M2 Design Review

Design Team 4C

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Previous Schematic for M1

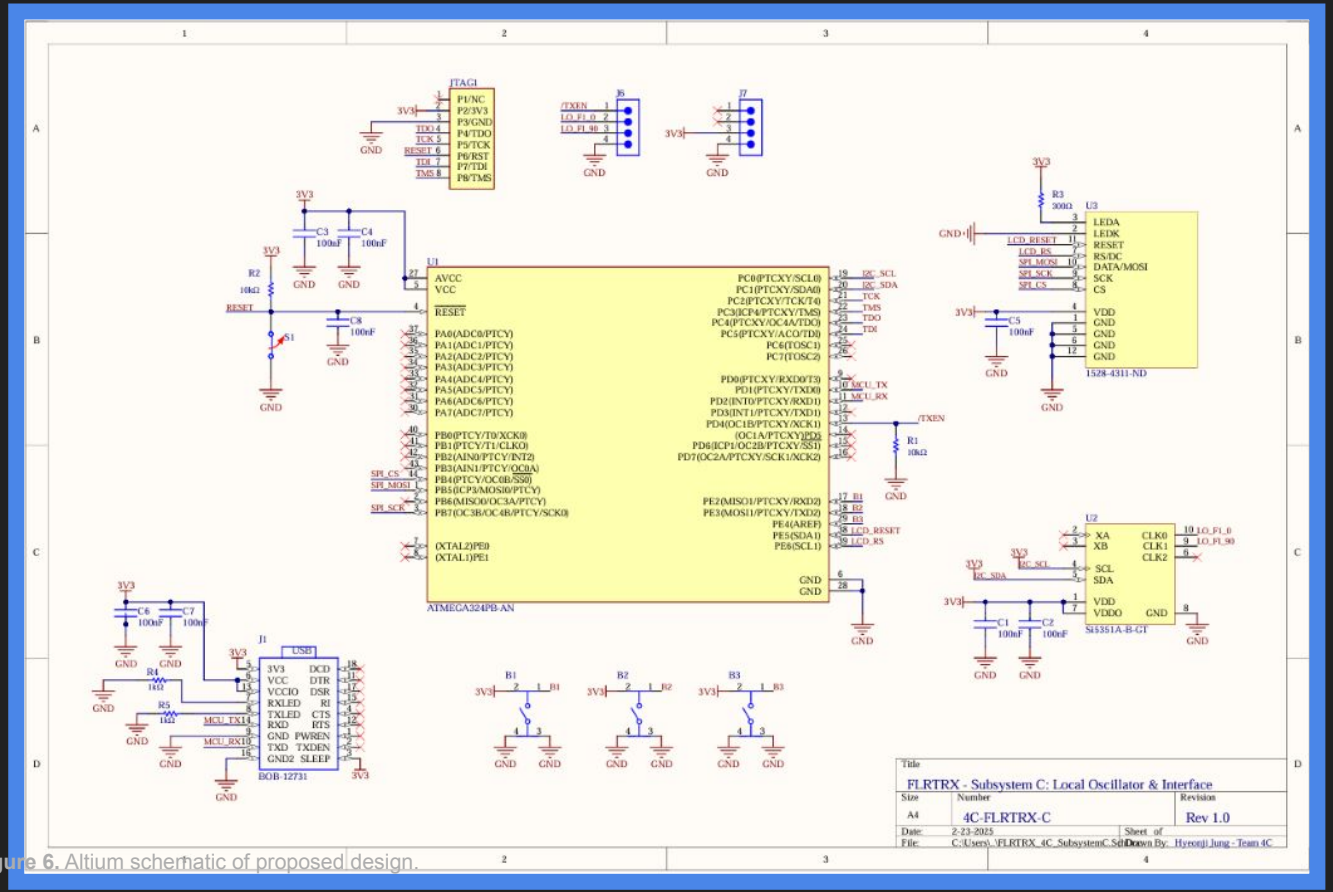
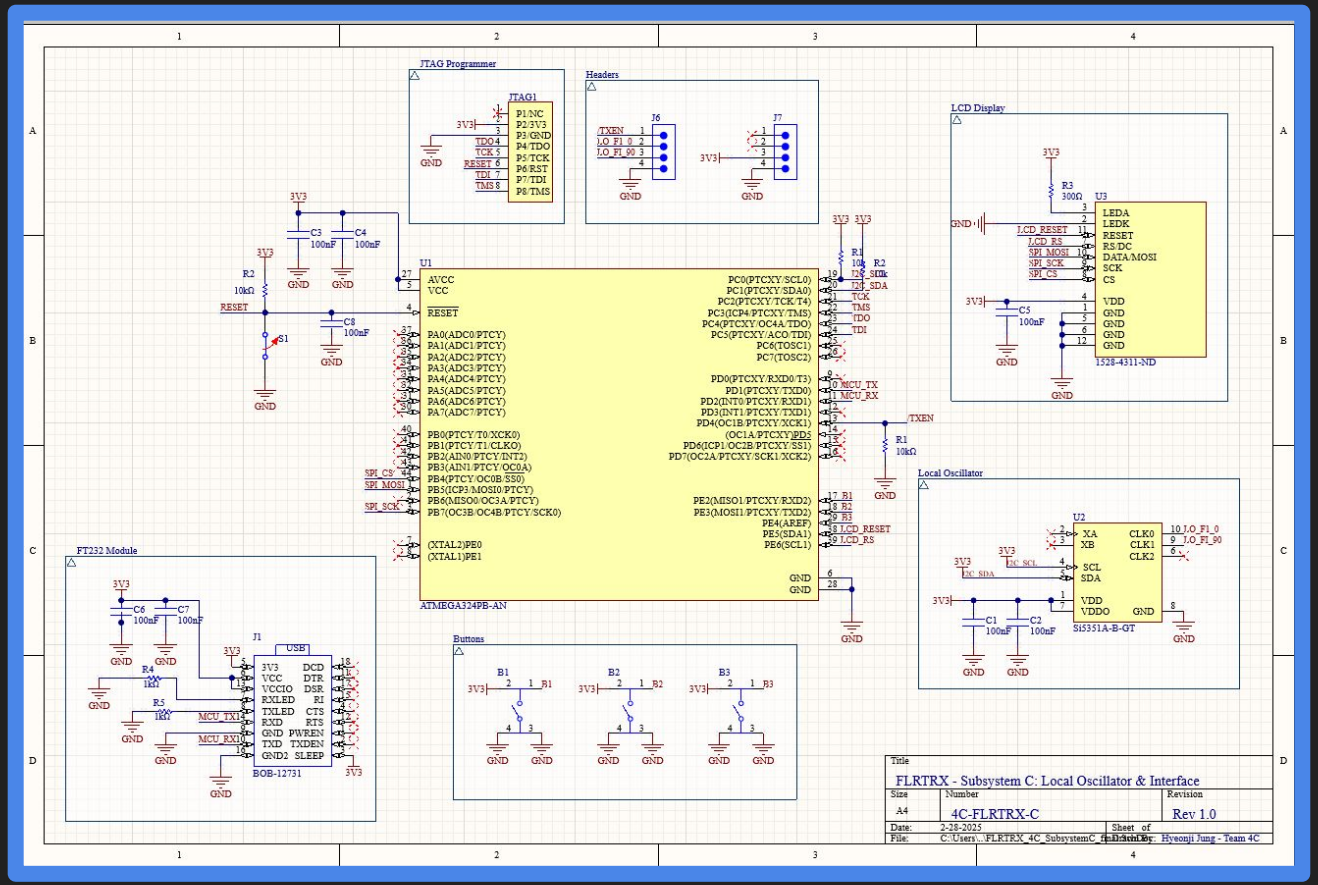
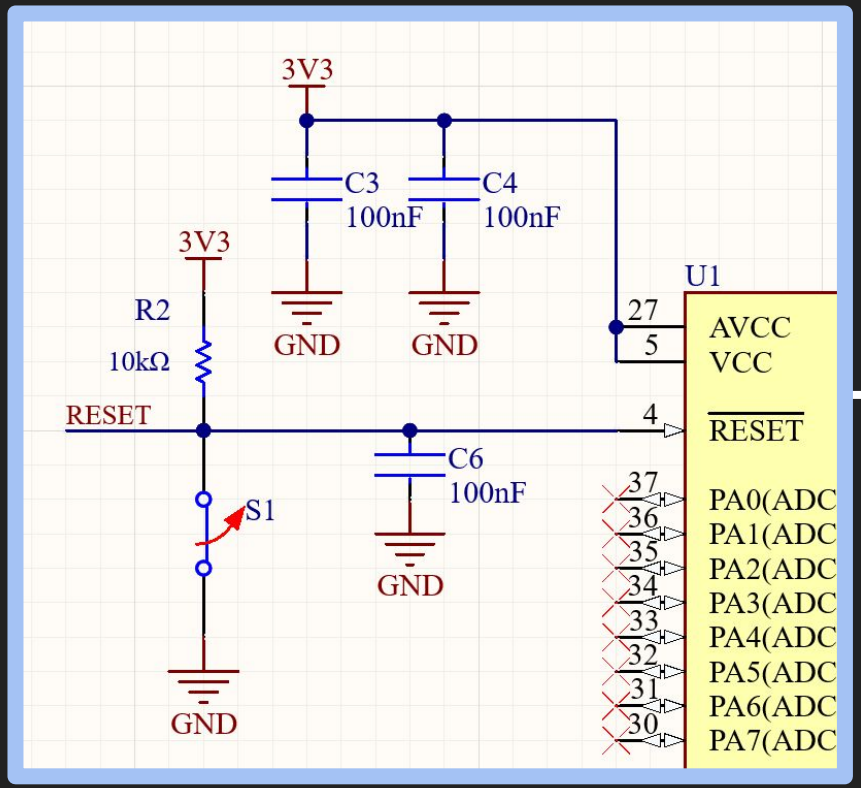


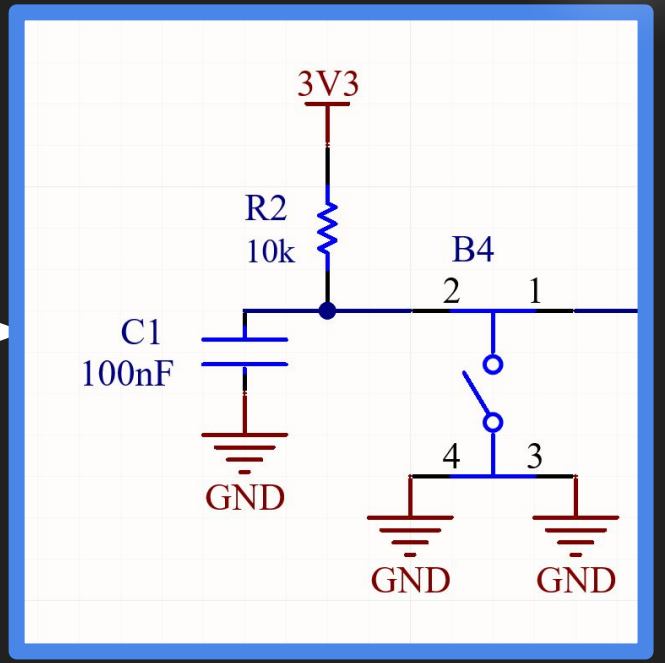
Figure 6. Altium schematic of proposed design.

Change 1. Included Boxes for Clarity

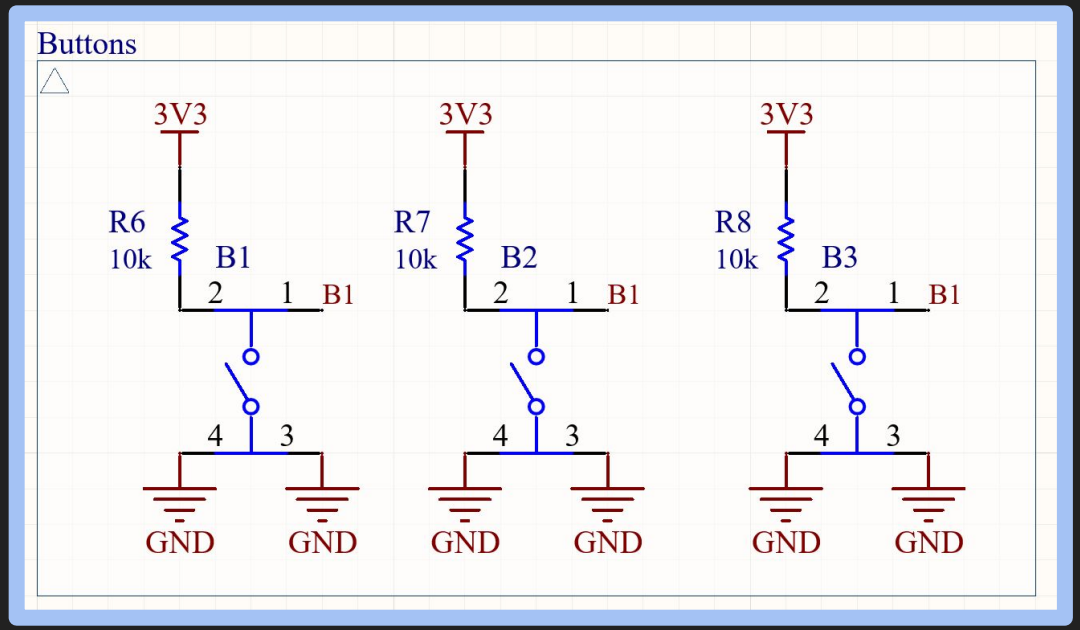


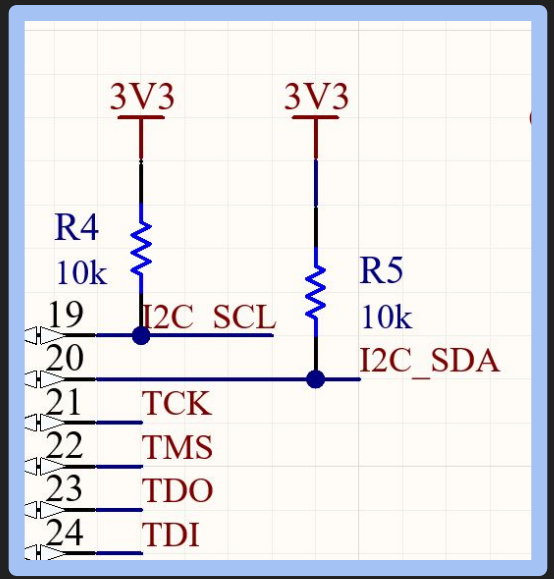
Change 2. Reset switch into buttons, Surface mount → Through Hole components



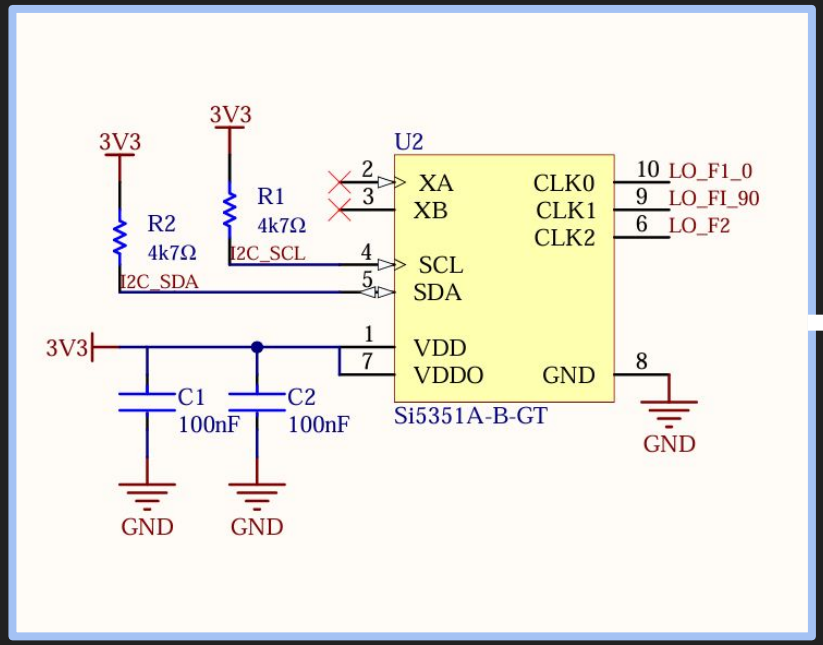


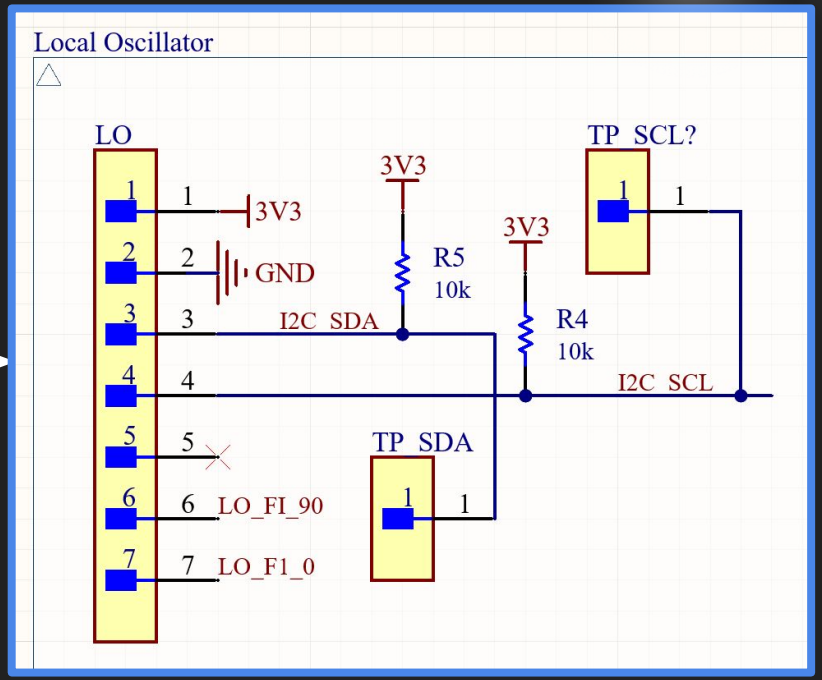
Change 3. Included Pull-up Resistors (buttons, I2C lines)



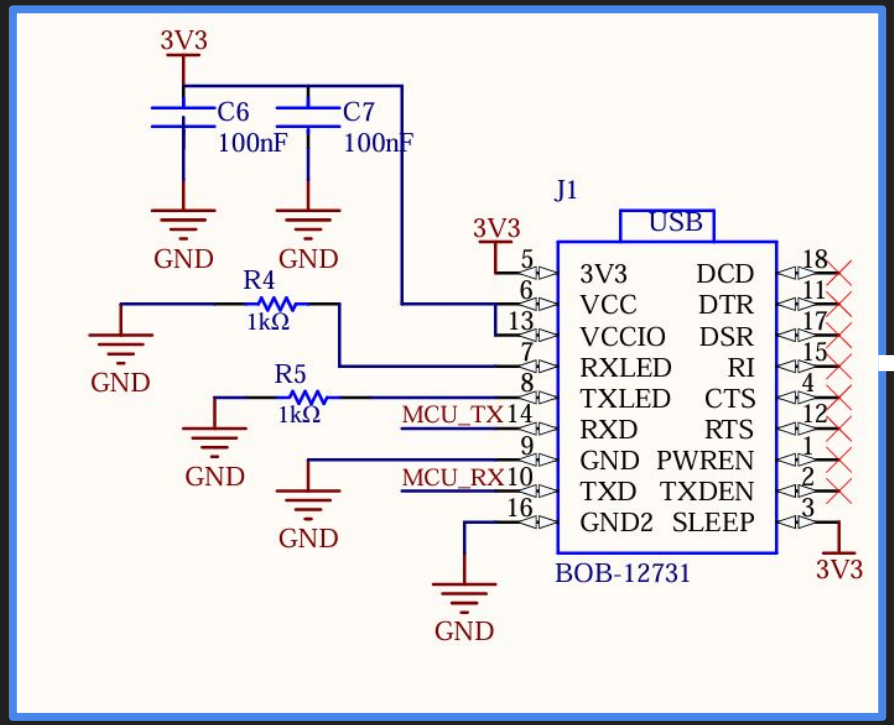


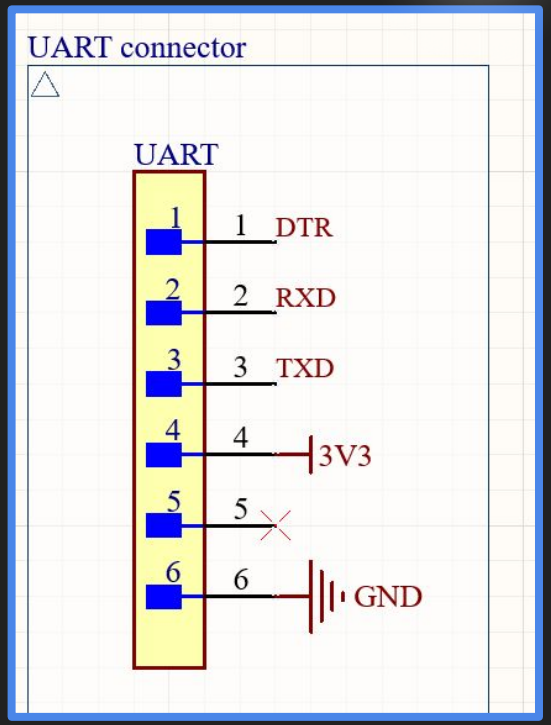
Change 4. LO module into **headers**



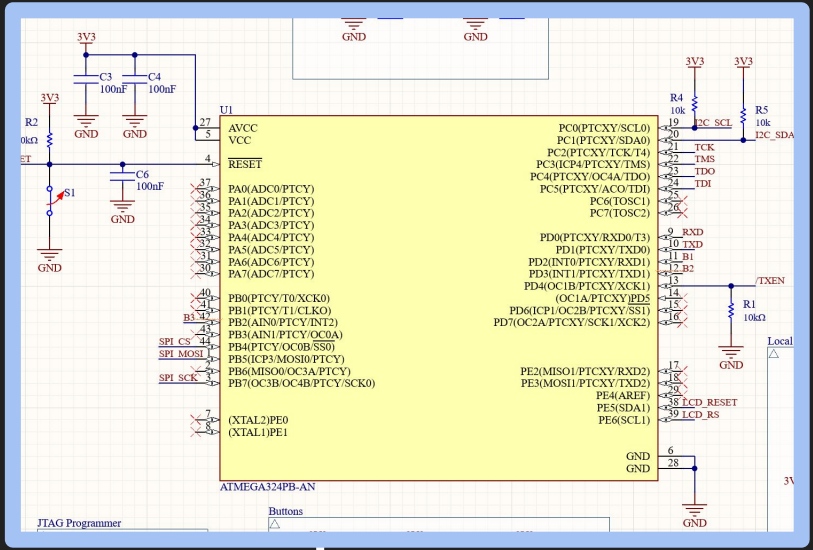


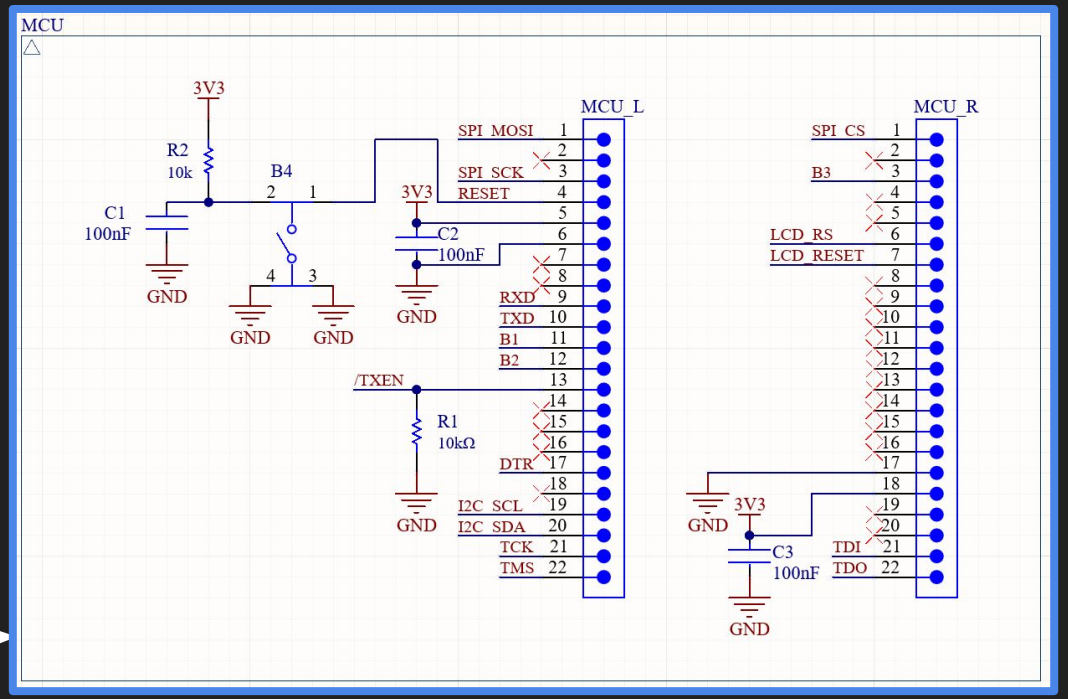
Change 5. FT232 module into **headers**



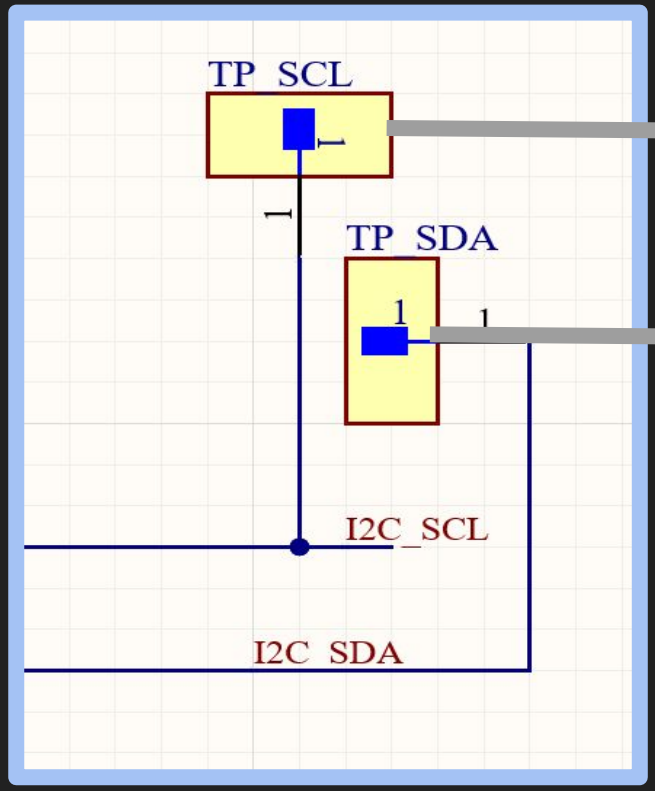


Change 6. Change **MCU** into 2 22 pin female headers



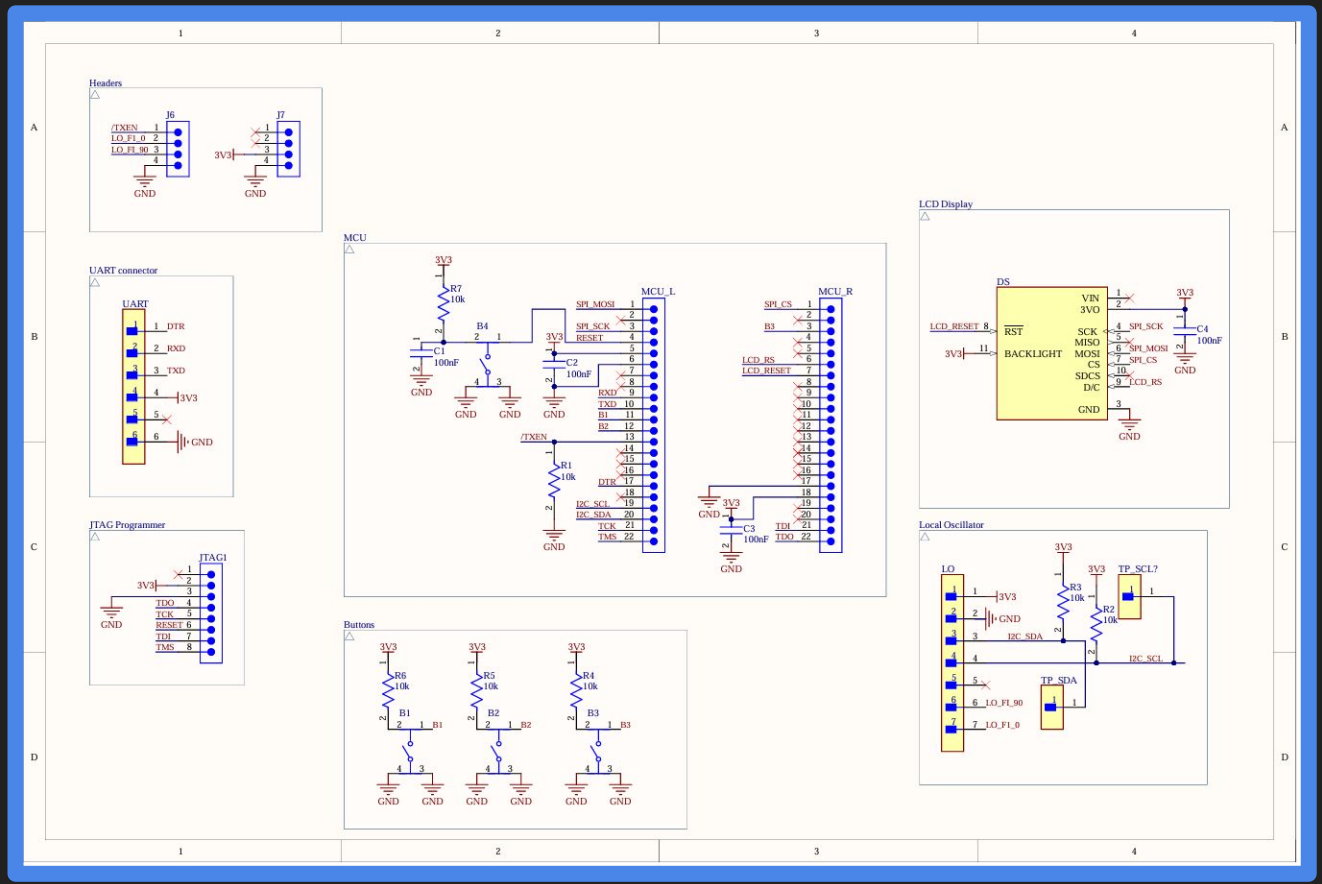


Change 7. Add **Testing Points** for I2C lines



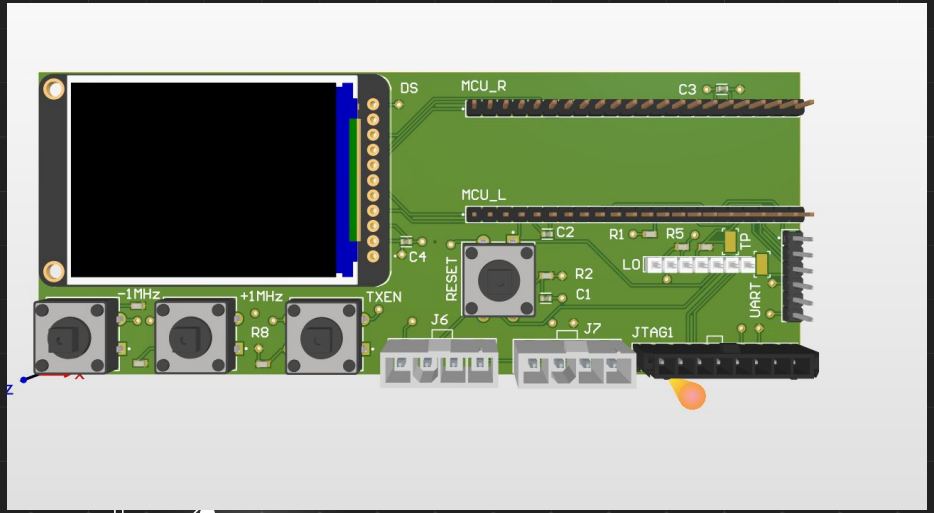
Component: PC test point Miniature

Final Schematic based on Changes from M1



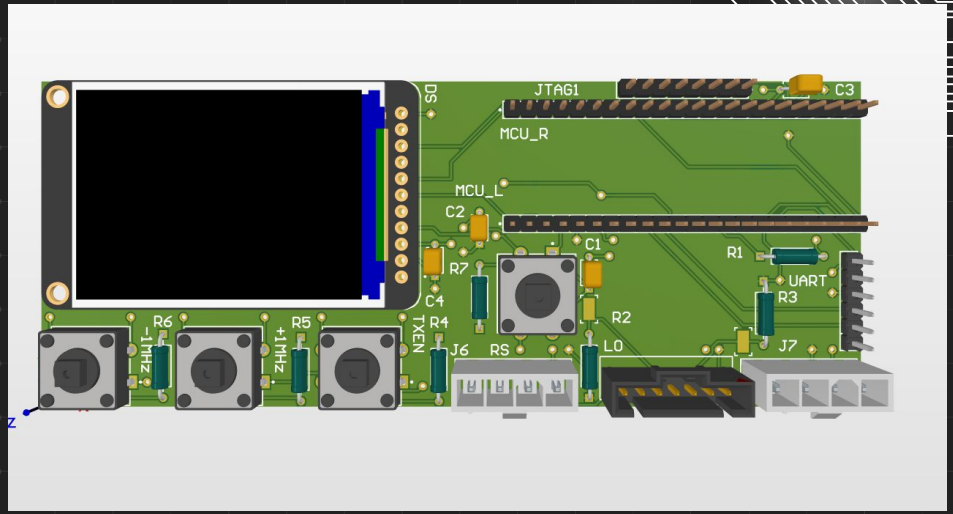
PCB Iteration Process

Before



- surface mount
- no space for lo

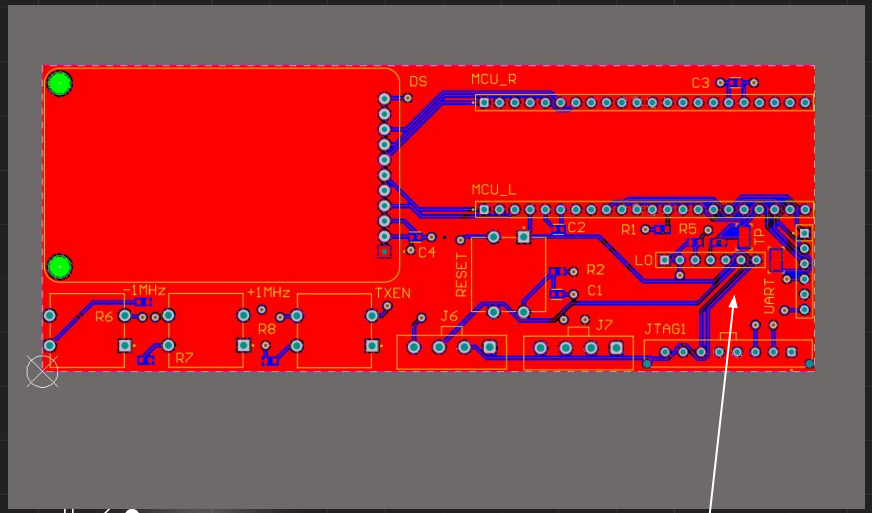
After



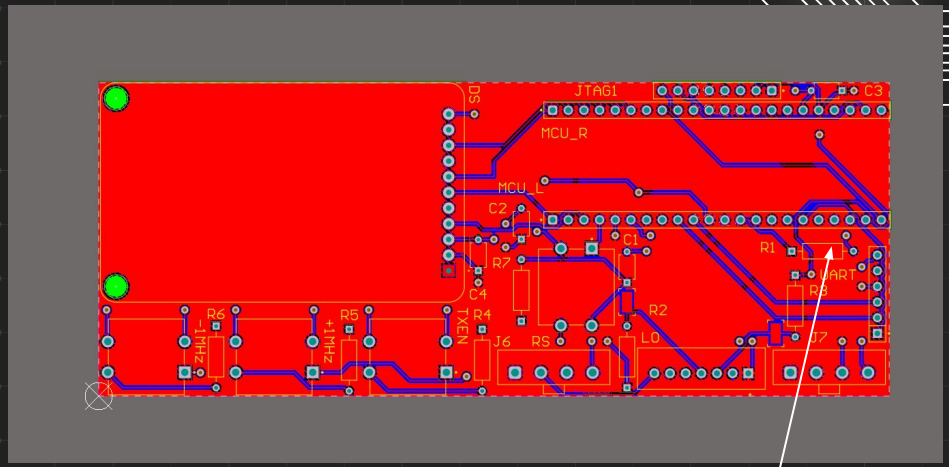
- through hole
- space for lo

PCB Iteration Process

Before

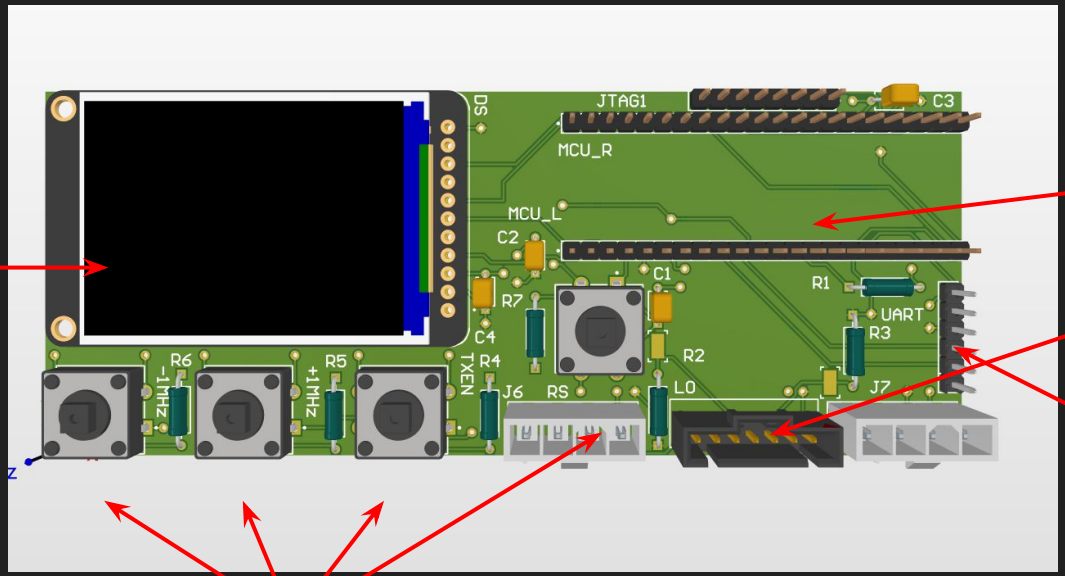


After



less congestion in lines to minimize EMI

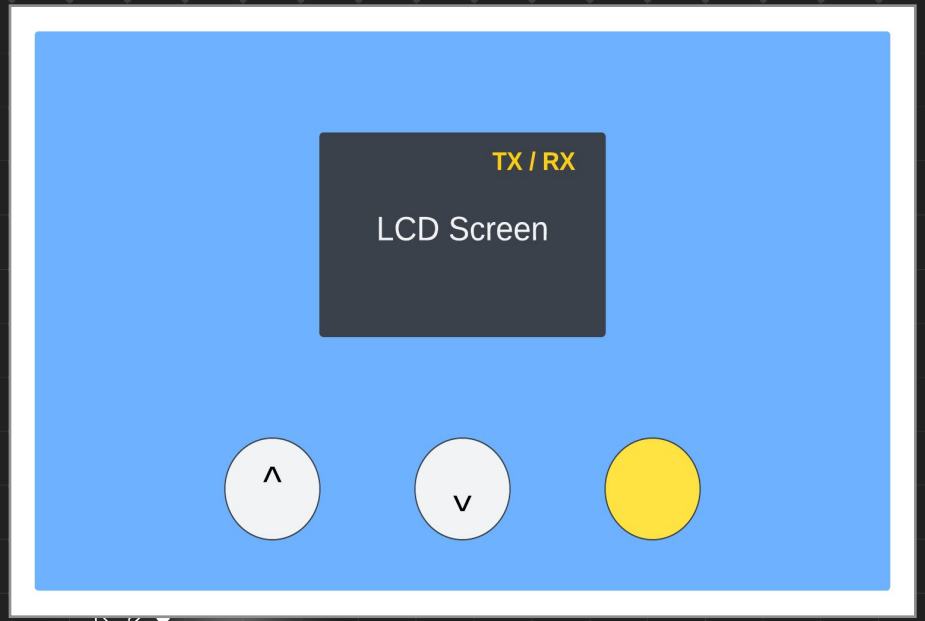
Components of Finalized PCB

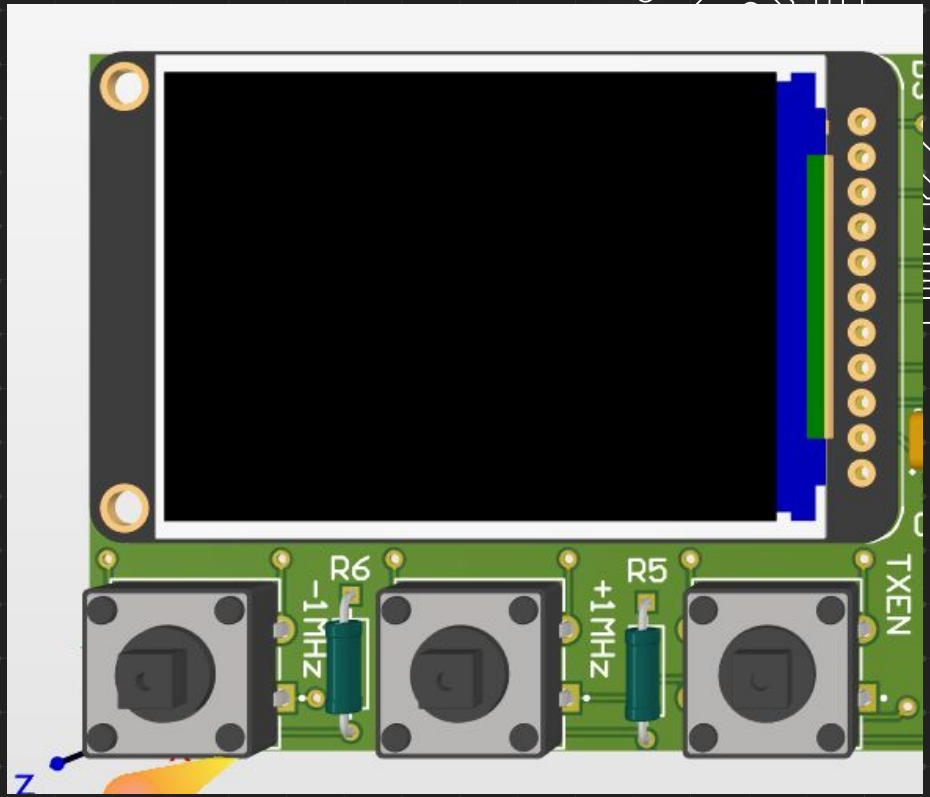


Component
ATmega324PB
Adafruit Si5351A
FT232R Module

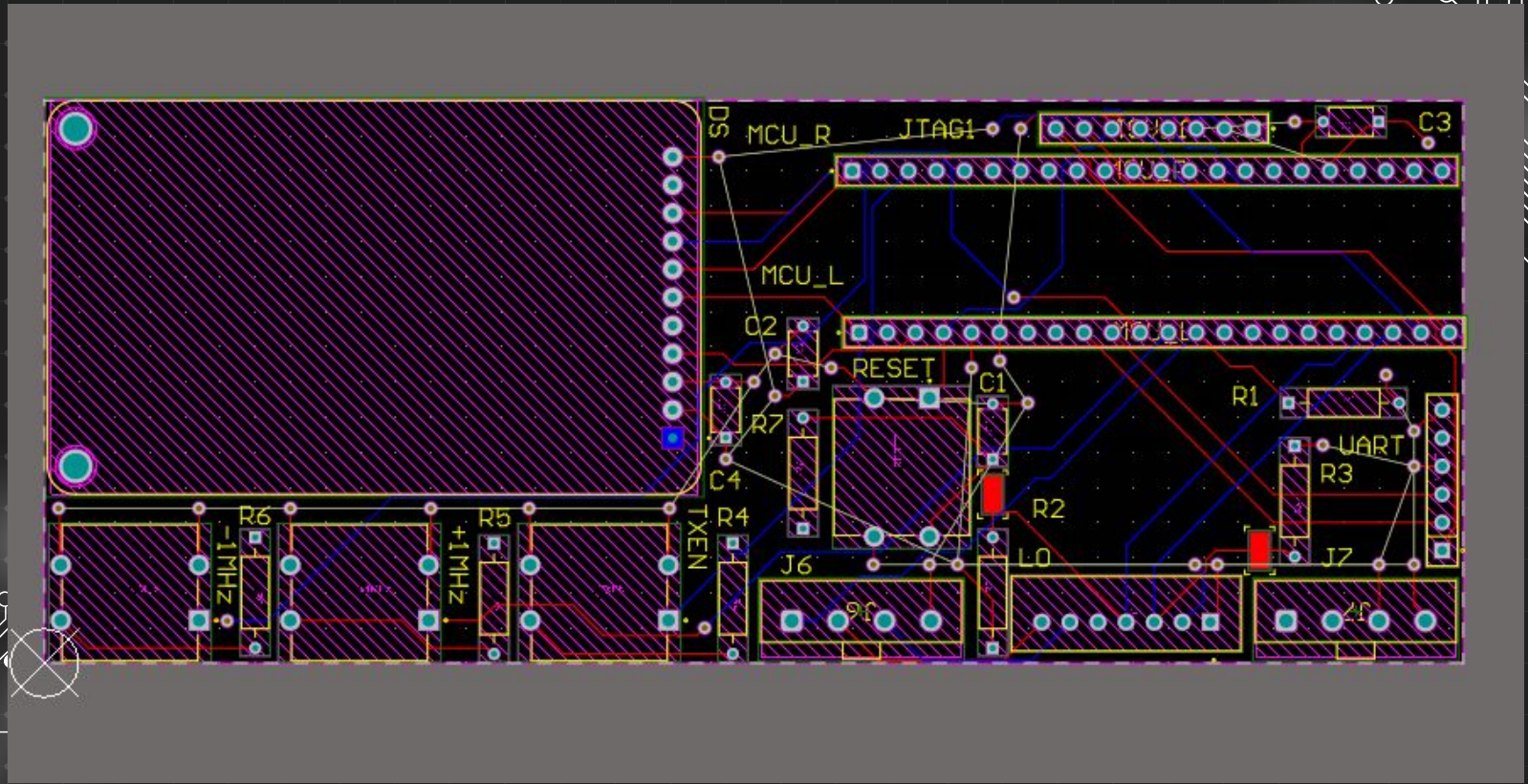
Adafruit 4311 LCD Display	Adafruit 1010 Buttons

UI portion of PCB

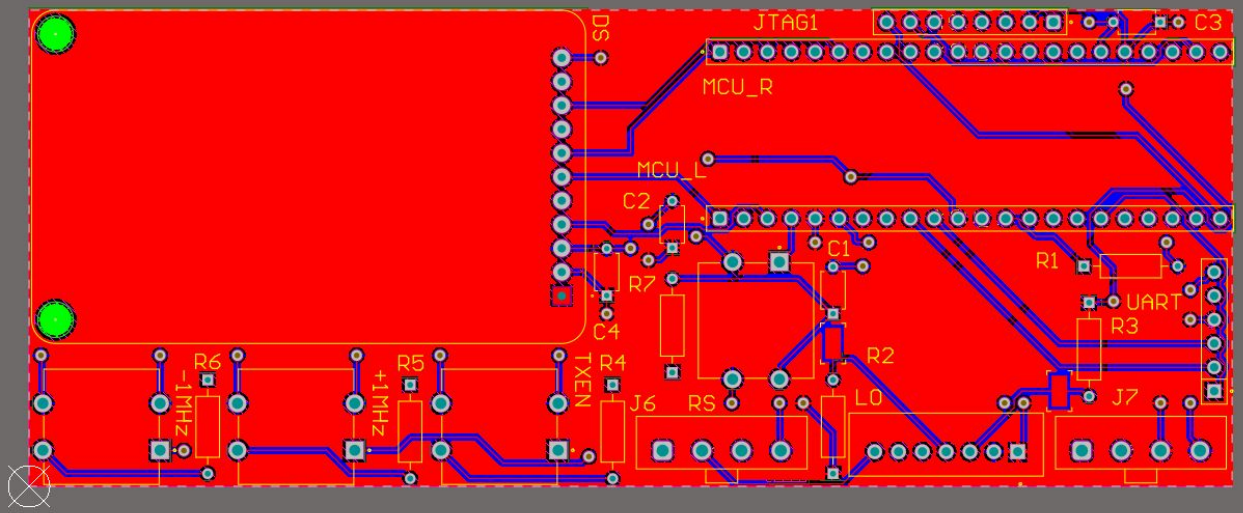




PCB before polygon pours

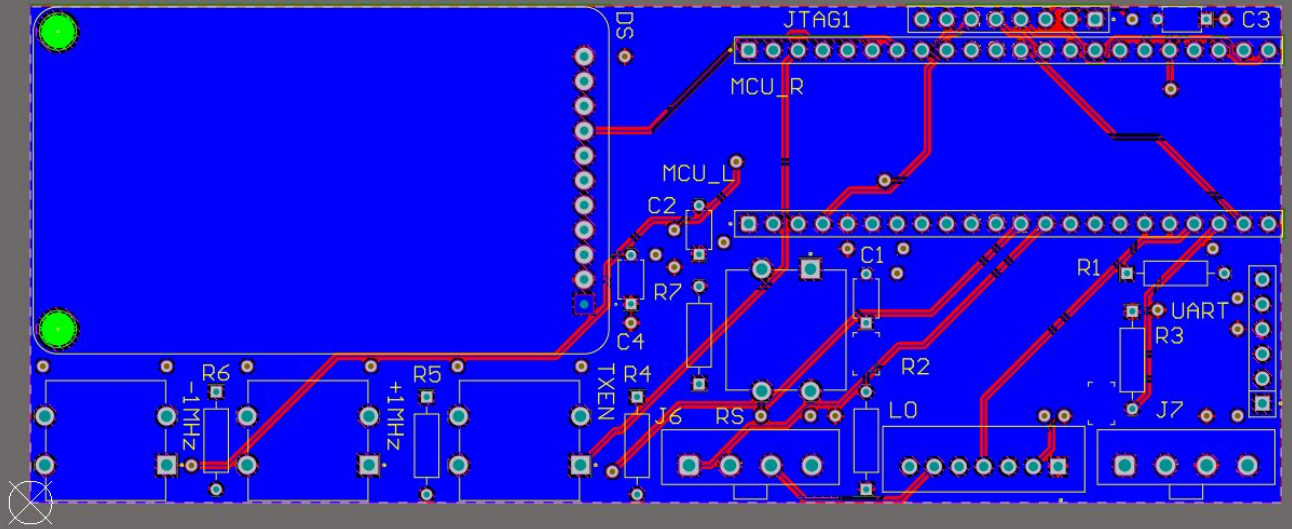


Top layer PCB



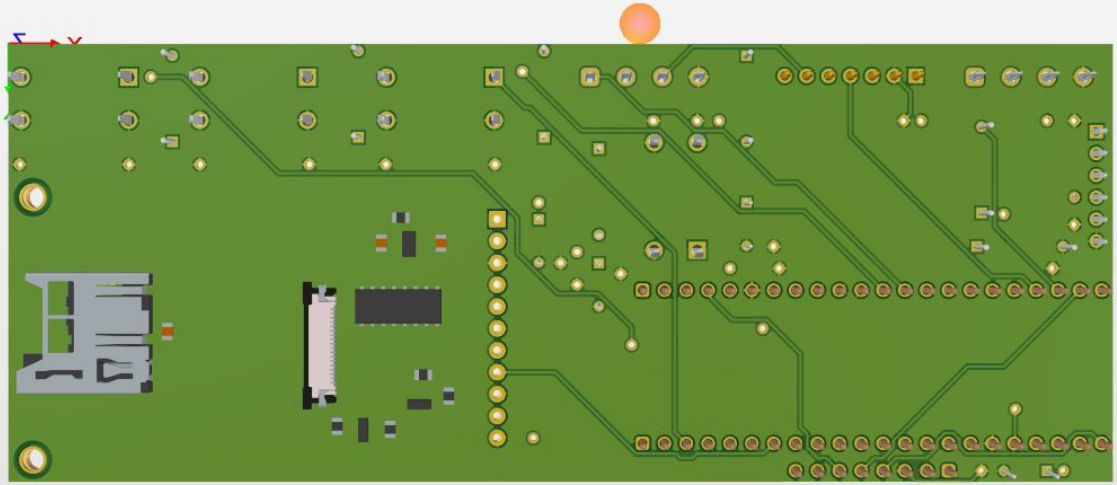
Polygon
Poured 3.3V

Bottom layer PCB

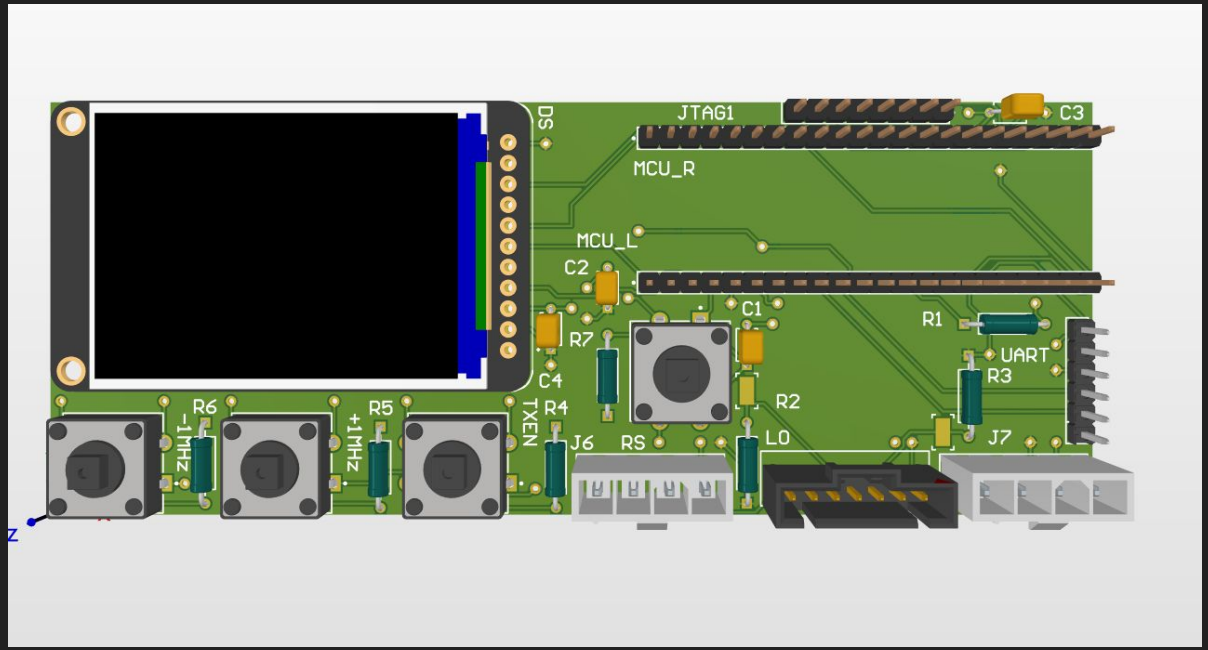


Polygon
Poured GND

3D view of Bottom layer PCB



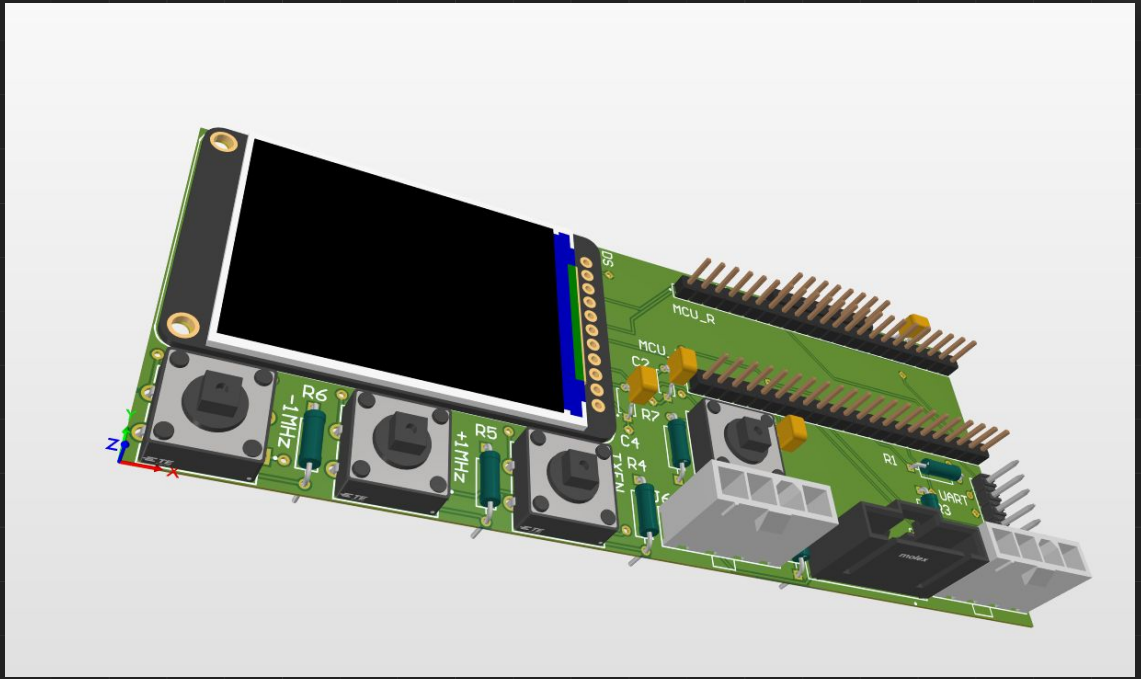
Key PCB Design Considerations



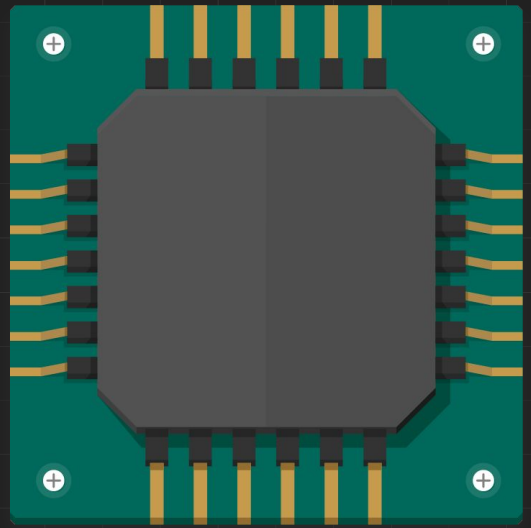
- JTAG & UART at PCB edge for access
- LO near MCU for connectivity
- Header pins for MCU (PCB ↔ Breadboard)
- Vias for signal integrity
- Polygon pours (3.3V & GND)

Thank you for Listening!

Additional information including are provided in the onenote [ECE295- Design Team 4]



QnA



References

[1] S. V. Hum, "Flexible Radio Transceiver (FLRTRX) Interface Control Document," ECE295: Hardware Design and Communication, v4.0. [Online]. Available: https://www.ab4oj.com/sdr/sdr_handbook.pdf. [Accessed: Jan. 27, 2025].

[2] Microchip Technology Inc., "ATmega164P/324P/644P data sheet," *Microchip Technology*, 40002071A, 2014. [Online]. Available: https://ww1.microchip.com/downloads/aemDocuments/documents/OTH/ProductDocuments/DataSheets/ATmega164P-324P-644P-Data-Sheet-40002071A.pdf. [Accessed: Jan 30, 2025].