TEP0002 TRM

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Overview

The Trenz Electronic TEP0002 is a Pmod compatible motor driver board and used for developing BLCD or CD motor driving software.

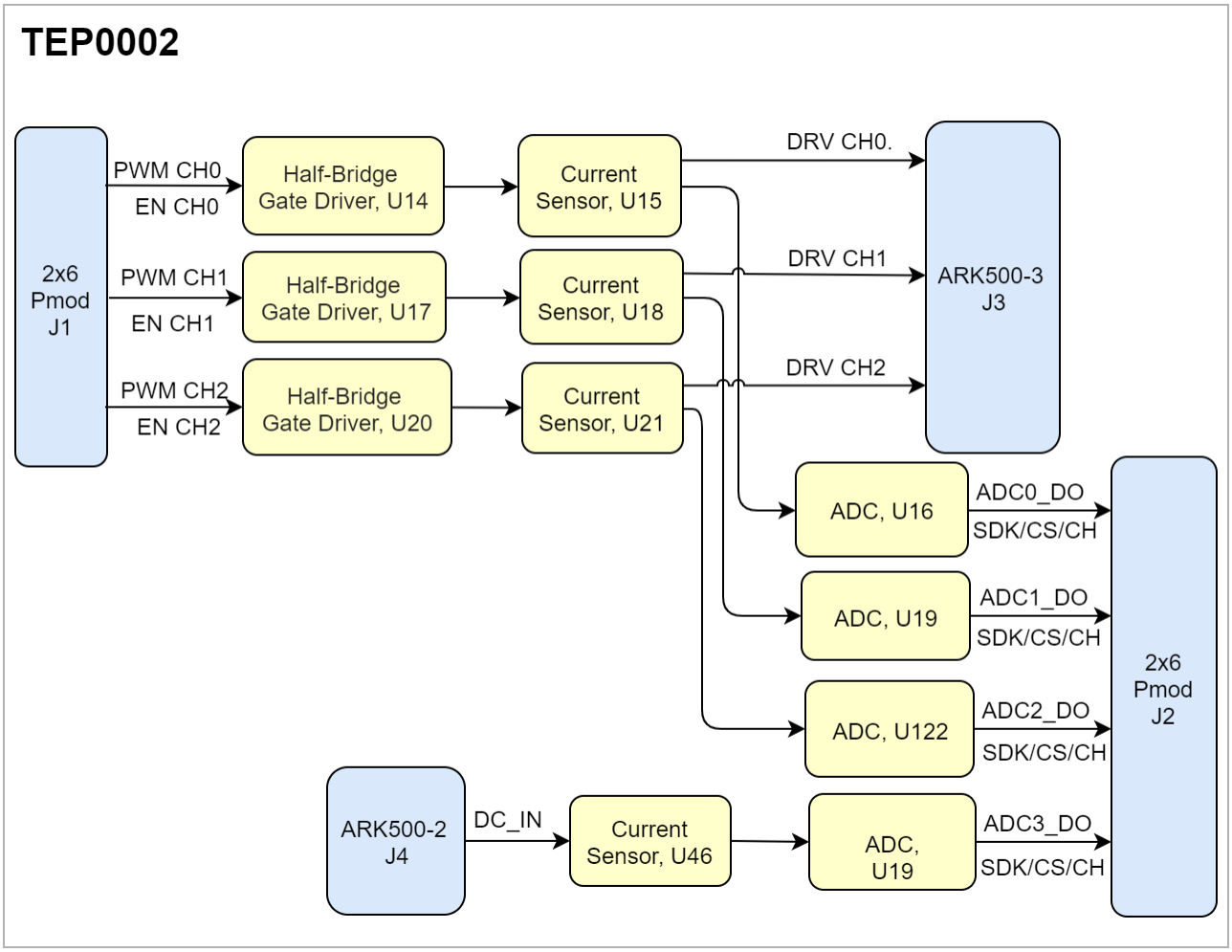
Wiki Resource page: http://trenz.org/tep0002-info for the current online version of this manual and other available documentation.

Key Features

- **Modules/ SoC FPGA**
  - Compatible with Digilent's Pmod interfaces
- **RAM/Storage**
- **On Board**
  - 4x Current Sensor
  - 4x ADC
  - 2x Terminal Blocks
  - 2x Power Regulators
  - 3x Half-Bridge Drivers
- **Interface**
  - 2x Pmod Pin Header (2x6 Pol)
- **Power**
  - 3.3V supply voltage from Pmods

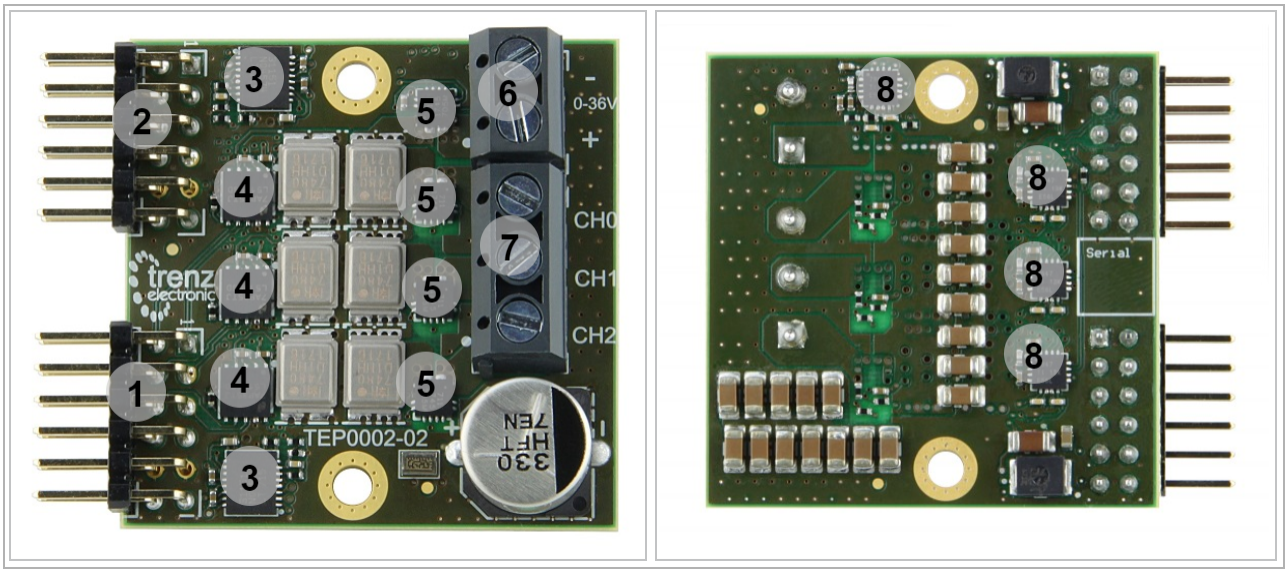
    - Supply current and voltage monitoring
- **Dimension**
    - 40 mm x 40 mm

Block Diagram



TEP0002 block diagram

Main Components



TEP0002 main components

1. 2x6 PMod Header, J1
2. 2x6 PMod Header, J2
3. Power Regulators, U1-U7
4. Half Bridge Gate Drivers, U14-U17-U20
5. Current Sensors, U15-U18-U21-U46
6. ARK500-2 connector, J2
7. ARK500-3 connector, J3
8. Analog Digital Converter, U16-U19-U22-U47

Initial Delivery State

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

Configuration Signals

MODE Signal State	Boot Mode
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Boot process.

Signal	B2B	I/O	Note
---	---	---	

Reset process.

Signals, Interfaces and Pins

Pmod Connectors

TEP0002 is equipped with two 2x6 Pmod Connectors, J1 and J2.

Pin	Pmod J1	Pmod J2	Notes
1	PWM_CH0	ADC_CH	
2	PWM_CH1	AD_SCK	
3	PWM_CH2	ADC_CS	
4	N.C	Sensor fault	
5	GND	GND	
6	VCC	VCC	
7	EN_CH0	ADC_DO0	
8	EN_CH1	ADC_DO1	
9	EN_CH2	ADC_DO2	
10	N.C	ADC_DO3	
11	GND	GND	
12	VCC	VCC	

General Pmod connectors information

Terminal blocks

The TEP0002 is equipped with two Terminal Blocks J3 and J4.

Designator	Pin	Schematic	Notes
J3	1	DRV_CH2	ARK500-3
	2	DRV_CH1	ARK500-3
	3	DRV_CH0	ARK500-3
J4	1	DC_IN	ARK500-2
	2	GND	ARK500-2

Terminal Blocks information

On-board Peripherals

Chip/Interface	Designator	Notes
ADC	U16,U19,U22,U47	

On board peripherals

Analog Digital Converters

The TEP0006 is equipped with four Analog Digital Converters.

Pin	Connected to	Notes

	ADC,U16	ADC,U19	ADC,U22	ADC,U47	
AVDD	5AV	5AV	5AV	5AV	
REF	Current Sensors,U17	Current Sensors,U20	Current Sensors,U22	Current Sensors,U46	VCC Pin
AIN0+	DRV_CH0	DRV_CH1	DRV_CH2	DC_IN	
AIN0-	GND	GND	GND	GND	
AIN1+	Current Sensors,U17	Current Sensors,U20	Current Sensors,U22	Current Sensors,U46	VIOUT Pin
AIN1-	GND	GND	GND	GND	
REFGND	GND	GND	GND	GND	
DVDD	3.3V	3.3V	3.3V	3.3V	
SCLK	ADC_SCK	ADC_SCK	ADC_SCK	ADC_SCK	PMod J2
SDO	ADC0_DO	ADC1_DO	ADC2_DO	ADC3_DO	PMod J2
nCS	ADC_CS	ADC_CS	ADC_CS	ADC_CS	PMod J2
CH_SEL	ADC_CH	ADC_CH	ADC_CH	ADC_CH	PMod J2
PDEN	GND	GND	GND	GND	
GND	GND	GND	GND	GND	

ADC Information

Power and Power-On Sequence

Power Supply

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

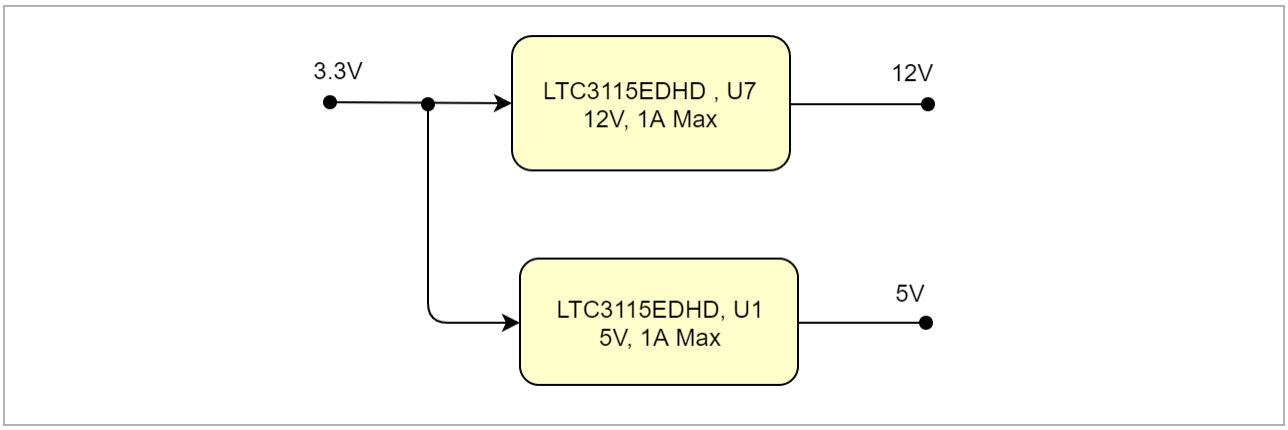
Power Consumption

Power Input Pin	Typical Current
VIN	TBD*

Power Consumption

* TBD - To Be Determined

Power Distribution Dependencies



Power Distribution

Power-On Sequence

There is no specific power on sequence, after power on the module all regulators will be enable.

Power Rails

Power Rail Name	Pmod J1 Pin	Pmod J2 Pin	Direction	Notes
3.3V	6,12	6,12	Input	

Module power rails.

Technical Specifications

Absolute Maximum Ratings

Symbols	Description	Min	Max	Unit
3.3V	Input	-0.3	6.5	V
STG_T	Storage Temperature	-40	105	°C

PS absolute maximum ratings

Recommended Operating Conditions

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

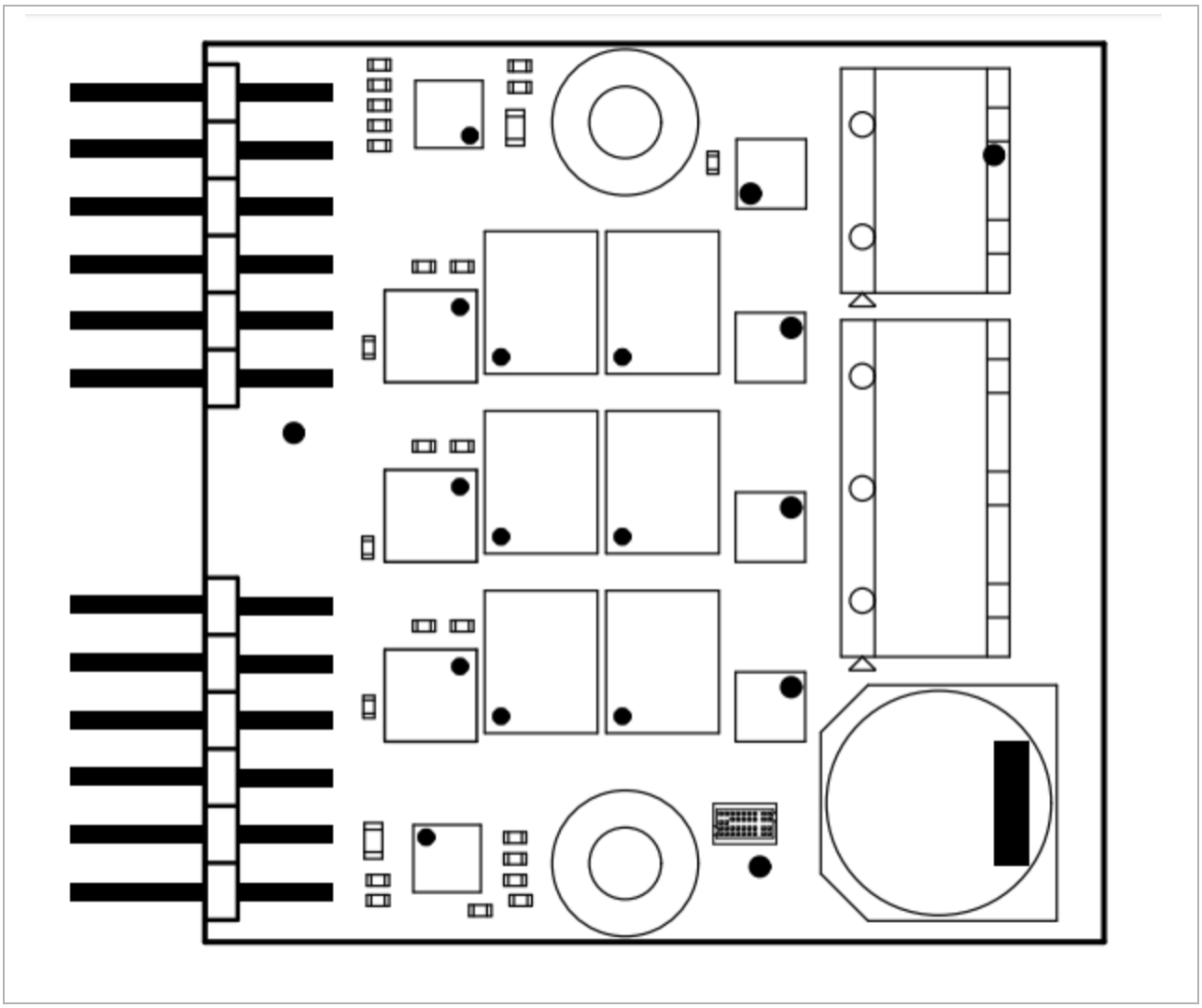
Parameter	Min	Max	Units	Reference Document
3.3V	3.0	4.2	V	
OPT_T	-40	105	°C	See ARK500-2 and ARK500-3 Data Sheet

Recommended operating conditions.

Physical Dimensions

- Module size: 40 mm × 40 mm. Please download the assembly diagram for exact numbers.

PCB thickness: 1.59 mm.



Physical Dimension

Currently Offered Variants

Trenz shop TEP0002 overview page	
English page	German page

Trenz Electronic Shop Overview

Revision History

Hardware Revision History

Date	Revision	Changes	Documentation Link
2019-04-23	03	• R18 and C46 have been removed • R22 and C57 have been removed • R26 and C67 have been removed • R17, R20, R21, R24, R25, R28 have been renamed and the resistance level have been change • U1 and U7 have been changed to LM4510SD	REV03
2018-02-27	02	• Schematic has been updated	REV02
2017-03-09	01	• Initial Release	REV01

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

Error rendering macro 'page-info' Ambiguous method overloading for method jdk.proxy241.$Proxy3496#hasContentLevelPermission. Cannot resolve which method to invoke for [null, class java.lang.String, class com.atlassian.confluence.pages.Page] due to overlapping prototypes between: [interface com.atlassian.confluence.user.ConfluenceUser, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk.proxy241.$Proxy3496#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]	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk.proxy241.$Proxy3496#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]	• Correction connector position
2020-01-15	v.54	Pedram Babakhani	• Technical specification update

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Document change history.

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