trenz electronic GmbH

Forging **FPGA** Frontiers

2025
PRODUCT CATALOGUE

+ SoCs
+ SoMs
+ Carrier boards

+ Development boards
+ Electronic Design Service
+ Distributors

Your Notes

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Company profile

Trenz Electronic GmbH

- Located in Germany
- Established 1992 as a sole proprietorship
- 2002 converted to GmbH
- now with 90+ employees
- ISO 9001 certified SMD in-house production

Trenz Electronic Production

- 25 years of development with in-house production
- 50,000+ modules per year; 500,000 lifetime
- 500+ customizable modules
- Rugged design with long term supply guarantee
- Industrial temperatures

Trenz Electronic Services

- Integration of FPGA and SoC modules
- Electronic Design Service
- Electronic Manufacturing Service
- Rapid prototyping
- All modules are developed & manufactured in Germany

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TE0955 Versal™ AI Edge SoM

AMD Versal™ AI Edge device
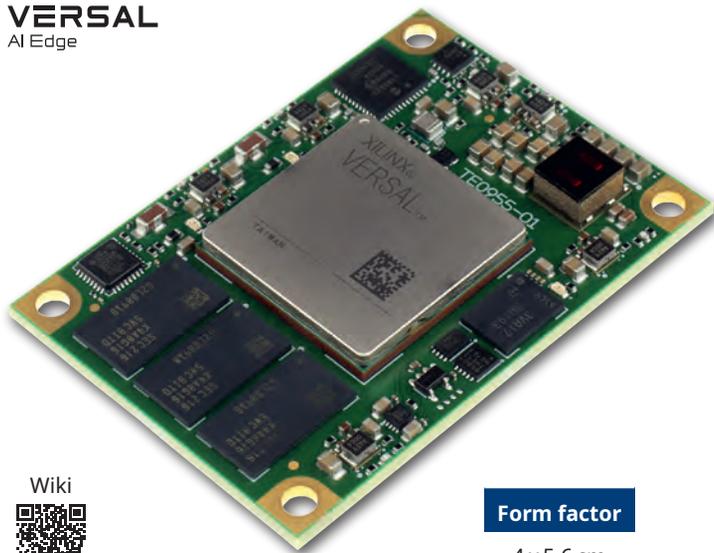
AMD VERSAL AI Edge

Wiki

Form factor

4 x 5.6 cm
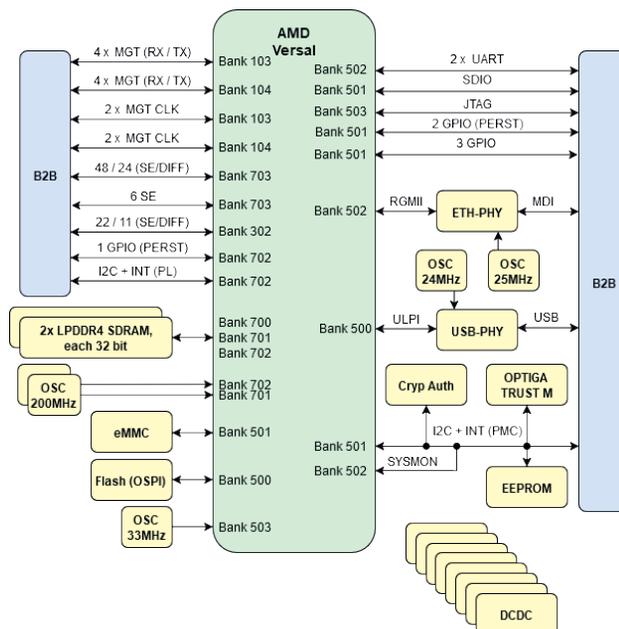
Device list	Pin packages	Connectors	SDRAM max	Flash	eMMC	EEPROM	Ethernet	USB	Other features
Versal™ AI Edge VE2002, VE2102, VE2202, VE2302, VM1102	A784	54-pins XPIO, up to 22-pins HDIO, 2 x Samtec ADM B2B	2 x 4 GB LPDDR4	256 MB OSPI	max. 64 GB	2 Kbit with MAC-Adress	1 Gbit PHY	USB2.0 PHY	Clocks for PS, PHYs, DDR4, PL, up to 8 GTYP transceiver, UART, I2C, SDIO

TE0838 RFSoC Module

AMD Zynq™ UltraScale+™ RFSoC, DDR4, Flash, Ethernet

AMD ZYNQ UltraScale+
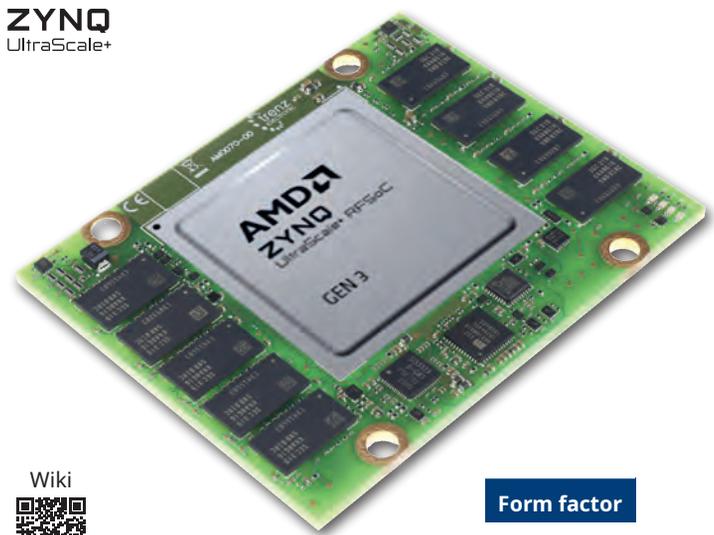
Wiki

Form factor

6.4 x 8 cm
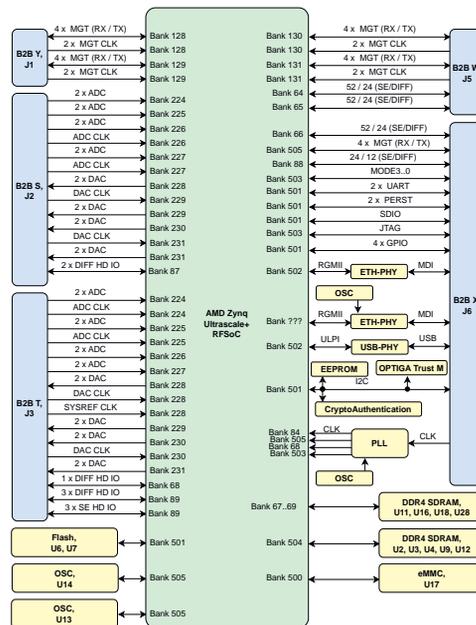
Device list	Connectors	SDRAM max	Flash	eMMC	Ethernet	USB	Other features
ZU29DR, ZU39DR, ZU49DR	5 x Samtec ADM6 4 x 60-pin	8 GB DDR4 64-bit (PS) with ECC 8 GB DDR4 64-bit (PL)	2 x 64 MB	8 GB	2 x 1Gbit	USB2.0	OPTIGA Trust M, Crypto Authentication, oscillator, RF-ADC, RF-DAC

TE0825 Zynq™ UltraScale+™ MPSoC Module
AMD Zynq™ UltraScale+™ MPSoC, DDR4, Flash, EEPROM
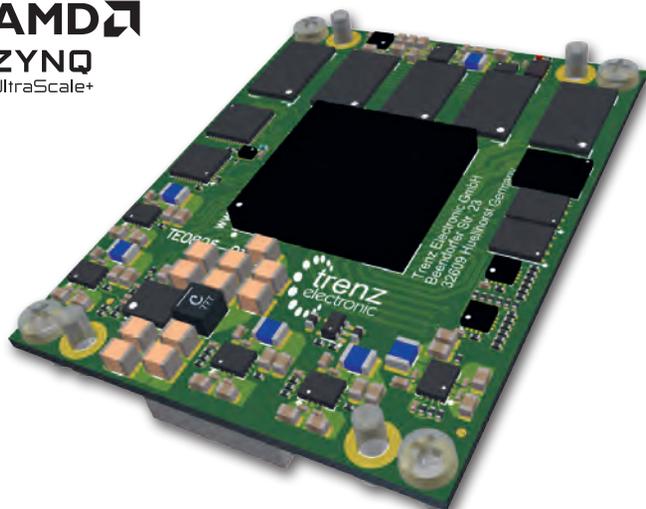
Wiki

Form factor

5.4 x 7 cm
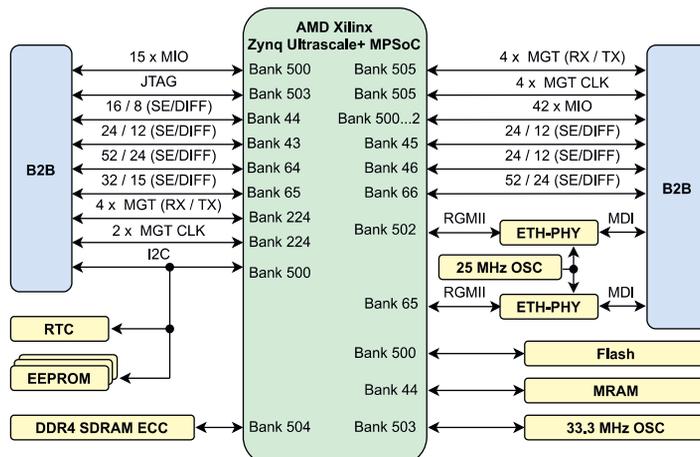
Device list	Connectors	SDRAM	Flash	EEPROM	Ethernet PHY	I/Os	Gbit transceiver	Other features
ZU2, ZU3, ZU4, ZU5	2 x Samtec ADM6 (4 x 60 pins), 1 x Samtec UMPT	8 GB DDR4 with ECC	2 x 64 MB	64 kByte, 2 x with MAC address	2 x 1Gbit	136 PL HP + 88 PL HD 57 PS MIO	4 x GTR + 4 x GTH	Real time clock, oscillator

TE0806 Zynq™ UltraScale+™ MPSoC Module
AMD Zynq™ UltraScale+™ MPSoC, Flash, Ethernet, USB
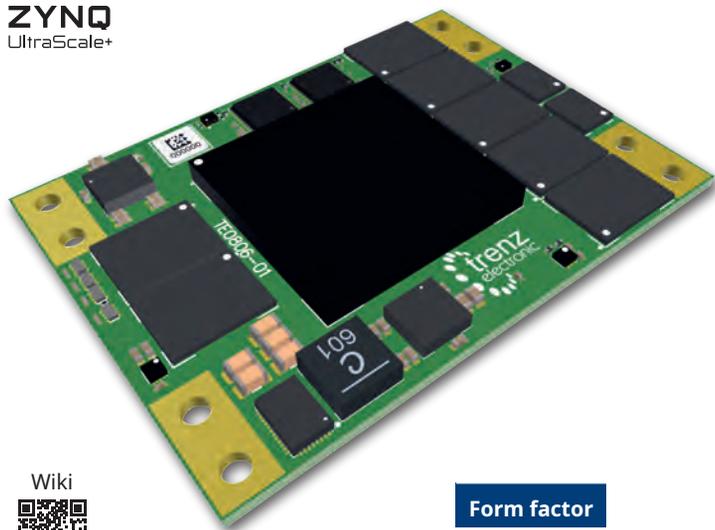
Wiki

Form factor

5.5 x 7.6 cm
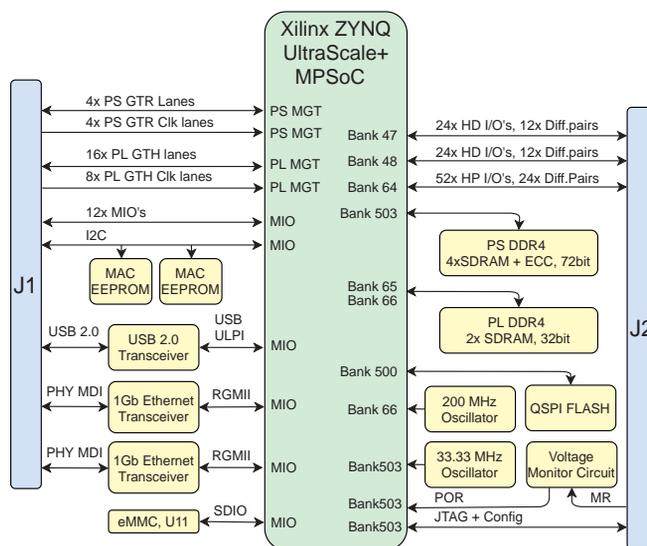
Device list	Connectors	SDRAM max	Flash	eMMC	Ethernet PHY	USB PHY	Total I/Os	Other features
ZU4, ZU5, ZU7, CG, EG, EV	2 x Samtec ADM6	8 GB DDR4 64-bit (PS) with ECC 4 GB DDR4 32-bit (PL)	512 MB	8 – 64 GB	2 x 1 Gbit	USB2.0 OTG	48 PL HD + 52 PL HP 14 MIOs + I2C	Transceiver clock in-/outputs, 2 x MAC address serial EEPROM, single 5-12V power required

TEI0187 Agilex™ 5E SoC Module

Altera® Agilex™ 5E, LPDDR4 SDRAM, Flash, Ethernet, USB

New!

Wiki
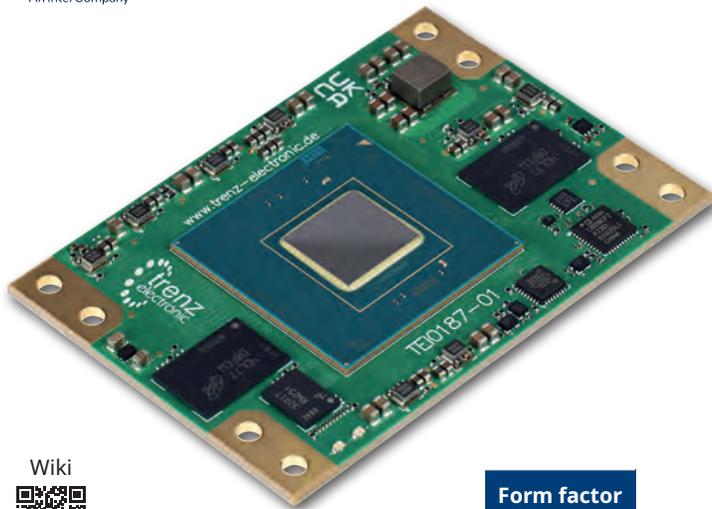
Form factor

5.2 x 7.6 cm
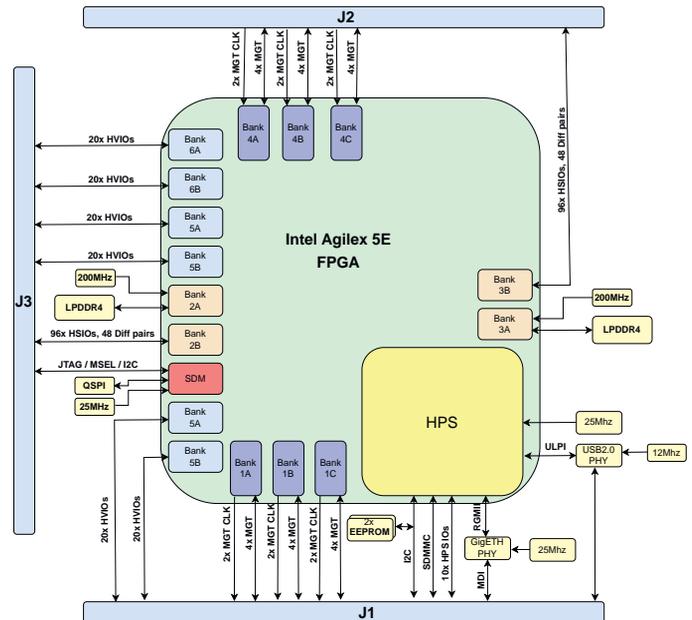
Device list	Pin packages	Connectors	SDRAM	Flash	I/Os	Ethernet	USB	Other features
Agilex™ 5E	B32A	3 x 240pin Samtec ADM6	2 GB LPDDR4	256 MB	331/96/19 (I/Os/Diff. Pairs/HPS I/Os)	1 Gbit PHY	USB2.0 PHY, Support USB3.1	12 V Power supply, 2 x EEPROM, 24 x up to 28 Gb transceiver

TEI1000 Stratix® 10 SoC Module

Altera® Stratix® 10 SX or GX, SDRAM, Flash

New!

Wiki

Form factor

6 x 8 cm
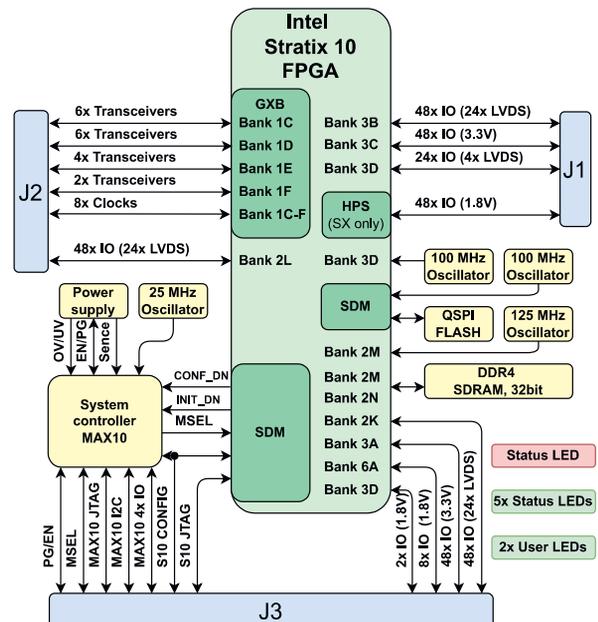
Device list	Connectors	SDRAM	Flash	Gbit transceivers	Total I/Os	Other features
Stratix® 10 SX or GX	3 x ADM 6 (4 x 60-pin)	up to 2 GByte DDR4	512 Mbit QSPI	18 x GXT	250 x PL 48 x CPU	Max® 10 System controller, Status and user LEDs, 1.8V, 3.3V and variable IO

TEI0181 Agilex™ 5 Integr. USB-Programmer
Altera® Agilex™ 5E FPGA, Arduino MKR Standard, CRUVI HS

altera
An Intel Company

Wiki
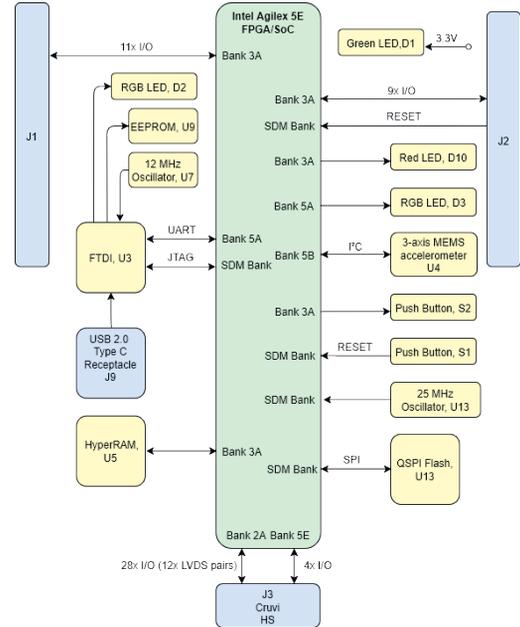
Device list	Programmer	Flash	HyperRAM	Total I/Os	Clock	Other features
A5E 008B, 013B, 028B	Integrated, USB to JTAG/Serial	32 MB	16 MB	Arduino MKR - 22, CRUVI - 32	25 MHz MEMS	2 x RGB LED, User LED, 2 x Dip Switch, Push button, 3-axis accelerometer

TEI0050 "CYC5000" Cyclone® V Module
Altera® Cyclone® V, SDRAM, Flash, EEPROM

altera
An Intel Company

Wiki

Form factor

2.5 x 7.07 cm
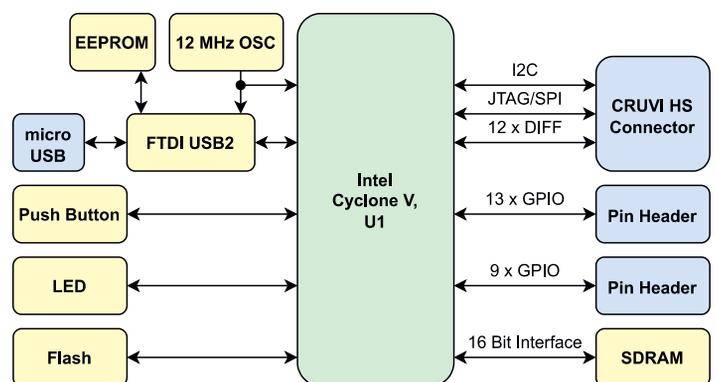
Device list	Pin packages	Connectors	SDRAM	Flash	Other features
Cyclone® V E, A2, A4	U15 UBGA 324 pins	CRUVI HS, 2 x 14 pin header	8 MB	up to 256 MB possible	USB-to-JTAG/GPIO-FTDI, user push buttons and LEDs

TEI0185 Agilex™ 5E Development Board

Altera® Agilex™ 5E, LPDDR4 SDRAM, Flash, Ethernet, USB, HDMI

New!
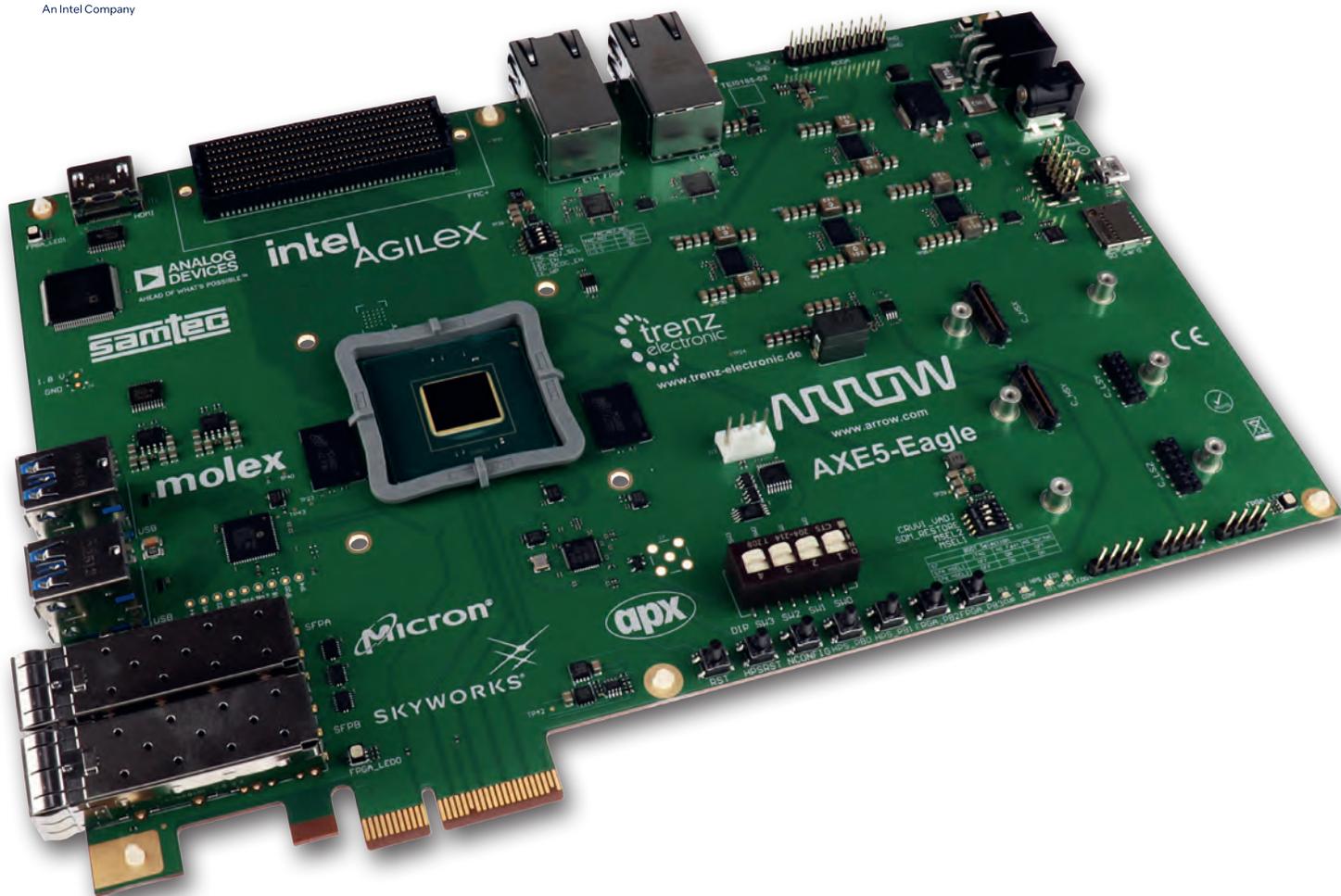
Device
- Altera® Agilex™ A5ED065BB32AE4SR0

On Board
- 2 x Ethernet PHY
- HDMI Transmitter
- USB-to-UART FTDI
- 8 channel ADC / DAC
- PLL clock
- Oscillator
- 2 x EEPROM with MAC address
- 128 Kbit EEPROM
- 2 x Temperature sensor
- Fan Speed-controller
- 4 x RGB LED
- 2 x User LED
- 4 x User push button
- 4 x DIP switch

Interface
- PCIe x4 (B2B)
- TEI0004 connector (B2B)
- FMC+ (B2B)
- CRUVI (2 x HS, 2 x LS)
- 2 x Gigabit ETH
- HDMI
- 4 x USB connector
- 2 x zSFP+ connector
- SD Card connector
- 3 x I2C connector (2 x DCDC, 1 x MISC)
- Fan connector

Power
- 12 V Power supply

Dimension
- 16 x 25 cm

TE0710 Artix™ 7 4 x 5 cm Module

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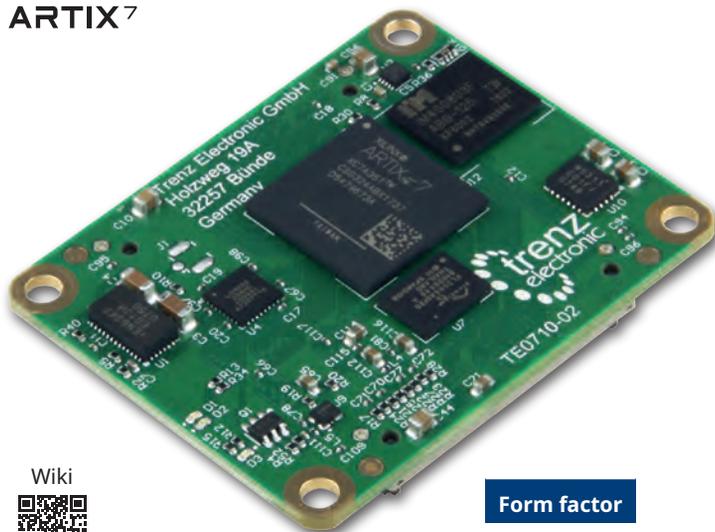
Wiki

Form factor

4 x 5 cm
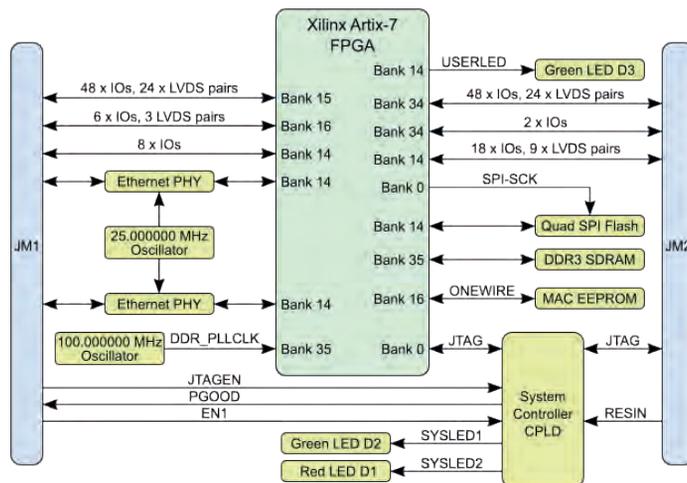
Device list	Connectors	SDRAM max	Flash	Ethernet PHY	Total I/Os	Other features
35T, 50T, 75T, 100T	2 x Samtec LSHM	512 MB DDR3	32 MB	2 x 100 Mbit	112 (51 differential pairs + 10 single-ended)	JTAG, 100 MHz MEMS oscillator, user LED, single supply

TE0711 Artix™ 7 4 x 5 cm Module

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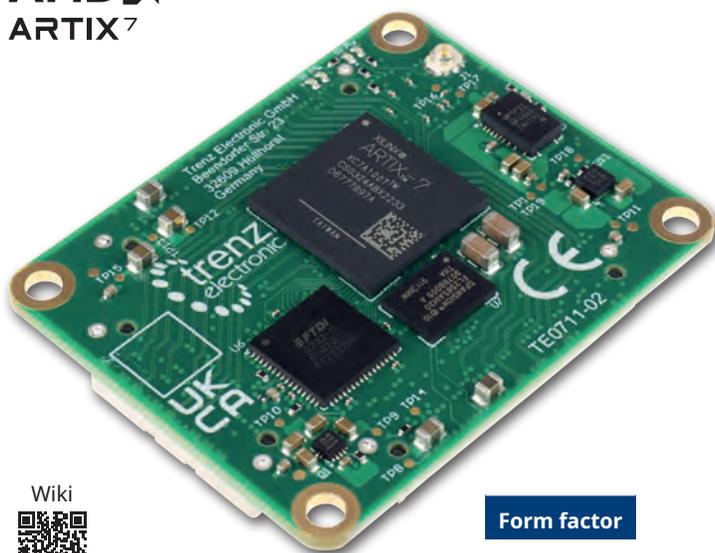
Wiki

Form factor
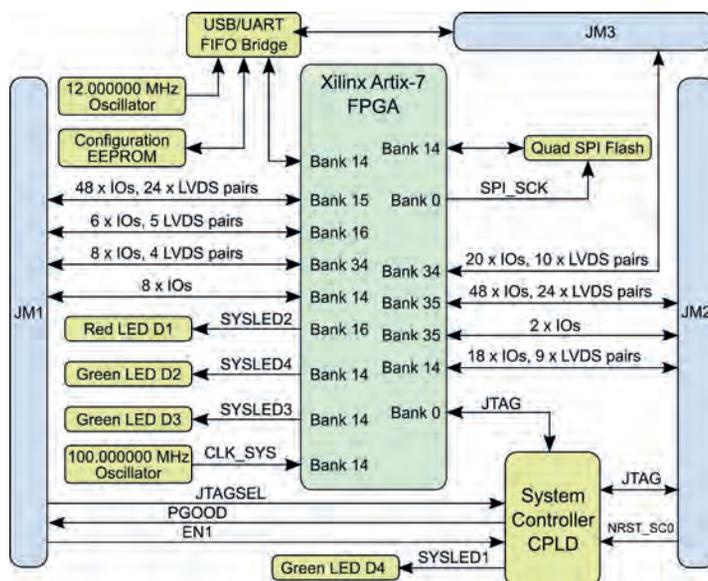
4 x 5 cm

Device list	Connectors	Flash	MEMS oscillator	USB PHY	Total I/Os	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 Artix™ 7 4 x 5 cm Module

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

Wiki
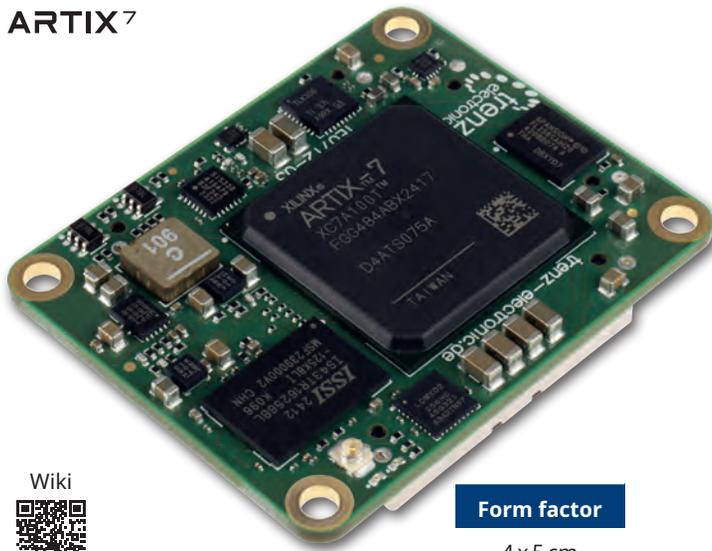
Form factor

4 x 5 cm
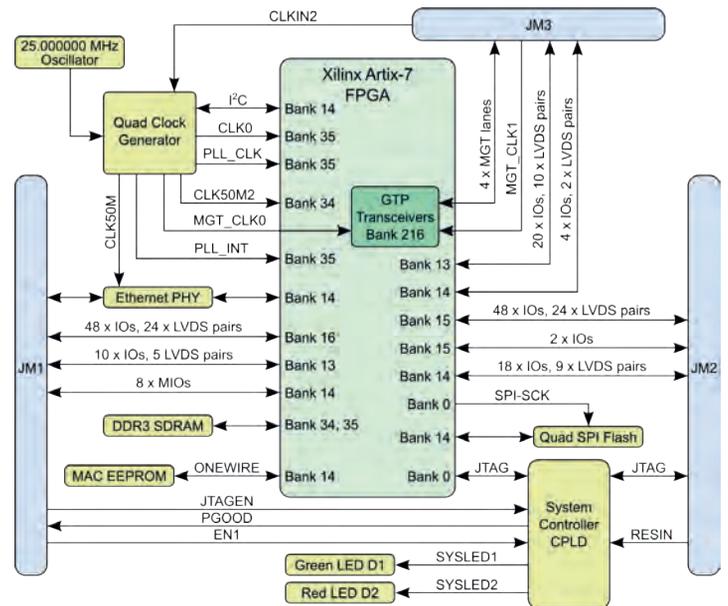
Device list	Connectors	SDRAM max	Flash	EEPROM	Ethernet PHY	Total I/O	Gbit transceivers	Other features
75T, 100T, 200T (with restrictions: 15T, 35T, 50T)	3 x Samtec LSHM	1 GB DDR3	32 MB	MAC Address	100 Mbit	158	4 x GTP	Programmable clock generator, single supply

TE0713 Artix™ 7 4 x 5 cm Module

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

Wiki
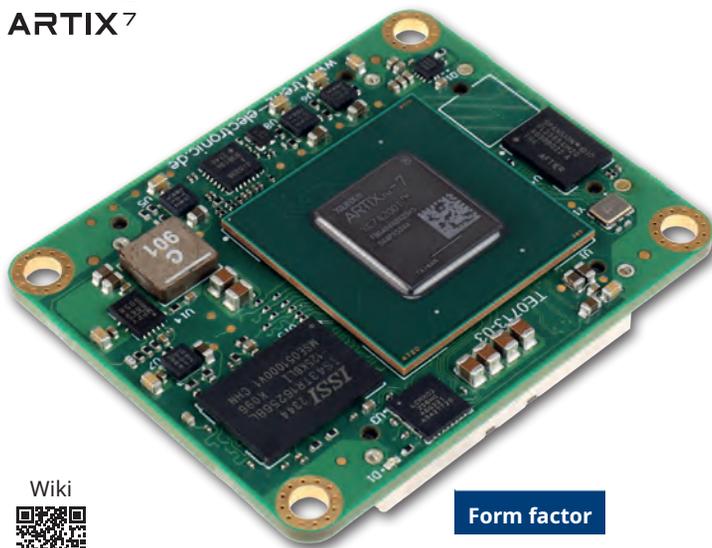
Form factor

4 x 5 cm
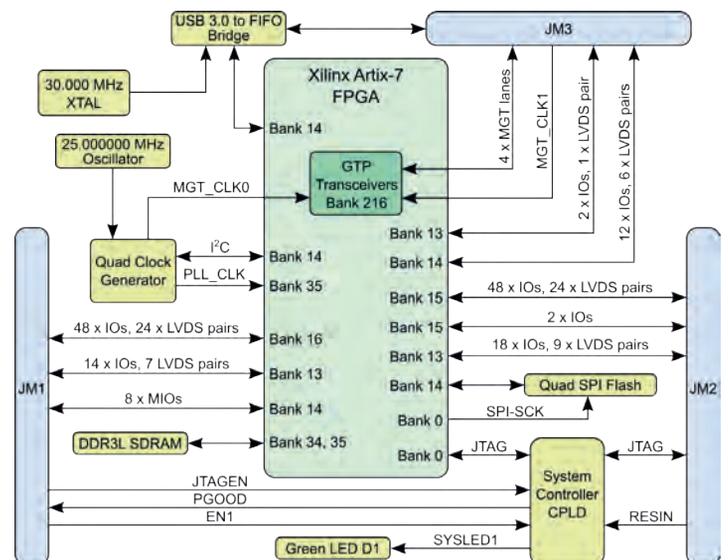
Device list	Connectors	SDRAM max	Flash	USB PHY	Total I/Os	Gbit transceivers	Other features
75T, 100T, 200T (with restrictions: 15T, 35T, 50T)	3 x Samtec LSHM	1 GB DDR3L	32 MB	USB3.0	152	4 x GTP	Programmable clock generator, single supply

TE0715 Zynq™ 7000 4 x 5 cm Module

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

Wiki

Form factor

4 x 5 cm

Device list	Connectors	SDRAM max	Flash	Ethernet PHY	USB PHY	Total I/Os	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 Zynq™ 7000 4 x 5 cm Module

AMD Zynq™ 7000, DDR3, Flash, Ethernet, USB, eMMC

Wiki

Form factor

4 x 5 cm

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

TE0741 Kintex™ 7 4 x 5 cm Module
AMD Kintex™ 7, Flash, 8 High Speed Serial Transceivers, 25 MHz Oscillator
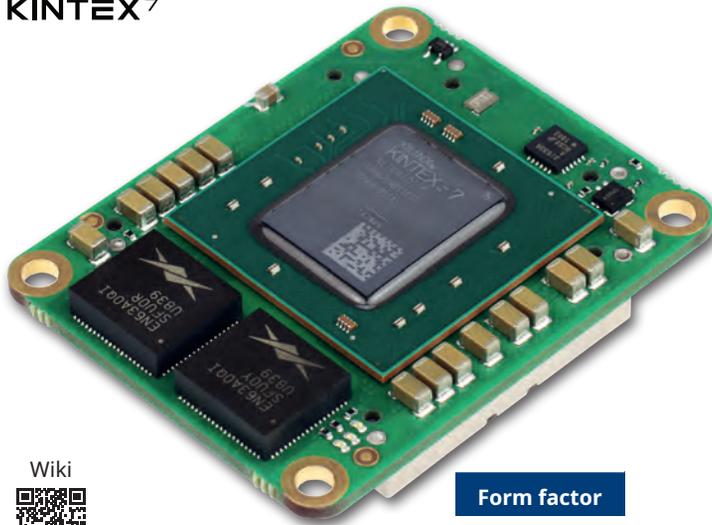
Wiki

Form factor
4 x 5 cm
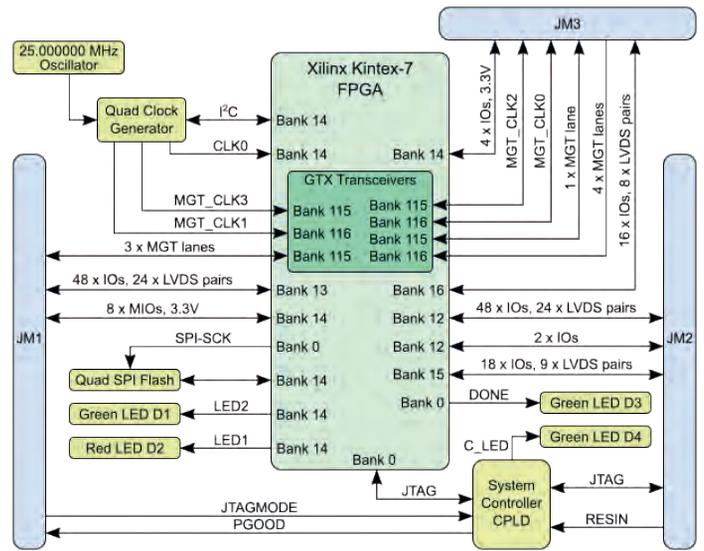
Device list	Connectors	Flash	Total I/Os	Gbit transceivers	Other features
70T, 160T, 325T, 410T	3 x Samtec LSHM	32 MB	144 (94 for 70T variant)	8 x MGTs	Programmable clock generator, single supply

TE0841 Kintex™ UltraScale™ 4 x 5 cm Module
AMD Kintex™ UltraScale™, DDR4, Flash, 8 x GTH Transceiver

Wiki

Form factor
4 x 5 cm
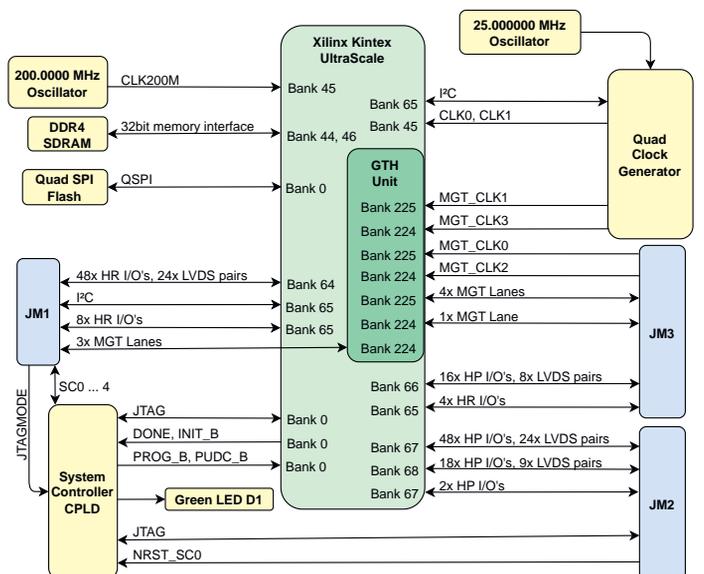
Device list	Connectors	SDRAM max	Flash	Total I/Os	Gbit transceivers	Other features
KU035, KU040	3 x Samtec LSHM	2 GB DDR4	64 MB	60 x HR I/Os 84 x HP I/Os	8 x GTH	Programmable clock generator, single supply

TE0820 Zynq™ UltraScale+™ 4 x 5 cm Module

AMD Zynq™ UltraScale+™, DDR4, Flash, USB, Ethernet, eMMC

Wiki

Form factor
4 x 5 cm

Device list	Pin packages	Connectors	SDRAM max	Flash	eMMC	Ethernet PHY	USB PHY	Total I/Os	Gbit trans-ceivers	Other features
ZU1CG - ZU5CG, ZU1EG - 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 Zynq™ UltraScale+™ 4 x 5 cm Module

AMD Zynq™ UltraScale+™, DDR4, Flash, USB, Ethernet, eMMC

Wiki

Form factor
4 x 5 cm

Device list	Pin packages	Connectors	SDRAM max	Flash	eMMC	Ethernet PHY	USB PHY	Total I/Os	Gbit trans-ceivers	Other features
ZU1CG - ZU5CG, ZU1EG - 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 x MIO	4 x PS GTR	GPU/VCU depending on device, programmable clock generator, single supply

TE0823 Zynq™ UltraScale+™ 4 x 5 cm Module

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

Wiki

Form factor
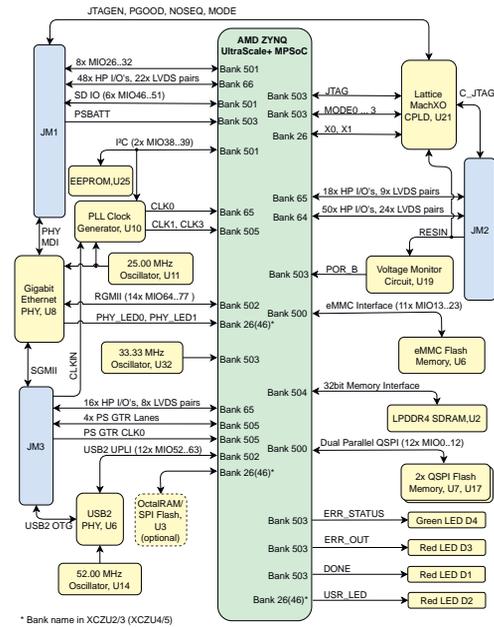
4 x 5 cm

Device list	Pin packages	Connectors	SDRAM max	Flash	eMMC	Ethernet PHY	USB PHY	Total I/Os	Gbit trans-ceivers	Other features
ZU1CG - ZU5CG, ZU1EG - ZU5EG, ZU4EV, ZU5EV	784	3 x Samtec LSHM	2 GB DDR4	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

AM0010 Zynq™ UltraScale+™ MPSoC Module

AMD Zynq™ UltraScale+™ MPSoC, DDR4, Flash, Ethernet, USB

Wiki

Form factor

4 x 5.6 cm
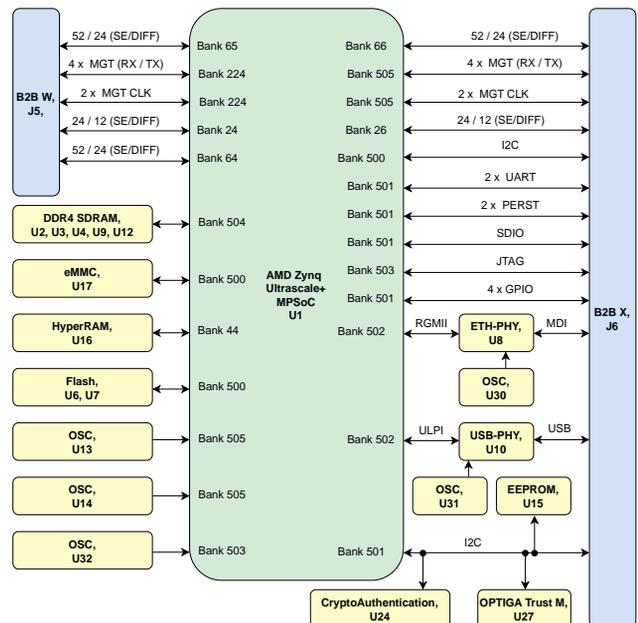
Device list	Connectors	SDRAM max	Flash	eMMC	Ethernet	USB	Total I/Os	Gbit transceivers	Other features
ZU1CG - ZU5CG, ZU1EG - ZU5EG, ZU4EV, ZU5EV	2 x Samtec ADM6 4 x 60-pin	8 GB DDR4 64-bit with ECC	128 MB	8 – 64 GB	1 Gbit	USB2.0 OTG	204	4 x PS GTR 4 x PL GTH (ZU4 + ZU5 only)	optional HyperRAM, MAC address serial EEPROM with EUI-48 node identity, security controller, Crypto Authentication

TE0803 / TE0813 Zynq™ UltraScale+™ MPSoC Module

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

Wiki

Compatible with
TEBF0808/818

Form factor

5.2 x 7.6 cm

Device list	Pin packages	Connectors	SDRAM max	Flash	Total I/Os	Gbit transceivers	Other features
ZU1CG - ZU5CG, ZU1EG - ZU5EG, ZU4EV, ZU5EV	C784	4 x Samtec ST5 (TE0803) 4 x Samtec ADM6 (TE0813)	8 GB DDR4	2 x 64 MB	204 + 65 MIO	4 x PS GTR 4 x PL GTH (ZU4 + ZU5 only)	GPU/VCU depending on device, EEPROM MAC address, programmable clock generator, single supply

TE0807 / TE0817 Zynq™ UltraScale+™ MPSoC Module

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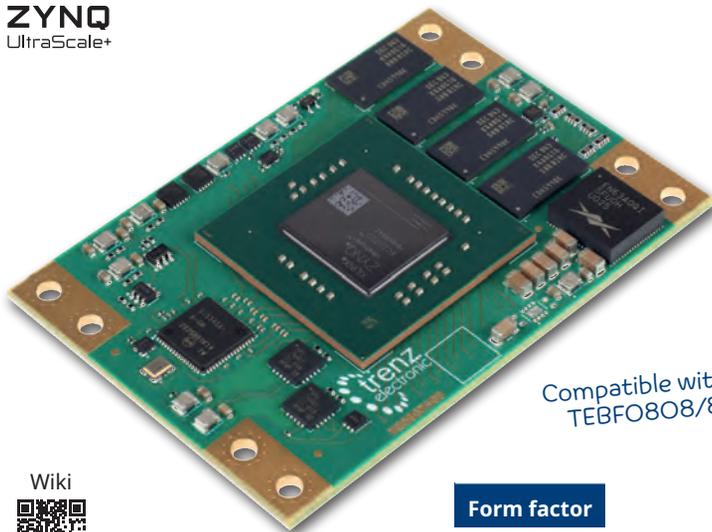
Wiki

Compatible with
TEBF0808/818

Form factor

5.2 x 7.6 cm

Device list	Pin packages	Connectors	SDRAM max	Flash	Total I/Os	Gbit transceivers	Other features
ZU4CG - ZU7CG, ZU4EG - ZU7EG, ZU4EV - ZU7EV	B900	4 x Samtec ST5 (TE0807) 4 x Samtec ADM6 (TE0817)	8 GB DDR4	2 x 64 MB	204 + 65 MIO	4 x GTR 16 x GTH	GPU and VCU, programmable clock generator, single supply

TE0808 / TE0818 Zynq™ UltraScale+™ MPSoC Module

AMD Zynq™ UltraScale+™, DDR4, Flash, 20 High Speed Serial Transceivers
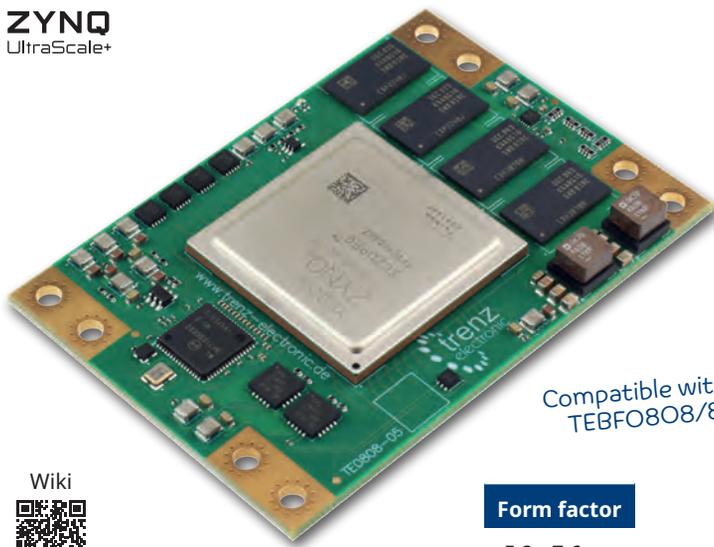
Compatible with TEBF0808/818
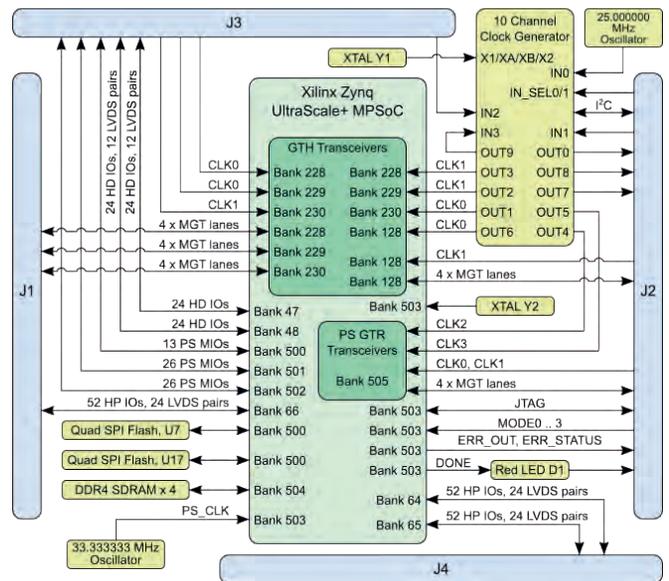
Wiki

Form factor
5.2 x 7.6 cm

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

TE0726 "ZynqBerry" SoC Module

AMD Zynq™ 7000, DDR3L, Flash, Ethernet, USB, HDMI
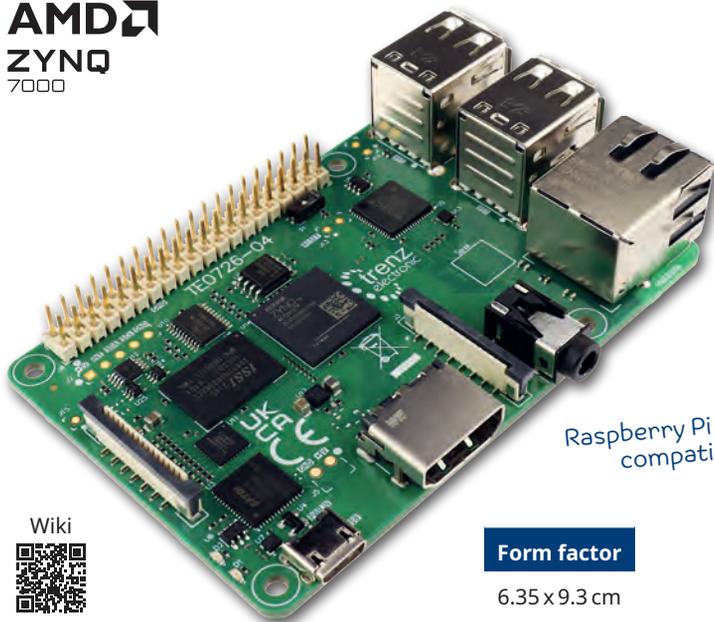
Raspberry Pi compatible

Wiki

Form factor
6.35 x 9.3 cm
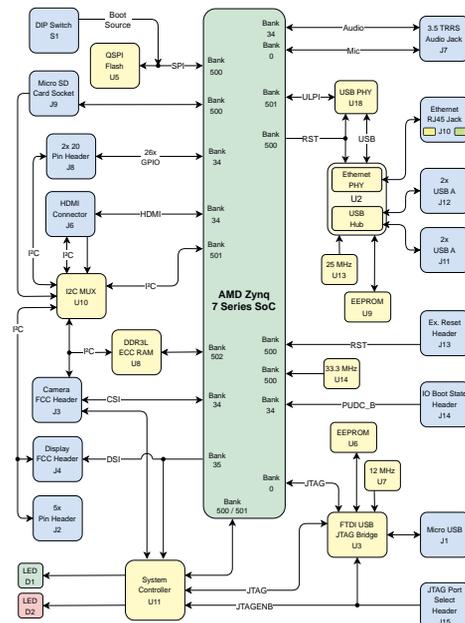
Device list	Connectors	SDRAM max	Flash	Ethernet PHY	USB PHY	Total I/Os	Other features
Z-7010, Z-7007S	40-pin "HAT" headers	512 MB DDR3L ECC	16 MB	100 Mbit	4 x USB2.0 host	26	DSI display connector, CSI-2 camera connector, micro SD card slot, 3.5 mm audio plug, HDMI type A

TE0724 Zynq™ 7000 SoC Module

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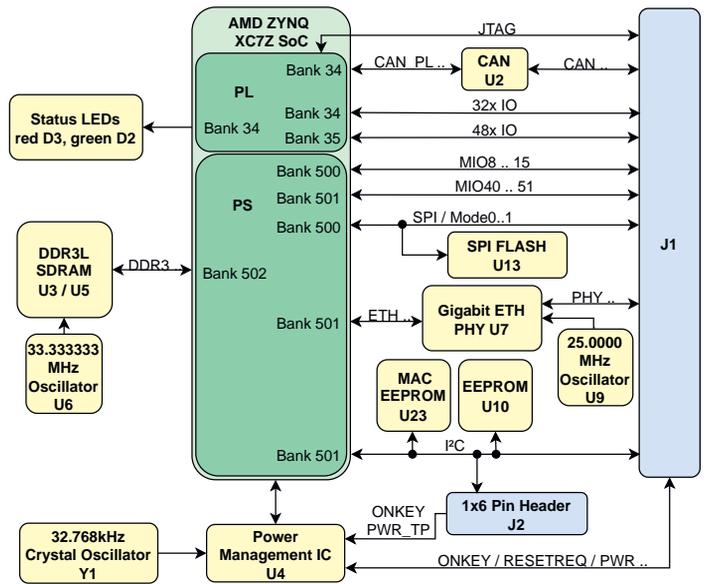
AMD ZYNQ 7000

Wiki

Form factor

4 x 6 cm

Device list	Connectors	SDRAM max	Flash	EEPROM	Ethernet PHY	Total I/Os	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, 3 x LED (1 x PS, 2 x PL)

TE0950 Versal™ AI Edge Evalboard

Evaluation Board with AMD Versal™ AI Edge

AMD VERSAL AI Edge

Wiki

Form factor

15 x 12 cm
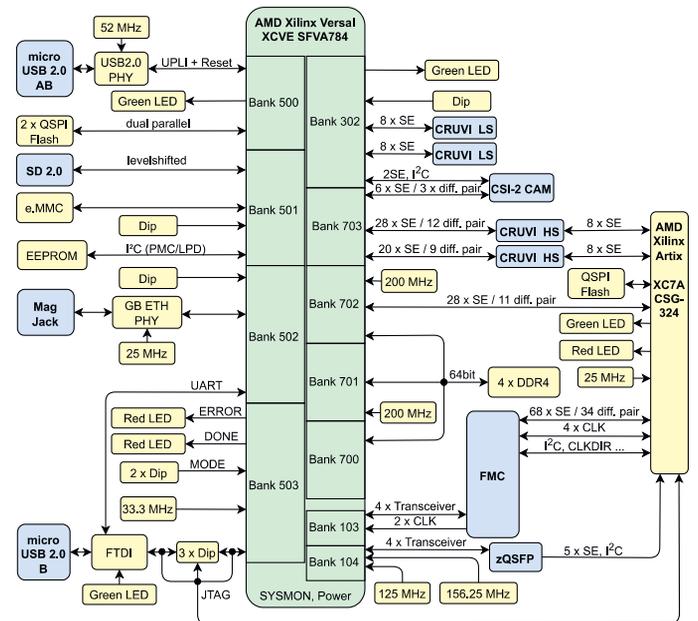
Device list	Pin packages	Connectors	SDRAM max	Flash	eMMC	Ethernet	USB	Other features
Versal™ AI Edge VE2302	A784	zQSFP, 2 x CRUVI HS, 2 x CRUVI LS, CSI-2, FMC	8 GB DDR4	2 x 64 MB QSPI	32 GB	1 Gbit RJ45	USB2.0 JTAG + UART	Artix™7 FPGA as configurable levelshifter, EEPROM with MAC-Adress, 3 x clock (1 x PL, 2 x GTs), 2 LEDs, push button, dip switches, reset button

TE0723 "ArduZynq" SoC Module

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

Wiki
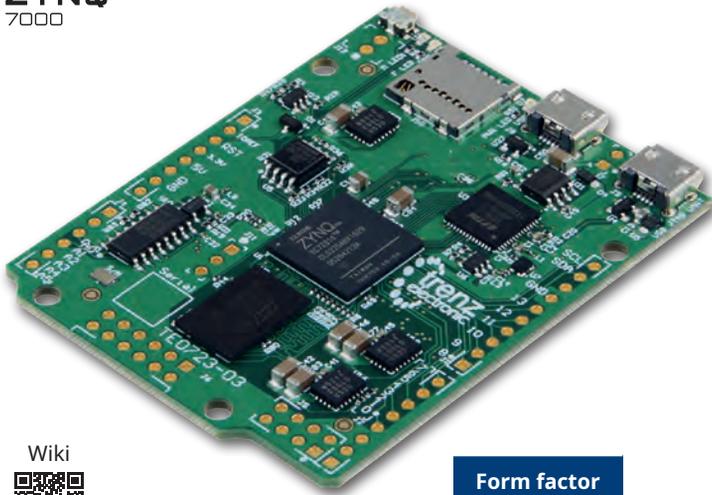
Form factor

6.9 x 5.3 cm
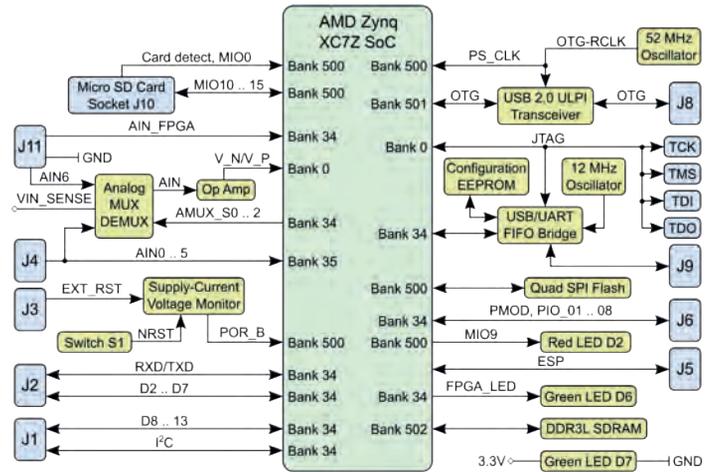
Device list	Connectors	SDRAM max	Flash	USB PHY	Total I/Os	Other features
Z-7010, Z-7007S	Arduino Pmod headers	512 MB DDR3L	16 MB	Micro USB OTG, micro USB, FT2232, JTAG/UART/FIFO	30	Micro SD, on board USB JTAG and UART

TE0835 / TE0836 Zynq™ UltraScale+™ RFSoC Module

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

Wiki

Form factor

6.5 x 9 cm
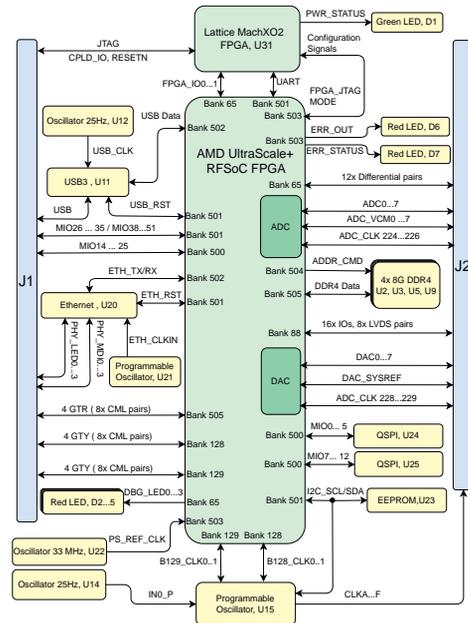
Device list	Pin packages	Connectors	SDRAM max	Flash	Ethernet PHY	Total I/Os	Gbit transceivers	Other features
ZU25, ZU27, ZU28, ZU43, ZU47, ZU48	FFVE1156, FSVE1156	2 x Samtec ST5 (TE0835) 2 x Samtec ADM6 (TE0836)	4 x 1 GB DDR4	128 MB	1 x Gbit	40 x I/O 20 LVDS + 32 MIO	8 x GTY 4 x GTR	USB2.0 OTG, MAC EEPROM, RF-ADCs, RF-DACs

TEF0008 FMC Card

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

Wiki

Form factor

6.9 x 8.4 cm
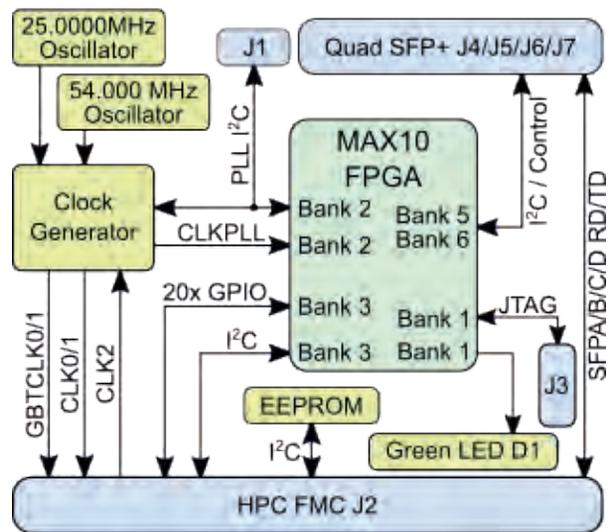
It is intended for use on a FMC HPC carrier and cannot be used stand-alone.

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

TE0802 MPSoC Development Board

AMD Zynq™ UltraScale+™, LPDDR4, Flash, Ethernet, USB, Audio, DP
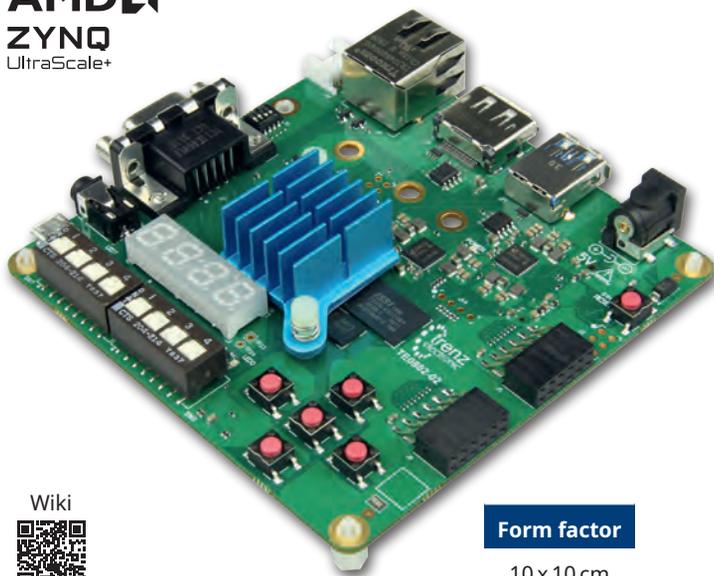
Wiki

Form factor

10 x 10 cm
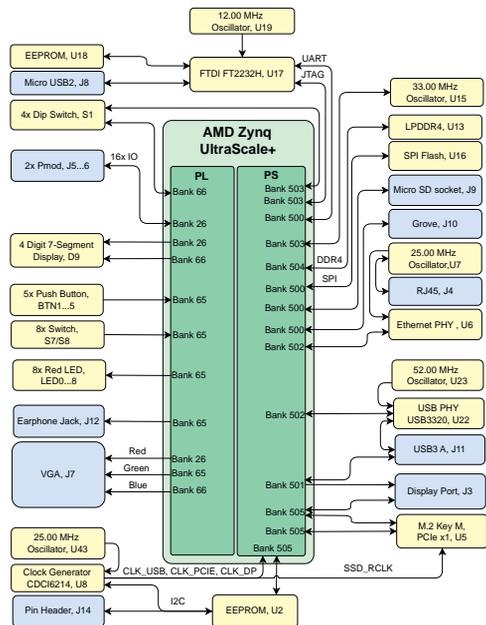
Device list	SDRAM max	Flash	Ethernet RJ45	USB	User I/O	Audio	Other features
ZU1CG ZU2CG	2 GB LPDDR4	32 MB	1 Gbit	USB3.0 Host (type A connector)	2 Pmod connectors	3.5 mm jack (PWM output)	EEPROM, USB JTAG/UART microUSB, microSD card, M2 PCIe SSD support, display, power: 5V plug

TE0890 "S7 Mini" Fully Open-Source Module

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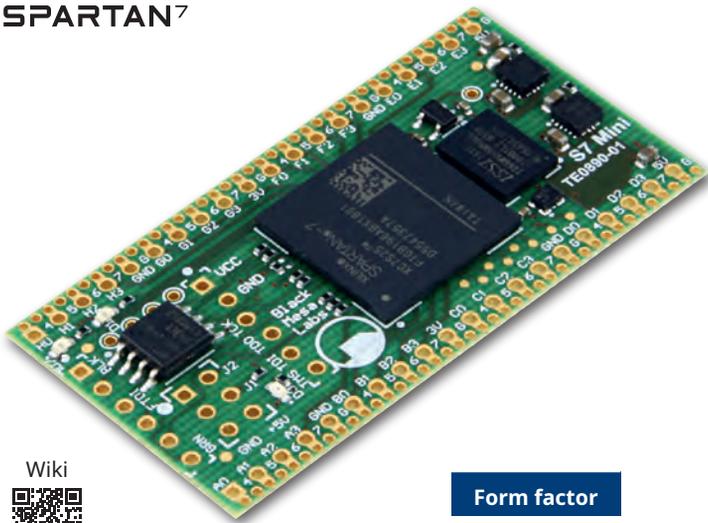
Wiki

Form factor

2.7 x 5.2 cm
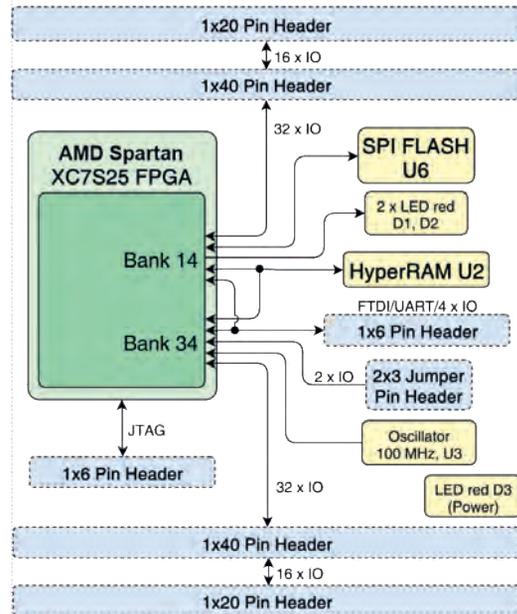
Device list	Footprint compatible	Config PROM	HyperRAM DRAM	Total I/Os	Interfaces	Supply	Other features
7S25	7S6, 7S15, 7S50 FTGB-196 devices	64 MB	64 MB	Dual-Pinout DIP-40 or 50mil 80 pin for 32 or 64 FPGA 3.3V I/Os	Standard 1 x 6 FTDI cable serial	5V input	23K Logic Cells, 29K Flops, 45 36Kb BRAMs, 80 Mults, fully open source

TE0714 Artix™ 7 FPGA Module

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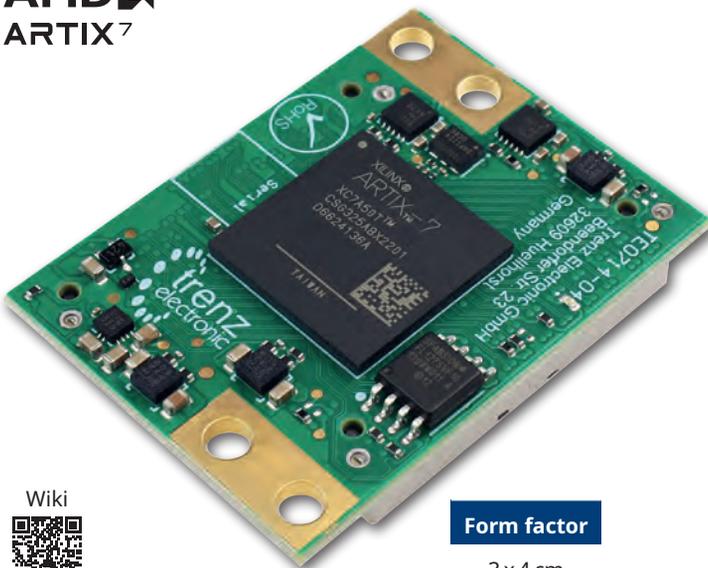
Wiki

Form factor

3 x 4 cm
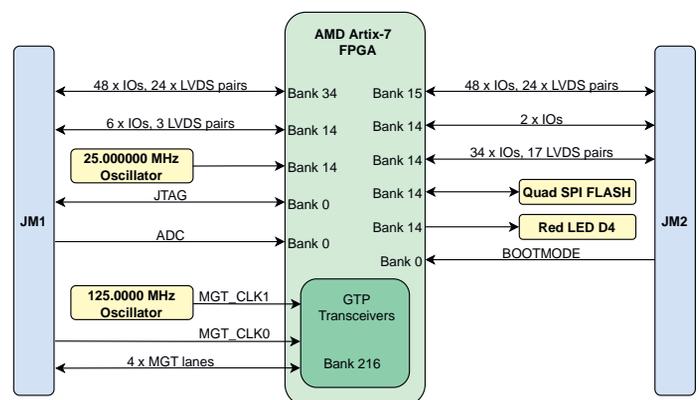
Device list	Pin packages	Connectors	Flash	Total I/Os	Gbit transceivers	Config. Voltage (B14)	Other features
A12, A15, A25, A35, A50	CSG325	2 x Samtec LSHM	16 MB	138 + 5 (QSPI or user I/Os)	4 x GTP	3.3 V or 1.8 V	Differential MEMS oscillator for MGT clocking, XADC analog Input, eFUSE bit-stream encryption (AES), single supply

TE0727 "ZynqBerryZero" Module

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

Wiki

Form factor

3 x 6.5 cm

Device list	SDRAM max	Flash	HAT header	Total I/Os	Other features
Z-7010	512 MB DDR3L	16 MB	40-pin	26 GPIO	2 x micro USB2.0, microSD card slot, Mini HDMI type C, CSI-2 connector (camera)

TE0725 Artix™ 7 FPGA Module

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

Wiki

Form factor

3.5 x 7.3 cm

Device list	Pin packages	Connectors	HyperRAM max	Flash	EEPROM	Total I/Os	Other features
15T, 35T, 50T, 75T, 100T	CSG324	2 x 50-pin headers	Up to 32 MB	32 MB	16 KB	87	Optional POF (Plastic Optical Fiber) adapter (125/250 Mbit/s), single supply

TE0716 Zynq™ 7000 SoC Module

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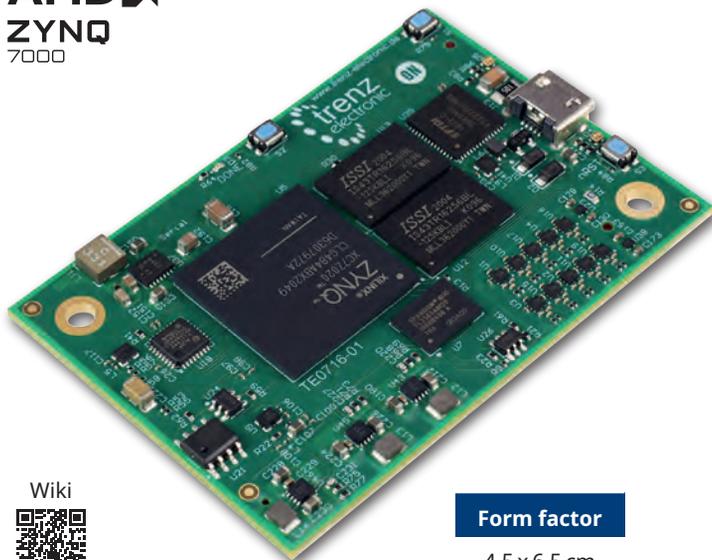
Wiki

Form factor

4.5 x 6.5 cm
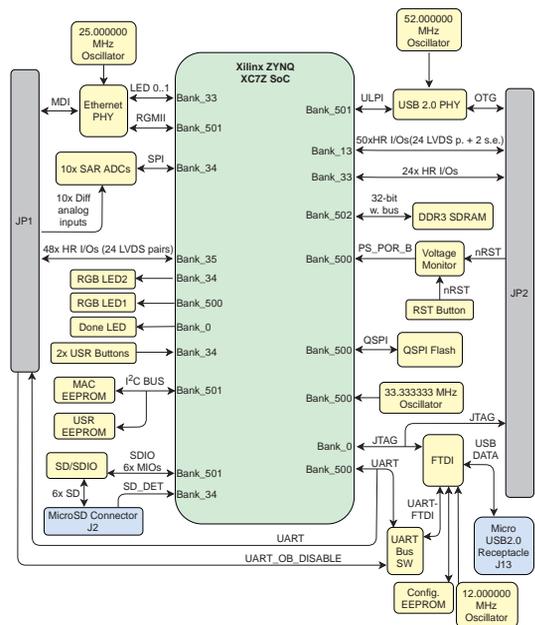
Device list	Connectors	SDRAM max	Flash	Ethernet PHY	USB PHY	Total I/Os	Interface	Other features
Z-7020	2 x FCI Bergstak	1 GB DDR3L	32 MB	1 Gbit	USB2.0	120 x HR PL	2 x PS MIO (shared with UART TX / RX ZYNQ-FTDI)	On board 10 x 12-bit low power SAR ADCs up to 2 MSPS, low power oscillators, USB2.0 to UART/JTAG interface, EEPROM

TE0728 Zynq™ 7000 SoC Module

AMD Zynq™ 7000, DDR3, Flash, Ethernet, CAN, Automotive
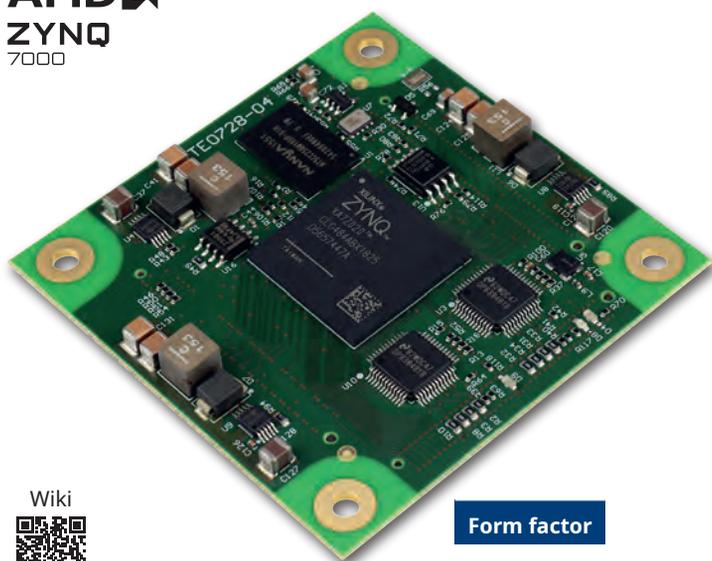
Wiki

Form factor

6 x 6 cm
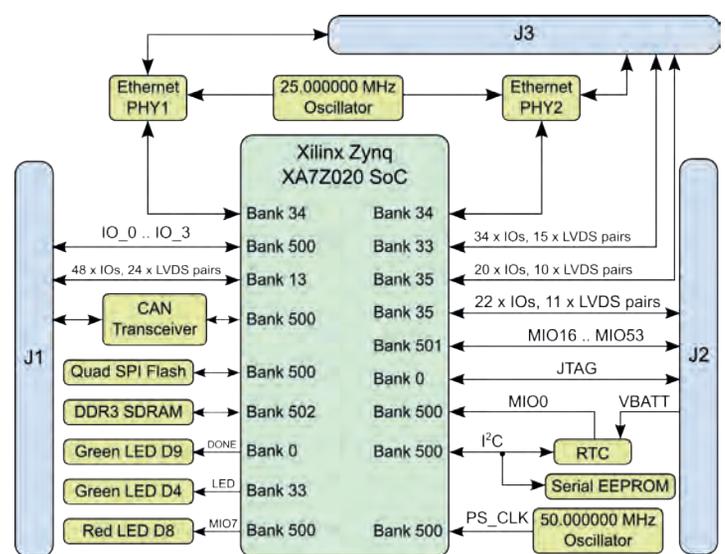
Device list	Connectors	SDRAM max	Flash	EEPROM	Ethernet PHY	Total I/Os	Other features
XA7Z020 (automotive FPGA)	3 x Samtec SEM	512 MB DDR3	16 MB	2 KByte	2 x 100 Mbit	124 + 42 MIO	Automotive, real time clock, CAN, 12 V power supply

TE0729 Zynq™ 7000 SoC Module

AMD Zynq™ 7000, DDR3, Flash, Ethernet, EEPROM, USB, eMMC

Wiki
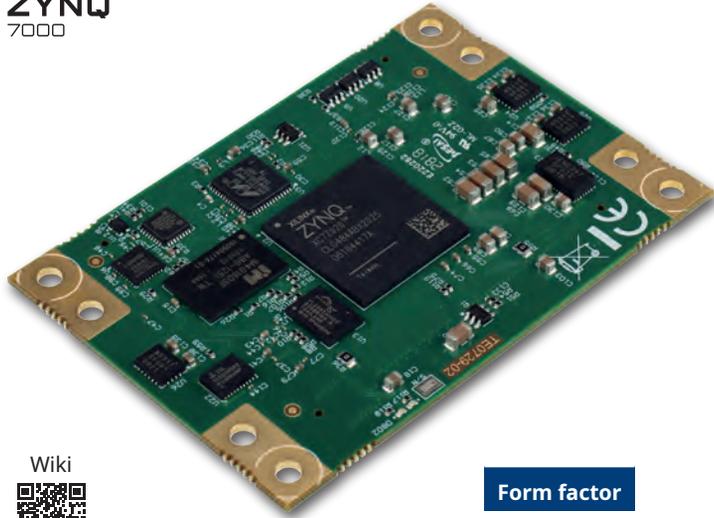
Form factor

5.2 x 7.6 cm
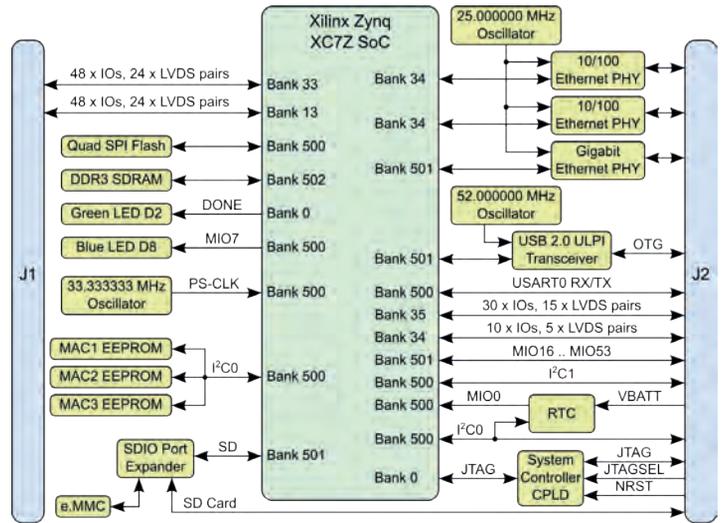
Device list	Connectors	SDRAM max	Flash	eMMC	EEPROM	Ethernet PHY	USB PHY	Total I/Os	Other features
Z-7020	2 x Samtec BTE	512 MB DDR3	32 MB	4 – 64 GB	3 x MAC address	2 x 100 Mbit, 1 Gbit	USB2.0 OTG	136 + 14 MIO	Real time clock

TE0745 Zynq™ 7000 SoM

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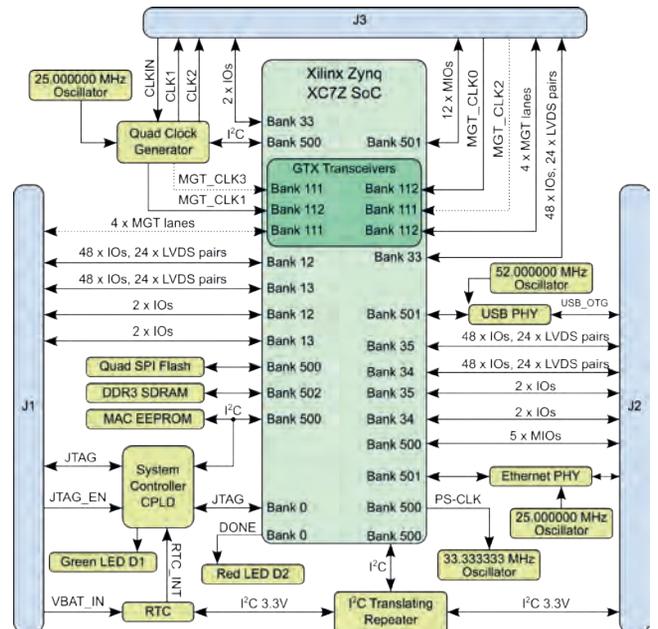
Wiki

Form factor

5.2 x 7.6 cm

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

TE0782 Zynq™ 7000 High-Performance Module

AMD Zynq™ 7000, DDR3, Flash, 2 x Gbit Ethernet, 2 x USB, eMMC

Wiki

Form factor

8.5 x 8.5 cm
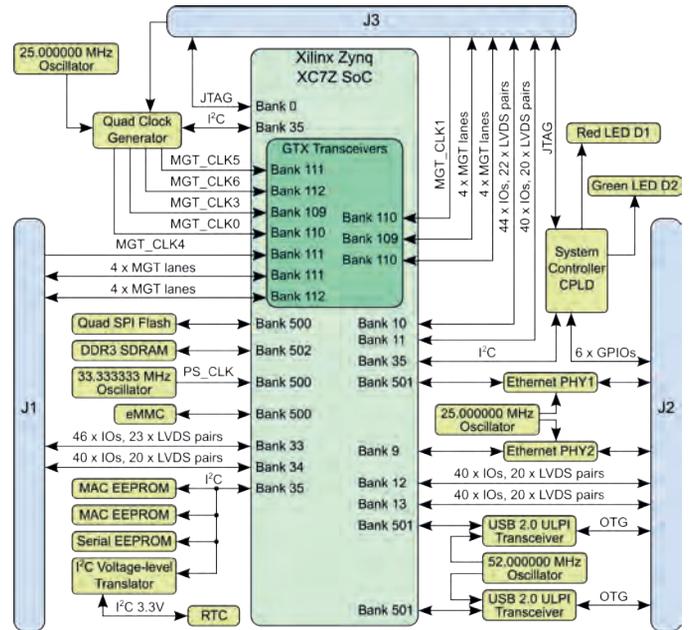
Device list	Connectors	SDRAM max	Flash	eMMC	Ethernet PHY	USB PHY	Total I/Os	Gbit transceivers	Other features
Z-7035, Z-7045, Z-7100	3 x Samtec QTH	1 GB DDR3	32 MB	4 - 64 GB	2 x 1 Gbit	2 x USB2.0 OTG	250 + 2 MIO	16 x GTX	Programmable clock generator, real time clock

TE0865 Zynq™ UltraScale+™ MPSoC Module

AMD Zynq™ UltraScale+™ MPSoC, DDR4, Flash, Ethernet, USB
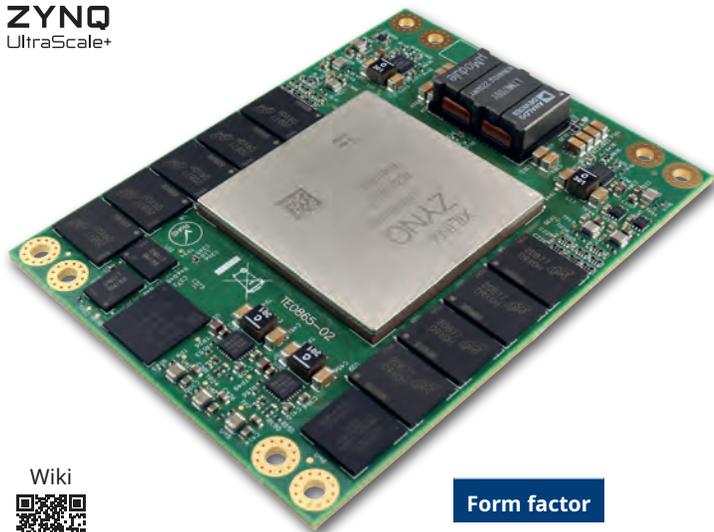
Wiki

Form factor

7.5 x 10 cm
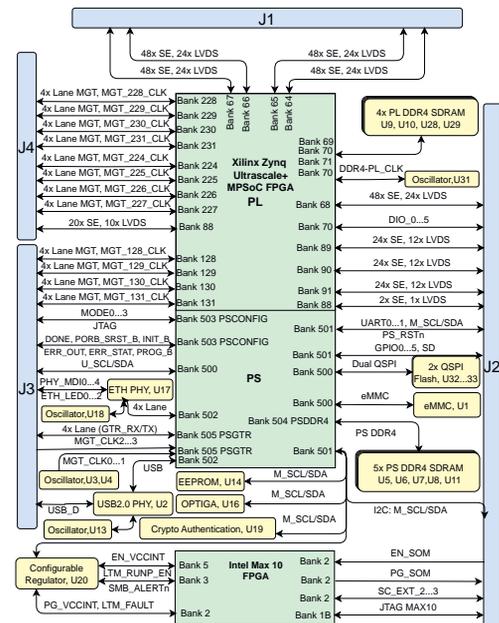
Device list	Pin packages	Connectors	SDRAM max	Flash	Ethernet PHY	Total I/Os	Gbit trans-ceivers	Other features
ZU11, ZU17, ZU19	C1760	4 x Samtec ADM6 4 x 60-pin	8 GB DDR4 64-bit (PS) with ECC, 8 GB DDR4 64-bit (PL)	2 x 64 MB	1 Gbit	240 PL HP 96 PL HD 21 MIO	32 x GTH, 16 x GTY, 4 x GTR	USB PHY, eMMC, 12V single supply

TEC0330 PCIe FMC Carrier

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

Wiki
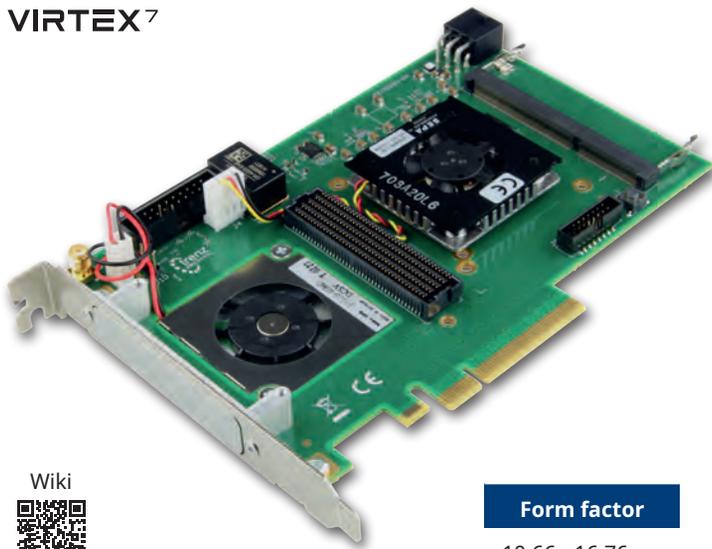
Form factor

10.66 x 16.76 cm
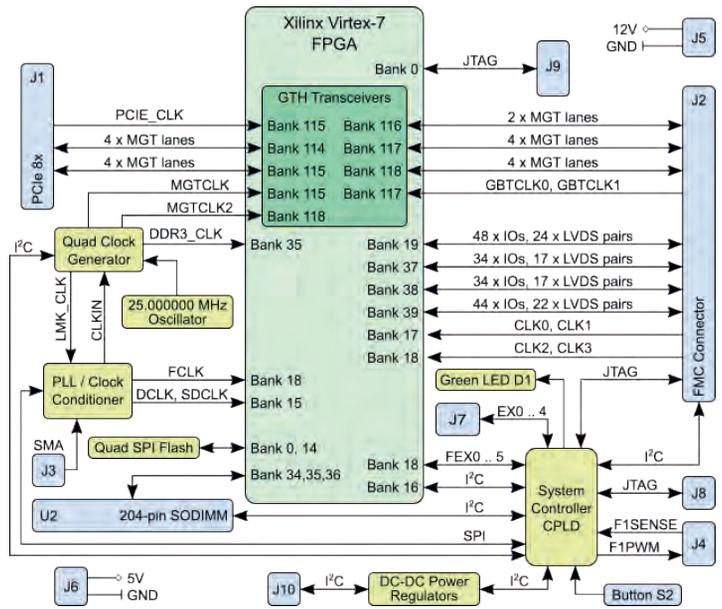
Device list	SDRAM	Flash	Total I/Os	Gbit transceivers	Gbit transceivers transmission rate	Other features
XC7VX330T	DDR3 SODIMM Socket	32 MB	Up to 202 FPGA I/O pins on FMC connector	10 on FMC 8 on PCIe lanes	13.1 Gbit/s	FMC High Pin Count (HPC) connector, programmable clock generator, PCIe x8

TEF1001 PCIe FMC Carrier

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

Wiki
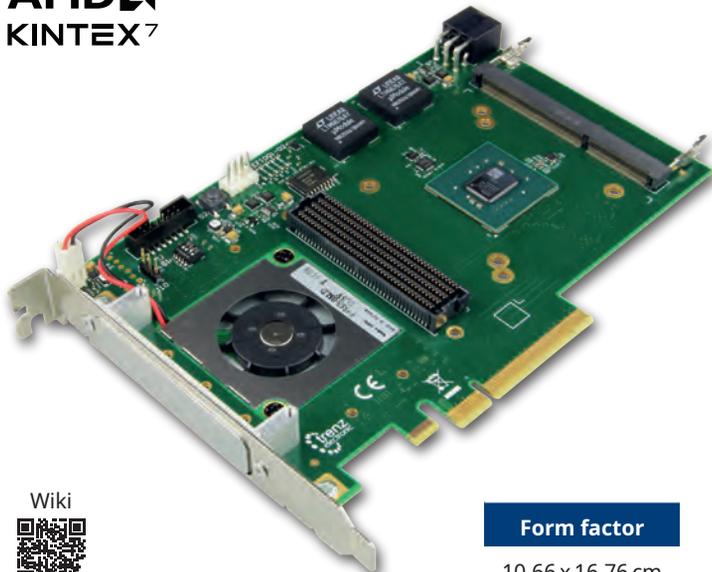
Form factor

10.66 x 16.76 cm
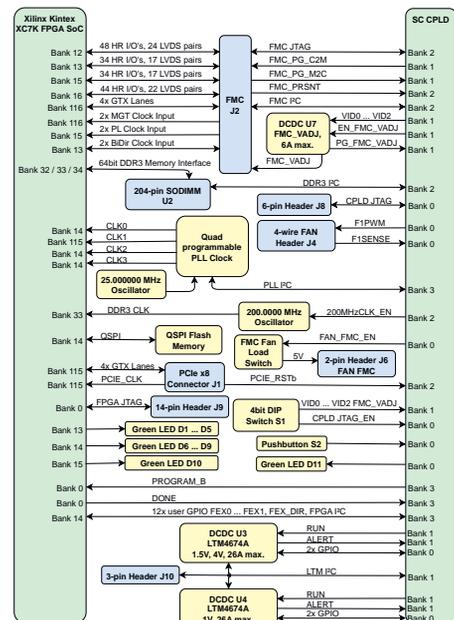
Device list	SDRAM max	Flash	Total I/Os	Gbit transceivers	Other features
XC7K160T	8 GB DDR3 SODIMM Socket	32 MB	160 on FMC connector	4 on FMC 4 on PCIe lanes	Vita 57.1 FMC HPC slot, programmable clock generator, 200 MHz low jitter LVDS oscillator

TEF1002 PCIe FMC Carrier

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

Wiki
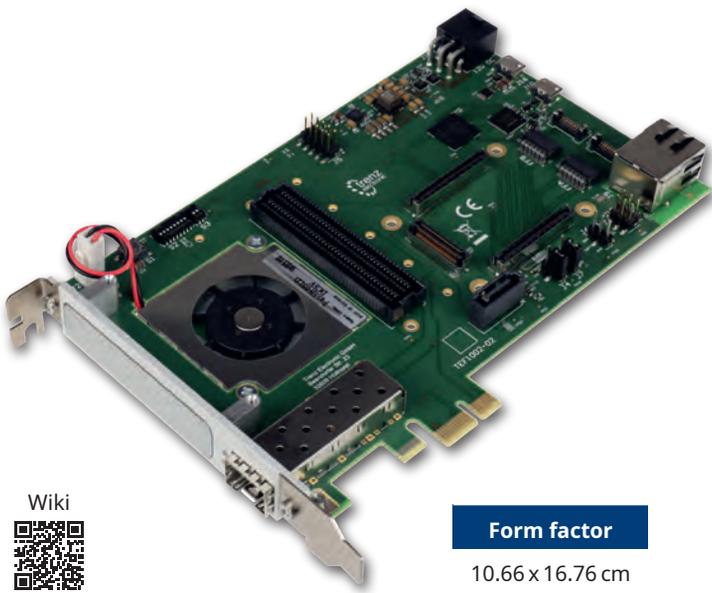
Form factor

10.66 x 16.76 cm
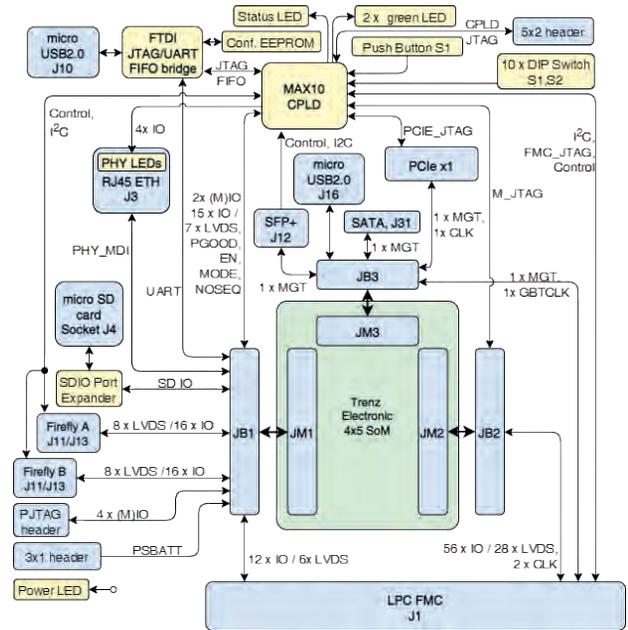
PCIe Carrier	Connectors	Other features
For 4 x 5 cm modules	LPC FMC, SFP+, PCIe x1, SATA with pin 7 power configuration for SATADoM, RJ45 Gigabit Ethernet, micro USB to JTAG/UART bridge, 2 x 8 LVDS (FireFly), microUSB, microSD card	MAX®10 CPLD, 4 x LED, module reset button, 10 x configuration/user dip switch

TEI0022 DataStorm DAQ

M-Board FMC Carrier for M-Series Presicion Converters

Wiki

Form factor

13 x 16 cm
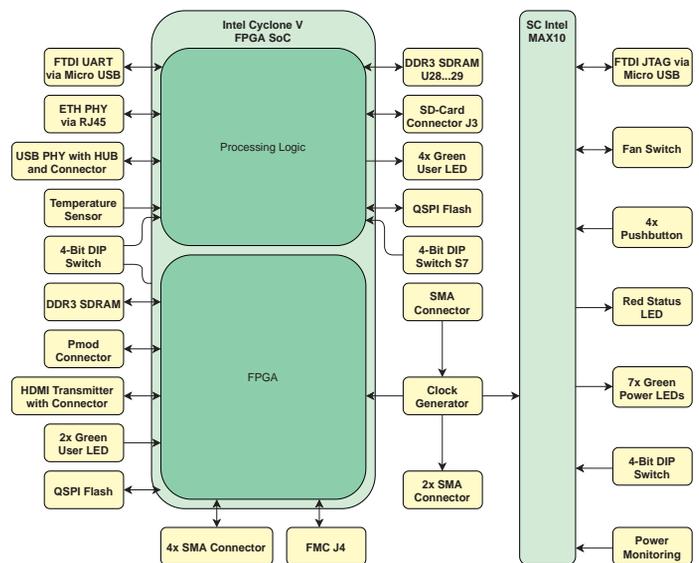
Device list	SDRAM max	Flash	On board	Interface	Other features
Cyclone®V 5CSEMA5F31C8N	1 GB for HPS 1 GB for FPGA	32 MB SPI for HPS 32 MB SPI for FPGA	up to 7 x SMA connector, temperature sensor, Intel MAX®10 for board management	Connectors: LPC FMC, 4 x Pmod, JTAG, UART via microUSB B (for FPGA and HPS), 4 x USB2.0 host, Ethernet, SD card, HDMI	Power: 12V input supply voltage

Development Boards

DesignWare® ARC® EM Software Development Platform
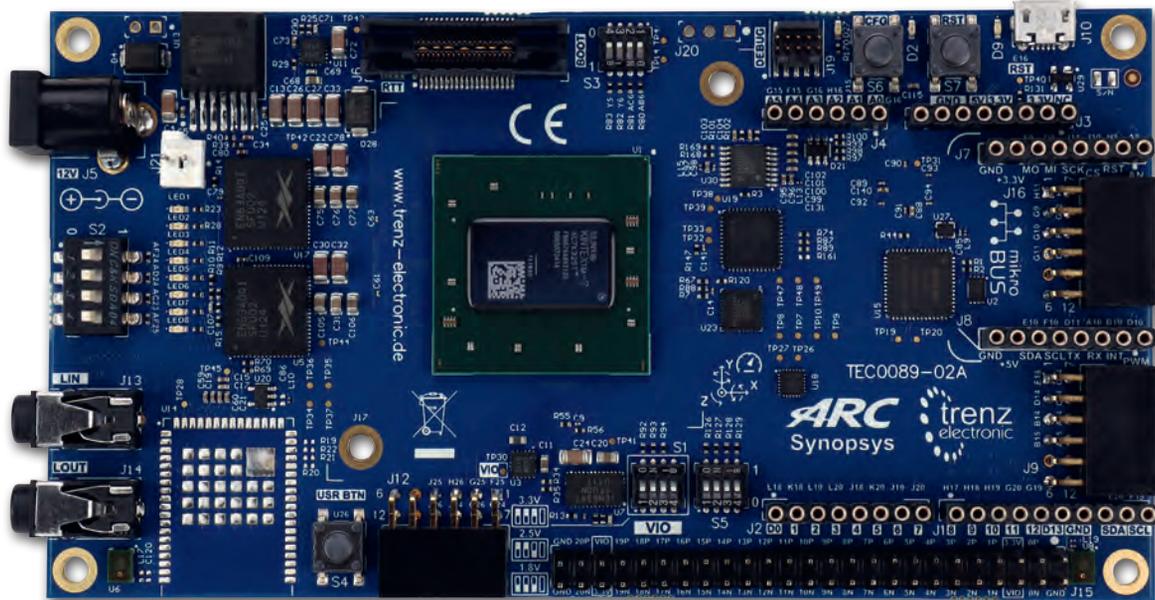
The DesignWare® ARC® EM Software Development Platform is a flexible platform for rapid software development on ARC EM processors and subsystems. It is intended to accelerate software development and debug of ARC EM processor-based systems for a wide range of ultra-low power embedded applications such 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 tool-chain and embARC Open Software Platform.

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

Each hardware configuration includes an ARC EM processor and subsystem with access to 16 MB of PSRAM, 16 MB of SPI Flash and a wide range of peripherals such 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:

- AMD Kintex™ 7 XC7K325T-2FBG676C
- 32 MByte Quad-SPI Flash memory (for configuration and operation)
- USB-JTAG bridge FT2232H
- FPGA configuration through JTAG and SPI Flash memory
- SPI Flash configuration through JTAG and USB
- Connectors
  - Arduino compatible pin headers
  - MicroBUS compatible pin headers
  - 3 x Pmod compatible pin headers
  - 50 pin header 2.54mm (40 single-ended IO, 20 differential lanes, variable VCCIO)
  - Mictor debug connector
  - 10 pin debug connector 2 mm

- 2 x 8 MByte PSRAM
- 32 MByte User Quad-SPI memory
- MicroSD card socket
- 3-axis gyroscope, 3-axis accelerometer, 3-axis magnetometer
- Stereo audio codec MAX9880A
- 2 x PDM microphones
- 2 x 3.5 mm RCA audio jacks (input/output)
- 100 MHz user clock oscillator SiT8008
- Status LEDs, power LED
- 12V power supply (seperately included in the scope of delivery)
- Dimensions: 72.5 x 137 mm
- Article number: TEC0089-02-D2C-1-D

http://trenz.org/tec0089

TEB0911 UltraRack+ Board

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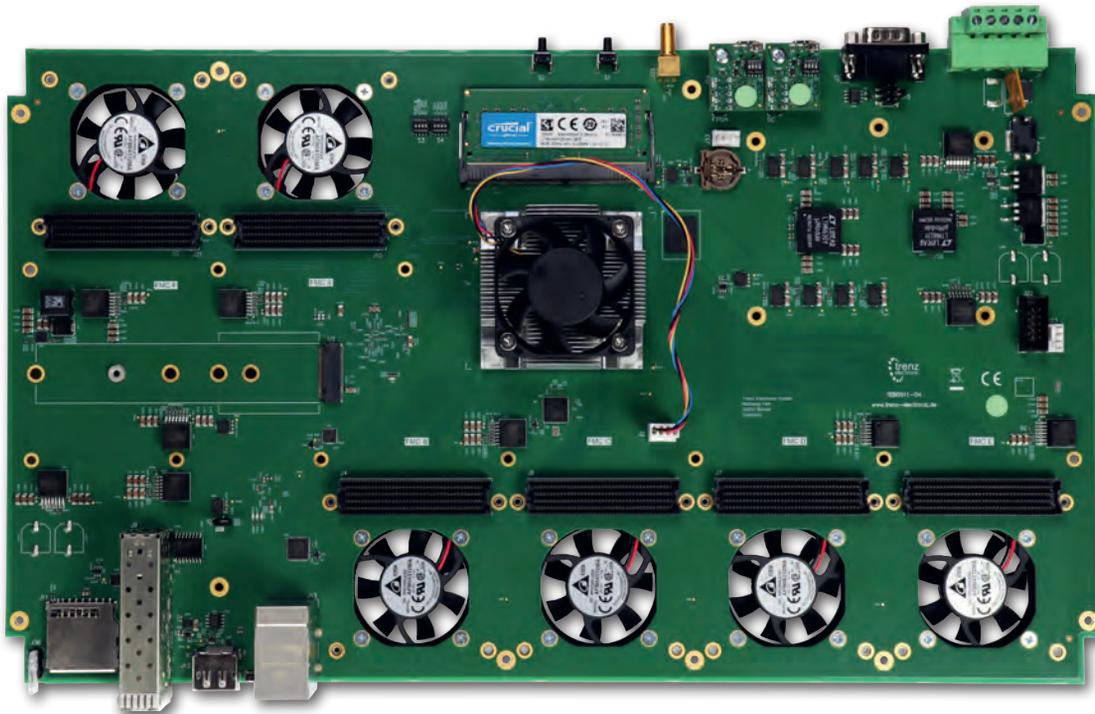
The TEB0911 UltraRack+ board is integrating a AMD Zynq™ UltraScale+™ MPSoC with 2 x 64 MByte Flash memory for configuration and operation, DDR4-SDRAM SO-DIMM socket with 64-bit wide data bus, 22 MGT lanes and powerful switch-mode power supplies for all on-board voltages. The TEB0911 board exposes the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

Key features:

- AMD Zynq™ UltraScale+™ MPSoC
  - 1156 Pin Package
  - Assembly options: ZU6, ZU9, ZU15
- 64-bit DDR4 SODIMM (PS connected)
- M2 PCIe SSD (1-Lane)
- eMMC (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
  - GTH per FMC
  - 68 ZynqMP PL IIO per FMC
- DisplayPort (2-lanes)

- RJ45 ETH + Dual USB3 combo
- Dual Stack SFP+
- SD (bootable)
- Status LEDs

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

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

http://trenz.org/teb0911-info

TEI0006 Cyclone® 10 GX SoM

Altera® Cyclone®10 GX SoM, DDR3, Flash, Ethernet
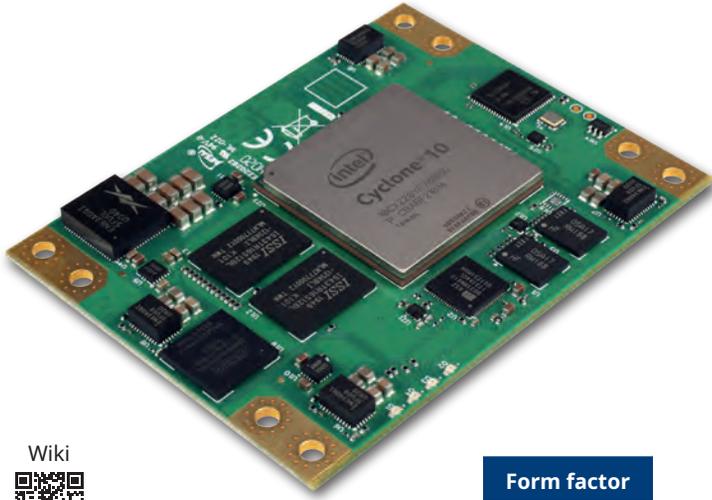
Wiki

Form factor

6 x 8 cm
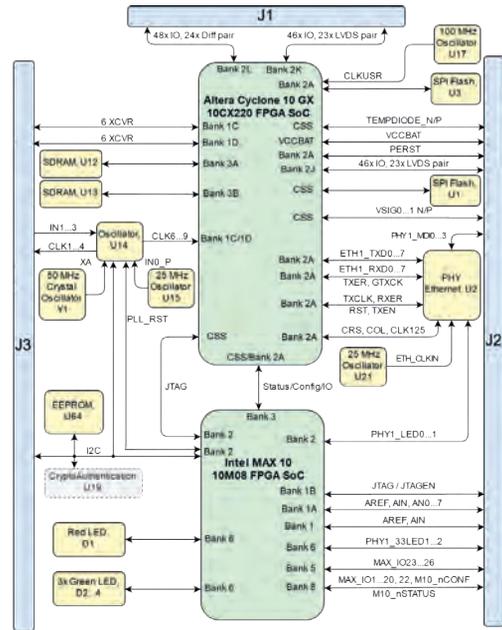
Device list	Connectors	SDRAM max	Flash	Ethernet	Other features
10CX220, 10CX150, 10CX105	3 x Samtec ST5	2 GB DDR3L	256 MB	1 Gbit	Max®10 as power sequencer, EEPROM, 4 LEDs, 5V input voltage

TEIB0006 Baseboard

Development Carrier Board for Trenz Electronic's TEI0006 FPGA Module
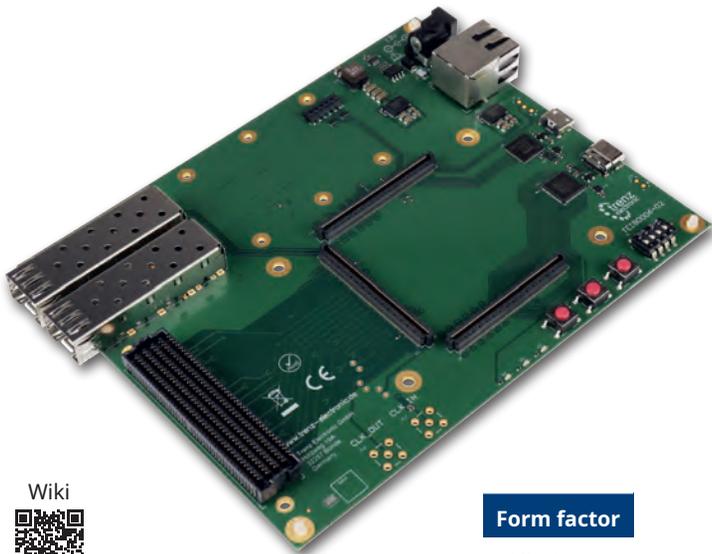
Wiki

Form factor

12 x 15 cm

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 = 1.8 V
- Gigabit Ethernet connector
- USB2.0 microUSB (JTAG / UART)
- USB3.0 type C

Power
- 12 V input voltage

RAM/ Storage	On board	Interface	Power
EEPROM	3 x LEDs (power, 2 x user), 3 x I/O expanders, 3 x push buttons (2 x user, system controller config), DIP switch	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 = 1.8 V, USB2.0 micro USB (JTAG / UART), USB3.0 type C	12 V input voltage

TEI0001 "MAX1000" & TEI0003 "CYC1000" Module
Arduino MKR Standard 2.5 x 6.15 cm
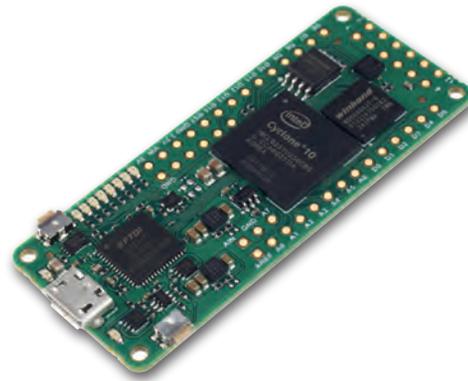
Resources

TEI0001 series "MAX 1000" IoT Maker board

- 10M02, 10M04, 10M08, 10M16
- 8 or 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
- 5V power supplied from the USB port or via a pin

Resources

TEI0003 series "CYY 1000" with Altera® Cyclone®10

- 10CL006, 10CL010, 10CL016, 10CL025
- 25kLE
- 8 MByte SDRAM
- 2 MByte Flash
- 21 I/O Arduino MKR compatible headers
- 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
- 8configurable and 2 status LEDs, user push button
- 5V single power supply with on-board voltage regulators

TEI0009 C10LP RefKit Development Board
Altera® Cyclone® 10 LP, 2 x 10/100 Ethernet, USB2.0
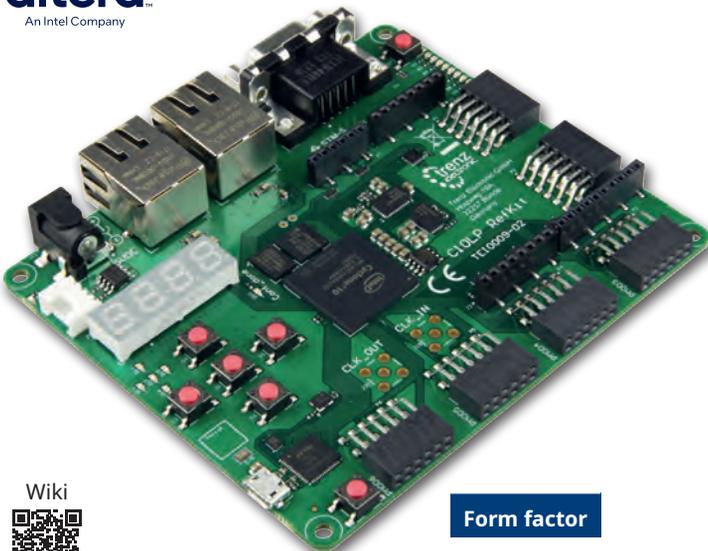
Wiki

Form factor

9.5 x 11 cm
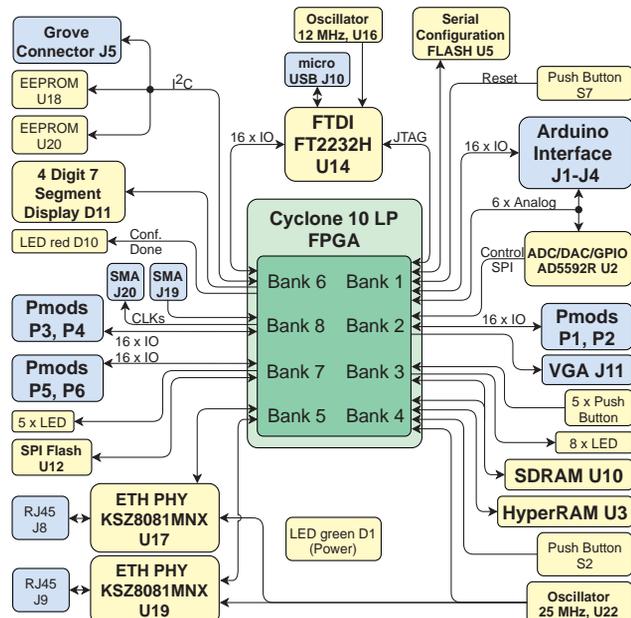
Device list	Connectors	SDRAM max	User Flash QSPI	HyperRAM max	Flash max	Ethernet PHY	USB	Other features
10CL016, 10CL025, 10CL040, 10CL055, 10CL080	QSE (for LVDS), Pmod, Arduino, SMA	512 Mbit	Up to 512 Mbit	128 Mbit	32 Mbit	2 x 10/100	USB2.0	Integrated USB programmer2

TEM0001 "SMF2000" SmartFusion® SoC Module

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

MICROCHIP

SMF 2000

Wiki
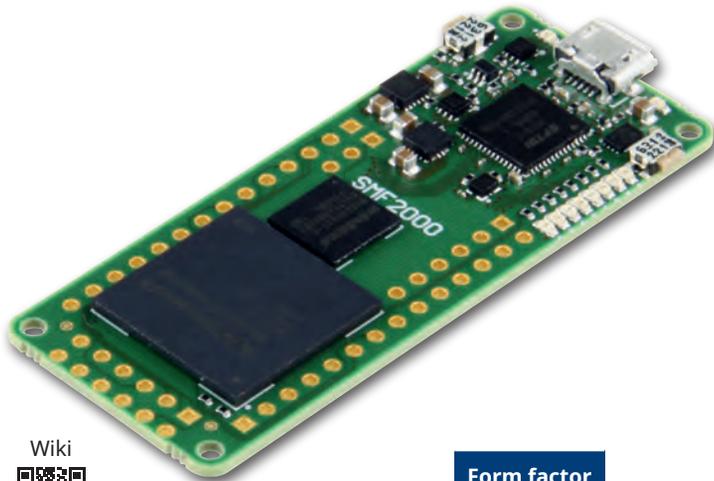
Form factor

2.5 x 6.15 cm
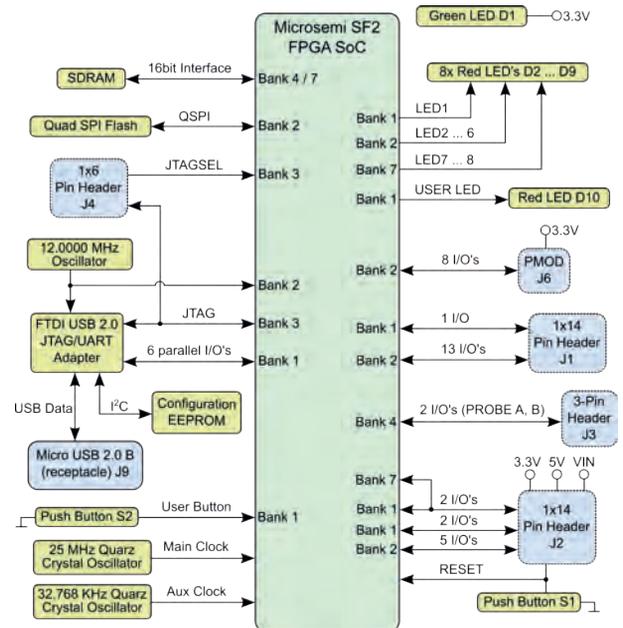
Device list	SDRAM max	Flash	Clocks	JTAG/UART	Total I/Os	Other features
M2S005, M2S010, M2S025, M2S050, M2S060	8 MB	8 MB	12 MHz system clock 32.768 kHz auxiliary clock	microUSB2.0 connector	31 (8 I/O 1 x Pmod header, 23 I/O 2 x 14-pin header)	1 x 3-pin header for LiveProbes, 9 user LEDs, 1 user push button

TEM0005 SmartFusion® SoC Module

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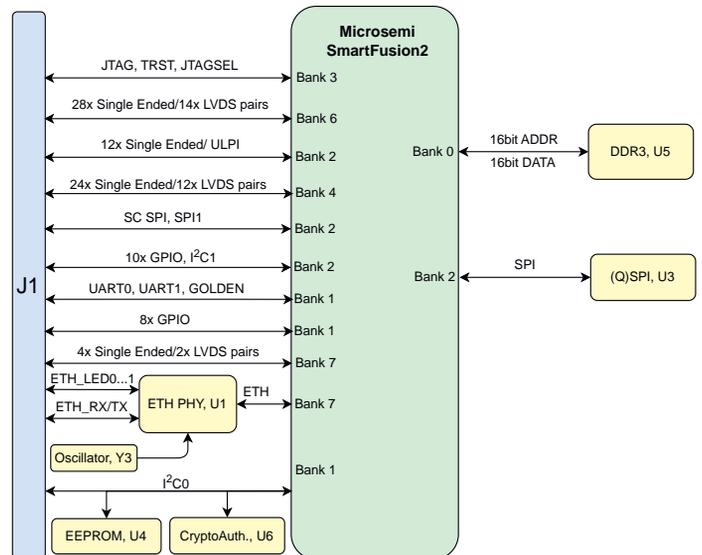
MICROCHIP

TEM0005-02

SmartFusion 2

Wiki

Form factor

3.1 x 5.6 cm

Device list	Connectors	SDRAM max	Flash	Ethernet PHY	Total I/Os	Other features
M2S005, M2S010, M2S025, M2S050, M2S060	1 x Samtec ST5 160 pin	256 MB DDR3	32 MB	100 Mbps	105	Optional crypto authentication device, serial EEPROM for MAC address, power supply monitor

TEM0007 PolarFire® SoC Module

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

Wiki

Form factor
4 x 5 cm
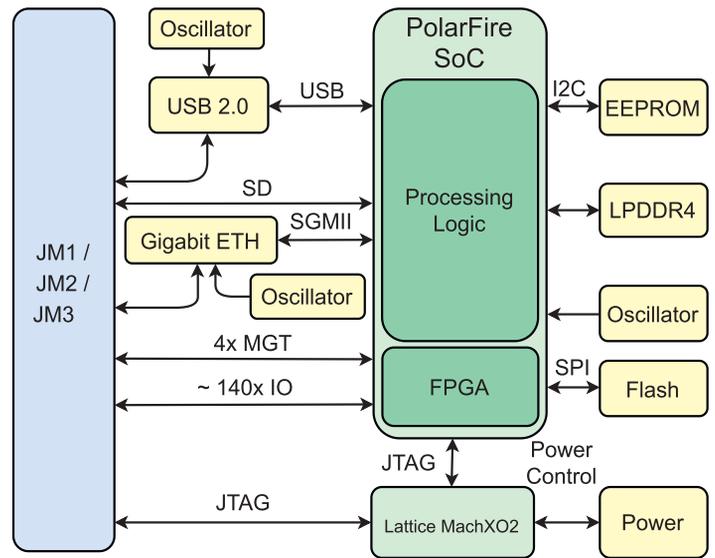
Device list	Pin packages	Connectors	SDRAM max	Flash	Ethernet	Other features
MPFS025T, MPFS095T, MPFS160T, MPFS250T	FCVG484I	3 x Samtec LSHM	1 GB LPDDR4	64 MB	1 Gbit	EEPROM MAC address, USB2.0

TEG2000 GateMate Module

Cologne Chip GateMate A1

Wiki
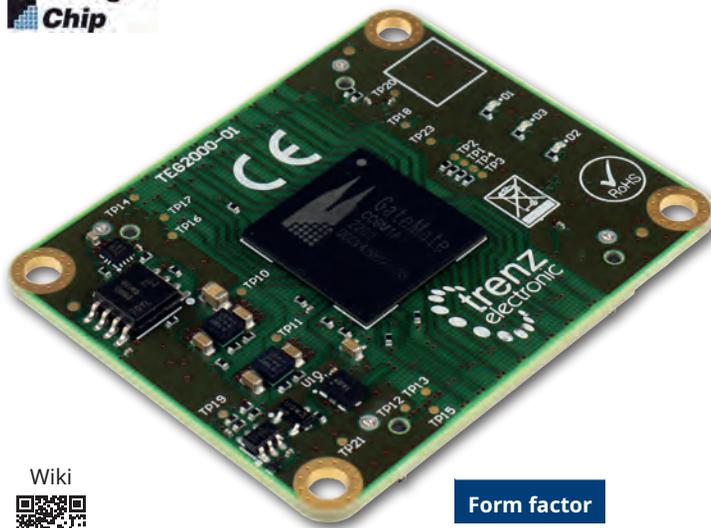
Form factor
4 x 5 cm
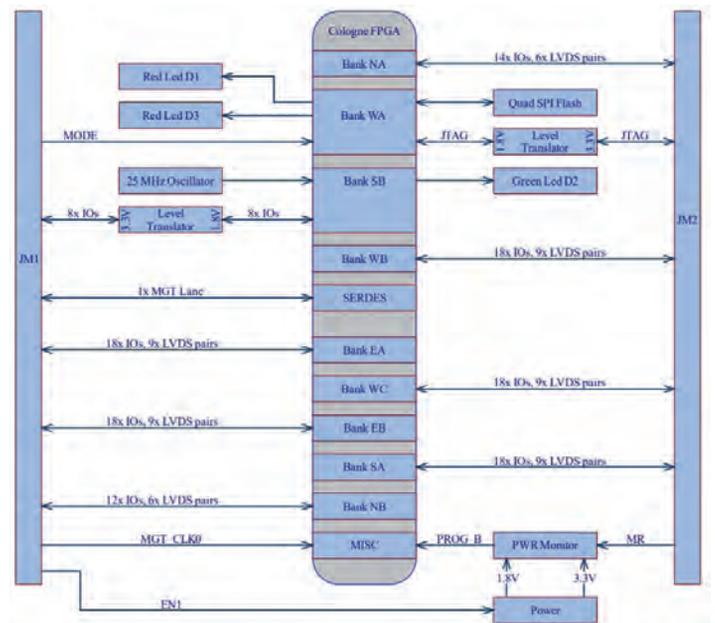
Device list	Interface	Flash	On board	Other features
GateMate CCGM1A1	Plug-on-Module with 2 x 100-Pin Razor Beam B2B connector, diverse I/O- and LVDS configurations	16 MB QSPI	25 MHz clock oscillator, level shifters	All power supplies on board

TEL0001 "LXO2000" Low Cost FPGA Module

Lattice XO2 FPGA, Arduino MKR Standard, on-board USB/JTAG and USB/serial
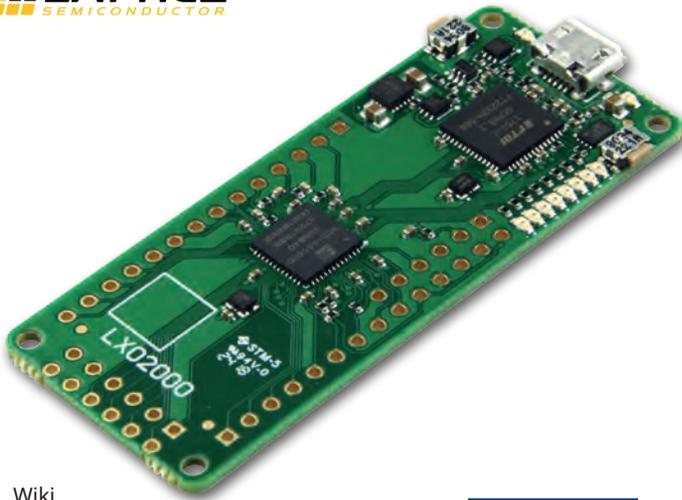
Wiki

Form factor

2.5 x 6.15 cm
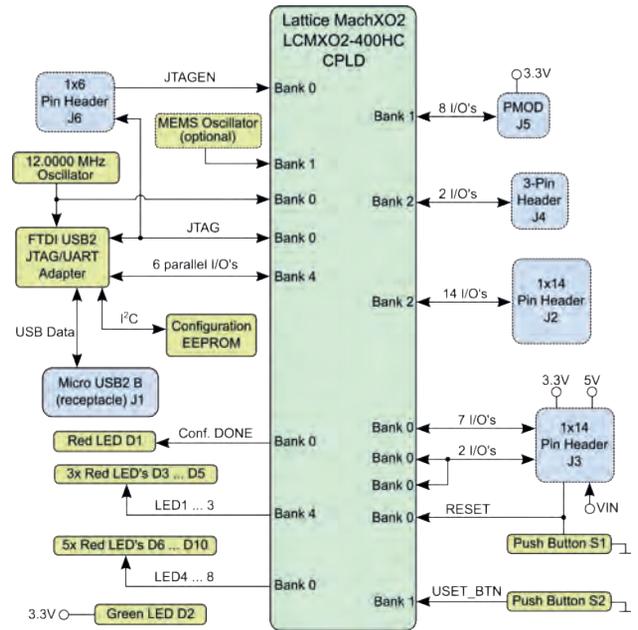
Device list	On board	Total I/Os	Clock oscillator	Other features
LCMXO2-4000HC	USB/JTAG, USB/serial	22 on MKR header, 2 I/O on additional header, optional Pmod header +8	100 MHz MEMS	8 LEDs, 2 push buttons, supply: USB or 5V from pin header, RC-networks

TE0876 "IceZero" Low Cost FPGA Module

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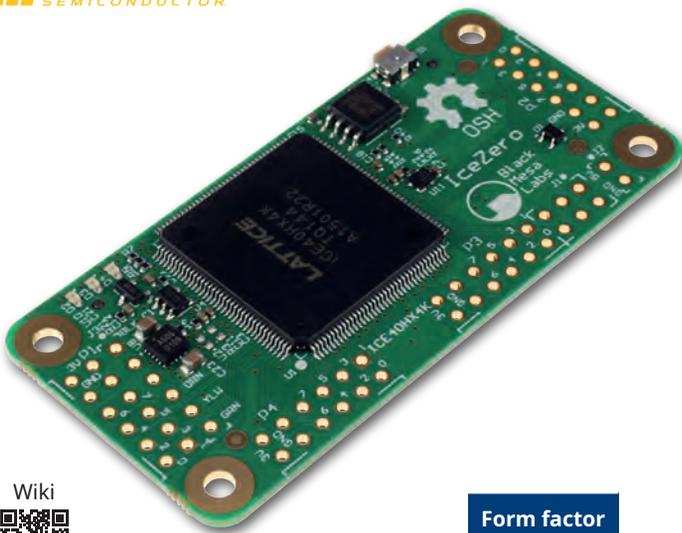
Wiki

Form factor

5.6 x 3.05 cm
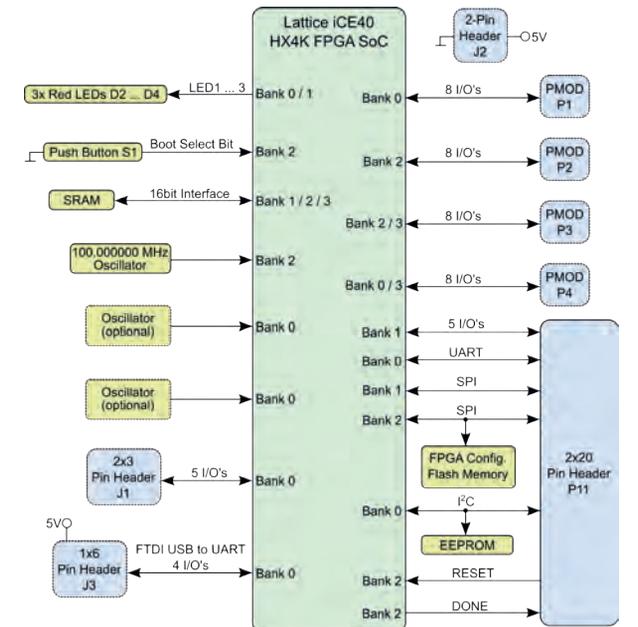
Device list	Connectors	SDRAM max	Flash	Other features
iCE40HX	4 x Pmod (DNP by default)	4 Mbit external SRAM	8 MB	100 MHz user clock, 3 user LED, supported by fully open source FPGA toolchain, fast FPGA configuration from Raspberry Pi, full FPGA design flow on Raspberry Pi (all open source)

TE0790 & TE0790-L FTDI JTAG Adapter

XMOD Form factor, FT2232H, Lattice X02-256 CPLD

for AMD **or** LATTICE SEMICONDUCTOR

Wiki

Two versions available:
1. Compatible with AMD tools (TE0790)
2. Not compatible with AMD tools (TE0790-L) can be used independently.
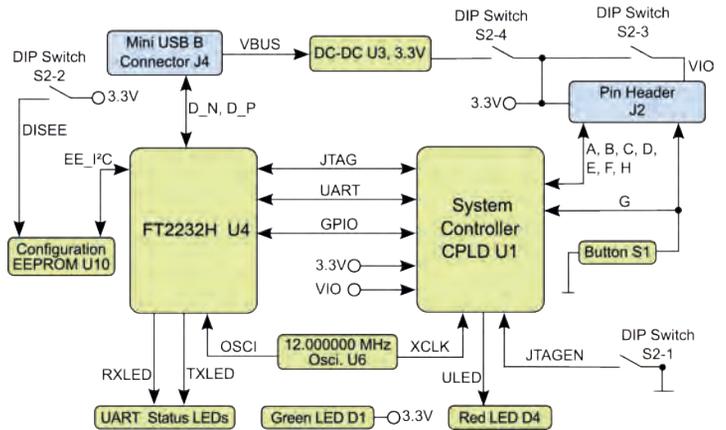
Device list	Form factor	FT2232H	Total I/Os	Other features
Lattice X02-256 CPLD	XMOD, M3 mounting hole	Mini USB connector, channel B RX/TX LEDs, EEPROM	8 universal I/O pins	Step down DCDC converter for optional power supply via USB-power, 4 position DIP switch

TEM0009 FPGA USB-Programmer JTAG

For development with Microchip FPGAs

for MICROCHIP

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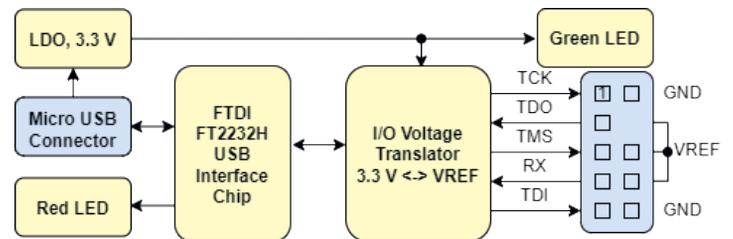
Supported by	JTAG connector	USB	Voltage levels	Other features
Libero SoC	Standard 2 x 5-pin header	MicroUSB connector USB2.0 HS support	0.8V – 3.6V	Green power-on LED

What is CRUVI?

A short overview

The word CRUVI is a combination of the Estonian word "KRUVI" for screw and the letter "C", which refers to the half of the hexagonal screw head. The "K" has been replaced by a "C" to emphasize the reference to the screw head. All modules are mechanically fixed with M2 screws with a diameter of 2 mm.

The expansion bus interface is designed to create an open ecosystem of function modules for high-performance peripheral connectivity. Its main focus is on supporting FPGA and FPGA SoC devices from all major manufacturers.

cruvi.com

CRUVI-LS (CR00025)

CRUVI Host (CR00100)

CRUVI-HS (CR00101)

CRUVI-LS (CR00040)
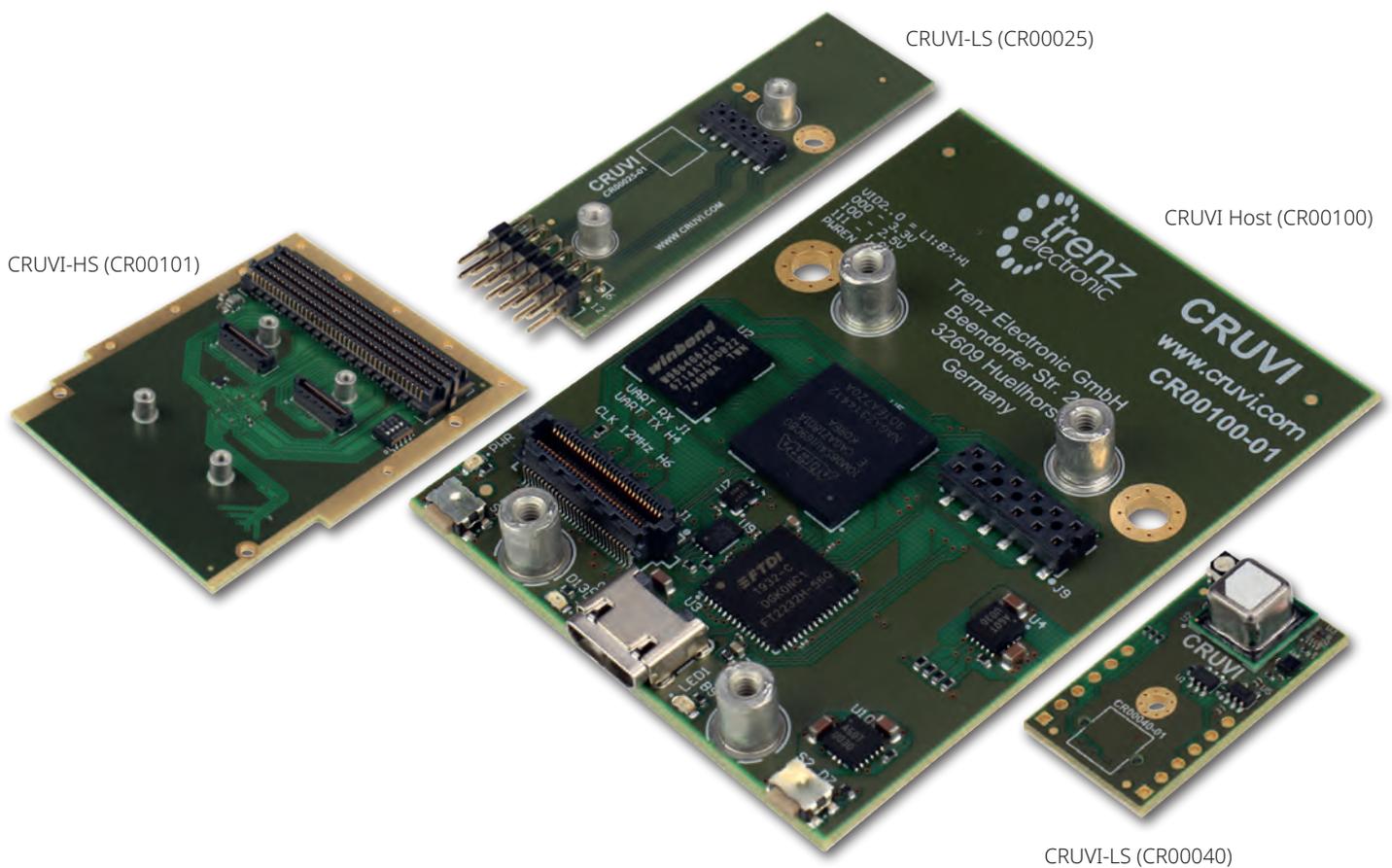
The picture shows FMC to CRUVI-HS, Pmod to CRUVI-LS, CRUVI host with LS and HS slot and CRUVI LS modules. CRUVI fills the space between Pmod and FMC card, it can be smaller and cheaper than SYZYGY.

Visit **cruvi.com** for more information

What is CRUVI?

A short overview

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

TEB0707

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

This board accepts Trenz 4x5 SoM and converts into a CRUVI compatible host carrier board. Three CRUVI slots are provided with HS connector support. One slot supports also LS.
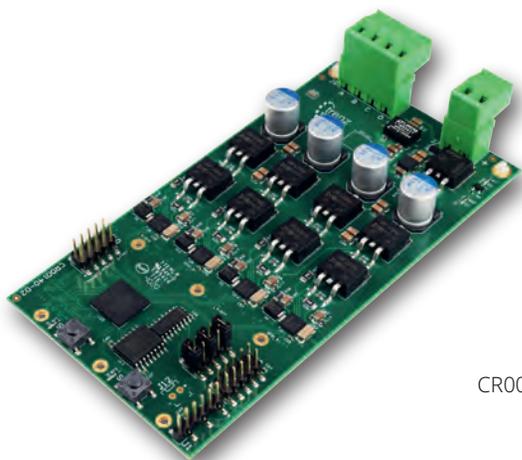
CR00140

Industrial Motor controller board with CRUVI connector

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

Visit **cruvi.com** for more information

CR00140 Control Development Kit

AMD Zynq™ 7000
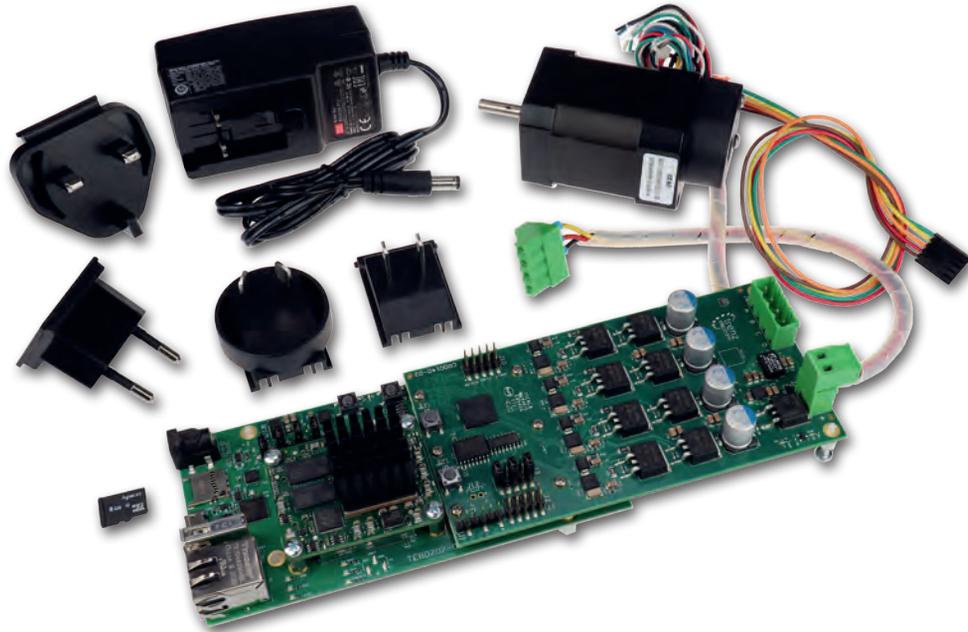
Motor Control Development Kit:

A CRUVI motor driver module CR00140-02, a carrier board TEB0707 and a MPSoC (TE0820/AMD UltraScale+™) or SoC (TE0720/AMD Zynq™) module including a heat sink. Supplied with a universal plug-in power supply with four adapters, a DC motor including cable for CRUVI CR00140 and an 8 GB microSD card.
- CR00140-02-K0A with MPSoC TE0820
- CR00140-02-K1A with SoC TE0720

CR00100 CRUVI MAX® 10 Baseboard

Altera® Max® 10 CRUVI, SDRAM, USB

Form factor
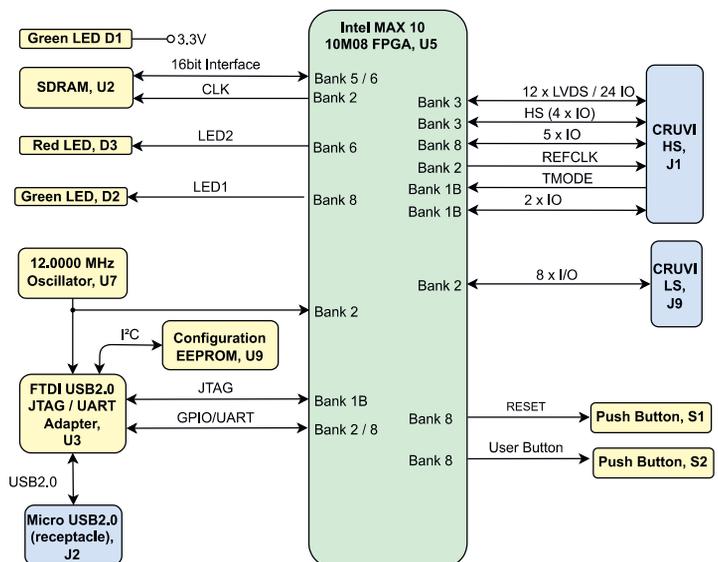
4.5 x 5.7 cm

Device list	Connectors	SDRAM max	Total I/Os	Other features
10M08	CRUVI (1 x HS, 1 x LS), 2 x 34 Pin header	8 MB	37 + 8	USB2.0, user push button and LEDs

CR00103 CRUVI Certus-NX Baseboard

Lattice® Certus-NX, HyperRAM, Flash, USB

Wiki
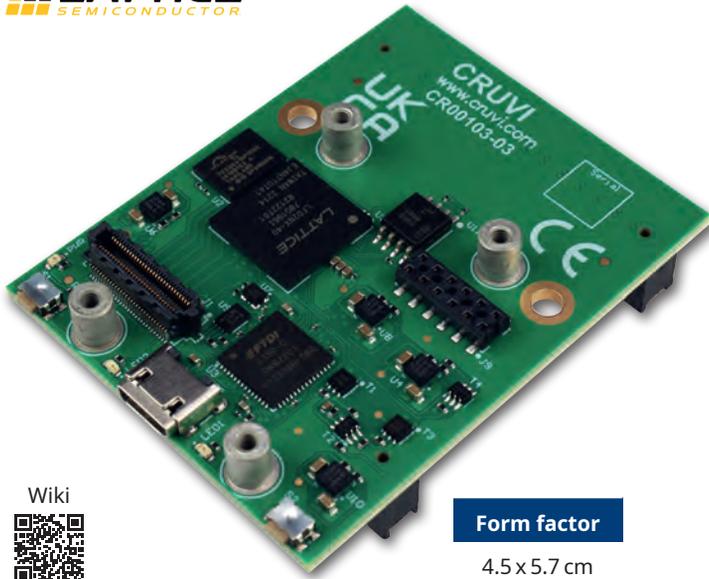
Form factor

4.5 x 5.7 cm
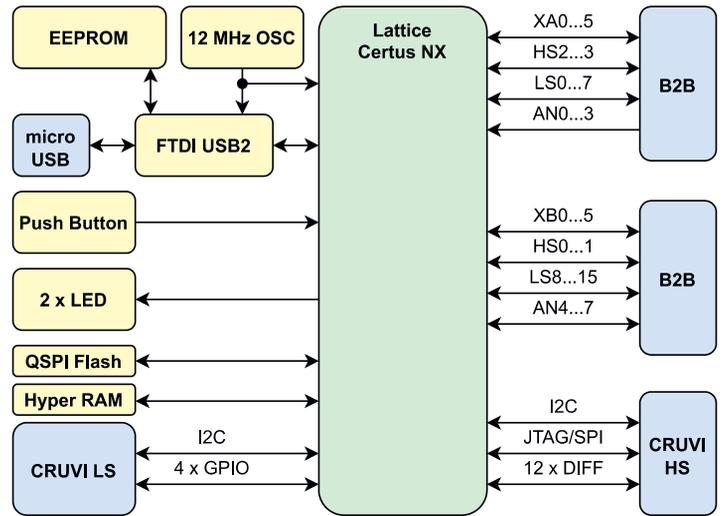
Device list	Interface	HyperRAM	Flash	Other features
LFD21X-40	CRUVI (2 x 34 Pin Header, 1 x High Speed 60 Pin Header, 1 x Low Speed 12 Pin Header), micro USB	16 MB	32 MB	USB to FIFO FTDI (JTAG/GPIO), user LEDs, push buttons

CR00109 CRUVI Development Board

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

Wiki

Form factor

11.65 x 15 cm
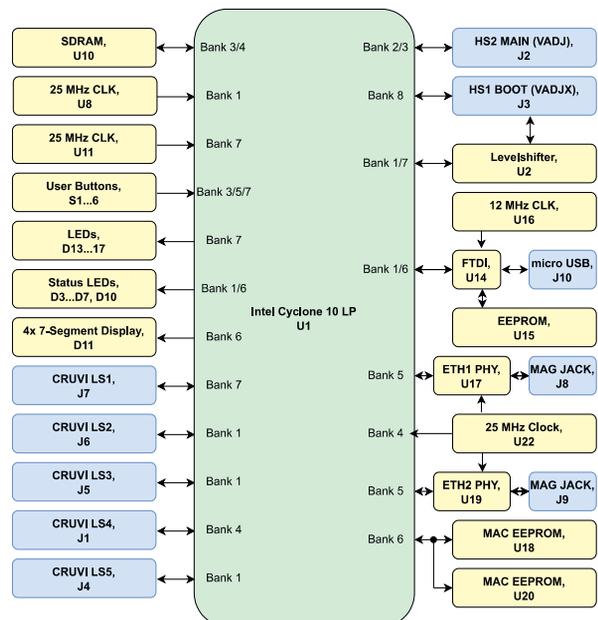
Device list	Connectors	SDRAM max	Other features
Cyclone® 10 LP, 10CL016, 10CL025, 10CL040, 10CL055, 10CL080	5 x CRUVI LS, CRUVI HS, CRUVI HS & BOOT, 2 x RJ45, micro USB	64 MB	2 x 10/100 Ethernet PHY, 2 x MAC EEPROM, Oscillator, 4 x 7-Segment-Display, user buttons, user LEDs, status LEDs

CRUVI Adapter

Small sizes mezzanine module standard providing option for high speed and ultra low cost modules.

CR00025 Pmod to CRUVI low speed Host Slot

On board
- Steel spacer
- M3-Hole
- Board-to-Board & Mezzanine connector

Power via CRUVI
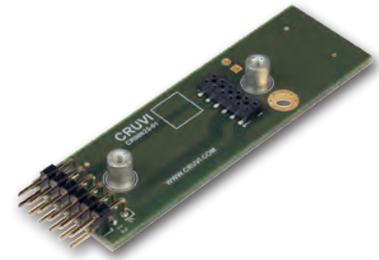
CR00026 Signal breakout debug Adapter

On board
- CRUVI HS Host connector
- CRUVI HS Device connector
- 100 mil pin headers

Power via CRUVI

CR00200 HS Ethernet PHY Adapter

On board
- CRUVI HS connector
- ETH PHY and 25 MHz oscillator

Memory
- Serial EEPROM with EUI-48 Node Identity

Interface
- CRUVI and RJ45

Power via CRUVI
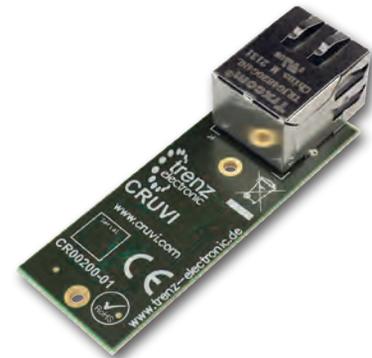
CR00202 HS Dual Ethernet PHY Adapter

On board
- CRUVI HS connector
- 2 x ETH PHY and 25 MHz oscillator

Memory
- 2 x Serial EEPROM with EUI-48 Node Identity

Interface
- CRUVI and 2 x RJ45

Power via CRUVI
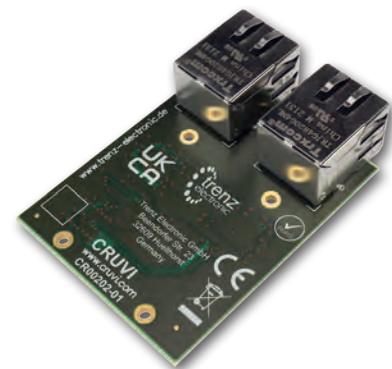
CR00240 HDMI Adapter

On board
- Serial EEPROM with EUI-48 Node Identity
- HDMI/DVI level shifter with active DDC Puffer (PTN3363BSMP)

Interface
- Samtec ST4-30-1.50-L-D-P-TR (Ultra-Fine Pitch Header 60 pins)
- HDMI connector

Power via CRUVI

CRUVI Adapter

Small sizes mezzanine module standard providing option for high speed and ultra low cost modules.

CR00045 AP Memory x8 / x16 Xccela PSRAM Board

On board
- AP Memory IoT RAM (OPI & HP):
  256 Mbit x8/x16 1.8V 200 MHz DDR PSRAM
- Serial EEPROM with EUI-48 Node Identity

Interface
- 1.8V 200 MHz DDR x8 / x16 Xccela PSRAM
- I2C

Power via CRUVI

CR00049 EMMC expansion Module

On board
- eMMC: 8 GB 1.8V/ 3.3V eMMC (SDINBDG4-8G-XI2)
- Serial EEPROM with EUI-48 Node Identity

Interface
- 1.8V/ 3.3V eMMC 5.1 with HS400
- I2C

Power via CRUVI

CR00091 Loopback Adapter

On board
- 25 MHz oscillator (REFCLK)
- EEPROM (SMB BUS)
- LED indicators for all three power rails and SMB_ALERT

Power via CRUVI

CR00101 FMC to CRUVI Adapter

On board
- 1 x FMC HPC connector and 2 x CRUVI HS connectors
- 4 x Steel Spacer
- Altera® MAX®10 FPGA 8kLE and internal Flash
- 128 kbit I2C EEPROM and clock generator 100 MHz
- 2 x LEDs (red, green), 4 x DIP switch

Power via CRUVI

CR00300 Camera Adapter

Memory
- Serial EEPROM with EUI-48 Node Identity

Interface
- Samtec ST4-30-1.50-L-D-P-TR (Ultra-Fine Pitch Header 60 pins)
- ZIF FFC/ FPC CSI-2 15 pol camera connector

Power via CRUVI
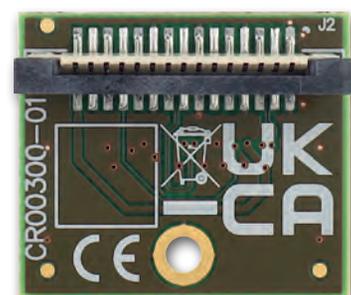
Trenz Electronic Carrier Boards
for 4 x 5 cm Trenz Electronic modules

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

TE0701
- Overvoltage-, undervoltage- and reversed- supply-voltage-protection
- Barrel jackc 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
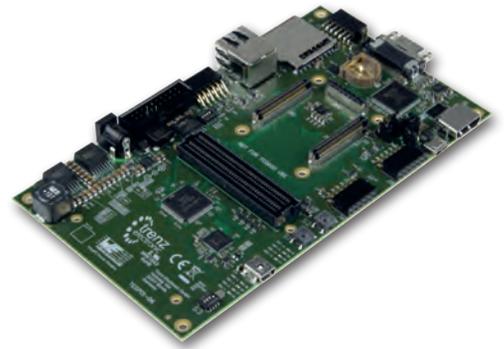
TE0703
- 2 x VG96 cconnectors (mounting holes and solder pads)
- SDIO port expander with voltage-level translation
- MicroSD card socket
- 4 x user LEDs, 1 x user-push button, 2 x user configurable DIP switches
- Mini USB connector (USB JTAG and UART interface)
- RJ45 Gigabit Ethernet socket with 4 integrated LEDs
- USB host connector
- Barrel jack for 5V power supply input
- DCDC step-down converter for 3.3V power supply
- USB JTAG and UART interface
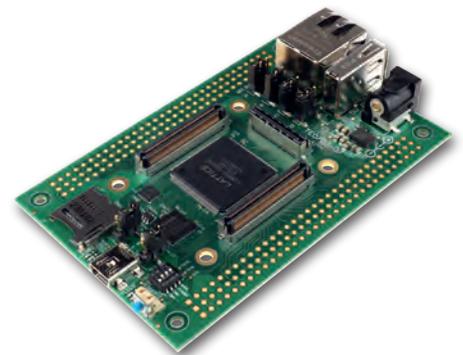
TE0705

TE0705 carrier board is a simplified version of the TE0701. It provides a cost-effective way to connect Trenz 4x5 modules and connect them to your own circuits. As little as possible has been changed in functionality except the functionality that was removed. Changes from TE0701:
- Pmod connectors changed to IDC headers
- HDMI removed
- CL connector removed
- USB connector position changed
- 5 pin header support added on both USB interfaces
- 12V DC power input connector changed to different type
- FMC connector removed and replaced by two dual row 100 mil pin headers

TE0706
- VG96 connector and 50-pin IDC male connector socket
- SDIO port expander with voltage-level translation
- MicroSD card socket and a USB type A connector
- 1 x user push button, user configurable DIP switch
- 2 x RJ45 Gigabit Ethernet MagJack
- 1 x Ethernet PHY
- Barrel jack for 5V power supply input
- DCDC step-down converter for 3.3V power supply
- JTAG pins on 12-pin header
- 3 x VCCIO selection jumper

TEB0707

TEB0707 is a carrier board for 4x5 Trenz Electronic modules. It provides three high speed and one low speed CRUVI extension connectors.
- Altera® Max®10 FPGA
- FTDI FT2223
- Gigabit RJ45 LAN socket
- MicroSD card socket, MicroUSB2.0 socket, USB A socket
- 6 x user LEDs (3 x green, 3 x red)
- 5V input power supply
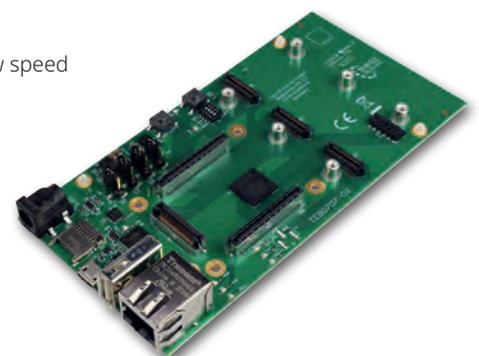
Trenz Electronic Carrier Boards
for modules with different form factors

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

TEBF0808/TEBF0818

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

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

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

TEB0835/TEB0836

- 4 kb EEPROM
- programmable clock generators
- I2C switch IC
- 6 x green user LEDs
- 16 x RF transformation
- reset push button
- temperature sensor
- FT2232H FTDI
- SDIO port expander DIP switch for mode
- Pin headers and PCIe 6 connector
- MicroSD card socket
- MicroUSB2.0

- 21 x UMCC connectors
- 6 x SMA connectors for clocks
- 2 x Samtec Razor Beam SS5
- RJ45 LAN socket
- 2 x UEC5 connectors
- 2 x UCC8 connectors
- PCI x8 card
- 12V input supply

Designed for Trenz Electronic's
TE0835 RFSoC series and
TE0836 RFSoC series

TEB0187

- Trenz Electronic TEI0187 module socket
- 12V plug
- 2 x Gigabit Ethernet RJ45 (1 x on board, 1 x on SoM)
- USB 3.1 (type C connector)
- USB JTAG + UART type C connector
- USB UART type C connector + PD function (12V)
- HDMI
- SSD M.2 PCIe x1 (Gen3 / Gen4)
- LEDs, temperature sensor, dip switches
- MicroSD card (primary boot option), eMMC (secondary boot option)
- EEPROM with MAC-address

AMB0010

- Trenz Electronic AM0010 module socket
- 12V power supply
- 2 x B2B connector (ADF6), clock buffer, oscillator
- 1 x RJ45 LAN connector
- XMOD (JTAG + UART to USB)
- UART Header, I2C Header
- 4 x user LED, 4 x user dip switch
- MicroSD card socket, USB connector
- Loopbacks for GTHs, IOs, GPIOs

http://trenz.org/te-baseboards

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 microSD card, a USB cable plus srews and bolts. Different module variants can be integrated on request.

	Starter Kit 720 / 820	Starter Kit 729	Starter Kit 813	Starter Kit 817	Starter Kit 818
Module	TE0720 / TE0820	TE0729	TE0813	TE0817	TE0818
FPGA	AMD Zynq™ 7020 / Zynq™ UltraScale+™	AMD Zynq™ 7020	AMD Zynq™ UltraScale+™	AMD Zynq™ UltraScale+™	AMD Zynq™ UltraScale+™
Baseboard	TE0703	TEB0729	TEBF0818	TEBF0818	TEBF0818
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	KK729-03 TE custom built	SuperGRIP	SuperGRIP	SuperGRIP
USB Cable	✓	✓	✓	✓	✓
MicroSD Card	✓	✓	✓	✓	✓
Screws & Bolts	✓	✓	✓	✓	✓

Starter Kit 720 / 820

Starter Kit 729

Starter Kit 81x

Photo shows similar product.

Cooling Solutions

for Trenz Electronic Modules

The individual cooling solutions from Trenz Electronic are required for efficient and effective cooling of the modules and serve to ensure the long-term functional reliability of the systems. The product portfolio includes both active and passive cooling solutions.

Available cooling solutions

TE Series	Article Number
TE0600	26920
TE0710	26925
TE0712 / TE0713	26924
TE0714	KK0714-04
TE0715	26923
TE0720	33337
TE0724	30829
TE0729	KK0729-03
TE0741	33013, 33866
TE0745	KK0745-03
TE0803 / TE0813	KK0803-04A, KK0813-02, 29665
TE0807 / TE0817	KK0807-04, KK0817-02, 29664
TE0808 / TE0818	KK0808-05, KK0818-02, 29664
TE0820 / TE0821 / TE0823	33338, 28606
TE0835	KK0835-03
TE0865	KK0865-02
TE0841	28606, 34323
TE0950	34097
TEB0911	25130
TEF1001	25130, 34455
TEI1000	33872
Heat Spreader Extension	34314

26924

KK0818-02

KK0729-03

KK0835-03

33013

29665

28606

34314

25130
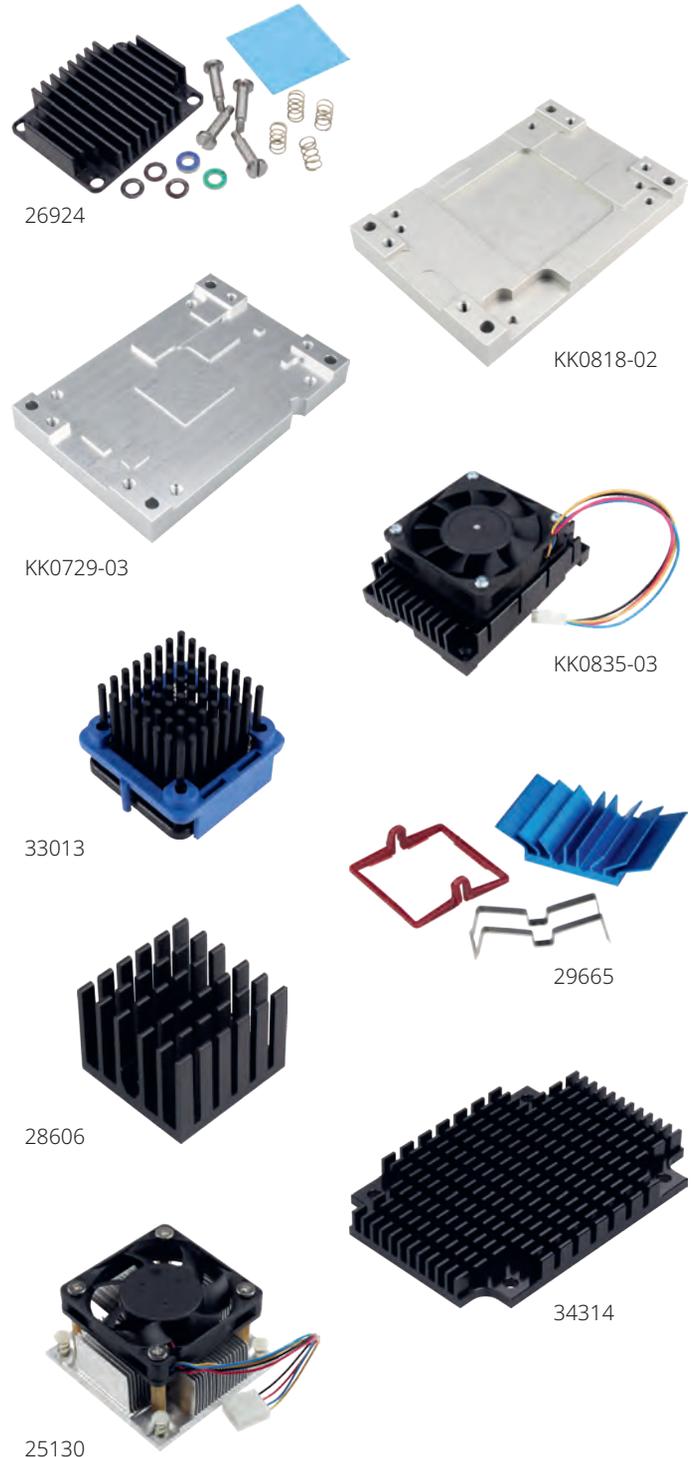
We are offering different customized cooling solutions for a selection of modules. Please ask for special solutions at

sales@trenz-electronic.de

http://trenz.org/Cooling-Solutions

Module Series Comparison Table
for Trenz Electronic Modules

AMD

	Device family	Device list	Form Factor	Connectors	Processing system	max. SDRAM [MByte]	Flash [MByte]	
AM0010	Zynq™ UltraScale+™	ZU1CG-ZU5CG, ZU1EG-ZU5EG, ZU4EV, ZU5EV	4 x 5.6	2 x Samtec ADM6	Up to 4 x Cortex A53 + 2 x Cortex R5	8192 DDR4 64-bit with EEC	128	
TE0710	Artix™ 7	35T, 50T, 75T, 100T	4 x 5	2 x Samtec LSHM	MicroBlaze	512 DDR3	32	
TE0711	Artix™ 7	35T, 50T, 75T, 100T	4 x 5	3 x Samtec LSHM	MicroBlaze	-	32	
TE0712	Artix™ 7	75T, 100T, 200T (with restrictions: 15T, 35T, 50T)	4 x 5	3 x Samtec LSHM	MicroBlaze	1024 DDR3	32	
TE0713	Artix™ 7	75T, 100T, 200T (with restrictions: 15T, 35T, 50T)	4 x 5	3 x Samtec LSHM	MicroBlaze	1024 DDR3L	32	
TE0714	Artix™ 7	A12, A15, A25, A35, A50	3 x 4	2 x Samtec LSHM	MicroBlaze	-	16	
TE0715	Zynq™ 7000	Z-7015, Z-7030, Z-7012S	4 x 5	3 x Samtec LSHM	2 x Cortex A9	1024 DDR3	32	
TE0716	Zynq™ 7000	Z-7020	4.5 x 6.5	2 x FCI Bergstak	2 x Cortex A9	1024 DDR3L	32	
TE0720	Zynq™ 7000	Z-7020, Z-7014S	4 x 5	3 x Samtec LSHM	2 x Cortex A9	1024 DDR3	64	
TE0724	Zynq™ 7000	Z-7010, Z-7020	6 x 4	1 x Samtec ST5	2 x Cortex A9	1024 DDR3L	64	
TE0725	Artix™ 7	15T, 35T, 50T, 75T, 100T	3.5 x 7.3	2 x 50-pin headers	MicroBlaze	optional	32	
TE0729	Zynq™ 7000	Z-7020	5.2 x 7.6	2 x Samtec BTE	2 x Cortex A9	512 DDR3	32	
TE0741	Kintex™ 7	70T, 160T, 325T, 410T	4 x 5	3 x Samtec LSHM	MicroBlaze	-	32	
TE0745	Zynq™ 7000	Z-7030, Z-7035, Z-7045	5.2 x 7.6	3 x Samtec ST5	2 x Cortex A9	1024 DDR3L	64	
TE0782	Zynq™ 7000	Z-7035, Z-7045, Z-7100	8.5 x 8.5	3 x Samtec QTH	2 x Cortex A9	1024 DDR3	32	
TE0803/ TE0813	Zynq™ UltraScale+™	ZU1CG-ZU5CG, ZU1EG-ZU5EG, ZU4EV, ZU5EV	5.2 x 7.6	4 x Samtec ST5 4 x Samtec ADM6	Up to 4 x Cortex A53 + 2 x Cortex R5	8192 DDR4	2 x 64	
TE0806	Zynq™ UltraScale+™	ZU4, ZU5, ZU7, CG, EG, EV	5.5 x 7.6	2 x Samtec ADM6	Up to 4 x Cortex A53 + 2 x Cortex R5	8192 DDR4 64-bit (PS) with ECC 4096 DDR4 32-bit (PL)	512	
TE0807/ TE0817	Zynq™ UltraScale+™	ZU4CG-ZU7CG, ZU4EG-ZU7EG, ZU4EV-ZU7EV	5.2 x 7.6	4 x Samtec ST5 4 x Samtec ADM6	Up to 4 x Cortex A53 + 2 x Cortex R5	8192 DDR4	2 x 64	
TE0808/ TE0818	Zynq™ UltraScale+™	ZU6CG, ZU9CG, ZU6EG, ZU9EG, ZU15EG	5.2 x 7.6	4 x Samtec ST5 4 x Samtec ADM6	Up to 4 x Cortex A53 + 2 x Cortex R5	8192 DDR4	128	
TE0820	Zynq™ UltraScale+™	ZU1CG-ZU5CG, ZU1EG-ZU5EG, ZU4EV, ZU5EV	4 x 5	3 x Samtec LSHM	Up to 4 x Cortex A53 + 2 x Cortex R5	4096 DDR4	128	
TE0821	Zynq™ UltraScale+™	ZU1CG-ZU5CG, ZU1EG-ZU5EG, ZU4EV, ZU5EV	4 x 5	3 x Samtec LSHM	Up to 4 x Cortex A53 + 2 x Cortex R5	4096 DDR4	128	
TE0823	Zynq™ UltraScale+™	ZU1CG-ZU5CG, ZU1EG-ZU5EG, ZU4EV, ZU5EV	4 x 5	3 x Samtec LSHM	Up to 4 x Cortex A53 + 2 x Cortex R5	2048 DDR4	128	
TE0825	Zynq™ UltraScale+™	ZU2, ZU3, ZU4, ZU5	5.4 x 7	2 x Samtec ADM6 1 x Samtec UMPT	Up to 4 x Cortex A53 + 2 x Cortex R5	8192 DDR4 with EEC	2 x 64	
TE0835/ TE0836	Zynq™ UltraScale+™	ZU25, ZU27, ZU28, ZU43, ZU47, ZU48	6.5 x 9	2 x Samtec ST5 2 x Samtec ADM6	Up to 4 x Cortex A53 + 2 x Cortex R5	4096 DDR4	128	
TE0838	Zynq™ UltraScale+™ RFSoC	ZU29DR, ZU39DR, ZU49DR	6.4 x 8	5 x Samtec ADM6	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	
TE0841	Kintex™ UltraScale™	KU035, KU040	4 x 5	3 x Samtec LSHM	MicroBlaze	2048 DDR4	64	
TE0865	Zynq™ UltraScale+™	ZU11, ZU17, ZU19	7.5 x 10	4 x Samtec ADM6	Up to 4 x Cortex A53 + 2 x Cortex R5	8192 DDR4 64-bit (PS) with EEC 8192 DDR4 64-bit (PL)	2 x 64	
TE0950	Versal™ AI Edge	VE2302	15 x 12	zQSFP, 2 x CRUVI HS, 2 x CRUVI LS, CSI-2, FMC	2 x Cortex A27, 2 x Cortex R5F	8192 DDR4	2 x 64	
TE0955	Versal™ AI Edge	VE2002, VE2102, VE2202, VE2302, VM1102	4 x 5.6	2 x Samtec ADM B2B	2 x Cortex A72, 2 x Cortex R5F	2 x 4096 LPDDR4	256	
TEB0911	Zynq™ UltraScale+™	ZU6, ZU9, ZU15 (CG, EG)	40.6 x 23.43	6 x FMC HPC	Up to 4 x Cortex A53 + 2 x Cortex R5	8192 64-bit DDR4 SODIMM (PS)	2 x 64	

	EEPROM	eMMC	Ethernet PHY	USB PHY	Total I/Os	Gbit transceiver	Other features
	1 x MAC	8-64 GB	1 Gbit	USB2.0 OTG	PL: 204 MIO: 22	4 x PS GTR, 4 x PL GTH (ZU4 + ZU5 only)	optional HyperRAM, MAC address serial EEPROM with EUI-48 node identity, security controller, Crypto Authentication
	-	-	2 x 100 Mbit	-	112	-	JTAG, 100 MHz MEMS oscillator, user LED, single supply
	-	-	-	USB2.0 UART/FIFO	178	-	4 LEDs, single supply
	1 x MAC	-	100 Mbit	-	158	4 x GTP	Programmable clock generator, single supply
	-	-	-	USB3.0	152	4 x GTP	Programmable clock generator, single supply
	-	-	-	-	138 + 5 (QSPI or user I/O)	4 x GTP	Differential MEMS oscillator for MGT clocking, XADC analog Input, eFUSE bit-stream encryption (AES), single supply
	1 x MAC	-	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
	1 x MAC + 64 kByte	-	1 Gbit	USB2.0	120 x HR PL	2 x PS MIO	On board 10 x 12-bit low power SAR ADCs up to 2 MSPS, low power oscillators, USB2.0 to UART/JTAG interface, EEPROM
	1 x MAC	32 GB	1 Gbit	USB2.0	152 + 14 MIO	-	Real time clock, MAC address, 2k serial EEPROM, 3 user LEDs, single supply
	1 x MAC	-	1 Gbit	-	PL: 80, PS: 20	-	CAN, single supply, 3 x LED (1 x PS, 2 x PL)
	16 kByte	-	-	-	87	-	Optional POF (Plastic Optical Fiber) adapter (125/250 Mbit/s), single supply
	3 x MAC	4-64 GB	2 x 100 Mbit, 1 Gbit	USB2.0 OTG	136 + 14 MIO	-	Real time clock
	-	-	-	-	144	8 x MGT	Programmable clock generator, single supply
	1 x MAC	-	1 Gbit	USB2.0 OTG	250 + 6 MIO	8 x GTX	Real time clock, single supply
	2 x MAC + 16 kByte	4-64 GB	2 x 1 Gbit	2 x USB2.0 OTG	250 + 2 MIO	16 x GTX	Programmable clock generator, real time clock
	-		-	-	204 + 65 MIO	4 x PS GTR, 4 x PL GTH (ZU4 + ZU5 only)	GPU/VCU depending on device, EEPROM MAC address, programmable clock generator, single supply
	2 x MAC	8-64 GB	2 x 1 Gbit	USB2.0 OTG	48 PL 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
	16 kByte	-	-	-	204 + 65 MIO	4 x GTR, 16 x GTH	GPU and VCU, programmable clock generator, single supply
	16 kByte	-	-	-	204 + 65 MIO	4 x GTR, 16 x GTH	GPU/VCU depending on device, programmable clock generator, single supply
	-	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
	1 x MAC	8-64 GB	1 Gbit	USB2.0 OTG	34 HP, 96 HD + 14 MIO	4 x PS GTR	GPU/VCU depending on device, programmable clock generator, single supply
	1 x MAC	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
	64 kByte	-	2 x 1 Gbit	-	136 PL HP + 88 PL HD, 57 PS MIO	4 x GTR, 4 x GTH	Real time clock, oscillator
	1 x MAC	-	-	USB2.0 OTG	40 x I/O 20 LVDS + 32 MIO	8 x GTY, 4 x GTR	USB2.0 OTG, MAC EEPROM, RF-ADCs, RF-DACs
	1 x MAC	8 GB	2 x 1 Gbit	USB2.0	180 + 22 MIO 16 ADC, 16 DAC	4 x GTR, 16 x GTY	OPTIGA Trust M, crypto authentication, oscillator
	-	-	1 Gbit	-	144	8 x GTH	Programmable clock generator, single supply
	1 x MAC	8 GB	1 Gbit	USB2.0	240 PL HP, 96 PL HD, 21 MIO	32 x GTH, 16 x GTY, 4 x GTR	USB PHY, eMMC, 12V single supply
	1 x MAC	32 GB	1 Gbit	USB2.0 OTG	16 HD, 54 XP, 68 FMC via Artix	8 x GTYP	Artix™7 FPGA as configurable levelshifter, EEPROM with MAC-Adress, 3 x clock (1 x PL, 2 x GTs), 2 LEDs, push button, dip switches, reset button
	1 x MAC	64 GB	1 Gbit	USB2.0	100	8 x GTYP	Clocks for PS, PHYs, DDR4, PL, UART, I2C, SDIO
	3 x MAC + 16 kByte	8 GB	1 Gbit	USB2.0	408	22 x GTH	Active heat sink, GPU/VCU depending on device, M2 PCIe SSD, system controller, DisplayPort, RJ45 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

Module Series Comparison Table
for Trenz Electronic Modules

altera
An Intel Company

	Device family	Device list	Form Factor	Connectors	Processing system (HW/SW)	max. SDRAM [MByte]	Flash [MByte]
CR00100	Max® 10	10M08	4.48 x 5.75	CRUVI (1 x HS, 1 x LS)	-/+	8	-
TEI0001	Max® 10	10M02, 10M04, 10M08, 10M16	2.5 x 6.15	-	-/+	64	8
TEI0003	Cyclone® 10 LP	10CL006, 10CL010, 10CL016, 10CL025	2.5 x 6.15	-	-/+	8	2
TEI0006	Cyclone® 10 GX	10CX220, 10CX150, 10CX105	6 x 8	3 x Samtec ST5	-/+	2048 DDR3L	256
TEI0009	Cyclone® 10 LP	10CL016, 10CL025, 10CL040, 10CL055, 10CL080	9.5 x 11	QSE (for LVDS), Pmod, Arduino, SMA	-/+	512	32
TEI1000	Stratix® 10	GX400, GX650, SX400, SX650	6 x 8	3 x Samtec ADM6	GX: -/+ SX: +/-	2048 DDR4	64
TEI0022	Cyclone® V	5CSEMA5F31C8N	13 x 16	-	+/+	1024 DDRe (HPS) 1024 DDR3 (FPGA)	32 for HPS 32 for FPGA
TEI0050	Cyclone® V	Cyclone® V E, A2, A4	2.5 x 7.07	CRUVI HS, 2 x 14 pin header	+/+	8	256
TEI0181	Agilex™ 5	A5E 008B, 013B, 028B	-	-	-	16 (HyperRAM)	32
TEI0187	Agilex™ 5E	Device Group A5E A: 013, 028, 043A, 0052, E065 Device Group A5E B: 008, 013, 028, 043, 052, 065 (default)	5.2 x 7.6	3 x Samtec ADM6	+/+	2048 LPDDR4	256

LATTICE SEMICONDUCTOR

	Device family	Device list	Form Factor	Connectors	Processing system (HW/SW)	max. SDRAM [MByte]	Flash [MByte]
CR00103	Certus-NX	LFD21X-40	4.5 x 5.7	microUSB2.0, CRUVI HS, CRUVI LS, 2 x Samtec SSM	-/+	8 (HyperRAM)	16/32
TEL0001	Mach X02	LCMX02-4000HC	2.5 x 6.15	Pmod, pin header, microUSB	-/-	-	-
TE0876	Mobile FPGA	iCE40HX	5.6 x 3.05	Raspberry PI Socket, Pmod connectors, pin header	-/-	4 Mbit external SRAM	8

MICROCHIP

	Device family	Device list	Form Factor	Connectors	Processing system (HW/SW)	max. SDRAM [MByte]	Flash [MByte]
TEM0001	SmartFusion®	M2S005, M2S010, M2S025, M2S050, M2S060	2.5 x 6.15	JTAG/UART over microUSB2.0, 3 pin header, Pmod	+/-	8	8
TEM0005	SmartFusion®	M2S005, M2S010, M2S025, M2S050, M2S060	3.1 x 5.6	Samtec ST5 160 pin	+/-	256 DDR3	32
TEM0007	PolarFire®	MPFS025T, MPFS095T, MPFS160T, MPFS250T	4 x 5	3 x Samtec LSHM	+/-	1024 LPDDR4	64

	EEPROM	eMMC	Ethernet PHY	USB PHY	Total I/Os	Gbit transceiver	Other features
	Config. EEPROM	-	-	-	24 + 4	-	User Push Button and LEDs
	Config. EEPROM	-	-	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
	2 Kbit	-	1 Gbit	-	226	-	Max®10 as power sequencer, EEPROM, 4 LEDs, 5V input voltage
	2 x MAC address	-	2 x 10/100 Mbit/s	USB2.0	70	-	Integrated USB programmer2
	-	-	-	-	GX: 248 SX: 296	18 x	Max® 10 System controller, Status and user LEDs, 1.8V, 3.3V and variable IO
A	2 Kbit	-	-	USB2.0	29	-	MEMS 3-axis accelerometer, fully calibrated single-chip temperature sensor, smoke detector, USB/JTAG programmer, single supply
	Config. EEPROM	-	-	-	24 + 24	-	USB-to-JTAG/GPIO-FTDI, user push buttons and LEDs
	-	-	-	-	Arduino MKR - 22, CRUVI - 32	-	2 x RGB LED, User LED, 2 x Dip Switch, Push button, 3-axis accelerometer
	1 x 2 Kbit 1 x 128 Kbit	-	1 Gbit	USB2.0 (Support USB3.1)	331/96/19 (I/Os/ Diff. Pairs/HPS I/Os)	up to 24 channels at 28 Gbps (Group A) up to 24 channels at 17 Gbps (Group B)	12 V Power supply, 2 x EEPROM, 24 x up to 28 Gb transceiver

	EEPROM	eMMC	Ethernet PHY	USB PHY	Total I/Os	Gbit transceiver	Other features
	4 Kbit	-	-	USB2.0, UART/ FIFO	Raspberry PI Socket: 18 B2B: 56 CRUVI: 28	-	USB to FIFO FTDI (JTAG/GPIO), user LEDs, push buttons
	4 Kbit	-	-	USB2.0, UART/ FIFO	22 + 8	-	8 LEDs, 2 push buttons, supply: USB or 5V from pin header, RC-networks
	2 Kbit	-	-	-	Raspberry PI Socket: 18 CRUVI: 32 Other: 4 + 5	-	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)

|	EEPROM	eMMC	Ethernet PHY	USB PHY	Total I/Os	Gbit transceiver	Other features
	4 Kbit	-	-	-	22 + 8	-	1 x 3-pin header for LiveProbes, 9 user LEDs, 1 user push button
	MAC address	-	100 Mbps	-	105	-	Optional crypto authentication device, serial EEPROM for MAC address, power supply monitor
	MAC address	-	1 Gbit	USB2.0	HSIO: 34* GPIO: 84 MSIO: 14	4 + 1	On-board DC-DC converter, *highly dependant on used SoC

**Probably** the smallest Single-Board Computer based on an AMD Zynq™ MPSoC.

Ultra-compact and low-power, the **VCS³** is a small Single-Board Computer with an AMD Zynq™ UltraScale+™ device with integrated ARM CPUs and FPGA fabric.

Measuring just 50mm x 30mm, this tiny workhorse can be placed almost anywhere, opening up the benefits of FPGAs to many more applications.
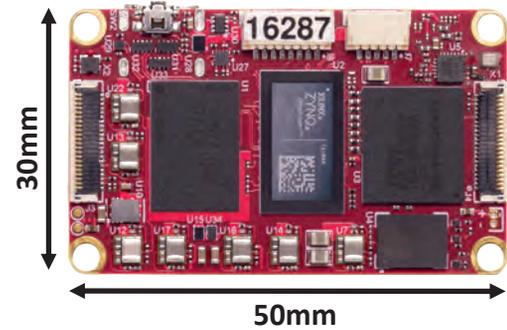
Features:

- AMD Zynq™ UltraScale+™
  ZU2 or ZU3 in InFO Package
- Dual or Quad A53 ARM CPU
- Four FPC connectors, 22 way
  CSI/DSI for Cameras/Displays
  3.3V Out & 56x GPIO
- 1Gb, 2Gb or 4Gb of LP-DDR4
- 64Gbit of eMMC Flash
- Dual 1Gbit QSPI ROM
- 9-axis IMU
- 5Mbps CAN-BUS
- Fast GPIO & UART
- Supply Voltage: +5V ±5%
- Power Consumption: ~ 3 Watts
- USB-C for data connection and/or power supply
- Dimensions: 50mm x 30mm
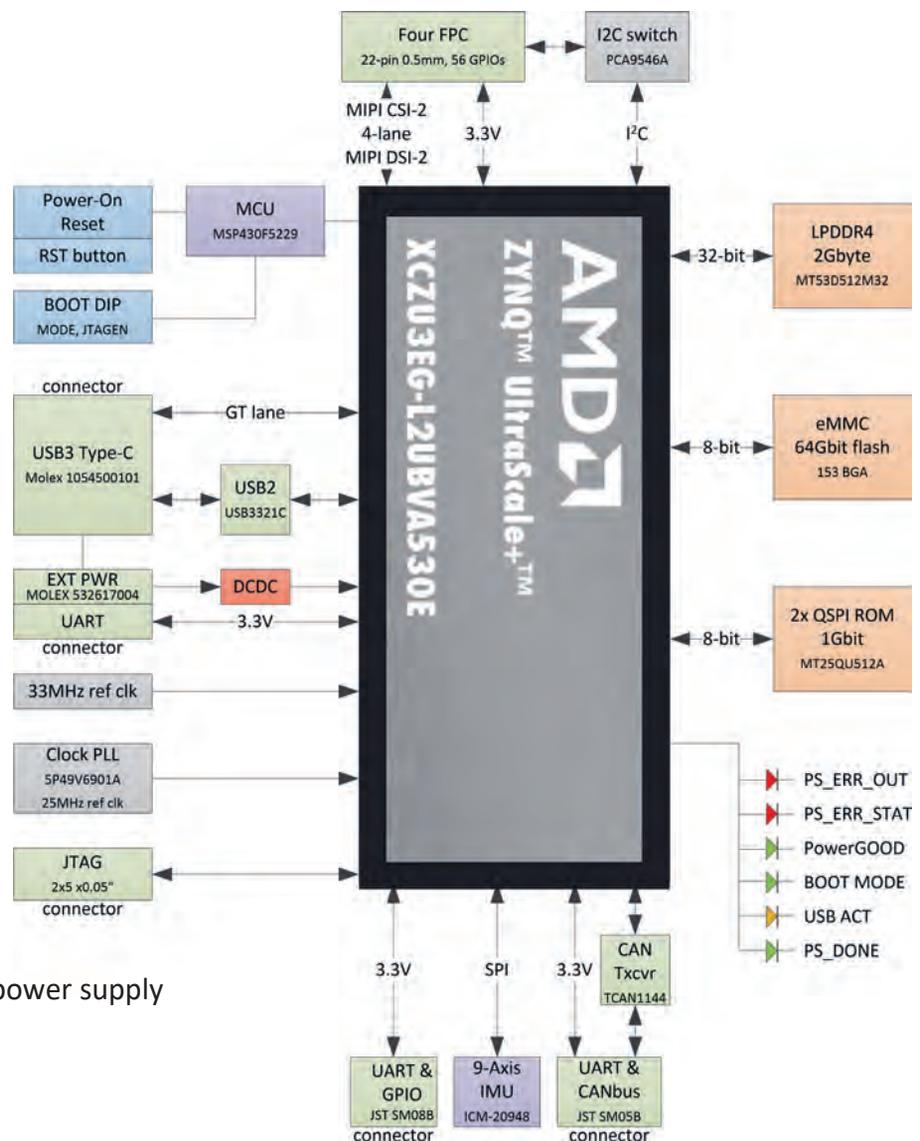
The **VCS³** utilizes an AMD Zynq™ UltraScale+™ MPSoC coupled with high-speed LP-DDR4 memory to produce a highly compact Edge-AI platform. Together with four digital camera interfaces, a 9-axis IMU, and a CAN-Bus interface, this platform is ideally suited for autonomous machines, cameras or automation. Device booting can be from SPI ROMs or eMMC flash, with no bulky, fiddly or unreliable SD cards. Numerous onboard power rails are generated from a single external 5V supply, or via a USB3 Type-C interface.

store.sundance.com/vcs3/

VCS³ - Dev Kit
Available now

- **VCS³** module on a test bench
- AMD XCZU3EG-L2UBVA530E
- Lynsyn Lite power measurement card virtual JTAG cable, through USB
- ATX breakout card with female banana sockets
- **VCS³** holder and fan unit
- 9-way cable for expansion
- 5-way cable for CAN bus and UART-1
- Main power and UART-0 (main UART) cable
- PicoATX power supply
- 12V AC-DC PSU

store.sundance.com/vcs3-dev-kit

VCS³ - Whisper
Available Q2 '25

- 3D-printed enclosure/cover with Integrated fan
- AMD XCZU3EG-L2UBVA530E
- Weight: 30g

store.sundance.com/vcs3-whisper

VCS³ - Stealth
Available Q3 '25

- Fan-less metal heatsink enclosure
- AMD XCZU3EG-L2UBVA530E
- Weight: 70g

store.sundance.com/vcs3-stealth

VCS³ - Core
Available Q4 '25

- Board-only with upgraded industrial FPGA
- AMD XCZU3EG-L1UBVA530I
- Weight: 10g

store.sundance.com/vcs3-core

Ndigo6G-12 – versatile pulse acquisition platform

The Ndigo6G-12 offers 6.4 Psps sample rate, 12 bits resolution and a greatly improved readout rate of 5.2 GB/s. It features four TDC channels that can be used on separate inputs to bring the total channel count up to eight.

Scan for more information

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	2
Connectors	10 x LEMO 00
Sample rate single channel	6400 Msps
Sample rate multi channel	1600 Msps
Resolution	12 bits
TDC double pulse resolution	typically 5 ns
TDC bin size	13 ps
Multihit	unlimited
Dead time between groups	none
TDC readout rate	30 MHits/s; 11.6 MHits/s
ADC readout rate	approx. 5200 MByte/s
Timestamp range	106 d
Common start / stop	yes / yes
Readout interface	PCIe3 x8
Time base	50 ppb on board or external 10 MHz clock
On-board calibration data storage	✓
Adjustable trigger windows	✓
Overlapping events possible	✓
Easy to use Windows C API	✓
In-system firmware update	✓
Linux support available	✓

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 transferred to the host PC.

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.

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 time resolution in a range of a few 100 ps is sufficient for your application, the TimeTagger4 can replace our high-end TDCs at a lower cost.
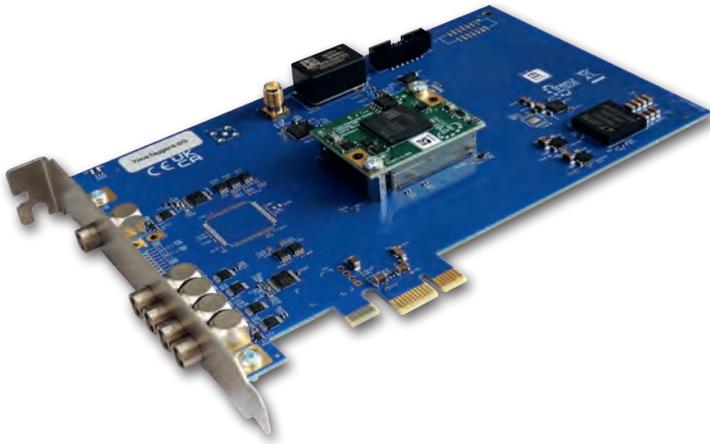
TimeTagger PCIe-Versions connect via PCIe x1 @ 400 MB/s

TimeTagger desktop units can be connected to any Thunderbolt port as standard to read out data.

Scan for more information

Time to digital converter

cronologic Time Taggers are low-cost, mid-resolution time-to-digital converters ideally suitable in applications that do not require the highest resolution, but high data acquisition rates and the lowest multiple-hit dead time.

All variants of these high-bandwidth, low-cost, common-start TDCs are also available as TDC modules which can be installed via board-to-board connectors with minimal hardware effort.

- TimeTagger 4-1.25G: 800 ps
- TimeTagger 4-2.5G: 400 ps
- TimeTagger 4-5G: 200 ps

The compact (approx. 30 x 40 x 5 mm) TimeTagger TDC modules enable a reduction in the space required for integrated picosecond time measurement units.

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	1 start & 4 stop channels
Connectors	5 x LEMO 00
Bin size (depending on version)	800 / 400 / 200 / 100 ps
Double pulse resolution	2 bins
Multihit	8000 x per start event
Dead time between groups	none
Readout rate	60 MHits/s total; 40 MHits/s per channel
Timestamp range	1.67 ms / 430 ms extended
Number of boards that can be synced	no sync possible
Common start / stop	yes / no
Readout interface	PCIe x1 @ 400 MB/s (or connects to TBT)
Time base	250 ppb on board
Linux support available	yes

xHPTDC8 - 8-channel time-to-digital converter / time tagging device

With the xHPTDC8 time interval analyzer, you can easily set up custom trigger scenarios.

Do you want to integrate your measurement system into a standard PC? In that case, the PCIe version is the best choice.

The xHPTDC8-TBT can be connected to your PC using Thunderbolt cables, offering flexible use across various scientific applications.

Scan for more information

Don't restrict yourself to classic common-start configurations! The xHPTDC8 provides an infinite stream of timestamps - one for each input pulse. You may filter the stream in your own DAQ software - or make use of the trigger and grouping features provided by xHPTDC8. These units provide very high-precision measurements with almost no cycle-to-cycle jitter and you can expect an RMS error that is very close to the quantization error. Its linearity is practically perfect! The inputs accept a wide range of single-ended signaling standards including NIM, TTL, and CMOS.

The PCIe bus master accesses directly a buffer on the host PC that is fully controlled by the device, ensuring low CPU load at high data throughput. The timing generator allows you to create digital output pulse patterns on all connectors to control the timing of your experiment and the newly added 18-bit ADC can monitor an analog voltage in your system in sync with the data acquisition or controlled by an external trigger.

xHPTDC8-PCIe – Data	
Optimized for	flexibility + performance
TDC channels	8
Additional inputs	event triggered ADC
Connectors	10 x LEMO 00
Bin size	13 ps
Double pulse resolution	5 ns
Multihit	unlimited
Dead time between groups	none
Readout rate	30 MHits/s total; 11.6 MHits/s per channel
Timestamp range	unlimited
Number of boards that can be synced	6
Readout interface	PCIe x1 @ 200 MB/s (or connects to TBT)
Time base	10 ppb on board
Linux support available	yes

Trenz Electronic
Projects

Innovative, flexible, and technically adept – these are the cornerstones of our customer relationships. Our extensive project experience enables us to collaborate with other companies in developing innovative solutions and successfully bringing them to market.

Let's delve into some of our notable collaborations:

The most powerful 4K Camera (Off the shelve):

In close partnership with Freefly, we supply them with the processing hardware (an off the shelf product) for their Ember Camera. This powerful camera is specifically designed for aerial photography and drone flights. It stands out for its compact size, high image quality, and advanced stabilization technology. Inside the camera is the Trenz Electronic TE0808 module, which provides impressive images. The Ember Camera allows breathtaking aerial shots and is an essential tool for professional filmmakers and photographers.

"Freefly chose the Trenz TE0808 to help speed the design of our latest camera 'Ember'. Trenz delivers high quality parts with the connectivity and processing we need to enable cutting edge imaging systems" - **Tabb Firchau (Freefly CEO)**

Shift-Left solutions (Assembly variant / custom solution):

Trenz Electronic GmbH and MLE have established a close engineering collaboration, and a track record of "Shift-Left", namely, accelerating FPGA projects by integrating FPGA Full System Stacks with off-the-shelf FPGA System-on-Modules (SoMs) for Compute, Video, Storage and/or Network Acceleration. The "Shift-Left" solutions not only shorten time-to-market but also reduce the risks and costs. In the project of TEBF0807, we completed and validated within days the PoC of low-latency SD-WAN access on the SoM and Devkit's carrierboard with the Network Protocol Acceleration Platform Full System Stacks integrated. Then we quickly designed a custom carrierboard that contained only the I/Os required by the client for low-risk cost optimization. The design re-use method greatly reduces the development time, costs and risks to shift-left clients' projects.

RFSoC Chip-Down for LIDAR detection in an automotive surrounding:

TEC0203 represents a bespoke board, tailored for integration within the LIDAR system. Its primary function revolves around the digitization of analogue signals sourced from optical sensors, followed by the processing of resulting digital signals. At its core lies a AMD Zynq™ UltraScale+™ RFSoC, complemented by 4 x 512 MByte DDR4 SDRAM for robust memory capabilities. Additionally, the board is equipped with a dual 512 MByte Flash memory configuration, essential for both initialization and ongoing operations. The analog part of the module also includes additional analog-to-digital converters (ADCs) for processing low-frequency signals. Ensuring efficient power distribution, the board features potent switch-mode power supplies catering to all onboard voltages. A dedicated system controller housed on LCMXO3D enhances operational control and coordination. Furthermore, facilitating seamless connectivity and control, the board incorporates a PCIe, Ethernet, USB2.0.

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