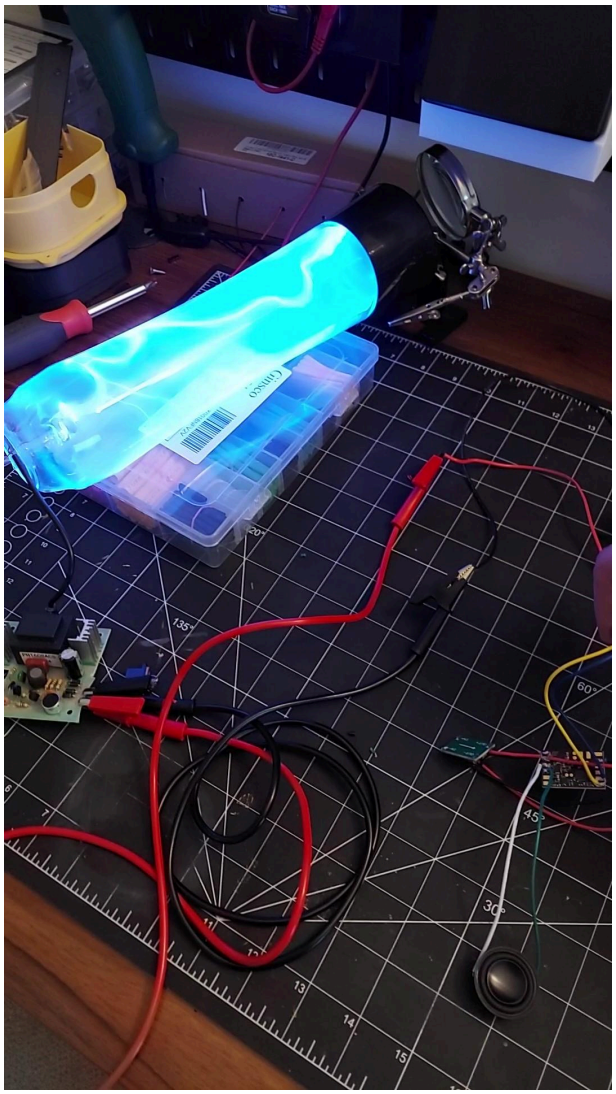
The Electrostaff

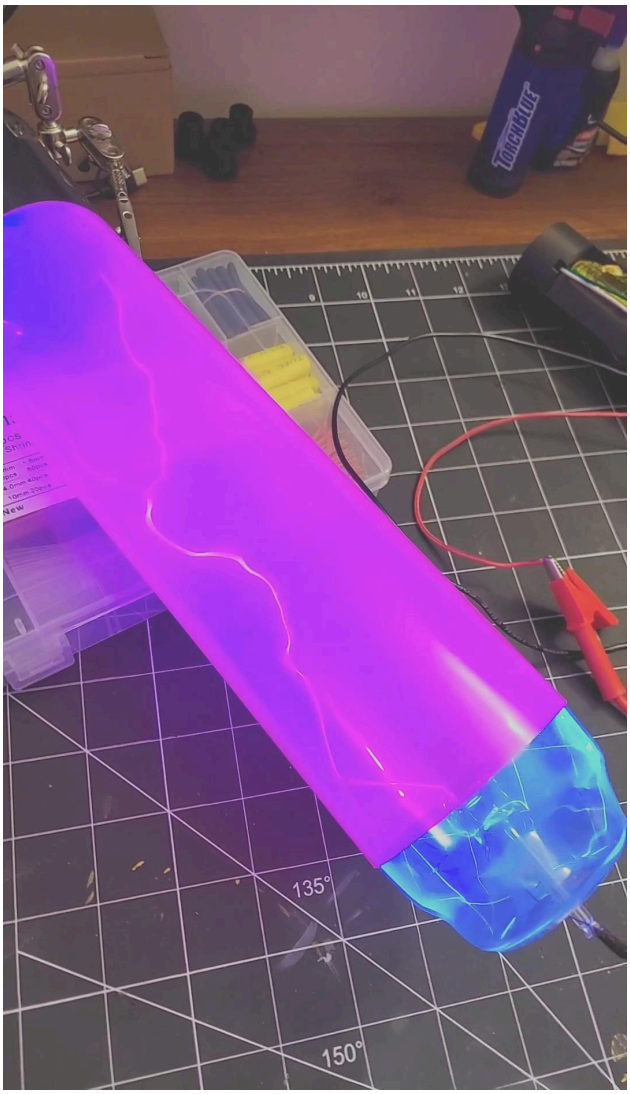
Star Wars

By Hasen.3D

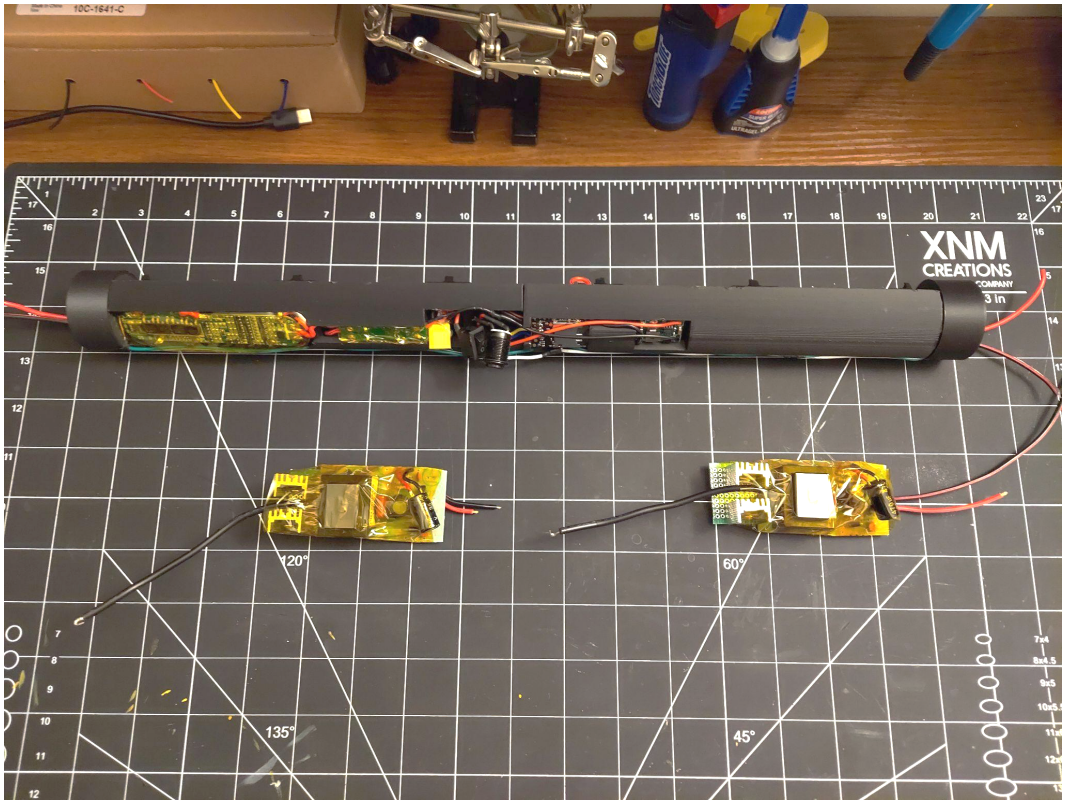
My primary goal while developing the Electrostaff was to emulate the electrical arcs shown on screen to the greatest effect possible while being able to remain convention safe.

I began the construction process by disassembling off the shelf plasma tubes and modifying the high voltage oscillator circuits to fit in the tube on either end of the core.



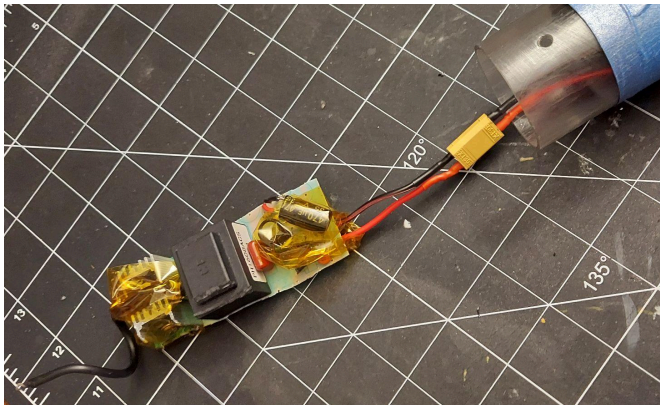


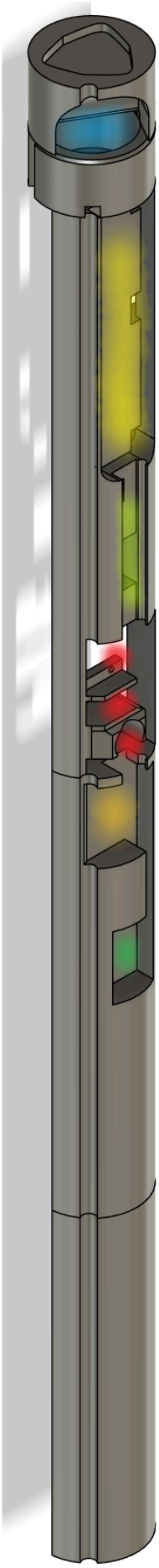
I 3D modeled and printed the core of the staff, which contains the power supply, soundboard, controls and relay. I had to custom build an 18 volt power supply to operate the plasma transformers. This also powers a buck converter to reduce voltage for the soundboard. The core has a 28mm bass speaker on each end to enhance the effect of plasma with true to screen sounds. Additionally, I made a custom soundfont for the soundboard and created a custom configuration to suit the staff.



The plasma is controlled by a relay that is triggered by the LED output of the soundboard for full control including impact detection.

The tube for the shaft was originally planned to be 1.5 inch PVC, but this seemed too thick as it came time to mount the ends. I redesigned the core and transformers to fit in a smaller and thinner polycarbonate tube. Step bits were used to drill the holes for controls, speakers and mounting the ends of the staff. Sound ducts were added later to improve volume in loud environments, as well as removable connectors for the transformers to ease maintenance.





Sound Duct & Speaker Mount
(One per side of core)

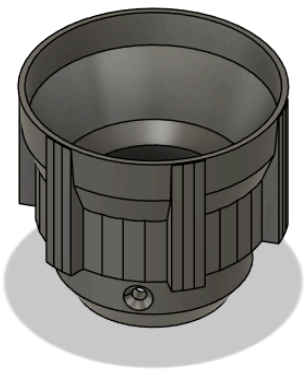
5S Battery Management
System (BMS)

Relay

Controls & charging

Golden Harvest V3
Soundboard

Low Voltage
Buck Converter



I then designed the endcaps and mounting interface for the plasma tubes. All parts were modeled in Autodesk Fusion. I 3D-printed two sets of end caps, one from flexible Thermoplastic Polyurethane (TPU) to dampen impacts, and the other from ABS which I vapor smoothed using acetone for display purposes. I used two part epoxy to attach the tubes to the mounting interface which is then screwed to the staff after the core and transformers are inserted.

Each end of the staff was then air brushed silver and the plasma tubes wrapped in a gel filter to turn the lightning from blue to the intended purple. Finally, I wrapped the staff in vinyl cut on my Cricut for a uniform finish.