

# Hands-On Hardware Security

## Frequently Asked Questions

## FAQ about the Microcontroller

1. Q: After I program the Microcontroller and turn off the board, will the program remain in the Microcontroller?

A: Yes.

2. Q: Why is my program for the Microcontroller not working as soon as I succeeded in programming it?

A: Your program will not be running until you reboot the board.

3. Q: I cannot program the Microcontroller. Why?

A: You could have made these mistakes:

You use the wrong USB port. You must use J1, instead of J18.

Or, you turned on S12 and reset the chip. You should turn it off.

Or, you turned on S14 and power the Microcontroller with an adjustable voltage source. You should turn S14 to 3.3F.

4. Q: Why is the Microcontroller not running the code I programmed after I reboot the board?

A: To run the code, you should:

- a. Connect the PE2 pin to VDD before you reboot for HAHA SEP 1.
- b. Put switch S15 to *APP* before you reboot for HAHA SEP 3.

5. Q: Why I cannot re-program the Microcontroller? It seems it is always running the code I programmed last time.

A: To re-program the chip, you should:

- a. Ground the PE2 pin before you reboot for HAHA SEP 1.
- b. Put switch S15 to *TEST* before you reboot for HAHA SEP 3.

## FAQ about the FPGA

1. Q: Which version of Quartus should I install to program the FPGA?  
A: Version 15 or higher. You get download it from Intel Quartus website.
2. Q: Why I cannot detect the chip with the USB Blaster plugin?  
A: You should install the driver file for the USB Blaster. The version you install should be compatible with the USB Blaster you use. If you are using the one you got from the TA, you should find the driver file in Quartus 13.1.
3. Q: I created the bitstream file, but why I cannot program with it?  
A: You should make sure you chose the correct device part number when you were building the project. You can find the number on the marking of the chip.
4. Q: After I program the FPGA and turn off the board, will the program remain in the FPGA?  
A: It depends. If you programmed it with a SOF file, it will be lost after power off. If with a POF file, it will stay.
5. Q: Which kind of file is recommended to program the FPGA?  
A: The SOF file is recommended. You can program with a POF only if you are 100% sure your design will do no harm to the board. Each of the I/O ports of your design should be assigned to a pin number.
6. Q: Why that I cannot see any output from the FPGA?  
A: You may forget to assign signals to the pins.
7. Q: When I am measuring the temperature with FPGA, I see the result is always 39 in hex, why?  
A: You should use the single cycle mode of the sequencer of the ADC. Refer to the datasheet to see how to configure that.
8. Q: When I finish reading the values in the In-System Memory Content Editor and close the window, the whole Quartus crashes, why?  
A: Stop auto updating the values before you close the window.

## FAQ about the Experiments

1. Q: For a variable in Verilog, where is the LSB?  
A: LSB means least significant bit. No matter how the variables are declared, the LSB is always on the right side. For example, the LSB for aaa [1:8] is aaa[8], and the LSB for bbb [63:0] is bbb[0].
2. Q: When I am trying to see the power up values in the SRAM of the Microcontroller, I find every time they stay the same. Why?  
A: You must totally power off the board before you power up. Plug out both the USB cable and the USB Blaster.
3. Q: Why I cannot write or read from the EEPROM on the board.  
A: You may forget to configure the 'hold' pin of the EEPROM. Please refer to its datasheet for details.
4. Q: Why I cannot detect the Bluetooth module from the computer.  
A: You may forget to connect the header P11 with jumpers.
5. Q: In the bus snooping experiment, why don't I see any signal in the waveform?  
A: You may try zooming in with a higher time base.
6. Q: Why the ADC in the FPGA is not working well?  
A: Try to use the single cycle mode of the sequencer of the ADC.
7. Q: Do I need to use Qsys when implementing the ADC in the FPGA?  
A: You do not.
8. Q: When using the temperature sensor in the FPGA, I find the value and temperature relation do not match that of the FPGA datasheet, do I do anything wrong?  
A: Some of the chips have an offset in the value – temperature relation. You need to first figure out the true relation of your chip.