**ECE 4723 Lab 3 Board Assembly Procedure**

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**Step 1: MCU – PIC33EP5122GP806**

Align dot on the MCU with the dot printed on the PCB. Next, ensure that the MCU’s pins are properly aligned with the pads on the PCB and solder the MCU.

**Step 2: Power Delivery**

LM2937:

Solder the three terminals onto the pads labeled IC3 on the PCB. Apply solder to the small heat spreader to connect it to the large pad on the PCB. Continuity check pin 1 and point C of the JP1 junction.

Power LED:

Find cathode and anode of LED by continuity check between the sides of the LED. Solder on LED in correct orientation to the pads labeled 3.3V on the PCB. Continuity check anode pad of the LED and R1.

R1:

Solder 1.5kOhm resistor to the area marked R1 on the PCB. Continuity check between the power LED and ground.

C1-C5:

Solder 0.1uF capacitors onto labeled locations on the PCB. Continuity check between the capacitor’s pads, 3.3V, and ground.

C6:

Solder 0.1uF capacitor onto the location on the PCB labeled C6. Continuity check between the capacitor’s pads, point C of JP1, and ground.

C7:

Solder 10uF capacitor to the labeled location on the PCB, verifying the correct orientation of the capacitor. Continuity check between the positive side of the capacitor and pin 3 of IC3 and the negative side and ground.

**Step 3: MCU Programming**

ICSP:

Solder 6 header pins on the location marked on the PCB as Microchip ICSP. Continuity check between each pin as specified on the design schematic.

FTDI:

Solder 6 header pins onto the location marked on the PCB as FTDI. Solder a jumper wire from the 1st pin of ICSP (MCLR) to pin 6 of the FTDI header (RTS pin). Solder an additional jumper wire from pin 5 of the FTDI header (RX0) to point RF0 on the H1 header. Continuity check all the data header pins and the corresponding pads on the MCU. Finally, continuity check between the USB5V pin and JP1 pin 1, and the ground pin and ground.

**Step 4: MCU Inputs**

Reset switch:

Slightly shorten terminals on switch and solder into the position labeled RESET. Continuity check between the switch, R0, and ground.

R0:

Solder 10kOhm resistor onto the location labeled R0 on the PCB. Continuity check between the 3.3V pin of the MCU and R0.

SW1:

Slightly shorten terminals on switch and solder into the position labeled SW1. Continuity check between SW1 and ground.

SW2:

Slightly shorten terminals on switch and solder into the position labeled SW2 on the PCB. Continuity check between SW2 ground.

Rotary Encoder/SW3:

Solder on rotary encoder onto the position in the bottom right corner of the PCB. Continuity check between the pads for SW3 and the corresponding MCU pin and between RPGA and RPGB and their MCU pins. Finally, continuity check between the ground pin and ground.

Potentiometer:

Solder potentiometer onto the position in the lower right corner of the PCB. Continuity check between the potentiometer and the corresponding MCU pin and between the ground pin and ground.

Temperature Sensor:

Solder LM60 temperature sensor onto the location labeled IC1 on the PCB. Continuity check between IC1 pin 1 and 3.3V, pin 2 and R5, and pin 3 and ground.

LM4128:

Solder LM4128 onto the PCB at the location marked IC2. Solder jumpers on pad 1 and 2 of SJ1 and SJ4 to enable the LM4128 and to supply it with 3.3V instead of VRAW. Continuity check between the pin 1 and SJ1, pin 2 and SJ4, pin 3 and ground, and pin 4 and VREF.

R5:

Solder 470 Ohm resistor onto the location labeled R5 on the PCB. Continuity check between IC1 pin 2 and to the solder pads of C15.

C15:

Solder 0.1uF capacitor onto the location labeled C15 on the PCB. Continuity check between R5, ground, and the pads of the capacitor location.

**Step 5: MCU Outputs**

LEDS:

Determine the cathode pad of the LEDs and solder the three LEDs into the marked locations on the PCB. Continuity check between the anode of the LEDs and the pads of the resistors R2-R4.

R2, R3, R4:

Solder 1.5kOhm resistors onto the locations labeled R2-R4 on the back of the PCB. Continuity check between the LEDs and the pads of the resistors.

LCD Module:

Solder header onto LCD module and solder that header onto the correct location on the PCB. Solder jumper to connect R6 and R7 to complete the voltage divider connected to the LCD. Continuity check between LCD control pins and the corresponding MCU pins, LCD VSS and ground, and VDD and 3.3V.