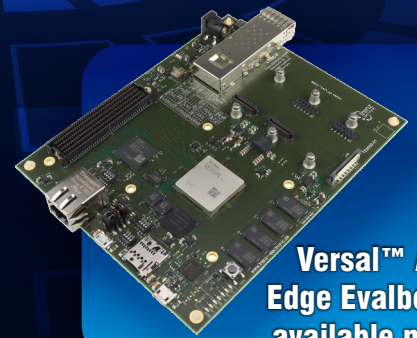





TRENZ ELECTRONIC CATALOGUE

Electronic Design Service
Development, Manufacture and Supply
of FPGA and SoC Modules



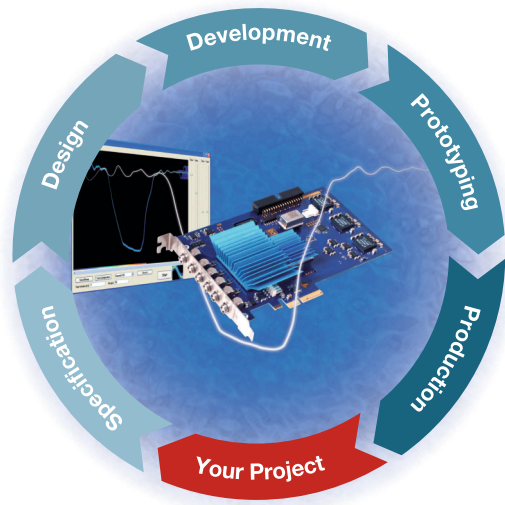
**Versal™ AI
Edge Evalboard
available now!**

updated February 2023

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**trenz**
electronic
GmbH

Trenz Electronic GmbH operates as a provider of development services in the electronic industry since 1992. Our services include design-in support as well as turnkey designs which typically covers all steps from product specification, hardware and software design up to prototyping and production.



We are particularly specialized in the design of high-speed data acquisition, high-accuracy measurement and embedded digital signalprocessing systems based on FPGA and CPU architectures.

Many of our products are compatible with some wide-spread form factors. We also provide SoM products for Automotive industry and high-end applications.

In the event that an off-the-shelf FPGA board won't fit the customers requirements, the design can be easily adapted by our comprehensive engineering design service.

Our in-house EMS (Electronic Manufacturing Service) and worldwide supply of FPGA and SoC modules complete the portfolio. All modules produced by Trenz Electronic GmbH are developed and manufactured in Germany.

Other assembly options of our modules for cost or performance optimization plus high volume prices are available on request. Also, cooling solutions and several carrier boards are at hand.

Hardware Design

- System architecture and design
- Hardware integration (Design-In)
- Ultrafast digital logic
- Analog and mixed signal
- Digital signal processing
- Schematic capture and PCB layout

HDL Design

- FPGA and System-On-Chip design
- System design and synthesis
- HDL design (VHDL, Verilog)
- Integration of soft-cores
- USB, PCI-Express, Gigabit Ethernet
- Ultrafast ADC/DAC interfaces

Software Development

- Device driver and application software development
- Software and Firmware development

- Extended device life cycle
- Rugged for industrial applications
- Automotive grade available
- Small and powerful
- Customizable
- Development and design service
- Rapid Prototyping
- Cooling solutions
- Carrier and testboards
- Free documentation and designs
- Sales worldwide
- In-house EMS
- Developed & produced in Germany



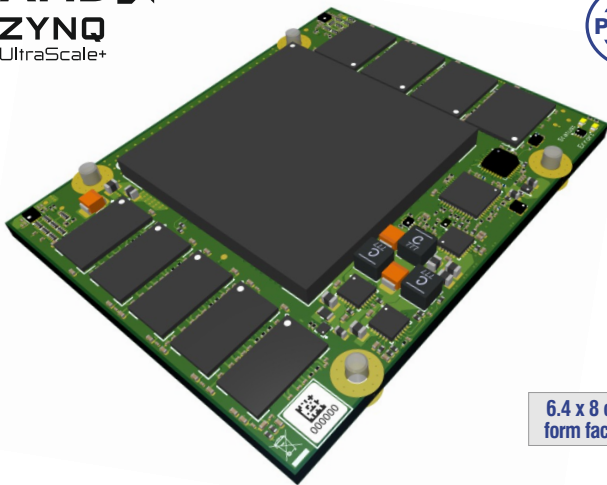
ISO 9001:2015
(quality management)
certified



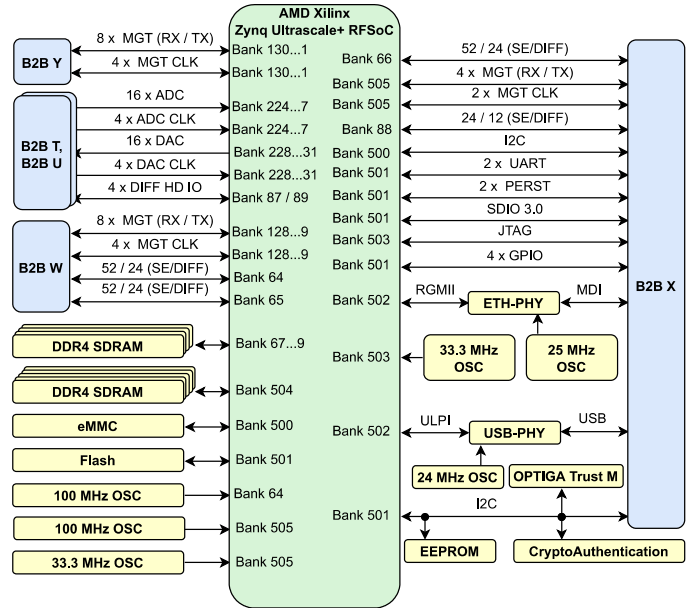
ISO 14001:2015
(environmental
management) certified

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NEW AM0070 Andromeda RFSoc Series
 AMD Zynq™ UltraScale+™ RFSoc, DDR4, Flash, Ethernet



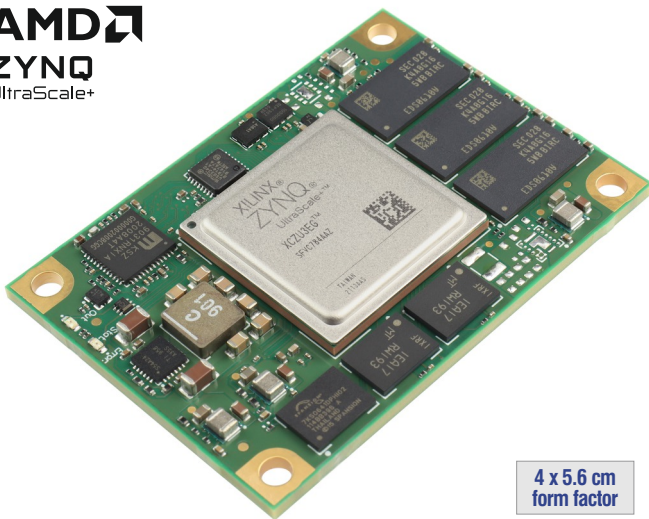
6.4 x 8 cm form factor



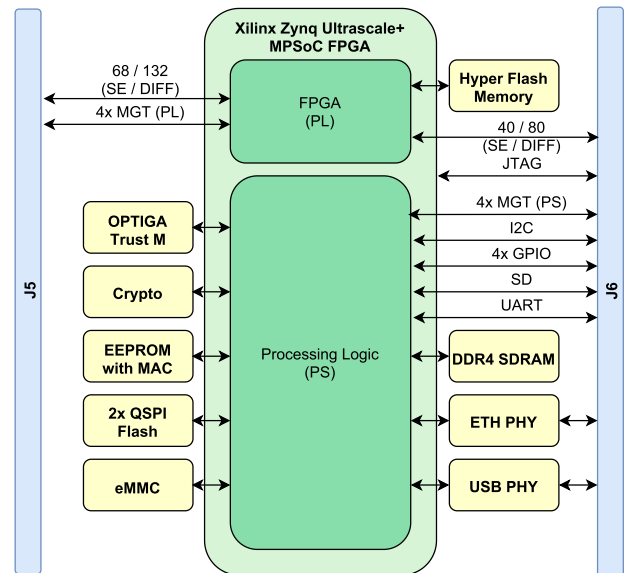
<http://trenz.org/am0070-info>

| Device list | Connectors | SDRAM max | Flash | e.MMC | Ethernet | USB | Other Features |
|------------------------|-------------------------------|---|-----------|-------|------------|--------|---|
| ZU29DR, ZU39DR, ZU49DR | 5 x Samtec ADM6 4 x 60-pin | 4 GB DDR4 64-bit (PS) with ECC 8 GB DDR4 64-bit (PL) | 2 x 64 MB | 8 GB | 2 x 1 Gbit | USB2.0 | OPTIGA Trust M, Crypto Authentication, Oscillator |

NEW AM0010 Andromeda MPSoC Series
 AMD Zynq™ UltraScale+™ MPSoC, DDR4, Flash, Ethernet, USB



4 x 5.6 cm form factor



<http://trenz.org/am0010-info>

| Device list | Connectors | SDRAM max | Flash | e.MMC | Ethernet | USB | Other Features |
|--|-------------------------------|--------------------------------|-----------|-------|----------|------------|--|
| ZU1CG-ZU5CG, ZU1EG-ZU5EG, ZU4EV, ZU5EV | 2 x Samtec ADM6 4 x 60-pin | 4 GB DDR4 64-bit (PS) with ECC | 2 x 64 MB | 8 GB | 1 Gbit | USB2.0 OTG | Total I/O: 204, optional HyperRAM, MAC address serial EEPROM with EUI-48 node identity, security controller, Crypto Authentication |

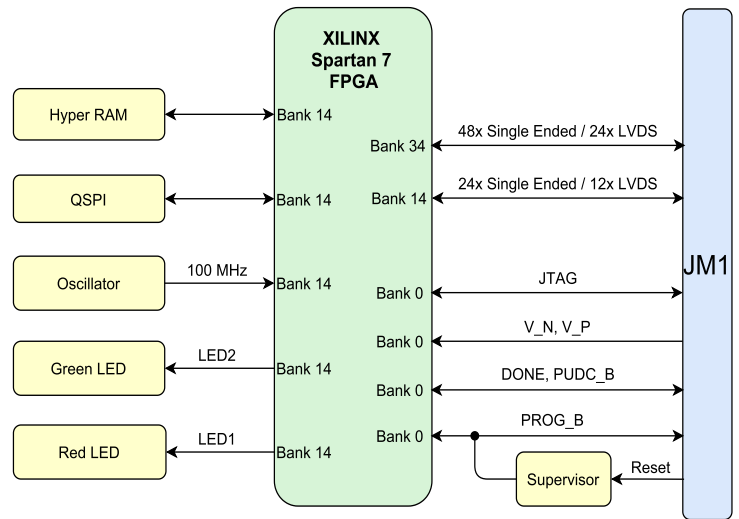
NEW TE0717 Series
AMD Spartan™ 7, HyperRAM, Flash, 100MHz Oscillator



AMD
SPARTAN™ 7



2.5 x 3.5 cm form factor



<http://trenz.org/te0717-info>

| Device list | Connector | HyperRAM | Flash | Other Features |
|-------------------|-------------------------|----------|---------|---|
| S6, S15, S25, S50 | 1 x Samtec 100-pin LSHM | 64 Mbit | 64 Mbit | Baseboard available, oscillator 100 MHz, green and red LED, single supply |

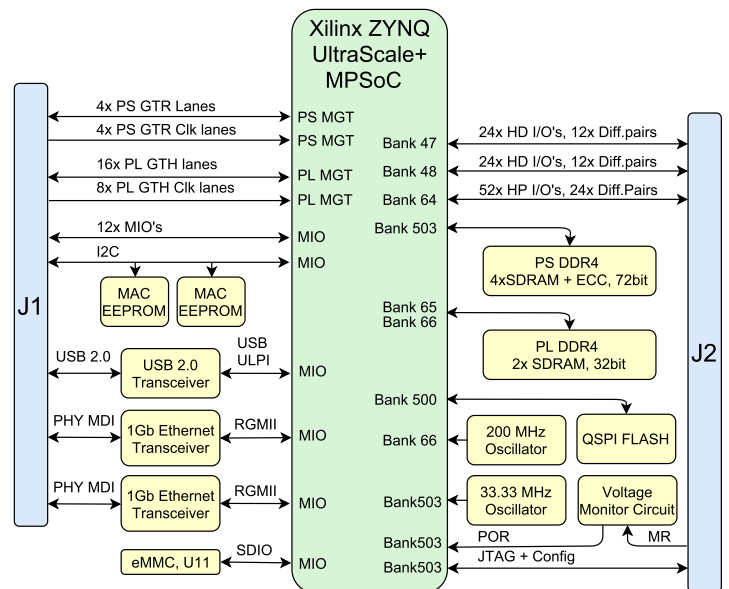
NEW TE0806 Series
AMD Zynq™ UltraScale+™ MPSoC, DDR4 (PS + PL domain), Flash, Ethernet, USB



AMD
ZYNQ
 UltraScale+



5.5 x 7.6 cm form factor



<http://trenz.org/te0806-info>

| Device list | Connectors | SDRAM max | Flash max | e.MMC max | Ethernet PHY | USB PHY | Total I/O | Gbit Transceiver | Other Features |
|---|-----------------|---|-----------|-----------|--------------|------------|--------------------------------------|--------------------|---|
| ZU4, ZU5, ZU7, CG, EG, EV support, 900 Pin packages | 2 x Samtec ADM6 | 8 GB DDR4 64-bit (PS) with ECC 4 GB DDR4 32-bit (PL) | 512 MB | 64 GB | 2 x 1 Gbit | USB2.0 OTG | 48 PI HD + 52 PL HP 14 MIOs + I2C | 4 x GTR + 16 x GTH | Transceiver clock in-/outputs, 2 x MAC address serial EEPROM, single 5-12V power required |

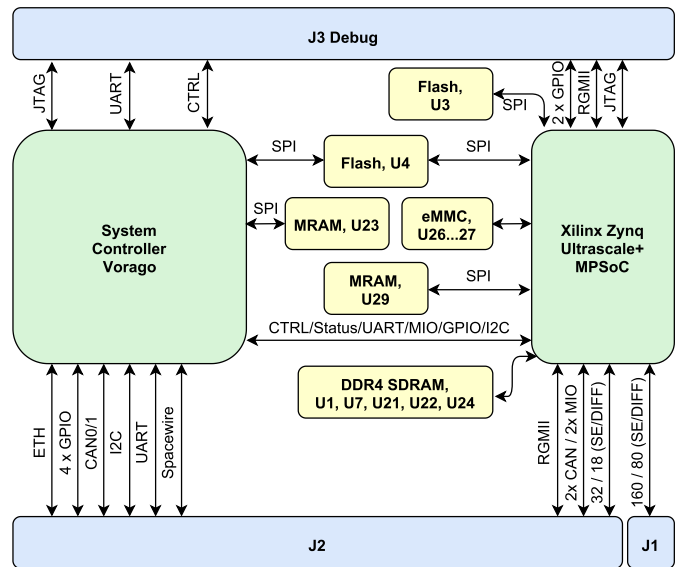
NEW TE0812 Series

Latest MPSoC chip technology in space, designed for cubesat missions



Radiation hardened

9 x 9 cm form factor

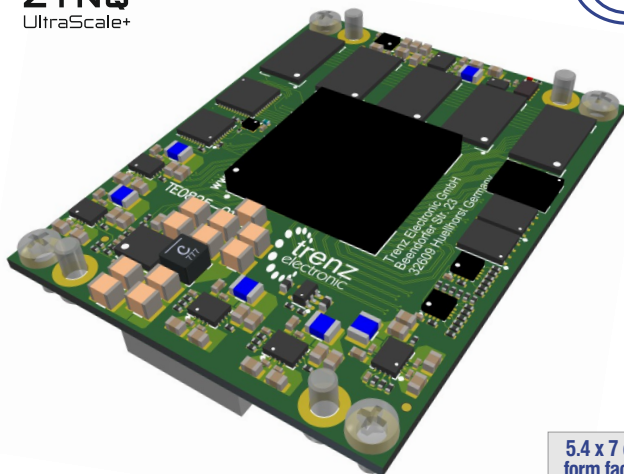


<http://trenz.org/te0812-info>

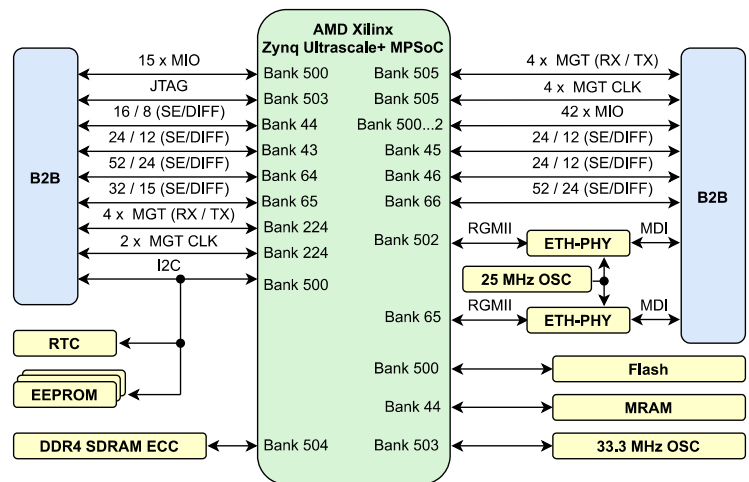
| Device list | Pin Packages | Connectors | SDRAM max | e.MMC | Flash | Total I/O | Gbit Transceivers | Other Features |
|-------------|--------------|--|--------------------|-----------|------------|-----------|-------------------------|---|
| ZU6 | C900 | 2 x B2B Samtec APM6 1 x Debug Samtec LSHM | 4 GB DDR4 with ECC | 2 x 32 GB | 2 x 128 MB | 127 | 16 (12 x PL; 4 x PS) | 2 x 4 MByte MRAM, on board Vorago VA41630, ETH, 2x Analog input, UART, 2 x CAN, PPSIn/PPSOut, I2C, 12V power supply |

NEW TE0825 Series

AMD Zynq™ UltraScale+™ MPSoC, Automotive, DDR4, Flash, EEPROM



5.4 x 7 cm form factor



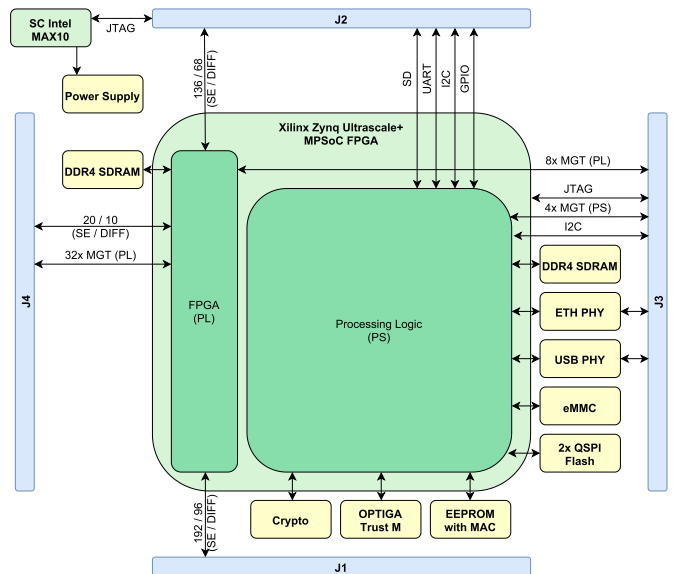
<http://trenz.org/te0825-info>

| Device list | Connectors | SDRAM | Flash | EEPROM | Ethernet PHY | Total I/O | Gbit Transceiver | Other Features |
|--------------------|--|--------------------|--------|-----------------------------------|--------------|--------------------------------------|----------------------|--|
| ZU2, ZU3, ZU4, ZU5 | 2 x Samtec ADM6, 1 x Samtec UMPT, 4 x 60 pin | 8 GB DDR4 with ECC | 256 MB | 64 kByte, 2 x with MAC address | 2 x 1 Gbit | 136 PL HP + 88 PL HD 57 PS MIO | 4 x GTR + 4 x GTH | real time clock, Oscillator, power connector (UMPT), ETH, JTAG |

NEW TE0865 Series
AMD Zynq™ UltraScale+™ MPSoC, DDR4, Flash, Ethernet, USB



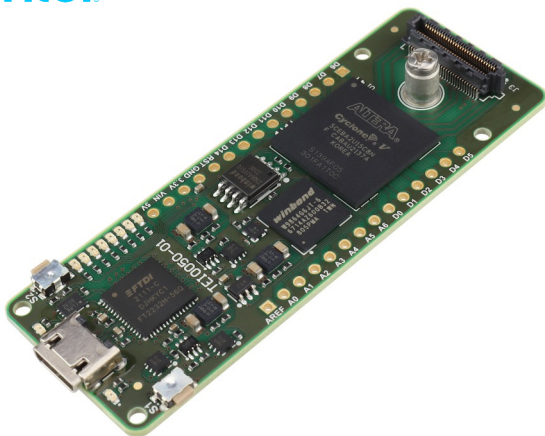
7.5 x 10 cm form factor



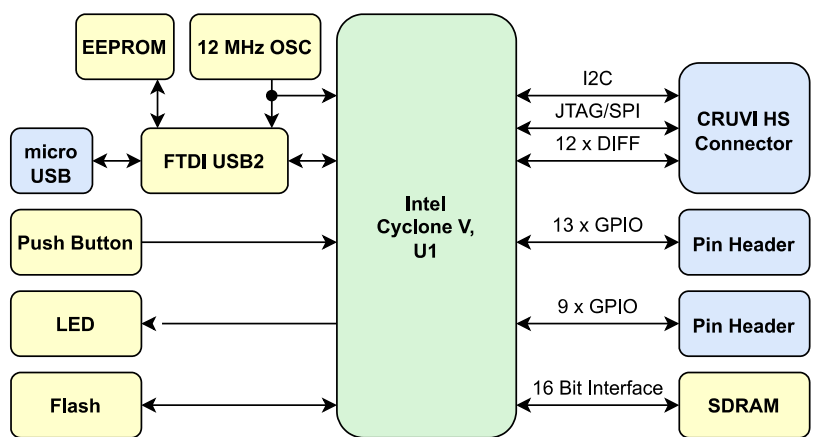
<http://trenz.org/te0865-info>

| Device list | Pin Packages | Connectors | SDRAM max | Flash | Ethernet PHY | Total I/O | Gbit Transceivers | Other Features |
|------------------|--------------|-------------------------------|---|-----------|--------------|----------------------------------|-----------------------------------|-----------------------------------|
| ZU11, ZU17, ZU19 | C1760 | 4 x Samtec ADM6 4 x 60-pin | 8 GB DDR4 64-bit (PS) with ECC, 8 GB DDR4 64-bit (PL) | 2 x 64 MB | 1 Gbit | 240 PL HP 96 PL HD 21 MIOs | 32 x GTH, 16 x GTY, 4 x GTR | USB PHY, e.MMC, 12V single supply |

NEW TEI0050 Series
Intel® Cyclone® V, SDRAM, Flash, EEPROM



2.5 x 7.07 cm form factor



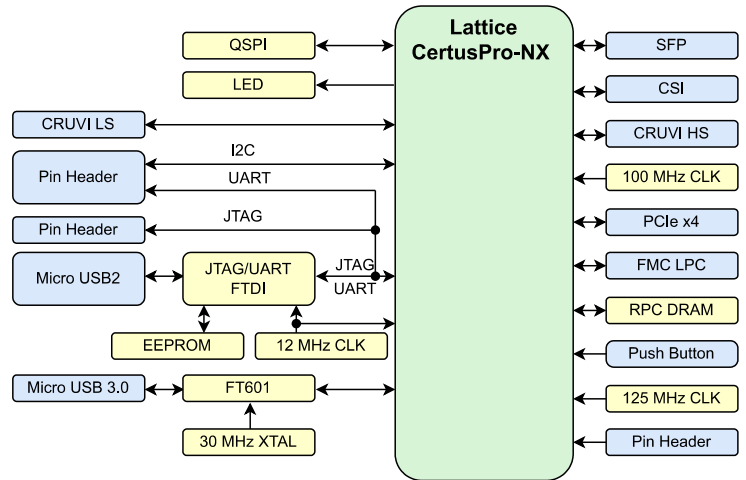
<http://trenz.org/tei0050-info>

| Device list | Pin Package | Connectors | SDRAM | Flash | Other Features |
|-----------------|------------------------------------|-----------------------------|-------|-----------------------|--|
| Intel Cyclone V | U15 Ultra FineLine BGA 325 Pins | CRUVI, 2 x 14 Pin Header | 8 MB | up to 256 MB possible | USB-to-JTAG/GPIO-FTDI, user push buttons and LEDs |

NEW TEL0003 Series
Lattice CertusPro-NX, CRUVI, DRAM, Flash



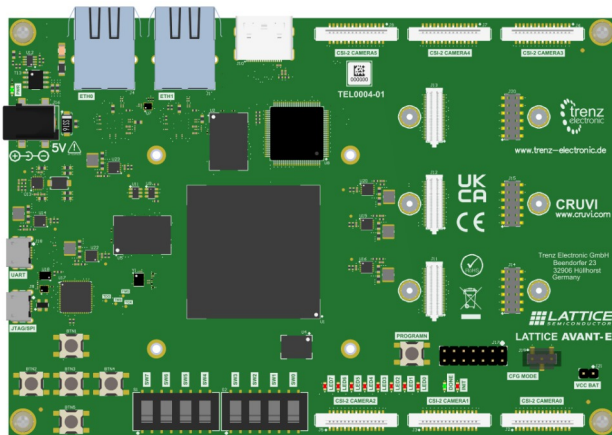
10.7 x 16.8 cm form factor



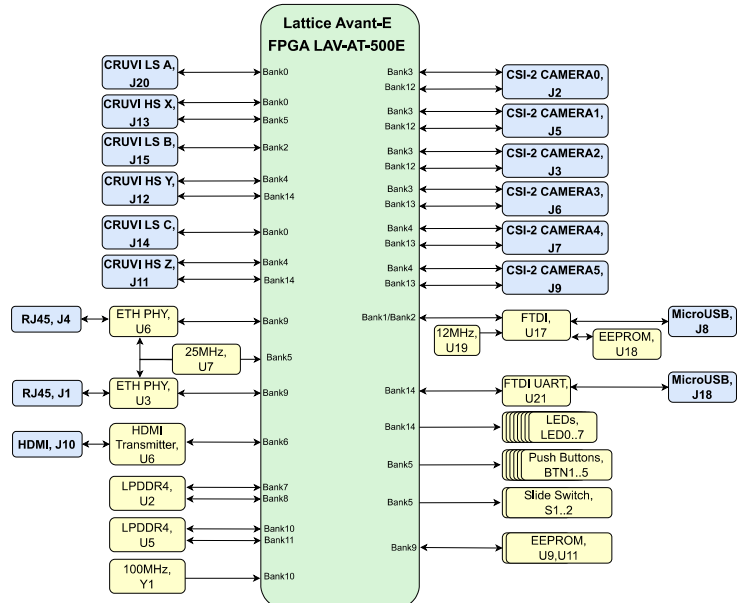
<http://trenz.org/tel0003-info>

| Device list | On-Board | DRAM | Flash | Interface | Other Features |
|--------------|---|---------------|------------|---|--|
| CertusPro-NX | USB3.0 to FIFO Bridge USB to FIFO FTDI | 2 x 32 MB RPC | 32 MB QSPI | CRUVI, PCI x 4, FMC (MGT/GPIO/JTAG/I2C), SFP+, USB3.0, USB2.0 (JTAG+UART), 3 x Pin Header | Oscillator, user LEDs, push buttons, DIP Switch, EEPROM |

NEW TEL0004 Series
Lattice Avant Evaluation Board, CRUVI, DRAM, Flash



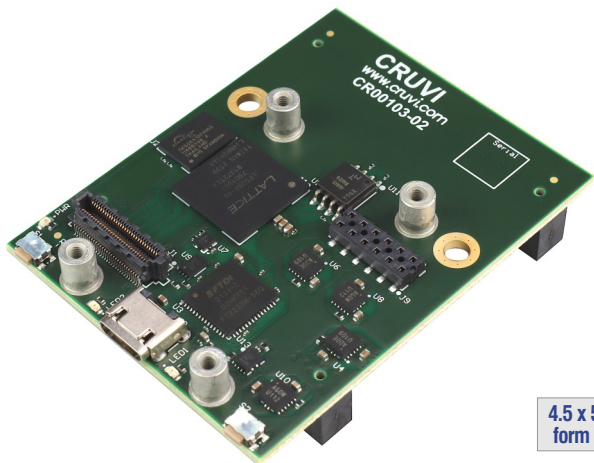
11 x 16 cm form factor



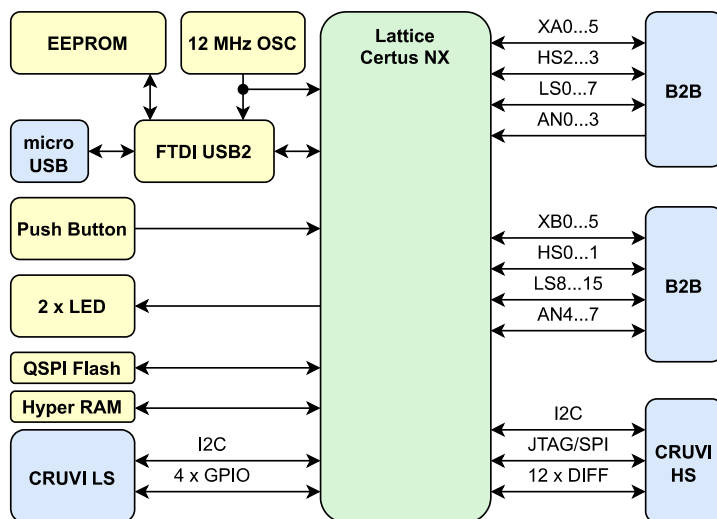
<http://trenz.org/tel0004-info>

| Device list | SDRAM | Flash | Interface | Other Features |
|--------------------------------|-------------------|---------------------|--|--|
| Lattice Avant-E (LAV-AT- 500E) | 2 x 8 Gbit LPDDR4 | 32 MB SPI/QUAD Boot | 2 Gbit Ethernet PHY, HDMI Transmitter, 2 x Micro-USB connector, 6 x MIPI CSI-2, 3 x CRUVIs | user LEDs, push buttons, Slide Switch, 2 x EEPROM with MAC address |

NEW CR00103 CRUVI Certus-NX Baseboard
Lattice Certus-NX, HyperRAM, Flash, EEPROM



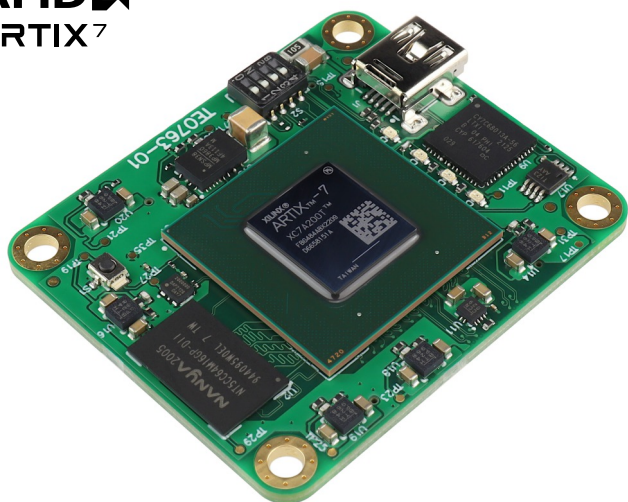
4.5 x 5,7 cm form factor



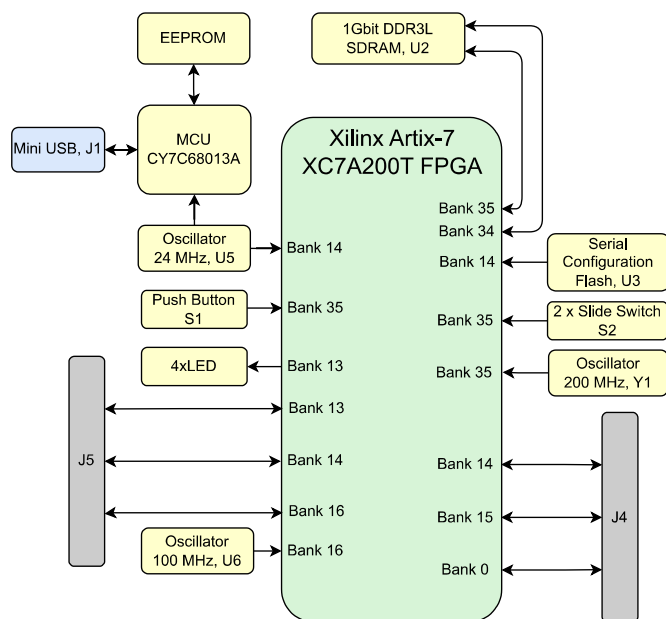
<http://trenz.org/cr00103-info>

| Device list | Interface | RAM | Flash | Other Features |
|-------------------|---|---------------|-------|---|
| Lattice Certus-NX | CRUVI (2 x 34 Pin Header, 1 x High Speed 60 Pin Header, 1 x Low Speed 12 Pin Header), micro USB | 8 MB HyperRAM | 32 MB | USB to FIFO FTDI (JTAG/GPIO), user LEDs, push buttons |

NEW TE0763 Series
AMD Artix™7 FPGA, 200K, DDR3L, Flash



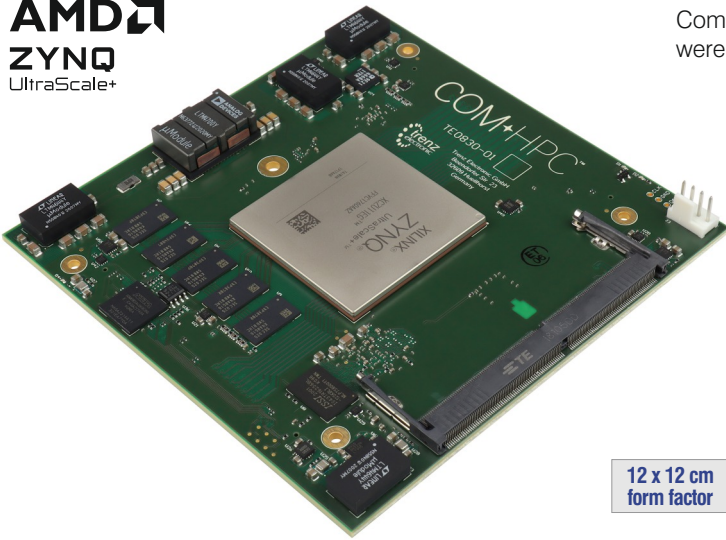
4.05 x 4.75 cm form factor



<http://trenz.org/te0763-info>

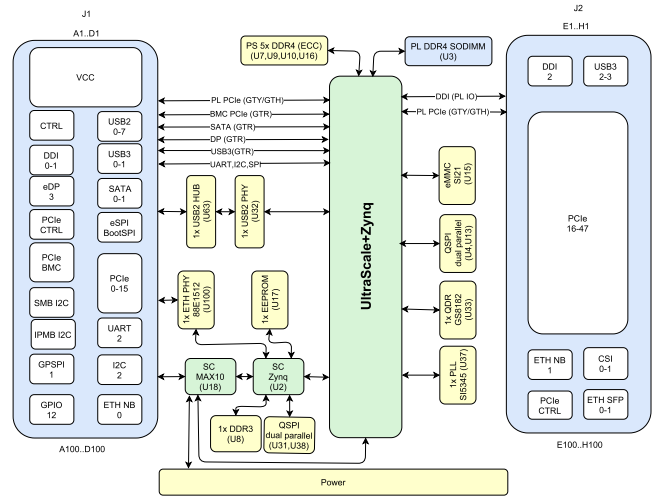
| Device list | On-Board | DRAM | Flash | Interface | Other Features |
|-------------|------------------------|--------------------|---------------------|--|--------------------------------------|
| 200T | HS-USB Microcontroller | 125 MB DDR3L SDRAM | 32 MB SPI/QUAD Boot | 2 x 80 pin B2B connectors, B2B USB, Reset IN, 100 x IOs, 6 x CLK IN, FPGA JTAG | user LEDs, push buttons, DIP Switch, |

NEW TE0830 Series (COM-HPC™ PICMG Standard)
AMD Zynq™ UltraScale+™ Module, ZU11EG up to ZU19EG, 12 x 12 cm (Client Size B)



12 x 12 cm form factor

COM-HPC™ is the new released PICMG standard for high-performance Computer-on-Modules (COMs). The pinout and majority of the functionality were recently officially approved.



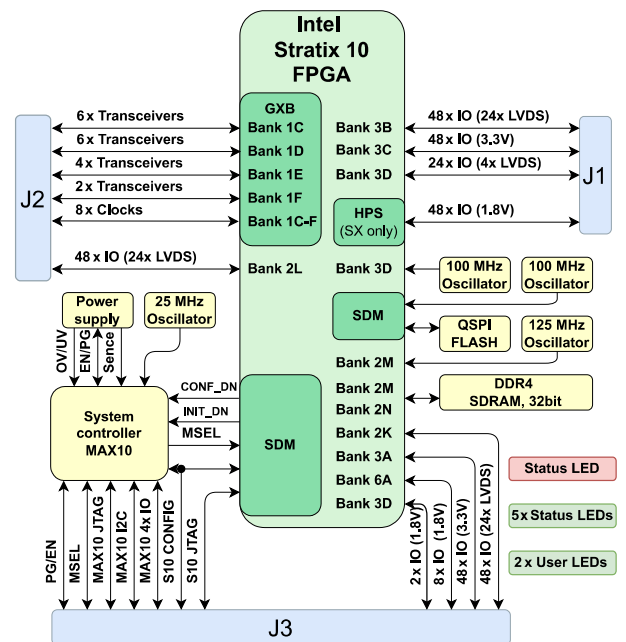
<http://trenz.org/te0830-info>

| Device list | Pin Packages | Connectors | SDRAM max | Gbit Transceivers | Other Features |
|------------------|--------------|---------------------|---|-----------------------------------|---|
| ZU11, ZU17, ZU19 | FFVC1760 | 2 x 400 Pin COM-HPC | bis 8 GB DDR4 (PS) with ECC bis 16 GB DDR4 (SODIMM) (PL) | 32 x GTH, 16 x GTY, 4 x GTR | 1 Gbit ETH PHY, USB PHY, e.MMC, System Controller, CLK Management, diverse IOs, 12V single supply |

NEW TEI1000 Series
Intel® Stratix® 10 SX or GX, SDRAM, Flash, MAX10 System Controller



6 x 8 cm form factor



<http://trenz.org/tei1000-info>

| Device list | Connector | SDRAM | QSPI Flash | Gbit Transceivers | Total IOs | Other Features |
|---------------------|-----------------|-------|------------|-------------------|----------------------|---|
| Stratix 10 SX or GX | 3 x 240 pin BGA | 2 GB | 512 Mbit | 18 x GXT | 250 x PL 48 x CPU | MAX10 System Controller, Status and User LEDs, 1.8V, 3.3V and variable IO |

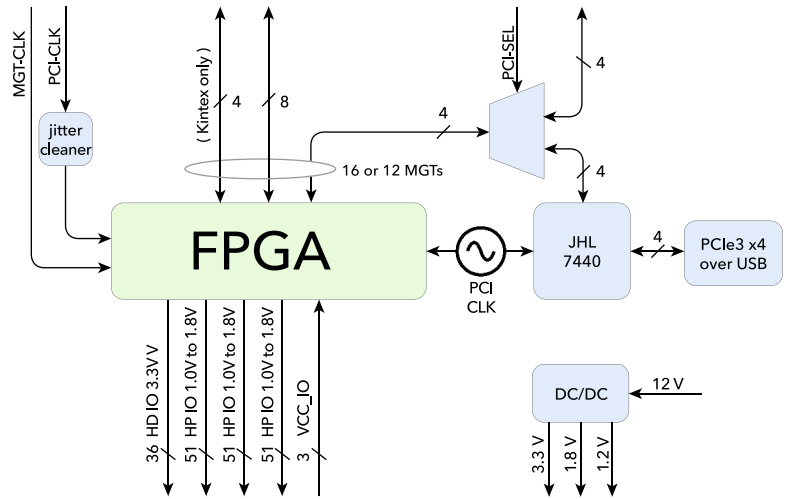
NEW TEC0217 Series
Micromodule with Artix™/Kintex™ Ultrascale+



TEC0217 is an FPGA module optimized to provide high MGT performance at relatively low cost. All 12 or 16 MGT lanes are available on the B2B connector. Of these, 4 lanes can optionally be routed to an onboard intel Thunderbolt 4 device controller JHL7440 to access the board via PCI over USB. An interface like this can connect to any Thunderbolt port and to USB ports that support PCIe over USB.



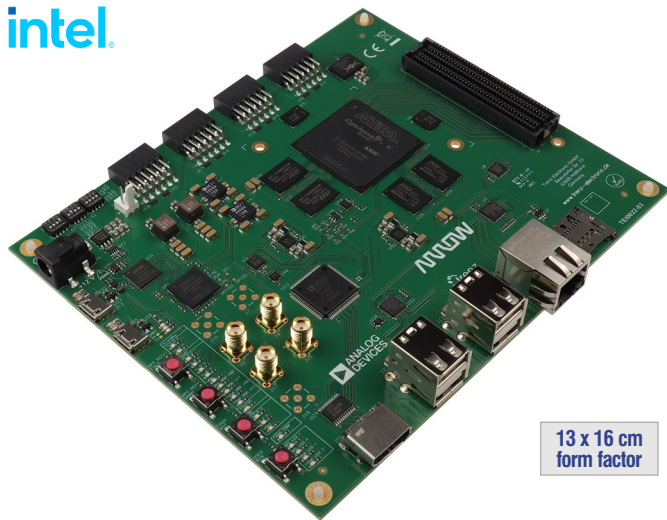
5.2 x 9.6 cm form factor



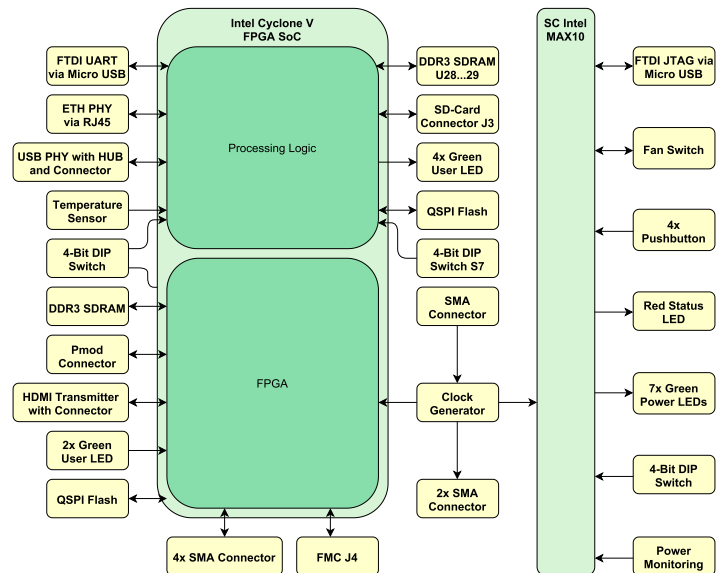
<http://trenz.org/tec0217-info>

| Device list | MGT count | MGT speed | MGT Type | PCI | System Logic Cells (K) | UltraRAM (Mb) | DSP Slices | HP IO (3 Banks with individually selectable IO voltage) | HD IO 3.3V |
|--|-----------|-------------------|----------|--------------------------------|------------------------|--------------------------------------|-----------------|---|-----------------------------|
| AU10P, AU15P, AU20P, AU25P, KU3P, KU5P | 12-16 | 16.3 - 32.75 Gbps | GTH GTY | PCIe4x8 PCIe3x8 PCIe3x16 | 96 up to 475 | only for KU3P (13.5) and KU5P (18.0) | 400 up to 1.824 | 153 | 58 in 29 differential pairs |

NEW TEI0022 DataStorm DAQ
M-Board FMC Carrier for M-Series Precision Converters



13 x 16 cm form factor



<http://trenz.org/tei0022-info>

| Device list | SDRAM max | Flash | On Board | Interface | Other Features |
|-------------------------|-------------------------------|---|--|---|---------------------------------|
| Cyclone V 5CSEMA5F31C8N | 1 GB for HPS 1 GB for FPGA | 32 MB SPI for HPS 32 MB SPI for FPGA | Up to 7 x SMA connector, temperature sensor, Intel MAX 10 for board management | Connectors: LPC FMC, 4 x Pmod, JTAG, UART via microUSB B (for FPGA and HPS), 4 x USB2.0 host, Ethernet, SD card, HDMI | Power: 12V input supply voltage |

TE0710 Series

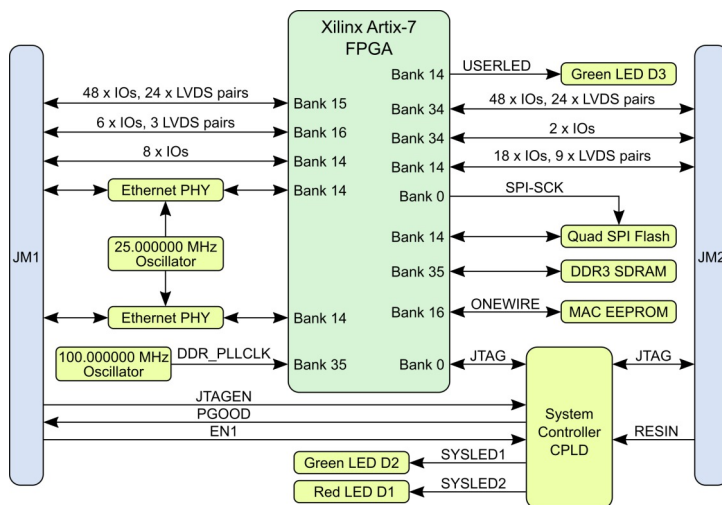
AMD Artix™ 7, DDR3, Flash, 2 x 100 Mbit Ethernet, EEPROM



AMD
ARTIX 7



4 x 5 cm form factor



<http://trenz.org/te0710-info>

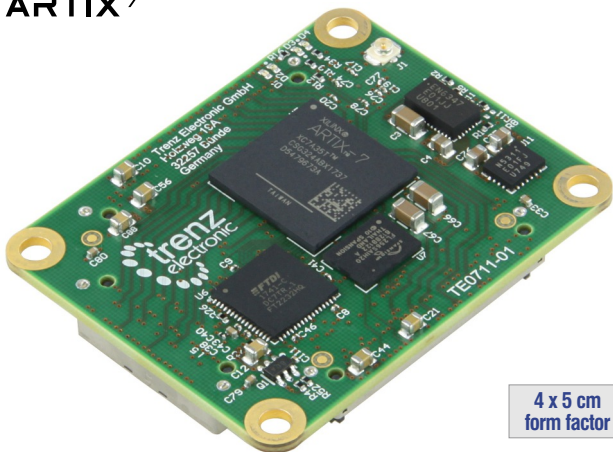
| Device list | Connectors | SDRAM max | Flash | Ethernet PHY | Total I/O | Other Features |
|---------------------|-----------------|-------------|-------|--------------|---|--|
| 35T, 50T, 75T, 100T | 2 x Samtec LSHM | 512 MB DDR3 | 32 MB | 2 x 100 Mbit | 112 (51 differential pairs + 10 single-ended) | JTAG, 100 MHz MEMS oscillator, user LED, single supply |

TE0711 Series

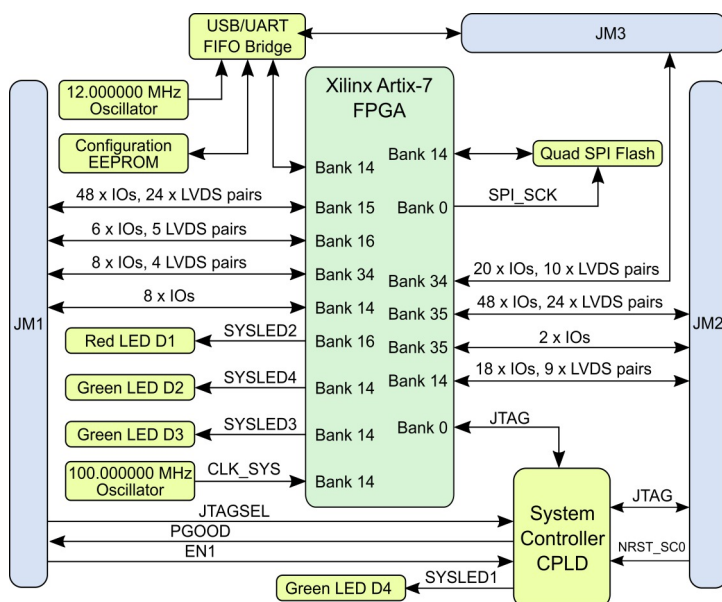
AMD Artix™ 7, Flash, USB, FTDI USB to UART/FIFO bridge, high pin count



AMD
ARTIX 7



4 x 5 cm form factor



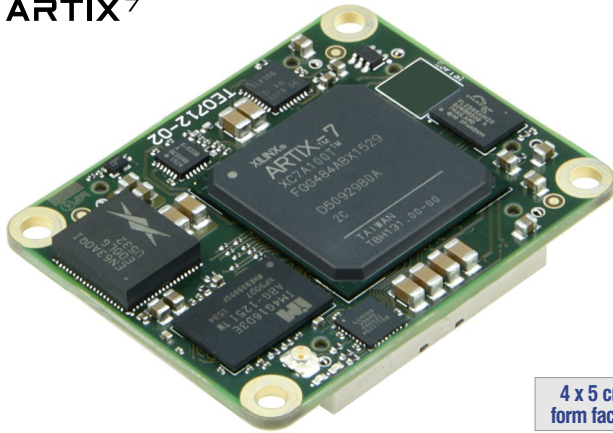
<http://trenz.org/te0711-info>

| Device list | Connectors | Flash | MEMS Oscillator | USB PHY | Total I/O | Other Features |
|---------------------|-----------------|-------|-----------------|---------------------|--------------------------------|--------------------------|
| 35T, 50T, 75T, 100T | 3 x Samtec LSHM | 32 MB | 100 MHz | USB2.0 UART/FIFO | 178 (84 differential pairs) | 4 LEDs, single supply |

TE0712 Series

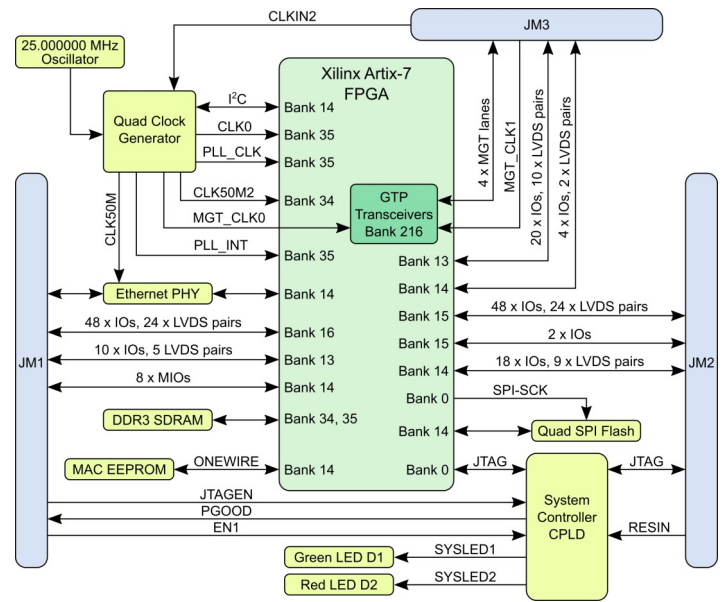
AMD Artix™7, DDR3, Flash, Ethernet, 4 x GTP Transceiver

AMD
ARTIX™7



4 x 5 cm form factor

<http://trenz.org/te0712-info>

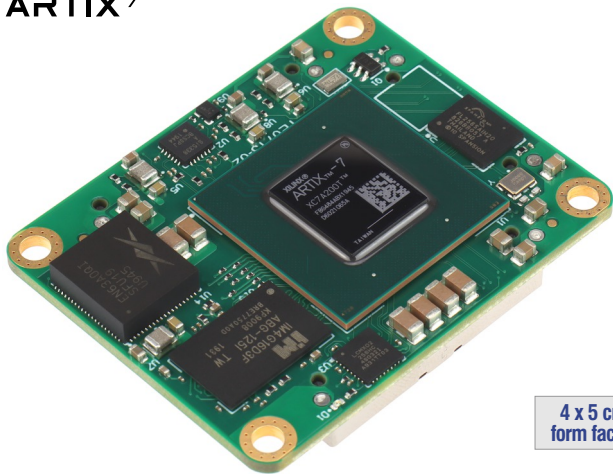


| Device list | Connectors | SDRAM max | Flash | EEPROM | Ethernet PHY | Total I/O | Gbit Transceivers | Other Features |
|---------------------------|-----------------|-----------|-------|-------------|--------------|-----------|-------------------|---|
| 35T, 50T, 75T, 100T, 200T | 3 x Samtec LSHM | 1 GB DDR3 | 32 MB | MAC Address | 100 Mbit | 158 | 4 x GTP | Programmable clock generator, single supply |

TE0713 Series

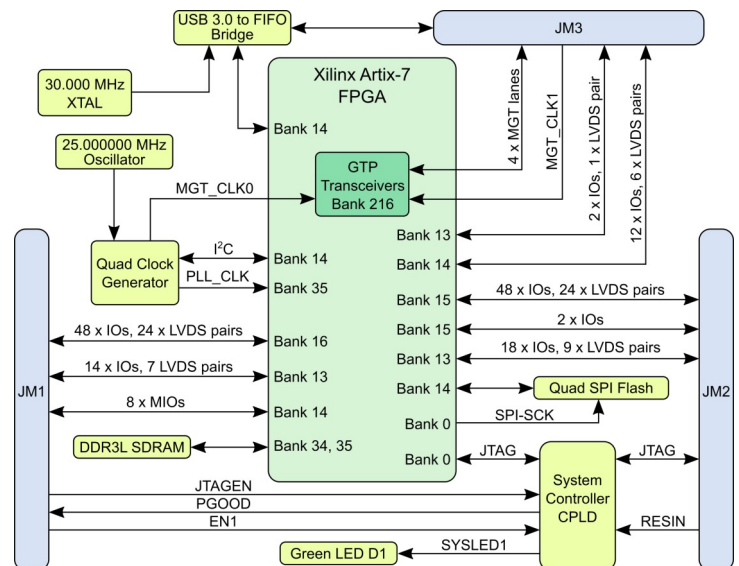
AMD Artix™7, DDR3L, Flash, USB3.0 to FIFO Bridge, 4 x GTP Transceiver

AMD
ARTIX™7



4 x 5 cm form factor

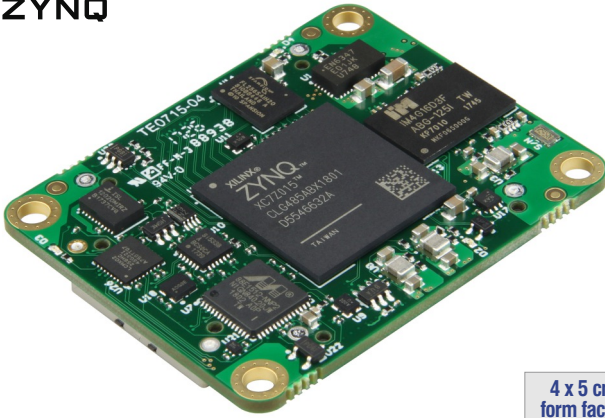
<http://trenz.org/te0713-info>



| Device list | Connectors | SDRAM max | Flash | USB PHY | Total I/O | Gbit Transceivers | Other Features |
|-------------|-----------------|------------|-------|---------|-----------|-------------------|---|
| 15T - 200T | 3 x Samtec LSHM | 1 GB DDR3L | 32 MB | USB3.0 | 152 | 4 x GTP | Programmable clock generator, single supply |

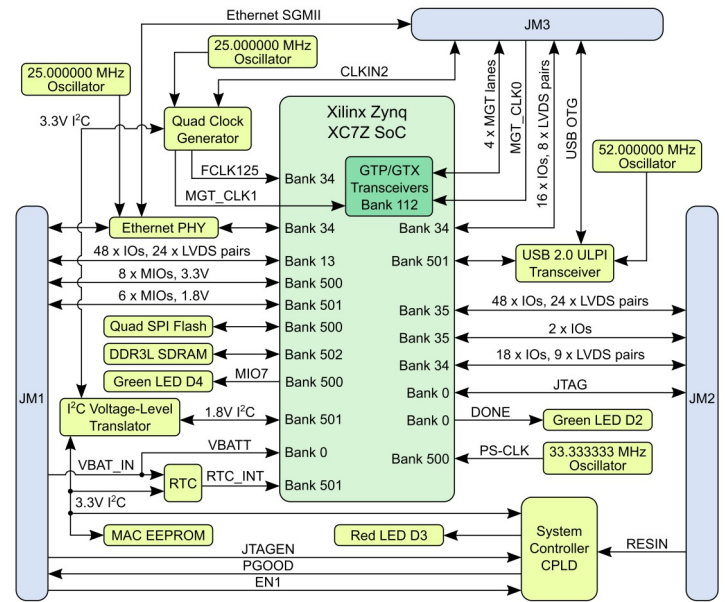
TE0715 Series

AMD Zynq™ 7000, DDR3, Flash, Ethernet, USB, 4 High Speed Serial Transceivers



4 x 5 cm form factor

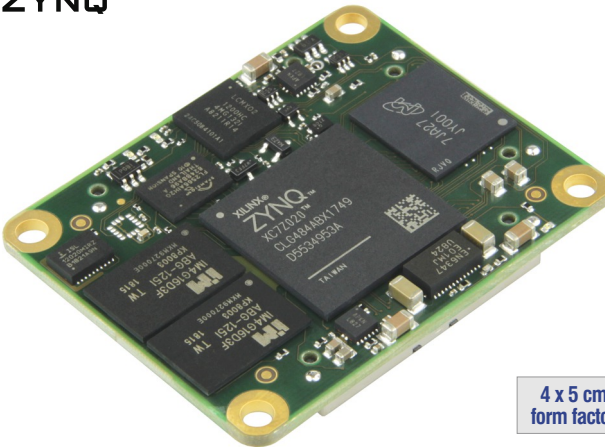
<http://trenz.org/te0715-info>



| Device list | Connectors | SDRAM max | Flash | Ethernet PHY | USB PHY | Total I/O | Gbit Transceivers | Other Features |
|-------------------------|-----------------|-----------|-------|--------------|---------|--------------|------------------------------------|--|
| Z-7015, Z-7030, Z-7012S | 3 x Samtec LSHM | 1 GB DDR3 | 32 MB | 1 Gbit | USB2.0 | 132 + 14 MIO | Z-7015: 4 x GTP Z-7030: 4 x GTX | Programmable clock generator, real time clock, single supply |

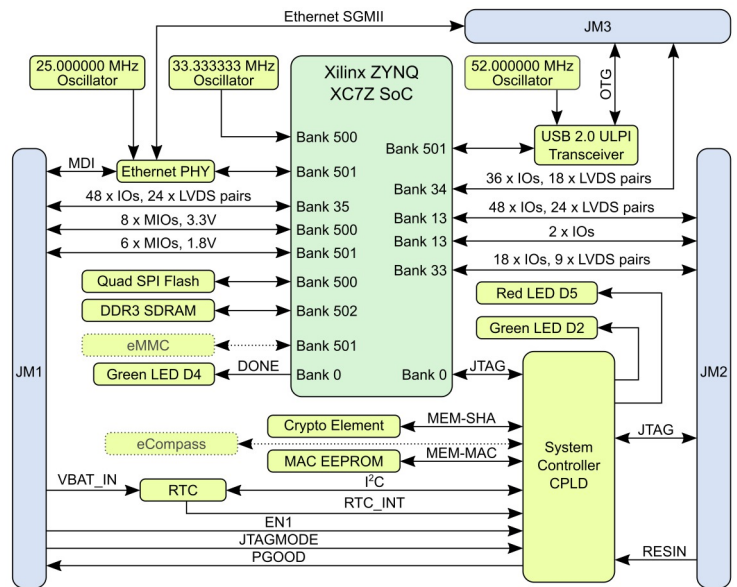
TE0720 GigaZee Series

AMD Zynq™ 7000, DDR3, Flash, Ethernet, USB, e.MMC, Automotive Grade available



4 x 5 cm form factor

<http://trenz.org/te0720-info>



| Device list | Connectors | SDRAM max | Flash max | e.MMC max | Ethernet PHY | USB PHY | Total I/O | Other Features |
|-----------------------------------|-----------------|-----------|-----------|-----------|--------------|---------|--------------|--|
| Z-7020, Z-7014S, XA7Z020-1CLG484Q | 3 x Samtec LSHM | 1 GB DDR3 | 64 MB | 32 GB | 1 Gbit | USB2.0 | 152 + 14 MIO | Real time clock, MAC address, 2k serial EEPROM, 3 user LEDs, single supply |

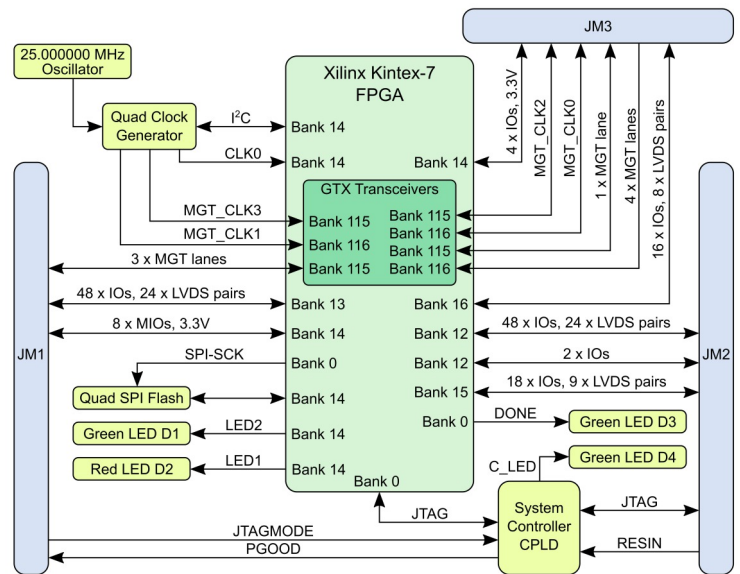
TE0741 Series

AMD Kintex™ 7, Flash, 8 High Speed Serial Transceivers, 25 MHz Oscillator



4 x 5 cm form factor

<http://trenz.org/te0741-info>



| Device list | Connectors | Flash | Total I/O | Gbit Transceivers | Other Features |
|-----------------------|-----------------|-------|-----------------------------|-------------------|---|
| 70T, 160T, 325T, 410T | 3 x Samtec LSHM | 32 MB | 144 (94 for 70T variant) | 8 x MGTs | Programmable clock generator, single supply |

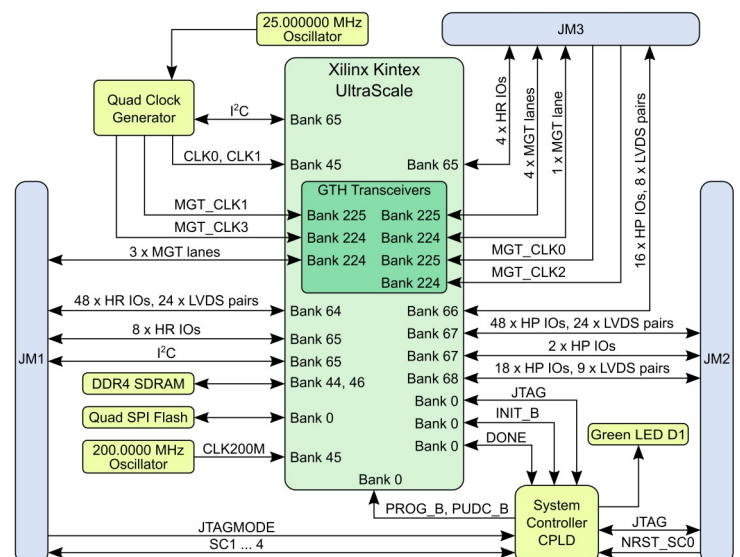
TE0841 Series

AMD Kintex™ UltraScale™, DDR4, Flash, 8 x GTH Transceiver



4 x 5 cm form factor

<http://trenz.org/te0841-info>



| Device list | Connectors | SDRAM max | Flash | Total I/O | Gbit Transceivers | Other Features |
|--------------|-----------------|-----------|-------|------------------------------|-------------------|---|
| KU035, KU040 | 3 x Samtec LSHM | 4 GB DDR4 | 64 MB | 60 x HR I/Os 84 x HP I/Os | 8 x GTH | Programmable clock generator, single supply |

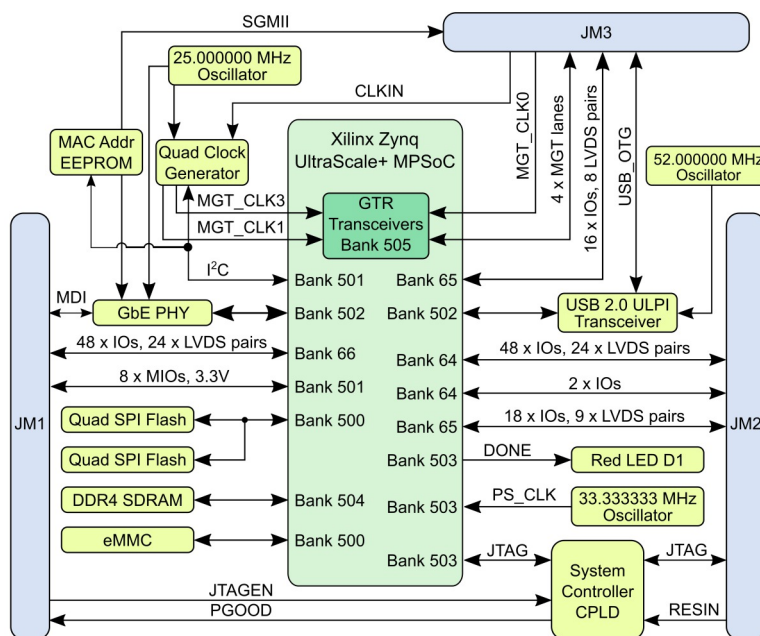
TE0820 Series

AMD Zynq™ UltraScale+™, DDR4, Flash, USB, Ethernet, e.MMC



4 x 5 cm form factor

<http://trenz.org/te0820-info>



| Device list | Pin Packages | Connectors | SDRAM max | Flash | e.MMC | Ethernet PHY | USB PHY | Total I/O | Gbit Transceiver | Other Features |
|--|--------------|-----------------|-----------|--------|-----------|--------------|------------|--------------|------------------|--|
| ZU2CG - ZU5CG, ZU2EG - ZU5EG, ZU4EV, ZU5EV | 784 | 3 x Samtec LSHM | 4 GB DDR4 | 128 MB | 8 - 64 GB | 1 Gbit | USB2.0 OTG | 132 + 14 MIO | 4 x PS GTR | GPU/VCU depending on device, programmable clock generator, single supply |

TE0821 Series

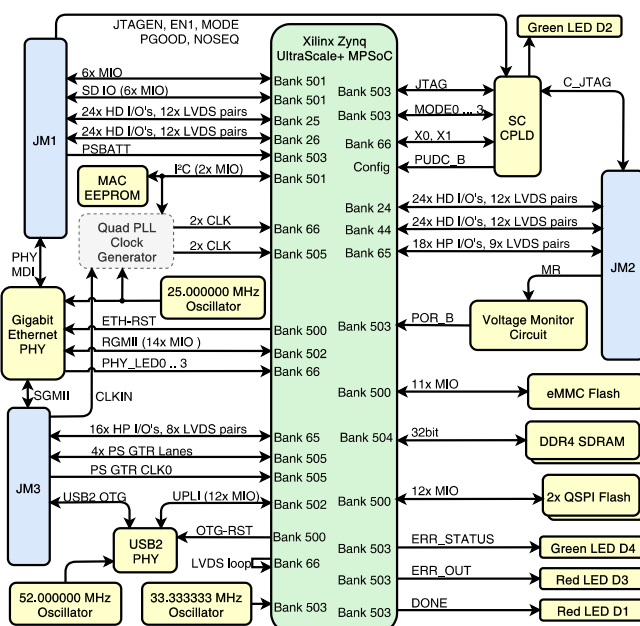
AMD Zynq™ UltraScale+™, DDR4, Flash, USB, Ethernet, e.MMC, 96 High Density PL I/Os



Pin compatible with TE0820

4 x 5 cm form factor

<http://trenz.org/te0821-info>



| Device list | Pin Packages | Connectors | SDRAM max | Flash | e.MMC | Ethernet PHY | USB PHY | Total I/O | Gbit Transceiver | Other Features |
|--|--------------|-----------------|-----------|--------|-----------|--------------|------------|------------------------------|------------------|--|
| ZU2CG - ZU5CG, ZU2EG - ZU5EG, ZU4EV, ZU5EV | 784 | 3 x Samtec LSHM | 4 GB DDR4 | 128 MB | 8 - 64 GB | 1 Gbit | USB2.0 OTG | 34 x HP 96 x HD 14 MIO | 4 x PS GTR | GPU/VCU depending on device, programmable clock generator, single supply |

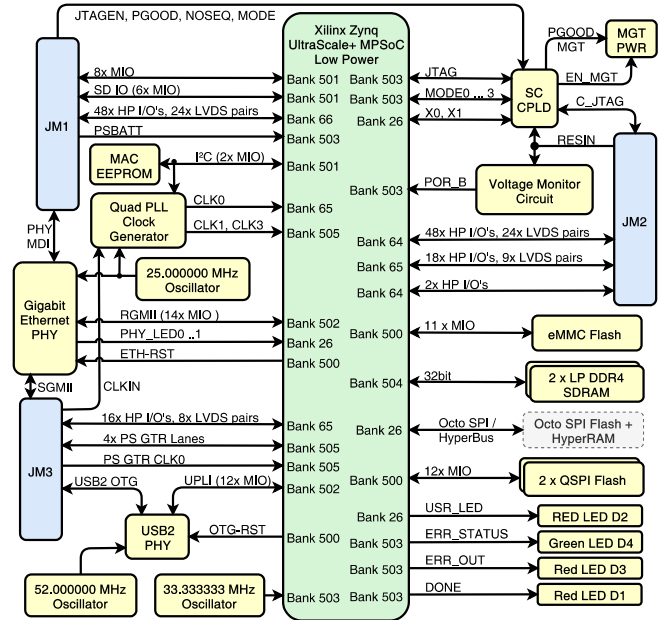
TE0823 Series

AMD Zynq™ UltraScale+™ Low Power FPGA, LPDDR4, Flash, USB, Ethernet, e.MMC



Optional HyperRAM/
OctalRAM/HyperFlash/
xSPI Flash

4 x 5 cm
form factor

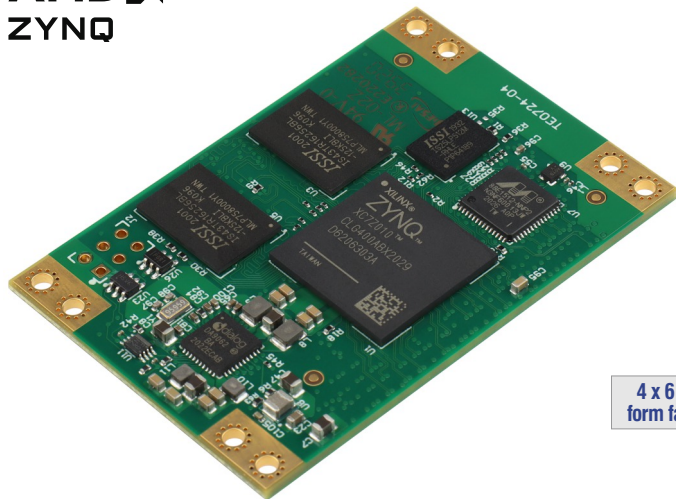


<http://trenz.org/te0823-info>

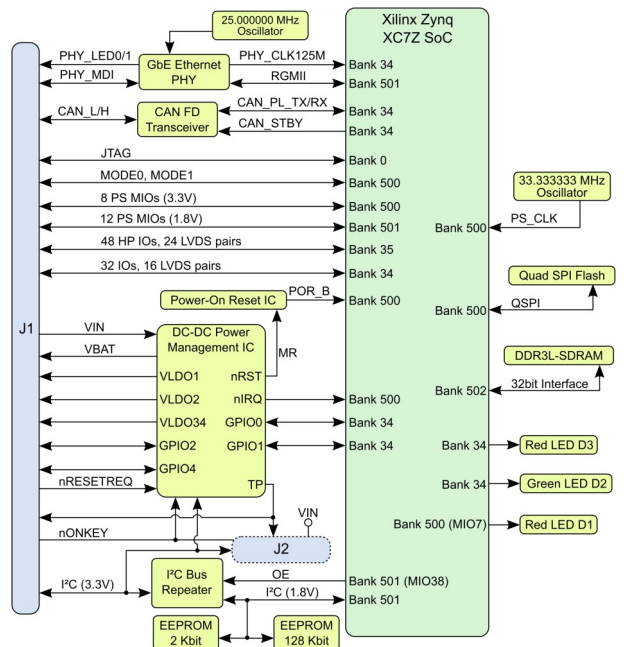
| Device list | Pin Packages | Connectors | SDRAM max | Flash | e.MMC | Ethernet PHY | USB PHY | Total I/O | Gbit Transceiver | Other Features |
|--|--------------|-----------------|-------------|--------|-----------|--------------|------------|-----------------|------------------|--|
| ZU2CG - ZU5CG, ZU2EG - ZU5EG, ZU4EV, ZU5EV | 784 | 3 x Samtec LSHM | 2 GB LPDDR4 | 128 MB | 8 - 64 GB | 1 Gbit | USB2.0 OTG | 132 HP + 14 MIO | 4 x PS GTR | GPU/VCU depending on device, programmable clock generator, single supply |

TE0724 Series

AMD Zynq™ 7000, DDR3L, Flash, Ethernet, EEPROM, CAN



4 x 6 cm
form factor



<http://trenz.org/te0724-info>

| Device list | Connectors | SDRAM max | Flash max | EEPROM | Ethernet PHY | Total I/O | Other Features |
|----------------|----------------|------------|-----------|-------------|--------------|------------------|--------------------|
| Z-7010, Z-7020 | 1 x Samtec ST5 | 1 GB DDR3L | 64 MB | MAC Address | 1 Gbit | PL: 80 PS: 20 | CAN, single supply |

TE0803/TE0813 "UltraSoM+" Series

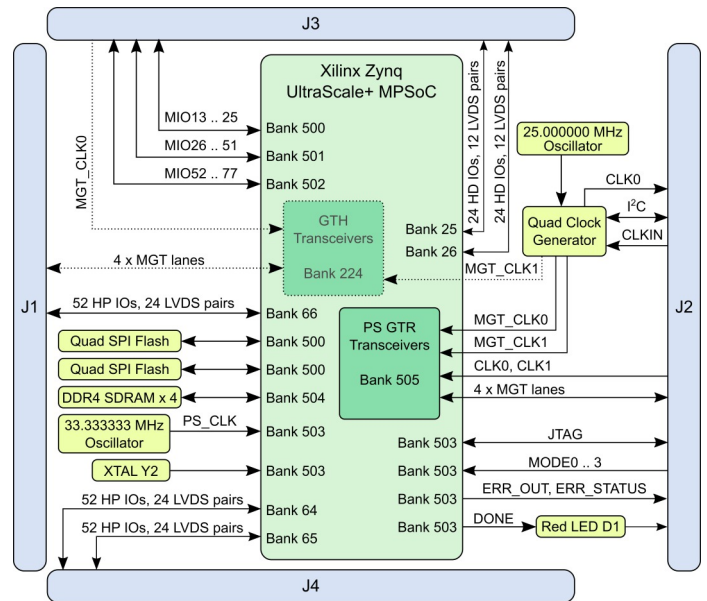
AMD Zynq™ UltraScale+™, DDR4, Flash, 8 High Speed Serial Transceivers



5.2 x 7.6 cm form factor

Compatible with
TEBF0808/818

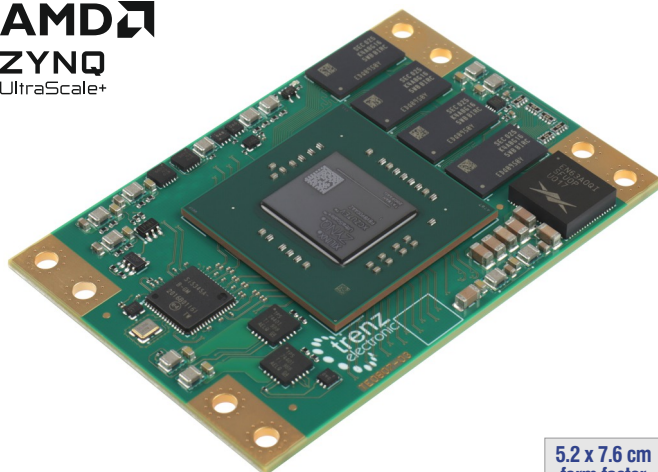
<http://trenz.org/te0803-info>



| Device list | Pin Packages | Connectors | SDRAM max | Flash | Total I/O | Gbit Transceivers | Other Features |
|--|--------------|---|-----------|-------|--------------|--|--|
| ZU2CG - ZU5CG, ZU2EG - ZU5EG, ZU4EV, ZU5EV | C784 | 4 x Samtec ST5 (TE0803) 4 x Samtec ADM6 (TE0813) | 8 GB DDR4 | 128 | 204 + 65 MIO | 4 x PS GTR 4 x PL GTH (ZU4+ZU5 only) | GPU/VCU depending on device, EEPROM MAC address, programmable clock generator, single supply |

TE0807/TE0817 "UltraSoM+" Series

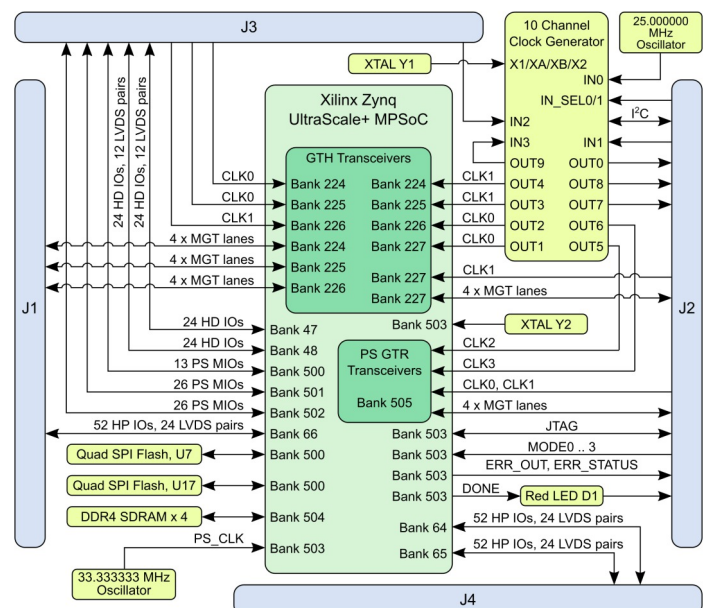
AMD Zynq™ UltraScale+™, DDR4, Flash, 20 High Speed Serial Transceivers



5.2 x 7.6 cm form factor

Compatible with
TEBF0808/818

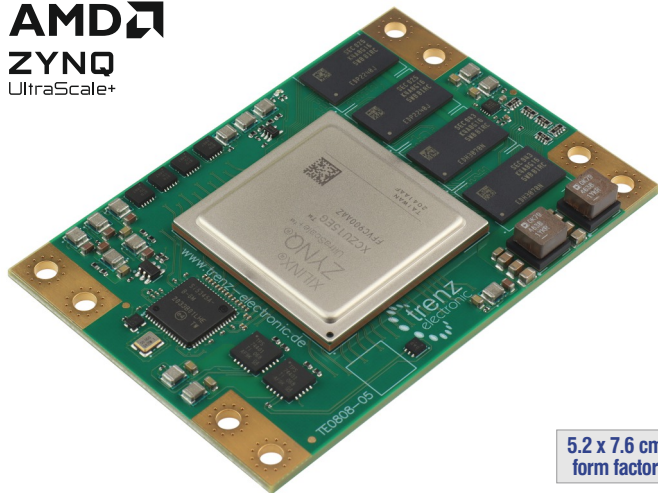
<http://trenz.org/te0807-info>



| Device list | Pin Package | Connectors | SDRAM max | Flash | Total I/O | Gbit Transceivers | Other Features |
|---|-------------|---|-----------|--------|--------------|----------------------|---|
| ZU4CG - ZU7CG, ZU4EG - ZU7EG, ZU4EV - ZU7EV | B900 | 4 x Samtec ST5 (TE0807) 4 x Samtec ADM6 (TE0817) | 8 GB DDR4 | 128 MB | 204 + 65 MIO | 4 x GTR, 16 x GTH | GPU and VCU, programmable clock generator, single supply |

TE0808/TE0818 "UltraSoM+" Series

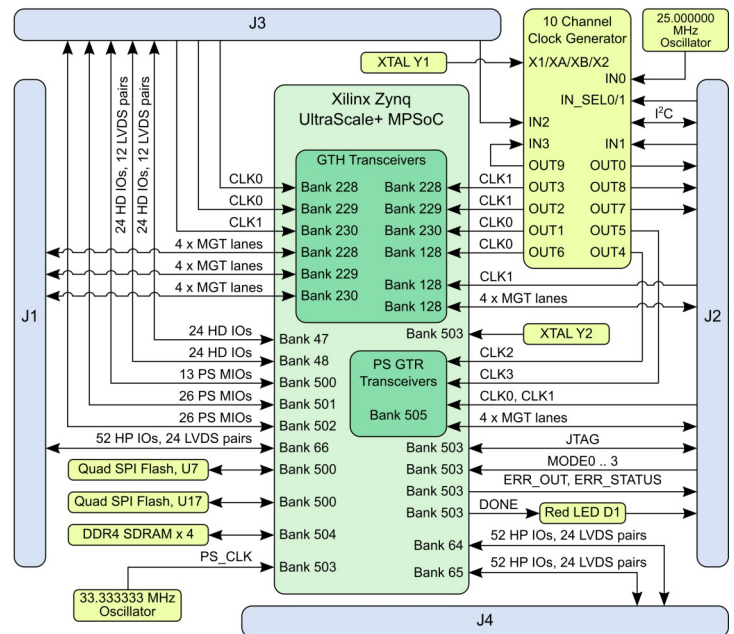
AMD Zynq™ UltraScale+™, DDR4, Flash, 20 High Speed Serial Transceivers



5.2 x 7.6 cm form factor

Compatible with TEBF0808/818

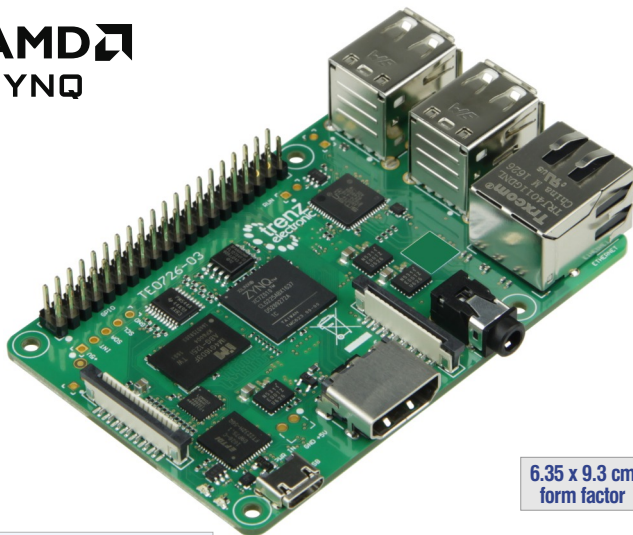
<http://trenz.org/te0808-info>



| Device list | Pin Package | Connectors | SDRAM max | Flash | Total I/O | Gbit Transceivers | Other Features |
|------------------------------------|-------------|---|-----------|--------|--------------|----------------------|--|
| ZU6CG, ZU9CG, ZU6EG, ZU9EG, ZU15EG | C900 | 4 x Samtec ST5 (TE0808) 4 x Samtec ADM6 (TE0818) | 8 GB DDR4 | 128 MB | 204 + 65 MIO | 4 x GTR, 16 x GTH | GPU/VCU depending on device, programmable clock generator, single supply |

TE0726 "ZynqBerry" Series

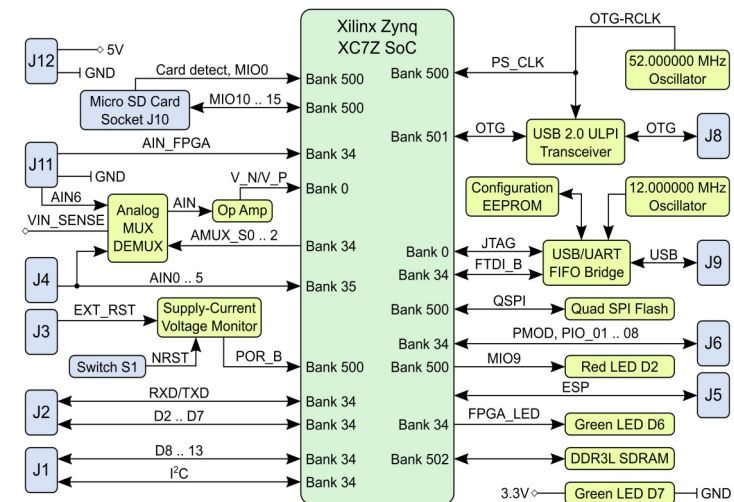
AMD Zynq™ 7000, Form Factor like Raspberry Pi 2, DDR3L, Flash, Ethernet, USB, HDMI



6.35 x 9.3 cm form factor

Raspberry Pi 2 compatible

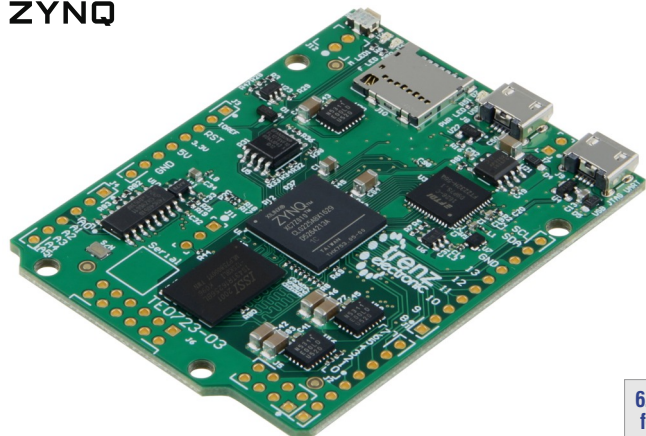
<http://trenz.org/te0726-info>



| Device list | Connectors | SDRAM max | Flash | Ethernet PHY | USB PHY | Total I/O | Other Features |
|-----------------|----------------------|--------------|-------|--------------|-----------------|-----------|---|
| Z-7010, Z-7007S | 40-pin "HAT" headers | 512 MB DDR3L | 16 MB | 100 Mbit | 4 x USB2.0 Host | 26 | DSI display connector, CSI-2 camera connector, micro SD card slot, 3.5 mm audio plug, HDMI type A |

TE0723 "ArduZynq" Series

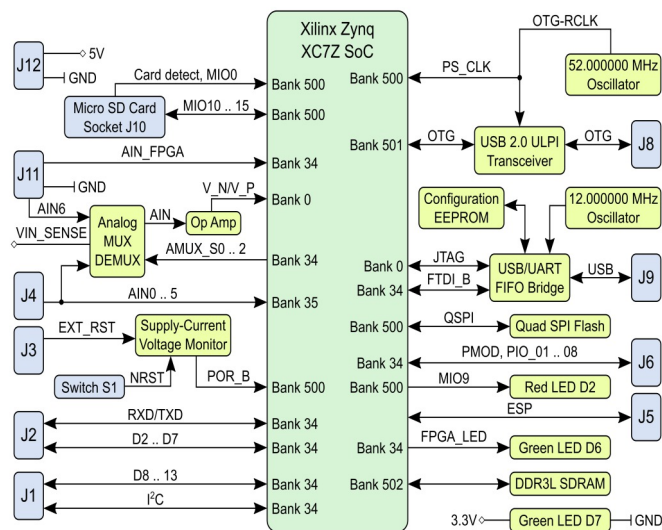
AMD Zynq™ 7000, Form Factor like Arduino Shield, DDR3L, Flash, USB OTG



6.9 x 5.3 cm form factor

Arduino Shield compatible

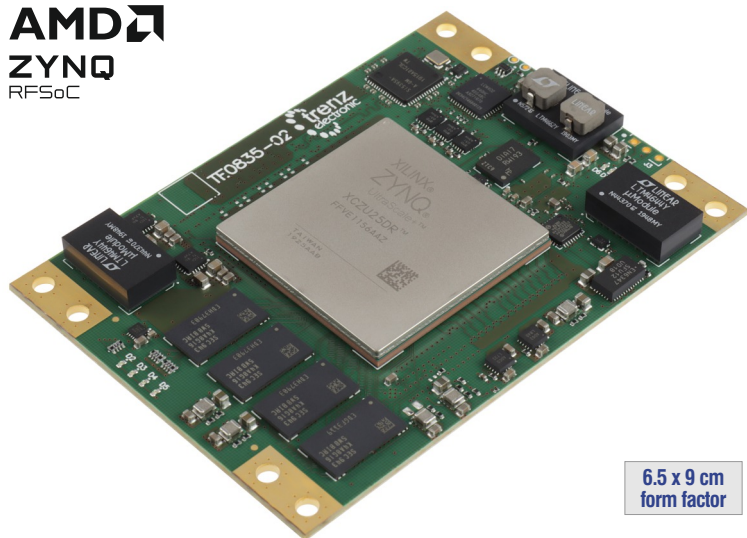
<http://trenz.org/te0723-info>



| Device list | Connectors | SDRAM max | Flash | USB PHY | Total I/O | Other Features |
|-----------------|----------------------|--------------|-------|--|-----------|--------------------------------------|
| Z-7010, Z-7007S | Arduino Pmod headers | 512 MB DDR3L | 16 MB | Micro USB OTG, micro USB, FT2232, JTAG/UART/FIFO | 30 | Micro SD, on-board USB JTAG and UART |

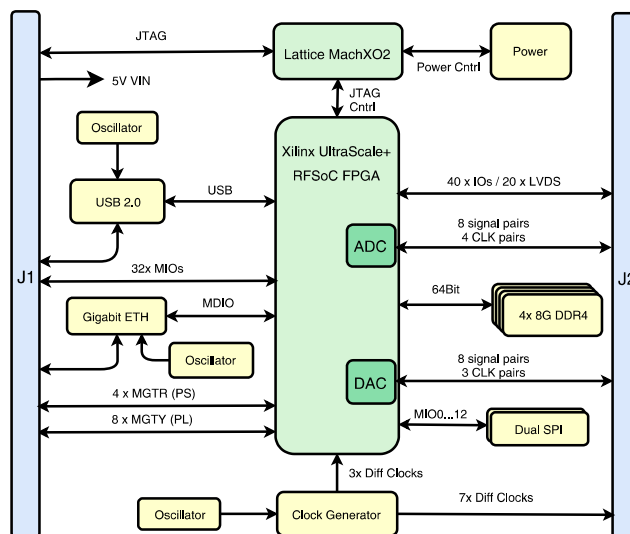
TE0835 RFSoc Series

AMD Zynq™ UltraScale+™ RFSoc, DDR4, Flash, Ethernet, USB, EEPROM



6.5 x 9 cm form factor

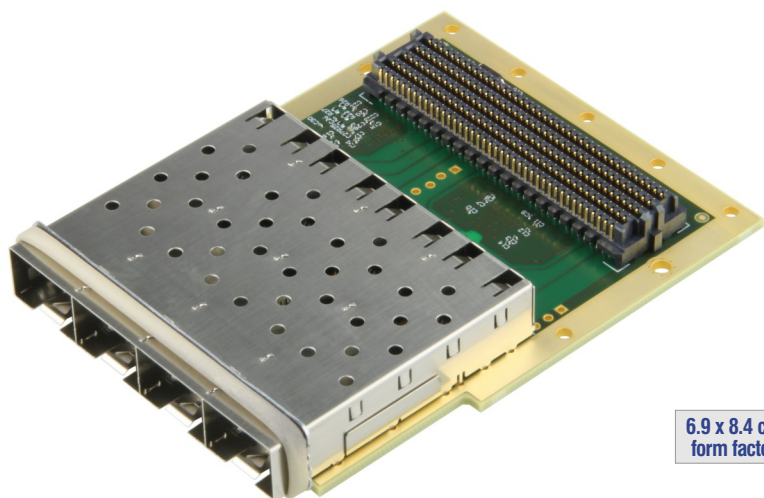
<http://trenz.org/te0835-info>



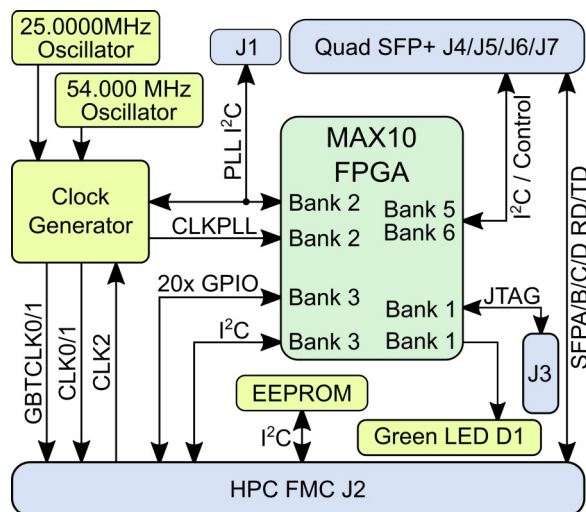
| Device list | Pin Packages | Connectors | SDRAM | Flash | Ethernet PHY | Total I/O | Gbit Transceivers | Other Features |
|----------------|----------------------|----------------|---------------|--------|--------------|----------------------------|-------------------|------------------------|
| ZU25DR, ZU47DR | E1156, speedgrade -1 | 2 x Samtec ST5 | 4 x 1 GB DDR4 | 128 MB | 1 x Gbit | 40 x I/O/ 20 LVDS + 32 MIO | 8 x GTY, 4 x GTR | USB2.0 OTG, MAC EEPROM |

TEF0008 Series

FMC Card with four SFP+ 10 Gbit Ports based on VITA 57.1 FMC HPC Standard



6.9 x 8.4 cm form factor



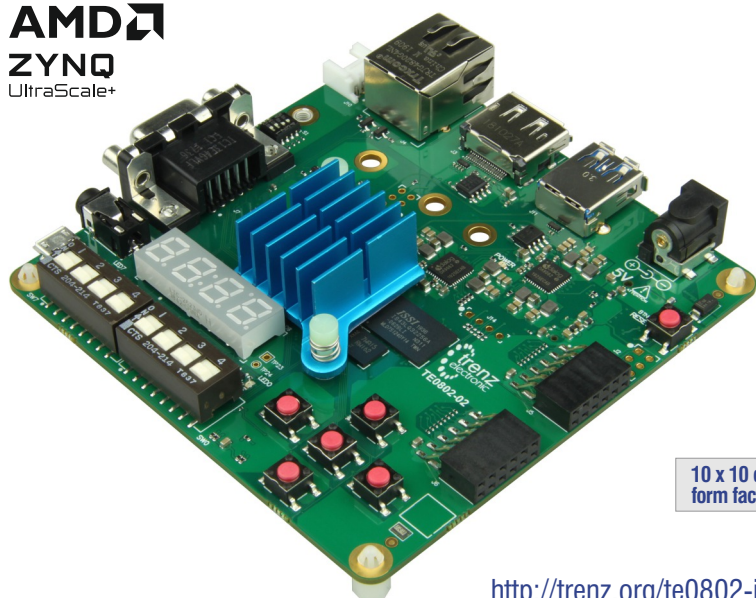
It is intended for use on a FMC HPC carrier and can not be used stand-alone.

<http://trenz.org/tef0008-info>

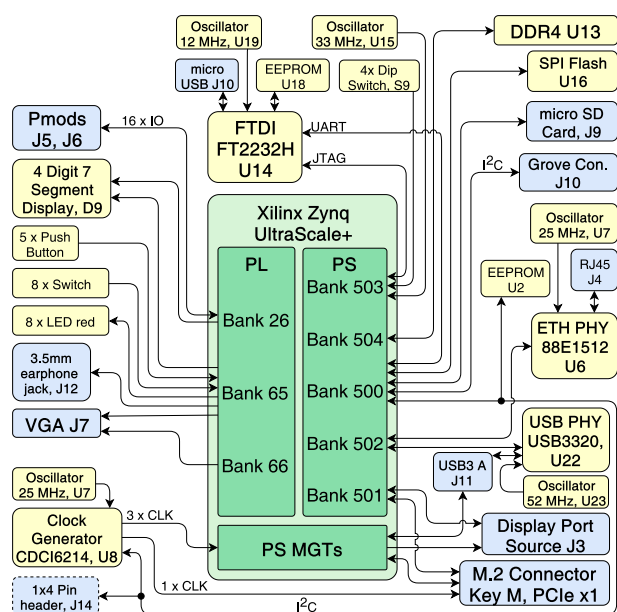
| Connector | Dimension | SFP+ | Other Features |
|-----------|--|--|---|
| HPC FMC | 69 x 84 mm, SFP+ connector excluded (+ 5.5 mm) | 4 SFP+ 10 Gbit ports for fiber optical SFP modules | Low-jitter programmable clock generator, 3.3V to 1.8V DCDC converter, 128 Kbit EEPROM, status LED (green) |

TE0802 MPSoC Development Board

AMD Zynq™ UltraScale+™, LPDDR4, Flash, Ethernet, USB, Audio, Display



10 x 10 cm form factor

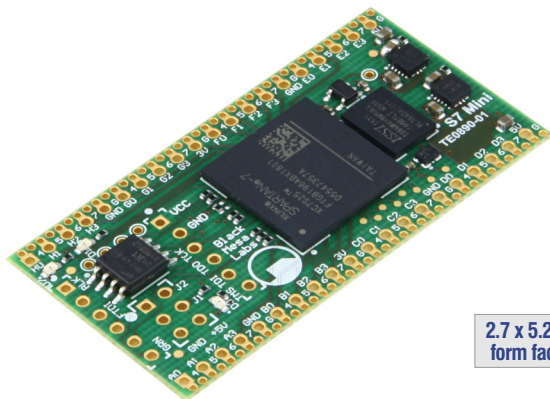


<http://trenz.org/te0802-info>

| Device list | SDRAM max | Flash | Ethernet RJ45 | USB | User I/O | Audio | Other Features |
|----------------|-------------|-------|---------------|--------------------------------|-------------------|--------------------------|--|
| ZU1CG ZU2CG | 2 GB LPDDR4 | 32 MB | 1 Gbit | USB3.0 Host (type A connector) | 2 Pmod connectors | 3.5 mm jack (PWM output) | EEPROM, USB JTAG/UART microUSB, microSD card, M2 PCIe SSD support, display, power: 5V plug |

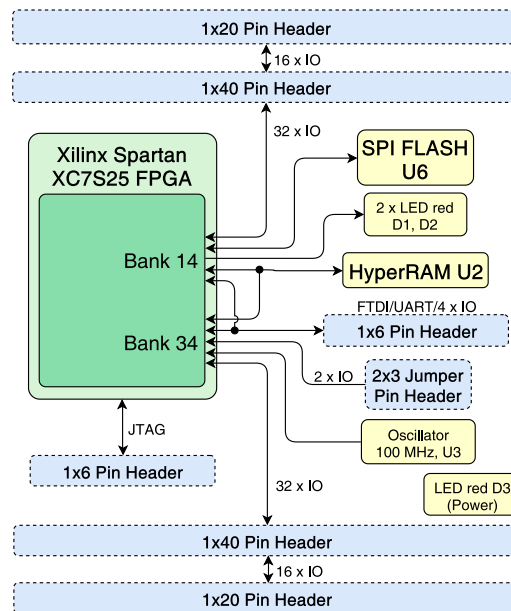
TE0890 "S7 Mini" Series

AMD Spartan™ 7, Fully Open-Source Module with HyperRAM



2.7 x 5.2 cm form factor

<http://trenz.org/te890-info>



| Device list | Footprint compatible | Config PROM | HyperRAM DRAM | Total I/O | Interface(s) | Supply | Other Features |
|-------------|----------------------------------|-------------|---------------|--|--------------------------------|----------|---|
| 7S25 | 7S6, 7S15, 7S50 FTGB-196 devices | 64 Mb | 64 Mb | Dual-Pinout DIP-40 or 50mil 80 pin for 32 or 64 FPGA 3.3V I/Os | Standard 1x6 FTDI cable serial | 5V input | 23K Logic Cells, 29K Flops, 45 36Kb BRAMs, 80 mults., fully open source |

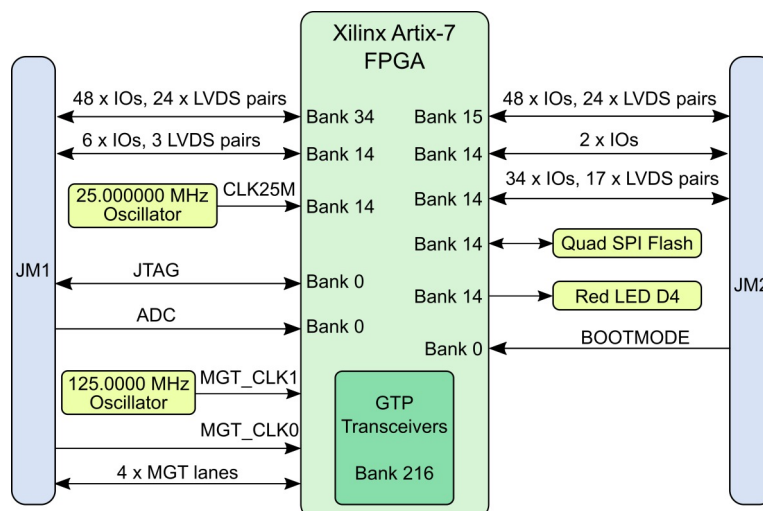
TE0714 Series

AMD Artix™ 7, Flash, 4 x GTP Transceiver, Form Factor 3 x 4 cm only



3 x 4 cm form factor

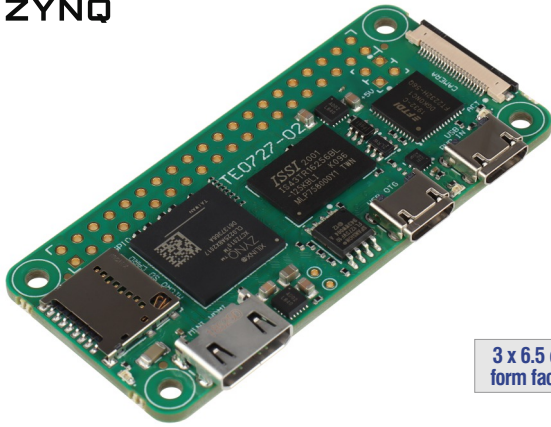
<http://trenz.org/te0714-info>



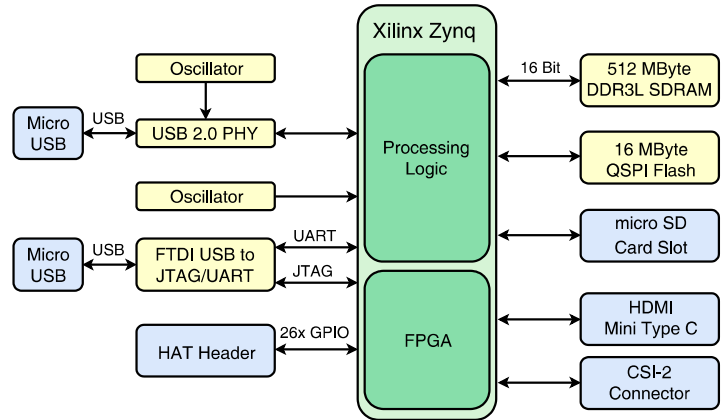
| Device list | Connectors | Flash | Total I/O | Gbit Transceivers | Config. Voltage (B14) | Other Features |
|---------------|-----------------|-------|-----------------------------|-------------------|-----------------------|--|
| 15T, 35T, 50T | 2 x Samtec LSHM | 16 MB | 138 + 5 (QSPI or user I/Os) | 4 x GTP | 3.3V or 1.8V | Differential MEMS oscillator for MGT clocking, XADC analog Input, eFUSE bit-stream encryption (AES), single supply |

TE0727 "ZynqBerryZero" Series

AMD Zynq™ 7000, Raspberry Pi Zero Form Factor, DDR3L, Flash, USB, mini HDMI



3 x 6.5 cm form factor

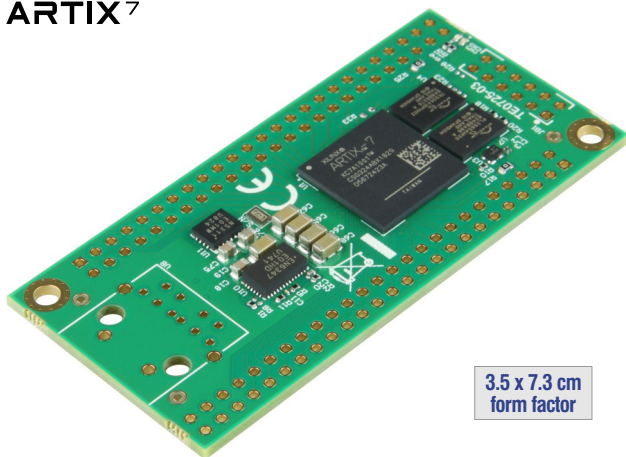


<http://trenz.org/te0727-info>

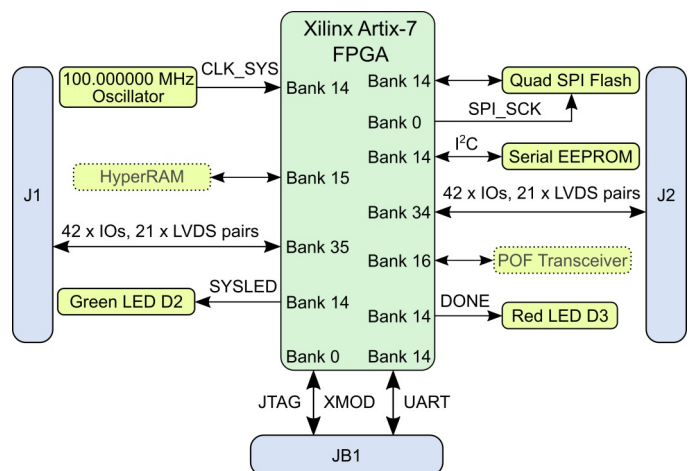
| Device list | SDRAM max | Flash | HAT header | Total I/O | Other Features |
|-------------|--------------|-------|------------|-----------|--|
| Z-7010 | 512 MB DDR3L | 16 MB | 40-pin | 26 GPIO | 2 x microUSB2.0, microSD card slot, Mini HDMI type C, CSI-2 connector (camera) |

TE0725 Series

AMD Artix™ 7, Flash, HyperRAM, 2 x 50-pin Headers, 2.54 mm Pitch



3.5 x 7.3 cm form factor



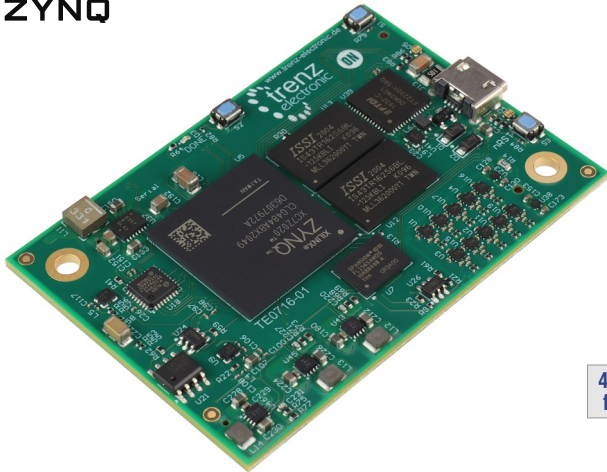
The TE0725LP series is the same form factor, but w/o POF adapter and depending on variant 3.3 or 1.8V main power VIN, 4 diff. pairs in extra header J3, system clock 25 MHz (can be customized on request).

<http://trenz.org/te0725-info>

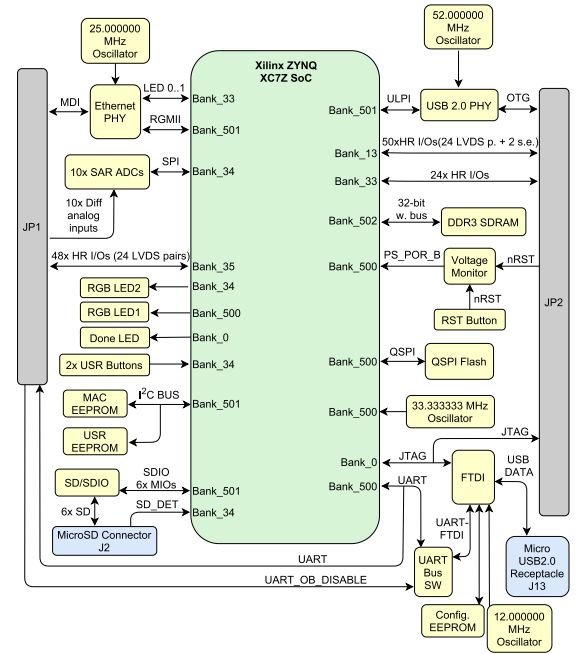
| Device list | Connectors | HyperRAM max | Flash | EEPROM | Total I/O | Other Features |
|--------------------------|--------------------|--------------|-------|--------|-----------|--|
| 15T, 35T, 50T, 75T, 100T | 2 x 50-pin headers | 8 MB | 32 MB | 16 KB | 87 | Optional POF (Plastic Optical Fiber) adapter (125/250 Mbit/s), single supply |

TE0716 Series

AMD Zynq™ 7000, DDR3L, Flash, Ethernet, USB PHY, low power SAR ADCs



4.5 x 6.5 cm form factor

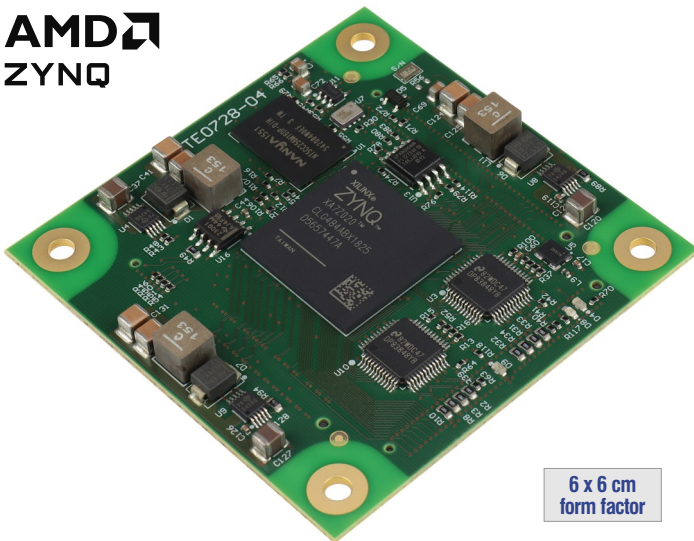


<http://trenz.org/te0716-info>

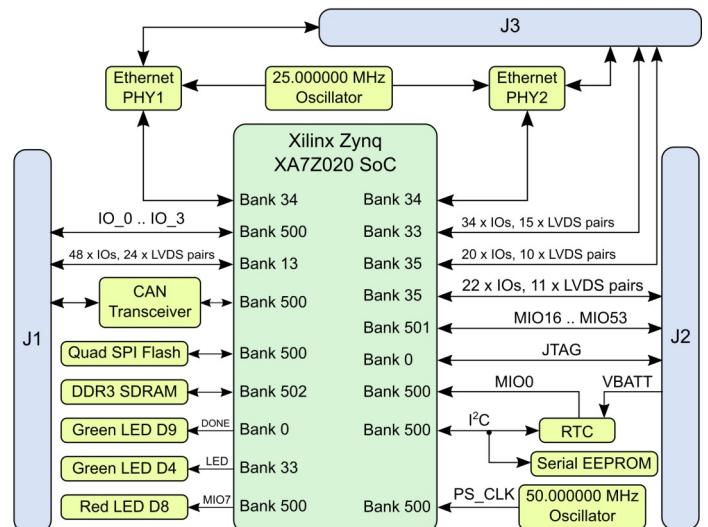
| Device list | Connectors | SDRAM max | Flash | Ethernet PHY | USB PHY | Total I/O | Gbit Transceiver | Other Features |
|-------------|------------------|------------|-------|--------------|---------|-------------|------------------|---|
| Z-7020 | 2 x FCI Bergstak | 1 GB DDR3L | 32 MB | 1 Gbit | USB2.0 | 120 x HR PL | 2 x PS MIOs | On board 10x 12-bit low power SAR ADCs up to 2 MSPS, low power oscillators, USB2.0 to UART/JTAG interface, EEPROM |

TE0728 Series

AMD Zynq™ 7000, DDR3, Flash, 2 x Ethernet, CAN, Automotive



6 x 6 cm form factor

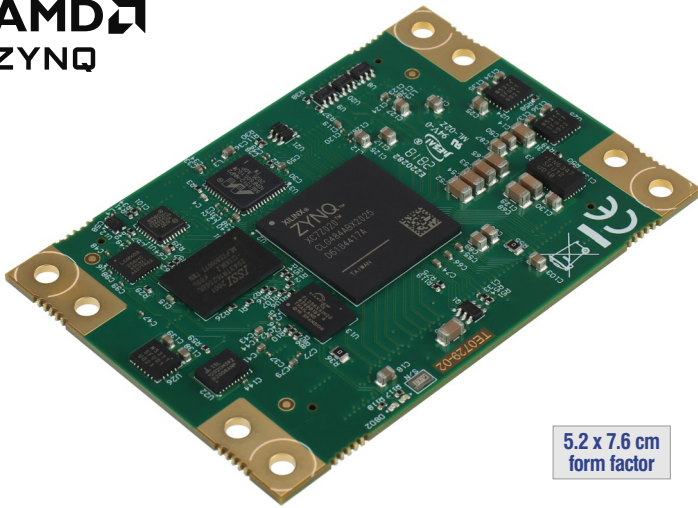


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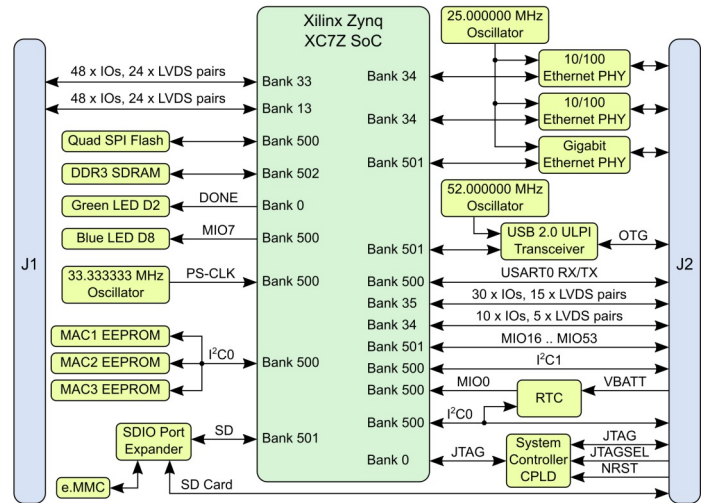
| Device list | Connectors | SDRAM max | Flash | EEPROM | Ethernet PHY | Total I/O | Other Features |
|---------------------------|----------------|-------------|-------|---------|--------------|--------------|---|
| XA7Z020 (automotive FPGA) | 3 x Samtec SEM | 512 MB DDR3 | 16 MB | 8 KByte | 2 x 100 Mbit | 124 + 30 MIO | Automotive, real time clock, CAN, single supply |

TE0729 Series

AMD Zynq™ 7000, DDR3, Flash, 3 x Ethernet, 3 x EEPROM, USB, e.MMC



5.2 x 7.6 cm form factor



<http://trenz.org/te0729-info>

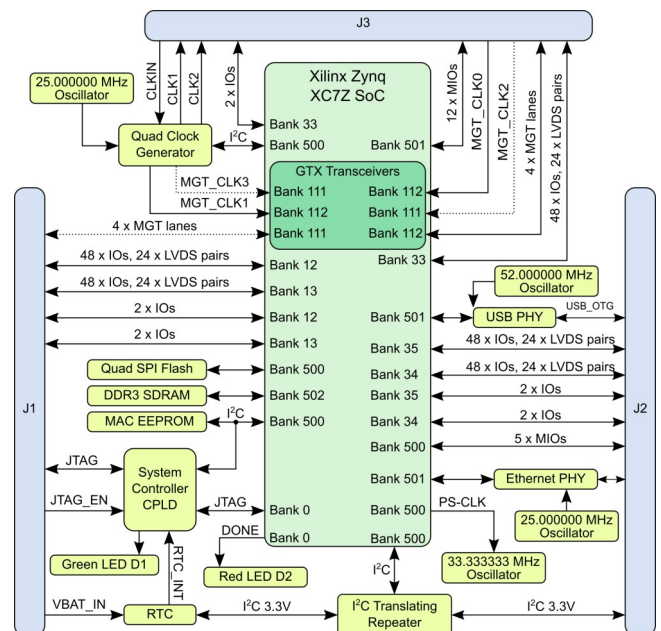
| Device list | Connectors | SDRAM max | Flash | e.MMC | Ethernet PHY | USB PHY | EEPROM | Total I/O | Other Features |
|-------------|-----------------|-------------|-------|-----------|----------------------|------------|-----------------|--------------|--------------------------------|
| Z-7020 | 3 x Samtec LSHM | 512 MB DDR3 | 32 MB | 4 - 64 GB | 2 x 100 Mbit, 1 Gbit | USB2.0 OTG | 2 x MAC address | 136 + 14 MIO | Real time clock, single supply |

TE0745 Series

AMD Zynq™ 7000, DDR3L, Flash, USB, Ethernet, 8 x GTX



5.2 x 7.6 cm form factor



<http://trenz.org/te0745-info>

| Device list | Connectors | SDRAM max | Flash | Ethernet PHY | USB PHY | Total I/O | Gbit Transceivers | Other Features |
|------------------------|----------------|------------|-------|--------------|------------|-------------|-------------------|--------------------------------|
| Z-7030, Z-7035, Z-7045 | 3 x Samtec ST5 | 1 GB DDR3L | 64 MB | 1 Gbit | USB2.0 OTG | 250 + 6 MIO | 8 x GTX | Real time clock, single supply |

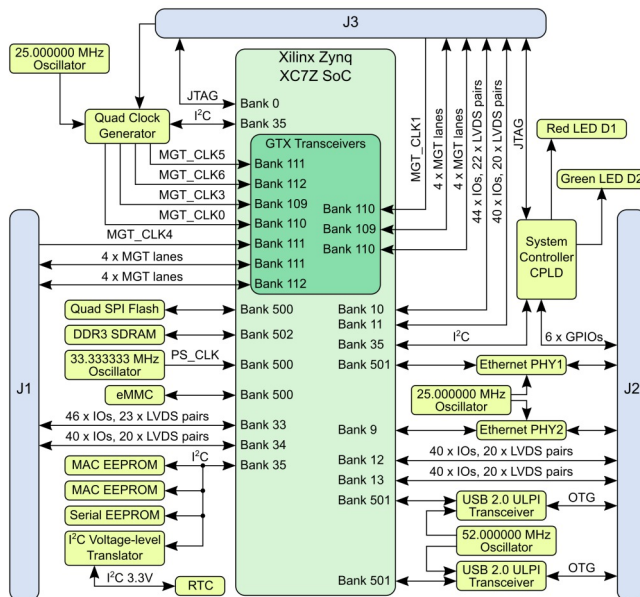
TE0782 Series

AMD Zynq™ 7000, DDR3, Flash, 2 x GBit Ethernet, 2 x USB, e.MMC, 16 x Transceivers



8.5 x 8.5 cm form factor

<http://trenz.org/te0782-info>



| Device list | Connectors | SDRAM max | Flash | e.MMC | Ethernet PHY | USB PHY | Total I/O | Gbit Transceivers | Other Features |
|------------------------|----------------|-----------|-------|-----------|--------------|----------------|-------------|-------------------|--|
| Z-7035, Z-7045, Z-7100 | 3 x Samtec QTH | 1 GB DDR3 | 32 MB | 4 - 64 GB | 2 x 1 Gbit | 2 x USB2.0 OTG | 250 + 2 MIO | 16 x GTX | Programmable clock generator, real time clock, single supply |

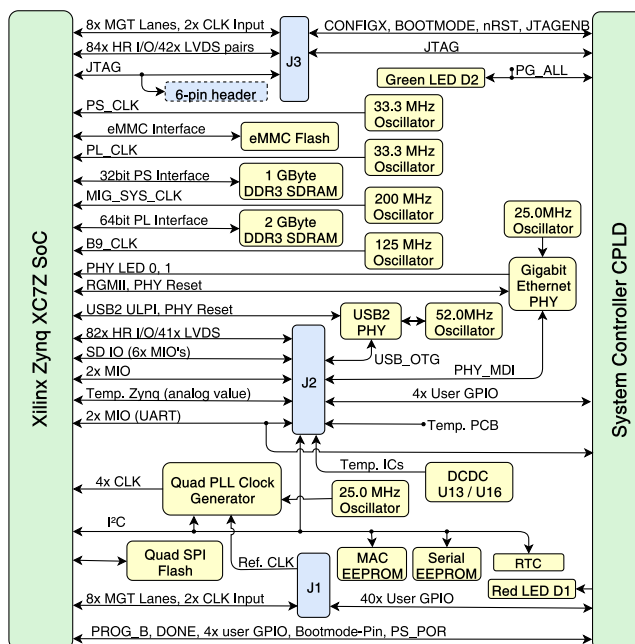
TE0783 Series

AMD Zynq™ 7000, Memory on both PS and PL, Flash, Ethernet, USB, e.MMC

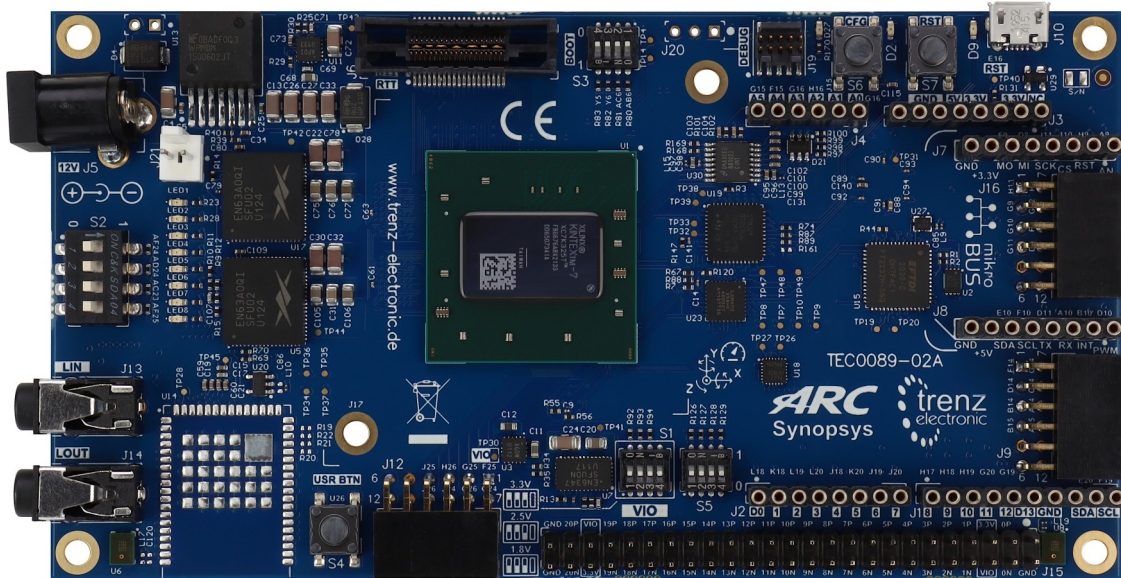


8.5 x 8.5 cm form factor

<http://trenz.org/te0783-info>



| Device list | Connectors | SDRAM max | Flash | e.MMC | Ethernet PHY | Total I/O | Gbit Transceivers | Other Features |
|------------------------|----------------|--|-------|-----------|--------------|-----------|--------------------|--|
| Z-7035, Z-7045, Z-7100 | 3 x Samtec QTH | 1 GB DDR3 32-bit (PS) 2 GB DDR3 64-bit (PL) | 32 MB | 4 - 64 GB | 1 Gbit | 166 | 16 x GTX 4 x GT | USB2.0 OTG, programmable clock generator, real time clock, single supply |



The DesignWare® ARC® EM Software Development Platform is a flexible platform for rapid software development on ARC EM processors and subsystems. It is intended to accelerate software development and debug of ARC EM processor-based systems for a wide range of ultra-low power embedded applications such as IoT, sensor fusion, and voice applications. It includes an FPGA-based hardware board with commonly used peripherals and interfaces for extensibility. Downloadable platform packages containing different hardware configurations enable the board to be programmed with different ARC EM processors and subsystems. The packages also contain the necessary software configuration information for the toolchain and embARC Open Software Platform.

The development platform is supported by Synopsys' MetaWare Development Tool Kit, which includes a compiler, debugger and libraries optimized for maximum performance with minimal code size. The embARC Open Software Platform (OSP), available online from embarc.org, gives developers online access to device drivers, FreeRTOS, middleware and examples that enables them to quickly start software development for their ARC-based embedded systems.

Each hardware configuration includes an ARC EM processor and subsystem with access to 16 MB of PSRAM, 16 MB of SPI Flash and a wide range of peripherals such as Audio Line In/Out, UART, SPI, I2C, and ADC. A 9-D motion sensor enable fast development of IoT applications. Two digital MEMs micro-phones can also be used for the development of voice applications. The hardware is extensible using the popular Arduino® interface and extension is also possible with Digilent Pmod Interfaces, mikroBUS headers and a 50-pin header. Debug and trace are handled with USB/JTAG interfaces and a NEXUS interface for ARC Real-Time Trace (RTT). The board includes a micro-SD card slot for loading application software.

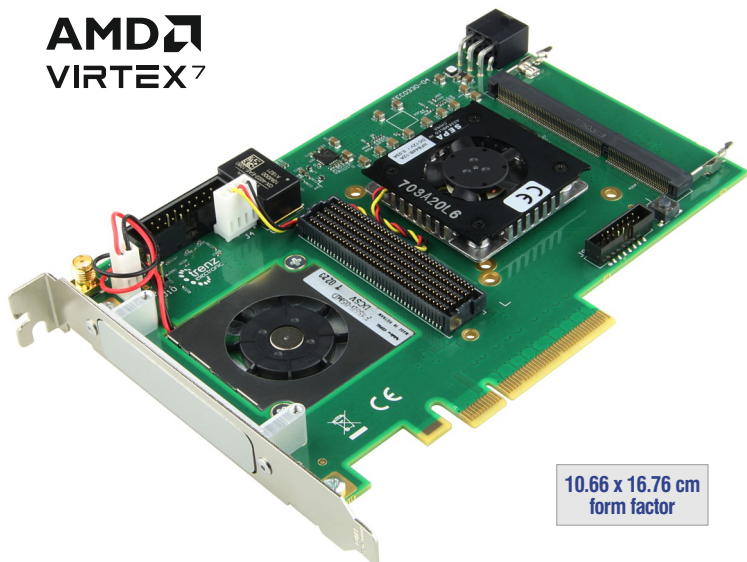
Key Features

- Xilinx Kintex-7 XC7K325T-2FBG676C
- 32 MByte Quad-SPI Flash memory (for configuration and operation)
- USB-JTAG bridge FT2232H
- FPGA configuration through JTAG and SPI Flash memory
- SPI Flash configuration through JTAG and USB
- Connectors
 - Arduino compatible pin headers
 - MicroBUS compatible pin headers
 - 3 x Pmod compatible pin headers
 - 50 pin header 2.54mm (40 single-ended IO, 20 differential lanes, variable VCCIO)
 - Mictor debug connector
 - 10 pin debug connector 2 mm
- 2 x 8 MByte PSRAM
- 32 MByte User Quad-SPI Flash memory
- Micro Sdcard Socket
- 3-axis gyroscope, 3-axis accelerometer, 3-axis magnetometer
- Stereo audio codec MAX9880A
- 2 x PDM microphones
- 2 x 3.5mm RCA audio jacks (input/output)
- 100 MHz user clock oscillator SiT8008
- Status LEDs, power LED
- 12V sower supply (separately included in the scope of delivery)
- Dimensions: 72,5 x 137 mm
- Article number: TEC0089-02-D2C-1-D

Available at <http://trenz.org/tec0089>

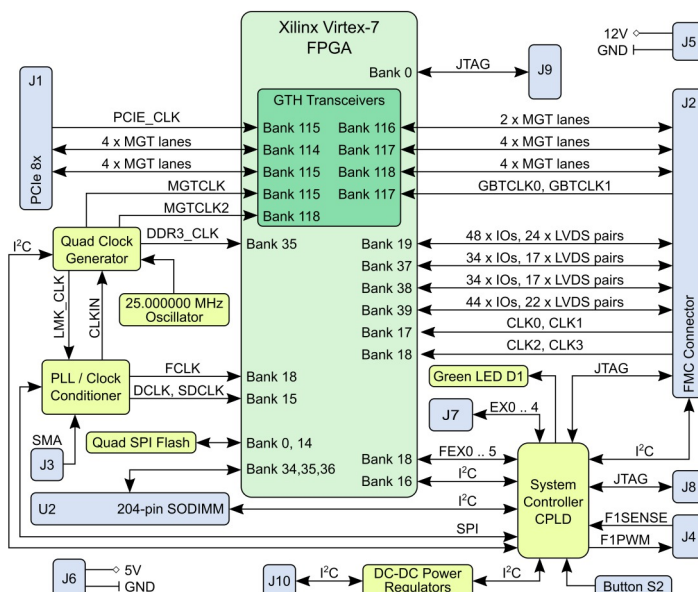
TEC0330 PCIe FMC Carrier

AMD Virtex™ 7, FMC HPC, 8 lane PCIe GEN2 card, DDR3 SODIMM Socket



10.66 x 16.76 cm form factor

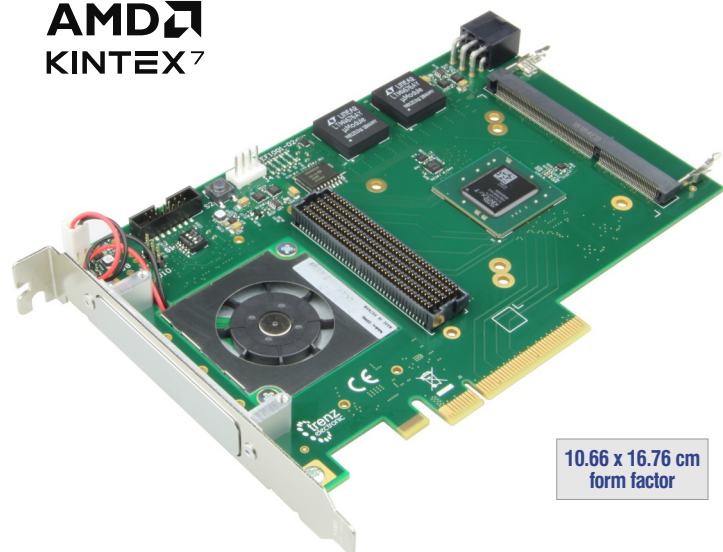
<http://trenz.org/tec0330-info>



| Device list | SDRAM | Flash | Total I/O | Gbit Transceivers | Gbit Transceivers Transmission Rate | Other Features |
|-------------|--------------------|-------|--|------------------------------|-------------------------------------|--|
| XC7VX330T | DDR3 SODIMM Socket | 32 MB | Up to 202 FPGA I/O pins on FMC connector | 10 on FMC 8 on PCIe lanes | 13.1 Gbit/s | FMC High Pin Count (HPC) connector, programmable clock generator |

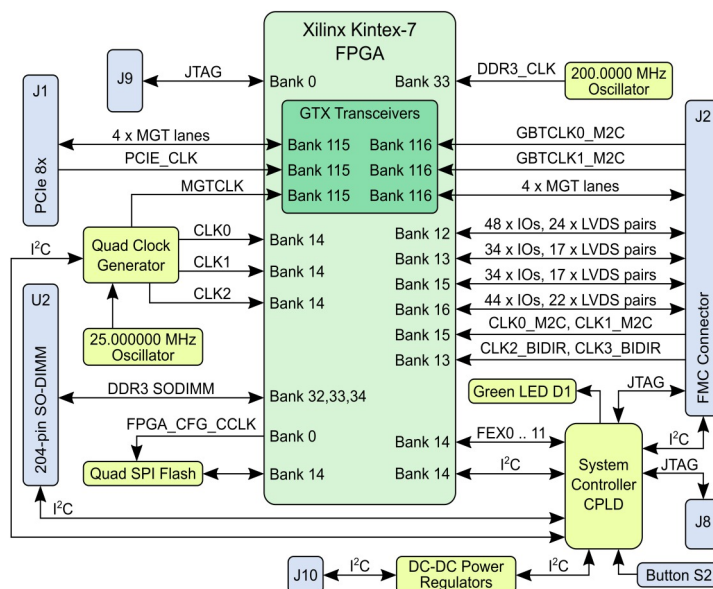
TEF1001 PCIe FMC Carrier

AMD Kintex™ 7, FMC HPC, 4 lane PCIe GEN2 card, DDR3 SO-DIMM Socket



10.66 x 16.76 cm form factor

<http://trenz.org/tef1001-info>



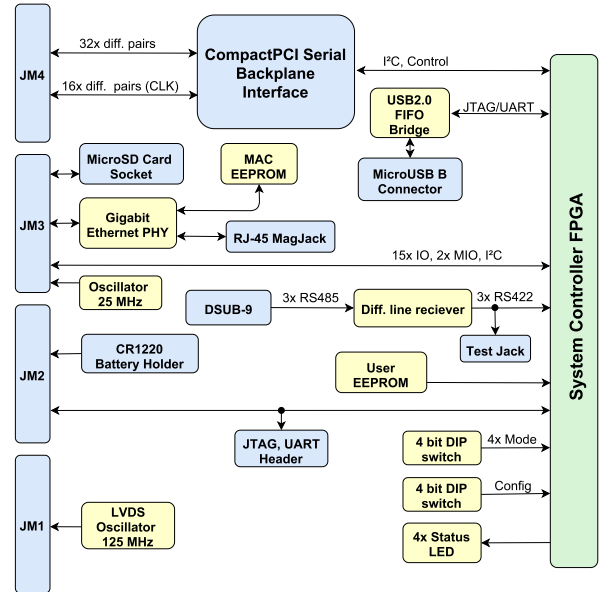
| Device list | SDRAM | Flash | Total I/O | Gbit Transceivers | Other Features |
|-------------|-------------------------------|-------|----------------------|-----------------------------|--|
| XC7K160T | 8 GB DDR3 (max) SODIMM Socket | 32 MB | 160 on FMC connector | 4 on FMC 4 on PCIe lanes | Vita 57.1 FMC HPC slot, programmable clock generator, 200 MHz low jitter LVDS oscillator |

TEC0810 CompactPCI Serial Card

for Trenz Electronic modules TE0803, TE0807 and TE0808, 3U Form Factor



<http://trenz.org/tec0810-info>



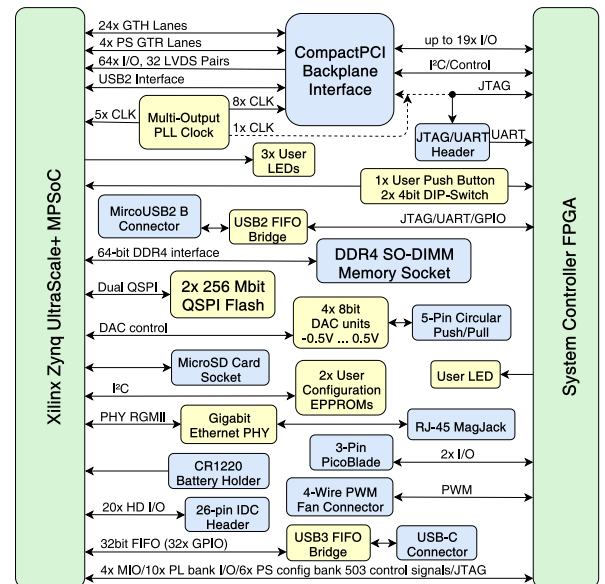
| System controller | Front side interface connectors | EEPROM | Rear I/O | GTR/GTH | Other Features |
|-------------------|---|----------|--|--|---|
| Intel MAX 10 | 1 Gbit Ethernet, 3 x RS485 receiver (DSUB-9), microUSB to JTAG/UART bridge, 4 x status LEDs | 128 Kbit | (32 + 16) x differential pairs on J6 and J5 backplane connectors | GTR and GTH of the module are not accessible | 125 MHz LVDS oscillator, LVCMOS output 25-MHz oscillator, 2 x 4-bit DIP switch, coin cell battery holder, microSD card socket |

TEC0850 CompactPCI Serial Card

AMD Zynq™ UltraScale+™, 3U Form Factor, DDR4 SODIMM, Flash, Ethernet



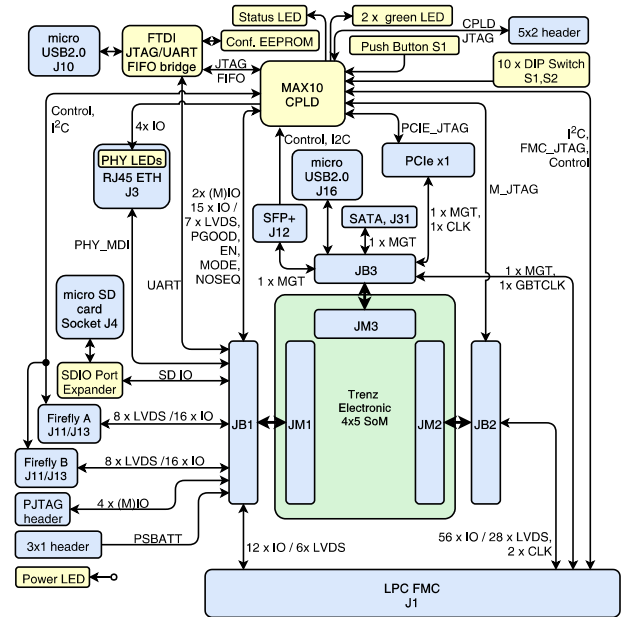
<http://trenz.org/tec0850-info>



| Device list | Form Factor | DDR4 SODIMM | Flash max | USB | Total I/O | Ethernet | Gbit Transceivers | Other Features |
|---------------------------|-------------|------------------|-----------|--------|-------------------------|----------|-------------------------------|---|
| ZU15EG, 1156 Pin Packages | 3U | 8 GB (32 GB max) | 512 MB | USB3.0 | 32 x differential pairs | 1 Gbit | 24 on PL side 4 on PS side | JTAG/UART via MicroUSB, 2 x EEPROM, real time clock, Zynq MPSoC cooling fan connector |

TEF1002 PCIe FMC Carrier

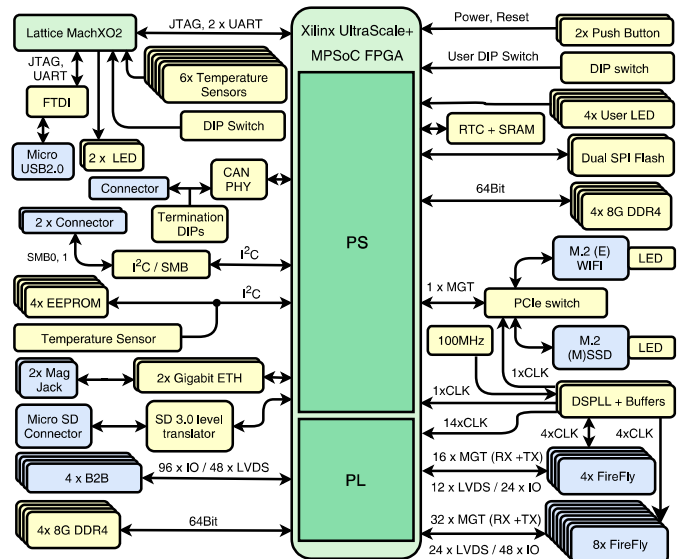
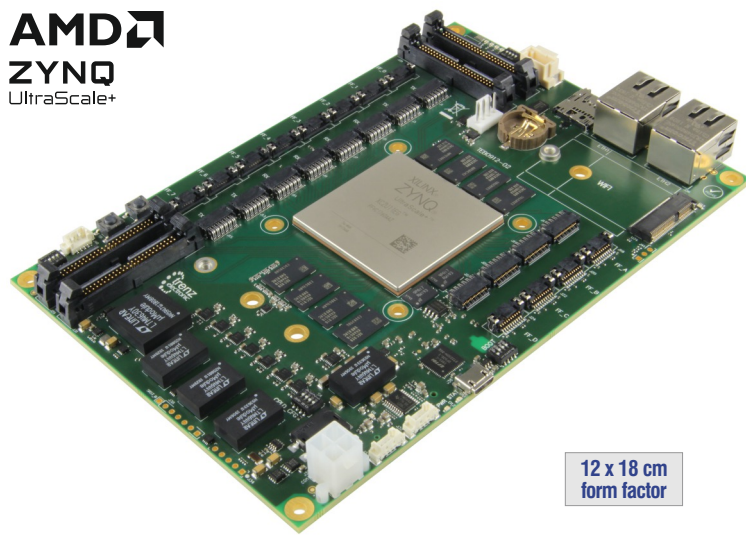
PCIe Carrier for Trenz Electronic 4 x 5 Modules and LPC FMC



| PCIe Carrier | Connectors | Other Features |
|----------------------|---|---|
| For 4 x 5 cm modules | LPC FMC, SFP+, PCIe x1, SATA with pin 7 power configuration for SATADoM, RJ45 Gigabit Ethernet, micro USB to JTAG/UART bridge, 2 x 8 LVDS (FireFly), microUSB, microSD card | MAX 10 CPLD, 4 x LED, module reset button, 10 x configuration/user dip switch |

TEB0912 Series

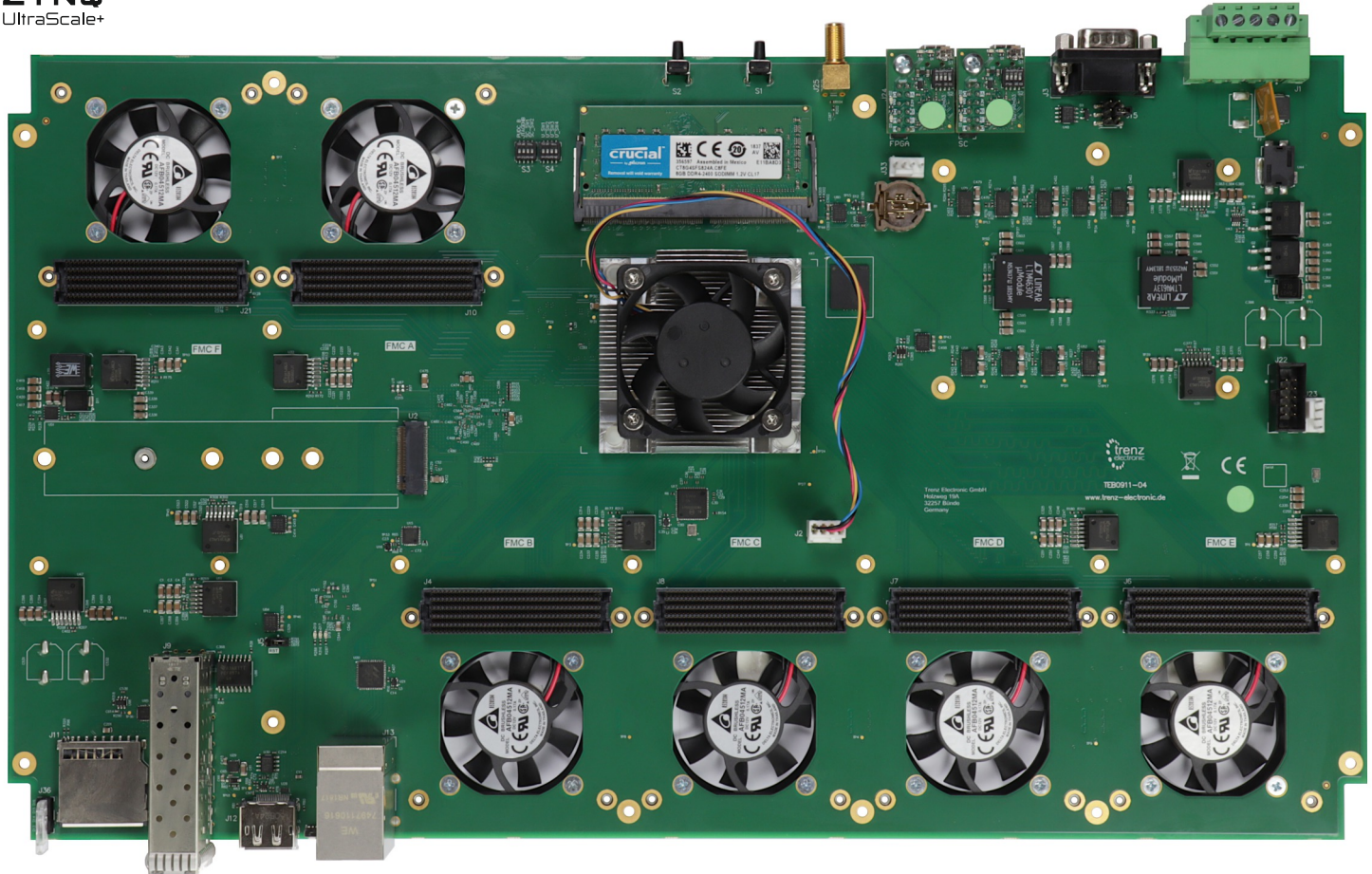
AMD Zynq™ UltraScale+™ MPSoC with Firefly socket, 4 GB SDRAM on both PL and PS



| Device list | Firefly sockets | SDRAM max | Flash | Ethernet | Header | Connectors | Other Features |
|-------------|---|--|--------|-----------------------|--------------------------|---|--|
| ZU11 - ZU19 | 4 x to GTY (copper/optical) 4 x for custom 8 lane JESD204B ADC 4 x for custom 8 lane JESD204B DAC | 4 GB DDR4 64-bit (PS) 4 GB DDR4 64-bit (PL) | 128 MB | 2 x RJ45 1 Gigabit | 4x IDC for PL HD IO/LVDS | M2 PCIe SSD, M2 WAN/WLAN slot (PCIe/USB), microSD card (SD 2.0) | Onboard USB JTAG and UART, 2 x Si5395 low jitter PLL, single 12V input |

TEB0911 UltraRack+ Board

AMD Zynq™ UltraScale+™, 6 FMC Slots, Gigabit Ethernet



Key Features

The TEB0911 UltraRack+ board is integrating a AMD Zynq™ UltraScale+™ MPSoC with 2 x 64 MByte Flash memory for configuration and operation, DDR4-SDRAM SO-DIMM socket with 64-bit wide data bus, 22 MGT lanes and powerful switch-mode power supplies for all on-board voltages. The TEB0911 board exposes the pins of the Zynq™ MPSoC to accessible connectors and provides a whole range of on-board components to test and evaluate the Zynq™ UltraScale+™ MPSoC and for developing purposes. The board is capable to be fitted to an enclosure, whereby on the enclosure's rear and front panel, I/O's, LVDS-pairs and MGT lanes are accessible through 6 on-board FMC connectors and other standard high-speed interfaces, namely USB3, SFP+, SSD, GbE, etc.

- AMD Zynq™ UltraScale+™ MPSoC
 - 1156 Pin Package
 - Assembly options: ZU6, ZU9, ZU15
- 64-bit DDR4 SODIMM (PS connected)
- M2 PCIe SSD (1-Lane)
- e.MMC (bootable)
- 2 x 64 MByte Dual QSPI Flash (bootable)
- System controller (LCMXO2-7000HC)
 - Power sequencing
 - IO expander
- Configurable PLLs
 - GTH/GTP reference CLKs

Front Panel

- 4 x FMC
 - 4 GTH per FMC
 - 68 ZynqMP PL IO per FMC
- DisplayPort (2-lanes)
- RJ45 ETH + dual USB3 combo
- Dual Stack SFP+
- SD (bootable)
- Status LEDs

Back Panel

- 2 x FMC
 - 4/2 GTH
 - 12 ZynqMP PL IO per FMC
- 56 SC IO
- USB JTAG/UART ZynqMP
- USB JTAG/GPIO FMC
- CAN FD (DB9 connector)
- SMA (external CLK)
- 5-pin 24V power connector

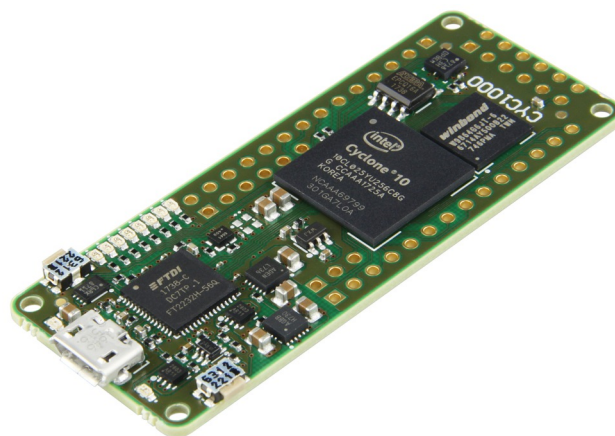
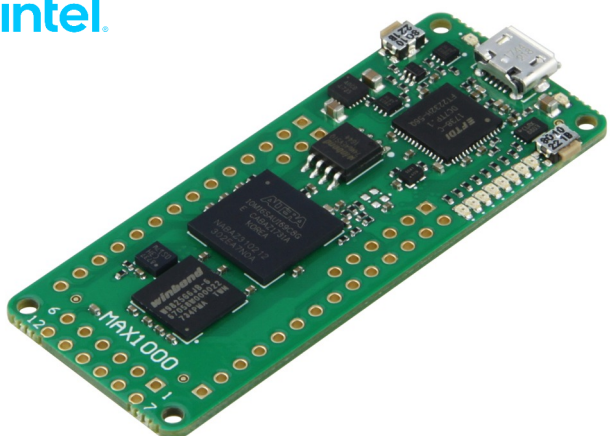
Additional Information

- 40.6 x 23.43 cm board size
- Other assembly options for cost or performance optimization plus high volume prices available on request.

<http://trenz.org/teb0911-info>

TEI0001 "MAX1000" and TEI0003 "CYC1000" Series

Arduino MKR Standard 2.5 x 6.15 cm



Resources <http://trenz.org/tei0001-info>

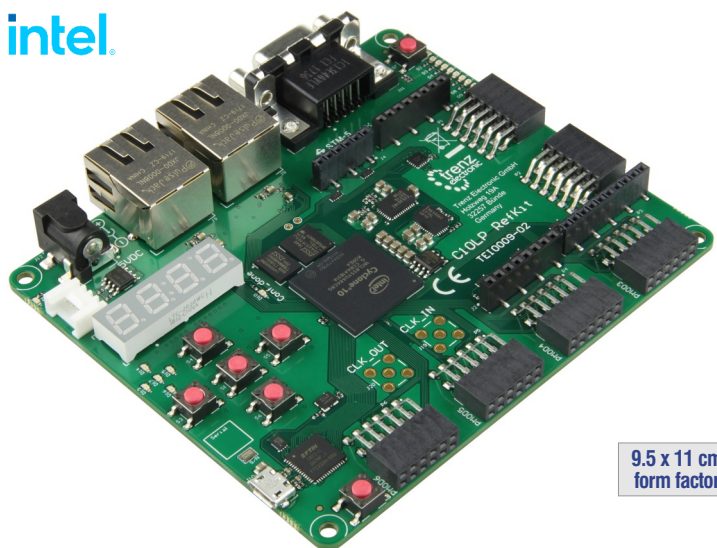
"MAX@1000" IoT/Maker board, TEI0001 series, MAX@ 10 10M08SAU 169C8G or 10M16SAU169C8G FPGA, 8/16 kLE, 8 to 32 MByte SDRAM (max. 64 MByte), 8 MByte Flash, USB programmer on-board, JTAG and UART over Micro USB2.0 connector, ADC 8 x 12 Bit, 12 MHz oscillator, optional MEMS oscillator, optional Pmod headers, supply USB/pins, 2 switches, 8 configurable and 2 status LEDs, power can be supplied as 5V from the USB port or via a separate pin.

Resources <http://trenz.org/tei0003-info>

"CYC1000", TEI0003 series, Cyclone® 10CL025YU256 C8G FPGA, 25 kLE, optional 10CL006, 10CL010, 10CL016, 8 MByte SDRAM, 2 MByte Flash, 21 I/O Arduino MKR compatible headers, JTAG and UART over Micro USB2 connector, LIS3DH 3-axis accelero-meter, 2 x 14-pin headers providing 23 GPIOs, 1 x 3-pin header providing 2 GPIOs, Pmod: 2 x 6-pin support, 8 configurable and 2 status LEDs, user push button, 5V single power supply with on-board voltage regulators

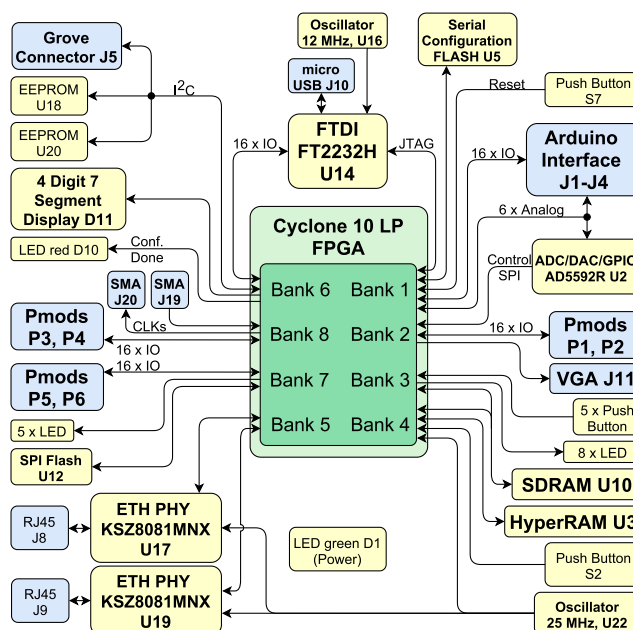
TEI0009 C10LP RefKit Development Board

Intel® Cyclone® 10 LP, Integrated USB Programmer2, 2 x 10/100 Ethernet, USB2.0



9.5 x 11 cm form factor

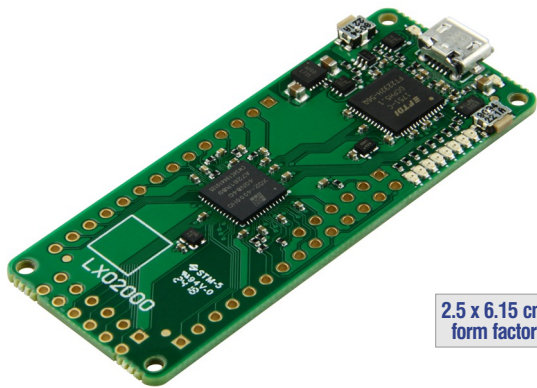
<http://trenz.org/tei0009-info>



| Device list | Connectors | SDRAM max | User Flash QSPI | HyperRAM max | Flash max | Ethernet PHY | USB | Other Features |
|--|------------------------------------|-----------|-----------------|--------------|-----------|--------------|--------|----------------------------|
| Cyclone® 10 LP 10CL055YU484C8G 55 kLE in 484-pin | QSE (for LVDS), Pmod, Arduino, SMA | 512 Mbit | Up to 512 Mbit | 128 Mbit | 32 Mbit | 2 x 10/100 | USB2.0 | Integrated USB programmer2 |

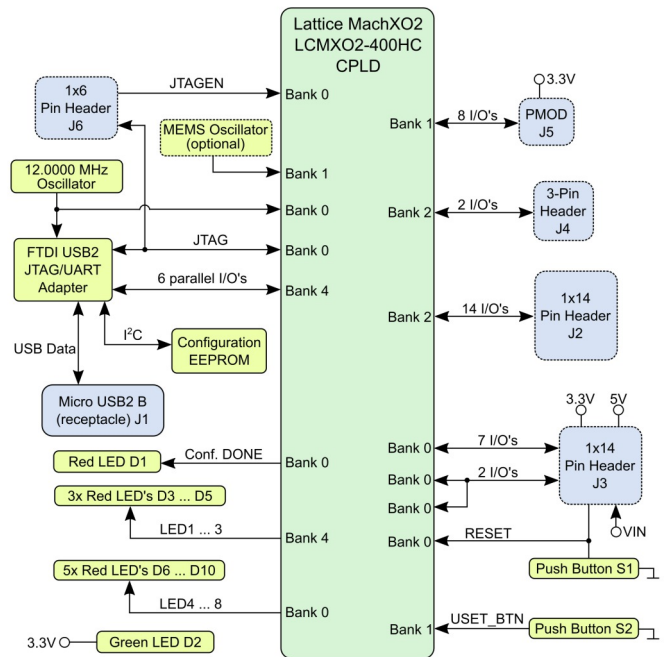
TEL0001 "LXO2000" Series

Lattice X02 FPGA, Arduino MKR Standard, on-board USB/JTAG and USB/serial



2.5 x 6.15 cm form factor

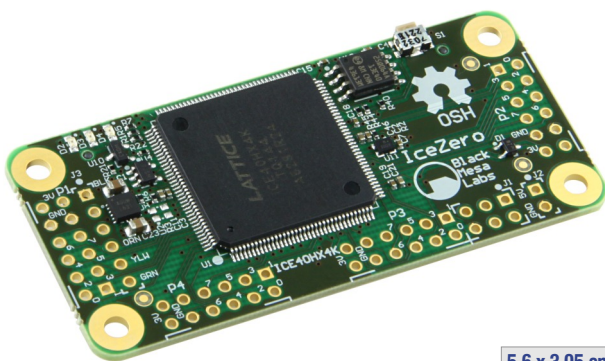
<http://trenz.org/tel0001-info>



| Device list | On-Board | Total I/O | Clock Oscillator | Other Features |
|-------------|----------------------|---|------------------|--|
| X02-4000 | USB/JTAG, USB/serial | 22 on MKR header, 2 I/O on additional header, optional Pmod header +8 | 100 MHz MEMS | 8 LEDs, 2 push buttons, supply: USB or 5V from pin header, RC-networks |

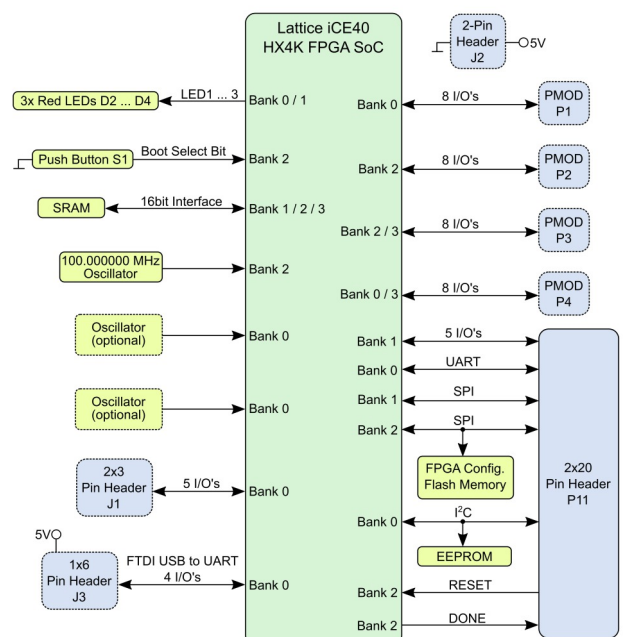
TE0876 IceZero Series

Lattice ICE40HX, Raspberry Pi HAT compatible, SRAM, Flash, Open-Source



5.6 x 3.05 cm form factor

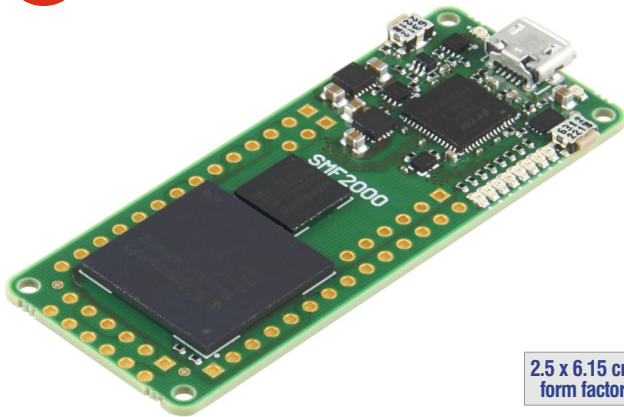
<http://trenz.org/te0876-info>



| Device list | Connectors | SDRAM max | Flash | Other Features |
|---------------|--|----------------------|-------|---|
| Lattice ICE40 | 4 2x6-pin Pmod connectors (no default) | 4 Mbit external SRAM | 8 MB | 100 MHz user clock, 3 user LED, supported by fully open source FPGA toolchain, fast FPGA configuration from Raspberry Pi, full FPGA design flow on Raspberry Pi (all open source) |

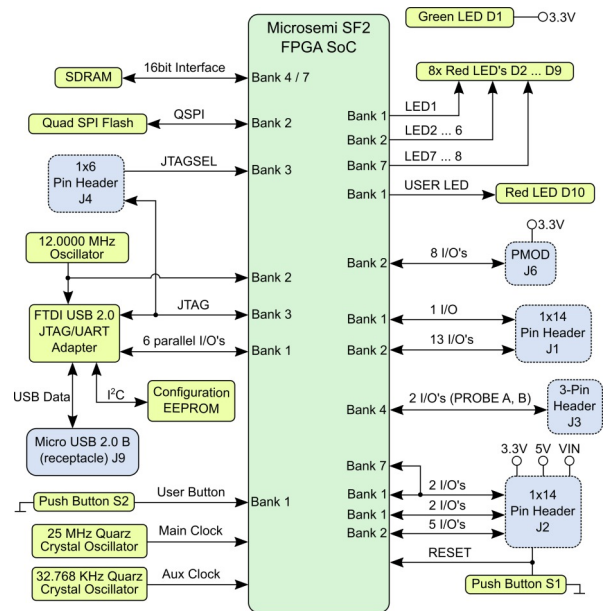
TEM0001 "SMF2000" Series

Microchip SmartFusion® 2, Arduino MKR Standard, SDRAM, Flash, UART/JTAG



2.5 x 6.15 cm form factor

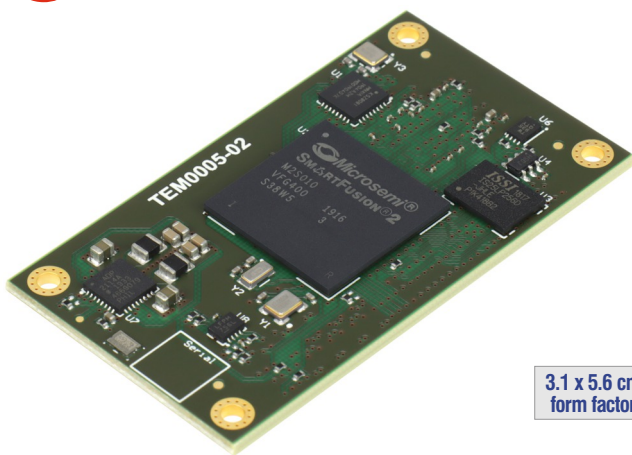
<http://trenz.org/smf2000-info>



| Device list | SDRAM | Flash | Clocks | JTAG/UART | Total I/O | Other Features |
|---------------|-------|-------|---|-----------------------|--|--|
| M2S010-VFG400 | 8 MB | 8 MB | 25 MHz system clock 32.768 kHz auxiliary clock | microUSB2.0 connector | 31 (8 I/O 1 x Pmod header, 23 I/O 2 x 14-pin header) | 1 x 3-pin header for LiveProbes, 9 user LEDs, 1 user push button |

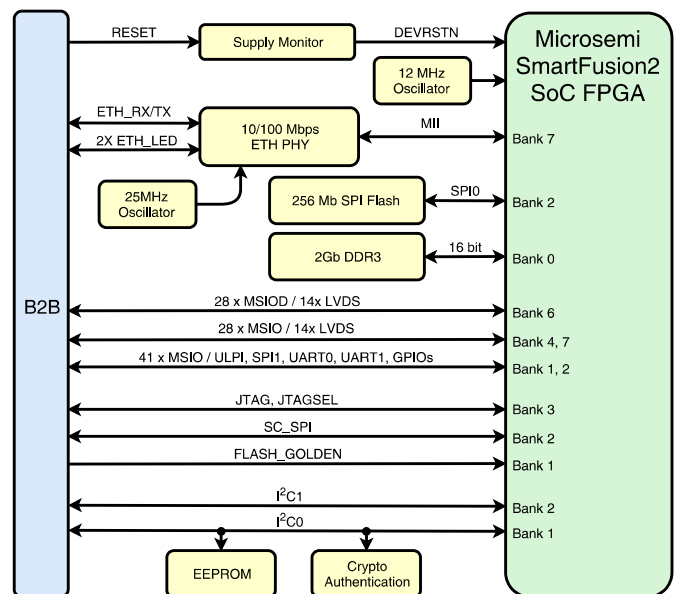
TEM0005 Series

Microchip SmartFusion® 2 SoC, DDR3, Flash, Ethernet, EEPROM



3.1 x 5.6 cm form factor

<http://trenz.org/tem0005-info>



| Device list | Connectors | SDRAM max | Flash | Ethernet PHY | Total I/O | Other Features |
|-------------------------------|------------------------|---------------------------|-------|--------------|-----------|--|
| M2S010, supports up to M2S050 | 1 x Samtec ST5 160 pin | 8 Gb DDR3, optional DDR3L | 32 MB | 100 Mbps | 105 | Optional crypto authentication device, serial EEPROM for MAC address, power supply monitor |

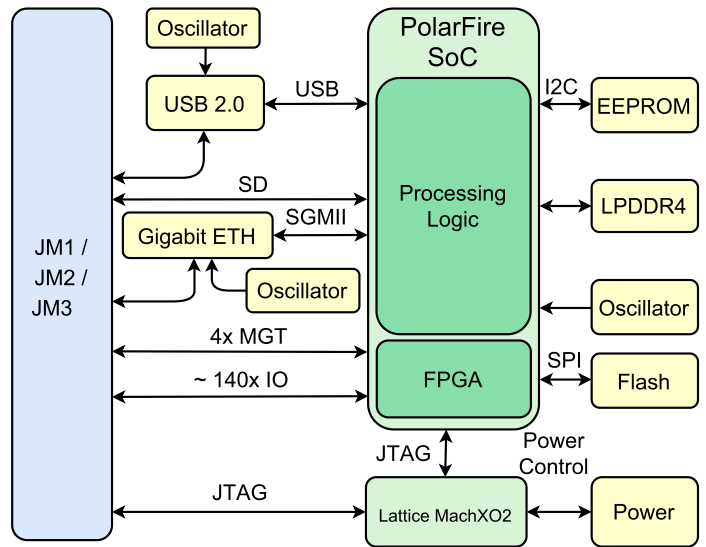
TEM0007 Series

Microchip PolarFire® Multi-Core RISC-V SoC FPGA, LPDDR4, Flash, Ethernet, EEPROM



4 x 5 cm form factor

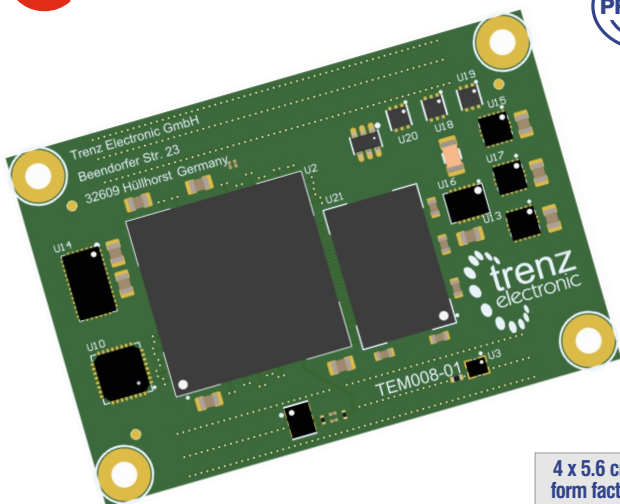
<http://trenz.org/tem0007-info>



| Device list | Pin Package | Connectors | SDRAM max | Flash | Ethernet | Other Features |
|-------------|-------------|-----------------|-------------|-------|----------|----------------------------|
| MPFS250T-1 | FCVG484I | 3 x Samtec LSHM | 1 GB LPDDR4 | 64 MB | 1 Gbit | EEPROM MAC address, USB2.0 |

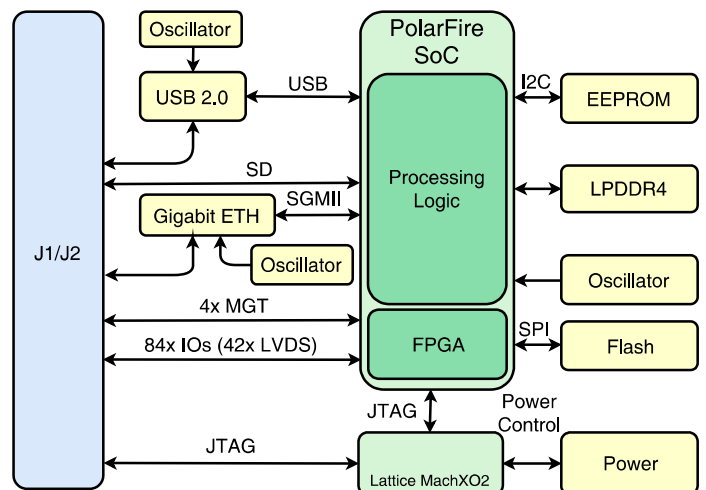
TEM0008 Series

Microchip PolarFire® Multi-Core RISC-V SoC FPGA, LPDDR4, Flash, Ethernet, USB



4 x 5.6 cm form factor

<http://trenz.org/tem0008-info>



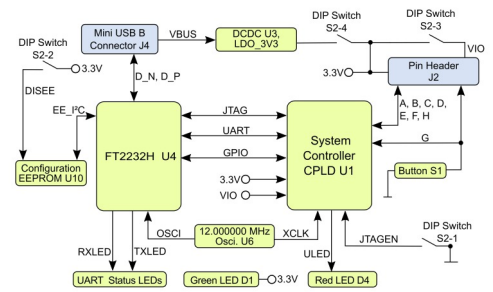
| Device list | Pin Package | Connectors | SDRAM max | Flash | Ethernet | Other Features |
|-------------|-------------|-----------------|-------------|-------|----------|----------------------------|
| MPFS250T-1 | FCVG484 | 2 x Samtec ADM6 | 1 GB LPDDR4 | 64 MB | 1 Gbit | EEPROM MAC address, USB2.0 |

TE0790 and TE0790-L FTDI JTAG Adapter XMOD Form Factor, FT2232H, Lattice X02-256 CPLD



for **AMD** or **LATTICE SEMICONDUCTOR**

- Two versions available:
- 1) Compatible with AMD tools (TE0790-02)
 - 2) Not compatible with AMD tools (TE0790-02L) can be used independently.



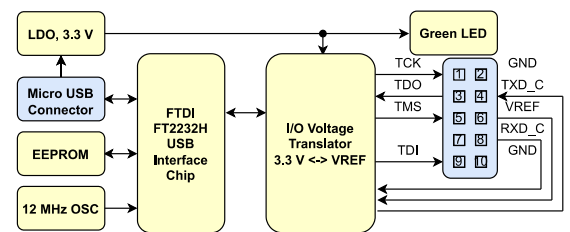
<http://trenz.org/te0790-info>

| Device | Form Factor | FT2232H | Total I/O | Other Features |
|----------------------|------------------------|---|----------------------|---|
| Lattice X02-256 CPLD | XMOD, M3 mounting hole | Mini USB connector, channel B RX/TX LEDs, EEPROM | 8 universal I/O pins | Step down DCDC converter for optional power supply via USB-power, 4 position DIP switch |

TEM0009 FPGA USB-Programmer JTAG For Development with Microchip FPGAs



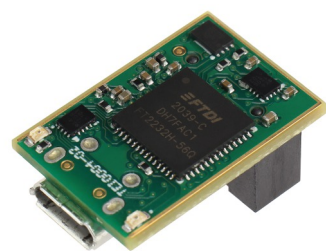
for **MICROCHIP**



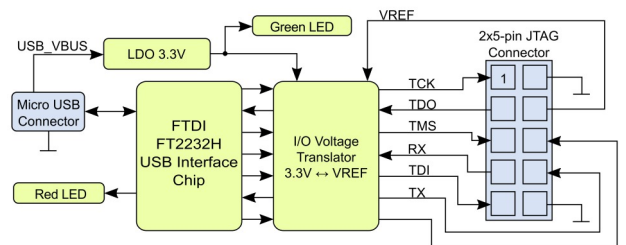
<http://trenz.org/tem0009-info>

| Supported by | JTAG Connector | USB | Voltage levels | Other Features |
|--------------|---------------------------|---|----------------|--------------------|
| Libero SoC | Standard 2 x 5-pin header | MicroUSB connector USB2.0 HS support | 0.8V - 3.6V | Green power-on LED |

TEI0004 ARROW USB Programmer2 For Development with Intel® FPGAs



for **intel**



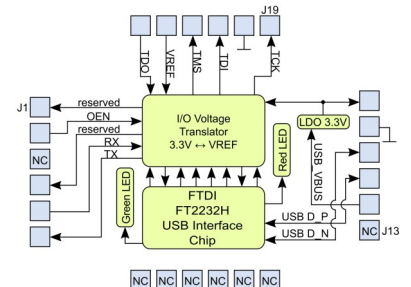
<http://trenz.org/tei0004-info>

| Supported by | JTAG Connector | USB | Voltage levels | Other Features |
|----------------------------|-----------------------------------|---|----------------|---|
| Intel® Quartus® programmer | Standard 2 x 5-pin 2.54 mm header | MicroUSB connector USB2.0 HS support | 0.8V - 3.6V | Additional support for UART, red activity LED, green power-on LED |

TEI0005 FPGA Programmer2 SMD Module FT2232H based JTAG Programmer, Surface-Mount Module

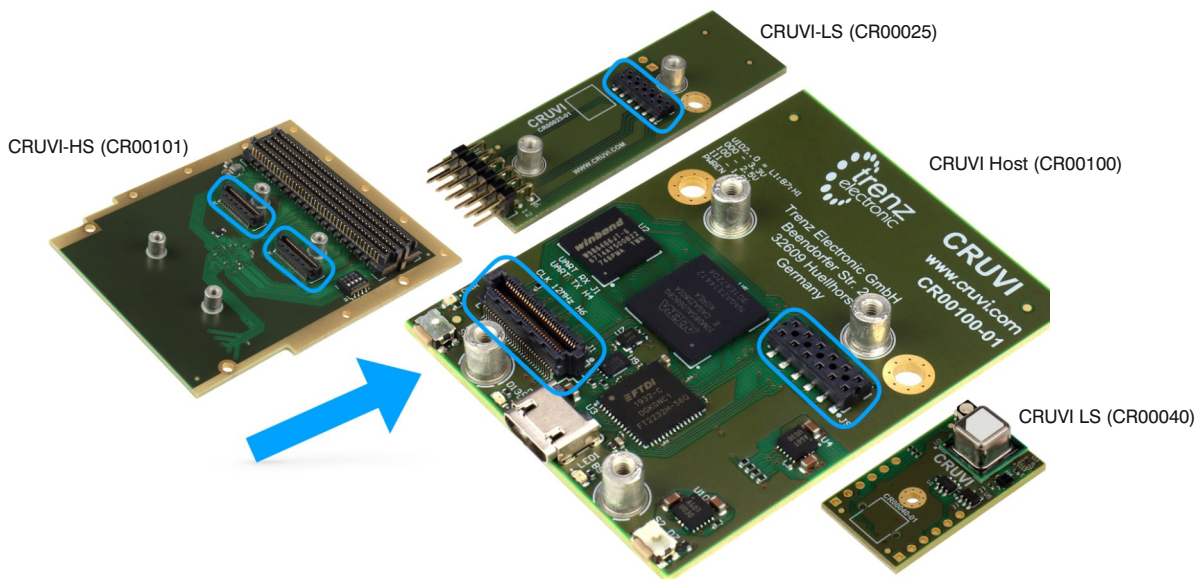


for **intel**



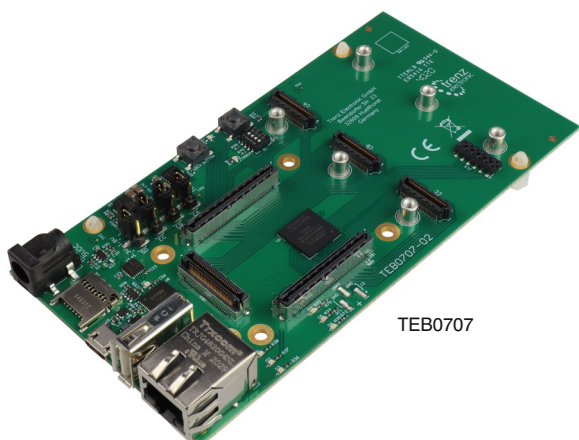
<http://trenz.org/tei0005-info>

| Device list | Supported | Powered | Compatible | Other Features |
|-------------------------------|--------------------------------|---------|-------------------------------------|--|
| FTDI FT2232H USB2.0 interface | by Intel® Quartus® (JTAG mode) | via USB | SMT pick and place assembly process | Additional UART channel available, activity LEDs, UART interface available, two I/O pins reserved for future use |



The picture shows FMC to CRUVI-HS, PMoD to CRUVI-LS, CRUVI Host with LS and HS slot and CRUVI LS modules. CRUVI fills the space between PMoD and FMC card, it can be smaller and cheaper than SYZGY.

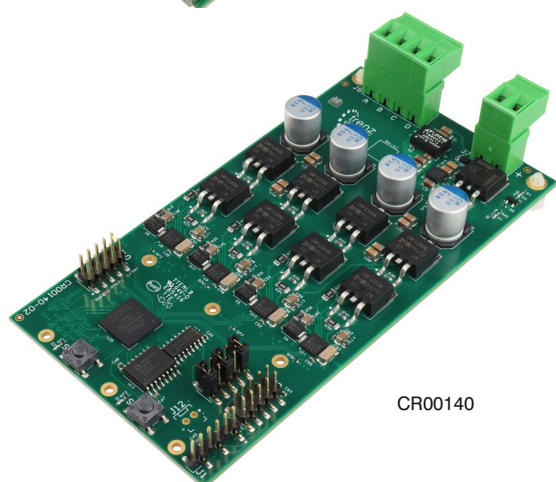
| | FMC LPC | SYZGY | CRUVI HS | PMoD | CRUVI LS |
|------------------------|-----------------|----------------|----------------|------|--------------|
| Single ended I/O | 68 | 28 | 37 (28+9) | 8 | 8 |
| Differential I/O pairs | 36 | 10 | 12 | - | - |
| Management I2C | I2C | SmartVIO | I2C/SMBUS | No | I2C (shared) |
| Mounting hole(s) | Yes | 2 one side | 1..6 | No | 1..6 |
| Power Supply | Adj., 3.3V, 12V | Adj., 3.3V, 5V | Adj., 3.3V, 5V | 3.3V | 3.3V, 5V |
| License | VITA \$\$\$ | Free | Free | Free | Free |



TEB0707

CRUVI Carrier board with 3 CRUVI slots (3 x HS, 1 x LS)

This board accepts Trenz 4 x 5 SoM and converts into a CRUVI compatible host carrier board. Three CRUVI slots are provided with HS connector support. One slot supports also LS.



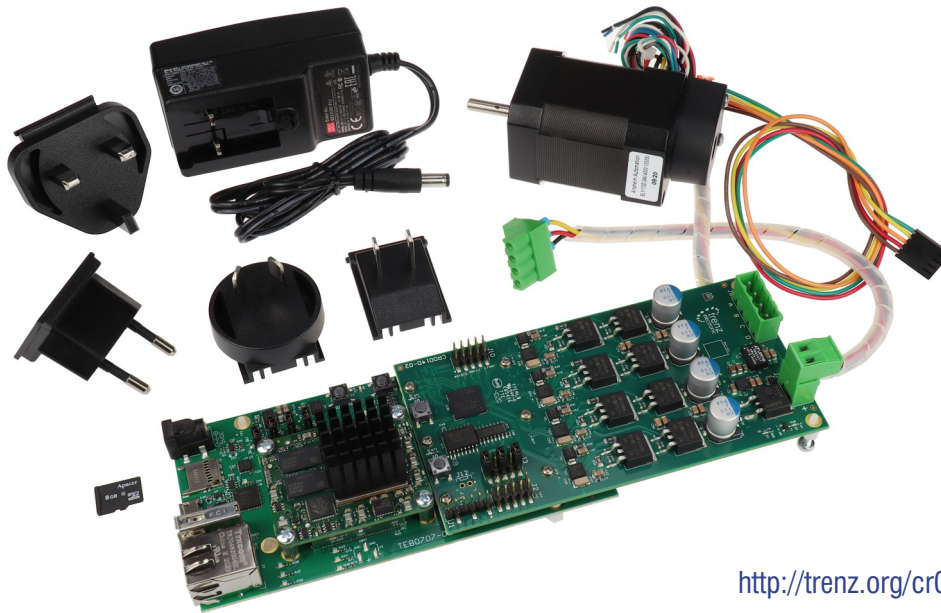
CR00140

Industrial Motor controller board with CRUVI connector

This board allows motor control applications with any CRUVI carrier that supports at least one HS slot. IO Voltage range supported 1.2 to 3.3V. There are total 4 phases available for either one 3 phase or two 2 phase motors. Pin headers are available for rotation sensor connections. There is current measurement on two phases and DC link voltage.

CR00140 Control Development Kit

AMD Zynq™ 7000



<http://trenz.org/cr00140-info>

Motor Control Development Kits:

A CRUVI motor driver module CR00140-02, a carrier board TEB0707 and a MPSoC (TE0820/AMD UltraScale+™) or SoC (TE0720/AMD Zynq™ 7020) module including a heat sink. Supplied with a universal plug-in power supply with four adapters, a DC motor including cable for CRUVI CR00140 and an 8 GB micro SD card.

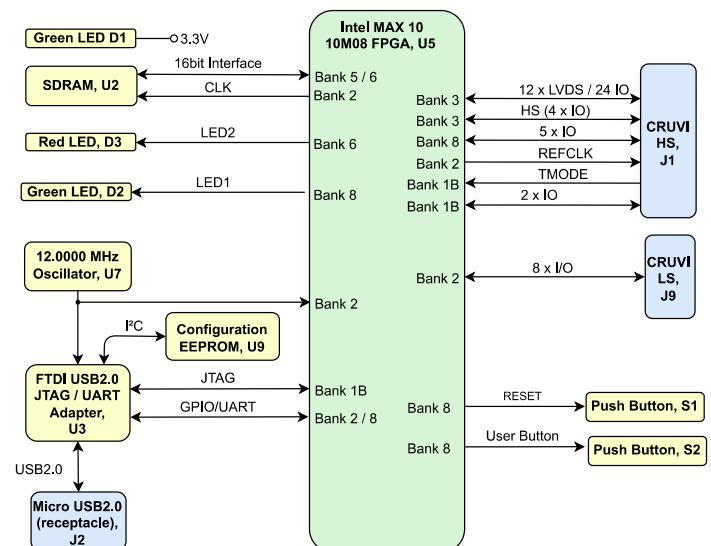
- CR00140-02-K0A with MPSoC TE0820
- CR00140-02-K1A with SoC TE0720

CR00100 CRUVI Series

Intel® MAX® 10 CRUVI, SDRAM, USB



4.5 x 5.7 cm form factor

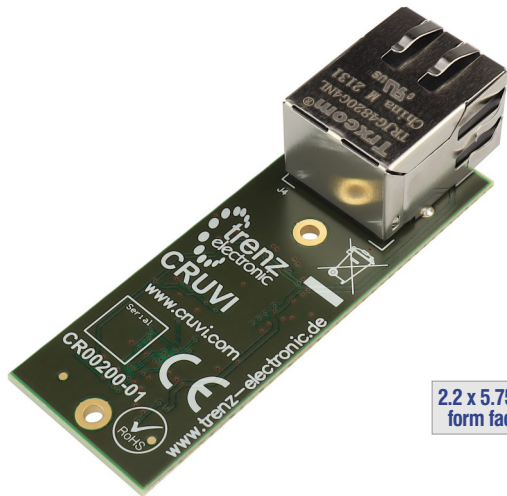


<http://trenz.org/cr00100-info>

| Device list | Connectors | SDRAM max | Total I/O | Other Features |
|----------------|--|-----------|-----------|-----------------------------------|
| Intel® MAX® 10 | CRUVI (1 x HS, 1 x LS), 2 x 34 Pin Header | 8 MB | 37 + 8 | USB2.0, user push button and LEDs |

CR00200 and CR00202 CRUVI Adapter

Ethernet adapter and dual ethernet adapter



2.2 x 5.75 cm form factor

<http://trenz.org/cr00200-info>

On Board

- CRUVI HS Connector
- ETH PHY
- 25 MHz Oscillator

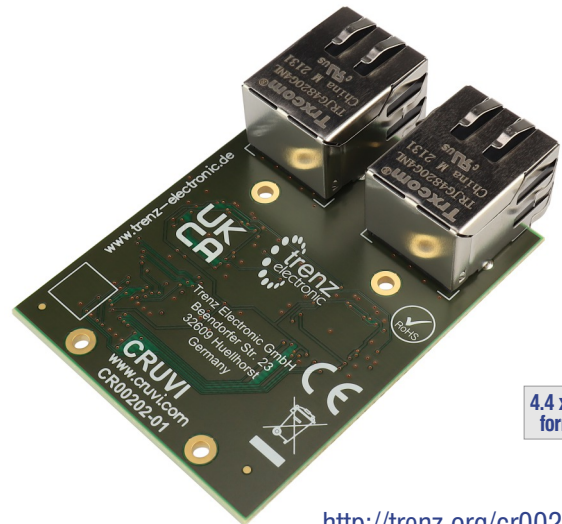
RAM/Speicher

- Serielles EEPROM mit EUI-48 Node Identity

Schnittstelle

- CRUVI
- RJ45

Power via CRUVI



4.4 x 5.75 cm form factor

<http://trenz.org/cr00202-info>

On Board

- CRUVI HS Connector
- 2 x ETH PHY
- 25 MHz Oscillator

RAM/Speicher

- 2 x Serielles EEPROM mit EUI-48 Node Identity

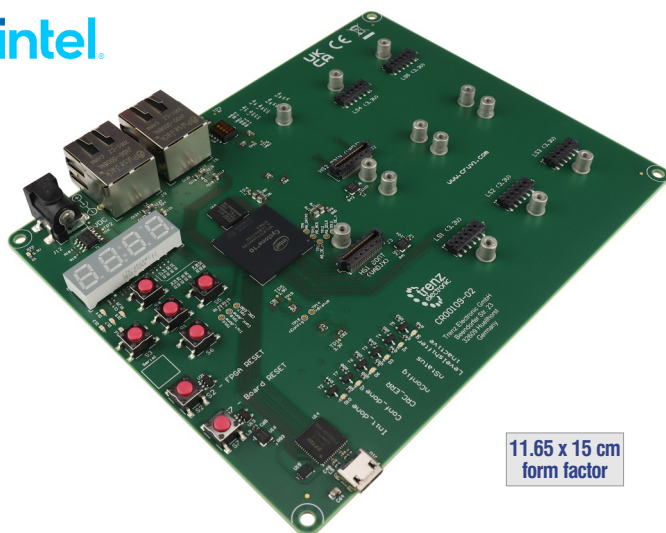
Schnittstelle

- CRUVI
- 2 x RJ45

Power via CRUVI

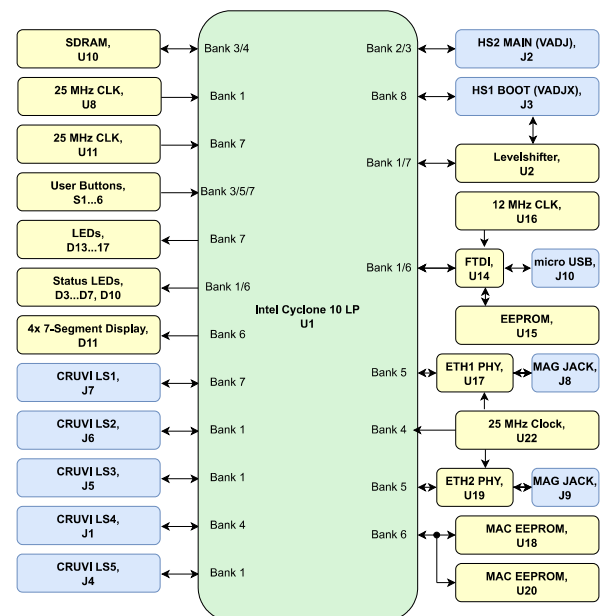
CR00109 CRUVI Development Board

Intel® Cyclone® 10 LP, with CRUVI LS and CRUVI HS, 2 x 10/100 Ethernet, microUSB



11.65 x 15 cm form factor

<http://trenz.org/cr00109-info>

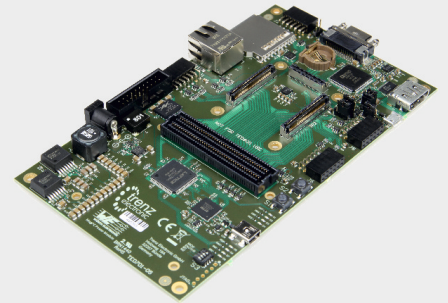


| Device list | Connectors | SDRAM max | Other Features |
|----------------|---|------------|--|
| Cyclone® 10 LP | CRUVI LS, CRUVI HS, CRUVI HS & BOOT, USB to Multipurpose FIFO IC, 2xRJ45, micro USB | 8 MB SDRAM | 2 x 10/100 Ethernet PHY, 2 x MAC EEPROM, Oscillator, 4 x 7-Segment-Display, user buttons, user LEDs, status LEDs |

The carrier boards are baseboards for 4 x 5 SoMs, which exposes the modules B2B-connector-pins to accessible connectors and provides a whole range of on-board components to test and evaluate Trenz Electronic 4 x 5 SoMs.

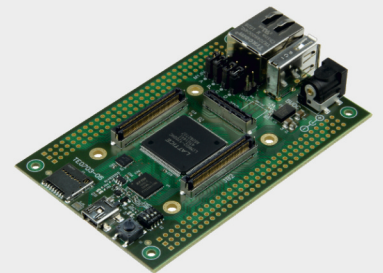
TE0701

- Overvoltage-, undervoltage- and reversed- supply-voltage-protection
- Barrel jack for 12V power supply
- Carrier Board System-Controller CPLD
- Mini CameraLink connector
- RJ45 Gigabit Ethernet MagJack
- FPGA Mezzanine Card (FMC-LPC) connector
- USB JTAG- and UART interface with Mini-USB connector
- HDMI transmitter with HDMI connector
- 8 x user LEDs, 2 x user push buttons, 2 x DIP switch
- Pmod connectors, Micro SD card socket and Micro-USB interface



TE0703

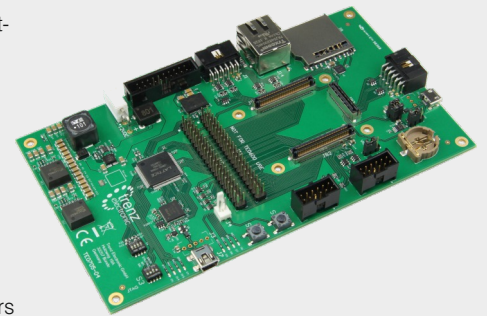
- 2 x VG96 connectors (mounting holes and solder pads)
- SDIO port expander with voltage-level translation
- Micro SD card socket
- 4 x user LEDs, 1 x user-push button, 2 x user configurable DIP switches
- Mini USB connector (USB JTAG and UART interface)
- RJ45 Gigabit Ethernet socket with 4 integrated LED's.
- USB host connector
- Barrel jack for 5V power supply input
- DCDC step-down converter for 3.3V power supply
- USB JTAG and UART interface



TE0705

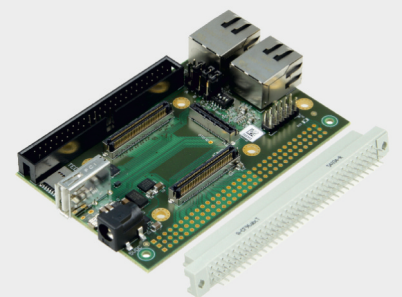
TE0705 carrier board is a simplified version of the TE0701. It provides a cost-effective way to connect Trenz 4 x 5 modules and connect them to your own circuits. As little as possible has been changed in functionality except the functionality that was removed. Changes from TE0701:

- Pmod connectors changed to IDC headers
- HDMI removed
- CL connector removed
- USB connector position changed
- 5 pin header support added on both USB interfaces
- 12V DC power input connector changed to different type
- FMC connector removed and replaced by two dual row 100 mil pin headers



TE0706

- VG96 connector and 50-pin IDC male connector socket
- SDIO port expander with voltage-level translation
- Micro SD card socket and a USB type A connector
- One user push button, user configurable DIP switch
- Two RJ45 Gigabit Ethernet MagJack
- One Ethernet PHY
- Barrel jack for 5 V power supply input
- DCDC step- down converter for 3.3V power supply
- JTAG pins on 12-pin header
- Three VCCIO selection jumper



TEB0707

TEB0707 is a carrier board for 4 x 5 Trenz Electronic modules. It provides three high speed and one low speed CRUVI extension connectors.

- Intel® MAX® 10 FPGA
- FTDI FT2223
- Gigabit RJ45 LAN socket
- MicroSD card socket
- Micro USB2.0 socket
- USB A socket
- 6 x user LEDs (3 x green, 3 x red)
- 5V input power supply



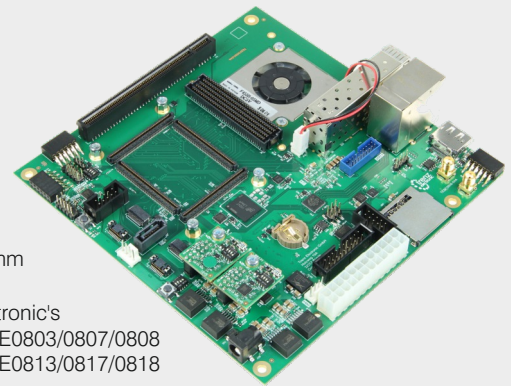
Following carrier boards are baseboards for specific Trenz Electronic SoMs, which exposes the module's B2B-connector-pins to accessible connectors and provides a whole range of on-board components to test and evaluate Trenz Electronic SoMs.

TEBF0808/ TEBF0818

- Mini-ITX form factor
- ATX power supply connector (12V only supply required)
- Optional 12V standard power plug
- USB3.0 with USB3.0 HUB
- FMC HPC slot (1.8V max VCCIO)
- MicroSD card (bootable) and e.MMC (bootable)
- PCIe slot - one PCIe lane (16 lane connector)
- Fan connectors, PC enclosure, FMC fan
- Intel front panel- and HDA audio-connector
- CAN FD transceiver (10 pin IDC connector)
- Displayport Single Lane
- One SATA Connector

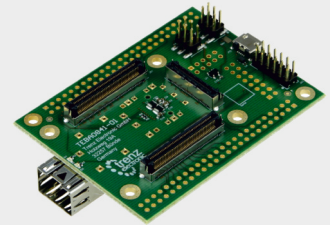
- Dual SFP+
- Gigabit Ethernet RJ45
- One Samtec FireFly (4 GT lanes bidir.)
- One Samtec FireFly connector for reverse loopback
- 20 pins ARM JTAG connector (PS JTAG0)
- Size: 170 mm × 170 mm

Designed for Trenz Electronic's
TE080x MPSoC series TE0803/0807/0808
TE081x MPSoC series TE0813/0817/0818



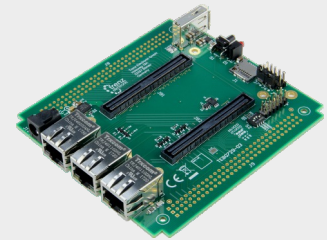
TEBA0841

- VG96 connector and 50-pin IDC male connector socket
- SDIO port expander with voltage-level translation
- Micro SD card socket and a USB type A connector
- One user push button, user configurable DIP switch
- Two RJ45 Gigabit Ethernet MagJack
- One Ethernet PHY
- Barrel jack for 5 V power supply input
- DCDC step- down converter for 3.3V power supply



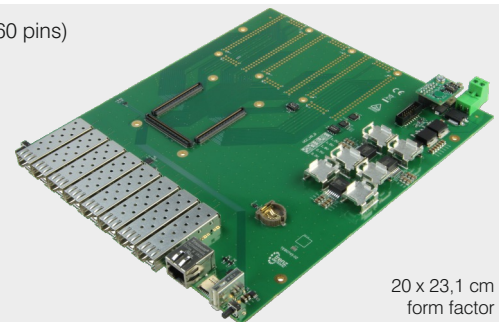
TEB0729

- Trenz TE0729 module socket (2 x Samtec BTE/BSE connectors 120 pins)
- 5V board supply via DC jack
- Three RJ45 Ethernet sockets
- One MicroUSB and one SD card connector
- One 128K I2C CMOS Serial EEPROM
- One 2K I2C Serial EEPROM
- XMOD (TE0790) pin header
- Two pin header FPGA bank power supply
- One VBat pin header and two VG96 pin header
- One user push button, one LED (red), user switch FPGA boot mode



TEB0745

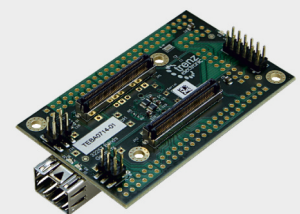
- Trenz Electronic TE0745 module socket (3 x Samtec ST5 connectors 160 pins)
- 24V power supply over ARKZ950/2 connecting terminal
- XMOD (TE0790) Pin Header (JTAG / UART)
- One EMI Network Filter
- MicroSD connector
- RJ45 Ethernet connector
- USB Host connector
- Eight SFP connector
- Six pin header 50 pol. (FPGA bank I/O and power)
- Six pin header 12 pol. (FPGA bank I/O and power)



20 x 23,1 cm
form factor

TEBA0714

- Trenz Electronic TE0714 module socket (2 x Samtec LSHM connectors 100 pins)
- XMOD (TE0790) pin header
- Two pin headers 50 pol. (FPGA bank I/O and power)
- SFP connector
- LDO voltage regulator 3.3V to 2.5V
- Two user LEDs (red/green) and one LED (red)
- One pin header 16 pol. (JTAG, MGT-CLK, boot mode, XADC, I/O's)
- One pin header 10 pol. (I/O)
- One pin header for FPGA bank power VCCIO34
- One pin header for FPGA bank power V_CFG (1.8 VOUT, 2.5V, 3.3 VOUT)



Trenz Electronic Starter Kits

Pre-assembled and ready-to-use



In general our Starter Kits contain a Trenz Electronic micromodule with a pre-assembled heat sink mounted on a Trenz Electronic baseboard. The TE08xx series modules are build in a black Core V1 Mini-ITX Enclosure. All this provided with a fitting power supply including different adapters, a micro SD card, a USB cable plus screws and bolts. Different module variants can be integrated on request.

| | Starter Kit 720 | Starter Kit 729 | Starter Kit 803 | Starter Kit 807 | Starter Kit 808 |
|---------------------------|--|-----------------------------|---------------------------------|---------------------------------|---------------------------------|
| Module | TE0720 | TE0729 | TE0803 | TE0807 | TE0808 |
| FPGA | AMD Zynq™ 7020 | AMD Zynq™ 7020 | AMD Zynq™ UltraScale+™ | AMD Zynq™ UltraScale+™ | AMD Zynq™ UltraScale+™ |
| Baseboard | TE0703 | TEB0729 | TEBF0808 | TEBF0808 | TEBF0808 |
| Enclosure | - | - | Core V1 Mini-ITX | Core V1 Mini-ITX | Core V1 Mini-ITX |
| Power Supply | Universal power supply unit | Universal power supply unit | Be Quiet! 400W ATX Power Supply | Be Quiet! 400W ATX Power Supply | Be Quiet! 400W ATX Power Supply |
| Heat Sink | Heat sink for TE0720, spring-loaded embedded | KK0729-02TE TE custom built | BGA Heat sink | SuperGRIP/ MaxiFLOW Heat sink | BGA Heat sink |
| USB Cable | ✓ | ✓ | ✓ | ✓ | ✓ |
| MicroSD Card | ✓ | ✓ | ✓ | ✓ | ✓ |
| Screws & Bolts | ✓ | ✓ | ✓ | ✓ | ✓ |



Starter Kit 720



Starter Kit 729



Starter Kit 80x

Photo shows similar product.

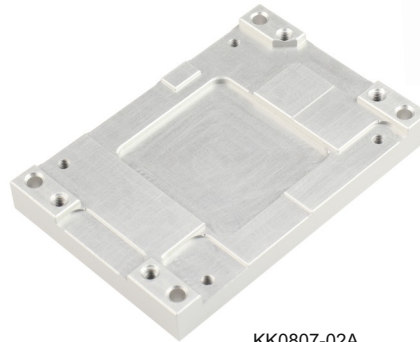
We are offering different customized cooling solutions for a selection of modules.
Please ask for special solutions at sales@trenz-electronic.de.

Available cooling solutions

| Trenz Electronic Article Numbers | |
|----------------------------------|--------------------------------------|
| Module | Cooling Solution |
| TE0600 | 26920 |
| TE0710 | 26925 |
| TE0712 | 26924 |
| TE0713 | 26924 |
| TE0714 | KK0714-02 |
| TE0715 | 26923 |
| TE0720 | 26922 |
| TE0729 | KK0729-02TE |
| TE0741 | 26921 |
| TE0745 | KK0745-02 |
| TE0803 | KK0803-04, 29665 |
| TE0807 | KK0807-02A |
| TE0808 | KK0808-05, 30137, 29664 (REV05 only) |
| TE0820 | 28606 |
| TE0821 | 28606 |
| TE0823 | 28606 |
| TE0841 | 28606 |
| TEB0911 | 25130 |
| TEF1001 | 25130 |
| Heat Spreader Extension | KK0001-01 |



KK0803-04



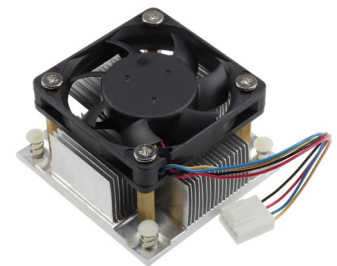
KK0807-02A



KK0808-05



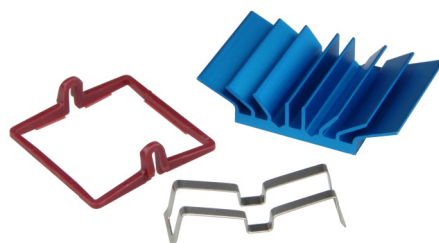
30137



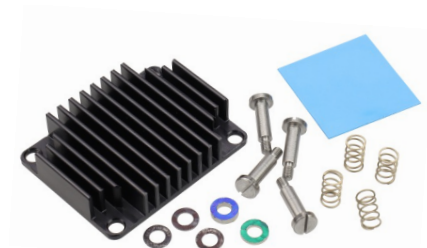
25130



28606



29665



26924

Available at <http://trenz.org/Cooling-Solutions>

Module series comparison table

for Trenz Electronic Modules



Other assembly options for cost or performance optimization available on request.

| | Device family | Device list | Form Factor/size [in cm] | Connectors | Programmable logic family | Processing system | SDRAM [in MByte] max | Flash [in MByte] | EEPROM |
|-------------------|--------------------------|---|--------------------------|------------------------------------|-------------------------------------|--------------------------------------|---|------------------|--------------------|
| AM0010 | Zynq UltraScale+™ | ZU1CG-ZU5CG, ZU1EG-ZU5EG, ZU4EV, ZU5EV | 4 x 5.6 | 2 x Samtec ADM6 | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 8192 DDR4 64-bit (PS) with ECC | 2 x 64 | 1 x MAC |
| TE0710 | Artix™7 | 35T, 50T, 75T, 100T | 4 x 5 | 2 x Samtec LSHM | Artix™7 | MicroBlaze | 512 DDR3 | 32 | - |
| TE0711 | Artix™7 | 35T, 50T, 75T, 100T | 4 x 5 | 2 x Samtec LSHM | Artix™7 | MicroBlaze | - | 32 | - |
| TE0712 | Artix™7 | 35T, 50T, 75T, 100T, 200T | 4 x 5 | 3 x Samtec LSHM | Artix™7 | MicroBlaze | 1024 DDR3 | 32 | MAC address |
| TE0713 | Artix™7 | 15T - 200T | 4 x 5 | 3 x Samtec LSHM | Artix™7 | MicroBlaze | 1024 DDR3L | 32 | - |
| TE0714 | Artix™7 | 15T, 35T, 50T | 4 x 3 | 2 x Samtec LSHM | Artix™7 | MicroBlaze | - | 16 | - |
| TE0715 | Zynq™7000 | Z-7015, Z-7030 | 4 x 5 | 3 x Samtec LSHM | Z-7015: Artix™7 Z-7030: Kintex™7 | 2 x Cortex A9 | 1024 DDR3 | 32 | MAC address |
| TE0716 | Zynq™7000 | Z-7020 | 4.5 x 6.5 | 2 x FCI Bergstak | Artix™7 | 2 x Cortex A9 | 1024 DDR3L | 32 | 1 x MAC + 64 KByte |
| TE0717 | Spartan™7 | S6, S15, S25, S50 | 2.5 x 3.5 | 1 x Samtec LSHM | Spartan™7 | MicroBlaze | - | 8 | - |
| TE0720 | Zynq™7000 | Z-7020 | 4 x 5 | 3 x Samtec LSHM | Artix™7 | 2 x Cortex A9 | 1024 DDR3 | 32 | MAC address |
| TE0724 | Zynq™7000 | Z-7010, Z7020 | 6 x 4 | 1 x Samtec ST5 | Artix™7 | 2 x Cortex A9 | 1024 DDR3L | 64 | MAC address |
| TE0825 | Zynq™ UltraScale+™ | ZU2...ZU5, CG, EG, EV support, automotive support | 5.4 x 7 | 2 x Samtec ADM6 1 x Samtec UMPT | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 8192 DDR4 with ECC | 256 | 64 KByte |
| TE0729 | Zynq™7000 | Z-7020 | 5.2 x 7.6 | 2 x Samtec BTE | Artix™7 | 2 x Cortex A9 | 512 DDR3 | 32 | 3 x MAC address |
| TE0741 | Kintex™7 | 70T, 160T, 325T, 410T | 4 x 5 | 3 x Samtec LSHM | Kintex™7 | MicroBlaze | - | 32 | - |
| TE0745 | Zynq™7000 | Z-7030, Z-7035, Z-7045 | 5.2 x 7.6 | 3 x Samtec ST5 | Kintex™7 | 2 x Cortex A9 | 1024 DDR3L | 64 | MAC address |
| TE0782 | Zynq™7000 | Z-7035, Z-7045, Z-1000 | 8.5 x 8.5 | 3 x Samtec QTH | Kintex™7 | 2 x Cortex A9 | 1024 DDR3 | 32 | 2 x MAC + 16 KByte |
| TE0783 | Zynq™7000 | Z-7035, Z-7045, Z-1000 | 8.5 x 8.5 | 3 x Samtec QTH | Kintex™7 | 2 x Cortex A9 | 2024 DDR3 64-bit (PL) 1024 DDR3 32-bit (PS) | 32 | 1 x MAC + 16 KByte |
| TE0803/ TE0813 | Zynq™ UltraScale+™ | ZU2CG-ZU5CG, ZU2EG-ZU5EG, ZU4EV, ZU5EV | 5.2 x 7.6 | 4 x Samtec S15 4 x Samtec ADM6 | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 8192 DDR4 | 128 | - |
| TE0806 | Zynq™ UltraScale+™ | ZU4, ZU5, ZU7, CG, EG, EV support | 5.5 x 7.6 | 2 x Samtec ADM6 | UltraScale+™ | Up to 4 x CortexA53 + 2 x Cortex R5 | 8192 DDR4 64-bit (PS) with ECC 4096 DDR4 32-bit (PL) | 2 x 64 | 2 x MAC address |
| TE0807/ TE0817 | Zynq™ UltraScale+™ | ZU4CG-ZU7CG, ZU4EG-ZU7EG, ZU4EV-ZU7EV | 5.2 x 7.6 | 4 x Samtec S15 4 x Samtec ADM6 | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 8192 DDR4 | 128 | 16 KByte |
| TE0808/ TE0818 | Zynq™ UltraScale+™ | ZU6EG, ZU9 EG, ZU15EG | 5.2 x 7.6 | 4 x Samtec S15 4 x Samtec ADM6 | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 8192 DDR4 | 128 | 16 KByte |
| TE0812 | Zynq™ UltraScale+™ | ZU6 | 9 x 9 | 2 x Samtec AP6 1 x Samtec LSHM | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 1024 DDR4 | 2 x 64 | - |
| TE0820 | Zynq™ UltraScale+™ | ZU2CG-ZU5CG, ZU2EG-ZU5EG, ZU4EV, ZU5EV | 4 x 5 | 3 x Samtec LSHM | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 4096 DDR4 | 128 | - |
| TE0821 | Zynq™ UltraScale+™ | ZU2CG-ZU5CG, ZU2EG-ZU5EG | 4 x 5 | 3 x Samtec LSHM | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 4096 DDR4 | 128 | 1 x MAC |
| TE0823 | Zynq™ UltraScale+™ | ZU2CG-ZU5CG, ZU2EG-ZU5EG | 4 x 5 | 3 x Samtec LSHM | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 2024 LPDDR4 | 128 | 1 x MAC |
| TE0830 | Zynq™ UltraScale+™ | ZU11EG, ZU17EG, ZU19EG | 12 x 12 | 2 x 400-pin COM-HPC | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 16384 DDR4 SODIMM (PL) 8192 DDR4 72-bit SDRAM (PS) | 512 | MAC address |
| TE0835 | Zynq™ UltraScale+™ RFSoc | ZU25DR | 6.5 x 9 | 2 x Samtec ST5 | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 4096 DDR4 | 128 | 1 x MAC |
| AM0070 | Zynq™ UltraScale+™ | ZU29DR, ZU39DR, ZU49DR | 6.4 x 8 | 5 x Samtec ADM6 | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 4096 DDR4 64-bit (PS) with ECC 8192 DDR4 64-bit (PL) | 2 x 64 | 1 x MAC |
| TE0841 | Kintex™ UltraScale™ | KU35, KU40 | 4 x 5 | 3 x Samtec LSHM | UltraScale+™ | MicroBlaze | 4096 DDR4 | 64 | - |
| TE0865 | Zynq™ UltraScale+™ | ZU11, ZU17, ZU19 | 7.5 x 10 | 4 x Samtec ADM6 | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 8192 DDR4 64-bit (PS) with ECC 8192 DDR4 64-bit (PL) | 2 x 64 | 1 x MAC |
| TEB0911 | Zynq™ UltraScale+™ | ZU6, ZU9, ZU15 (CG, EG) | 40.6 x 23.43 | 6 x FMC HPC | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 8192 64-Bit DDR4 SODIMM (PS) | 2 x 64 | 3 x MAC + 16 KByte |
| TEB0912 | Zynq™ UltraScale+™ | ZU11-ZU19 | 12 x 18 | Firefly sockets | UltraScale+™ | Up to 4 x Cortex A53 + 2 x Cortex R5 | 4096 DDR4 (PS) 4096 DDR4 (PL) | 2 x 64 | 4 x |

Module series comparison table

for Trenz Electronic Modules



| e.MMC | Ethernet PHY | USB PHY | Total I/O | Gbit Transceiver | Other Features |
|---------------|--|------------------|---------------------------------------|------------------------------------|---|
| 4-64 GByte | 1 Gbit | USB2.0 OTG | PL: 204 MIO: 22 | 4 x GTR, 4 x GTH | GPU/VCU depending on device, security controller, crypto authentication |
| - | 2 x 100 Mbit | - | 112 | - | Single supply |
| - | - | USB2.0 UART/FIFO | 178 | - | Single supply |
| - | 100 Mbit | - | 158 | 4 x GTP | Programmable clock generator, single supply |
| - | - | USB3.0 | 152 | 4 x GTP | Programmable clock generator, single supply |
| - | - | - | 144 | 4 x GTP | Differential MEMS osc. for MGT clocking, XADC analog input, GT reference clock input, single supply |
| - | 1 Gbit | USB2.0 OTG | 132 + 14 MIO | Z-7015: 4 x GTP Z-7030: 4 x GTX | Programmable clock generator, real time clock, single supply |
| - | 1 Gbit | USB2.0 | 120 x HR PL | 2 x PS MIOs | On board 10 x 12-bit low power SAR ADCs up to 2 MSPS, low power oscillators, USB2.0 to UART/JTAG interface, single supply |
| - | - | - | 72 HR | - | HyperRAM, 100 MHz clock oscillator, red and green LED, single supply |
| 4 - 64 GByte | 1 Gbit | USB2.0 OTG | 152 + 14 MIO | - | Real time clock, single supply, automotive grad available |
| - | 1 Gbit | - | PL: 80 PS: 20 | - | CAN, single supply |
| - | 2 x 1 Gbit | - | PL: 136 +88 PS: 57 | - | (Automotive), real time clock, oscillator |
| 4 - 64 GByte | 2 x 100 Mbit, 1 Gbit | USB2.0 OTG | 136 + 14 MIO | - | Real time clock, single supply |
| - | - | - | 144 | 8 x GTX | Programmable clock generator, single supply |
| - | 1 Gbit | USB2.0 OTG | 250 + 6 MIO | 8 x GTX | Real time clock, single supply |
| 4 - 64 GByte | 2 x 1 Gbit | 2 x USB2.0 OTG | 250 + 2 MIO | 16 x GTX | Programmable clock generator, real time clock, single supply |
| 4 - 64 GByte | 1 Gbit | USB2.0 OTG | 166 + 12 MIO + 40 CPLD muxed IO | 16 x GTX | Programmable clock generator, real time clock, single supply |
| - | - | - | 156 + 65 MIO | 4 x GTR (PS) | GPU/VCU depending on device, programmable clock generator, single supply |
| 4-64 GByte | 2 x 1 Gbit | USB2.0 OTG | 48 PL HD + 52 PL HP, 14 MIOs + I2C | 4 x GTR, 16 x GTH | GPU/VCU depending on device, transceiver clock in-/outputs, single 5-12V power required |
| - | - | - | 204 + 65 MIO | 4 x GTR, 16 x GTH | GPU/VCU depending on device, programmable clock generator, single supply |
| - | - | - | 204 + 65 MIO | 4 x GTR, 16 x GTH | GPU/VCU depending on device, programmable clock generator, single supply |
| 2 x 128 GByte | 2x RGMII (1x Debug) 100 Mbit for SC | - | 127 | 16 (12 x PL, 4 x PS) | 2 x 4 MByte MRAM, on board Vorago VA41630, 2 x analog input, UART, 2 x CAN, PPSin/PPSOut, I2C, 12V power supply |
| 8 - 64 GByte | 1 Gbit | USB2.0 OTG | 132 + 14 MIO | 4 x GTR (PS) | GPU/VCU depending on device, programmable clock generator, real time clock, single supply |
| 8 - 64 GByte | 1 Gbit | USB2.0 OTG | 34 HP, 96 HD + 14 MIO | 4 x GTR (PS) | GPU/VCU depending on device, programmable clock generator, single supply |
| 8 - 64 GByte | 1 Gbit | USB2.0 OTG | 132 HP + 14 MIO | 4 x GTR (PS) | GPU/VCU depending on device, programmable clock generator, single supply |
| 64 GByte | 1 Gbit | USB2.0 OTG | x32 (15 diff.) | 12 x GPIO | SC CLPD Intel MAX 10 & Xilinx Zynq-XC7Z010 on-board, interface: PCIe SMB, PCIe up to 48 lane, 4 x USB2.0, 1 x USB 3.0, 2 x UART, 1 x I2C SMB, 3 x I2C, DDI, Sata |
| - | 1 Gbit | USB2.0 OTG | 132 + 14 MIO | 4 x GTR (PS) | Programmable clock generator, real time clock, single supply |
| 8 GByte | 2 x 1 Gbit | USB2.0 | 180 + 22 MIO 16 ADC, 16 DAC | 4 x GTR 16 x GTY | OPTIGA Trust M, crypto authentication, oscillator |
| - | 1 Gbit | - | 144 | 8 x GTH | Programmable clock generator, single supply |
| 8 GByte | 1 Gbit | USB2.0 | 240 PL HP 96 PL HD 21 MIOs | 32 x GTH, 16 x GTY, 4 x GTR | 12V single supply |
| 8 GByte | 1 Gbit | USB2.0 | 408 | 22 x GTH | Active heat sink, GPU/VCU depending on device, M2 PCIe SSD, system controller, DisplayPort, RJ34 ETH + Dual USB3 Combo, Dual Stack SFP+, SD (bootable), USB JTAG/UART ZynqMP, USB JTAG/GPIO FMC, CAN FD (DB9 Connector), SMA (external CLK), 5-pin 24 V power connector |
| - | 2 x Gbit | USB2.0 | 184 | 32 x GTH, 16 x GTY | 4 x IDC for PL HD IO/LVDS, M2 PCIe SSD, M2 WAN/WLAN slot (PCIe/USB), on-board USB JTAG and UART, CAN, real time clock, single supply |

Module series comparison table for Trenz Electronic Modules

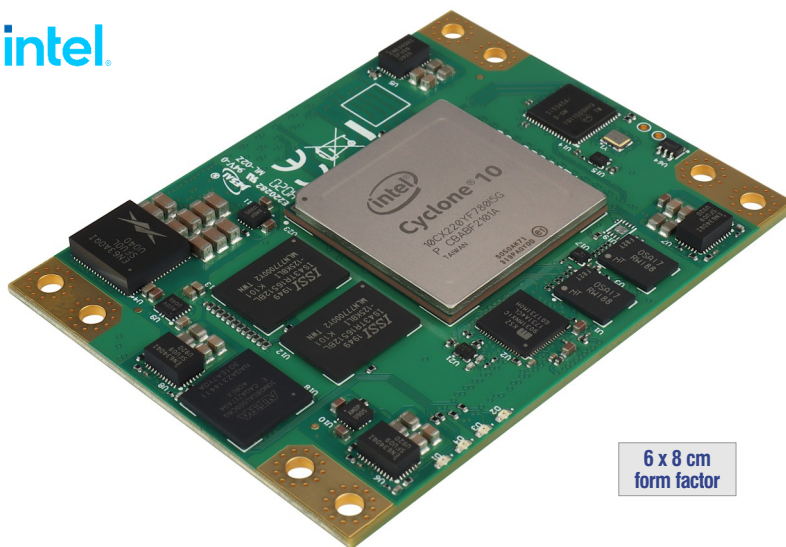


Other assembly options for cost or performance optimization available on request.

| | Device family | Device list | Form Factor/size [in cm] | Connectors | Programmable logic family | Processing system (HW/SW) | SDRAM [in MByte] max | Flash [in MByte] | EEPROM |
|---------|----------------|------------------------------------|--------------------------|--------------------------------|---------------------------|---------------------------|-------------------------------------|---------------------------|-----------------|
| CR00100 | MAX® 10 | 10M08 | 4.48 x 5.75 | CRUVI (1 x HS, 1 x LS) | MAX 10 | -/+ | 8 | - | Config. EEPROM |
| TEI0001 | MAX® 10 | 10M08 | 2.5 x 6.15 | - | MAX 10 | -/+ | 8-64 | 8 | Config. EEPROM |
| TEI0003 | Cyclone® 10 LP | 10CL025, 10CL006, 10CL010, 10CL016 | 2.5 x 6.15 | - | Cyclone 10 LP | -/+ | 8 | 2 | - |
| TEI0006 | Cyclone® 10 GX | 10CX220, 10CX150, 10CX105 | 6 x 8 | 3 x Samtec ST5 | Cyclone 10 GX | -/+ | 2024 DDR3 | 256 | 2 Kbit |
| TEI0009 | Cyclone® 10 LP | 10CL055 | 9.5 x 11 | - | Cyclone 10 LP | -/+ | 64 | 64 | 2 x MAC address |
| TEI0022 | Cyclone® V | 5CSEMA5F31C8N | 13 x 16 | - | Cyclone V | +/+ | 1024 DDR3 (HPS) 1024 DDR3 (FPGA) | 32 for HPS 32 for FPGA | 2 Kbit |
| TEI0050 | Cyclone® V | 5CEBA2U15C8N | 2.5 x 7.07 | CRUVI HS, 2 x 14 pin header | Cyclone V | +/+ | 8 | 8 | Config. EEPROM |

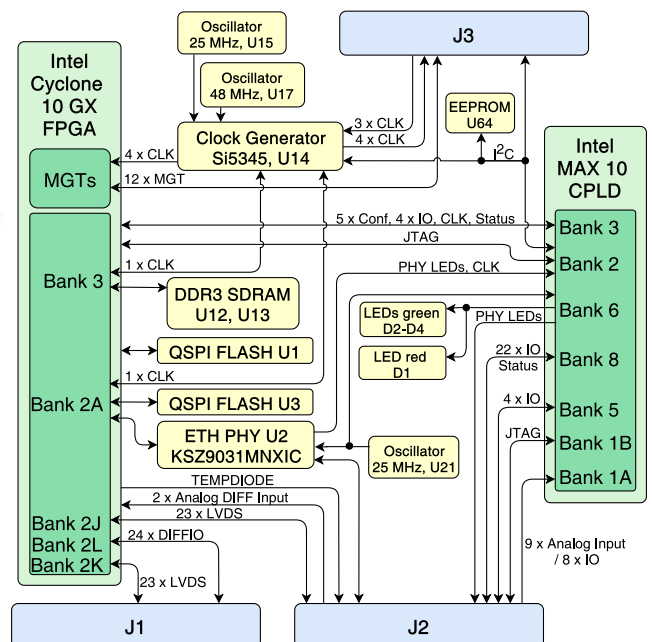
TEI0006 Series

Intel® Cyclone® 10 GX SoM, DDR3, Flash, Ethernet, MAX 10 as power sequencer



6 x 8 cm form factor

<http://trenz.org/tei0006-info>



| Device list | Connectors | SDRAM | Flash | Ethernet | Other Features |
|-----------------------------------|----------------|-----------|--------|----------|--|
| Cyclone® 10 GX 10CX220YF780I5G | 3 x Samtec ST5 | 2 GB DDR3 | 256 MB | 1 Gbit | Intel® MAX® 10 as power sequencer, EEPROM, 4 LEDs, 5V input voltage |

| e.MMC | Ethernet PHY | USB PHY | Total I/O | Gbit Transceiver | Other Features |
|-------|-------------------|---------|-----------|------------------|---|
| - | - | - | 24 + 4 | - | User Push Button and LEDs |
| - | - | USB2.0 | 31 | - | 3-axis accelerometer, on-board USB Programmer, JTAG/UART over microUSB2.0 connector, Pmod header, 2 x 14 pin headers, 1 x 3 pin header, single supply |
| - | - | USB2.0 | 21 | - | 3-axis accelerometer, Pmod: 2 x 6 pin support, 8 user LED, 1 user push button, single supply |
| - | 1 Gbit | - | 226 | - | Intel MAX 10 as system controller (CPLD), programmable oscillator, single supply, baseboard available |
| - | 2 x 10/100 MBit/s | USB2.0 | 70 | - | Up to 128 MByte HyerRAM, integrated USB Programmer2, Arduino and Pmod compatible pin headers, Grove connector, D-SUB connector for VGA, SMA connectors, 7-segment display |
| - | - | USB2.0 | 29 | - | MEMS 3-axis accelerometer, fully calibrated single-chip temperature sensor, smoke detector, USB/JTAG programmer, single supply |
| - | - | - | 24 + 24 | - | USB-to-JTAG/GPIO-FTDI, user push button and LEDs |

TEIB0006

Development Carrier Board for Trenz Electronic's TEI0006 FPGA Module



12 x 15 cm
form factor

Key Features

RAM/Storage

- EEPROM

On Board

- 3 x LEDs (power, 2 x user)
- 3 x I/O expanders
- 3 x push buttons (2 x user, system controller config)
- DIP switch

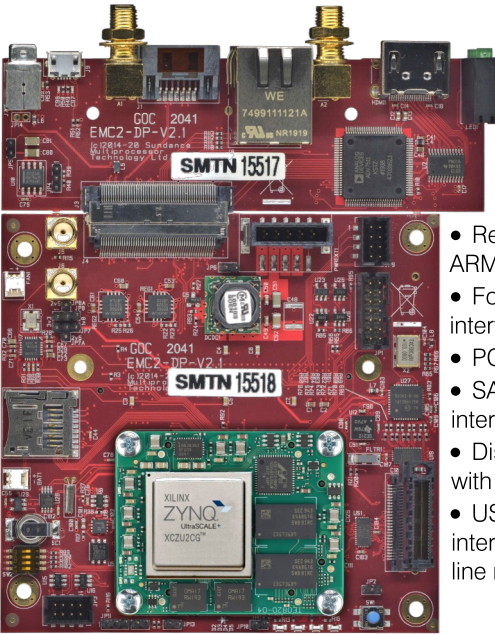
Interface

- 2 x SFP connectors
- 3 x Samtec ST5 B2B connectors
- FMC HPC connector (10 x transceiver, 34 x LVDS on LA, 10 x LVDS on HA), VADJ= 1.8V
- Gigabit Ethernet connector
- USB2.0 - microUSB (JTAG/UART)
- USB3.0 - type C

Power

- 12V input voltage

<http://trenz.org/teib0006-info>

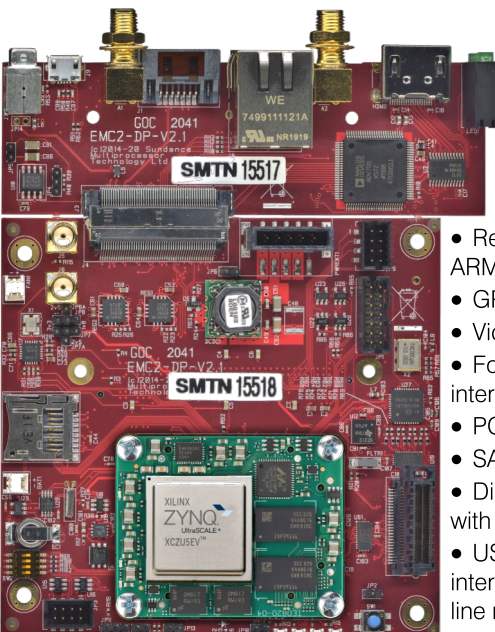
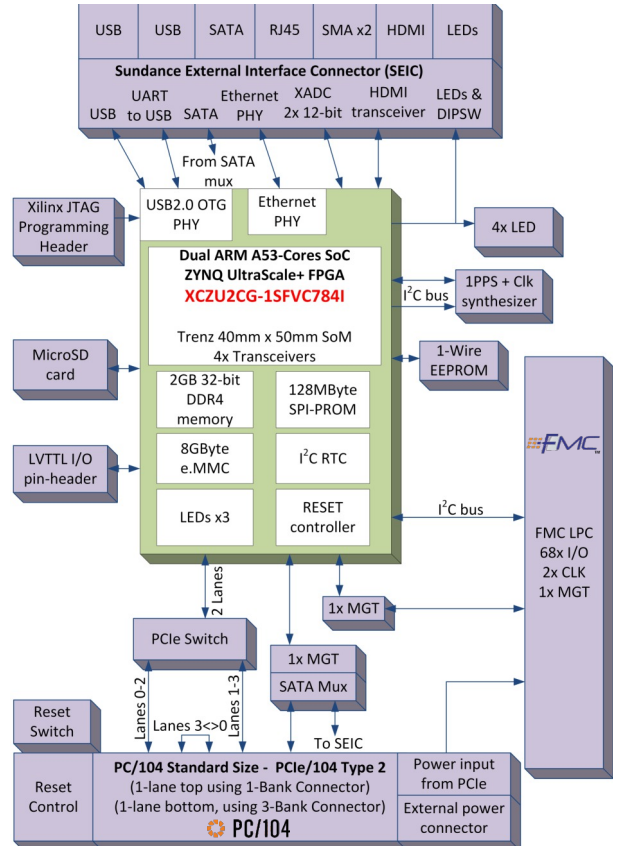


Xilinx Zynq UltraScale+ XCZU2CG-1SFVC7841

- Application Processor: Dual-core ARM Cortex-A53 MPCore
- Real-Time Processor: Dual-core ARM Cortex-R5 MPCore
- Four high-speed serial I/O interfaces supporting:
 - PCI Express v2.1 compliant
 - SATA 3.1 specification compliant interface
 - DisplayPort source-only interface with video resolution up to 4k x 2k
 - USB 3.0 specification compliant interface implementing a 5 Gbit/s line rate



The EMC²-DP is a PCIe/104 OneBank™ Carrier for a Trez compatible SoC Module and has expansion for a VITA57.1 FMC™ LPC I/O board. The SEIC board contains LEDs, RS232, USB2.0, HDMI, 1Gb Ethernet and SATA. It can be customised for individual applications and bespoke connectors. This provides a total solution for any embedded application.

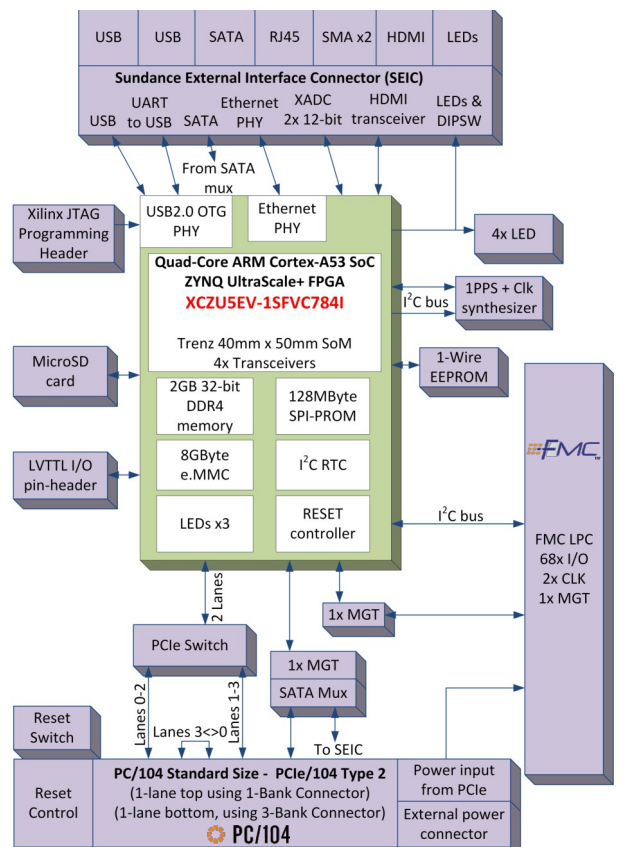


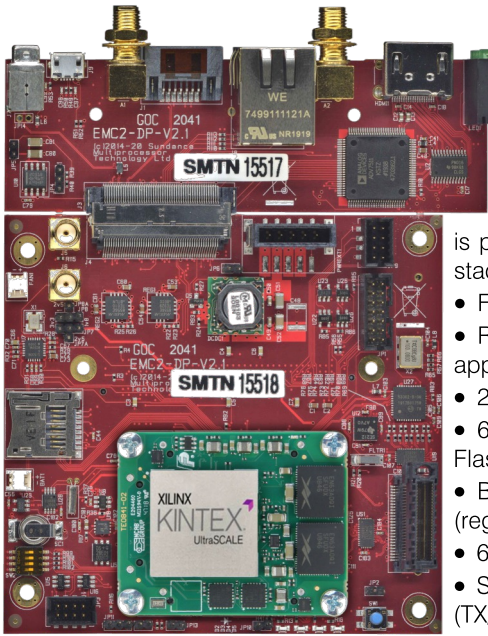
Xilinx Zynq UltraScale+ XCZU5EV-1SFVC7841

- Application Processor: Quad-Core ARM Cortex-A53 MPCore
- Real-Time Processor: Dual-core ARM Cortex-R5 MPCore
- GPU: Mali-400 MP2
- Video Codec: H.264 / H.265
- Four high-speed serial I/O interfaces supporting:
 - PCI Express v2.1 compliant
 - SATA 3.1 specification compliant
 - DisplayPort source-only interface with video resolution up to 4k x 2k
 - USB 3.0 specification compliant interface implementing a 5 Gbit/s line rate



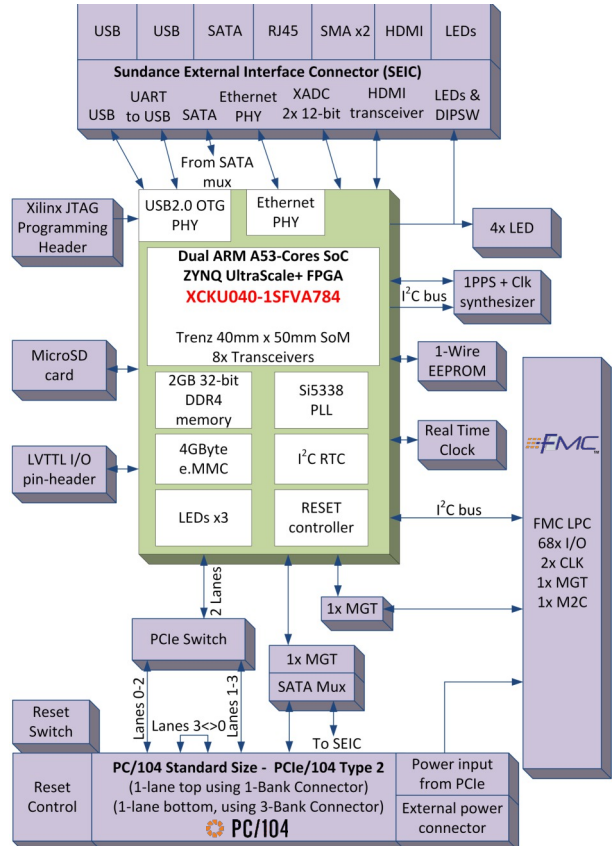
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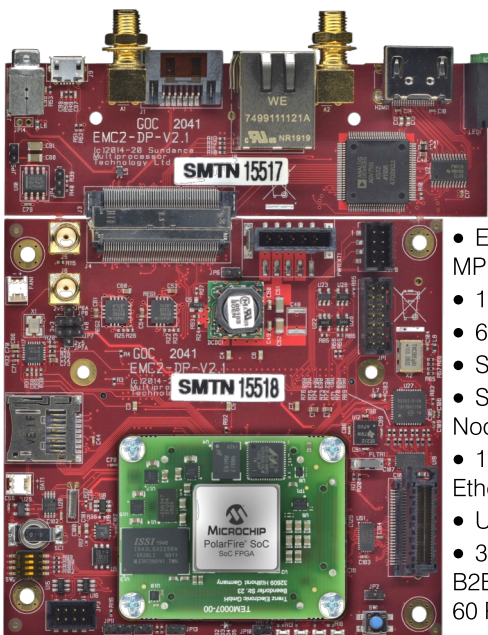


The Trenz Electronic TE0841-02-41121-A is an industrial-grade FPGA module integrating a Xilinx Kintex UltraScale KU40. A large number of configurable I/O's is provided via rugged high-speed stacking strips.

- FPGA: XCKU040-1SFVA784I
- Rugged for industrial applications
- 2 x 1GB DDR4 SDRAM banks
- 64MB (512 MBit) QSPI Boot Flash
- B2B Connectors: 3 Razor Beam (regular 4 mm), total 260 terminals:
- 60 x HR I/Os, 84 x HP I/Os
- Serial transceiver: GTH 8 lanes (TX/RX)

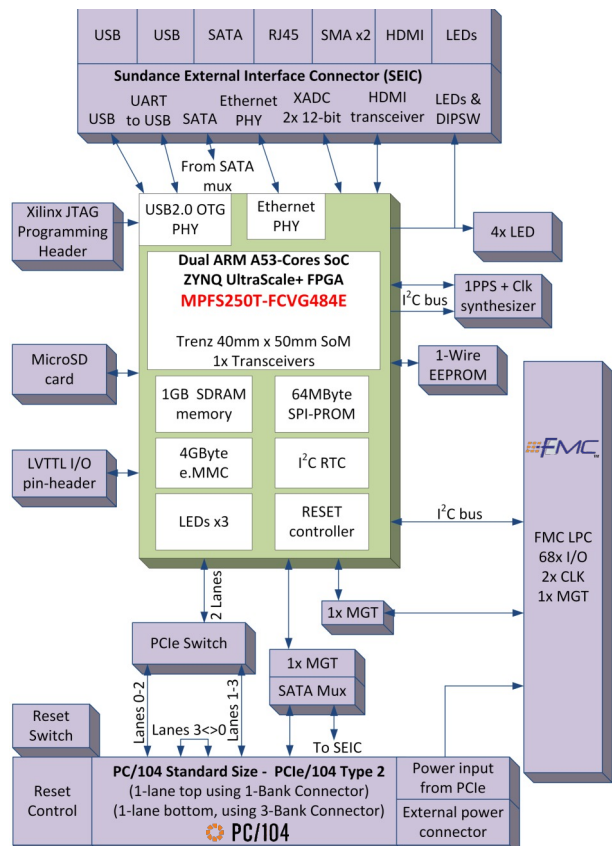


The EMC²-DP is a PCIe/104 OneBank™ Carrier for a Trenz compatible SoC Module and has expansion for a VITA57.1 FMC™ LPC I/O board. The SEIC board contains LEDs, RS232, USB2.0, HDMI, 1Gb Ethernet and SATA. It can be customised for individual applications and bespoke connectors. This provides a total solution for any embedded application.



This system utilises a Microchip PolarFire® SoC MPFS250T, which is a low cost, small-sized FPGA module.

- Extended commercial grade MPFS250T-FCVG484E FPGA
- 1 GByte LPDDR4 SDRAM
- 64 MByte SPI Flash Memory
- System Controller CPLD
- Serial EEPROM with EUI-48 Node Identity
- 10/100/1000 Mbps Gigabit Ethernet PHY
- USB 2.0 ULPI Transceiver
- 3 x Samtec LSHM B2B connectors (2 x 100 Pins, 1 x 60 Pins)

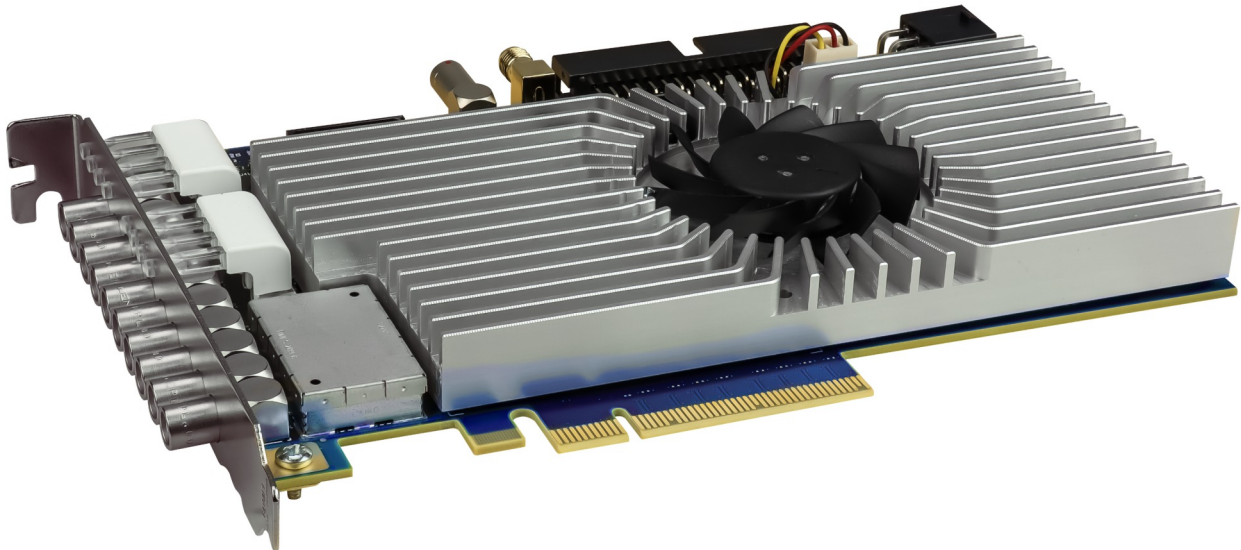


The EMC²-DP is a PCIe/104 OneBank™ Carrier for a Trenz compatible SoC Module and has expansion for a VITA57.1 FMC™ LPC I/O board. The SEIC board contains LEDs, RS232, USB2.0, HDMI, 1Gb Ethernet and SATA. It can be customised for individual applications and bespoke connectors. This provides a total solution for any embedded application.



Ndigo6G-12 - versatile pulse acquisition platform

The Ndigo6G-12 offers 6,4 Gsps sample rate, 12 bits resolution and a greatly improved readout rate of 6,0 GB/s.



The Ndigo6G-12 is a hybrid ADC/TDC-solution for the acquisition of short pulses. It builds on the established platform of the Ndigo5G-10, but takes it to the next level in both, performance and flexibility. The Ndigo6G-12 is particularly well-suited for time of flight applications like LIDAR or TOF mass spectrometry. Pulse arrival times can be measured with an accuracy down to 5 ps in combination with information on pulse shape such as area or amplitude. Four channels at 1,6 Gsps with 12 Bits resolution can be recorded independently or combined to two or one channel(s) with higher dynamic range or up to 6,4 Gsps. The Ndigo6G-12 comprises, in addition, four TDC channels with a resolution of 13 ps.

| Ndigo6G-12 - Data | |
|---|--|
| Optimized for | TOF applications |
| ADC channels | 4 |
| TDC channels | 4 |
| Gating channels | 4 |
| Connectors | 10x LEMO 00 |
| Sample rate single channel | 6,4 Gsps |
| Sample rate multi channel | 1,6 GSps |
| Resolution | 12 bits |
| Double pulse resolution | TBD |
| Maximum bandwidth | TBD |
| TDC bin size | 12 ps |
| Multihit | unlimited |
| Dead time between Groups | none |
| TDC readout rate | TBD |
| ADC readout rate | approx. 6 GByte/s |
| Range | TBD |
| Common start/stop | yes/yes |
| Number of boards that can be event-synchronized | 8 |
| Readout interface | PCIe3 x8 |
| Time base | 50 ppb on board or external 10 MHz clock |
| On-board calibration data storage | x |
| Adjustable trigger windows | x |
| Overlapping events possible | x |
| Easy to use Windows C API | x |
| In-system firmware update | x |

Zero suppression

Detect pulses above a certain threshold and only acquire the relevant data to massively reduce the amount of data that needs to be copied and analysed.

Configurable DC offset

When acquiring unipolar pulses, shift the baseline to the edge of the ADC range to double your dynamic range.

Flexible utility functions

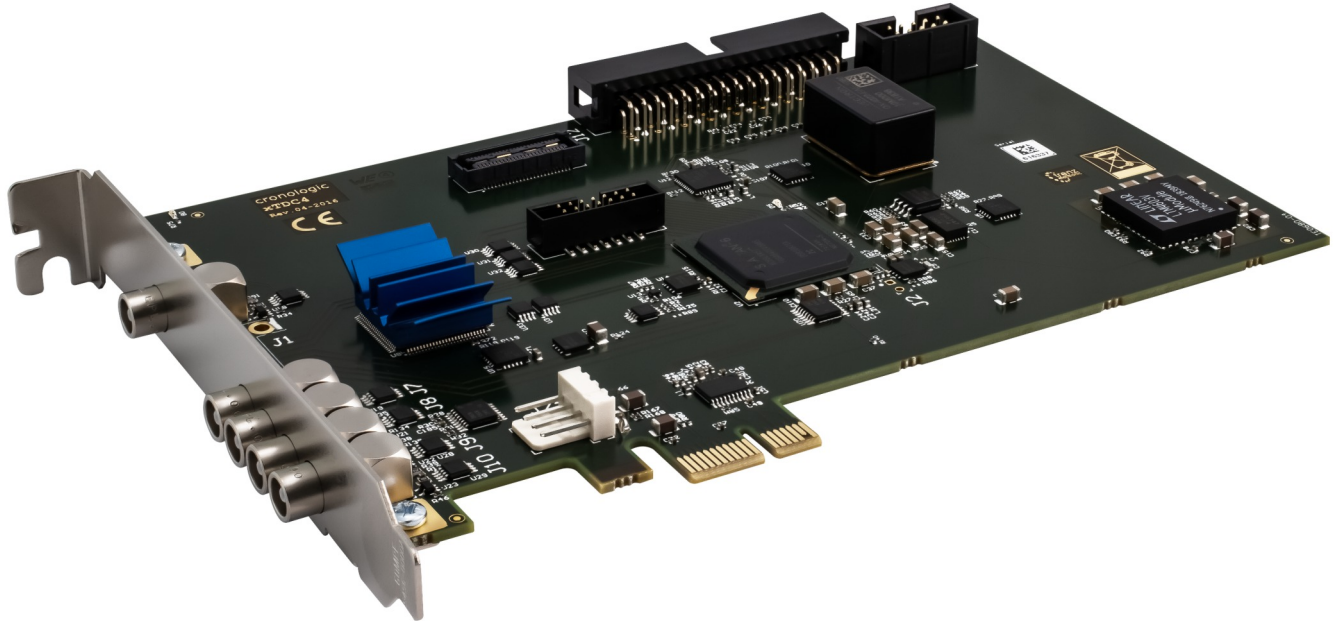
A multitude of useful details help you to create a highly integrated setup with a minimum of external components. Using the integrated TiGer timing pattern generator can provide digital pulse patterns to control your experiment or internal triggers. Use gate and veto functions with our gating logic. This also works across channels or from the additional digital input with a flexible trigger matrix.

Streaming architecture

The buffers of the Ndigo6G-12 are only limited by the size of your PC's main memory. Data is streamed at a rate of 6,0 GByte/s concurrently to data acquisition. There is no dead time and latency is minimized.

TimeTagger - low cost, mid resolution time-to-digital converter

If a resolution of 500ps is sufficient, the TimeTagger4G can replace our high end TDCs at a lower cost.



Time to digital converter

cronologic has a wide series of high performance time to digital converters (TDC) with resolutions starting at 3ps. The current lineup contains boards with up to 10 channels.

cronologic presents an exciting series of low cost, mid resolution time-to-digital converters. The boards feature 500ps to 1ns single shot resolution at a high readout bandwidth.

Time Taggers are ideally suitable in applications that do not require highest single shot timing resolution, but high data acquisition rates and lowest multiple hit deadtime. These include certain types of mass spectroscopy (TOF-MS), time correlated single photon counting (TCSPC) and frequency counting applications.

The TimeTagger4-1G features a bin size of 1 ns. The TimeTagger4-2G provides a bin size of 500 ps.

Low cost

The TimeTagger4 is available at the lowest cost, while still providing picosecond resolution.

Bipolar

The threshold discriminators can use positive or negative threshold with configurable voltage. This allows you to use the xTDC with a wide range of detectors or constant fraction discriminators (CFD).

TiGer timing generator

All inputs can also be used to output periodic pulse patterns to control your setup. The exact timing of these is measured by the TDC.

| TimeTagger - Data | |
|--------------------------|------------------------|
| Optimized for | low cost |
| TDC channels @ bin size | 4 @500 ps |
| Connectors | 5x LEMO 00 |
| Bin size | 500 ps / 1 ns |
| Double pulse resolution | 1 ns |
| Multihit | 1000x per start event |
| Dead time between groups | none |
| Resolution | 12 bits |
| Readout rate | 30 MHits/s |
| Maximum bandwidth | TBD |
| Range | 8 ms, 2.147 s extended |
| Common start/stop | yes / no |
| Readout interface | PCIe x1 |
| Time base | 50 ppb on board |

Ndigo Crate

With the Ndigo Crate it is possible to use up to 8 PCIe boards with a PC. The connection of the external chassis to the PC happens over PCIe 2 x16 for a full duplex bandwidth of 2x8 GByte/s.

The enclosure was specifically designed to operate multiple synchronized cronologic digitizer boards to create a high speed data acquisition system. It can also be used to house other DAQ cards, GPUs for high performance computing, storage adapters or networking equipment.

The extension is fully transparent. The operating system can't distinguish between boards in the PCIe expansion box and boards inside the PC itself. No drivers are required.

The slot covers are on the front side of the enclosure to easily see status information and plug in cables during operation.

The crate is delivered as a set with cable and PC link board.



| Facts | Crate | Crate-3 | Crate-5 |
|---|---------------------------------------|--------------|--------------|
| Connection to Host | PCIe 2.0 x16 | PCIe 2.0 x16 | PCIe 2.0 x16 |
| Bandwidth to Host | 8 GByte/s | 8 GByte/s | 8 GByte/s |
| Performance relative to 10Gbps Thunderbolt link | 8x | 8x | 8x |
| PCIe3 x16 slots with 8 lanes | - | 2 | 2 |
| PCIe3 x16 slots with 4 lanes | - | 3 | 3 |
| PCIe2 x16 slots with 4 lanes | 8 | - | - |
| PCI slots 5V, 32 Bit, 33MHz | - | - | 2 |
| PCI slots 3V, 32 Bit, 66MHz | - | 2 | - |
| Availability | now | now | now |
| Cable and link boards | included | included | included |
| Cable Length | 3 meters (1m, 2m and 5m upon request) | | |

Trenz Electronic is for more than 30 years the ideal partner to design an FPGA and SoC based system from scratch, or to complete and optimize an existing project.

Customers can choose from a wide range of module series including FPGA from manufacturers such as:

AMD

- Versal™
- Zynq™ UltraScale+™ and UltraScale™
- Kintex™ UltraScale+™ and UltraScale™
- Zynq™ 7000
- Artix™ 7
- Kintex™ 7
- Spartan™ 7
- Virtex™ 7
- Spartan™ 6

Intel®

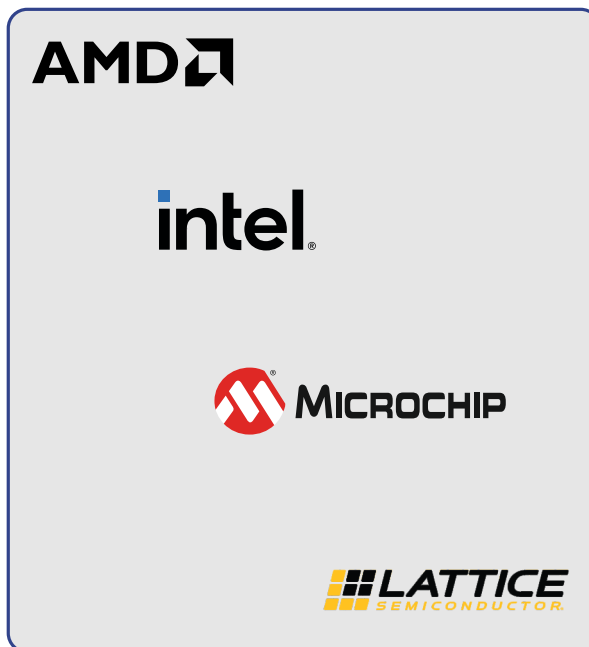
- Agilex®
- Stratix®
- MAX® 10
- Cyclone® 10
- Cyclone® V

Microchip

- PolarFire®
- SmartFusion® 2

Lattice

- Avant
- CertusPro-NX
- Certus-NX
- MachXO2
- iCE40



In addition, customer-specific modules can also be realized.

By closely coordinating all departments in one building, we cover the entire process from product specification, hardware and software development to prototyping and production.

Our developers discuss the possibilities of your request with you. Finally, we create the hardware and the PCB layout to produce the first prototypes.

The Design of software working on embedded systems has special requirements. Functional compatibility, software re-use, real-time performance, small-footprint - these are only some issues of the additional requirements concerning embedded software. We understand software as an integral part of the system and therefore we offer you these additional services.

During the entire development and production process, Trenz Electronic, as your reliable partner, is in regular contact with you to implement possible changes as quickly as possible.

As a service provider, the wishes of our customers are very important to us. Once the product has met your requirements, it goes into series production.

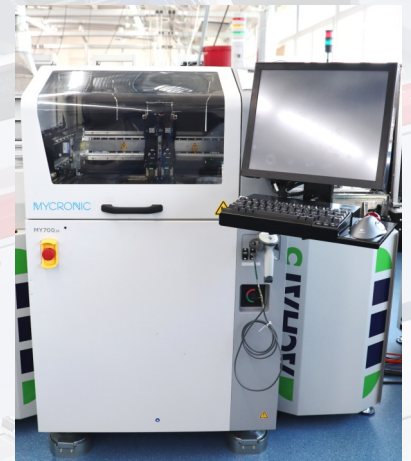
Trenz Electronic SMD In-house Production

Full SMT production since 2014, smallest SMD part 01005



The modern, production-oriented storage system is an automated, highly flexible and expandable buffer storage unit for electronic components. It is ready for fast and smooth changeovers in our SMT line.

Trenz Electronic uses printing technology to make it possible to dispense solder paste for the most challenging circuit boards and components, with micrometer accuracy, maximum speed and perfect quality solder joints.



In the complex process of solder paste inspection (SPI), Trenz Electronic has the possibility to measure the paste volume with the highest precision in 3D. Furthermore, possible defects and bridges are detected.

To produce even faster, we use several production lines at the same time. Here, we can easily switch from full volume to batch size one and handle a wider variety of components with uncompromising manufacturing quality.





The Automatic Optical Inspection (AOI) is used to detect and report tolerance deviations in production using an image processing techniques.

For some applications, THT placement remains indispensable. THT assembly creates a strong connection between the components and the PCB. This makes it ideal for larger components that are exposed to high power and high voltages.



With our new X-ray machine, we use leading technology for precise analyses. The detailed 3D visualization masters the special requirements of our field of application.

Official Trenz Electronic Distributor List as of July 2023

Current list with address is online at <http://trenz.org/distri>

Worldwide

Digi-Key Electronics

Web: www.digikey.com

E-mail: sales@digikey.com



Mouser Electronics, Inc.

Web: www.mouser.com

E-mail: sales@mouser.com



ARROW Electronics

Web: www.arrow.com

Contact via form on website



RS Components GmbH

Web: de.rs-online.com

E-mail: bestellung@rs-components.com



EMEA

AVNET Silica

Web: www.avnet-silica.com

E-mail: trenz_sales@avnet.eu



APAC

AVNET Asia Pacific

Web: avnet.com/apac

E-mail: xilinxapac@avnet.com



China & Taiwan

Future Linking Solution Tech Co. Ltd.

Web: www.fulso.com

E-mail: liu@fulso.com

Haley Technology Co. Ltd.

Web: www.haleytech.com

E-mail: sales@haleytech.com

Czech Republic + Slovakia

DFC Design, s.r.o.

Web: www.dfcdesign.cz

E-mail: info@dfcdesign.cz

France

ERTIS SASU

Web: www.ertis.fr

E-mail: sales@ertis.fr

Lextronic

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E-mail: lextronic@lextronic.fr

India

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E-mail: info@microembesys.com

ApexPlus Technologies

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E-mail: info@apexplustech.com

Sinelec Technologies

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(Europe and India)

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E-mail: store@mirifica.it

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Missing Link Electronics, Inc.

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