Cyclone II EP2C5 Mini Dev Board

Contents

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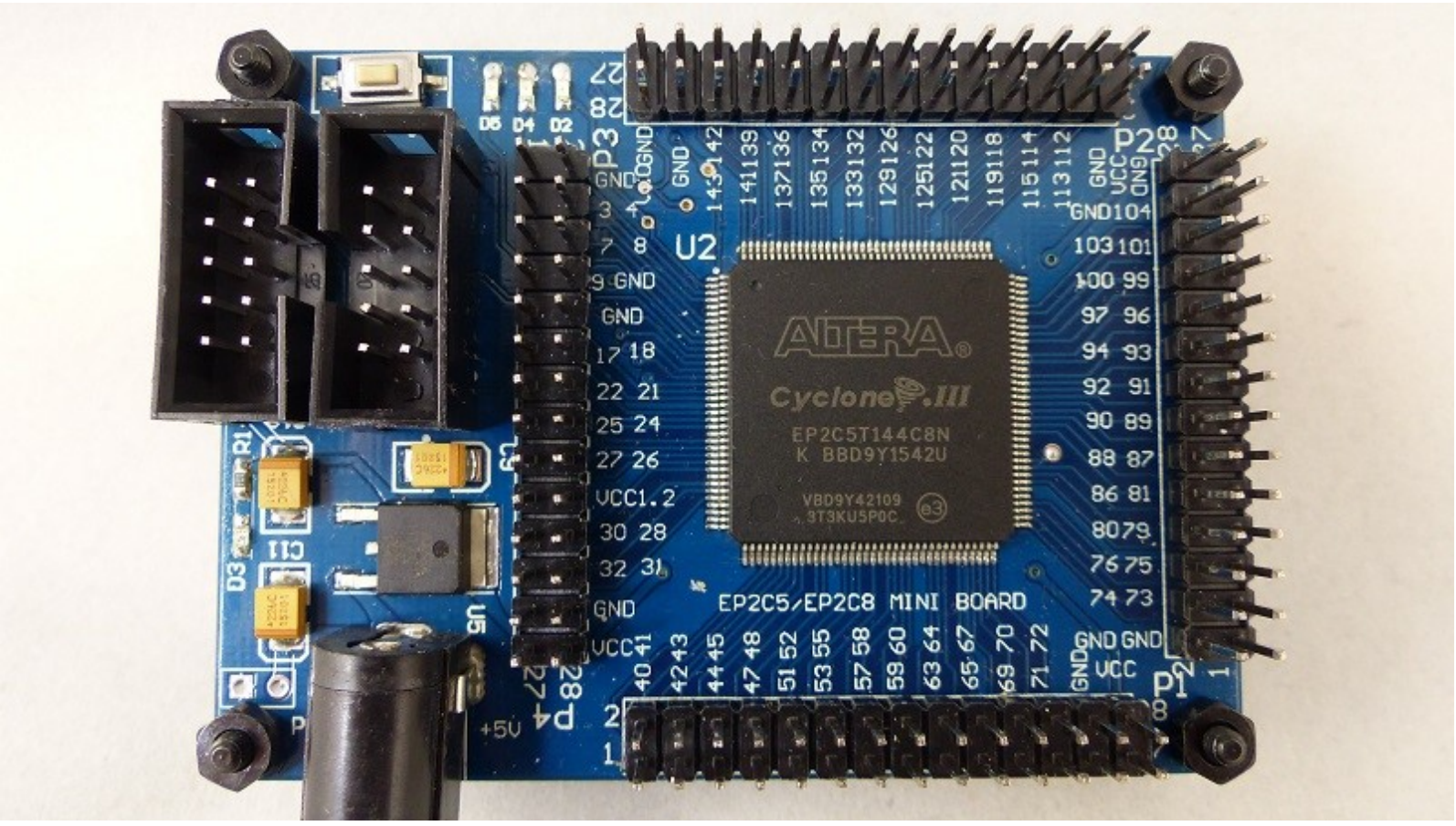
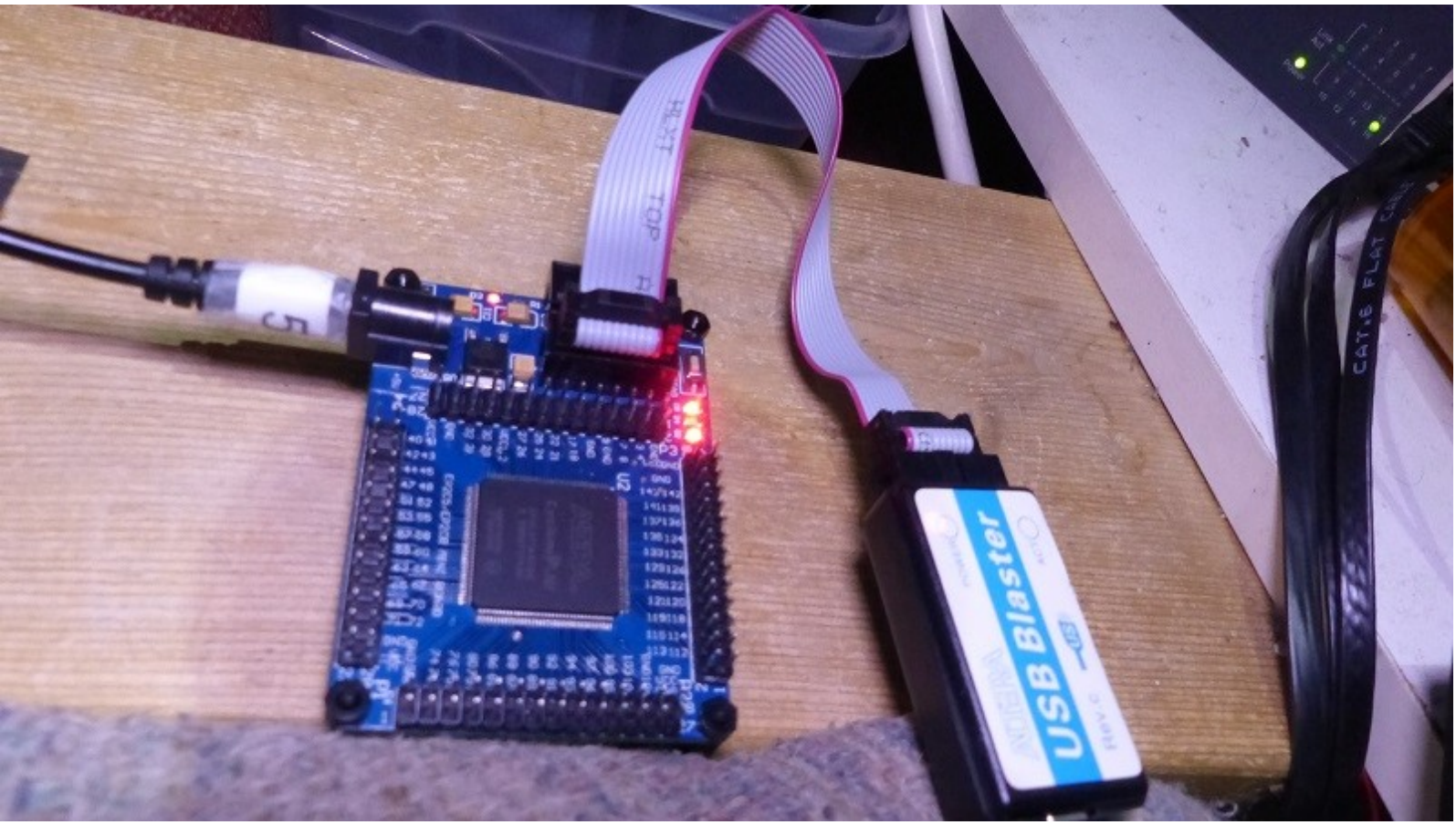


Features

- FPGA part is EP2C5T144C8 (marking is EP2C5T144C8N)
- 80+ I/O pins
  - (4) 14x2 headers (0.1" pitch)
- EPCS4 for configuration EPROM (4 Mbit)
- 5 VDC power supply
  - 5V only operation
  - 2.1mm DC socket

- (3) LEDs
- Button
- 50 MHz crystal oscillator (clock)
- JTAG/SWD connectors
- LED for power indication
- 60mm*80mm

Part Specific Programming



- Land Boards GitHub repo (https://github.com/douggilliland/EP2C5-Cyclone-II-Mini-Board)
- Quartus II 64-bit Edition 13.0.1 SP 1 Web Edition
  - Quartus II Handbook (pdf) (https://courses.cs.washington.edu/courses/cse467/15wi/docs/Quartus_II_Handbook.pdf)
- Upload temporary program over JTAG
  - Does not remain after power cycling
- Upload to EPROM over ASM
  - Remains after power cycling

I/O Pin Mapping

FPGA Pin	Function	Notes
3	D2 LED	Low to Light LED
7	D4 LED	Low to Light LED
9	D5 LED	Low to Light LED
144	Pushbutton	Push to ground, no external pullup. Set internal pullup on FPGA configuration if used.
17	50MHz clock input	
73	10uF capacitor to ground	10K resistor to Vcc, for power up reset if needed?
26	Connected to Vcc 1.2V	Only needed for EPC28. The "zero ohm" resistor could be removed and the pin used as normal.
27	Connected to GND	Only needed for EPC28. The "zero ohm" resistor could be removed and the pin used as normal.
80	Connected to GND	Only needed for EPC28. The "zero ohm" resistor could be removed and the pin used as normal.
81	Connected to Vcc 1.2V	Only needed for EPC28. The "zero ohm" resistor could be removed and the pin used as normal.

Quartus II Notes

- Project > Copy Project to create a separate copy of your project, rather than just a revision within the same project
- VHDL Examples

Requirements

- Cyclone II EP2C5 Mini Dev Board (http://www.ebay.com/itm/142101985664?_trksid=p2057872.m2749.l2649&ssPageName=STRK%3AMEBIDX%3AITEP2C5T144C8N) - Boards on Ebay
- USB Blaster (http://www.ebay.com/sch/i.html?_odkw=usb+blaster&_sop=15&LH_BIN=1&LH_FS=1&_osacat=0&_from=R40&_trksid=p2045573.m570.l1311.R2.TR6.TRC1.A0.H1.TRS1&_nkw=usb+blaster+altera&_sacat=0)
- 5V Power Supply, either
  - 5V Wall Wart (http://www.ebay.com/sch/i.html?_odkw=5v+DC+ac&_sop=15&LH_BIN=1&LH_FS=1&_osacat=0&_from=R40&_trksid=p2045573.m570.l1313.TR0.TRC0.H0.Xpower+adapter+5v+DC+ac.TRS1&_nkw=power+adapter+5v+DC+ac&_sacat=0), or
  - USB to 5V cable (http://www.ebay.com/sch/i.html?_sop=15&_from=R40&_sacat=0&LH_BIN=1&_nkw=usb%205v%20DC%202.1mm%20cable&rt=nc&LH_FS=1&_trksid=p2045573.m1684)

Comparison of EP2 and EP4 Boards

Feature	EP2C5	EP4CE6	Delta (%)
RAM (bits)	119808	270000	125.36%
RAM (bytes)	14976	33750	
Logic Elements	4608	6272	36.11%
LAB	288	392	36.11%
I/Os	89	91	
Freq (Mhz)	260	200	
Cost (chip/Mouser)	$14.72	$11.95	-18.82%

Links

- Getting started with the EP2C5 Cyclone II Mini Board (http://www.leonheller.com/FPGA/FPGA.html) - Quick start
  - Board Schematic Diagram.pdf (http://www.leonheller.com/FPGA/EP2C5T144mini.pdf)

- Cyclone II Device Handbook (pdf) (https://www.altera.com/content/dam/altera-www/global/en_US/pdfs/literature/hb/cyc2/cyc2_cii5v1.pdf)
- Cyclone® II EP2C5 Device Pin-out (pdf) (https://www.altera.com/content/dam/altera-www/global/en_US/pdfs/literature/dp/cyclone2/ep2c5.pdf)
- EP2C5 core board test.zip (https://www.openimpulse.com/blog/wp-content/uploads/wpsc/downloadables/EP2C5-core-board-test.zip)
- EP2C5T144E Diagrams.zip (https://www.openimpulse.com/blog/wp-content/uploads/wpsc/downloadables/EP2C5T144E-Diagrams.zip)
- UK101 FPGA based computer (http://searle.hostei.com/grant/uk101FPGA/index.html)

Videos

- Cyclone II FPGA Overview (https://youtu.be/Uss6RKC9KaM)
- Tutorial Video (https://www.youtube.com/watch?v=le6Jo5DpLao) - Getting Started with VHDL and the Cyclone II EP2C5 Mini Dev Board
  - Video uses Quartus II 11.1 SP 2
- Breadboard To Cyclone II Wiring (https://youtu.be/dToTM6GE-Uc)
- Cyclone II - Breadboard Inputs and Outputs (https://youtu.be/4E6_-8fmmWg)
- Altera Cyclone II EP2C5T144 FPGA Mini Board (https://youtu.be/ZVbPpyMeOTU)
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