

VME-CPU/T10

VME Master with 64-bit PowerPC™ T1022, XMC/PMC Slots

High-End PowerPC QorIQ CPU

- VME master CPU A16/A24, D16/D8 (EO) and SGL arbiter
- Freescale™ PowerPC QorIQ T1022, 1.2 GHz, 64-bit architecture, Double Precision Floating Point Unit, Ethernet, ECC-RAM
- Altera® Cyclone V FPGA for VME interface
- 2x XMC/PMC slots
- RTC with battery backup
- 2x GB-Ethernet, 1x RS-232
- I/O interfaces designed to be compatible with Motorola CPU MVME5110
- USB at 4-pin header

Health Features

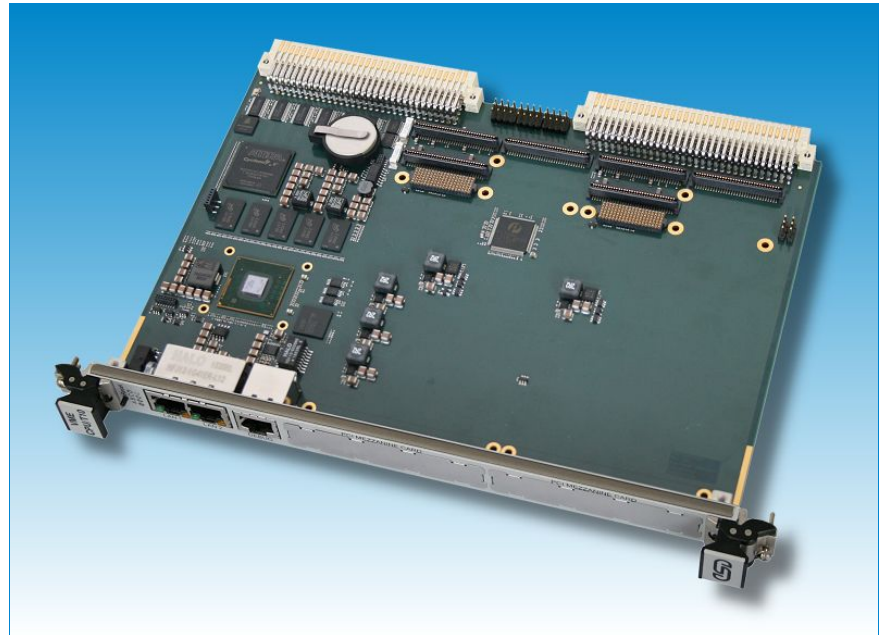
- Local voltage and temperature monitoring
- Backup Flash selectable via jumper
- Watchdog
- Over temperature protection
- 8 user configuration jumper

Wide Range of Software Support

- OS-9, QNX®, VxWorks® and Linux® BSPs available
- Universal boot loader: U-Boot
- EtherCAT® master available

Customization on Request

- Low power CPU QorIQ T1014 (one core)
- Extended MRAM (2 MB instead of 128 Kbyte)
- Additional serial MRAM (512 Kbyte)
- Extended DDR3 RAM (2 GB instead of 512 Mbyte)
- Extended Flash memory (2x 128 Mbyte instead of 2x 16 Mbyte)
- Gold Cap (backup time 7 days) instead of battery
- Board version suitable for extended temperature range -40 °C ... +55 °C
- P0 (pinning according VITA 35 P4V0-64 or customized, e. g.: Ethernet, serial, PMC Slot2 J4)
- More customized solutions on request



64-Bit VME PowerPC Master CPU

The VME-CPU/T10 is a VMEbus CPU board with 2 XMC/PMC slots. The Freescale 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 VME-CPU/T10 is equipped with a second 16 Mbyte backup SPI Flash selectable by jumper that can be used for system recovery, if a system crash occurs during a firmware update.

VMEbus Interfaced by FPGA

The Altera Cyclone V FPGA is connected to the CPU by local bus for low latency data exchange and by PCI Express for high bandwidth data exchange. The VMEbus master interface offers a A16/A24, D16/D8 (EO) and a SGL arbiter. A VMEbus slave interface is not supported.

XMC/PMC Interfaces

The XMC interface comes with 2x 1-lane PCIe bus and is designed according to VITA 42.3.

Both PMC interfaces support 32 bit / 66 MHz PCI bus according to PCI Local Bus Specification 3.0.

Gigabit Ethernet

The VME-CPU/T10 is equipped with two Gigabit Ethernet interfaces accessible at the front panel, which give an excellent base for EtherCAT® applications. One of the Ethernet interfaces can be routed to VME P2 (100 Mbit/s only).

Console (Serial)

A RS-232 interface with RJ45 connector is accessible at the front panel.

Software Support

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

BSPs are available for OS-9, QNX, Linux and VxWorks.

The esd EtherCAT master is available for VxWorks and other operating systems.

Customization on Request

The VME-CPU/T10 is also available with the power saving single core QorIQ CPU T1014 with 1-lane PCIe (therefore only one XMC interface) on request.

The memory can be extended with larger MRAM, DDR3 RAM and Flash. An additional serial MRAM is also available. Instead of the battery a Gold Cap can be equipped.

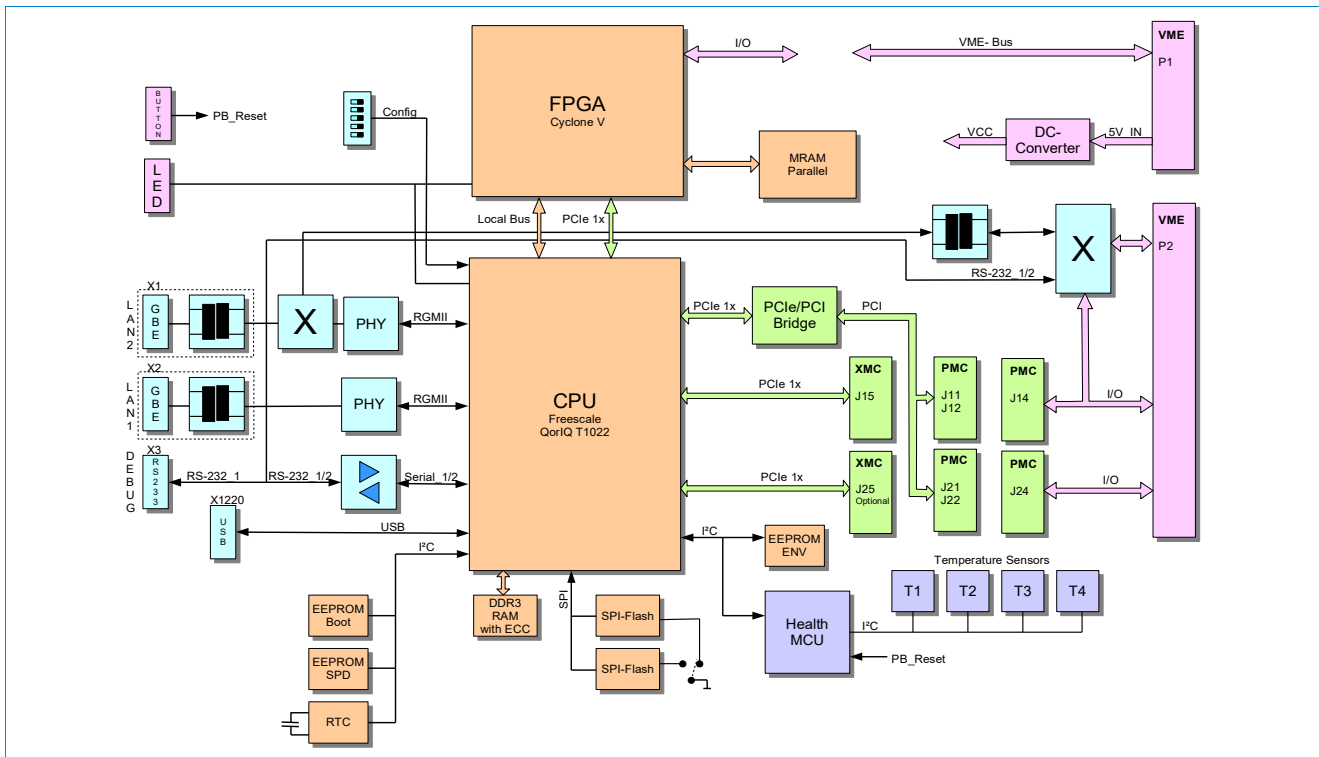
If an extended temperature range is requested please ask for the -40 °C ... +55 °C version of the VME-CPU/T10.

A special P0 pin routing according to VITA 35 P4V0-64 or customized routings, e.g. Ethernet, serial or PMC Slot2 J4 are available on request.

(This product is under development. It will be available Q4 2016.)

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Technical Specifications:

Microcontroller and Memory:	
Microcontroller	Freescale PowerPC™ QorIQ T1022, 64-bit, Dual Core, 1.2 GHz, Double Precision FPU
Memory	512 Mbyte DDR3 RAM, 64 bits wide + 8 bit ECC, 2x 16 Mbyte Flash for boot loader with health controller, 128 Kbyte MRAM, 32 Kbit I ² C EEPROM for U-Boot, 32 Kbit I ² C EEPROM for Bootstrapping, 4 Kbit I ² C EEPROM for SPD info DDR RAM
Real Time Clock	RTC with battery, backup time min. 5 years
Bus Interfaces	
VME	Master A16/A24 D16/D8 (EO), SGL Arbiter, IEEE 1014 Rev. D
XMC	2x XMC according to VITA 42.3, 1-lane PCI EXPRESS® acc. to PCIe 1.1
PMC	2x PMC according to IEEE Std 1386-2001, Connectors: J11, J21, J41, J12, J22, J42 I/O routing to VME: P4V2-64ac and P4V2-46dz, PCI bus acc. to PCI Local Bus Spec. 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 I ² C temperature sensors, CPU temperature sensor
Watchdog	CPU watchdog
Interfaces:	
Ethernet	2x Gigabit Ethernet, 1000BaseT, IEEE802.3 at RJ45 in front panel or 1x 100BaseT at VME P2 (selectable via jumper and multiplexer)
USB host	USB 2.0 Full Speed, onboard 4-pin header

Interfaces (continued):	
Console (serial)	RS-232, Rx/Tx only, up to 115 kbaud, RJ45 connector (compatible to MVME5110)
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	VME 5 V, P _{IN,5V} = typ. 15 W tbd., 3.3 V for XMC/PMC slots (if supported by VME 3.3V, otherwise generated from VME 5 V): P _{OUT,3.3V} = max. 2 x 7.5 W
Dimensions	4 HP / 6 U
Order Information:	
Hardware	
VME-CPU/T10	VME QorIQ T1022 PowerPC CPU Board, 1.2 GHz, 512 Mbyte RAM, 2x XMC/PMC
Accessories	
CPU-ADAPTER-BDI	Interface to connect the Abatron BDI3000
CPU-ADAPTER-NXP	Interface to connect NXP (Health controller)
Software Support	
VME-CPU/T10-OS9	OS-9 BSP
VME-CPU/T10-QNX	QNX BSP
VME-CPU/T10-Linux	Linux BSP
VME-CPU/T10-VxW	VxWorks BSP
EtherCAT Master-VxW 6.x/PPC	Object code