# ME 461 Prelab #6
# Fall 2017
# Due at the beginning of class on 10/25/2017, Question #1 is soldering and that must be completed by your lab day either 10/26/2017, 10/27/2017

**Suggested Reading:**

Review USCI I2C Mode Chapter in MSP430x2xx user's guide.
Linux Introduction Websites like http://community.linuxmint.com/tutorial/view/100
Lab 6 manual

1. With your partner, solder your microcontroller board. Most of the new circuits and connectors needed for the C.H.I.P. have been soldered to your board for you. Your job is to solder the wires and a few components that connect the C.H.I.P. to the MSP430. The solder instructions given below are the same instructions given at the beginning of Lab 6 Exercise 2. Also use the demo board as a guide. To get credit for this item you will need to show your finished board to instructor or TA. We will look over the board and tell you if it looks good or if it needs a bit of work.

    - Solder a wire from the TWI1.SCL pin of the C.H.I.P. to MSP430F2272 pin P3.2.
    - Solder a wire from the TWI1.SDA pin of the C.H.I.P. to MSP430F2272 pin 3.1.
    - Solder a wire from the "+3.3V" to any Vcc pin on the right of the board. This will power the MSP430F2272 when only the C.H.I.P.'s power is connected.
    - Solder a push button next to the MSP430F2272. This is a "Reset" button for the MSP430F2272 that is useful to restart your program when the debugger is not connected to the MSP430F2272.

At the end of Lab 6 Exercise 2 you are going to be asked to command the position of a RC servo motor. The steps below explain how to wire for the RC servo motor.

- At the top of your board you will find two spots, RC1 and RC2, for soldering and RC servo connector. First solder a three pin header to the top most pads of those three columns.
- The GND columns are already connected to ground through the traces of the board so you do not have to connect a wire to that column.
- The PWR columns are connected to each other but one column needs to be connected to 5V. Solder a wire from one PWR column to one of the +5V pins down in the C.H.I.P. area.
- The OUT column of RC1 needs to be connected to a PWM output. If you were driving a second RC servo then the OUT column of RC2 would need to be connected to a PWM output pin. But for this exercise we are going to drive only one RC servo so solder a wire from the RC1 OUT column to MSP430F2272 P4.1/TB1.

2. Linux Practice: If you do not have access to a Linux machine, use the Linux laptops at each bench in the lab with the default user and the password "f33dback5"

a. What command along with an option would you type to list all the files in a directory and more information like file date and file size?

b. What command is used to change to a new directory? What command prints the current directory you are in?

c. What command is used to copy a file in Linux? In the /home/<myusername> directory there is a file named “me461data.dat” and a directory named “me461stuff”. What command would you type to copy “me461data.dat” to the directory “me461stuff” with the new name “goodtest.dat”

d. What do the “more” and “cat” commands do? How are they different?

e. Check out the “nano” editor. How do you save the file you are editing in “nano”? How do you exit the “nano” editor?

f. Experiment with the “ifconfig” and “ping” commands. Using “ifconfig” can you figure out the IP of the Linux machine you are using? If you are in the lab “ping 192.168.1.1”. What is the response? If you are on a different Linux machine that is connected to the internet, type “ping www.google.com”. What is the response? The lab Linux laptops are connected to the lab local network by default and would not be able to see www.google.com.

g. Using the “date” command, how would you set the date to 12:30pm Oct. 19th 2016?

h. What does the “grep” command do? Come up with an example command line that uses “grep.”

3. Write the initialization code necessary to setup USCIB0 as an I2C slave serial port. Remember to put the serial peripheral in the reset state before writing to the other USCIB0 registers. Then when the initializations are done pull the USCIB0 out of reset. (One exception here. Writes to the IE2 register are ignored while the USCIB0 is in reset. Set the IE2 register after the USCIB0 is pulled out of reset. Set the USCIB0 as follows:

- Synchronous mode and I2C mode enabled.
- Slave Mode, Single Master environment, and own address is 7-bit.
- SMCLK as clock source, but since this is the slave I don’t think the clock source is used in slave mode.
- Setting the Baud/Bit rate is **NOT** necessary because the master dictates the transmission speed.
- Set the I2C Own Adress to the i2C address the Linux program is attempting to communicate with, 0x25.
- Pull the USCIB0 out of reset, and then initially enable only USCIB0’s receive interrupt.

4. Explain all the parts in the time graph below of an I2C transmission from the C.H.I.P. (Master) to the MSP430 (Slave). We will call this a single byte write. Label and comment on:

a. The START condition

b. The address bits. What address is being used?

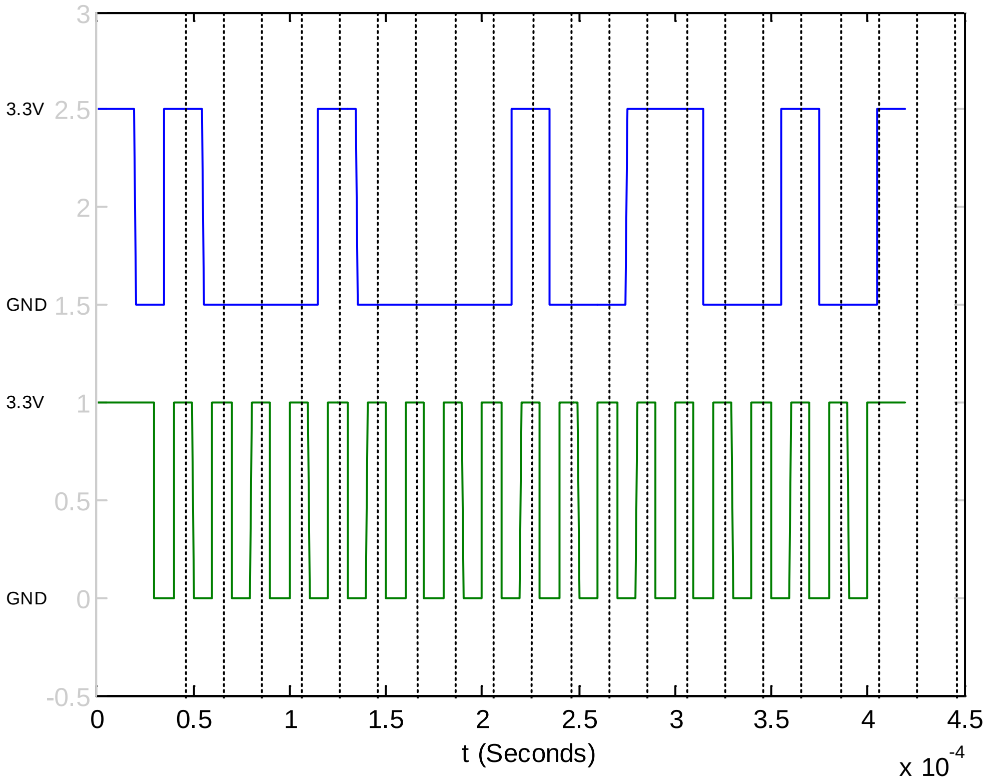
c. The Read or Write bit.

d. The address acknowledge.

e. The 8 data bits. What is the data's value?

f. The STOP condition.

g. From the I2C Master's (C.H.I.P.) perspective when is the SDA an output pin driving a signal and when is it an input pin?



5. Explain how a read of one character from Slave to Master, single byte read, is different from a single byte write in question 4. Remember the Master always initiates these read or write transmissions.