

Final Write-Up

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Our group made a functional music cube throughout the C24 term. When rolled, the laptop the cube is connected to via Bluetooth will play audio based on the side of the cube it lands on. Our goal was not only to create a functional music cube but was to ensure fairness in the cube rolling.



Figure 1. Image shows final design of the developed music cube. Each face of the cube has a different album cover of the Dire Straits.

The cube consisted of 2 main parts: the outer shell and the circuit board. The circuit board was composed of the Xiao microcontroller, a 3.7 Li-ion battery and battery holder, and an on/off switch. The layout of the board was organized so that the weight of the board would be balanced (see Figure 2). We made rough schematics of the component layout and tested it with a breadboard. After measuring and laying out the components on the soldering board, we soldered all the components to piece the final circuit board together. This circuit board was used to connect the cube to our laptops which would result in an audio being played. We first had to copy and download the code the previous group left on Gitlab to the microcontroller.

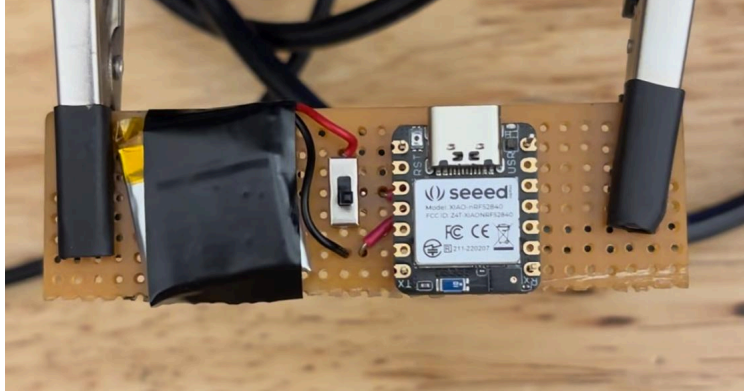


Figure 2. Image shows the layout of the circuit board containing the Xiao microcontroller (right), the 3.7 Li-ion battery (left), and the on/off switch (in between the battery and controller).

The second main component of the cube was the shell. The shell was designed using Solidworks and made so that the inside of the shell could hold the circuitry when the cube rolls. The shell splits into a diagonal so that the circuit board lies diagonally across the cube. The purpose of this was so that the circuit board could be configured inside the shell so that the weight is evenly distributed across the cube, preventing rolls favored to one side. The shell was also designed with a closure for the halves to snap together. The outer visuals of the shell were made using sticker paper. Each side of the cube had a sticker of a different album cover of the band Dire Straits. As the team name we had was “Dice Straits”, using album covers of the Dire Straits was our way of showing where our team name came from (see Figure 1 and Table 1).

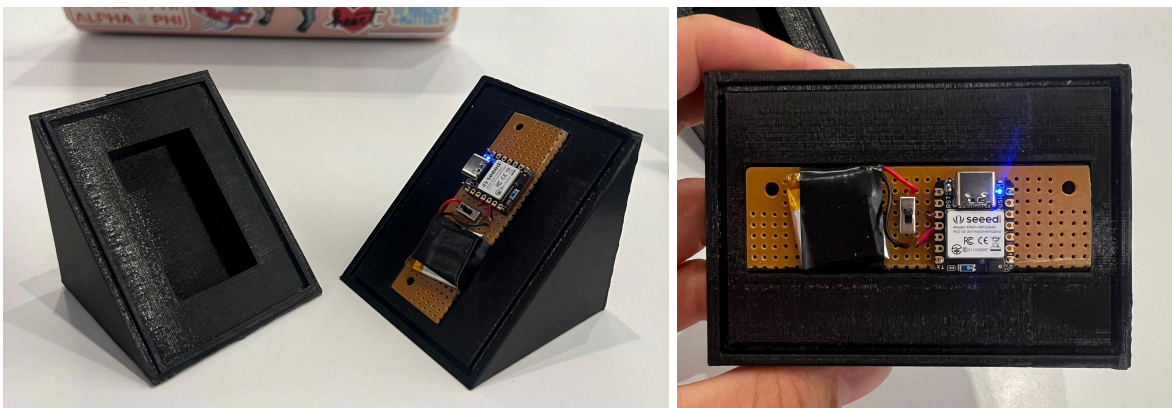


Figure 3. Images show the shell of the cube designed via Solidworks. The cube's inside is configured so that the circuit board lies across the cube's diagonal and the cube also snaps together across that same diagonal.