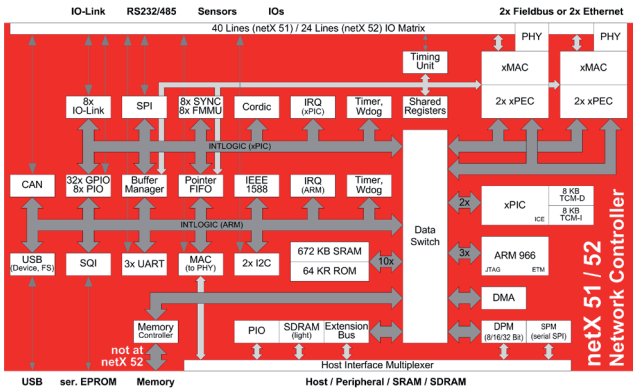
netX 51

More functions & higher Performance for Real-Time Ethernet

- Flexible „high end“ network controller equipped with a host interface or stand-alone solution for digital I/Os
- Two communication channels for Real-Time Ethernet equipped with PHY or fieldbus
- Extended communication function support amongst others, PROFINET V2.3 - Dynamic Frame Packing and IO link V1.1
- Second RISC CPU for time-critical IO tasks
- Additional CAN and MAC controller
- Fast SPI host interface with Read/ Write functions



Real-Time Ethernet systems are successfully used and further developed in many applications. The demands made on the resources and functionalities of network controllers are therefore increasing. The network controllers netX 51 / 52 bank on the further developed netX 50 communications architecture, which features considerably more internal storage capacity and additional function units. The netX 51 hardware is compatible with the netX 50. The netX 52 contains the same silicon, but dispenses with an external memory bus, and due to its smaller housing, is more cost-effective. These three components are thus optimized for designing modular or compact slaves, or as a Real-Time Ethernet controller on a high-performing CPU. The communication channels take all actual and future requirements from the PROFINET Specification V2.3, such as „Dynamic Frame Packing,“ into consideration. Furthermore, the new PHYs manufactured by Renesas are applied, ensuring faster throughput times and expanded diagnosis properties.

Through the internal memory for more than 670 KByte, it is possible to build together with a QSPI Flash very compact solutions with twice the performance of netX 50. For processing the fast IOs, the application is provided with a second RISC CPU. It works in parallel to ARM and significantly relieves the demands made on the ARM software via short bus cycle times. Typical applications are IO-Link Master Gateways. The xPIC takes over the IO-Link data transfer, leaving the ARM completely available for processing the transmission protocol to the master. A third Ethernet interface for connecting a PC for diagnosis and configuration purposes is implemented. Alternatively, it can also be used for connecting the netX to a host CPU. The netX then behaves like a PHY on this MII interface.

Some Real-Time Ethernet systems use the CANopen object models or the same communication services such as Ethernet/IP and DeviceNet. This results in the task of connecting CAN as the „legacy“ network to the Real-Time Ethernet system. Up to now, that entailed using an expensive netX 100 controller, with its three communication channels. As an alternative, a dedicated CAN controller is now available.

With this possibility, the netX 51 / 52 is so much more than just a Real-Time Ethernet interface chip equipped with a dual-port memory.

netX networX on chip Hilscher NETX 51 A 1137IU900 ARM

Supported Real-Time Ethernet Systems

EtherCAT
EtherNet/IP
ETHERNET POWERLINK
Modbus
PROFINET
sercos the automation bus
VARAN

Supported Fieldbus Systems

CANopen
CC-Link
DeviceNet
PROFIBUS

Other communications systems

IO-Link
SmartWire-DT™ The easy way to connect

hilscher COMPETENCE IN COMMUNICATION

Technical Data / Product Overview

Technical Data

Parameter	Value		
Computer Core			
Processor	ARM 966E-S, 100 MIPS, ARMv5TE instruction set with DSP extension, timer, interrupt and DMA controller		
	xPIC, 32-bit RISC, 100 MIPS, TCM: 8 KByte data, 8 KByte commands		
Internal Memory			
RAM	672 KByte		
ROM	64 KByte with bootloader		
Ethernet Interface			
Ports	2 x 10BASE-T / 100BASE-TX, half/ full duplex, IEEE 1588 time stamp		
PHY	Integrated, auto-negotiation, auto-crossover		
Real-Time Ethernet	EtherCAT with eight FMMUs and eight sync managers		
	Ethernet/IP		
	Modbus IDA		
	POWERLINK with integrated hub		
	PROFINET RT and IRT with integrated switch, according to PROFINET V2.3		
	Sercos		
	VARAN		
Fieldbus Interface	In place of Ethernet, each channel can be configured as a fieldbus controller.		
	The systems can be freely combined.		
Fieldbus	AS interface, Master only		
	CANopen, Master and Slave		
	CC-Link, Slave only		
	DeviceNet, Slave only		
	PROFIBUS, Slave only		
Peripherals			
IO-Link Controller	8 channels, data link layer control via xPIC, IO-Link V1.1		
MII Interface	Configurable in PHY or MAC mode, DMA support for Ethernet frames, HAL API operates with xPIC		
CAN Controller	SJA1000 compatible		
IEEE 1588 system time	32-bit second counter, 32-bit nanosecond counter		
USB	Revision 1.1, 12 MBaud full speed, device mode		
UART	16550-compatible, max. 3 MBaud, RTS / CTS support	Quantity	3
I²C	Master and Slave mode, 50 KHz up to 3.4 MHz, 16-bit FIFO	Quantity	2
SPI / SQI with XiP	Master and Slave mode, max. 10 MHz, 3 chip-select signal	Quantity	1 / 1
General IOs	As multiplex matrix of the internal periphery controller / 3.3 V / 6 mA	Quantity	40
Status LEDs	LEDs dual colored, 3.3 V / 9 mA	Quantity	2
Memory Interface			
Memory bus	32-bit data bus / 24-bit address bus		
Address range	256 MByte SDRAM		
Memory components	SDRAM or SRAM		
Host-Interface			
	In part, the modes can be operated in parallel with an 8- or 16-bit data bus range		
Dual-Port Memory Mode	8 / 16 / 32-bit data bus, 64 KByte configurable in 8 blocks, emulated via internal RAM		
Extension Mode	8 / 16 / 32-bit data bus, 24-bit address bus, adjustable bus timing		
SPI Mode	Slave with integrated Read/Write controller of the DPMs, 125 MHz		
MII Mode	Signals of the MII interface mapped in host interface		
SDRAM Mode	16 / 32-bit SDRAM, max. 64 MByte		
PIO Mode	Freely programmable inputs and outputs	Quantity	53
Debug Interface			
JTAG	ARM processor and boundary scan		
ETM	Embedded Trace Macrocell, ETM9 V2 medium size		
Operating Requirements / Housing / Miscellaneous			
System cycle	100 MHz		
Signal level		V	3.3
Power supply	for the core	V	1.5
	for inputs/outputs	V	3.3
Operating temperature	without heat sink	°C	–40 ... +70
	with heat sink 10°/W	°C	–40 ... +85
Storage temperature		°C	–65 ... +150
Power consumption	PHYs switched off, typically	W	0.8
	PHYs switched on, typically	W	1.5
Housing	PBGA, 1 mm raster	Pins	324
	Dimensions	mm	19 x 19

Note: All technical data are provisional and subject to change without further notice.

Overview

Article Description	Article Number	Article
NETX 51	2231.001	netX 51 Network Controller

Note: When using a Hilscher Master Protocol, a Master license must be separately ordered. It will be delivered in the form of a Security EPROMs, and is foreseen for the design. For further information, please refer to www.hilscher.com

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