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Understanding [Embedded - Microcontroller, Microprocessor, FPGA Modules](#)

Embedded - Microcontroller, Microprocessor, and FPGA Modules are fundamental components in modern electronic systems, offering a wide range of functionalities and capabilities. Microcontrollers are compact integrated circuits designed to execute specific control tasks within an embedded system. They typically include a processor, memory, and input/output peripherals on a single chip. Microprocessors, on the other hand, are more powerful processing units used in complex computing tasks, often requiring external memory and peripherals. FPGAs (Field Programmable Gate Arrays) are highly flexible devices that can be configured by the user to perform specific logic functions, making them invaluable in applications requiring customization and adaptability.

Applications of [Embedded - Microcontroller,](#)

Details

Product Status	Obsolete
Module/Board Type	MCU, FPGA
Core Processor	ARM Cortex-A9
Co-Processor	Zynq-7000 (Z-7015)
Speed	125MHz
Flash Size	32MB
RAM Size	1GB
Connector Type	Samtec LSHM
Size / Dimension	1.97" x 1.57" (50mm x 40mm)
Operating Temperature	-40°C ~ 85°C
Purchase URL	https://www.e-xfl.com/product-detail/trenz-electronic/te0715-04-15-2i



Overview

The Trenz Electronic TE0803 is an industrial-grade MPSoC module integrating a Xilinx Zynq UltraScale+ with up to 8 GByte 64-Bit width DDR4 SDRAM, and max. 512 MByte SPI Boot Flash memory for configuration and operation, and powerful switch-mode power supplies for all on-board voltages. A large number of configurable I/O's is provided via rugged high-speed stacking connections.

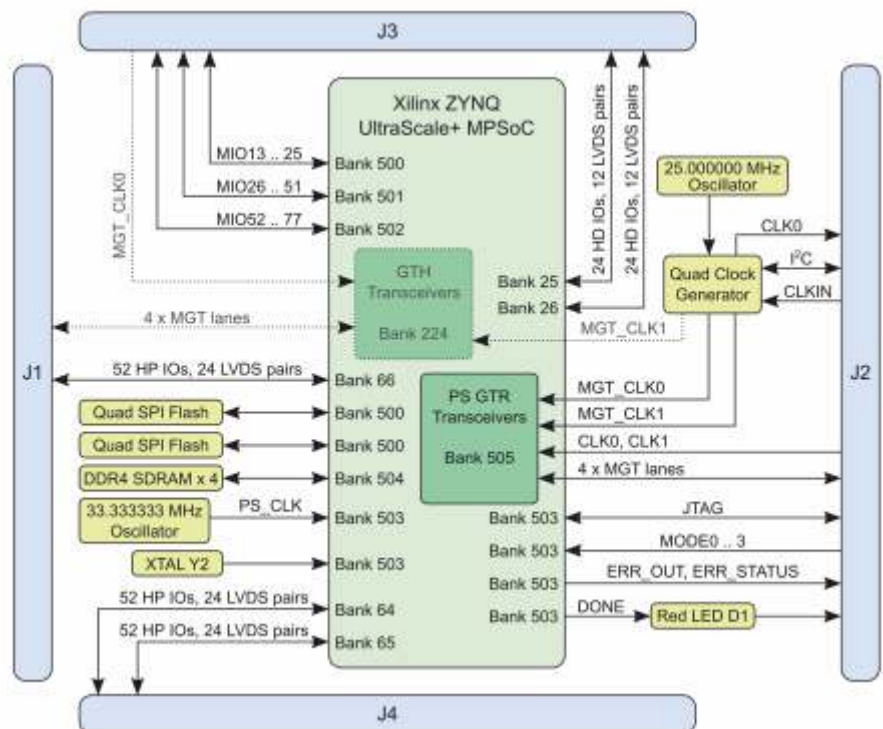
All this in a compact 5.2 x 7.6 cm form factor, at the most competitive price.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

Key Features (preliminary)

- Xilinx Zynq UltraScale+ MPSoC 784 pin package (ZU3EG, optional ZU5EV)
- Memory:
 - 64-Bit DDR4 - 8 GByte max
 - SPI Boot Flash dual parallel - 512 MByte max
- B2B connectors:
 - Plug-on module with 4 x 160-pin connectors
 - 65 x MIO, 156 I/O's x HP (3 banks)
 - Serial transceiver: PS GTR 4, PL GT 4 (ZU4, ZU5 only)
 - GT Reference clock input
 - PLL for GT Clocks (optional external reference)
- Size: 52 x 76 mm
- All power supplies on board.
- Other assembly options for cost or performance optimization plus high volume prices available on request.

Extended device life cycle
Rugged for industrial applications





Key Features

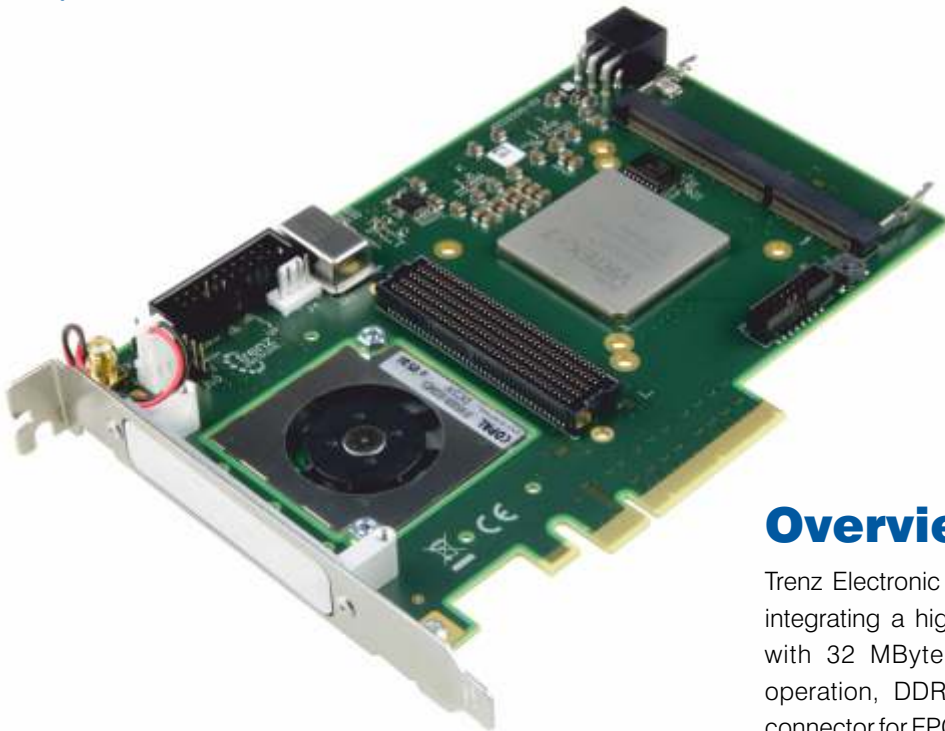
- Zynq UltraScale+ MPSoC - 1156 Package ZU9 (ZU6, ZU9, ZU15 Possible as assembly option)
- 64-Bit DDR4 SODIMM (PS connected)
- PS-GTR
 - M2 PCIe SSD (internal, 1-Lane)
 - 2 x USB3 Host (from 4 port internal HUB)
 - 2 Lane DisplayPort output - Monitor
- RJ45 GbE Ethernet PS connected, 88E1512 PHY
- 4 x FMC-HPC connector front
 - 4 GTH
 - 1 GT Clock
 - 68+4 HP or HD I/O
- FMC-HPC connector Back
 - 4 GTH
 - 1 GT Clock
 - 12 I/O
- FMC-HPC connector Back
 - 1 GTH
 - 1 GT Clock
 - 12 I/O
- 2 x SFP+ connected to 2 PL GTH,
- 1 x SFP+ connected to PL GTH
- Power: 24V

Overview

The Trenz Electronic TEB0911 "UltraRack+" is a high performance Zynq UltraScale+ MPSoC board with 6 FMC slots and Gigabit Ethernet.

All modules produced by Trenz Electronic are developed and manufactured in Germany.





Overview

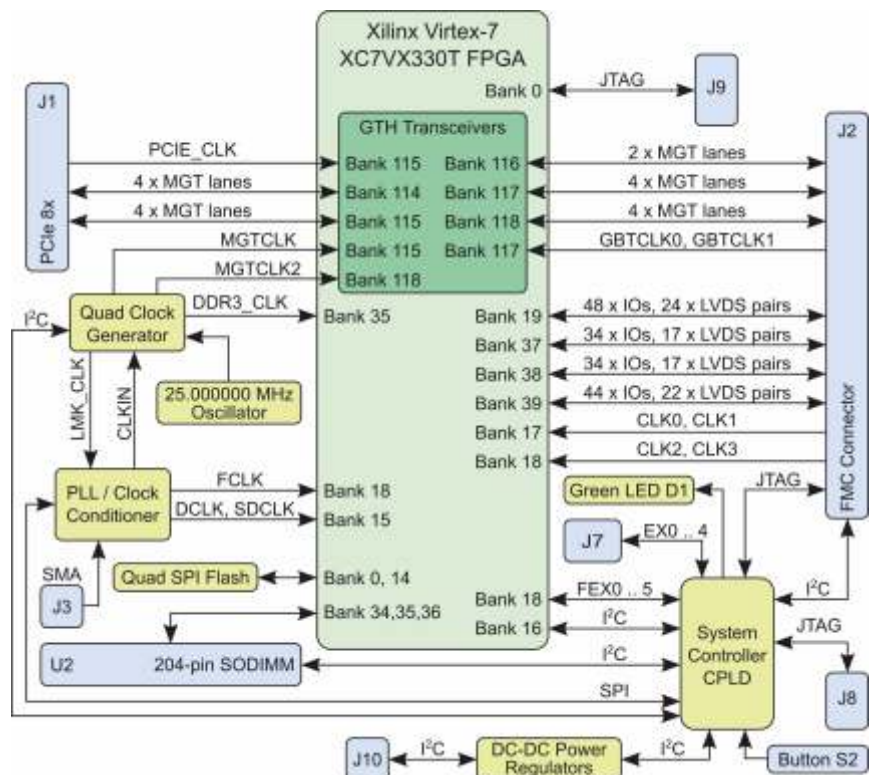
Trenz Electronic TEC0330 is an 8 lanes PCIe GEN2 Card integrating a high performance Xilinx Virtex-7 330T FPGA with 32 MByte Flash memory for configuration and operation, DDR3 SODIMM Socket and full FMC HPC connector for FPGA Mezzanine Cards.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

Key Features

- FMC HPC
- 8 lane PCIe Gen 2 capable
- Xilinx Virtex-7 XC7VX330T-2FFG1157C
- DDR3 SODIMM Socket
- 32 MByte SPI Flash
- LMK04828B Clock Synthesizer
- External Clock Input

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





Overview

The Trenz Electronic TE0745 is an industrial-grade SoC module integrating a Xilinx Zynq-7 (Z-7030, Z-7035, Z-7045), 1 GByte 32-Bit wide DDR3/L, 32 MByte SPI Flash memory for configuration and operation and powerful switch-mode power supplies for all on-board voltages. A large number of configurable I/O's is provided via rugged high-speed stacking strips.

All this on a tiny footprint, smaller than a credit card, at the most competitive price.

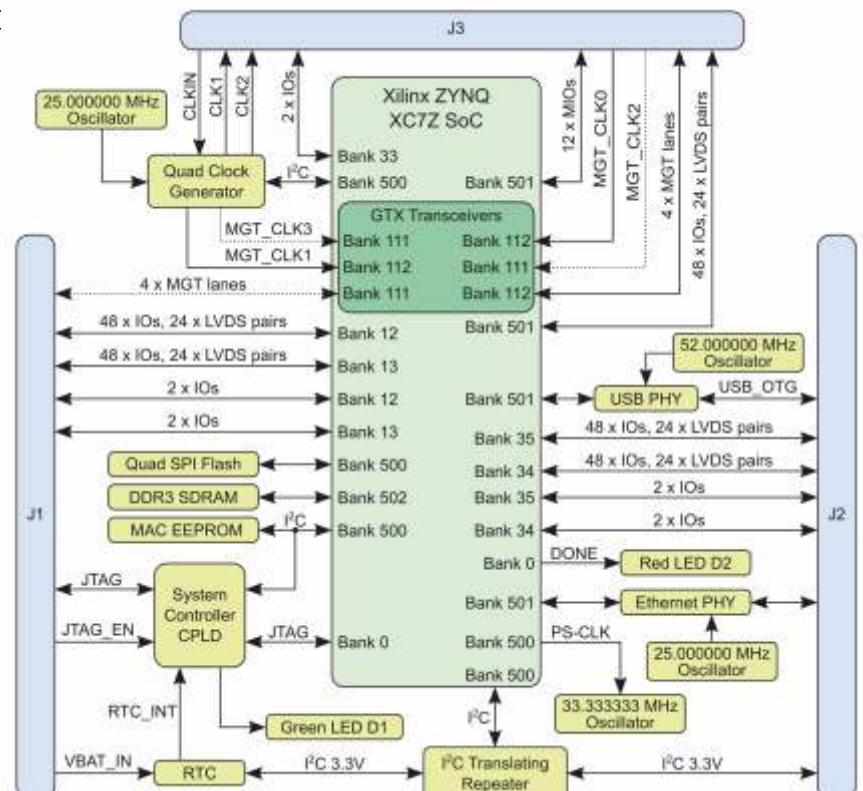
All modules produced by Trenz Electronic are developed and manufactured in Germany.

Key Features

- Xilinx Zynq 7030/7035/7045
- Rugged for shock and high vibration
- 1 GByte 32-Bit wide DDR3/L
- 32 MByte SPI Flash
- Dimensions: 5.2 x 7.6 cm
- B2B Connectors with 3 x 160 pin
 - 250 I/O's, all HR and HP I/O
 - 1 GBit Ethernet PHY,
 - USB 2.0 OTG PHY
 - 8 x GTX (7030: 4 GT)
 - 2 GT Reference Clock inputs (7030: 1 REFC)
 - Reference clock input for PLL (optional)
 - 2 x PLL outputs
 - I2C
 - 6 MIO
- Real Time Clock
- MAC Address EEPROM
- Evenly spread supply pins for good signal integrity

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

Extended device life cycle
Rugged for industrial applications





Overview

Trenz Electronic TE0715 are industrial-grade SoC modules integrating a Xilinx Zynq-7000 SoC, a gigabit Ethernet transceiver (physical layer), 1 gigabyte DDR3 SDRAM with 32-Bit width, 32 megabyte Flash memory for configuration and operation, 4 transceivers, a USB ULPI transceiver, and powerful switch-mode power supplies for all onboard voltages. A large number of configurable I/O's is provided via rugged high-speed stacking strips. All modules in 4 x 5 cm form factor are mechanically compatible.

All this on a tiny footprint, smaller than a credit card, at the most competitive price.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

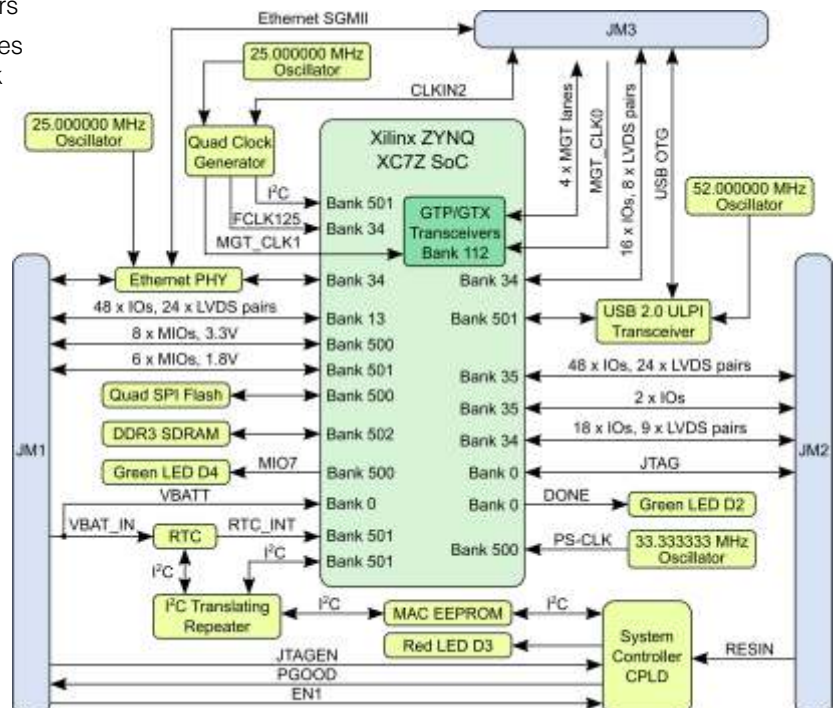
Key Features

- Industrial-grade Xilinx Zynq-7000 (Z-7015, Z-7030) SoM , supported by the free Xilinx Vivado WebPACK tool
- Rugged for shock and high vibration
- ARM dual-core Cortex-A9
- 10/100/1000 tri-speed gigabit Ethernet transceiver (PHY) with SGMII
 - MAC Address EEPROM
- 32-Bit-wide 1 GByte DDR3 SDRAM
- 32 MByte QSPI Flash memory (with XiP support)
- Programmable clock generator
 - Transceiver clock (default 125 MHz)
- Plug-on module with 2 × 100-pin and 1 × 60-pin high-speed hermaphroditic strips
- 132 FPGA I/O's (65 LVDS pairs possible) and 14 PS-MIO available on board-to-board connectors
- 4 GTP/GTX (high-performance transceiver) lanes
- GTP/GTX (high-performance transceiver) clock input
- USB 2.0 high-speed ULPI transceiver
- On-board high-efficiency DC-DC converters
 - 4.0 A x 1.0 V power rail
 - 1.5 A x 1.5 V power rail
 - 1.5 A x 1.8 V power rail
- System management
- eFUSE bit-stream encryption
- AES bit-stream encryption
- Temperature compensated RTC (real-time clock)
- User LED
- Evenly spread supply pins for good signal integrity

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

Extended device life cycle

Rugged for industrial applications





Overview

Trenz Electronic TE0720 are industrial-grade SoC modules integrating a Xilinx Zynq-7000 SoC, a gigabit Ethernet transceiver, 1 gigabyte DDR3 SDRAM with 32-Bit width, 32 megabyte Flash memory for configuration and operation, a USB ULPI transceiver, and powerful switch-mode power supplies for all on-board voltages. A large number of configurable I/O's is provided via rugged high-speed stacking strips. All modules in 4 x 5 cm form factor are mechanically compatible.

All this on a tiny footprint, smaller than a credit card, at the most competitive price.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

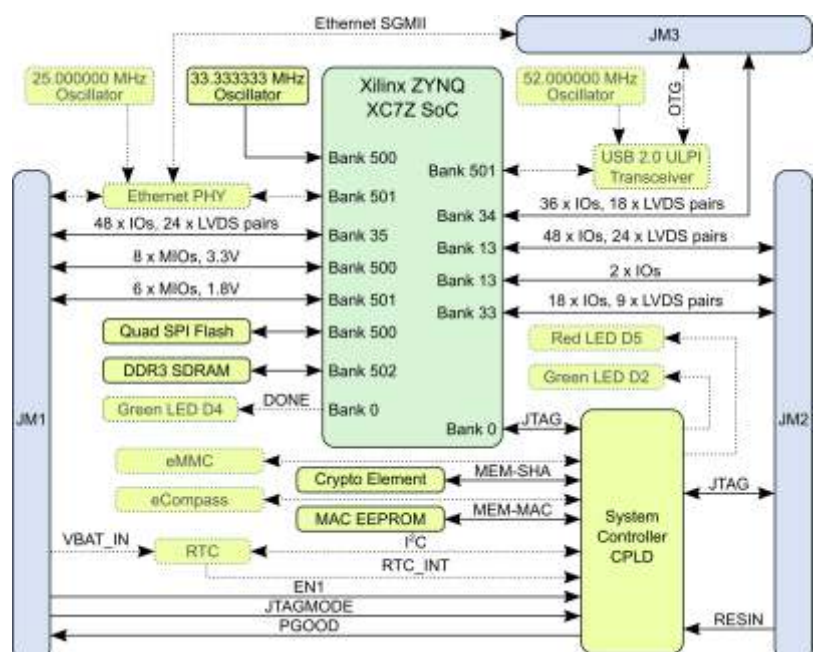
Key Features

- Industrial-grade Xilinx Zynq 7020 SoM, supported by the free Xilinx Vivado WebPACK tool
- Rugged for shock and high vibration
- ARM Dual Core Cortex-A9
- 10/100/1000 tri-speed gigabit Ethernet transceiver (PHY) with SGMII
 - MAC Address EEPROM
- 32-Bit-wide 1 GByte DDR3 SDRAM
- 32 MByte QSPI Flash memory (with XiP support)
- 4 GByte (up to 32 GB) e-NAND
- Plug-on module with 2 × 100-pin and 1 × 60-pin high-speed hermaphroditic strips
- 152 FPGA I/O's (75 LVDS pairs possible) and 14 PS-MIO available on board-to-board connectors
- USB 2.0 high-speed ULPI transceiver
- On-board high-efficiency DC-DC converters
 - 4.0 A x 1.0 V power rail
 - 1.5 A x 1.5 V power rail
 - 1.5 A x 1.8 V power rail
- System management and power sequencing
- eFUSE bit-stream encryption
- AES bit-stream encryption
- Temperature compensated RTC (real-time clock)
- 3 user LEDs
- Optional MEMS sensor (3D accelerometer and 3D magnetometer)
- Evenly spread supply pins for good signal integrity

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

Extended device life cycle

Rugged for industrial applications





Overview

The Trenz Electronic TE0728-04-1Q is a SoC module integrating a Xilinx Automotive Zynq-7020, 512 MByte DDR3 SDRAM with 16-Bit width, 16 MByte Flash Memory for configuration and operation, two 100 Megabit Ethernet transceivers, and powerful switch-mode power supplies for all on-board voltages. A large number of configurable I/O's is provided via rugged high-speed stacking strips.

Within the complete module only Automotive components are installed. All this in a compact 6 x 6 cm form factor, at the most competitive price.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

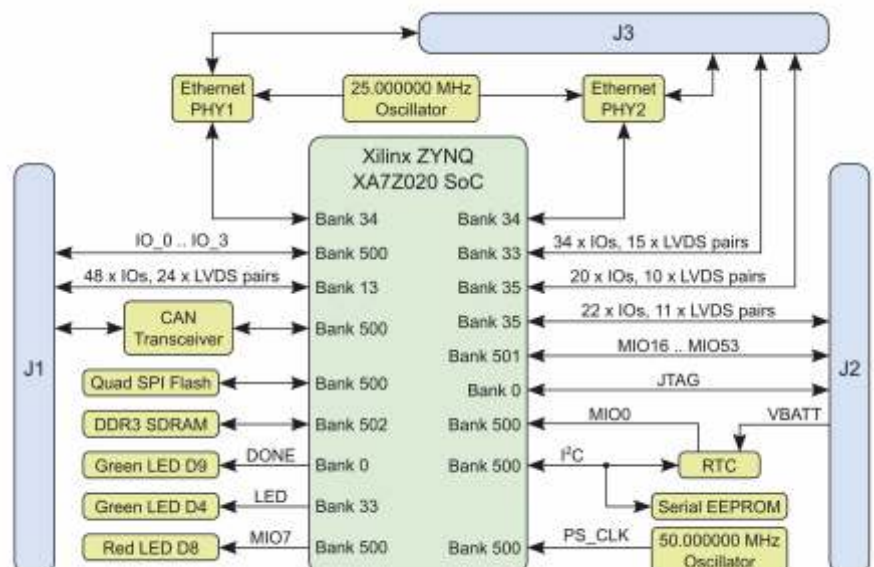
Key Features

- Xilinx Zynq XA7Z020-1CLG484Q (Automotive)
- Rugged for shock and high vibration
- 2 x ARM Cortex-A9 MPCore
- 2 x 100 MBit Ethernet transceiver (PHY)
- 16-Bit-wide 512 MByte DDR3 SDRAM
- 16 MByte QSPI Flash memory (with XiP support)
- Plug-on module with 3 x 80-pin high-reliability high-speed strips
- 76 single ended I/O, 24 LVDS pairs (48 I/O) and 42 MIO available on
- board-to-board connectors
- Board-to-board connectors
- CAN transceiver (PHY)
- Temperature compensated RTC (real-time clock)
- 12 V power supply with watchdog
- On-board high-efficiency DC-DC converters
- System management and power sequencing
- eFUSE bit-stream encryption
- AES bit-stream encryption
- 3 user LEDs
- Evenly spread supply pins for good signal integrity

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

Extended device life cycle

Rugged for automotive applications





Overview

The Trenz Electronic TE0723 is a Arduino compatible FPGA module integrating a Xilinx Zynq-7010, 512 MByte DDR3L, and 16 MByte SPI Flash Memory for configuration and operation.

The "ArduZynq" is the lowest cost, Linux ready solution to use the latest FPGA: the Xilinx 7 series. Use it as a FPGA development platform, or run Linux on the Cortex A9 cores.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

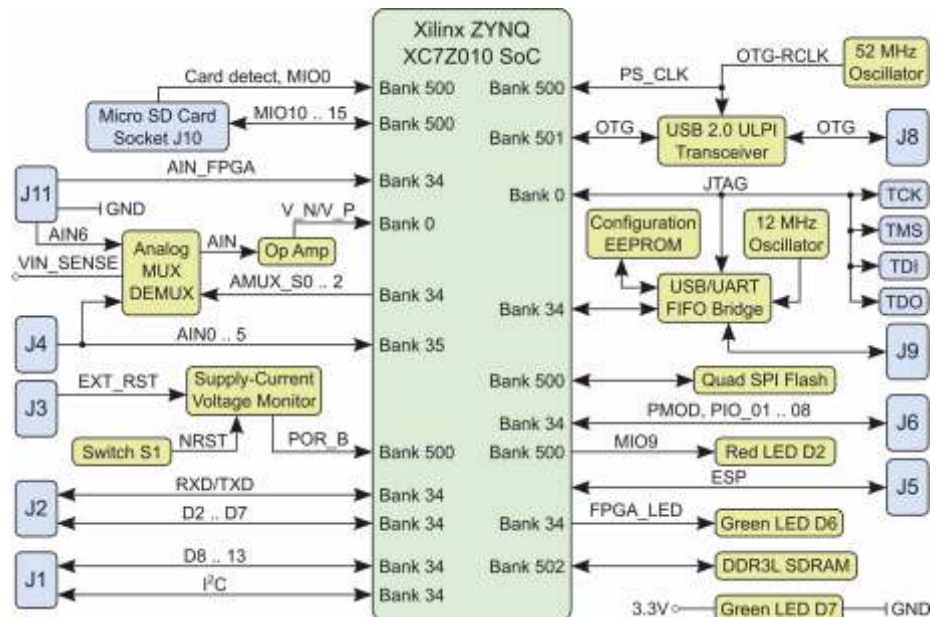
Key Features

- Xilinx XC7Z010-1CLG225C
- Form Factor: Arduino Shield
- Dual ARM Cortex-A9
- Up to 512 MByte DDR3L
- 16 MByte SPI Flash memory
- 12 MHz MEMS Oscillator low power consumption
- Hi-Speed USB2.0 ULPI Transceiver
- 23 FPGA I/O's available on board-to-board connectors
- MicroSD Card socket
- Micro USB OTG
- RGB LED (PL I/O connected)
- "Done" LED (inverted polarity)
- On-board USB JTAG and UART
- CERN Open Hardware Licence 1.2

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

Extended device life cycle

"Ideal for Maker"
Make:





Overview

The Trenz Electronic TE0726 is a Raspberry Pi compatible FPGA module integrating a Xilinx Zynq-7010, 512 MByte DDR3L SDRAM, 4 USB ports, an Ethernet port and 16 MByte Flash memory for configuration und operation.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

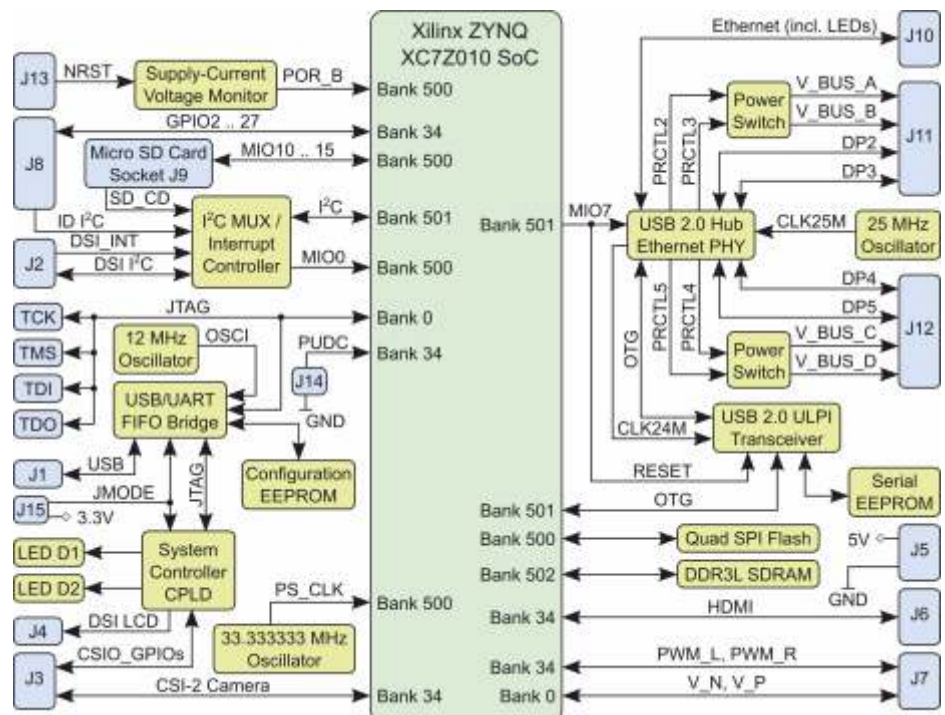
Extended device life cycle

"Ideal for Maker"
Make:

Key Features

- Xilinx Zynq XC7Z010-1CLG225C
 - 512 MByte DDR3L SDRAM
 - 16 MByte Flash
- LAN9514 USB Hub with Ethernet
 - 4 x USB with power switches
 - 100 MBit Ethernet RJ45
- Micro SD card slot
- HDMI Typ A
- DSI Connector (Display)
- CSI-2 Connector (Camera)
- Micro USB
 - power input
 - USB UART
 - JTAG ARM- und FPGA-Debug
- 3.5 mm audio plug (PWM Audio output only)
- Raspberry Pi Model 2 form faktor
- HAT header with 26 I/O's

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





Overview

The Trenz Electronic TE0841 is an industrial-grade FPGA module integrating a Xilinx Kintex UltraScale KU35 or KU40, max. 4 GByte 16-Bit width DDR4, max. 256 MByte QSPI Flash for configuration and operation, and powerful switch-mode power supplies for all on-board voltages. A large number of configurable I/O's is provided via rugged high-speed stacking strips.

All this on a tiny footprint, smaller than a credit card, at the most competitive price.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

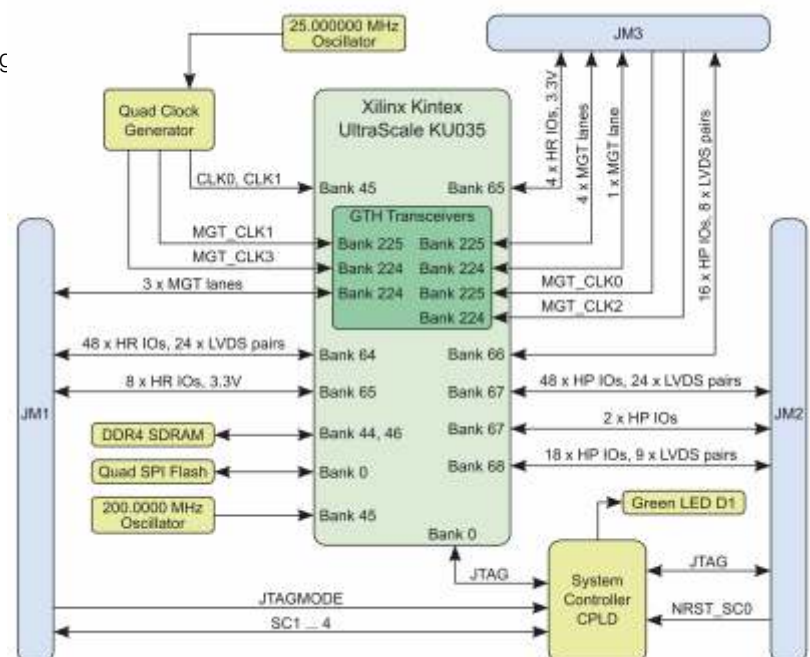
Key Features

- Xilinx Kintex UltraScale KU35 or KU40 FPGA
- Rugged for industrial application
- max. 4 GByte 16-bit wide DDR4
- max. 256 MBit (32 MByte) SPI Boot Flash
- Size: 40 x 50 mm
- 3 mm mounting holes for skyline heat spreader
- B2B Connectors: 3 x Razor Beam, total 260 terminals
 - User I/O: HR 12, HP 132
 - Serial transceiver: GTH 8 lanes (all)
 - GT clock inputs: 2
- Clocking
 - Si5338 - 4 output PLL, GT and PL clocks
 - 200 MHz LVDS oscillator
- All power supplies on board, single supply operation supported.
- Evenly spread supply pins for good signal integ

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

Extended device life cycle

Rugged for industrial applications





Overview

Trenz Electronic TE0741 are industrial-grade FPGA modules integrating a Xilinx Kintex-7 T FPGA, 32 MByte Flash memory for configuration and operation, 8 transceivers, and powerful switch-mode power supplies for all on-board voltages. A large number of configurable I/O's is provided via rugged high-speed stacking strips. All modules in 4 x 5 cm form factor are mechanically compatible.

All this on a tiny footprint, smaller than a credit card, at the most competitive price.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

Key Features

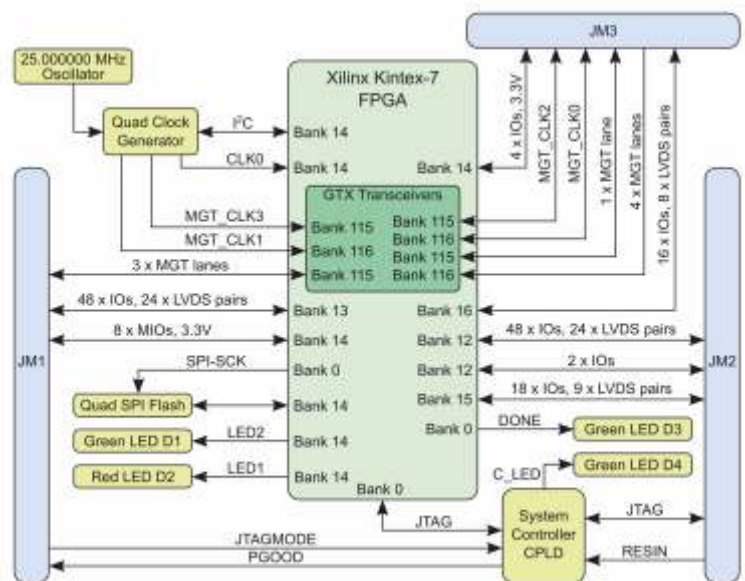
- Industrial-grade Xilinx Kintex-7 (70T, 160T, 325T and 410T) SoM
- Rugged for shock and high vibration
- 32 MByte QSPI Flash memory (with XiP support)
- Programmable clock generator
 - 2 x Transceiver clock (default 125 MHz)
 - Fabric clock (default 200 MHz)
- Plug-on module with 2 × 100-pin and 1 × 60-pin high-speed hermaphroditic strips
- 144 FPGA I/O's (65 LVDS pairs possible) available on board-to-board connectors
- 8 GTX (high-performance transceiver) lanes
 - GTX (high-performance transceiver) clock input
- On-board high-efficiency DC-DC converters
 - 20.0 A x 1.0 V power rail
 - 1.5 A x 1.8 V power rail
- System management and power sequencing
- eFUSE bit-stream encryption
- AES bit-stream encryption
- User LEDs
- Evenly spread supply pins for good signal integrity

Recommended Software:

- Kintex-7 XC7K70T-2CF, Kintex-7 XC7K160T-2CF: Xilinx Vivado Webpack (free license)
- Kintex-7 XC7K325T-2CF, Kintex-7 XC7K410T-2CF: Xilinx Vivado Design Suite

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

Extended device life cycle
Rugged for industrial applications





Overview

The Trenz Electronic TE0713 is an industrial-grade FPGA module integrating a Xilinx Artix-7 FPGA, USB 3.0 to FIFO bridge, 1 GByte of DDR3L SDRAM, 32 MByte Flash memory for configuration and operation, and powerful switching-mode power supplies for all on-board voltages. Numerous configurable I/O's are provided via rugged high-speed strips. Modules in 4 x 5 cm form factor are fully mechanically and largely electrically compatible among them. All this on a tiny footprint, smaller than a credit card, at the most competitive price.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

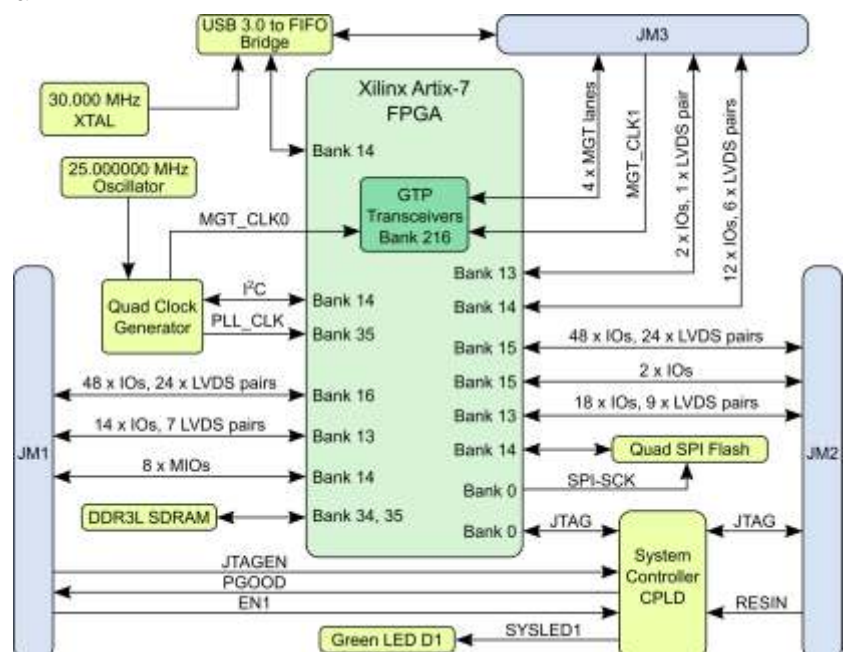
Key Features

- Xilinx Artix-7 (15T to 200T) SoM
- Both industrial and commercial temperature ranges available
- Rugged for high shock and high vibration resistance
- 1 GByte DDR3L 32-bit SDRAM
- 32 MByte QSPI Flash memory (with XiP support)
- USB 3.0 to FIFO interface bridge
- Programmable clock quad generator
 - GTP transceiver clock (default 125 MHz)
 - Fabric clock (default 200 MHz)
- Plug-on module with 2 x 100-pin and 1 x 60-pin high-speed hermaphroditic strips
- 152 FPGA I/O's (75 differential pairs) available via B2B connectors
- 4 GTP (multi Gigabit transceiver) lanes
- External clock input for GTP transceivers via B2B connector
- On-board high-efficiency DC-DC converters
- System management and power sequencing
- eFUSE bit-stream encryption
- AES bit-stream encryption
- User configurable LED
- Evenly spread supply pins for good signal integrity.

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

Extended device life cycle

Rugged for industrial applications



TE0725 Series

Xilinx Artix-7, 32 MByte Flash, 87 IO's, 2x 50 Pin Headers 2.54 mm Pitch

Overview



The Trenz Electronic TE0725 is a low cost small-sized FPGA module integrating a Xilinx Artix-7 (15T - 100T) and 32 MByte Flash memory for configuration and operation. The 2 x 50 pin header with a 2.54 mm standard pitch fits perfect on a breadboard.

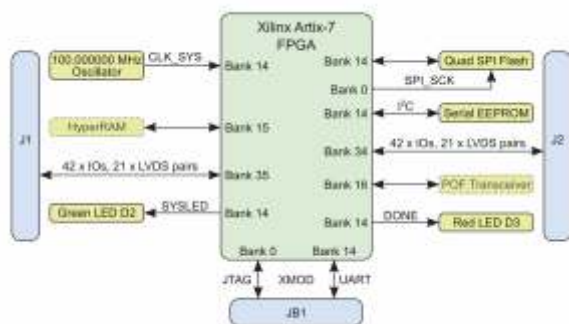
All modules produced by Trenz Electronic are developed and manufactured in Germany.



Key Features

- Xilinx Artix-7 15T up to 100T
- commercial temperature grade (industrial on request)
- 32 MByte Flash memory
- 2 x 50 pin headers with 2.54 mm pitch, ideal for breadboard use
- 87 IO's (42 + 42 + 3)
- 100 MHz system clock
- I2C EEPROM
- 3.3V single supply with on board voltage regulators
- Size 73 x 35 mm
- JTAG connector
- 2 LEDs
- optional HyperRAM (8 to 32 MByte)
- optional Fiber Optic module

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



TE0725LP

Xmod Form-Factor, FT232H, Lattice X02-256 CPLD, 4 Position DIP Switch

Overview



The Trenz Electronic TE0725LP-01-100-2C is a low cost small-sized FPGA module integrating a Xilinx Artix-7 (15T - 100T) and 32 MByte Flash memory for configuration and operation. The 2 x 50 pin headers with a 2.54 mm standard pitch are perfect

for bread-board or low cost dual layer PCB.

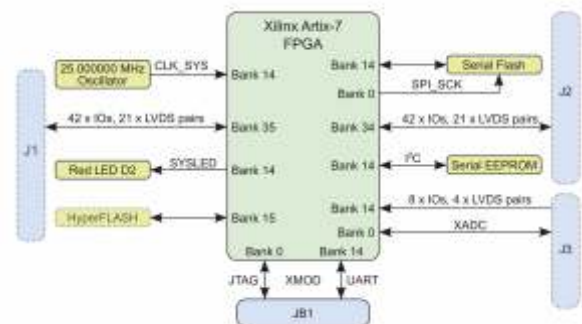
All modules produced by Trenz Electronic are developed and manufactured in Germany.



Key Features

- Xilinx Artix-7 XC7A100T
- commercial temperature grade (industrial on request)
- 32 MByte Flash memory
- 2 x 50 pin headers with 2.54 mm pitch, ideal for breadboard use
- 3.3 V or optional 1.8 V single supply with on board voltage regulators
- 95 I/O's (42 + 42 + 3 + 8)
- 25 MHz system clock (100 MHz can be customized on request)
- I2C EEPROM
- JTAG/UART connector
- One user LED
- 7.3 x 3.5 cm form factor
- Optional HyperRAM (8 - 32 MByte) or HyperFlash

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





Overview

Xmod-USB-X is a universal USB adapter with 2 channels based on FTDI FT2232H USB2 HS Interface chip.

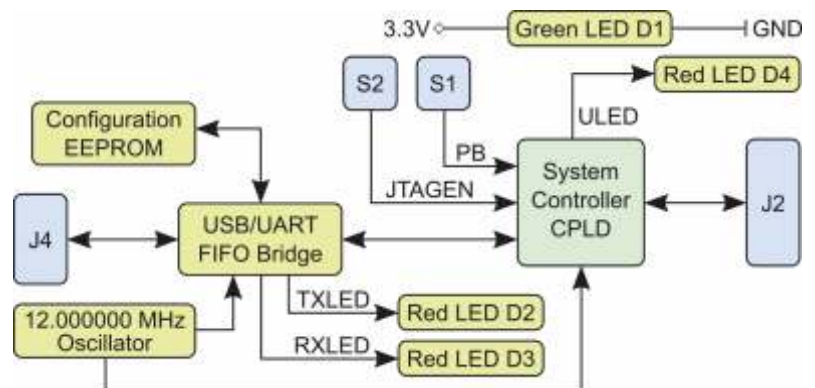
In the consigned default configuration Port A is JTAG and Port B is a serial interface. FT2232H port A and B are connected to small on-board programmable CPLD to allow flexible application specific remappings of FT2232H functions into 8 user I/O pins of single Xmod 12x8 Module.

Minimum PCB area on base board to support JTAG function 5 x 10 mm (does not include mounting hole space). TE0790 is compatible with Xilinx Tools in contrast to the TE0790-01L, that can be used flexibly.

All modules produced by Trenz Electronic are developed and manufactured in Germany.

Key Features

- Xmod form-factor
 - Supported base slots: 6 x 2, 8 x 4, 10 x 6, 12 x 8, 5 x 2, 5 x 3
 - Size: 20 x 25 mm
 - M3 mounting hole
- FT2232H
 - Channel B RX/TX LED's (on top, not visible from front)
 - Mini-USB connector (more rugged then micro-USB)
 - 93C56 EEPROM
- Lattice XO2-256 CPLD
 - On board programmable using Lattice tools
 - 8 universal I/O pins
 - VCCIO either 3.3 V or user supplied (1.8 to 3.3V)
 - Red user LED (front visible)
 - 12 MHz clock from on-board Oscillator
- LDO for optional USB power
- Green Power-on LED (front visible)
- User button (front accesible)
- 4 position DIP switch
 - Choose CPLD program mode
 - FTDI EEPROM disable (not implemented in PCB REV 1)
 - Use VIO same as VCC
 - Use VCC from USB



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

TE0701

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



TE0703

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



TE0705

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

Changes from TE0701

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



TE0706

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



TEBA0841

Mainly for the use with TE0841 and TE0741 modules.

- XMOD (TE0790) pin header
- SFP connector
- Micro USB
- 1 x pin header 16 pol. (JTAG, MGT-CLK, boot mode, RST, IOs)
- 1 x pin header 10 pol. (SD IOs)
- 2 x pin headers 50 pol. (FPGA bank IOs and power)
- 1 x pin header for FPGA bank power VCCIOA and 1 x for VCCIOD
- LDO voltage regulator 3.3 V to 2.5 V
- 2 x user LED's (Red/Green)



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

TEBF0808

- Mini-ITX form factor
- ATX power supply connector (Important 12 V only supply required)
- optional 12 V standard power plug
- USB 3.0 with USB 3.0 HUB
- Gigabit Ethernet RJ45
- MicroSD Card (bootable) and eMMC (bootable)
- PCIe slot - one PCIe lane (16 Lane connector)

- Displayport Single Lane
- One SATA Connector
- Dual SFP+
- FMC HPC slot (1.8 V max VCCIO)
- Fan connectors, PC enclosure, FMC fan
- Intel front panel- and HDA audio-connector
- CAN FD transceiver (10 pin IDC connector)
- 20 pins ARM JTAG connector (PS JTAG0)
- One Samtec FireFly (4 GT lanes bidir)
- One Samtec FireFly connector for reverse loopback



TEB0728

- Trenz TE0728 module socket (3 x Samtec SEM connectors 80 pins)
- 2 x RJ45 Ethernet
- SD card slot
- Power supply with DC jack
- 3 x user LED's (red/yellow/green)
- User push button



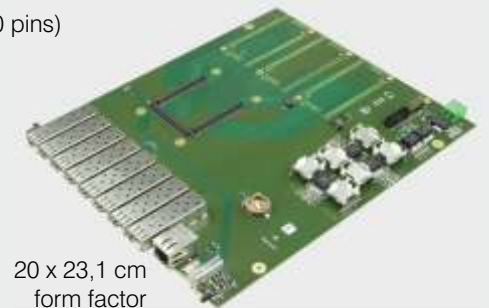
TEB0729

- Trenz TE0729 module socket (2 x Samtec BTE/BSE connectors 120 pins)
- 5 V board supply via DC jack
- 3 x RJ45 Ethernet
- 1 x MicroUSB and 1 x SD card connector
- 1 x 128K I2C CMOS Serial EEPROM
- 1 x 2K I2C Serial EEPROM
- XMOD (TE0790) pin header
- 2 x pin header FPGA bank power supply
- 1 x VBat pin header and 2 x VG96 pin header
- 1 x user push button, 1 x LED (red), user switch FPGA boot mode



TEB0745

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



TEBA0714

- Trenz TE0714 module socket (2 x Samtec LSHM connectors 100 pins)
- XMOD (TE0790) pin header
- 1 x pin header 16 pol. (JTAG, MGT-CLK, boot mode, XADC, I/O's)
- 1 x pin header 10 pol. (I/O's)
- SFP connector
- LDO voltage regulator 3.3 V to 2.5 V
- 2 x user LED's (red/green) and 1 x LED (red)
- 2 x pin headers 50 pol. (FPGA bank I/O's and power)
- 1 x pin header for FPGA bank power VCCIO34 (1.8 VOUT, 2.5 V, 3.3 VOUT)
- 1 x pin header for FPGA bank power V_CFG (1.8 VOUT, 2.5 V, 3.3 VOUT)



TE0728	TE0729	TE0741	TE0745	TE0782	TE803	TE0808 „UltraSOM+“	TE820	TE0841
Z-7020 (automotive)	Z-7020	70T 160T 325T 410T	Z-7030 Z-7035 Z-7045	Z-7035 Z-7045 Z-7100	ZU3EG, ZU5EV, (ZU2CG-ZU5CG, ZU2EG-ZU5EG, ZU4EV, ZU5EV)	ZU9EG (ZU6CG, ZU9CG, ZU6EG, ZU9EG, ZU15EG)	ZU3EG, ZU5EV, (ZU2CG-ZU5CG ZU2EG-ZU5EG ZU4EV, ZU5EV)	KU35 KU40
3 x Samtec SEM	2 x Samtec BTE	3 x Samtec LSHM	3 x Samtec ST5	3 x Samtec QTH	4 x Samtec ST5	4 x Samtec ST5	3 x Samtec LSHM	3 x Samtec LSHM
Artix-7	Artix-7	Kintex-7	Kintex-7	Kintex-7	UltraScale+	UltraScale+	UltraScale+	UltraScale
2 x Cortex A9	2 x Cortex A9	MicroBlaze	2 x Cortex A9	2 x Cortex A9	4 x Cortex A53+ 2 Cortex R5	4 x Cortex A53 + 2 Cortex R5	4 x Cortex A53+ 2 Cortex R5	MicroBlaze
512 DDR3	512 DDR3	-	1024 DDR3/L	1024 DDR3	8192 DDR4	8192 DDR4	4096 DDR4	4096 DDR4
16	32	32	32	32	64	64	64	32
8 KByte	3 x MAC	-	MAC	2 x MAC + 16 KByte	-	16 KByte	-	-
	4 - 64 GByte	-	-	4 - 64 GByte	-	-	4 - 64 GByte	-
2 x 100 MBit	2 x 100 MBit, 1 GBit	-	1 GBit	2 x 1 GBit	-	-	4 - 64 GByte	1 GBit
-	USB 2.0 OTG PHY	-	USB 2.0 OTG PHY	2 x USB 2.0 OTG	-	-	USB 2.0 OTG	-
124 + 34 MIO	136 + 14 MIO	144	250 + 6 MIO	250 + 2 MIO	156 + 65 MIO	204 + 65 MIO	132 + 14 MIO	144
-	-	8 x GTX	8 x GTX	16 x GTX	PS GTR 4	4 x GTR, 16 x GTH	PS GTR 4	8 x GTH
Automotive, RTC, CAN	RTC, Cooling Solution available	Programmable Clock Generator	RTC	Programmable Clock Generator, RTC, eMMC	Programmable Clock Generator	System Monitor, Programmable Clock Generator	Programmable Clock Generator, Real Time Clock, eMMC	Programmable Clock Generator

*modules with form factor 5.2. x 7.6 cm are not compatible with each other

EMC²-DP

PC/104 OneBank Carrier for SoC Modules

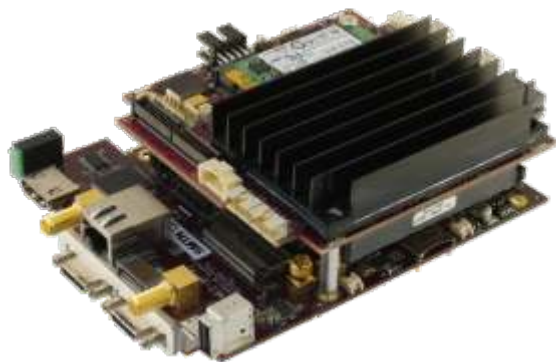
www.sundance.technology/emc2-dp/

Providing the base for all of our PC/104 integrated systems the EMC²-DP is a PCIe/104 OneBank[®] Carrier for a Trenz compatible SoC Module and also has expansion for a VITA57.1 FMC™ LPC I/O board. It has I/O pins, using a 100-way Samtec RazorBeam connector system. The add-on board, called “Sundance External Interface Connector – SEIC” contains LEDs, RS232, USB2.0, HDMI, 1Gb Ethernet and SATA . The SEIC can be customized for individual applications with bespoke connectors.

The PCIe/104 OneBank[®] design enables the EMC²-DP to be added to robust and rugged installations for various commercial, medical, industrial and military uses.



- PCIe/104 OneBank[®] Carrier for Trenz SoC Modules
- PCI Express Gen 2 compatible and integrated PCI Express switch
- A number of EMC²-DP can be stacked for large I/O solutions
- Expandable with any VITA57.1 FMC I/O Module for more flexibility
- 96mm x 90 mm PC/104 Form-Factor with cable-less break-out PCB connector



oi110 - DUAL CAMERALINK

www.sundance.technology/oi110/

A dual lane CameraLink camera interface card (SMT-FMC521) and the EMC²-DP. The integrated Xilinx FPGA allows any CameraLink format to be connected to the oi110. Additional SATA-3 expansions allow connection to large storage for future processing.

- Dual CameraLink Ports
- Dual Single SATA-3 Ports
- PoCL (Power over Camera Link) support
- Up to 85MHz data rate
- Dual Base, Single Medium Base
- Single Extended Full CL Base



oi115 - HDMI IN / OUT

www.sundance.technology/oi115/

An HDMI in/out module and the EMC²-DP. As such this system gives you HDMI in and out on a one bank PC/104 FPGA carrier card.

- HDMI input/output FMC module (FMC-IMAGEON)
- HDMI input
- HDMI output
- Interface for ON Semiconductor VITA image sensor modules
- Video clock synthesizer

cronologic GmbH & Co. KG

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

All models share these characteristics:

- 4 analog input channels
- Additional digital trigger and/or gating inputs
- PCIe x4 or x8 half-size boards
- Gross DMA-bandwidth of 1 Gbyte/s or 2 Gbyte/s
- Arbitrary board combinations can be synchronized
- LEMO 00 series input connectors (adapter cables to SMA connector available)
- The DC-offset can be shifted to make optimal use of the ADC range for either positive or negative pulses

	Ndigo5G-10			Ndigo5G-8			Ndigo250M-14	Violet250M-14	Violet125M-14	unit
PCIe lanes	4			4			8	8	8	-
PCIe Bandwidth	800			800			1400	1400	1400	MB/s
Analog channels	4	2	1	4	2	1	4	4	4	-
Max. Sampling Rate	1250	2500	5000	1250	2500	5000	250	250	125	Msp/s
Max. Bandwidth	1000			1000			120 or 700	120 or 700	60 or 450	MHz
Max. individual sample length	26	26	26	26			32	hours	hours	µs
THD	58	58	58	58			73	73	86	dBc
SNR	51	50	50	45			64	64	74	dBc
SFDR incl.	61	60	60	58			74	74	86	dBc
SFDR excl.	74	64	63	57			76	76	TBD	dBc
SINAD	50	48	48	45			64	64	72	dBc
ENOB	8.0	7.7	7.7	7.2			10.3	10.3	11.0	-
Input type and coupling	AC single ended			AC single ended			DC single ended	DC single ended	DC single ended	-

Ndigo Series

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

These boards are ideally suited for applications like

- Mass Spectrometry
- Photon Counting
- Lidar
- NMR

Ndigo Crate

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

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

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

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

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



Facts	Crate	Crate-3	Crate-5
Connection to Host	PCIe 2.0 x 16	PCIe 2.0 x 16	PCIe 2.0 x 16
Bandwidth to Host	8 GByte/s	8 GByte/s	8 GByte/s
Performance relative to 10Gbps Thunderbolt link	8x	8x	8x
PCIe3 16x slots with 8 lanes	-	2	2
PCIe3 16x slots with 4 lanes	-	3	3
PCIe2 16x slots with 4 lanes	8	-	-
PCI slots 5V, 32 Bit, 33MHz	-	-	2
PCI slots 3V, 32 Bit, 66MHz	-	2	-
Availability	now	now	now
Cable and link boards	included	included	included
Cable Length	3 meters (1m, 2m and 5m upon request)		