TEI0005 TRM

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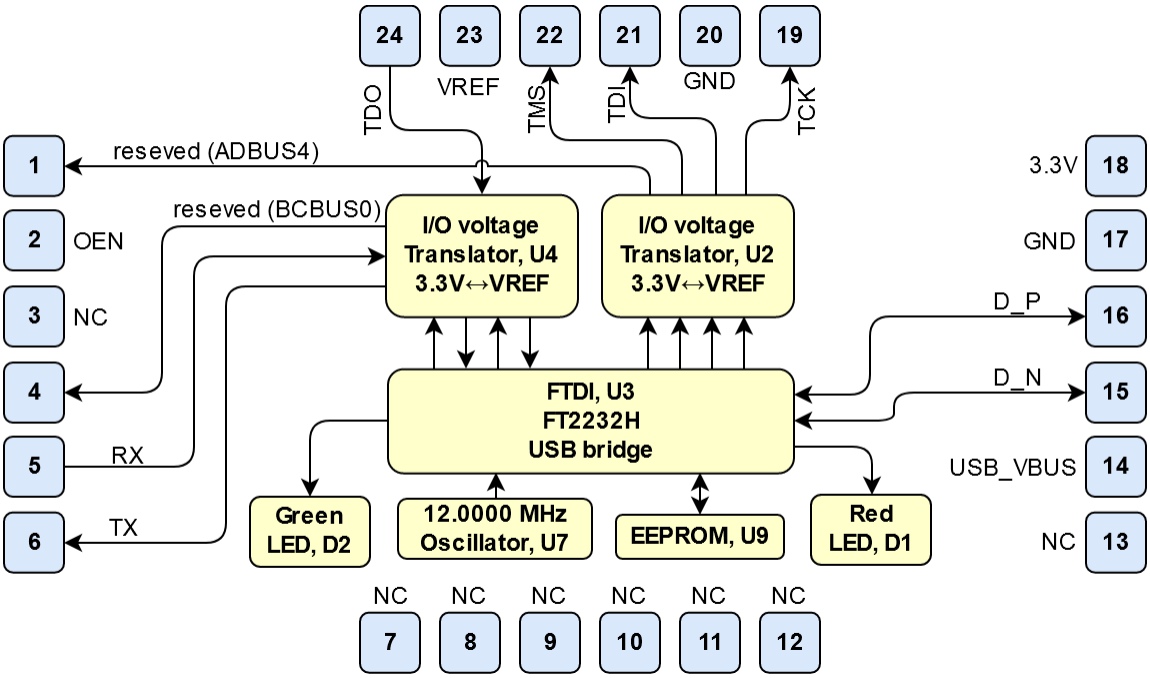
Overview

Arrow USB Programmer2 SMD module is a FT2232H based JTAG programmer supported by Intel Quartus. It's designed as Surface-mount module and have to be fitted on the target board in Surface Mount Technology. Furthermore, there is also an UART interface available and two I/O-pins reserved for future use.

Key Features

- Supported by Intel Quartus (JTAG Mode only)
- Designed as Surface-mount module
- Compatible to SMT Pick and Place Assembly Process
- Delivery Option in Standard JEDEC Tray
- 17 x 17 mm
- Based on FTDI FT2232H USB2 Interface
- Additional UART channel available
- Activity LEDs

Block Diagram



TEI0005 block diagram

Signals, Interfaces and Pins

Board to Board (B2B)

JTAG module pin assignment.

Pin	Signal	Module Direction
1	reserved for future use	out
2	OEN (enable data transmitting), low active	in
3	Do not connect (reserved for future use)	-
4	reserved for future use	out
5	UART RX	in
6	UART TX	out
7...13	Do not connect (reserved for future use)	-
14	USB-VBUS (USB Host supply voltage)	in
15	USB Data -	bidir
16	USB Data +	
17	GND	-
18	3.3V output voltage from module	out

19	TCK	out
20	GND	-
21	TDI	out
22	TMS	out
23	VREF (Reference I/O-voltage from target board for JTAG and UART)	in
24	TDO	in

B2B connectors information

USB Interface

The USB interface is provided by the FTDI FT2232H IC. The entire USB protocol is handled on chip and compatible to USB 2.0 High Speed (480 MBps) and Full Speed (12 MBps).

On-board Peripherals

FTDI FT2232H IC

FTDI FT2232H IC (U3) is used in MPSSE Mode for JTAG, Channel B is available as UART. FT2232H EEPROM is programmed with Arrow Programmer2 Identificator to be recognized by the support library for Quartus.

On-board LEDs

On-board LEDs indicating UART and JTAG activity:

Designator	Color	Connected to	Active Level	Note
D2	Green	U3-48; U3-49	low	UART activity (BCBUS3 and BCBUS4)
D1	Red	U3-20	low	JTAG activity (ADBUS7)

On-board LEDs

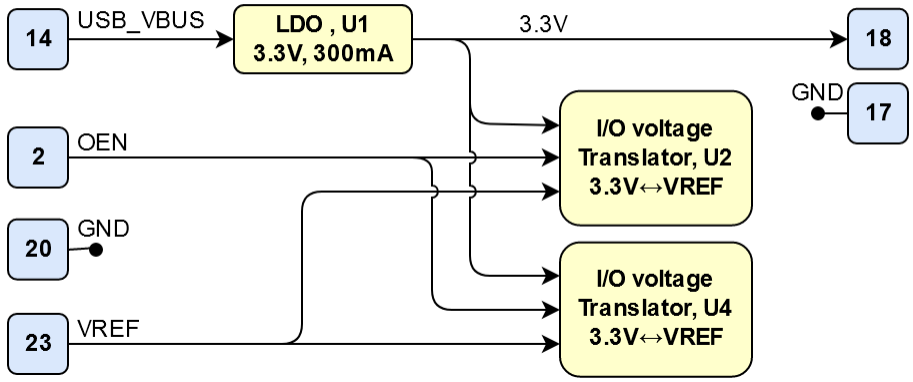
Power

Power supply of the adapter board

Arrow Programmer2 is powered via USB_VBUS rail.

Power Distribution Dependencies

TEI0005-02



Power Distribution

Power Rails

Power Rail Name	Pad	Direction	Notes
USB_VBUS	14	IN	
VREF	23	IN	
3.3V	18	OUT	LDO output generated from USB_VBUS. Do not supply this rail external

Module power rails.

Technical Specifications

Absolute Maximum Ratings

Parameter	Min	Max	Units	Reference Document
USB VBUS	4.75	5.25	V	USB 2.0 Specification
VREF	-0.5	4.6	V	Nexperia 74AVCH4T245 data sheet
Voltage on I/O pins	-0.5	4.6	V	Nexperia 74AVCH4T245 data sheet
Storage temperature	-55	+85	°C	LED LTST-C191KRKT

PS absolute maximum ratings

Recommended Operating Conditions

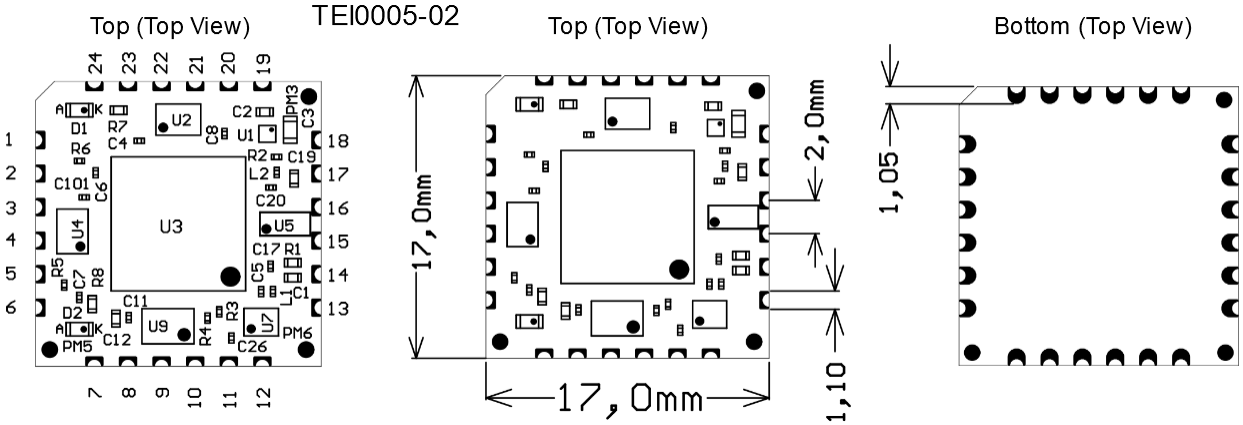
Parameter	Min	Max	Units	Reference Document
USB VBUS	4.75	5.25	V	USB 2.0 Specification
VREF	0.8	3.6	V	Nexperia 74AVCH4T245 data sheet (VCCB)
Voltage on I/O pins	0	VREF	V	Nexperia 74AVCH4T245 data sheet
Operating temperature	-40	+85	°C	FTDI FT2232H data sheet

Recommended operating conditions.

Arrow Programmer2 can be used within industrial temperature range.

Physical Dimensions

- Module size: 17.0mm × 17.0mm. Please download the assembly diagram for exact numbers.
- PCB thickness: ca. 1.2mm
- Highest part on the PCB is 1mm, the overall hight of the module is up to 2.4mm max.



Physical Dimension

Currently Offered Variants

Trenz shop TE0728 overview page	
English page	German page

Trenz Electronic Shop Overview

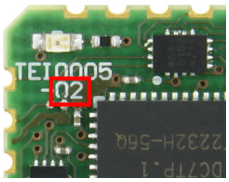
Revision History

Hardware Revision History

Date	Revision	Changes	Documentation Link
-	01	-	TEI0005-01
2018-05-04	02	• Reconnected D2 for RX TX indication • Renamed SMD Pads	TEI0005-02

Table 5: 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	Contributors	Description
Error rendering macro 'page-info' Ambiguous method overloading for method jdk.proxy244.$Proxy3572#hasContentLevelPermission. Cannot resolve which method to invoke for [null, class java.lang.String, class com.atlassian.confluence.pages.Page] due to overlapping prototypes between: [interface com.atlassian.confluence.user.ConfluenceUser, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk.proxy244.$Proxy3572#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.proxy244.$Proxy3572#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]	• update all to REV02 and new TRM template >2.0
2018-01-23	v.13	John Hartfiel	• update "Recommended Operating condition"

2018-01-12	v.12	John Hartfiel	• updated physical dimensions
2017-11-24	v.11	Ali Naseri	• updated physical dimensions
2017-11-23	v.10	Ali Naseri	• First TRM release

Table 6: Document change history.

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

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REACH, RoHS and WEEE

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

Error rendering macro 'page-info'

Ambiguous method overloading for method jdk.proxy244.$Proxy3572#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]