

# Project 2 Assembly Instructions

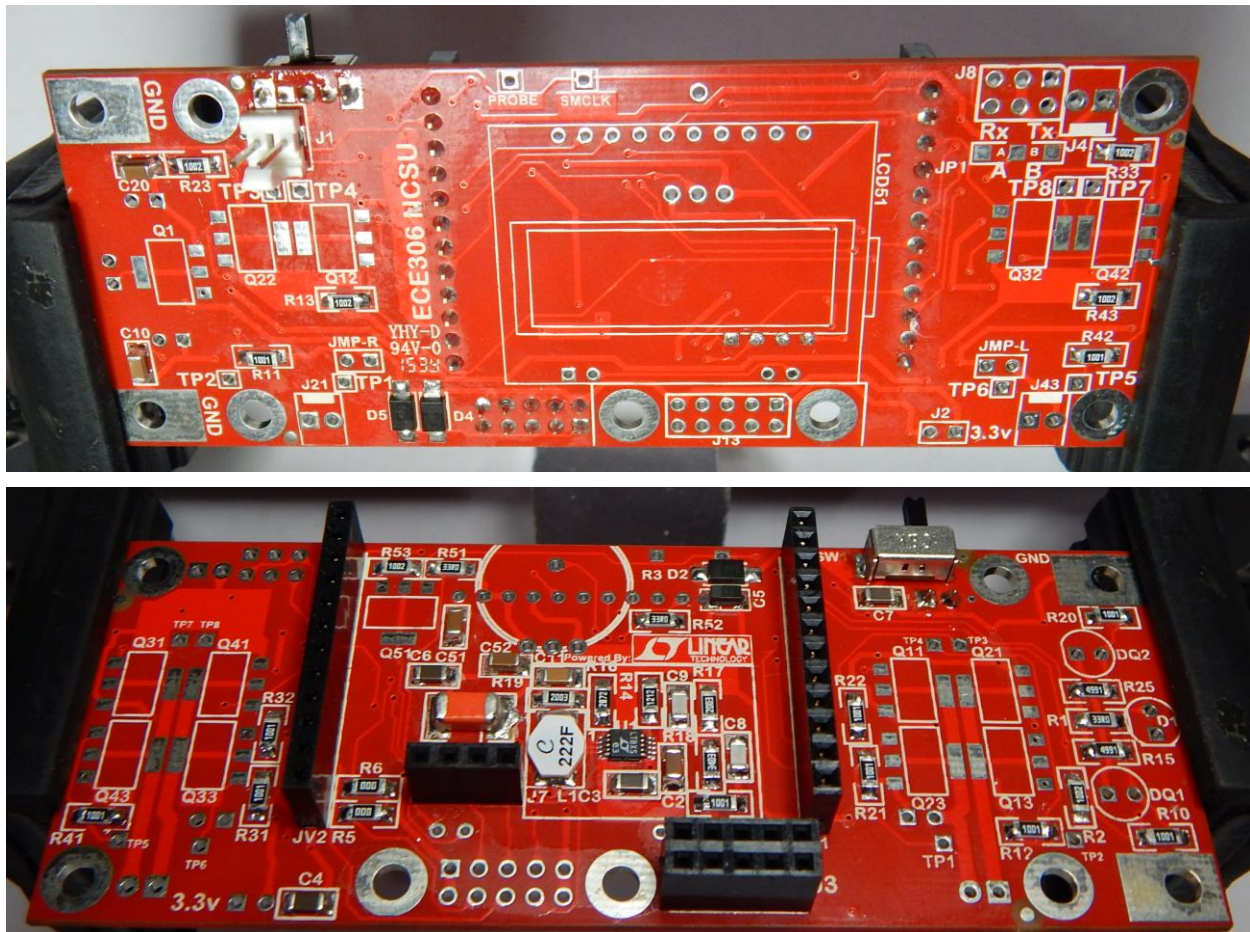
Rev 1 Initial Document

This document contains notes and information concerning the construction of the Control Board, modifications to the MSP430FR5739 board and general information pertinent to Project 2. The steps are presented in the order of easiest assembly. It is suggested to use what is relevant to your needs. This document ONLY covers the assembly notes associated with the Project 2. Refer to the Project 2 Assignment for project deliverables and Project specific instructions. Some of the photos were taken using an earlier class board. While there are differences, when the old photos are used the information is the same between old board and new.

**READ AND UNDERSTAND EACH STEP BEFORE EXECUTING THE STEP!!**

## Step 1.

For Project 2, you will be provided an LCD [pre-soldered to the backlight] and an N-FET.



## Project 2 Assembly Instructions

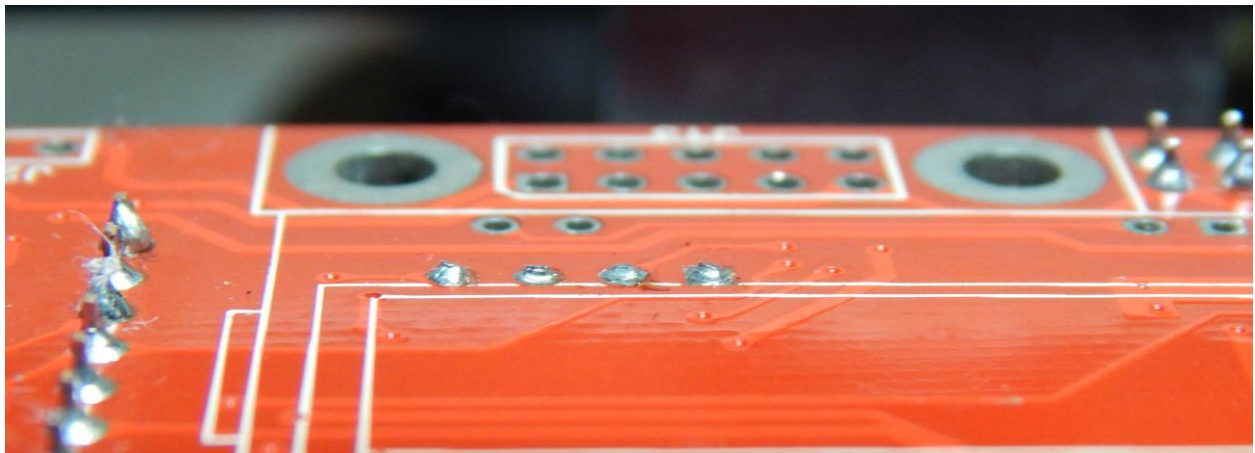
### Step 2.

Inspect the solder applied during project 1. The solder should wick down the hole and create a small "Hersey Kiss" like form around the remaining stub of the pin. This is a critical step. If you are unsure, check with a TA. You should error on more solder than less. Solder should slop up the remaining pin stub all around the circuit board pad as shown below. I strongly suggest you brush on flux on all pins, then apply the soldering iron tip to the pad on the board and allow the solder to re-flow around and down the barrel of the hole; and back up the pin. Add more solder to end with the "Hersey Kiss". The soldering iron should start with contact with the pad and move into touch the pin.



### Step 3.

Using the red handle side cutters in the lab. Cut the pins flush with the surface of the circuit board of the 4 Pin connector that will end up under the display[near flush is good enough]. Be careful not to cut into the board. This will reduce the risk of a short developing with the back of the back light.



After Cutting

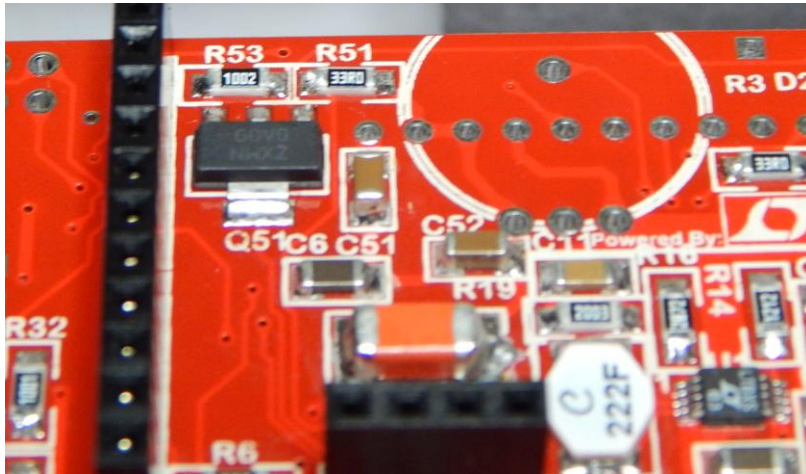
## Project 2 Assembly Instructions

### Step 4.

A reflow of the solder on the pin will remove the cutter marks and leave the pins with a small dome appearance.

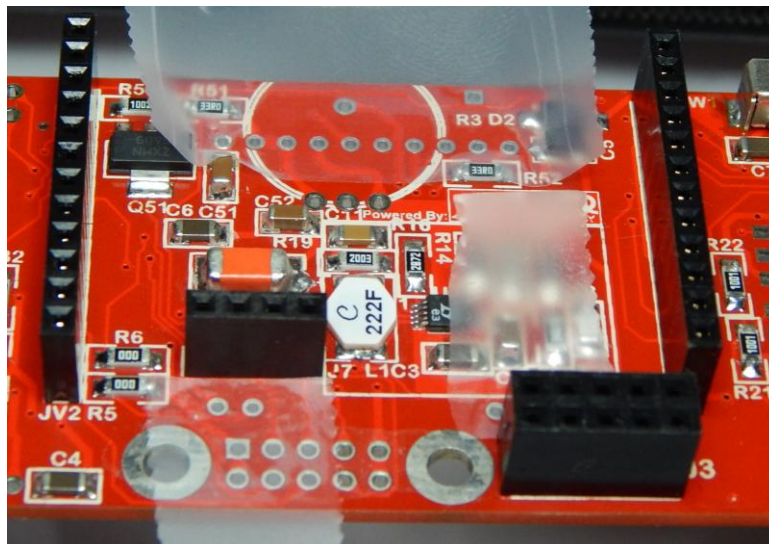
### Step 5.

First step is to solder the N-FET. Install Q5. Be careful not to accidentally melt your intra board connectors.



### Step 6.

The display needs to be mounted with the Pins flush on the back side. This is best way to accomplish this is to apply tape to the back side, which will insure the pins are flush with the back side.

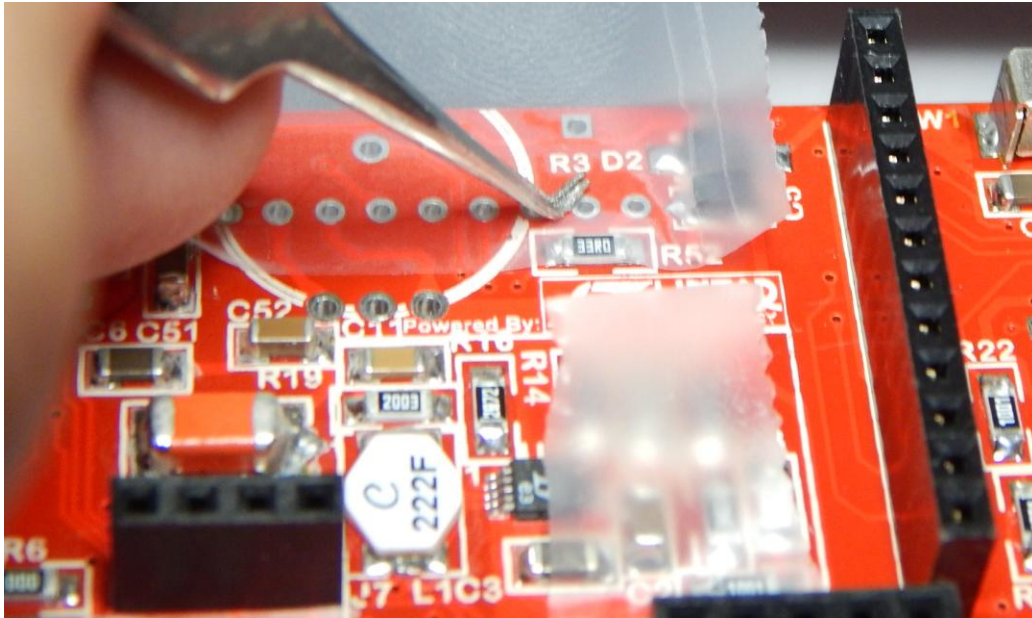




## Project 2 Assembly Instructions

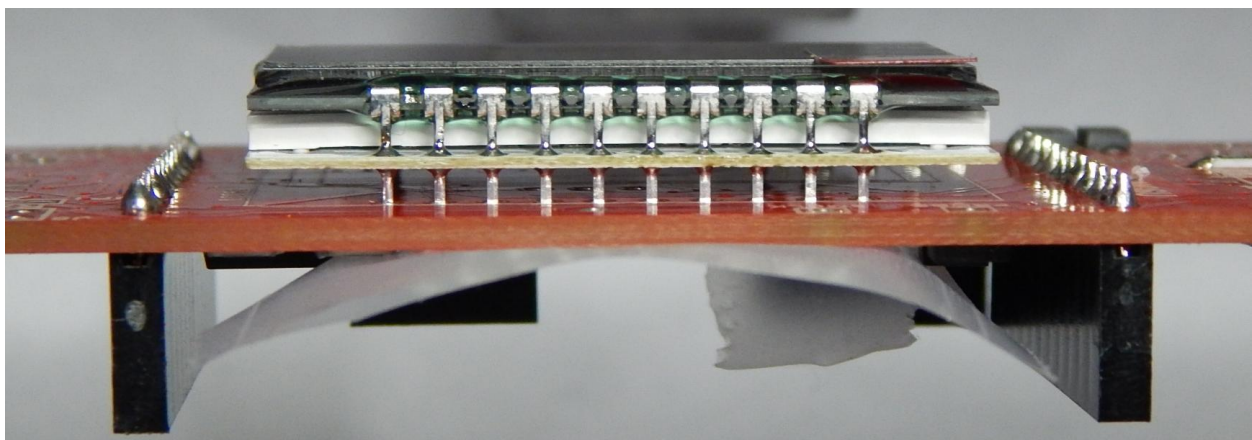
### Step 7.

Insure the tape is secured tight to the board over all the LCD mounting holes.



### Step 8.

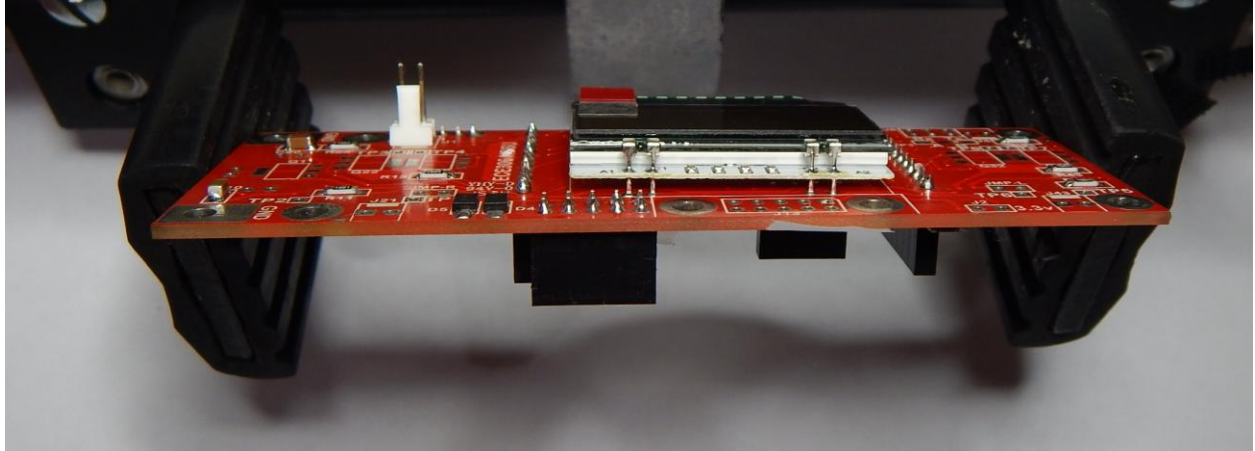
Time to install the display. The TA's soldered the back light to the LCD Display. Inspect their work on the top of the back light. Insure no shorts exist between pins. Place the display into the holes. Do not press it down as you want to end up with the pins flush on the tape. Observe it from an angle to verify the display is parallel to the board, and that the pins are flush on the back side.



## Project 2 Assembly Instructions

### Step 9.

Mount the board into the vise at about a 30 degree angle.

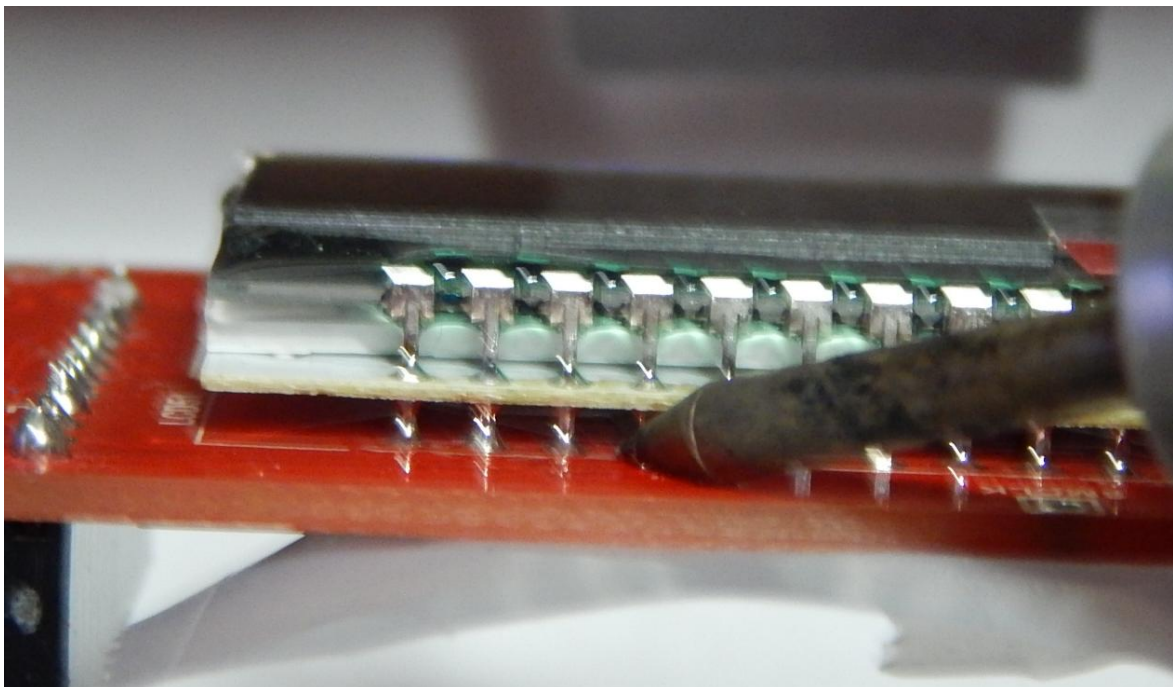


### Step 10.

Carefully solder the corner pins from the top side. After soldering a pin make sure the LCD pins on the back side are still flush.

### Step 11.

Carefully solder the remaining pins.

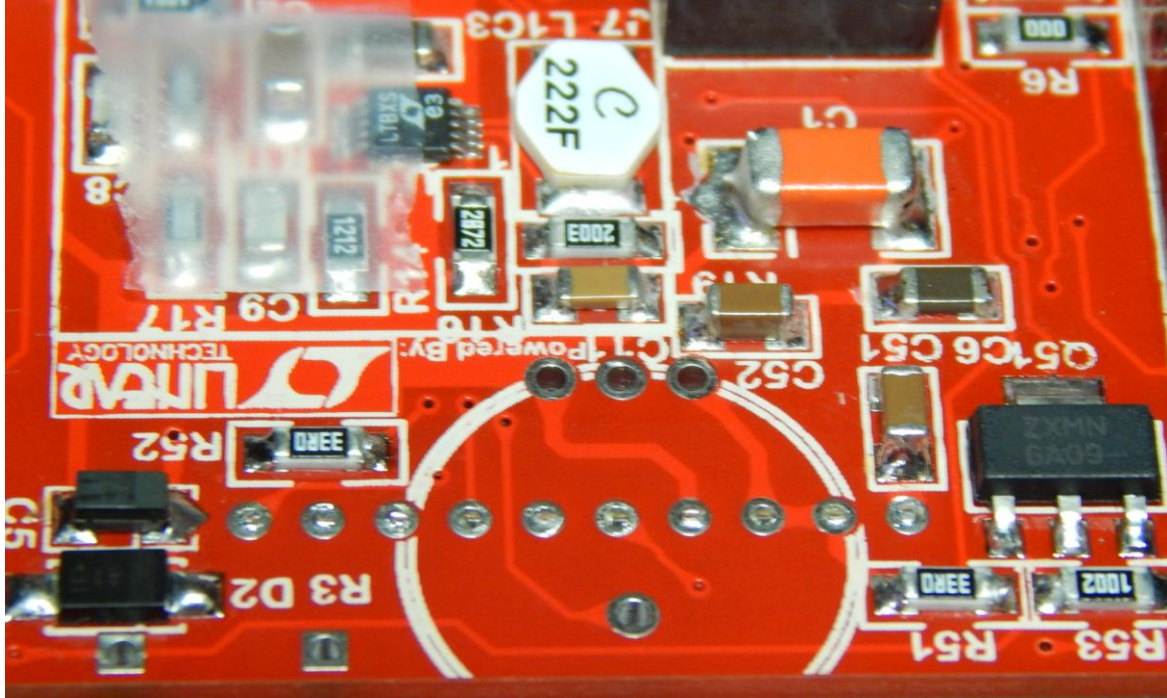




## Project 2 Assembly Instructions

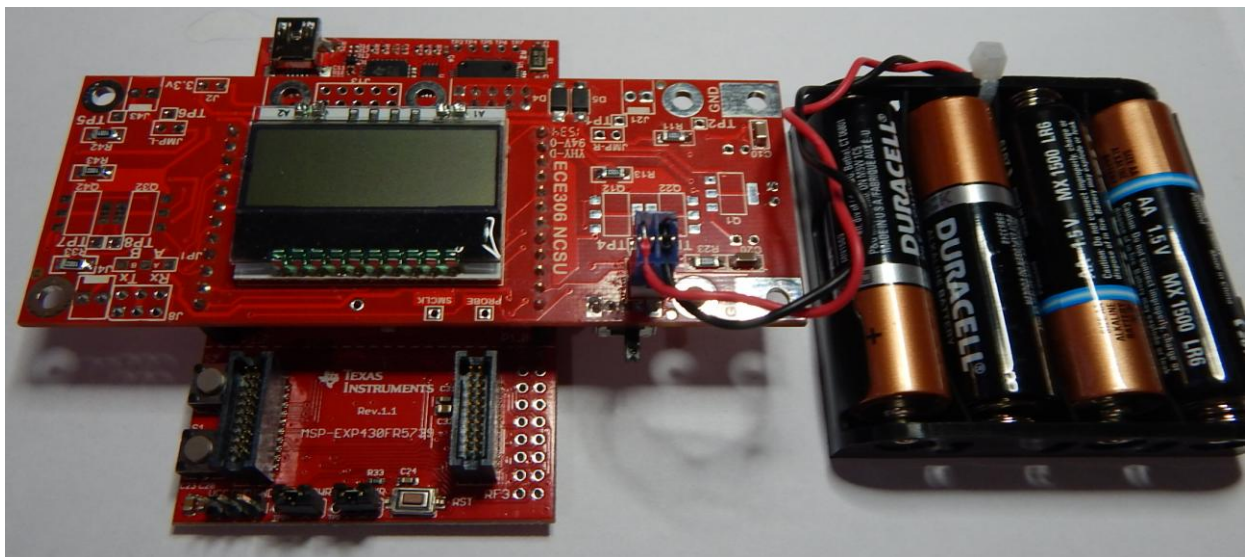
### Step 12.

Once the top side is soldered, remove the tape and solder the back side. The goal is for the solder to be FLUSH with the back side of the board. Do not over apply solder.



### Step 13.

Load Project 2 software and verify the display works. Change the display text to replace your name. Note, the display can only display 10 characters per line.



## Project 2 Assembly Instructions

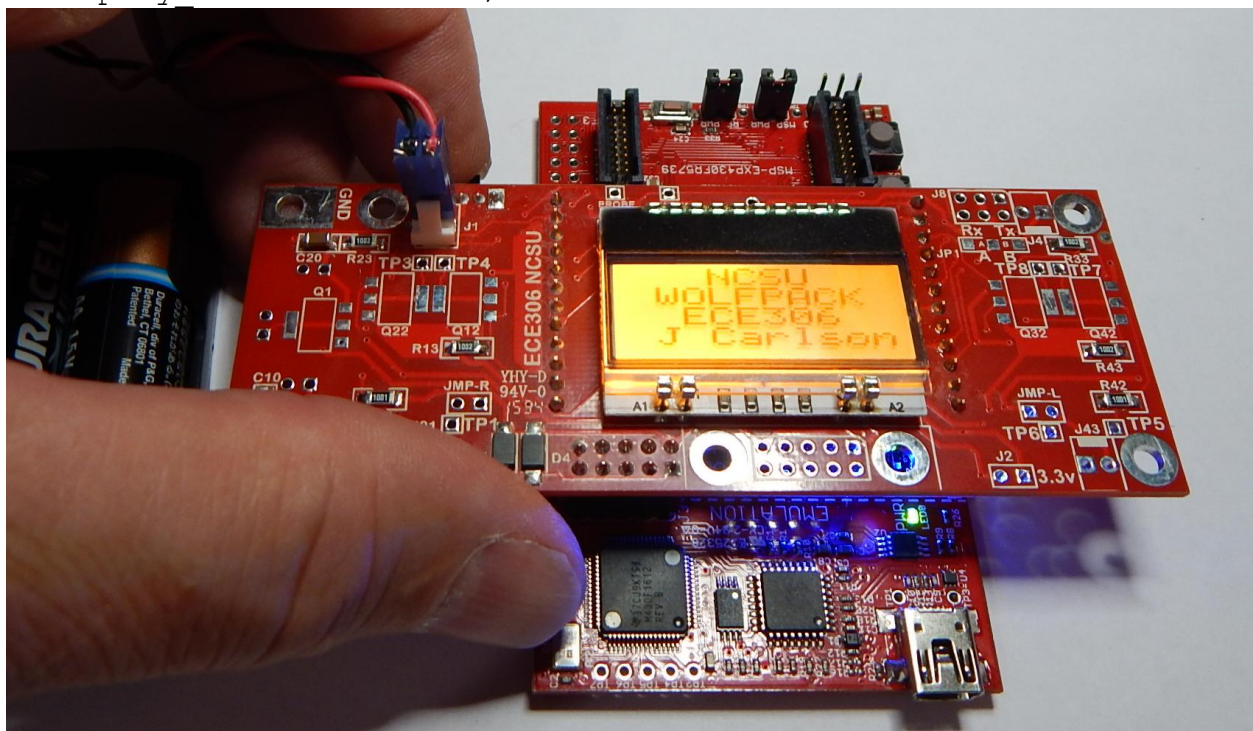
### Step 14.

Now it is time to see if it works. Download Project 2 files. This workspace is similar to Homework 01, but gives the ability to write the display. Project 2 is preprogrammed to display 2 messages. Plug your USB and the Assembly should display a message. Pressing Button 1 and Button 2 will switch between different messages.

There is a time lag, as the display is updated on a regular interval. Pressing the Buttons changes the information stored in the display array that will be used at the next update interval.

Changing and re-compiling the following lines will change the default message.

```
0123456789
display_1 = "NCSU";
display_2 = "WOLFPACK";
display_3 = "ECE306";
display_4 = "J Carlson";
```



# Project 2 is now complete.

Sign-up for a Demo time with the TA.