AMB0010 TRM

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Overview

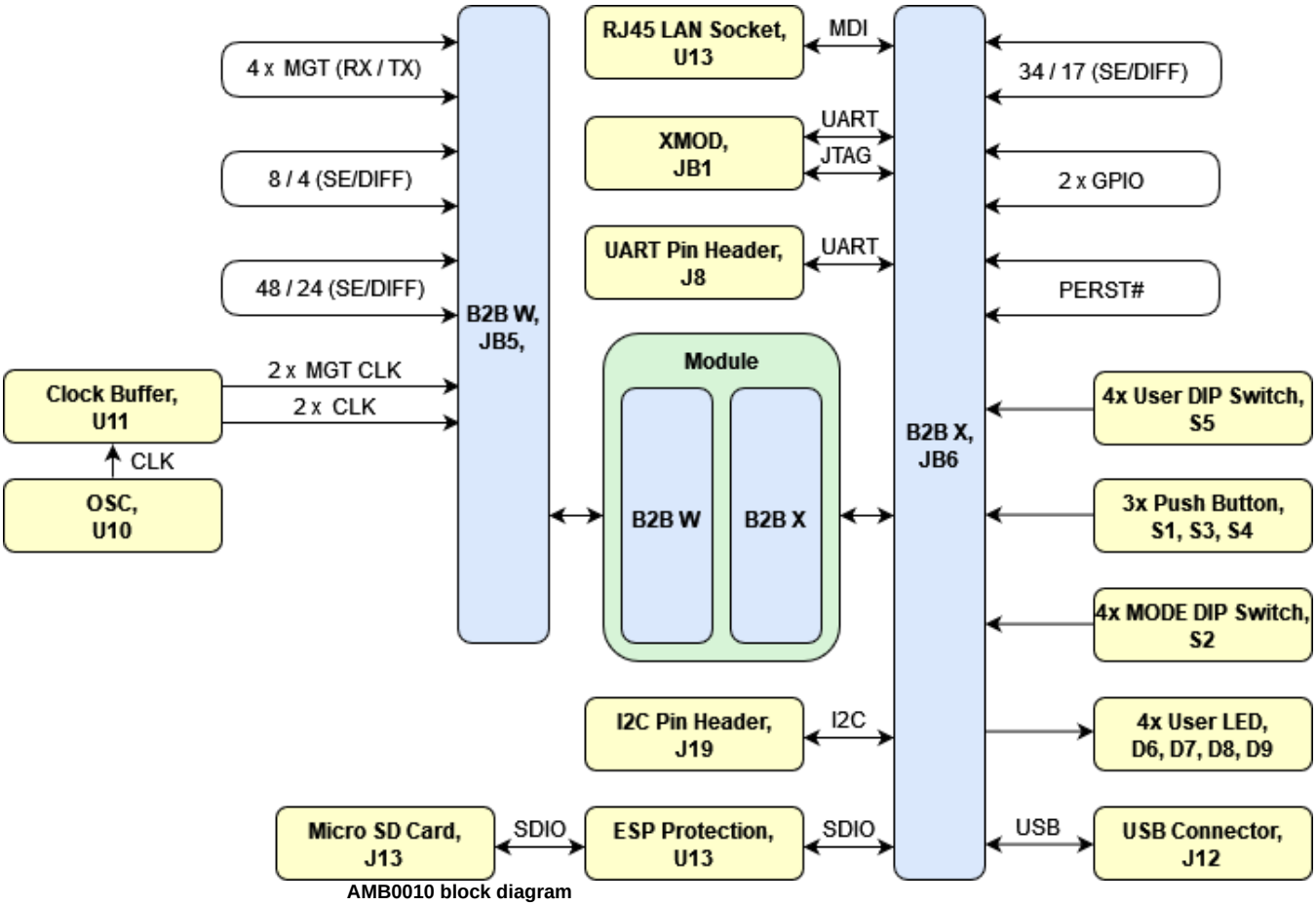
The Trenz Electronic AMB0010 is a commercial grade baseboard for Andromeda modules.

Refer to http://trenz.org/amb0010-info for the current online version of this manual and other available documentation.

Key Features

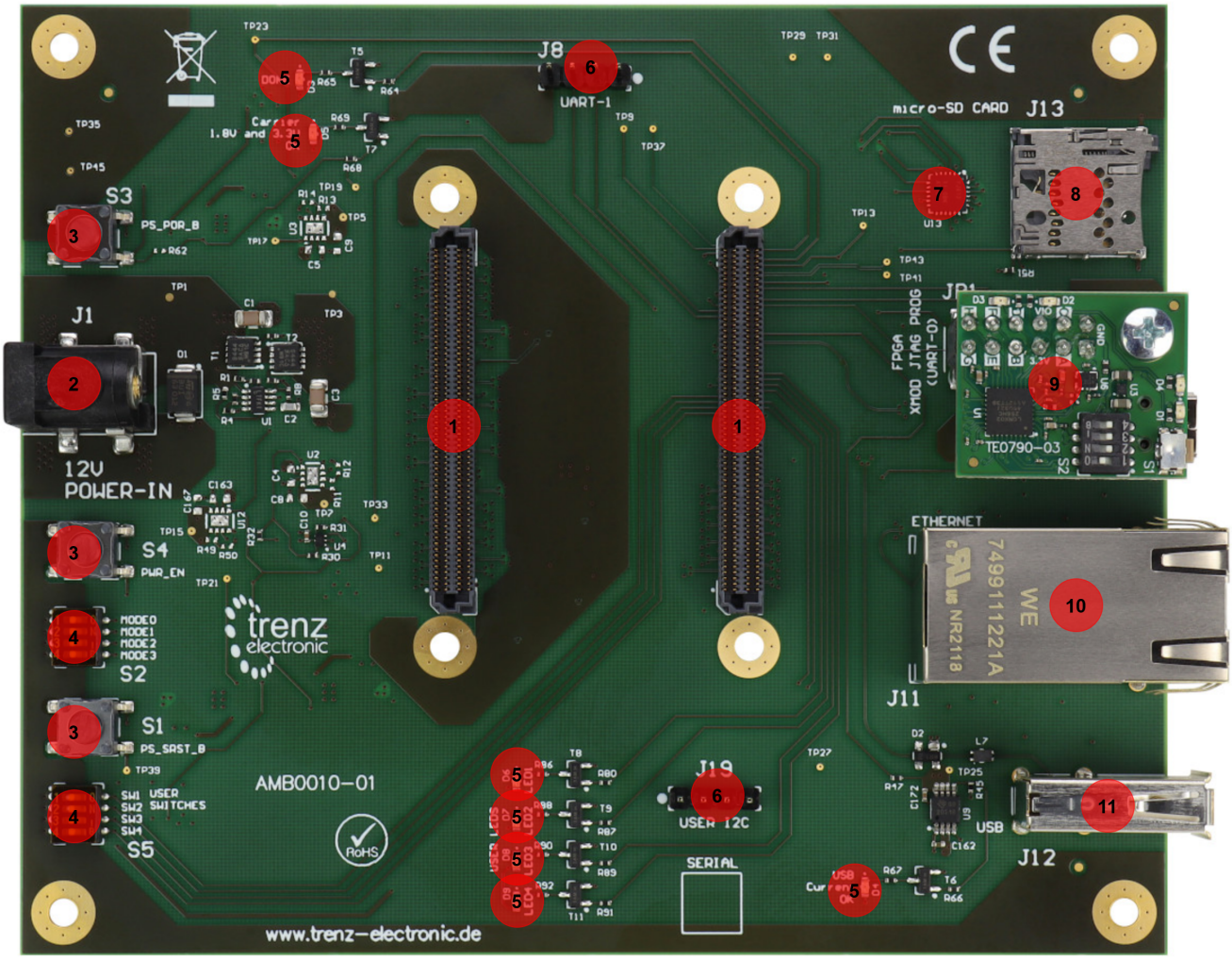
- **Module**
  - Andromeda modules (like AM0010, ...)
- **On Board**
  - 2 x B2B connector (ADF6)
  - Clock Buffer
  - Oscillator
  - Micro SD Card Socket
  - USB Socket
  - RJ45 LAN Socket
  - XMOD
  - UART Header
  - I2C Header
  - 4 x User DIP Switch
  - 4 x User LED
  - Micro SD Card Socket with ESD protection
  - USB Connector
  - Loopbacks for GTHs, IOs, GPIOs
- **Power**
  - 12 V Input Supply Voltage
- **Dimension**
  - 128 mm x 106 mm

Block Diagram



AMB0010 block diagram

Main Components


J8
UART-1
micro-SD CARD J13
S3
PS_POR_B
J1
12V
POWER-IN
S4
PWR_EN
S2
MODE0
MODE1
MODE2
MODE3
S1
PS_SRST_B
S5
USER
SWITCHES
AMB0010-01
trenz
electronic
www.trenz-electronic.de
FPGA
XMOD JTAG PROG
(UART-0)
JP1
TE0790-03
ETHERNET
7499111221A
WE
J11
USB
J12
J19
USER I2C
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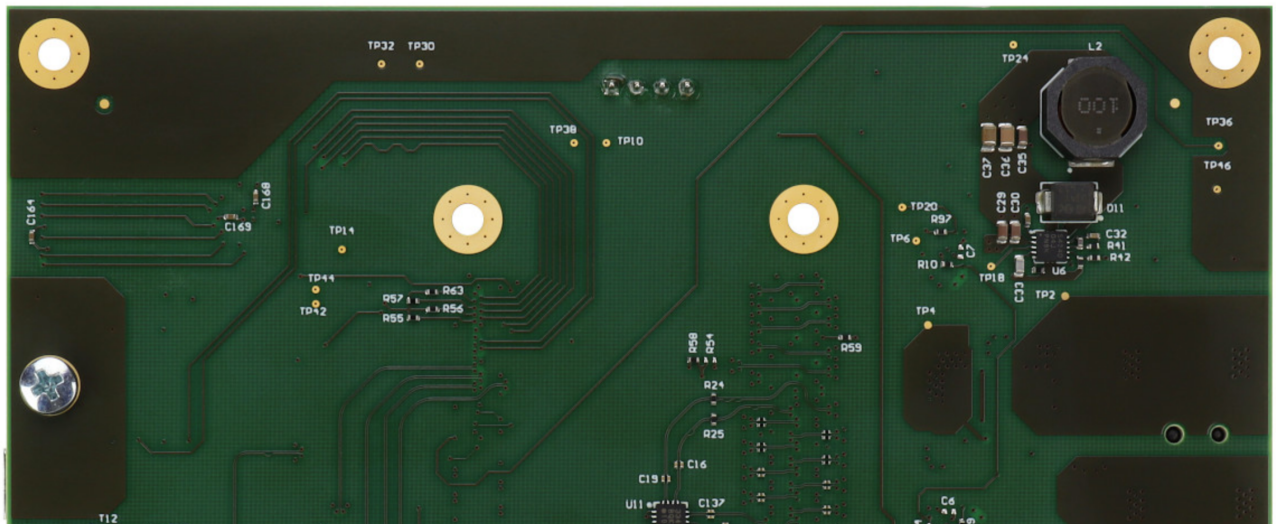
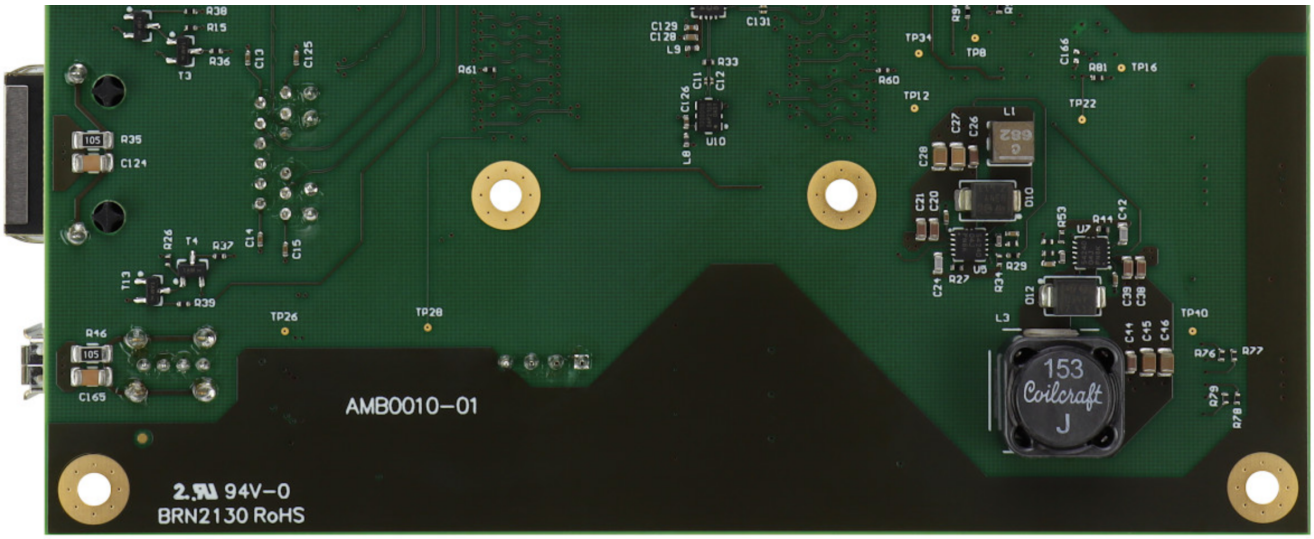




AMB0010 main components

1. B2B Connector (ADF6), JB5, JB6
2. Power Jack, J1
3. Push Button, S1, S3, S4
4. DIP Switch, S2, S5
5. LED, D3...9
6. Pin Header, J8, J19
7. ESD Protection, U13
8. Micro SD Socket, J13
9. XMOD Connector, JB1
10. RJ45 LAN Socket, J11
11. USB Socket, J12

Initial Delivery State

Storage device name	Content	Notes
-	-	-

Initial delivery state of programmable devices on the module

Signals, Interfaces and Pins

Connectors

Connector Type	Designator	Interface	IO CNT	Notes
B2B	JB5	HP	104 SE / 48 DIFF	Loopbacked.
B2B	JB5	MGT PL	4 x MGT (RX/TX)	Loopbacked.
B2B	JB5	MGT PL	2 x MGT CLK	
B2B	JB5	HD	24 SE / 12 DIFF	Loopbacked.
B2B	JB6	HP	52 SE / 24 DIFF	Loopbacked.
B2B	JB6	MGT PS	4 x MGT (RX/TX)	Not connected.

B2B	JB6	MGT PS	2 x MGT CLK	
B2B	JB6	HD	24 SE / 12 DIFF	Loopbacked.
B2B	JB6	MIO	2 x I2C	
B2B	JB6	MIO	2 x UART	
B2B	JB6	MIO	2 x PERST	Loopbacked.
B2B	JB6	MIO	SDIO	
B2B	JB6	MIO	JTAG	
B2B	JB6	MIO	4 x GPIO	Loopbacked.
B2B	JB6	ETH		
B2B	JB6	USB		
RJ45	J11	ETH		
XMOD	JB1	JTAG	JTAG	
XMOD	JB1	UART	UART	
Pin Header	J8	UART	UART	
Pin Header	J19	I2C	I2C	
Power Jack	J1	PWR	PWR	
SD Card Socket	J13	SDIO	SDIO	
USB Socket	J12	USB	USB	

Board Connectors

Test Points

Test Point	Signal	Notes[1)]
TP1	+12.0V_input	
TP2	+12.0V_input	
TP3	V_MOD1	OUT
TP4	V_MOD1	OUT
TP5	Carrier_+3V3	OUT
TP6	Carrier_+3V3	OUT
TP7	Carrier_+1V8	OUT
TP8	Carrier_+1V8	OUT
TP9	Module_+3.3V	Connected to JB6, U4 - IN
TP10	Module_+3.3V	Connected to JB6, U4 - IN
TP11	Module_+1.8V	Connected to JB5, JB6 - IN
TP12	Module_+1.8V	Connected to JB5, JB6 - IN
TP13	PWR_EN	JB6, S4 - PWR_EN is pulled-up in module AM0010 to 3.3 V.

TP14	PWR_EN	JB6, S4 - PWR_EN is pulled-up in module AM0010 to 3.3 V.
TP15	Carrier_USB+5V	
TP16	Carrier_USB+5V	
TP17	PG_Carrier_+1V8	Connected to U2, U3, U4, U5, U6, U7, U12
TP18	PG_Carrier_+1V8	Connected to U2, U3, U4, U5, U6, U7, U12
TP19	Carrier_PG	Connected to U3, U6, T7 (LED D5)
TP20	Carrier_PG	Connected to U3, U6, T7 (LED D5)
TP21	PG_Carrier_USB+5V	Connected to U7, U12
TP22	PG_Carrier_USB+5V	Connected to U7, U12
TP23	PWR_GOOD	Connected to JB6, U4 - IN (M2C), pulled-up in module AM0010 to 3.3 V.
TP24	PWR_GOOD	Connected to JB6, U4 - IN (M2C), pulled-up in module AM0010 to 3.3 V.
TP25	USB-VBUS	
TP26	USB-VBUS	
TP27	IO_X0_D12_P	Connected to JB6
TP28	IO_X0_D12_P	Connected to JB6
TP29	M_SDA	Connected to JB6
TP30	M_SDA	Connected to JB6
TP31	M_SCL	Connected to JB6
TP32	M_SCL	Connected to JB6
TP33	RST_M2C#	Connected to JB6
TP34	RST_M2C#	Connected to JB6
TP35	U_INT	Connected to JB6
TP36	U_INT	Connected to JB6
TP37	PS_POR#	Connected to JB6, S3 - PS_POR# is pulled up in module AM0010 to Carrier_+3V3 (V_IO_CFG).
TP38	PS_POR#	Connected to JB6, S3 - PS_POR# is pulled up in module AM0010 to Carrier_+3V3 (V_IO_CFG).

TP39	PS_SRST#	Connected to JB6, S1 - PS_SRST# is pulled up in module AM0010 to Carrier_+3V3 (V_IO_CFG).
TP40	PS_SRST#	Connected to JB6, S1 - PS_SRST# is pulled up in module AM0010 to Carrier_+3V3 (V_IO_CFG).
TP41	DX_P	Connected to JB6
TP42	DX_P	Connected to JB6
TP43	DX_N	Connected to JB6
TP44	DX_N	Connected to JB6
TP45	M_INT	Connected to JB6
TP46	M_INT	Connected to JB6

[1] Direction:

- IN: Input from the point of view of this board.
- OUT: Output from the point of view of this board.

Test Points Information

On-board Peripherals

Chip/Interface	Designator	Connected To	Notes
Oscillator	U10	U11	100 MHz
Clock Buffer	U11	JB5	
RJ45 LAN Socket	J11	JB6	
XMOD	JB1	JB6	
Pin Header	J8	JB6	
Pin Header	J19	JB6	
Power Jack	J1		
Micro SD Card Socket	J13	JB6 via U13	
USB Socket	J12	JB6 via L7	

On board peripherals

Configuration and System Control Signals

Connector.Pin	Signal Name	Direction[1)]	Description
JB6.A59	V_BAT	OUT	Input voltage for VCC_PSBATT [2) 3)].
JB6.B58	RST_M2C#	IN	Module reset for peripheral reset
JB6.C53	DONE	IN	Signal PS_DONE.
JB6.C54 / JB6.C55 / JB6.C56 / JB6.C57	MODE0...3	OUT	Boot mode selection. Consider possible module boot modes.
JB6.C58	PS_SRST#	OUT	FPGA system reset [2) 3)].
JB6.C59	PS_POR#	OUT	Power-on-reset status [2) 3)].
JB6.D56 / JB6.D57	DX_P / DX_N	OUT	Temperature sensing diode pin
JB6.D58	PWR_EN	OUT	Power Enable [2) 3)]. Controlled module internally. Can be used to delay power on sequencing or disable power. Tie only to GND or leave floating.
JB6.D59	PWR_GOOD	IN	Power good status
J6.D51 / J6.D52 / J6.D54 / J6.D55	TDI/TCK/TDO/TMS	Signal-dependent	JTAG configuration and debugging interface [2) 3)]. JTAG reference voltage: 3.3 V

1) Direction:

- IN: Input from the point of view of this board.
- OUT: Output from the point of view of this board.

2) See UG1085 for additional information.

3) Consider modules input voltage range.

Controller signal.

Power and Power-On Sequence

Power Rails

Power Rail Name/ Schematic Name	Connector + Pin	Direction[1)]	Notes
V_MOD1	JB5.A7 / JB5.A15 / JB5.A47 / JB5.A55 / JB5.B5 / JB5.B11 / JB5.B17 / JB5.B45 / JB5.B51 / JB5.B57 / JB6.C5 / JB6.C11 / JB6.C17 / JB6.D7 / JB6.D15	OUT	

Module_+1.8V	J5.C7 / J5.C15 / J6.B7 / J6.B15	IN	
Carrier_+1V8	JB5.D3 / JB5.D17 / JB5.D43 / JB5.D57 / JB6.A3 / JB6.A17 / JB6.A59	OUT	
Carrier_+3V3	JB5.D40 / JB6.B35 / JB6.C52 / JB1.5 / JB1.6 / J8.1 / J19.1	OUT	
Module_+3.3V	JB6.B59	IN	
+12.0V_input	J1.1	IN	

[1] Direction:

- IN: Input from the point of view of this board.
- OUT: Output from the point of view of this board.

Module power rails.

Recommended Power up Sequencing (preliminary)

Sequence	Net name	Recommended Voltage Range	Pull-up/down	Description	Notes
0	-	-	-	Configuration signal setup.	See Configuration and System Control Signals.
1 [1]	V_BAT	3.3 V	-	Battery connection.	Battery Power Domain usage. When not used, tie to GND.
2	V_MOD1	12 V	-	Main Power supply.	Main module power supply. 3 A recommended. Power consumption depends mainly on design and cooling solution.
3 [1]	PWR_EN	-	PU [2], 3.3 V	Power release.	Controlled module internally. Can be used to delay power on sequencing or disable power. Tie only to GND or leave floating.
4	PWR_GOOD	-	PU [2], 3.3 V	Power good status.	Module power on sequencing finished. Periphery and variable bank voltages can be enabled on carrier.

5 [1]	3.3V / 1.8V	-	-	Module generated output voltages.	Voltages are available after PWR_GOOD deassertion. These voltages can be used • to supply bank voltages, • to supply periphery and/or • as power good signal to enable external power regulators. Important: Consider maximum power consumption.
5	V_IO_W01 / V_IO_W45 / V_IO_X01 / V_IO_W3 / V_IO_X3 / V_IO_CFG	[3]	-	Module bank voltages.	Enable bank voltages after PWR_GOOD deassertion.
6 [1]	-	-	-	Reset handling.	RST_M2C# delivers external periphery reset. See Configuration and System Control Signals.

[1] (optional)

[2] (on module)

[3] See DS925 for additional information.

Baseboard Design Hints

Board to Board Connectors

The Andromeda modules use Samtec AcceleRate HD High-Density on bottom side.

- ADM6-60-01.5-L-4-2 (compatible to ADF6-60-03.5-L-4-2), (240 pins, "60" per row)

The Andromeda carriers use Samtec AcceleRate HD High-Density on top side.

- ADF6-60-03.5-L-4-2 (compatible to ADF6-60-01.5-L-4-2), (240 pins, "60" per row)

Features

- Board-to-Board Connector 240-pins, 60 contacts per row
- 0.025" (0.635 mm) pitch
- Data Rate: max 56 Gbps
- Mates with: ADM6/APF6
- Insulator Material: LCP, Black
- Contact Material: Copper Alloy
- Plating: Au or Sn over 50 µ" (1.27 µm) N
- Operating Temperature Range: -55 ºC to +125 ºC

- PCIe 5.0 capable: Yes
- Lead-Free Solderable: Yes
- RoHS Compliant: Yes

Connector Mating height

When using the same type on baseboard, the mating height is 5mm. Other mating heights are possible by using connectors with a different height

Order number	Connector on baseboard	compatible to	Mating height
30095	REF-30095	ADM6-60-01.5-L-4-2	5 mm
31137	REF-31137	ADF6-60-03.5-L-4-2	5 mm

Connectors.

The module can be manufactured using other connectors upon request.

Connector Speed Ratings

The AcceleRate HD High-Density connector speed rating depends on the stacking height; please see the following table:

Stacking height	Speed rating
5 mm	10/ 25/ 56 Gbps

Speed rating.

Current Rating

Current rating of Samtec AcceleRate HD High-Density B2B connectors is 1.34 A per pin (4 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 20200225_hsc_adm6-xx-01p5-xxx-4-a_adf6-xx-03p5-xxx-4-a.pdf	04 03, 2022 by ED
PDF File adf6.pdf	04 03, 2022 by ED
PDF File adm6.pdf	04 03, 2022 by ED
PDF File adm6-xxx-xx.x-xxx-4-x-x-xr-mkt.pdf	04 03, 2022 by ED
PDF File adm6-xxx-xx.x-xxx-x-x-x-footprint.pdf	04 03, 2022 by ED

Download All

Technical Specifications

Absolute Maximum Ratings

Power Rail Name/ Schematic Name	Description	Min	Max	Unit
+12.0V_input	Power Supply	11.0	13.0	V
Module_+3.3V	Input from Module	3.315	3.465	V
Module_+1.8V	Input from Module	1.71	1.89	V

Absolute maximum ratings

Recommended Operating Conditions

This TRM is generic for all variants. Temperature range can be differ depending on the assembly version. Voltage range is mostly the same during variants (exceptions are possible, depending on custom request)

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

- Variants of modules are described here: Article Number Information
- Modules with commercial temperature grade are equipped with components that cover at least the range of 0°C to 75°C
- Modules with extended temperature grade are equipped with components that cover at least the range of 0°C to 85°C
- Modules with industrial temperature grade are equipped with components that cover at least the range of -40°C to 85°C
- The actual operating temperature range will depend on the FPGA / SoC design / usage and cooling and other variables.

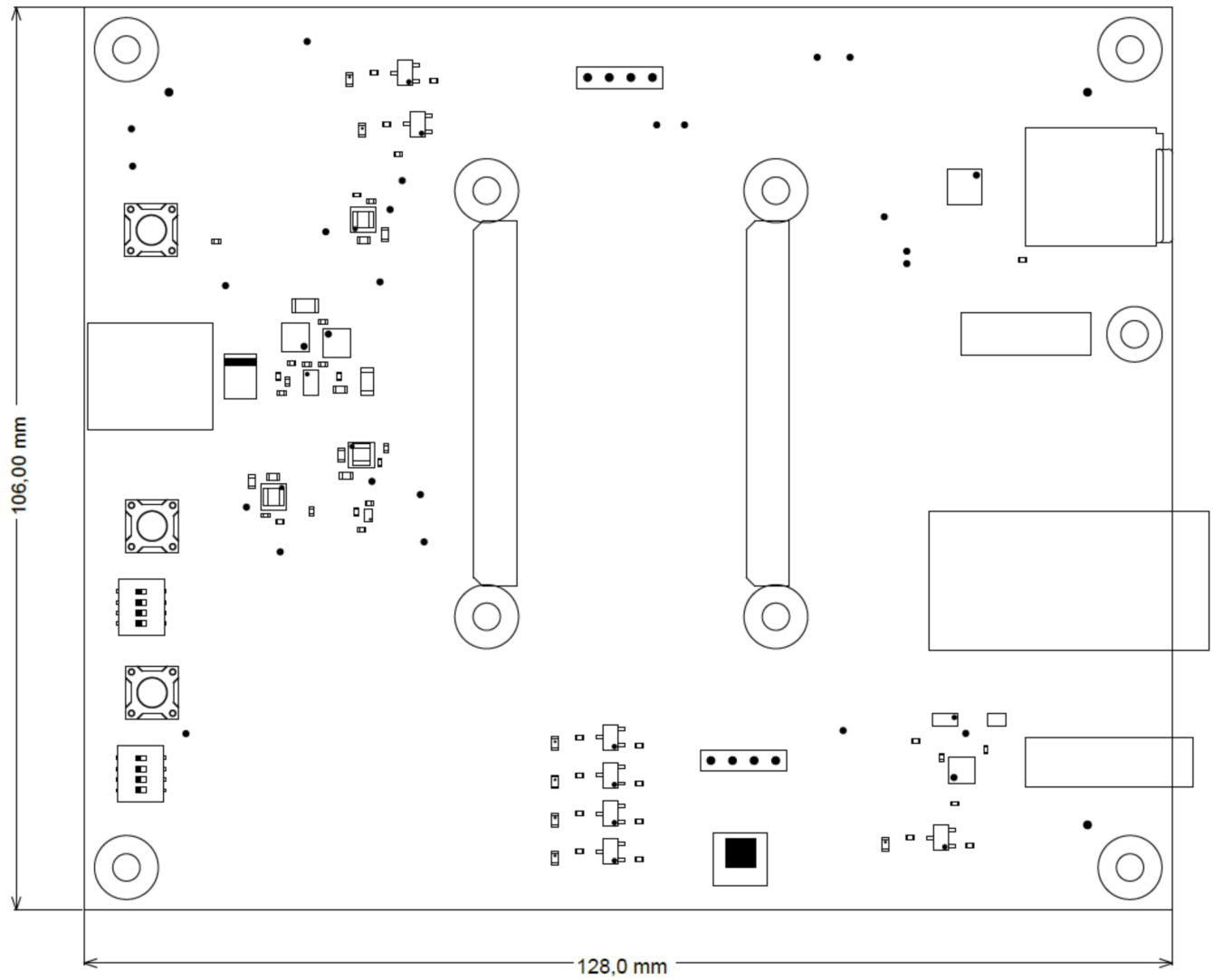
Power Rail Name/ Schematic Name	Min	Typical	Max	Units	Reference Document
+12.0V_input	11.0	12.0	13.0	V	See LTC4365ITS8 datasheets.
Module_+3.3V	3.315	3.3	3.465	V	
Module_+1.8V	1.71	1.8	1.89	V	

Recommended operating conditions.

Physical Dimensions

- Module size: 128 mm × 106 mm. Please download the assembly diagram for exact numbers.
- Mating height with standard connectors: 5 mm.

PCB thickness: 1.6 mm.



Physical Dimension

Currently Offered Variants

Trenz shop AMB0010 overview page	
English page	German page

Trenz Electronic Shop Overview

Revision History

Hardware Revision History

Board hardware revision number.

Date	Revision	Changes	Documentation Link
-	REV01	Initial Revision	

Hardware Revision History

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

Document Change History

Date	Revision	Contributor	Description
Error rendering macro 'page-info' Ambiguous method overloading for method jdk.proxy279.$Proxy4022#hasContentLevelPermission. Cannot resolve which	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk.proxy279.$Proxy4022#hasContentLevelPermission. Cannot resolve which	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk.proxy279.$Proxy4022#hasContentLevelPermission. Cannot resolve which	• Initial Document

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.

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.

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]	confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]	confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]	
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class
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atlassian
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Document change history.

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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.

Error rendering macro 'page-info'

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]