

# TEBA0714 TRM

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## Overview

The Trenz Electronic TEBA0714 is a carrier for Trenz Electronic module TE0714 which is an industrial grade module integrated with Xilinx Artix 7.

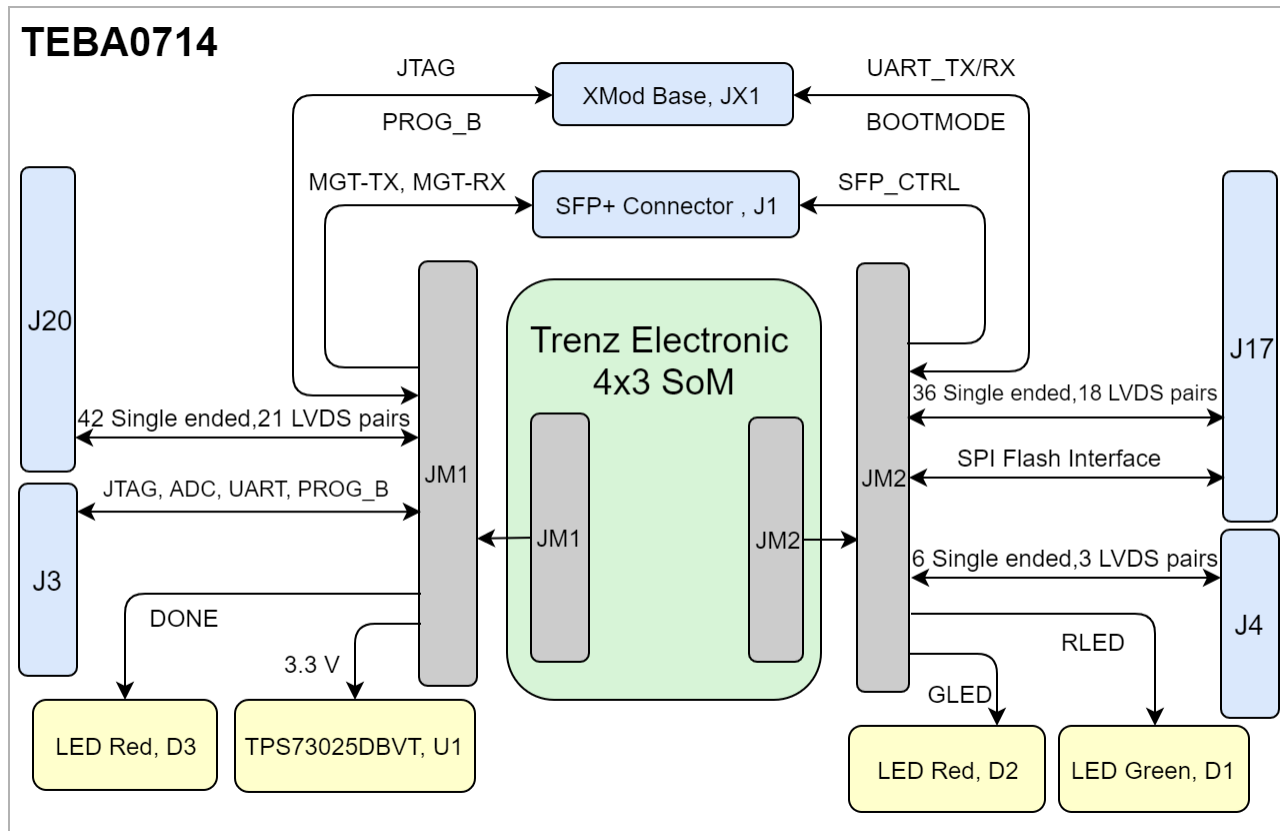
Refer to <http://trenz.org/teba0714-info> for the current online version of this manual and other available documentation.

## Key Features

- **Module:**
  - TE0714

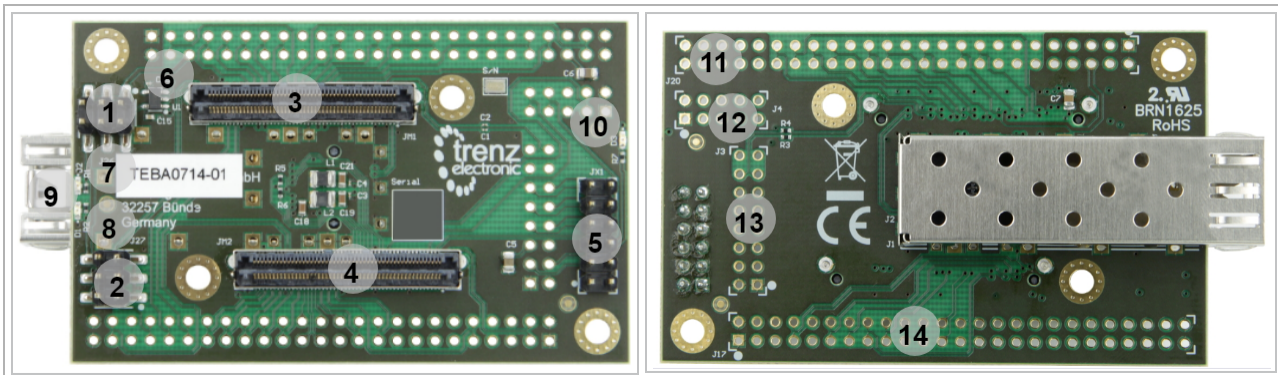
- **On Board:**
  - 2 x User LEDs (Red, Green)
  - 1 x DONE LED (Red)
- **Interface:**
  - 2 x Pin Header 50 Pol. (FPGA Bank I/Os and Power)
  - 2x Samtec 100 Pin LSHM Series Connectors
  - 1 x XMOD JTAG/UART Adapter (TE0790)
  - 1 x Pin Header 16 Pol. (JTAG, MGT-CLK, Boot Mode, XADC, I/O's)
  - 1 x Pin Header 10 Pol. (FPGA Bank I/Os and Power)
  - 1 x SFP+ Connectors
- **Power:**
  - 1 x LDO Regulator
  - 3.3V Nominal Power supply
- **Dimension:**
  - 46 mm x 75 mm

## Block Diagram



TEBA0714 block diagram

## Main Components



TEBA0714 main components

1. SMT pin header, J26
2. SMT pin header, J27
3. Board to Board (B2B) Connector, JM1
4. Board to Board (B2B) Connector, JM2
5. XMOD header, JX1
6. Voltage Regulator, U1
7. User Red LED, D2
8. User Green LED, D1 (Red)
9. SFP+ Connector, J1
10. User Red LED, D3
11. 50 pin header (Not assembled), J20
12. 16 pin header (Not assembled), J3,
13. 10-pin header (Not assembled), J4
14. 50-pin header (Not assembled), J17

## Initial Delivery State

Storage device name	Content	Notes
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Initial delivery state of programmable devices on the module

## Configuration Signals

Signal	MODE Signal State	Boot Mode	Note
BOOTMODE	0	Slave SelectMAP	
	1	Master SPI	

Boot process.

Signal	B2B	Signal State	Note
PROG_B	JM1-94	Active Low	Clear FPGA configuration and initiate a new configuration

Reset process.

# Signals, Interfaces and Pins

## Board to Board (B2B) I/Os

Number of I/O signals and Interfaces connected to the B2B connector:

B2B Connector	Interface	Number of I/O	Notes
JM1	User I/O	52 Single ended, 27 Differential	-
	MGT lanes	4 Differential, 2 lanes	
	MGT reference clock input	2 Single ended, 1 Differential	
	JTAG	4 Single ended	
	SoM control signals	2 Single ended	PROG_B, DONE
JM2	User I/O	36 Single ended or 18 differential	-
	SFP+ Interface control signals	8 Single ended	
	QSPI interface	6 Single ended	
	UART interface	2 Single ended	
	User LEDs	2 Single ended	Red, Green
	SoM control signals	1 Single ended	BOOTMODE

General PL I/O to B2B connectors information

## On-board Pin Header

TEBA0714 is equipped with four pin headers J17, J20, J3 and J4 which are not assembled on the board, in case of need customer can solder the pins and have access to the signals in the following table.

Pin Header	Interface	Number of I/O	Notes
J17	User I/O	36 Single ended, 18 Differential	Module FPGA Bank 14
	SPI interface	6 Single ended	-
	Power	4 Single ended	3.3V, V_CFG
J20	User I/O	42 Single ended or 21 differential	Module FPGA Bank 34
	Power	4 Single ended	3.3V, V_CFG
	User LEDs	2 Single ended	Red, Green
	SoM control signals	1 Single ended	'BOOTMODE'
J3	JTAG	4 Single ended	
	UART	2 Single ended	B14_L25, B14_L0
	ADC	2 Single ended	
	Clock	2 Single ended, 1 Differential	
	Power	4 Single ended	3.3V, V_CFG
	Control Signals	2 Single ended	BOOTMODE, PROG_B
J4	User I/O	6 Single ended or 3 differential	
	Power	2 Single ended	3.3V, 3.3V_OUT

General I/O to Pin headers information

JTAG Interface Base

JTAG access to the mounted SoM is provided through B2B connector JM1 and JM2 and is also routed to the XMOD JTAG/UART header JX1.

XMOD Header Pin	Schematic	B2B Connector	Pin Header	Note
A	B14_L25	JM2-97	J3-4	UART Transfer
B	B14_L0	JM2-99	J3-7	UART Receive
E	BOOTMODE	JM2-100	J3-9	
G	PROG_B	JM1-94	J3-11	
C	TCK	JM1-90	J3-4	
D	TDI	JM1-86	J3-10	
F	TDO	JM1-88	J3-8	
H	TMS	JM1-92	J3-12	
3.3V	3.3V	JM1-97,99	J3,J4,J17,J20	Nominal Input Voltage
VIO	V_CFG	-	J17-45	Configuration Voltage

JTAG pins connection

The DIP-switch S2 on XMOD Adapter TE0790 must be set as the following table.

S2	Status	Description	Notes
1	ON	Update Mode JTAG access to SC CPLD only	
2	OFF	Must be in OFF state always	
3	OFF	3.3V is input	supplied from pin headers externally
4	OFF	VIO is input	supplied from pin header externally

JTAG pins connection

SFP+ Connector

Pin	Connected to	Notes
VCCR	3.3V	
VCCT	3.3V	
VREF	GND	
TD+/TD-	MGT TX	MGT Lane
RD+/RD-	MGT RX	MGT Lane
TX/FAULT	SFP0_TX_FAUL	SFP_CTRL
TX/DISABLE	SFP0_TX_DIS	SFP_CTRL
MOD-DEF2	SFP0_SDA	SFP_CTRL
MOD-DEF1	SFP0_SCL	SFP_CTRL

MOD-DEF0	SFP0_MT_DEF0	SFP_CTRL
RS0/RS1	SFP0_RS0_1	SFP_CTRL
LOS	SFP0_LOS	SFP_CTRL

#### SFP+ Connector Information

## SMT Pin Headers

There are two SMT Pin Headers, J26-J27.

J26 is available to choose voltage level for VCCIO34 (FPGA Bank 34) and J27 is provided to set the voltage level of V\_CFG (Configuration Voltage). In order to set the voltage level, you should connect it to the corresponding pin with the target value voltage.

SMT Pin Header	VCCIO/VCC	Voltage Level	Notes
J26	VCCIO34	1.8V	
		2.5V	
		3.3V	3.3V_OUT
J27	V_CFG	1.8V	
		2.5V	V_CFG0
		3.3V	3.3V_OUT

#### SMD Connector Information

## On-board Peripherals

Chip/Interface	Designator	Notes
<a href="#">LEDs</a>	D1...3	

#### On board peripherals

## LEDs

Designator	Color	Connected to	Active Level	Note
D1	Green	GLED	Active High	
D2	Red	RLED	Active High	
D3	Red	DONE	Active Low	DONE pin

#### On-board LEDs

## Power and Power-On Sequence

### Power Supply

Power supply with minimum current capability of 3A for system startup is recommended.

The on-board voltages of the carrier board will be powered up with an external power-supply with nominal voltage of 3.3V.

## Power Consumption

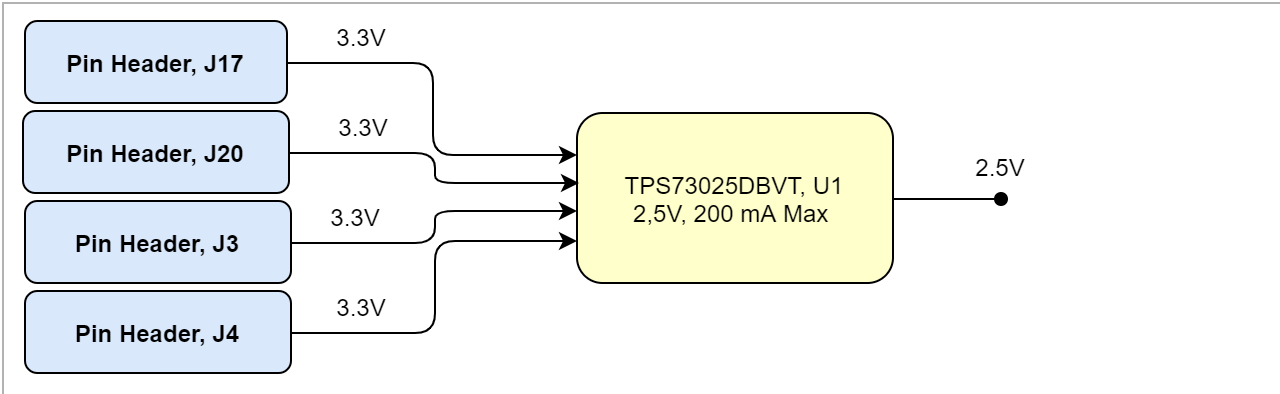
Power Input Pin	Typical Current
3.3V	* TBD

### Power Consumption

\* TBD - To Be Determined

## Power Distribution Dependencies

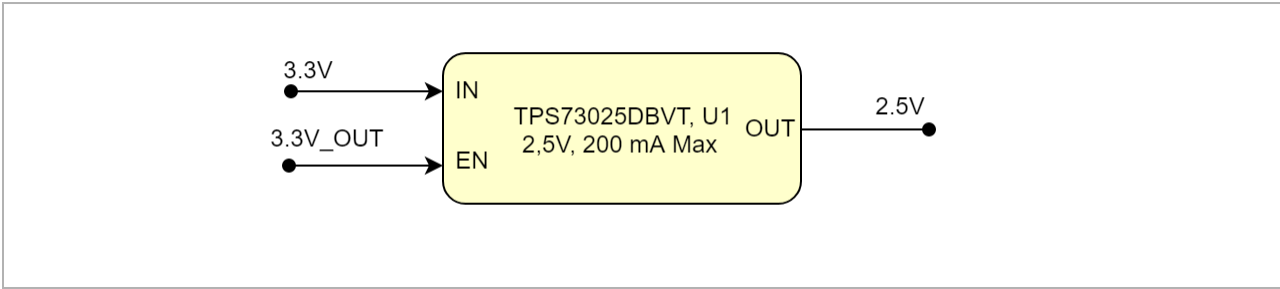
3.3V can be supplied through Pin Headers on specific pins.



### Power Distribution

## Power-On Sequence

There is no specific power-on sequence. After power on, the module and carrier will be powered on.



### Power Sequency

## Power Rails

Power Rail Name	B2B , JM1 Pin	B2B JM2 Pin	Pin Header J17	Pin Header J20	Pin Header J3	Pin Header J4	Direction	Notes
3.3V	99,97	-	5, 46	5, 46	5	5	Input	
1.8V	-	18	-	-	-	-	Input	Comes from Module

3.3V_OUT	83	54	-	-	-	6	Output	
VCCIO34	61	-	-	45	-	-	Output	Variable voltage level
V_CFG	53	-	-	-	-	-	Input	Variable voltage level

**Module power rails.**

## Board to Board Connectors

TEBA0714 carrier use two [Samtec Razor Beam LSHM Connectors](#) on the bottom side.



These connectors are hermaphroditic. Odd pin numbers on the module are connected to even pin numbers on the baseboard and vice versa.

4 x 5 modules use two or three [Samtec Razor Beam LSHM connectors](#) on the bottom side.

- 2 x REF-189016-02 (compatible to LSHM-150-04.0-L-DV-A-S-K-TR), (100 pins, "50" per row)
- 1 x REF-189017-02 (compatible to LSHM-130-04.0-L-DV-A-S-K-TR), (60 pins, "30" per row) (depending on module)

### Connector Mating height

When using the same type on baseboard, the mating height is 8mm. Other mating heights are possible by using connectors with a different height

Order number	Connector on baseboard	compatible to	Mating height
23836	REF-189016-01	LSHM-150-02.5-L-DV-A-S-K-TR	6.5 mm
	LSHM-150-03.0-L-DV-A-S-K-TR	LSHM-150-03.0-L-DV-A-S-K-TR	7.0 mm
23838	REF-189016-02	LSHM-150-04.0-L-DV-A-S-K-TR	8.0 mm
	LSHM-150-06.0-L-DV-A-S-K-TR	LSHM-150-06.0-L-DV-A-S-K-TR	10.0mm
26125	REF-189017-01	LSHM-130-02.5-L-DV-A-S-K-TR	6.5 mm
	LSHM-130-03.0-L-DV-A-S-K-TR	LSHM-130-03.0-L-DV-A-S-K-TR	7.0 mm
24903	REF-189017-02	LSHM-130-04.0-L-DV-A-S-K-TR	8.0 mm
	LSHM-130-06.0-L-DV-A-S-K-TR	LSHM-130-06.0-L-DV-A-S-K-TR	10.0mm

**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
12 mm, Single-Ended	7.5 GHz / 15 Gbps
12 mm, Differential	6.5 GHz / 13 Gbps
5 mm, Single-Ended	11.5 GHz / 23 Gbps
5 mm, Differential	7.0 GHz / 14 Gbps

**Speed rating.**

### Current Rating

Current rating of Samtec Razor Beam™ LSHM B2B connectors is 2.0A 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 hsc-report_lshm-lshm-05mm_web.pdf High speed test report	07 04, 2016 by Thorsten Trenz
PDF File lshm_dv.pdf LSHM catalog page	07 04, 2016 by Thorsten Trenz
PDF File LSHM-1XX-XX.X-X-DV-A-X-X-TR-FOOTPRINT(1).pdf Recommended layout and stencil drawing	07 04, 2016 by Thorsten Trenz
PDF File LSHM-1XX-XX.X-XX-DV-A-X-X-TR-MKT.pdf Technical drawing	07 04, 2016 by Thorsten Trenz
PDF File REF-189016-01.pdf Technical Drawing	07 04, 2016 by Thorsten Trenz
PDF File REF-189016-02.pdf Technical Drawing	07 04, 2016 by Thorsten Trenz
PDF File REF-189017-01.pdf Technical Drawing	07 04, 2016 by Thorsten Trenz
PDF File REF-189017-02.pdf Technical Drawing	07 04, 2016 by Thorsten Trenz
PDF File TC0923--2523_report_Rev_2_qua.pdf Design qualification test report	07 04, 2016 by Thorsten Trenz
PDF File tc0929--2611_qua(1).pdf Shock and vibration report	07 04, 2016 by Thorsten Trenz

[Download All](#)

Technical Specifications

Absolute Maximum Ratings

Symbols	Description	Min	Max	Unit
VIN	Input Supply Voltage	-0.3	6	V
T_STR	Storage Temperature	-40	125	°C

PS absolute maximum ratings

Recommended Operating Conditions

Operating temperature range depends also on customer design and cooling solution. Please contact us for options.

Parameter	Min	Max	Units	Reference Document
VIN	3.135	3.465	V	3.3V Nominal Power Supply

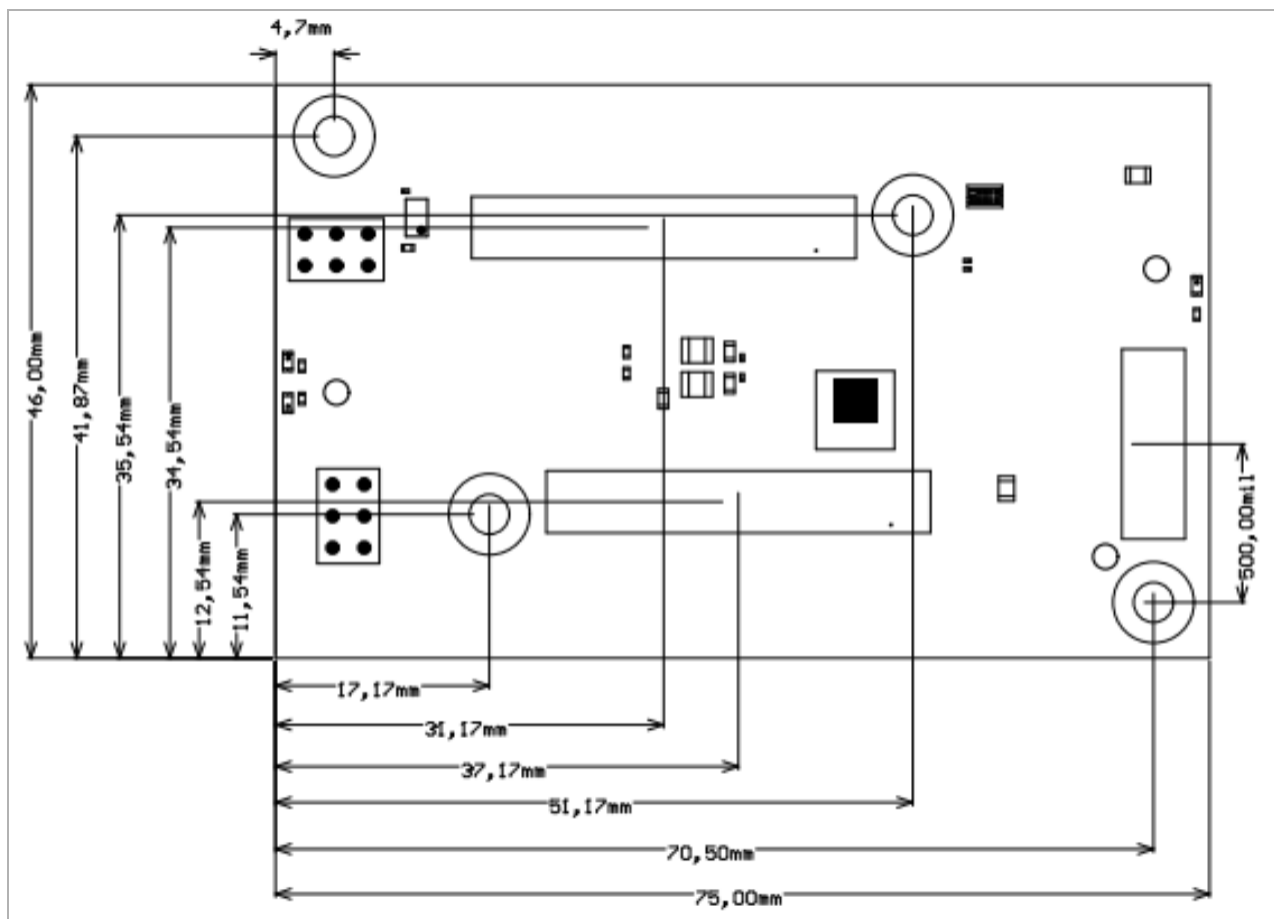
T_OPR	-40	85	°C	
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Recommended operating conditions.

## Physical Dimensions

- Module size: 46 mm x 75 mm. Please download the assembly diagram for exact numbers.
- Mating height with standard connectors: 8 mm.

PCB thickness: 1.64 mm.



Physical Dimension

## Currently Offered Variants

Trenz shop TEBA0714 overview page	
<a href="#">English page</a>	<a href="#">German page</a>

Trenz Electronic Shop Overview

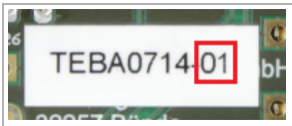
# Revision History

## Hardware Revision History

Date	Revision	Changes	Documentation Link
2016-06-15	01	<ul style="list-style-type: none"><li>Initial Release</li></ul>	<a href="#">REV01</a>

### Hardware Revision History

Hardware revision number can be found on the PCB board together with the module model number separated by the dash.



Board hardware revision number.

## Document Change History

Date	Revision	Contributor	Description
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<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>Initial Release</li></ul>
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--	all	<div><div>Error rendering macro 'page-info'</div><div>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]</div></div>	• --
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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.

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]`