TEI0006 Test Board

Public Docs

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1 Overview

NIOS II Design with software example "simple_socket_server".

Refer to http://trenz.org/tei0006-info for the current online version of this manual and other available documentation.

1.1 Key Features

- Quartus 19.4 Pro
- NIOS II
- UART
- ETH
- QSPI flash memory
- DDR3L memory
- User LED

1.2 Revision History

Date	Quartus	Project Built	Authors	Description
2020-10-19	19.4 Pro	TEI0006-test_board_noprebuilt-quartus_19.4.0-20201019101920.zip TEI0006-test_board-quartus_19.4.0-20201019101840.zip	Thomas Dück	• script update • bugfixes
2020-05-13	19.4 Pro	TEI0006-test_board_noprebuilt-quartus_19.4.0-20200513124953.zip TEI0006-test_board-quartus_19.4.0-20200513125247.zip	Thomas Dück	• TE scripts update
2020-03-09	19.4 Pro	TEI0006-test_board-quartus_19.4-20200309134933.zip TEI0006-test_board_noprebuilt-quartus_19.4-20200309135555.zip	Thomas Dück	• initial release

1 Design Revision History

1.3 Release Notes and Know Issues

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

2 Known Issues

1.4 Requirements

1.4.1 Software

Software	Version	Note
Quartus Prime Pro	19.4	needed
NIOS II SBT for Eclipse	---	optional

3 Software

1.4.2 Hardware

Complete List is available on <design_name>/board_files/*_devices.csv

Design supports following modules:

Module Model	Board Part Short Name	PCB Revision Support	DDR	QSPI Flash	EMMC	Others	Notes
TEI0006-02-220-5I	220_5I_2GB	REV01, REV02	2GB	128MB	NA	NA	NA

4 Hardware Modules
Design supports following carriers:

Carrier Model	Notes
TEIB0006	

5 Hardware Carrier
Additional HW Requirements:

Additional Hardware	Notes
USB cable for JTAG/UART	Check Carrier Board and Programmer for correct type
RJ45 ethernet cable	connect carrier board to network

6 Additional Hardware

1.5 Content

For general structure and of the reference design, see Project Delivery - Intel devices[1]

1.5.1 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

7 Design sources

1.5.2 Prebuilt

File	File-Extension	Description
SOPC Information File	*.sopcinfo	File with description of the .qsys file to create software for the target hardware
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 II processor system

8 Prebuilt files (only on ZIP with prebult content)

1.5.3 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:

- TEI0006 "Test Board" Reference Design[2]

1 https://wiki.trenz-electronic.de/display/PD/Project+Delivery+-+Intel+devices
2 https://shop.trenz-electronic.de/Download/?path=Trenz_Electronic/Modules_and_Module_Carriers/6x8/TEI0006/Reference_Design/19.4/test_board

2 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.

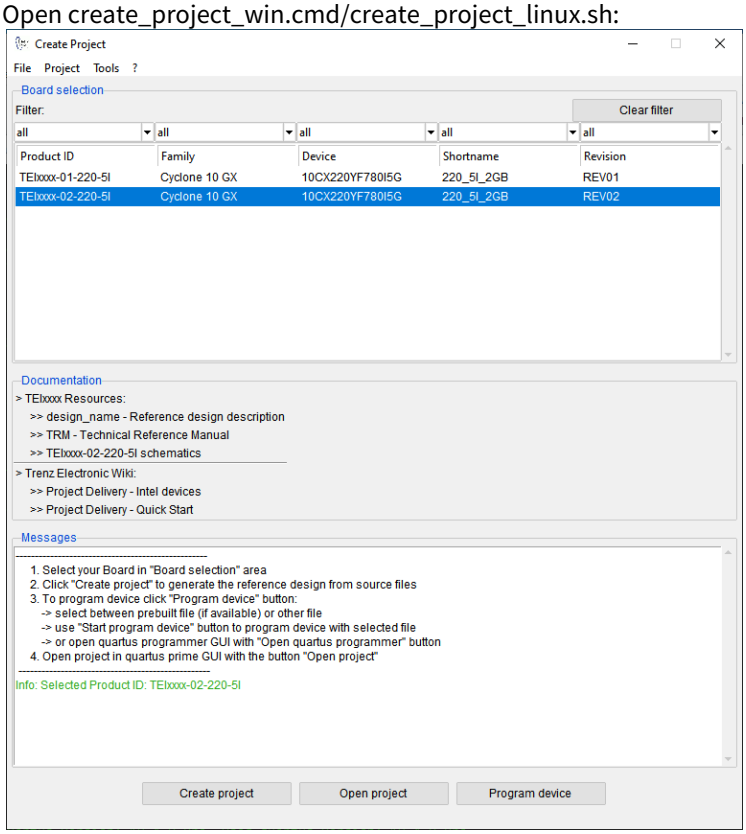
See also:

- Project Delivery - Intel devices[3]

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 executed by Intel Quartus/SDK GUI. For currently Scripts limitations on Win and Linux OS see: Project Delivery - Intel devices → Currently limitations of functionality[4]

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 "<design_name>/settings/design_basic_settings.tcl"

3 https://wiki.trenz-electronic.de/display/PD/Project+Delivery+-+Intel+devices
4 https://wiki.trenz-electronic.de/display/PD/Project+Delivery+-+Intel+devices#ProjectDelivery-Inteldevices-Currentlylimitationsoffunctionality

3 Launch

3.1 Programming

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

3.1.1 QSPI

1. Connect JTAG and power on carrier with module
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"
    b. using own generated programming file: select "Program other file" and click on "Browse ..." to open own generated programming file
    c. (optional) click on "Open programmer GUI" to program device with Quartus programmer GUI
5. Click on "Start program device" button

3.1.2 JTAG

Not used on this Example.

3.2 Usage

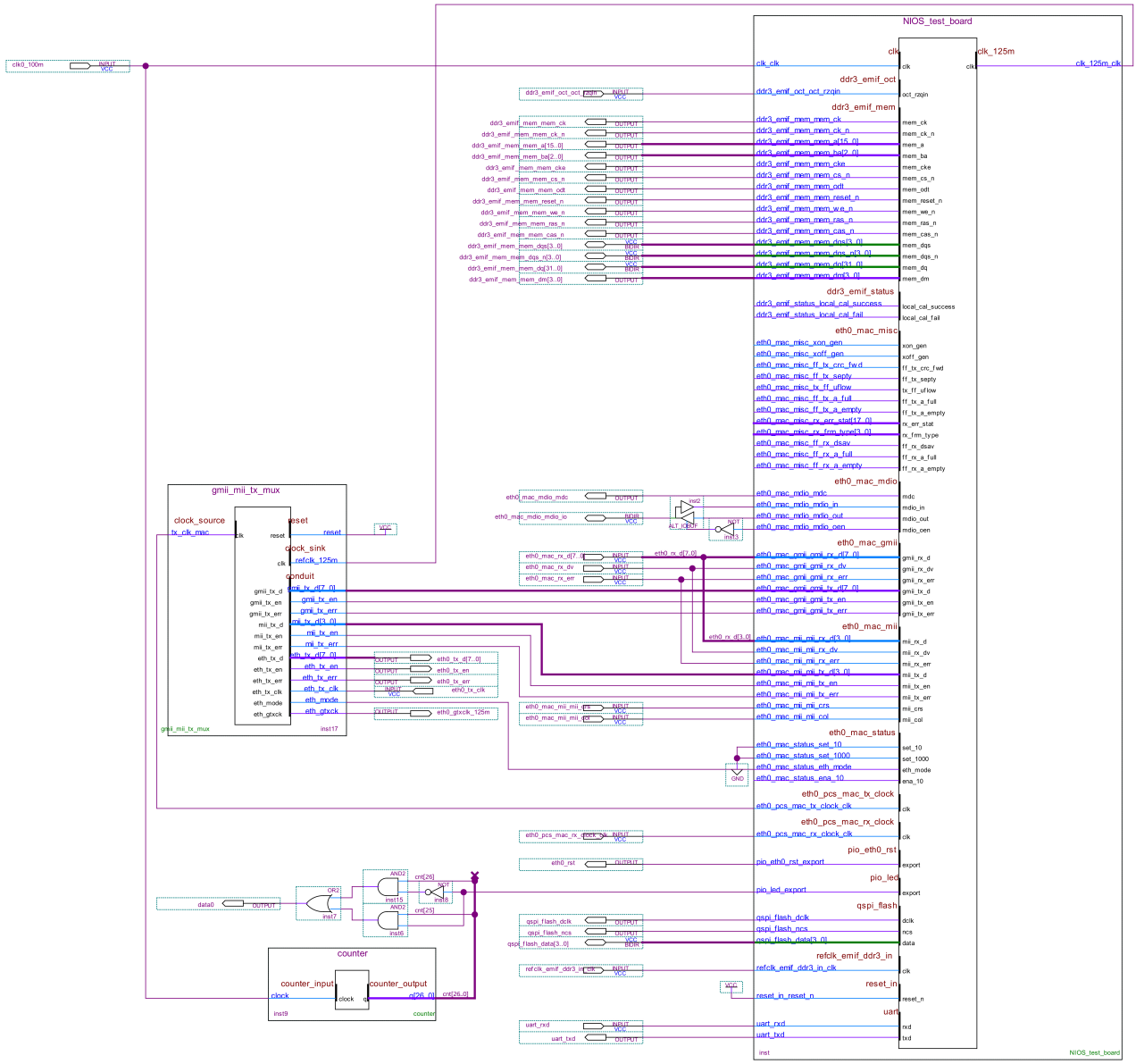
1. Prepare HW like described on section Programming(see page 8)
2. Connect UART USB (most cases same as JTAG)
3. Connect your board to the network
4. Power on PCB

3.2.1 UART

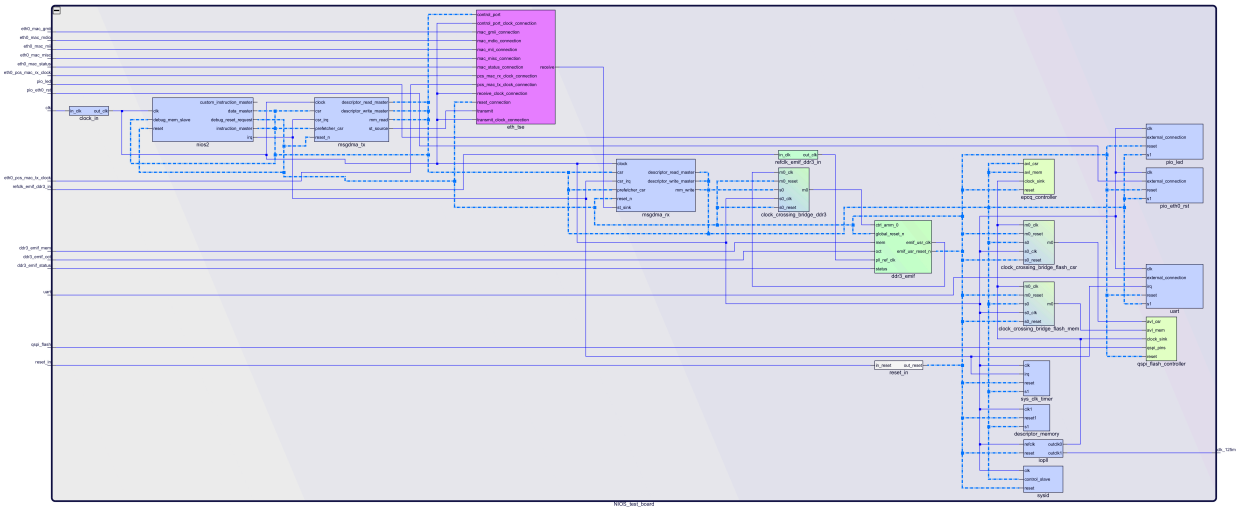
1. Open Serial Console (e.g. PuTTY)
    a. COM Port: Win OS see device manager, Linux OS see dmesg | grep tty (UART is *USB1)
    b. Speed: 11520
    c. Select "Implicit CR in every LF" in category "Terminal"
2. Press reset button
3. Simple Socket Server is starting up. Follow instructions on shell.
    a. If dhcp server is not available: open software project in sdk gui (e.g. NIOS II SBT for Eclipse) and change predefined IP address in "simple_socket_server.h", rebuild software project and download *.elf file to the device.
    b. Open command shell and enter "telnet <ip_address> 30" to connect to simple socket server

4 System Design - Quartus

4.1 Block Design



1 Block Design - Project



2 Block Design - Platform Designer

5 Software Design - SDK

5.1 Application

Template location: <design_name>/source_files/software/

5.1.1 simple_socket_server

Software example "Simple Socket Server" from eclipse (modified source files for TEI0006 board).

6 Appx. A: Change History and Legal Notices

6.1 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
2021-06-15	v.7(see page 4)	Thomas Dück[5]	• script update • bugfixes
2020-05-13	v.5	Thomas Dück	• Design files update
2020-03-18	v.4	Thomas Dück	• initial release 19.4
--	all	Thomas Dück[6]	--

9 Document change history.

6.2 Legal Notices

6.3 Data Privacy

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

6.4 Document Warranty

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5 https://wiki.trenz-electronic.de/display/~t.dueck
6 https://wiki.trenz-electronic.de/display/~t.dueck

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6.6 Copyright Notice

6.7 Technology Licenses

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6.8 Environmental Protection

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.

6.9 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[7]. 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[8] 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)[9].

RoHS

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

WEEE

7 http://guidance.echa.europa.eu/
8 https://echa.europa.eu/candidate-list-table
9 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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