




TRENZ ELECTRONIC CATALOGUE

Electronic Design Service

Development, Manufacture and Supply
of FPGA and SoC Modules

- Trenz goes SPACE -
New space grade device
on page 6, designed for
cubesat missions.

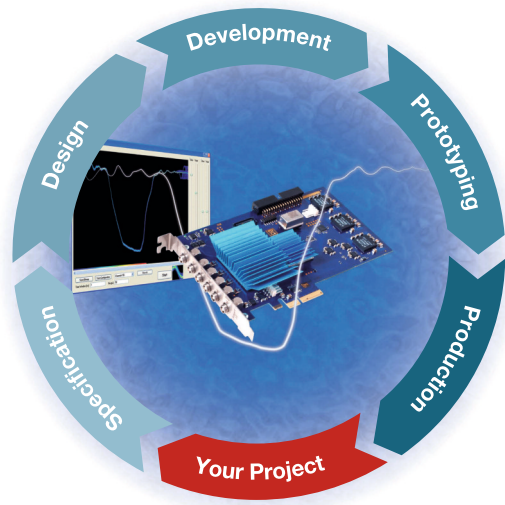
updated august 2021

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FPGA inside



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 signal processing systems based on FPGA and CPU architectures.

Many of our products are compatible with some widespread 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 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



Trenz Electronic is certified partner in the Xilinx Partner Program.



ISO 9001:2015
(quality management)
certified



ISO 14001:2015
(environmental
management) certified

(sorted by form factor within product categories)

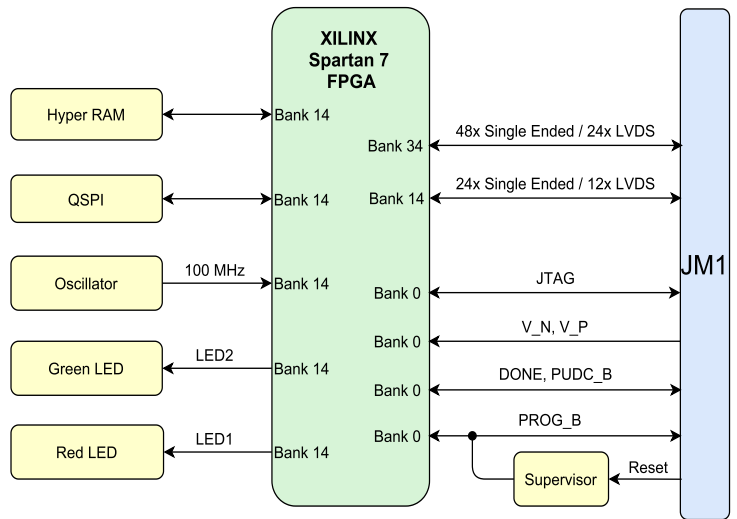
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NEW TE0717 Series
Xilinx Spartan-7, HyperRAM, Flash, 100MHz Oscillator

SPARTAN⁷



2.5 x 3.5 cm form factor

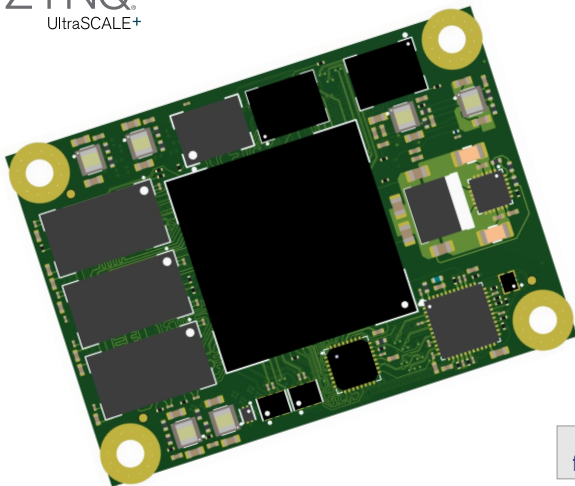


<http://trenz.org/te0717-info>

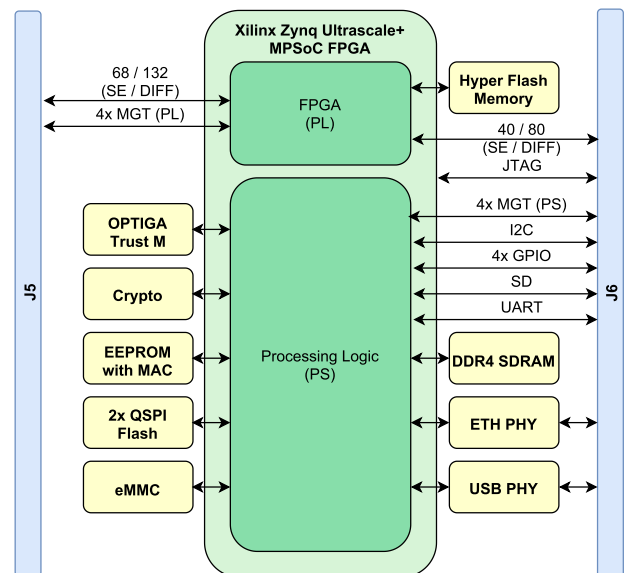
Device list	Connector	HyperRAM	Flash	Other Features
S6, S15, S25, S50	1 x Samtec 100-pin LSHM	64 Mbit	64 Mbit	Baseboard available, oscillator 100 MHz, green and red LED, single supply

NEW AM0010 Series
Xilinx Zynq UltraScale+, DDR4 PS connected, Flash, HyperRAM, Ethernet, USB

ZYNQ[®]
 UltraSCALE+



4 x 5.6 cm form factor



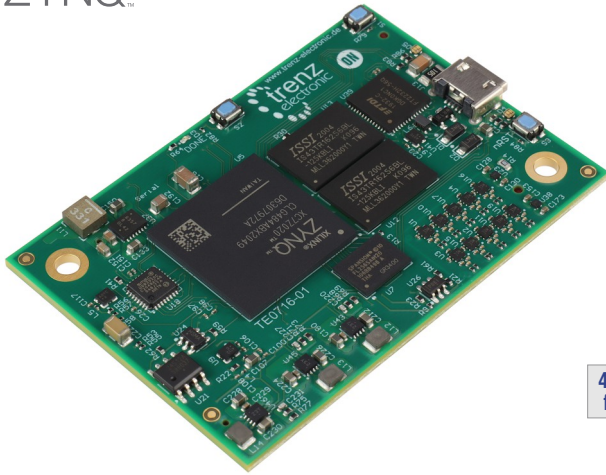
<http://trenz.org/am0010-info>

Device list	Connectors	SDRAM max	Flash	e.MMC	Ethernet	USB	Other Features
ZU2CG-ZU5CG, ZU2EG-ZU5EG, ZU4EV, ZU5EV	2 x Samtec ADM6 4 x 60-pin	2 GB DDR4 64-bit (PS) with ECC	128 MB	4-64 GB	1 Gbit	USB2.0 OTG	Total I/O: 192, 8 MByte HyperRAM, MAC address serial EEPROM with EUI-48 node identity, security controller, crypto authentication

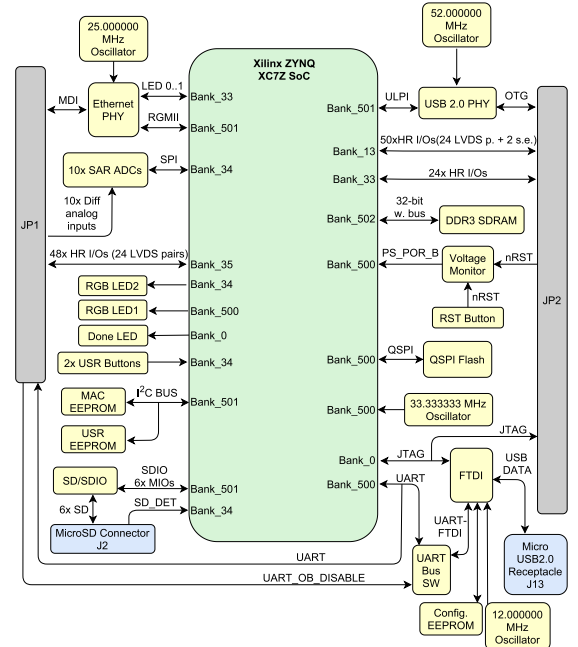
NEW TE0716 Series
Xilinx Zynq-7000, DDR3L, Flash, Ethernet, USB PHY, low power SAR ADCs



ZYNQ™



4.5 x 6.5 cm form factor



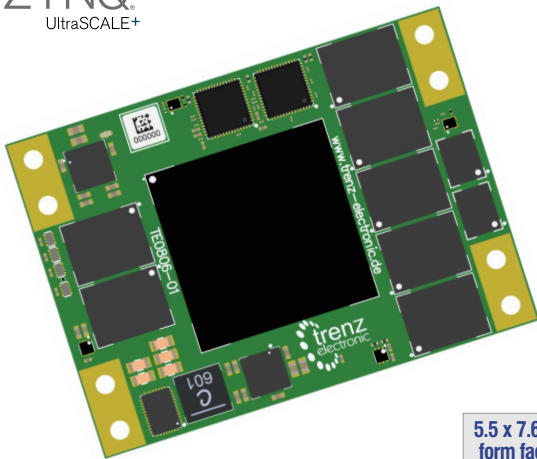
<http://trenz.org/te0716-info>

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

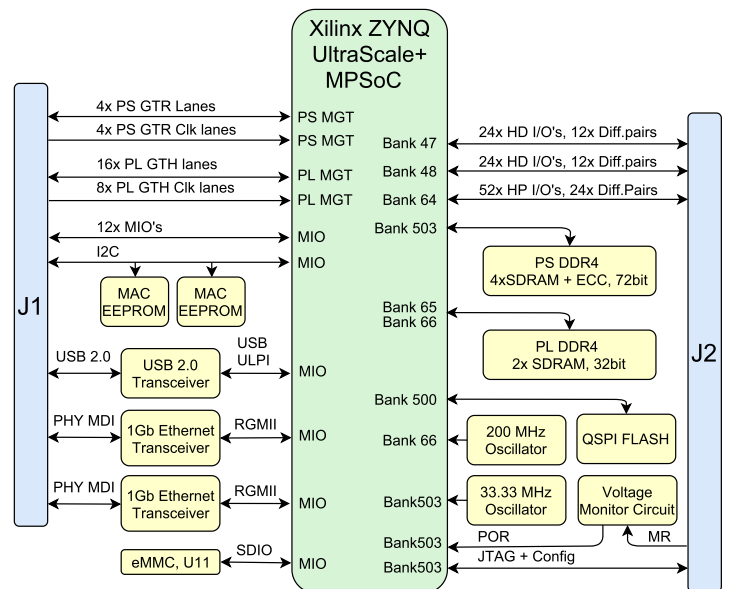
NEW TE0806 Series
Xilinx Zynq UltraScale+, DDR4 (PS + PL domain), Flash, Ethernet, USB, e.MMC



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

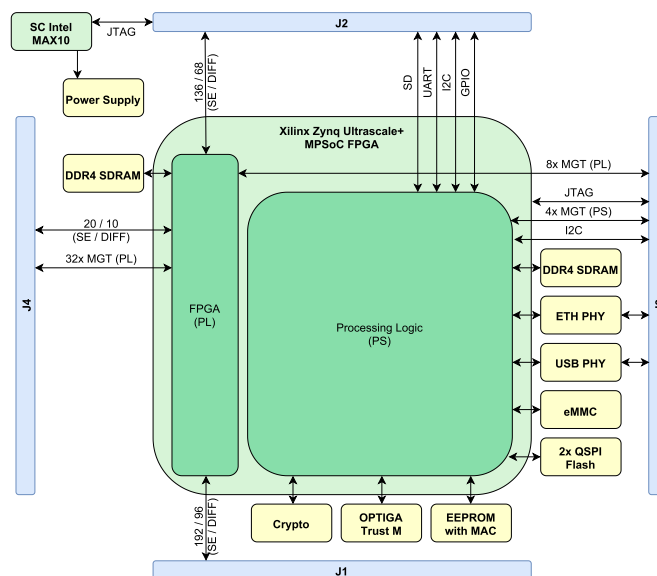
NEW TE0865 Series

Xilinx Zynq UltraScale+, SDRAM on PS and PL, 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	8 GB DDR4 64-bit (PS) with ECC, 8 GB DDR4 64-bit (PL)	256 MB	1 Gbit	370	32 x GTH, 16 x GTY, 4 x GTR	USB PHY, e.MMC, 12V single supply

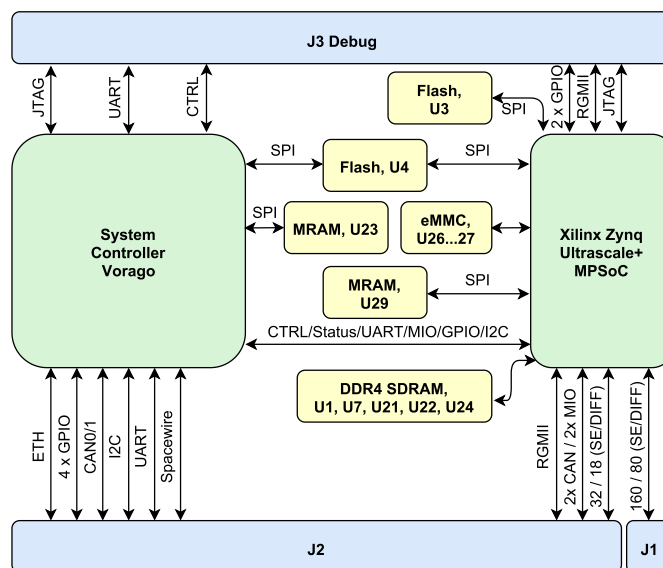
NEW TE0812 Series

Latest MPSoC chip technology in space, designed for cubesat missions



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 AP6 1 x Debug Samtec LSHM	1 GB DDR4	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

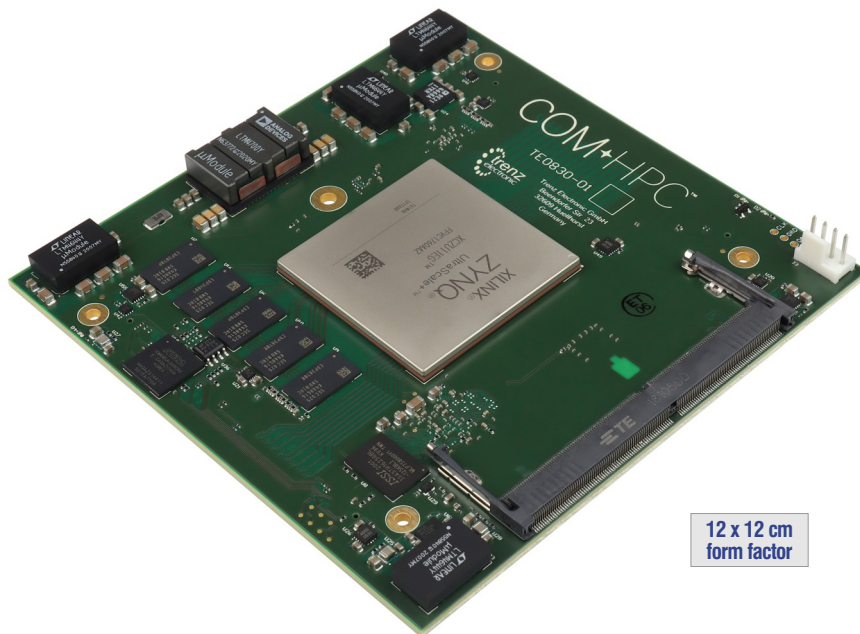


COM-HPC™ is the new released PICMG standard for high-performance Computer-on-Modules (COMs). The pinout and majority of the functionality were recently officially approved.

Higher performance, more interfaces

The need for a new specification to complement COM Express is easily explained: As a result of the digital transformation, the demand for embedded computers to provide high-speed performance is growing. To serve the new class of embedded edge servers, scalability must be limitless. With its 440 pins, COM Express does not have enough interfaces for powerful edge servers. The performance of the COM Express connector is also slowly approaching its limits: While COM Express can easily handle the 8.0 GHz clock speed and 8 Gbit/sec throughput of PCIe Gen 3, the verdict is still out regarding whether the connector meets certain technological advances such as PCIe Gen 4.

Source: picmg.org



12 x 12 cm form factor

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

Key Features

SoC/FPGA (Zynq UltraScale+)

- Package: FFVC1760, device: ZU11, ZU17, ZU19*, engine: EG, speed: -1, -2,-3*, ** temperature: I, E, (Q, M)*, **

RAM/Storage

- DDR4 (PS connected)
 - Data width: 72-bit with ECC
 - Size: def. 4 GB (up to 8 GB possible)*
- DDR4 SODIMM (PL connected)
 - 72-bit DDR4 with ECC, size: max 16 GB*
- eMMC, data width: 8-bit
 - Size: def. 8 GB (up to 64 GB possible)*
- QSPI boot Flash in dual parallel mode
 - Data width: 8-bit
 - Size: def. 128 MB (up to 512 MB possible)*
- QDDRII (optional, default not assembled)
 - Size: 18 Mbit*
- MAC address serial EEPROM with EUI-48™ node identity

On Board

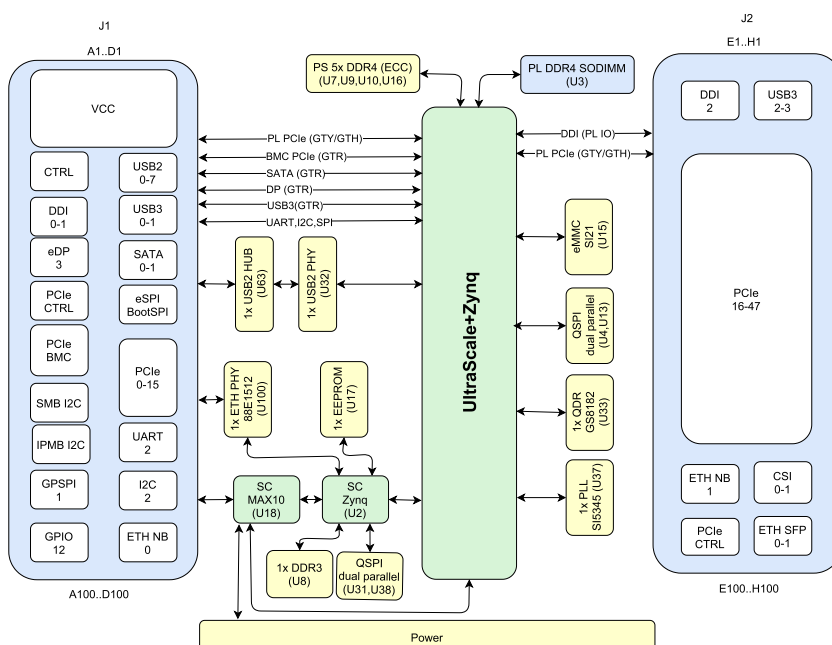
- SC CPLD to SoC
 - Intel MAX 10: 10M08
 - Xilinx Zynq-7 series: XC7Z010 with 128 MB QSPI and 512 MB DDR3 (16-bit)
- PLL SI5345
- Gigabit Ethernet PHY
- USB2.0 HUB
- USB2.0 PHY

Interface (2 x 400pin COM-HPC connectors)

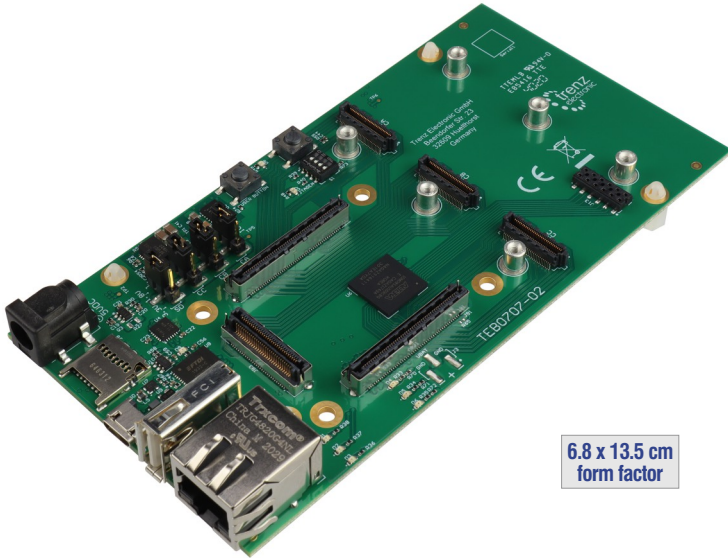
- 1 x PCIe SMB (ZynqMP PS GTR)
 - PCIe up to 48 lane (16 x GTY (32.75 Gb/s) and 32 x GTH (16.3 Gb/s))****
 - 1 x Gbit Ethernet
 - 4 x USB2.0
 - 1 x USB3.0 (ZynqMP PS GTR)
 - 1 x DDI (DP) (ZynqMP PS GTR)
 - 1 x SATA (ZynqMP PS GTR)
 - 1 x SPI
 - 1 x I2C SMB
 - 3 x I2C
 - 2 x UART (1 x ZynqMP, 1 x SC Zynq)
 - 12 x GPIO (JTAG over GPIO)
 - PL HP I/Os x 32 (15 diff) over COM-HPC CSI interface
- ### Power
- 12V main, 5V standby, 2.0-3.3V RTC

Notes

- * depends on assembly version
- ** not all combinations are possible
- *** depends on used Zynq UltraScale+ and DDR4 combination
- **** uses is limited by Zynq UltraScale+ specification

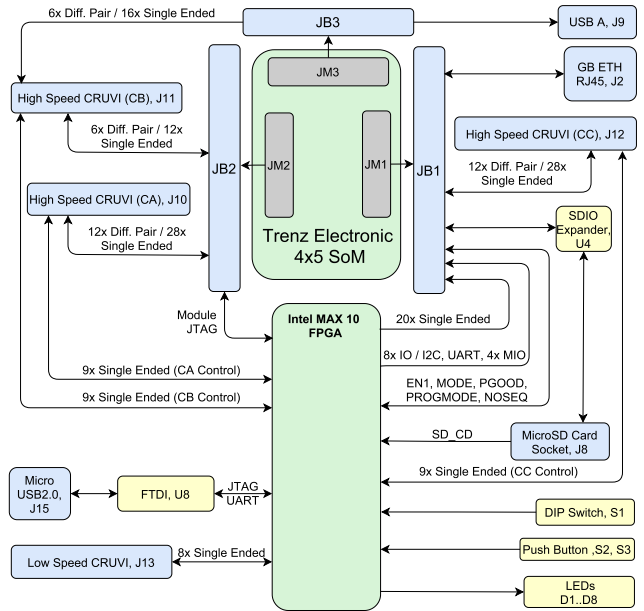


NEW TEB0707 Carrier Board
4 x 5 Module Carrier for CRUVI Extension Boards



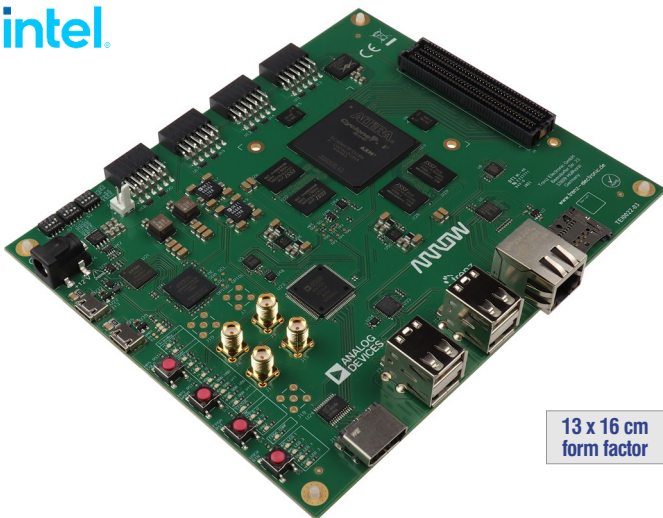
6.8 x 13.5 cm form factor

<http://trenz.org/teb0707-info>



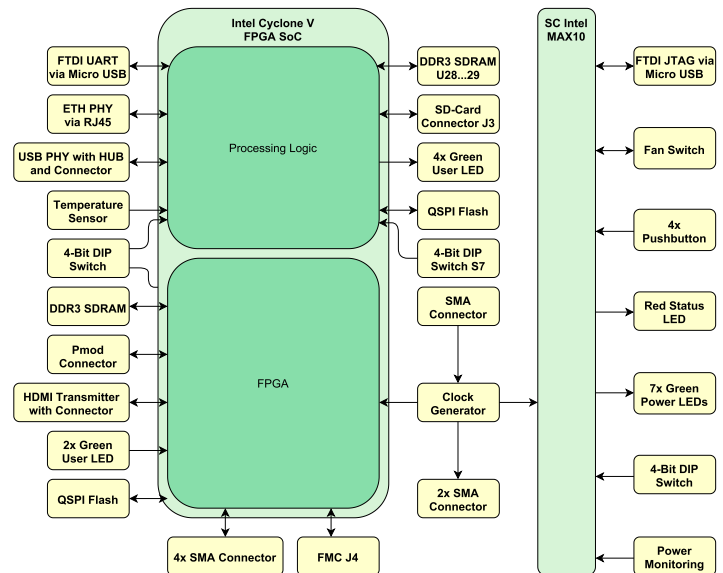
Modules	Connectors	RAM/Storage	On Board	Interface	Power
4 x 5 Trenez Electronic Modules	3 x High Speed CRUVI 1 x Low Speed CRUVI	EEPROM (FTDI configuration)	Intel Max 10 FPGA, FTDI FT2223, 6 x user LEDs (3 x green, 3 x red), 2 x status LEDs, DIP switch, push buttons	Gigabit RJ45 LAN socket, MicroSD card socket, Micro USB2.0 socket, USB A socket, 4 x jumpers	5V input power supply

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



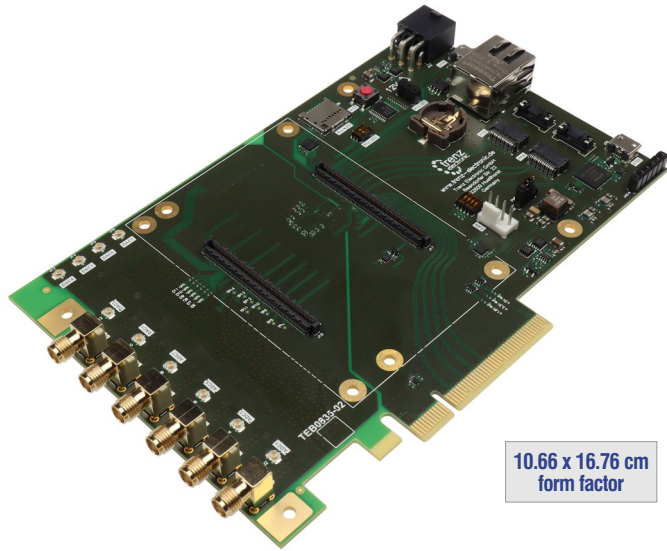
13 x 16 cm form factor

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



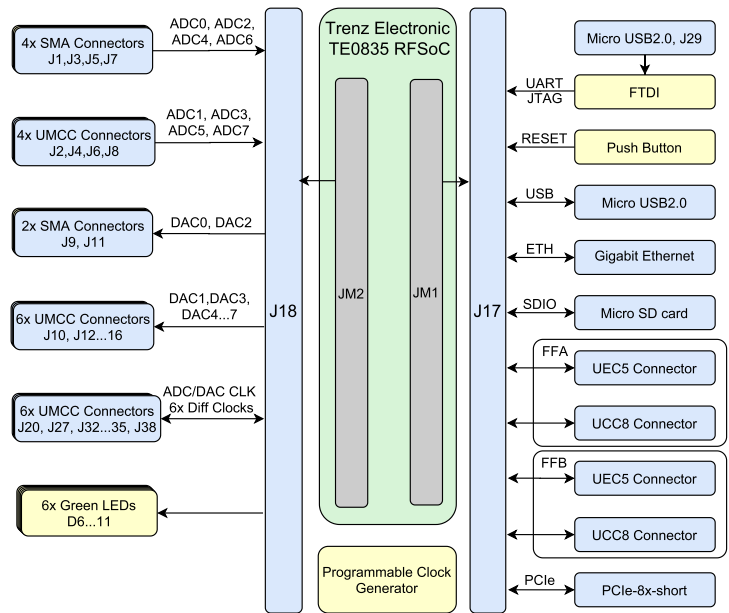
Device list	SDRAM max	Flash	On Board	Interface	Other Features
Cyclone V 5CSEMA5F31C8N	1 GB for HPS 1 GB for FPGA	32 MB SPI for HPS 32 MB SPI for FPGA	Up to 7 x SMA connector, temperature sensor, Intel MAX 10 for board management	Connectors: LPC FMC, 4 x Pmod, JTAG, UART via microUSB B (for FPGA and HPS),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

NEW **TEB0835 PCIe Baseboard**
for Trenz Electronic's TE0835 RFSoc



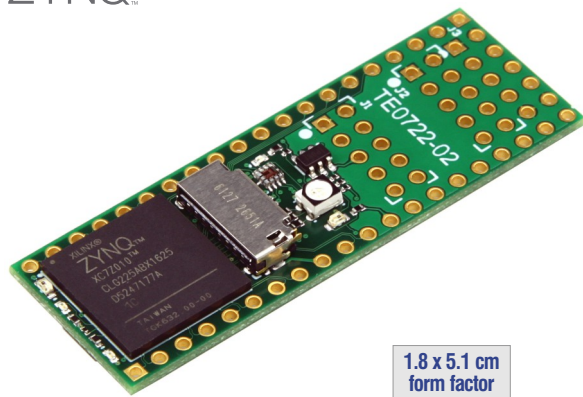
10.66 x 16.76 cm form factor

<http://trenz.org/teb0835-info>



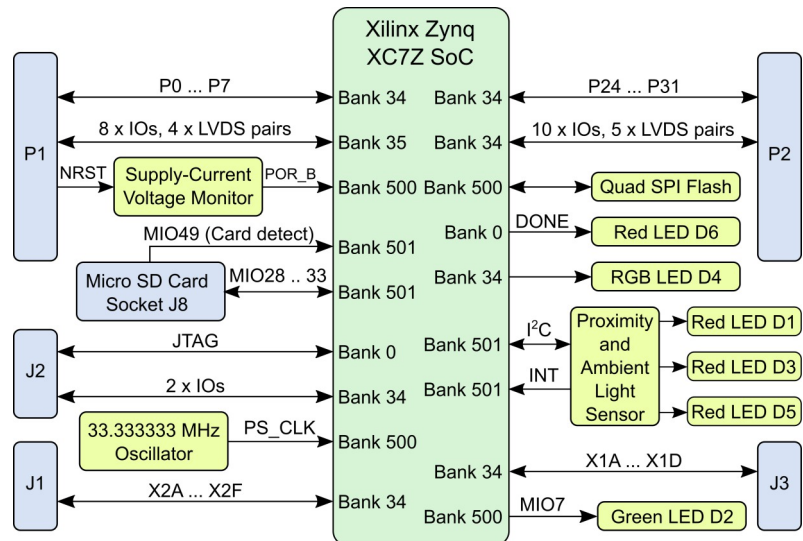
Designed for Module	Connectors	RAM/Storage	On Board	Interface
RFSoc TE0835	2 x Samtec Razor Beam SS5	4 Kb EEPROM	Programmable clock generator, I2C switch IC, 16 x RF transformation, temperature sensor, FT2232H FTDI, SDIO port expander, PCIe 6 connector	Connectors: 21 x UMCC, 6 x SMA, 2 x UEC5, 2 x UCC8, sockets: RJ45 LAN, microSD card, other: 2 x Micro USB2.0, PCIe x8 card, 12V input supply voltage

TE0722 DIPFORTy1 "Soft Propeller" Series
Xilinx Zynq-7000, Flash, fits on DIP40 Pinout, Parallax Propeller Chip compatibility



1.8 x 5.1 cm form factor

<http://trenz.org/te0722-info>



Device list	Flash	Total I/O	DIP40 form factor	Clock	Other Features
Z-7010, Z-7007S	16 MB	46 +3 Input only	2 x 20 holes for socket pins or pin-header	33.333 MHz (MEMS Oscillator)	3.3V single supply, micro SD card socket, proximity and ambient light sensor, industrial and commercial temperature range available

TE0890 "S7 Mini" Series

Xilinx Spartan-7, Fully Open-Source Module with HyperRAM

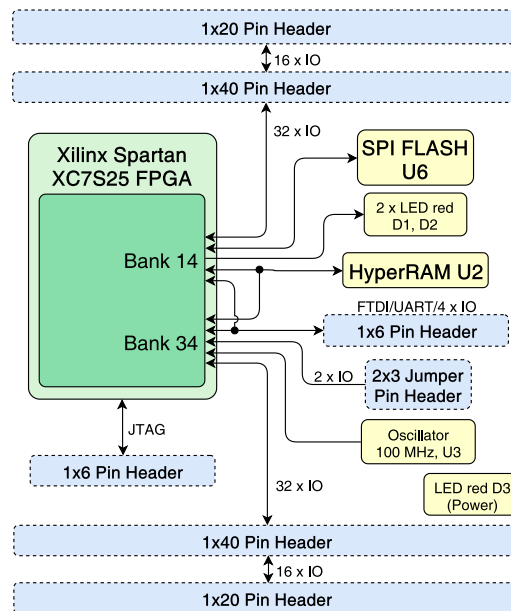


SPARTAN-7



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

Xilinx Artix-7, Flash, 4 x GTP Transceiver, Form Factor 3 x 4 cm only

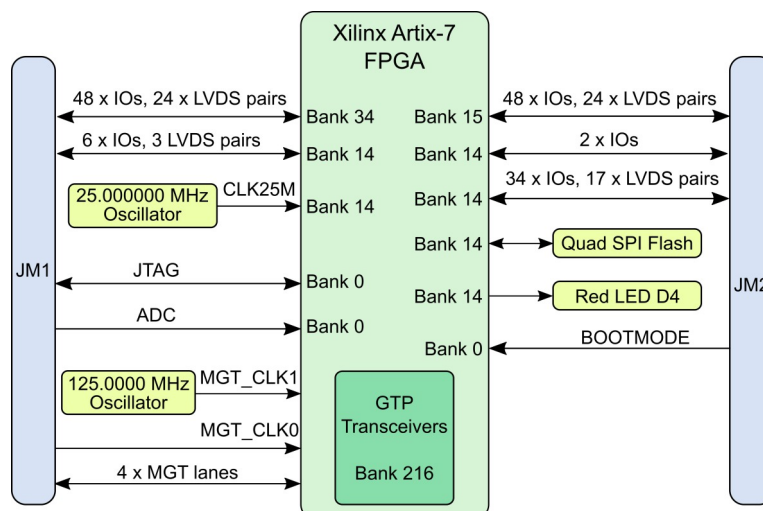


ARTIX-7



3 x 4 cm form factor

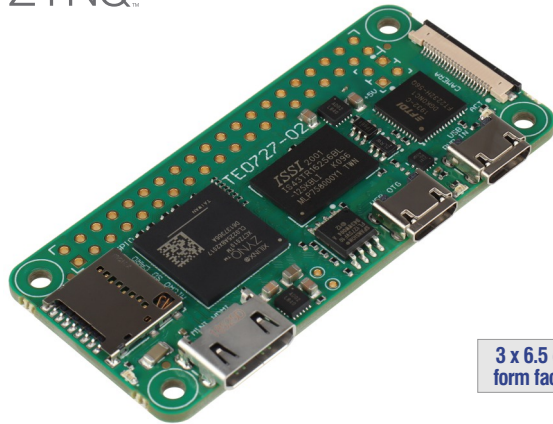
<http://trenz.org/te0714-info>



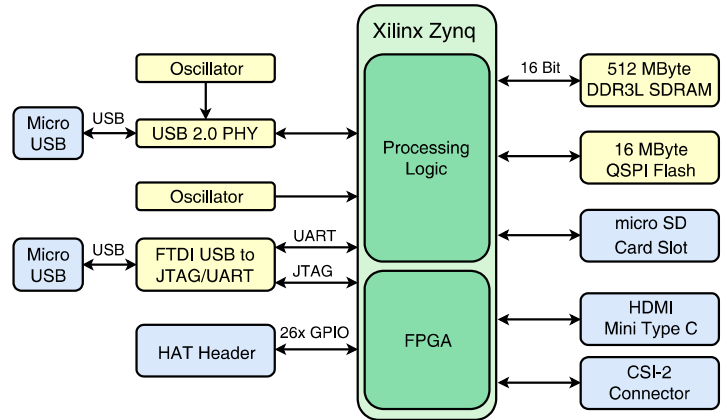
Device list	Connectors	Flash	Total I/O	Gbit Transceivers	Config. Voltage (B14)	Other Features
15T, 35T, 50T	2 x Samtec LSHM	16 MB	138 + 5 (QSPI or user I/Os)	4 x GTP	3.3V or 1.8V	Differential MEMS oscillator for MGT clocking, XADC analog Input, eFUSE bit-stream encryption (AES), single supply

TE0727 "ZynqBerryZero" Series

Xilinx Zynq-7000, Raspberry Pi Zero Form Factor, DDR3L, Flash, USB, mini HDMI



3 x 6.5 cm form factor

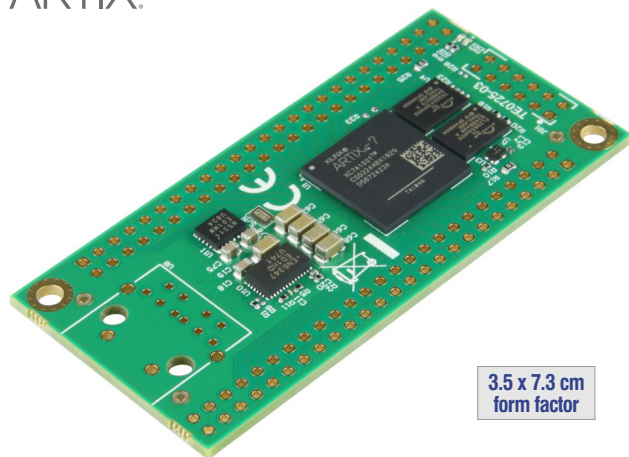


<http://trenz.org/te0727-info>

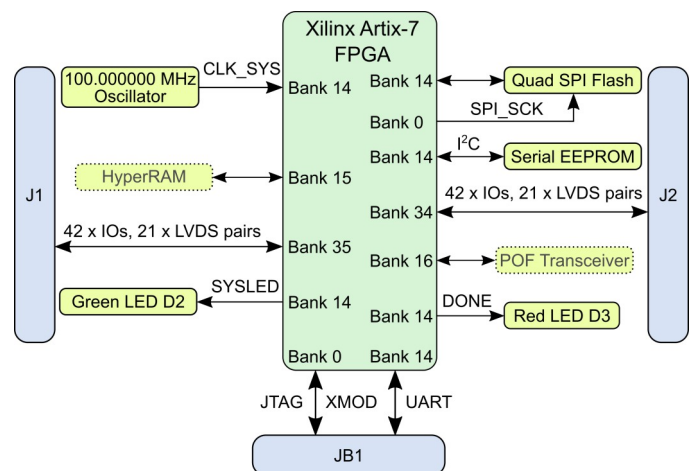
Device list	SDRAM max	Flash	HAT header	Total I/O	Other Features
Z-7010	512 MB DDR3L	16 MB	40-pin	26 GPIO	2 x microUSB2.0, microSD card slot, Mini HDMI type C, CSI-2 connector (camera)

TE0725 Series

Xilinx 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>

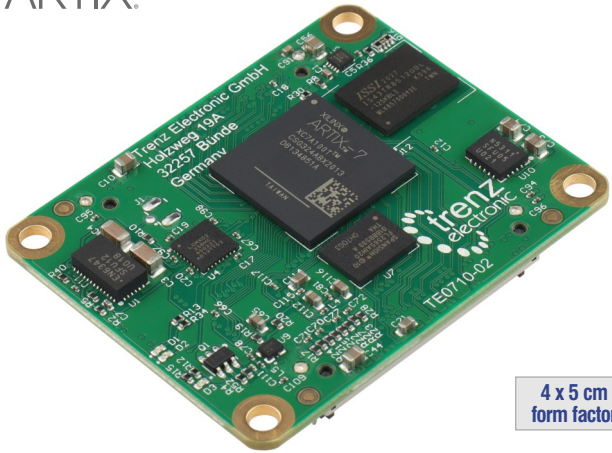
Device list	Connectors	HyperRAM max	Flash	EEPROM	Total I/O	Other Features
15T, 35T, 50T, 75T, 100T	2 x 50-pin headers	8 MB	32 MB	16 KB	87	Optional POF fiber optical adapter (125/250 Mbit/s), single supply

TE0710 Series

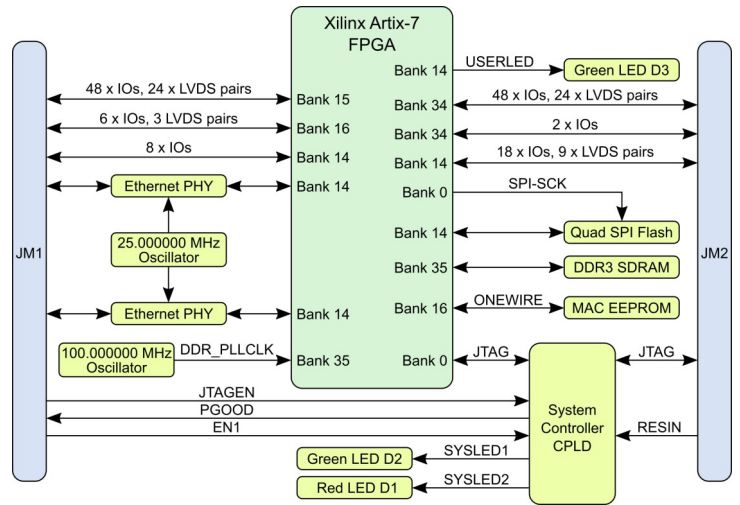
Xilinx Artix-7, DDR3, Flash, 2 x 100 Mbit Ethernet, EEPROM



ARTIX⁷



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

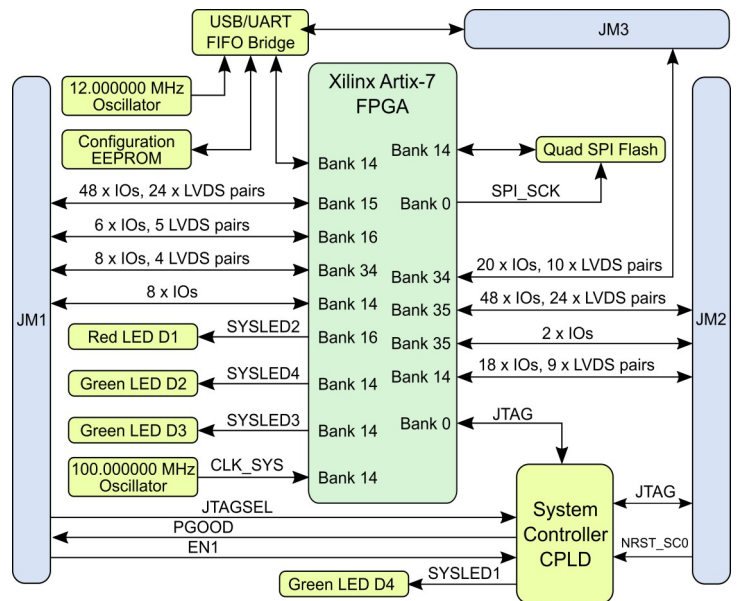
Xilinx Artix-7, Flash, USB, FTDI USB to UART/FIFO bridge, high pin count



ARTIX⁷



4 x 5 cm form factor



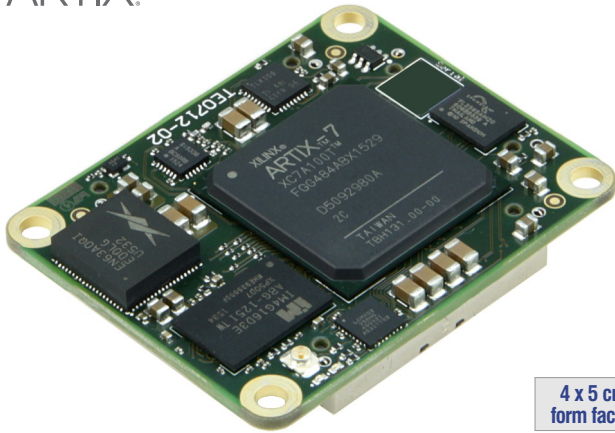
<http://trenz.org/te0711-info>

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

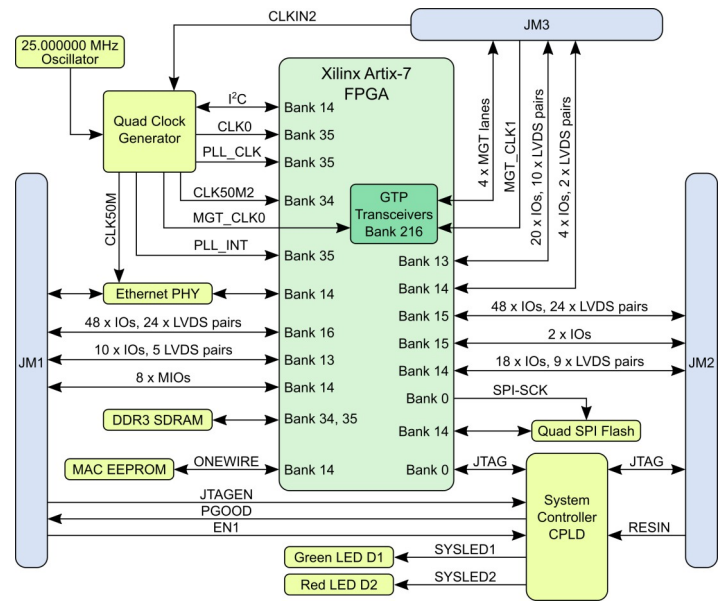
Xilinx Artix-7, DDR3, Flash, Ethernet, 4 x GTP Transceiver

ARTIX⁷



4 x 5 cm form factor

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

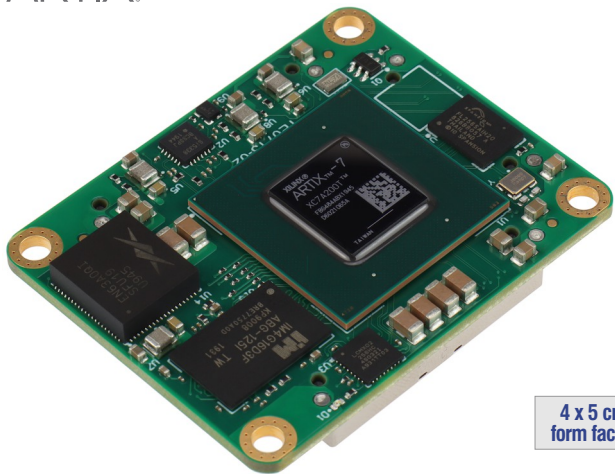


Device list	Connectors	SDRAM max	Flash	EEPROM	Ethernet PHY	Total I/O	Gbit Transceivers	Other Features
35T, 50T, 75T, 100T, 200T	3 x Samtec LSHM	1 GB DDR3	32 MB	MAC Address	100 Mbit	158	4 x GTP	Programmable clock generator, single supply

TE0713 Series

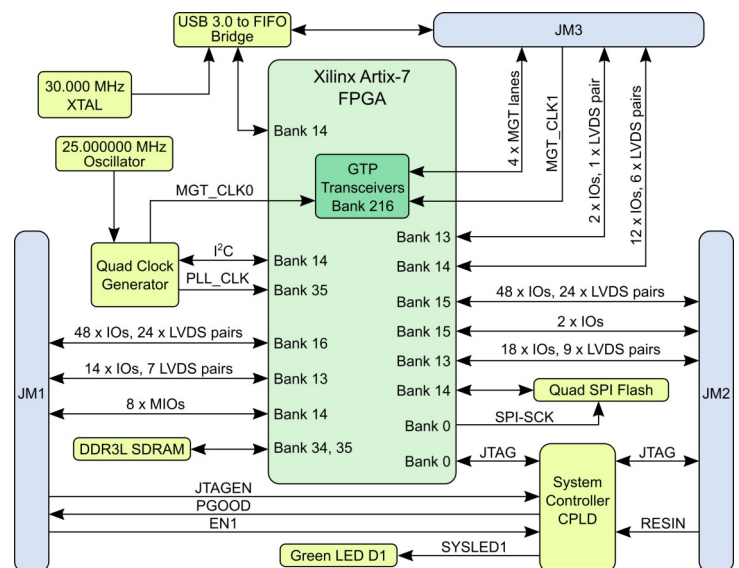
Xilinx Artix-7, DDR3L, Flash, USB3.0 to FIFO Bridge, 4 x GTP Transceiver

ARTIX⁷



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

Xilinx Zynq-7000, DDR3, Flash, Ethernet, USB, 4 High Speed Serial Transceivers

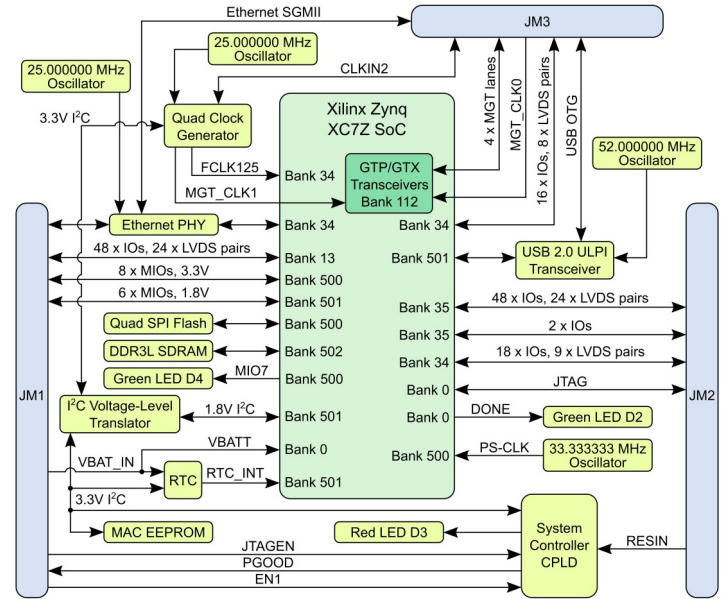


ZYNQ™



4 x 5 cm form factor

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



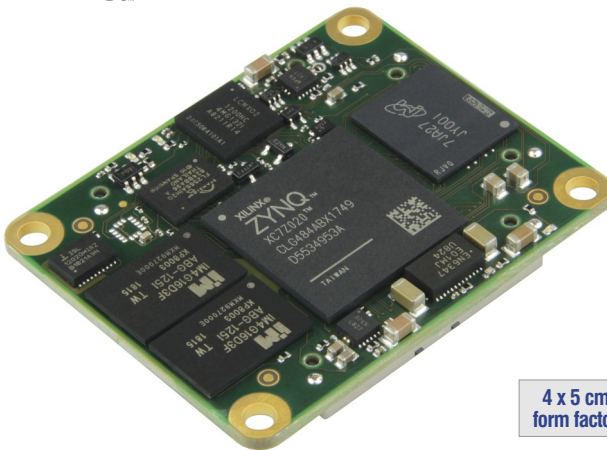
Device list	Connectors	SDRAM max	Flash	Ethernet PHY	USB PHY	Total I/O	Gbit Transceivers	Other Features
Z-7015, Z-7030, Z-7012S	3 x Samtec LSHM	1 GB DDR3	32 MB	1 Gbit	USB2.0	132 + 14 MIO	Z-7015: 4 x GTP Z-7030: 4 x GTX	Programmable clock generator, real time clock, single supply

TE0720 GigaZee Series

Xilinx Zynq-7000, DDR3, Flash, Ethernet, USB, e.MMC, Automotive Grade available

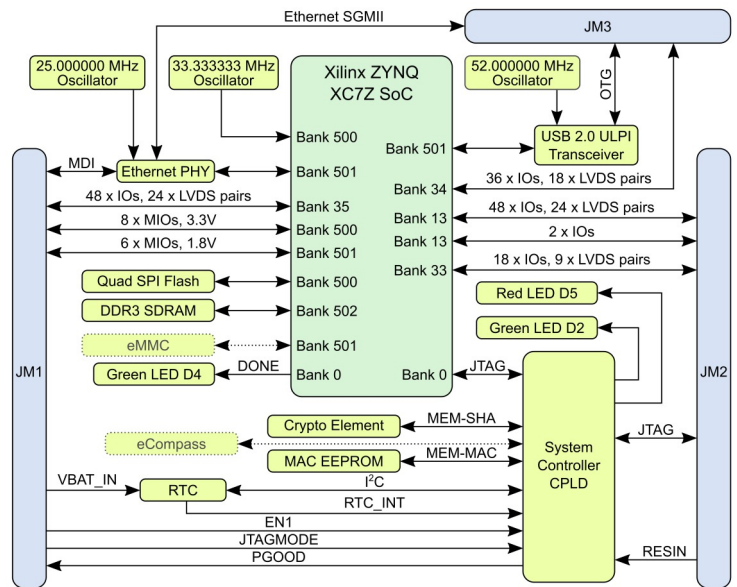


ZYNQ™



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

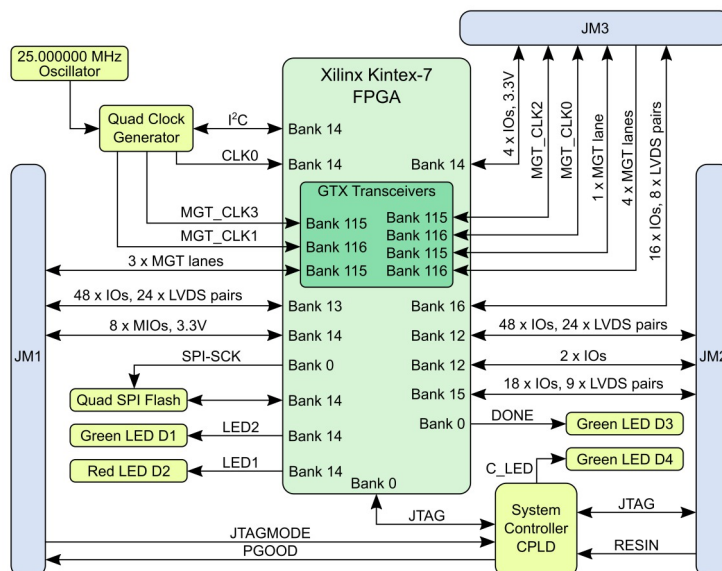
Xilinx Kintex-7, Flash, 8 High Speed Serial Transceivers, 25 MHz Oscillator

KINTEX⁷



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

TE0820 Series

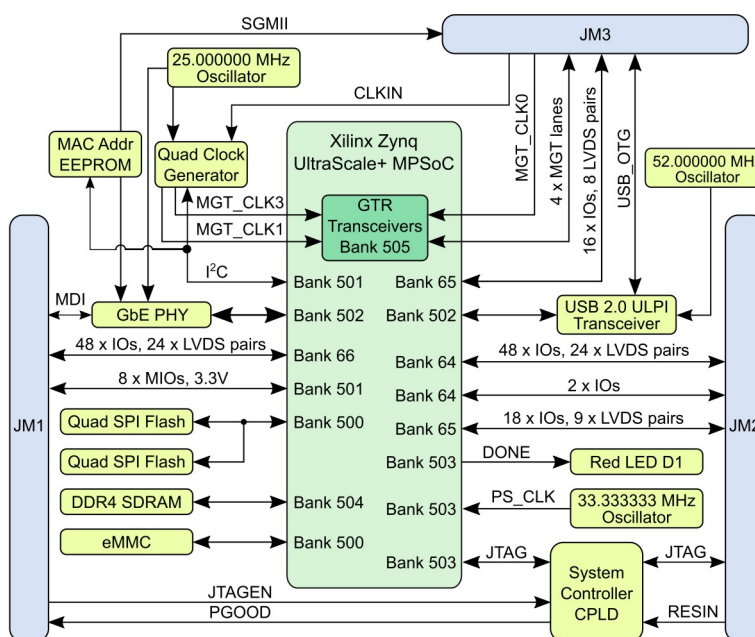
Xilinx Zynq UltraScale+, DDR4, Flash, USB, Ethernet, e.MMC

ZYNQ[®]
UltraSCALE⁺



4 x 5 cm form factor

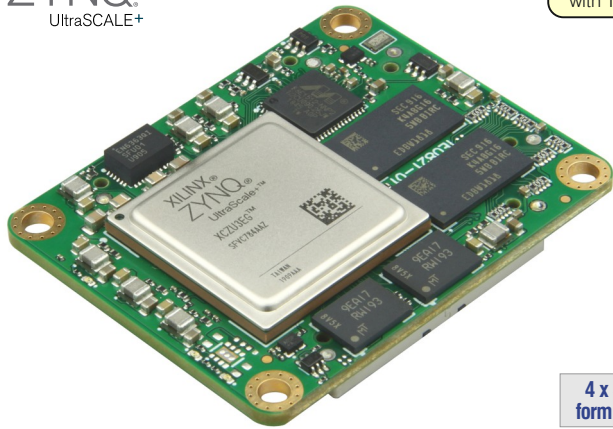
<http://trenz.org/te0820-info>



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

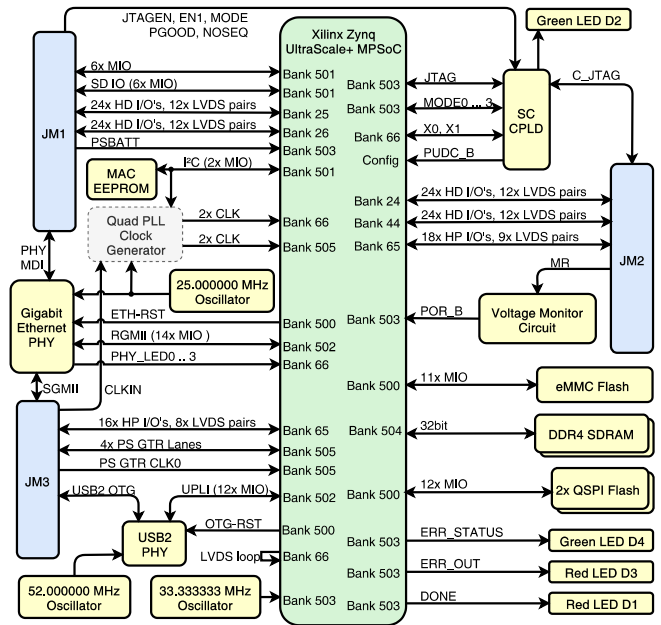
Xilinx Zynq UltraScale+, DDR4, Flash, USB, Ethernet, e.MMC, 96 High Density PL I/Os



Pin compatible with TE0820

4 x 5 cm form factor

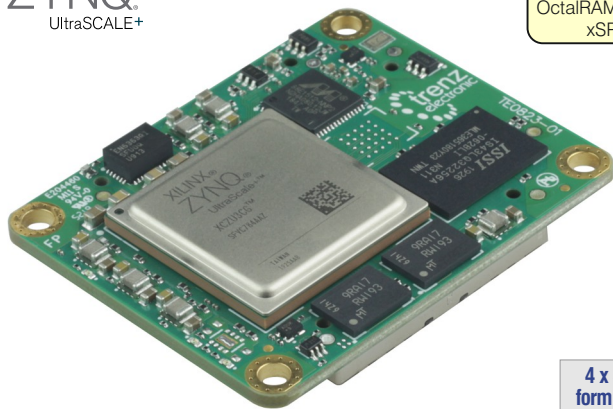
<http://trenz.org/te0821-info>



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

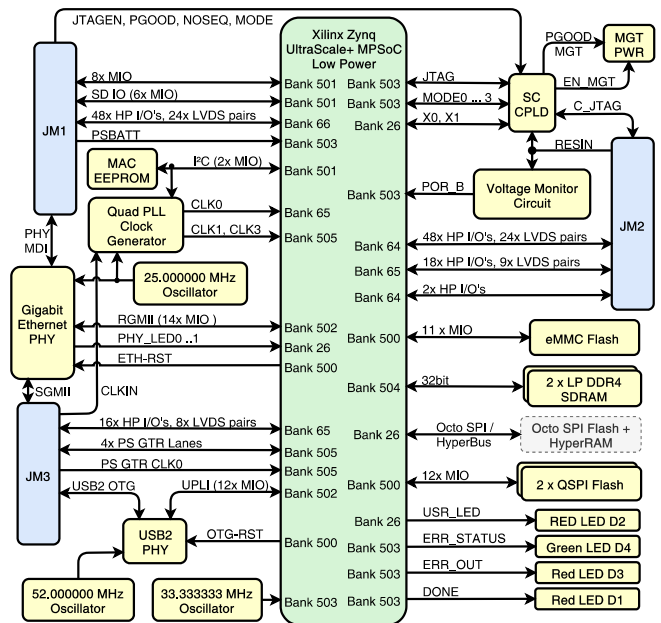
Xilinx Zynq UltraScale+ Low Power FPGA, LPDDR4, Flash, USB, Ethernet, e.MMC



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

TE0841 Series

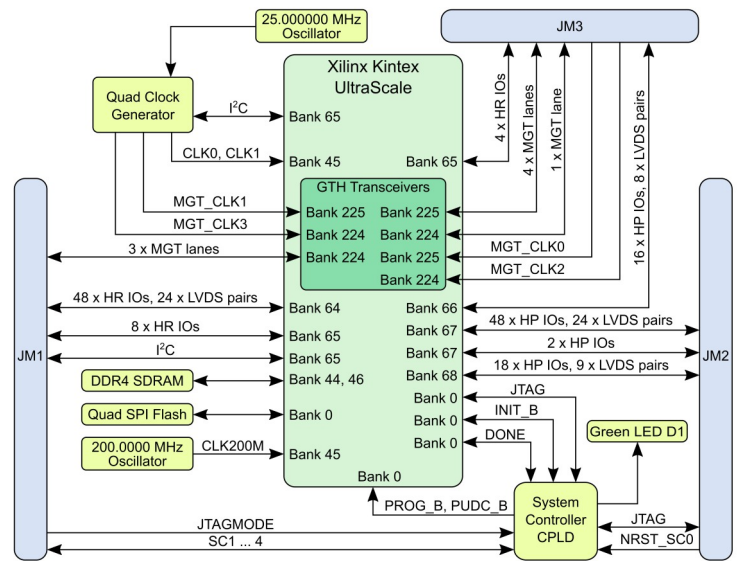
Xilinx Kintex UltraScale, DDR4, Flash, 8 x GTH Transceiver

KINTEX[®]
UltraSCALE



4 x 5 cm form factor

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

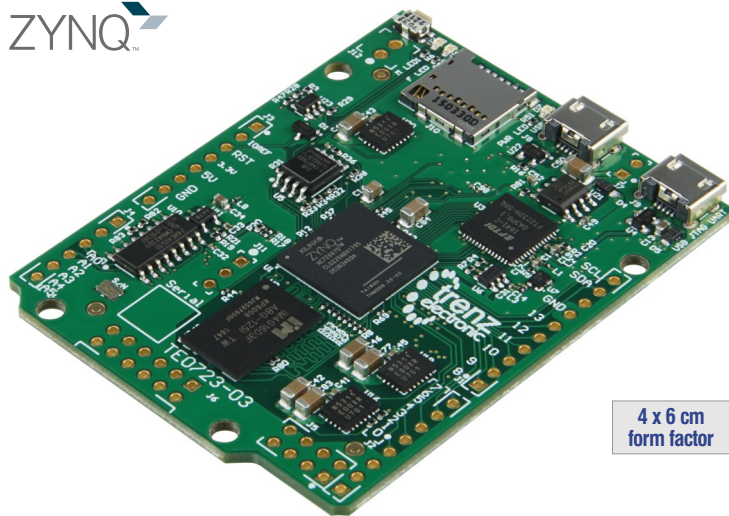


Device list	Connectors	SDRAM max	Flash	Total I/O	Gbit Transceivers	Other Features
KU035, KU040	3 x Samtec LSHM	4 GB DDR4	64 MB	60 x HR I/Os 84 x HP I/Os	8 x GTH	Programmable clock generator, single supply

TE0724 Series

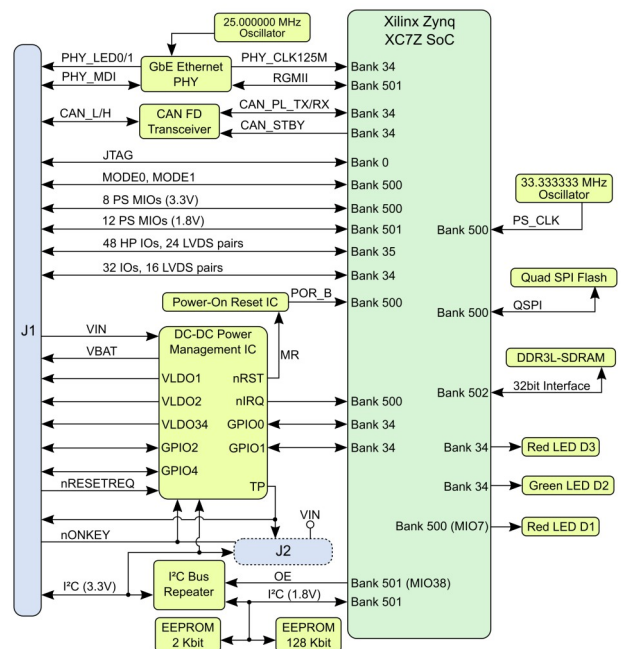
Xilinx Zynq-7000, DDR3L, Flash, Ethernet, EEPROM, CAN

ZYNQ[™]



4 x 6 cm form factor

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

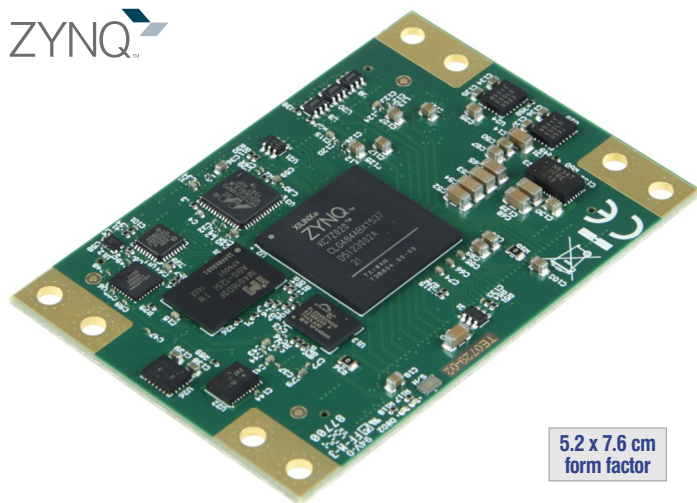


Device list	Connectors	SDRAM max	Flash max	EEPROM	Ethernet PHY	Total I/O	Other Features
Z-7010, Z-7020	1 x Samtec ST5	1 GB DDR3L	64 MB	MAC Address	1 Gbit	PL: 80 PS: 20	CAN, single supply

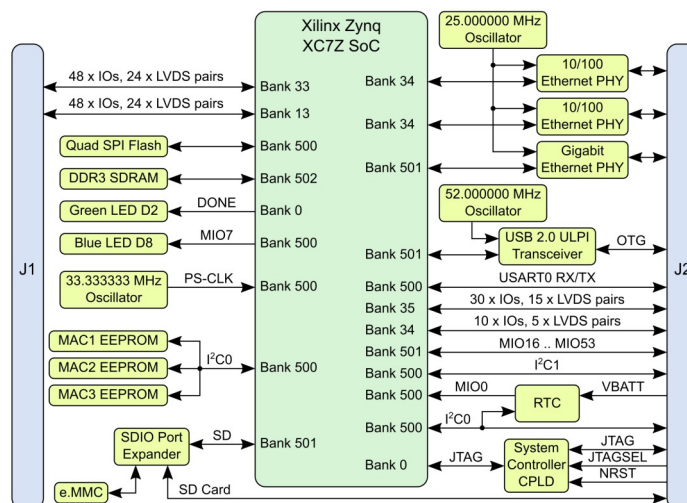
TE0729 Series

Xilinx Zynq-7000, DDR3, Flash, 3 x Ethernet, 3 x EEPROM, USB, e.MMC

ZYNQ™



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

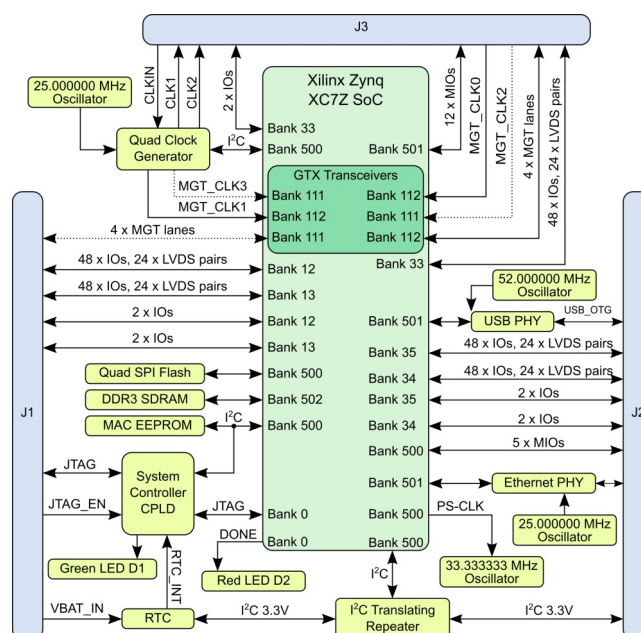
TE0745 Series

Xilinx Zynq-7000, DDR3L, Flash, USB, Ethernet, 8 x GTX

ZYNQ™



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

TE0803 "UltraSoM+" Series

Xilinx Zynq UltraScale+, DDR4, Flash, 8 High Speed Serial Transceivers

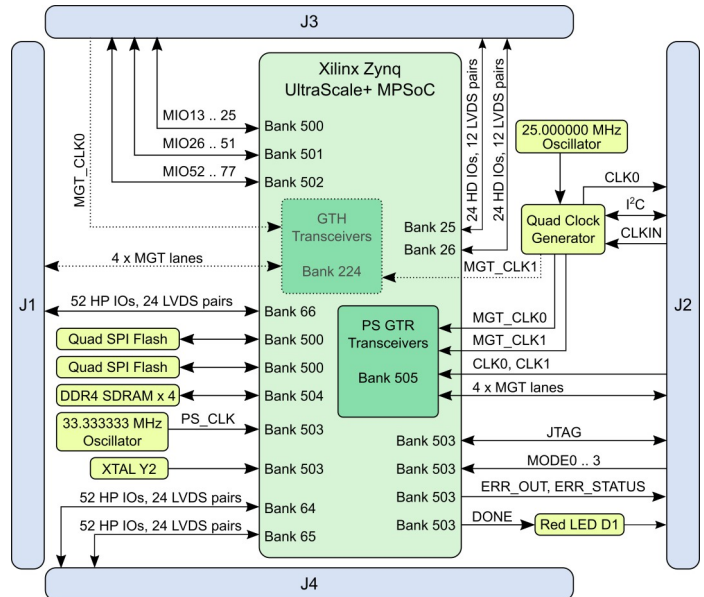


ZYNQ[®]
UltraSCALE⁺



5.2 x 7.6 cm
form factor

<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	8 GB DDR4	128	156 + 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 "UltraSoM+" Series

Xilinx Zynq UltraScale+, DDR4, Flash, 20 High Speed Serial Transceivers

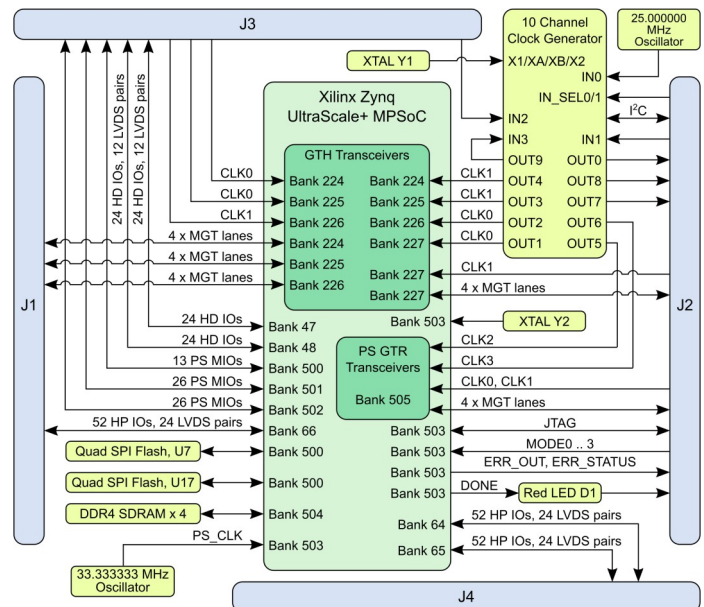


ZYNQ[®]
UltraSCALE⁺



5.2 x 7.6 cm
form factor

<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	8 GB DDR4	128 MB	204 + 65 MIO	4 x GTR, 16 x GTH	GPU and VCU, programmable clock generator, single supply

TE0808 "UltraSoM+" Series

Xilinx Zynq UltraScale+, DDR4, Flash, 20 High Speed Serial Transceivers

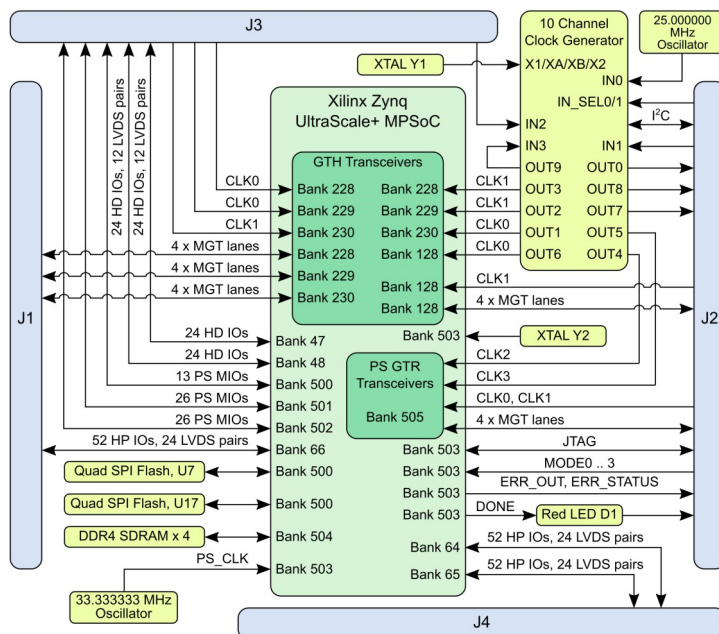


ZYNQ[™]
UltraSCALE⁺



5.2 x 7.6 cm
form factor

<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	8 GB DDR4	128 MB	204 + 65 MIO	4 x GTR, 16 x GTH	GPU/VCU depending on device, programmable clock generator, single supply

TE0728 Series

Xilinx Zynq-7000, DDR3, Flash, 2 x Ethernet, CAN, Automotive

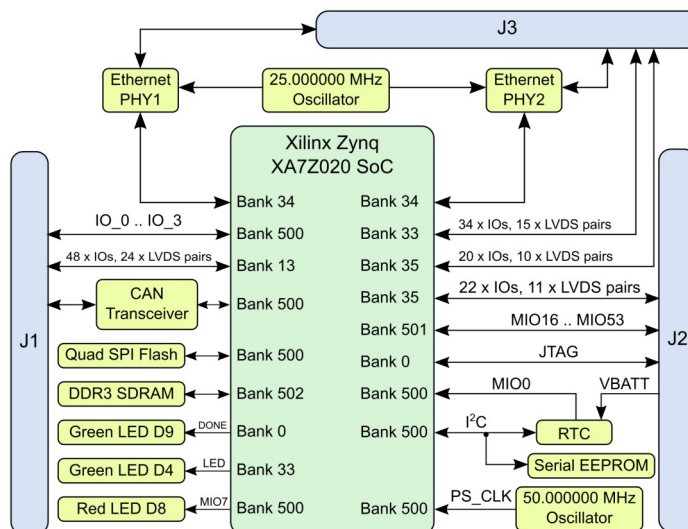


ZYNQ[™]



6 x 6 cm
form factor

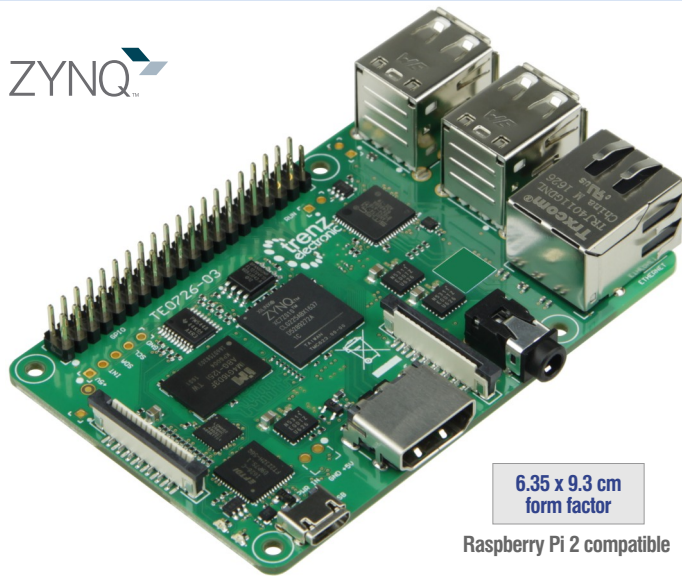
<http://trenz.org/te0728-info>



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

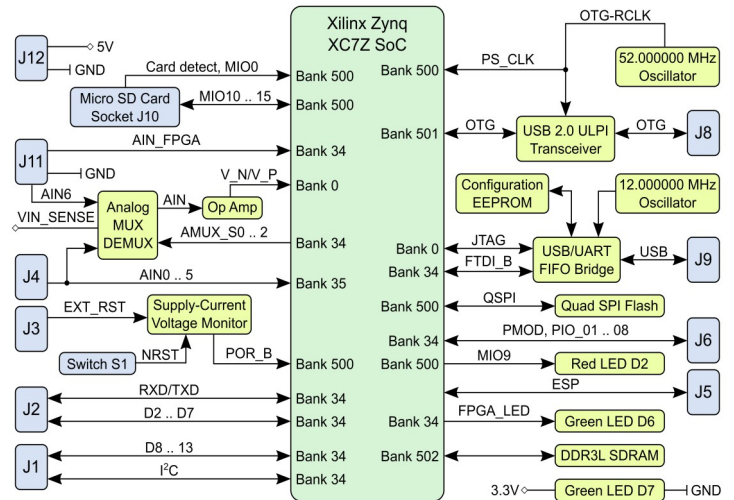
TE0726 "ZynqBerry" Series

Xilinx 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>

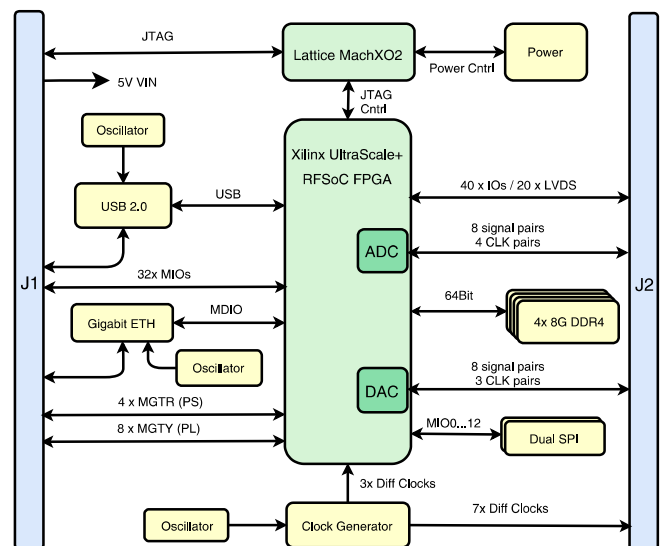
Device list	Connectors	SDRAM max	Flash	Ethernet PHY	USB PHY	Total I/O	Other Features
Z-7010, Z-7007S	40-pin "HAT" headers	512 MB DDR3L	16 MB	100 Mbit	4 x USB2.0 Host	26	DSi display connector, CSI-2 camera connector, micro SD card slot, 3.5 mm audio plug, HDMI type A

TE0835 RFSoc Series

Xilinx Zynq UltraScale+ RFSoc, DDR4, Flash, Ethernet, USB, EEPROM



6.5 x 9 cm form factor

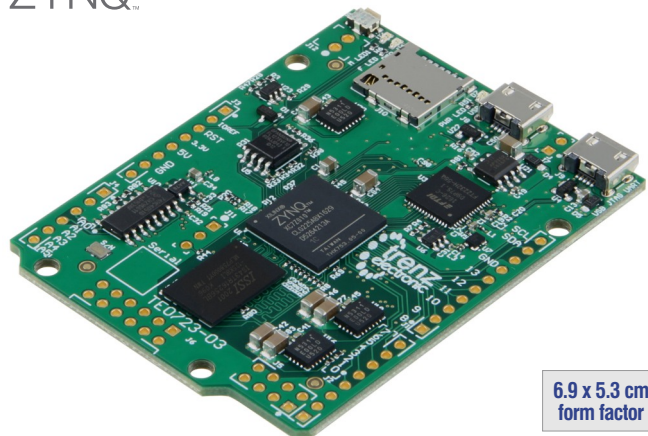


<http://trenz.org/te0835-info>

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

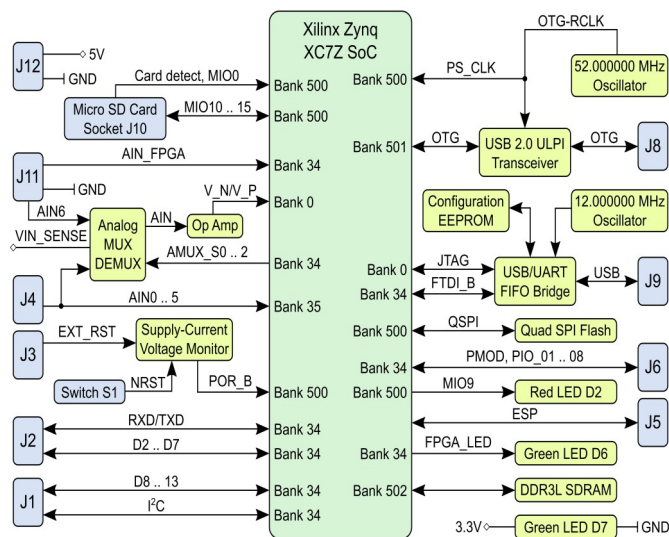
TE0723 "ArduZynq" Series

Xilinx Zynq-7000, Form Factor like Arduino Shield, DDR3L, Flash, USB OTG



6.9 x 5.3 cm form factor

Arduino Shield compatible

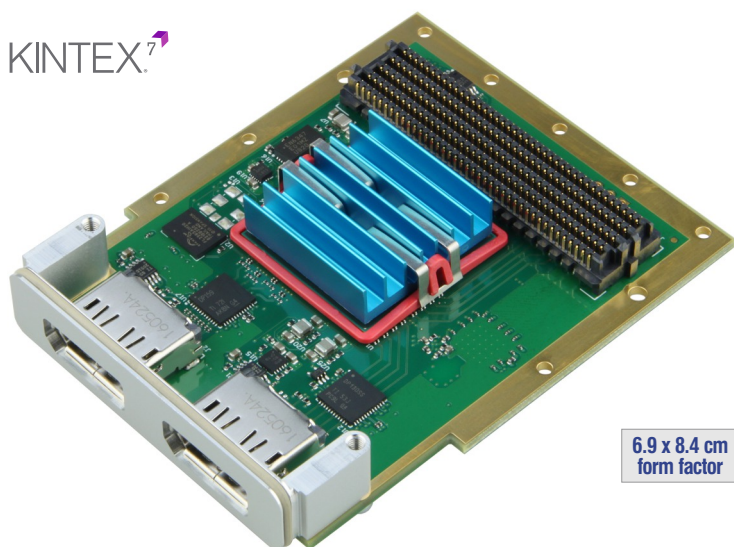


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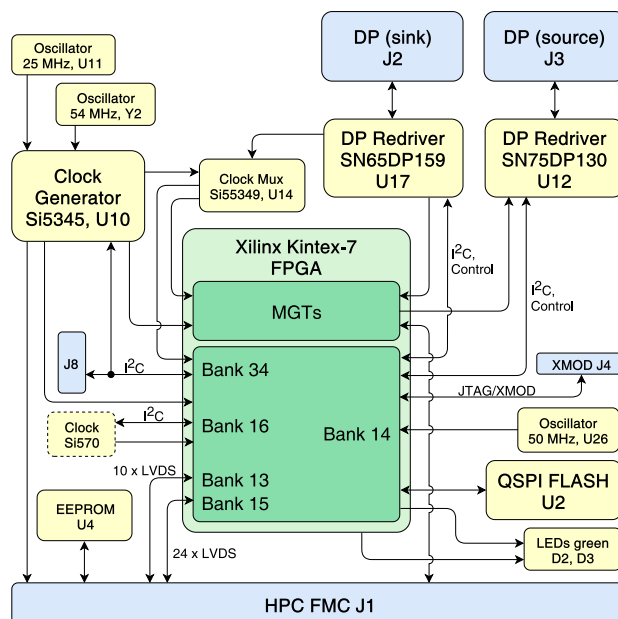
Device list	Connectors	SDRAM max	Flash	USB PHY	Total I/O	Other Features
Z-7010, Z-7007S	Arduino Pmod headers	512 MB DDR3L	16 MB	Micro USB OTG, micro USB, FT2232, JTAG/UART/FIFO	30	Micro SD, on-board USB JTAG and UART

TEF0007 Series

FMC Card with DisplayPort input and output

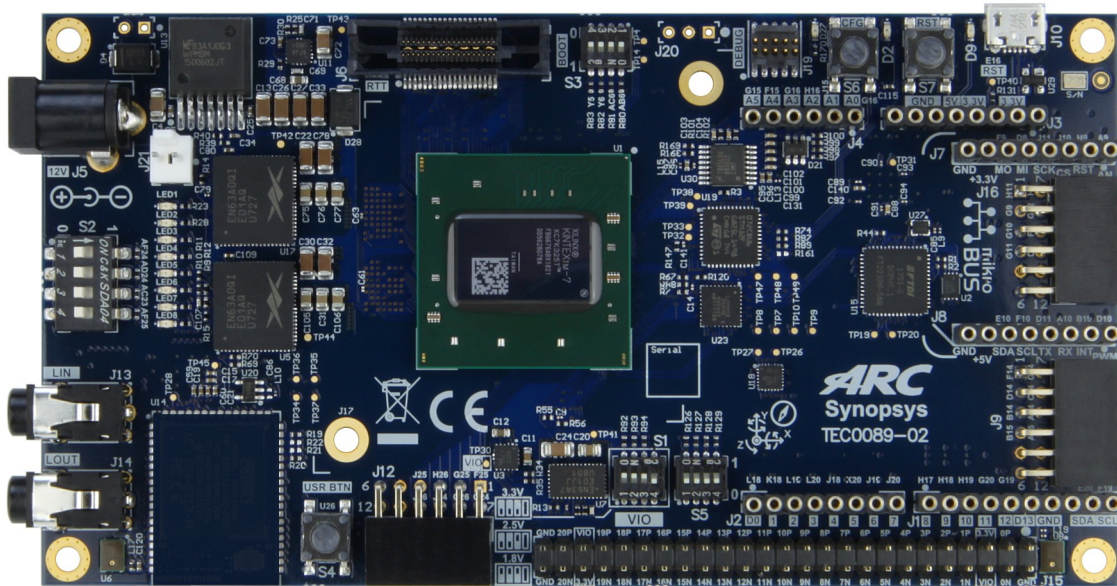


6.9 x 8.4 cm form factor



<http://trenz.org/tef0007-info>

Device list	Connector	Flash	Total I/O	Gbit Transceiver(s)	Other Features
Kintex-7 160T	HPC FMC	32 MB	34 differential (68 single ended)	4 x GTP	Data rates up to 5.4 Gbps, sink + source DP connector, 50 MHz oscillator, configurable PLL



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, 16M B 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 2mm
- 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)
- 100MHz 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-electronic.de/DesignWare_ARC_EM

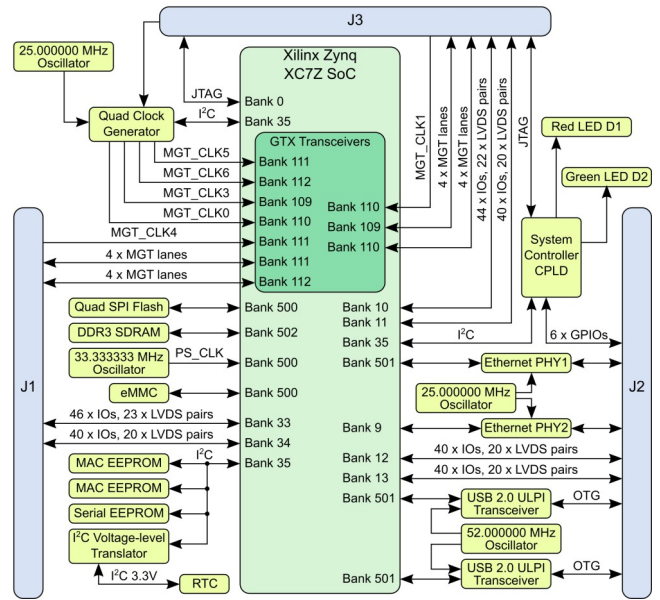
TE0782 Series

Xilinx 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

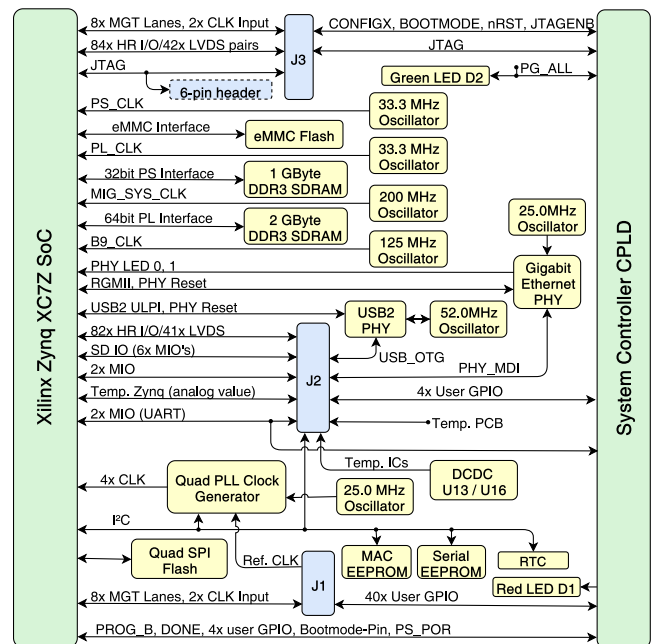
TE0783 Series

Xilinx 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 connected to PS plus 2 GB DDR3 64-bit connected to 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

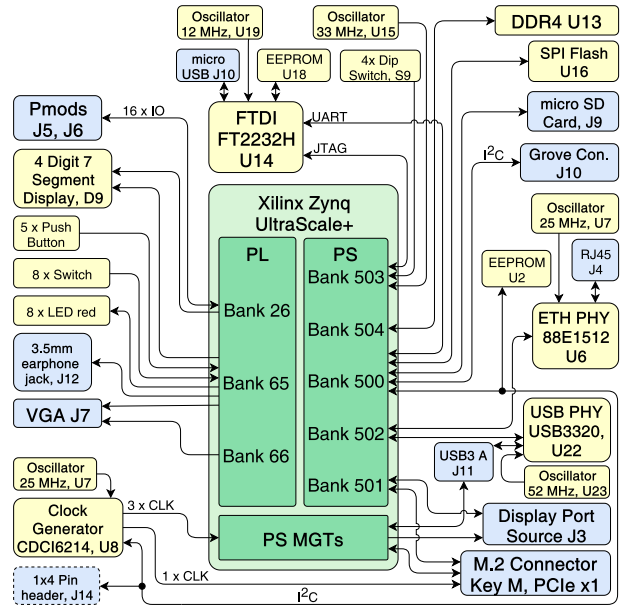
TE0802 MPSoC Development Board

Xilinx Zynq UltraScale+, LPDDR4, Flash, Ethernet, USB, Audio, Display



10 x 10 cm form factor

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



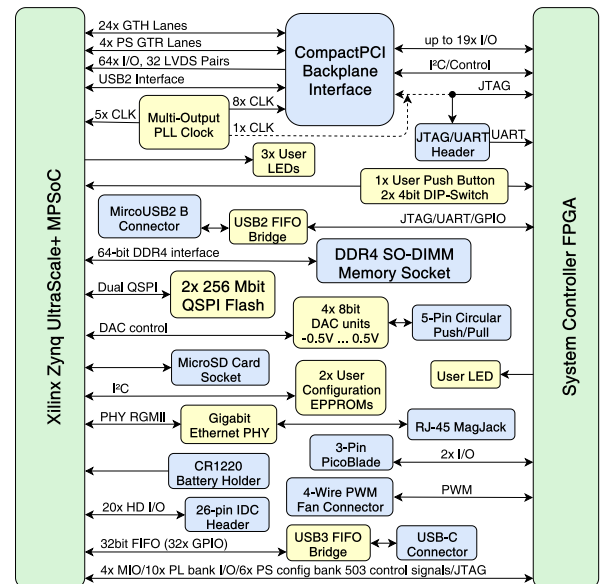
Device list	SDRAM max	Flash	Ethernet RJ45	USB	User I/O	Audio	Other Features
ZU2CG	2 GB LPDDR4	32 MB	1 Gbit	USB3.0 Host (type A connector)	2 Pmod connectors	3.5 mm jack (PWM output)	EEPROM, USB JTAG/UART microUSB, microSD card, M2 PCIe SSD support, display, power: 5V plug

TEC0850 CompactPCI Serial Card

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



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

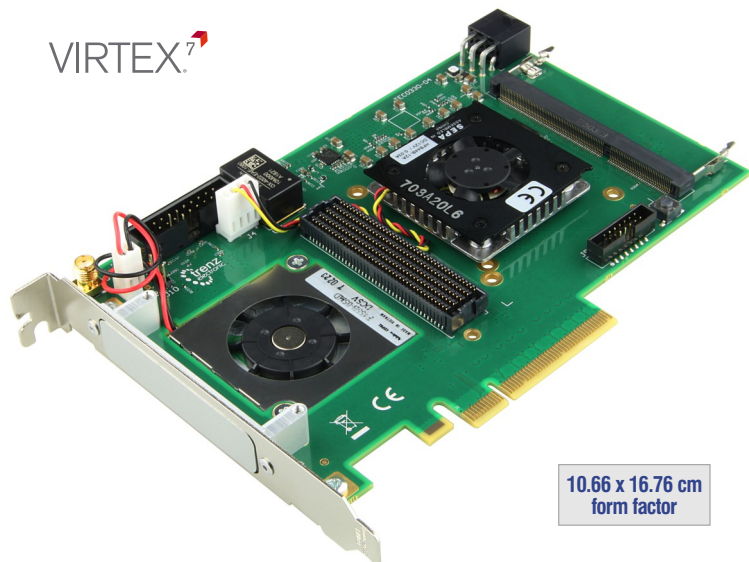


Device list	Form Factor	DDR4 SODIMM	Flash max	USB	Total I/O	Ethernet	Gbit Transceivers	Other Features
ZU15EG, 1156 Pin Packages	3U	8 GB (32 GB max)	512 MB	USB3.0	32 x differential pairs	1 Gbit	24 on PL side 4 on PS side	JTAG/UART via MicroUSB, 2 x EEPROM, real time clock, Zynq MPSoC cooling fan connector

TEC0330 PCIe FMC Carrier

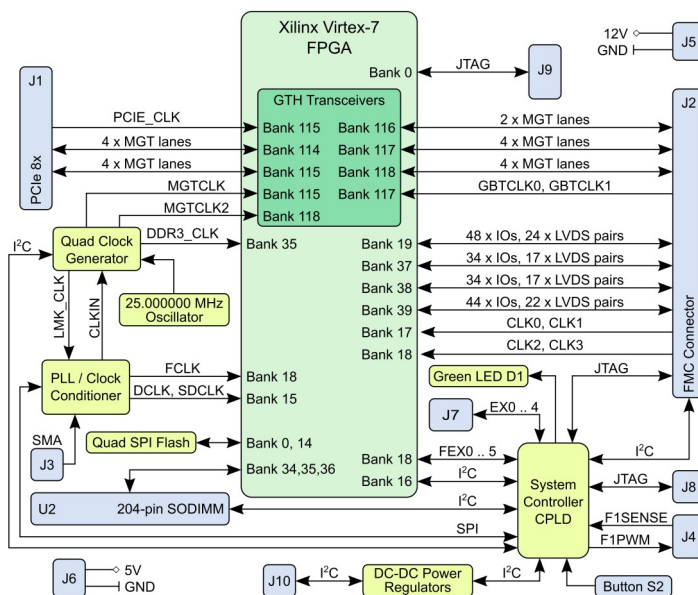
Xilinx Virtex-7, FMC HPC, 8 lane PCIe GEN2 card, DDR3 SODIMM Socket

VIRTEX⁷



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

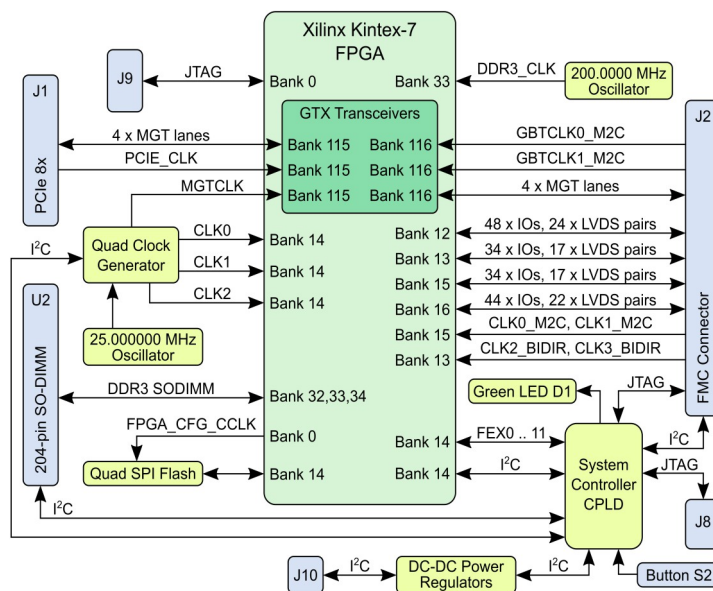
Xilinx Kintex-7, FMC HPC, 4 lane PCIe GEN2 card, DDR3 SO-DIMM Socket

KINTEX⁷



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

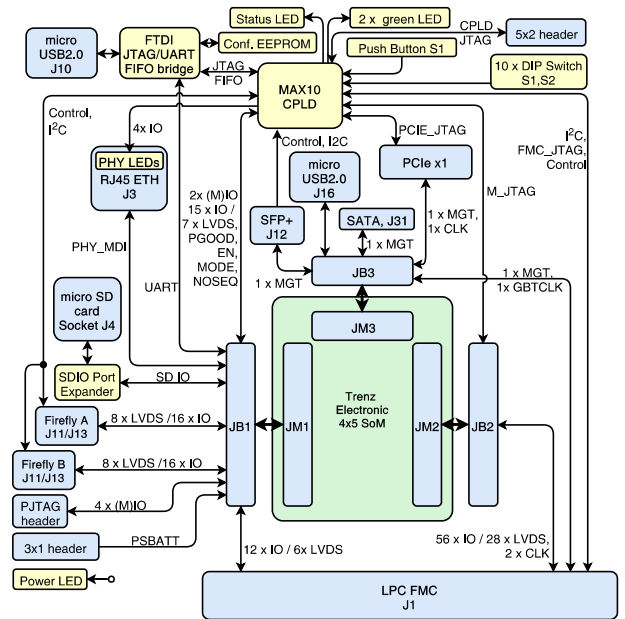
TEF1002 PCIe FMC Carrier

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



10.66 x 16.76 cm form factor

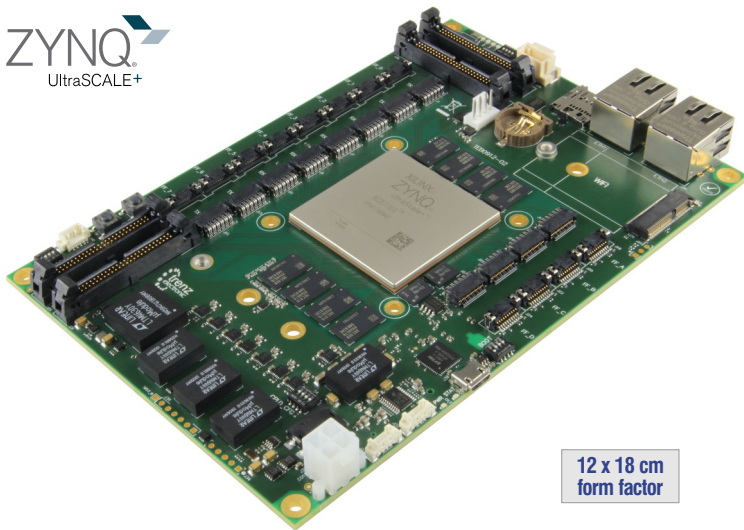
<http://trenz.org/tef1002-info>



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

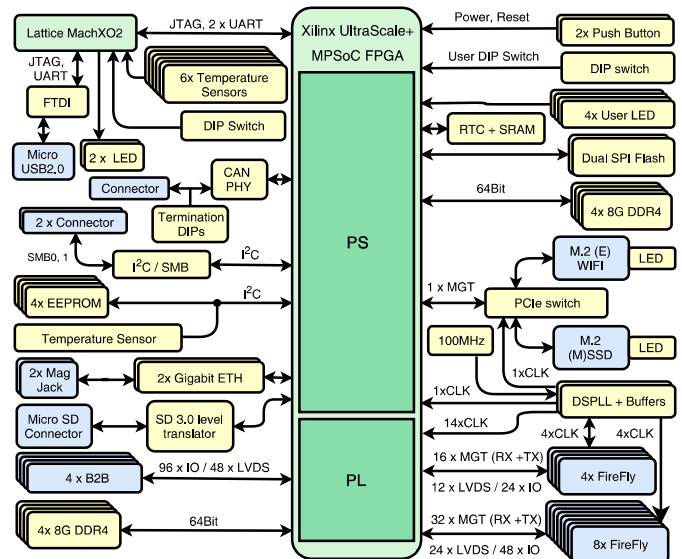
TEB0912 Series

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



12 x 18 cm form factor

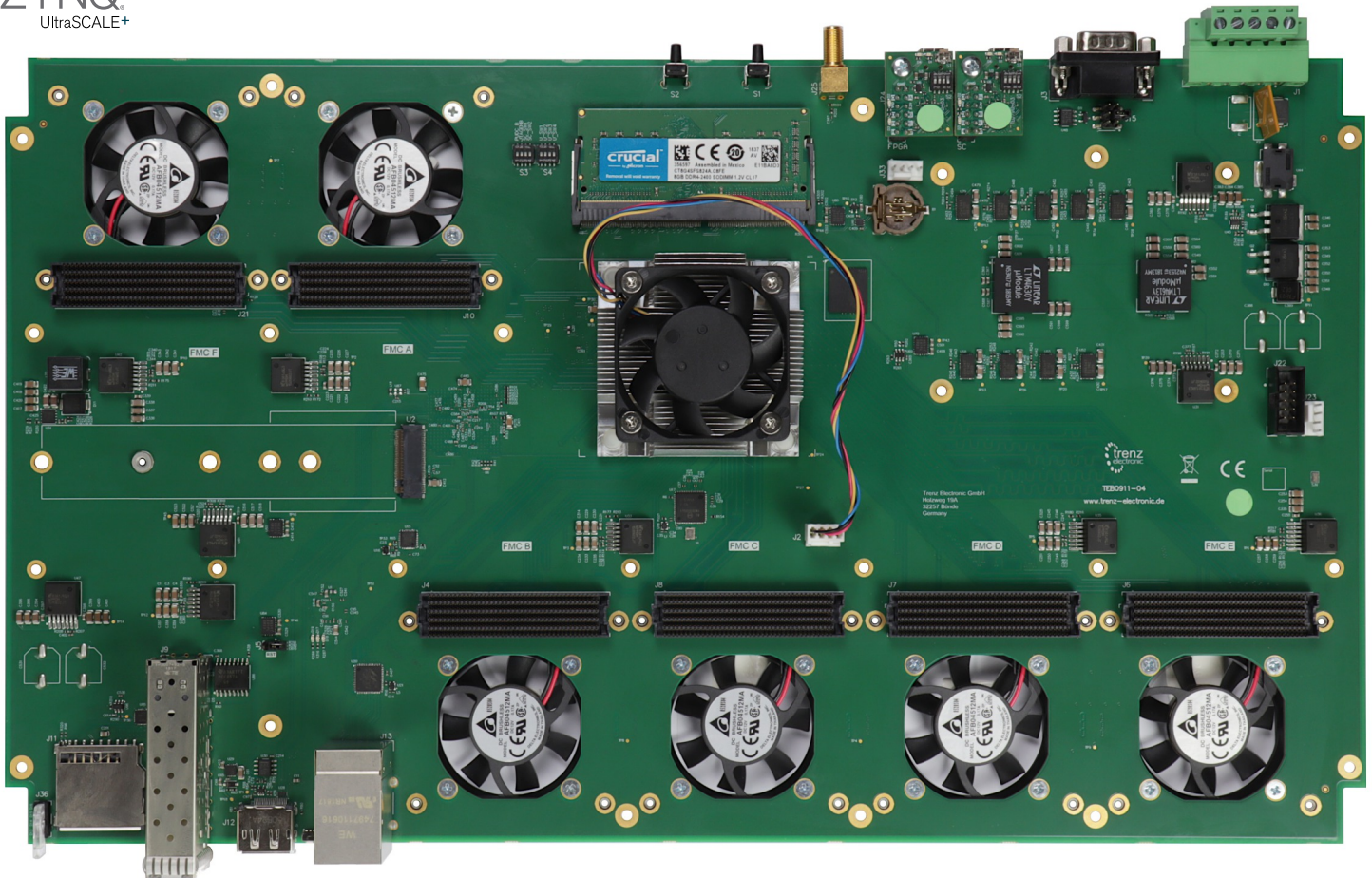
<http://trenz.org/teb0912-info>



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

Xilinx Zynq UltraScale+, 6 FMC Slots, Gigabit Ethernet



Key Features

The TEB0911 UltraRack+ board is integrating a Xilinx 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.

- Xilinx 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

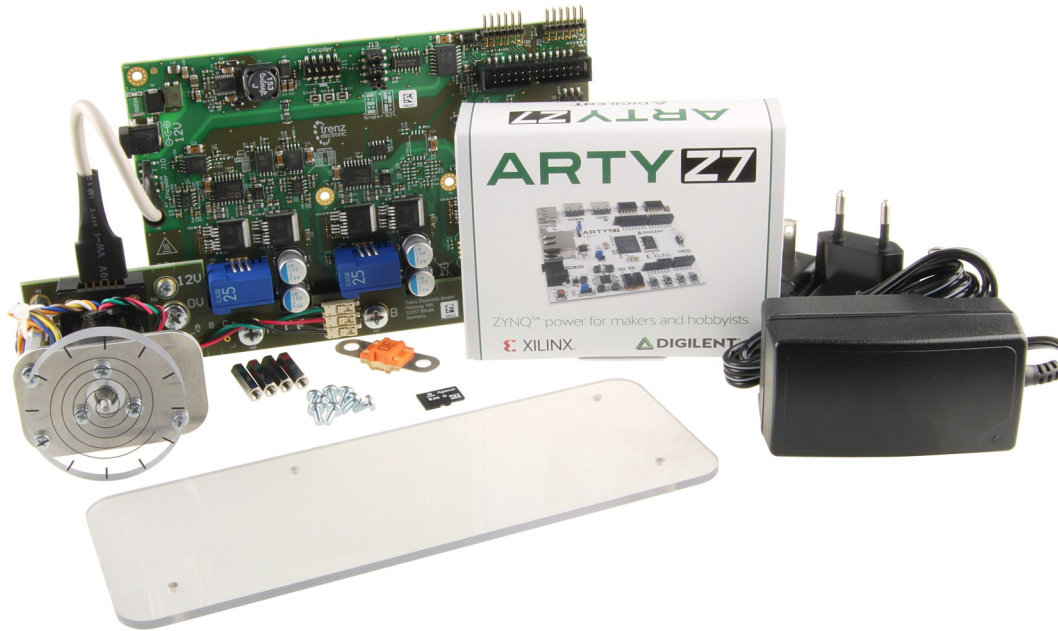
- 4 x FMC
 - 4 GTH per FMC
 - 68 ZynqMP PL IO per FMC
- DisplayPort (2-lanes)
- RJ45 ETH + dual USB3 combo
- Dual Stack SFP+
- SD (bootable)
- Status LEDs

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.



EDDP Motor Control Kit

The EDDP Kit enables rapid, simplified development and evaluation of three-phase motor control applications by providing software, documentation, binary images, editable source code to run on a Xilinx Zynq®-7000 All Programmable SoC along with associated hardware. For the first time ever, the highly parallel and deterministic benefits of FPGA-based motor control, offering up to 30-40x more responsiveness than traditional embedded approaches, is available in a C/C++ development environment. Furthermore, scalability with minimal CPU burden is increasingly differentiating for developers of such systems given the industry rise in demand for multi-axis motion control.

The three main hardware components included in the EDDP Kit are the development board, TEC0053, from Trenz Electronic as the motor driver board, the Arty Z7-10 from Digilent Inc. as the reference controller board, and a three-phase permanent magnet synchronous motor from Anaheim Automation as the reference motor. The main software components are the field oriented motor control algorithm implemented with the Xilinx Vivado Design Suite and the Web UI. To edit the included design or replace with proprietary C/C++ code, users must have access to either a fully licensed seat of Vivado HLx Edition or the no-charge WebPACK Edition. Also required is the SDSoc tool, part of the SDx Development Environment, available for purchase or no cost evaluation from Xilinx. All other resources are available for free download from <http://trenz.org/EDDP/>.

Key Features

- Development and evaluation of three-phase motor control applications
- Speed and flexibility provided by FPGA-fabric in Xilinx Zynq-7000 All Programmable SoC
- Implementation of a Field Oriented Control Algorithm with Vivado SDSoc™, offloading from processor to embedded
- Available motor control modes consist of speed control and stator current control
- Internet connectivity provided by the Linux operating system running on an ARM processor
- Web UI and Network API for the control of the motor over internet
- Runs on 12V DC power
- Optionally, the power stage can be run from a separate 5V ... 48V DC power supply

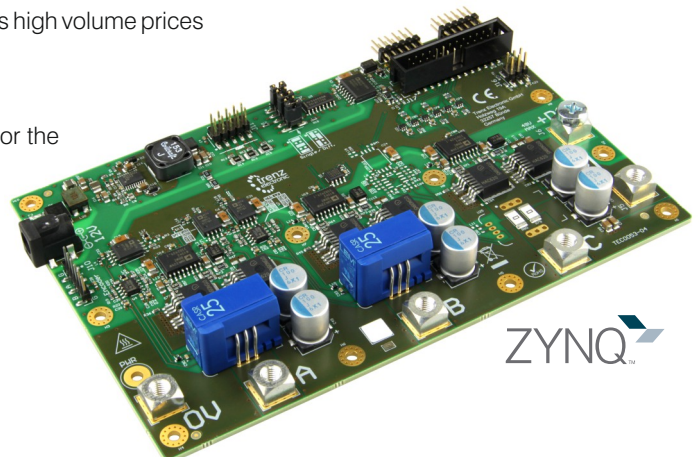
Other assembly options for cost or performance optimization plus high volume prices available on request.

Resources

trenz.org/EDDP/ - including a Quick Start Guide, User Manual for the EDDP Kit and the EDPS motor driver board, block diagram, design database and technical specifications.

Support

A support forum especially for this product is accessible at <http://trenz.org/EDDPsupport>.

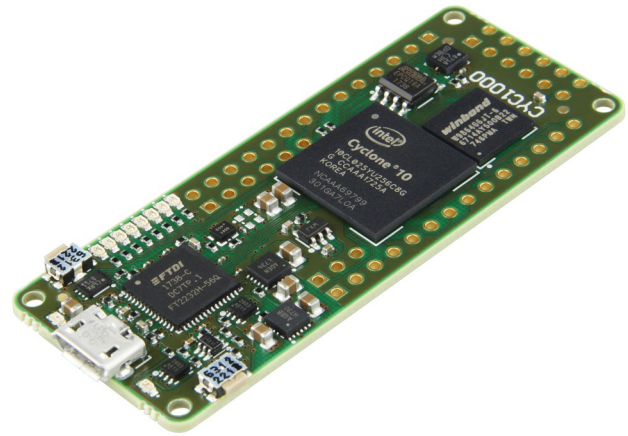
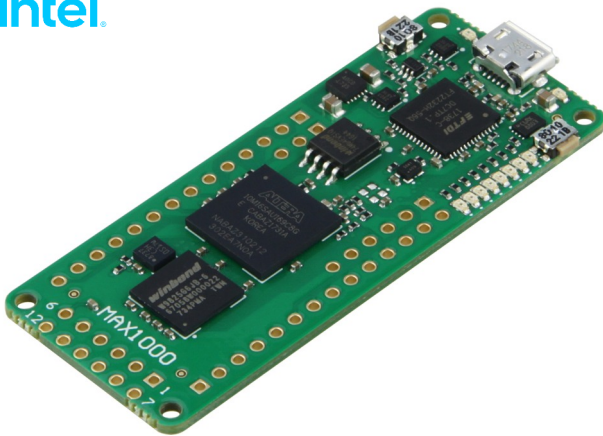


TEI0001 "MAX1000" and TEI0003 "CYC1000" Series

Arduino MKR Standard 2.5 x 6.15 cm



intel



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

"MAX1000" 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>

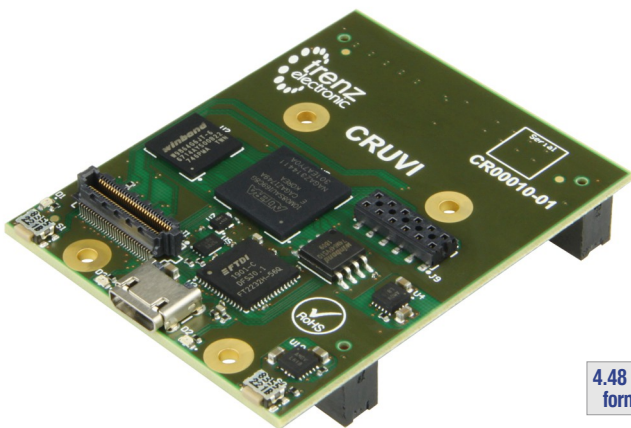
"CYC1000", TEI0003 series, Cyclone 10CL025YU256 C8G FPGA, 25 kLE, optional 10CL006, 10CL010, 10CL016, 8 MByte SDRAM, 2 MByte Flash, 21 I/O Arduino MKR compatible headers, JTAG and UART over Micro USB2 connector, LIS3DH 3-axis accelerometer, 2 x 14-pin headers providing 23 GPIOs, 1 x 3-pin header providing 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

CR00010 CRUVI Series

Intel MAX 10 CRUVI Carrier, SDRAM, Flash, USB

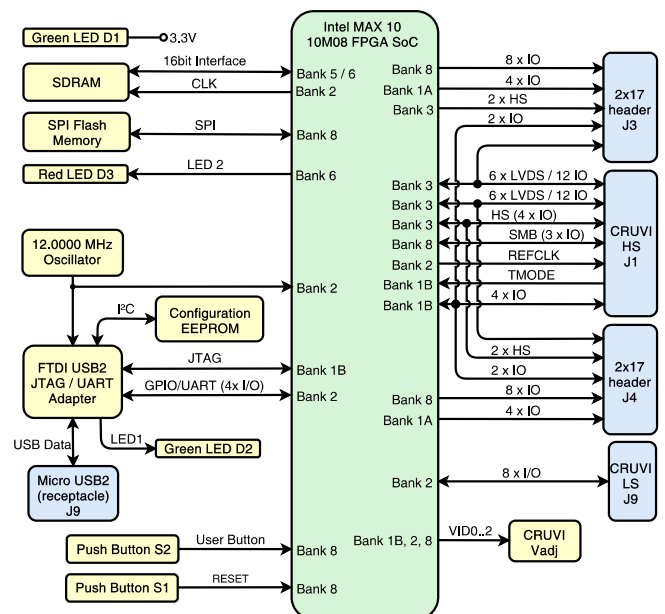


intel



4.48 x 5.6 cm form factor

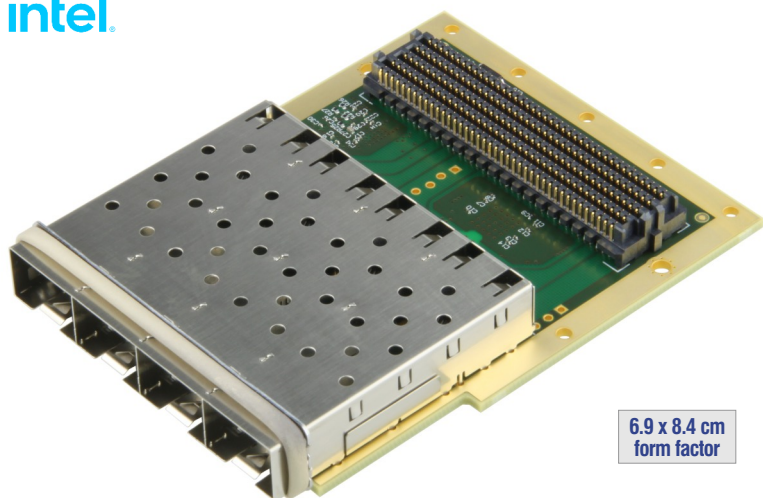
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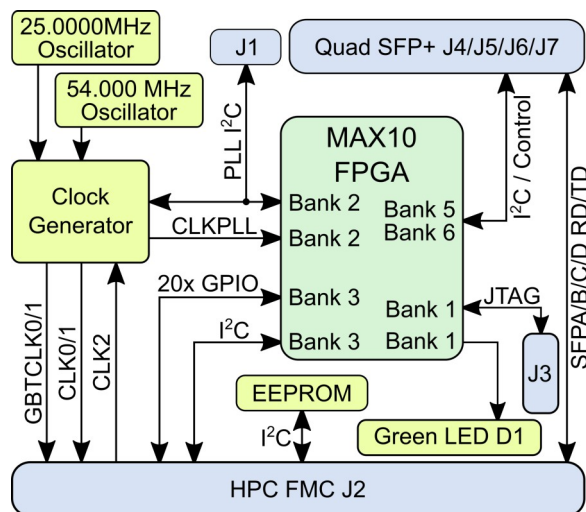
Device list	Connectors	SDRAM max	Flash	Total I/O	Other Features
10M08SAU169C8G	CRUVI (1 x HS, 1 x LS), 2 x 34 Pin Header	8 MB	8 MB	24 + 32	USB2.0, user push buttons and LED

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



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

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

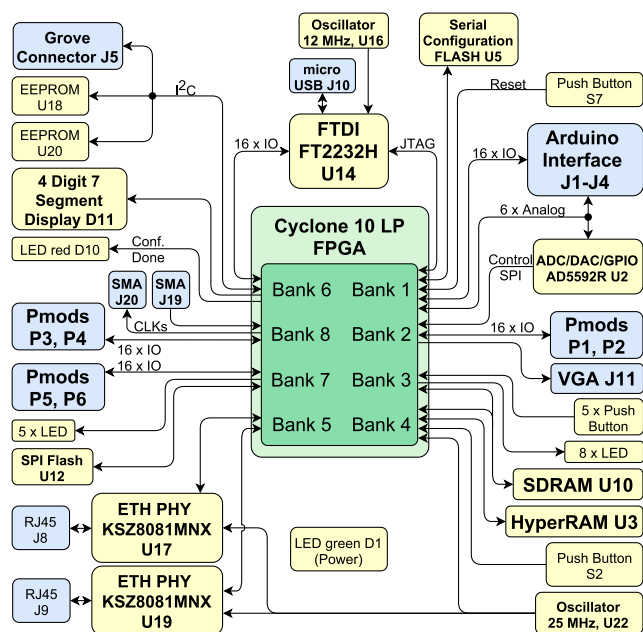
Device list	Connector	Dimension	SFP+	Other Features
Intel MAX 10 10M08SAU169C8G	HPC FMC	69 x 84 mm, SFP+ connector excluded (+ 5.5 mm)	4 SFP+ 10 Gbit ports for fiber optical SFP modules	Low-jitter programmable clock generator, 3.3V to 1.8V DCDC converter, 128 Kbit EEPROM, status LED (green)

TEI0009 C10LP RefKit Development Board

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



9.5 x 11 cm form factor



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

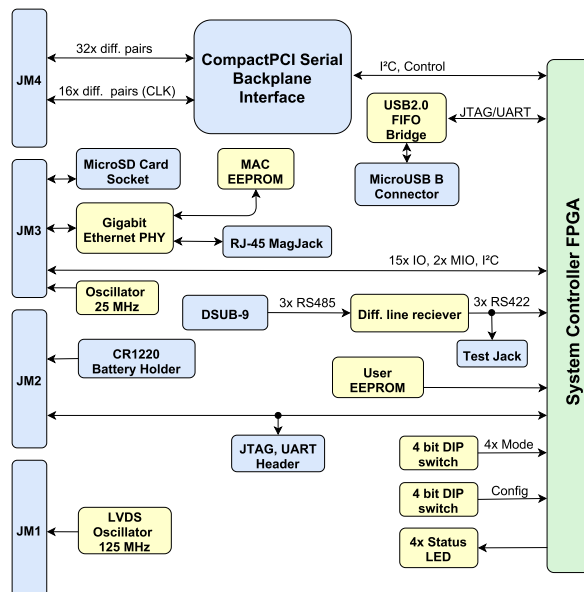
Device list	Connectors	SDRAM max	User Flash QSPI	HyperRAM max	Flash max	Ethernet PHY	USB	Other Features
Cyclone 10 LP 10CL055YU484C8G 55 kLE in 484-pin	QSE (for LVDS), Pmod, Arduino, SMA	512 Mbit	Up to 512 Mbit	128 Mbit	32 Mbit	2 x 10/100	USB2.0	Integrated USB programmer2

TEC0810 CompactPCI Serial Card

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



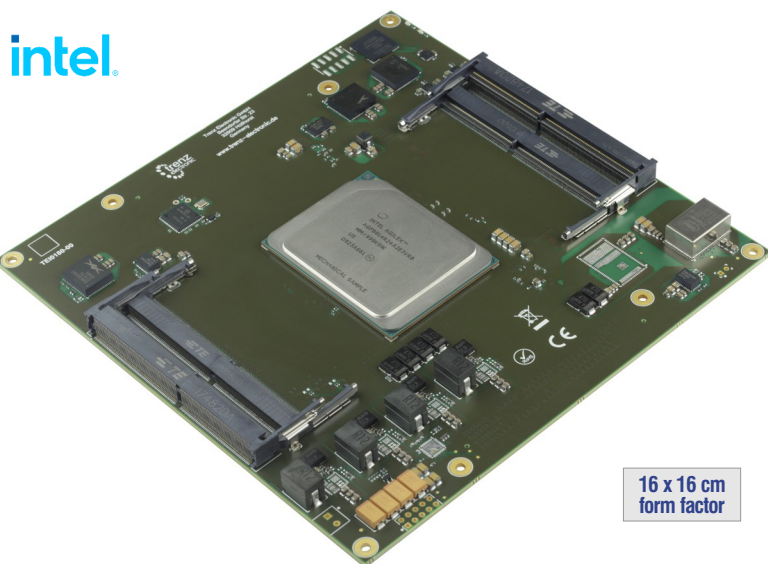
<http://trenz.org/tec0810-info>



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

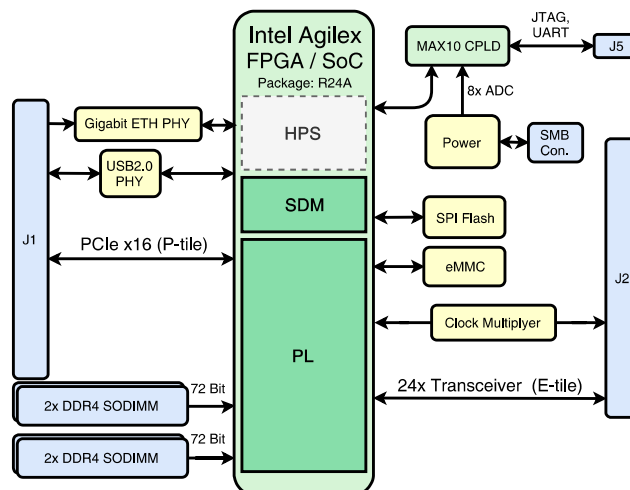
TEI0180 Series

Intel Agilex F-Series, DDR4 SODIMM Memory Socket, Flash, Intel MAX 10 Controller



16 x 16 cm form factor

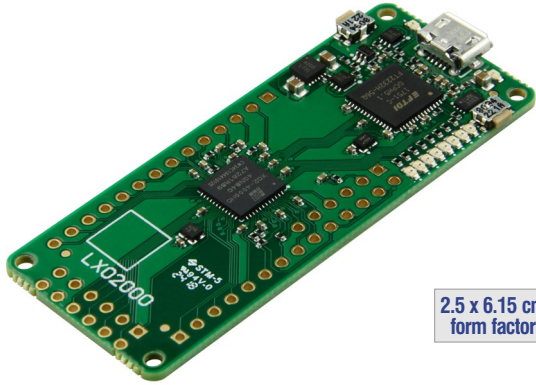
<http://trenz.org/tei0180-info>



Device list	Pin Package	Connectors	DDR4 SODIMM	Flash	System Controller	Transceivers	Other Features
Intel Agilex F-Series AGFA014R24A3E3VR0	R24A 2486	2 x 400 pin Samtec	4 x	512 MB	Intel MAX 10	16 + 24	PLL clock generator, optional (with Agilex including HPS): 1 Gbit ETH-PHY, 8 GByte e.MMC, USB2.0 PHY

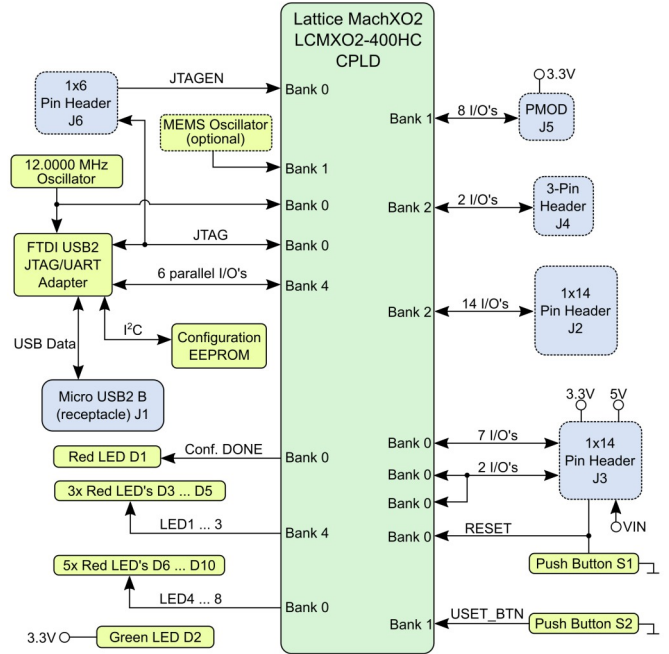
TEL0001 "LXO2000" Series

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



2.5 x 6.15 cm form factor

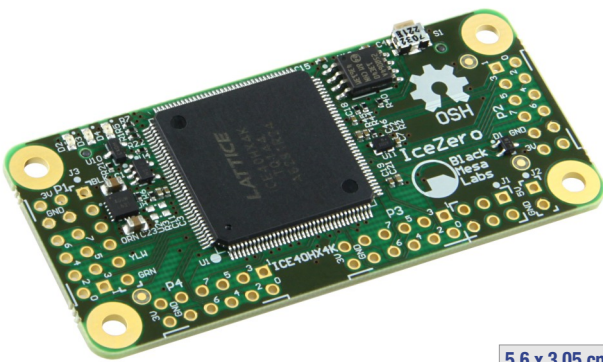
<http://trenz.org/tel0001-info>



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

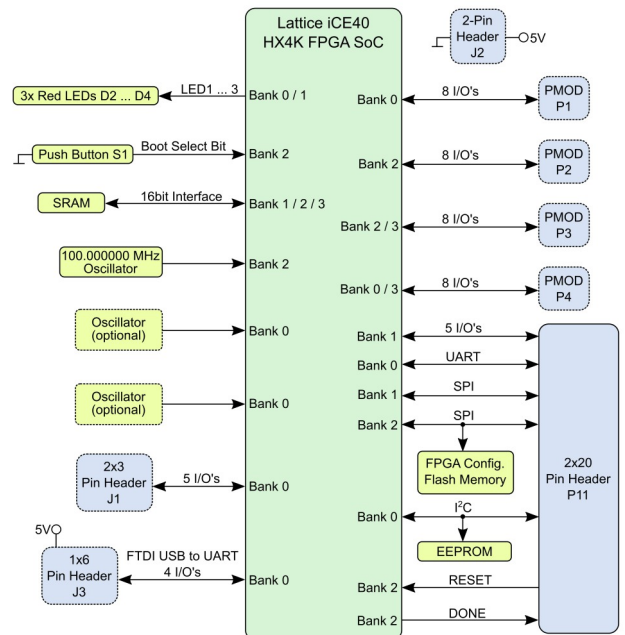
TE0876 IceZero Series

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



5.6 x 3.05 cm form factor

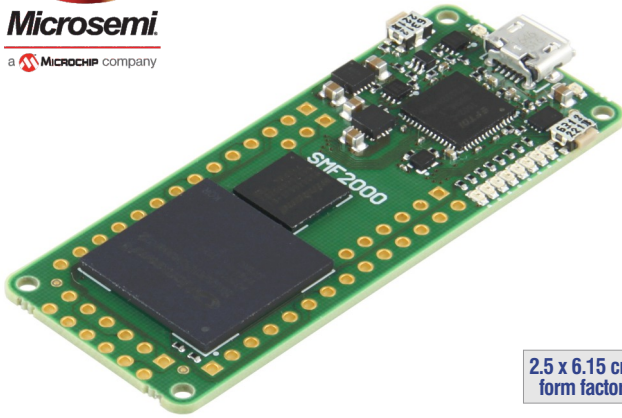
<http://trenz.org/te0876-info>



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)

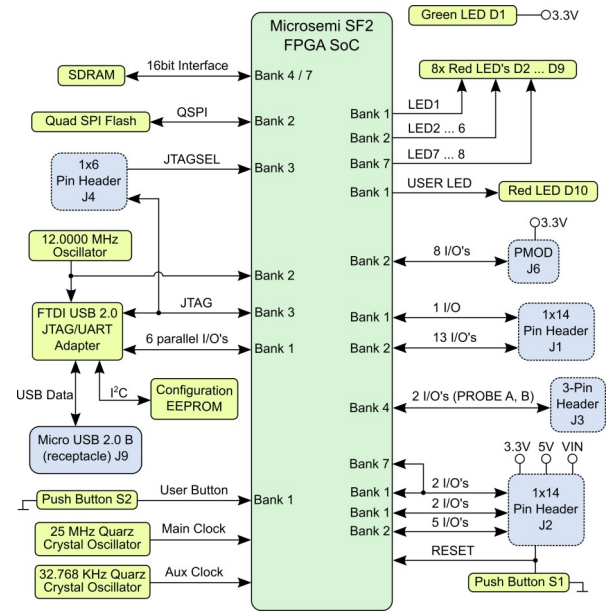
TEM0001 "SMF2000" Series

Microsemi SmartFusion 2, Arduino MKR Standard, SDRAM, Flash, UART/JTAG



2.5 x 6.15 cm form factor

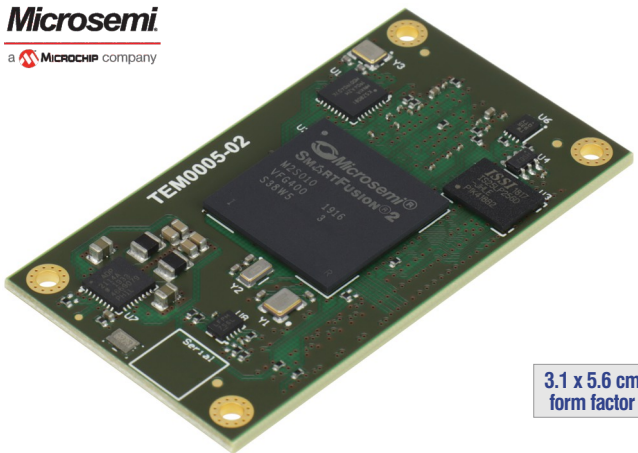
<http://trenz.org/smf2000-info>



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

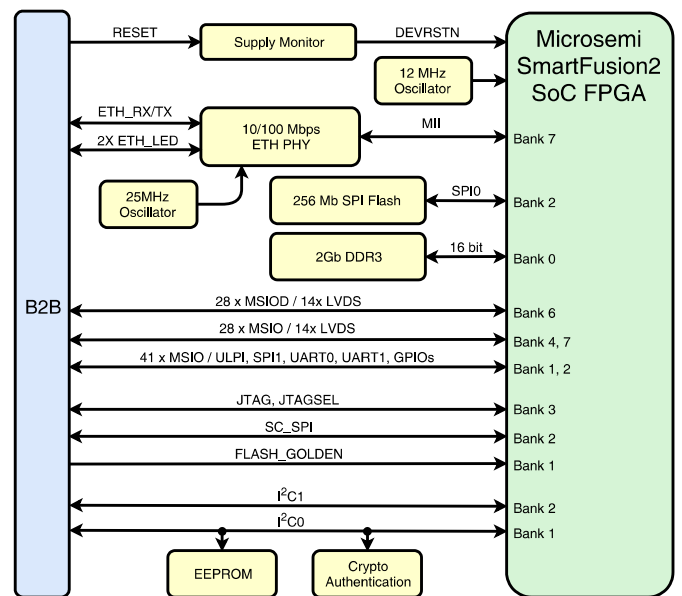
TEM0005 Series

Microsemi SmartFusion 2 SoC, DDR3, Flash, Ethernet, EEPROM



3.1 x 5.6 cm form factor

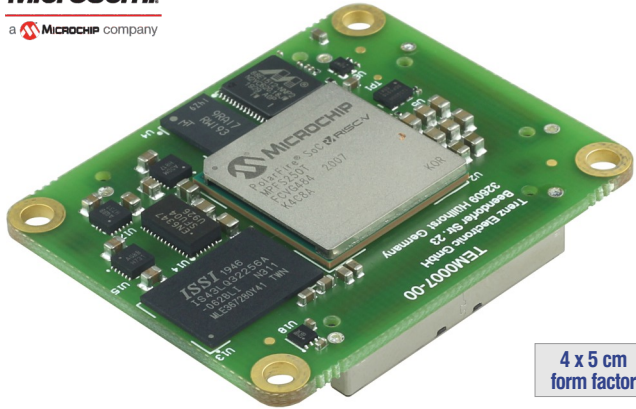
<http://trenz.org/tem0005-info>



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

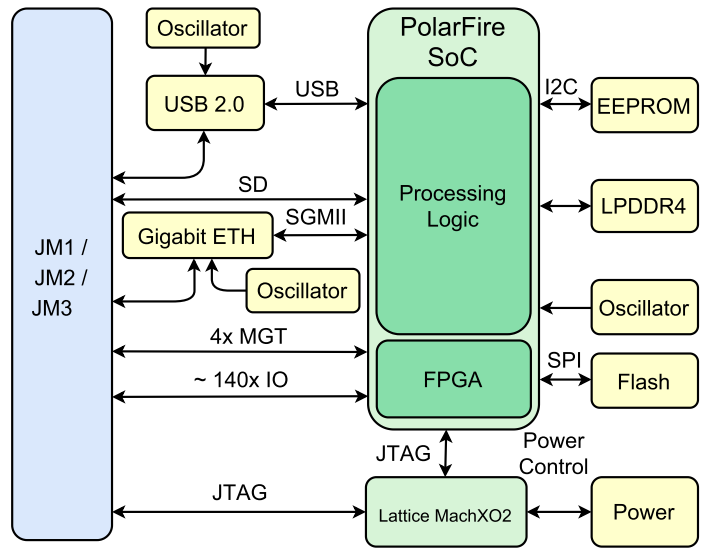
TEM0007 Series

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



4 x 5 cm form factor

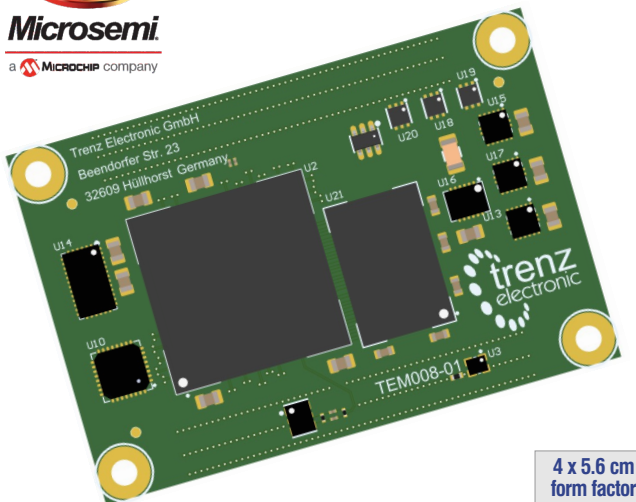
<http://trenz.org/tem0007-info>



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

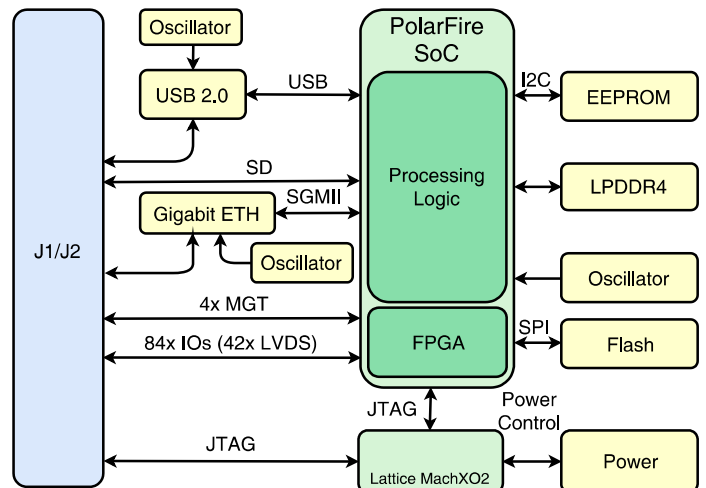
TEM0008 Series

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



4 x 5.6 cm form factor

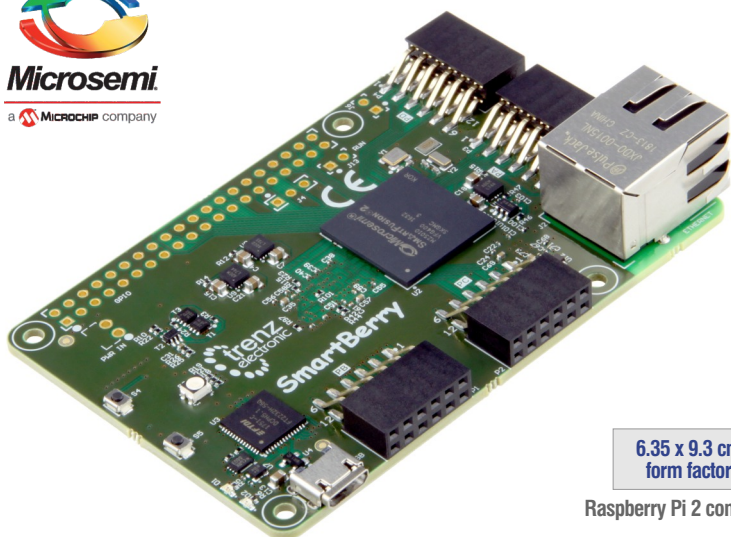
<http://trenz.org/tem0008-info>



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

TEM0002 SmartBerry Series

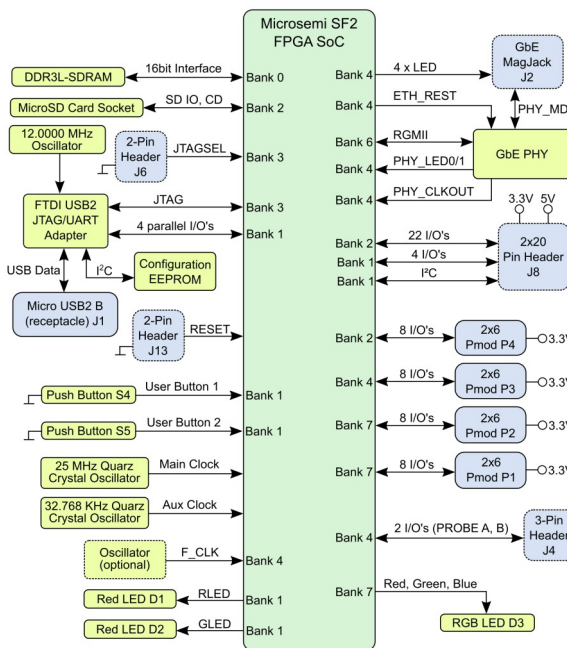
Microsemi M2S010, DDR3, Ethernet PHY with RJ45 MagJack



6.35 x 9.3 cm form factor

Raspberry Pi 2 compatible

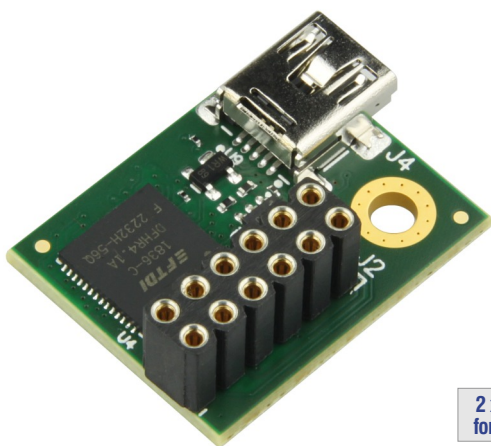
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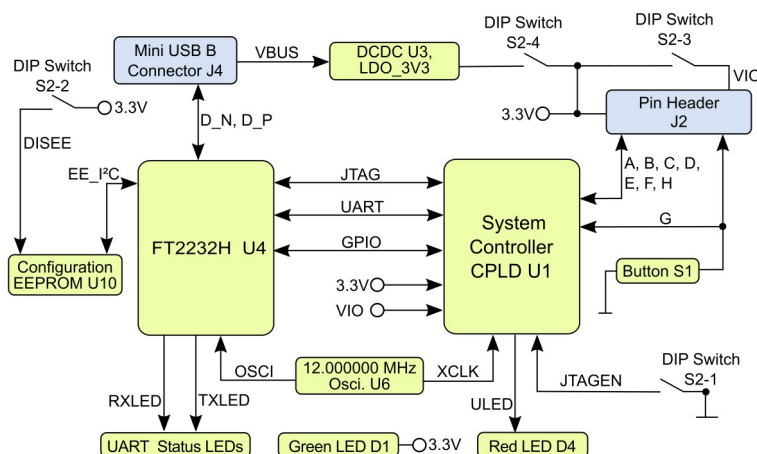
Device list	SDRAM	Ethernet	Total I/O	Connectors	on-board	Other Features
Microsemi M2S010-VFG400	265 MB DDR3	1 Gbit Ethernet PHY with RJ45 MagJack	Raspberry Pi compatible header with 26 I/O + I2C	MicroSD card socket, 4 Pmod headers	USB/JTAG USB/serial	2 push buttons

TE0790 XMOD FTDI JTAG Adapter

XMOD Form Factor, FT2232H, Lattice X02-256 CPLD



2 x 2.5 cm form factor



Comes in two versions

- a) compatible with Xilinx tools (TE0790-0x) or
- b) not compatible with Xilinx tools (TE0790-0xL), for independent use

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

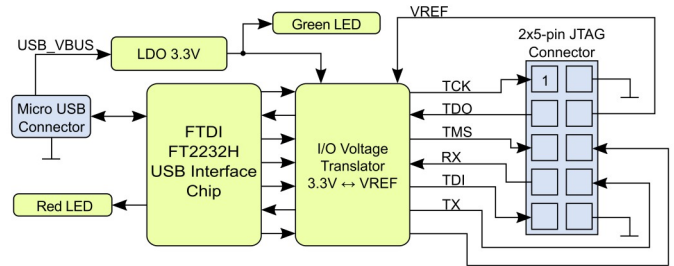
Device	Form Factor	FT2232H	Total I/O	Other Features
Lattice X02-256 CPLD	XMOD, M3 mounting hole	Mini USB connector, channel B RX/TX LEDs, EEPROM	8 universal I/O pins	Step down DCDC converter for optional power supply via USB-power, 4 position DIP switch

TEI0004 FPGA USB-Programmer2 JTAG (Arrow)

For Development with Intel FGAs, 2.54 mm Header



1.35 x 2.2 cm form factor



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

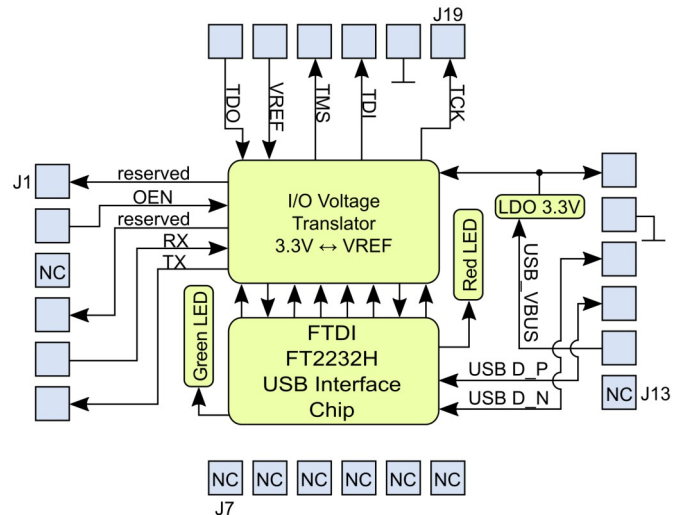
Supported by	JTAG Connector	USB	Voltage levels	Other Features
Intel Quartus programmer	Standard 2 x 5-pin header	MicroUSB connector USB2.0 HS support	1.8V - 3.3V	Additional support for UART, red activity LED, green power-on LED

TEI0005 FPGA USB-Programmer2 SMD Module

FT2232H based JTAG Programmer, Surface-Mount module



1.7 x 1.7 cm form factor



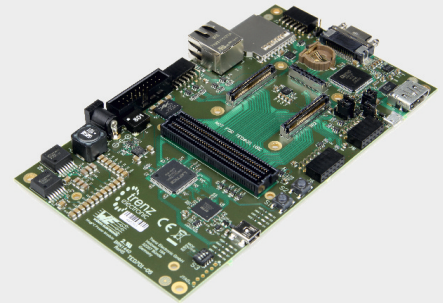
<http://trenz.org/tei0005-info>

Device list	Supported	Powered	Compatible	Other Features
FTDI FT2232H USB2.0 interface	by Intel Quartus (JTAG mode only)	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 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.

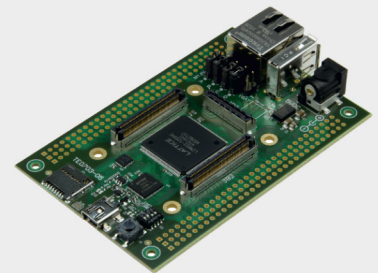
TE0701

- 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

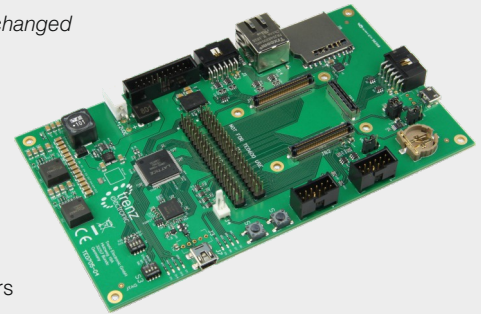


TE0705

TE0705 is a "downgraded" version of TE0701. As little as possible has been changed in functionality except the functionality that was removed.

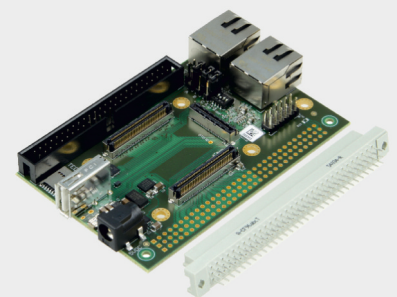
Changes from TE0701

- 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

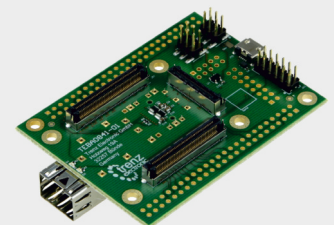
- VG96 connector and 50-pin IDC male connector socket
- SDIO port expander with voltage-level translation
- Micro SD card socket and a USB type A connector
- One user push button, user configurable DIP switch
- Two RJ45 Gigabit Ethernet MagJack
- One Ethernet PHY
- Barrel jack for 5 V power supply input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



TEBA0841

Mainly for the use with TE0841 and TE0741 modules.

- XMOD (TE0790) pin header
- SFP connector
- Micro USB
- One pin header 16 pol. (JTAG, MGT-CLK, boot mode, RST, I/Os)
- One pin header 10 pol. (SD IOs)
- Two pin headers 50 pol. (FPGA bank I/Os and power)
- One pin header for FPGA bank power VCCIOA and 1 x for VCCIOD
- LDO voltage regulator 3.3V to 2.5V
- Two user LEDs (red/green)



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.

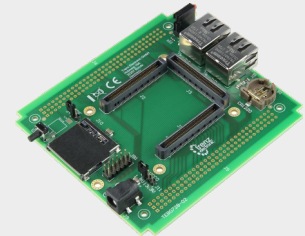
TEBF0808

- 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.



TEB0728

- Trenz TE0728 module socket (3 x Samtec SEM connectors 80 pins)
- Two RJ45 Ethernet socket
- Micro SD card socket
- Barrel Jack for 5V power supply
- 3 x user LEDs (red/yellow/green)
- One user push button



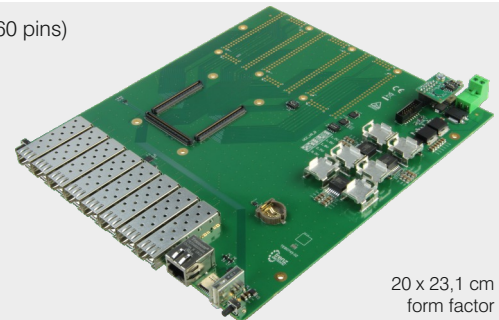
TEB0729

- 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

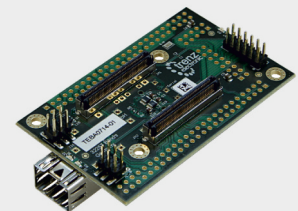
- Trenz Electronic TE0745 module socket (3 x Samtec ST5 connectors 160 pins)
- 24V power supply over ARKZ950/2 connecting terminal
- XMOD (TE0790) Pin Header (JTAG / UART)
- One EMI Network Filter
- MicroSD connector
- RJ45 Ethernet connector
- USB Host connector
- Eight SFP connector
- Six pin header 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	Xilinx Zynq-7020	Xilinx Zynq-7020	Xilinx Zynq UltraScale+	Xilinx Zynq UltraScale+	Xilinx 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	✓	✓	✓	✓	✓

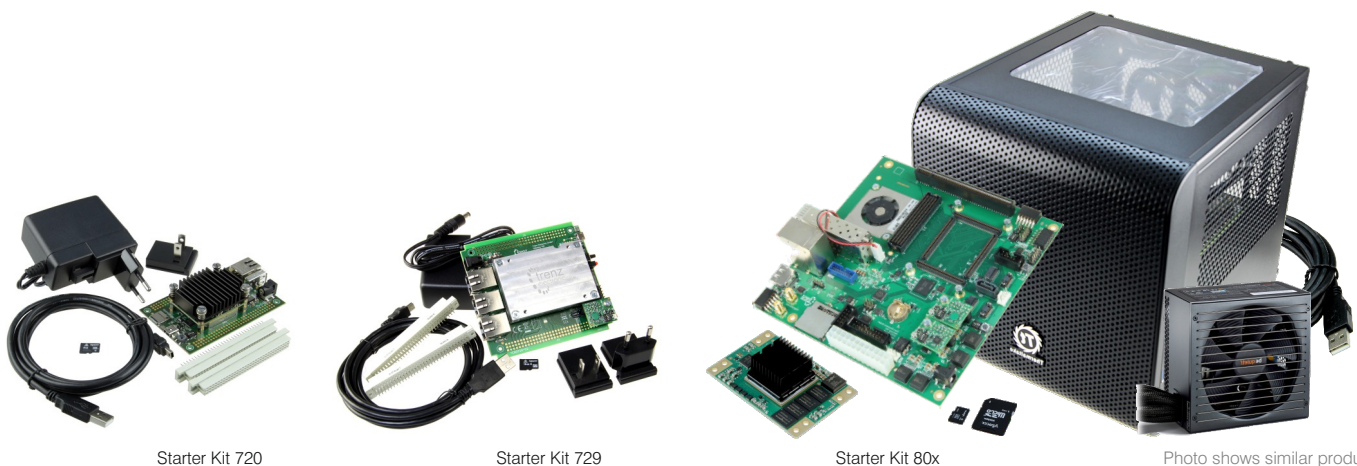
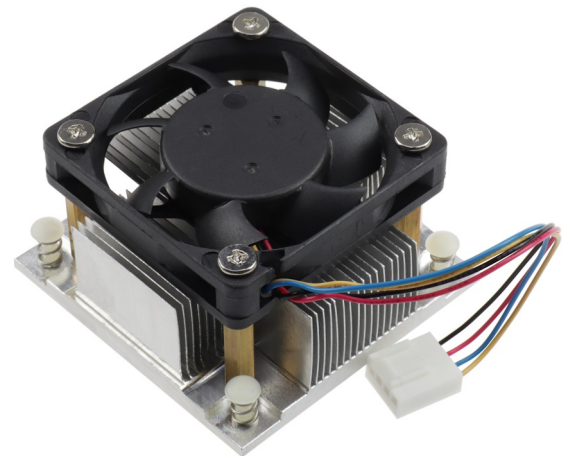
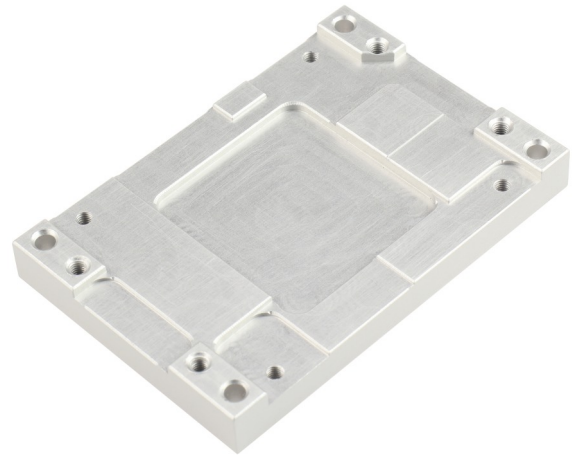
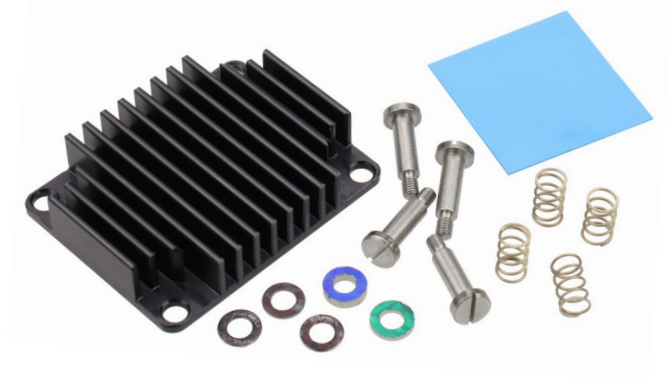


Photo shows similar product.

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	KK0803-03A, KK0803-04, 29665
TE0807	KK0807-02A
TE0808	KK0808-03, KK0808-05, 30137, 29664 (REV05 only)
TE0820	28606
TE0821	28606
TE0823	28606
TE0841	28606
TEB0911	25130
TEF1001	25130
Heat Spreader Extension	KK0001-01



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 [cm]	Connectors	Programmable logic family	Processing system	SDRAM [MByte] max	Flash [MByte]	EEPROM
AM0010	Zynq UltraScale+	ZU2CG-ZU5CG, ZU2EG-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	128	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
TE0728	Zynq-7000	Z-7020 (automotive)	6 x 6	3 x Samtec SEM	Artix-7	2 x Cortex A9	512 DDR3	16	8 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	1024 DDR3 32-bit (PL) 2024 DDR3 64-bit (PS)	32	1 x MAC + 16 KByte
TE0803*	Zynq UltraScale+	ZU2CG-ZU5CG, ZU2EG-ZU5EG, ZU4EV, ZU5EV	5.2 x 7.6	4 x Samtec ST5	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 Cortex A53 + 2 x Cortex R5	8192 DDR4 64-bit (PS) with ECC 4096 DDR4 32-bit (PL)	512	2 x MAC address
TE0807*	Zynq UltraScale+	ZU4CG-ZU7CG, ZU4EG-ZU7EG, ZU4EV-ZU7EV	5.2 x 7.6	4 x Samtec ST5	UltraScale+	Up to 4 x Cortex A53 + 2 x Cortex R5	8192 DDR4	128	16 KByte
TE0808*	Zynq UltraScale+	ZU6EG, ZU9 EG, ZU15EG	5.2 x 7.6	4 x Samtec ST5	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
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

* notice: new modules (TE0813/817/818) with improved connectors - Samtec ADM6 - will be available in the UltraSoM+ product family

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	192	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 100 Mbit	-	124 + 34 MIO	-	Automotive, real time clock, CAN, single supply
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 PI HD + 52 PL HR, 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 HR, 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 HR + 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
-	1 Gbit	-	144	8 x GTH	Programmable clock generator, single supply
8 GByte	1 Gbit	USB2.0	350	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

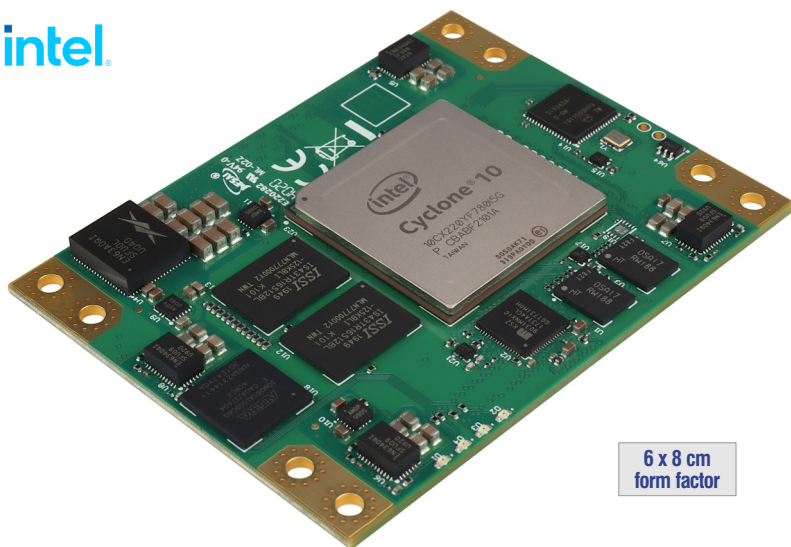


Other assembly options for cost or performance optimization available on request.

	Device family	Device list	Form Factor/ size [cm]	Connectors	Programmable logic family	Processing system (HW/SW)	SDRAM [MByte] max	Flash [MByte]	EEPROM
CR00010	MAX 10	10M08	4.48 x 5.6	CRUVI (1 x HS, 1 x LS) 2 x 34 pin header	MAX 10	-/+	8	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
TEI0010	MAX 10	10M08	2.5 x 6.15	-	MAX 10	-/+	8	8	Config. EEPROM
TEI0022	Cyclone V	5CSEMA5F31C8N	13 x 16	-	Cyclone V	+/+	1024 DDR3 (HPS) 1024 DDR3 (FPGA)	32 for HPS 32 for FPGA	2 Kbit
TEI0180	Agilex F	AGFA014R24A3E3VR0	16 x 16, COM- HPC Server Size D	2 x 400 pin Samtec	Agilex F	optional/+	4 x SODIMM DDR4	512	optional

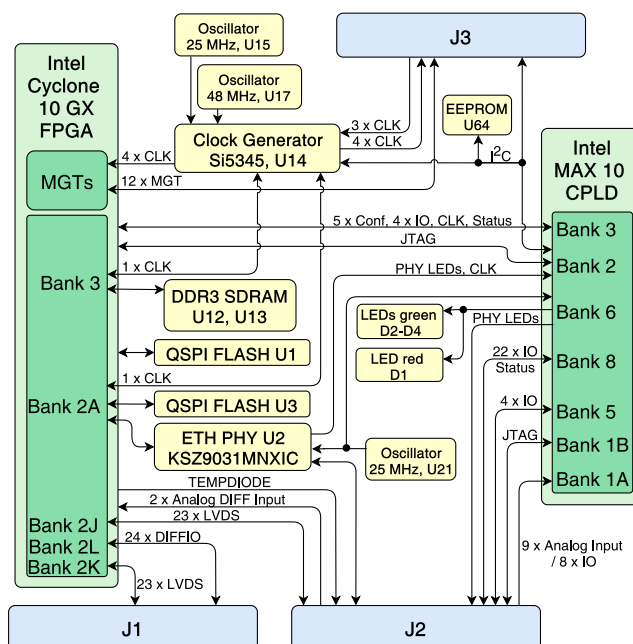
TEI0006 Series

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



6 x 8 cm
form factor

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

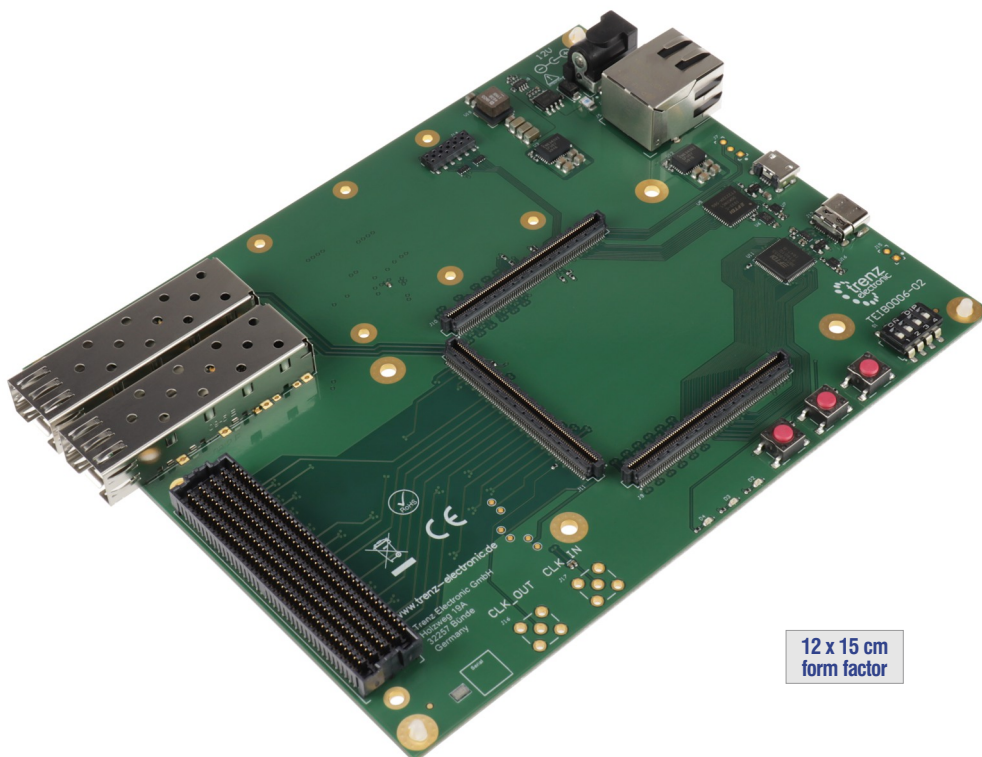


Device list	Connectors	SDRAM	Flash	Ethernet	Other Features
Cyclone 10 GX 10CX220YF780I5G	3 x Samtec ST5	2 GB DDR3	256 MB	1 Gbit	Intel MAX 10 as power sequencer, EEPROM, 4 LEDs, 5V input voltage

e.MMC	Ethernet PHY	USB PHY	Total I/O	Gbit Transceiver	Other Features
-	-	USB2.0	24 + 32	-	User Push Buttons and LED
-	-	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
-	1 Gbit	4 x USB2.0	32 (Pmod), 72 (FMC)	-	On board: 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&HPS), SD card, HDMI, 12V input supply voltage
8 GByte (optional)	1 Gbit (optional)	USB2.0 (optional)	N/A	16 + 24	Intel MAX 10 as system controller, PLL clock generator

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

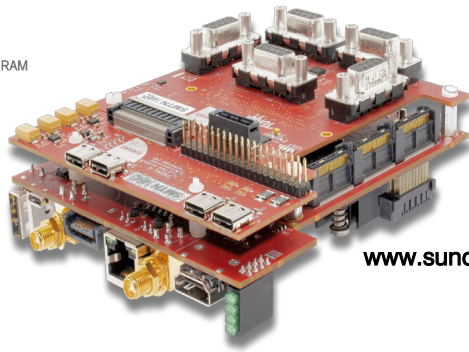
Power

- 12V input voltage

Sundance VCS-1

Vision, Control and Sensors, the all in one control system for precision robotics.

SUNDANCE

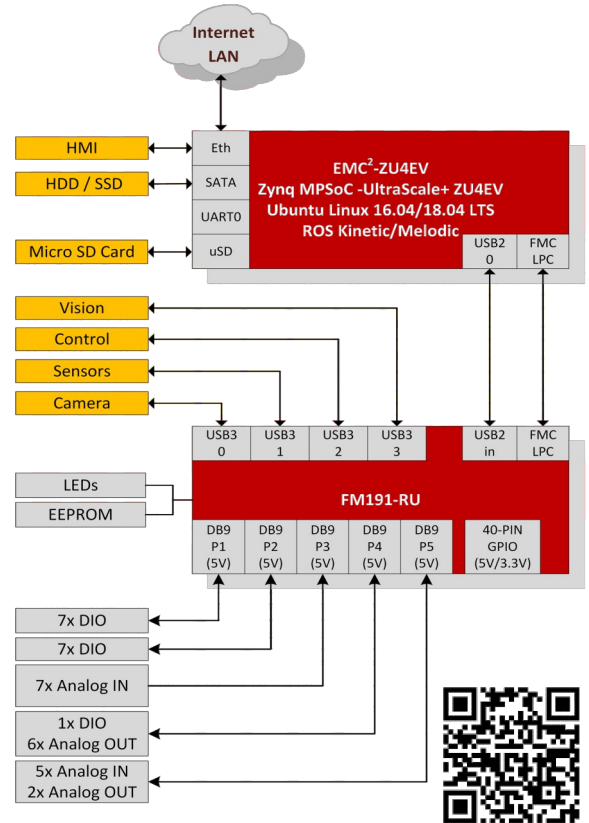


www.sundance.com/VCS-1

The Sundance VCS system is a PC/104 Linux stack that is ideally suited to controlling all forms of high precision robotics. It is comprised of two main components, namely the EMC2 board which is a PCIe/104 OneBank™ carrier for a Trenz Electronic compatible SoC Module and the FM191 expansion card that fans out the I/Os from the SoC to the outside world.

A Xilinx Zynq® MPSoC is the heart of the VCS-1 and provides 64-bit processor scalability while combining real-time control with soft and hard engines for graphics, video, waveform, and FPGA acceleration, using a Trenz Electronic TE0820 SoM.

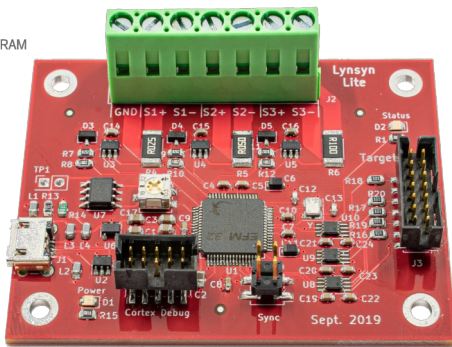
The versatility of the VCS system is derived from the modular concept of the SoM processing element on a PC/104 board, combined with a separate I/O Module. This gives it plenty of ADC, DAC, I/O and expansion possibilities with PC/104 options.



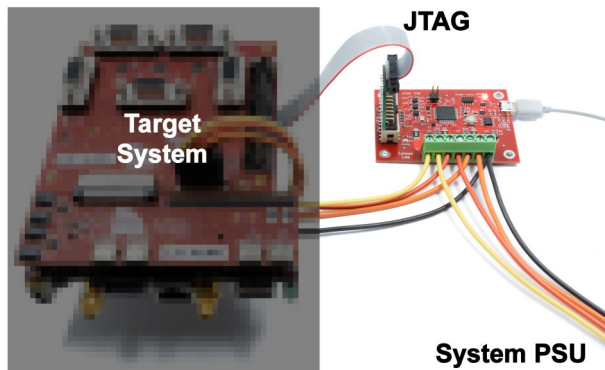
Sundance Lynsyn Lite

Power measurement utility board for Xilinx, Nvidia and Raspberry Pi systems

SUNDANCE



www.sundance.com/Lynsyn-Lite



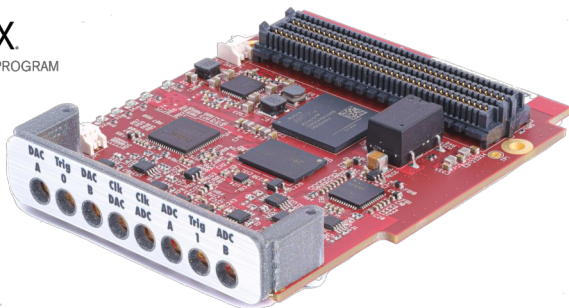
- Using the Lynsyn Lite to measure the power usage of each section of source code in a system is simple and the results are both detailed and precise.
- 3 sensors that measure both current and voltage.
- Correlates power measurements with source code by sampling program counters over JTAG
- Up to 10kHz sampling frequency.
- JTAG sampling supports ARM Cortex A cores (currently A9, A53 and A57).



Sundance SMT-FMC311

2-Channel DAQ Module - Low-Pin-Count

SUNDANCE

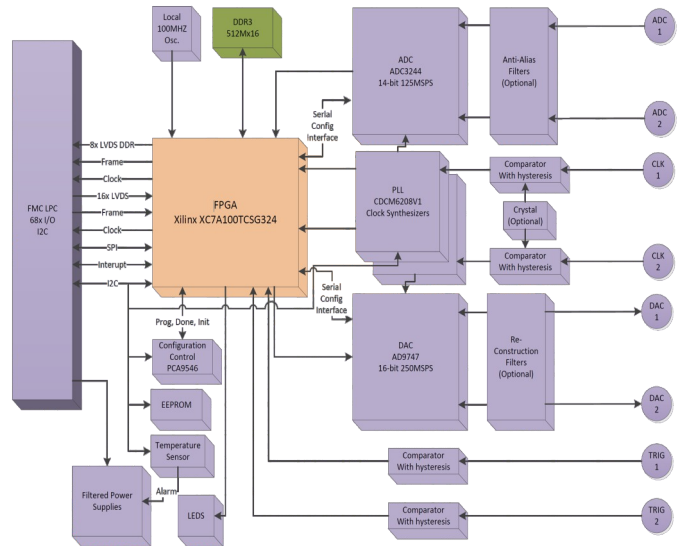


www.sundance.technology/smt-fmc311

For the ADC the SMT-FMC311 includes a single TI ADC3244 device. This is a dual 14-bit ADC able to sample from 15 up to 125MSPS. It has a maximum power dissipation of 325mW (typically 233mW). SNR is typically around 72dBFS and SFDR around 90dBc.

On the DAC side the module has a single Analog Devices AD9747 device. This is a dual 16-bit DAC able to operate from 0 up to 250MSPS. Power dissipation is 355mW maximum (typically 310mW). SFDR is around 82dBc.

Analog input connectors are either SMA or SSMC. If SMA is selected, then only the ADC and DAC connections are available on the module itself. Access to the triggers and clocks is via underside mounted MMCX connectors. A mezzanine board is available that converts from MMCX to SMA.



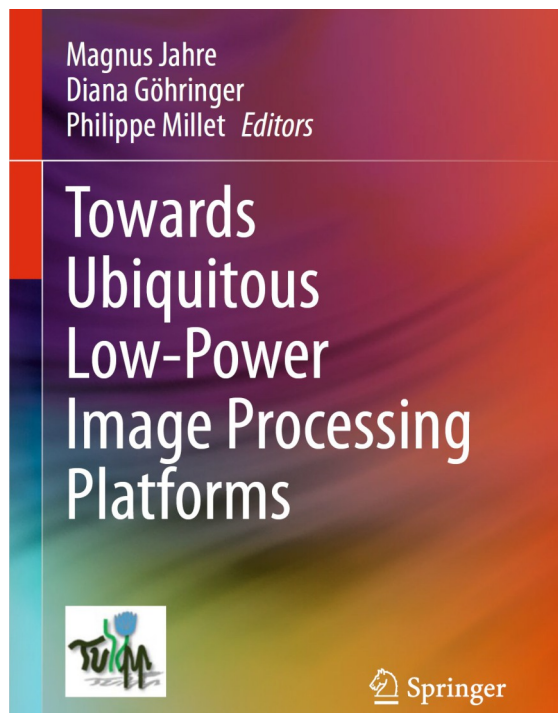
- VITA57.1 FMC-LPCTM (subset, no MGT) mezzanine.
- One dual channel ADC.
- One dual channel DAC.
- PLL clock synthesizer.
- External clock and trigger inputs.



TULIPP Project Book

Available to purchase now

SUNDANCE



The focus of the Tulipp project was the development of high-performance, energy-efficient embedded systems for the growing range of increasingly complex image processing applications. This book is the final outcome of the project and highlights the benefits of using a Xilinx Zynq® MPSoC for Edge-AI, Robotics and Vision system.

A key objective of Tulipp was to carve out a path towards increased reuse and collaboration within industrial high-performance embedded image processing in Europe. This is not a simple task as future gains, such as those achieved through reuse and collaboration, are typically secondary to the immediate concern of getting products to the market.

- Discusses the development of high-performance, energy-efficient embedded systems for the growing range of increasingly complex image processing applications
- Covers the hardware architecture of embedded image processing systems, novel methods, tools and libraries for programming those systems as well as embedded operating systems to manage those systems
- Demonstrates results with several challenging applications, such as medical systems, robotics, drones and automotive

To purchase a copy: https://bit.ly/Tulipp_Zynq_Book

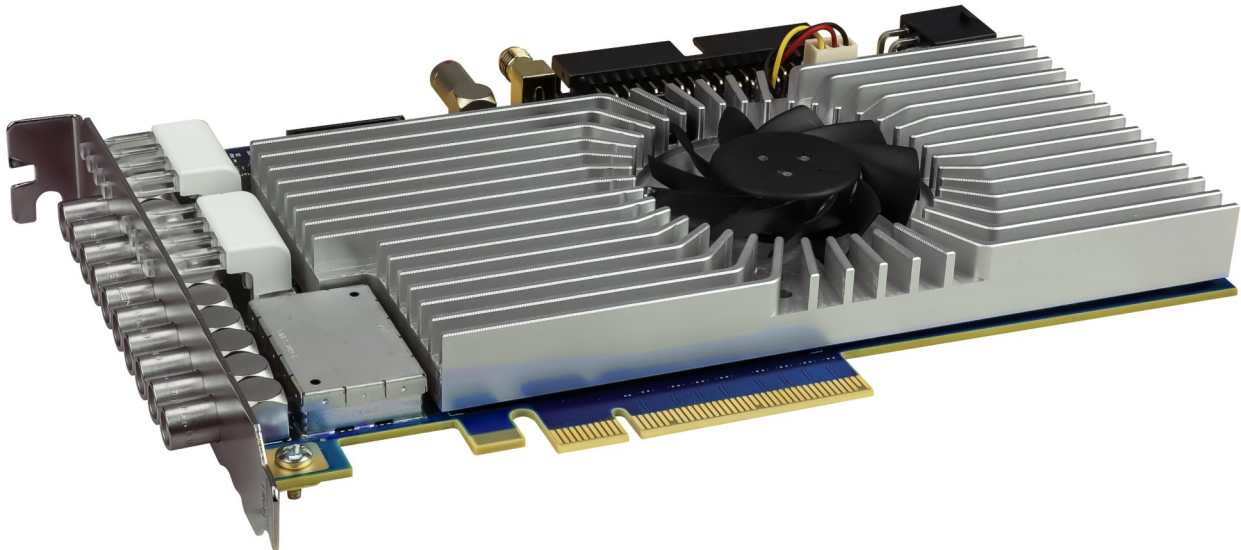
Full details of the project: www.tulipp.eu



www.sundance.com/TULIPP-book

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

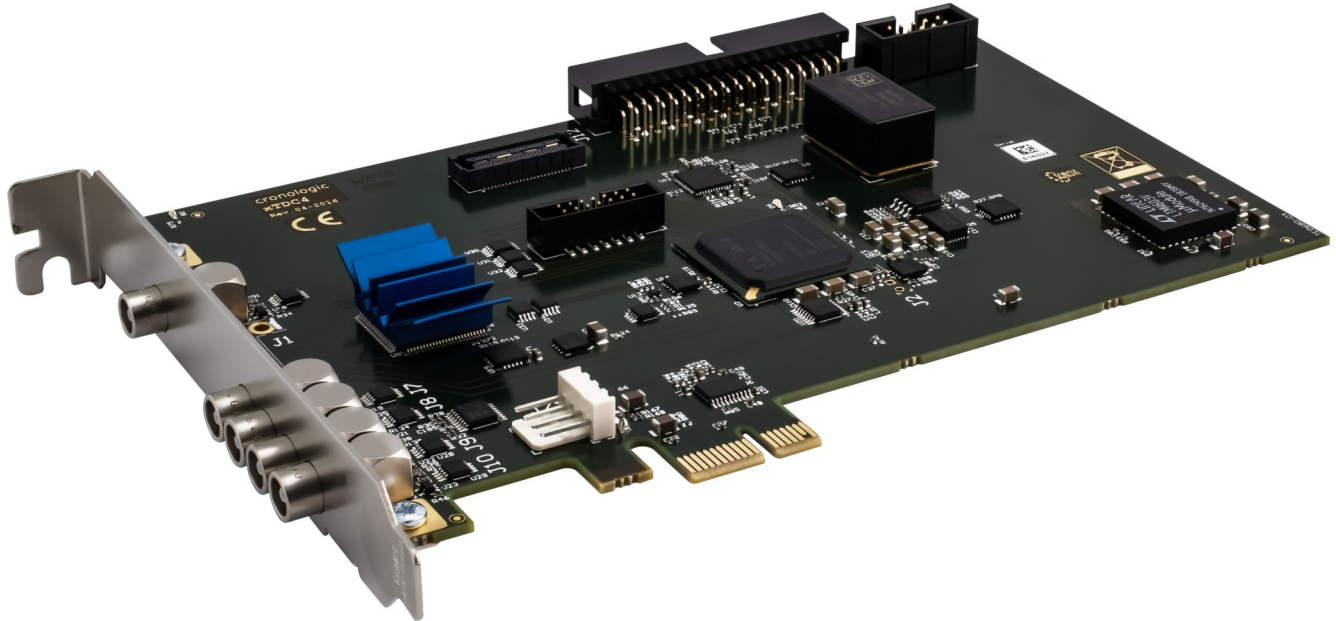
A multitude of useful details help you to create a highly integrated setup with a minimum of external components. Using the integrated TiGer timing pattern generator can provide digital pulse patterns to control your experiment or internal triggers. Use gate and veto functions with our gating logic. 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 insufficient, 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 exiting series of low cost, mid resolution time-to-digital converters. The boards feature 500ps to 1 ns 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
Double pulse resolution	1 ns
Multihit	1000x per start event
Dead time between groups	none
Resolution	12 bits
Readout rate	48 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 SMD In-house Production

Full SMT production since 2014, smallest SMD part 01005

- Full SMT production since 2014
- Smallest SMD part 01005
- Two Mycronic MY700 (direct solder printing)
- Inline PCB feeder Mycronic MY300 and MY100, pick and place

- Mycronic automatic SMD storage system
- Mycronic VI Technology 5K 3D (AOI)
- Two IBL vapor phase ovens
- Two PI series 3D SPI (Solder Paste Inspection)
- PCB cleaning system (ÖKO 1000)



Official Trenz Electronic Distributor List as of August 2021

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

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

Web: www.lextronic.fr

E-mail: lextronic@lextronic.fr

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Microembesys Technologies Pvt Ltd.

Web: www.microembesys.com

E-mail: info@microembesys.com

ApexPlus Technologies

Web: www.apexplustech.com

E-mail: info@apexplustech.com

Sinelec Technologies

Deutschland GmbH

Web: www.sinelec-tech.com

E-mail: contact@sinelec-tech.com

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Web: www.mirifica.it

E-mail: store@mirifica.it

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Tokushu Denshi Kairo Inc.

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E-mail: info@tokudenkairo.co.jp

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E-mail: webmaster@inipro.net

Neocess Co., Ltd.

Web: www.neocess.co.kr

E-mail: james@neocess.co.kr

Poland

BTC Korparacja

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E-mail: sprzedaz@kamami.pl

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Active Supply LLC

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E-mail: info@activesupply.ru

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E-mail: fpga@macrogroupp.ru

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E-mail: sales@cyberallgroup.com

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E-mail: info@e-kom.com

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E-mail: sales@nanomagnetics-inst.com

Same Elektronik San. Ve Tic. A.S.

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E-mail: same@sameas.com.tr

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