**Lab 6: Digital Function Synthesizer**

Stuffing, Soldering, and Partial-Build Testing Procedures

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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 addition of the I2C peripherals to the embedded system target board. The additional chips that were added include a Maxim DS1631 temperature sensor and a Microchip-Atmel AT24C02D EEPROM. These chips were placed on a breadboard and wired with address lines being set to 0 and SCL and SDA being wired to the I2C bus of the embedded system target board. In order for these devices to work properly, modifications also had to be made to the board including exposing copper traces and connecting these nodes to pins on the I2C bus and DAC. Once all the hardware was populated on the board and connected correctly, the team began created the designated files needed for this lab: esos\_menu.c, esos\_menu.h, fall17lib.c, fall17lib.h, and fcn\_synth.c. These files were completed to include all necessary functionality for outputting an intuitive UI on the lcd screen on the target board. An additional file, esos\_at24c02d was created to define the functionality of the EEPROM device.

**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 code was first tested to ensure functionality with the Maxim DS1631 temperature sensor and relating UI menu. The test verified that all the necessary menu options were included and that the menu scrolled with movement of the RPG. Each of the menu options were tested to verify that the temperature sensor was working as intended and that the menu was easily navigable. Similar test were conducted to verify the functionality of ESOS function synthesizer. The menu was tested for smooth operation and each option was tested to verify that the output on the oscilloscope matched the expected output for each specific option.