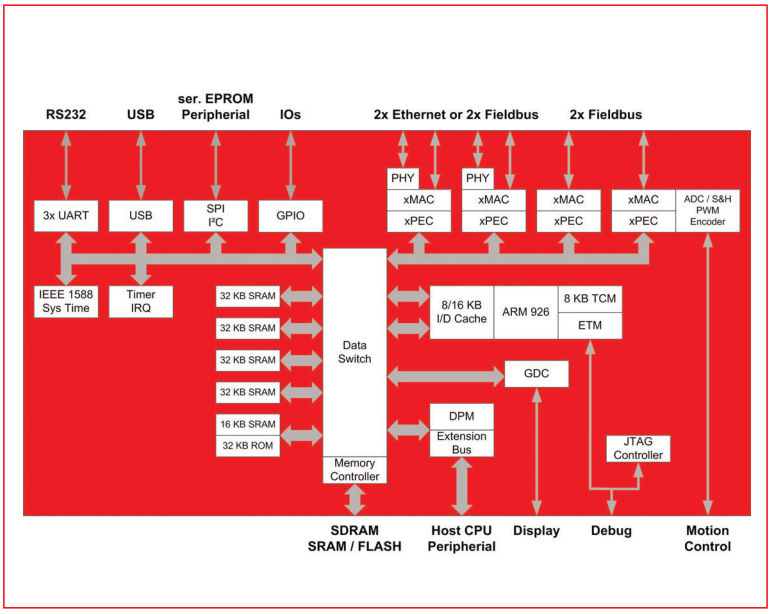
# netX 100/500 – networX on chip
# The future of communication

## Description

- Flexible “high end” network controller or highly integrated single chip solution for applications and communication
- Four communication channels as Real-Time Ethernet or fieldbus interface individually configurable
- New system architecture optimized for communication and high data throughput
- 32-Bit/200MHz CPU ARM 926 with 200 MIPs computing power for Windows CE and Linux
- Dual-port-memory, AD converter and graphic controller on chip




The netX is a highly integrated network controller with a new system architecture optimized for communication and maximum data throughput.

Based on the 32-Bit CPU ARM 926EJ-S cycled at 200 MHz, it possesses a memory management unit, caches, DSP and Java extensions. The internal memory of 144 KByte RAM and 32 KByte ROM that contains the Bootloader is sufficient for smaller applications whereas for Windows CE and Linux it is supplemented with the 32 Bit Memory Controller memory externally with SDRAM, SRAM or FLASH. The connection to a primary Host is carried out via the Dual-port-memory interface, which is configurable for stand-alone applications also as a 16 Bit extension bus. Comprehensive peripheral functions, serial interfaces such as UART, USB, SPI, I²C as well as the integrated graphic controller permit a wide spectrum of applications. Yet, it is the central data switch and the four freely configurable communication channels with their own intelligence that is the main characteristic of the netX as a "high end” network controller.

The data switch connects via five data paths to the ARM CPU and the communication, graphic and Host controllers with the memory or the peripheral units. In this way the controllers transmit their data in parallel, contrary to the traditional sequential architecture with only one common data bus and additional bus allocation cycles.

The controllers of the four communication channels are structured on two levels and are identical to each other. They consist of dedicated ALUs and special logic units that receive their protocol functions via Microcode. Two channels posses an additional integrated PHY for Ethernet.
The Medium-Access-Controller xMAC sends or receives the data according to the respective bus access process and encrypts or converts these into Byte depictions.
The Protocol Execution Controller xPEC compiles these into data packets and controls the telegram traffic. These are exchanged in DMA blocks over the memory of the ARM. In addition, every channel has a Dual-port-memory available for status information or as local data picture.

With the intelligent communication ALUs, the netX carries out the most varied protocols and protocol combinations and can synchronize them independently of the reaction time of the CPU – an absolutely new feature in industrial communication technology.

netX
networX on chip
Hilscher
NETX 500 A
0535LU601 ARM

**Supported Real-Time-Ethernet-Systems**

EtherCAT Technology Group
EtherNet/IP
ETHERNET POWERLINK
PROFINET INDUSTRIAL ETHERNET
SERCOS interface
Modbus IDA MEMBER

**Supported Fieldbus-Systems**

Master only
AS-Interface
CANopen
Slave only
CC-Link
DeviceNet
PROFIBUS PROCESS FIELD BUS

# netX 100/500 – details

## Technical Data

| | | | netX 100 | netX 500 |
|---|---|---|---|---|
| **Core** | | | | |
| Processor | ARM 926EJ-S, 200 MIPS, ARMv5TE-command set with DSP- and Java-extension | | X | X |
| Cache | 16 KByte commands / 8 KByte Data | | X | X |
| Tightly coupled memory | 8 KByte Data | | X | X |
| Memory Managment Unit | Windows CE- and Linux-Support | | X | X |
| **Internal Memory** | | | | |
| RAM | 144 KByte, of this 16 KByte with external voltage supply | | X | X |
| ROM | 32 KByte with Bootloader | | X | X |
| **Ethernet-Interface** | | | | |
| Ports | 2 x 10BASE-T/100BASE-TX, Half-/Full-Duplex, IEEE 1588 time stamp | | X | X |
| PHY | Integrated, Auto-Negotiation, Auto-Crossover | | X | X |
| Real-Time-Ethernet | EtherCAT with three FMMUs and four Sync-Manager | | X | X |
| | Ethernet/IP | | X | X |
| | Modbus IDA | | | |
| | Powerlink with integrated Hub | | X | X |
| | PROFINET RT and IRT with integrated Switch | | X | X |
| | SERCOS-III | | X | X |
| **Fieldbus-Interface** | If Ethernet is not used, then two additional fieldbusses are available | | | |
| | The systems can be combined as desired. | Quantity | 1 | 2 |
| Fieldbus | AS-Interface, Master only | | X | X |
| | CANopen / DeviceNet, Master and Slave | | X | X |
| | CC-Link, Slave only | | X | X |
| | PROFIBUS, Master and Slave | | X | X |
| **Periphery** | | | | |
| Color-LCD-Controller | For TFT-panels, Color-STN- and Mono-STN-panels | | | X |
| | Resolution 320 x 200 to 640 x 480, color depth 1, 2, 4, 8, 16-Bit | | | |
| Real-Time clock | With external voltage supply | | | X |
| IEEE 1588 System Time | 32-Bit second counter, 32-Bit Nano second counter | | X | X |
| USB | Revision 1.1, 12 MBaud Full-Speed, Host- or Device-Mode | | X | X |
| UART | 16550 compatible, max. 3 MBaud, RTS/CTS support | Quantity | 3 | 3 |
| I²C | | | X | X |
| SPI | Master- and Slave-Mode, max. 10 MHz, 3 Chip-Select-Signals | | X | X |
| AD-Converter | 2 x 4 Channels with 1MS/s Sample&Hold and 10 Bit-resolution | | X | X |
| | Single ended, Common Analog Ground, external reference voltage | | | |
| PWM | 0–20 kHz/12-Bit-resolution 0–80 kHz/10-Bit-resolution | | X | X |
| Encoder | 2 Channels, Impuls quadruplication, digital input filter | | X | X |
| General I/Os | 3.3 V/6 mA | Quantity | 16 | 16 |
| Status LEDs | 2 LEDs two-colors, 3.3 V/9 mA | | X | X |
| **Memory-Interface** | | | | |
| Memory bus | 32-Bit-Databus / 24-Bit-Address bus | | X | X |
| Address region | 256 MByte SDRAM / 64 MByte Flash | | X | X |
| Memory modules | SDRAM, SRAM, Flash | | X | X |
| **Host-Interface** | | | | |
| Dual-port-memory-mode | 8/16-Bit-Databus, 64 KByte configurable in 8 Blocks, emulated by internal RAM | | X | X |
| Extension-Mode | 8/16-Bit-Databus, 24-Bit-Address bus, Bustiming adjustable | | X | X |
| PIO-Mode | Freely programmable Inputs and Outputs | Quantity | 53 | 53 |
| **Debug-Interface** | | | | |
| JTAG | ARM-Processor and Boundary-Scan | | X | X |
| ETM | Embedded Trace Macrocell, ETM9 V2 Medium Size | | X | X |
| **Operating conditons / housings / various data** | | | | |
| System cycles | 200 MHz ARM / 100 MHz Periphery | | | |
| Signal level | 3.3 V | | | |
| Power supply | 1.5 V for Core | | | |
| | 3.3 V for Input/Output | | | |
| Operating temperature | without heat sink | | –40..+70 °C | –40..+70 °C |
| | with heat sink 10°/W | | –40..+85 °C | –40..+85 °C |
| Storage temperature | | | –65..+150 °C | –65..+150 °C |
| Power consumption | PHYs switched off | typ. | 1.0 W | 1.0 W |
| | PHYs switched on | typ. | 1.5 W | 1.5 W |
| Housing | PBGA, 1 mm raster | Pins | 345 | 345 |
| | Dimensions | mm | 22 x 22 | 22 x 22 |

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

## Product Overview

| *Article designation* | *Article number* | *Article* |
|---|---|---|
| netX 100 | 2220.000 | netX 100 |
| netX 500 | 2210.000 | netX 500 |

Note

*For application Hilscher master protocol a master license must be ordered separately. These will delivered as Security EPROMs and is provided in the design. Further information: www.hilscher.com/netx*


### Headquarters

**Germany**
Hilscher Gesellschaft für Systemautomation mbH
Rheinstrasse 15
65795 Hattersheim
Phone: +49 (0) 6190 9907-0
Fax: +49 (0) 6190 9907-50
E-Mail: info@hilscher.com
Web: www.hilscher.com

### Subsidiaries

**China**
Hilscher Ges.f.Systemaut. mbH
Shanghai Representative Office
200010 Shanghai
Phone: +86 (0) 21-6355-5161
E-Mail: info@hilscher.cn

**France**
Hilscher France S.a.r.l.
69500 Bron
Phone: +33 (0) 4 72 37 98 40
E-Mail: info@hilscher.fr

**Italy**
Hilscher Italia srl
20090 Vimodrone (MI)
Phone: +39 02 25007068
E-Mail: info@hilscher.it

**Japan**
Hilscher Japan KK
Tokyo, 160-0022
Phone: +81 (0) 3-5362-0521
E-Mail: info@hilscher.jp

**Switzerland**
Hilscher Swiss GmbH
4500 Solothurn
Phone: +41 (0) 32 623 6633
E-Mail: info@hilscher.ch

Hilscher Swiss GmbH
Branch Office East Switzerland
Embedded Systems
9444 Diepoldsau
Phone: +41 (0) 71 737 7575
E-Mail: info@hilscher.ch

**USA**
Hilscher North America, Inc.
Lisle, IL 60532
Phone: +1 630-505-5301
E-Mail: info@hilscher.us

### Internet Shop

www.hilscher-shop.com


hilscher
COMPETENCE IN COMMUNICATION

05/2007 V3 GB