




Electronic Design Service

Development, Manufacture and Supply of FPGA and SoC Modules

-  www.trenz-electronic.de
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5.2 x 7.6 cm
form factor

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

ZU6CG, ZU9CG, ZU6EG, ZU9EG, ZU15EG	C900	4 x Samtec ST5	8 DDR4	128	204 + 65 MIO	4 x GTR, 16 x GTH	GPU/VCU depending on device, Programmable Clock Generator, Single Supply
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TE0820 Series

Xilinx Zynq UltraScale+, DDR4, Flash, USB, Ethernet, eMMC



4 x 5 cm
form factor

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

ZU2CG - ZU5CG, ZU2EG - ZU5EG, ZU4EV, ZU5EV	784	3 x Samtec LSHM	4 DDR4	128	4 - 64	1 GBit	USB2.0 OTG	132 + 14 MIO	4 x PS GTR	GPU/VCU depending on device, Programmable Clock Generator, Single Supply
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6 x 6 cm
form factor

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

XA7Z020 (automotive)	3 x Samtec SEM	512 DDR3	16	8 KByte	2 x 100 MBit	124 + 30 MIO	Automotive, Real Time Clock, CAN, Single Supply

TE0724 Series
Xilinx Zynq-7000, DDR3L, Flash, Ethernet, EEPROM, CAN



4 x 6 cm
form factor

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

Z-7010, Z-7020	1 x Samtec ST5	1 DDR3L	32	MAC Address	1 GBit	PL: 80 PS: 20	CAN, Single Supply

TE0841 Series

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

KINTEX⁷



4 x 5 cm
form factor

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

KU035, KU040	3 x Samtec LSHM	4 DDR4	64	60 x HR I/Os 84 x HP I/Os	8 x GTH	Programmable Clock Generator, Single Supply

TE0741 Series

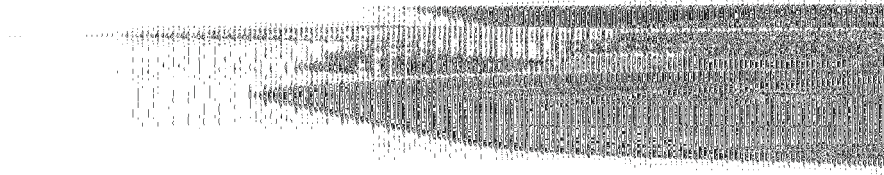
Xilinx Kintex-7, Flash, 8 High Speed Serial Transceivers, 25 MHz Oscillator

KINTEX⁷

4 x 5 cm
form factor

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

70T, 160T, 325T, 410T	3 x Samtec LSHM	32	144 (94 for 70T variant)	8 x MGTs	Programmable Clock Generator, Single Supply



EDDP Motor Control Kit

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

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

Key Features

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

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

Resources

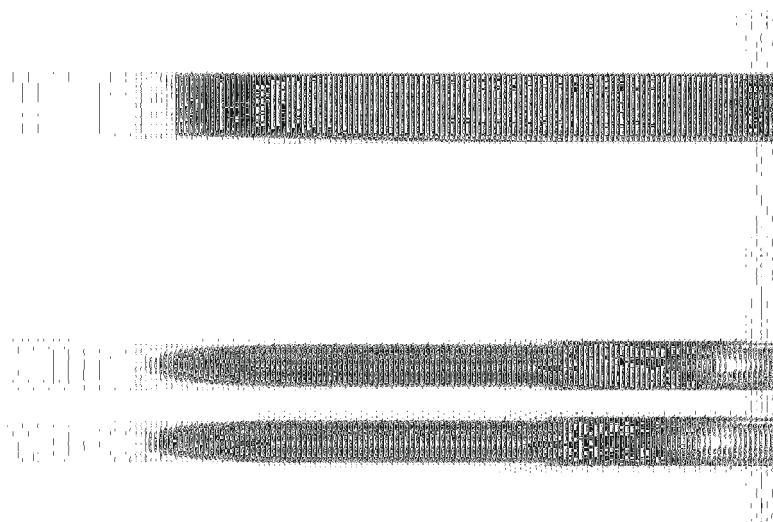
trenz.org/EDDP/ - including a Quick Start Guide, an User Manual for the EDDP Kit and the EDPS motor driver board, block diagram, design database and technical specifications

Support

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



<http://trenz.org/EDDP/>



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

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

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

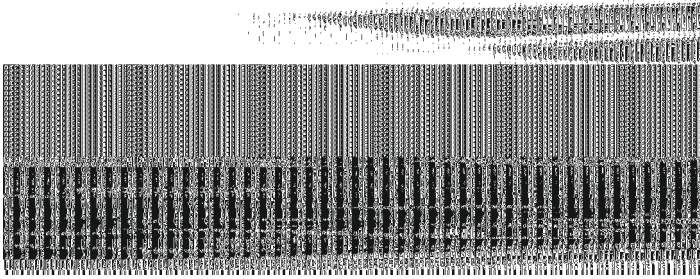
Key Features

- Xilinx Kintex-7 XC7K325T-2FBG676C
- 32 MByte Quad-SPI Flash memory (for configuration and operation)
- USB-JTAG bridge FT2232H
- FPGA configuration through Jtag and SPI Flash memory
- SPI Flash configuration through JTAG and USB
- Connectors
 - Arduino compatible pin headers
 - MicroBUS compatible pin headers
 - 3 x Pmod compatible pin headers
 - 50 pin header 2.54mm (40 single-ended IO, 20 differential lanes, variable VCCIO)
 - Mictor Debug connector
 - 10 pin Debug connector 2mm
- 2 x 8 MByte PSRAM
- 32 MByte User Quad-SPI Flash memory
- Micro SDcard Socket
- Wireless module RS9113-NBZ-D1C (Wi-Fi/BT/BLE)
- 3-axis gyroscope, 3-axis accelerometer, 3-axis magnetometer ICM-20948
- Stereo Audio Codec MAX9880A
- 2 x PDM Microphones SPK0641HT4H-1
- 2 x 3.5mm RCA audio jacks (input/output)
- 100MHz User Clock Oscillator SiT8008
- Status LEDs, Power LED
- 12V Power Supply (separately included in the scope of delivery)

TEC0330 PCIe FMC Carrier

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

VIRTEX⁷



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

XC7VX330T	32	DDR3 SO-DIMM Socket	up to 202 FPGA I/O pins on FMC connector	10 on FMC 8 on PCIe lanes	13.1 GBit/s	FMC High Pin Count (HPC) Connector, Programmable Clock Generator

TEF1001 PCIe FMC Carrier

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

KINTEX⁷



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

XC7K160T	32	DDR3 SO-DIMM Socket	160 on FMC connector	4 on FMC 4 on PCIe lanes	Vita 57.1 FMC HPC Slot, Programmable Clock Generator, 200 MHz Low-Jitter LVDS Oscillator	

Following carrier boards are 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 (12 V only supply required)
- optional 12 V standard power plug
- USB 3.0 with USB 3.0 HUB
- FMC HPC slot (1.8 V max VCCIO)
- MicroSD Card (bootable) and eMMC (bootable)
- PCIe slot - one PCIe lane (16 Lane connector)
- Fan connectors, PC enclosure, FMC fan
- Intel front panel- and HDA audio-connector
- CAN FD transceiver (10 pin IDC connector)
- Displayport Single Lane
- One SATA Connector
- Dual SFP+
- Gigabit Ethernet RJ45
- One Samtec FireFly (4 GT lanes bidir.)
- One Samtec FireFly connector for reverse loopback
- 20 pins ARM JTAG connector (PS JTAG0)

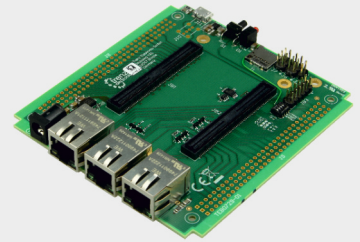
TEB0728

- Trenz TE0728 module socket (3 x Samtec SEM connectors 80 pins)
- 2 x RJ45 Ethernet
- SD card slot
- Power supply with DC jack
- 3 x user LEDs (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



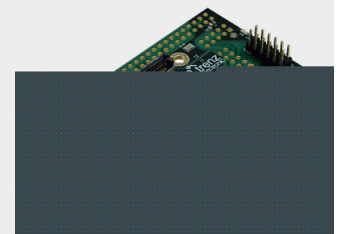
TEB0745

- 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 and power)
- 6 x pin header 12 pol. (FPGA bank I/O and power)

20 x 23,1 cm
form factor

TEBA0714

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



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 base board. The TE08xx series modules are built in a black Core V1 Mini-ITX Enclosure. All this provided with a fitting power supply including different adapters, a micro SD card, a USB cable plus screws and bolts. Different module variants can be integrated on request.

Module	TE0720	TE0729	TE0803	TE0807	TE0808
FPGA	Xilinx Zynq-7020	Xilinx Zynq-7020	Xilinx Zynq UltraScale+ ZU3EG	Xilinx Zynq UltraScale+ ZU7EV	Xilinx Zynq UltraScale+ ZU9EG
Baseboard	TE0703	TEB0729	TEBF0808	TEBF0808	TEBF0808
Enclosure	-	-	Core V1 Mini-ITX	Core V1 Mini-ITX	Core V1 Mini-ITX
Power Supply	Universal power supply unit	Universal power supply unit	Be Quiet! 400W ATX Power Supply	Be Quiet! 400W ATX Power Supply	Be Quiet! 400W ATX Power Supply
Heat Sink	Heat sink for TE0720, spring-loaded embedded	KK0729-02 TE custom built	BGA Heat sink	SuperGRIP/ MaxiFLOW Heat sink	BGA Heat sink
USB Cable	✓	✓	✓	✓	✓
MicroSD Card	✓	✓	✓	✓	✓
Screws & Bolts	✓	✓	✓	✓	✓