

3. Getting the board started

1. Once you have made your design and verified it using the waveform simulator, the next thing you need to do is connect a Terasic board and get it running.
2. The Terasic boards are kept in boxes inside the DSD cupboard (the one on the right) at EE103. Inside the box you will find everything you need to connect the board to the PC and get it running. Please check the board assignment list for your section and find the board number assigned to you. Please stick with using this board only for the rest of the semester, unless you encounter a problem. In such a case, document the problem the best you can and inform your section TA.



2.



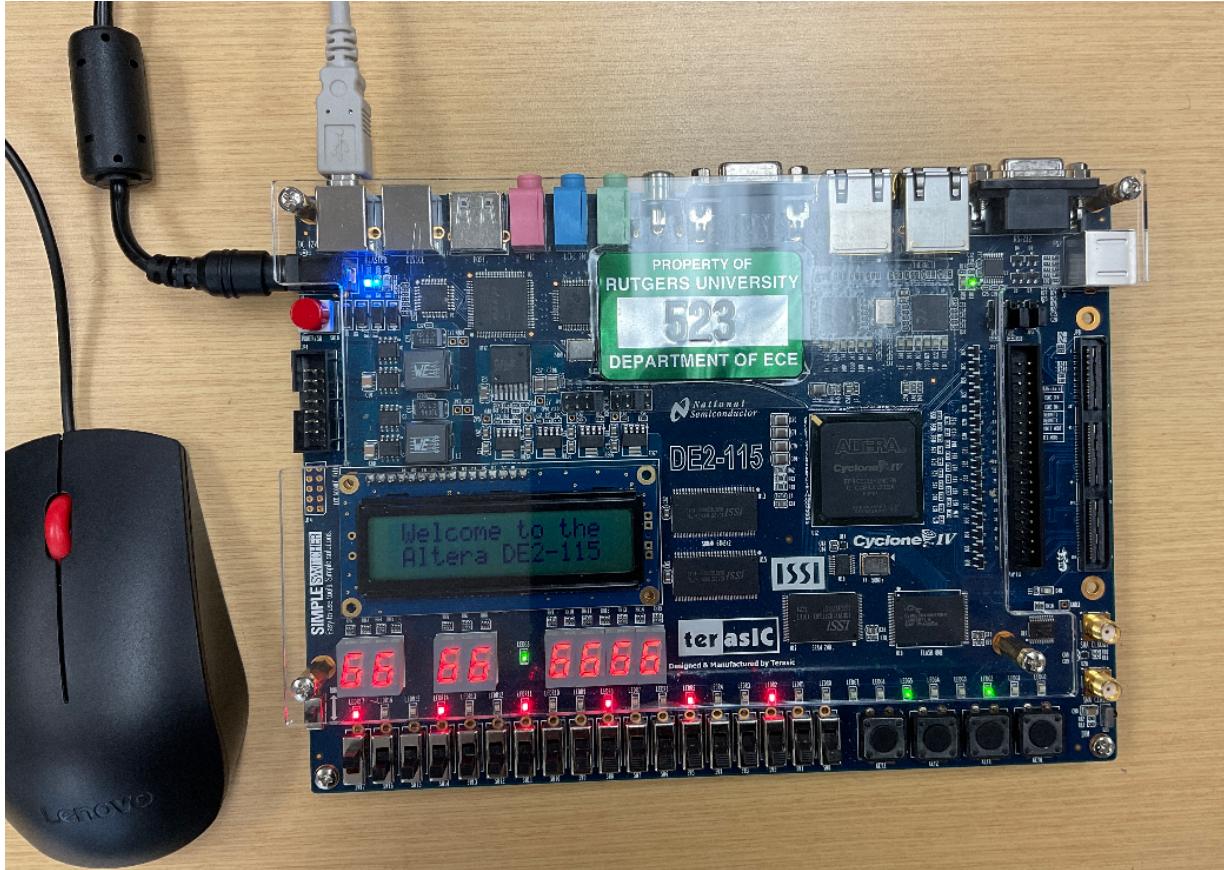
3.



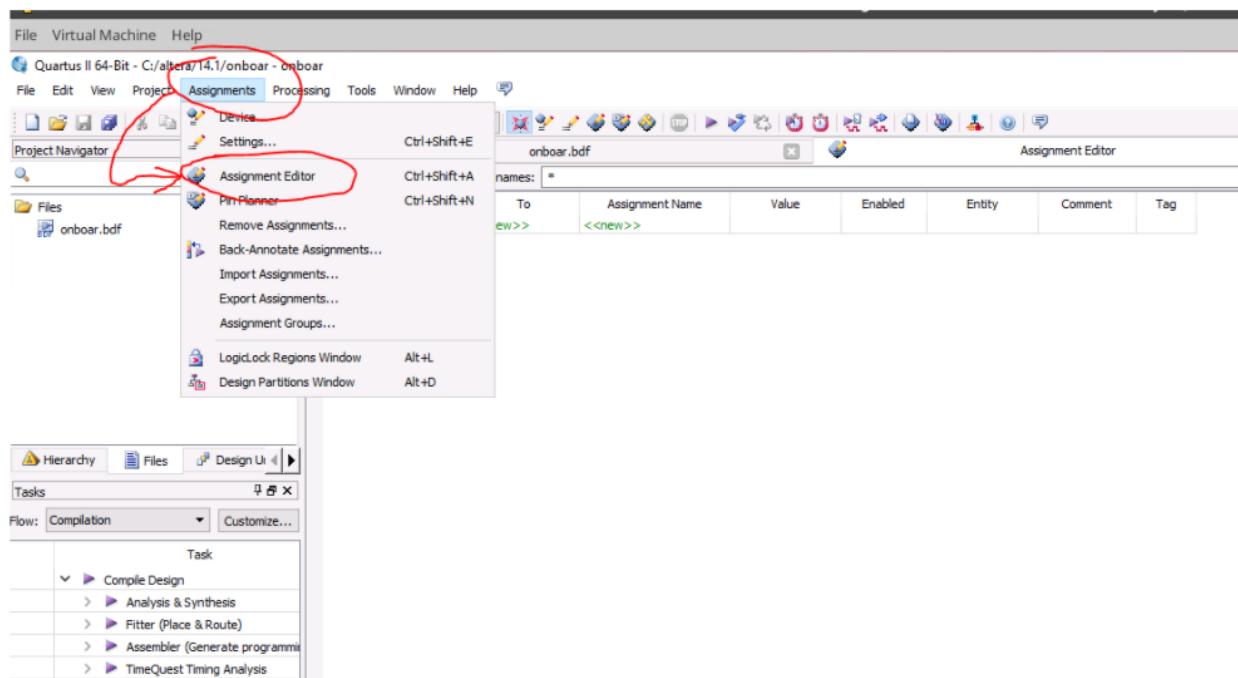
4.



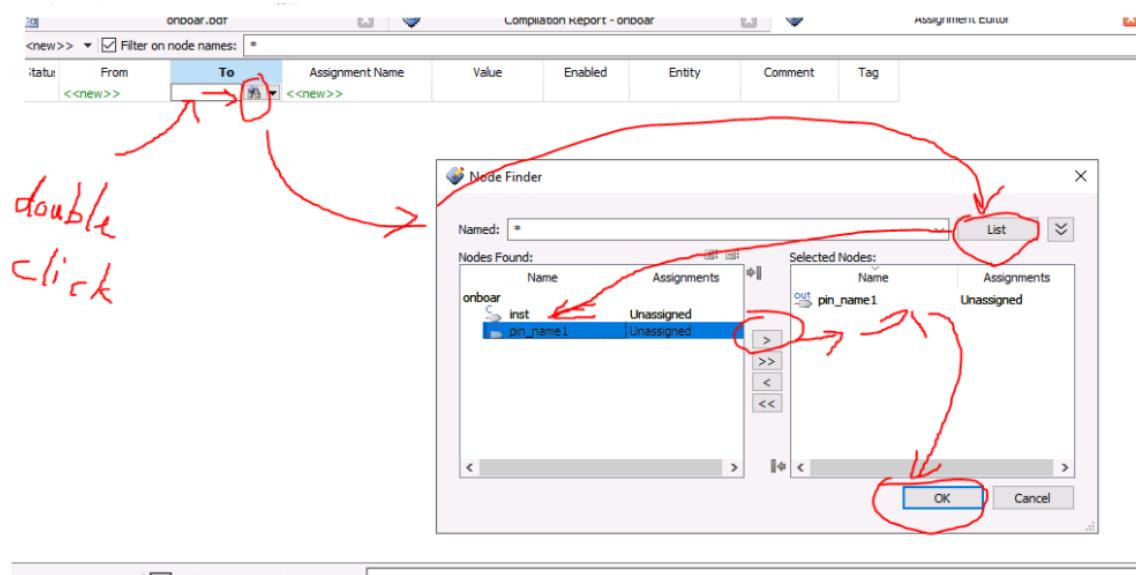
3. The white cable is used to connect the board to the PC via USB. The black cable is the power adapter for the board. These cables connect to the board near the BIG ROUND RED button. Once the board is plugged into the PC and the mains power, press the BIG ROUND RED button to turn it on. The board should light up and look like the one below-



4. The board is now ready for you to download your code on it and test your design. After you have completed your Block Design and are satisfied with the simulation results, the next step is to Assign Pin Locations on the board for each of the inputs and outputs. To do this, go to the **Assignments drop down menu** in the top bar on Quartus and select Assignment Editor.



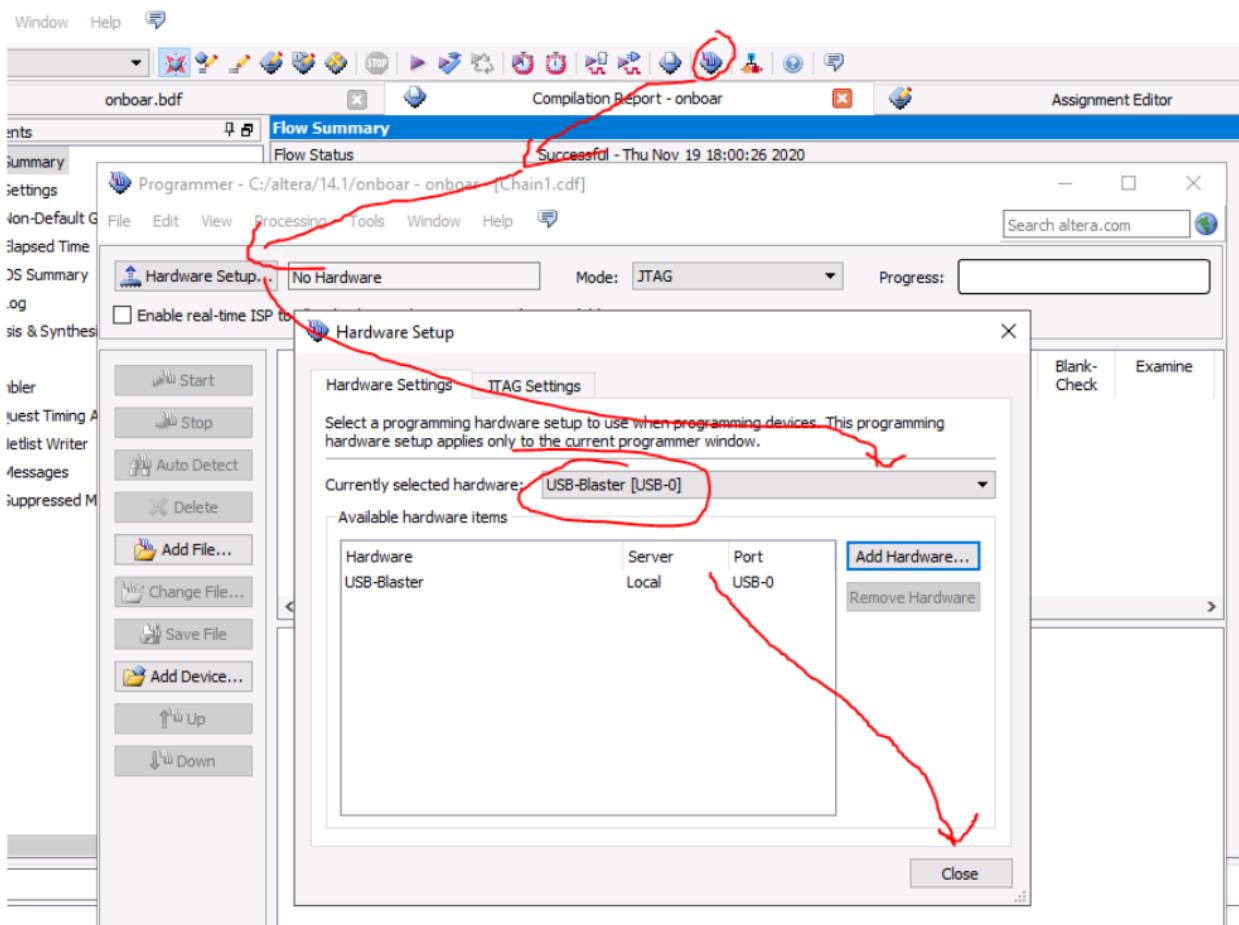
5. Now you need to add the nodes from your design to the Assignment Editor. To do this, double click on the To field (where it says <<new>> in green) and then click on the small binoculars button that appears in the same field. You will see a Node Finder Dialog box that looks similar to what you see when simulating waveforms. First hit the List button in the top right corner. In the list that appears on the left select all the relevant pins and disregard the **inst** node in the nodes list. Then hit the > button in the center to move the selected nodes to the list on the right. Once you are done, click OK.



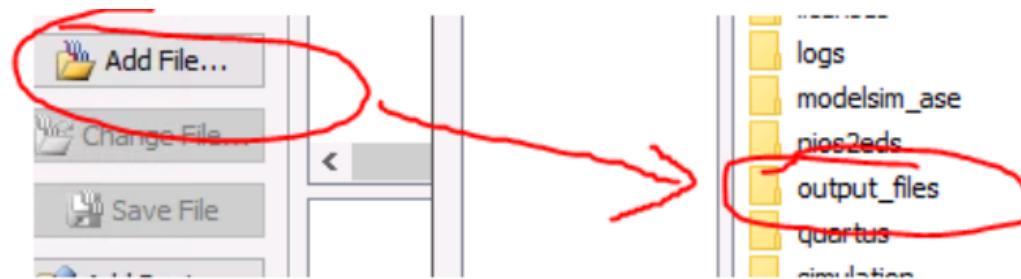
6. Once the nodes are added to the Assignment editor, you now need to specify the appropriate pin locations for these nodes on the board. Refer to the lab assignment and the Terasic user manual to find the exact pin location. Once you have that information for one node, first click on the field for Assignment Name (where it says <<new>> in green) and select **Location** from the drop down menu that appears. Then enter the Pin number from the manual in the field for **Value** for that node.

<<new>>		<<new>>		<<new>>		<<new>>		<<new>>	
Status	From	To	Assignment Name	Value	Enabled	Entity	Comment	Tag	
1 ✓		out	pin_name1	Location	PIN_G18	Yes			
2	<<new>>	<<new>>	<<new>>	<<new>>					

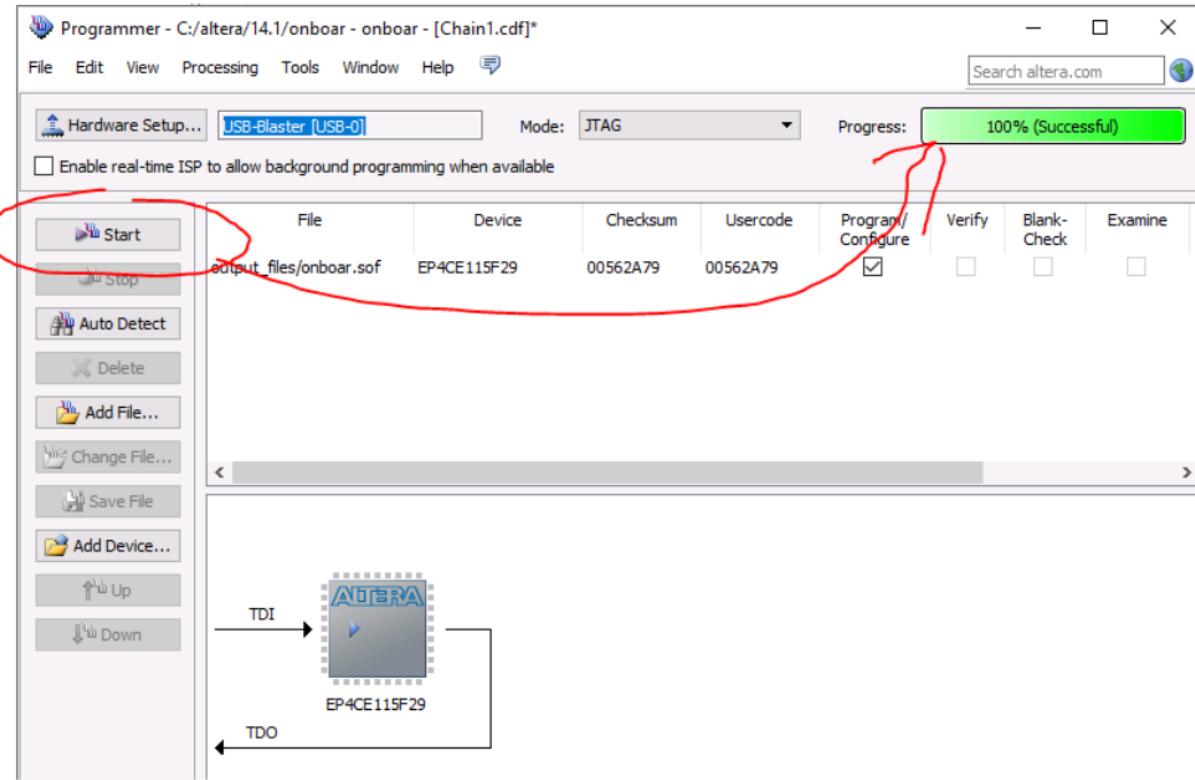
7. Once you have done this for all the nodes, hit save and then compile. Now you need to download these settings to the board. To do this, click on the Programmer button highlighted in the picture below. In the dialog box that appears, select Hardware Setup in the top left corner. From the drop down list in **Currently selected hardware** field, select USB-Blaster and then hit Close to save your selections.



8. Once you have set the hardware, you now need to add files that are to be downloaded to that hardware. So go ahead and hit **Add File** option in the left column off the Programmer Dialog box. In the browser window that opens, select **output_files** folder and then select the **.sof** file in that folder. Hit open.



9. Now you just need to hit **Start** from the left column of the Programmer Dialog Box and wait for the downloading to complete successfully.



10. Now your code has been downloaded on the Terasic board. You can now go ahead and test your design on actual hardware. Test all possible input combinations and verify that you get the expected output.

11. Once you are satisfied with your design, have the lab instructor verify your design.

12. This marks the completion of the verification of your design on Terasic board.