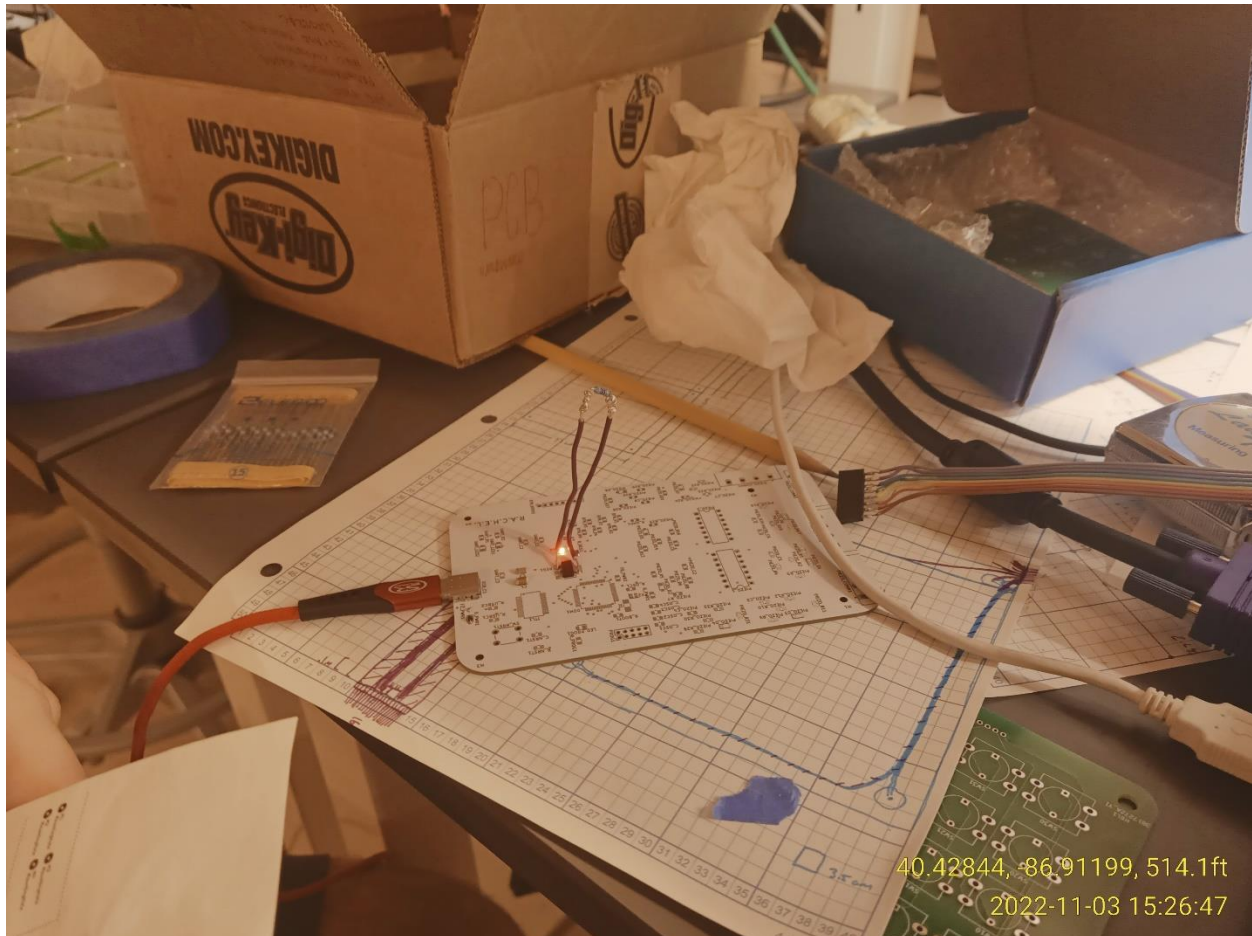


WEEK 11:

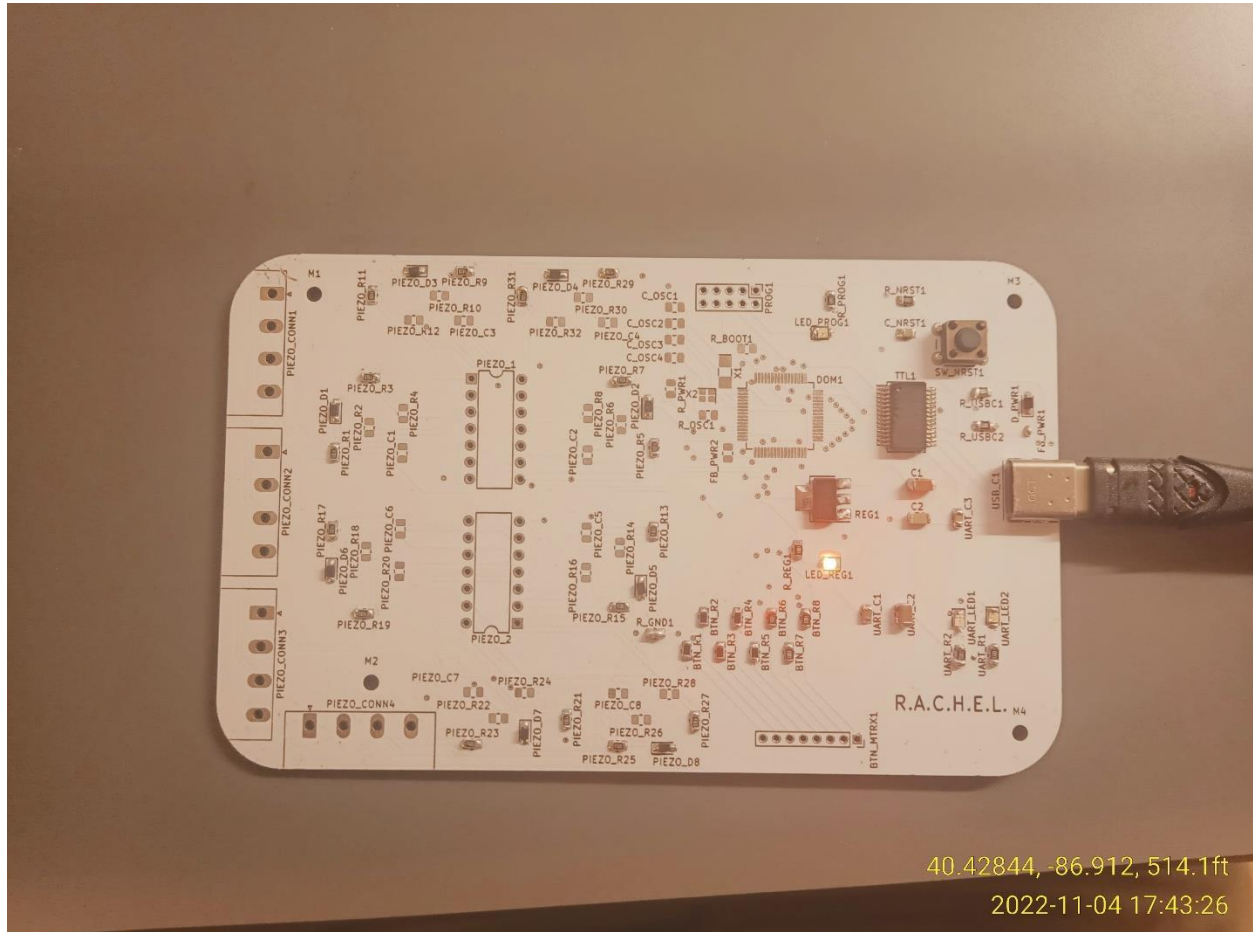
Hours: 8

This week most of my time in the lab was spent soldering and testing our new PCBs. Some small amount of time went into continuing my work from last week, but the main focus this week is to get all the major parts of the PCB assembled and tested.



Shown above is my experimental setup for performing a power supply endurance test. The power supply on our PCB is obscenely overengineered, so there was never any doubt that it would be able to handle the maximum load our project would draw. With that being said, the endurance test is an important shakedown and at least prevents wasting time debugging a problem caused by inconsistent or waning power delivery. The maximum output rating for our 5-3.3V regulator is 800mA, but the maximum current that our project could conceivably draw based on the maximum input ratings of our microcontroller and opamps is around 250mA. I settled on around 170mA for my test, which lasted overnight. To draw this current from the power supply, I soldered a 20 Ω resistor directly across the output of the regulator and measured the supply voltage to be 3.27V. Approximately 12 hours later, the resistor was too hot to hold, but the regulator was room temperature, and the supply voltage was maintaining a rock-solid 3.27V. The results of the test gave me the confidence to continue with the assembly of the rest of the board.

The next major component to assemble and test was the USB-to-UART converter. I asked Jack to solder the chip itself, because he has more experience with drag-soldering and we only have two of these chips at our disposal. After soldering all of the auxiliary components myself, I was able to connect our PCB to a computer via USB-C and see the LEDs blink in response to serial messages.



Next week, the team is anxious to get a microcontroller and programming header onto our PCB. Since the above photo was taken, almost every component except the microcontroller and oscillators has been assembled onto the PCB. The footprints for our headers turned out to be too small, so components have been ordered to fit the existing PCBs. In the meantime, the team will likely solder wires directly through the vias where header pins should go.