

# TEI0003 Test Board

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### Revision History

6 Appx. A: Change History and Legal Notices				
Date	Quartus	Project Built	Authors	Description
2023-09-13	22.1 Lite <ul style="list-style-type: none"><li>6.1 Document Warranty</li><li>6.2 Limitation of Liability</li><li>6.3 Copyright Notice</li><li>6.4 Technology Licenses</li><li>6.5 Environmental Protection</li><li>6.6 REACH, RoHS and WEEE</li></ul>	TEI0003-test_board_noprebuilt-quartus_22.1std.2-20230913161158.zip	Thomas Dück	<ul style="list-style-type: none"><li>• update to Quartus Prime Lite 22.1</li><li>• new board variants</li><li>• change to Nios V/m</li><li>• TE scripts update</li></ul>
2022-04-21	21.1 Lite	TEI0003-test_board_noprebuilt-quartus_21.1.0-20220421150041.zip	Thomas Dück	<ul style="list-style-type: none"><li>• update to Quartus Prime Lite 21.1</li></ul>
2021-07-09	20.1 Lite	TEI0003-test_board_noprebuilt-quartus_20.1.1-20210709110930.zip	Thomas Dück	<ul style="list-style-type: none"><li>• update to Quartus Prime Lite 20.1</li><li>• TE scripts update</li></ul>

2020-10-19	19.1 Lite	TEI0003-test_board_noprebui lt-quartus_19.1.0- 20201019101802.zip  TEI0003-test_board- quartus_19.1.0- 20201019101738.zip	Thomas Dück	<ul style="list-style-type: none"> <li>script update</li> <li>bugfixes</li> </ul>
2020-05-13	19.1 Lite	TEI0003-test_board_noprebui lt-quartus_19.1.0- 20200513080815.zip  TEI0003-test_board- quartus_19.1.0- 20200513081030.zip	Thomas Dück	<ul style="list-style-type: none"> <li>19.1 update</li> </ul>
2019-11-11	18.1	TEI0003-test_board_noprebui lt-quartus_18.1- 201911111104152.zip  TEI0003-test_board- quartus_18.1- 201911111104339.zip	Thomas Dück	<ul style="list-style-type: none"> <li>add bash files for Linux OS</li> </ul>
2019-10-29	18.1	TEI0003-test_board_noprebui lt-quartus_18.1- 20191029121432.zip  TEI0003-test_board- quartus_18.1- 20191029121225.zip	Thomas Dück	<ul style="list-style-type: none"> <li>create project with TE scripts</li> <li>new board variants</li> </ul>
2019-04-02	18.1	TEI0003-02-test_board- quartus_18.1- 20190402.zip	Thomas Dück	<ul style="list-style-type: none"> <li>initial release</li> </ul>

#### Design Revision History

## Release Notes and Know Issues

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

#### Known Issues

## Requirements

### Software

Software	Version	Note
Quartus Prime Lite	22.1std	Nios V license is needed. For more information see: <a href="#">Intel Nios V Processors</a>
RiscFree IDE for Intel FPGAs	22.1std	needed

#### Software

### Hardware

Complete List is available on <project folder>/board\_files/\*\_devices.csv

Design supports following modules:

Module Model	PCB Revision Support	Board Part Short Name	SDRAM	Configuration flash	Flashers	Notes
TEI0003-02	REV01, REV02	QFCR1	8MByte	2MByte	--	--
TEI0003-02A	REV2	QFCR1	8MByte	2MByte	--	--
TEI0003-03A-S001	REV03	QFCR4_S1	8MByte	8MByte	--	--
TEI0003-03-QFCR1A	REV03	QFCR1	8MByte	2MByte	--	--
TEI0003-03-QFCR4A*	REV03	QFCR4	8MByte	8MByte	--	--

\*used as reference

#### Hardware Modules

Design supports following carriers:

Carrier Model	Notes
---	

\*used as reference

#### Hardware Carrier

Additional HW Requirements:

Additional Hardware	Notes
Micro USB cable for JTAG/UART	--

\*used as reference

#### Additional Hardware

## Content

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

## Design Sources

Type	Location	Notes
Quartus	<project folder>/source_files /quartus/	Quartus project will be generated by TE Scripts
Software	<project folder>/source_files /software/	Additional software will be generated by TE Scripts

#### Design sources

## Prebuilt

File	File-Extension	Description
SOPC Information File	*.sopcinfo	File with description of the *.qsys file to create software for the target hardware
SRAM Object File	*.sof	Ram configuration file
JTAG indirect configuration file	*.jic	Flash configuration file
Diverse Reports	---	Report files in different formats
Software Application File	*.elf	Software application for Nios V processor system

**Prebuilt files (only in ZIP file with prebuilt content)**

## 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:

- [TEI0003 "Test Board" Reference Design](#)

## Design Flow



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.

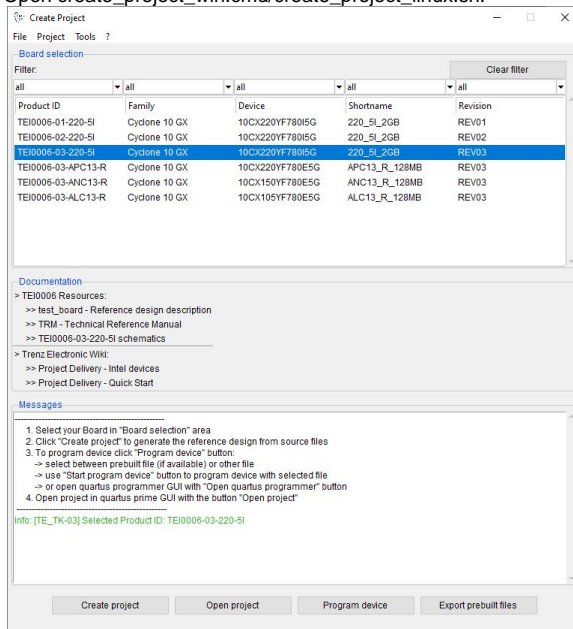
See also:

- [Project Delivery - Intel devices](#)

The Trenz Electronic FPGA Reference Designs are TCL-script based projects. To create a project, open a project or program a device execute "create\_project\_win.cmd" on Windows OS and "create\_project\_linux.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. For currently Scripts limitations on Win OS and Linux OS see: [Project Delivery - Intel devices](#) [Currently limitations of functionality](#)

1. Open `create_project_win.cmd/create_project_linux.sh`:



2. Select Board in "Board selection"
3. Click on "Create project" button to create project
  - a. (optional for manual changes) Select correct quartus installation path in "`<project folder>/settings/design_basic_settings.tcl`"

## Launch

## Programming



Check Module and Carrier TRMs for proper HW configuration before you try any design.

## Get prebuilt boot binaries



Reference Design is also available with prebuilt files. It's recommended to use TE prebuilt files for first launch.

1. Run `create_project_win.cmd/create_project_linux.sh`
2. Select Module in 'Board selection'
3. Click on 'Export prebuilt files' button
  - a. Folder `<project folder>/_binaries_<Article Name>` with subfolder `programming_files` will be generated and opened

## Configuration Flash

1. Connect the Module to USB-Port
2. Open `create_project_win.cmd/create_project_linux.sh`
3. Select correct board in "Board selection"
4. Click on "Program device" button
  - a. if prebuilt files are available: select "Program prebuilt file"

5. Click on "Start program device" button

**JTAG**

Not used on this example.

## Usage

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

## UART

1. Open Serial Console (e.g. PuTTY)
  - a. select COM Port



Win OS: see device manager

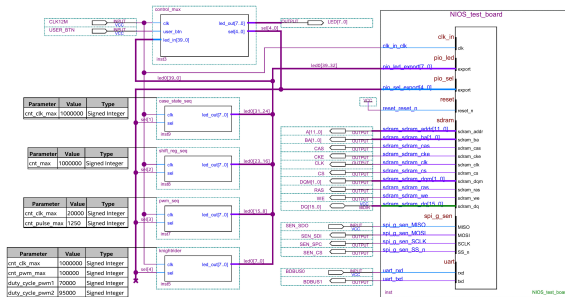
Linux OS: see `ls -l dev/serial/by-id` (UART is \*USB1)

- 
- b. Speed: 115200
2. Press reset button
3. Console output depends on used Software project, see [Software Design - SDK#Application](#)

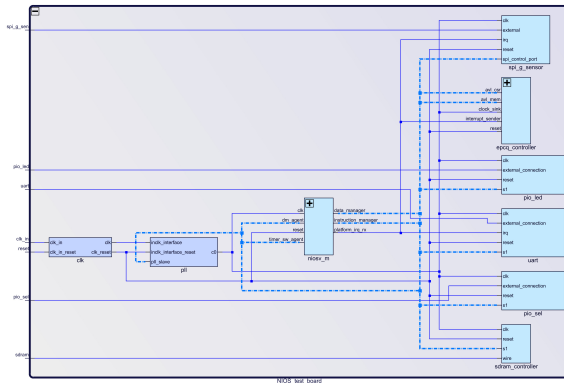
## System Design - Quartus

## Block Design

The block designs may differ depending on the assembly variant.



## Block Design - Project



Block Design - NIOS\_test\_board.qsys

## Block Design - Platform Designer

## Software Design - SDK

### Application

Used software project depends on board assembly variant. Template location: *<project folder>/source\_files/software/*

### test\_tei0003

Software example to test TEI0003 module.

- You can select between following modes by pressing the user button:
  - Spirit level
  - Case statement sequence
  - Shift register sequence
  - Knighttrider sequence
  - Pulse-width modulation sequence

### hello\_tei0003

Software example with 'Hello TEI0003' console output in endless loop.

## Appx. A: Change History and Legal Notices

### Document Change History

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

Date	Document Revision	Authors	Description
			<ul style="list-style-type: none"> <li>update to Quartus Prime Lite 22.1</li> <li>document style update</li> </ul>

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2022-04-22	v.9	Thomas Dück	<ul style="list-style-type: none"> <li>• update to Quartus Prime Lite 21.1</li> </ul>
2021-07-09	v.8	Thomas Dück	<ul style="list-style-type: none"> <li>• update to Quartus Prime Lite 20.1</li> <li>• document style update</li> <li>• script update</li> </ul>
2020-10-09	v.7	Thomas Dück	<ul style="list-style-type: none"> <li>• script update</li> <li>• bugfixes</li> </ul>
2020-05-13	v.6	Thomas Dück	<ul style="list-style-type: none"> <li>• 19.1 release</li> </ul>
2019-11-11	v.5	Thomas Dück	<ul style="list-style-type: none"> <li>• add bash files for Linux OS</li> </ul>
2019-10-29	v.3	Thomas Dück	<ul style="list-style-type: none"> <li>• change design to TE scripts</li> <li>• new board variants</li> </ul>
2019-04-03	v.2	Thomas Dück	<ul style="list-style-type: none"> <li>• Initial release 18.1</li> </ul>
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#### **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]