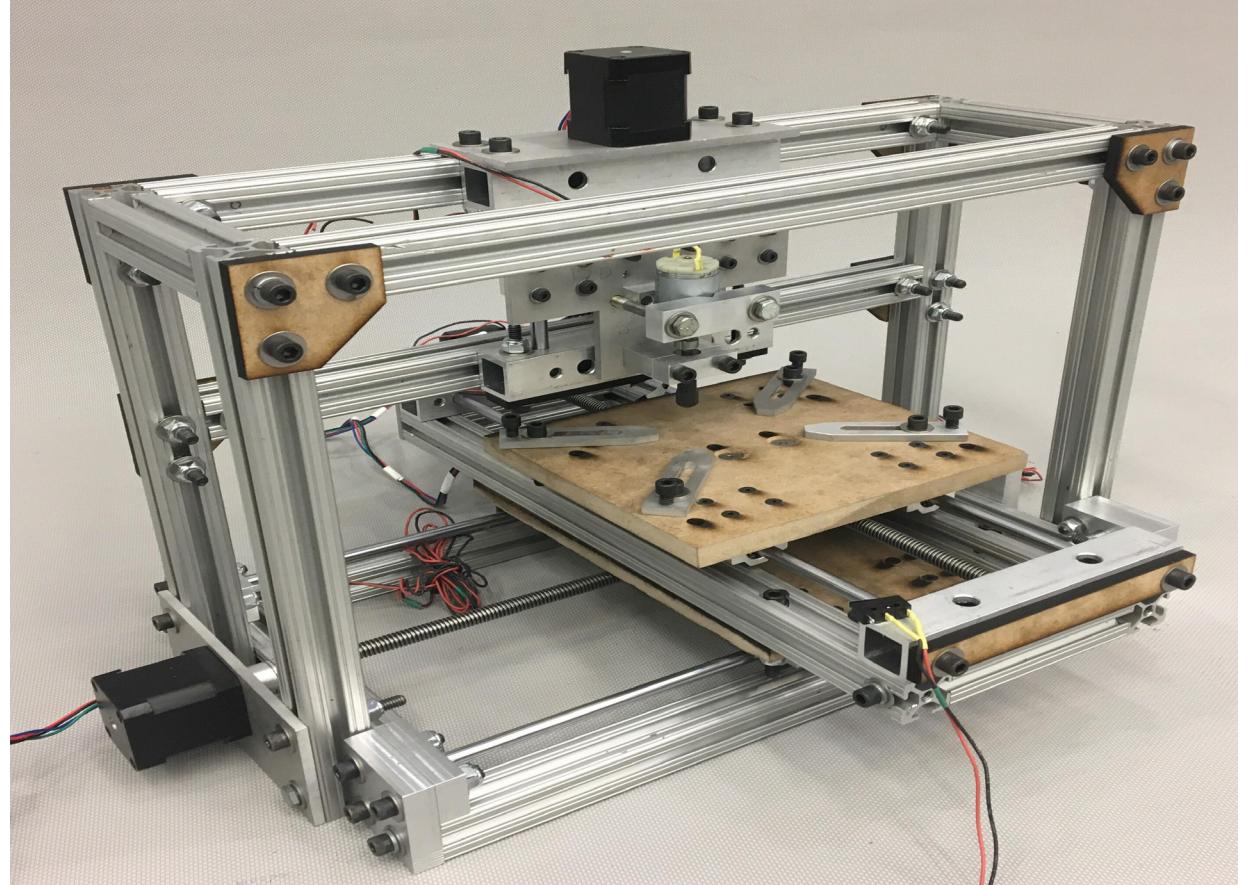
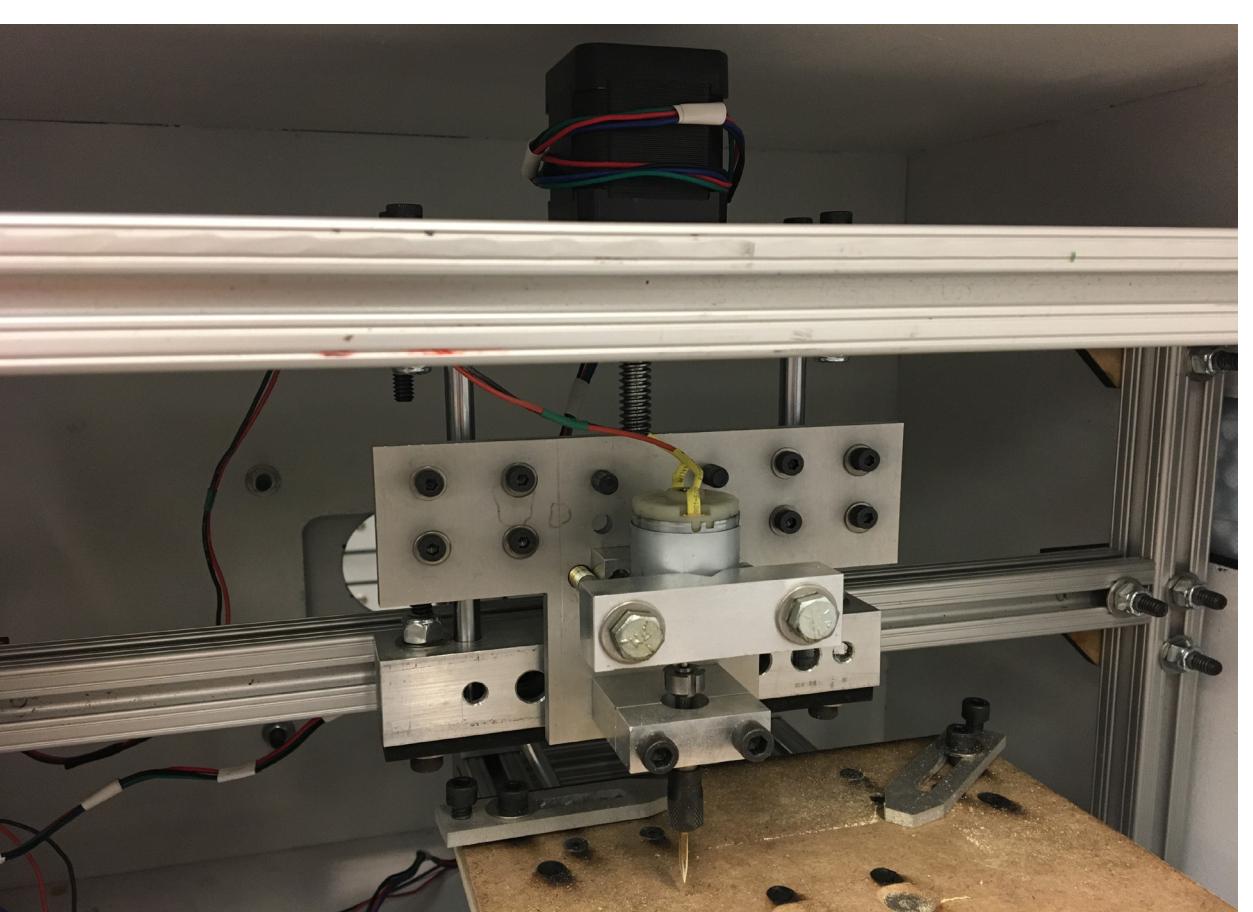


Mechanical

The mechanical system contains three main subassemblies.



The X-Y compound table moves the PCB under the cutting tool.

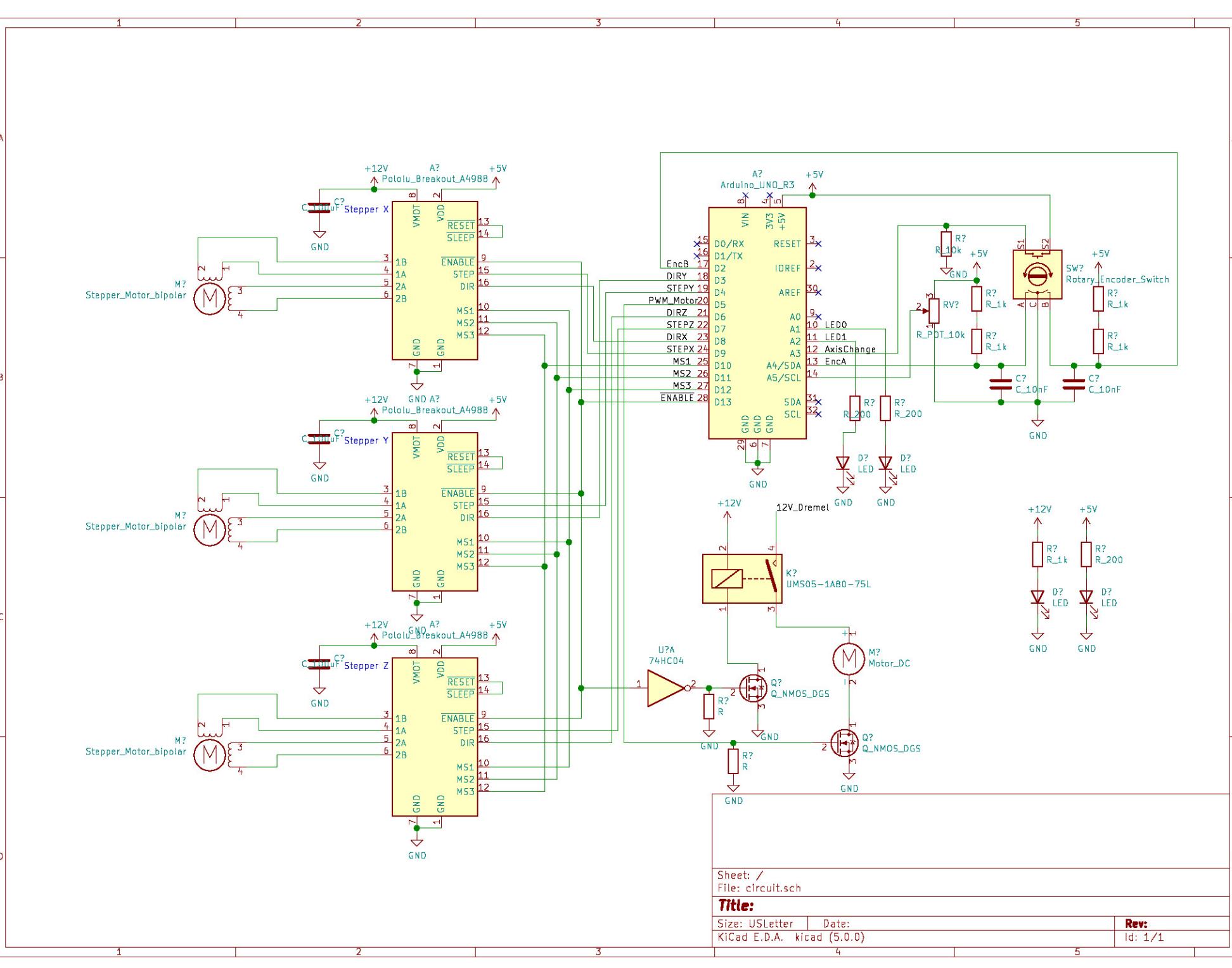


The Z-axis spindle assembly holds and moves the cutting tool.

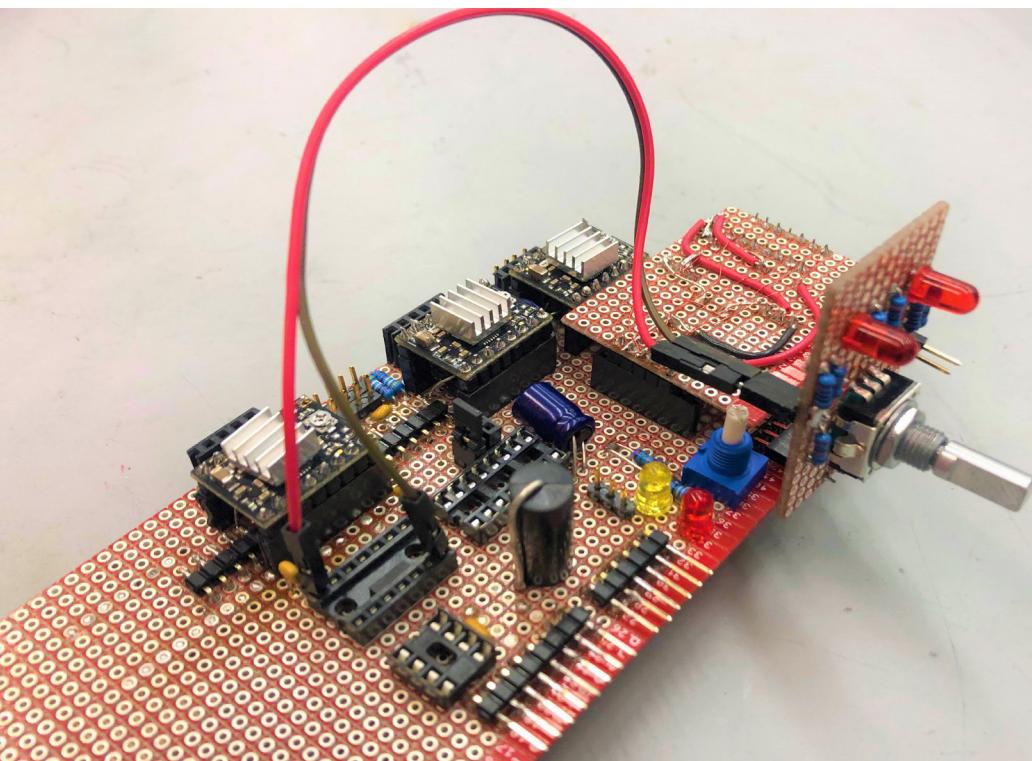


Enclosure to integrate ventilation system and electrical system.

Electrical



We created a main electrical proto-board and two extension boards to facilitate real-time control.



Etch a Schetch: Desktop PCB Milling and CNC Etching

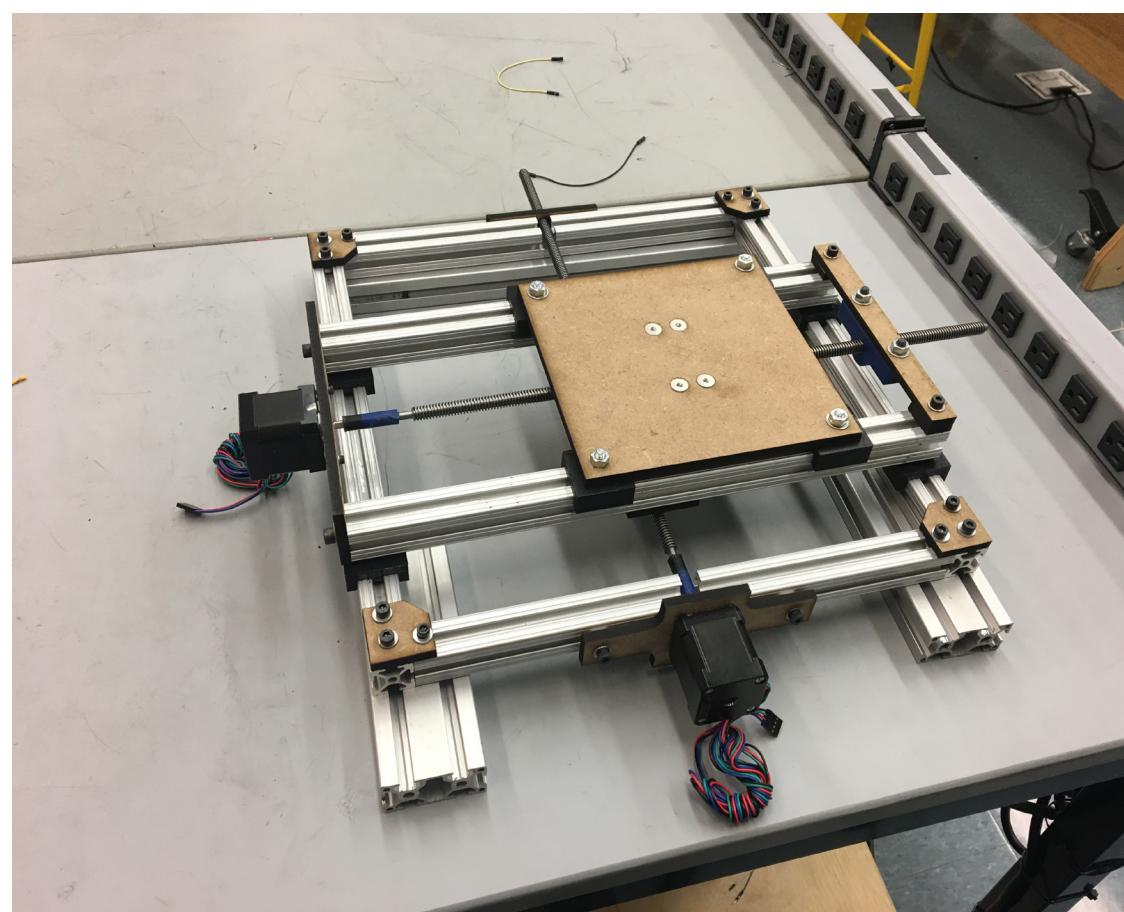
Aiden Carley-Clopton, Anusha Datar, Qingmu Deng, and Quinn Kelley
Principles of Engineering Final Project

Our Project

Over the course of seven weeks, our Principles of Engineering team built a PCB (Printed Circuit Board) milling machine. Our goal for the project was to make a robust, usable tool that was affordable.

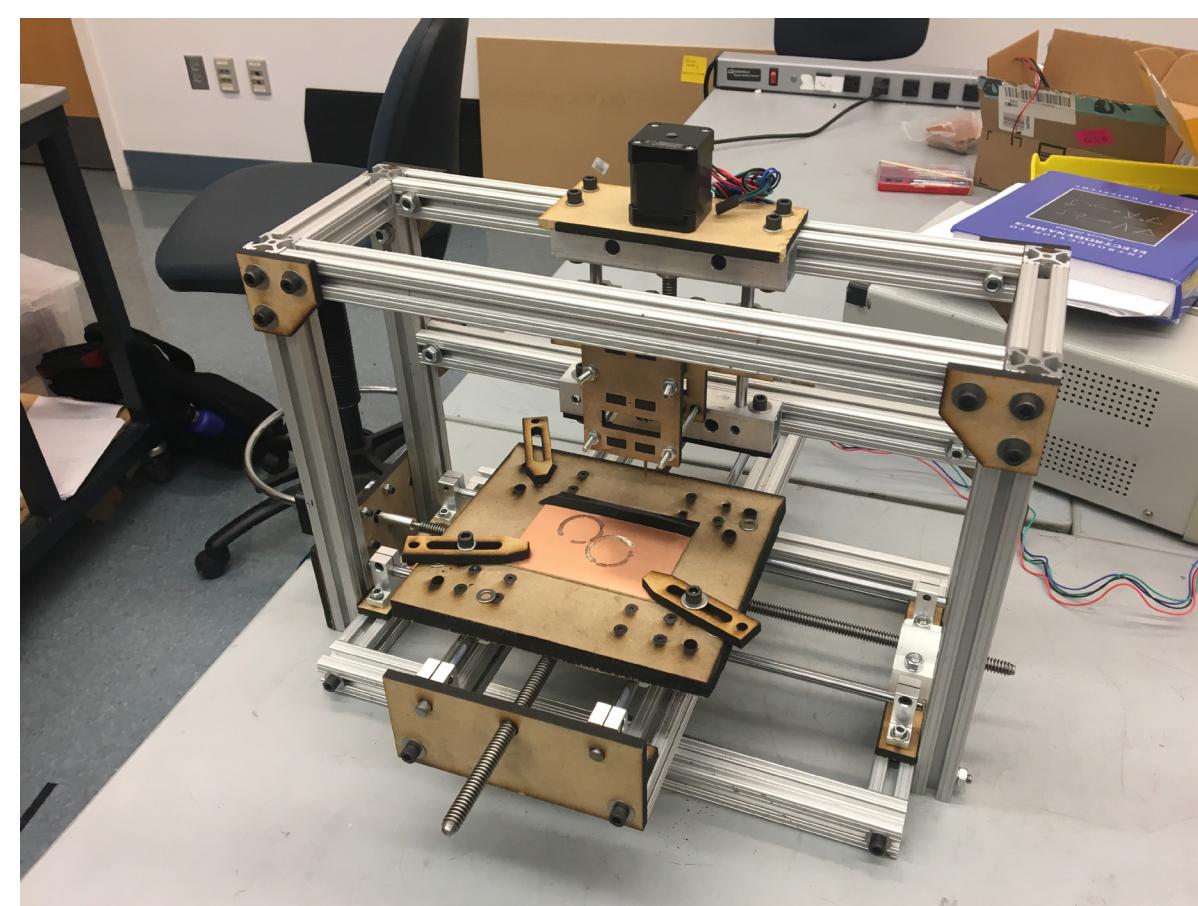
Our Process

Sprint 1



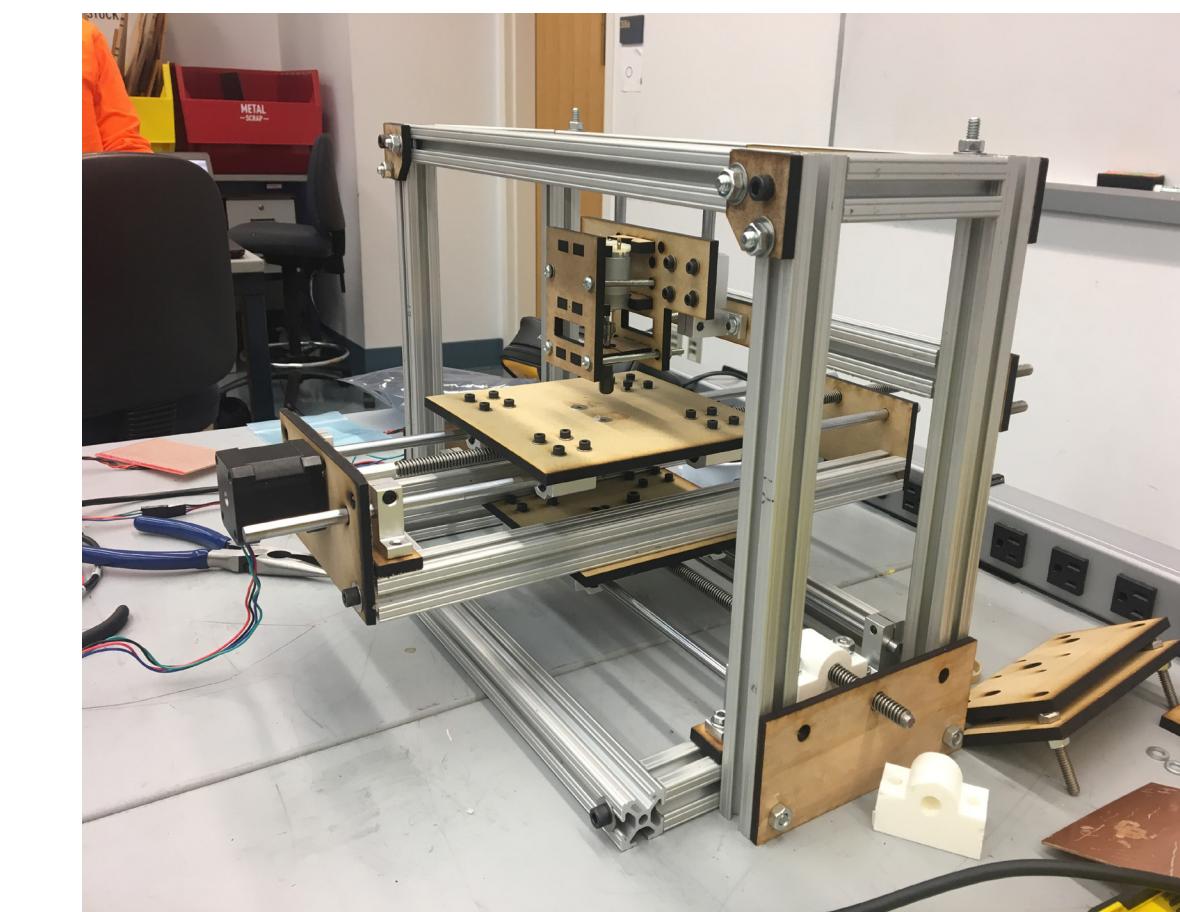
In sprint one, we built a solid, functional two-axis compound table framework capable of traversing the X-Y plane and drawing continuous figures.

Sprint 3



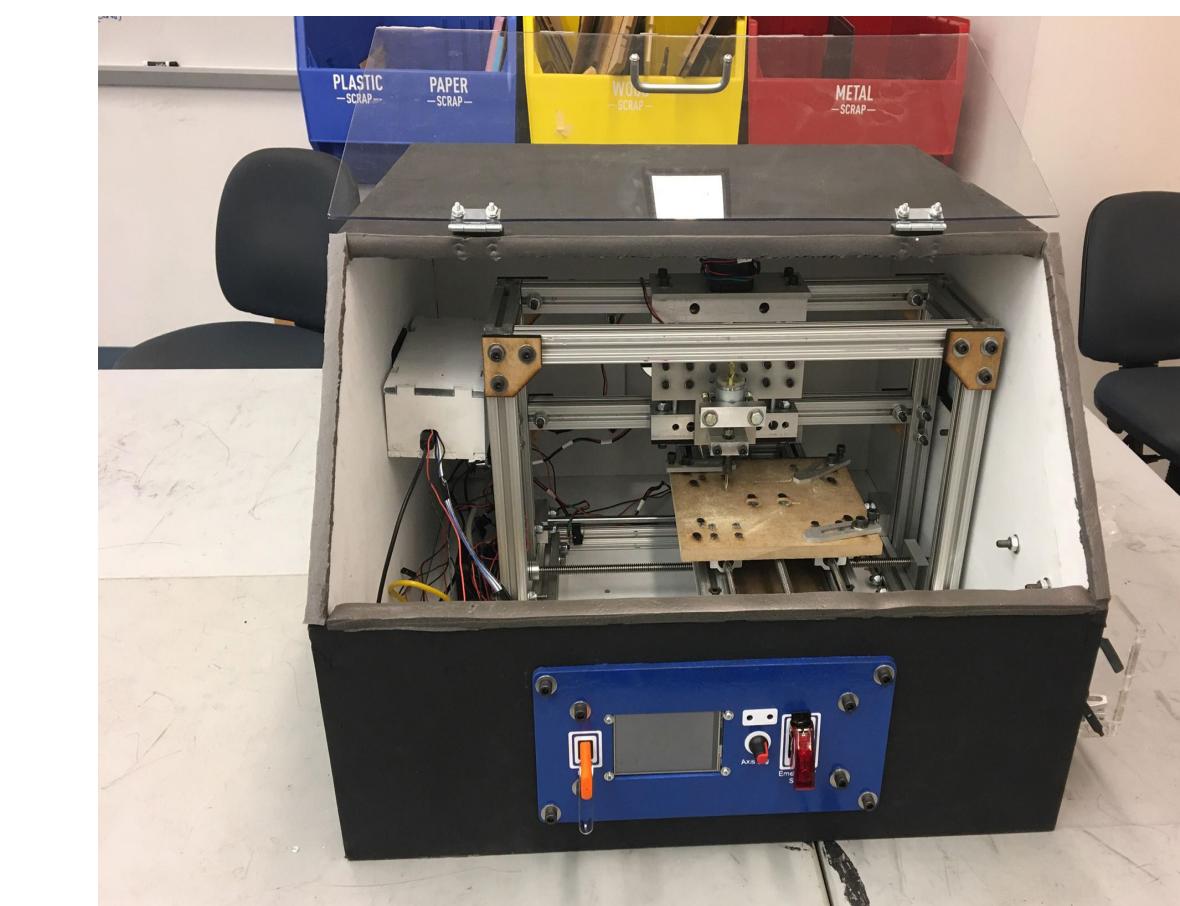
In sprint three, we achieved full MVP functionality by actuating the z axis and adding necessary UI features to etch a complete PCB design.

Sprint 2



In sprint two, we developed a system that could mill simple, continuous designs by receiving two-axis gcode commands over serial.

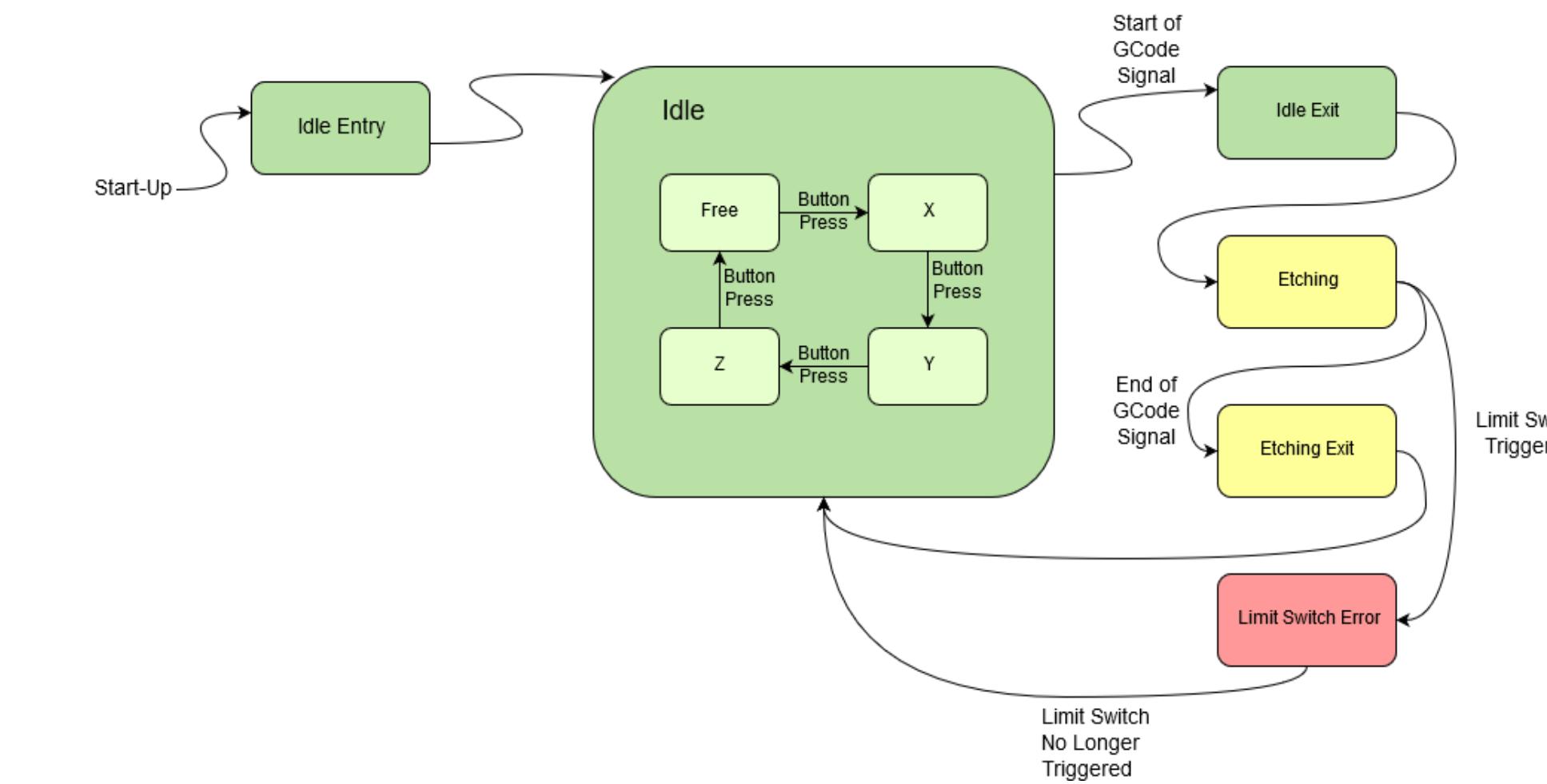
Final Stretch



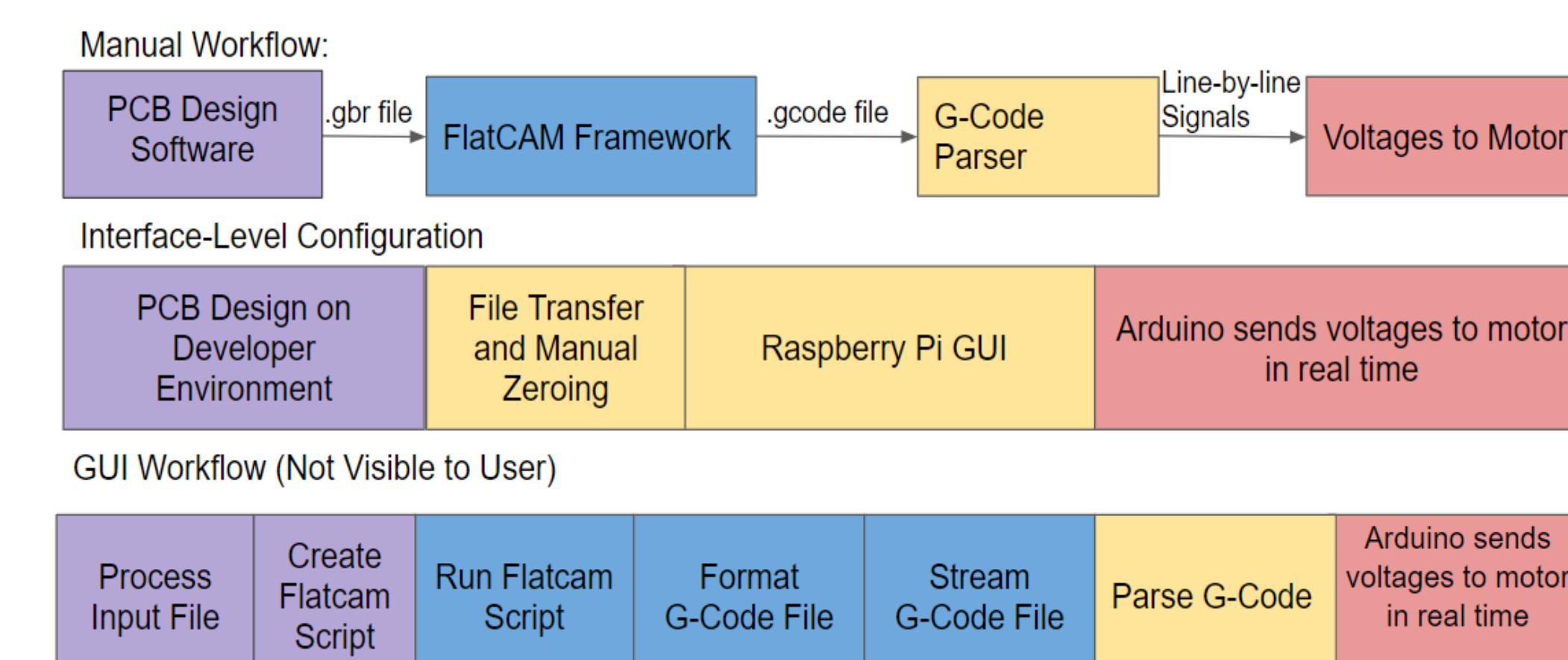
In the final stretch, we added UI features and a housing to create as functional, refined, and user-friendly a product as possible.

Software

Our software framework contains two subsystems - firmware on the Arduino and software on a computing platform. The firmware uses a state machine.



The software framework handles the UI to obtain a file, create formatted tool-paths from that file, and communicate commands to the microcontroller.



System Diagram

