XMC-CPU/2041
XMC/PMC Quad Core PowerPC™ CPU with FPGA

Quad Core PowerPC and FPGA
- Freescale™ PowerPC™ QorIQ P2041, 1.2 GHz, Double Precision Floating Point Unit, 4x Ethernet, ECC-RAM
- Xilinx® FPGA Spartan® 6 XC6LXT-45T for local applications
- 3x Ethernet, 1x USB 2.0
- 52 LVTTL I/Os at connector PMC-P14

Health Features and Fallback FLASH
- local voltage and temperature monitoring
- fail save firmware update by means of fallback FLASH

Hardware Options
- PowerPC with 1.5 GHz
- max. DRAM capacity 2 Gbyte + ECC
- Precision Time Protocol (PTP) synchronization via Ethernet
- 2x SGMII interface at PMC-P14
- RS-232 interface at PMC-P14
- RS-485 or CAN interface at PMC-P14
- Conformal coating for rugged applications

Software Support
- VxWorks
- Linux
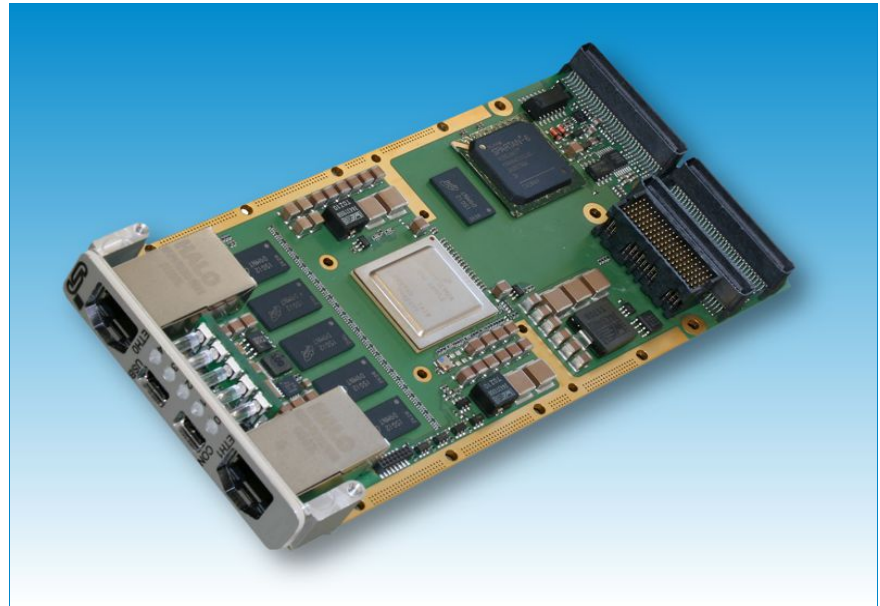
XMC PowerPC Host CPU
The XMC-CPU/2041 is a equipped with a PMC and a XMC interface. The powerful Freescale PowerPC QorIQ P2041 with 1.2 GHz is built on Power Architecture® technology, bringing high-end architectural features pioneered in the P4 platform into the mid range quad core space.

The local memory bus is 64 bits wide plus 8 bits ECC with an overall capacity of up to 512 Mbyte. 2x 16 Mbyte SPI FLASH for boot loader and 128 Kbit I²C EEPROM for U-Boot environment offer non-volatile memory spaces.

The XMC-CPU/2041 is equipped with a fallback SPI FLASH that is used for recovery, if a system crash occurs during a firmware update.

FPGA for Local Applications
The Xilinx FPGA Spartan 6 is connected to the CPU by local bus for low latency data exchange. For high bandwidth data exchange the FPGA is additionally connected via PCI Express to the CPU. 52 LVTTL-I/Os of the FPGA are routed to the PMC-P14 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/2041 is equipped with two Gigabit Ethernet interfaces accessible at the front panel, which gave an excellent base for EtherCAT® applications. An additional Ethernet interface (SGMII) is accessible via PMC-P14.

USB
The USB host port supports USB 2.0.

Software Support
The flash memory carries the standard boot program U-boot and enables the XMC-CPU/2041 to boot various operating systems from network or on-board Flash. BSPs are available for VxWorks and Linux. Example source code for the FPGA is included in the BSPs.
For the FPGA a esdACC (esd Advanced CAN Controller) implementation is available.

Options
The PowerPC is available with 1.5 GHz as well.
The maximum DDR3 RAM capacity that can be equipped is 2 Gbyte + ECC.
A Precision Time Protocol (PTP) synchronization via Ethernet is available as an option.
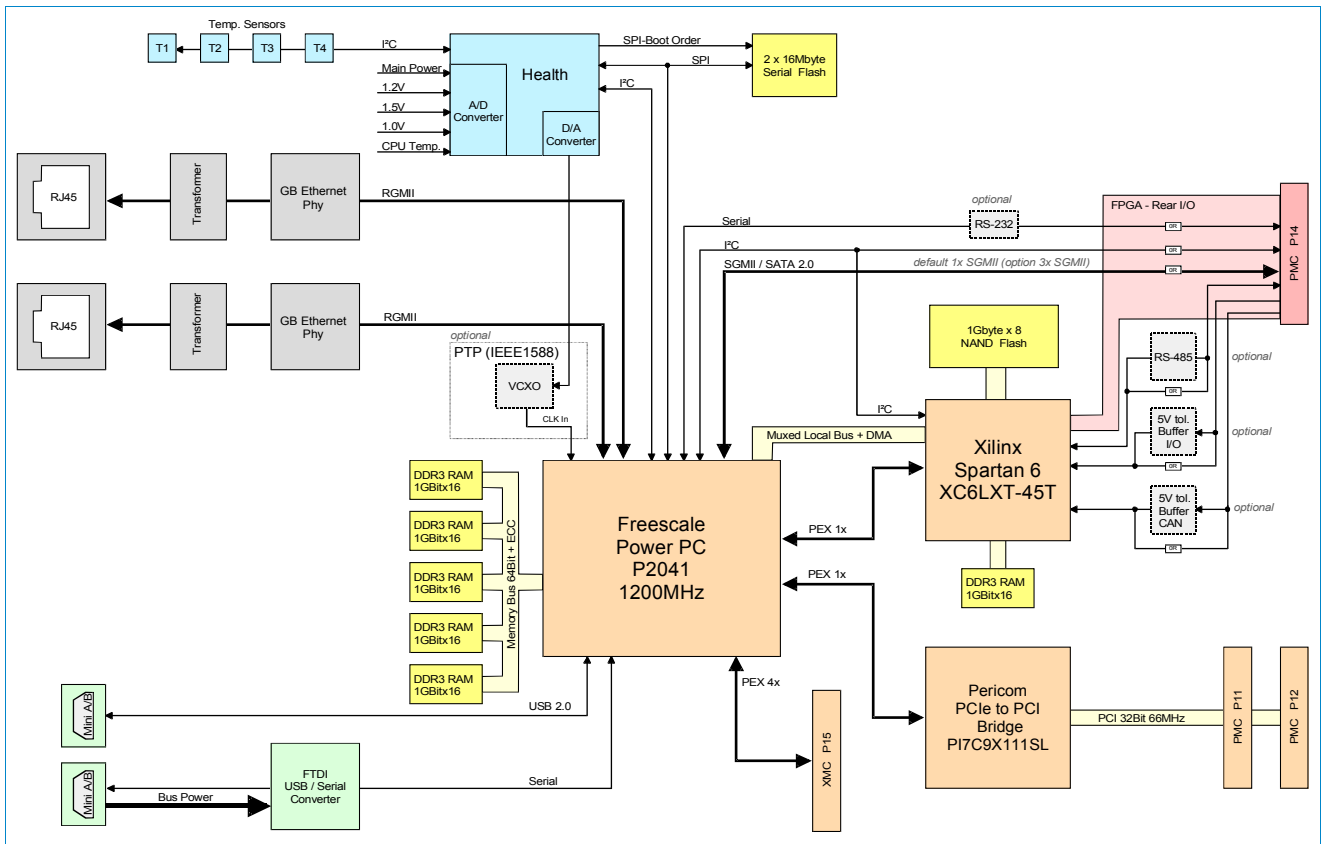Alternative signal routing, with a reduced number of LVTTL-I/Os allows the following options:
- Two SATA interfaces instead of the SGMII interface.
- One serial interface (RS-232).
- A RS-485 interface or a CAN high-speed interface or 5V-tolerant I/O buffers.
For harsh environment applications a conformal coating is available as an option.
Please contact our sales team for availability and order information about the options.

(This product is under development. It will be available Q1 2014.)

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Technical Specifications:

Microcontroller and Memory:

Microcontroller	Freescale PowerPC™ QorIQ P2041, 1.2 GHz (option: 1.5 GHz), Double Precision Floating Point Unit
Memory	512 Mbyte RAM 64 bits wide plus 8 bits ECC DDR3 RAM, 16 Mbyte SPI FLASH for boot loader (standard) and 16 Mbyte SPI FLASH for system recovery, 2x 64 Kbit I²C EEPROM for U-Boot environment, 1 Gbyte NAND Flash for operating system, 1 Gbit DDR3 RAM for user application
Real Time Clock	RTC with Gold Cap

Bus Interfaces

XMC	XMC according to VITA 42.3, 4-lane PCI EXPRESS® acc. to PCIe 1.1
PMC	PMC according to IEEE Std 1386-2001, connectors: P11, P12, P14
PCI	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	1.0 V, 1.2 V, 1.5 V, 5V
Temperature monitor	I²C temperature sensors, CPU temperature sensor

Interfaces:

Ethernet	2x Gigabit Ethernet, 1000BaseT, IEEE802.3 at RJ45-connectors in front panel, 1x GigaBit Ethernet SGMII at PMC P14, PTP-option: PTP (IEEE1588) via Ethernet

Interfaces (continued):

USB host	USB 2.0 Full Speed (480 Mbit/s), USB-A connector in front panel
Console (serial)	via bus powered USB device interface at USB-A connector in front panel
Digital I/O	52x LVTTL-I/O (3.3 V only) at PMC-P14
I²C	1x I²C at PMC-P14
Serial (option)	1x RS-232, 9600 bit/s ...115200 bit/s, at PMC-P14
Further optional interfaces at P14	1x RS-485 or CAN high speed interface or 5V tolerant buffer I/O

General:

Cooling method	Rugged air cooled
Operating temperature	-40 °C ... ≥75 °C (600 LFM)
Storage temperature	-40 °C ... +105 °C ambient
Vibration	0.04 g²/Hz (maximum), 5 to 2000 Hz
Shock	30 g, 11 ms sawtooth
Relative humidity	0% ... 90 % (non-condensing)
Power supply voltage	3.3 V, 5 V
Dimensions	149 mm x 74 mm

Order Information:

Hardware		Order No.
XMC-CPU/2041	XMC QorIQ P2041 PowerPC Processor CPU Board, 1.2 GHz, 512 Mbyte RAM	V.2029.01

Software Support		
XMC-CPU/2041-VxW	VxWorks BSP	V.2029.30
XMCI-CPU/2041-Linux	Linux BSP	on request