⚠ WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!

- First disconnect the power plug of the host system before mounting the netJACK.
- Make sure that the power supply is off at the device.



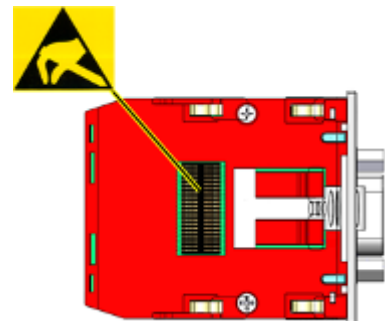
- Remove the cardboard cover which protects the underside of the netJACK, by sliding the cover underneath the brackets to the side. Be careful not to damage or bend the brackets holding the cardboard cover.



Remove Cover

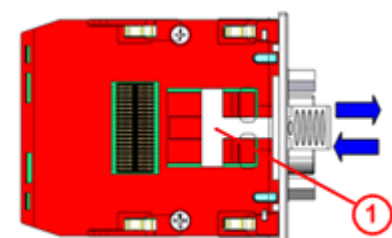
NOTICE Electrostatic Sensitive Device

After removing the cover, make sure you do not touch the metal pins of the SAMTEC connector located on the underside of the netJACK communication module, because this might damage the device.



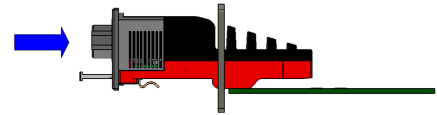
Electrostatic Sensitive Device

- Set the sliding latch located on the underside of the netJACK to mounting position: Pull the handle of the sliding latch half way out of the module. Mounting position ① is reached, when the latch is approximately at center position of the guiding rails.



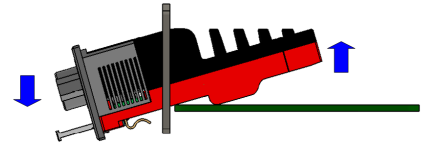
Bring Sliding Latch into Mounting Position

- Insert the netJACK approximately half way into the host system.



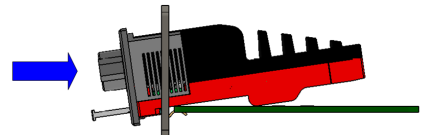
Push netJACK Inside

- Tilt the netJACK slightly downwards at the front, in order to push it further into the housing of the host system.

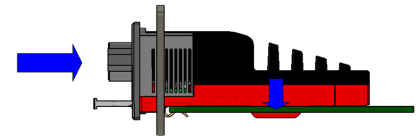


Tilt netJACK

- Push the netJACK further in, until it can be pushed downwards onto the carrier board and vertically engages in the cut-outs of the board.

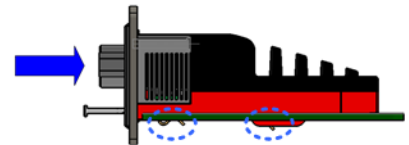


Push netJACK Further in



Engage netJACK Vertically

- Push the netJACK further in, until final position is reached and the module can not be moved in any further. You might have to push a little harder than before, in order to overcome the resistance of the brackets engaging horizontally with the carrier board.

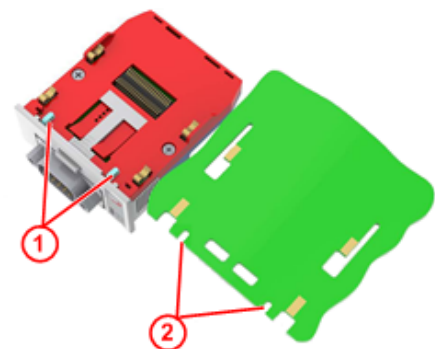


Engage netJACK in Final Position

- The brackets now fix the netJACK to the carrier board.

NOTICE Do not use force!

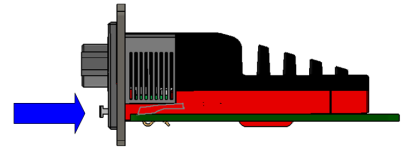
If the netJACK can not be brought into final position by pushing it with moderate strength, please check if you are by mistake trying to install a type of netJACK which is not compatible to the interface of the host system (e. g. netJACK for Dual-Port Memory into a PCI Express host system). The netJACK and the carrier board are endowed with small guides **①** and cut outs **②**, ensuring that only a compatible netJACK can be mounted onto the carrier board.



Protection Against Mounting Wrong netJACK

- To lock the netJACK onto the carrier board, push the handle of the sliding latch fully into the module.

⇒ You have mounted the netJACK communication module.



Lock netJACK

7.4 Removing netJACK

To remove the netJACK communication module from the host system, proceed as follows:



⚠ WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!



- First disconnect the power plug of the host system before removing the netJACK.
- Make sure that the power supply is off at the device.



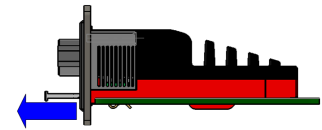
⚠ WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!



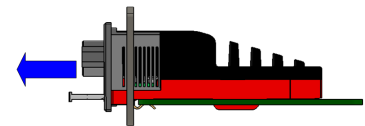
- First disconnect the power plug of the host system before removing the netJACK.
- Make sure that the power supply is off at the device.

- To unlock the netJACK, pull the handle of the sliding latch out of the module.



Unlock netJACK

- While holding on to the handle of the sliding latch, pull the netJACK fully out of the housing of the host system. You might have to use a little strength, in order to overcome the resistance of the brackets clinging onto the carrier board.



Pull out netJACK

⇒ You have removed the netJACK communication module.

8 Using the Evaluation Board

8.1 Overview

For testing, diagnosing or updating firmware, you can connect the netJACK communication module via Evaluation Board to a PC which runs under Microsoft Windows® and has the cifX Device Driver and a configuration software (SYCON.net) installed on it.

**Note:**

Before connecting the Evaluation Board, first install all necessary software. Brief instructions for installing drivers and software can be found in the *Getting Started* PDF, which is stored in the root directory of the Communication Solutions DVD.

No tools are necessary for using the Evaluation Board. First, you need to mount the netJACK onto the Evaluation Board and then connect the Evaluation Board to the PC.

The Evaluation Board NJEB-E for netJACK with PCI Express can simply be plugged into the PCI Express slot of the PC.

When using the Evaluation Board NJEB-D for netJACK with Dual-Port-Memory, you need an NXPCA-PCI Adapterboard and a CAB-NXPCA-PCI cable to connect the Evaluation Board NJEB-D with the PC.

8.1.1 Required Hardware

For a netJACK with PCI Express, you need:

- Evaluation Board NJEB-E (Hilscher part number 1600.010).

For a netJACK with Dual-Port Memory, you need:

- Evaluation Board NJEB-D (Hilscher part number 1600.000)
- Adapterboard NXPCA-PCI (Hilscher part number 7902.100)
- Cable CAB-NXPCA-PCI (Hilscher part number 4400.000)
- Power Adaptor NXAC-POWER (Hilscher part number 7930.000) for power supply (24 Volt) for Evaluation Board NJEB-D

8.1.2 Required Software

For driver, you need to install the cifX Device Driver on the PC.

If you want to download firmware, configure or diagnose a **master device**, you also need to install the SYCON.net configuration software.

8.2 Safety messages

Please observe the following safety messages:



WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!



Hazardous Voltage may be present inside the PC, into which the Evaluation Board or the Adapterboard are to be installed. Strictly obey all safety rules given in the documentation of the PC manufacturer.

- First disconnect the power plug of the PC.
- Make sure that the power supply is off at the PC.
- Open the housing and install or remove the Evaluation Board only after disconnecting the power!



WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!



Hazardous Voltage may be present inside the PC, into which the Evaluation Board or the Adapterboard are to be installed. Strictly obey all safety rules given in the documentation of the PC manufacturer.

- First disconnect the power plug of the PC.
- Make sure that the power supply is off at the PC.
- Open the housing and install or remove the Evaluation Board only after disconnecting the power!

NOTICE

Device Destruction caused by short-circuit !

The netJACK communication module, the Evaluation Board and the adapter board are not designed for „hot-plugging“. Therefore, only install or remove these devices if no voltage is applied to the system.



NOTICE

Electrostatic Sensitive Devices

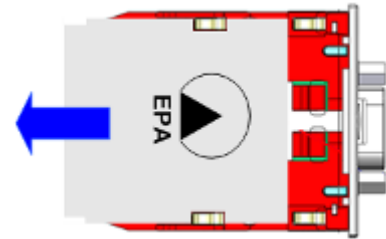
The netJACK communication module, the Evaluation Board and the adapter board are sensitive to electrostatic discharge, which can cause internal damage and affect their normal operations. Therefore adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge, if you install or replace these devices. Follow the guidelines listed hereafter when you handle these devices:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wrist strap.
- Do not touch unprotected connectors or wirings.
- If available, use a static-safe workstation.
- When not in use, store the devices in an appropriate static-safe packaging.

8.3 Mounting netJACK onto Evaluation Board

To mount the netJACK communication module onto the Evaluation Board, proceed as follows:

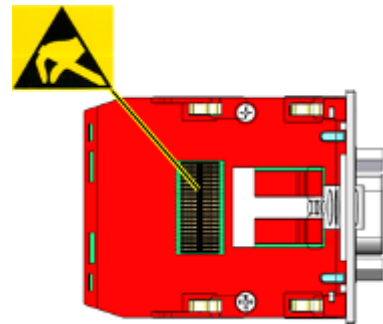
- Remove the cardboard cover which protects the underside of the netJACK by sliding the cover underneath the brackets to the side. Be careful not to damage or bend the brackets holding the cardboard cover.



Remove Cover

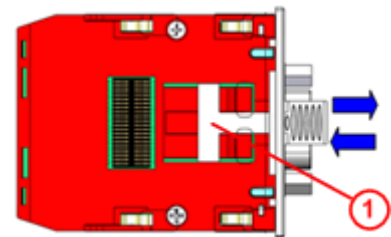
NOTICE Electrostatic Sensitive Device

After removing the cover, make sure you do not touch the metal pins of the SAMTEC connector located on the underside of the netJACK communication module, because this might damage the device.



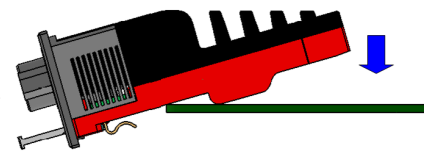
Electrostatic Sensitive Device

- Set the sliding latch located on the underside of the netJACK to mounting position: Pull the handle of the sliding latch half way out of the module. Mounting position ① is reached, when the latch is approximately at center position of the guiding rails.



Bring Sliding Latch into Mounting Position

- Lower the netJACK onto the Evaluation Board, thereby inserting the guiding rails of the netJACK into the cut out slots of the board.



Mount netJACK onto Evaluation Board



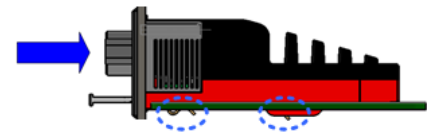
Fit Guiding Rails into Slots

- Push the netJACK horizontally onto the Evaluation Board, until final position is reached and the module can not be pushed in any further. You might have to push with moderate strength, in order to overcome the resistance of the brackets engaging horizontally with the Evaluation Board.
- ⇒ The brackets now fix the netJACK to the Evaluation Board.

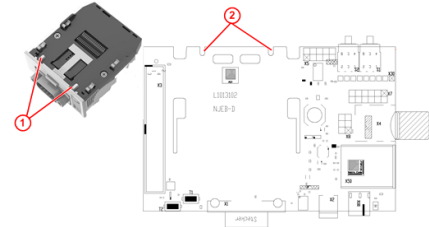
NOTICE Do not use force !

If the netJACK can not be brought into final position by pushing it with moderate strength, please check if you are by mistake trying to install a type of netJACK which is not compatible to the Evaluation Board (e. g. a NJ 100EN-RE with PCI Express and a NJEB-D Board for Dual-Port Memory). The netJACK and the Evaluation Board are endowed with small guides **①** and cut outs **②**, ensuring that only a compatible netJACK can be mounted onto the Evaluation Board.

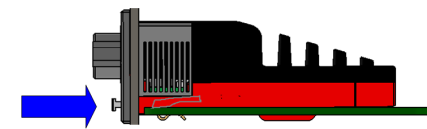
- To lock the netJACK onto the Evaluation Board, push the handle of the sliding latch fully into the module.
- ⇒ You have mounted the netJACK onto the Evaluation Board



Engage netJACK in Final Position



Protection Against Mounting Wrong netJACK



Lock netJACK

8.4 Connecting Evaluation Board to PC

8.4.1 Evaluation Board NJEB-E (PCI Express)

First mount the netJACK communication module onto the Evaluation Board NJEB-E as described in section *Mounting netJACK onto Evaluation Board* [► page 101].

Then install the Evaluation Board with mounted netJACK at the PCI Express interface of the PC.

To do this, proceed as follows:



⚠ WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!

- First disconnect the power plug of the PC.
 - Make sure that the power supply is off at the PC.
-



⚠ WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!

- First disconnect the power plug of the PC.
 - Make sure that the power supply is off at the PC.
-



- Open the housing of the PC. Follow the safety instructions of the manufacturer of the PC.
- Plug the Evaluation Board with mounted netJACK into the PCI Express slot of the PC. When doing this, please follow the rules concerning electrostatic sensitive devices given in section *Safety Messages* [► page 100].
- Close the housing of the PC according to the instructions of the manufacturer of the PC.
- Reconnect PC to power supply and switch it on.
- ⇒ If the installation of the Evaluation Board NJEB-E with mounted netJACK has been successful, the entry **CIFx Communication Interface > netJACK 100PCI/PCle Device** is displayed in the Windows Device Manager.

8.4.2 Evaluation Board NJEB-D (Dual-Port Memory)

First mount the netJACK communication module onto the Evaluation Board NJEB-D as described in section *Mounting netJACK onto Evaluation Board* [► page 101].

Then install the Adapterboard NXPCA-PCI at a PCI interface of the PC. Finally connect the Adapterboard via cable CAB-NXPCA-PCI to the Evaluation Board with mounted netJACK.



Important:

Please note, that the Evaluation Board NJEB-D needs an external power supply of 24 Volts (e. g. NXAC-POWER adaptor, Hilscher part number 7930.000), because the Adapterboard NXPCA-PCI does not supply power for the Evaluation Board.

Note also, that in this setup, the Evaluation Board is not protected by a housing, therefore take extra care to observe the notice concerning electrostatic sensitive devices in section *Safety Messages* [► page 100].

To connect the Evaluation Board NJEB-D to a PC, proceed as follows:



⚠ WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!

- First disconnect the power plug of the PC.
- Make sure that the power supply is off at the PC.



⚠ WARNING

Hazardous voltage! Danger to life, risk of injury by electric shock!

- First disconnect the power plug of the PC.
- Make sure that the power supply is off at the PC.
- Open the housing of the PC and install the Adapterboard NXPCA-PCI at a free PCI interface slot of the PC
- Connect the CAB-NXPCA-PCI cable to the NXPCA-PCI Adapterboard.



For further information, please refer to the manual of the Adapterboard *User Manual NXPCA-PCI*.

- Plug the CAB-NXPCA-PCI cable into the connector of the host interface of the Evaluation Board ①. Then connect the 24 V NXAC-POWER adaptor to the power connector of the Evaluation Board ② and switch it on.

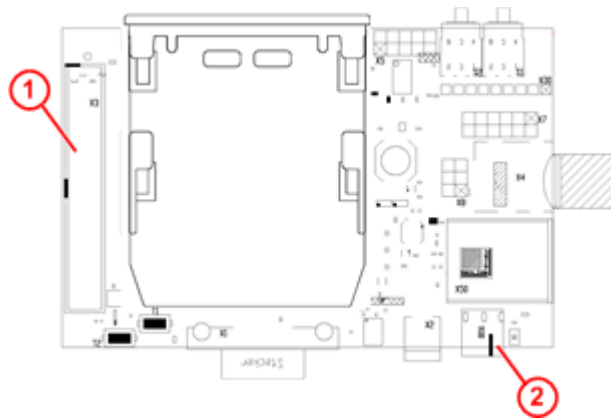


Figure 3: Host Interface and Power Connector on NJEB-D

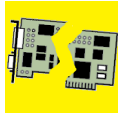
- Reconnect PC to power supply and switch it on.
- ⇒ If the installation has been successful, the entry **CIFx Communication Interface > NX-PCA-PCI** is displayed in the Windows Device Manager.

9 Updating firmware

9.1 Ways to update firmware

This section introduces you to the different possibilities of updating the firmware in the netJACK communication modules.

In the following illustrations, which shall provide an overview of the various update scenarios, the yellow marked elements show the way in which the firmware is being transferred into the netJACK communication module.



NOTICE

Power drop during write and delete accesses in the file system

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

- Make sure, that the power supply of the device does not drop during write and delete accesses in the file system (firmware update, configuration download etc.).

If your host system (in the subsequent graphics designated as “Embedded System”) runs under a Windows® operating system with the SYCON.net configuration software and the cifX Device Driver installed, you can update the firmware of your netJACK communication module directly on your host system. In this case, you don’t need an external PC.

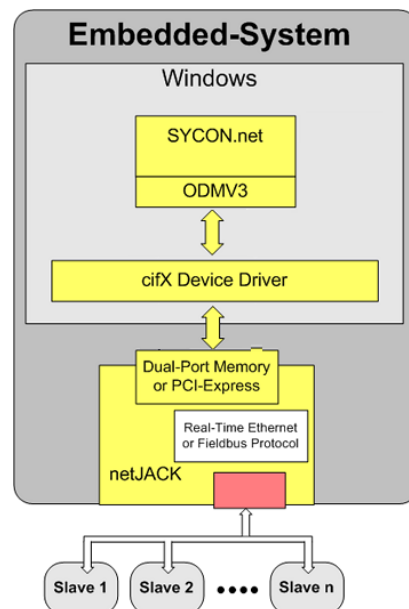


Figure 4: Updating firmware in host system running under Windows

In most cases however – especially if your host system does not run under Windows®, and SYCON.net is not installed on your host system – you might want to update the netJACK firmware by using an external PC with SYCON.net.

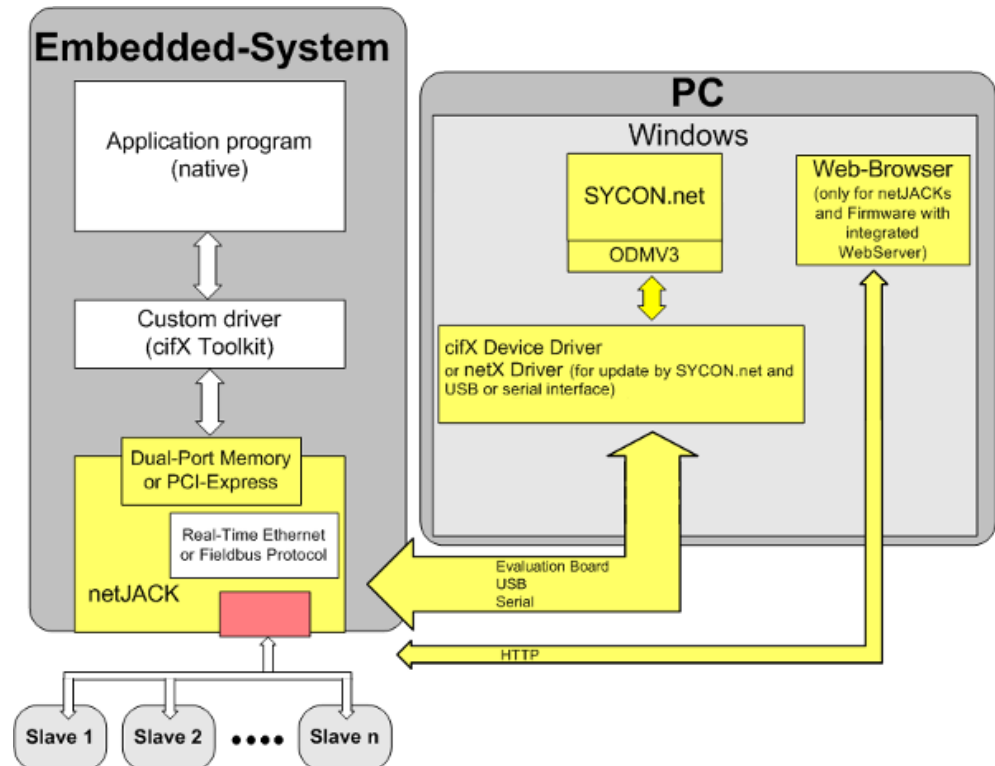


Figure 5: Updating firmware by external PC

Depending on your hardware setup, there are different ways to update firmware by using an external PC. These options are described in the subsequent sections.

You will find instructions on how to use SYCON.net for updating netJACK firmware in section *Instructions for Updating Firmware with SYCON.net* [► page 115].

9.1.1 Updating firmware of mounted netJACKs

For updating firmware of a netJACK communication module which is mounted in its host system, the following ways are possible:

9.1.1.1 Setup A1: Updating firmware with SYCON.net via USB interface

Updating netJACK firmware with SYCON.net via external PC and USB interface.

To update firmware by USB, you do not need a cifX Device Driver, only the netX Driver, which is included in SYCON.net.

Prerequisites

- The USB interface of the netJACK communication module must be implemented on the carrier board of the host system according to the specifications given in the netJACK Design Guide and must be accessible from outside the host system.
- USB driver has been installed on the external PC.
- SYCON.net has been installed on the external PC.

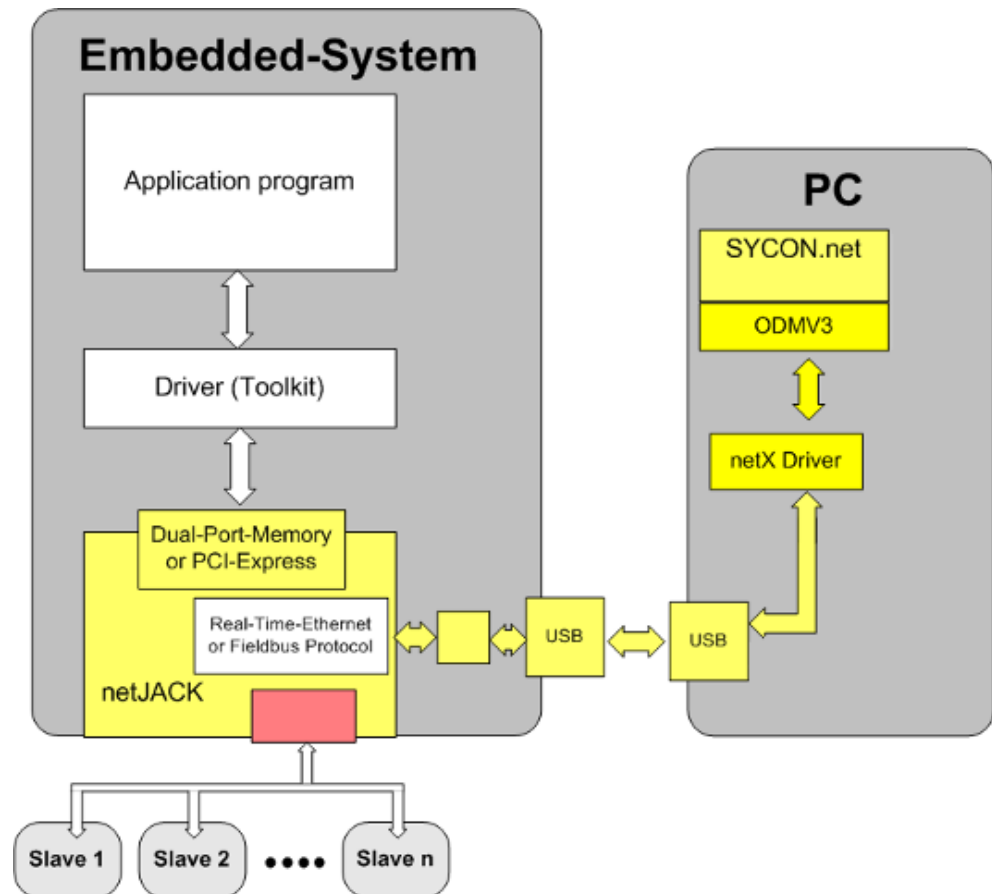


Figure 6: Updating firmware with SYCON.net via USB interface

9.1.1.2 Setup A2: Updating firmware with SYCON.net via serial interface (Dual-Port Memory only)

Updating netJACK firmware with SYCON.net via external PC and serial interface.

To update firmware by serial interface, you do not need a cifX Device Driver, only the netX Driver, which is included in SYCON.net.

Prerequisites

- The host interface of the netJACK is Dual-Port Memory.
- The serial interface of the netJACK communication module must be implemented on the carrier board of the host system according to the specifications given in the netJACK Design Guide and must be accessible from outside the host system.
- SYCON.net has been installed on the external PC.

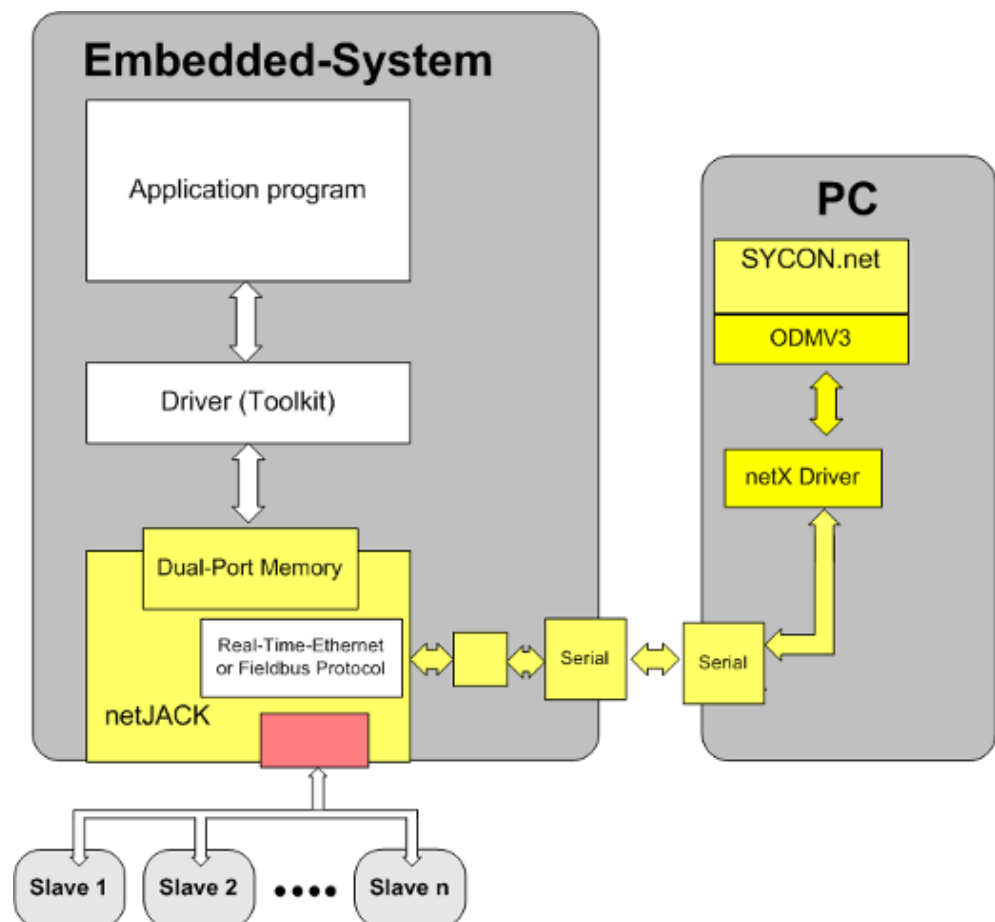


Figure 7: Updating firmware with SYCON.net via serial interface

9.1.1.3 Setup A3: Updating firmware via HTTP and Ethernet interface

This option is only available for netJACK communication modules NJ 51D-RE, NJ 100DN-RE and NJ 100EN-RE for Real-Time-Ethernet running on firmware with integrated WebServer functionality. The firmware of these netJACKs can be updated via their Ethernet interface and HTTP. For this setup, you need a PC with installed standard web browser and a connection to the netJACK via Ethernet network.

Prerequisites

- The netJACK communication module is a device for Real-Time Ethernet (NJ 51D-RE, NJ 100DN-RE and NJ 100EN-RE) running on firmware with integrated WebServer.
- The netJACK is connected to an IP network via its Ethernet interface.
- Your PC has a web browser and is connected to the IP network.
- You know the IP address of the netJACK and the user name and password for the firmware update function of the WebServer.

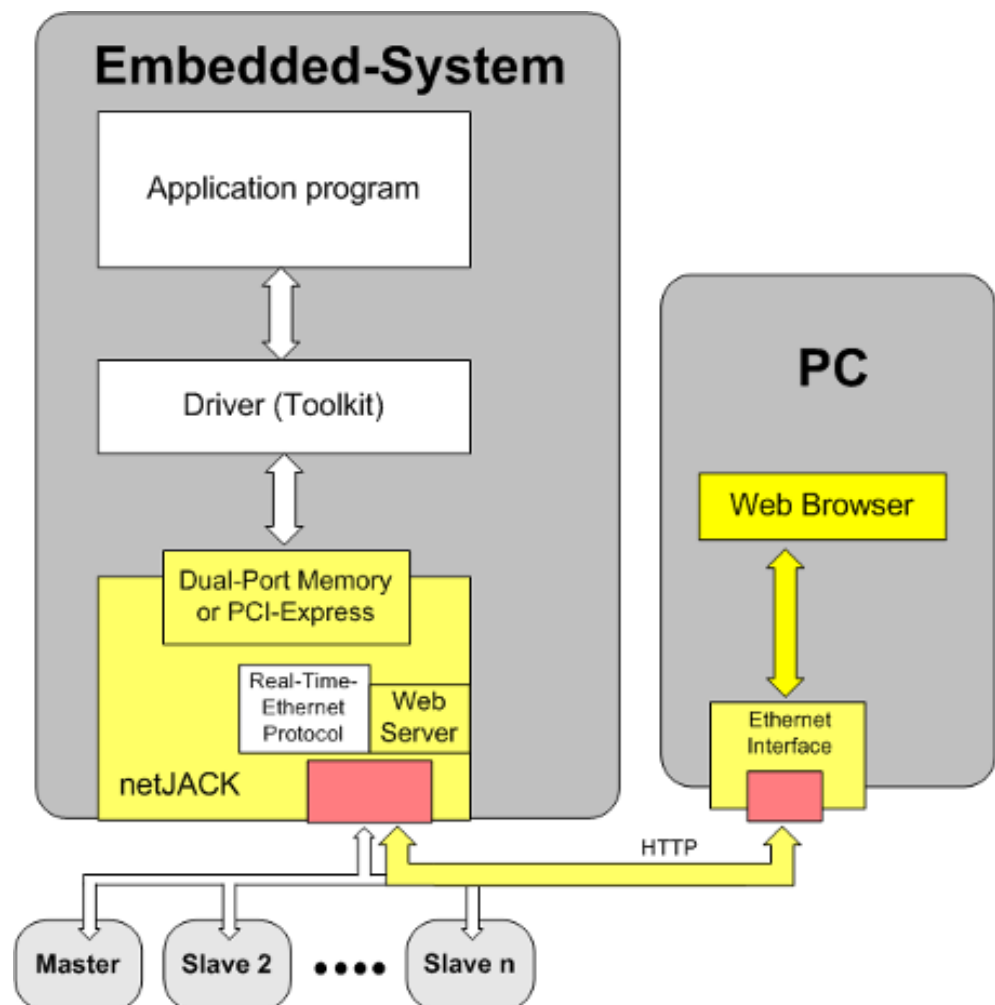


Figure 8: Updating firmware via HTTP and Ethernet interface



For further information on this update method and a list of firmware with integrated WebServer, please refer to the Application Note *Functions of the integrated WebServer*.

9.1.2 Updating firmware of netJACK via Evaluation Board

If you want to update the firmware of the netJACK communication module while there is no serial or USB diagnostic interface available on the carrier board of the host system, you have to remove the netJACK from its host system and connect it via Evaluation Board to an external PC.

There are several ways to do so, depending on whether you use a netJACK communication module with PCI Express or with Dual-Port Memory.

9.1.2.1 Setup B1a: Updating firmware of netJACK with PCI Express via Evaluation Board

To update the firmware of a netJACK communication module with PCI Express host interface, install the netJACK on the NJEB-E Evaluation Board (Hilscher part number 1600.010) and connect the Evaluation Board to the PCI Express interface of a PC. The PC must have SYCON.net and the cifX Device Driver installed on it.

Prerequisites:

- The netJACK communication module is installed on an NJEB-E Evaluation Board.
- The Evaluation Board is connected to a PCI Express interface of the PC.
- SYCON.net is installed on the PC.
- cifX Device Driver is installed on the PC.

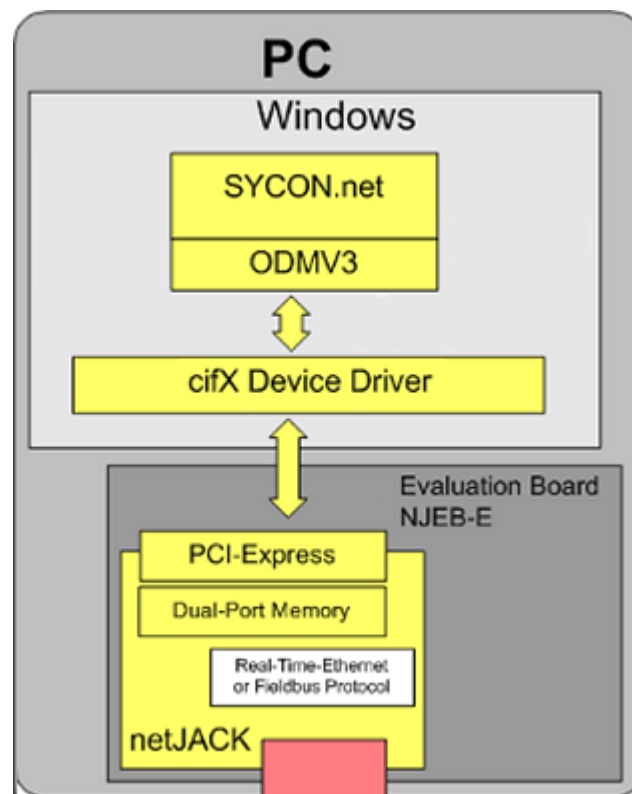


Figure 9: Updating firmware of a netJACK with PCI Express via Evaluation Board

9.1.2.2 Setup B1b: Updating firmware of netJACK with PCI Express via Evaluation Board and USB

As an alternative, you can install the netJACK on the NJEB-E Evaluation Board (Hilscher part number 1600.010), connect the Evaluation Board to the PCI Express interface of a PC, and then connect the Evaluation Board via USB interface to another external PC. The external PC must have SYCON.net installed on it.

To update firmware by USB, you do not need a cifX Device Driver, only the netX Driver, which is included in SYCON.net.

Prerequisites:

- The netJACK communication module is installed on an NJEB-E Evaluation Board.
- The Evaluation Board is plugged into a PCI Express slot of a PC.
- The USB interface of the Evaluation Board is connected to a USB interface of the external PC.
- USB driver has been installed on the external PC.
- SYCON.net is installed on the external PC.

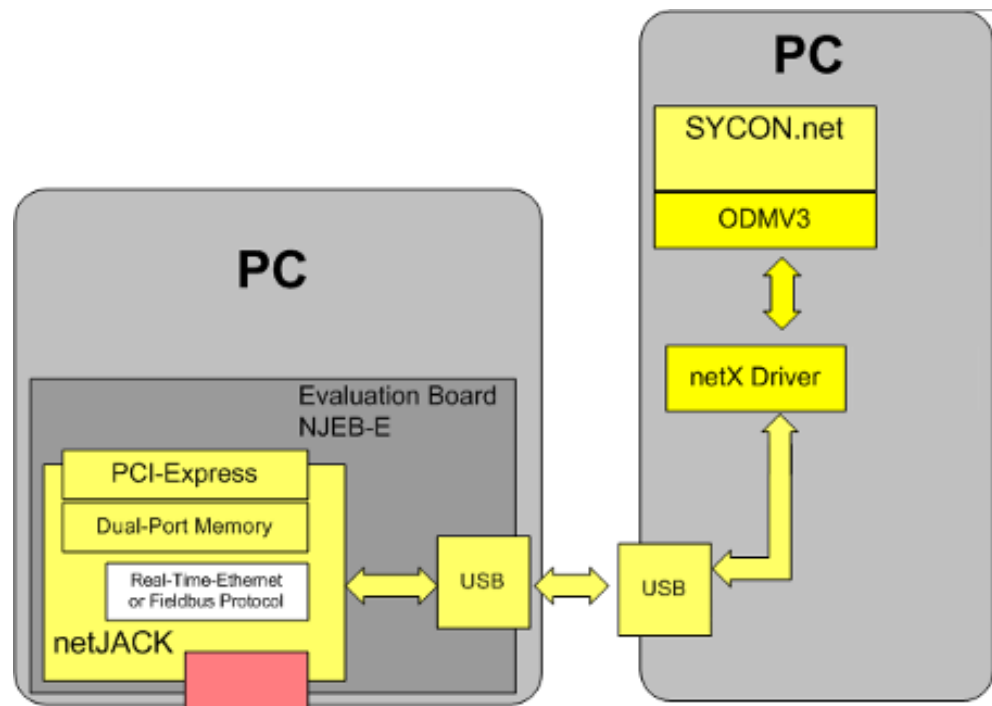


Figure 10: FW_Update_Eval_Board_PCI_USB_EN_new

9.1.2.3 Setup B2a: Updating firmware of netJACK with Dual-Port Memory via Evaluation Board

To update the firmware of a netJACK communication module with Dual-Port Memory host interface, you can install the netJACK on the NJEB-D Evaluation Board (Hilscher part number 1600.000) and connect the Evaluation Board via USB or serial interface to a PC. The PC must have SYCON.net installed on it.

To update firmware by USB or serial interface, you do not need a cifX Device Driver, only the netX Driver, which is included in SYCON.net.

Note that the Evaluation Board NJEB-D must be connected to 24 V power adaptor (e. g. NXAC-POWER adaptor, Hilscher part number 7930.000).

Prerequisites

- The netJACK communication module is installed on an NJEB-D Evaluation Board.
- The Evaluation Board is connected to a 24 Volt power adaptor.
- The Evaluation Board is connected to the PC via USB or serial interface.
- USB driver has been installed on the external PC (if USB interface is to be used).
- SYCON.net is installed on the PC.

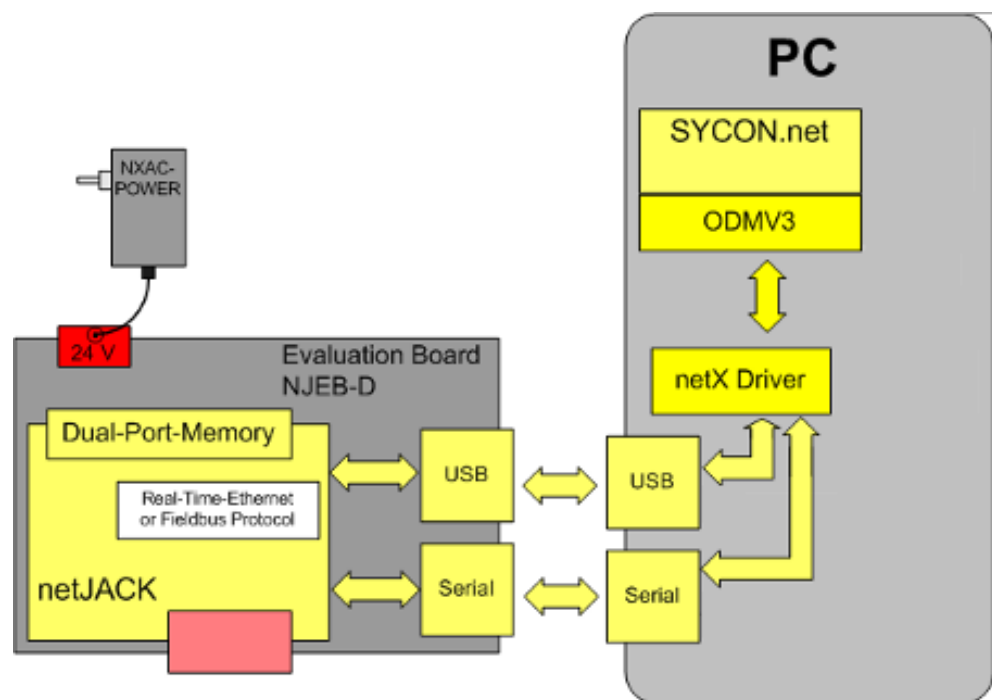


Figure 11: Updating firmware of a netJACK with DPM via Evaluation Board and USB or serial interface

9.1.2.4 Setup B2b: Updating firmware of netJACK with Dual-Port Memory via Evaluation Board and Adapter Board

As an alternative to USB or serial interface, you can also connect the netJACK via host interface of the NJEB-D Evaluation Board to a PC. The PC must have SYCON.net installed on it. For this setup, you also need the NXPCA-PCI Adapter Board (Hilscher part number 7902.100), which has to be connected to the PCI interface of the PC, and a CAB-NXPCA-PCI cable (Hilscher part number 4400.000), which connects the Adapter Board with the host interface of the Evaluation Board.

Note that the Evaluation Board NJEB-D must be connected to 24 V power adaptor (e. g. NXAC-POWER adaptor, Hilscher part number 7930.000).

Prerequisites

- The netJACK communication module is installed on an NJEB-D Evaluation Board.
- The Evaluation Board is connected to a 24 Volt power adaptor.
- The Evaluation Board is connected via CAB-NXPCA-PCI cable to the NXPCA-PCI Adapter Board.
- The NXPCA-PCI Adapter Board is connected to the PCI interface of the PC.
- SYCON.net is installed on the PC.

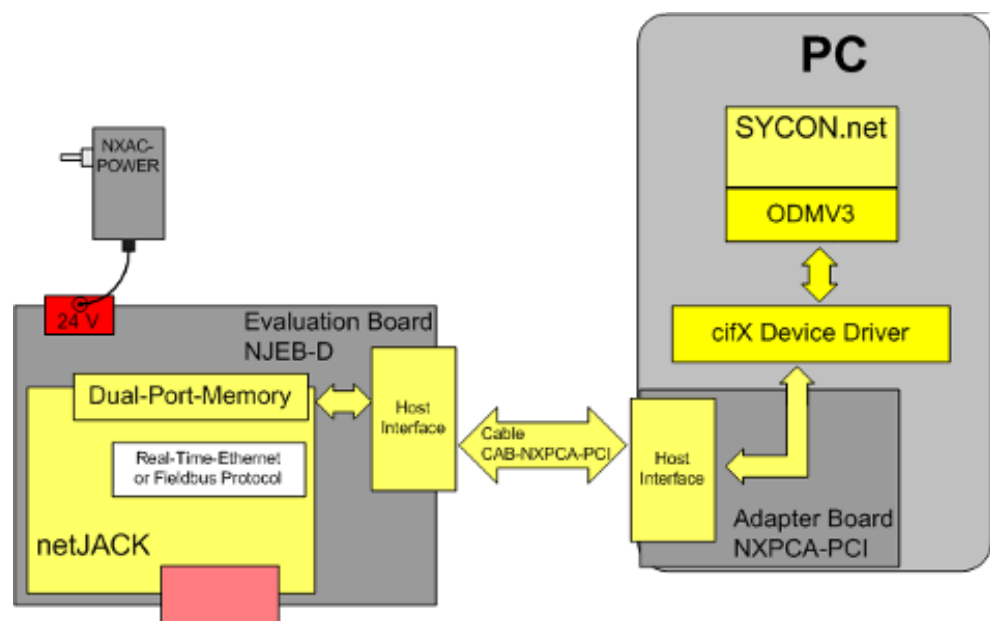


Figure 12: Updating firmware of a netJACK with DPM via Evaluation Board and NXPCAPCI

9.2 Instructions for updating firmware with SYCON.net

9.2.1 Prerequisites

Make sure, that the netJACK communication module is connected to a PC according to one of the methods described in section *Ways to Update Firmware* [► page 106] and that SYCON.net and the necessary drivers are installed on the PC.

9.2.2 Overview

To update the firmware of the netJACK with SYCON.net, the following tasks have to be performed:

1. Select existing project or create new project
2. Choose driver to establish a connection to the netJACK (depending on hardware setup, see section *Ways to Update Firmware* [► page 106])
3. Choose netJACK to be updated (Device Assignment)
4. Download firmware into the netJACK (Firmware Download)



For a detailed description of the updating process, please refer to the SYCON.net DTM manual of the corresponding Fieldbus or Real-Time Ethernet protocol. You will find a list of relevant manuals in section *Documentation overview* [► page 15].

9.2.3 Step-by-step instructions for updating firmware

1. Start SYCON.net configuration software.
 - In the Windows **Start** menu, select **Programs > SYCON.net System Configurator > SYCON.net**.
 - SYCON.net opens.
 2. Choose an existing project or create a new one.
 - In the menu, select **File > Open...** to open a suitable existing project.
- or
- In the menu, select **File > New** to create a new project and add a master or slave device to the bus configuration line.



For more information on how to create and configure a new project, please refer to the SYCON.net DTM manual of the corresponding Fieldbus or Real-Time Ethernet protocol.

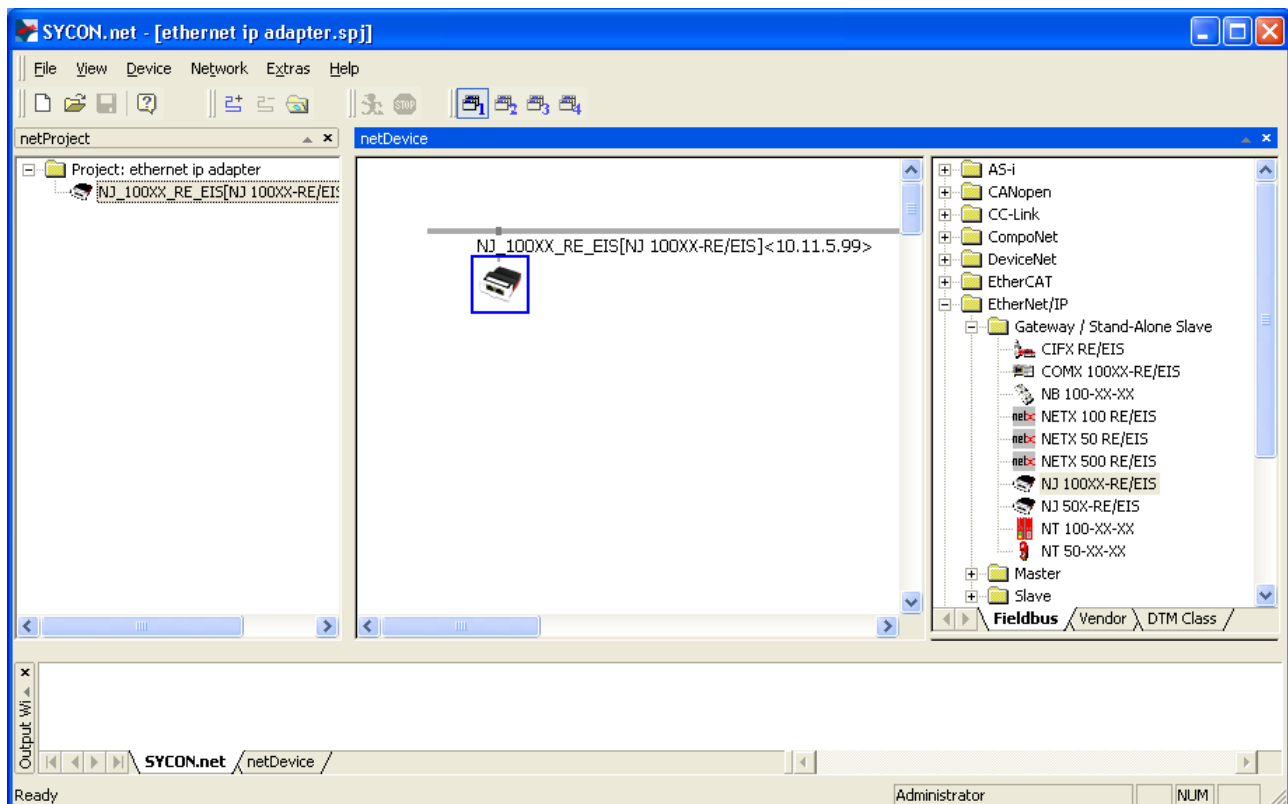


Figure 13: netJACK project in SYCON.net

3. Open configuration window.
 - Double click the device symbol in the bus configuration line or open the context menu and choose **Configuration** entry.
 - The Configuration window opens.

4. Choose adequate driver.

- In the **Navigation Area**, select **Settings > Driver**.
- The **Driver** list opens.

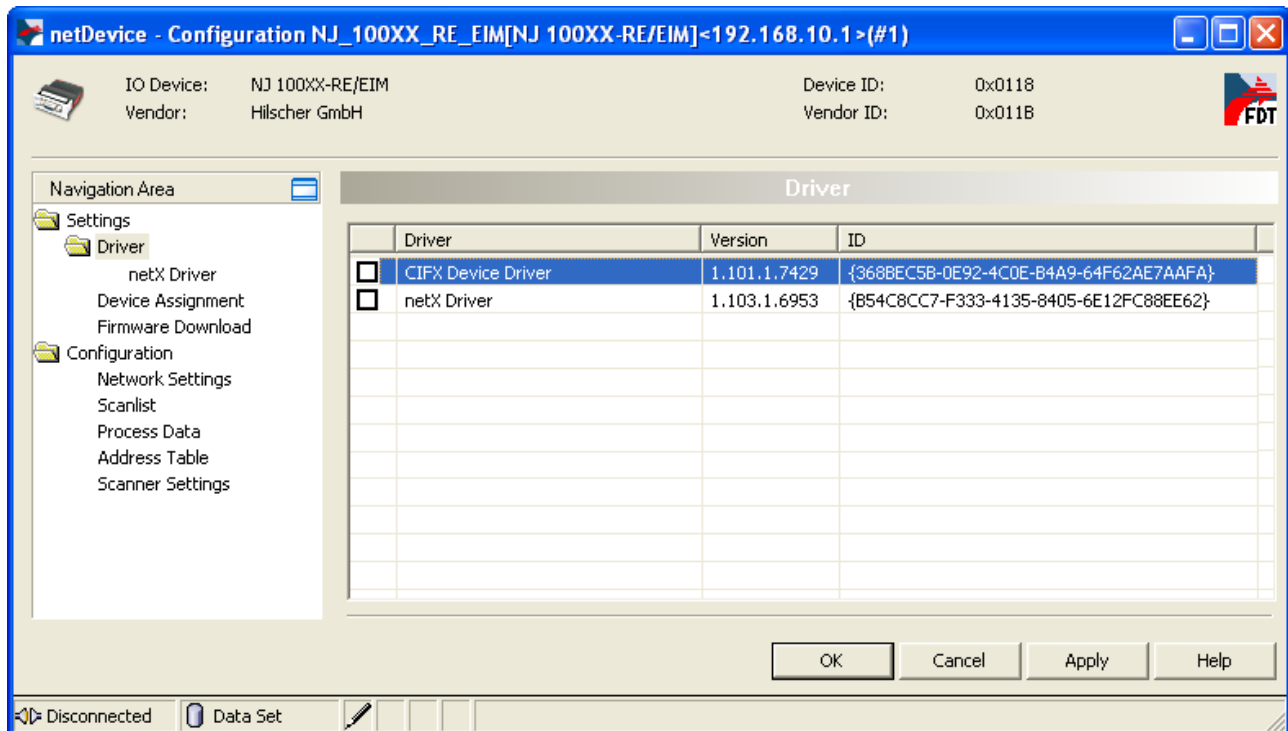


Figure 14: Choosing driver

If a USB or serial interface (serial interface only available for netJACKs with Dual-Port Memory) is used for the firmware update, the **netX Driver** is needed:

- In this case, check the box in front of the **netX Driver** entry and click **Apply** button.

**Note:**

The netX Driver is included in every SYCON.net installation and does not need to be installed separately.

If a no USB or serial interface is used for the firmware update, the cifX Device Driver is needed:

- In this case, check the box in front of the **cifX Device Driver** entry and click **Apply** button.



Please also refer to the *Selecting the Driver* section in the SYCON.net DTM manual for the corresponding Fieldbus or Real-Time Ethernet protocol.

For details on the netX Driver, please refer to the *netX Driver* section in the SYCON.net DTM manual. The necessary adjustment of interfacing parameters is explained in the *Driver parameters for netX Driver - USB/RS232 Connection* section.

For details on the cifX Device Driver, please refer to the *cifX Device Driver* section in the SYCON.net DTM manual.

5. Choose the netJACK, for which you want to update the firmware.
 - In the **Navigation Area**, select **Settings > Driver > Device Assignment**.
 - The **Device Assignment** window opens.
6. Start scanning for connected devices.
 - In the **Device selection** dropdown list, select entry **All** and click **Scan** button.
 - A list displaying all connected devices is opened.
7. Choose the device.
 - Check the box in front of the appropriate device and click **Apply** button.

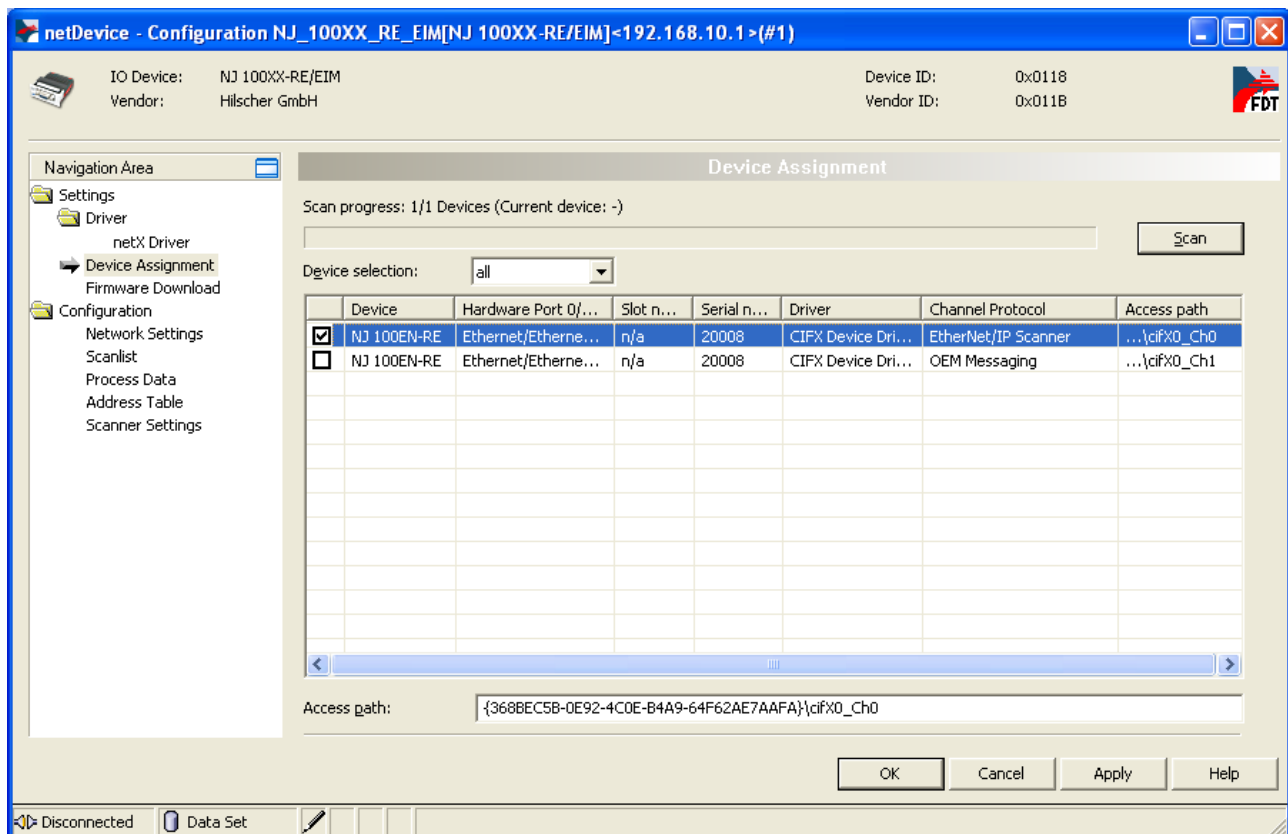


Figure 15: Choosing device



For details, please refer to the *Device Assignment* section in the SYCON.net DTM manual for the corresponding Fieldbus or Real-Time Ethernet protocol.

8. Download the firmware to the netJACK.
 - In the **Navigation Area**, select **Settings > Driver > Firmware-Download**.
 - The **Firmware-Download** window is opens.
9. Choose the firmware which you want to load to the netJACK.
 - Click **Browse...** button.
 - The **Select Firmware File** dialog opens.
 - Navigate to the folder containing the firmware files, select the appropriate file and click **Open** button.

**Note:**

If you choose a firmware that does not fit to the device, an error message will be issued.

For a list of firmware, please refer to section *Devices and firmware* [▶ page 11].

- Name and version of the selected firmware are displayed in the **Firmware-Download** window.
- Check name and version of the firmware.

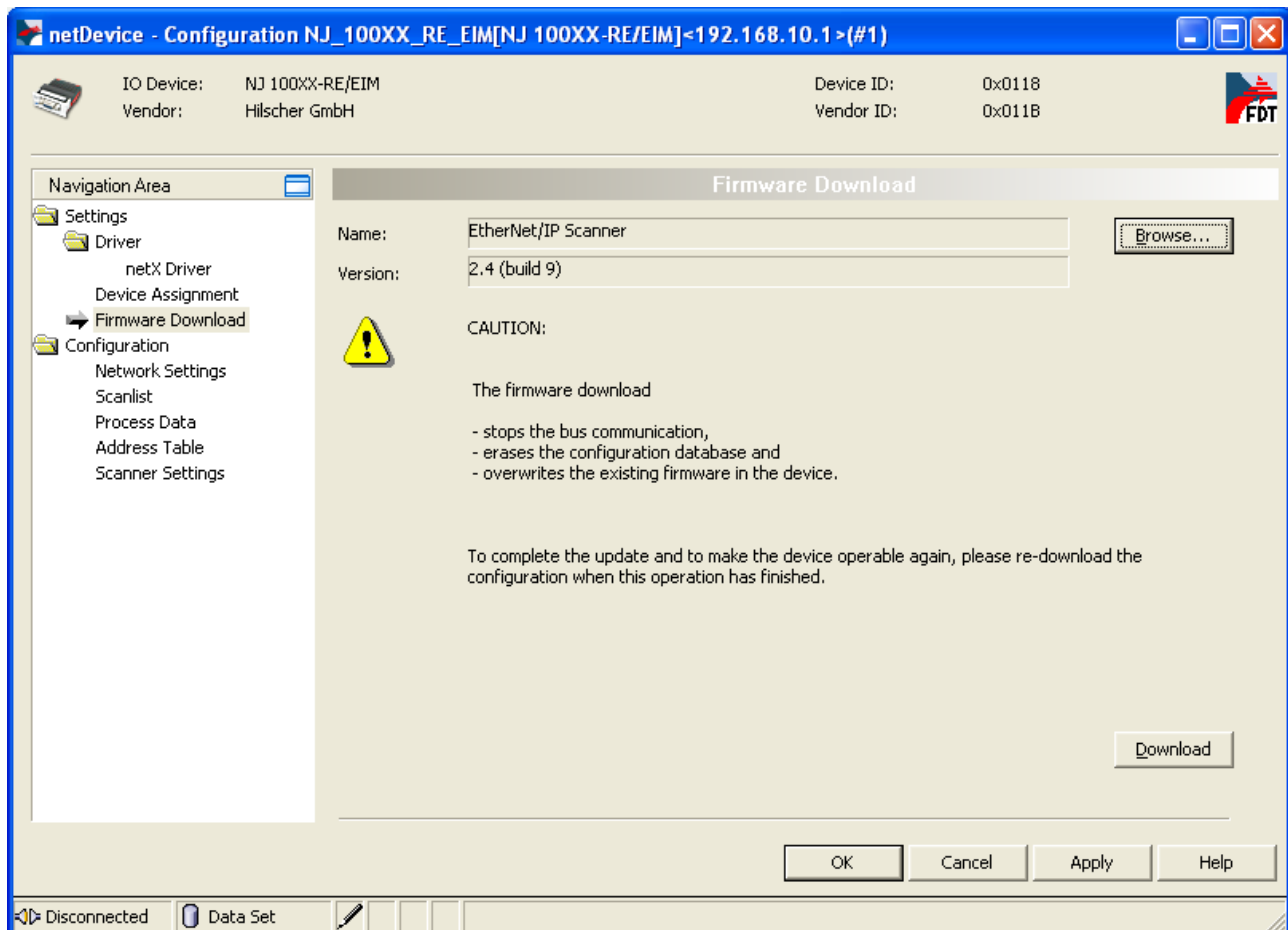
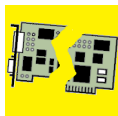


Figure 16: Downloading firmware to the device

**NOTICE****Power drop during write and delete accesses in the file system**



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

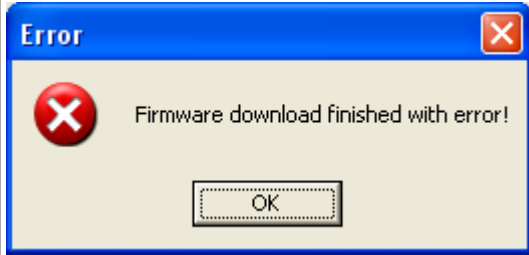


- Make sure, that the power supply of the device does not drop during write and delete accesses in the file system (firmware update, configuration download etc.).



10. Start the download.

- Click **Download** button
- ⇒ The firmware is downloaded to the netJACK.
- To close the configuration window, click **OK** button.
- ⇒ You have downloaded the firmware to the netJACK.

9.2.4 Troubleshooting firmware update

Problem	<p>Error message</p>  <p>appears</p>
Cause 1	The loaded file does not contain firmware for any Hilscher device (neither for netJACK nor for any other Hilscher device).
Remedial Action 1	Load a correct firmware file, see section <i>Devices and firmware</i> [► page 11].
Cause 2	When updating the netJACK via Evaluation Board: The netJACK has no sufficient contact with the Evaluation Board.
Remedial Action 2	Check whether the netJACK is mounted correctly.
Cause 3	When updating the netJACK with PCI Express via Evaluation Board: The Evaluation Board has no sufficient contact with the PCI Express interface of the PC.
Remedial Action 3	Check whether the Evaluation Board is mounted correctly.
Cause 4	When updating the netJACK with Dual-Port Memory via Evaluation Board and Adapter Board: The Adapter Board has no sufficient contact with the PCI interface of the PC.
Remedial Action 4	Check whether the Adapter Board is mounted correctly.
Problem	<p>Error message</p>  <p>appears</p>
Cause 1	The connection to the netJACK communication module has been lost due to contact problems.
Remedial Action 1	Check whether the netJACK is mounted correctly. When updating the netJACK with PCI Express via Evaluation Board, check whether the Evaluation Board is mounted correctly.
Cause 2	When updating the netJACK via serial or USB interface: The connection to the netJACK has been lost due to contact problems at the serial or USB connection.
Remedial Action 2	Check whether the serial or USB cable are connected correctly.

Problem	<p>Error message</p>  <p>appears</p>
Cause	When updating the netJACK via serial or USB interface: The firmware download has been finished with an error due to having lost the serial or USB connection to the netJACK during the firmware download.
Remedial Action	Check whether the serial or USB cable are connected correctly.
Problem	<p>Error message</p>  <p>appears.</p>
Cause	The device classes do not match. The selected firmware file contains a Hilscher firmware which is not suited for the netJACK communication module but for another Hilscher product (in this case for instance a cifX card).
Remedial Action	Select adequate firmware file for the netJACK. See section <i>Devices and firmware</i> [► page 11].
Problem	<p>Error message</p>  <p>appears</p>
Cause	The communication classes do not match. Either the firmware file to be loaded is suited for a Master/Scanner/Controller and the installed netJACK communication module requires a Slave/Adapter/Device firmware or the firmware file to be loaded is suited for a Slave/Adapter/Device and the installed netJACK requires a Master/Scanner/Controller firmware.

Remedial Action	If a change from Master to Slave or vice versa is intended and a Master license is present, then click Yes to perform the intended change. In all other cases click No and use a firmware of the correct type for your netJACK, i. e. a Master firmware for a Master module and a Slave firmware for a Slave module.
Problem	<p>Error message</p>  <p>appears.</p>
Cause	The protocol classes do not match. The selected firmware does not support any protocol suited for the selected netJACK communication module. This error mostly occurs in conjunction with the two errors discussed directly above.
Remedial Action	Use a suitable firmware for a protocol that is supported by your netJACK. If a change of the Real-Time Ethernet System is intended and you use a netJACK Real-Time Ethernet Module (NJ 51D-RE, NJ 100EN-RE), click Yes to perform the intended change. In all other cases click No .
Problem	<p>Error message</p>  <p>appears.</p>
Cause	The hardware options do not match, i. e. you either use a Real-Time Ethernet-firmware in conjunction with a Fieldbus communication module, or vice versa, a Fieldbus firmware in conjunction with a Real-Time Ethernet communication module.
Remedial Action	Click No and use a firmware suitable for a protocol that is supported by your netJACK communication module. If you choose Yes , a non-conforming firmware is loaded and the module will not operate correctly.
Problem	The Download button in the Firmware Download screen is grayed out/deactivated.
Cause	There is a (temporary) contact problem.

Remedial Action	Check whether the netJACK communication module and the Evaluation Board (if used) are tightly connected and have good electrical contact. Then, click the Select button and again select the firmware file to be loaded using the subsequent file selection dialog. Afterwards, the Download button should not be grayed out anymore.
-----------------	---

Table 51: Troubleshooting firmware update with SYCON.net

If you have problems while downloading firmware, please also check:

- When using a master firmware: a master license must be present and loaded. If not, a Master license must be purchased from Hilscher and must be loaded.
- Has SYCON.net been installed correctly?
- Is the correct device selected within SYCON.net?

10 Device pictures, connectors and LEDs

10.1 Device pictures

netJACK top view

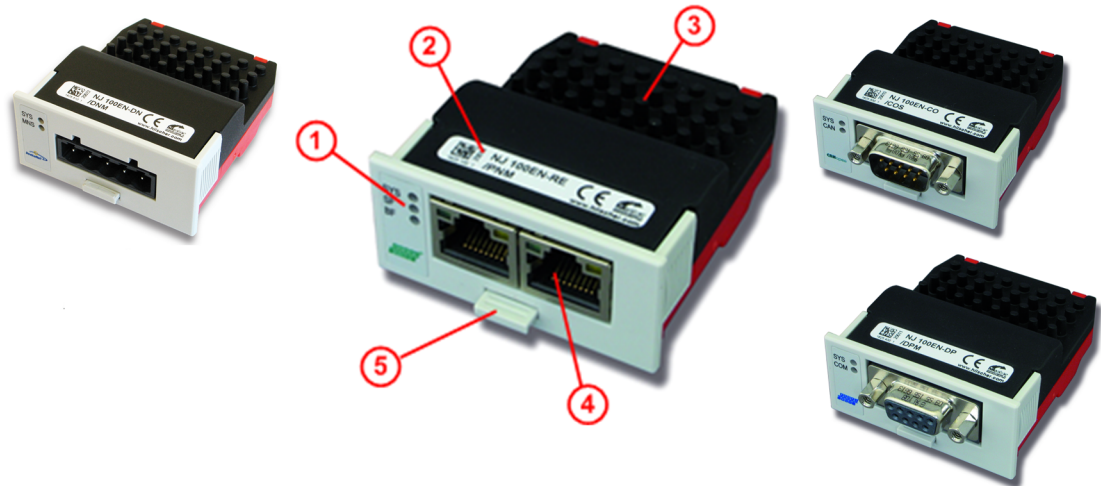


Figure 17: Top view of netJACK devices

- ① Status LEDs. The arrangement of the LEDs depends on the network protocol.
See section *Positions of the LEDs and Control Elements* ► page 126].
- ② Device label
- ③ Ventilation slats
- ④ Network interface. The design depends on the network protocol.
See section *Positions of the LEDs and Control Elements* ► page 126].
- ⑤ Sliding latch

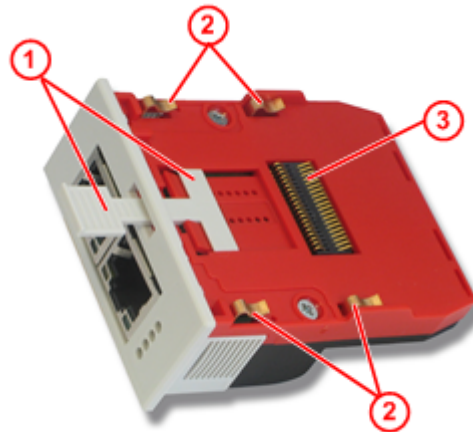
netJACK bottom view

Figure 18: Bottom view of netJACK devices

- ① Sliding latch to lock the netJACK in the host system.
- ② Brackets to fix the netJACK to the carrier board of the host system.
- ③ SAMTEC connector, interface to the host system. Number of Pins depends on the kind of interface (PCI Express or Dual-Port Memory) used by the host system and on the netX chip in the netJACK.

10.2 Device type label

Each netJACK communication module carries a device type label, which provides the following information:

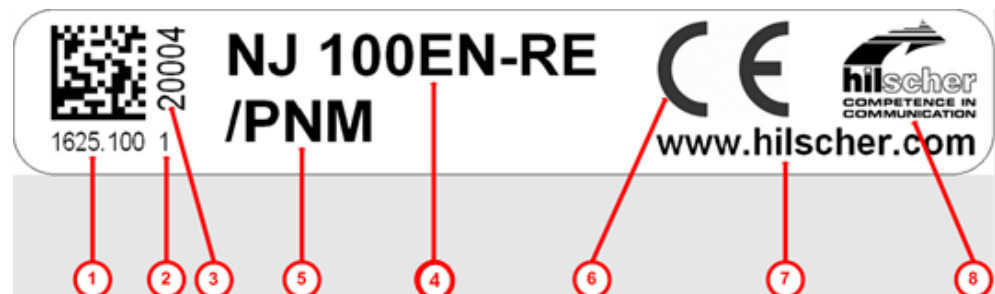


Figure 19: Device type label netJACK

- ① Part number
- ② Hardware revision number
- ③ Serial number of individual device
- ④ Device type name
- ⑤ Abbreviation of firmware
- ⑥ CE Sign
- ⑦ Hilscher's web address
- ⑧ Hilscher logo

The netJACK device type name and the abbreviation of the firmware provide the following information:



Figure 20: Device type name netJACK

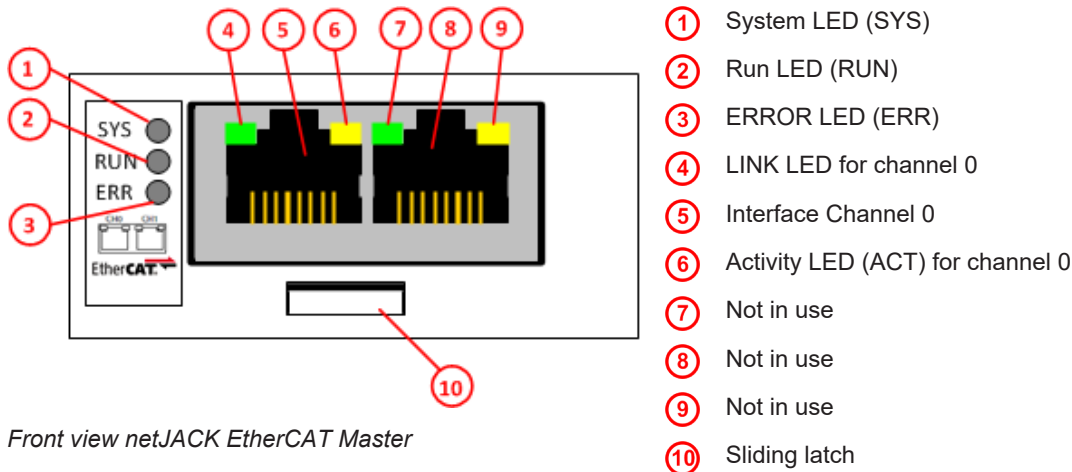
- ① Abbreviation of the Hilscher netJACK product line
- ② Type of built-in netX processor:
51 = netX 51
52 = netX 52
100 = netX 100
- ③ Abbreviation of host interface:
D = Dual-Port Memory
E = PCI Express
- ④ Indicates, whether netJACK provides additional network functionality (**N** = yes)
- ⑤ Abbreviation of the network/protocol type:
CO = CANopen
DN = DeviceNet
DP = Profibus
RE = Real-Time-Ethernet
- ⑥ Abbreviation of the firmware loaded in the netJACK:

COM = CANopen Master	COS = CANopen Slave
DPM = PROFIBUS DP Master	DPS = PROFIBUS DP Slave
DNM = DeviceNet Master	DNS = DeviceNet Slave
ECM = EtherCAT Master	ECS = EtherCAT Slave
EIM = EtherNet/IP Scanner/Master	EIS = Ethernet/IP Adapter/Slave
OMB = Open Modbus/TCP	
PLS = POWERLINK Controlled Node	
PNM = PROFINET IO Controller	PNS = PROFINET IO Device
S3M = Sercos Master	S3S = Sercos Slave
VRS = VARAN Client	

10.3 Positions of the LEDs and control elements

10.3.1 netJACK for Real-Time Ethernet systems

10.3.1.1 Front view of netJACK with EtherCAT Master

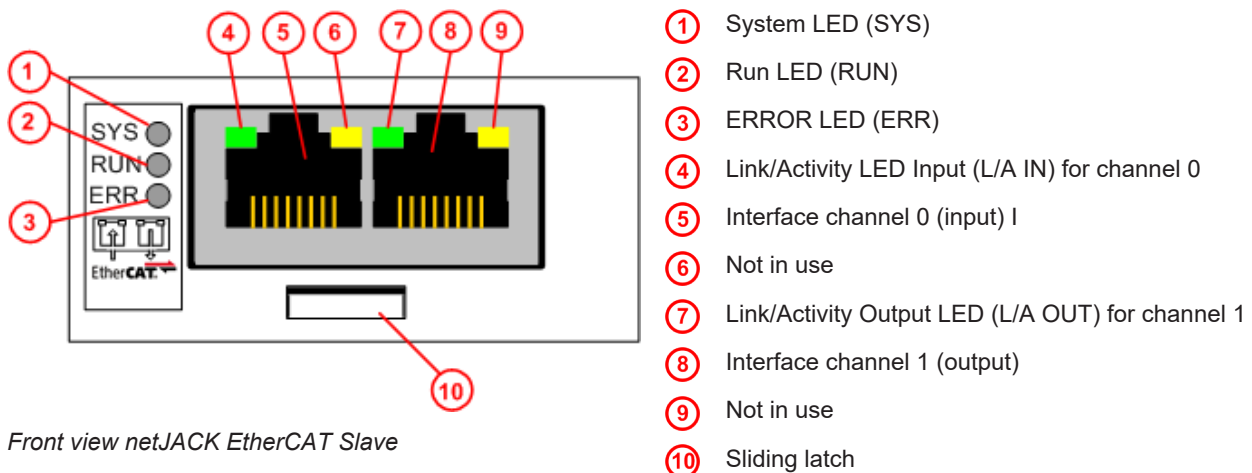


Front view netJACK EtherCAT Master

For a description of the LED signals used by EtherCAT (Master), see section *LEDs EtherCAT Master V4* [► page 136].

For a description of the pinning of the network interface, see section *Pinning Real-Time Ethernet Interface* [► page 159].

10.3.1.2 Front view of netJACK with EtherCAT Slave

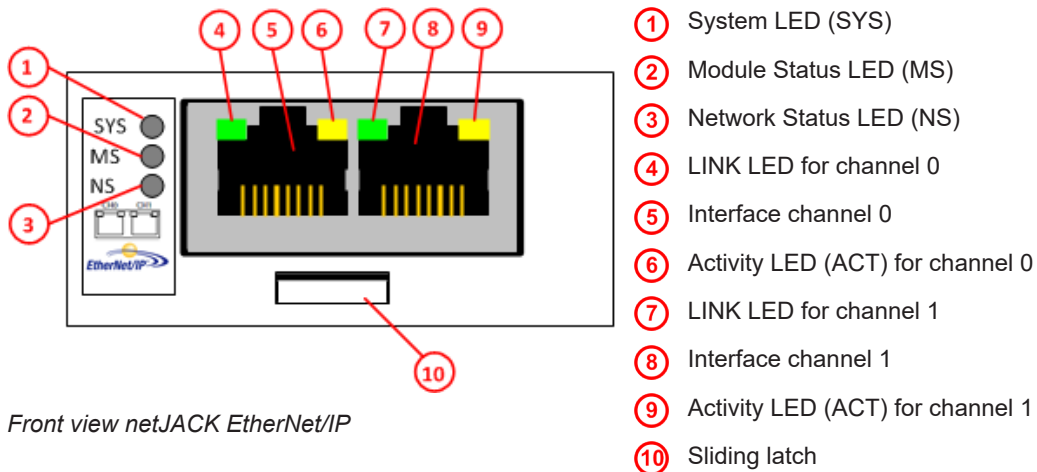


Front view netJACK EtherCAT Slave

For a description of the LED signals used by EtherCAT (Slave), see section *LEDs EtherCAT Slave* [► page 138].

For a description of the pinning of the network interface, see section *Pinning Real-Time Ethernet Interface* [► page 159].

10.3.1.3 Front view of netJACK with EtherNet/IP

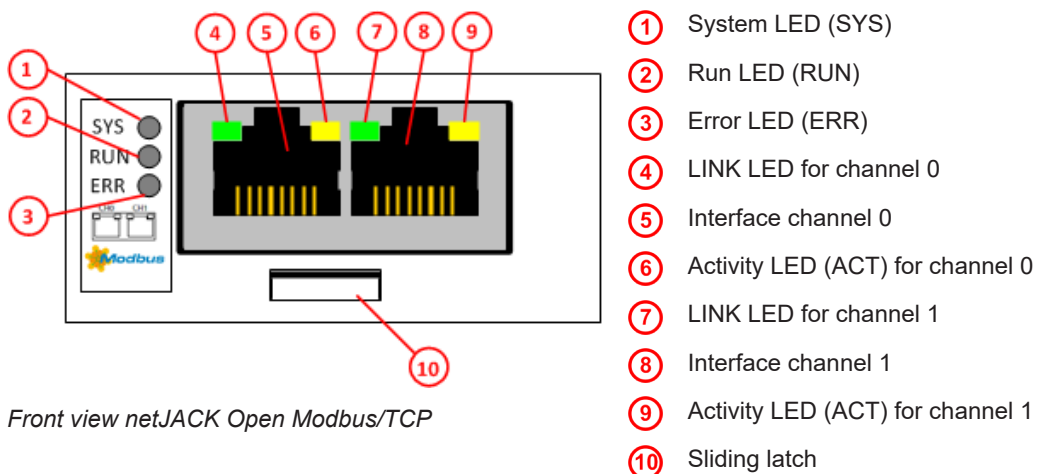


Front view netJACK EtherNet/IP

For a description of the LED signals used by EtherNet/IP, see section *LEDs EtherNet/IP Scanner* [► page 140] and section *LEDs EtherNet/IP Adapter* [► page 142].

For a description of the pinning of the network interface, see section *Pinning Real-Time Ethernet Interface* [► page 159].

10.3.1.4 Front view of netJACK with Open Modbus/TCP

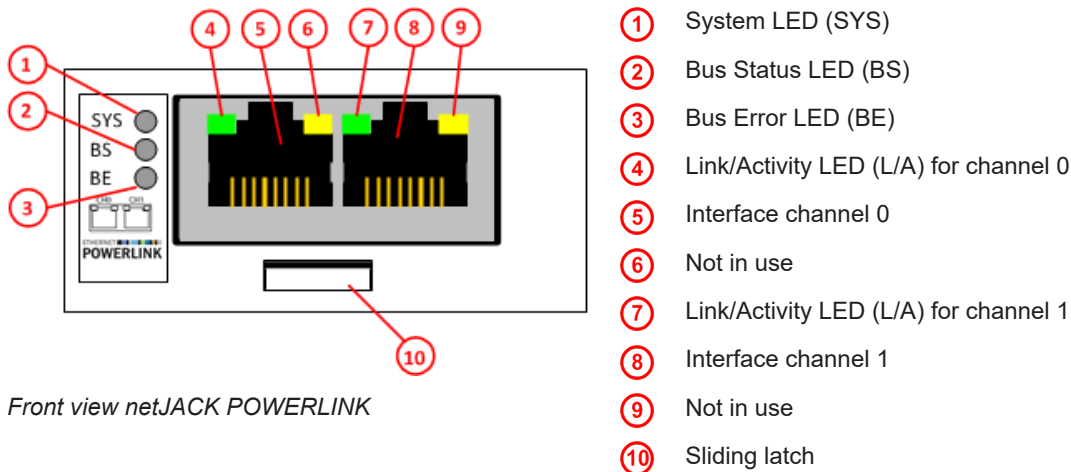


Front view netJACK Open Modbus/TCP

For a description of the LED signals used by Open Modbus/TCP, see section *LEDs Open Modbus/TCP* [► page 144].

For a description of the pinning of the network interface, see section *Pinning Real-Time Ethernet Interface* [► page 159].

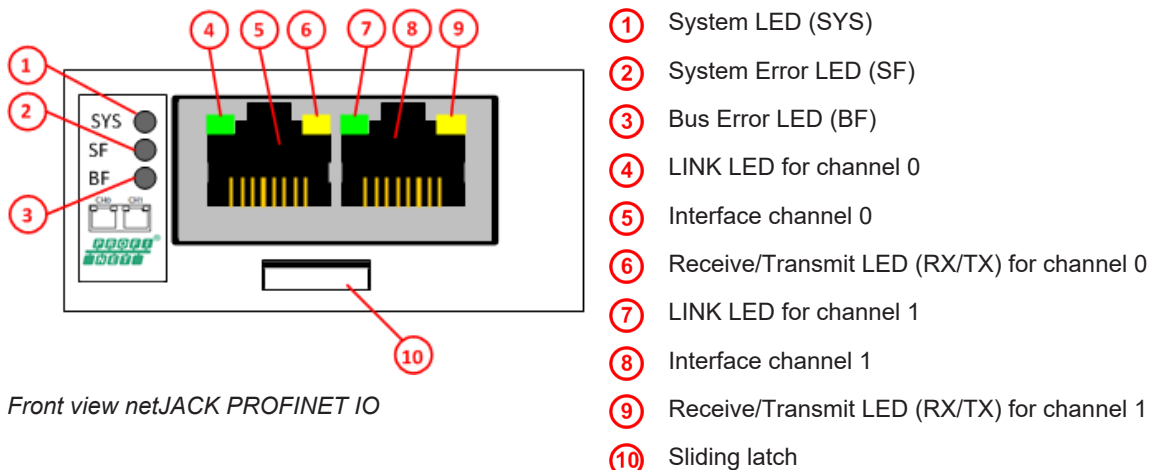
10.3.1.5 Front view of netJACK with POWERLINK



For a description of the LED signals used by POWERLINK, see section *LEDs POWERLINK* [► page 145].

For a description of the pinning of the network interface, see section *Pinning Real-Time Ethernet Interface* [► page 159].

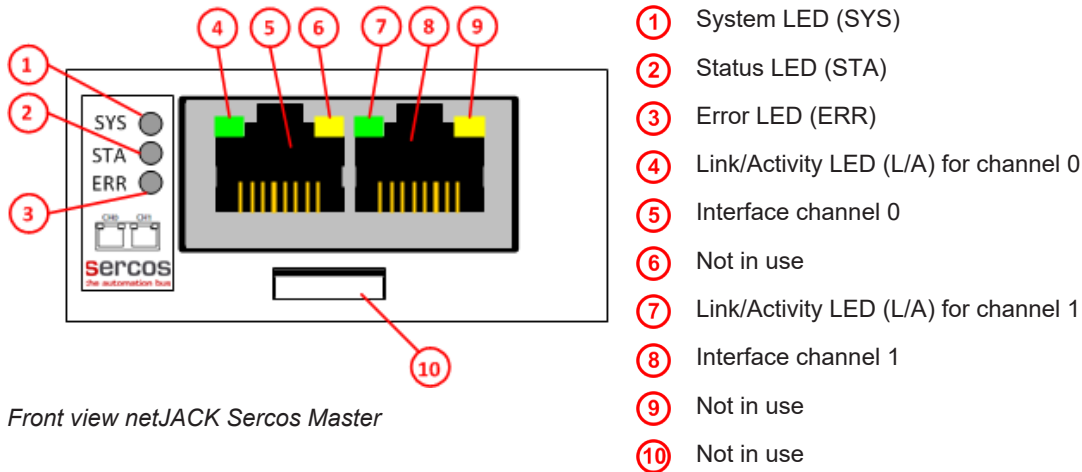
10.3.1.6 Front view of netJACK with PROFINET IO



For a description of the LED signals used by PROFINET IO, see section *LEDs PROFINET IO Controller V3* [► page 146] and section *LEDs PROFINET IO Device* [► page 148].

For a description of the pinning of the network interface, see section *Pinning Real-Time Ethernet Interface* [► page 159].

10.3.1.7 Front view of netJACK with Sercos Master

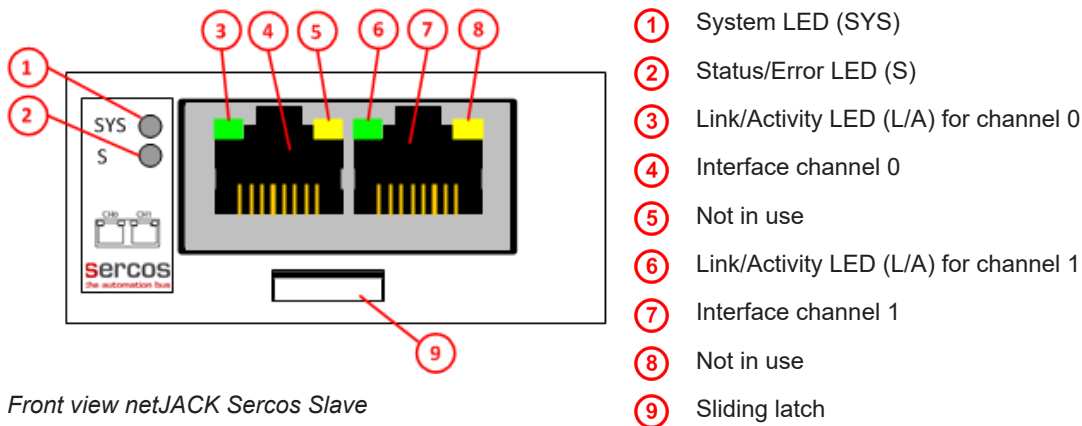


Front view netJACK Sercos Master

For a description of the LED signals used by Sercos (Master), see section *LEDs Sercos Master* [► page 149].

For a description of the pinning of the network interface, see section *Pinning Real-Time Ethernet Interface* [► page 159].

10.3.1.8 Front view of netJACK with Sercos Slave

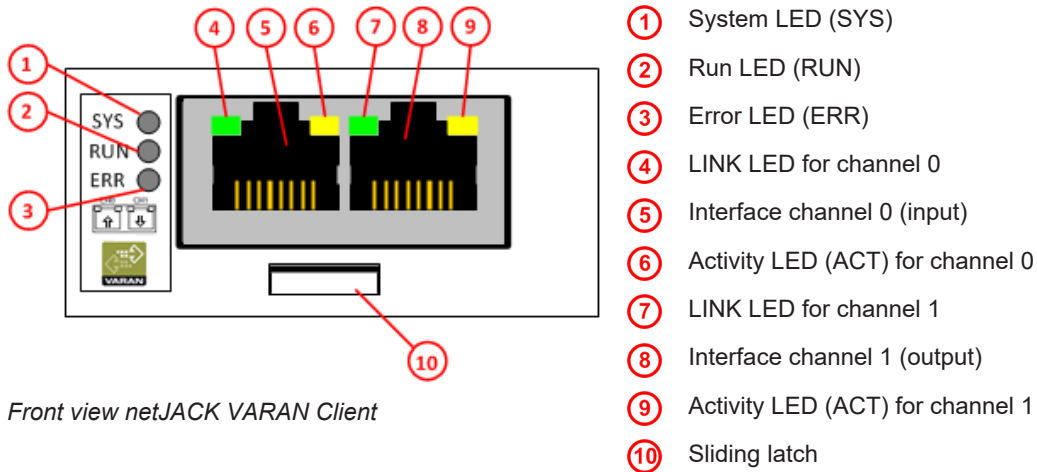


Front view netJACK Sercos Slave

For a description of the LED signals used by Sercos (Slave), see section *LEDs Sercos Slave* [► page 151].

For a description of the pinning of the network interface, see section *Pinning Real-Time Ethernet Interface* [► page 159].

10.3.1.9 Front view of netJACK with VARAN Client



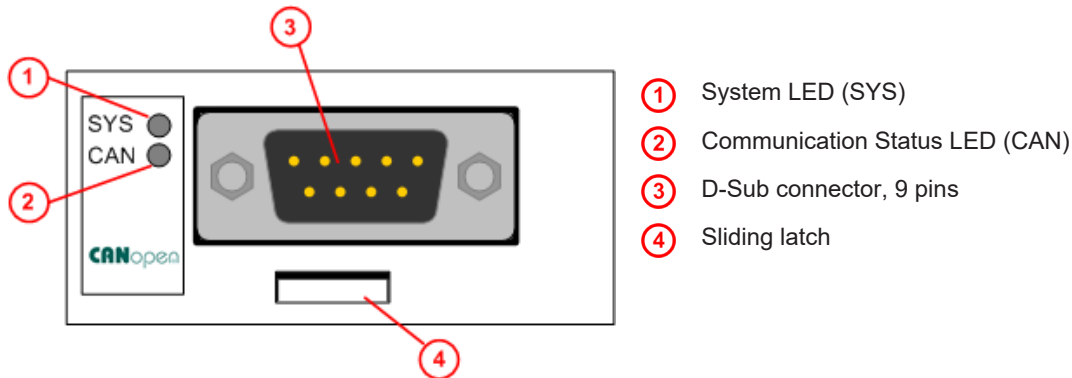
Front view netJACK VARAN Client

For a description of the LED signals used by VARAN (Client), see section *LEDs VARAN Client* [► page 153].

For a description of the pinning of the network interface, see section *Pinning Real-Time Ethernet Interface* [► page 159].

10.3.2 netJACK for fieldbus systems

10.3.2.1 Front view of netJACK with CANopen

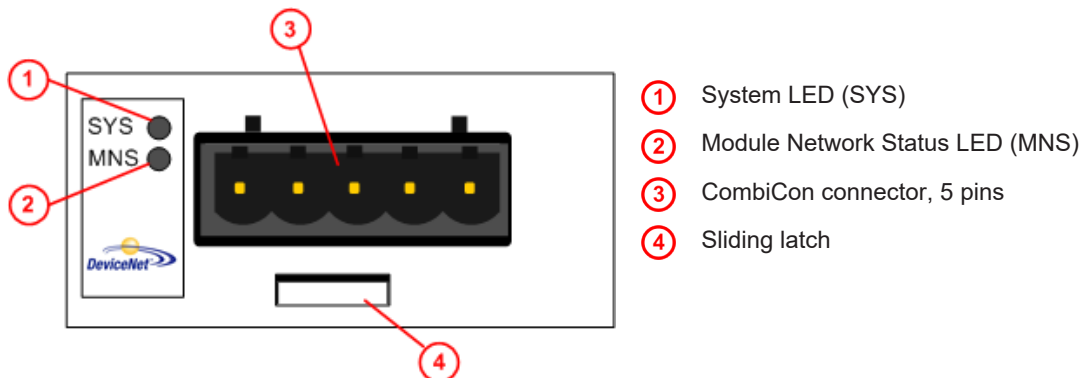


Front view netJACK CANopen

For a description of the LED signals used by CANopen, see section *LEDs CANopen Master* [► page 154] and section *LEDs CANopen Slave* [► page 155].

For a description of the pinning of the network interface, see section *Pinning CANopen Interface* [► page 160].

10.3.2.2 Front view of netJACK with DeviceNet

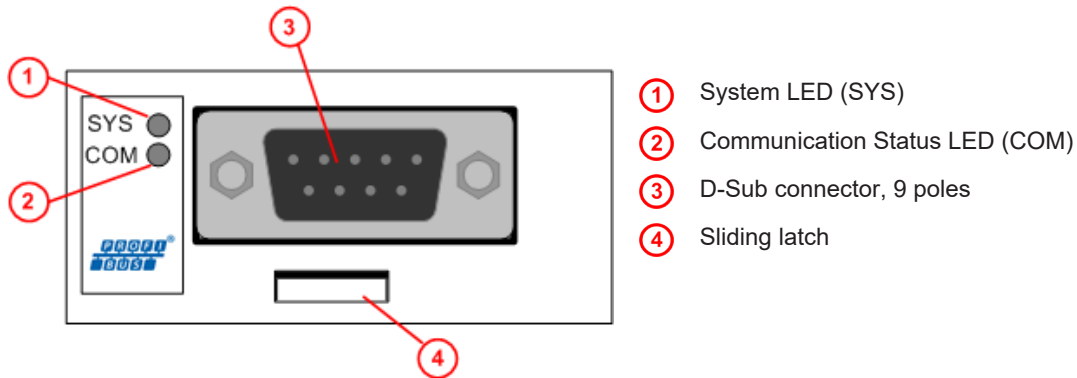


Front view netJACK DeviceNet

For a description of the LED signals used by DeviceNet, see section *LEDs DeviceNet Master* [► page 156] and section *LEDs DeviceNet Slave* [► page 157].

For a description of the pinning of the network interface, see section *Pinning DeviceNet Interface* [► page 160].

10.3.2.3 Front view of netJACK with PROFIBUS DP



Front view netJACK PROFIBUS DP

For a description of the LED signals used by PROFIBUS DP, see section *LEDs PROFIBUS DP Master* [► page 158] and section *LEDs PROFIBUS DP Slave* [► page 158]

For a description of the pinning of the network interface, see section *Pinning PROFIBUS DP Interface* [► page 161].

10.4 Descriptions of the LEDs

10.4.1 System LED

The subsequent table describes the meaning of the **System** LED of the netJACK communication module. The meaning of the **System** LED is the same in all network protocols.

For the position of the System LED on the devices, see position (1) in section *Positions of the LEDs and control elements* [► page 128].





LED	Color	State	Description
SYS	Duo LED yellow/green		
	 (green)	On	Operating system is running.
	 (green/ yellow)	Blinking	Second stage bootloader is waiting for firmware.
	 (yellow)	On	Bootloader netX (= romloader) is waiting for second stage bootloader.
	 (off)	Off	Power supply for the device is missing or hardware defect.

Table 52: States of the SYS LED, netX 10/50/51/52/100/500-based devices

10.4.2 LEDs Real-Time Ethernet systems

10.4.2.1 LEDs EtherCAT Master V4

LED	Color	State	Description
RUN Position in the device drawing: (2)	Duo LED red/green		
	● (off)	Off	INIT: The device is in INIT state.
	☀ (green)	Blinking (2.5 Hz)	PRE-OPERATIONAL: The device is in PRE-OPERATIONAL state.
	☀ (green)	Flickering (10 Hz)	The device is not configured.
	☀ (green)	Single flash	SAFE-OPERATIONAL: The device is in SAFE-OPERATIONAL state.
	● (green)	On	OPERATIONAL: The device is in the OPERATIONAL state.
ERR Position in the device drawing: (3)	Duo LED red/green		
	● (off)	Off	Master has no errors
	☀ (red)	Single flash	Bus Sync error threshold
	☀ (red)	Double flash	Internal Stop of the bus cycle
	☀ (red)	Triple Flash	DPM watchdog has expired.
	☀ (red)	Quadruple Flash	No Master license present in the device.
	☀ (red)	Blinking (2.5 Hz)	Error in the configuration database.
	☀ (red)	Single Flickering	Channel Init was executed at the Master. Transient state that may not be visible.
	☀ (red)	Double Flickering	Slave is missing Unconfigured slave No matching mandatory slave list No bus connected
	☀ (red)	Flickering (10 Hz)	Boot-up was stopped due to an error.
LINK Ch0 (4)	LED green		
	● (green)	On	Link: The device is linked to the Ethernet, but does not send/receive Ethernet frames.
	☀ (green)	Flickering (load dependent)	Activity: The device is linked to the Ethernet and sends/receives Ethernet frames.
	● (off)	Off	The device has no link to the Ethernet.
ACT Ch0 (6)	LED yellow		
	● (off)	Off	This LED is not used.

Table 53: LED states for the EtherCAT Master (V4) protocol

LED state	Definition
Single flash	The LED shows one short flash (200 ms) followed by a long "Off" phase (1,000 ms).
Double flash	The LED 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 LED 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).
Quadruple Flash	The LED shows a sequence of four 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).

LED state	Definition
Blinking (2.5 Hz)	The LED turns on and off with a frequency of 2.5 Hz: "On" for 200 ms, followed by "Off" for 200 ms.
Single Flickering	The LED is switched on and off once: "On" for 50 ms, followed by "Off" for 500 ms.
Double Flickering	The LED is switched on and off and on once: "On" / "Off" / "On" each for approximately 50 ms, followed by "Off" for 500 ms.
Flickering (10 Hz)	The LED turns on and off with a frequency of 10 Hz: "On" for 50 ms, followed by "Off" for 50 ms.
Flickering (load dependent)	The LED turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "On" for approximately 50 ms, followed by "Off" for 50 ms. The LED turns on and off in irregular intervals to indicate low Ethernet activity.

Table 54: LED state definitions for the EtherCAT Master (V4) protocol

The positions of the LEDs are indicated in section *Front view of netJACK with EtherCAT Master* [► page 128].

10.4.2.2 LEDs EtherCAT Slave

Communication status EtherCAT Slave

LED	Color	State	Description
RUN Position in the device drawing: (2)	Duo LED red/green		
	● (off)	Off	INIT: The device is in INIT state.
	☀ (green)	Blinking (2.5 Hz)	PRE-OPERATIONAL: The device is in PRE-OPERATIONAL state.
	☀ (green)	Single flash	SAFE-OPERATIONAL: The device is in SAFE-OPERATIONAL state.
ERR Position in the device drawing: (3)	Duo LED red/green		
	● (off)	Off	No error: The EtherCAT communication of the device is in working condition.
	☀ (red)	Blinking (2.5 Hz)	Invalid configuration: General Configuration Error Possible reason: State change commanded by master is impossible due to register or object settings.
	☀ (red)	Single flash	Local error: Slave device application has changed the EtherCAT state autonomously. Possible reason 1: A host watchdog timeout has occurred. Possible reason 2: Synchronization Error, device enters Safe-Operational automatically.
	☀ (red)	Double flash	Application watchdog timeout: An application watchdog timeout has occurred. Possible reason: Sync Manager Watchdog timeout.

Table 55: Communication status EtherCAT Slave

LED state	Definition
Blinking (2.5 Hz)	The LED turns on and off with a frequency of 2.5 Hz: "On" for 200 ms, followed by "Off" for 200 ms.
Single flash	The LED shows one short flash (200 ms) followed by a long "Off" phase (1,000 ms).
Double flash	The LED 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 56: Definition LED states communication status

Ethernet status EtherCAT Slave

LED	Color	State	Description
L/A IN, L/A OUT Ch0 (4) , Ch1 (7)	LED green		
	● (green)	On	Link: The device is linked to the Ethernet, but does not send/receive Ethernet frames.
	☀ (green)	Flickering (load dependent)	Activity: The device is linked to the Ethernet and sends/receives Ethernet frames.
Ch0 (6) , Ch1 (9)	● (off)	Off	The device has no link to the Ethernet.
	LED yellow		
	● (off)	Off	This LED is not used.

Table 57: Ethernet status EtherCAT Slave

LED state	Definition
Flickering (load dependent)	The LED turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "On" for approximately 50 ms, followed by "Off" for 50 ms. The LED turns on and off in irregular intervals to indicate low Ethernet activity.

Table 58: Definition LED states Ethernet status

The positions of the LEDs are indicated in section *Front view of netJACK with EtherCAT Slave* [► page 128].

10.4.2.3 LEDs EtherNet/IP Scanner

















LED	Color	State	Description
MS (module status) Position in the device drawing: (2)	Duo LED red/green		
	 (green)	On	Device operational: The device is operating correctly.
	 (green)	Flashing (1 Hz)	Standby: The device has not been configured.
	 (green/red/green)	Flashing green/red/green	Self-test: The device performs a self-test after power-on. The following sequence is displayed during the self-test: <ul style="list-style-type: none"> • NS-LED off. • MS LED turns green for approximately 250 ms, turns red for approximately 250 ms, and again turns green (and holds that state until the power-up test has completed). • NS LED turns green for approximately 250 ms, turns red for approximately 250 ms, and then turns off (and holds that state until the power-up test has completed).
	 (red)	Flashing (1 Hz)	Major recoverable fault: The device has detected a major recoverable fault. E.g., an incorrect or inconsistent configuration can be considered a major recoverable fault.
	 (red)	On	Major unrecoverable fault: The device has detected a major unrecoverable fault.
	 (off)	(Off)	No power: The device is powered off.
NS (Network status) Position in the device drawing: (3)	Duo LED red/green		
	 (green)	On	Connected: An IP address is configured, at least one CIP connection (any transport class) is established, and an Exclusive Owner connection has not timed out.
	 (green)	Flashing (1 Hz)	No connections: An IP address is configured, but no CIP connections are established, and an Exclusive Owner connection has not timed out.
	 (green/red/off)	Flashing green/red/off	Self-test: The device performs a self-test after power-on. Refer to the description of the MS LED in the self-test status.
	 (red)	Flashing (1 Hz)	Connection timeout: An IP address is configured, and an Exclusive Owner connection for which this device is the target has timed out. The NS LED returns to steady green only when all timed out Exclusive Owner connections are reestablished.
	 (red)	On	Duplicate IP: The device has detected that its IP address is already in use.
	 (off)	Off	Not powered, no IP address: The device does not have an IP address (or is powered off).
LINK Ch0 (4) , Ch1 (7)	LED green		
	 (green)	On	The device is linked to the Ethernet.
	 (off)	Off	The device has no link to the Ethernet.
ACT Ch0 (6) , Ch1 (9)	LED yellow		
	 (yellow)	Flickering (load dependent)	The device sends/receives Ethernet frames.
	 (off)	Off	The device does not send/receive Ethernet frames.

Table 59: LED states for the EtherNet/IP Scanner protocol

LED state	Definition
Flashing (1 Hz)	The LED turns on and off with a frequency of 1 Hz: "On" for 500 ms, followed by "Off" for 500 ms.
Flashing fast green/red/ green	The MS LED or NS LED turns on green "On" for 250 ms, then red "On" for 250 ms, then green "On" (until the test is completed).
Flickering (load dependent)	The LED turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "On" for approximately 50 ms, followed by "Off" for 50 ms. The LED turns on and off in irregular intervals to indicate low Ethernet activity

Table 60: LED state definitions for the EtherNet/IP Scanner protocol

The positions of the LEDs are indicated in section *Front view of netJACK with EtherNet/IP* [► page 129].

10.4.2.4 LEDs EtherNet/IP Adapter

Communication status EtherNet/IP Adapter




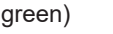










LED	Color	State	Description
MS (module status) Position in the device drawing: (2)	Duo LED red/green		
	 (green)	On	Device operational: The device is operating correctly.
	 (green)	Flashing (1 Hz)	Standby: The device has not been configured.
	 (green/red/green)	Flashing fast green/red/green	Self-test: The device performs a self-test after power-on. The following sequence is displayed during the self-test: <ul style="list-style-type: none"> • NS-LED off. • MS LED turns green for approximately 250 ms, turns red for approximately 250 ms, and again turns green (and holds that state until the power-up test has completed). • NS LED turns green for approximately 250 ms, turns red for approximately 250 ms, and then turns off (and holds that state until the power-up test has completed).
	 (red/green/off)	Flashing sequence red/green/off	Flashing sequence: The flashing sequence is used to visually identify the device. The scanner can start the flashing sequence in Identity object 1 of the device. The MS LED and NS LED perform the flashing sequence simultaneously.
	 (red)	Flashing (1 Hz)	Major recoverable fault: The device has detected a major recoverable fault. E.g., an incorrect or inconsistent configuration can be considered a major recoverable fault.
	 (red)	On	Major unrecoverable fault: The device has detected a major unrecoverable fault.
	 (off)	Off	No power: The device is powered off.
NS (Network status) Position in the device drawing: (3)	Duo LED red/green		
	 (green)	On	Connected: An IP address is configured, at least one CIP connection (any transport class) is established, and an Exclusive Owner connection has not timed out.
	 (green)	Flashing (1 Hz)	No connections: An IP address is configured, but no CIP connections are established, and an Exclusive Owner connection has not timed out.
	 (green/red/green)	Flashing fast green/red/green	Self-test: The device performs a self-test after power-on. Refer to the description of the MS LED in the self-test status.
	 (red/green/off)	Flashing sequence red/green/off	Flashing sequence: The flashing sequence is used to visually identify the device. The scanner can start the flashing sequence in Identity object 1 of the device. The MS LED and NS LED perform the flashing sequence simultaneously.
	 (red)	Flashing (1 Hz)	Connection timeout: An IP address is configured, and an Exclusive Owner connection for which this device is the target has timed out. The NS LED returns to steady green only when all timed out Exclusive Owner connections are reestablished.
	 (red)	On	Duplicate IP: The device has detected that its IP address is already in use.
	 (off)	Off	Not powered, no IP address: The device does not have an IP address (or is powered off).

Table 61: Communication status EtherNet/IP Adapter

LED state	Definition
Flashing (1 Hz)	The LED turns on and off with a frequency of 1 Hz: "On" for 500 ms, followed by "Off" for 500 ms.
Flashing fast green/red/green	The MS LED or NS LED turns on green "On" for 250 ms, then red "On" for 250 ms, then green "On" (until the test is completed).
Flashing sequence red/green/off	The MS LED and NS LED each turn red "On" for 500 ms, then green "On" for 500 ms, then "Off" for 500 ms. This flashing sequence is repeated at least 6 times.

Table 62: Definition LED states communication status

Ethernet status EtherNet/IP Adapter

LED	Color	State	Description
LINK Ch0 (4) , Ch1 (7)	LED green		
	● (green)	On	The device is linked to the Ethernet.
	● (off)	Off	The device has no link to the Ethernet.
ACT Ch0 (6) , Ch1 (9)	LED yellow		
	☀ (yellow)	Flickering (load dependent)	The device sends/receives Ethernet frames.
	● (off)	Off	The device does not send/receive Ethernet frames.

Table 63: Ethernet status EtherNet/IP Adapter

LED state	Definition
Flickering (load dependent)	The LED turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "On" for approximately 50 ms, followed by "Off" for 50 ms. The LED turns on and off in irregular intervals to indicate low Ethernet activity

Table 64: Definition LED states Ethernet status

The positions of the LEDs are indicated in section *Front view of netJACK with EtherNet/IP* ► page 129].

10.4.2.5 LEDs Open Modbus/TCP

Communication status OpenModbusTCP








LED	Color	State	Description
RUN Position in the device drawing: (2)	Duo LED red/green		
	 (green)	On	Connected: OMB task has communication. At least one TCP connection is established.
	 (green)	Flashing (1 Hz)	Ready, not configured yet: OMB task is ready and not yet configured.
	 (green)	Flashing (5 Hz)	Waiting for Communication: OMB task is configured.
	 (off)	Off	Not Ready: OMB task is not ready.
ERR Position in the device drawing: (3)	Duo LED red/green		
	 (off)	Off	No communication error
	 (red)	Flashing (2 Hz, 25% on)	System error
	 (red)	On	Communication error active

Table 65: Communication status OpenModbusTCP

LED state	Definition
Flashing (1 Hz)	The LED turns on and off with a frequency of 1 Hz: "On" for 500 ms, followed by "Off" for 500 ms.
Flashing (5 Hz)	The LED turns on and off with a frequency of 5 Hz: "On" for 100 ms, followed by "Off" for 100 ms.
Flashing (2 Hz, 25% on)	The LED turns on and off with a frequency of 2 Hz: "On" for 125 ms, followed by "Off" for 375 ms.

Table 66: Definition LED states communication status

Ethernet status OpenModbusTCP





LED	Color	State	Description
LINK Ch0 (4) , Ch1 (7)	LED green		
	 (green)	On	The device is linked to the Ethernet.
	 (off)	Off	The device has no link to the Ethernet.
ACT Ch0 (6) , Ch1 (9)	LED yellow		
	 (yellow)	Flickering (load dependent)	The device sends/receives Ethernet frames.
	 (off)	Off	The device does not send/receive Ethernet frames.

Table 67: Ethernet status OpenModbusTCP

LED state	Definition
Flickering (load dependent)	The LED turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "On" for approximately 50 ms, followed by "Off" for 50 ms. The LED turns on and off in irregular intervals to indicate low Ethernet activity.

Table 68: Definition LED states Ethernet status

The positions of the LEDs are indicated in section *Front view of netJACK with Open Modbus/TCP* [► page 129].

10.4.2.6 LEDs POWERLINK Controlled Node V2 and V3

LED	Color	State	Description
BS (Bus status) Position in the device drawing: (2)	Duo LED red/green		
	● (green)	On	Slave is in ' Operational ' state.
	☀ (green)	Triple flash	Slave is in ' ReadyToOperate ' state.
	☀ (green)	Double flash	Slave is in ' Pre-Operational 2 ' state.
	☀ (green)	Single flash	Slave is in ' Pre-Operational 1 ' state.
	☀ (green)	Flickering (10 Hz)	Slave is in ' Basic Ethernet ' state
	☀ (green)	Blinking (2.5 Hz)	Slave is in ' Stopped ' state.
BE (Bus Error) Position in the device drawing: (3)	● (off)	Off	Slave has no error
	● (red)	On	Slave has detected an error
L/A Ch0 (4) , Ch1 (7)	LED green		
	● (green)	On	Link: The device is linked to the Ethernet, but does not send/receive Ethernet frames.
	☀ (green)	Flickering (load dependent)	Activity: The device is linked to the Ethernet and sends/receives Ethernet frames.
Ch0 (6) , Ch1 (9)	● (off)	Off	The device has no link to the Ethernet.
	LED yellow		
	● (off)	Off	This LED is not used.

Table 69: LED states for the POWERLINK Controlled Node protocol

LED state	Definition
Triple flash	The LED 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).
Double flash	The LED 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).
Single flash	The LED shows one short flash (200 ms) followed by a long "Off" phase (1,000 ms).
Flickering (10 Hz)	The LED turns on and off with a frequency of 10 Hz: "On" for 50 ms, followed by "Off" for 50 ms. The red LED and the green LED are switched on alternately.
Blinking (2.5 Hz)	The LED turns on and off phase with a frequency of 2,5 Hz: "On" for 200 ms followed by "Off" for 200 ms. The red LED and the green LED are switched on alternately.
Flickering (load dependant)	The LED turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "On" for approximately 50 ms, followed by "Off" for 50 ms. The LED turns on and off in irregular intervals to indicate low Ethernet activity.

Table 70: LED state definitions for the POWERLINK Controlled Node protocol

The positions of the LEDs are indicated in section *Front view of netJACK with POWERLINK* [► page 130].

10.4.2.7 LEDs PROFINET IO Controller V3







SYS	SF	BF	Description
System status	System Failure Position in the device drawing: (2)	Bus Failure Position in the device drawing: (3)	LED name name
Yellow/green	Red/green	Red/green	Colours of the Duo LEDs SYS, SF or BF
Firmware and Configuration			
● Off	● Off	● Off	Power supply for the device is missing or hardware defect.
● On, yellow	● Off	● Off	No second stage bootloader found in Flash memory.
 Flashing, green/ yellow, cyclic	● Off	● Off	No firmware file found in Flash file system.
● On, green	● On, red	● Off	PROFINET IO Controller is not configured.
● On, green	● Off	● On, red	No Ethernet port has a link. E. g., no cable connected to any of the Ethernet ports.
● On, green	● Off	 Flashing, red, 2 Hz	PROFINET IO Controller is not online (Bus is switched to Off).
PROFINET communication			
● On, green	● Off or ● On, red	 Flashing, red, 1Hz	Not all configured devices are in data exchange.
● On, green	● On, red	-	One IO Device connected to the PROFINET IO Controller reports a problem.
● On, green	● Off	● Off	All devices are in data exchange and no problem has been reported by any device.
PROFINET IO Controller operation			
● On, green	 Flashing, red, 1 Hz, 3 s	● Off	A PROFINET DCP Set Signal has been received.
● On, green	 Flashing, red, 2 Hz	 Flashing, red, 2 Hz	The PROFINET IO Controller has detected an address conflict. Another device in the network is using the same Name of Station or IP address as the PROFINET IO Controller. Or watchdog error
● On, green	● On, red	● On, red	No valid Master license

Table 71: PROFINET IO Controller, SYS, COM0 and COM1 LEDs states


LED	Color	State	Description
LINK Ch0 (4) , Ch1 (7)	LED green		
	● (green)	On	The device is linked to the Ethernet.
	● (off)	Off	The device has no link to the Ethernet.
RX/TX Ch0 (6) , Ch1 (9)	LED yellow		
	 (yellow)	Flickering (load dependent)	The device sends/receives Ethernet frames.
	● (off)	Off	The device does not send/receive Ethernet frames.

Table 72: PROFINET IO Controller, Ethernet LEDs states

LED state	Definition
Flashing (1 Hz, 3 s)	The LED turns on and off for 3 seconds with a frequency of 1 Hz: "On" for 500 ms, followed by "Off" for 500 ms.
Flashing (1 Hz)	The LED turns on and off with a frequency of 1 Hz: "On" for 500 ms, followed by "Off" for 500 ms.
Flashing (2 Hz)	The LED turns on and off with a frequency of 2 Hz: "On" for 250 ms, followed by "Off" for 250 ms.
Flickering (load dependent)	The LED turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "On" for approximately 50 ms, followed by "Off" for 50 ms. The LED turns on and off in irregular intervals to indicate low Ethernet activity.

Table 73: PROFINET IO Controller, LEDs states definitions

The positions of the LEDs are indicated in section *Front view of netJACK with PROFINET IO* [► page 130].

10.4.2.8 LEDs PROFINET IO Device

Communication status PROFINET IO-Device

LED	Color	State	Description
SF (System Failure) Position in the device drawing: (2)	Duo LED red/green		
	● (off)	Off	No error
	☀ (red)	Flashing (1 Hz, 3 s)	DCP signal service is initiated via the bus.
	● (red)	On	Watchdog timeout; channel, generic or extended diagnosis present; system error
BF (Bus Failure) Position in the device drawing: (3)	Duo LED red/green		
	● (off)	Off	No error
	☀ (red)	Flashing (2 Hz)	No data exchange
	● (red)	On	No configuration; or low speed physical link; or no physical link

Table 74: Communication status PROFINET IO-Device

LED state	Definition
Flashing (1 Hz, 3 s)	The LED turns on and off for 3 seconds with a frequency of 1 Hz: "On" for 500 ms, followed by "Off" for 500 ms.
Flashing (2 Hz)	The LED turns on and off with a frequency of 2 Hz: "On" for 250 ms, followed by "Off" for 250 ms.

Table 75: Definition LED states communication status

Ethernet status PROFINET IO-Device

LED	Color	State	Description
LINK Ch0 (4) , Ch1 (7)	LED green		
	● (green)	On	The device is linked to the Ethernet.
	● (off)	Off	The device has no link to the Ethernet.
RX/TX Ch0 (6) , Ch1 (9)	LED yellow		
	☀ (yellow)	Flickering (load dependent)	The device sends/receives Ethernet frames.
	● (off)	Off	The device does not send/receive Ethernet frames.

Table 76: Ethernet status PROFINET IO-Device

LED state	Definition
Flickering (load dependent)	The LED turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "On" for approximately 50 ms, followed by "Off" for 50 ms. The LED turns on and off in irregular intervals to indicate low Ethernet activity.

Table 77: Definition LED states Ethernet status

The positions of the LEDs are indicated in section *Front view of netJACK with PROFINET IO* ► page 130].

10.4.2.9 LEDs Sercos Master

LED	Color	State	Description
STA Position in the device drawing: (2)	Duo LED red/green		
	● (green)	On	CP4: Communication phase 4
	☀ (green)	Triple Flash	CP3: Communication phase 3
	☀ (green)	Double flash	CP2: Communication phase 2
	☀ (green)	Single flash	CP1: Communication phase 1
	☀ (green)	Blinking (2.5 Hz)	CP0: Communication phase 0
	☀ (green)	Flickering (10 Hz)	Master is not configured and is in NRT. After a status change this isn't indicated again
	● (off)	Off	NRT: Non Real-Time Mode
ERR Position in the device drawing: (3)	Duo LED red/green		
	☀ (red)	Single flash	Bus Sync error threshold
	☀ (red)	Double flash	Internal Stop of the bus cycle
	☀ (red)	Triple Flash	DPM watchdog has expired.
	☀ (red)	Quadruple Flash	No Master license present in the device.
	☀ (red)	Blinking (2.5 Hz)	Error in the configuration database.
	☀ (red)	Single Flickering	Channel Init was executed at the Master. Transient state that may not visible at all.
	☀ (red)	Double Flickering	Slave is missing. Unconfigured slave No matching mandatory slave list No bus connected Duplicate Sercos address Invalid Sercos address
	☀ (red)	Flickering (10 Hz)	Boot-up was stopped due to an error.
	● (off)	Off	No error
L/A Ch0 (4) , Ch1 (7)	LED green		
	● (green)	On	Link: The device is linked to the Ethernet, but does not send/receive Ethernet frames.
	☀ (green)	Flickering (load dependent)	Activity: The device is linked to the Ethernet and sends/receives Ethernet frames.
	● (off)	Off	The device has no link to the Ethernet.
Ch0 (6) , Ch1 (9)	LED yellow		
	● (off)	Off	This LED is not used.

Table 78: LED states for the Sercos Master protocol

LED state	Definition
Single flash	The LED shows one short flash (200 ms) followed by a long "Off" phase (1,000 ms).
Double flash	The LED 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 LED 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).
Quadruple flash	The LED shows a sequence of four 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).
Blinking (2.5 Hz)	The LED turns on and off with a frequency of 2.5 Hz: "On" for 200 ms, followed by "Off" for 200 ms.
Single Flickering	The LED is switched on and off once: "On" for 50 ms, followed by "Off" for 500 ms.
Double Flickering	The LED is switched on and off and on once: "On" / "Off" / "On" each for approximately 50 ms, followed by "Off" for 500 ms.
Flickering (10 Hz)	The LED turns on and off with a frequency of 10 Hz: "On" for 50 ms, followed by "Off" for 50 ms.
Flickering (load dependent)	The LED turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "On" for approximately 50 ms, followed by "Off" for 50 ms. The LED turns on and off in irregular intervals to indicate low Ethernet activity.

Table 79: LED state definitions for the Sercos Master protocol

The positions of the LEDs are indicated in section *Front view of netJACK with Sercos Master* [► page 131].

10.4.2.10 LEDs Sercos Slave
















LED	Color	State	Meaning
S Position in the device drawing: (2)	Duo-LED red/green (orange = red/green simultaneously)		
	 (green)	On	CP4: Communication phase 4: Normal operation, no error
	 (green)	Flashing (2 Hz)	Loopback: The network state has changed from „fast-forward“ to „loopback“.
	 (green/orange)	Flashing (3 x green/3s)	CP3: Communication phase 3
		(2 x green/3s)	CP2: Communication phase 2
		(1 x green/3s)	CP1: Communication phase 1
	 (orange)	On	CP0: Communication phase 0
	 (orange/green)	Flashing (2 Hz)	HP0: Hot-plug mode
		(1 x orange/3s)	HP1: Hot-plug mode
		(2 x orange/3s)	HP2: Hot-plug mode
	 (orange)	Flashing (2 Hz)	Identification: Invoked by (C-DEV.Bit15 in the Device Control) Or SIP Identification Request
	 (green/red)	Flashing (2 Hz, min. 2s)	MST losses \geq (S-0-1003/2): The communication warning (S-DEV.Bit 15) is present in the device status.
	 (red/orange)	Flashing (2 Hz)	Application error (C1D): See GDP & FSP Status codes class error.
	 (red)	Flashing (2 Hz)	Watchdog error: Application is not running.
	 (red)	On	Communication Error (C1D): Error detected according to Sercos third generation Class 1 Diagnosis, see SCP Status codes class error.
	 (off)	Off	NRT-Mode: (Non Real-Time Mode) No Sercos Communication
L/A Ch0: (3) Ch1: (6)	LED green		
	 (green)	On	Link: The device is linked to the Ethernet, but does not send/receive Ethernet frames.
	 (green)	Flickering (load dependent)	Activity: The device is linked to the Ethernet and sends/receives Ethernet frames.
	 (off)	Off	The device has no connection to the Ethernet.
	LED yellow		
	 (off)	Off	This LED is not used.

Table 80: LED states for the Sercos Slave protocol

LED state	Definition
Flashing (2 Hz)	The indicator turns on and off with a frequency of 2 Hz: <i>one color</i> : On for appr. 250 ms, followed by off for appr. 250 ms. <i>two colors</i> : First color for appr. 250 ms, followed by the second color for appr. 250 ms.
Flashing (1 x green/3s)	Flashing green for 250 ms, then orange on for 2 second and 750 ms.
(2 x green/3s)	Flashing orange / green / orange, each for 250 ms, then green on for 2 seconds and 250 ms.
(3 x green/3s)	Flashing green / orange / green / orange / green, each for 250 ms, then orange on for 1 second and 750 ms.
(1 x orange/3s)	Flashing orange for 250 ms, then green on for 2 second an 750 ms.
(2 x orange/3s)	Flashing orange / green / orange, each for 250 ms, then green on for 2 seconds and 250 ms.
Flickering (load dependent)	The indicator turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "on" for approximately 50 ms, followed by "off" for 50 ms. The indicator turns on and off in irregular intervals to indicate low Ethernet activity.

Table 81: LED state definitions for the Sercos Slave protocol

The positions of the LEDs are indicated in section *Front view of netJACK with Sercos Slave* [► page 131].

10.4.2.11 LEDs VARAN Client

LED	Color	State	Description
RUN Position in the device drawing: (2)	Duo LED red/green		
	● (green)	On	Configured and communication is active.
	☀ (green)	Blinking (5 Hz)	Configured and communication is inactive.
	● (off)	Off	Not configured.
ERR Position in the device drawing: (3)	Duo LED red/green		
	● (off)	Off	Configured.
	☀ (red)	Blinking (5 Hz)	Not configured.
	● (red)	On	Communication error occurred.
LINK IN Ch0 (4) LINK OUT Ch1 (7)	LED green		
	● (green)	On	The device is linked to the Ethernet.
	● (off)	Off	The device has no link to the Ethernet.
ACT IN Ch0 (6) ACT OUT Ch1 (9)	LED yellow		
	☀ (yellow)	Flickering (load dependent)	The device sends/receives Ethernet frames.
	● (off)	Off	The device does not send/receive Ethernet frames.

Table 82: LED states for the VARAN Client protocol

LED state	Definition
Blinking (5 Hz)	The LED turns on and off with a frequency of 5 Hz: "On" for 100 ms, followed by "Off" for 100 ms.
Flickering (load dependent)	The LED turns on and off with a frequency of approximately 10 Hz to indicate high Ethernet activity: "On" for approximately 50 ms, followed by "Off" for 50 ms. The LED turns on and off in irregular intervals to indicate low Ethernet activity.

Table 83: LED state definitions for the VARAN Client protocol

The positions of the LEDs are indicated in section *Front view of netJACK with VARAN Client* [► page 132].

10.4.3 LEDs fieldbus systems

10.4.3.1 LEDs CANopen Master








LED	Color	State	Description
CAN Position in the device drawing: (2)	Duo LED red/green		
	 (green)	On	OPERATIONAL: The device is in the OPERATIONAL state.
	 (green)	Blinking (2.5 Hz)	PREOPERATIONAL: The device is in the PREOPERATIONAL state.
	 (green)	Single flash	STOPPED: The device is in STOPPED state.
	 (red)	Single flash	Warning limit reached: At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many error frames).
	 (red)	Double flash	Error control event: A guard event (NMT Slave or NMT Master) or a heartbeat event (Heartbeat consumer) has occurred.
	 (red)	On	Bus off: The CAN controller is in bus OFF state.
	 (off)	Off	RESET: The device is executing a reset or the device has no configuration.

Table 84: LED states for the CANopen Master protocol

LED states	Definition
Blinking (2.5 Hz)	The LED turns on and off with a frequency of 2.5 Hz: "On" for 200 ms, followed by "Off" for 200 ms.
Single flash	The LED shows one short flash (200 ms) followed by a long "Off" phase (1,000 ms).
Double flash	The LED 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 85: LED state definitions for the CANopen Master protocol

The position of the LED is indicated in section *Front view of netJACK with CANopen* [► page 133].

10.4.3.2 LEDs CANopen Slave










LED	Color	State	Description
CAN Position in the device drawing: (2)	Duo LED red/green		
	 (green)	On	OPERATIONAL: The device is in the OPERATIONAL state.
	 (green)	Blinking (2.5 Hz)	PREOPERATIONAL: The device is in the PREOPERATIONAL state.
	 (green)	Single flash	STOPPED: The device is in STOPPED state.
	  (red/green)	Flickering (10 Hz)	Auto baud rate detection active: The Device is in the auto baud rate detection mode.
	 (red)	Single flash	Warning limit reached: At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many error frames).
	 (red)	Double flash	Error control event: A guard event (NMT Slave or NMT Master) or a heartbeat event (Heartbeat consumer) has occurred.
	 (red)	On	Bus off: The CAN controller is in bus OFF state.
	 (off)	Off	RESET: The device is executing a reset or the device has no configuration.

Table 86: States of the CAN LED for the CANopen Slave protocol

LED state	Definition
Flickering (10 Hz)	The LED turns on and off with a frequency of 10 Hz: "On" for 50 ms, followed by "Off" for 50 ms.
Blinking (2.5 Hz)	The LED turns on and off with a frequency of 2.5 Hz: "On" for 200 ms, followed by "Off" for 200 ms.
Single flash	The LED shows one short flash (200 ms) followed by a long "Off" phase (1,000 ms).
Double flash	The LED 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). The LED turns on and off in irregular intervals to indicate low Ethernet activity.

Table 87: LED state definitions for the CANopen Slave protocol

The position of the LED is indicated in section *Front view of netJACK with CANopen* [► page 133].

10.4.3.3 LEDs DeviceNet Master










LED	Color	State	Description
MNS Position in the device drawing:  (2)	Duo LED red/green		
	 (green)	On	Device operational AND on-line, connected Device is online and has established all connections with all Slaves.
	 (green)	Flashing (1 Hz)	Device operational AND on-line Device is online and has established no connection in the established state. - Configuration missing, incomplete or incorrect.
	   (green/red/off)	Flashing green/red/off	Self-test: The device performs a self-test after power-on. The MNS LED turns green for approximately 250 ms, then turns red for approximately 250 ms, then turns off.
	 (red)	Flashing (1 Hz)	Minor fault and/or connection time-out Device is online and has established one or more connections in the established state. It has data exchange with at least one of the configured slaves. Minor or recoverable fault: No data exchange with one of the configured Slaves. One or more Slaves are not connected. Connection timeout. No network power present.
	 (red)	On	Critical fault or critical link failure Critical connection failure; device has detected a network error: duplicateMAC-ID or severe error in CAN network (CAN-bus off).
	 (off)	Off	Device is not powered - The device may not be powered. Device is not on-line and/or no network power - The device has not yet completed the Dup_MAC_ID test. - The device is powered, but the network power is missing.

Table 88: LED states for the DeviceNet Master protocol

LED state	Definition
Flashing (1 Hz)	The LED turns on and off with a frequency of 1 Hz: "On" for 500 ms, followed by "Off" for 500 ms.
Flashing green/red/off	The LED turns on green "On" for 250 ms, then red "On" for 250 ms, then "Off".

Table 89: LED state definitions for the DeviceNet Master protocol

10.4.3.4 LEDs DeviceNet Slave







LED	Color	State	Description
MNS Position in the device drawing: (2)	Duo LED red/green		
	 (green)	On	Device operational AND on-line, connected Device is online and has established all connections with all Slaves.
	 (green)	Flashing (1 Hz)	Device operational AND on-line Device is online and has established no connection in the established state. - Configuration missing, incomplete or incorrect.
	 (green/red/off)	Flashing green/red/off	Self-test: The device performs a self-test after power-on. The MNS LED turns green for approximately 250 ms, then turns red for approximately 250 ms, then turns off.
	 (red)	Flashing (1 Hz)	Minor fault and/or connection time-out Device has no connection to the Master. Minor or recoverable fault: No data exchange with the Master. Connection timeout. No network power present.
	 (red)	On	Critical fault or critical link failure Critical connection failure; device has detected a network error: duplicate MAC-ID or severe error in CAN network (CAN-bus off).
	 (off)	Off	Device is not powered - The device may not be powered. Device is not on-line and/or no network power - The device has not yet completed the Dup_MAC_ID test. - The device is powered, but the network power is missing.

Table 90: LED states for the DeviceNet Slave protocol

LED state	Definition
Flashing (1 Hz)	The LED turns on and off with a frequency of 1 Hz: "On" for 500 ms, followed by "Off" for 500 ms.
Flashing green/red/off	The LED turns on green "On" for 250 ms, then red "On" for 250 ms, then "Off".

Table 91: LED state definitions for the DeviceNet Slave protocol

The positions of the LEDs are indicated in section *Front view of netJACK with DeviceNet* [► page 133].

10.4.3.5 LEDs PROFIBUS DP Master







LED	Color	State	Description
COM Position in the device drawing: (2)	Duo LED red/green		
	 (green)	On	Communication to all Slaves is established.
	 (green)	Blinking (5 Hz)	PROFIBUS is configured, but the bus communication is not yet released from the application.
	 (green)	Flashing, acyclic	No configuration or faulty configuration
	 (red)	Blinking (5 Hz)	Communication to at least one Slave is disconnected.
	 (red)	On	Communication to all Slaves is disconnected or another serious error has occurred. Redundant Mode: The active Master was not found.
	 (off)	Off	Device is not switched on or supply voltage is missing.

Table 92: LED states for the PROFIBUS DP Master protocol

LEDs states	Definition
Blinking (5 Hz)	The LED turns on and off with a frequency of 5 Hz: "On" for 100 ms, followed by "Off" for 100 ms.
Flashing, acyclic	The LED turns on and off in irregular intervals.

Table 93: LED state definitions for the PROFIBUS DP Master protocol

10.4.3.6 LEDs PROFIBUS DP Slave







LED	Color	State	Description
COM Position in the device drawing: (2)	Duo LED red/green		
	 (green)	On	RUN, cyclic communication
	 (green)	Flashing, cyclic (2 Hz)	Master is in CLEAR state.
	 (red)	Flashing, acyclic (1 Hz)	The device is not configured.
	 (red)	Flashing, cyclic (2 Hz)	STOP, no communication, connection error
	 (red)	On	Wrong configuration at PROFIBUS DP Slave.
	 (off)	Off	Device is not switched on or supply voltage is missing.

Table 94: LED states for the PROFIBUS DP Slave protocol

LED states	Definition
Flashing, acyclic (1 Hz)	The LED turns on and off in irregular intervals, with a frequency of 1 Hz: "On" for 750 ms, followed by "Off" for 250 ms.
Flashing, cyclic (2 Hz)	The LED turns on and off with a frequency of 2 Hz: "On" for 250 ms, followed by "Off" for 250 ms.

Table 95: LED state definitions for the PROFIBUS DP Slave protocol

The position of the LED is indicated in section *Front view of netJACK with PROFIBUS DP* [► page 134].

10.5 Pinning

10.5.1 Pinning Real-Time Ethernet interface

The following picture shows the pinning of the Real-Time Ethernet interface of the netJACK communication module:

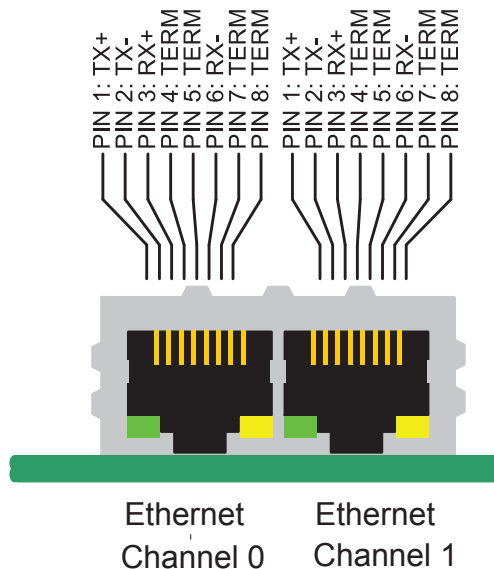


Figure 21: Pinning of Ethernet connectors

Pin	Signal	Description
1	TX +	Transmit Data +
2	TX –	Transmit Data –
3	RX +	Receive Data +
4	TERM	Bob Smith Termination
5	TERM	
6	RX –	Receive Data –
7	TERM	Bob Smith Termination
8	TERM	

Table 96: Ethernet interface channel 0 and channel 1 pin assignments



Note:

Auto-crossover function is supported by the netJACK modules.

10.5.2 Pinning CANopen interface

The following picture shows the pinning of the CANopen interface of the netJACK communication module:

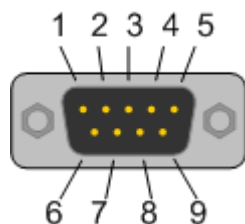


Figure 22: Pinning CANopen interface (D-Sub-Plug, 9-poles)

Pin	Signal	Description
2	CAN_L	CAN-Low bus line
3	CAN_GND	CAN reference potential
7	CAN_H	CAN-High bus line

Table 97: Pinning CANopen interface

10.5.3 Pinning DeviceNet interface

The following picture shows the pinning of the DeviceNet interface of the netJACK communication module:

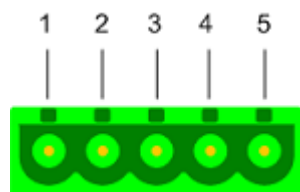


Figure 23: Pinning DeviceNet interface (CombiCon connector, 5-pole)

Connection with CombiCon plug	Signal	Color	Description
1	V-	Black	Data reference potential of the DeviceNet power supply
2	CAN_L	Blue	CAN Low signal
3	Drain		Shield
4	CAN_H	White	CAN High signal
5	V+	Red	+24 V DeviceNet supply voltage

Table 98: Pinning DeviceNet interface

10.5.4 Pinning PROFIBUS DP interface

The following picture shows the pinning of the PROFIBUS interface of the netJACK communication module:

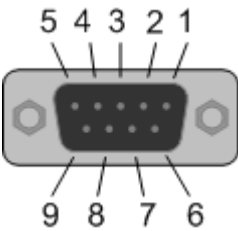


Figure 24: Pinning PROFIBUS DP interface (D-Sub-female connector, 9-pole)

Pin	Signal	Description
3	RxD/TxD-P	Receive-/Send data-P (Line B at plug)
5	DGND	Data reference potential
6	VP	Power supply (positive)
8	RxD/TxD-N	Receive-/Send data--N (Line A at plug)

Table 99: Pinning PROFIBUS DP interface



Note:
The PROFIBUS interface is a potential free RS-485 interface according to PROFIBUS Standard EN 50170.

11 Troubleshooting

In case of error, please follow the hints given below:

General

- Check, if the requirements for operating the netJACK are fulfilled (see *Prerequisites for Operation* [▶ page 83] section).



Important:

If you are using a Windows operating system and a **cifX Device Driver**, make sure you have upgraded the **cifX Device Driver** to the version indicated in the *Reference to Drivers* [▶ page 13] table.

LINK-LEDs

If you are using Real-Time Ethernet:

- Check the LINK LEDs status, to see if a connection to the Ethernet is established.

For further information on this, please refer to the corresponding protocol in the section *Descriptions of the LEDs* [▶ page 135].

Cable

- Check, if the pinning of the used cable is correct.

Configuration

- Check, if master and slave configuration match.

Diagnosing with SYCON.net

In the SYCON.net configuration software, use the **Online > Diagnosis** menu to display diagnostic information about the device.



Note:

You will find more information about device diagnosis functions in the operating manual of the corresponding protocol.

12 Technical data

12.1 Technical Data of the netJACK Communication Modules

See the following pages for the technical data of the netJACK Communication Modules.

12.1.1 NJ 51D-RE (preliminary)

NJ 51D-RE	Parameter	Value
Device ID	Part number	1662.100
Communication controller	Type	netX 51 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	Parallel or serial Dual-Port Memory
	Dual-port memory size	64 KB (16 address lines), where 16 KB used by firmware (14 address lines, lowest 16 KB)
	Data width (parallel)	8 or 16 bit
	Serial dual-port memory interface	SPI, mode 3 (CPOL = 1, CPHA = 1)
	Serial transmission rate	Max. 50 MHz
	Connector type	60 pin connector, SAMTEC FSI-130-03-G-D-AB
Ethernet communication	Supported firmware	EtherCAT Slave, EtherNet/IP Adapter/Slave, Open Modbus/TCP, PROFINET IO Device (Slave), Sercos Slave
Ethernet interface	Transmission rate	100 MBit/s or 10 MBit/s (depending on loaded firmware)
	Interface type	100 BASE-TX, isolated or 10 BASE-T (depending on loaded firmware)
	Half duplex/Full duplex	supported (at 100 MBit/s)
	Auto-Negotiation	depending on loaded firmware
	Auto-Crossover	depending on loaded firmware
Diagnostic Interface	USB or UART	Signal at host interface Available only if interpreted in host system
Display	LEDs	SYS System Status
		COM0/1 Communication status
		Link0/1; Activity0/1
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	570 mA
	Current at 3.3 V (maximum)	not measured yet
	Power consumption	1.94 W
Signal lines	Voltage of IO signal lines	+3,3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-20 ... +65°C
Dimensions (L x W x H)	Length	62 mm (with RJ45 connector), 60 mm (without RJ45 connector)
	Width	53.4 mm (at front panel), 50.4 mm (at body)
	Height	25.2 mm (at front panel), 19.2 mm (at body)
Weight	Weight	approx. 60 g
Device	Housing / Protection class	Closed module / IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Zertifizierung	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes, cURus
	UL File No.	E334100

NJ 51D-RE	Parameter	Value
Applied tests	Emission	CISPR 11; Class A
	Immunity	according to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 100: Technical Data NJ 51D-RE

12.1.2 NJ 52D-COS

NJ 52D-COS	Parameter	Value
Device identification	Part number	1672.540
Communication controller	Type	netX 52 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	Parallel or serial Dual-Port Memory
	Dual-port memory size	64 KB (16 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)
	Data width (parallel)	8 or 16 bit
	Serial dual-port memory interface	SPI, mode 3 (CPOL = 1, CPHA = 1)
	Serial transmission rate	Max. 50 MHz
	Connector Type	60-Pin connector (SAMTEC FSI-130-03-G-D-AB)
CANopen communication	Supported firmware	CANopen Slave
CANopen interface	Transmission rate	10 kBits/s to 1 MBit/s
	Interface type	ISO 11898, potential free
Diagnostic Interface	USB or UART	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status
		CAN Communication Status
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	356 mA
	Current at 3.3 V (maximum)	410 mA
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-25 ... +70 °C
	Ambient temperature range for storage	-40 ... +85 °C
Dimensions (L x W x H)	Length	68.2 mm / 60 mm (with / without DSUB connector)
	Width	53.4 mm (at front panel) / 50.4 mm (at body)
	Height	25.2 mm (at front panel) / 19.2 mm (at body)
Weight	Weight	46 g
Device	Housing	Closed module
	Protection class	IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes
Applied Tests	Emission	CISPR 11; Class A
	Immunity	According to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 101: Technical Data NJ 52D-COS

12.1.3 NJ 52D-DNS

NJ 52D-DNS	Parameter	Value
Device identification	Part number	1672.520
Communication controller	Type	netX 52 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	Parallel or serial Dual-Port Memory
	Dual-port memory size	64 KB (16 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)
	Data width (parallel)	8 or 16 bit
	Serial dual-port memory interface	SPI, mode 3 (CPOL = 1, CPHA = 1)
	Serial transmission rate	Max. 50 MHz
	Connector Type	60 pin connector (SAMTEC FSI-130-03-G-D-AB)
DeviceNet communication	Supported firmware	DeviceNet Slave
DeviceNet interface	Transmission rate	125 kBits/s, 250 kBits/s, 500 kBits/s
	Interface type	ISO 11898, potential free
	Connector	CombiCon connector, 5-pin
Diagnostic Interface	USB or UART	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status
		MNS Module Network Status
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	405 mA
	Current at 3.3 V (maximum)	470 mA
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 % DC
Environmental conditions	Ambient temperature range for operation	-25 ... +70 °C
	Ambient temperature range for storage	-40 ... +85 °C
Dimensions (L x W x H)	Length	60 mm
	Width	53.4 mm (at front panel) / 50.4 mm (body)
	Height	25.2 mm (at front panel) / 19.2 mm (body)
Weight	Weight	33 g
Device	Housing	Closed module
	Protection class	IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes
Applied tests	Emission	CISPR 11; Class A
	Immunity	According to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 102: Technical Data NJ 52D-DNS

12.1.4 NJ 52D-DPS

NJ 52D-DPS	Parameter	Value
Device identification	Part number	1672.420
Communication controller	Type	netX 52 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	Parallel or serial Dual-Port Memory
	Dual-port memory size	64 KB (16 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)
	Data width (parallel)	8 or 16 bit
	Serial dual-port memory interface	SPI, mode 3 (CPOL = 1, CPHA = 1)
	Serial transmission rate	Max. 50 MHz
	Connector Type	60-Pin connector (SAMTEC FSI-130-03-G-D-AB)
PROFIBUS communication	Supported firmware	PROFIBUS DP Slave
PROFIBUS interface	Transmission rate	Fixed values ranging from 9.6 kBits/s to 12 MBit/s
	Interface type	RS-485, potential-free
Diagnostic Interface	USB or UART	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status
		COM Communication Status
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	375 mA
	Current at 3.3 V (maximum)	400 mA (no short circuit) 450 mA (in case of short circuit)
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-25 ... +70 °C
	Ambient temperature range for storage	-40 ... +85 °C
Dimensions (L x W x H)	Length	68.2 mm / 60 mm (with / without DSUB connector)
	Width	53.4 mm (at front panel) / 50.4 mm (at body)
	Height	25.2 mm (at front panel) / 19.2 mm (at body)
Weight	Weight	approx. 64 g
Device	Housing	Closed module
	Protection class	IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes
Applied tests	Emission	CISPR 11; Class A
	Immunity	according to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 103: Technical Data NJ 52D-DPS

12.1.5 NJ 100EN-RE

NJ 100EN-RE	Parameter	Value
Device identification	Part number	1625.100
Communication controller	Type	netX 100 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	PCI Express
	Port type	One-Lane-Port
	Frequency	1.5 GHz
	Connector Type	40 pin connector, SAMTEC FSI-120-03-G-D-AB
Ethernet communication	Supported firmware	EtherCAT Master, EtherCAT Slave, EtherNet/IP Scanner/Master, EtherNet/IP Adapter/Slave, Open Modbus/TCP, POWERLINK Controlled Node/Slave, PROFINET IO Controller (Master), PROFINET IO Device (Slave), Sercos Master, Sercos Slave, TCP/IP, VARAN Client
Ethernet interface	Transmission rate	100 MBit/s or 10 MBit/s (depending on loaded firmware)
	Interface type	100 BASE-TX, isolated or 10 BASE-T (depending on loaded firmware)
	Half duplex/Full duplex	supported (at 100 MBit/s)
	Auto-Negotiation	depending on firmware
	Auto-Crossover	depending on firmware
Diagnostic Interface	USB	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status, COM0/1 Communication status, Link, Activity
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	746 mA
	Power Consumption	2.5 W
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-20 ... +65°C
Dimensions (L x W x H)	Length	62 mm / 60 mm (with / without RJ45 connector)
	Width	53.4 mm (at front panel) / 50.4 mm (at body)
	Height	25.2 mm (at front panel) / 19.2 mm (at body)
Weight	Weight	approx. 60 g
Device	Housing	Closed module
	Protection class	IP40
	Number of pins	40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes, cURus
	UL File No.	E334100

NJ 100EN-RE	Parameter	Value
Applied tests	Emission	CISPR 11; Class A
	Immunity	according to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 104: Technical Data NJ 100EN-RE

12.1.6 NJ 100EN-CO

NJ 100EN-CO	Parameter	Value
Device identification	Part number	1625.500
Communication controller	Type	netX 100 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	PCI Express
	Port type	One-Lane-Port
	Frequency	1.5 GHz
	Connector Type	40 pin connector (SAMTEC FSI-120-03-G-D-AB)
CANopen communication	Supported firmware	CANopen Master, CANopen Slave
CANopen interface	Transmission rate	10 kBits/s to 1 MBit/s
	Interface type	ISO 11898, potential free
Diagnostic Interface	USB	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status, CAN Communication Status
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	590 mA
	Power Consumption	1.95 W (at 590 mA)
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-20 ... +65 °C
Dimensions (L x W x H)	Length	68.2 mm / 60 mm (with / without DSUB connector)
	Width	53.4 mm (at front panel) / 50.4 mm (at body)
	Height	25.2 mm (at front panel) / 19.2 mm (at body)
Weight	Weight	approx. 68 g
Device	Housing	Closed module
	Protection class	IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes, cURus
	UL File No.	E334100
Applied tests	Emission	CISPR 11; Class A
	Immunity	according to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 105: Technical Data NJ 100EN-CO

12.1.7 NJ 100EN-DN

NJ 100EN-DN	Parameter	Value
Device identification	Part number	1625.510
Communication controller	Type	netX 100 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	PCI Express
	Port type	One-Lane-Port
	Frequency	1.5 GHz
	Connector Type	40 pin connector, (SAMTEC FSI-120-03-G-D-AB)
DeviceNet communication	Supported firmware	DeviceNet Master, DeviceNet Slave
DeviceNet interface	Transmission rate	125 kBits/s, 250 kBits/s, 500 kBits/s
	Interface type	ISO 11898, potential free
	Connector	CombiCon connector, 5-pin
Diagnostic Interface	USB	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status, MNS Module Network Status (green: MS, red: NS)
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	590 mA
	Power Consumption	1.95 W (at 590 mA)
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-20 ... +65 °C
Dimensions (L x W x H)	Length	60 mm
	Width	53.4 mm (at front panel) / 50.4 mm (body)
	Height	25.2 mm (at front panel) / 19.2 mm (body)
Weight	Weight	approx. 54 g
Device	Housing	Closed module
	Protection class	IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes, cURus
	UL File No.	E334100
Applied tests	Emission	CISPR 11; Class A
	Immunity	according to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 106: Technical Data NJ 100EN-DN

12.1.8 NJ 100EN-DP

NJ 100EN-DP	Parameter	Value
Device identification	Part number	1625.400
Communication controller	Type	netX 100 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	PCI Express
	Port type	One-Lane-Port
	Frequency	1.5 GHz
	Connector Type	40 pin connector (SAMTEC FSI-120-03-G-D-AB)
PROFIBUS communication	Supported firmware	PROFIBUS DP Master, PROFIBUS DP Slave
PROFIBUS interface	Transmission rate	Fixed values ranging from 9.6 kBits/s to 12 MBit/s
	Interface type	RS-485, potential-free
Diagnostic Interface	USB	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status, COM Communication Status
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	560 mA
	Power Consumption	1.85 W (at 560 mA)
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-20 ... +70 °C
Dimensions (L x W x H)	Length	68.2 mm (with DSUB connector), 60 mm (without DSUB connector)
	Width	53.4 mm (at front panel), 50.4 mm (body)
	Height	25.2 mm (at front panel), 19.2 mm (body)
Weight	Weight	approx. 68 g
Device	Housing	Closed module
	Protection class	IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes, cURus
	UL File No.	E334100
Applied tests	Emission	CISPR 11; Class A
	Immunity	according to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 107: Technical Data NJ 100EN-DP

12.1.9 NJ 100DN-RE

NJ 100DN-RE	Parameter	Value
Device identification	Part number	1623.100
Communication controller	Type	netX 100 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	Dual-port memory, parallel
	Dual-port memory size	64 KB (16 address lines), where 16 KB used by firmware (14 address lines, lowest 16 KB)
	Data width (parallel)	8 or 16 bit
	Connector Type	80 pin connector (SAMTEC FSI-140-03-G-D-AB)
Ethernet communication	Supported firmware	EtherCAT Master, EtherCAT Slave, EtherNet/IP Scanner/Master, EtherNet/IP Adapter/Slave, Open Modbus/TCP, POWERLINK Controlled Node/Slave, PROFINET IO Controller (Master), PROFINET IO Device (Slave), Sercos Master, Sercos Slave, TCP/IP, VARAN Client
Ethernet interface	Transmission rate	100 MBit/s or 10 MBit/s (depending on loaded firmware)
	Interface type	100 BASE-TX, isolated or 10 BASE-T (depending on loaded firmware)
	Half duplex/Full duplex	supported (at 100 MBit/s)
	Auto-Negotiation	depending on firmware
	Auto-Crossover	depending on firmware
Diagnostic Interface	USB or UART	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status, COM0/1 Communication status, Link, Activity
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	620 mA
	Power Consumption	2.11 W
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-20 ... +70°C
	Ambient temperature range for storage	-40 ... +85°C
Dimensions (L x W x H)	Length	62 mm / 60 mm (with / without RJ45 connector)
	Width	53.4 mm (at front panel) / 50.4 mm (at body)
	Height	25.2 mm (at front panel) / 19.2 mm (at body)
Weight	Weight	< 80 g
Device	Housing / protection class	Closed module / IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining metal brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes, cURus
	UL File No.	E334100

NJ 100DN-RE	Parameter	Value
Applied tests	Emission	CISPR 11; Class A
	Immunity	according to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 108: Technical Data NJ 100DN-RE

12.1.10 NJ 100DN-CO

NJ 100DN-CO	Parameter	Value
Device identification	Part number	1623.500
Communication controller	Type	netX 100 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	Dual-port memory, parallel
	Dual-port memory size	64 KB (16 address lines), where 16 KB used by firmware (14 address lines, lowest 16 KB)
	Data width (parallel)	8 or 16 bit
	Connector Type	80 pin connector, SAMTEC FSI-140-03-G-D-AB
CANopen communication	Supported firmware	CANopen Master, CANopen Slave
CANopen interface	Transmission rate	10 kBits/s to 1 MBit/s
	Interface type	ISO 11898, potential free
Diagnostic Interface	USB or UART	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status, CAN Communication Status
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	490 mA
	Power Consumption	1,67 W
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-20 ... +70°C
	Ambient temperature range for storage	-40 ... +85°C
Dimensions (L x W x H)	Length	68.20 mm (with DSUB connector), 60 mm (without DSUB connector)
	Width	53.4 mm (at front panel), 50.4 mm (at body)
	Height	25.2 mm(at front panel), 19.2 mm (at body)
Weight	Weight	< 80 g
Device	Housing	Closed module
	Protection class	IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining metal brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot-plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes, cURus
	UL File No.	E334100
Applied tests	Emission	CISPR 11; Class A
	Immunity	according to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 109: Technical Data NJ 100DN-CO

12.1.11 NJ 100DN-DN

NJ 100DN-DN	Parameter	Value
Device identification	Part number	1623.510
Communication controller	Type	netX 100 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	Dual-port memory, parallel
	Dual-port memory size	64 KB (16 address lines), where 16 KB used by firmware (14 address lines, lowest 16 KB)
	Data width (parallel)	8 or 16 bit
	Connector Type	80 pin connector, SAMTEC FSI-140-03-G-D-AB
DeviceNet communication	Supported firmware	DeviceNet Master, DeviceNet Slave
DeviceNet interface	Transmission rate	125 kBits/s, 250 kBits/s, 500 kBits/s
	Interface type	ISO 11898, potential free
	Connector	CombiCon connector, 5-pin
Diagnostic Interface	USB or UART	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status, MNS Module Network Status
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	530 mA
	Power Consumption	1.82 W
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-20 ... +70°C
	Ambient temperature range for storage	-40 ... +85°C
Dimensions (L x W x H)	Length	60 mm
	Width	53.4 mm (at front panel) / 50.4 mm (body)
	Height	25.2 mm (at front panel) / 19.2 mm (body)
Weight	Weight	< 80 g
Device	Housing /	Closed module
	Protection class	IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining metal brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes, cURus
	UL File No.	E334100
Applied tests	Emission	CISPR 11; Class A
	Immunity	according to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 110: Technical Data NJ 100DN-DN

12.1.12 NJ 100DN-DP

NJ 100DN-DP	Parameter	Value
Device identification	Part number	1623.400
Communication controller	Type	netX 100 processor
Integrated memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash EPROM
Host interface	Type	Dual-port memory, parallel
	Dual-port memory size	64 KB (16 address lines), where 16 KB used by firmware (14 address lines, lowest 16 KB)
	Data width (parallel)	8 or 16 bit
	Connector Type	80 pin connector, SAMTEC FSI-140-03-G-D-AB
PROFIBUS communication	Supported Firmware	PROFIBUS DP Master, PROFIBUS DP Slave
PROFIBUS interface	Transmission rate	Fixed values ranging from 9.6 kBits/s to 12 MBit/s
	Interface type	RS-485, potential-free
Diagnostic Interface	USB or UART	Signal at host interface Available only if integrated in host system
Display	LEDs	SYS System Status, COM Communication status
Power supply	Voltage	+3.3 V \pm 5 % DC
	Current at 3.3 V (typically)	Not measured yet
	Power Consumption	Not measured yet
Signal lines	Voltage of IO signal lines	+3.3 V \pm 5 %
Environmental conditions	Ambient temperature range for operation	-20°C ... +70°C
	Ambient temperature range for storage	-40 ... +85°C
Dimensions (L x W x H)	Length	68.20 mm (with DSUB connector), 60 mm (without DSUB connector)
	Width	53.4 mm (at front panel), 50.4 mm (at body)
	Height	25.2 mm(at front panel), 19.2 mm (at body)
Weight	Weight	approx. 68 g
Device	Housing /	Closed module
	Protection class	IP40
	Width / distance of pins	0.55 mm / 0.45 mm
	Mounting	Via milled footprint holes in the carrier board and retaining metal brackets. No mounting accessories required.
	Mounting/pulling cycles	max. 10
	Hot plugging	No
Certification	CE Sign	Yes
	RoHS	Yes
	Reach	Yes
	UKCA	Yes
	UL Certification	Yes, cURus
	UL File No.	E334100
Applied tests	Emission	CISPR 11; Class A
	Immunity	according to EN 61131-2:2003
	Shock and vibration	EN60068-2-6 Fc / EN60068-2-27 Ea

Table 111: Technical Data NJ 100DN-DP

12.2 Technical Data of the Real-Time Ethernet Systems

12.2.1 EtherCAT Master

Parameter	Description
Maximum number of EtherCAT Slaves	Maximum 388 slaves if RCX_GET_SLAVE_HANDLES_REQ service is used. The usable number of slaves depends on several parameters: available memory size for the configuration file (see 'Configuration file'), used cycle time, frame runtimes.
Maximum number of cyclic input data	Approx. 4600 bytes if no LRW (Logical Read Write) commands are used for process data
Maximum number of cyclic output data	Approx. 4600 bytes if no LRW (Logical Read Write) commands are used for process data
Acyclic communication	CoE (CANopen over EtherCAT): SDO, SDOINFO, Emergency FoE (File Access over EtherCAT) SoE (Servo Drive Profile over EtherCAT) EoE (Ethernet over EtherCAT) Configurable with SYCON.net: CoE If the ETHERCAT.XML file contains corresponding configuration information (e.g. created with "EtherCAT Configurator"), the following functions can be used: CoE, SoE, EoE
Mailbox protocols	CoE, EoE, FoE, SoE
Functions	Distributed Clocks Redundancy Slave diagnosis Bus scan
Minimum bus cycle time	250 µs, depending on the used slaves and the used number of cyclic input and output data.
Topology	Line or ring
Slave station addresses	1 - 14335
Data transport layer	Ethernet II, IEEE 802.3, 100 MBit/s, full-duplex
Configuration file (ETHERCAT.XML or CONFIG.NXD)	Device with RAM disk: maximum 1 MByte (CONFIG.NXD), device with flash disk: maximum 3 MByte (ETHERCAT.XML)
Synchronisation via ExtSync	Supported (not configurable with SYCON.net)
"ENI Slave-to-Slave copy infos"	Supported (not configurable with SYCON.net)
Hot Connect	Supported (not configurable with SYCON.net)
EoE (Ethernet over EtherCAT)	Via NDIS
Restrictions	The size of the bus configuration file is limited by the size of the RAM disk (1 MByte) or the FLASH disk (3 MByte). Store-and-forward switches must not be used in the network topology due to the hard receive time requirements. RCX_GET_SLAVE_HANDLES_REQ can only be used up to max. 388 slaves. Process data are limited to max. 5760 bytes by the dual-port memory.
Reference to firmware/stack version	V4.5

Table 112: Technical data EtherCAT Master

12.2.2 EtherCAT Slave

Parameter	Description NJ 51X-RE	Description NJ 100XX-RE
Maximum number of cyclic input data	1024 bytes	256* bytes
Maximum number of cyclic output data	1024 bytes	256* bytes (netX 100/netX 500)
Acyclic communication	SDO SDO Master Slave SDO Slave Slave (depending on master functionality)	
Type	Complex Slave	
Protocols	SDO server-side protocol CoE Emergency messages (CoE) Ethernet over EtherCAT (EoE) File Access over EtherCAT (FoE) AoE (ADS over EtherCAT) SoE (Servo Profile over EtherCAT) SoE and CoE cannot be used at the same time.	
State Machine	ESM (EtherCAT State Machine)	
Synchronization modes	Freerun: The application of the EtherCAT slave is not synchronized to EtherCAT Synchronous with SYNCMAN event: Application of EtherACT slave is synchronized to the SM2 or SM3 event Synchronous with SYNC event: Application of EtherACT slave is synchronized to the SYNC0 or SYNC1 event	
Functions	Emergency Distributed clocks (DC), 32 bit PDI watchdog Integrated CoE Object Directory (ODV3)	
FMMUs	8	3
SYNC Manager	4	4
Ethernet interface	Two Ethernet interfaces 100BASE-TX Integrated dual PHY (supports Auto-Negotiation and Auto-Crossover)	
Data transport layer	Ethernet II, IEEE 802.3	
Restrictions	LRW not supported (no direct slave-to-slave communication) No DC latch function No support for bit-wise FMMU mapping (Exception: Fill Status of Transmit Mailbox) Restricted DC sync signal generation <ul style="list-style-type: none"> • Single shot mode is not supported • Acknowledge mode is not supported Restricted DC control function <ul style="list-style-type: none"> • No adjustment of the registers "Speed Counter Start" (0x0930:0x931) • Register "Speed Counter Diff" (0x0932:0x933) is not shown "Physical Read-Write commands" (APRW, FPRW, BRW) are not supported	
Reference to firmware/stack version	V4.8	V4.8

Table 113: Technical data EtherCAT Slave

**Note:**

For NJ 100XX-RE: * The loadable firmware supports for the number of cyclic input data and for cyclic output data in total up to 512 bytes. If more than 256 bytes for input data or for output data shall be exchanged via EtherCAT, then a customer specific XML file is necessary. Additionally the following formula applies: The sum of the input data length and the output data length may not exceed 512 bytes, where each length has to be rounded up to the next multiple of 4 for this calculation.

12.2.3 EtherNet/IP Scanner

Parameter	Description
Maximum number of EtherNet/IP connections	64 connections for implicit and explicit
Maximum number of cyclic input data	5712 bytes
Maximum number of cyclic output data	5760 bytes
Maximum number of cyclic input data per adapter	504 bytes per adapter per frame
Maximum number of cyclic output data per adapter	504 bytes per adapter per frame
I/O connection type	Cyclic, minimum 1 ms (depending on used number of connections and used number of input and output data)
Maximum number of 'Unscheduled Data'	1400 bytes per frame
UCMM, Class 3	Supported
Explicit Messages, Client and Server Services	Get_Attribute_Single/All Set_Attribute_Single/All
Quick Connect	Supported
Predefined standard objects	Identity object Message Router object Assembly object Connection Manager object Ethernet Link object TCP/IP object DLR object QoS object
Max. number of application-specific objects	20
Network scan	Supported
Topology	Tree, line, ring
DLR (Device Level Ring)	Beacon based 'Ring Node'
ACD (Address Conflict Detection)	Supported
DHCP	Supported
BOOTP	Supported
Baud rate	10 and 100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
Switch function	Integrated
Restrictions	CIP Sync Services are not implemented TAGs are not supported
Reference to firmware/stack version	V2.11

Table 114: Technical data EtherNet/IP Scanner

12.2.4 EtherNet/IP-Adapter

Parameter	Beschreibung
Maximum number of input data	504 bytes per assembly instance
Maximum number of output data	504 bytes per assembly instance
Maximum number of assembly instances	10
I/O connection types (implicit)	Exclusive Owner Listen Only Input Only
I/O connection trigger types	Cyclic (Minimum 1 ms*) Application triggered (Minimum 1 ms*) Change of State (Minimum 1 ms*) * depending on the number of connections and the input and output data
Explicit messages	Connected and unconnected
Unconnected Message Manager (UCMM)	Supported
Maximum number of connections	Implicit connections (Class 1): 5 Explicit connections (Class 3): 10 UCMM: 10
Predefined standard objects	Identity object (1, 0x01) Message Router object (2, 0x02) Assembly object (4, 0x04) Connection Manager (6, 0x06) DLR object (71, 0x47) QoS object (72, 0x48) TCP/IP object (245, 0xF5) Ethernet Link object (246, 0xF6)
Maximum number of user-specific objects	20
Supported features	TCP/IP, UDP/IP DHCP, BOOTP Quick Connect Device level Ring (DLR) – Media redundancy Address Conflict Detection (ACD) Quality of Service CIP reset service: Identity object: Reset service type 0 and 1
Ethernet interface	10 and 100 MBit/s Integrated switch
Duplex mode	Half-duplex, full-duplex, auto-negotiation
MDI mode	MDI, MDI-X, Auto-MDIX
Data transport layer	Ethernet II, IEEE 802.3
Restrictions	Tags are not supported. Connection type "Null forward Open" is not supported. CIP Motion is not supported. CIP Safety is not supported.
Reference to firmware/stack version	V3.6

Table 115: Technical data EtherNet/IP Adapter

12.2.5 Open Modbus/TCP

Parameter	Description
Maximum number of input data	5760 bytes (2880 registers)
Maximum number of output data	5760 bytes (2880 registers)
Acyclic communication	Read/write registers <ul style="list-style-type: none"> • 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 16) Read/write coils <ul style="list-style-type: none"> • 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*, 43 * Function code 23 can be used via the packet API but not with the command table.
Protocol mode	Message mode (Client) <ul style="list-style-type: none"> • Client (using the command table in the configuration software: The data is stored in the I/O process data image) • Client and server (using the packet API: The I/O process data image is not used) E/A mode (Server) <ul style="list-style-type: none"> • (Only) Server (The data is stored in the I/O process data image)
Command table (Configuration API only)	Max. 16 server configurable Max. 256 commands
Baud rate	10 and 100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
Reference to firmware/stack version	V3.1

Table 116: Technical data Open Modbus/TCP

12.2.6 POWERLINK Controlled Node

Parameter	Description
Maximum number of cyclic input data	1490 bytes
Maximum number of cyclic output data	1490 bytes
Acyclic communication	SDO Upload/Download
Functions	SDO via ASND and UDP
Baud rate	100 MBit/s, half-duplex
Data transport layer	Ethernet II, IEEE 802.3
Ethernet POWERLINK version	V 2
Restriction	No slave to slave communication
Reference to firmware/stack version	V3.5

Table 117: POWERLINK Controlled Node

12.2.7 PROFINET IO-Controller

Parameter	Description
Maximum number of ARs (Application relation)	128 for RT communication 64 for IRT communication
Maximum number of cyclic input data	5652 bytes, including provider and consumer status data
Maximum number of cyclic output data	5700 bytes, including provider and consumer status data
Send clock	1 ms, 2 ms, 4 ms for RT mode 250 µs, 500 µs, 1 ms, 2 ms, 4 ms for IRT mode
AR performance limits	Max. 8 ARs, if any send clock < 500 µs Max. 16 ARs, if any send clock < 1 ms Max. 64 ARs, if any send clock < 2 ms
Maximum number of submodules	2048
Maximum number of data per IOCR	1440 bytes
Number of IOCRs per AR	1 Input IOCR 1 Output IOCR
Maximum number of data for acyclic read/write (record access)	65536 bytes
Maximum amount of record data per AR	16384 bytes
Alarm processing (configurable)	Stack automatically handles alarms Application processes alarms
Maximum number of ARVendorBlock	256
Maximum number of data ARVendorBlockData	512 bytes
Device Access AR CMI timeout	20 s
Functions	Automatic Name Assignment Media Redundancy Client Media Redundancy Manager (requires license)
DCP function API	Name Assignment IO-Devices (DCP set NameOfStation) Set IO-Device IP (DCP set IP) Signal IO-Device (DCP set SIGNAL) Reset IO-Device to factory settings (DCP Reset FactorySettings) Bus scan (DCP identification ALL) DCP GET
PROFINET IO specification	Implemented according to V2.3 ED2 MU3 Legacy Startup according to the PROFINET specification V2.2 supported

Parameter	Description
Restrictions	<p>The size of the bus configuration file is limited by the size of the RAM disk (1 MByte).</p> <p>The usable (minimum) cycle time depends on the number of IO-Devices used and the number of input and output data used.</p> <p>RT over UDP not supported</p> <p>"Multicast communication" not supported</p> <p>DHCP not supported (neither for PROFINET IO-Controller nor for IO-Devices)</p> <p>Only one IOCR per IO-Device per direction</p> <p>Only one DeviceAccess AR instance at a time</p> <p>MRPD is not supported</p> <p>No IRT planning by the stack</p> <p>Sync Slave not supported</p> <p>MRP Manager (Auto), the Auto Manager, not supported</p> <p>Only one fragmented acyclic service at the same time</p> <p>Multiple MRP Managers not supported</p> <p>Only one DCP service at a time</p> <p>Multiple Sync Master not supported</p> <p>System Redundancy (SA-AR) and Dynamic Reconfiguration (formerly Configuration-in-Run, CiR) not supported</p> <p>Shared input not supported</p> <p>IO-Device interface (iDevice) not supported</p>
Reference to firmware/stack version	V3.4

Table 118: Technical data PROFINET IO-Controller

12.2.8 PROFINET IO-Device

Parameter	Description
Maximum number of cyclic input data	1440 bytes (including IOPS and IOCS)
Maximum number of cyclic output data	1440 bytes (including IOPS and IOCS)
Maximum number of submodules	Depends on the firmware, can be configured via "Number of configurable submodules" in tag list. Up to 256 in general and may be smaller number for specific firmware. Note: If the application uses max. 2 APIs, the "Number of configurable submodules" can be used. Each further API reduces the total number of usable submodules by 1.
Multiple Application Relations (AR)	Depends on the firmware, can be configured via "Number of additional IO Connections (ARs)" in tag list. Up to 4 IO-ARs and one Supervisor-DA AR in general and may be smaller for numbers specific firmware.
Acyclic communication (Record objects)	Read/Write Record, max supported size can be configured via taglist.
Alarm types	Process Alarm, Diagnostic Alarm, Return Of Submodule Alarm, Plug Alarm (implicit), Pull Alarm (implicit), Update Alarm, Status Alarm, Upload and Retrieval Notification Alarm
Diagnosis entries	Depends on the firmware, can be configured via "Number of available Diagnosis buffers" in tag list. Up to 256 application diagnosis records of type Channel or Extended Channel Diagnosis in general and may be smaller number for specific firmware.
Identification & Maintenance (I&M)	I&M0 Read: Either integrated for slot 0 / subslot 1 or forwarded to the application for each submodule. I&M1-5 Read/Write: Either built in for Slot 0 / Subslot 1 or pass through to application for any submodule. I&M4 and I&M5 are inactive by default.
Topology recognition	LLDP, SNMP V1, Physical Device Record Objects
Minimum cycle time (MinDeviceInterval)	RT_CLASS_1: 1 ms (min. SendClockFactor 32) RT_CLASS_3: 250 µs (min. SendClockFactor 8)
IRT support	RT_CLASS_3
Media redundancy	MRP Client
Additional supported features	"Shared Device" "Fast Startup" (depends on hardware) Asset Management PROFInergy ASE
Baud rate	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3, MAUType 16
PROFINET IO specification	V2.3, PNIO_version 2.35 V2.2 ("legacy startup") is supported
Conformance Class	C
Application IP stack API	The lwIP IP stack can be used by the application via Socket API Packets. Up to 8 sockets are available to the Application.
Application Raw Ethernet API	Sending and Receiving Raw Ethernet Frames as Application is supported

Parameter	Description
Restrictions	<p>RT over UDP not supported.</p> <p>Multicast communication not supported.</p> <p>DHCP is not supported.</p> <p>The amount of configured I/O-data influences the minimum cycle time that can be reached.</p> <p>Only 1 Input-CR and 1 Output-CR per AR are supported.</p> <p>Little endian byte order not supported.</p> <p>System Redundancy (SR-AR) and Dynamic Reconfiguration are not supported.</p> <p>The usage of PROFINET CombinedObjectContainer is not supported.</p> <p>SharedInput is not supported.</p> <p>MRPD is not supported.</p> <p>DFP and other HighPerformance-profile related features are not supported.</p> <p>Submodules cannot be configured or used by an AR in subslot 0.</p> <p>The stack does not support usage of PDEV submodules (InterfaceSubmodule or PortSubmodule) outside of slot 0. In addition the InterfaceSubmodule is only supported in subslot 0x8000 and the PortSubmodules are only supported in subslots 0x8001 and 0x8002.</p>
Reference to firmware/stack version	V4.5

Table 119: Technical data PROFINET IO-Device

The maximum values for number of submodules, Multiple Application Relations, Acyclic communication, and Diagnosis entries are configuration parameters in the tag list of a firmware. Each of these features require resources and have to be set in order to not exceed the available resource (e.g. RAM) of a device.

12.2.9 Sercos Master

Parameter	Description
Maximum number of cyclic input data	5760 bytes (including Connection Control per Connection)
Maximum number of cyclic output data	5760 bytes (including Connection Control per Connection)
Maximum number of configurable slave devices	511
Minimum cycle time	250 µs (depending on used number of slaves and used number of input and output data)
Acyclic communication	Service channel: Read/Write/Commands
Functions	Bus scan
Communication phases	NRT, CP0, CP1, CP2, CP3, CP4
Topology	Line and double ring
Redundancy	Supported
NRT channel	Supported
Hot plug	Supported
Cross communication	Supported, but only if the master is configured with packages by the host application program.
Baud rate	100 MBit/s, full-duplex
Data transport layer	Ethernet II, IEEE 802.3
Auto crossover	Supported
Supported Sercos version	Communication Specification Version 1.3
TCP/IP Stack	Integrated
Reference to firmware/stack version	V2.1

Table 120: Technical data Sercos Master

12.2.10 Sercos Slave

Parameter	Description NJ 51D-RE	Description NJ 100DN-RE and NJ 100EN-RE
Maximum number of cyclically produced data	284 bytes (including 2 bytes Connection Control and 2 bytes IO Status)	132 bytes (including 2 bytes Connection Control and 2 bytes IO Status)
Maximum number of cyclically produced data	276 bytes (including 2 bytes Connection Control and 2 bytes IO Control)	124 bytes (including 2 bytes Connection Control and 2 bytes IO Control)
Maximum number of slave devices	8	
Sercos addresses	1 ... 511	
Minimum cycle time	250 µs (depending on used number of slaves and used number of input and output data)	
Topology	Line and ring	
Communication phases	NRT, CP0, CP1, CP2, CP3, CP4, HP0, HP1, HP2	
Connection descriptors (including Connection Control and IO Status/Control)	Max. 64	
Cross Communication (CC)	Supported	
Acyclic communication (service channel)	Read/write/standard commands	
Baud rate	100 MBit/s	
Data transport layer	Ethernet II, IEEE 802.3	
Supported Sercos version	"Communication Specification" Version 1.1.2 and 1.3.1	
Supported Sercos Communication Profiles	SCP_FixCFG Version 1.1.1 SCP_VarCFG Version 1.1.1 SCP_VarCFG Version 1.1.3 SCP_HP Version 1.1.1 SCP_SysTime Version 1.3	
Supported users SCP profiles	SCP_WD Version 1.1.1 SCP_Diag Version 1.1.1 SCP_RTb Version 1.1.1 SCP_Mux Version 1.1.1 SCP_Sig 1.1.1 SCP_ExtMuX 1.1.2 SCP_RTbListProd 1.3 SCP_RTbListCons 1.3 SCP_RTbWordProd 1.3 SCP_RTbWordCons 1.3 SCP_OvSBasic 1.3 SCP_WDCon 1.3	
Supported FSP profiles	FSP_IO FSP_Drive FSP_Encoder	
Functions	SCP Sync S/IP protocol Identification LED function	
SCP_NRT	NRT Channel forwarding only	NJ 100EN-RE: Supported NJ 100DN-RE: NRT channel forwarding only
Storage of the object dictionary	Mixed mode	

Parameter	Description NJ 51D-RE	Description NJ 100DN-RE and NJ 100EN-RE
Restrictions	<p>Max. 2 connections: 1 for consumer and 1 for producer</p> <p>Modifications of the Service-Channel Object Dictionary will be volatile after reset, if it resides on device</p> <p>Ethernet interface (API) is not supported</p> <p>Clock parameters ulDTDivClk (Content of DTDivClk register) and ulDivClkLength (DivClk Length) are not adjustable.</p> <p>ulDivClkLength is set to the fixed value 1 μs.</p> <p>Div_Clk mode 0 is not supported.</p> <p>ulConClkLength has a maximum of 655350 ns.</p>	<p>Max. 2 connections: 1 for consumer and 1 for producer</p> <p>Modifications of the Service-Channel Object Dictionary will be volatile after reset, if it resides on device</p> <p>NJ 100DN-RE: Ethernet interface (API) is not supported</p> <p>Clock parameters ulDTDivClk (Content of DTDivClk register) and ulDivClkLength (DivClk Length) are not adjustable.</p> <p>ulDivClkLength is set to the fixed value 1 μs.</p> <p>Div_Clk mode 0 is not supported.</p> <p>ulConClkLength has a maximum of 655350 ns.</p>
Reference to firmware/stack version	V3.5	

Table 121: Technical data Sercos Slave

12.2.11 VARAN Client

Parameter	Description
Maximum number of cyclic input data	256 bytes
Maximum number of cyclic output data	256 bytes
Memory Area	Read Memory Area 1, Read Memory Area 2 Write Memory Area 1, Write Memory Area 2
Functions	Memory Read Memory Write Integrated 2 port splitter for daisy chain topology
Baud rate	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
VARAN protocol version	1.1.1.0
Restrictions	Integrated EMAC for IP data exchange with client application not supported SPI single commands not supported
Reference to firmware/stack version	V1.1

Table 122: Technical data VARAN Client

12.3 Technical Data of the Fieldbus Systems

12.3.1 CANopen Master

Parameter	Value
Maximum number of CANopen nodes	126
Maximum number of cyclic input data	3584 bytes
Maximum number of cyclic output data	3584 bytes
Maximum number of receive PDOs	512
Maximum number of transmit PDOs	512
Exchange of process data	Via PDO transfer <ul style="list-style-type: none"> • synchronized, • remotely requested, and • event driven (change of date)
Acyclic communication	SDO upload/download, max. 512 bytes per query
Functions	Emergency Message (Consumer and Producer) Node Guarding / Life Guarding, Heartbeat PDO Mapping NMT Master SYNC protocol (Producer) Simple boot-up process, reading object 1000H for identification
Baud rate	10 kBits/s, 20 kBits/s, 50 kBits/s, 100 kBits/s, 125 kBits/s, 250 kBits/s, 500 kBits/s, 800 kBits/s, 1 MBits/s
CAN Layer 2 access	Send/receive: Via API supported (11 bit / 29 bit)
Data transport layer	CAN frames
CAN frame type for CANopen	11 bit
Reference to firmware/stack version	2.14

Table 123: Technical data CANopen Master

12.3.2 CANopen Slave

Parameter	Description NJ 52D-COS	Description NJ 100DN-CO and NJ 100EN-CO
Maximum number of cyclic input data	256 bytes (Default)	512 bytes (Default)
Maximum number of cyclic output data	256 bytes (Default)	512 bytes (Default)
Maximum number of receive PDOs	32 (Default)	64 (Default)
Maximum number of transmit PDOs	32 (Default)	64 (Default)
Exchange of process data	Via PDO transfer <ul style="list-style-type: none"> • synchronized, • remotely requested, and • event driven (change of date, event timer) On request by host application program via packet	
Acyclic communication	SDO upload/download (Server only) Emergency Message (Producer) Timestamp (Producer/Consumer)	
Functions	Node Guarding / Life Guarding Heartbeat: 1 Producer, max. 32 Consumer PDO Mapping NMT Slave SYNC protocol (Consumer) Behaviour in case of error in state "operational" (configurable): <ul style="list-style-type: none"> • Change to "pre-operational" • No state change Change to "stopped"	Node Guarding / Life Guarding Heartbeat: 1 Producer, max. 64 Consumer PDO Mapping NMT Slave SYNC protocol (Consumer) Behaviour in case of error in state "operational" (configurable): <ul style="list-style-type: none"> • Change to "pre-operational" • No state change Change to "stopped"
Baud rate	10 kBits/s, 20 kBits/s, 50 kBits/s, 100 kBits/s, 125 kBits/s, 250 kBits/s, 500 kBits/s, 800 kBits/s, 1 MBits/s Automatic baud rate detection is supported.	
CAN Layer 2 access	Send/receive: Via API supported (11 bit / 29 bit)	
Data transport layer	CAN frames	
CAN frame type for CANopen	11 bit	
Reference to firmware/stack version	V3.8	

Table 124: Technical data CANopen Slave

12.3.3 DeviceNet Master

Parameter	Value
Maximum number of DeviceNet Slaves	63
Maximum number of cyclic input data	5736 bytes
Maximum number of cyclic output data	5760 bytes
Maximum number of cyclic input data per connection	255 bytes/connection
Maximum number of cyclic output data per connection	255 bytes/connection
Maximum number of configuration data	1000 bytes/slave
Acyclic communication	Explicit connection All service codes are supported via API.
Connections	Bit Strobe Change of State Cyclic Poll Explicit Peer-to-Peer Messaging
Functions	Quick Connect Server (Explicit and Poll)
Fragmentation	Explicit and I/O
UCMM	Supported
Objects	Identity object (1, 0x01) Message Router object (2, 0x02) DeviceNet object (3, 0x03) Connection object (4, 0x04) Acknowledge Handler object (43, 0x2B)
Baud rate	125 kBits/s, 250 kBit/s, 500 kBit/s Automatic baud rate detection is not supported.
Data transport layer	CAN frames
Reference to firmware/stack version	V2.4

Table 125: Technical data DeviceNet Master

12.3.4 DeviceNet Slave

Parameter	Value
Maximum number of cyclic input data	255 bytes
Maximum number of cyclic output data	255 bytes
Acyclic communication	Get_Attribute_Single/All: Max. 240 bytes per request Set_Attribute_Single/All: Max. 240 bytes per request Other services: Max. 248 bytes per request
Connections	Poll Change of State Cyclic Bit Strobe
Explicit messaging	Supported
Fragmentation	Explicit and I/O
UCMM	Not supported
Baud rate	125 kBits/s, 250 kBit/s, 500 kBit/s Automatic baud rate detection is not supported
Data transport layer	CAN frames
Reference to firmware/stack version	V2.7

Table 126: Technical data DeviceNet Slave

12.3.5 PROFIBUS DP Master

Parameter	Value
Maximum number PROFIBUS DPV0/DPV1 slaves	125
Maximum number of total cyclic input data	5712 bytes
Maximum number of total cyclic output data	5760 bytes
Maximum number of cyclic input data	244 bytes per slave
Maximum number of cyclic output data	244 bytes per slave
Configuration data	Max. 244 bytes per slave
Parameter data per slave	7 bytes standard parameters per slave Max. 237 bytes/slave application specific parameters
Acyclic communication	DPV1 class 1: Read, write, alarm DPV1 class 2: Initiate, read, write, data transport, abort
Maximum number of acyclic data (read/write/data transport)	240 bytes per slave and telegram
Functions	Configuration in Run (CiR), requires support by the host application program
Redundancy	Supported. Requires support by the host application program.
Baud rate	9.6 kBits/s, 19.2 kBits/s, 31.25 kBits/s, 45.45 kBits/s, 93.75 kBits/s, 187.5 kBits/s, 500 kBits/s, 1.5 MBits/s, 3 MBits/s, 6 MBits/s, 12 MBit/s Automatic baud rate detection is not supported
Data transport layer	PROFIBUS FDL
Restrictions	DPV2 isochronous mode and slave-slave communication are not supported. The redundancy function cannot be used if the master is configured with 'packets' by the host application program.
Reference to firmware/stack version	V2.8

Table 127: Technical data PROFIBUS DP Master

12.3.6 PROFIBUS DP Slave

Parameter	Value
Maximum number of cyclic input data	244 bytes
Maximum number of cyclic output data	244 bytes
Maximum number of acyclic data (read/write)	240 bytes/telegram
Configuration data	Max. 244 bytes
Parameter data	237 bytes of application-specific parameters
Acyclic communication	DPV1 class 1: Read, write, alarm DPV1 class 2: Read, write, data transport
Baud rate	9.6 kBits/s, 19.2 kBits/s, 31.25 kBits/s, 45.45 kBits/s, 93.75 kBits/s, 187.5 kBits/s, 500 kBits/s, 1.5 MBits/s, 3 MBits/s, 6 MBits/s, 12 MBit/s Automatic baud rate detection is supported.
Data transport layer	PROFIBUS FDL
Restrictions	SSCY1S – Slave to slave communication state machine not implemented Data exchange broadcast not implemented I&M LR services other than 'Call-REQ/RES' are not supported.
Reference to firmware/stack version	V2.11

Table 128: Technical data PROFIBUS DP Slave

12.4 PCI IDs netJACK on the PCI Bus

On the PCI bus, the NJ 100EN communication modules have the following PCI IDs:

PCI IDs	Value	Value
VendorID	0x15CF	0x15CF
DeviceID	0x0020	0x0020
Subsystem Vendor ID	0x15CF	0x15CF
Subsystem Device ID	0x0000	0x0001
Remark	netJACK 100 RAM based device	netJACK 100 FLASH based device

Table 129: PCI IDs netJACK on the PCI Bus

12.5 EtherNet/IP Adapter/Slave – Instance ID of I/O Data

I/O Data	Instance ID	Remark
Consumed I/O Data	100	I/O Data: EtherNet/IP Scanner/Master → EtherNet/IP Adapter/Slave.
Produced I/O Data	101	I/O Data: EtherNet/IP Adapter/Slave → EtherNet/IP Scanner/Master.

Table 130: EtherNet/IP Adapter/Slave – Instance ID of I/O Data

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