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TERM: Spring,2022

Module: EE1616 Electronics Workshop

CLASS: 34092102

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Introduction and aims:

In this seminar, I'm further realize Quartus II. Under the guidance of the teacher, I use the two FULL ADDERS to create a 2-bit ADDER. Then, it's the same as the last class, compile the project and simulate a waveform. Finally, I copy this program to FPGA, let the 2-bit ADDER have an intuitive display.

Task description:

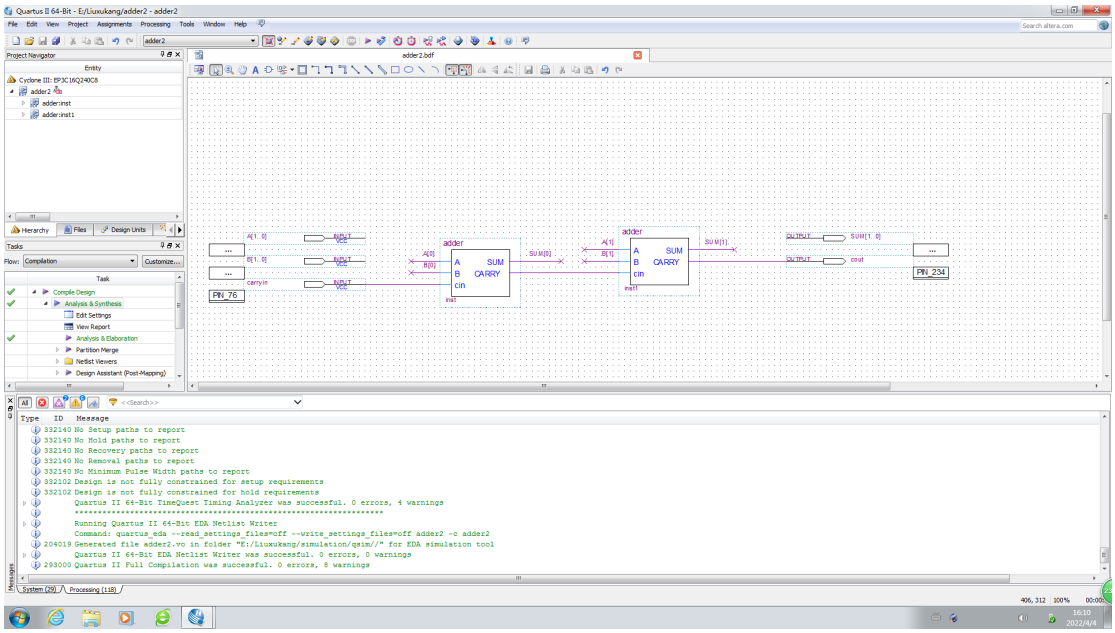
1. Find the file which completed in the previous lesson and open it. Create a symbol files for current file and do not change anything in saving window.
2. Create a another top-level BDF, enter two symbols , which I just saved according to the content of last class. Create some other basic gates and connect each symbols with orthogonal line tool. Then name each symbols.
3. After making the BDF, start compiling the project and check mistakes, until it is successfully compiled. Create a waveform to simulate it and check it with truth table.
4. Connect computer and Altera Device, programme my design onto an Altera device. Choose appropriate pins to ensure the successful operation of the project.

Experimental method:

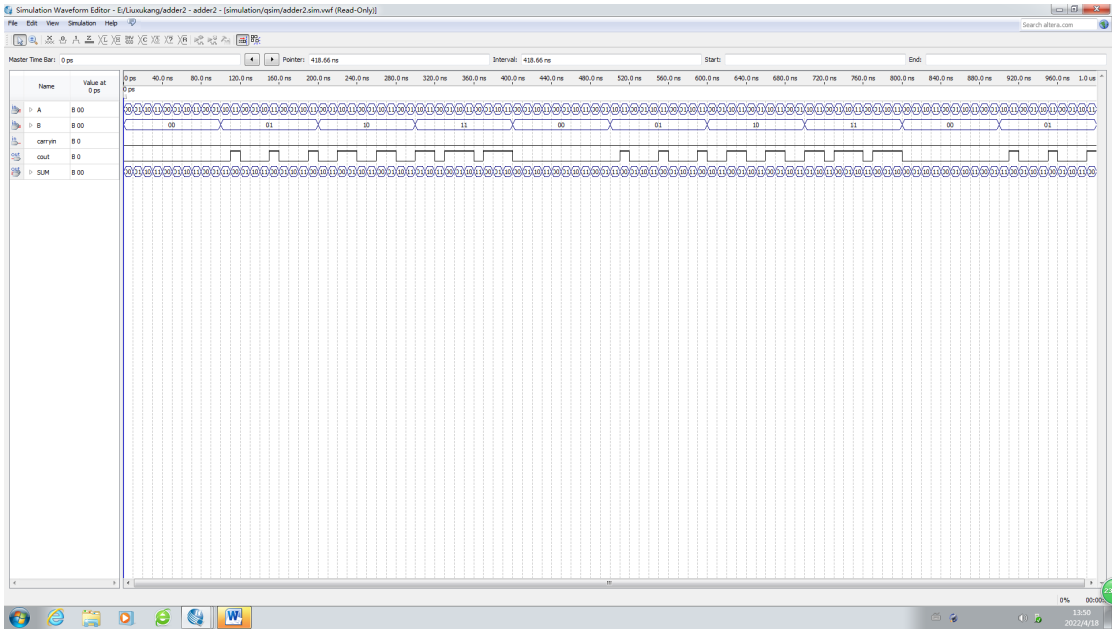
1. Create a symbol for the full ADDER circuit, ensure that we can use it easily.
2. Creat and connect each symbols with the correct order.
3. Compile and simulate it, make sure that the project have no problems.
4. Connect the FPGA board to computer and power on it. choose correct pins and compile.
5. Switch keys on the FPGA board and observe the LED, test your design.

Results and observations:

Draw the appropriate digital circuit diagram with required symbols.



Create a waveform to simulate the project



Check with the truth table

Point 1: 115.0ns

A=11 B=01 carry in=0 cout=1 SUM=0 Correct

Point 2: 235.0ns

A=11 B=10 carry in=0 cout=1 SUM=01 Correct

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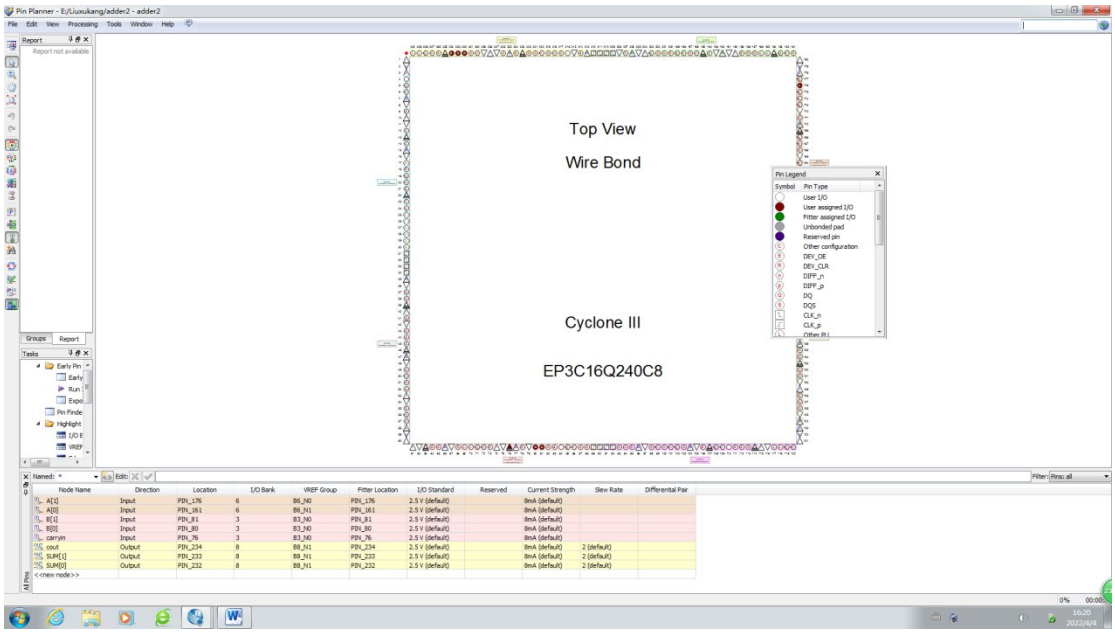
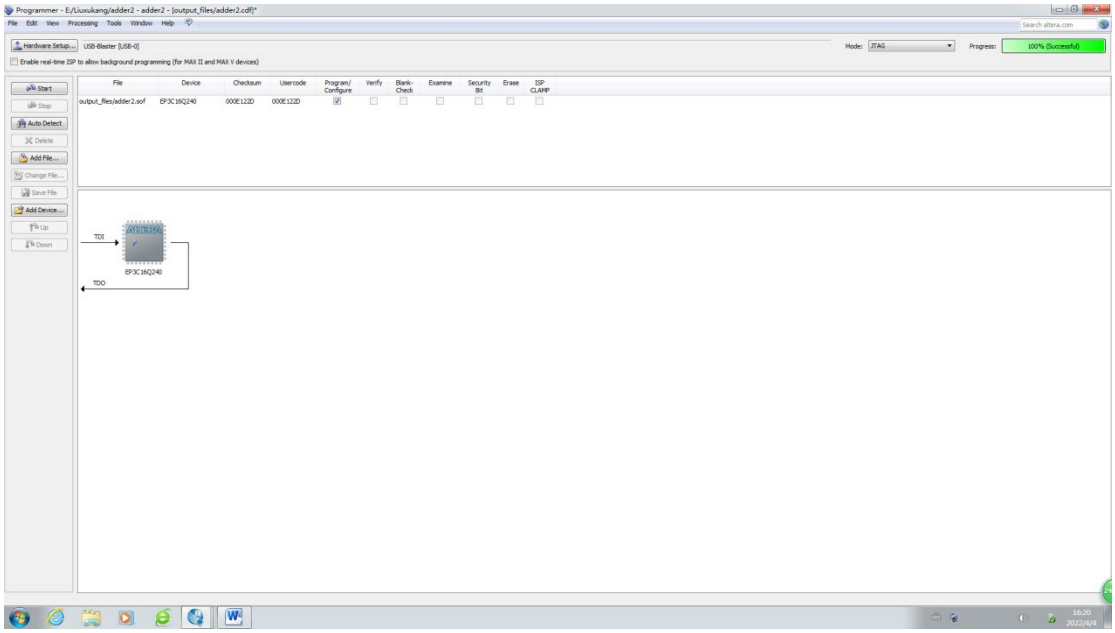
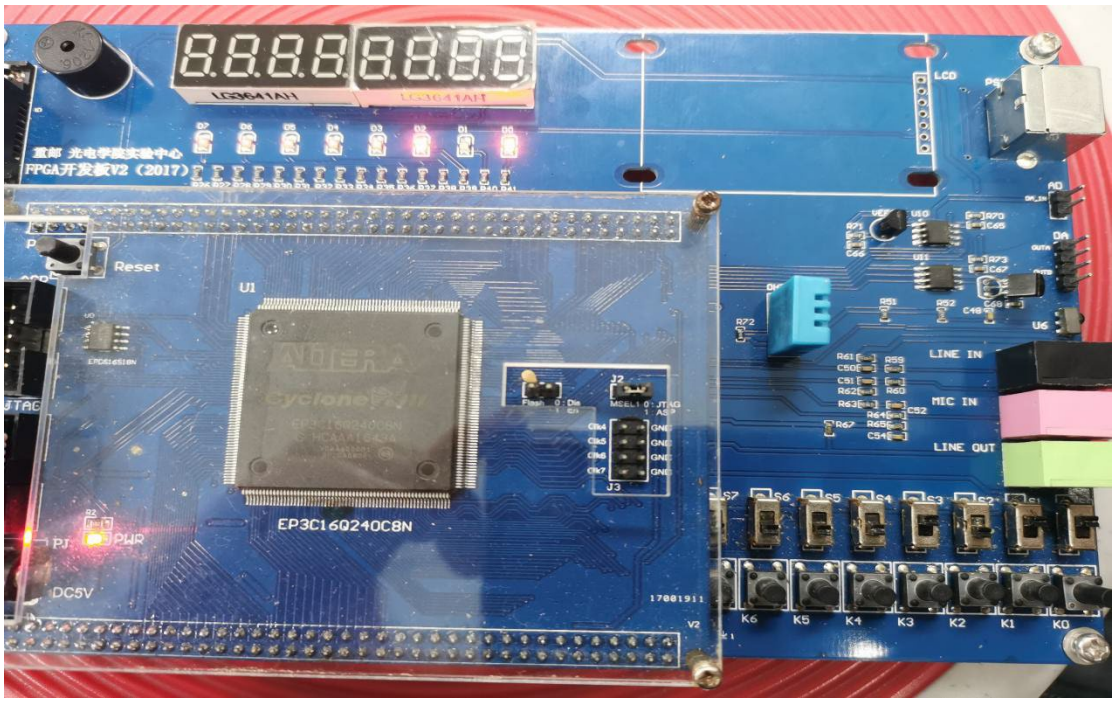
Select appropriate pins to programme an Altera device

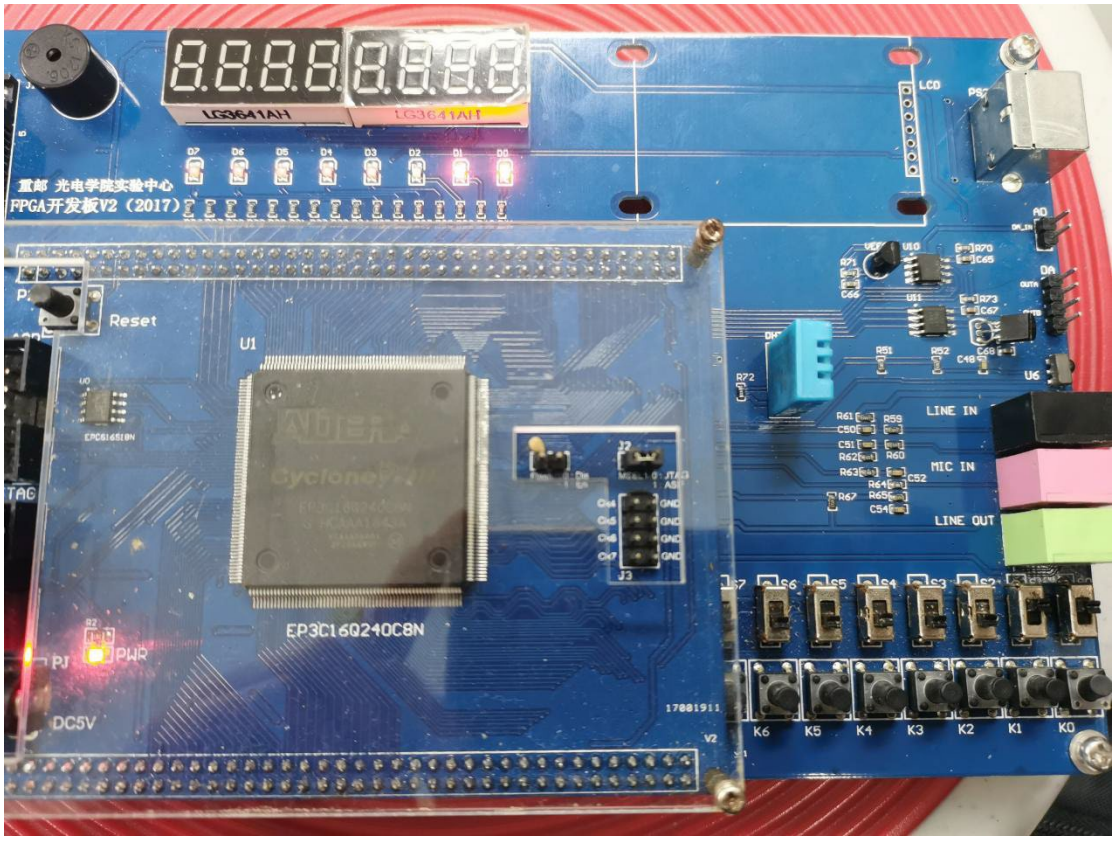


Connect the FPGA board to computer and test the design.



My results show





Conclusion:

Through this workshop, I learned how to create a default symbol and know the function of encapsulation. I also further learned the adder circuit and how to program the design onto the Altera device. Focus on the waveform and actual results, I checked my waveform against the truth table and find that the waveform is correct, so I powered it on the FPGA board. Through the control of the switch, I could see the light on and off of the LCD lamp, and finally came to a successful conclusion. During using Quartus II to complete the plan, I encountered some difficulties. When I compile the project, the system always reports an error, under the gudience of my teacher, I find that

two full ADDER have the same order number, I didn't notice that at all. So when I devised it and compile, it's true. Moreover, when I programme the Altera Device, I don't konw the function of pins. I readed the handout and ask my classmates for advice, finally I got it. The experience made know that what is the operation of pins in the FPGA board.