

XMC-CPU/T10

XMC/PMC 64-bit PowerPC® T1022 Processor Board with FPGA



High-End CPU for Test and Application

- NXP® PowerPC® QorIQ® T1022, 1.2 GHz, 64-bit architecture, Double Precision Floating Point Unit, Ethernet, ECC-RAM
- Xilinx® Artix®-7 FPGA (XC7A75T) for local applications
- RTC
- 2x Gigabit-Ethernet, 1x USB 2.0 (Host)
- 62 I/Os at connector PMC-P4 configurable via FPGA as single ended (LVTTTL) or 31 LVDS pairs

Health Features and Fallback Flash

- Local voltage and temperature monitoring
- Fail save firmware update by means of fallback Flash
- Watchdog
- Over temperature protection

Wide Range of Software Support

- QNX®, VxWorks® and Linux® BSPs available
- Example source code for the FPGA included in the BSPs
- Universal boot loader: "Das U-Boot"
- EtherCAT® Master available

Customization on Request

- QorIQ T1014 or T1024 or T1042 are applicable
- Additional connector P6 with (e.g.) 73 LVTTTL or 34 LVDS I/Os
- MRAM (512 Kbyte)
- Console RS-232 via P4
- CAN (with IRIG-B timestamp) via P4
- Up to 2x 128 MByte Flash
- Up to 2 GByte DDR3 RAM
- PMC only version, without connectors P5 and P6
- BSP for OS-9® on request

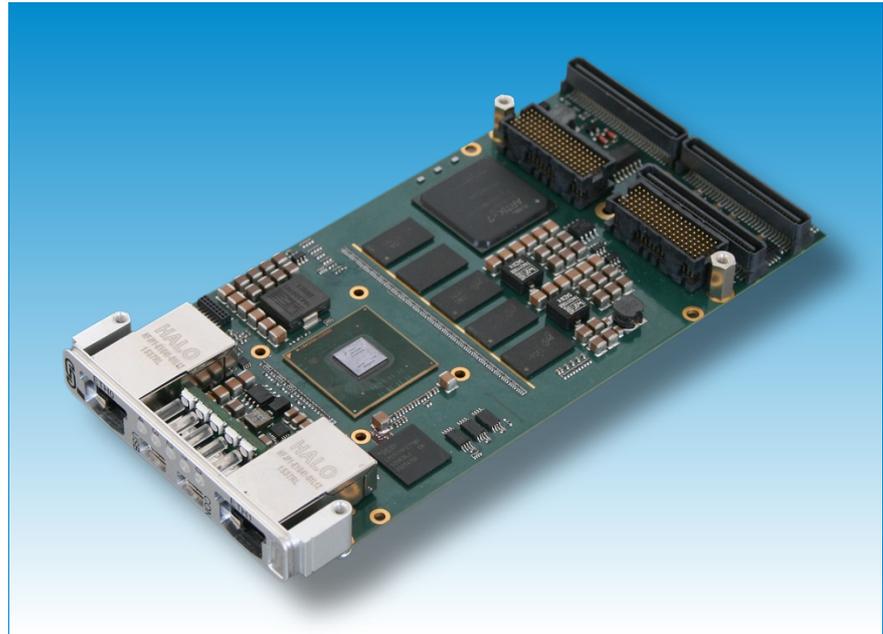
64-Bit XMC PowerPC Host CPU

The XMC-CPU/T10 is equipped with a PMC and an XMC interface.

The NXP PowerPC QorIQ T1022 with 1.2 GHz features two 64-bit e5500 Power Architecture® processor cores with high-performance data path acceleration architecture (DPAA) and network peripheral interfaces.

The local memory bus is 64 bits wide plus 8 bits ECC with an overall capacity of 512 Mbyte. 16 Mbyte SPI Flash for boot loader and 32 Kbit I²C EEPROM for U-Boot environment offer non-volatile memory spaces.

The XMC-CPU/T10 features a second 16 Mbyte 'fallback' SPI Flash, used for system recovery if a system crash occurs during a firmware update. Alternatively it can be used for application software.



FPGA for Local Applications

The Xilinx Artix-7 FPGA is connected to the CPU by local bus for low latency data exchange. For high bandwidth data exchange the FPGA is additionally connected to the CPU via PCI Express®. 62 LVTTTL-I/Os of the FPGA are routed to the PMC-P4 connector.

XMC/PMC Interfaces

The XMC interface comes with 4-lane PCIe® bus and is designed according to VITA™ 42.3.

The PMC interface supports 32 bit / 66 MHz PCI bus according to PCI Local Bus Specification 3.0.

Gigabit Ethernet

The XMC-CPU/T10 is equipped with two Gigabit Ethernet interfaces accessible at the front panel, which give an excellent base for EtherCAT® applications.

USB

The USB host port supports USB 2.0.

Software Support

The Flash memory carries the standard boot program "Das U-Boot" and enables the XMC-CPU/T10 to boot various operating systems from on-board Flash, network or USB.

BSPs are available for QNX, Linux and VxWorks. The BSPs include an example source code for the FPGA. Programming of the FPGAs is done via XILINX Toolchain.

The esd EtherCAT Master Stack is available for all supported operating systems.

Customization on Request

CAN

esd offers standard PIM modules for CAN signals. Furthermore a CAN IP-core (CAN esdACC) is available on request, implemented in a customized configuration (number of CAN nodes, routing FPGA ↔ P4).

I/Os via P6

Additional 73 LVTTTL I/Os at connector P6 or 34 LVDS I/Os are available on request as well as a Serial ATA interface.

CPU Type

Furthermore other CPU-types (T1014, T1042) are applicable, also an additional MRAM and other serial interfaces (RS-232) via P4.

Flash

Up to 2x 128 MByte Flash is available on request.

RAM

Up to 2 GByte DDR3 RAM is available.

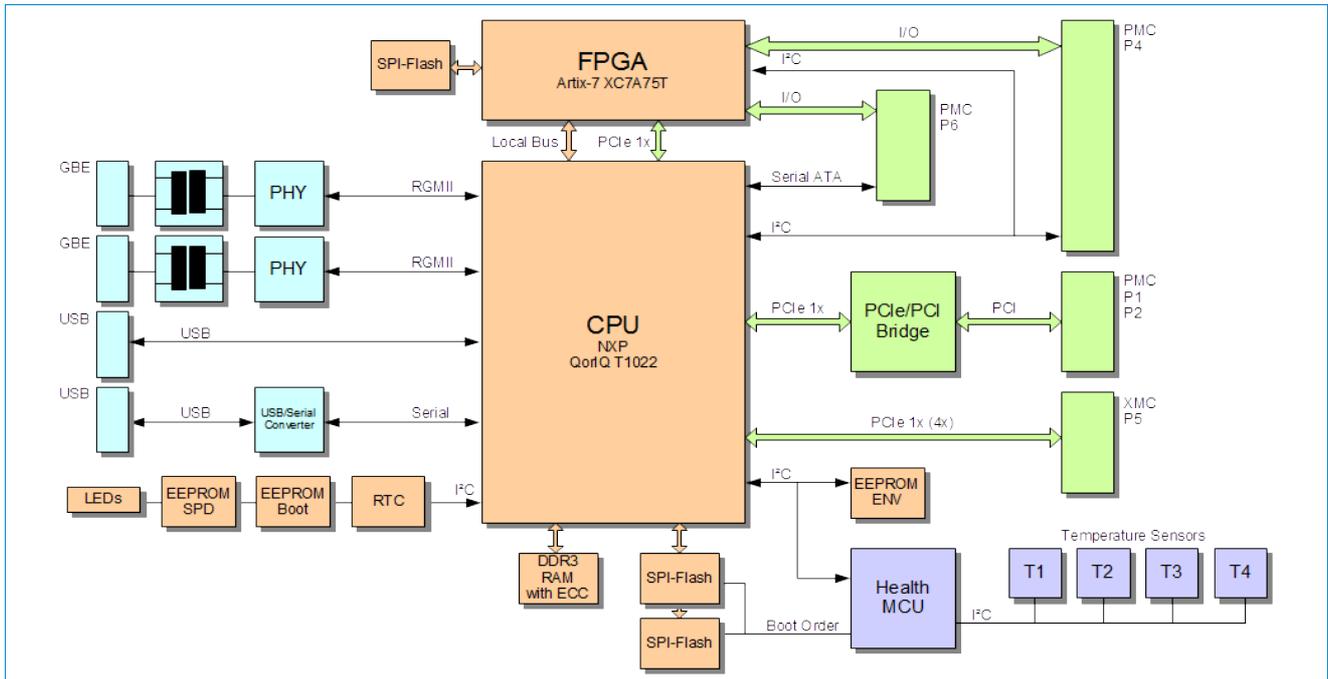
PMC only

The XMC-CPU/T10 can be produced without the connectors P5 and P6 if the space on the carrier is limited.

All these options are available for customized series production in reasonable quantities. Please contact our sales team for detailed information.

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Technical Specifications:

Microcontroller and Memory:	
Microcontroller	NXP PowerPC QorIQ T1022, 64-bit, 1.2 GHz, Double Precision Floating Point Unit
Memory	512 Mbyte DDR3 RAM, 64 bits wide + 8 bit ECC, 32 Mbyte Flash for boot loader with health controller, 32 Kbit I²C EEPROM for U-Boot environment, 32 Kbit I²C EEPROM for Bootstrapping, 4 Kbit I²C EEPROM for SPD info DDR RAM
Real-Time Clock RTC with Gold Cap, backup time min. 7 days	
Bus Interfaces	
XMC	XMC according to VITA 42.3, 4-lane PCI Express acc. to PCIe 1.1 (with T1022, T1042)
PMC	PMC according to IEEE Std 1386-2001, connectors: P1, P2, P4 PCI bus according to PCI Local Bus Specification 3.0, 32 bit 33/66 MHz, 3.3 V (5 V tolerant), PCI bus master capability
Voltage level	3.3 V (signal level), 5 V tolerant
Health:	
Voltage monitor	For all internal voltages and temperatures
Temperature monitor	4x XMC power board I²C temperature sensors, CPU temperature sensor
Watchdog	CPU watchdog
Interfaces:	
Ethernet	2x Gigabit Ethernet, 1000BaseT, IEEE802.3 at RJ45-connectors in front panel
USB host	USB 2.0 Full Speed (480 Mbit/s), Mini USB socket type AB in front panel
Console (serial)	1x Via bus powered USB device interface at Mini USB socket type-B in front panel
Digital I/O	62x single ended LVTTTL-I/O (3.3V only) at PMC-P4 or (configurable via FPGA) 31 LVDS pairs (3.3V only) at PMC-P4
I²C	1x I²C at PMC-P4

General:	
Cooling method	Convection cooling
Operating temperature	0 °C ... 55 °C ambient
Storage temperature	-20 °C ... +70 °C ambient
Relative humidity	0% ... 90 % (non-condensing)
Power supply voltage	3.3 V, 5 V or 12 V from XMC, P _{3.3V+5V} max. 10 W
Dimensions	149 mm x 74 mm x 10 mm
Order Information:	
Hardware	Order No.
XMC-CPU/T10	XMC QorIQ T1022 PowerPC CPU Board, 1.2 GHz, 512 Mbyte RAM V.2030.01

Accessories		
XMC-CPU-ADAPTER-BDI	Interface for Abatron BDI3000	V.2029.02
XMC-CPU-ADAPTER-FPGA	Interf. for XILINX ChipScope	V.2029.03
XMC-CPU-ADAPTER-NXP	Interf. for NXP health controller	V.2029.04

Board Support Packages ¹ for Real-time OS		
XMC-CPU/T10-Linux-BSP	incl. 12 months support	V.2030.57
XMC-CPU/T10-QNX-BSP	incl. 12 months support	V.2030.55
XMC-CPU/T10-VxW-BSP	incl. 12 months support	V.2030.58

Support ¹ for BSP		
XMC-CPU/T10-Linux-Support	12 months Linux support	V.2030.67
XMC-CPU/T10-QNX-Support	12 months QNX support	V.2030.65
XMC-CPU/T10-VxW-Support	12 months VxW support	V.2030.68

EtherCAT Master Stacks ¹ (runtime licence for a single site)		
EtherCAT Master-Linux/PowerPC	Object code	P.4500.03
EtherCAT Master-QNX 6.x/PowerPC	Object code	P.4500.10
EtherCAT Master-VxW/PowerPC	Object code	P.4500.20

¹ For detailed information about driver availability for your operating system please contact our sales team.