TRENZ ELECTRONIC CATALOGUE

Electronic Design Service

Development, Manufacture and Supply of FPGA and SoC Modules

updated september 2020

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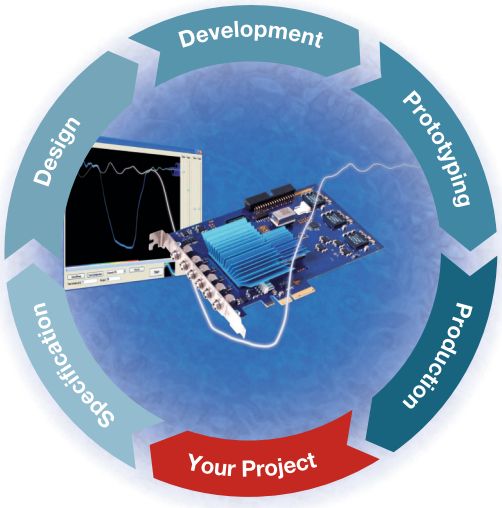
trenz electronic GmbH

Company Profile

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

ISO 9001 REGISTERED FIRM

ISO 9001:2015 (quality management) certified

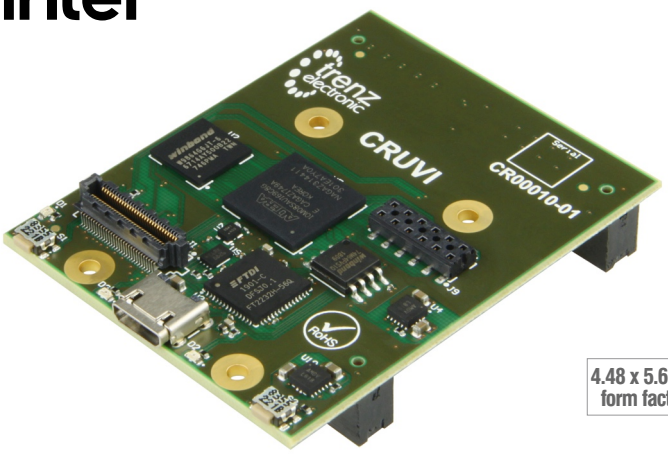
ISO 14001 REGISTERED FIRM

ISO 14001:2015 (environmental management) certified

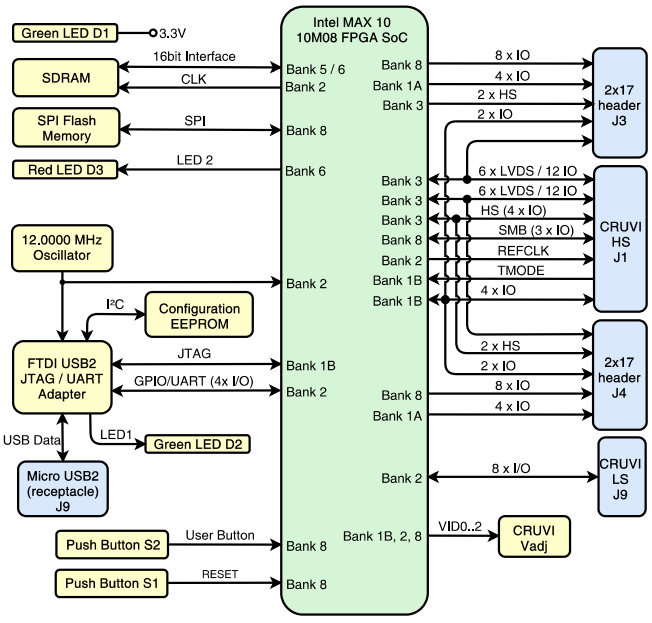
Index

NEW CR00010 CRUVI Series

Intel MAX 10 CRUVI Carrier, SDRAM, Flash, USB



4.48 x 5.6 cm form factor

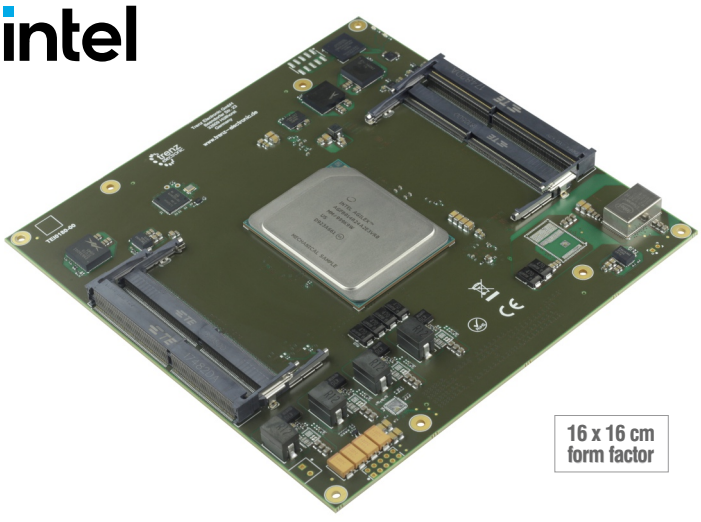


http://trenz.org/cr00010-info

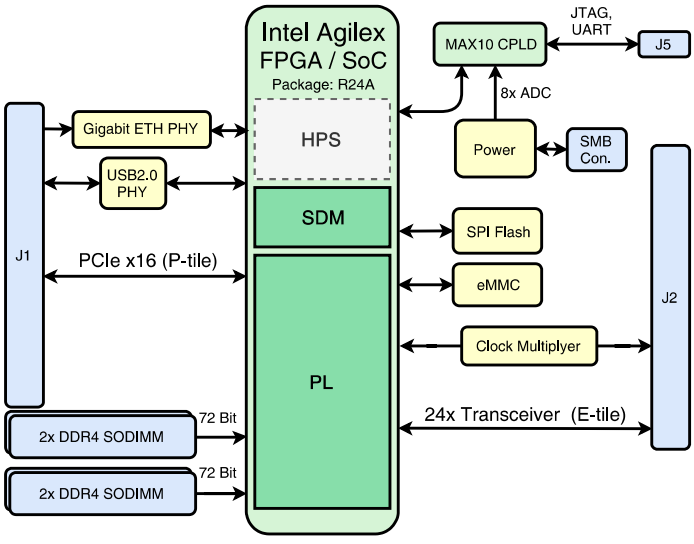
Device list	Connectors	SDRAM max [MByte]	Flash [MByte]	Total I/O	Other Features
Altera 10M08SAU169C8G	CRUVI (1 x HS, 1 x LS), 2 x 34 Pin Header	8	8	24 + 32	USB2.0, user push buttons and LED

NEW TEI0180 Series

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



16 x 16 cm form factor

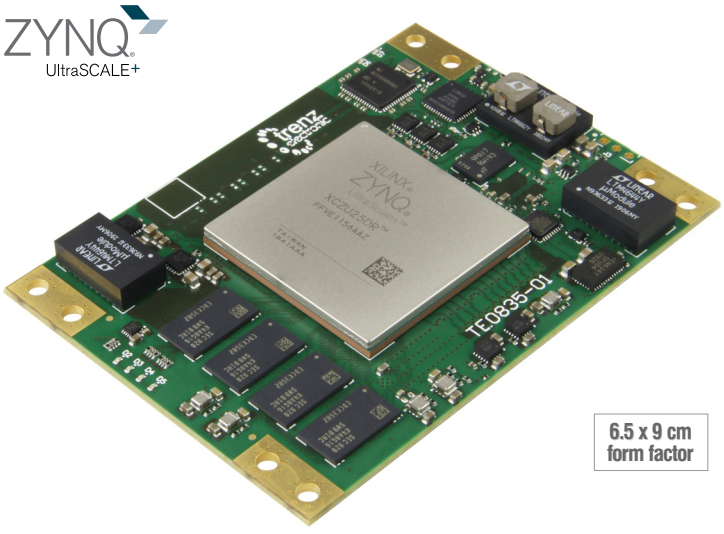


http://trenz.org/tei0180-info

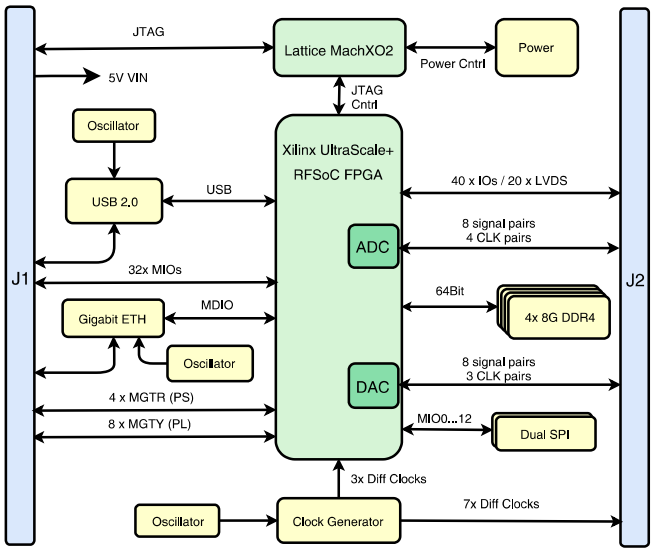
Device list	Pin Package	Connectors	DDR4 SODIMM	Flash [MByte]	System Controller	Transceivers	Other Features
Intel Agilex F-Series AGFA014R24A3E3VR0	R24A 2486	2 x 400 pin Samtec	4 x	512	Intel MAX 10	16 + 24	PLL clock generator, optional (with Agilex including HPS): 1 GBit ETH-PHY, 8 GByte e.MMC, USB2.0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

NEW TE0835 RFSoC Series

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



6.5 x 9 cm form factor



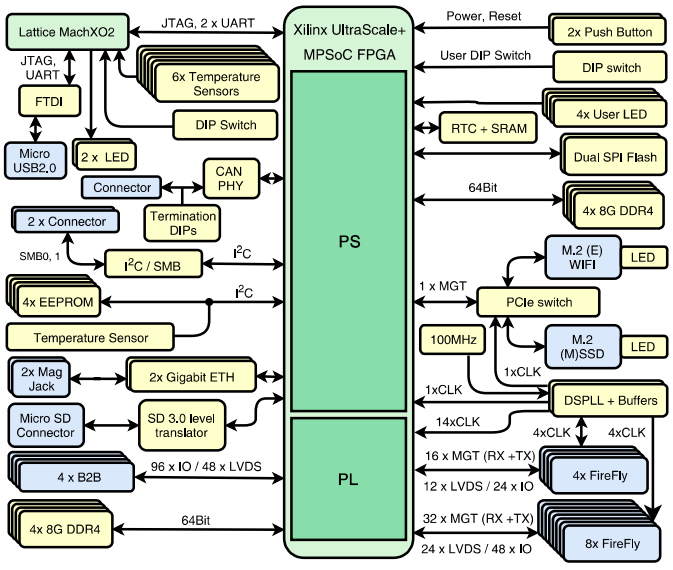
http://trenz.org/te0835-info

Device list	Pin Packages	Connectors	SDRAM [GByte]	Flash [MByte]	Ethernet PHY	Total I/O	GBit Transceivers	Other Features
XCZU25DR-1FFVE1156E	E1156, speedgrade -1	2 x Samtec ST5	4 DDR4	128	Gigabit	40 x I/O/ 20 LVDS + 32 MIO	8 x GTY, 4 x GTR	USB2.0 OTG, MAC EEPROM

NEW TEB0912 Series

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

12 x 18 cm form factor

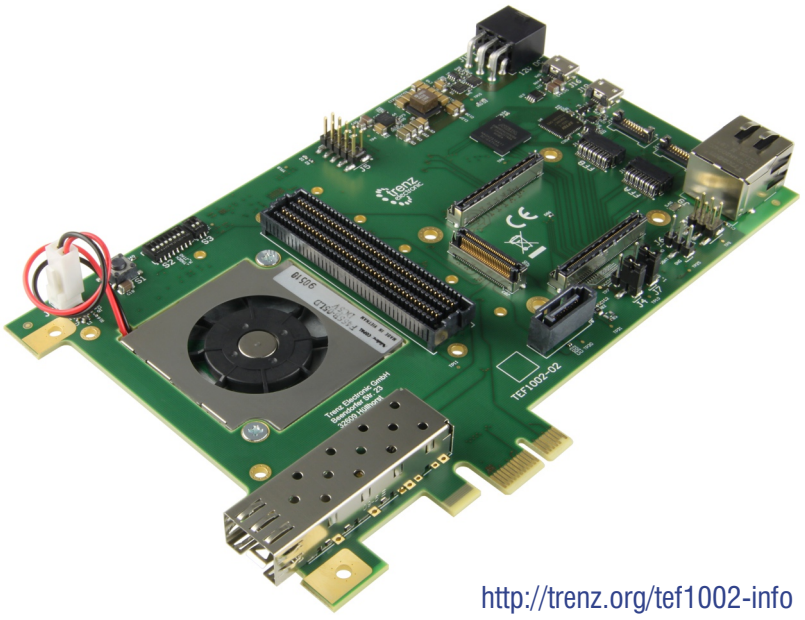


http://trenz.org/teb0912-info

Device list	Firefly sockets	SDRAM max [GByte]	Flash [MByte]	Ethernet	Header	Connectors	Other Features
Zynq UltraScale+ ZU11 - ZU19	4 x to GTY (copper/optical) 4 x for custom 8 lane JESD204B ADC 4 x for custom 8 lane JESD204B DAC	PS 4 DDR4 64 Bit, PL 4 DDR4 64 Bit	2 x 64	2 x RJ45 1 Gigabit	4x IDC for PL HD IO/LVDS	M2 PCIe SSD, M2 WAN/WLAN slot (PCIe/USB), Micro SD card (SD 3.0)	Onboard USB JTAG and UART, 2 x Si5395 low jitter PLL, single 12V input

NEW TEF1002 Series

PCIe Carrier for 4 x 5 Modules and LPC FMC



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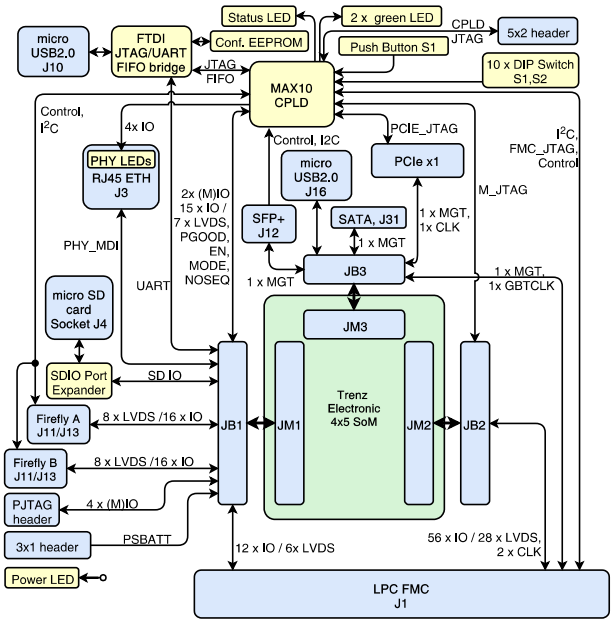


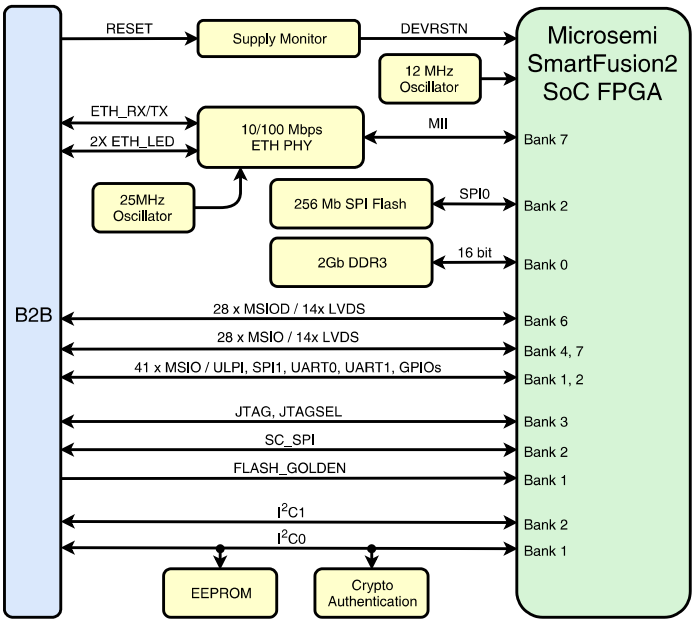
PCIe Carrier	Connectors	Other Features
For 4 x 5 cm modules	LPC FMC, SFP+, PCIe x1, SATA with pin 7 power configuration for SATADoM, RJ45 Gigabit Ethernet, micro USB to JTAG/UART bridge, 2 x 8 LVDS (FireFly), micro USB, micro SD card	MAX 10 CPLD, 4 x LED, module reset button, 10 x configuration/user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

NEW TEM0005 Series

Microsemi SmartFusion2 SoC, DDR3, Flash, Ethernet, EEPROM

3.1 x 5.6 cm form factor

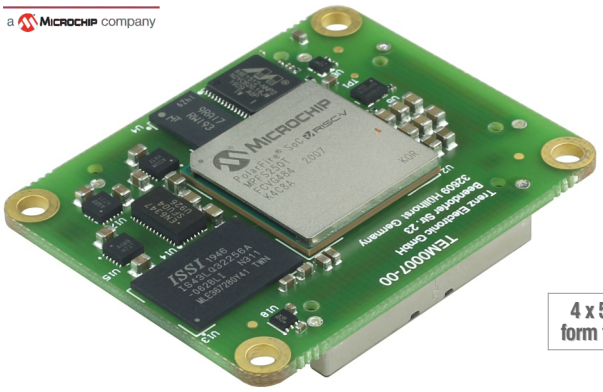
http://trenz.org/tem0005-info

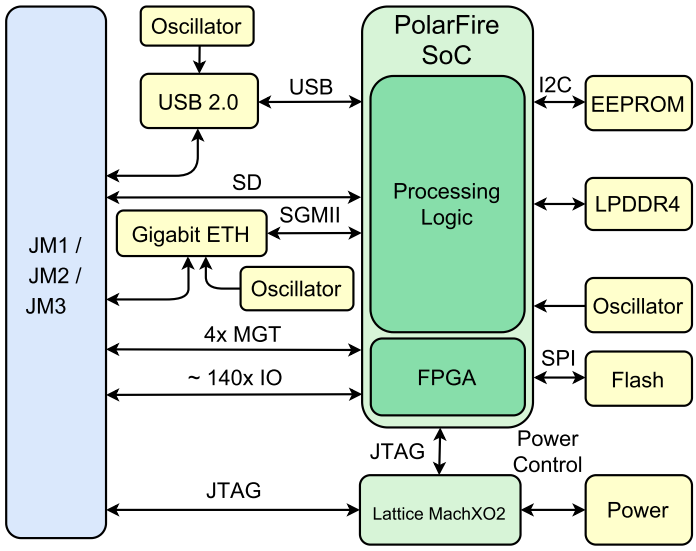


Device list	Connectors	SDRAM max [GBit]	Flash [MByte]	Ethernet PHY	Total I/O	Other Features
M2S010, supports up to M2S050	1 x Samtec ST5 160 pin	8 DDR3, optional DDR3L	32	100 Mbps	105	Optional crypto authentication device, serial EEPROM for MAC address, power supply monitor

NEW TEM0007 Series

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



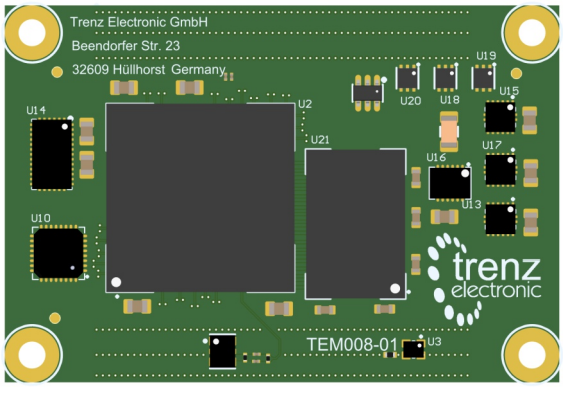


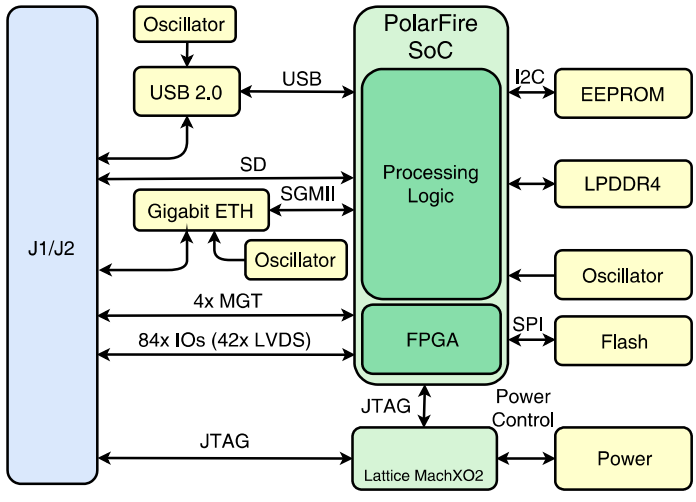
http://trenz.org/tem0007-info

Device list	Pin Package	Connectors	SDRAM max [GByte]	Flash [MByte]	Ethernet	Other Features
MPFS250T-1	FCVG484I	3 x Samtec LSHM	1 LPDDR4	64 MByte	1 GBit	EEPROM MAC address, USB2.0

NEW TEM0008 Series

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





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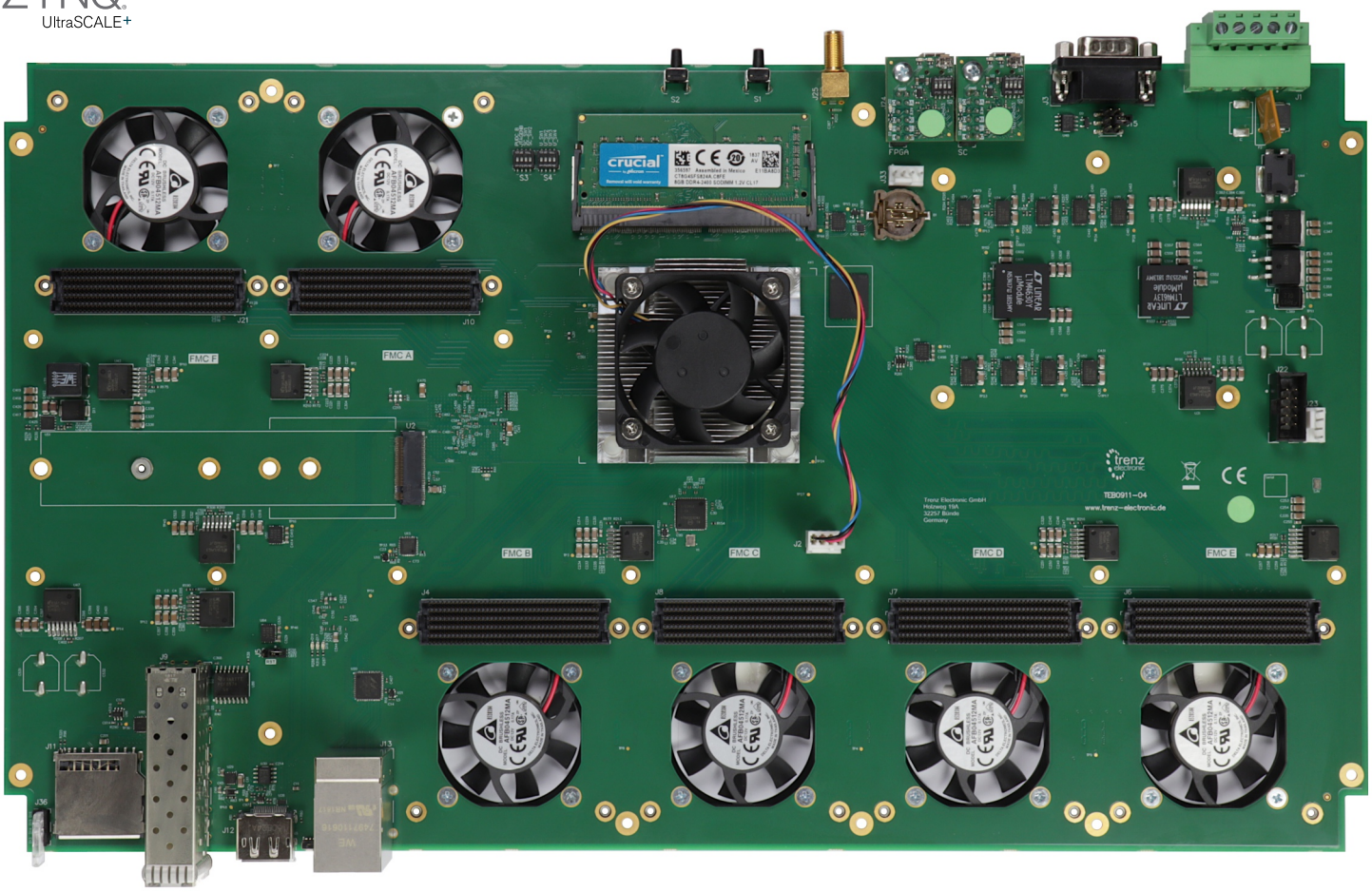
Device list	Pin Package	Connectors	SDRAM max [GByte]	Flash [MByte]	Ethernet	Other Features
MPFS250T-1	FCVG484	2 x Samtec ADM6	1 LPDDR4	64 MByte	1 GBit	EEPROM MAC address, USB2.0

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 4 GByte 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 a 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.

- 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)
- 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

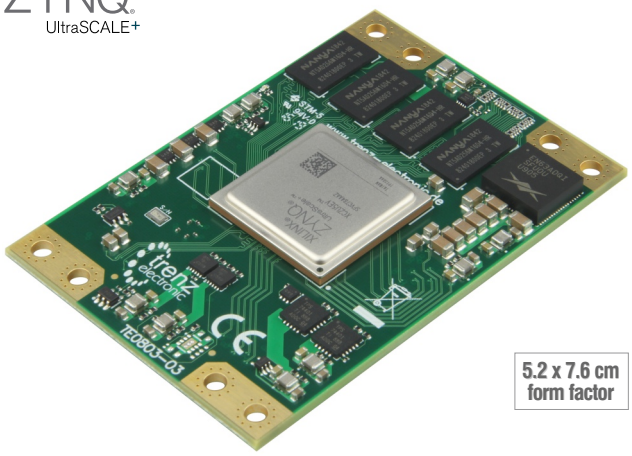
Additional information

- 406 mm x 234.30 mm board size
- Other assembly options for cost or performance optimization plus high volume prices available on request.

http://trenz.org/teb0911-info

TE0803 Series

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



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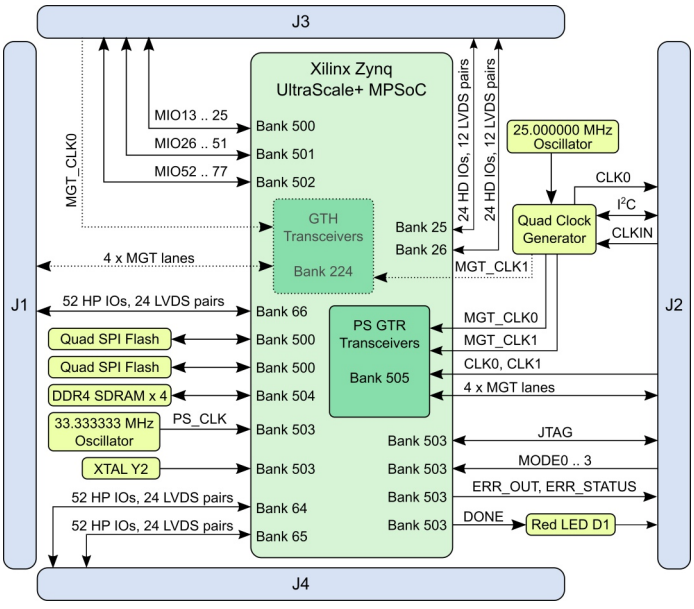
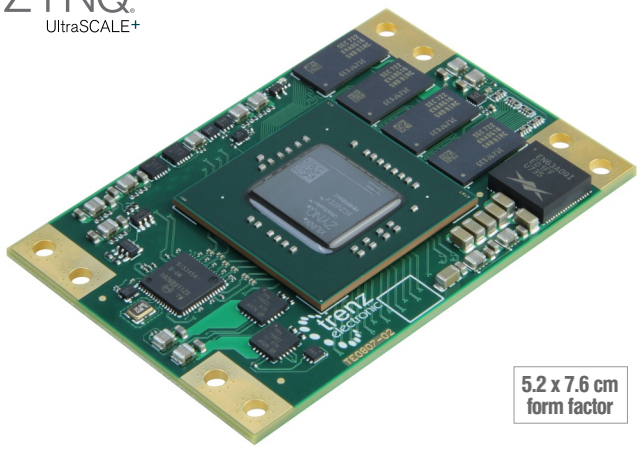


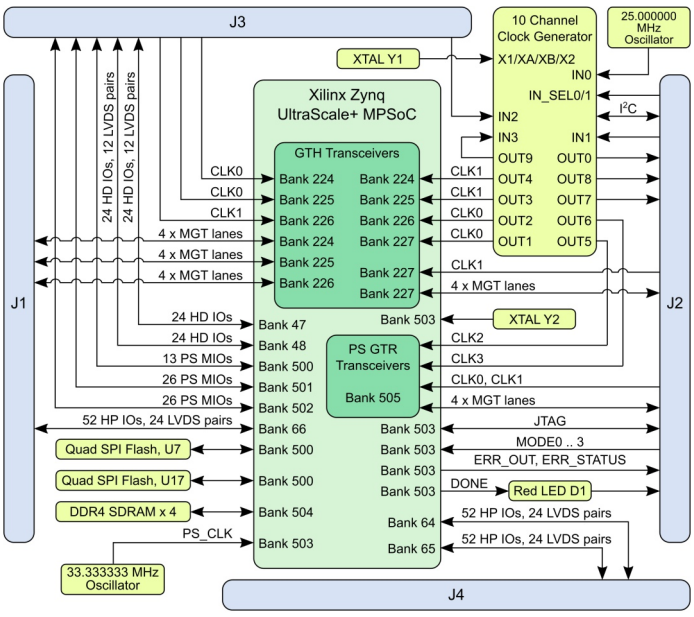
Device list	Pin Packages	Connectors	SDRAM max [GByte]	Flash [MByte]	Total I/O	GBit Transceivers	Other Features
ZU2CG - ZU5CG, ZU2EG - ZU5EG, ZU4EV, ZU5EV	C784	4 x Samtec ST5	8 DDR4	128	156 + 65 MIO	4 x PS GTR 4 x PL GTH (ZU4+ZU5 only)	GPU/VCU depending on device, EEPROM MAC address, programmable clock generator, single supply

TE0807 Series

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



http://trenz.org/te0807-info

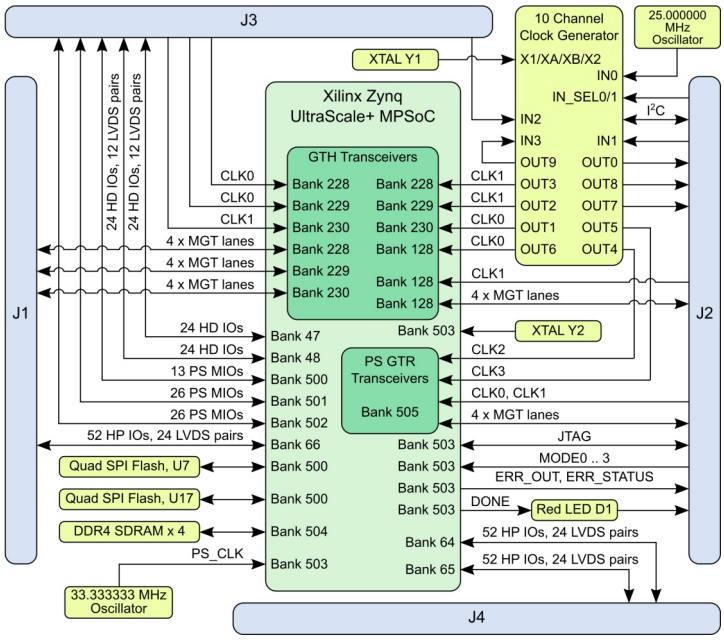


Device list	Pin Package	Connectors	SDRAM max [GByte]	Flash [MByte]	Total I/O	GBit Transceivers	Other Features
ZU4CG - ZU7CG, ZU4EG - ZU7EG, ZU4EV - ZU7EV	B900	4 x Samtec ST5	8 DDR4	128	204 + 65 MIO	4 x GTR, 16 x GTH	GPU and VCU, programmable clock generator, single supply

TE0808 UltraSOM+ Series

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

http://trenz.org/te0808-info

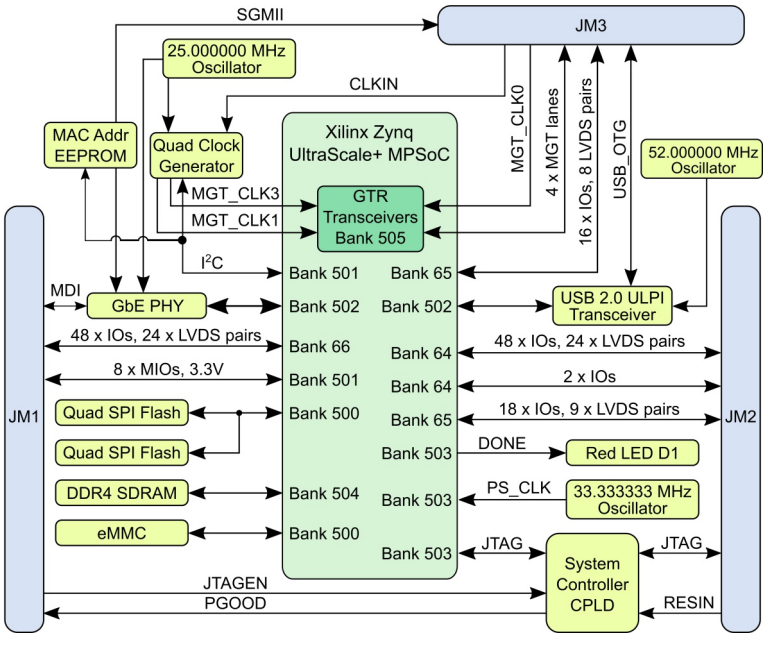


Device list	Pin Package	Connectors	SDRAM max [GByte]	Flash [MByte]	Total I/O	GBit Transceivers	Other Features
ZU6CG, ZU9CG, ZU6EG, ZU9EG, ZU15EG	C900	4 x Samtec ST5	8 DDR4	128	204 + 65 MIO	4 x GTR, 16 x GTH	GPU/VCU depending on device, programmable clock generator, single supply

TE0820 Series

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

http://trenz.org/te0820-info

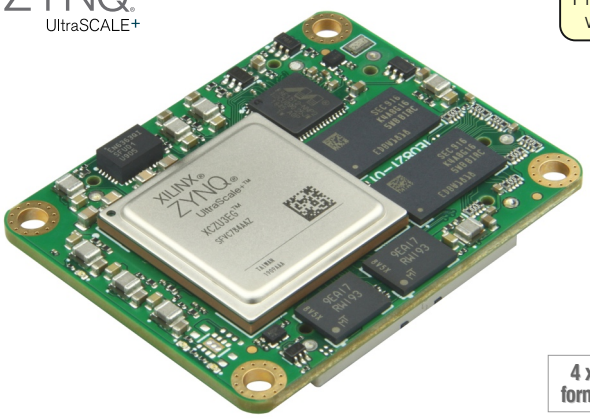


Device list	Pin Packages	Connec-tors	SDRAM max [GByte]	Flash [MByte]	e.MMC [GByte]	Ethernet PHY	USB PHY	Total I/O	GBit Transceiver	Other Features
ZU2CG - ZU5CG, ZU2EG - ZU5EG, ZU4EV, ZU5EV	784	3 x Samtec LSHM	4 DDR4	128	4 - 64	1 GBit	USB2.0 OTG	132 + 14 MIO	4 x PS GTR	GPU/VCU depending on device, programmable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

NEW TE0821 Series

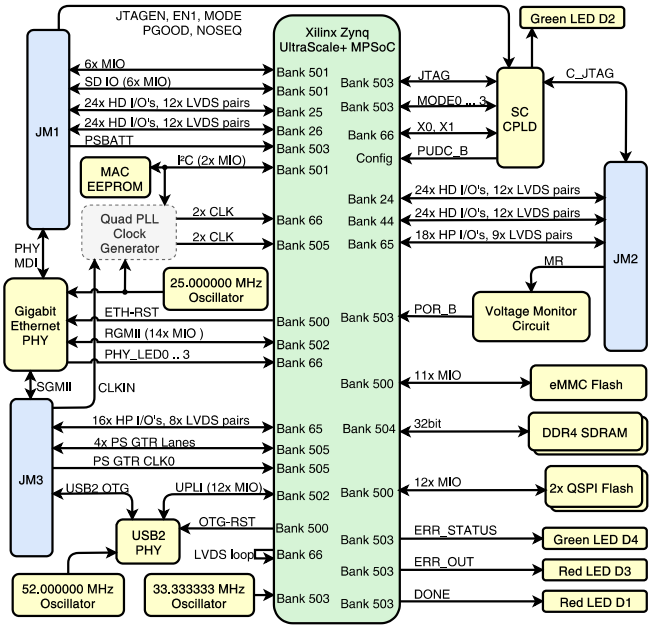
Xilinx Zynq UltraScale+, DDR4, Flash, USB, Ethernet, e.MMC, 96 High Density PL I/Os

ZYNQ UltraSCALE+



Pin compatible with TE0820

4 x 5 cm form factor



http://trenz.org/te0821-info

Device list	Pin Packages	Connec-tors	SDRAM max [GByte]	Flash [MByte]	e.MMC [GByte]	Ethernet PHY	USB PHY	Total I/O	GBit Transceiver	Other Features
ZU2CG - ZU5CG, ZU2EG - ZU5EG, ZU4EV, ZU5EV	784	3 x Samtec LSHM	4 DDR4	128	8 64 max.	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

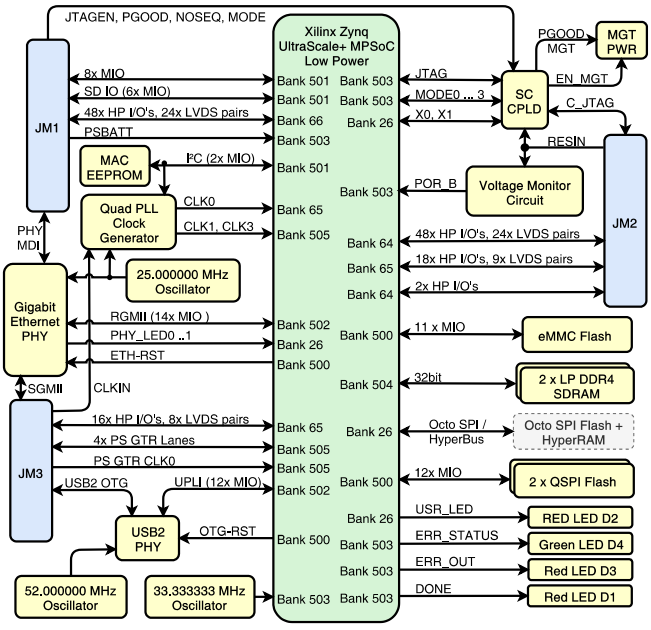
NEW TE0823 Series

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

ZYNQ UltraSCALE+

Optional HyperRAM/ OctalRAM/HyperFlash/ xSPI Flash

4 x 5 cm form factor



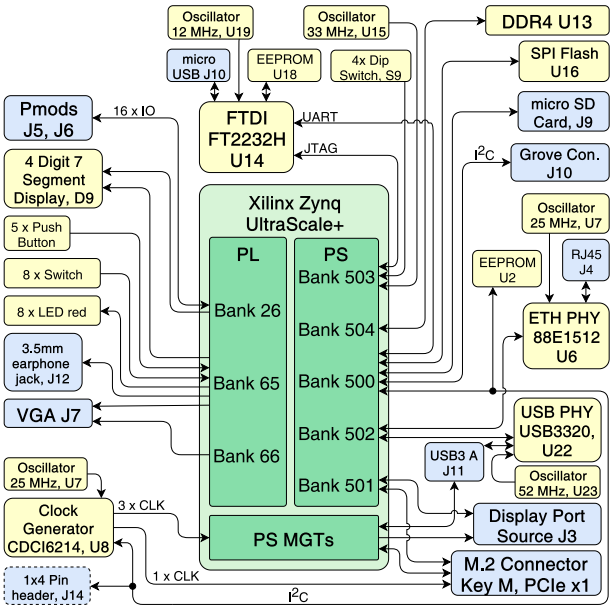
http://trenz.org/te0823-info

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

TE0802 MPSoC Development Board

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

http://trenz.org/te0802-info

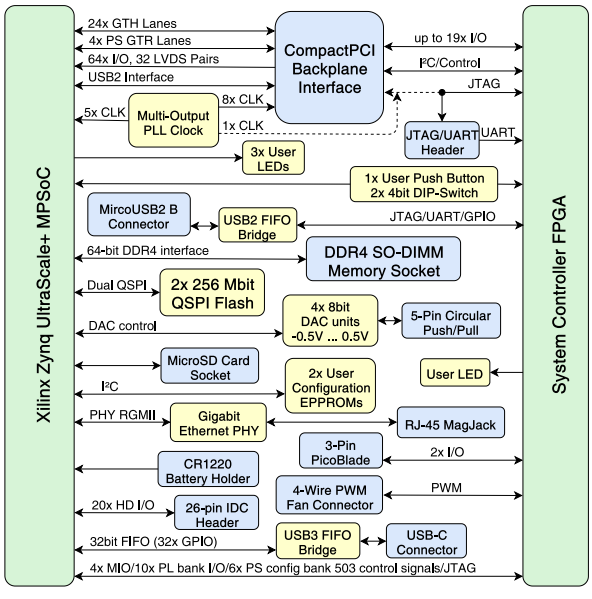


Device list	SDRAM max [GByte]	Flash [MByte]	Ethernet RJ45	USB	User I/O	Audio	Other Features
ZU2CG	2 LPDDR4	32	1 GBit	USB3.0 Host (type A connector)	2 Pmod connectors	3.5 mm jack (PWM output)	EEPROM, USB JTAG/UART MicroUSB, Micro SD card, M2 PCIe SSD support, display, power: 5V Plug

TEC0850 CompactPCI Serial Card

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

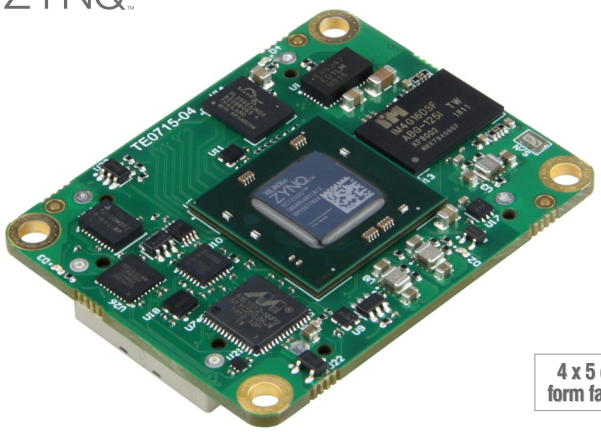
http://trenz.org/tec0850-info



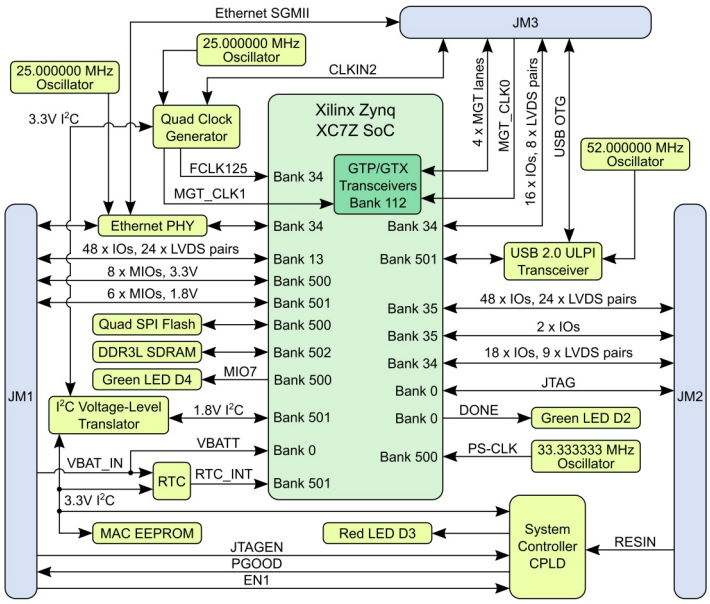
Device list	Form Factor	DDR4 SODIMM [GByte]	Flash [MByte]	USB	Total I/O	Ethernet	GBit Transceivers	Other Features
ZU15EG, 1156 Pin Packages	3U	8 (32 max.)	512 max.	USB3.0	32 x differential pairs	1 Gigabit	24 on PL side 4 on PS side	JTAG/UART via MicroUSB, 2 x EEPROM, real time clock, Zynq MPSoC cooling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

TE0715 Series

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



4 x 5 cm form factor



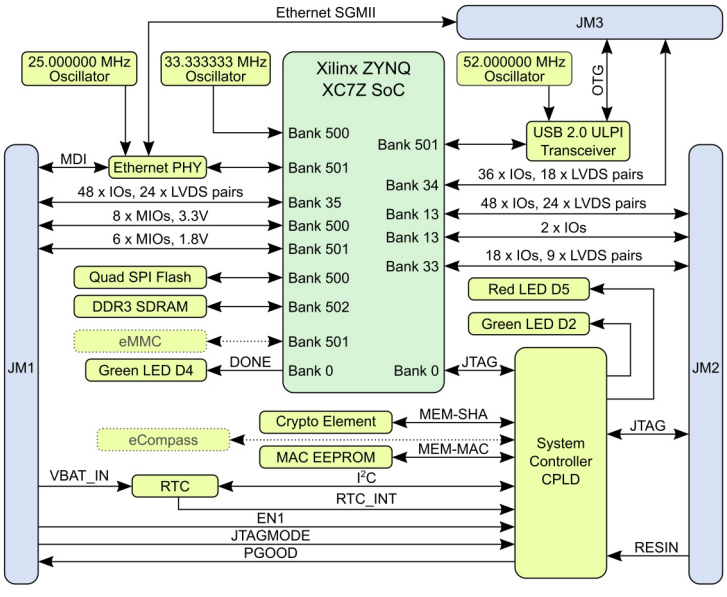
http://trenz.org/te0715-info

Device list	Connectors	SDRAM max [GByte]	Flash [MByte]	Ethernet PHY	USB PHY	Total I/O	GBit Transceivers	Other Features
Z-7015, Z-7030, Z-7012S	3 x Samtec LSHM	1 DDR3	32	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

4 x 5 cm form factor

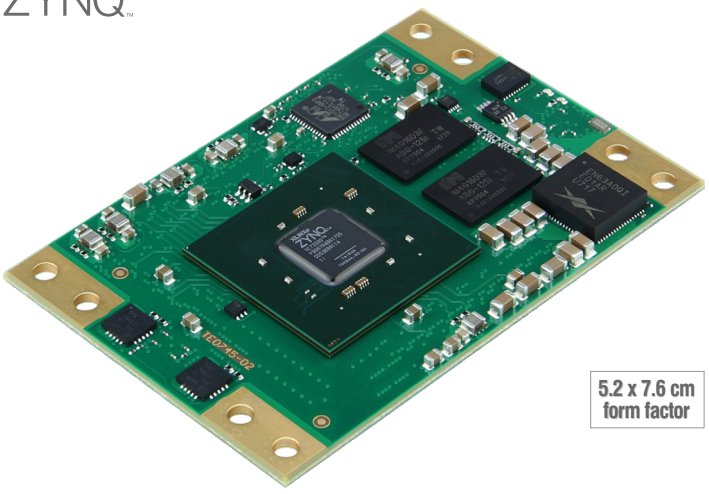


http://trenz.org/te0720-info

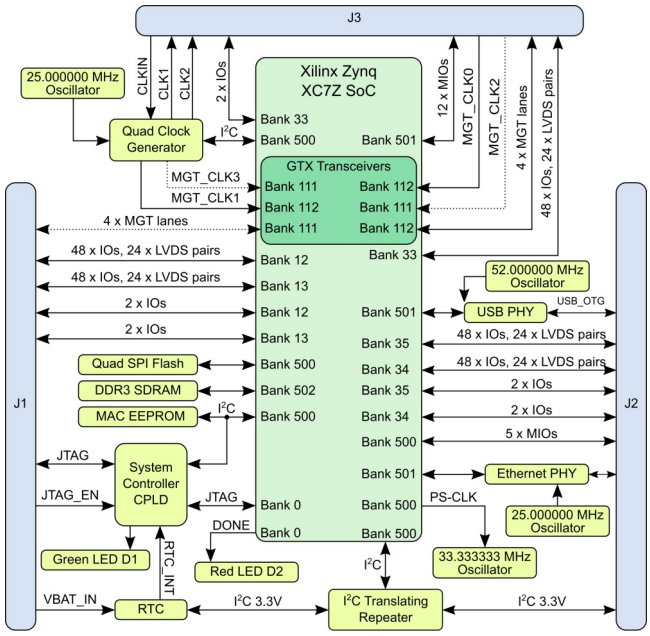
Device list	Connectors	SDRAM max [GByte]	Flash [MByte]	e.MMC max. [GByte]	Ethernet PHY	USB PHY	Total I/O	Other Features
Z-7020, Z-7014S, XA7Z020-1CLG484Q	3 x Samtec LSHM	1 DDR3	32	32	1 GBit	USB2.0	152 + 14 MIO	Real time clock, MAC address, 2k serial EEPROM, 3 user LEDs, single supply

TE0745 Series

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



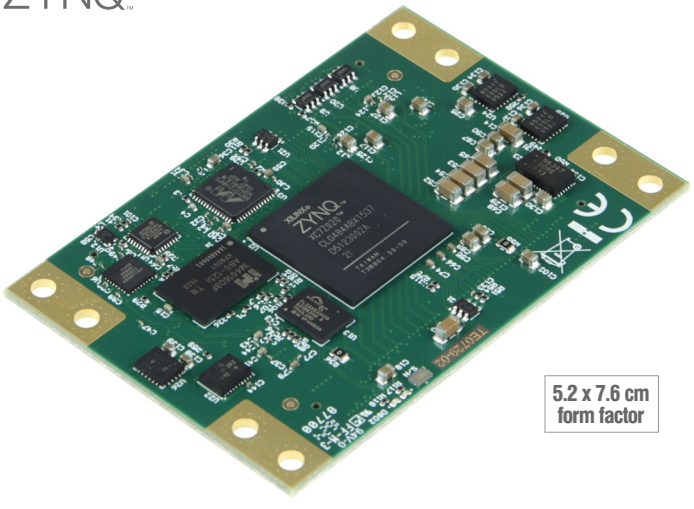
http://trenz.org/te0745-info



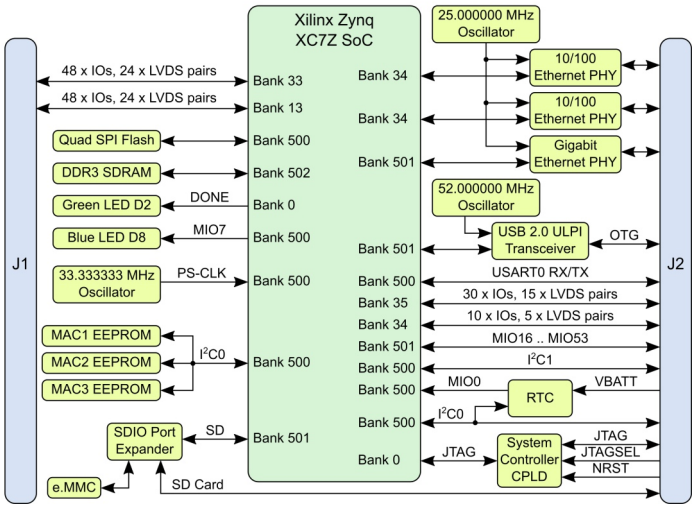
Device list	Connectors	SDRAM max [GByte]	Flash [MByte]	Ethernet PHY	USB PHY	Total I/O	GBit Transceivers	Other Features
Z-7030, Z-7035, Z-7045	3 x Samtec ST5	1 DDR3L	64	1 GBit	USB2.0 OTG	250 + 6 MIO	8 x GTX	Real time clock, single supply

TE0729 Series

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



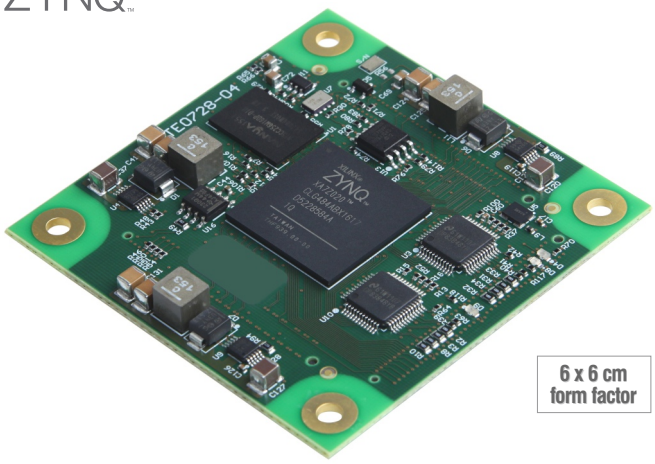
http://trenz.org/te0729-info

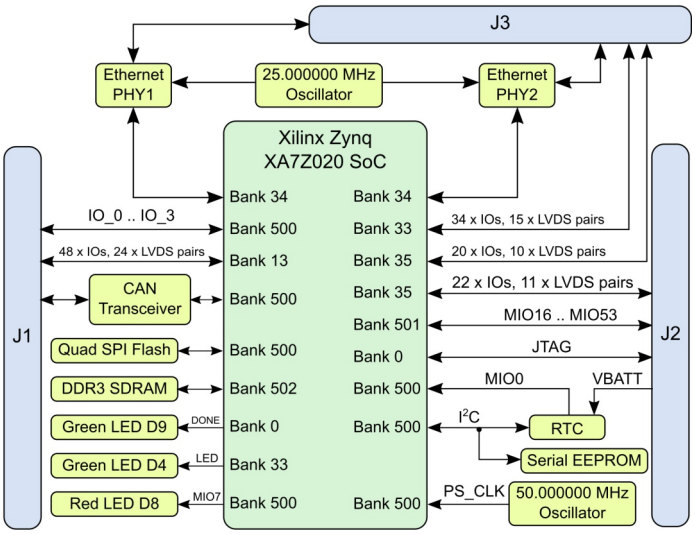


Device list	Connectors	SDRAM max [MByte]	Flash [MByte]	e.MMC [GByte]	Ethernet PHY	USB PHY	EEPROM	Total I/O	Other Features
Z-7020	3 x Samtec LSHM	512 DDR3	32	4 - 64	2 x 100 MBit, 1 GBit	USB2.0 OTG	2 x MAC address	136 + 14 MIO	Real time clock, single supply

TE0728 Series

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



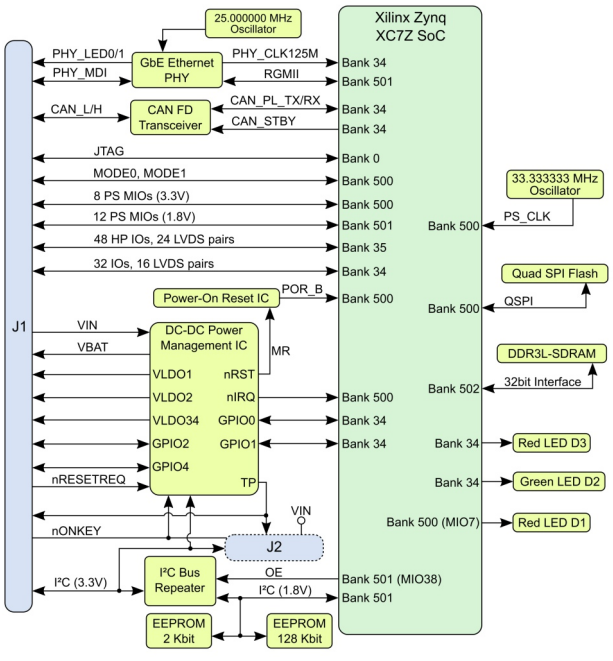


http://trenz.org/te0728-info

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

TE0724 Series

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

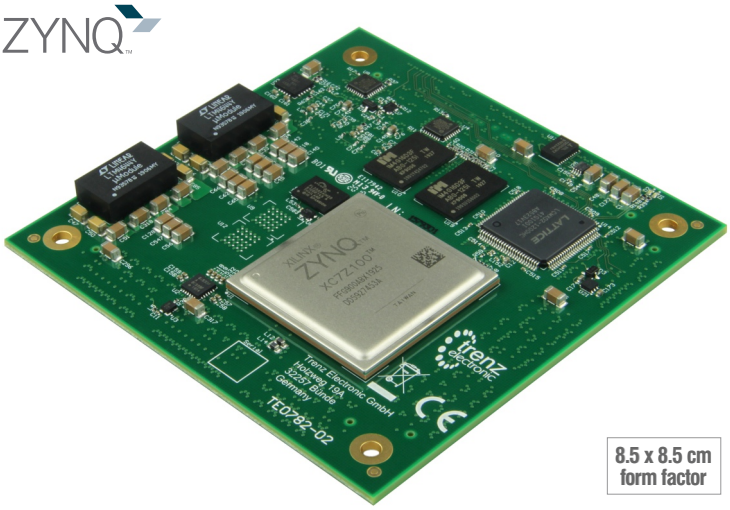


http://trenz.org/te0724-info

Device list	Connectors	SDRAM max [GByte]	Flash [MByte]	EEPROM	Ethernet PHY	Total I/O	Other Features
Z-7010, Z-7020	1 x Samtec ST5	1 DDR3L	32	MAC Address	1 GBit	PL: 80 PS: 20	CAN, single supply

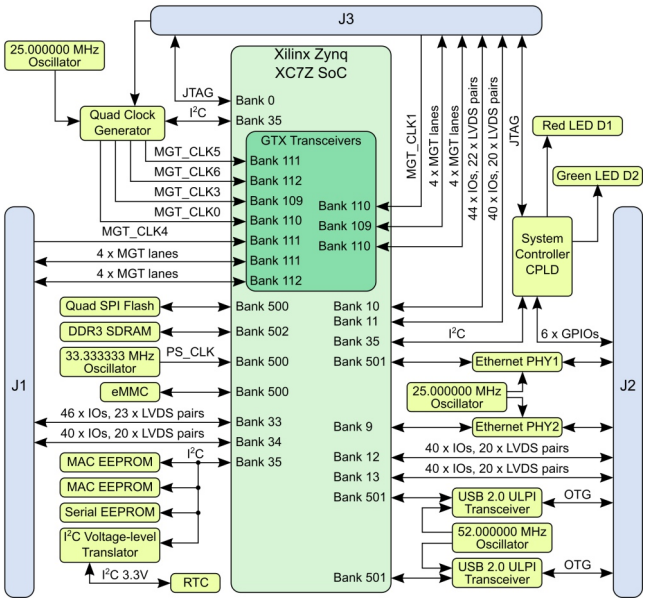
TE0782 Series

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

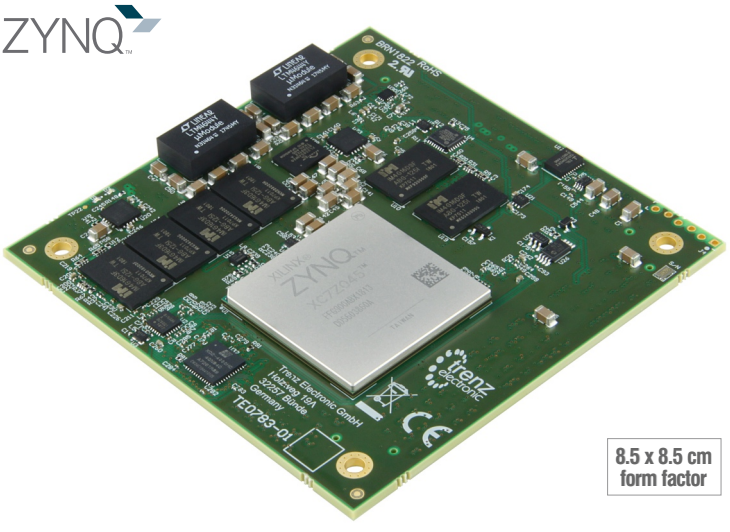
http://trenz.org/te0782-info



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

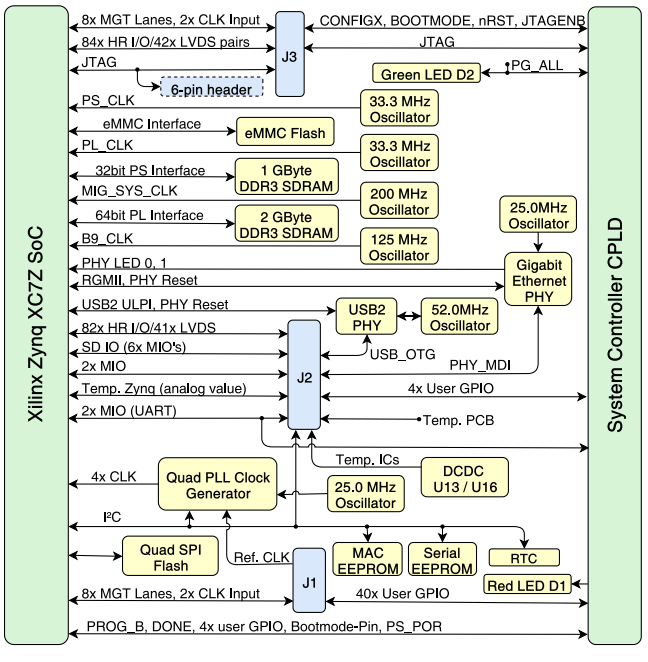
TE0783 Series

Xilinx Zynq-7000, Memory on both PS and PL, Flash, Ethernet, USB, e.MMC



8.5 x 8.5 cm form factor

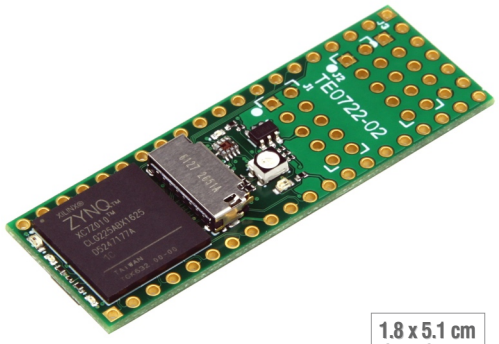
http://trenz.org/te0783-info



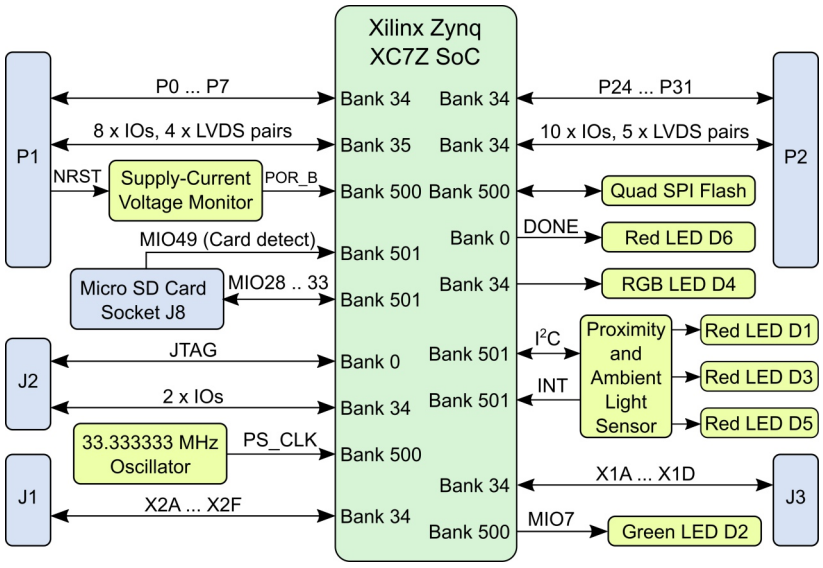
Device list	Connectors	SDRAM max [GByte]	Flash [MByte]	e.MMC [GByte]	Ethernet PHY	Total I/O	GBit Transceivers	Other Features
Z-7035, Z-7045, Z-7100	3 x Samtec QTH	1 DDR3 32-bit conntected to PS plus 2 DDR3 64-bit connected to PL	32	4 max. 64	1 Gigabit	166	16 x GTX 4 x GT	USB2.0 OTG, programmable clock generator, real time clock, single supply

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

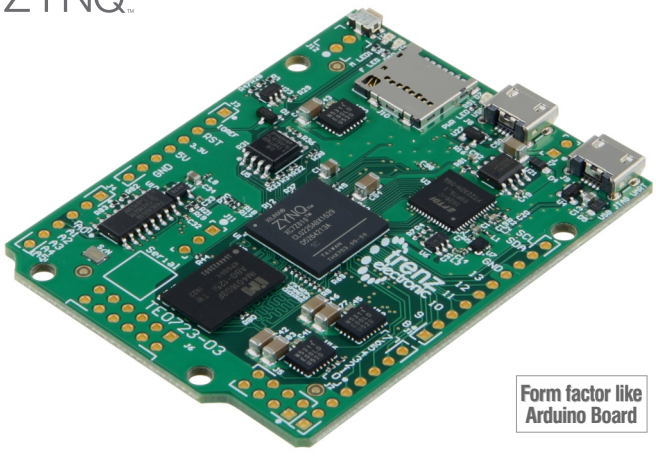


http://trenz.org/te0722-info

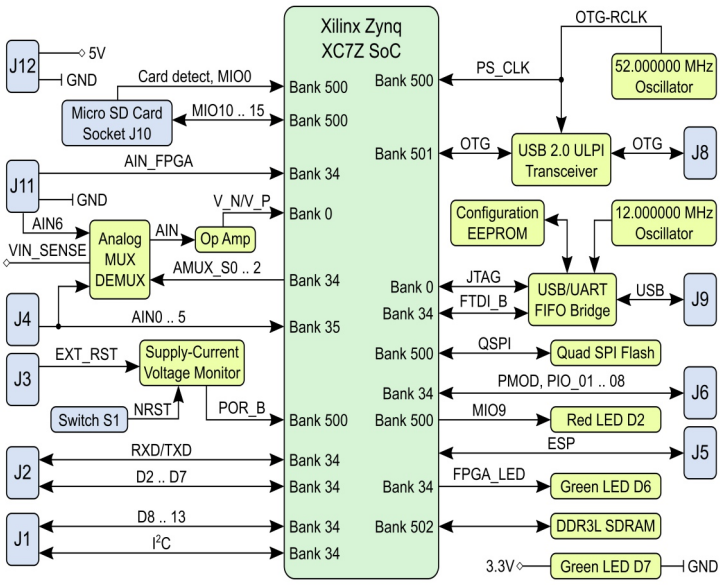
Device list	Flash [MByte]	Total I/O	DIP40 form factor	Clock	Other Features
Z-7010, Z-7007S	16	46 +3 Input only	2 x 20 holes for socket pins or pin-header	33.333 MHz (MEMS Oscillator)	3.3V single supply, micro SD card socket, proximity and ambient light sensor, industrial temperature range available

TE0723 "ArduZynq" Series

Xilinx Zynq-7000, DDR3L, Flash, USB OTG, On-board USB JTAG and UART



Form factor like Arduino Board

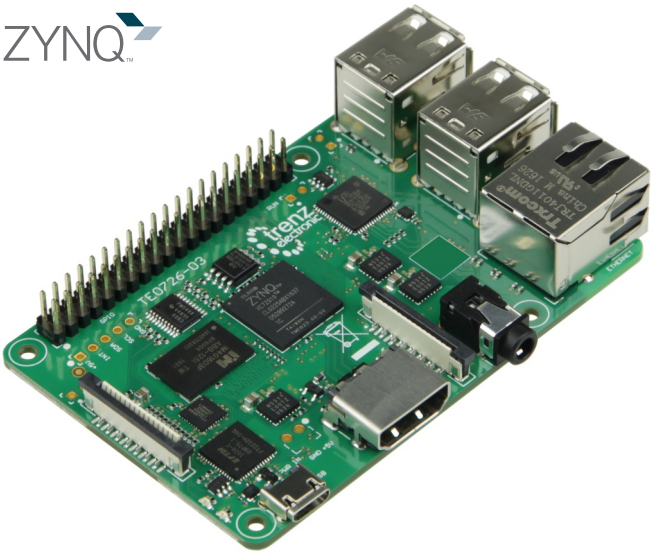


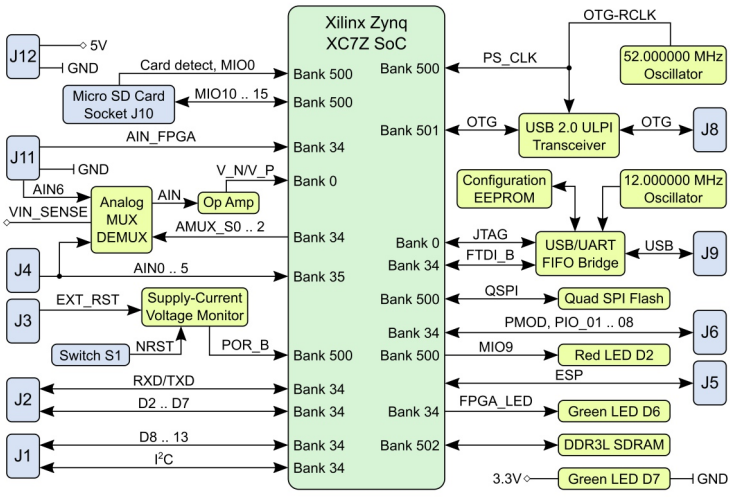
http://trenz.org/te0723-info

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

TE0726 "ZynqBerry" Series

Xilinx Zynq-7000, Raspberry Pi 2 Form Factor, DDR3L, Flash, Ethernet, USB, HDMI



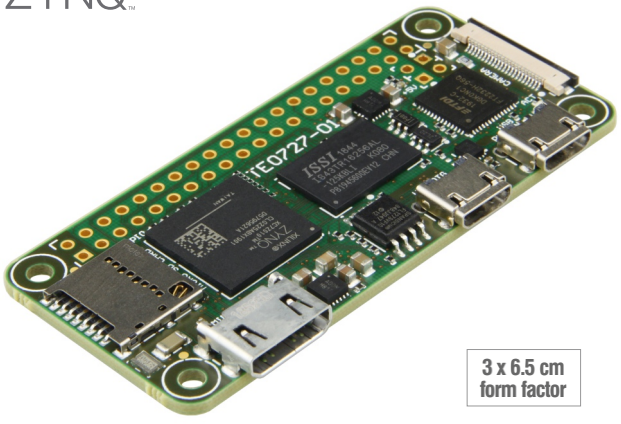


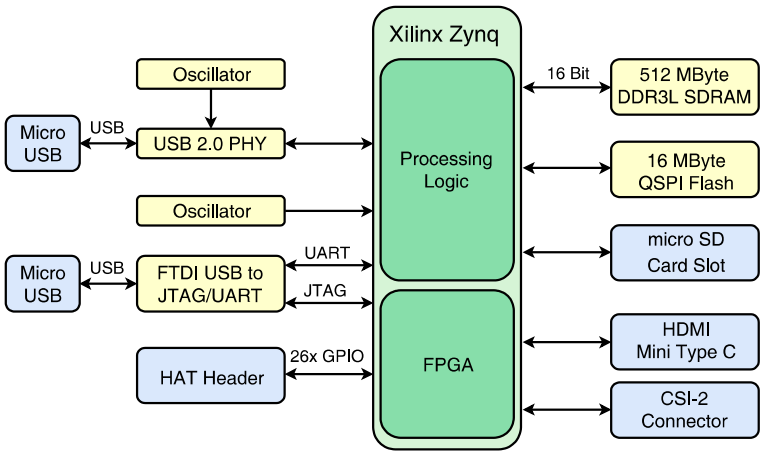
http://trenz.org/te0726-info

Device list	Connectors	SDRAM max [MByte]	Flash [MByte]	Ethernet PHY	USB PHY	Total I/O	Other Features
Z-7010, Z-7007S	40-pin "HAT" headers	512 DDR3L	16	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

NEW TE0727 "ZynqBerryZero" Series

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





http://trenz.org/te0727-info

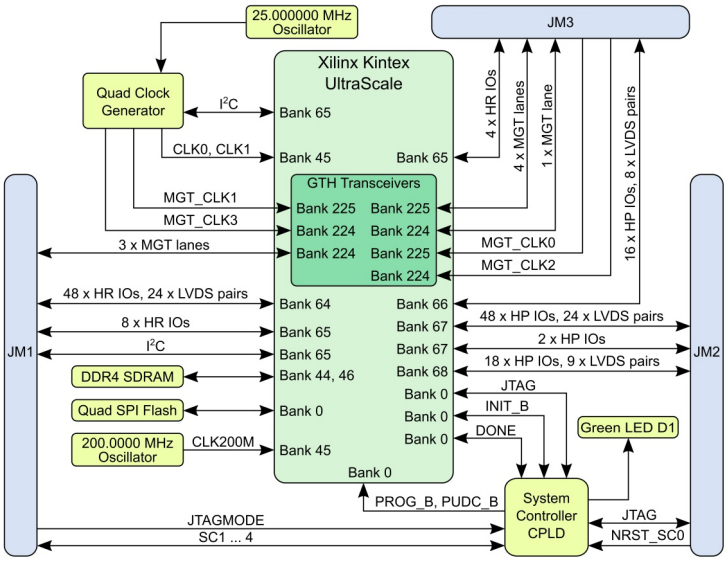
Device list	SDRAM max [MByte]	Flash [MByte]	HAT header	Total I/O	Other Features
Z-7010	512 DDR3L	16	40 pin	26 GPIO	2 x micro USB2.0, micro SD card slot, Mini HDMI type C, CSI-2 connector (camera)

TE0841 Series

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

KINTEX UltraSCALE

4 x 5 cm form factor



http://trenz.org/te0841-info

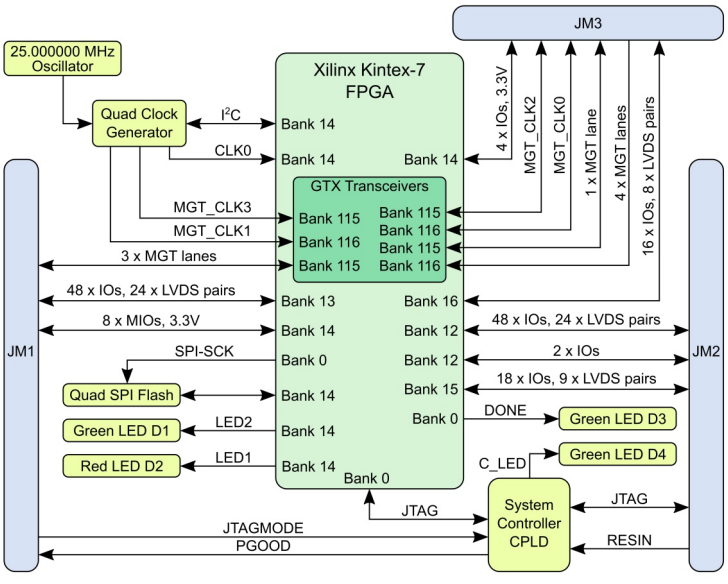
Device list	Connectors	SDRAM max [GByte]	Flash [MByte]	Total I/O	GBit Transceivers	Other Features
KU035, KU040	3 x Samtec LSHM	4 DDR4	64	60 x HR I/Os 84 x HP I/Os	8 x GTH	Programmable clock generator, single supply

TE0741 Series

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

KINTEX 7

4 x 5 cm form factor

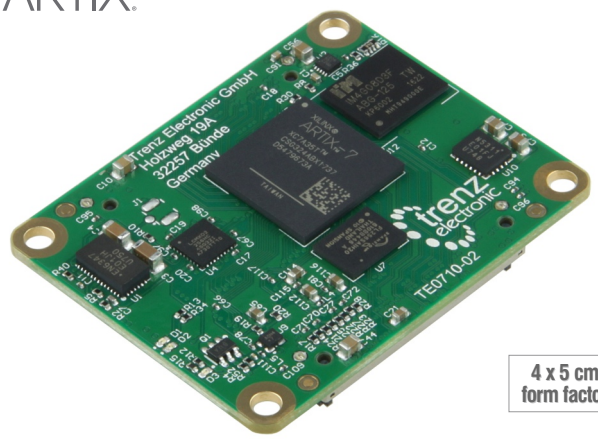


http://trenz.org/te0741-info

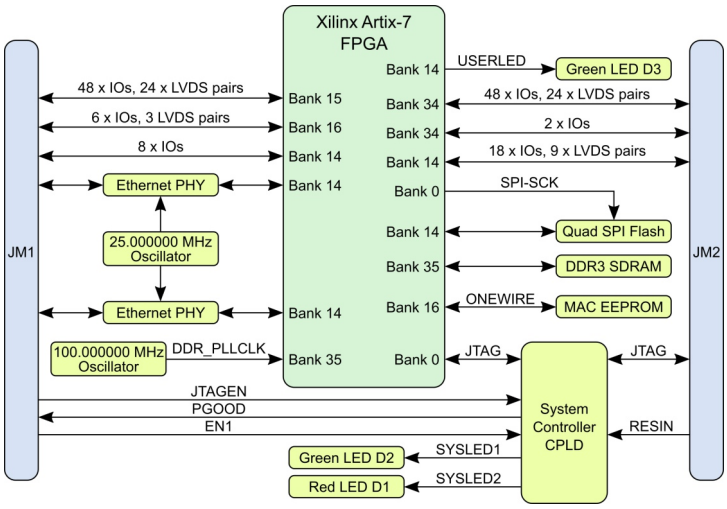
Device list	Connectors	Flash [MByte]	Total I/O	GBit Transceivers	Other Features
70T, 160T, 325T, 410T	3 x Samtec LSHM	32	144 (94 for 70T variant)	8 x MGTs	Programmable clock generator, single supply

TE0710 Series

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



4 x 5 cm
form factor

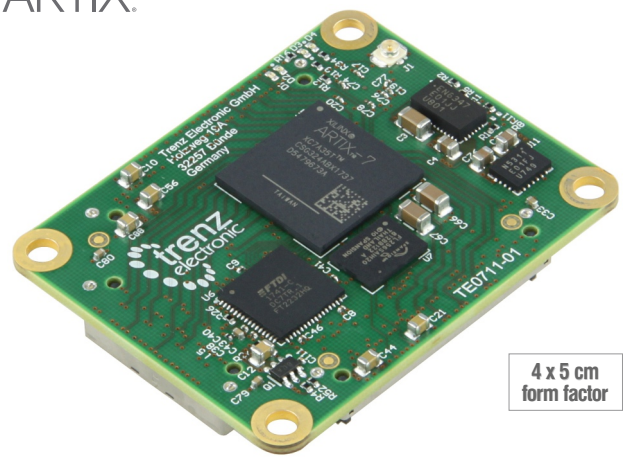


http://trenz.org/te0710-info

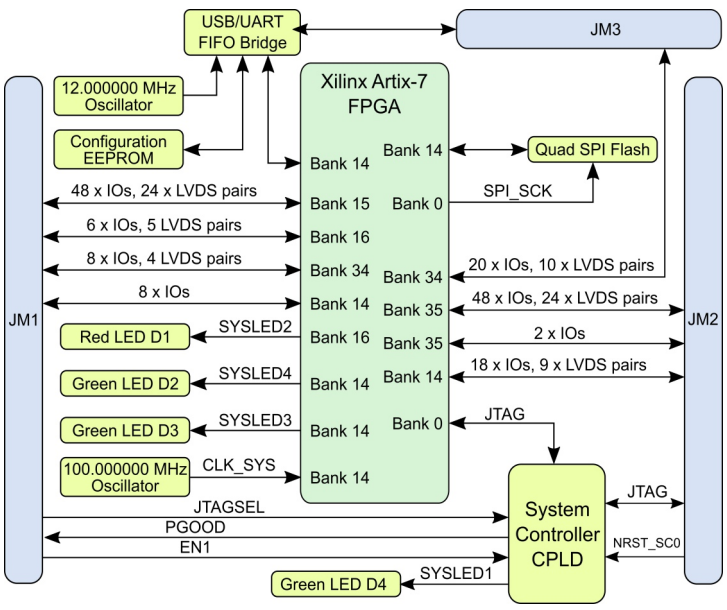
Device list	Connectors	SDRAM max [MByte]	Flash [MByte]	Ethernet PHY	Total I/O	Other Features
35T, 50T, 75T, 100T	2 x Samtec LSHM	512 DDR3	32	2 x 100 MBit	112 (51 differential pairs + 10 single-ended)	JTAG, 100 MHz MEMS oscillator, user LED, single supply

TE0711 Series

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



4 x 5 cm
form factor

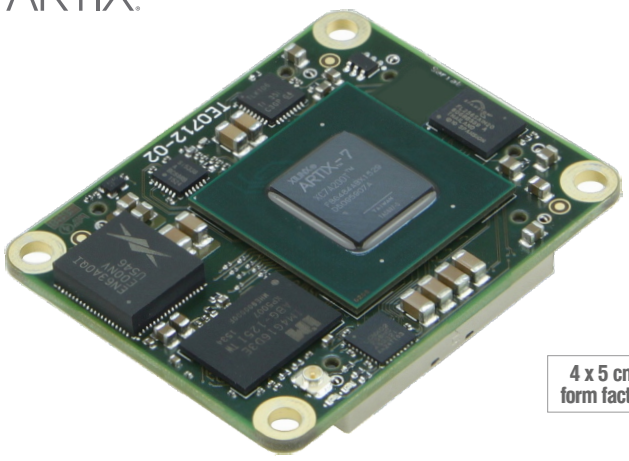


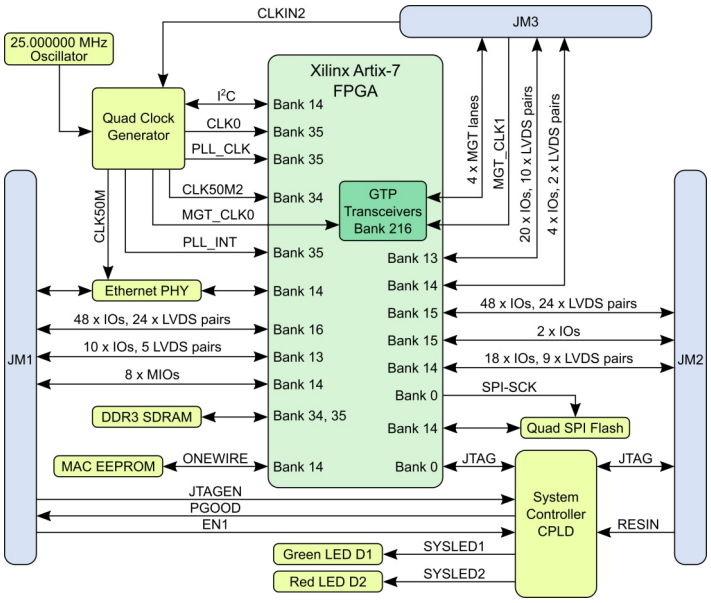
http://trenz.org/te0711-info

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

TE0712 Series

Xilinx Artix-7, DDR3, Flash, 100 MBit Ethernet, 4 x GTP Transceiver



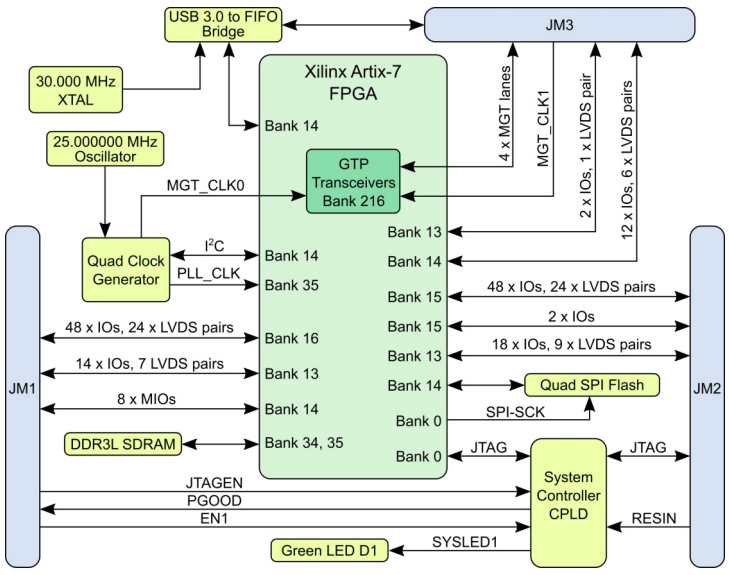


http://trenz.org/te0712-info

Device list	Connectors	SDRAM max [MByte]	Flash [MByte]	EEPROM	Ethernet PHY	Total I/O	GBit Transceivers	Other Features
35T, 50T, 75T, 100T, 200T	3 x Samtec LSHM	1024 DDR3	32	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



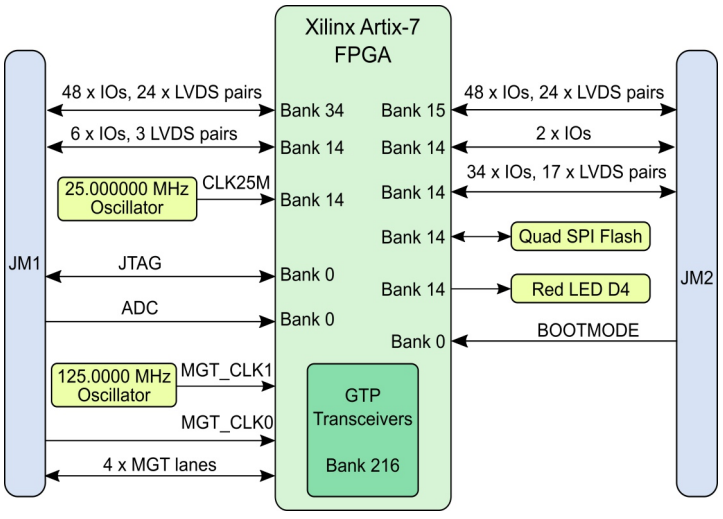
http://trenz.org/te0713-info

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

TE0714 Series

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

3 x 4 cm form factor

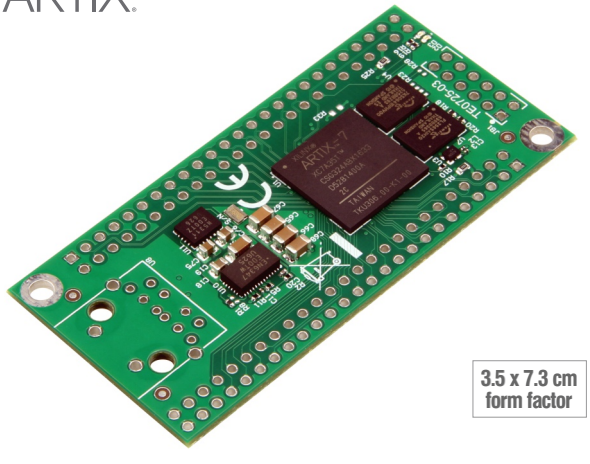


http://trenz.org/te0714-info

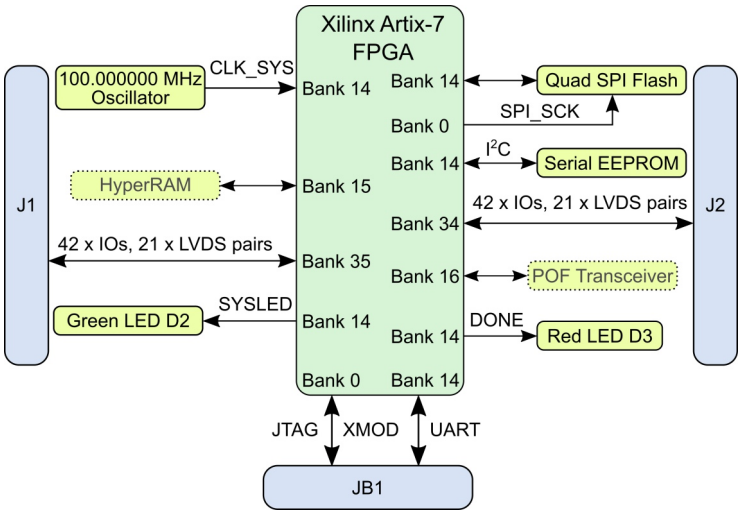
Device list	Connectors	Flash [MByte]	Total I/O	GBit Transceivers	Other Features
15T, 35T, 50T	2 x Samtec LSHM	16	138 + 5 (QSPI or user I/Os)	4 x GTP	Differential MEMS oscillator for MGT clocking, XADC analog Input, eFUSE bit-stream encryption (AES), single supply

TE0725 Series

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



3.5 x 7.3 cm form factor

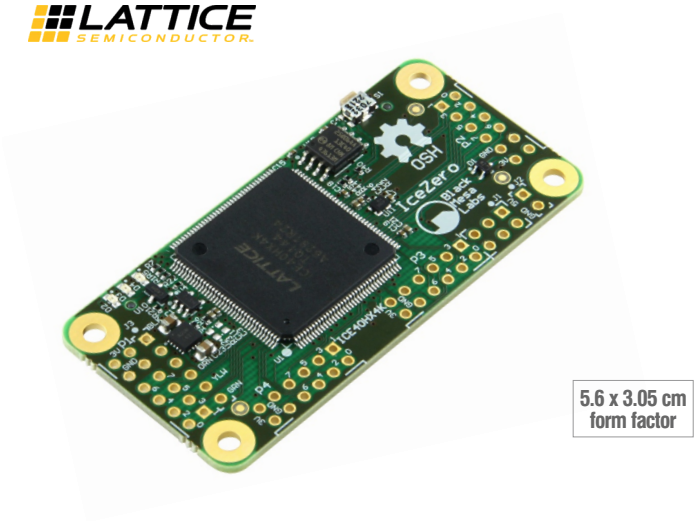


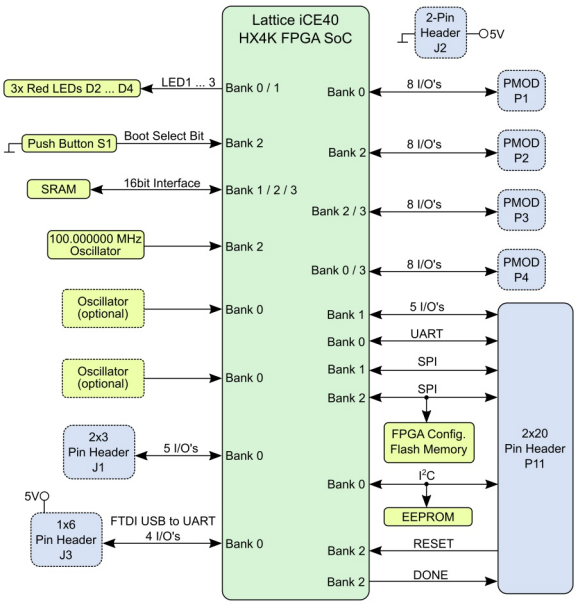
http://trenz.org/te0725-info

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

TE0876 IceZero Series

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



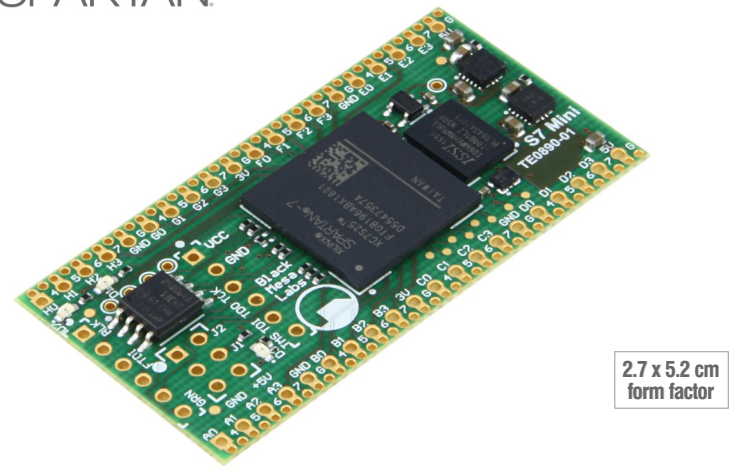


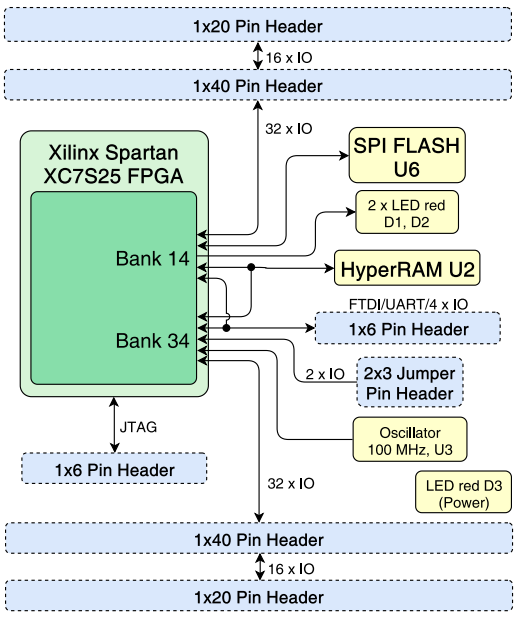
http://trenz.org/icezero-info

Device list	Connectors	SDRAM max [MBit]	Flash [MByte]	Other Features
Lattice ICE40	4 2x6-pin Pmod connectors (no default)	4 external SRAM	8	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)

TE0890 S7 Mini

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





http://trenz.org/te890-info

Device list	Footprint compatible	Config PROM[[MBit]	HyperRAM DRAM [MBit]	Total I/O	Interface(s)	Supply	Other Features
7S25	7S6, 7S15, 7S50 FTGB-196 devices	64 MBit	64	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

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

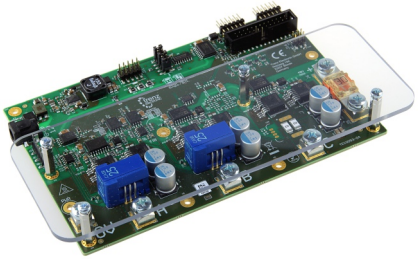
Other assembly options for cost or performance optimization plus high volume prices available on request.

Resources

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

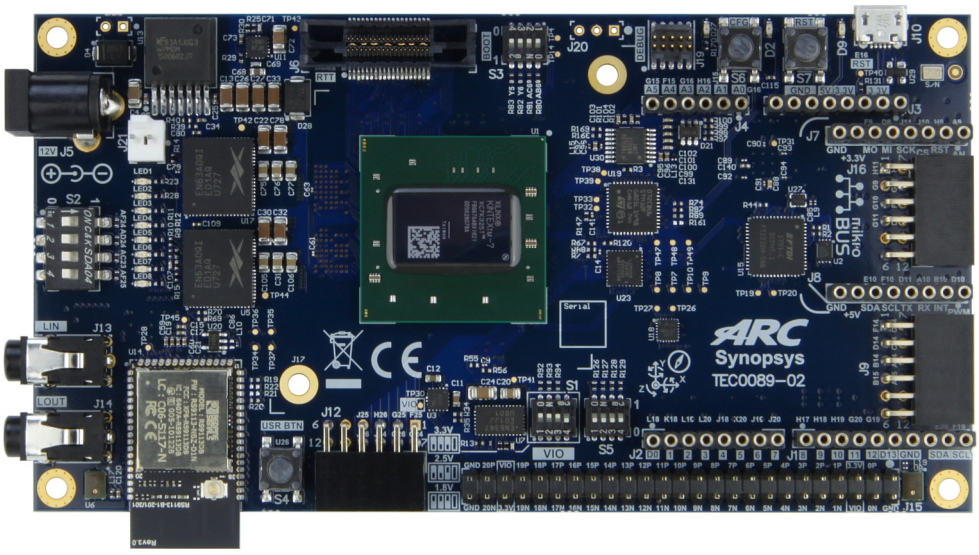
Support

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



ZYNQ™

http://trenz.org/EDDP/



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 16MB of PSRAM, 16MB of SPI Flash and a wide range of peripherals such Audio Line In/Out, UART, SPI, I2C, and ADC. An on-board module providing Wi-Fi/Bluetooth functionality and a 9-D motion sensor enable fast development of IoT applications. Two digital MEMs microphones 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
- Wireless module RS9113-NBZ-D1C (Wi-Fi/BT/BLE)
- 3-axis gyroscope, 3-axis accelerometer, 3-axis magnetometer ICM-20948
- Stereo Audio Codec MAX9880A
- 2 x PDM Microphones SPK0641HT4H-1
- 2 x 3.5mm RCA audio jacks (input/output)
- 100MHz User Clock Oscillator SiT8008
- Status LEDs, Power LED
- 12V Power Supply (separately included in the scope of delivery)

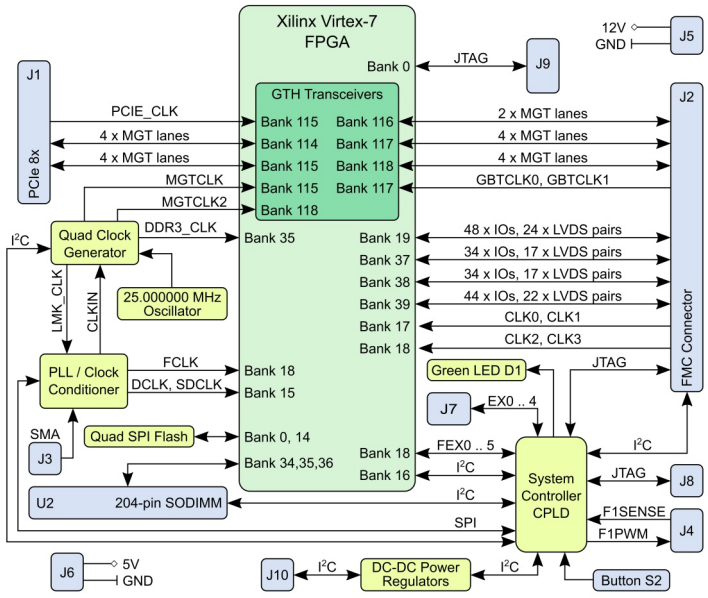
http://trenz-electronic.de/DesignWare_ARC_EM

TEC0330 PCIe FMC Carrier

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

VIRTEX 7

http://trenz.org/tec0330-info



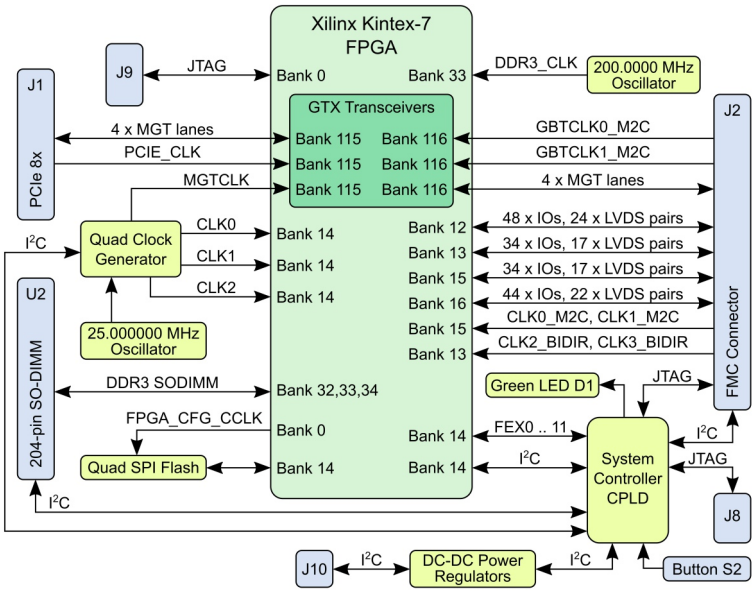
Device list	Flash [MByte]	SDRAM	Total I/O	GBit Transceivers	GBit Transceivers Transmission Rate	Other Features
XC7VX330T	32	DDR3 SO-DIMM Socket	up to 202 FPGA I/O pins on FMC connector	10 on FMC 8 on PCIe lanes	13.1 GBit/s	FMC High Pin Count (HPC) connector, programmable clock generator

TEF1001 PCIe FMC Carrier

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

KINTEX 7

http://trenz.org/tef1001-info



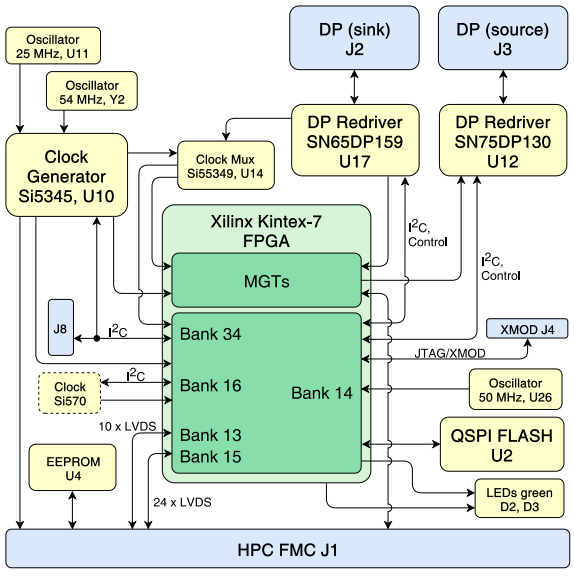
Device list	Flash [MByte]	SDRAM	Total I/O	GBit Transceivers	Other Features
XC7K160T	32	DDR3 SO-DIMM Socket	160 on FMC connector	4 on FMC 4 on PCIe lanes	Vita 57.1 FMC HPC slot, programmable clock generator, 200 MHz low jitter LVDS oscillator

TEF0007 Series

FMC Card with DisplayPort input and output

KINTEX-7

http://trenz.org/tef0007-info



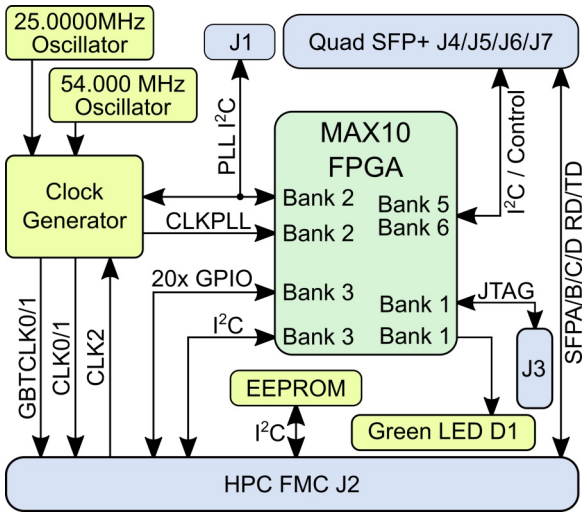
Device list	Connector	Flash [MByte]	Total I/O	GBit Transceiver(s)	Other Features
Xilinx Kintex-7 160T	HPC FMC	32	34 differential (68 single ended)	4 x GTP	Data rates up to 5.4 Gbps, sink + source DP connector, 50 MHz oscillator, configurable PLL

TEF0008 Series

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

intel

http://trenz.org/tef0008-info



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

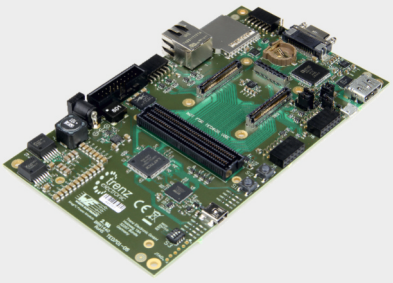
Device list	Connector	Dimension	SFP+	Other Features
Intel MAX 10 10M08SAU169C8G	HPC FMC	69 x 84 mm, SFP+ connector excluded (+ 5.5 mm)	4 SFP+ 10 GBit ports for fiber optical SFP modules	Low-jitter programmable clock generator, 3.3V to 1.8V DCDC converter, 128 KBit EEPROM, status LED (green)

Trenz Electronic Carrier Boards
for 4 x 5 cm TE modules

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.

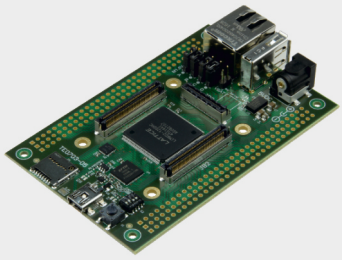
TE0701

- 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

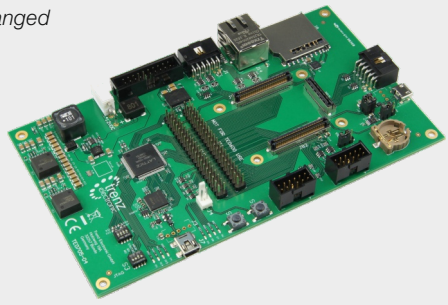


TE0705

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

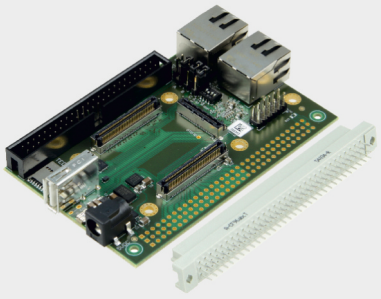
Changes from TE0701

- 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

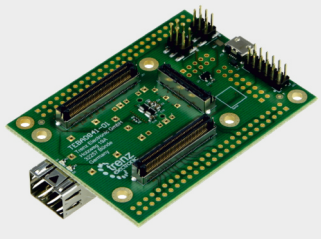
- VG96 connector and 50-pin IDC male connector socket
- SDIO port expander with voltage-level translation
- Micro SD card socket and a USB type A connector
- One user push button, user configurable DIP switch
- Two RJ45 Gigabit Ethernet MagJack
- One Ethernet PHY
- Barrel jack for 5 V power supply input
- 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, IOs)
- One pin header 10 pol. (SD IOs)
- Two pin headers 50 pol. (FPGA bank IOs 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)



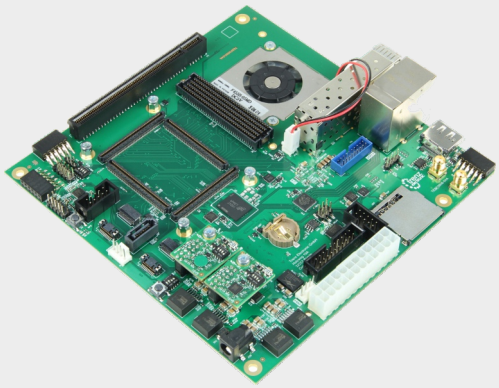
http://trenz.org/te-baseboards

Trenz Electronic Carrier Boards
for modules with different form factors

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.

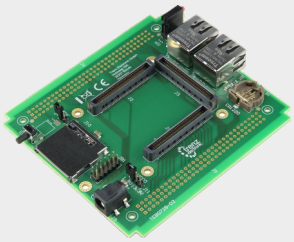
TEBF0808

- 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)



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 suppy
- 3 x user LEDs (red/yellow/green)
- One user push button

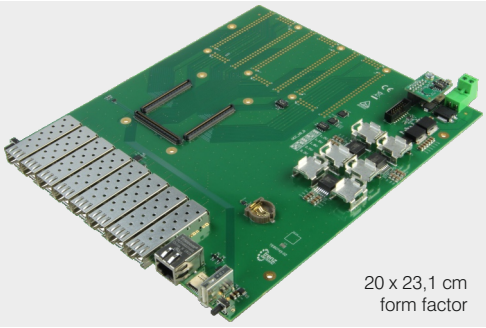


TEB0729

- 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

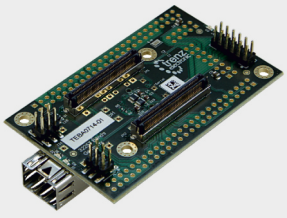
- Trenz TE0745 module socket (3 x Samtec ST5 connectors 160 pins)
- 24V power supply over ARKZ950/2 connecting terminal
- XMOD (TE0790) Pin Header (JTAG / UART)
- One EMI Network Filter
- MicroSD connector
- RJ45 Ethernet connector
- USB Host connector
- Eight SFP connector
- Six pin header 50 pol. (FPGA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



20 x 23,1 cm
form factor

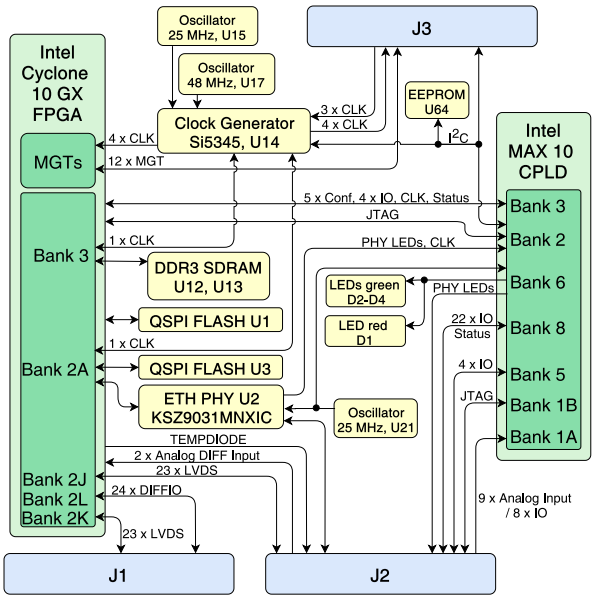
TEBA0714

- Trenz 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)



TEI0006 Series

Intel Cyclone 10 GX SoM, DDR3, Flash, Ethernet, Baseboard available

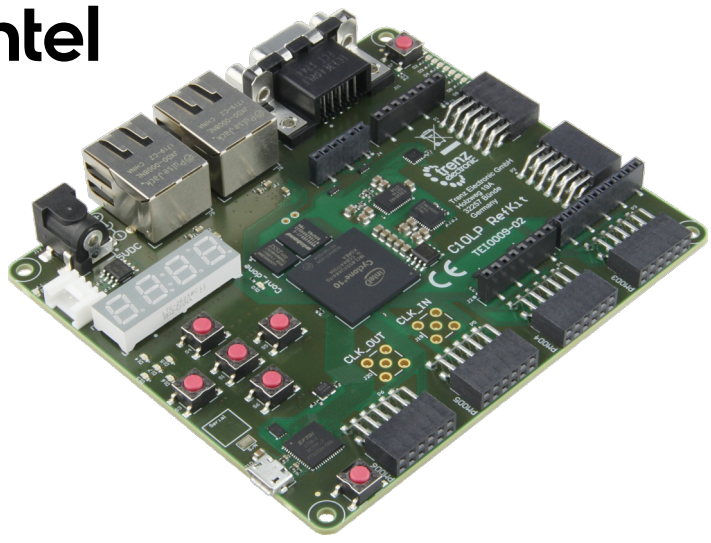


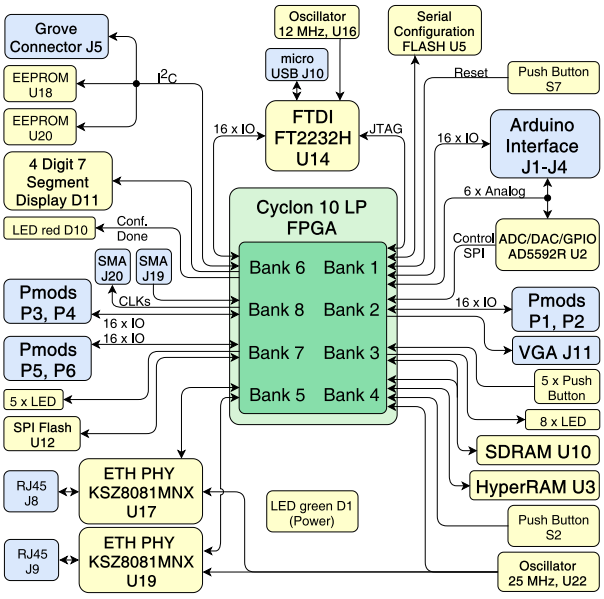
http://trenz.org/tei0006-info

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

TEI0009 C10LP RefKit Development Board

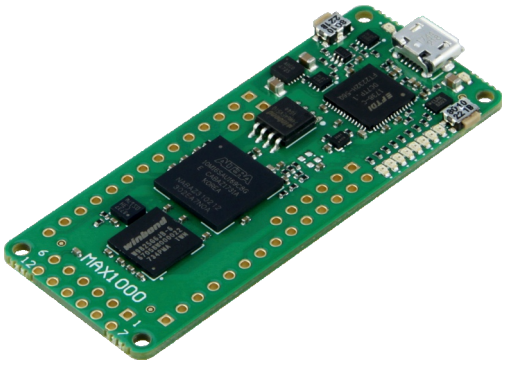
Intel Cyclone 10 LP, Integrated USB Programmer2, 2 x 10/100 Ethernet, USB2.0





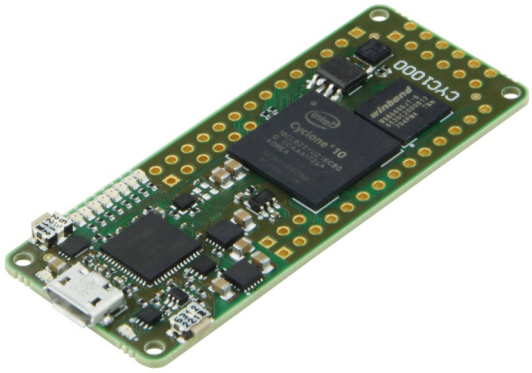
http://trenz.org/tei0009-info

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



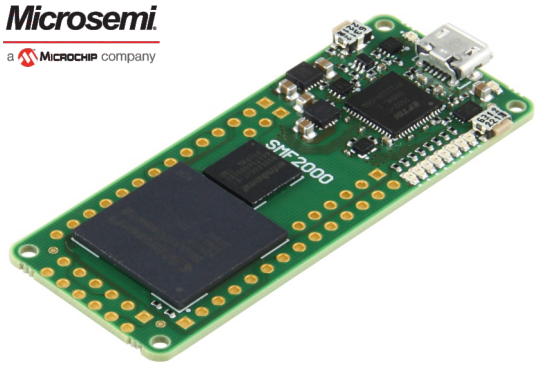
Resources http://trenz.org/max1000-info

MAX1000 IoT/Maker board, TEI0001 series, Intel MAX 10 10M08SAU169C8G 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



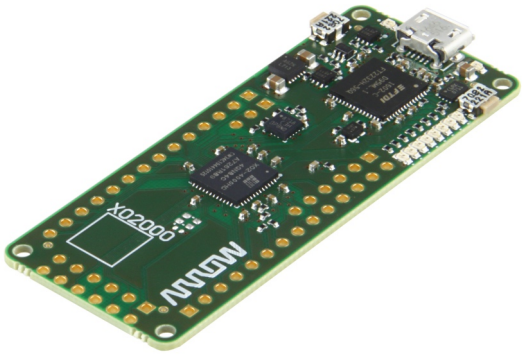
Resources http://trenz.org/cyc1000-info

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



Resources http://trenz.org/smf2000-info

SMF2000, TEM0001 series, Microsemi SmartFusion2 M2S010-VFG400 FPGA, 8 MByte SDRAM, 8 MByte Flash, 25 MHz system clock and 32.768 KHz auxiliary clock, JTAG and UART over Micro USB2.0 connector, 1 x 3-pin header for Live Probes, 1 x Pmod header providing 8 I/O, 2 x 14-pin header (2.54 mm pitch) providing 23 I/O, 9 user LEDs, 1 user push button

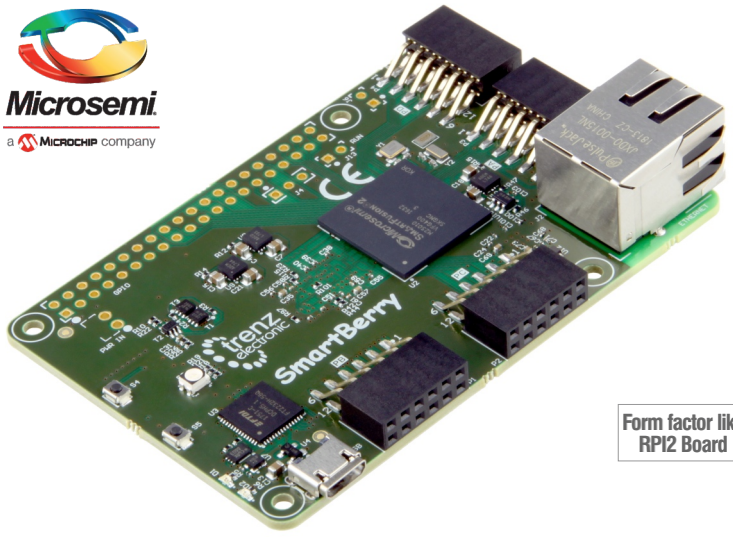


Resources http://trenz.org/xo2000-info

LXO2000, TEL0001 series, Lattice X02-4000 FPGA, 22 I/O on MKR header, 2 I/O on additional header, optional Pmod header (+8 I/O), on-board USB/JTAG, on-board USB/serial, 100 MHz MEMS clock oscillator, 2 push buttons, 8 LEDs, supply: USB or 5V from pin header, RC-networks

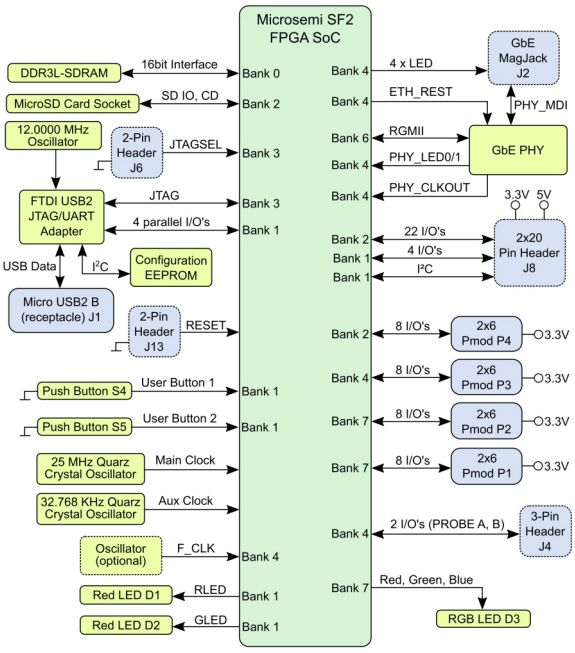
TEM0002 SmartBerry Series

Microsemi M2S010, DDR3, Ethernet PHY with RJ45 MagJack



Form factor like RPI2 Board

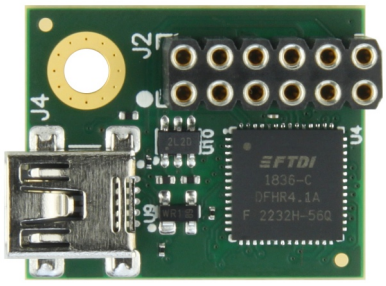
http://trenz.org/smartberry-info



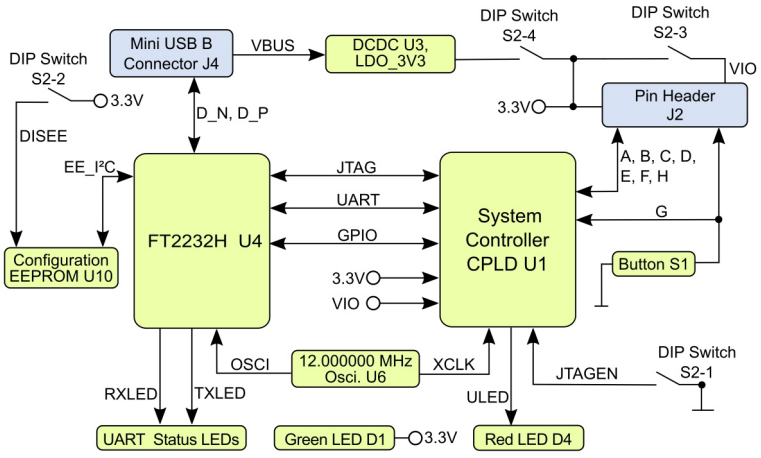
Device list	SDRAM [GBit]	Ethernet	Total I/O	Connectors	on-board	Other Features
Microsemi M2S010-VFG400	1 DDR3	1 GBit Ethernet PHY with RJ45 MagJack	Raspberry Pi compatible header with 26 I/O + I2C	MicroSD card socket, 4 Pmod headers	USB/JTAG USB/serial	2 push buttons

TE0790 XMOD FTDI JTAG Adapter

XMOD Form Factor, FT2232H, Lattice XO2-256 CPLD



2 x 2.5 cm form factor



http://trenz.org/te0790-info

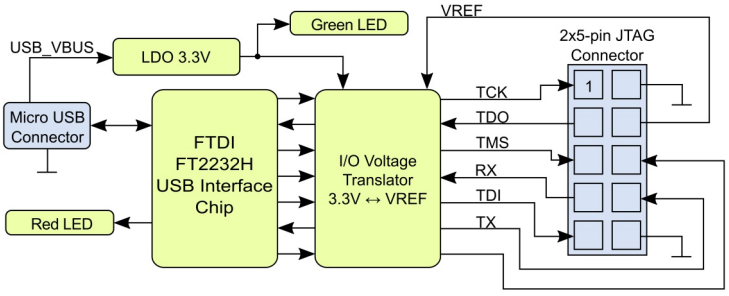
Comes in two versions
a) compatible with Xilinx tools or
b) not compatible with Xilinx tools, for independent use

Device	Form Factor	FT2232H	Total I/O	Other Features
Lattice XO2-256 CPLD	Xmod, M3 mounting hole	Mini USB connector, channel B RX/TX LED's, EEPROM	8 universal I/O pins	Step down DCDC converter for optional power supply via USB-power, 4 position DIP switch

TEI0004 ARROW USB Programmer2

For Development with Intel FPGAs, 2.54 mm Header

1.35 x 2.2 cm form factor



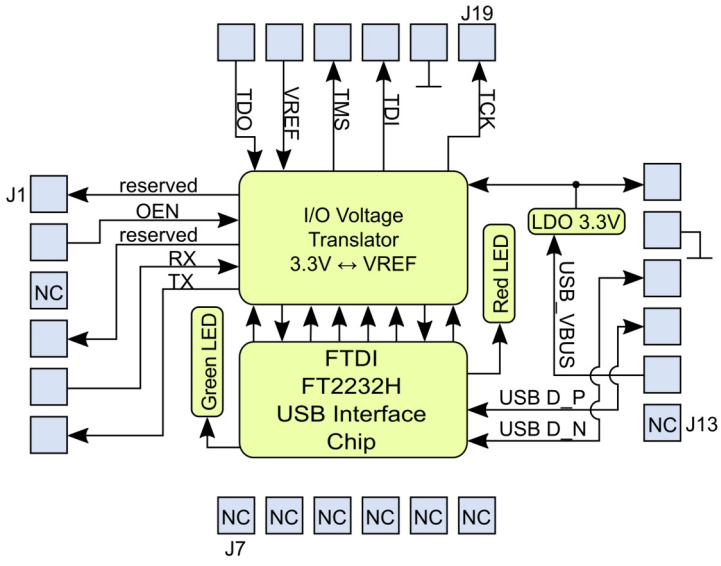
http://trenz.org/tei0004-info

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 Programmer2 Module

FT2232H based JTAG Programmer, Surface-Mount module

1.7 x 1.7 cm form factor



http://trenz.org/usbprogrammer2

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

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	KK0729-02 TE custom built	BGA Heat sink	SuperGRIP/ MaxiFLOW Heat sink	BGA Heat sink
USB Cable	✓	✓	✓	✓	✓
MicroSD Card	✓	✓	✓	✓	✓
Screws & Bolts	✓	✓	✓	✓	✓

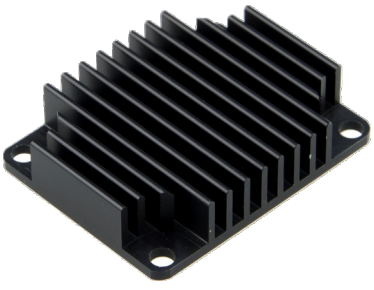
Starter Kit 720

Starter Kit 729

Starter Kit 80x

Photo shows similar product.

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



Available cooling solutions

Module	TE0600	TE0710	TE0712/ TE0713	TE0714	TE0715	TE0720	TE07290
Trenz Electronic Article Number	26920	26925	26924	KK0714-02	26923	26922	KK0729-02TE

Module	TE0741	TE0745	TE0803	TE0807	TE0808	TE0820/ TE0841	TEB0911/ TEF1001
Trenz Electronic Article Number	26921	KK0745-02	KK0803-03 and 29665	KK0807-02	KK0808-03 and 30137	28606	25130

Module series comparison table
For Trenz Electronic Modules

XILINX

	Device family	Device list	Form Factor/ size [cm]	Connectors	Programmable logic family	Processing system	SDRAM [MByte] max	Flash [MByte]	EEPROM
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
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	32	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	Kinex-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 KB
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 connected to PL 2024 DDR3 connected to PS*	32	1 x MAC + 16 KB
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	-
TE0807	Zynq UltraScale+	ZU4CG-ZU7CG, ZU4EG-ZU7EG, ZU4EV-ZU7EV	5.2 + 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-ZU15EG	5.2 + 7.6	4 x Samtec ST5	UltraScale+	Up to 4 x Cortex A53 + 2 x Cortex R5	8192 DDR4	128	16 KByte
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
TE0835	Zynq UltraScale+ RFSoC	ZU25DR	6.5 x 9	2 x Samtec ST5	UltraScale+	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	-
TEB0912	Zynq UltraScale+	ZU11-ZU19	12 x 18	Firefly sockets	UltraScale+	4 x Cortex A53 + 2 x Cortex R5	4096 DDR4 connected to PS 4096 DDR4 connected to PL	2 x 64	4 x

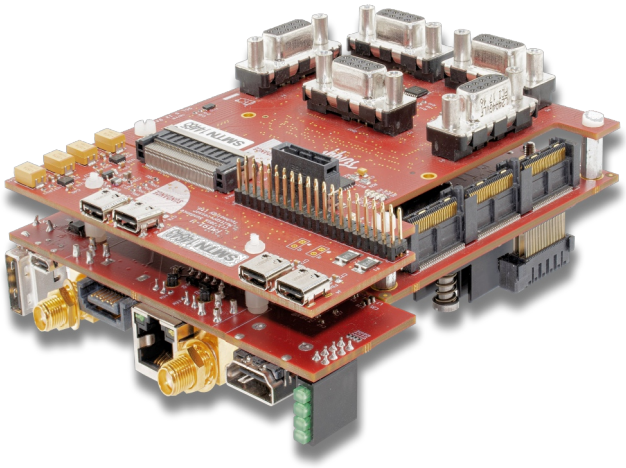
intel

	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
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

	e.MMC	Ethernet PHY	USB PHY	Total I/O	GBit transceiver	Other features
	-	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
	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	* 32-bit and 64-bit wide DDR3, 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
	-	-	-	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
	4 - 64 GByte	1 GBit	USB2.0 OTG	132 + 14 MIO	4 x GTR (PS)	GPU/VCU depending on device, programmable clock generator, real time clock, single supply
	8 - 64 GByte	1 GBit	USB2.0 OTG	34 HP, 96 HD + 14 MIO	4 x GTR (PS)	GPU/VCU depending on device, programmable clock generator, single supply
	8 - 64 GByte	1 GBit	USB2.0 OTG	132 HP + 14 MIO	4 x GTR (PS)	GPU/VCU depending on device, programmable clock generator, single supply
	-	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
	-	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

	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
	8 GByte (optional)	1 GBit (optional)	USB2.0 (optional)	N/A	16 + 24	Intel MAX 10 as system controller, PLL clock generator

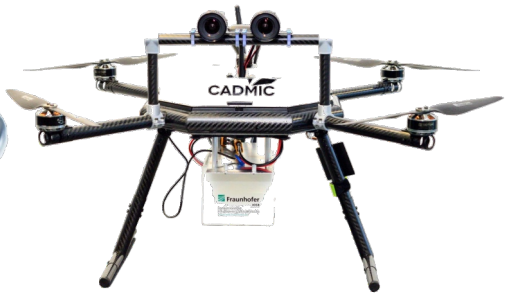
Sundance VCS System - Vision, Control and Sensors.



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 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 TE0820 SoM.

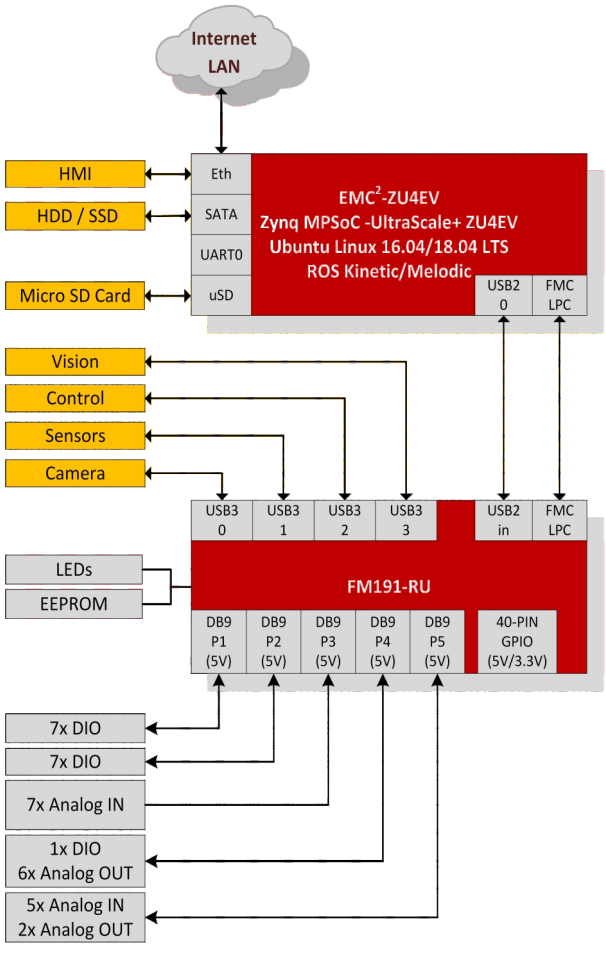
The versatility of the VCS system is derived from the modular concept of the SoM processing element on a PC/104 board, combined with a separate I/O Module. This gives it plenty of ADC, DAC, I/O and expansion possibilities with PC/104 options. The VCS also has all of the typical interfaces to allow the VCS to act a like a PC with HMDI display, SATA, four USB C ports and Ethernet.



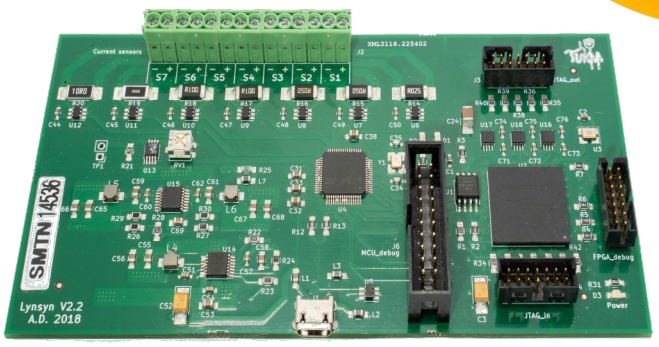
The SoC provides standard connectivity (SPI, RS232, I2C, USB, GigE, PCIe, etc), ARM-based processing which is used to run Ubuntu Linux OS and ROS Melodic, memory interfaces and Programmable Logic used for hardware acceleration and GPIO.

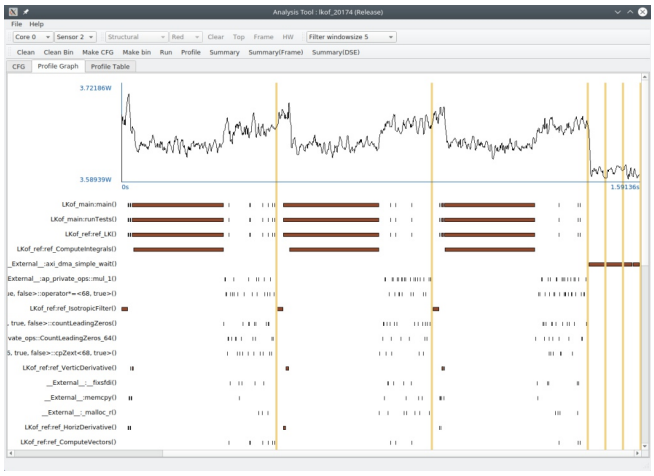
- High performance, low power consumption (24V @ 1.1A)
- Will be fully compatible with the Xilinx reVision stack.
- Raspberry PI and Arduino compatible
- MQTT and OpenCV compatible
- ROS compatible, ROS2 ready and HIPPEROS ready
- Compatible with a wide range of commercially available sensors and actuators
- Support for the most popular neural networks including YOLO, AlexNet, GoogLeNet, CAFFE, DarkNet, VCG, SSD, TensorFlow and FCN.
  Optimized implementations for CNN network layers, required to build custom neural networks (DNN/CNN) = Xilinx NDDDK™

www.sundance.com/VCS-1



LYNSYN Power Measurement Utility Board



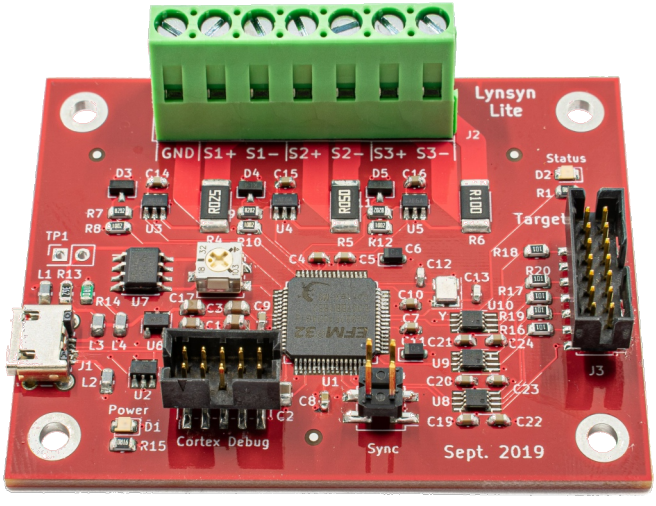


The Lynsyn is designed to measure the power usage of a system and correlate the measured power values with the source code of the program the system is running.
The target board power supply is connected through one of the current sensors and a JTAG cable is connected to the target board.
The Lynsyn is connected to a host PC via USB and a Xilinx JTAG adapter. The other component of the system is the analysis tool which runs on the PC providing a graphical front end to the Lynsyn PMU.

- 10kHz current sampling frequency
- 7 independent current sensors
- Non-intrusive PC sampling (JTAG) for correlating power with source code
- Supports ARMv7-A and ARMv8-A architectures

www.sundance.com/Lynsyn

LYNSYN LITE - a simplified version of the Lynsyn



- 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).
- No need for a Xilinx JTAG pod as it can be used as a USB JTAG programmer with Xilinx Vivado tools.
- Can be used as a remotely controlled current/voltage meter.
- Includes open source software that samples and visualises the results.

www.sundance.com/Lynsyn-Lite

bsi. UKAS MANAGEMENT SYSTEMS 0003
Certificate Number FM 55022

XILINX ALLIANCE PROGRAM CERTIFIED

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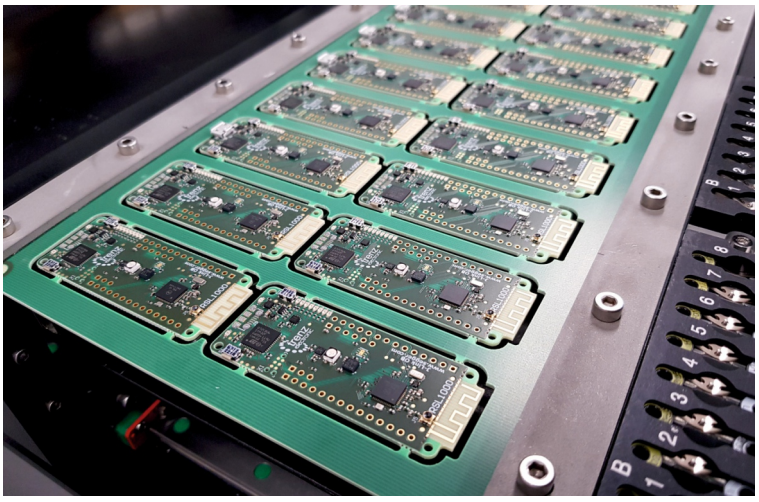
United Kingdom.

Phone: +44 (0) 1494 793 167
Email: sales@sundance.com

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)



cronologic offers a family of high-resolution high-throughput PCIe analog-to-digital converters (ADCs)

- Up to 4 analog input channels
- Additional digital trigger and/or gating inputs
- PCIe x4 or x8 half-size boards
- Gross DMA-bandwidth up to 8 GByte/s
- Arbitrary board combinations can be synchronized
- LEMO 00 series input connectors (adapter cabels to SMA connector available)
- The DC-offset can be shiftet to make optimal use of the ADC range for either positiv or negative pulses

	Ndigo6G-12			Ndigo5G-10			Ndigo5G-8			Unit
Analog channels	4	2	1	4	2	1	4	2	1	-
ADC resolution		12			10			8		Bits
Max. sampling rate	1600	3200	6400	1250	2500	5000	1250	2500	5000	Msps
Bandwidth		TBD			1000			1000		MHz
Max. individual sample length		110			26			26		µs
THD		67*			58			58		dBc
SNR		54*		51	50	50		45		dBc
SFDR incl.	72*	69*	66*	61	60	60		58		dBc
SFDR excl.	72*	69*	68*	74	64	63		57		dBc
SINAD		53*		50	48	48		45		dBc
ENOB		8.6*		8.0	7.7	7.7		7.2		-
Input type and coupling	AC single ended			AC single ended			AC single ended			-
PCIe lanes	Gen3 x8			Gen1 x4			Gen1 x4			-
PCIe bandwidth	3000*			800			800			MB/s

*preliminary data

Ndigo Series

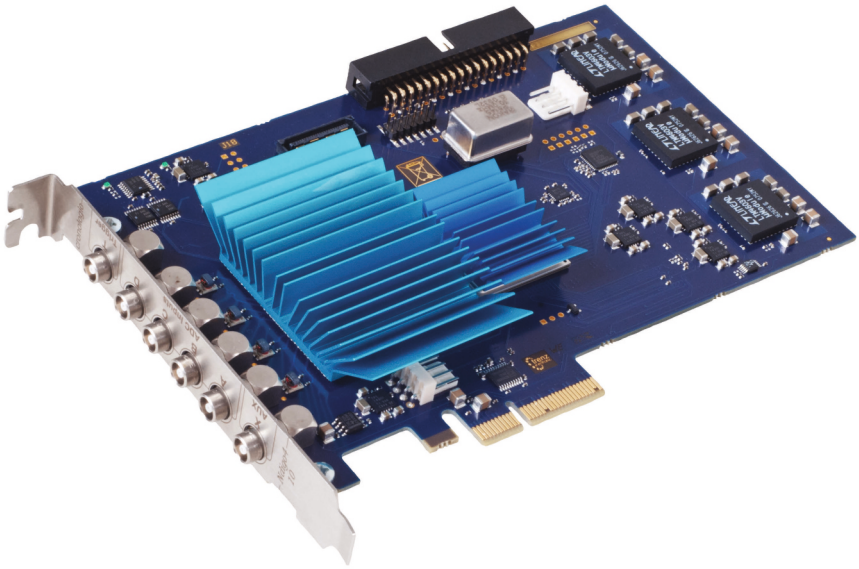
It has been designed to aquire trains of pulses at high repetition rates. Employing an onboard zero supression, the pulse data is recorded with pre- and post-cursors, omitting the data inbetween to reduce the requirements on bandwidth and pulse processing or averaging. There is no deadtime between samples as long as the sustained rate is lower than the available PCIe bandwidth. The first available instances of this series provide 5 Gsps at 10-bit resolutuion and 250 Msps at 14-bit resolution.

These boards are ideally suited for applications like

Mass Spectrometry
Photon Counting
Lidar
NMR

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, a new series with up to 64 channels will be introduced in 2020.



Time Tagger

Cronologic presents a new series of low cost, mid resolution time-to-digital converters.

Two new boards are available featuring 500ps to 1ns single shot resolution at highest data bandwidths.

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, time correlated single photon counting (TCSPC) and frequency counting applications.

http://www.trenz-electronic.de/cronologic

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 2x 8GByte/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
Performace 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)		

Official Trenz Electronic Distributor List as of September 2020

There is a current list 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

Italy

mirifica s.r.l.
Web: www.mirifica.it
E-mail: store@mirifica.it

Japan

Tokushu Denshi Kairo Inc.
Web: www.tokudenkairo.co.jp
E-mail: info@tokudenkairo.co.jp

Korea

Inipro Inc.
Web: www.inipro.net
E-mail: webmaster@inipro.net

Neocess Co., Ltd.
Web: www.neocess.co.kr
E-mail: james@neocess.co.kr

Poland

BTC Korparacja
Web: www.kamami.pl
E-mail: sprzedaz@kamami.pl

Russian Federation

Active Supply LLC
Web: www.activesupply.ru
E-mail: info@activesupply.ru

Macro Group
Web: www.macrogroup.ru
E-mail: fpga@macrogroup.ru

Singapore

SemiPIN PTE Ltd.
Web: www.semipin.com
E-mail: trenz@semipin.com

Spain

Cyberall Group
Web: www.cyberallgroup.com
E-mail: sales@cyberallgroup.com

Turkey

EKOM Elektronik A.S.
Web: www.e-kom.com
E-mail: info@e-kom.com

NanoManyetik Bilimsel CihazlarSan. ve Tic. Ltd. Sti.
Web: www.nanomagnetics-inst.com
E-mail: sales@nanomagnetics-inst.com

Same Elektronik San. Ve Tic. A.S.
Web: www.sameas.com.tr
E-mail: same@sameas.com.tr

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