

# TE0728 TRM

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## Overview

Trenz Electronic TE0728 is an automotive-grade FPGA module integrating an Automotive Xilinx Zynq-7 FPGA, two Ethernet transceivers (PHY) , DDR3 SDRAM, QSPI Flash memory for configuration and operation, and powerful switching-mode power supplies for all on-board voltages. Numerous configurable I/Os are provided via rugged high-speed strips.

Within the complete module only Automotive components are installed.

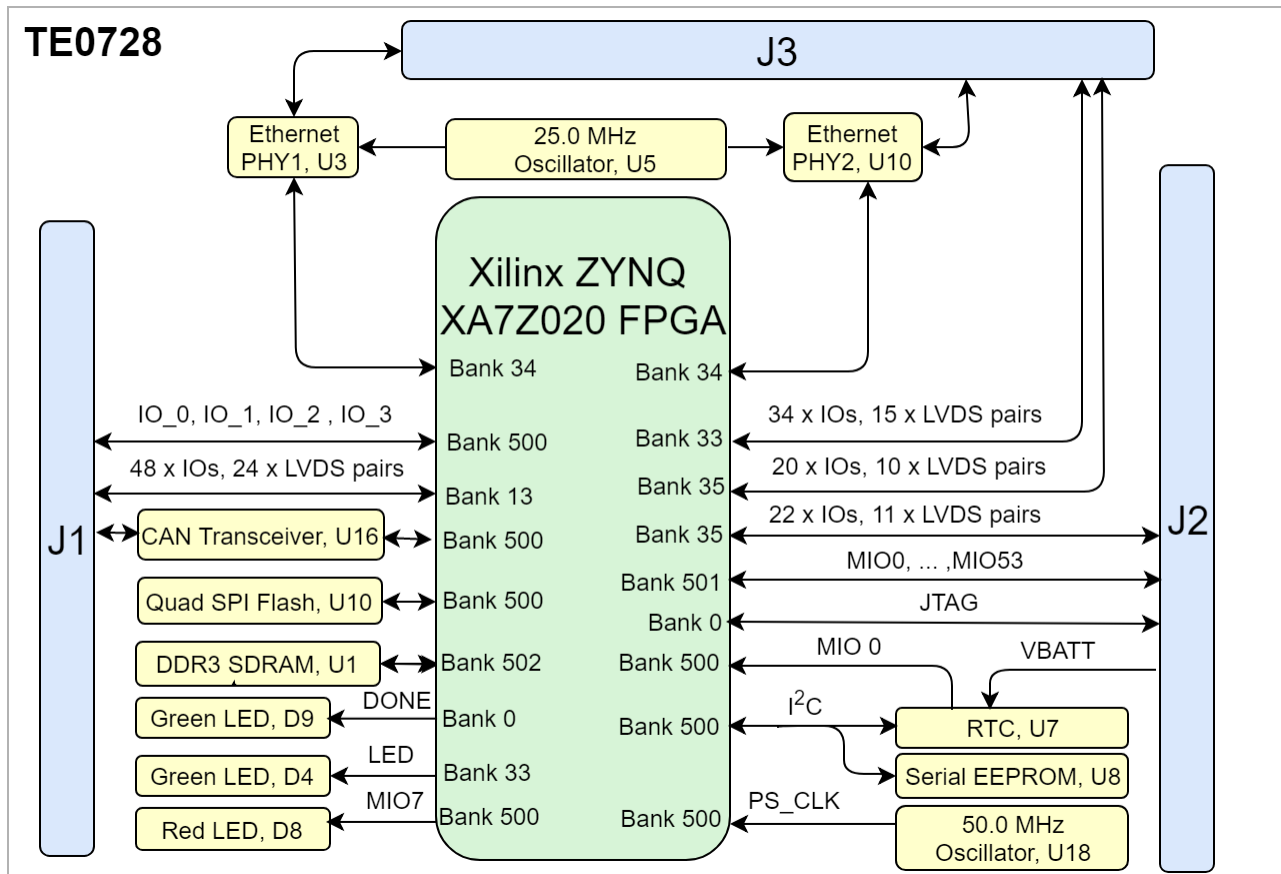
All this in a compact 6 x 6 cm form factor, at the most competitive price.

Refer to <http://trenz.org/te0728-info> for the current online version of this manual and other available documentation.

## Key Features

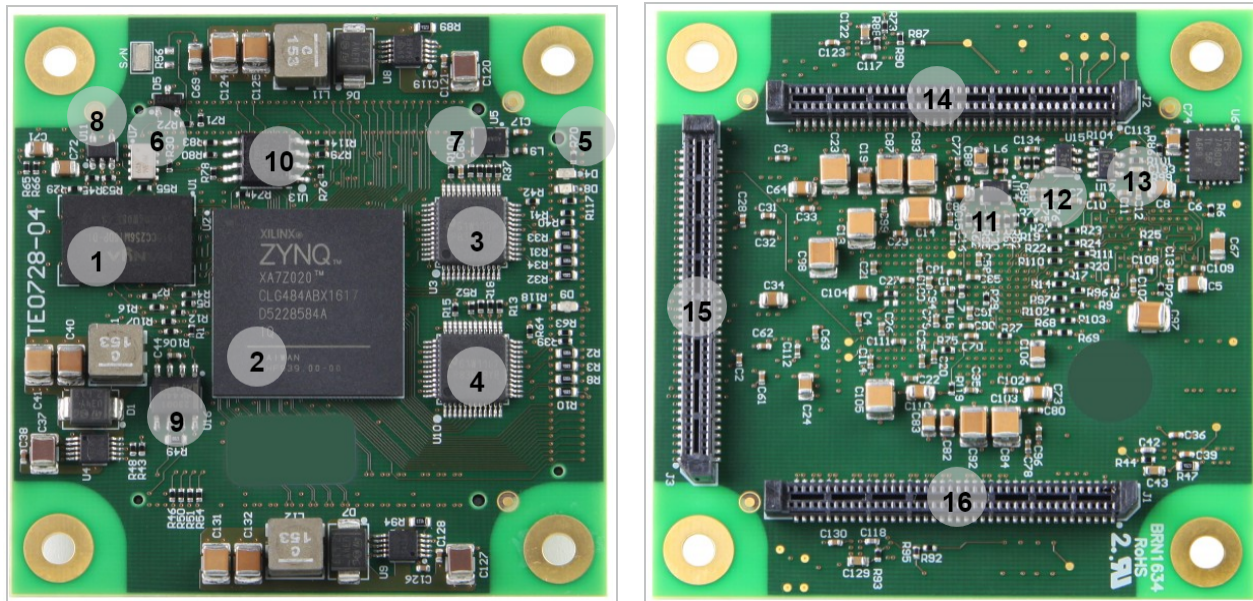
- Xilinx XC7Z020-1CLG484Q (Automotive) [XA7Z014S is available on other assembly options]
  - Package: CL/CLG484
  - Speed Grade: -1
  - Temperature Grade: Expanded (-40 to +128 °C)
- Dual-Core ARM Cortex-A9 MPCore
- DDR3 SDRAM, up to 512MB, up to 1066 Mb/s, connected to PS [different size is available on other assembly options]
- QSPI Flash memory (with XiP support) [different size is available on other assembly options]
- Programmable SIT8918A , PS clock generator
- 2 Kbit serial EEPROM
- Three user LEDs
- CAN transceiver (PHY)
- Temperature compensated RTC (real-time clock)
- 2 x 100 MBit Ethernet transceiver (PHY)
- Board to Board (B2B)
  - Plug-on module with 3 x 80-pin Samtec Micro Tiger Eye(TM) high-speed connectors
- I/O Interface
  - 42x MIO
  - 200x HR
  - 128x PS IO
  - 0x GTP Transceiver
  - 0x GTX Transceiver
- Power Supply
  - 12V power supply with watchdog
- Others:
  - Dimensions: 6 x 6 cm
  - Rugged for shock and high vibration
  - On-board high-efficiency DC-DC converters
  - System management and power sequencing
  - eFUSE bit-stream encryption
  - AES bit-stream encryption
  - Evenly-spread supply pins for good signal integrity

## Block Diagram



TE0728 block diagram

## Main Components



TE0728 main components

1. DDR3 SDRAM, U1
2. Xilinx Automotive XA7Z020-1CLG484Q ,U2
3. 100 MBit Ethernet transceiver, U3
4. 100 MBit Ethernet transceiver, U10
5. User LED Green, D4
6. Real Time Clock, U7
7. Standard Clock Oscillators, U5
8. 64 Kbit I2C EEPROM, U11
9. CAN Transceiver, U16
10. QSPI NOR Flash memory, U13
11. Standard Clock Oscillators, U14
12. Low-Quiescent-Current Programmable Delay Supervisory Circuit, U15
13. Low-Quiescent-Current Programmable Delay Supervisory Circuit, U12
14. B2B connector , JM2
15. B2B connector , JM3
16. B2B connector , JM1

FPGA (U2), DDR3 SDRAM (U1) and QSPI (U13) can be varied on other assembly option, for more information contact us.

## Initial Delivery State

| Storage Device | Symbol | Content        |
|----------------|--------|----------------|
| Quad SPI Flash | U13    | Not Programmed |
| EEPROM         | U11    | Not Programmed |

Initial delivery state of programmable devices on the module

## Configuration Signals

| Signal | FPGA Bank | Pin | B2B | Signal State | Boot Mode |
|--------|-----------|-----|-----|--------------|-----------|
|--------|-----------|-----|-----|--------------|-----------|

|        |     |    |       |      |         |
|--------|-----|----|-------|------|---------|
| Boot_R | 500 | E4 | J2-11 | Low  | QSPI    |
|        |     |    |       | High | SD Card |

**Boot process.**

| Signal  | B2B  | I/O    | Note               |
|---------|------|--------|--------------------|
| Reset   | J2-7 | Input  | Comes from Carrier |
| RST_OUT | J2-9 | Output | PS_PROB_B          |

**Reset process.**

## Signals, Interfaces and Pins

### Board to Board (B2B) I/Os

TE0728 Module has 3 B2B connectors and every connector has 80 pins (2 row, 40 pins).

FPGA bank number and number of I/O signals connected to the B2B connector:

| FPGA Bank | Type | B2B Connector | I/O Signal Count          | Voltage Level | Notes                 |
|-----------|------|---------------|---------------------------|---------------|-----------------------|
| 13        | HR   | J1            | 48 Single ended (24 Diff) | VCCO_13       | variable from carrier |
| 500       | MIO  | J1            | 4 Singel ended            | 3.3V          |                       |
| 501       | MIO  | J2            | 38 Singel ended           | VMIO1         | variable from carrier |
| 33        | HR   | J3            | 34 Single ended (17 Diff) | 3.3V          |                       |
| 35        | HR   | J3            | 20 Single ended (10 Diff) | 3.3V          |                       |
|           |      | J2            | 22 Single ended (11 Diff) |               |                       |

**General PL I/O to B2B connectors information**

### Ethernet PHY

Ethernet pins connections to Board to Board (B2B). Ethernet components ETH1 and ETH2 are connected to B2B connector J3.

| Schematic     | ETH1  | ETH2  | Direction | Notes                                     |
|---------------|-------|-------|-----------|-------------------------------------------|
| CTREF         | J3-57 | J3-25 | In        | Magnetics center tap voltage              |
| TD+           | J3-58 | J3-28 | Out       | Transfer                                  |
| TD-           | J3-56 | J3-26 | Out       |                                           |
| RD+           | J3-52 | J3-22 | In        | Receive                                   |
| RD-           | J3-50 | J3-20 | In        |                                           |
| LED1          | J3-55 | J3-23 | Out       | LED Yellow on carrier, multiple usage-ACK |
| LED2          | J3-53 | J3-21 | Out       |                                           |
| LED3          | J3-51 | J3-19 | Out       | LED Green on carrier, multiple usage-Link |
| POWERDOWN/INT | L21   | R20   | In        |                                           |
| RESET_N       | M15   | R16   | In        | Active low PHY Reset                      |

**Ethernet PHY B2B connectors.**

# CAN PHY

CAN pins connections to Board to Board (B2B).

| Schematic | B2B       | Direction   | Notes |
|-----------|-----------|-------------|-------|
| CANH/CANL | J1-2/J1-4 | Inout/Inout |       |

CAN B2B connectors.

# JTAG Interface

JTAG access to the Xilinx XA7Z020 FPGA through B2B connector JM2.

| JTAG Signal | B2B Pin |
|-------------|---------|
| TMS         | J2-12   |
| TDI         | J2-10   |
| TDO         | J2-8    |
| TCK         | J2-6    |

JTAG pins connection

# MIO Pins

| MIO Pin       | Connected to                           | B2B | Notes                 |
|---------------|----------------------------------------|-----|-----------------------|
| MIO0          | MIO0                                   | -   | RTC interrupt         |
| MIO1...MIO6   | SPI_CS , SPI_DQ0... SPI_DQ3<br>SPI_SCK | -   | SPI Flash             |
| MIO7          | LED RED                                | -   | LED                   |
| MIO8/MIO9     | Tx/Rx                                  | -   | CAN Transceiver       |
| MIO10...MIO13 | IO_0 ... IO_3                          | J1  | GPIO                  |
| MIO14/MIO15   | SCL/SDA                                | -   | I2C                   |
| MIO16...MIO39 | -                                      | J2  | GPIO                  |
| MIO40...MIO48 | CLK, Cmd, Data0...Data3, wp, cd        | J2  | SD                    |
| MIO48         | PS_MIO48_501                           | J2  | LED Red on Carrier    |
| MIO49         | PS_MIO49_501                           | J2  | LED Yellow on Carrier |
| MIO50         | PS_MIO49_501                           | J2  | LED Green on Carrier  |
| MIO51         | PS_MIO51_501                           | J2  | GPIO                  |
| MIO52/MIO53   | UART_Txd / UART_Rxd                    | J2  | UART transfer/recieve |

MIOs pins

# On-board Peripherals

| Chip/Interface  | Designator  | Notes                     |
|-----------------|-------------|---------------------------|
| QSPI Flash      | U13         | ---                       |
| EEPROM          | U11         | EEPROM                    |
| RTC             | U7          | Real Time Clock           |
| DDR3 SDRAM      | U1          | Volatile Memory           |
| Ethernet        | U3, U10     | Two 100 Mbit Ethernet PHY |
| CAN Transceiver | U16         | ---                       |
| User LED        | D4          | Green LED                 |
| Oscillators     | U14, U7, U5 | Clock Sources             |

On board peripherals

## Quad SPI Flash Memory

On-board QSPI flash memory is used to store initial FPGA configuration. Besides FPGA configuration, remaining free flash memory can be used for user application and data storage. All four SPI data lines are connected to the FPGA allowing x1, x2 or x4 data bus widths. Maximum data rate depends on the selected bus width and clock frequency.

Quad SPI Flash (U7) is connected to the Zynq PS QSPI0 interface via PS MIO bank 500.

| MIO Pin | Schematic  | Notes |
|---------|------------|-------|
| MIO1    | SPI_CS     |       |
| MIO2    | SPI_DQ0/M0 |       |
| MIO3    | SPI_DQ1/M1 |       |
| MIO4    | SPI_DQ2/M2 |       |
| MIO5    | SPI_DQ3/M3 |       |
| MIO6    | SPI_SCK/M4 |       |

Quad SPI interface MIOs and pins

## RTC

The RTC has an I<sup>2</sup>C Bus (2-wire SerialInterface) and offers temperature compensated time. The STC-Smart Temperature Compensation is calibrated in the factory and leads to a very high time-accuracy.

RTC interrupt is connected to MIO0 connected to Bank 500 through pin G6.

| MIO Pin    | I2C Address | Designator | Notes         |
|------------|-------------|------------|---------------|
| MIO14...15 | 0x56        | U7         | Slave address |

I2C Address for RTC

## EEPROM

The Microchip Technology Inc. 24xx64 is a 64 Kbit Electrically Erasable PROM. The device is organized as a single block of 8K x 8-bit memory with a 2-wire serial interface. The 24xx64 also has a page write capability for up to 32 bytes of data. Functional address lines allow up to eight devices on the same bus, for up to 512 Kbits address space.

| MIO Pin    | I2C Address | Designator | Notes         |
|------------|-------------|------------|---------------|
| MIO14...15 | 0x50        | U11        | Slave address |

**I2C address for EEPROM**

## LEDs

| Designator | Color | Connected to  | Active Level |
|------------|-------|---------------|--------------|
| D9         | Green | DONE          | Low          |
| D8         | RED   | MIO7          | High         |
| D4         | Green | Bank 33 - V18 | High         |

**On-board LEDs**

## DDR3 SDRAM

The TE0728 SoM has a volatile DDR3 SDRAM, 256Mx16bit (512MB), IC for storing user application code and data. Size of DDR3 can be varied in different assembly versions.

- Part number: NT5CB256M16CP-DIH
- Supply voltage: 1.5V
- Organization: 256M x 16 bits

DDR3 SDRAM can be varied on demand for other assembly options. DDR3 can have density of maximum 512MB due to available addressing. The maximum possible speed for DDR3 SDRAM is 1066 Mb/s.

## Ethernet

There are two 100 MBit Extreme Temperature Ethernet provided by Texas Instrumen on the board. Datasheet is provided at TI website. Both PHY's are connected with all I/O Pins to FPGA Bank 34 (VCCIO = 3.3V). PHY Clock 25 MHz sources is provided from MEMS Oscillator. There is no sharing of signals for the two PHY's.

PUDC pin is connected with pull-up to 3.3V those pre-configuration pull-ups are disabled by default. Strapping resistor exist to change the PUDC mode.

| Bank | Signal Name | ETH1 | ETH2 | Signal Description                                |
|------|-------------|------|------|---------------------------------------------------|
| 34   | ETH-RST     | M15  | R16  | Ethernet reset, active-low.                       |
| 34   | ETH_COL     | L16  | P20  |                                                   |
| 34   | MDC         | P16  | T17  | Ethernet management clock.                        |
| 34   | MDIO        | M16  | T16  | Ethernet management data.                         |
| 34   | ETH_TX_D0   | J22  | N22  | Ethernet transmit data 0. Output to Ethernet PHY. |
| 34   | ETH_TX_D1   | M17  | P21  | Ethernet transmit data 1. Output to Ethernet PHY. |
| 34   | ETH_TX_D2   | K21  | P22  | Ethernet transmit data 2. Output to Ethernet PHY. |
| 34   | ETH_TX_D3   | M22  | R21  | Ethernet transmit data 3. Output to Ethernet PHY. |
| 34   | ETH_TX_EN   | J21  | M21  | Ethernet transmit enable.                         |
| 34   | ETH_RX_D0   | L17  | R18  | Ethernet receive data 0. Input from Ethernet PHY. |
| 34   | ETH_RX_D1   | K18  | R19  | Ethernet receive data 1. Input from Ethernet PHY. |
| 34   | ETH_RX_D2   | J18  | T18  | Ethernet receive data 2. Input from Ethernet PHY. |

|    |           |     |     |                                                   |
|----|-----------|-----|-----|---------------------------------------------------|
| 34 | ETH_RX_D3 | J20 | T19 | Ethernet receive data 3. Input from Ethernet PHY. |
| 34 | ETH_RX_DV | N17 | P15 | Ethernet receive data valid.                      |

#### Ethernet PHY to Zynq SoC connections

## CAN Transceiver

Controller Area Network (CAN) transceivers are designed for use with the Texas Instruments TMS320Lx240x 3.3-V DSPs with CAN controllers. The datasheet is available in TI website. Each CAN transceiver is designed to provide differential transmit capability to the bus and differential receive capability to a CAN controller at speeds up to 1 Mbps.

| Bank | Signal name | Notes           |
|------|-------------|-----------------|
| 500  | D - Tx      | Driver Input    |
| 500  | R - Rx      | Receiver Output |

#### CAN Transceiver interface MIOs

## Oscillators

| Designator | Description               | Frequency  | Used as                        |
|------------|---------------------------|------------|--------------------------------|
| U14        | MEMS Oscillator           | 50 MHz     | PS_CLK                         |
| U5         | MEMS Oscillator           | 25 MHz     | Ethernet PHY Clock             |
| U7         | RTC (internal oscillator) | 32.768 KHz | CLKOUT of RTC is not connected |

#### Oscillators

## Power and Power-On Sequence

### Power Supply

Power supply with minimum current capability of 2.5A for system startup is recommended.

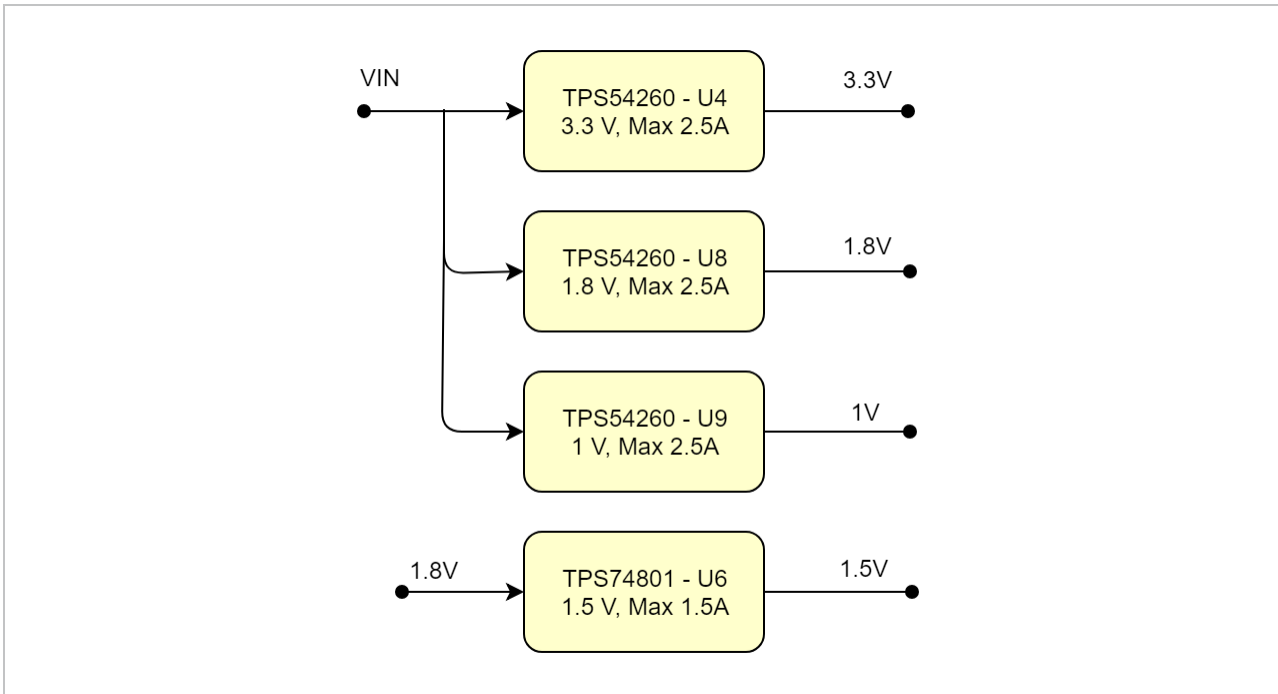
### Power Consumption

| Power Input Pin | Typical Current |
|-----------------|-----------------|
| VIN             | TBD*            |

#### Power Consumption

\* TBD - To Be Determined

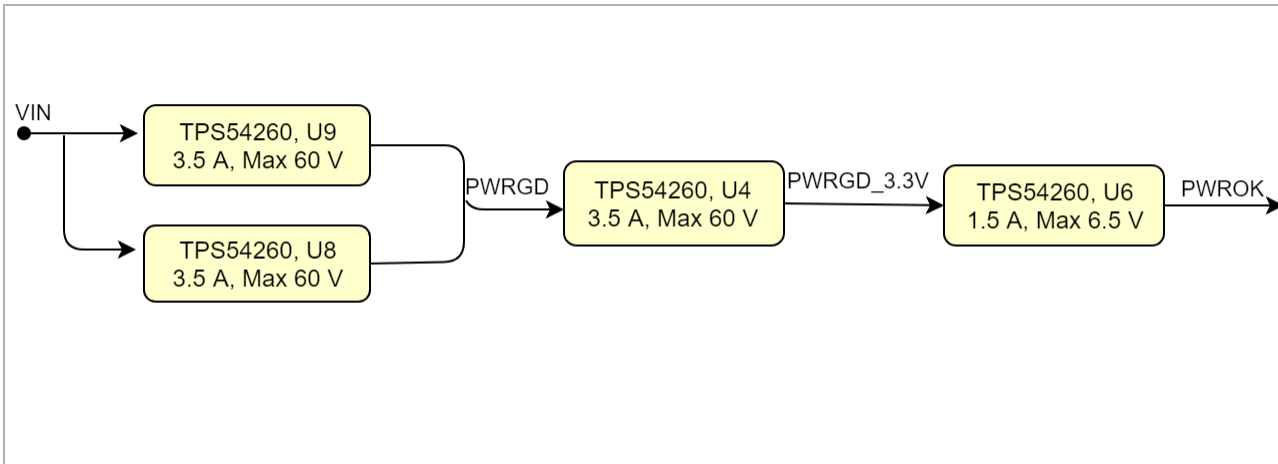
## Power Distribution Dependencies



Power Dependencies

## Power on Sequence

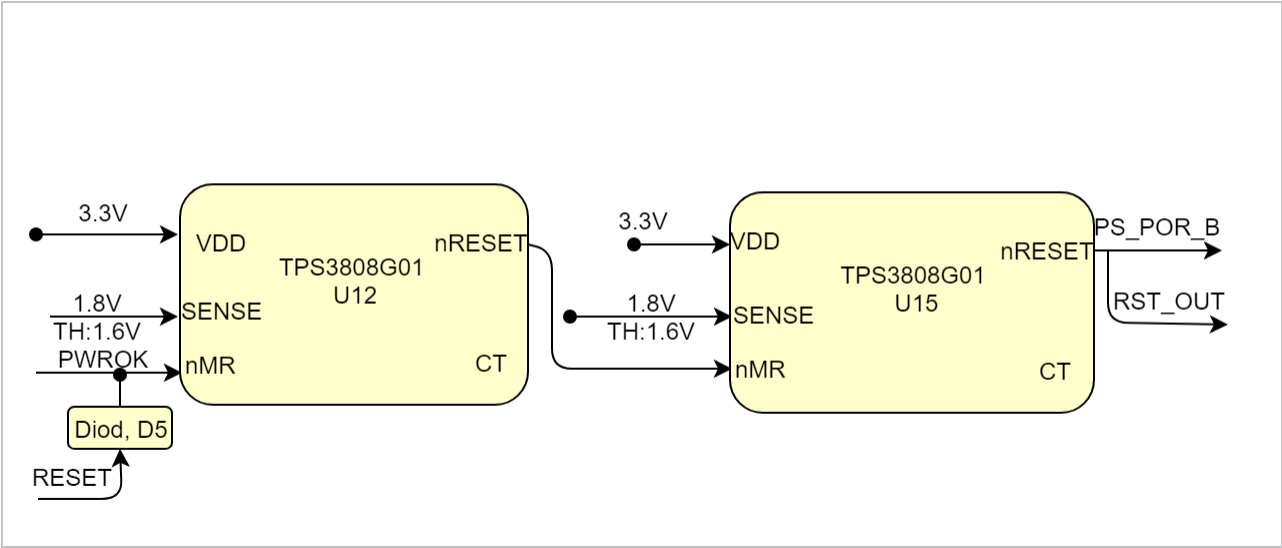
The TE07028 SoM meets the recommended criteria to power up the Xilinx Zynq properly by keeping a specific sequence of enabling the on-board DC-DC converters and regulators dedicated to the particular functional units of the Zynq chip and powering up the on-board voltages. When the U8 and U9 generates PWRGD signal, it turns on the U4 which generates PWRGD\_3.3V, it turns on the U6 and it generates PWROK signal which is connected to MR. Whenever the supply voltage for U12 drops down below the threshold it resets the system. Actually it resets the system when all regulators are working.



Power On Sequence

## Voltage Monitor Circuit

The microprocessor supervisory circuits monitor system voltages asserting an open-drain RESET signal when the SENSE voltage drops below a preset threshold or when the manual reset (MR) pin drops to a logic low. The RESET output remains low for the user adjustable delay time after the SENSE voltage and MR return above their thresholds. Datasheet is available in Texas Instruments website.



Voltage Monitor Circuit

Power Rails

| Power Signal | B2B<br>JM1 Pin | B2B<br>JM2 Pin | B2B<br>JM3 Pin | Direction | Notes                              |
|--------------|----------------|----------------|----------------|-----------|------------------------------------|
| VIN          | 1,3            | -              | -              | Input     | Supply voltage from carrier board. |
| VCCO_13      | 39             | -              | -              | Input     |                                    |
| VBATT        | -              | 1              | -              | Output    | RTC Supply voltage                 |
| 3.3V         | 19             | 4              | 25,57          | Output    | Internal 3.3V voltage level.       |
| VMIO         | -              | 2              |                | Input     | Variable and supplied by carrier   |
| 1.8V         | -              | 5              | -              | Output    | Internal 1.8V voltage level.       |

Module power rails.

Bank Voltages

| Bank | Schematic Name | Voltage      | I/O Type | Notes                                 |
|------|----------------|--------------|----------|---------------------------------------|
| 500  | VCCO_MIO0_500  | 3.3V         | MIO      |                                       |
| 501  | VCCO_MIO1_501  | 2.5V or 3.3V | MIO      | supplied by carrier.                  |
| 502  | VCCO_DDR_502   | 1.5V         | DDR3     |                                       |
| 13   | VCCO_13        | 1.8V or 3.3V | HR       | Supplied by the carrier board. J1     |
| 33   | 3.3V           | 3.3V         | HR       | Supplied by carrier board. J3         |
| 34   | 3.3V           | 3.3V         | HR       |                                       |
| 35   | 3.3V           | 3.3V         | HR       | Supplied by the carrier board. J2, J3 |

Zynq SoC bank voltages.

## Board to Board Connectors

6 x 6 modules use two or three [Samtec Micro Tiger Eye Socket Strip](#) on the bottom side.

- 3 x REF-189018-01 (compatible to TEM-140-02-03.0-H-D-A ), (80 pins, "40" per row)

| Connector Specifications    | Value                          |
|-----------------------------|--------------------------------|
| Insulator material          | Black Liquid Crystal Polymer   |
| Stacking height             | 6 mm                           |
| Contact material            | Phosphor-bronze                |
| Plating                     | Au or Sn over 50 " (1.27 m) Ni |
| Current rating              | 2.9 A per pin (2 pins powered) |
| Operating temperature range | -55 °C to +125 °C              |
| RoHS compliant              | Yes                            |

**Connector specifications.**

### Connector Mating height

When using the same type on baseboard, the mating height is 6mm. Other mating heights are possible by using connectors with a different height

| Order number | Connector on baseboard | compatible to         | Mating height |
|--------------|------------------------|-----------------------|---------------|
| 26056        | REF-189018-01          | TEM-140-02-03.0-H-D-A | 6 mm          |
|              | SEM-140-02-03.0-H-D-A  | TEM-140-02-03.0-H-D-A | 6 mm          |

**Connectors.**

The module can be manufactured using other connectors upon request.

### Connector Speed Ratings

The LSHM connector speed rating depends on the stacking height; please see the following table:

| Stacking height     | Speed rating |
|---------------------|--------------|
| 6 mm, Single-Ended  | 12 GHz       |
| 10 mm, Differential | 17 GHz       |
| 6 mm, Single-Ended  | 14.5 GHz     |
| 10 mm, Differential | 17.5 GHz     |

**Speed rating.**

### Current Rating

Current rating of Samtec Micro Tiger Eye Connector™ LSHM B2B connectors is 2.9A per pin (2 adjacent pins powered).

Connector Mechanical Ratings

- Shock: 100G, 6 ms Sine
- Vibration: 7.5G random, 2 hours per axis, 3 axes total

Manufacturer Documentation

| File                               | Modified                        |
|------------------------------------|---------------------------------|
| PDF File SEM-140-02-03.0-H-D-A.pdf | 11 02, 2019 by Pedram Babakhani |
| PDF File TEM-140-02-03.0-H-D-A.pdf | 11 02, 2019 by Pedram Babakhani |

[Download All](#)

Technical Specifications

Absolute Maximum Ratings

| Symbols             | Min  | Max | Unit | Description                        |
|---------------------|------|-----|------|------------------------------------|
| VIN supply voltage  | -0.3 | 65  | V    | TPS54260-Q1 datasheets.            |
| VMIO                | -0.5 | 3.6 | V    | PS MIO I/O supply voltage          |
| VCCO                | -0.5 | 3.6 | V    | PL supply voltage for HR I/O banks |
| Storage Temperature | -40  | +85 | °C   |                                    |

Absolute maximum ratings

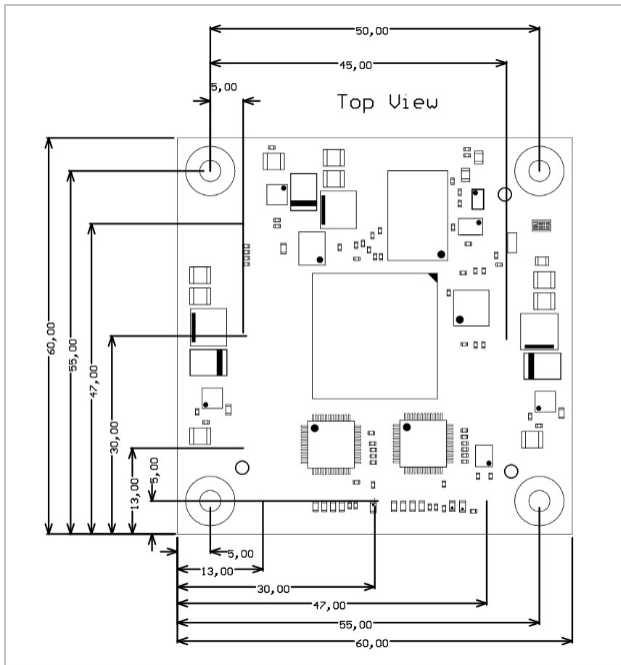
Recommended Operating Conditionse

| Symbol                | Min  | Max   | Units | Reference Document           |
|-----------------------|------|-------|-------|------------------------------|
| VIN supply voltage    | 3.5  | 60    | V     | TPS54260-Q1 datasheets.      |
| VMIO                  | 1.71 | 3.465 | V     | See Xilinx DS187 data sheet. |
| VCCO                  | 1.14 | 3.465 | V     | See Xilinx DS187 datasheet.  |
| Operating Temperature | -40  | +105  | °C    |                              |

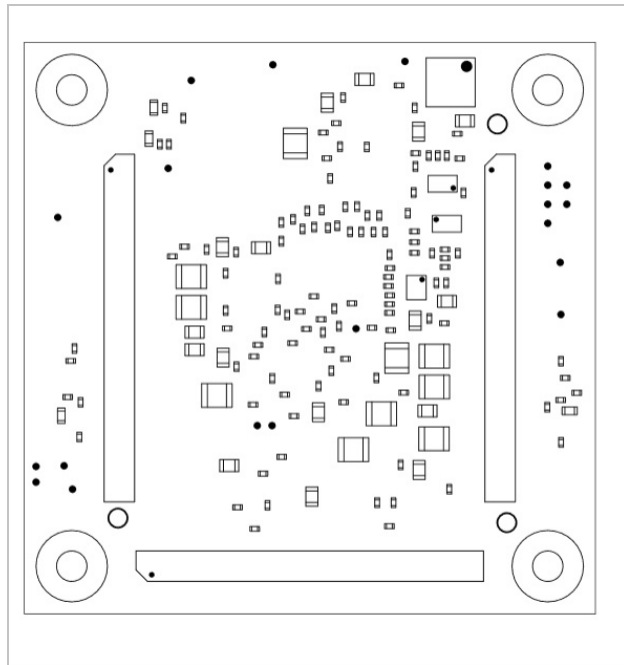
Recommended operating conditions

Physical Dimensions

- Module size: 60 mm × 60 mm. Please download the assembly diagram for exact numbers.
- Mating height with standard connectors: 7 mm.
- PCB thickness: 1.6 mm.



Physical Dimension



## Currently Offered Variants

| Trenz shop TE0728 overview page |                             |
|---------------------------------|-----------------------------|
| <a href="#">English page</a>    | <a href="#">German page</a> |

Trenz Electronic Shop Overview

## Revision History

### Hardware Revision History

Product changes can be seen in [PCN](#) page.

| Date       | Revision | Changes                                                                                                                                                                                                                                                |
|------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2016-08-18 | 04       | <ul style="list-style-type: none"> <li>U1 DDR3 IC changed from NT5CB256M16CP-DIH to NT5CC256M16CP-DIH</li> <li>Net DDR3-ODT0: added series resistor R55</li> <li>Added Traceability pad</li> <li>Net PS-POR-B: added pull-down resistor R56</li> </ul> |
| 2015-12-01 | 03       | <ul style="list-style-type: none"> <li>...</li> </ul>                                                                                                                                                                                                  |

|            |    |                                                         |
|------------|----|---------------------------------------------------------|
| 2015-06-12 | 02 | <ul style="list-style-type: none"> <li>• ...</li> </ul> |
| 2015-03-03 | 01 | <ul style="list-style-type: none"> <li>• ...</li> </ul> |

#### Hardware Revision History

Hardware revision number is printed on the PCB board next to the module model number separated by the dash.

## Document Change History

| Date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Revision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Contributor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Description                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <p><b>Error rendering macro 'page-info'</b></p> <p>Ambiguous method overloading for method jdk.proxy279.\$Proxy4022#hasContentLevelPermission. Cannot resolve which method to invoke for [null, class java.lang.String, class com.atlassian.confluence.pages.Page] due to overlapping prototypes between: [interface com.atlassian.confluence.user.ConfluenceUser, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]</p> | <p><b>Error rendering macro 'page-info'</b></p> <p>Ambiguous method overloading for method jdk.proxy279.\$Proxy4022#hasContentLevelPermission. Cannot resolve which method to invoke for [null, class java.lang.String, class com.atlassian.confluence.pages.Page] due to overlapping prototypes between: [interface com.atlassian.confluence.user.ConfluenceUser, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]</p> | <p><b>Error rendering macro 'page-info'</b></p> <p>Ambiguous method overloading for method jdk.proxy279.\$Proxy4022#hasContentLevelPermission. Cannot resolve which method to invoke for [null, class java.lang.String, class com.atlassian.confluence.pages.Page] due to overlapping prototypes between: [interface com.atlassian.confluence.user.ConfluenceUser, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]</p> | <ul style="list-style-type: none"> <li>• smale style update</li> </ul> |
| 2019-05-16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | v. 367                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Pedram Babakhani                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• initial release</li> </ul>    |

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Document change history.

Disclaimer

Data Privacy

Please also note our data protection declaration at <https://www.trenz-electronic.de/en/Data-protection-Privacy>

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To confront directly with the responsibility toward the environment, the global community and eventually also oneself. Such a resolution should be integral part not only of everybody's life. Also enterprises shall be conscious of their social responsibility and contribute to the preservation of our common living space. That is why Trenz Electronic invests in the protection of our Environment.

## REACH, RoHS and WEEE

### REACH

Trenz Electronic is a manufacturer and a distributor of electronic products. It is therefore a so called downstream user in the sense of [REACH](#). The products we supply to you are solely non-chemical products (goods). Moreover and under normal and reasonably foreseeable circumstances of application, the goods supplied to you shall not release any substance. For that, Trenz Electronic is obliged to neither register nor to provide safety data sheet. According to present knowledge and to best of our knowledge, no [SVHC \(Substances of Very High Concern\) on the Candidate List](#) are contained in our products. Furthermore, we will immediately and unsolicited inform our customers in compliance with REACH - Article 33 if any substance present in our goods (above a concentration of 0,1 % weight by weight) will be classified as SVHC by the [European Chemicals Agency \(ECHA\)](#).

### RoHS

Trenz Electronic GmbH herewith declares that all its products are developed, manufactured and distributed RoHS compliant.

### WEEE

Information for users within the European Union in accordance with Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE).

Users of electrical and electronic equipment in private households are required not to dispose of waste electrical and electronic equipment as unsorted municipal waste and to collect such waste electrical and electronic equipment separately. By the 13 August 2005, Member States shall have ensured that systems are set up allowing final holders and distributors to return waste electrical and electronic equipment at least free of charge. Member States shall ensure the availability and accessibility of the necessary collection facilities. Separate collection is the precondition to ensure specific treatment and recycling of waste electrical and electronic equipment and is necessary to achieve the chosen level of protection of human health and the environment in the European Union. Consumers have to actively contribute to the success of such collection and the return of waste electrical and electronic equipment. Presence of hazardous substances in electrical and electronic equipment results in potential effects on the environment and human health. The symbol consisting of the crossed-out wheeled bin indicates separate collection for waste electrical and electronic equipment.

Trenz Electronic is registered under WEEE-Reg.-Nr. DE97922676.

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