netX 90

...IT'S ALL YOU NEED!

netx
networX on chip
Hilscher
ON SALE NOW!
NETX 90

- **Smallest multiprotocol SoC with additional Cortex-M4 application processor**

- **Built-in security features for secure field- and cloud-connectivity**

- **Supports all Industrial Ethernet, Fieldbus- and IIoT standards**

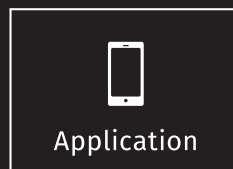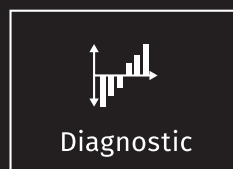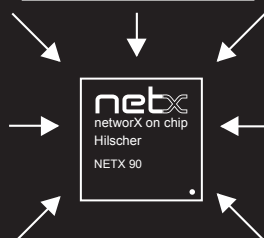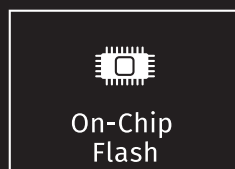- **Energy-efficient SoC with lowest power consumption**

COMMUNICATION

PROFINET®
EtherCAT.
Industrial Ethernet

PROFIBUS®
CANopen
Fieldbus

OPC UA
MQTT .org
Industrial IoT

Security

On-Chip Flash

Diagnostic

IoT
Internet of Things

netx
networX on chip
Hilscher
NETX 90

10010101
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Multiprotocol

Communication

Application

APPLICATION

Motion

Encoder

Sensors

IP67 / IO

hilscher
COMPETENCE IN
COMMUNICATION

www.hilscher.com/netX90

INDUSTRIAL COMMUNICATION SOC – netX 90

Innovative Architecture

- Two ARM® Cortex®-M4 high-performance processor cores, each with 125 DMIPS, to separate the communication tasks from the application tasks
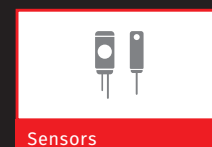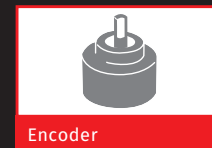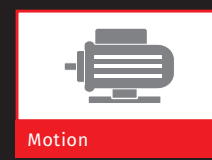
- Optimized hardware design with integrated DC/DC converter, on-chip BOD and POR circuits

- On-Chip-Flash and –SRAM, integrated Fast Ethernet PHYs and analog/mixed signal IPs

Built-in Security

- Hardware support for cryptographic operations and security functions for protocols such as HTTPS, MQTT, and OPC UA

- Secure boot option with multiple security levels

- FIPS 140-2 compliant built-in cryptographic algorithms for highest encryption with different key lengths of up to RSA-4096, ECC-512, and AES-256

Built-in Diagnostics

- Enables the application design of high-reliable systems with built-in diagnostics and enhanced data integrity for IIoT-enabled cloud services

- High product reliability and robustness due to integrated power watch, clock supervisor, and fully ECC equipped on-chip memory

- Applicable for predictive maintenance by dint of onchip functions for voltage monitoring, time stamping, and die temperature sensing

Uniform Application Software Interface

- Overlaid structured software layout with DPM channel access functions to the industrial communication protocol stack as consistent and uniform API

- High-speed access from either the external host interface or the internal host application, precisely clock synchronized with the network cycle time

- Ease of use, fast and hassle-free protocol stack implementation that enables application developers to set up a prototype in a few hours

netX 90 block diagram

Interface								Interface
I2C0-1	LVDS PHY	LVDS PHY	**netX 90**					UART0-1
GPIO0-3/Timer	xC0	xC1	10 mm x 10 mm 144-pin BGA					I2C0-1
MLED0-3	**CPU**		**CPU**					SPI0-3

netX 90 — 10 mm x 10 mm 144-pin BGA

Communication side: Interface — I2C0-1, GPIO0-3/Timer, MLED0-3; LVDS PHY xC0, LVDS PHY xC1; CPU — xPIC 100 MHz, D-TCM 8 KB, I-TCM 8 KB; ARM Cortex-M4 100 MHz; Memory — Flash 1024 KB ECC, RAM 576 KB ECC, ROM 128 KB; Data Switch; System / Timer — DMA0-3, WDC0-1, SysTime0-1; Host Interface — DPM, SPM0-1.

Shared: UART, ETH MAC, CryptoCore, Extension Bus Memory I/F, SQI XIP, 2x ADC0-1, TempSensor, TPIU, JTAG/SWD, BOD, POR, DC/DC, OSC/PLL, RC-OSC, ClockSup.

iDPM

Application side: CPU — D-TCM 8 KB, I-TCM 8 KB, xPIC 100 MHz; ARM Cortex-M4 FPU 100 MHz; Data Switch; System / Timer — DMA0-3, WDC0-1, SysTime; Interface — UART0-1, I2C0-1, SPI0-3, SQI0-1, CAN0-1, IO-Link0-7, SSI/BiSS0-1, EnDat2.20-1, MPWM0-5, QuadDec0-1, 2x ADC0-7, GPIO0-7/Timer, MLED0-7, PIO0-28; Memory — Flash 512 KB ECC, RAM 64 KB ECC.
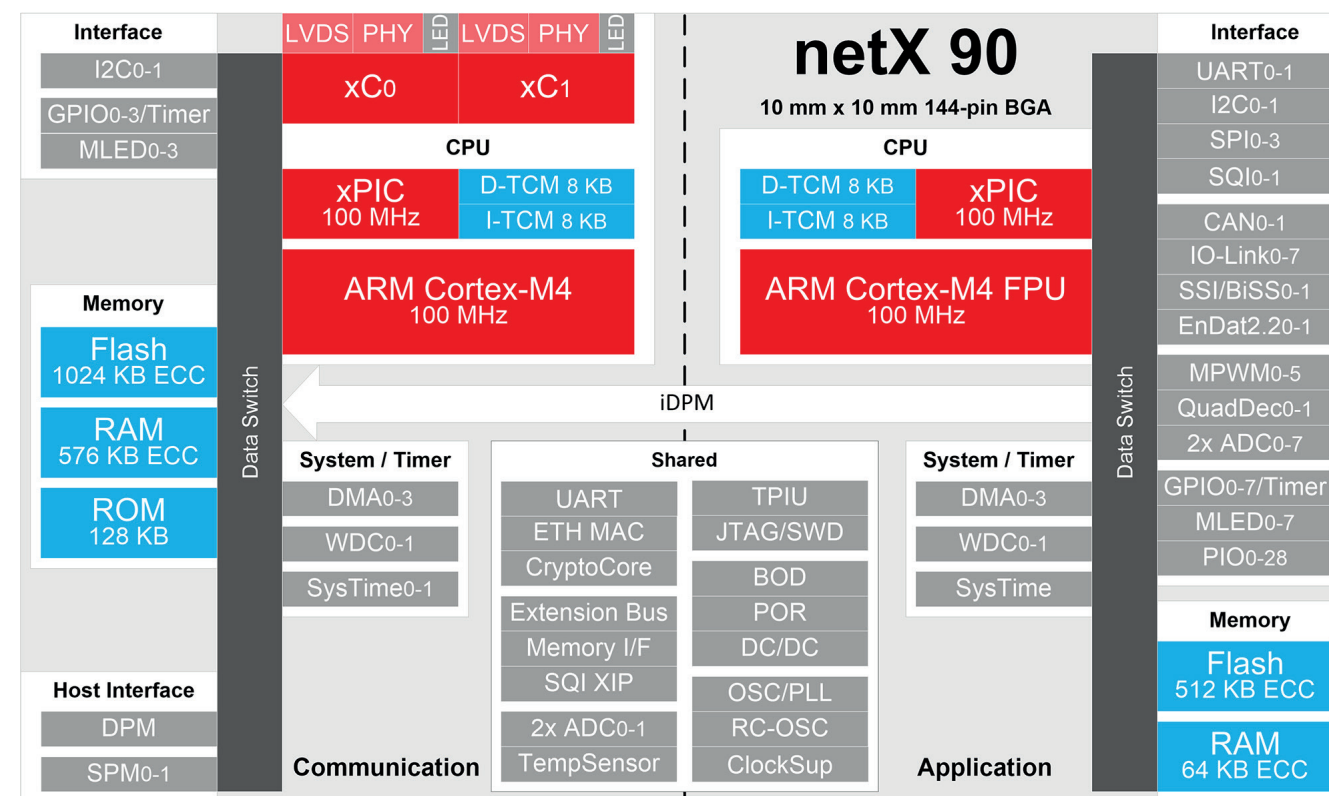
Unmatched Flexibility

- Ready for all popular Industrial Ethernet and Fieldbus protocols due to programmable dual-channel xC subsystem, with switch and IEEE 1588 functionality

- Flexibly adapts to emerging standards and future network requirements such as TSN, PROFINET „High-Performance Profile" and CC-Link IE Field Basic

Rich Peripheral Set

- Rich set of peripherals for connectivity to interface sensor-specific ICs or submodules with fast I/O processing for electronic controls

- Enhanced functional feature set with industry related on-chip peripherals such as 2x EnDat, 2x BiSS, 2x SSI, 8x IO-Link, 2x CAN, and 3x MAC

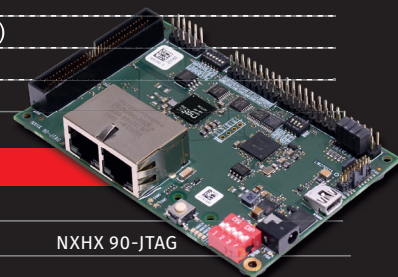- Integrated LVDS PHYs, which provide a low-cost backplane bus solution

DeviceNet EtherNet/IP MQTT OPC UA EtherCAT® PROFIBUS PROFINET Modbus CANopen CC-Link sercos the automation bus ETHERNET POWERLINK VARAN

PRODUCT INFORMATION
TECHNICAL DATA

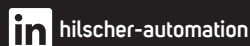| SoC Features	Communication	Application
ARM® Processor	Cortex®-M4 at 100 MHz with MPU	Cortex®-M4 at 100 MHz with MPU and FPU
Hilscher 32-bit RISC	xPIC at 100 MHz with 2x 8 KB TCM	xPIC at 100 MHz with 2x 8 KB TCM
SRAM	576 KB	64 KB
Flash	1024 KB	512 KB
Mask ROM	128 KB	-
DMA Controller	4 channels	
WDC (ARM / xPIC)	1 / 1	1 / 1
Timer (ARM / xPIC)	3x 32-bit / 3x 32-bit	3x 32-bit / 3x 32-bit
xC Subsystem	2 channels	-
IEEE 1588 SysTime	2	1
Fast Ethernet PHY	Dual-port, FX support	-
100 Mbps LVDSPHY	Dual-port	-
Ethernet MAC	10 / 100 Mbps, MII	
UART / SPI / SQI / I²C / CAN	1 (Shared) / - / - / 2 / -	3 / 4 / 2 (Master only, with SPI mode) / 2 / 2
IO-Link V1.1 Controller	-	8 channels
MLED (PWM tuned)	4	8
HIF PIO / PIO / GPIO / MMIO	- / - / 4 / -	Up to 41 / 29 / 8 / 18
Timer (PWM, IC/OC)	4x 32-bit	8x 32-bit
Motion PMW Unit	-	1
ADC SAR (12-Bit, 2 Msps)	2x 2 channels and 2x 8 channels	
Quadratur Decoder	-	2
EnDat 2.2 (Master E6)	-	2 (with RTM)
BiSS / SSI (Master BiSS C)	-	2 / 2
Parallel (DPM)	8/16-bit (Read access min. 55 ns)	Internal 32-bit
Serial (SPM)	2x SPI/SQI (Up to 125 MHz/33 MHz)	-
MAC (PHY Modus)	MII (10/100 Mbps)	
SRAM / NOR / NAND / SDRAM	✓ / ✓ / - / ✓ (8/16-bit)	
SD/MMC / SDIO	SPI mode / -	
SQI (XIP)	✓	
Crypto Core	SSL/TLS accelerator, up to RSA-4096, ECC-512, AES-256 and SHA-512	
Secure Boot	Mask ROM Code, EMSA-PSS	
Built-in support	Security levels, AHB Firewall	
Debug / Trace	JTAG/SWD, 4-bit TPIU	
Boundary Scan	JTAG	
DC/DC / POR / BOD	✓ / ✓ / ✓	
Thermal diode	✓	
Clock Supervisor	Xtal (RC-Osc)	
Power Supply	Single 3.3V	
Temperature range	T_a -40°C … +85°C / +105°C* ($T_{j\,max}$ ≤ +125°C)	
Power consumption	≤ 1W	
Package dimension	144-pin BGA, 10x10 mm², 0.8 mm Ball Pitch	

*Depends on the thermal characteristics of the embedded design and the targeted mission profile (see netX 90 Design-In Guide)

Article Overview

NETX 90	2270.000	netX 90 Network Controller
NXHX 90-JTAG	7833.000	Software-Development board for netX 90

NXHX 90-JTAG

Note: Technical data may be changed without further notice.

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