

DE1-SoC Board Related Information

EECE-4740 VHDL and FPGAs
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1. Installing USB-Blaster driver

It is possible (it happened on my laptop) that after installing Quartus 17.1 and opening for the first time the Programmer in a first project to see “No Hardware”, and even if you wanted to do Hardware Setup not to be able to find the USB-Blaster. This is because the USB-Blaster driver was not installed properly, for some unknown reason. You can check if that is the case by opening the Control Panel -> System -> Device Manager and observing whether the Altera USB-Blaster JTAG cable driver is ok or not. If the driver is not installed properly, then, install it again manually within the Control Panel and provide the corresponding location, which in my case is: `C:\intelFPGA_lite\20.1\quartus\drivers\usb-blaster`

2. Programming of DE1-SoC Board

First, download the user manual of the board and store it so that you have it available quickly all the time throughout the semester. I placed its PDF on D2L, but you can also download it directly from here: <http://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=167&No=836&PartNo=4>
Note, that you should download the revision E manual : “**DE1-SoC User Manual(rev.E Board)**”

There are **two modes** to program the DE1-SoC board:

- **Use JTAG via USB-blaster**; see pages 14-18 of the manual. Essentially, once you opened the Programmer, you click Auto Detect, then Select Device 5CSEMA5, then click Ok, then right click on the 5CSEMA5 circuit box, select Edit -> Change File and select the **.sof** file from the **output_files/** folder. Finally, click Start button of the Programmer to program the FPGA device.
- **Configuring the EPCS128 in Active Serial (AS) mode**; see pages 18-19 of the manual!

3. Programming of DE2-115 board (**Not Used in Spring 2021**)

There are **two modes** to program the DE2-115 board. This info is from the user manual that you can download from here: <http://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=139&No=502&PartNo=4>

- **Use JTAG via USB-blaster**; see page 32 of the user manual

- **Configuring the EPCS64 in Active Serial (AS) mode;** see page 33 of the manual. Active Serial (AS) Mode Programming is useful to keep the program when FPGA is disconnected from the power supply. To program in AS mode, do this:

> **a)** Assignments->Device...; Click on "Device & Pin Options" button; and click on the "Configuration" tab; then select Configuration Active Serial (if it's not already selected); then, in the "Configuration Device" dialog, check-mark "Use configuration device" and then select from the pull down menu EPSC64. Then recompile your project. This will generate .pof configuration file too, which normally is not generated by Quartus. This .pof file you will use to configure the FPGA; see page 33 of the user manual of the de2-115 board.

> **b)** Set the RUN/PROG slide switch to PROG.

Open Programmer, select Mode and pick Active Serial Programming; then, and "Add Device..." and pick Chip EPCS64. Finally click on "Change File..." and look for the .pof file in your project's output_files/ directory. Select it. Then hit "Start" to program; you will note that this is a bit slower.

> **c)** Once the programming operation is finished, set the RUN/PROG slide switch back to the RUN position and then reset the board by turning the power switch off and back on; this action causes the new configuration data in the EPCS64 device to be loaded into the FPGA chip.