



User manual

netTAP NT 151-CCIES-RE

CC-Link IE Field Slave to PROFINET IO-Device gateway



Hilscher Gesellschaft für Systemautomation mbH
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1 Introduction

1.1 About this document

1.1.1 Description of the contents

This user manual describes hardware, technical data, installation and commissioning of the Hilscher netTAP **NT 151-CCIES-RE** gateway, which couples a *CC-Link IE Field Slave* with a *PROFINET IO-Device*.

This document also features step-by-step instructions on how to reset the netTAP device to its “factory settings” (a.k.a. “firmware recovery”) and how to use an SD memory card to copy configuration data from one device to another (a.k.a. “cloning” of a spare device).

You will also find the technical data of the supported CC-Link IE Field Slave and PROFINET IO-Device protocols in this document.

Note that the configuration of the NT 151-CCIES-RE device is not subject of this document. Configuration and firmware download are described in the operating instruction manual *Configuration of Gateway and Proxy Devices*, DOC081201OlxxEN. Instructions on how to install the necessary configuration software can be found in the user manual *Software Installation*, DOC100315UMxxEN.

1.1.2 Obligation to read the manual



Important:

- To avoid personal injury or property damage to your system or to your device, you must read and understand all instructions in this manual and in the documents accompanying your device before installing and operating your device.
 - First read the **Safety Instructions** in the chapter *Safety* [▶ page 15].
 - Observe all **Safety Messages** in this manual.
 - Keep the product DVD providing the product manuals.
-

1.1.3 List of revisions

Index	Date	Author	Revision
1	2018-08-07	MK	Document created

Table 1: List of revisions

1.1.4 Conventions in this document

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

Notes



Important:

<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 18].

1.1.5 Reference to hardware, firmware, software and drivers

Hardware and firmware

This document relates to the following hardware and firmware version of the netTAP **NT 151-CCIES-RE**:

Hardware revision	Protocol at interface X2	Protocol at interface X3	Article no.	Firmware file	Firmware version (starting from this version and higher)
2	CC-Link IE Field Slave	PROFINET IO-Device	1724.122	T220X0D0.NXF	1.x.x

Table 2: Reference to hardware and firmware

Software

This document relates to the following software versions:

Software	Version	File name	Path on Gateway Solutions DVD
SYCON.net	1.500.x.x	SYCONnet netX setup.exe	Setups & Drivers\SYCON.net

Table 3: Reference to software tools

Drivers

This document relates to the following driver:

Driver	File name	Path on Gateway Solutions DVD
Installation program for Windows USB drivers	setup.exe	Setups & Drivers\USB Driver

Table 4: Reference to drivers

1.2 Contents of the product DVD

The **Gateway Solutions** product DVD contains:

- SYCON.net configuration and diagnostic program for Windows
- USB drivers for Windows
- PDF documentation
- Firmware
- Device description files
- Video audio tutorials
- Presentation for netSCRIPT
- Tools

Directory of the DVD:

Folder	Contents
Documentation	
1. Software	Operating instruction manuals for device configuration (PDF)
Ethernet Device Setup Utility	
SYCON.net Configuration Software	
2. Hardware	User manuals of the gateway devices (PDF)
netBRICK 100, Model NB 100-xx-yy	
netLINK PROXY, Model NL 51N-DPL	
netTAP 50, Model NT 50-xx-yy	
netTAP 100, Model NT 100-xx-yy	
netTAP 151, Model NT 151-CCIES-RE	
netTAP 151, Model NT 151-RE-RE	
3. For Programmers	Documentation for developers (PDF)
Error Codes Compilation	
IO Data Flow Control of 3964R protocol	
IO Data Flow Control of ASCII protocol	
Modbus RTU Specification	
Modbus TCP Specification	
netSCRIPT Scripting Language	
4. PLC Application Notes	
CCLINK IE - PROFINET coupler specification	
Controllogix PLCs - EthernetIP Integration	
SIMATIC PLCs - Consistent Data PROFIBUS, PROFINET	
SIMATIC PLCs - Migration from PROFIBUS to PROFINET	
Simple TCP/IP connectivity through Modbus TCP	
5. Installation Instructions	Wiring and software installation instructions for standard users (PDF)

Folder	Contents
Electronic Data Sheets (e.g. EDS,GSD,GSDML)	Device description files
CANopen	
CCLink	
DeviceNet	
EtherCAT	
EtherNetIP	
POWERLINK	
PROFIBUS	
PROFINET	
SERCOS_III	
Firmware	Loadable firmware files
netBRICK 100	
netLINK PROXY	
netTAP 50	
netTAP 100	
netTAP 151	
fscommand	Files needed for displaying the installation menu of the Gateway Solutions DVD
Setups & Drivers	
Lua for Windows	
netSCRIPT_Debugger	
Setup	Installation wizard for software components
SYCON.net	Configuration and diagnosis software
USB Driver	
Supplements & Examples	
Device Factory Reset	Tools for resetting the devices to their “factory settings”
netBRICK 100 Factory Settings	
netTAP 100 Factory Settings	
netTAP 151 CCLINK IE Factory Settings	
netTAP 151 Factory Settings	
NL 51N-DPL Factory Settings	
Modbus RTU,TCP Technical Resources	
Source Code from www.freemodbus.org (Freeware)	
Test Tools from www.modbustools.com (Shareware)	
netSCRIPT Source Codes	
RSLogix5000 Projects	
Siemens STEP7 Projects	Example project acyclic communication PROFINET IO-Device to Ethernet IP Scanner
SYCON.net Projects	SYCON.net example projects
Training & Podcasts	
Podcasts	Flash video presentations
Powerpoints	PowerPoint presentations

Table 5: Directory of Gateway Solutions DVD

1.3 Documentation overview

This section lists documents that are relevant to the user of the netTAP NT 151-CCIES-RE device.

Basic documents

Title	Contents	Document ID	Path on the Gateway Solutions DVD
User Manual <i>netTAP NT 151-CCIES-RE – CC-Link IE Field Slave to PROFINET IO-Device gateway (this document)</i>	Installation, commissioning and hardware description of the NT 151 device and other technical data	DOC180403UMxxEN	Documentation\english \2.Hardware\netTAP 151, Model NT 151-CCIES-RE\netTAP NT 151-CCIES-RE UM xx EN.pdf
Operating Instruction Manual <i>Configuration of Gateway and Proxy Devices,</i>	Configuring, testing, diagnosing and updating firmware of the NT 151 device	DOC081201OIxxEN	Documentation\english \1.Software\SYCON.net Configuration Software \Configuration of Gateway and Proxy Devices OI xx EN.pdf
<i>CC-Link IE Field Network / PROFINET coupler specification</i>	“Coupler-Specification” by joint working group of <i>PI</i> and <i>CLPA</i>	Version 1.00 – Date: March 2017	Documentation\english\4.PLC Application Notes\CCLINK IE – PROFINET coupler specification \coupler-PI_CLPA_en.pdf
User Manual <i>Software Installation Gateway Solutions</i>	Instructions for installing the configuration software	DOC100315UMxxEN	Documentation\english \5.Installation Instructions \Software Installation – Gateway Solutions UM xx EN.pdf

Table 6: Basic documentation for NT 151-CCIES-RE

1.4 Legal notes

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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 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 netTAP **NT 151-CCIES-RE** device described in this manual is a communication device connecting a CC-Link IE Field network to a PROFINET network. The netTAP acts as slave respectively IO device in each network.

The device is equipped with a compact housing and is intended for DIN rail mounting according to DIN EN 60715.

2.3 Personnel qualification

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

- 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 Safety references

- [S1] ANSI Z535.6-2011 American National Standard for Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials
- [S2] DIN EN 62368-1: 2016-05, Audio/video, information and communication technology equipment - Part 1: Safety requirements (IEC 62368-1: 2014, modified + Cor.:2015); German version EN 62368-1: 2014 + AC: 2015
- [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 safety instructions and all safety messages in this manual about danger that might cause personal injury, before you install and operate your netTAP device.

2.5.1 Danger of unsafe system operation

To prevent personal injury, make sure that the removal of the netTAP device from your plant during operation will not affect the safe operation of the plant.

2.6 Safety instructions to avoid property damage

To avoid property damage to your system or to the netTAP device, you must read, understand and follow the safety instructions and all safety messages in this manual about danger that might cause property damage, before you install and operate your device.

2.6.1 Device destruction by exceeding allowed supply voltage

Observe the following notes concerning the supply voltage:

- The netTAP device 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 device!
- A supply voltage below the lower limit can cause malfunction of the device.

The allowed range for the supply voltage of the netTAP device is specified in section *Technical data netTAP NT 151-CCIES-RE* [► page 56].

2.6.2 Danger of unsafe system operation

To prevent property damage, make sure that the removal of the netTAP device from your plant during operation will not affect safe operation of the plant.

2.6.3 Device destruction due to overheating

The air ventilation slots of the netTAP device must not be covered by any objects, otherwise the device might overheat!

Maximum environmental temperature is +60 °C.

If the environmental temperature exceeds +50 °C, you must allow for a minimum of 17.5 mm distance between the netTAP and neighboring devices.

2.6.4 Exceeding the maximum number of allowed write/delete accesses

This device uses a serial Flash chip for storing remanent data, such as firmware, configuration, etc. This chip allows a maximum of 100 000 write/delete accesses which is sufficient for a standard device operation. Writing/deleting the chip excessively (e.g. in order to change configuration or name of station) will exceed the maximum number of allowed write/delete accesses and, thus, result in damage to the device. If, e.g., the configuration is changed every hour, the maximum number will be reached after 11.5 years. If, e.g., it is changed every minute, the maximum number will already be reached after approx. 69 days.

Avoid exceeding the maximum number of allowed write/delete accesses by excessive writing.

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 Z535** standard.

- The **Section Safety Messages** at the beginning of a chapter are pinpointed particularly and highlighted by a signal word according to the degree of endangerment. The kind of danger is specified exactly by the safety message text and optionally by a specific safety sign.
- The **Integrated Safety Messages** embedded in operating instructions are highlighted by a signal word according to the degree of endangerment. In the safety message, the nature of the hazard is indicated.

Signal words and safety signs in safety messages on personal injury




Signal word	Meaning
 DANGER	Indicates a direct hazard with high risk, which will have as consequence death or grievous bodily harm if it is not avoided.
 WARNING	Indicates a possible hazard with medium risk, which will have as consequence death or (grievous) bodily harm if it is not avoided.
 CAUTION	Indicates a minor hazard with medium risk, which could have as consequence personal injury if it is not avoided.

Table 7: Signal words in safety messages on personal injury



Safety sign	Sort of warning or principle
	Warning of lethal electrical shock
	Principle: Disconnect the power plug

Table 8: Safety signs in messages on personal injury

Signal words and safety signs in safety messages on property damage


Signal word	Meaning
 NOTICE	Indicates a property damage message

Table 9: Signal words in safety messages on property damage


Safety sign	Sort of warning or principle
	Warning of property damage by electrostatic discharge

Table 10: Safety signs in safety messages on property damage

3 Description

3.1 Functionality

The netTAP **NT 151-CCIES-RE** is a communication gateway connecting a CC-Link IE Field network (at X2 interface of the device) to a PROFINET IO network (at X3 interface of the device). Currently available is the protocol conversion CC-Link IE Field Slave to PROFINET IO Device.

For handling the network communication, each interface is equipped with its own CPU: The CC-Link IE Field network (X2) is operated by a **CP520** chip, the PROFINET network (X3) by a **netX 100** controller. In addition to cyclic process data, the gateway can also exchange acyclic data.

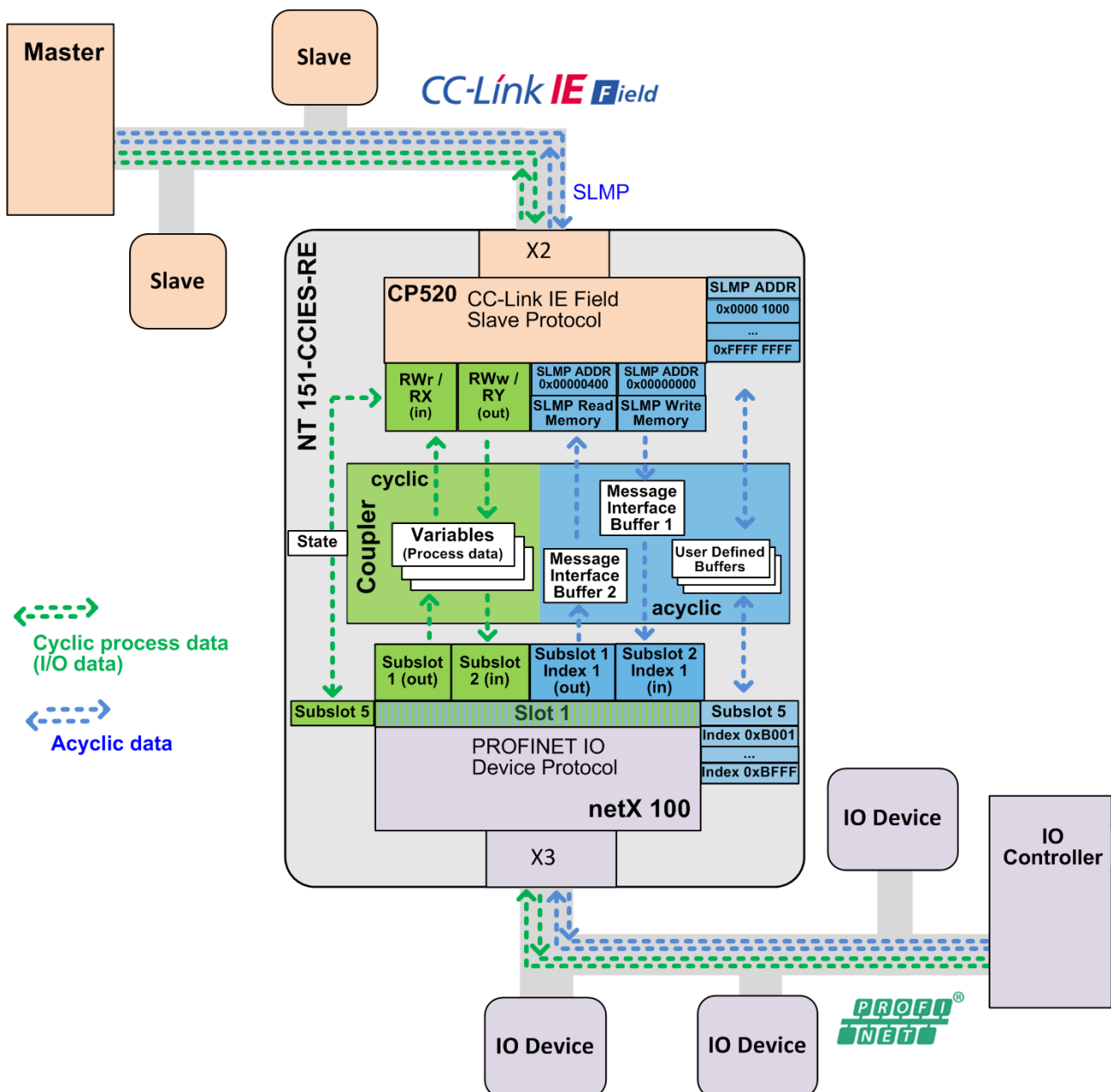


Figure 1: Data flow netTAP NT 151-CCIES-RE

The gateway is shipped its firmware already loaded. Configuration is done by the user himself by means of the **SYCON.net** configuration and diagnosis software. The device description files needed for configuring the network master respectively the IO Controller are also created by **SYCON.net**.

The device is equipped with a compact housing and is suitable for DIN rail mounting according to DIN EN 60715.

3.2 Interfaces

The Gigabit Ethernet interface (1000 BASE-T) for the CC-Link IE Field network (X2) is located on the upper side of the **NT 151-CCIES-RE**, the Ethernet interface (100 BASE-TX) for the PROFINET network (X3), also consisting of two RJ45 jacks, is located on the bottom side of the device. The configuration interfaces (Mini USB socket and SD memory card slot) are easily accessible at the front of the device.

4 Requirements

Technical requirements

- The netTAP **NT 151-CCIES-RE** device is to be mounted on a DIN rail according to DIN EN 60715.
- A suitable external power supply is required.
- The voltage to be applied must be in the allowed range $24\text{ V} \pm 6\text{ V DC}$.
- The power supply must be able to deliver at least a current of 180 mA at 24 V.

NOTICE

Device Destruction by Exceeding Allowed Supply Voltage!

The voltage must not exceed 30 V, otherwise the device may be destroyed or damaged.

In order to avoid damage caused by overheating or freezing, it is necessary that the temperature of the device does not exceed the limits of the allowed temperature range. For the allowed temperature, see section *Technical data netTAP NT 151-CCIES-RE* [► page 56].

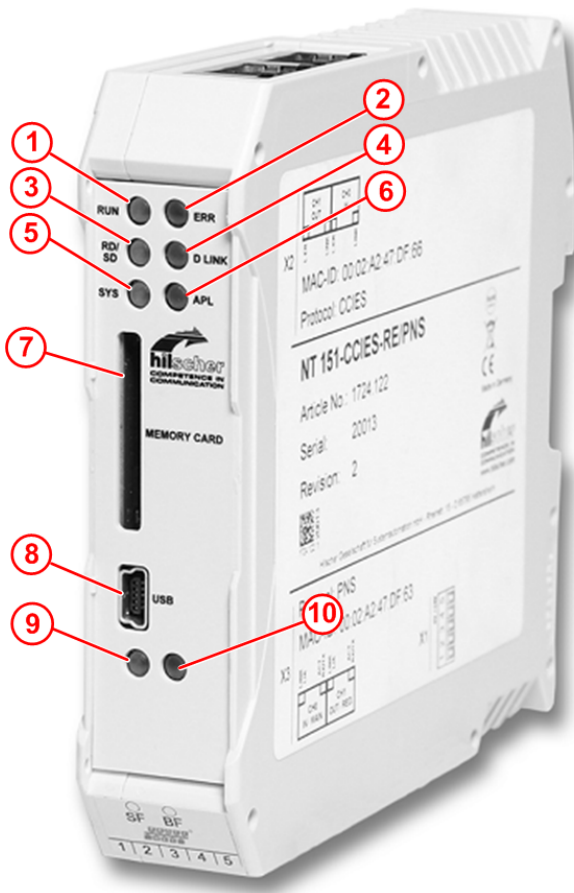
Requirements for using the SYCON.net configuration software

For installing and operating the SYCON.net configuration software on your PC, you need the following:

- PC with 1 GHz processor or higher
- Windows® 7 (32 bit) SP1, Windows® 7 (64 bit) SP1, Windows® 8 (32 bit) or Windows® 8 (64 bit)
- Administrator privilege required for installation
- Internet Explorer 5.5 or higher
- Free disk space: min. 400 MByte
- DVD ROM drive
- RAM: min. 512 MByte, recommended 1024 MByte
- Graphic resolution: min. 1024 x 768 pixel
- Keyboard and Mouse
- USB interface

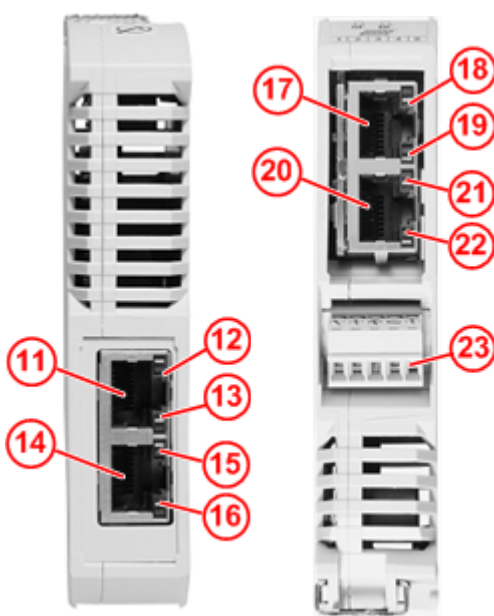
5 Device drawings and connectors

5.1 Positions of the interfaces and LEDs



Front view

- (1) RUN LED CC-Link IE Slave
- (2) ERR LED (Error) CC-Link IE Slave
- (3) RD/SD LED (Receive/Send Data) CC-Link IE Slave
- (4) D LINK LED (Data Link) CC-Link IE Slave
- (5) SYS LED (system status of gateway)
- (6) APL LED (application status of gateway)
- (7) Slot for SD memory card
(part number of card: 1719.003)
- (8) Mini-USB interface
- (9) SF LED (System Failure) PROFINET IO-Device
- (10) BF LED (Bus Failure) PROFINET IO-Device



Top view (X2)

Bottom view (X3)

- (11) CC-Link IE Field Slave interface channel 0
- (12) LINK LED (green) of CC-Link IE Field Slave channel 0
- (13) L-ERR LED (yellow) of CC-Link IE Field Slave channel 0
- (14) CC-Link IE Field Slave interface channel 1
- (15) LINK LED (green) of CC-Link IE Field Slave channel 1
- (16) L-ERR LED (yellow) for CC-Link IE Field Slave channel 1
- (17) PROFINET IO-Device interface channel 0
- (18) LINK LED of PROFINET IO-Device channel 0
- (19) RX/TX LED of PROFINET IO-Device channel 0
- (20) PROFINET IO-Device interface channel 1
- (21) LINK LED of PROFINET IO-Device channel 1
- (22) RX/TX LED of PROFINET IO-Device channel 1
- (23) Connector for supply voltage

5.2 Dimensioned drawings

Outer dimensions of the netTAP **NT 151**:

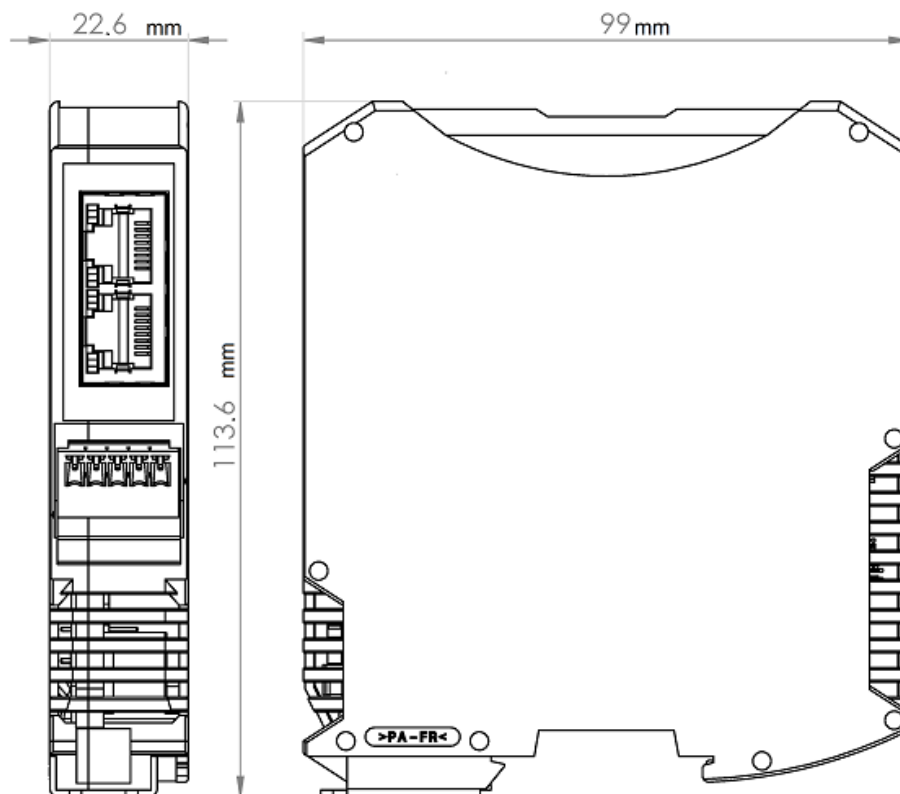


Figure 2: Outer dimensions of NT 151

Dimensions of the power supply plug:

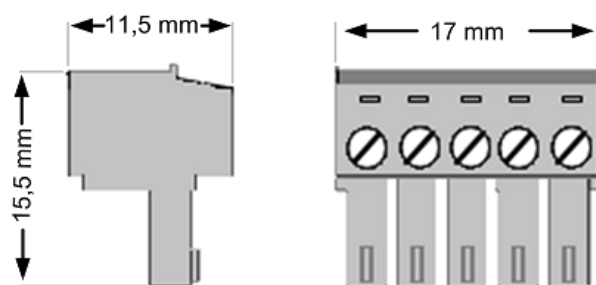


Figure 3: Dimensions of Mini COMBICON power supply plug

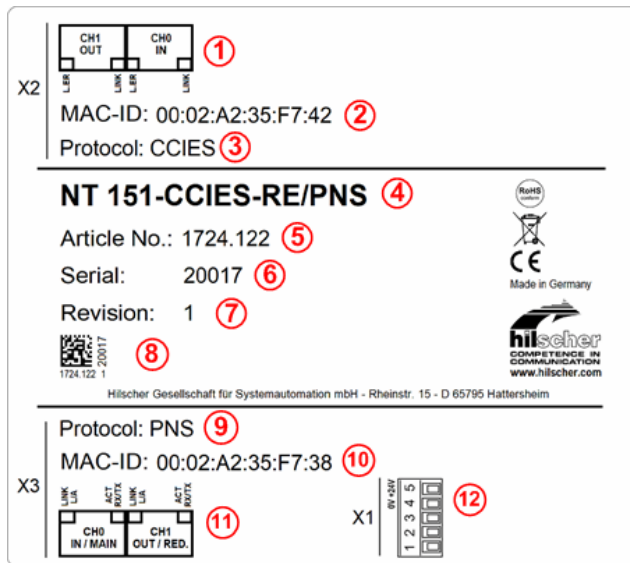


Important:

When planning the installation of the netTAP device, reserve sufficient room above and below the device to allow for convenient plugging or unplugging of the network and power supply cables.

5.3 Device label

Each netTAP **NT 151-CCIES-RE** carries a device type label providing the following information:



- (1) Labelling of channels and LEDs of the connectors of the CC-Link IE Field Slave interface (on top of device)
- (2) MAC address of the CC-Link IE Field Slave interface *
- (3) Abbreviation of the CC-Link IE Field Slave protocol
- (4) Device type ID
- (5) Part number
- (6) Serial number of the device
- (7) Hardware revision number
- (8) Matrix label
- (9) Abbreviation of the PROFINET IO-Device protocol
- (10) MAC address of the PROFINET IO-Device interface *
- (11) Labelling of channels and LEDs of the connectors of the PROFINET IO-Device interface (on bottom of device)
- (12) Labelling of the connectors of the voltage supply (on bottom of device)

* three additional MAC addresses are reserved for each network interface

5.4 Power supply connector

The power supply of the netTAP NT 151-CCIES-RE has to be connected to pins 4 and 5 of the five-pole MINI COMBICON connector **X1** (for identification, see position (23) in section *Positions of the interfaces and LEDs* [► page 22]) The power supply voltage must be 24 V DC \pm 6 V DC.

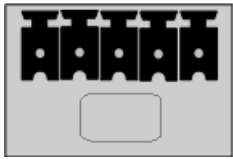
Connector	Pin	Signal	Description
	1	ISO_GND	Ground of isolated I/Os (reserved for future use)
	2	ISO_IN	Isolated input (reserved for future use)
	3	ISO_OUT	Isolated output (reserved for future use)
	4	0 V / GND	Ground of supply voltage
	5	+24 V	+24 V supply voltage

Table 11: Pin assignment of 5-pole power supply socket

Use a five-pole MINI COMBICON plug (included in the delivery) for connecting the voltage supply:

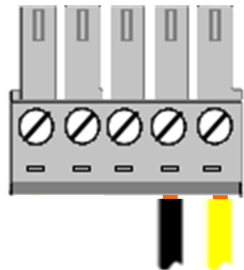
Supply voltage	Pin	Signal	Description
	1	-	Reserved for future use
	2	-	Reserved for future use
	3	-	Reserved for future use
	4	0 V / GND	Ground of supply voltage
	5	24 V	+24 V supply voltage

Table 12: Pin assignment Mini Combicon plug 5-pole

5.5 Real-Time Ethernet connector

The PROFINET IO-Device interface is equipped with RJ45 sockets (see positions (17) and (20) in section *Positions of the interfaces and LEDs* [▶ page 22]).



Note:
The device supports Auto Crossover function. Due to this fact, RX and TX can be switched.

The following figure shows the RJ45 standard pinning:

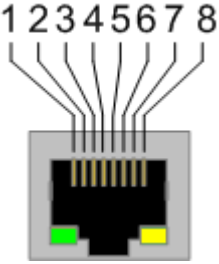
Ethernet	Pin	Signal	Description
 RJ45 Buchse	1	TX+	Transmit data +
	2	TX-	Transmit data –
	3	RX+	Receive data +
	4	-	Connected to FE via RC combination*
	5	-	
	6	RX-	Receive data –
	7	-	Connected to FE via RC combination*
	8	-	
	Shield		Capacitive to FE
	* Bob Smith Termination		

Table 13: Ethernet RJ45 pin assignment

5.6 Gigabit Ethernet connector

The CC-Link IE Field Slave interface (see positions (11) and (14) in section *Positions of the interfaces and LEDs* [▶ page 22]) is equipped with RJ45 sockets:

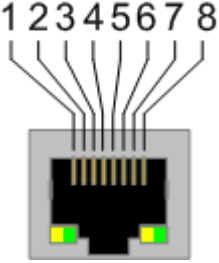
Ethernet	Pin	Signal	Description
 RJ45 socket	1	D1+	Transmit/receive data positive channel 1
	2	D1-	Transmit/receive data negative channel 1
	3	D2+	Transmit/receive data positive channel 2
	4	D3+	Transmit/receive data positive channel 3
	5	D3-	Transmit/receive data negative channel 3
	6	D2-	Transmit/receive data negative channel 2
	7	D4+	Transmit/receive data positive channel 4
	8	D4-	Transmit/receive data negative channel 4
	Bob Smith termination		

Table 14: RJ45 Gigabit Ethernet pin assignment

5.7 USB interface (Mini-B USB)

The USB interface (see position (8) in section *Positions of the interfaces and LEDs* [▶ page 22]) is used for configuring the netTAP **NT 151-CCIES-RE** with SYCON.net (see operating instruction manual *Configuration of Gateway and Proxy Devices*, DOC081201OlxxEN) and for recovering the firmware (see section *Using USB to recover firmware* [▶ page 36]).

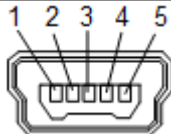
USB socket	Pin	Signal	Description
	1	-	-
	2	D-	Data -
	3	D+	Data +
	4	-	-
	5	GND	Ground
	Shield		Capacitive to GND

Table 15: Pin assignment Mini-B USB connector (5-pin)

5.8 Galvanic isolation

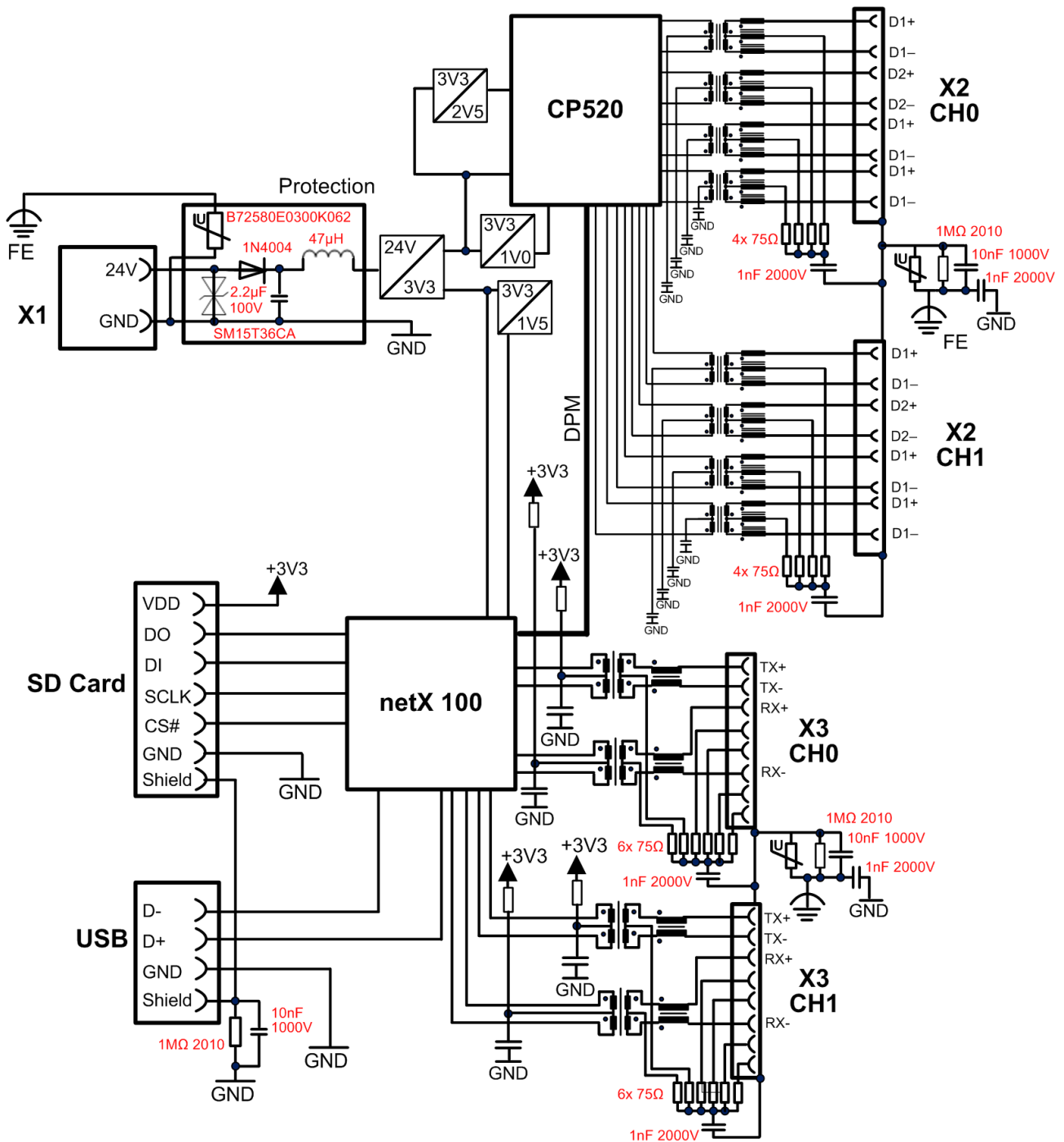


Figure 4: Galvanic isolation NT-151 CCIES-RE



Note:

Functional earth is connected via back plane bus of the DIN top hat rail.

6 Mounting of device

6.1 Safety messages

Please observe the following safety messages:

NOTICE**Device destruction due to compensating currents !**

Please pay attention to the grounding and shielding concept of your plant. The concept should prevent the flowing of compensating currents via signal and power supply lines between the used devices. Otherwise device destruction of the netTAP is possible.

NOTICE**Device destruction due to overheating !**

The air ventilation slots of the netTAP device must not be covered by any objects. Otherwise the device might overheat.

Maximum allowed environmental temperature is + 60 °C.

If the environmental temperature exceeds + 50 °C, you must allow a minimum distance of 17.5 mm between the netTAP and neighboring devices.

6.2 Mounting device onto Top Hat Rail

- The netTAP device is to be mounted onto a horizontally attached top hat rail according to DIN EN 60715.
- The rail has to be connected with the potential equalization conductor (FE).

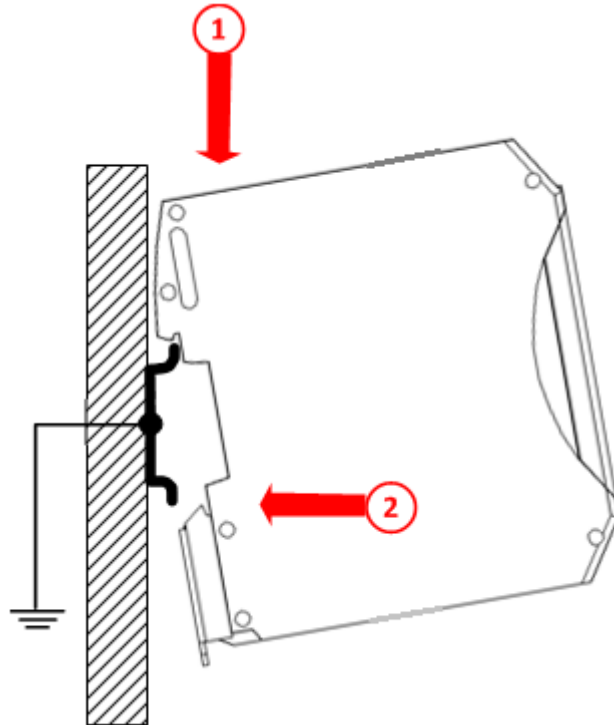


Figure 5: Mounting the netTAP device onto Top Hat Rail

- Push the device onto the top hat rail from above (1).
- Then press the device against the rail until the bolt of the lower hook engages (2).
- After mounting, connect the 24 V supply voltage to the device.

NOTICE

Device Destruction by Exceeding the Allowed Supply Voltage!

The supply voltage must not exceed 30 V, otherwise the netTAP device will be damaged.



Note:

Grounding is done via a grounding contact located at the backside of the device, connecting it electrically to the DIN top hat rail.

6.3 Removing device from Top Hat Rail

- Before dismantling the netTAP from the top hat rail, first remove the power supply cable and all data cables from the device.

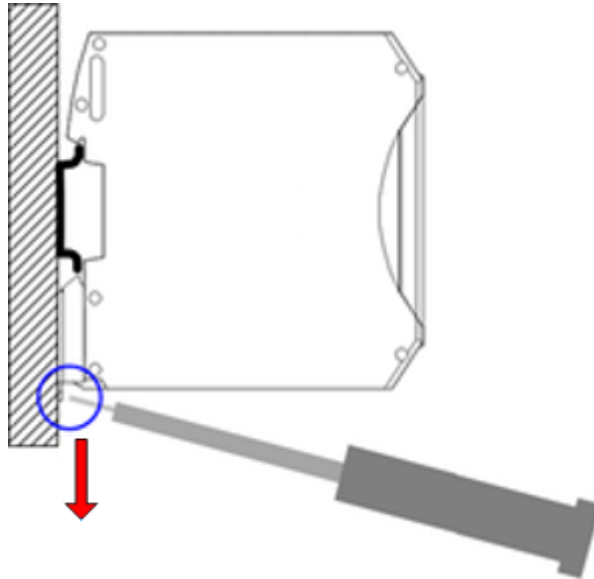


Figure 6: Removing the netTAP device from Top Hat Rail

- Put a screw driver into the slot of the latch at the bottom of the device.
- To disengage the lock of the hook, pull down the latch with the screw driver.
- Take the device off the top hat rail.

7 Commissioning

Firmware

The netTAP **NT 151 CCIES-RE** is delivered with pre-loaded firmware and can thus be instantly installed, configured and commissioned.

Configuration

The netTAP is to be configured with the Windows configuration software **SYCON.net** via the USB interface of the device (see position (8) in section *Positions of the interfaces and LEDs* [► page 22]).

SYCON.net allows you to create a configuration “offline”, without an actual connection to the target device (i. e. the netTAP). Only for the subsequent download of the configuration into the device, you need a physical USB connection.

The device stores this data remanently, i.e. the data is being kept after power off or device reset.

The device description files for configuring the CC-Link IE Field Master and the PROFINET IO Controller can also be generated by SYCON.net.



Detailed information about configuration with SYCON.net can be found in the operating instruction manual *Configuration of Gateway and Proxy Devices*, DOC081201OIxxEN on the Gateway Solutions DVD in the Documentation\english\1.Software\SYCON.net Configuration Software\Configuration of Gateway and Proxy Devices OI xx EN.pdf directory.

SD memory card option

In case an SD memory card containing a valid configuration is inserted into the netTAP **NT 151-CCIES-RE** while a power-on cycle is being performed, all data stored on the card will be copied to the internal load memory of the device. (For the position of the memory card slot, see (7) in section *Positions of the interfaces and LEDs* [► page 22].)

Any old data stored in the load memory will be erased by this.

With this procedure, you can reset the device to its factory settings or load a desired configuration without having to establish a USB connection to the SYCON.net configuration software. SYCON.net offers the function to copy the data of the internal load memory of an already configured netTAP onto an inserted empty SD memory card. Thus, you can easily “clone” a configuration and transfer it into another device, e.g. into a spare device in case of a defective primary device.

Note that the SD card must be FAT formatted, otherwise it will not be recognized by the device. Detailed instructions on how to transfer configuration data into another netTAP device by SD memory card can be found in chapter *Using SD memory card to copy configuration data into spare netTAP devices* [► page 43].

Resetting the netTAP to its factory settings by using an SD memory card (e.g. in case of a defective firmware) is described in the subsequent chapter.

8 Firmware recovery

8.1 Overview

If after power-on the **SYS** LED (see position (5) in section *Positions of the interfaces and LEDs* [► page 22]) is flashing yellow and green at a rate of 1 Hz, the device is in boot mode. The firmware file of the netTAP **NT 151-CCIES-RE** is missing or defective. In this state, the device cannot be operated and the firmware needs to be recovered either by SD memory card or via USB.

Using SD memory card to reset the device to its factory settings

When using the SD memory card, the file system inside the device will be reformatted and all existing firmware, configuration or IP address files will automatically be deleted. The device will thus be reset to its “factory settings”. Note that by this method, only a so-called “base firmware” is copied from the SD memory card to the device, enabling the subsequent downloading of the “regular” full firmware by SYCON.net via USB connection. This means that after using the SD card, you will have to establish a USB connection between the netTAP and your configuration PC in order to download the regular firmware and a new configuration to the device with SYCON.net.

Using USB and ComProX2 to reset the device to its factory settings/ recover the firmware

On the other hand, if you are using the Hilscher **ComProX2** tool via USB, you can directly access the file system of the netTAP and overwrite the old defective firmware file with a fresh firmware file. Here, you can directly download the “regular” firmware to the netTAP without first having to use the “base firmware” – as it is the case when using the SD card.

Since **ComProX2** allows you to format the whole file system or to erase or download only individual files, you can decide for yourself whether you want to reset the device to its factory settings (erase all files and then download firmware) or whether you want to preserve old configuration files inside the device and only erase the old defective firmware file by downloading new firmware file, thus performing only a “firmware recovery” instead of a “factory reset”. Note, however, that a defective firmware most likely causes corruption also of the file system, thus making a re-formatting of the file system strongly advisable before downloading the new firmware file. Therefore it is recommended to completely reset the device to its factory settings instead of just exchanging/recovering the firmware.

8.2 Using an SD memory card to reset the netTAP to its “factory settings”

The netTAP **NT 151-CCIES-RE** can be reset to its factory settings by using the load memory image on an SD memory card. You will find the load memory image on the Gateway Solutions DVD in the `Supplements & Examples\Device Factory Reset\netTAP 151 CCLINK IE Factory Settings\Recovery via Memory Card` directory. From there, you can copy the image to the SD memory card, and then use the card to copy it to the netTAP device.

All existing old data (including the configuration) in the internal load memory of the netTAP will thereby be deleted and a “base firmware” will be loaded to the device. After recovery by SD card, you therefore must download the full “regular” firmware and a new configuration to the device with SYCON.net.



Note:

The SD memory card is not included in the delivery of the **NT 151-CCIES-RE** device, but can be obtained from Hilscher. The part number of the card is 1719.003.

Prerequisites

- Empty SD memory card (FAT formatted)
- PC with SD card reader device
- Gateway Solutions DVD
- The netTAP device is supplied with voltage

Step-by-step instructions

1. Copy load memory image from DVD to SD card.
 - If applicable: remove write protection on your SD memory card.
 - Insert the empty SD memory card into the SD card reader device of your PC.
 - On the Gateway Solutions DVD, open `Supplements & Examples\Device Factory Reset\netTAP 151 CCLINK IE Factory Settings\Recovery via Memory Card` directory.
 - Copy the `STARTUP.INI` file and the `BACKUP` folder (with all its subfolders) to the root directory of the SD memory card.
 - Remove the SD memory card from the SD card reader device.

2. Copy load memory image to netTAP device.
 - Disconnect the voltage supply from your netTAP device.
 - Insert the SD card into the card slot of the netTAP device until it engages (metal contacts of the card must be facing left).



Figure 7: Insert SD card

- Reconnect the voltage supply of your netTAP device.
- ⇒ The device then loads the memory image. While loading the image, the **SYS** LED quickly alternates between green and yellow for approximately eight seconds, then shows steady yellow for approximately ten seconds, then is switched off for a short while before it finally shows steady green light. The device automatically starts the loaded firmware.
- Remove the SD memory card from device.
- ⇒ The netTAP device has been reset to its factory settings. The device now needs a firmware download and a new configuration with SYCON.net via USB connection. Instructions for this can be found in the operating instruction manual *Configuration of Gateway and Proxy Devices*, DOC0812010lxxEN.

8.3 Using USB to recover firmware

Via USB, you can reset the netTAP device to its factory settings by re-formatting its file system and downloading a new firmware file to the device.

For this, you need a USB cable with a Mini USB connector and the Hilscher **ComProX2** tool, which is stored on the Gateway Solutions DVD in the `Supplements & Examples\Device Factory Reset\netTAP 151 CCLINK IE Factory Settings\Recovery via USB` directory.

ComProX2 can be executed directly from DVD, it does not need to be installed on your configuration PC. Note that for recovery via USB, you need to install the USB driver for the Hilscher netTAP on your configuration PC. This driver allows you to communicate with the netTAP via USB, even if the old firmware within the device is defective or missing altogether. It is recommended to install the USB driver *before* you connect the netTAP device via USB cable. Use the **setup.exe** driver installation program for this, which is stored on the Gateway Solutions DVD in the `Setups & Drivers\USB Driver` directory.



The installation of the USB driver is described in the user manual *Software Installation Gateway Solutions*, DOC100315UMxxEN, which is stored on the Gateway Solutions DVD in the `Documentation\english\5.Installation Instructions` directory.



Note:

As an alternative, you can just perform a so-called “firmware recovery” by downloading a new firmware file to the device without having re-formatted the file system beforehand, thus preserving all existing configuration files within the device. Note, however, that a defective firmware most likely causes corruption also of the file system, therefore you are strongly advised to re-format the file system before downloading a new firmware file.

Prerequisites

- The USB driver for Hilscher netTAP has been installed on the configuration PC (the driver is included in the USB driver installation program stored on the Gateway Solutions DVD).
- The configuration PC has been connected to the netTAP device via USB cable.
- You have access to the Gateway Solutions DVD.
- The netTAP device is supplied with voltage.
- Disconnect all other Hilscher devices (apart from the **NT 151-CCIES-RE**) that may happen to be also connected to the configuration PC via USB.
- If applicable, close **SYCON.net** on your configuration PC.

Step-by-step instructions

1. Open ComProX2.

- On the Gateway Solutions DVD, open Supplements & Examples \Device Factory Reset\netTAP 151 CCLINK IE Factory Settings\Recovery via USB directory.
- Double-click **comproX2.exe** file.
- The **ComProX2** tool opens:

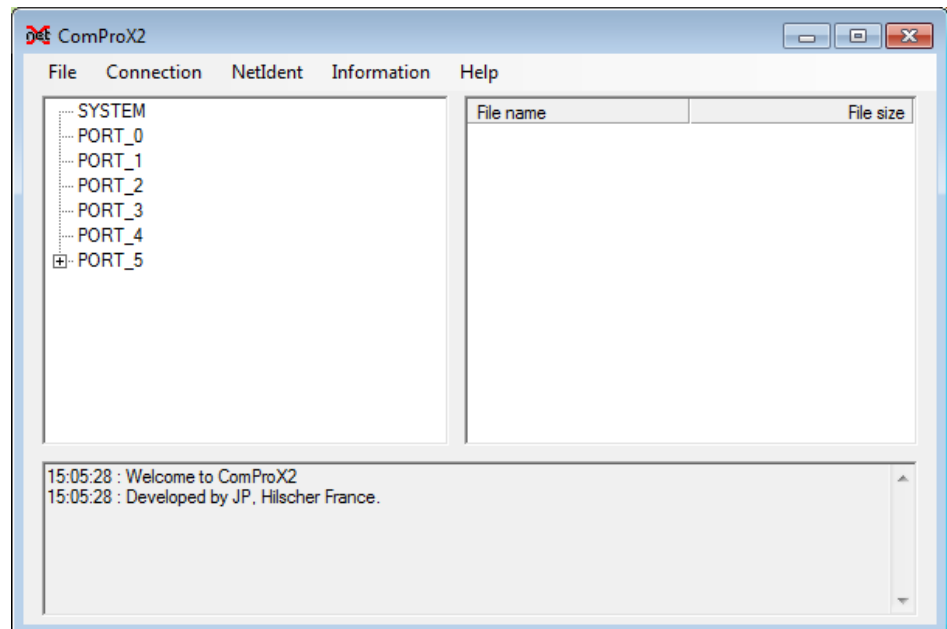


Figure 8: ComProX start window

2. Activate Auto-Refresh function.

- Open **Connection** menu and make sure that the **File Explorer auto refresh** option is checked.

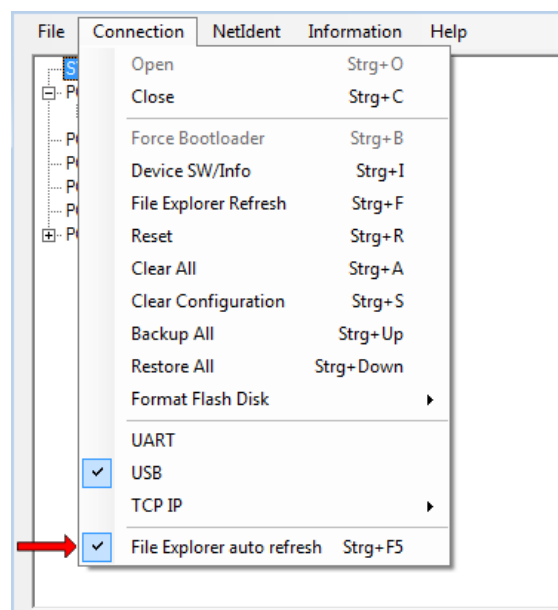


Figure 9: Activate auto refresh function

3. Connect to netTAP device.

- In the menu, choose **Connection > Open**.
- After the Windows USB/COM ports on the configuration PC have been scanned, the **Open USB Port** dialog window opens. The netTAP is displayed in the drop-down list as **2nd Stage Loader** (netX100/500) behind the connecting USB COM of the PC (in this example COM18):

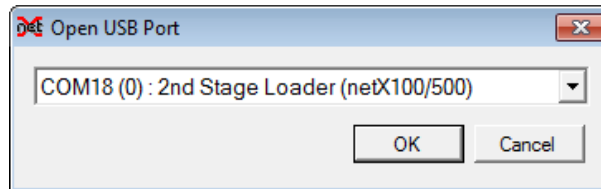


Figure 10: ComProX Open USB Port dialog window



Note:

The so-called “Second Stage Bootloader” (2nd Stage Loader) is a software module inside the netTAP complementing the regular firmware. If the firmware is defective or missing, the Second Stage Bootloader takes over, enabling communication between the device and **ComProX2** via USB.

A netTAP device running with proper functional firmware connected via USB would answer at the COM port with a **netTAP 151** entry, followed by the abbreviation of the protocol conversion implemented in the firmware.

- Click **OK** button.
- The **Open USB Port** dialog window closes. The **File Explorer** (left window) shows the files currently stored in the various ports of the netTAP. (The ports within the netTAP are not to be confused with the USB COM ports of the configuration PC.)

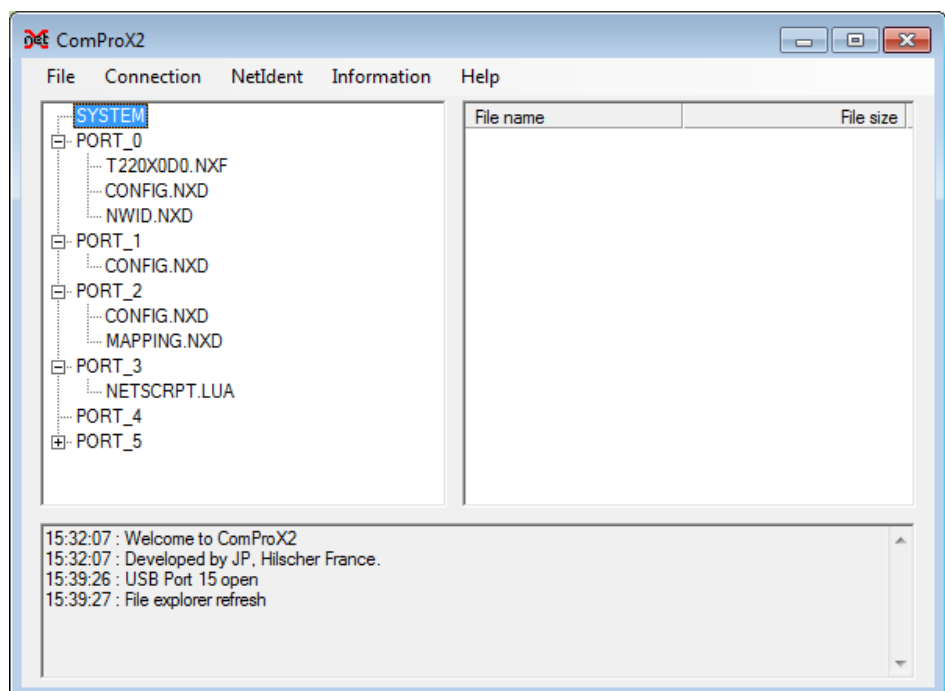


Figure 11: Contents of the netTAP ports displayed in ComProX

4. Re-format file system (delete old files in flash memory of netTAP).
 - Before you proceed to re-format the file system, thus deleting all existing files, you should note or write-down the exact name of the firmware file stored in **PORT_0**. You can recognize the firmware file by its **NXF** file extension. In this example, it is the **T220X0D0.NXF** file (protocol conversion CC-Link IE Field Slave to PROFINET IO-Device). Noting the file name makes it easier for you to identify the file later on the **Gateway Solutions** DVD for download.
 - In the menu, choose **Connection > Format Flash Disk > Quick Format**.

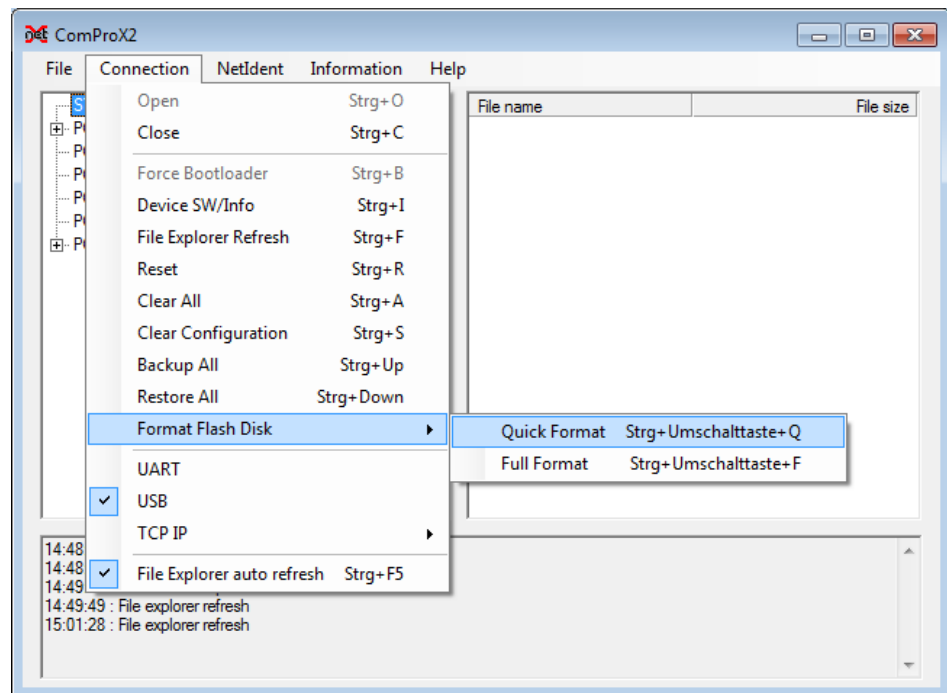


Figure 12: Format flash memory

- In the **Information** window, click **OK** button.

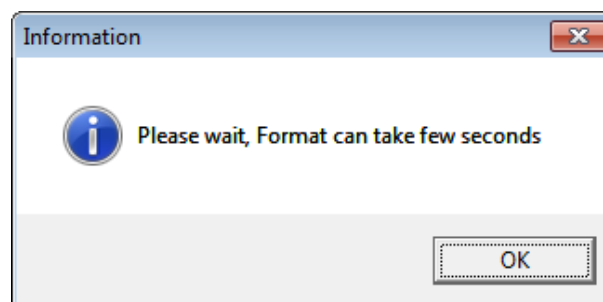


Figure 13: Acknowledge formatting dialog

- The file system is being formatted and all files in the ports are deleted.

- Acknowledge the **Quick Format is finished** message by clicking the **OK** button.

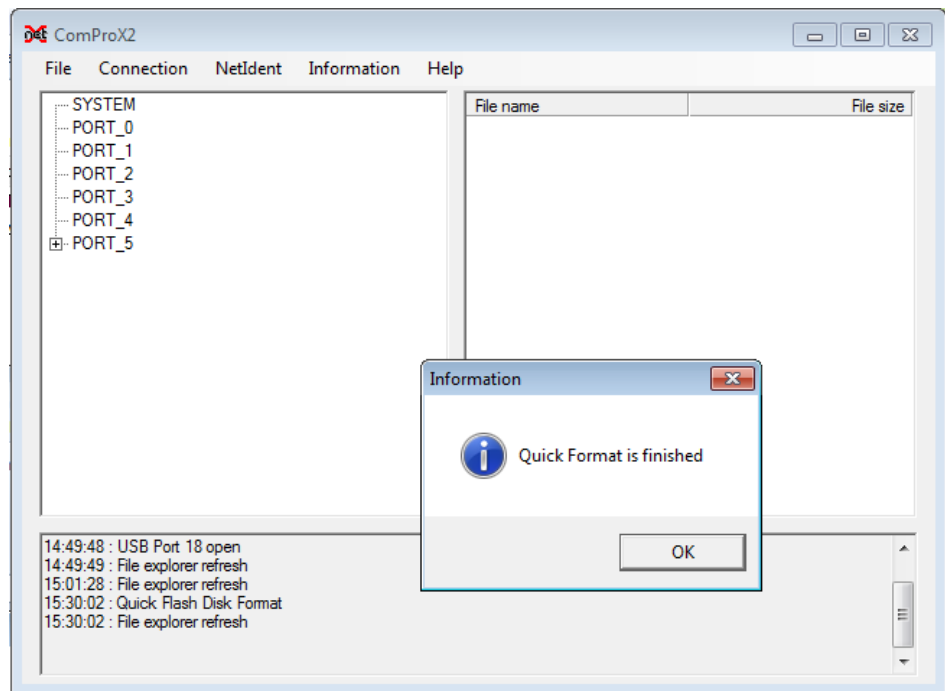


Figure 14: Formatting finished message

5. Download firmware file.

- In the **File Explorer** (left window) select **PORT_0** entry.
- Use the right mouse button to open the context menu and select **Download**.

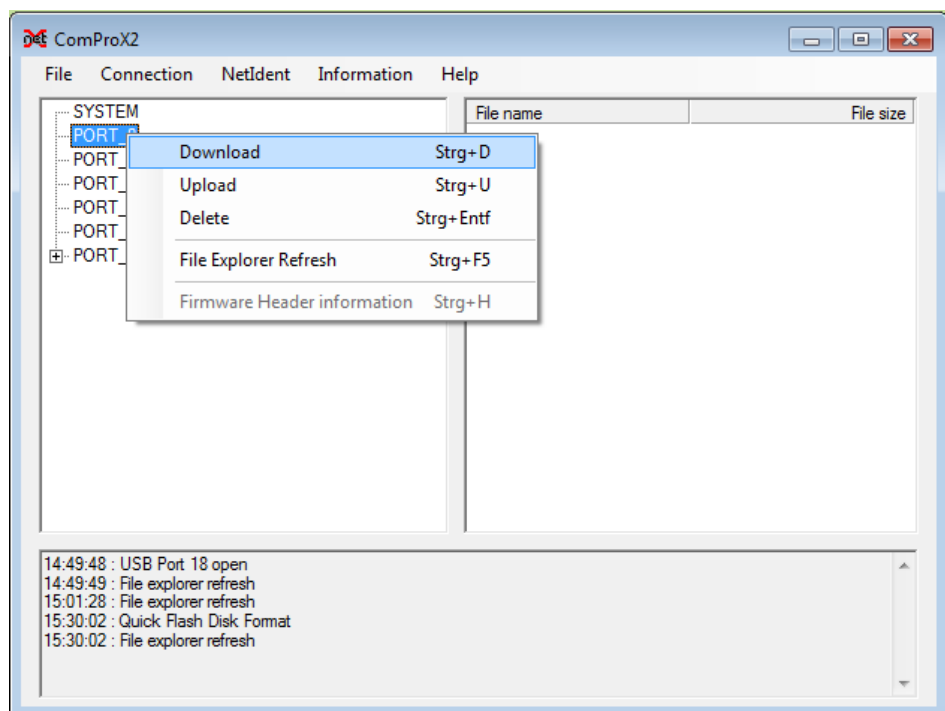


Figure 15: Download menu

➤ The **Open file to download** dialog window opens:

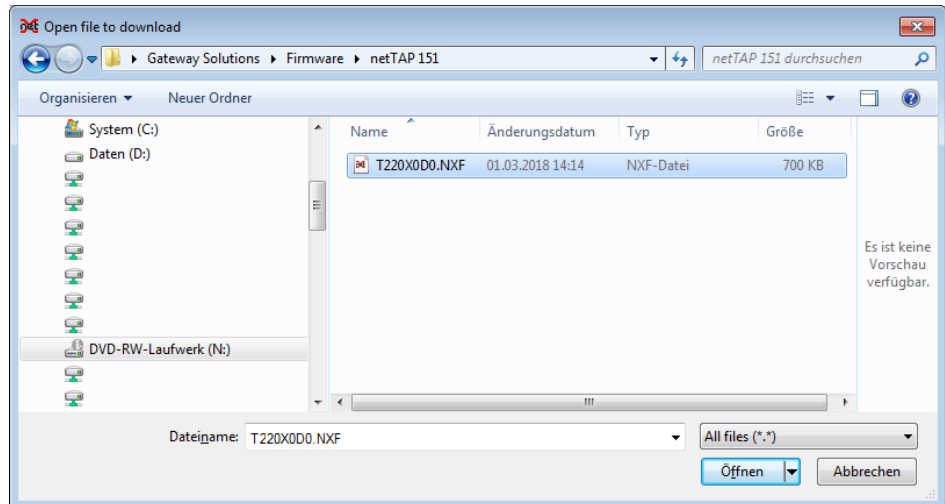


Figure 16: Open File Dialog

- On the **Gateway Solutions** DVD, open `Firmware\netTAP 151` folder. Search the list for the name of the firmware file which you had noted/written down before you formatted the file system/flash disk. In this example, it is the `T220X0D0.NXF` file (protocol conversion CC-Link IE Field Slave to PROFINET IO-Device).
- Select the firmware file you want to download, then click **Open** button.
- The file is being downloaded:

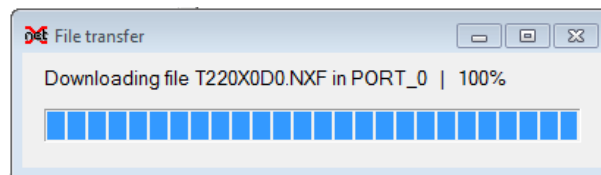


Figure 17: Download status

- Acknowledge the **File successfully downloaded** message by clicking the **OK** button.

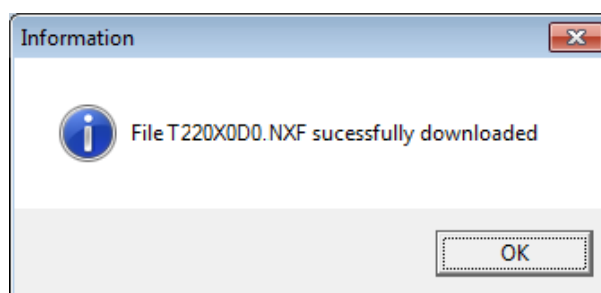


Figure 18: Download finished message

➤ The downloaded firmware file should now be displayed under **PORT_0**:

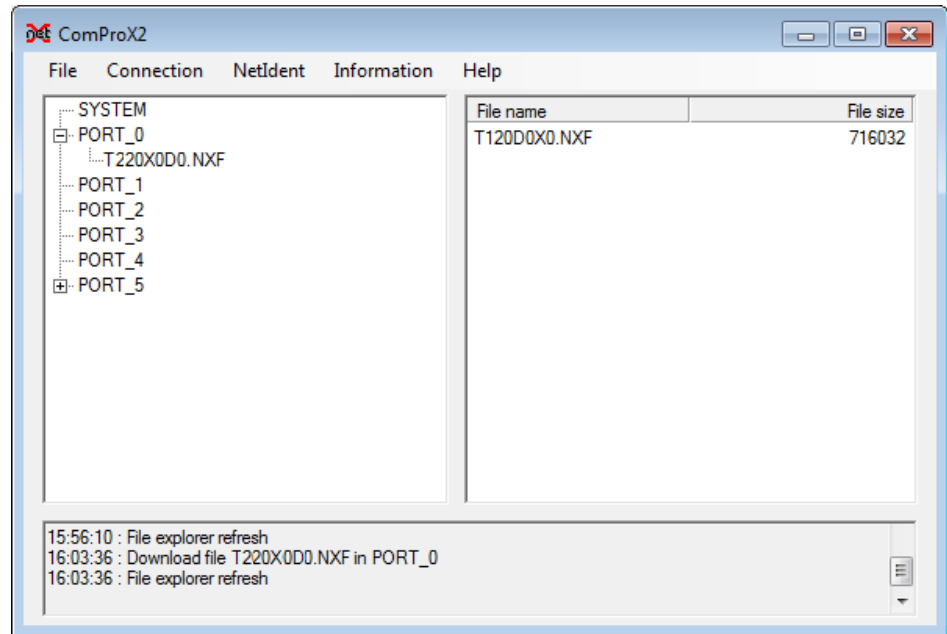


Figure 19: Firmware in PORT_0

- In the menu, choose **Connection > Close** to close the connection to the netTAP, then choose **File > Exit** to close ComProX.
6. Restart netTAP device.
- Disconnect the voltage supply from the device, then reconnect it.
 - After restart, the **SYS** LED shows steady green light (indicating firmware is running) and the **APL** LED shows steady red light (indicating missing configuration).
 - ⇒ You have reset the netTAP device to its factory settings. The device now needs a new configuration with SYCON.net via USB connection. Instructions for this can be found in the operating instruction manual *Configuration of Gateway and Proxy Devices*, DOC0812010IxxEN.

9 Using SD memory card to copy configuration data into spare netTAP devices

9.1 Overview

With the **Memory Card Management** function of the netTAP DTM in SYCON.net, you can copy an already downloaded configuration together with the firmware and the IP address from the internal load memory of the netTAP device onto an SD memory card, which has been inserted into the device. Thus, you can “backup” this data to an external storage medium. Afterwards, you can remove the SD memory card from the netTAP device, insert it into other devices and thus copy the data into their internal load memory.

By this method, you can easily bring several devices to an identical state of configuration (i. e. “clone” a primary device) without having each time to establish an online connection between the configuration PC (respectively SYCON.net) and the individual devices.

This can be useful, e. g., if you want to prepare an identical “spare” device.

9.2 Prerequisites

- SD memory card, FAT formatted.



Note:

The SD memory card is not included in the delivery of the netTAP device, but can be obtained from Hilscher, part number 1719.003.

- A configuration has been downloaded to the netTAP device.
- The Windows PC/Notebook with SYCON.net and the netTAP device are connected via USB.
- The netTAP is connected to a voltage supply.

9.3 Step-by-step instructions

1. Start **SYCON.net** configuration software.
 - In the Windows Start menu, select **All Programs > SYCON.net System Configurator > SYCON.net**.
 - A login dialog appears:

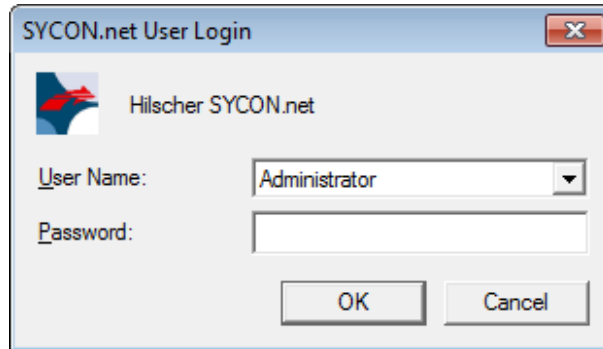


Figure 20: Login SYCON.net

- Enter your password, then click **OK**.
- SYCON.net opens with a new empty project:

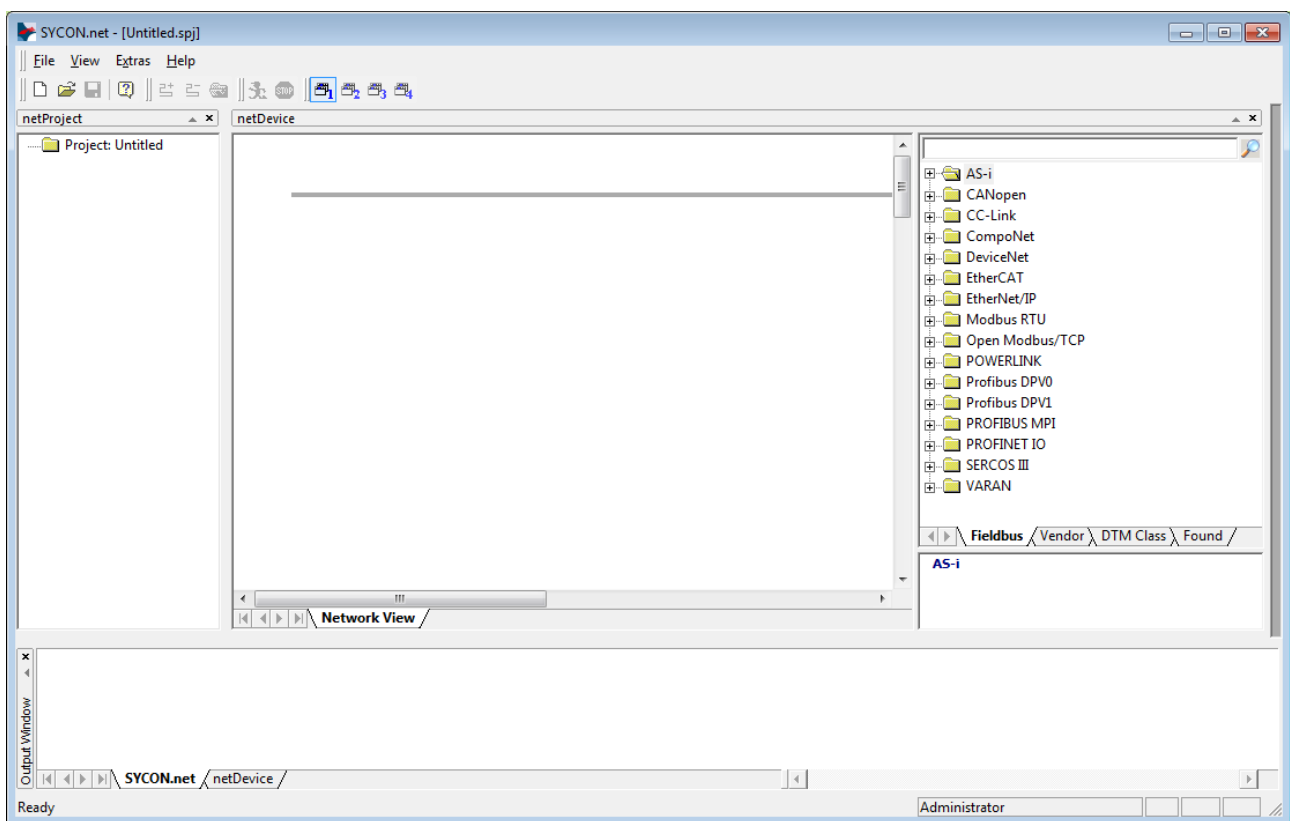


Figure 21: Empty project in SYCON.net

2. Open existing netTAP project or create a new project.

**Note:**

You can use your already existing configuration project to establish a USB connection between SYCON.net and the netTAP device, and to open the **Memory Card Management** dialog. If you don't have access to the old configuration project file, you can create a provisional new project, consisting only of the netTAP symbol, and use this makeshift project to establish the USB connection.

- In the menu, choose **File > Open...** to open an existing netTAP project.

OR

- In the **Vendor** tab of the **Device Catalog** (right window), open folder **Hilscher GmbH > Gateway Stand-Alone Slave**. Then select the NT 151-CCIES-RE device and drag & drop it onto the bus configuration line in the middle window.

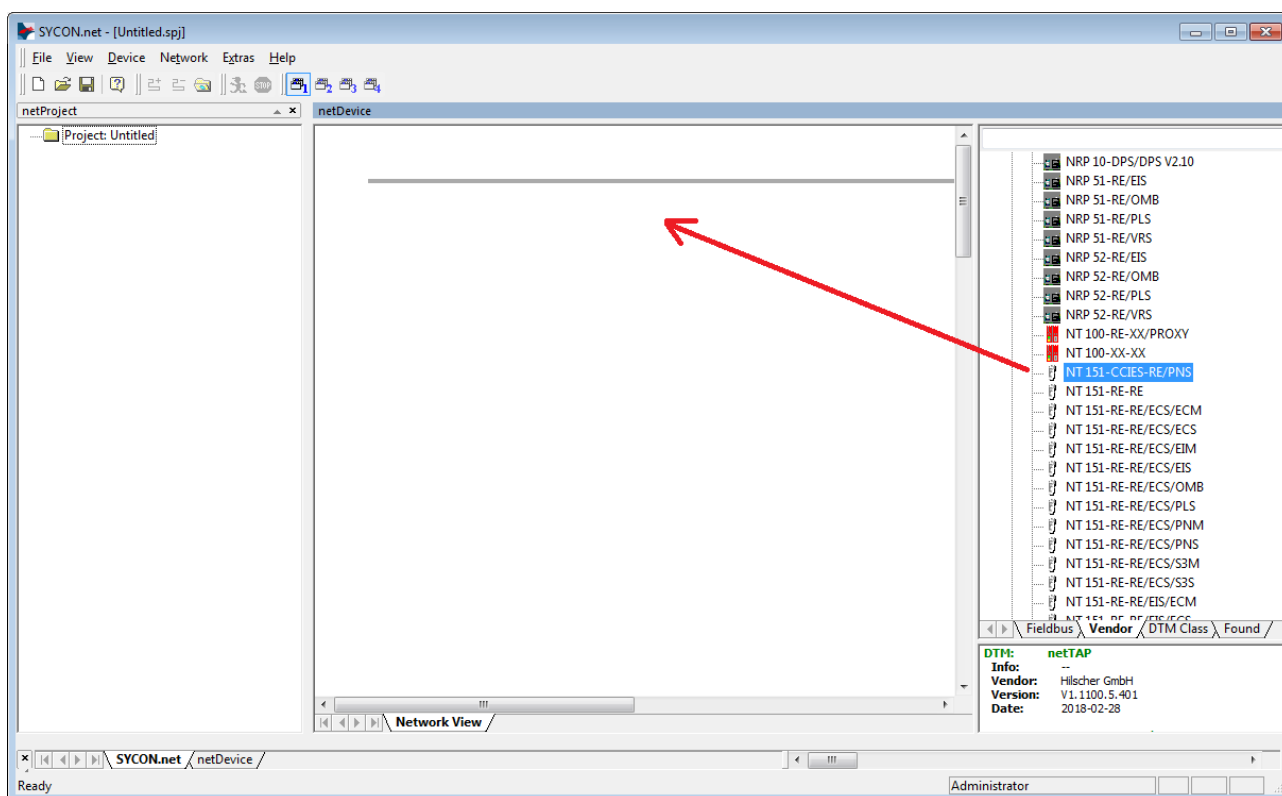


Figure 22: Add netTAP in SYCON.net

3. Open the netTAP configuration window (i.e. the netTAP DTM).
 - Double-click the netTAP symbol in the bus configuration line, or select the netTAP symbol and choose **Configuration > Gateway** from the context menu (to open context menu, right-click on the netTAP symbol).
 - If you are using an existing netTAP project, for which the configuration of the driver and the device assignment had already taken place, the netTAP DTM now opens with the **Settings** dialog window. In this case, you can directly proceed with **step 5**.

If you have just now created a new project, the netTAP DTM opens with the **Device Assignment** dialog window and immediately starts scanning for connected devices.



- Wait a moment until the connected device has been found:



5. Copy configuration data from netTAP device to SD memory card.

- In the **Navigation Area**, select **Configuration > Memory Card Management**.
- The **Memory Card Management** dialog window opens. The **Folder** field in the **Directory** area of the dialog window displays the file system of the internal load memory of the netTAP device:

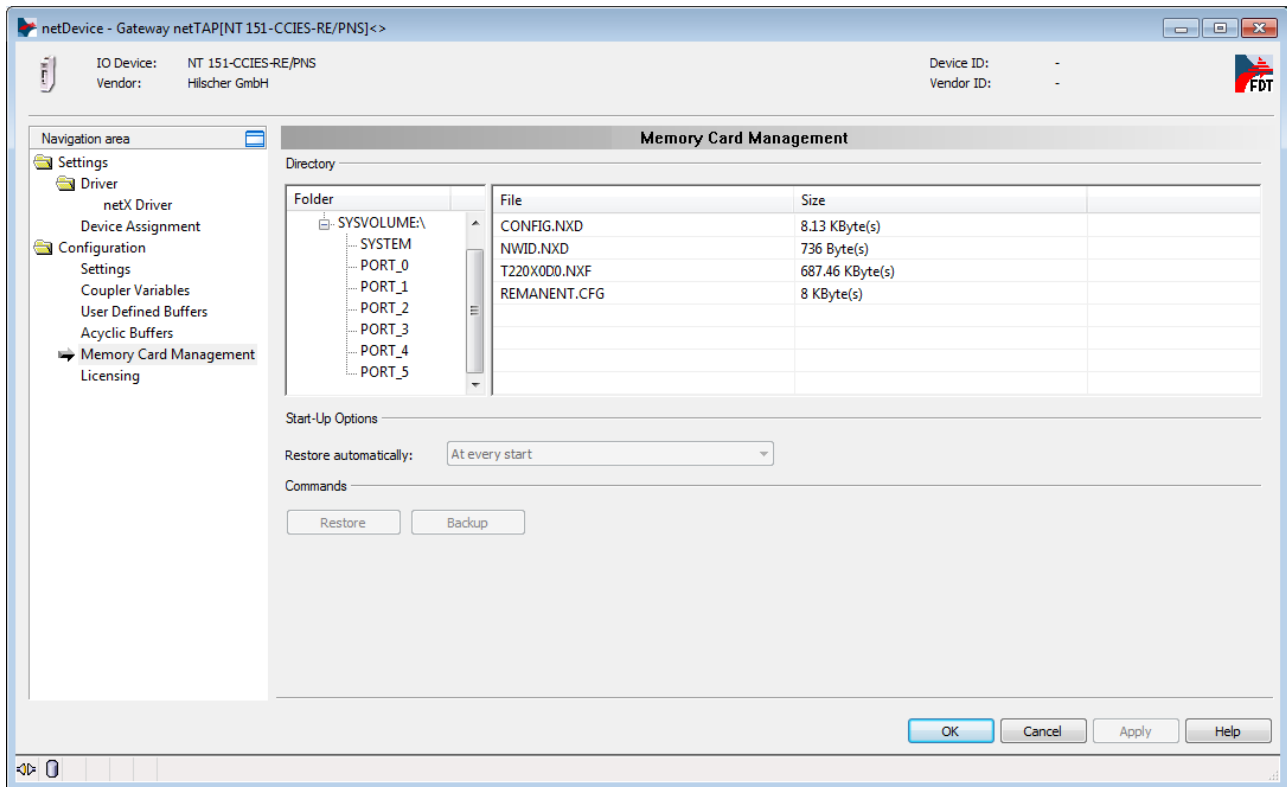


Figure 26: Memory Card Management of the netTAP DTM

- Remove the write protection of your SD memory card and insert it into the netTAP device until it engages (metal contacts of card must be facing left).



Figure 27: Insert SD card

- In order to refresh the display: close the **Memory Card Management** dialog window (e.g. by clicking on **Licensing** entry in the **Navigation area**), then open it again.

- In the **Folder** field of the **Directory** area, the file system of the SD memory card is now displayed below the directory of the internal load memory of the netTAP device (scroll down in the **Folder** window). Furthermore, the **Backup** button is now active and can be used:

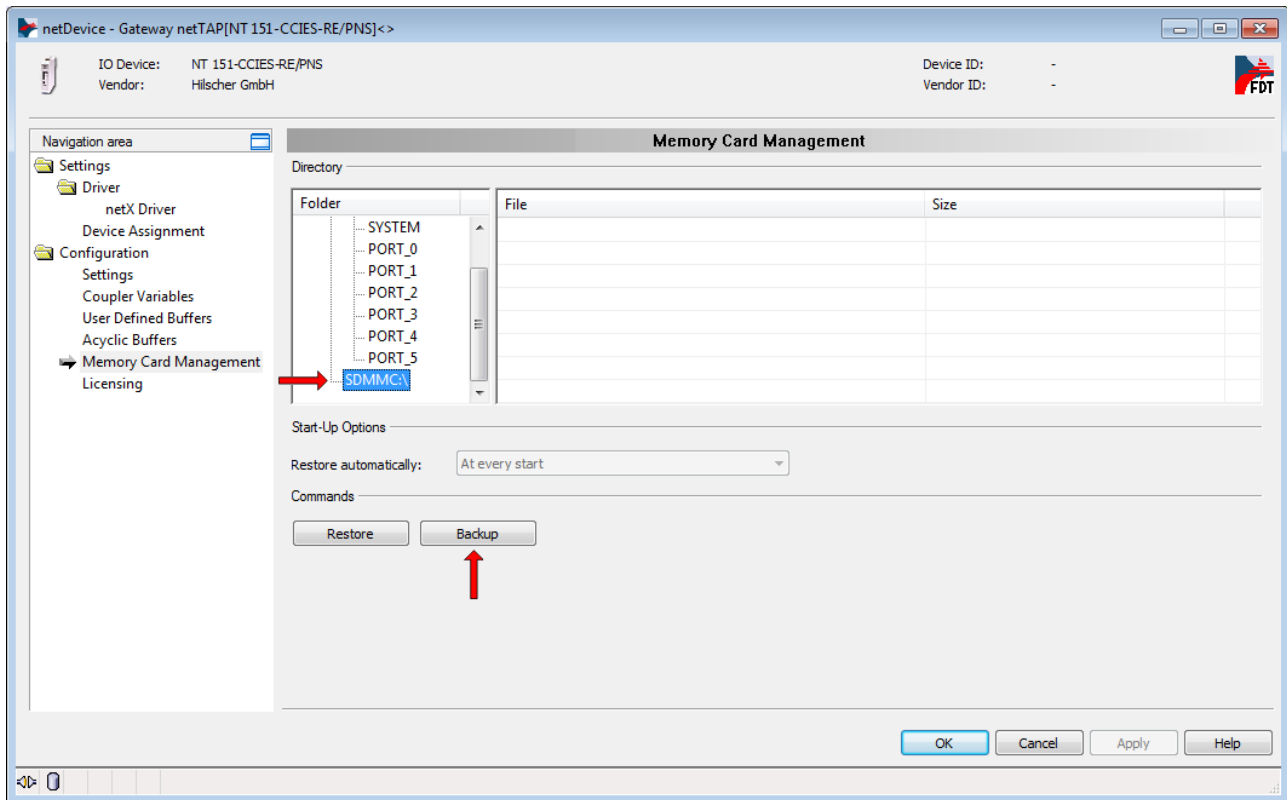



Figure 28: Memory Card Management after inserting SD memory card

- Click **Backup** to copy the data stored in the internal load memory of the netTAP to the SD memory card.

- On the SD memory card, a “Backup” folder is being created and the data is copied from the netTAP into this folder. This can take a short while (observe the clock symbol  Backup in the footer of the dialog window). After copying has been finished, you can inspect the data by selecting a folder in the **SDMMC:\Backup** directory in the **Folder** window:

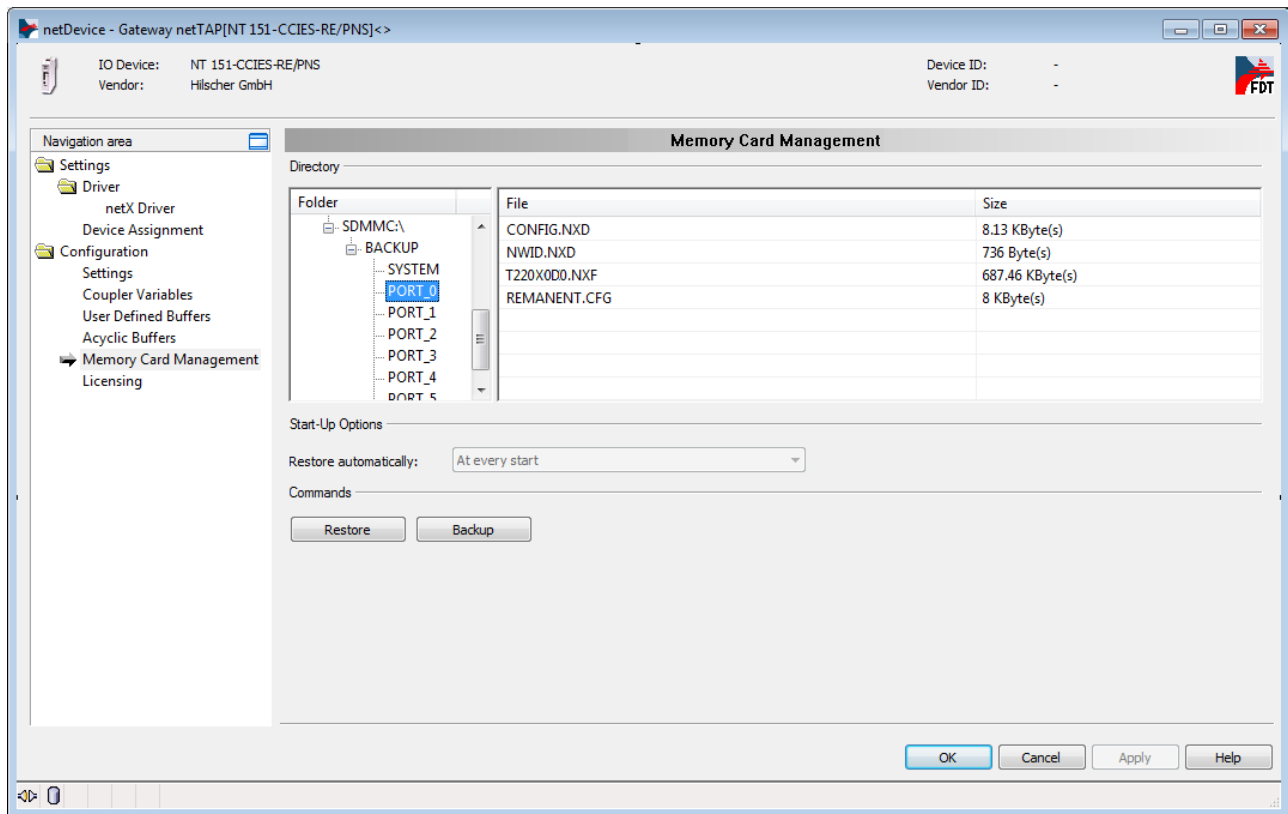


Figure 29: Memory Card Management after backup to SD memory card

- Click **OK** to close the netTAP DTM.
 - Exit SYCON.net
6. Copy data from SD memory card into spare netTAP device.
- Remove the SD memory card from the original netTAP device.
 - Insert the SD memory card into the spare device.
 - Connect spare device to voltage supply or briefly disconnect voltage supply (in case the device had already been connected to voltage supply).
 - ⇒ The spare netTAP device then loads the data from the SD memory card into its own internal load memory. While loading, the SYS LED quickly alternates between green and yellow for approximately eight seconds, then shows steady yellow for approximately ten seconds, then is switched off for a short while before it finally shows steady green light. The device automatically starts the loaded firmware and the configuration.
 - Remove the SD memory card from the netTAP device.

10 LEDs

10.1 Overview

This chapter describes the meaning of the LEDs of the netTAP **NT 151-CCIES-RE** device.

For identification of the LEDs on the device, please refer to section *Positions of the interfaces and LEDs* [▶ page 22].

10.2 SYS LED

This LED indicates basic operating states which are independent of the configuration of the netTAP.







LED	Color	State	Meaning
SYS Position in the device drawing: (5)	Duo LED yellow/green		
	 (green)	On	Operating System running. For further diagnosis, see APL LED.
	 (yellow)	On	The hardware of the device is defective and needs replacement.
	 (yellow)	Flashing	The device could not be initialized. No boot loader was found in the load memory. The load memory of the device might be defective or a USB cable, which has pin 4 connected with ground, might be attached to the device. This prevents the device from starting.
	 (yellow/green)	Flashing yellow/green 1 Hz	Error state! Boot loader active. Firmware file is missing or defective. The device needs to be recovered by SD memory card or via USB. See chapter <i>Firmware recovery</i> [▶ page 33].
	 (yellow/green)	Flashing yellow/green 16 Hz	Data is being copied from the SD memory card into the internal load memory.
	 (off)	Off	Power supply for the device is missing or hardware is defective.

Table 16: System LED

10.3 APL LED

The APL LED indicates the communication state between CC-Link IE Field Slave (X2) and the PROFINET IO-Device (X3), as well as the configuration state of the device.








LED	Color	State	Meaning
APL Position in the device drawing: (6)	Duo-LED red/green		
	 (green)	on	The communication on X2 and X3 is in cyclic data exchange and the gateway function is executed.
	 (green)	Blinking with 1 s on, 1 s off (0.5 Hz)	netTAP is initialized, but has detected some error or both networks are not connected.
	 (green)	Blinking with 2 s on, 0.5 s on	netTAP is initialized, but the communication on X2 is not in cyclic data exchange.
	 (green)	Blinking with 2 s on, 0.5 s on, 0.5 s off, 0.5 s on	netTAP is initialized, but the communication on X3 is not in cyclic data exchange.
	 (red)	Blinking with 2 s on, 0.5 s on	netTAP is initialized, but the configuration for the communication protocol on X2 is missing or has an error.
	 (red)	Blinking with 2 s on, 0.5 s on, 0.5 s off, 0.5 s on	netTAP is initialized, but the configuration for the communication protocol on X3 is missing or has an error.
	 (red)	On	netTAP has detected an error during the initialization: <ul style="list-style-type: none"> • Missing configuration • Error in configuration • Internal error

Table 17: APL LED

10.4 LEDs PROFINET IO Device

The subsequent table describes the meaning of the PROFINET IO-Device LEDs.

LED	Color	State	Meaning
SF (System Failure) Position in the device drawing: (9)	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: (10)	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
LINK CH0: (18), CH1: (21)	LED green		
	● (green)	On	The device is linked to the Ethernet.
	● (off)	Off	The device has no link to the Ethernet.
RX/TX CH0: (19), CH1: (22)	LED yellow		
	☀ (yellow)	Flickering (load dependent)	The device sends/receives Ethernet frames.
	● (off)	Off	The device does not send/receive Ethernet frames.

Table 18: LED states for the PROFINET IO-Device protocol

LED state	Definition
Flashing (1 Hz, 3 s)	The indicator 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 indicator turns on and off with a frequency of 2 Hz: "on" for 250 ms, followed by "off" for 250 ms.
Flickering (load dependant)	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 19: LED state definitions for the PROFINET IO-Device protocol

10.5 LEDs CC-Link IE Field-Slave

The subsequent table describes the meaning of the CC-Link IE Field-Slave LEDs.














LED	Color	State	Meaning
RUN	LED green: Indicates the operation status		
Position in the device drawing: (1)	 (green)	On	Operating normally (depending on "BusOn" status of the netX firmware)
	 (off)	Off	A watchdog timer error or a hardware failure has occurred
ERR	LED red: Indicates the CP520 error status		
Position in the device drawing: (2)	 (red)	On	Error in own station
	 (off)	Off	Normal operation
RD/SD	LED orange: Displays the reception and the sending status of the data		
Position in the device drawing: (3)	 (orange)	On	Receive or send data
	 (off)	Off	No data received or sent
D-LINK	LED yellow: Indicates the status of the data link		
Position in the device drawing: (4)	 (yellow)	On	Data link in operation (cyclic transmission in progress)
	 (yellow)	Blinking	Data link in operation (cyclic transmission stopped)
	 (off)	Off	Data link not performed (disconnected)
LINK	LED green		
Position in the device drawing: CH0: (12) CH1: (15)	 (green)	On	Link up
	 (off)	Off	Link down
L-ERR	LED yellow		
Position in the device drawing: CH0: (13) CH1: (16)	 (yellow)	On	Abnormal data received or loopback in progress
	 (off)	Off	Normal data received or loopback not performed

Table 20: LED states of the CC-Link IE Field Slave protocol

11 Troubleshooting

There are two steps of error diagnosis:

- the initial approximate diagnosis by checking the LEDs of the device,
- the comprehensive diagnosis with the SYCON.net configuration and diagnosis software via USB connection.

The following overview describes the error conditions that may be detected by checking the LEDs (for identification of the LEDs, please refer to section *Positions of the interfaces and LEDs* [► page 22]).



For information on diagnosis with SYCON.net, see operating instruction manual *Configuration of Gateway and Proxy Devices*, DOC081201OIxxEN on the Gateway Solutions DVD in the Documentation\english\1.Software\SYCON.net Configuration Software\Configuration of Gateway and Proxy Devices OI xx EN.pdf **directory**.









LED	LED state	Cause/remedy
All	No LED is on	The device is not powered or the device is defective and needs replacement.
SYS Position in device drawing: (5)	SYS LED flashes   yellow/green at 1 Hz	After a power cycle the device has not found a valid firmware and remains in boot loader mode. The firmware of the device has to be "recovered". See chapter <i>Firmware recovery</i> [► page 33]. If recovery fails, the load memory of the device might be defective.
SYS Position in device drawing: (5)	SYS LED flashes  yellow	The device could not be initialized. No boot loader was found in the load memory. The load memory of the device might be defective or a USB cable, which has pin 4 connected with ground, might be attached to the device. This prevents the device from starting.
SYS Position in device drawing: (5)	SYS LED shows static  yellow	The hardware of the device is defective and needs replacement.
SYS Position in device drawing: (5) APL Position in device drawing: (6)	SYS LED shows static  green and APL LED flashes  red or shows static  red.	The device is well initialized. Further diagnosis is possible with the APL LED. See section <i>APL LED</i> [► page 52].
APL Position in device drawing: (6)	APL LED flashes  green.	The communication at port X2 or/and port X3 is not in data exchange mode. See also <i>APL LED</i> [► page 52].

Table 21: netTAP NT 151-CCIES-RE troubleshooting by LED

For protocol-specific error diagnostics by LED, see sections *LEDs PROFINET IO Device* [► page 53] respectively *LEDs CC-Link IE Field-Slave* [► page 54].

12 Technical data

12.1 Technical data netTAP NT 151-CCIES-RE

Category	Parameter	Value
Valid for	Hardware revision	2
Communication controller	CC-Link IE Field Slave (X2)	CP520
	PROFINET IO Device (X3)	netX 100
Memory	RAM	netX 100: 8 MB SDRAM
	FLASH	netX 100: 4 MB serial Flash
	SD memory card (optional)	max. 2 GByte Do not use SDHC or SDXC card types
USB Interface	USB Socket	Mini-USB, 5-pin
Display	LEDs	RUN – Run (CC-Link IE Field Slave) ERR – Error (CC-Link IE Field Slave) RD/SD – Receive/Send Data (CC-Link IE Field Slave) D-LINK – Data Link (CC-Link IE Field Slave) SYS – System status (Gateway) APL – Application status (Gateway) SF – System Failure (PROFINET Device) BF – Bus Failure (PROFINET Device) 2 x LINK – Link (at RJ45 for PROFINET Device) 2 x RX/TX – Receive/Transmit (at RJ45 for PROFINET Device) 2 x LINK – Link (at RJ45 for CC-Link IE Field Slave) 2 x L-ERR – Link Error (at RJ45 for CC-Link IE Field Slave)
Power supply	Voltage	24 V ± 6 V DC with reverse voltage protection
	Current at 24 V (typically)	180 mA
	Power consumption	4.42 W
	Connector	MINI COMBICON, 5-pin
EMC	ESD air discharge (DIN EN 61131-2)	Criterion B 8 kV
	ESD contact discharge (DIN EN 61131-2)	Criterion B 6 kV
	Burst (DIN EN 61131-2)	Criterion B 2.2 kV
	Surge (DIN EN 61131-2)	Criterion A 1 kV 0,5 kV Line to Line
	Immunity: radiated, HF field (DIN EN 61000-4-3)	Criterion A 10 V/m 80 MHz ... 1 GHz 3 V/m 1GHz ... 6 GHz
	Immunity: conducted (DIN EN 61000-4-6)	Criterion A 10 V/m 150 kHz ... 80 MHz
	Radio interference emission (DIN EN 55016-2-3)	Criterion A 30 MHz ... 6 GHz
	Radio interference voltage (DIN EN 55016-2-1)	Criterion A 0.15 MHz ... 30 MHz
Environmental conditions	Ambient temperature range for operation	If distance to neighboring devices is minimum 17.5 mm: - 25 ... + 60 °C If housing has contact to neighboring device (and if surface temperature of neighboring device does not exceed + 70 °C): - 25 ... + 50 °C
	Humidity	10 ... 95 %

Category	Parameter	Value
Device	Dimensions (L x W x H)	113.6 x 22.6 x 99 mm (without connector)
	Weight	126 g
	Mounting	Top hat rail (DIN rail EN 60715)
	Protection class	IP 20
	RoHS	Yes
CE Sign	CE Sign	Yes
Configuration	Software	SYCON.net
Ethernet Interface (X3)	Transmission rate	100 MBit/s 10 MBit/s
	Interface type	100 BASE-TX, isolated
	Half duplex/Full duplex	supported (at 100 MBit/s)
	Auto-Negotiation	supported
	Auto-Crossover	supported
	Connector	2 x RJ45
Gigabit Ethernet interface (X2)	Transmission rate	1 GBit/s
	Interface type	1000 BASE-T, isolated
	Half duplex/Full duplex	yes
	Auto-Negotiation	yes
	Auto-Crossover	yes
	Connector	2 x RJ45

Table 22: Technical data netTAP NT 151-CCIES-RE

12.2 Technical data of the protocols

12.2.1 PROFINET IO Device

Parameter	Description
Maximum number of cyclic input data	1428 bytes
Maximum number of cyclic output data	1432 bytes
Maximum number of submodules	Fixed number: 2 modules and 7 submodules
Multiple Application Relations (AR)	The Stack can handle up to 2 IO-ARs, one Supervisor AR and one Supervisor-DA AR at the same time.
Supported protocols	RTC – Real Time Cyclic Protocol, Class 1 (unsynchronized), Class 3 (synchronized) RTA – Real Time Acyclic Protocol DCP – Discovery and configuration Protocol CL-RPC – Connectionless Remote Procedure Call LLDP – Link Layer Discovery Protocol SNMP – Simple Network Management Protocol MRP – MRP Client
Acclic communication	Read/Write Record, API 0x4608, Read and write “Message Interface Buffer” and “User Defined Buffer”
Topology recognition	LLDP, SNMP V1, MIB2, physical device
Identification & Maintenance	Read I&M0 Read and write of I&M1–4
Minimum cycle time	1 ms for RT_CLASS_1 250 µs for RT_CLASS_3
IRT Support	RT_CLASS_3
Media redundancy	MRP client is supported
Additional features	DCP, VLAN- and priority-tagging
Baud rate	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
PROFINET IO specification	V2.2 (legacy startup) and V2.3 (but advanced startup only for RT) are supported.
Limitations	RT over UDP not supported. Multicast communication not supported. DHCP is not supported. FastStartUp is not supported. The amount of configured IO-data influences the minimum cycle time that can be reached. Only 1 Input-CR and 1 Output-CR are supported. System Redundancy (SR-AR) and Configuration-in-Run (CiR) are not supported. RT Class 2 synchronized (IRT “flex”) is not supported. Access to the submodule granular status bytes (IOCS) is not supported. SharedInput is not supported. MRPD is not supported. DFP and other HighPerformance-profile related features are not supported. PDEV functionality is only supported for submodules located in slot 0. Submodules cannot be configured or used by an AR in subslot 0. DAP and PDEV submodules only supported in slot 0.
Reference to stack version	V3.12

Table 23: Technical data PROFINET IO-Device protocol

12.2.2 CC-Link IE Field Slave

Parameter	Description
Station types	Intelligent Device Station
Maximum number of cyclic input data	RY data: 256 bytes (2048 bits) RWw data: 716 words (each 16 bit)
Maximum number of cyclic output data	RX data: 256 bytes (2048 bits) RWr data: 720 words (each 16 bit)
Acyclic communication	SLMP: read and write "Message Interface Buffer" and "User Defined Buffer"
Baud rate	1 GBit/s, full-duplex
Data transport layer	Ethernet II, IEEE 802.3
Reference to firmware / stack version	V1.3 / V1.1

Table 24: Technical data CC-Link IE Field Slave protocol

12.2.3 Protocol coupler

Category	Parameter	Value
Data buffers cyclic communication	From PROFINET to CC-Link IE Field (effectively usable data size)	1432 bytes
	From CC-Link IE Field to PROFINET (effectively usable data size)	1428 bytes
Data Buffer acyclic communication	Quantity of Message Interface Buffer from PROFINET to CC-Link IE Field with "handshake" procedure	1 with 8-buffer-FIFO
	Quantity of Message Interface Buffer from CC-Link IE Field to PROFINET with "handshake" procedure	1 with 8-buffer-FIFO
	Quantity of User Defined Buffers without "handshake" procedure	256
	Maximum data size per acyclic message (limited by SLMP)	960 bytes

Table 25: Technical data protocol coupler

13 Decommissioning/Disposal

13.1 Putting the device out of operation

NOTICE**Danger of Unsafe System Operation !**

To prevent personal injury or property damage, make sure that the removal of the device from your plant during operation will not affect the safe operation of the plant.

- Disconnect all communication cables from the device.
- Disconnect the power supply plug.
- Remove the device from the DIN rail as described in section *Removing device from Top Hat Rail* [► page 31].

13.2 Disposal of waste electronic equipment

Important notes from the European Directive 2012/19/EU "Waste Electrical and Electronic Equipment (WEEE)"

**Waste electronic equipment**

This product must not be treated as household waste.

This product must be disposed of at a designated waste electronic equipment collecting point.

Waste electronic equipment may not be disposed of as household waste. As a consumer, you are legally obliged to dispose of all waste electronic equipment according to national and local regulations.

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