**Lab 5: LCD Character Module**

Stuffing, Soldering, and Partial-Build Testing Procedures

Feb. 25, 2021

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**Purpose**

The purpose of this document is to outline the steps the team took to test the code written for this lab.

**Process**

The first step for this lab was the inclusion of additional hardware onto the embedded systems target board. A Newhaven NHD0208AZ-33V 8x2 LCD character module was soldered onto each members board along with the addition of a jumper wire between resistors R6 and R7. The team then added the necessary hardware configuration definitions to the revF14.h file and hardware configuration functions to the esos\_pic24\_lcd44780.h and esos\_pic24\_lcd44780.c files created from the template files esos\_hwxxx\_lcd44780. Next, the team finished the lcd public functions within the esos\_lcd44780.h and esos\_lcd44780.c file by divided the functions among team members. Once the lcd operation files were completed, the team created the task 5 file temperature\_lcd.c based on the t4\_sensor3 file from lab 4. With the temperature sensor and potentiometer components of lab 4 already done, the team added lcd functionality so that the data values would be display on the lcd as per lab 5 request.

**Testing**

The testing procedure for the written code began with compiling all files that were modified by the team. Once the compilation was able to complete without any errors, a code review was conducted by the team to catch any errors or missing comments. After this was done, the target board was programmed and the functionality of the code was tested.

The board testing started with verifying the functionality of the lcd character module. With a simple test script, the team was able to verify at least one members working lcd character module to use for further testing. The team then uploaded the temperature\_lcd.hex file to the target board to verify correct operation as per lab instructions. First, the team verified that the lcd was displaying the correct potentiometer values as the tester rotated the potentiometer. The team also verified that the slider moved correctly as the potentiometer values increased and decreased. The team then verified that a press of switch 3 switch the lcd display to show temperature values instead, and that the values shown were correct to the expect temperature value of the room. The team experimented by putting the sensor in different temperature environments to ensure that the value was changing as expected, and that the value was correctly displayed on the lcd module.