

# XMC-CPU/Zulu

XMC Ultrascale+™ Zynq® MPSoC Board with integrated FPGA



## High-End CPU for Test and Application

- XILINX® Zynq® Ultrascale+™ CG MPSoC, 1.3 GHz, Dual Core A53 Application Processor Unit (APU) + Dual Core Real-time Processor Unit (RPU)
- Powerful XILINX FPGA for flexible hardware design, integrated in CPU
- 4x GB-Ethernet, 1x serial interface
- More than 120 I/Os at connectors P4 and P6 configurable via FPGA as single ended (LVTTTL) or 50 LVDS pairs

## Health Features

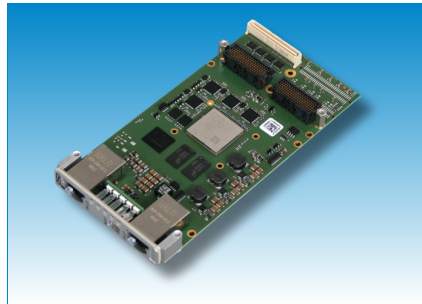
- Local voltage and temperature monitoring
- Watchdog
- Over temperature protection

## Software Support

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

## Customization on Request

- PMC instead of XMC
- CAN IP-Core via P4 or P6
- IRIG-B IP-Core via P4 or P6
- Other CPU-types of the Zynq UltraScale+ MPSoC family
- Extended temperature range
- RTC



## 64-Bit XMC ARM® Host CPU

The XMC-CPU/Zulu in XMC form factor comes with a XILINX Zynq Ultrascale+ CG multiprocessor system-on-chip (XCZU2CG) with 1.3 GHz core frequency. The local memory bus is 32 bits wide with an overall capacity of 1 Gbyte. 64 Mbyte SPI Flash for boot loader and 32 Kbit I<sup>2</sup>C EEPROM for U-Boot environment. XMC-CPU/Zulu features a 16 Gbyte eMMC memory which is used for operating system, file system and application software.

## XMC Interface

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

## Gigabit Ethernet

Two Gigabit Ethernet interfaces are accessible via the front panel of the XMC-CPU/Zulu. This gives an excellent base for EtherCAT® applications. Two additional rear IO Ethernet interfaces are accessible via the XMC connector P6. The rear IO Ethernet interfaces come without electrical isolation. Two of the GB Ethernet interfaces (one front, one rear) are rooted through the FPGA. Therefore special Ethernet IP-cores can be implemented.

## Serial Interface

A serial interface, designed as terminal interface, is accessible via an USB Mini connector. This USB Mini type-B connector is easily accessible via the front panel of the XMC-CPU/Zulu.

## Software Support

The Flash memory carries the standard boot program "Das U-Boot" and enables the XMC-CPU/Zulu to boot various operating systems from on-board Flash, network or eMMC. BSPs are available for 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 various operating systems.

## Customization on Request

Customized options are available for customized series production in reasonable quantities. Please contact our sales team for detailed information. For example...

### - CAN

esd offers standard PIM modules for CAN signals. Furthermore a CAN IP-core (CAN esdACC), which is configurable (number of CAN nodes, routing FPGA ↔ P4), is available for the on-board FPGA on request.

### - IRIG-B

An IRIG-B IP Core by esd electronics can be implemented in the FPGA. The physical interface of IRIG-B has to be provided externally via a PIM module. An esd PIM module is available on request.

### - Further CPU Types

Furthermore other CPU-types (ZU2EG, ZU3CG and ZU3EG) are applicable.

### - Extended Temperature Range

The temperature range can be extended from -40 °C up to 75 °C.

### - PMC

PMC according to IEEE Std 1386-2001 instead of XMC interface via connectors P1 and P2. The PCI bus conforms to PCI Local Bus Specification 3.0, 32 bit 33/66 MHz, 3.3 V (5 V tolerant), PCI bus master capability. The PMC interface supports 32 bit / 66 MHz PCI bus according to PCI Local Bus Specification 3.0.

### - Ethernet

The rear IO Ethernet signals are connected via P6. To connect standard Ethernet cabling an esd PIM module is available on request. The PIM module comes with an RJ45 connector and the Ethernet transformers on-board.

### - RTC

An additional RTC can be equipped. A backup battery can be connected via P4 and P6.

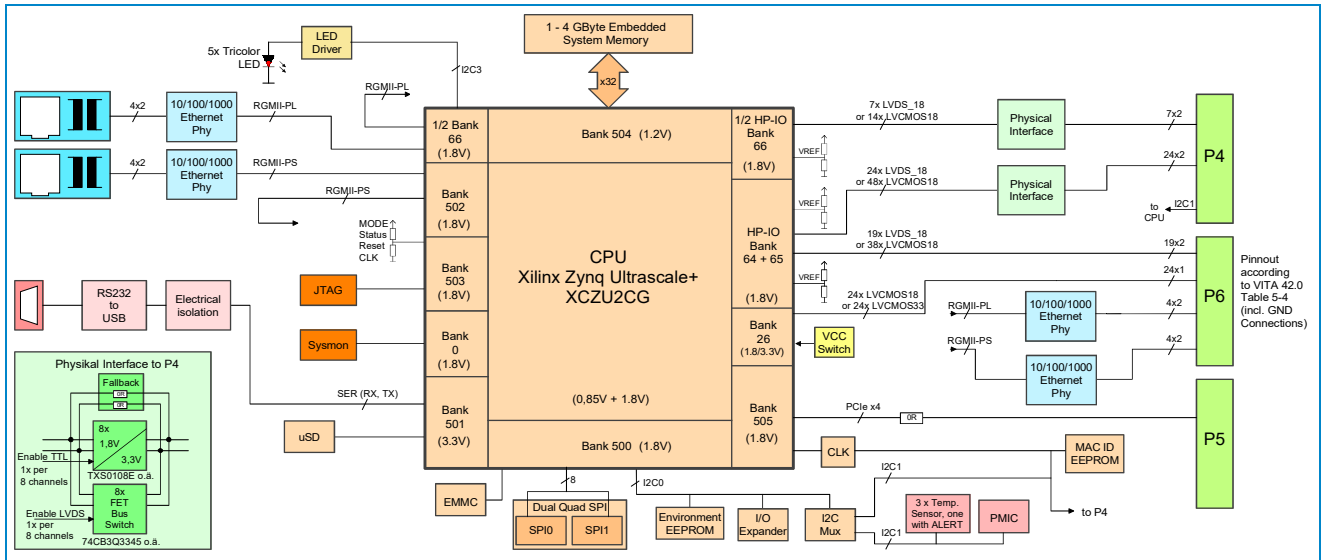
### - Software

Please contact our [Sales-Team](#) for board support packages of other real-time operating systems (e.g. QNX).

(This product is under development. It will be available Q3 2019.)

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## Technical Specifications:

<b>Microcontroller and Memory:</b>	
Microcontroller	XILINX® Zynq Ultrascale+ XCZU2CG with 1.3 GHz
Memory	1 Gbyte DDR4 RAM, 32 bits wide, 64 Mbyte Flash for boot loader with health controller, 16 Gbyte eMMC, 32 Kbit I <sup>2</sup> C EEPROM for U-Boot environment, 4 Kbit I <sup>2</sup> C EEPROM for SPD info DDR RAM
<b>Bus Interfaces</b>	
XMC	XMC according to VITA 42.3, 4-lane PCI EXPRESS® acc. to PCIe 1.1 via XMC connector P5
<b>Health:</b>	
Voltage monitor	For internal voltages and temperatures
Temperature monitor	I <sup>2</sup> C temperature sensors, CPU temperature sensor
Watchdog	CPU watchdog
<b>Interfaces:</b>	
Ethernet	2x Gigabit Ethernet, 1000BaseT, IEEE802.3 via RJ45-sockets in front panel, 2x Gigabit Ethernet, 1000BaseT, IEEE802.3, without electrical isolation, via XMC connector P6
Console (serial)	1x Via bus powered USB 1.1 device interface at USB Mini socket type-B in front panel
Digital I/O	62x single ended LVTTTL-I/O (3.3V only) at PMC connector P4 and 62x single ended LVTTTL-I/O (1.8V only) at XMC-P6  or (configurable via FPGA): 31 LVDS pairs (1.8V only) at PMC-P4 and 19 LVDS pairs (1.8V only) at XMC-P6
I <sup>2</sup> C	1x I <sup>2</sup> C at PMC connector P4
Weight	Ca. 200 g

<b>General:</b>	
Cooling method	Convection cooling
Operating temperature	0 °C ... 55 °C ambient
Storage temperature	-40 °C ... +85 °C ambient
Relative humidity	0% ... 90 % (non-condensing)
Power supply voltage	3.3 V, 5 V or 12 V from XMC, P <sub>MAX</sub> : 10 W
Dimensions	149 mm x 74 mm x 10 mm
<b>Order Information:</b>	
Hardware	Order No.
XMC-CPU/Zulu	XMC-CPU based on XILINX Zynq Ultrascale+ XCZU2CG, 1.3 GHz, 1 Gbyte DDR4 RAM V.2031.01

<b>Board Support Packages including 12 months hotline support and BSP updates</b>		
XMC-CPU/Zulu-Linux-BSP (Bundle)	Linux BSP Bundle	V.2031.57
XMC-CPU/Zulu-VxW-BSP (Bundle)	VxWorks BSP Bundle	V.2031.58
<b>Hotline Support and BSP Updates</b>		
XMC-CPU/Zulu-Linux-Support	12 months Linux support	V.2031.67
XMC-CPU/Zulu-VxW-Support	12 months VxWorks support	V.2031.68
<b>EtherCAT Master Stacks (runtime licence for a single site)</b>		
EtherCAT Master-Linux/PowerPC	Object code	P.4500.03