

netX – The next Generation of Communication

netX 90 - Multi-protocol network controller **netX 4000** - High-end automation platform





netX 4000

www.hilscher.com

netX Technology

FOR THE WORLD

OF INDUSTRIAL

COMMUNICATION

Key Features

- The universal communication platform Connecting to all networks with only
- As master or slave for all Fieldbus and Real-Time Ethernet systems
- Consistent, continuous interface across all systems
- One stop shop for hardware and software
- Open technology for your own applications
- Licensed and pre-certified Loadable Firmware (LFW)
- High flexibility when selecting the communication system

Your Benefit

- Connecting to all networks with only one controller
- One contact person One stop
- Reduced development effort thanks to consistent interfaces for hardware and software across all systems
- Reduced product, storage and administration costs
- Space requirements of the interface is reduced to a minimum
- Access to all markets of factory and process automation
- Flexibility in view of future product generations

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COMMUNICATION

- Communicate over all Fieldbus and Real-Time Ethernet Systems
- Forward-looking IoT protocols MQTT and OPC UA, as well as TSN 100 Mbit (further informationen at IoT-booklet)
- We offer a Loadable Firmware (LFW):
- Flexible selection of licensed and pre-certified protocol stacks
- Simple integration thanks to consistent API and fast update mechanism
- Just pay for the license. We provide updates for one year exempt from charges.



"Our next-generation technology combines application and secured multiprotocol communication on the smallest footprint"

> ——— Sebastian Hilscher Department Manager **netX**

APPLICATION



INTELLIGENT CONFIGURATION, DEVELOPMENT AND DEBUGGING – **netX Studio (netX 90)**

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netX Studio - Pin assignment as graphical user interface

- Integrated development environment from Hilscher based on Eclipse
- GCC 4.5.2 Compiler, Python based WAF Built scripts, Open OCD Debugger, Flasher
- Pin assignment graphical user interface (GUI) and netX code-samples
- Low-level driver free of charge (UART, SPI, I2C, CAN 2.0B, IO-Link V1.1 Controller, MLED, GPIO/32-bit Timer, EnDat 2.2 /SSI, BiSS/SSI, Flash Controller, ETH MAC, ADC SAR, SQI/SPI, Memory/Extension Bus)
- cifX API as software driver for LFW stacks
- FreeRTOS as reference implemented

LINUX BOARD SUPPORT PACKAGE FOR YOUR AUTOMATION PLATFORM – **netX 4000**

The Yocto-based Linux Board Support Package contains all the components you need to get started quickly with your application development.

We provide comprehensive documentation and examples for this purpose.



Linux Board Support Package (BSP):

- Barebox Bootloader
- Yocto GCC Compiler Toolchain
- Wiki Pages
- Code-Samples
- Linux Patches
- Linux Kernel driver
- MMC, NAND, UART, GPIO, SPI, I2C, cifX
- GMAC, USB 2.0 Host + Device, PCIe

Hilscher Linux Service:

- Professional support as a service
- Custom development service

GitHub

Download now your BSP free of charge on GitHub github.com/hilscher/netx4000-linux-bsp



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Documentation and further information on: kb.hilscher.com/x/q8KxB





Interface Interface LVDS PHY LED LVDS PHY LED netX 90 XC 0 XC 1 10 mm x 10 mm 144-pin BGA CPU CPU _____GPIO 0-3 / Tin xPic xPic D-TCM 8 kB 100 MHz I-TCM 8 kB 100 MHz ARM[®] Cortex[®] M4 ARM[®] Cortex[®] M4 FPU 100 MHz 100 MHz Memory idpm 0 0-7 / Timer Flash 1024 kB ECC 1 RAM 576 kB ECC System / Timer System / Timer Shared ROM 96 kB WDC 0-1 Memory SysTime Flash 512 kB ECC Extension Bus Host Interface Memory I/F RAM 64 kB ECC Communication Application BD-NX90-V6

- First Industrial Ethernet node in 10x10 mm² with two ARM[®] Cortex[®]-M4 processor cores, on-chip Flash, analog/mixed signal, and integrated PHYs
- Fulfills the highest demand on flexibility, determinism, and performance in terms of multiprotocol capability and low latency for short cycle times
- Enables developers to implement a profound secure by design concept compliant to the IEC 62443 series for industrial automation security
- Improves the application design of high-reliable systems with builtin diagnostics and enhanced data integrity for IIoT-enabled services



netX 4000/4100





* On-chip memories and caches with ECC

- First Industrial Ethernet node with 4-port multiprotocol capability, two ARM[®] Cortex[®] processor cores, and high-speed peripherals like PCIe, Gigabit Ethernet, and USB 2.0
- Fulfills the highest demand on flexibility, determinism, and performance in terms of multiprotocol master and slave capability, and low latency for short cycle times
- High-performance application processors for Linux, combined with security support and Gigabit Ethernet, are the easiest way to build IIoT enabled devices.

(**netX** 4100 without application part)

SOFTWARE **DEVELOPMENT BOARDS**

NXHX 90-JTAG



NXHX 4000-JTAG



- Software development board for the new Hilscher SoC familiy
- Large hardware- and software-package to immediately start your development
- Host interface connector
- 2-port Real-Time Ethernet RJ45 connectors for communication
- Gigabit Ethernet connectors and optional mini PCIe interface on-board (only NXHX 4000-JTAG)
- Encoder Interface for BiSS / EnDAT and FTDI chip on-board (only NXHX 90-JTAG)
- Additional plug-in modules as accessories available

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Documentation, Examples and further information on kb.hilscher.com/display/netX





READY TO USE

Accessories	NXHX 90-JTAG	NXHX 4000-JTAG
NXHX-FTDI Serial Dual-Port Memory via USB device at host interface		
NXPCA-PCI Parallel Dual-Port Memory at host interface	\checkmark	×
Fieldbus interface adapter modules PROFIBUS, CANopen, DeviceNet, CC-Link	\checkmark	\checkmark
AIFX detached fieldbus interface devices PROFIBUS, CANopen, DeviceNet, CC-Link	×	\checkmark
NXHX-RS232 Serial interface adapter	\checkmark	\checkmark
NXHX-ENC Encoder Modul	\checkmark	×
NXAC-POWER Power supply unit	\checkmark	\checkmark

HILSCHER SERVICES FROM CONCEPT TO CERTIFIED DEVICE

Kick Off Meeting

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HARDW, WORKSH

In a first workshop we offer the opportunity to develop your concept together with our experts. In this concept Meeting we explain the functionality and differences of the **netX** chips and examine together with your experts, how these could be used for your application.

Based on this, we can roughly estimate the development effort and risks on communication side. If the development effort is too much, Hilscher can also take over some parts or the complete development and / or even the production.

Schematic Review

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CONCEPT (

Hardware-Services from Hilscher Hardware Design-In Workshop

You are not sure what components are needed for your hardware design or just need a few hints for your layout? Then we offer a workshop about how to setup your netX design correctly and give some best practices about it.

Schematic Review

You have your Hardware finished designed, but you are not sure whether the **netX** with all its peripherals is connected properly? Then we offer to check the schematic for you.

Basic trainings from Hilscher

For the implementation of your concept, there are two types of license models available:

- Your application is running on the **netX** (Linkable Object Module)
- The netX is used as a pure communications chip and application is running on a separate host processor

To give a first introduction we offer for both scenarios a workshop.

Linkable Object Module LOM

The Linkable Object has the advantage, that the complete set of the **netX** peripherals could be used. The workshop will give a simple introduction to: the Hilscher tools, development environment, as well as to the Hilscher own real-time kernel rcX.

Loadable Firmware LFW

With the loadable firmware you use the protocol stack as complete finished firmware, where the **netX** is seen as "black box". The workshop shows how to download the Loadable firmware via the Hilscher tools to the **netX** and afterwards communicate over the dual port memory with it.

Protocol Stack

In addition to the basic topics, Hilscher offers for each protocol, a protocol Workshop. In this workshop the basics of the protocol itself and how these could be implemented with the Hilscher stack is explained.

Troubleshooting

During your development an error occurs and you can not afford to waste time with troubleshooting or you were at the pre-certification and encountered an problem and do not know how to fix it?

Then we offer the opportunity to analyze your code together with our experts, to find out where the error is and how to fix it.

Certification support by Hilscher

Is your software and hardware completely developed, Hilscher provides several assistance on the way to a certified device. Beginning with a precertification test in our house, up to complete certification of your device by an accredited certification laboratory.



DEVICE TEST & CERTIFICATION

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Interoperability tests in Hilscher Test center

You don't have the PLC of the market leader in your office or no time to familiarize with the operation? Then you can come along with your device and set it up together with an experienced service technician in our test center. After setup your device is running together with other in the market available devices on the same bus and checked that they don't interfere with each other. CERTIFIED DEVICE

HILSCHER SERVICES BASIC TRAININGS AND CERTIFICATIONS



Trainings

NXS-PNS

PROFINET Stack and Protocol Workshop

NXS-EIS

EtherNet/IP Stack and Protocol Workshop

NXS-ECS

EtherCAT Stack and Protocol Workshop

NXS-PLS POWERLINK Stack and Protocol Workshop

NXS-S3S Sercos Stack and Protocol Workshop

NXS-TS

Troubleshooting Workshop

netX 90

Application Development Workshop

netIOT

Interface Workshop

Certifications

NXS-PNS-RT-TEST

Conformance test according to latest PROFINET RT specifications

NXS-PNS-IRT-TEST

Conformancetest according to latest PROFINET IRT specifications

NXS-EIS-TEST

Conformance test according to latest EtherNet/IP specifications

NXS-ECS-TEST

Conformance test according to latest EtherCAT specifications

NXS-S3S-TEST

Conformance test according to latest Sercos specifications

In addition, we offer on-site or commissioning support, expert support or a service assignment on request.

HW-Services

NXS-HWR Schematic Review

NXS-IEEE 100BASE-TX test to ANSI X3.263-1995, IEEE802.3-2012 subclause 25 More information about our Workshops can be find here: www.hilscher.com/services/ netx-guided-development/



Reduction of your training period

- Support in every development stage
- Avoid mistakes by Know-how transfer
- Benefit by our development experience
- Fast "time-to-market"

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