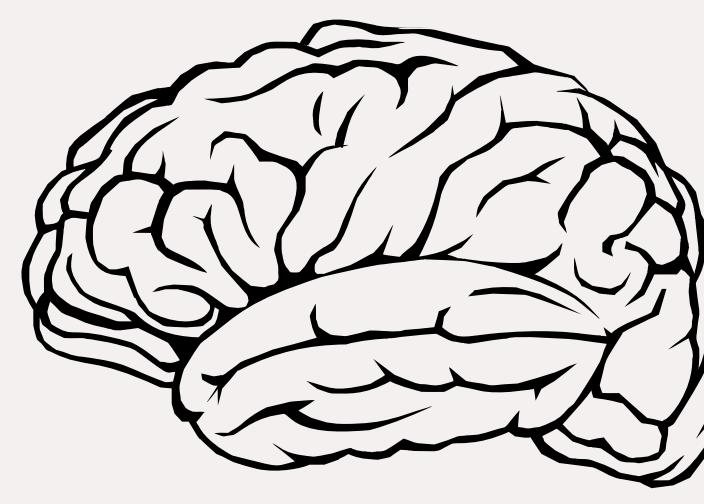


# MENTAL HEALTH

ECE 196 FALL 2024

## PROBLEM

Engineering Students struggle with building consistent routines, which impacts their mental health.



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## WEB PAGE

[HTTPS://M7DELACRUZ.WIXSITE.COM/  
BRAIN-BUDDIES](https://m7delacruz.wixsite.com/brain-buddies)

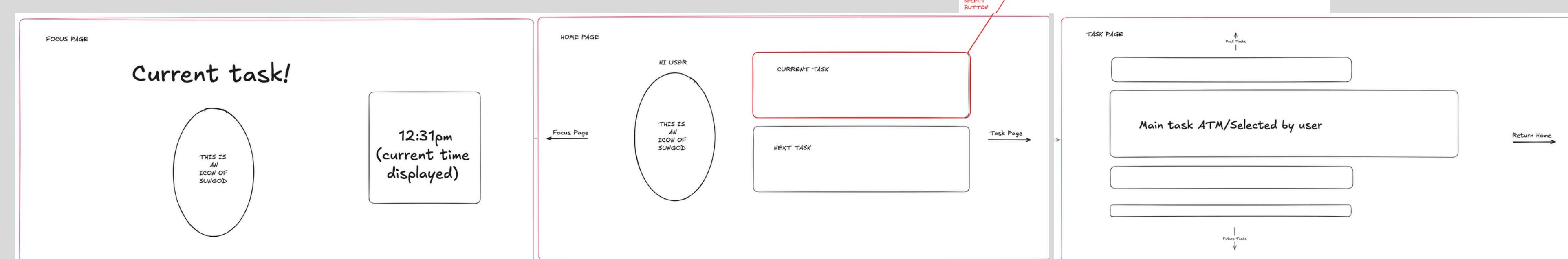


## SOLUTION

Our solution is an assistive device\* that encourages and helps engineering students build and be accountable to a routine. Our device enforces the creation of a routine through organization and simplification of scheduling.

## DESIGN

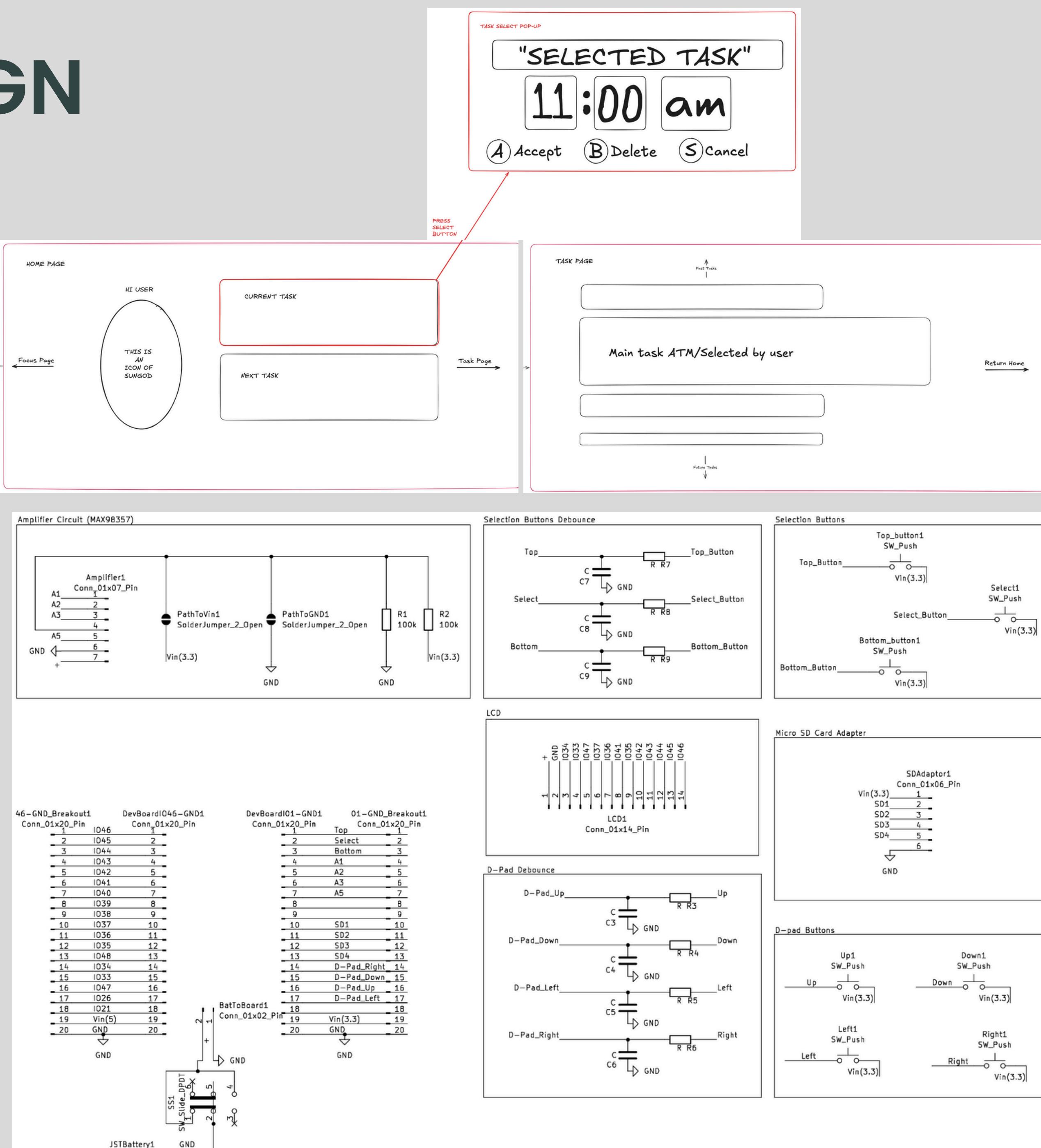
UI layouts for our device:



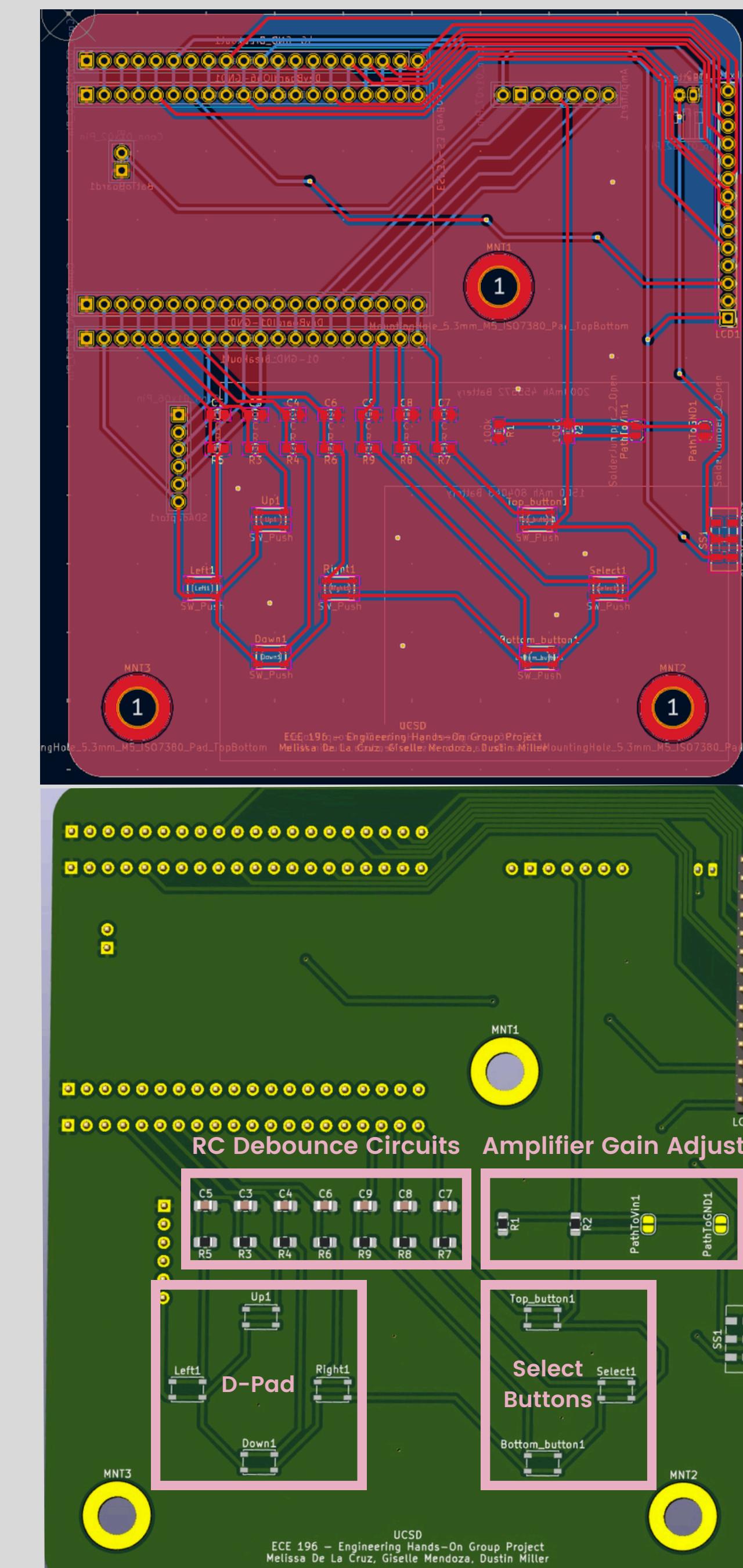
### PCB Schematic:

The printed circuit board (PCB) is a structural element and an interconnecting platform between electronic components.

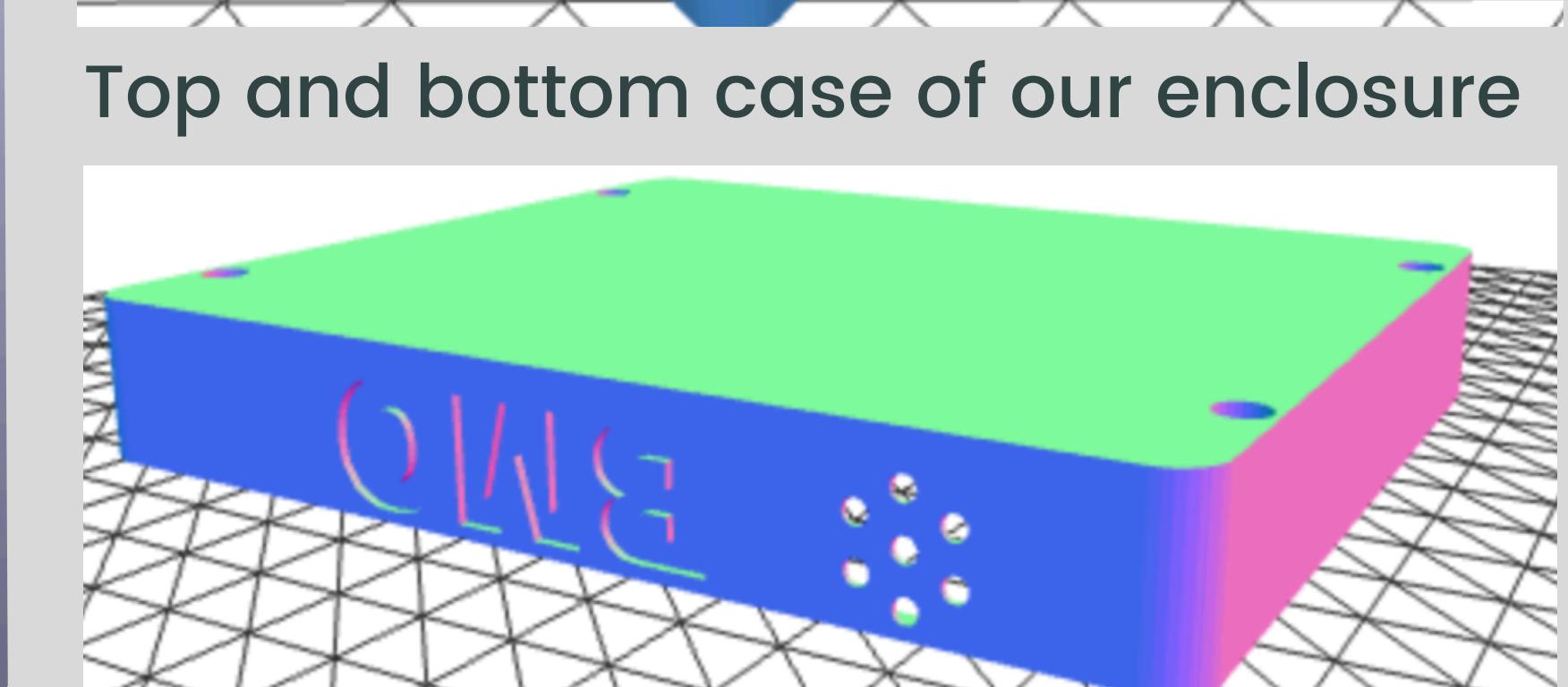
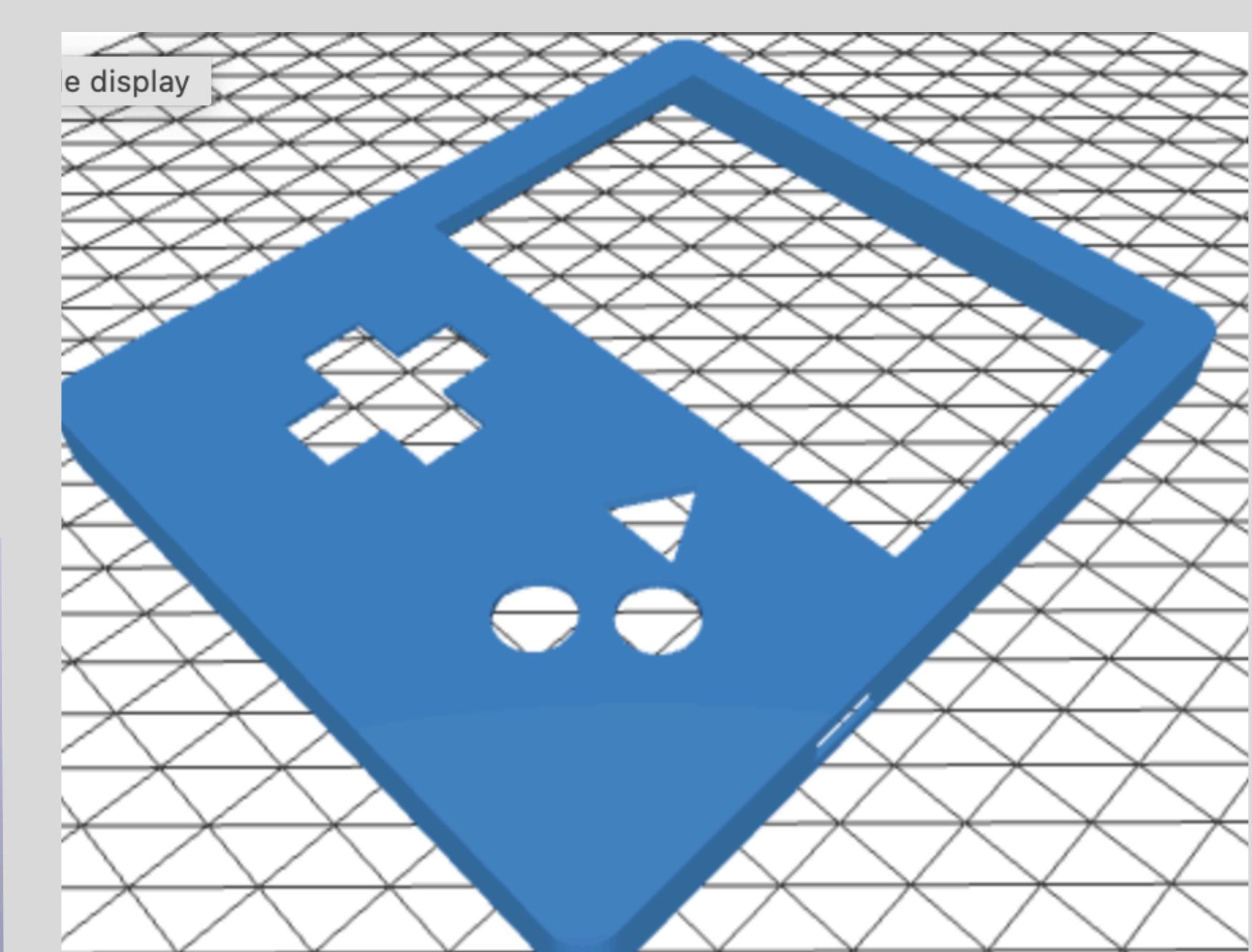
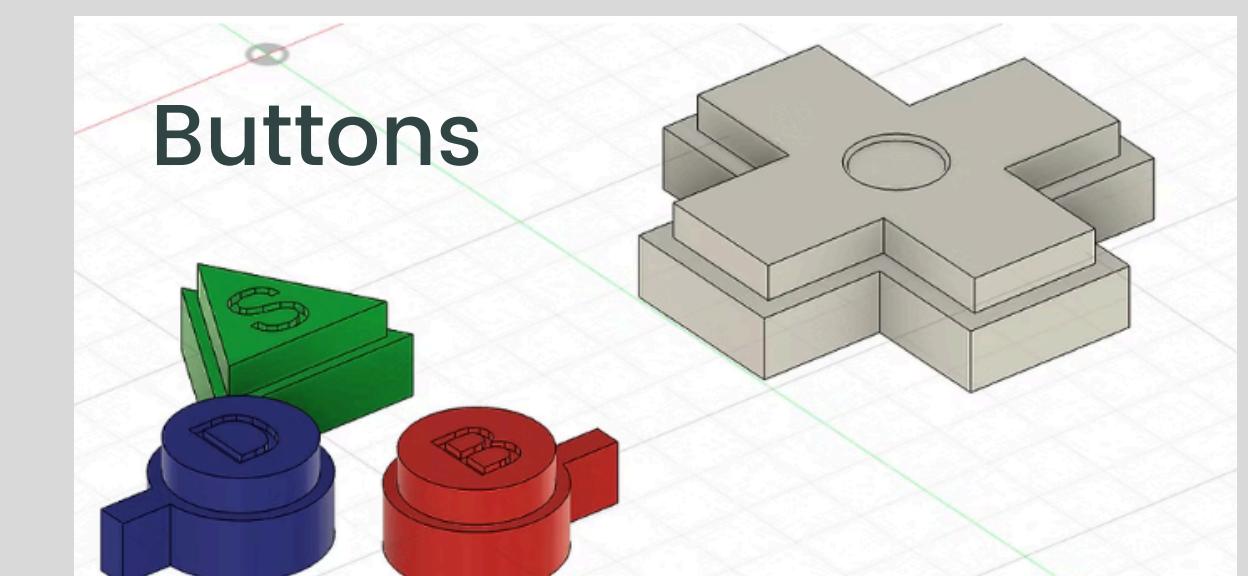
It facilitates the integration of the ESP32 S3 with peripherals, including the display, a microSD card adapter, an audio amplifier, a lithium polymer battery, and seven push-button interfaces.



PCB connections and 3D viewer

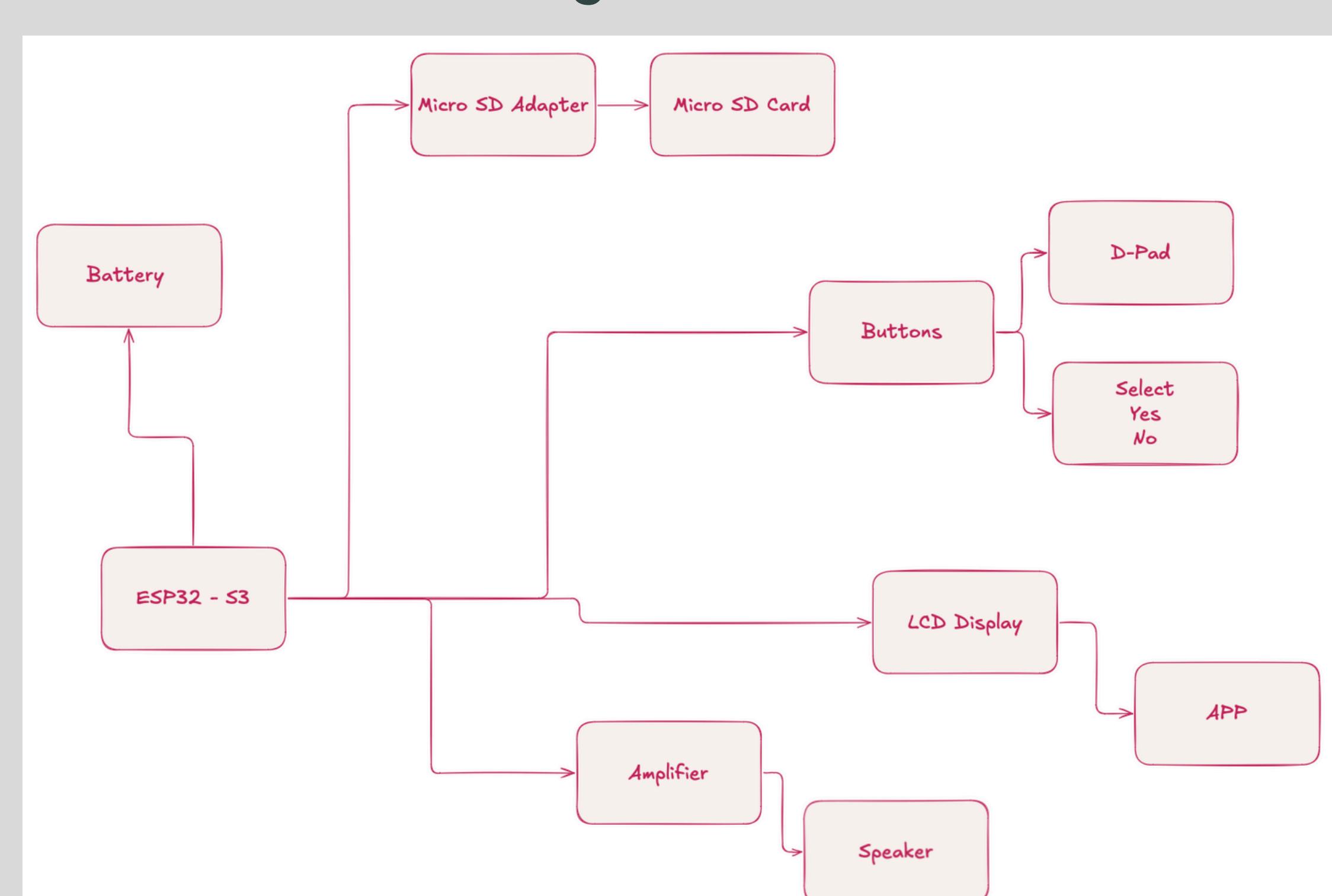


CAD Designs:



## PROTOTYPE

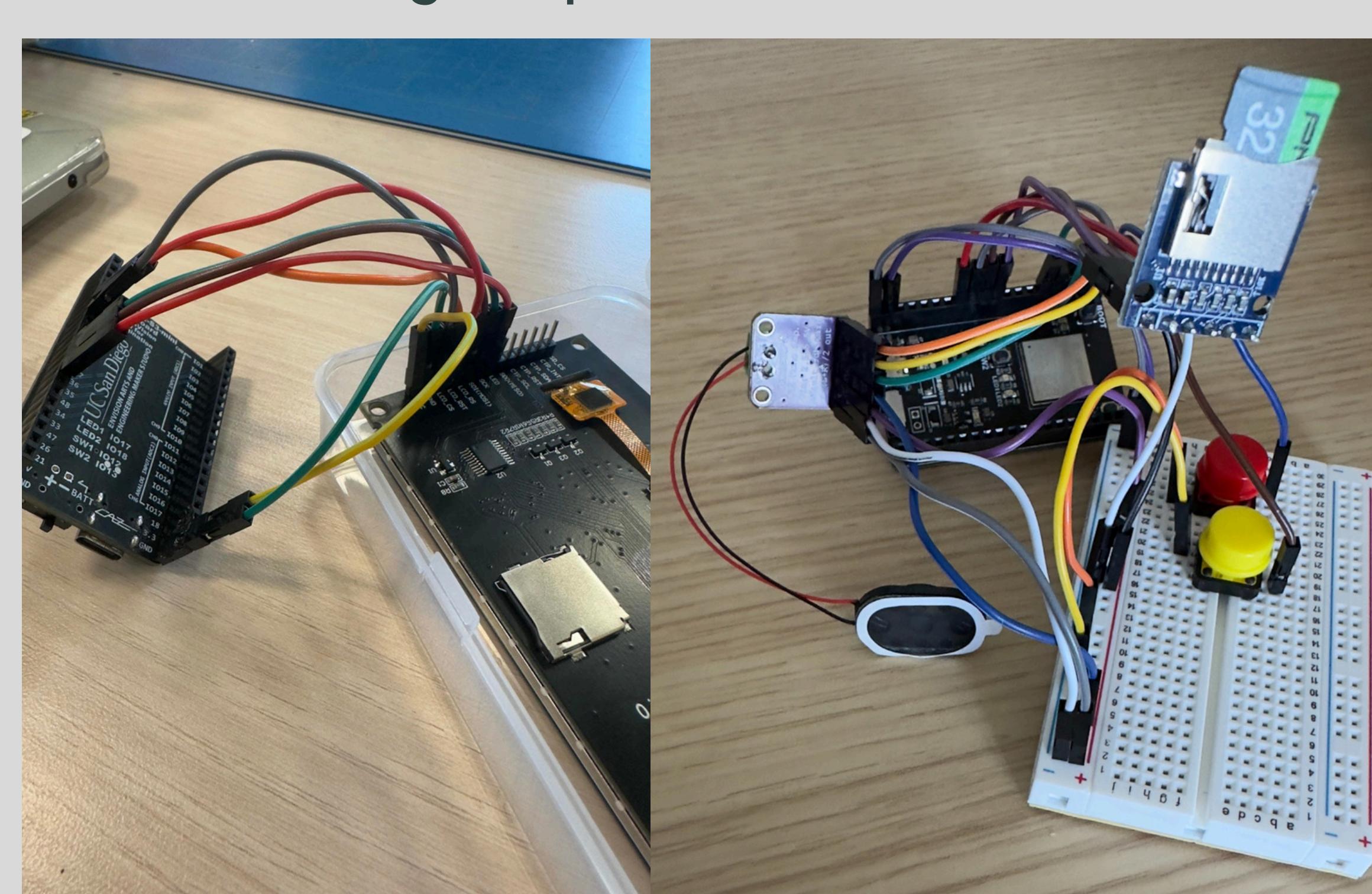
Hardware Block Diagram:



Laying out the individual peripherals is immensely helpful in understanding how we expect them to be connected.

From here we ordered the parts and when they arrived we breadboarded them to ensure they functioned and would be compatible.

Breadboarding Peripherals:



On the left, we connected our LCD to the ESP32 and found libraries to help us connect the hardware. This is a challenging aspect of the project, requiring a lot of research, trial & error, and determination.

On the right is the breadboard of the Amplifier Circuit. It connects the SD card adaptor, amplifier, speaker, and two buttons.

PCB and Final Design:



Top: Our assembled PCB with all peripherals in our hardware block diagram.

Bottom: The finished design running our routine software. All three UI screens have been implemented but are not shown.

## TESTABLE HYPOTHESIS

**Hypothesis:** Our device will be used as an organization tool that helps students keep track of their tasks. It will be a simple-to-use tool that will help organize tasks and remind students to finish them.

**Test:** Students can add tasks and notifications, making it easy to follow a daily routine with minimal distractions.

## TEST RESULTS

Due to supply issues, among other challenges, we still need test results from the device itself.

However, we found that with the pressures of engineering with a routine tracked over two weeks, less than 50% of routine items tracked by hand were completed. Furthermore, many of the routine items completed often took place at times that were different than intended.