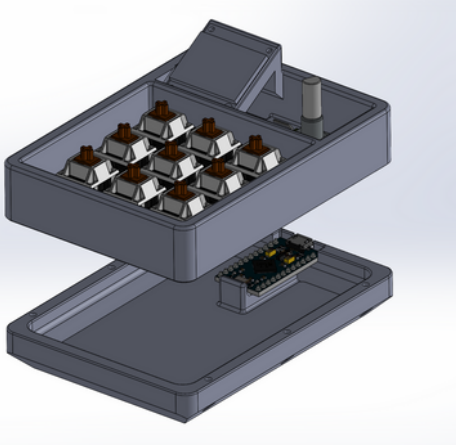


3x3 Custom Keyboard - Personal Project



What?

- Designed a **custom keyboard** for optimizing my workflow in **SolidWorks**.
- The objective was to **increase efficiency** while maintaining an intuitive and **visually appealing design**.



How?

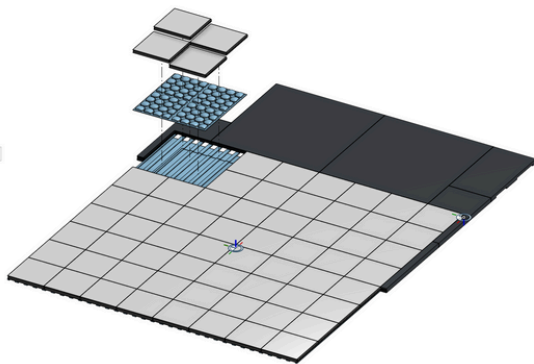
- Designed a 3D-printed enclosure with heat inserts to mount a **microcontroller, rotary encoder, and OLED screen**.
- Designed and ordered a **custom PCB** for the switches using **KiCAD**.
- Developed **custom firmware** for communication between components.



Outcomes

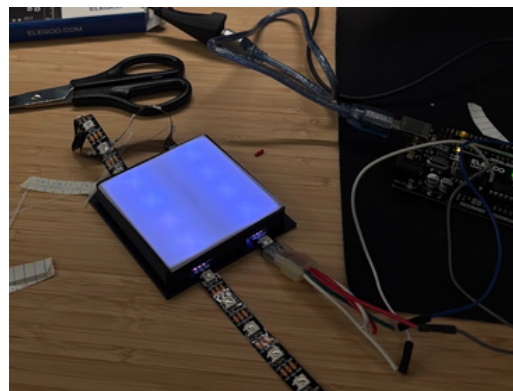
- Created a custom macropod with **39+ programmable functions**.
- Gained a **end-to-end product design experience**, from **CAD modelling** to **electronics integration** and **firmware development**.

Custom LED Embedded Chess Board - Spark!



What?

- Designed an **LED-embedded chessboard** for my design team's Smart Chess project.
- The objective was to **optimize the board thickness**, ensuring **structural strength** while maintaining a **thin profile for reliable magnetic attraction** on opposite sides of the board.
- Light from LEDs also had to **diffuse minimally** between board pieces.



How?

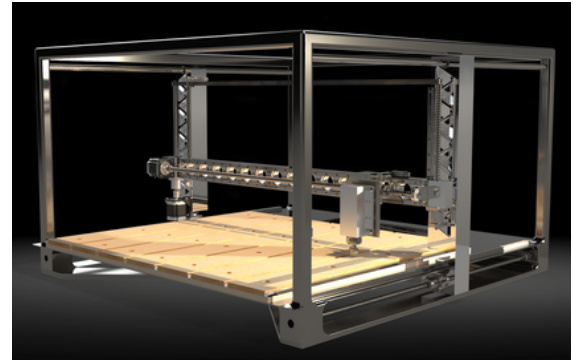
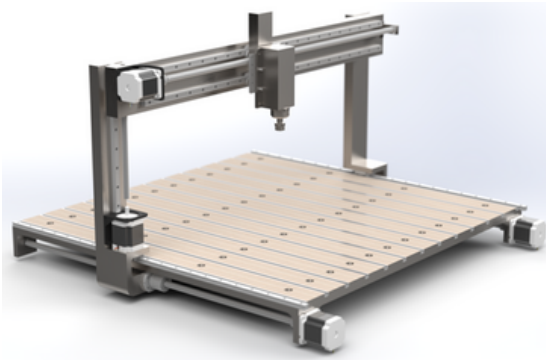
- Designed a system with three layers: a topper that connected to other toppers and prevented light bleed to other positions, a diffusion layer and a layer for holding LED strips.
- Used **OnShape** to **prototype** and test **10+ iterations** during the design process.
- Tested light diffusion using the **FastLED Arduino** library.



Outcomes

- Designed and manufactured a **LED-embedded chessboard** with a **thickness of 7.7mm** and a **deflection of less than 2mm**.
- Chessboard contains **1024+ LEDs** with **little to no light diffusing between the grids**.

Custom CNC Machine - University of Toronto



What?

- Designed and modelled a **large-format three-axis CNC router** with a combination of **custom-designed parts** and **McMaster-Carr components**.
- The objective was to **maximize utility, modularity** and **repairability** while **keeping costs low**.

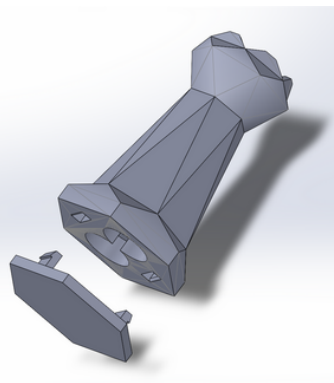
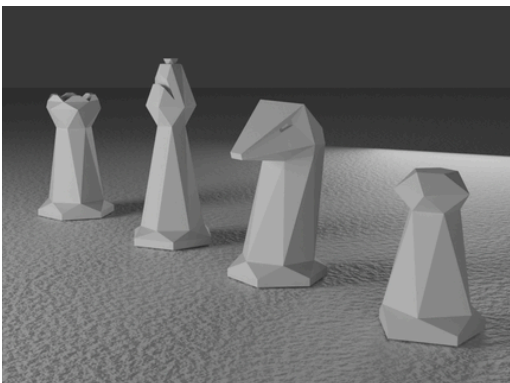
How?

- Researched components to **optimize for cost-efficiency** and performance based on **design specifications**.
- Developed and delivered Google Slides to communicate **key design features and trade-offs**, effectively **securing approval** during **engineering design briefing**.

Outcomes

- Designed and modelled a custom CNC router with **229 parts** and **400+ mates** in **SolidWorks**.
- Created a **comprehensive design report**, including **engineering specifications, component justification** and a **bill of materials** outlining all components required to assemble the router.

Custom Chess Pieces with Magnets - Spark!



What?

- Designed **four unique chess pieces** with **internal magnets** for my team's Smart Chess project.
- The objective was to design something with a **low-poly aesthetic** that could house internal magnets.

How?

- Designed and modelled** the chess pieces in **Blender**.
- Created renders** of the design in Blender for marketing purposes.
- Created a **Blender to SolidWorks workflow** to utilize both organic modelling and technical refinement in both software.
- Designed a **3D printable clip-on cover** and **magnet slots** within **SolidWorks**.