



## TEI0010 Test Board

Revision v.3

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Online version of this document:

<https://wiki.trenz-electronic.de/display/PD/TEI0010+Test+Board>

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## 5 Overview

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NIOS II Design with SDRAM Controller and different sensors and LED sequences, that can be toggled using the user button.

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

### 5.1 Key Features

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- Quartus 18.1
- NIOS II
- SPI
- UART
- ADC
- User Flash memory
- SDRAM memory
- 3-axis accelerometer
- Temperature sensor
- Smoke detector
- User LEDs
- User buttons

### 5.2 Revision History

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Date	Quartus	Project Built	Authors	Description
2019-11-11	18.1	TEI0010-test_board_noprebuilt-quartus_18.1-20191111104210.zip  TEI0010-test_board-quartus_18.1-20191111104330.zip	Thomas Dück	<ul style="list-style-type: none"> <li>• create project with TE scripts</li> <li>• new board variants</li> </ul>
2019-04-17	18.1	TEI0010-02-08-C8-test_board-quartus_18.1-20190417.zip	Thomas Dück	<ul style="list-style-type: none"> <li>• initial release</li> </ul>

**Table 1: Design Revision History**

### 5.3 Release Notes and Know Issues

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Issues	Description	Workaround	To be fixed version
No known issues	---	---	---

**Table 2: Known Issues**

## 5.4 Requirements

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### 5.4.1 Software

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Software	Version	Note
Quartus	18.1	needed
NIOS II SBT for Eclipse	18.1	needed

**Table 3: Software**

### 5.4.2 Hardware

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Design supports following modules:

Module Model	PCB Revision Support	Board Part Short Name	DDR	QSPI Flash	Others	Notes
TEI0010-02-0 8-C8	REV01, REV02	08_C8_8MB	8 MByte	64 MBit	NA	NA

**Table 4: Hardware Modules**

Design supports following carriers:

Carrier Model	Notes
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**Table 5: Hardware Carrier**

Additional HW Requirements:

Additional Hardware	Notes
USB Cable for JTAG/UART	Check Carrier Board and Programmer for correct type

**Table 6: Additional Hardware**

## 5.5 Content

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For general structure and of the reference design, see [Project Delivery - Intel devices](#)<sup>1</sup>

<sup>1</sup> <https://wiki.trenz-electronic.de/display/PD/Project+Delivery+-+Intel+devices>

### 5.5.1 Design Sources

Type	Location	Notes
Quartus	<design name>/source_files/ quartus	Quartus Project will be generated by TE Scripts
Software	<design name>/source_files/ software	Additional Software will be generated by TE Scripts

**Table 7: Design sources**

### 5.5.2 Prebuilt

File	File-Extension	Description
SOPC Information File	*.sopcinfo	File with description of the .qsys file to create software for the target hardware
Programmer Object File	*.pof	FPGA Configuration File
Diverse Reports	---	Report files in different formats
Software-Application-File	*.elf	Software Application for NIOS II processor system

**Table 8: Prebuilt files (only on ZIP with prebuilt content)**

### 5.5.3 Download

Reference Design is only usable with the specified Quartus version. Do never use different Versions of Quartus Software for the same Project.

Reference Design is available on:


- [TEI0010 "Test Board" Reference Design<sup>2</sup>](https://shop.trenz-electronic.de/Download/?path=Trenz_Electronic/Modules_and_Module_Carriers/2.5x6.15/TEI0010/Reference_Design/18.1/test_board)

<sup>2</sup> [https://shop.trenz-electronic.de/Download/?path=Trenz\\_Electronic/Modules\\_and\\_Module\\_Carriers/2.5x6.15/TEI0010/Reference\\_Design/18.1/test\\_board](https://shop.trenz-electronic.de/Download/?path=Trenz_Electronic/Modules_and_Module_Carriers/2.5x6.15/TEI0010/Reference_Design/18.1/test_board)



## 6 Design Flow

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 Reference Design is available with and without prebuilt files. It's recommended to use TE prebuilt files for first launch.

Trenz Electronic provides a tcl based built environment based on Quartus Design Flow.

See also:

- [Project Delivery - Intel devices](#)<sup>3</sup>

The Trenz Electronic FPGA Reference Designs are TCL-script based projects. Command files for execution will be generated with "\_create\_win\_setup.cmd" on Windows OS and "\_create\_linux\_setup.sh" on Linux OS.

TE Scripts are only needed to generate the quartus project, all other additional steps are optional and can also be executed by Intel Quartus/SDK GUI.

1. Open \_create\_win\_setup.cmd/\_create\_linux\_setup.sh and follow instructions on shell:
2. Press 0 and enter to start "Module Selection Guide"
3. Create Project (follow instruction of the product selection guide), settings file will be configured automatically during this process
  - a. (optional for manual changes) Select correct device and Quartus install path on "design\_basic\_settings.cmd"/"design\_basic\_settings.sh" and create Quartus project with "quartus\_create\_project\_batchmode.cmd"/"quartus\_create\_project\_batchmode.sh"

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<sup>3</sup> <https://wiki.trenz-electronic.de/display/PD/Project+Delivery+-+Intel+devices>

## 7 Launch

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### 7.1 Programming

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#### 7.1.1 JTAG

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Not used on this Example.

#### 7.1.2 MAX10 Flash

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1. Connect the Module to USB-Port
2. Open Quartus project with  
"quartus\_open\_existing\_project\_guiemode.cmd"/"quartus\_open\_existing\_project\_guiemode.sh"
3. Open the Quartus Prime Programmer from *Tools* → *Programmer*
4. If the Arrow-USB-Blaster is not visible:
  - a. Click "Hardware Setup..."
  - b. Choose at the drop-down menu "Currently selected hardware" Arrow-USB-Blaster [USB0]
  - c. Close "Hardware Setup"
5. If the correct configuration file is not set:
  - a. Delete other files
  - b. Click "Add file..."
  - c. Select the correct .pof file (**created project file:** <design\_name>/quartus/output\_files/test\_board.pof **or prebuilt file:** <design\_name>/prebuilt/<boardpart\_shortname>/programming\_files/\*.pof)
6. Click "Start"

## 7.2 Usage

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1. Prepare Hardware like described on section [Programming](#)(see page 10)
2. Connect UART USB (most cases same as JTAG)

#### 7.2.1 UART

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1. Open Serial Console "PuTTY"
2. Change settings in category "Session"
  - a. Connection Type: Serial
  - b. COM Port: Win OS → see device manager, Linux OS → see `dmesg |grep tty`
  - c. Speed: 115200
3. Select "Implicit CR in every LF" in category "Terminal"
4. Click *Open*
5. You can toggle between following modes by pressing user button
  - a. Spirit level
  - b. Winbond SPI flash memory test
  - c. Temperature measurement
  - d. Smoke detector
  - e. ADC


## 8 Appx. A: Change History and Legal Notices

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### 8.1 Document Change History

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To get content of older revision got to "Change History" of this page and select older document revision number.

Date	Document Revision	Authors	Description
 2019-11-11	v.3(see page 5)	Thomas Dück <sup>4</sup>	<ul style="list-style-type: none"> <li>change design to TE scripts</li> <li>new variants</li> </ul>
2019-04-17	v.1	Thomas Dück	<ul style="list-style-type: none"> <li>Initial release 18.1</li> </ul>
--	all	Thomas Dück <sup>5</sup>	--

**Table 9: Document change history.**

### 8.2 Legal Notices

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### 8.3 Data Privacy

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

### 8.4 Document Warranty

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<sup>4</sup> <https://wiki.trenz-electronic.de/display/~t.dueck>

<sup>5</sup> <https://wiki.trenz-electronic.de/display/~t.dueck>

## 8.5 Limitation of Liability

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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.

## 8.9 REACH, RoHS and WEEE

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### **RoHS**

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

### **WEEE**

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<sup>6</sup> <http://guidance.echa.europa.eu/>


<sup>7</sup> <https://echa.europa.eu/candidate-list-table>

<sup>8</sup> <http://www.echa.europa.eu/>

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.

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