CR00100 Test Board

Table of contents

Overview

Refer to http://trenz.org/cr00100-info for the current online version of this manual and other available documentation.

Key Features

- Quartus Prime Lite 21.1
- NIOS II
- UART
- SDRAM memory
- User buttons
- User LED

Revision History

Date	Quartus	Project Built	Authors	Description
2021-04-21	21.1 Lite	CR00100-test_board_noprebuilt-quartus_21.1.0-20220421150346.zip CR00100-test_board-quartus_21.1.0-20220421150419.zip	Thomas Dück	• update to Quartus Prime Lite 21.1
2021-02-25	20.1 Lite	CR00100-test_board_noprebuilt-quartus_20.1.1-20220225103813.zip CR00100-test_board-quartus_20.1.1-20220225104254.zip	Thomas Dück	• initial release

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	21.1	needed
NIOS II SBT for Eclipse	---	optional

Software

Hardware

Complete List is available on *<project folder>/board_files/*_board_files.csv*

Design supports following modules:

Module Model	Board Part Short Name	PCB Revision Support	DDR	QSPI Flash	EMMC	Others	Notes
CR00100-01-DBC82A*	08_C8_8MB	REV01	8MByte	--	--	--	--
CR00100-01-FBC82A	16_C8_8MB	REV01	8MByte	--	--	--	--

*used as reference

Hardware Modules

Design supports following carriers:

Carrier Model	Notes
---	

*used as reference

Hardware Carrier

Additional HW Requirements:

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

*used as reference

Additional Hardware

Content

For general structure and usage 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
Software-Application-File	*.elf	Software application for NIOS II processor system
Diverse Reports	---	Report files in different formats

Prebuilt files (only on ZIP with prebult 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:

- CR00100 "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.

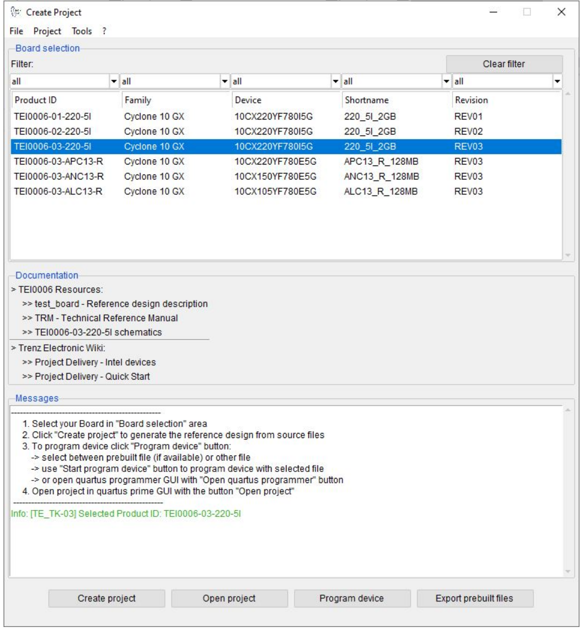
See also:

- 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 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:



Product ID	Family	Device	Shortname	Revision
all	all	all	all	all
TEI0006-01-220-5I	Cyclone 10 GX	10CX220YF780I5G	220_5I_2GB	REV01
TEI0006-02-220-5I	Cyclone 10 GX	10CX220YF780I5G	220_5I_2GB	REV02
TEI0006-03-220-5I	Cyclone 10 GX	10CX220YF780I5G	220_5I_2GB	REV03
TEI0006-03-APC13-R	Cyclone 10 GX	10CX220YF780E5G	APC13_R_128MB	REV03
TEI0006-03-ANC13-R	Cyclone 10 GX	10CX150YF780E5G	ANC13_R_128MB	REV03
TEI0006-03-ALC13-R	Cyclone 10 GX	10CX105YF780E5G	ALC13_R_128MB	REV03

> TEI0006 Resources:
>> test_board - Reference design description
>> TRM - Technical Reference Manual
>> TEI0006-03-220-5I schematics

> Trenz Electronic Wiki:
>> Project Delivery - Intel devices
>> Project Delivery - Quick Start

```
--------------------------------------------------------
  1. Select your Board in "Board selection" area
  2. Click "Create project" to generate the reference design from source files
  3. To program device click "Program device" button:
    -> select between prebuilt file (if available) or other file
    -> use "Start program device" button to program device with selected file
    -> or open quartus programmer GUI with "Open quartus programmer" button
  4. Open project in quartus prime GUI with the button "Open project"
--------------------------------------------------------
Info: [TE_TK-03] Selected Product ID: TEI0006-03-220-5I
```

'Create Project' GUI example

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.

MAX10 Flash

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

JTAG

Not used on this example.

Usage

1. Prepare HW like described on section Programming
2. Connect UART USB (most cases same as JTAG)
3. Power on PCB
4. Press user button 'S2' to toggle between two frequencies for the blinking led 'LED2'

UART

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

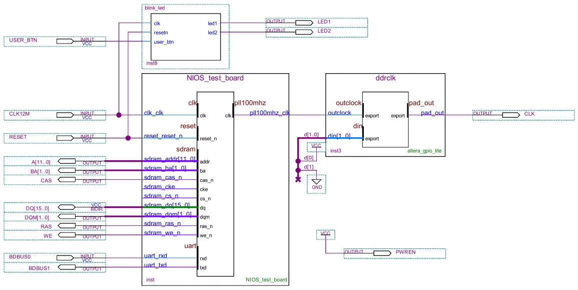
   > Win OS: see device manager
   >
   > Linux OS: see dmesg | grep tty (UART is *USB1)

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

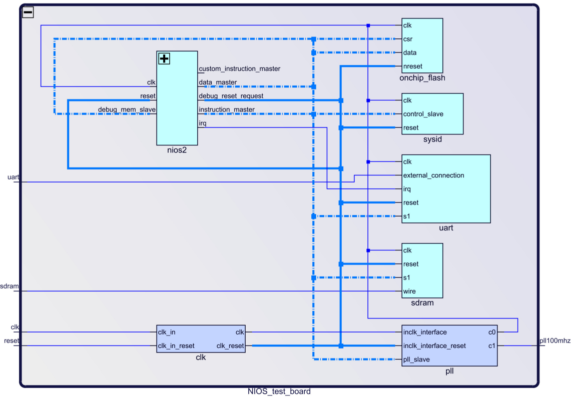
System Design - Quartus

Block Design

The block designs may differ depending on the assembly variant.



Block Design - Project



Block Design - Platform Desginer

Software Design - SDK

Application

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

hello_cr00100

This is a Hello World example as endless loop instead of one console output.

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
Error rendering macro 'page-info' Ambiguous method overloading for method jdk.proxy241.$Proxy3496#hasContentLevelPermission	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk.proxy241.$Proxy3496#hasContentLevelPermission	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk.proxy241.$Proxy3496#hasContentLevelPermission	• update to Quartus Prime Lite 21.1

. 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,	. 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,	. 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]	class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]	class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]	
2022-03-01	v.4	Thomas Dück	- initial release 20.1
--	all	**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.ContentEntityOb	

		ject]	

Document change history

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