

11/11/25

2.5hrs

Was inspired by a youtuber who runs a company which makes heated massage pens for TMJ. This would help my jaw a lot but I cant afford his and this is a great opperl researched how thermistors work, how to induce vibration in the pen tip without the user feeling too much vibration, how to make 3dp prints work without supports and how to print it, and looked at similar heated massage devices that are for sale.

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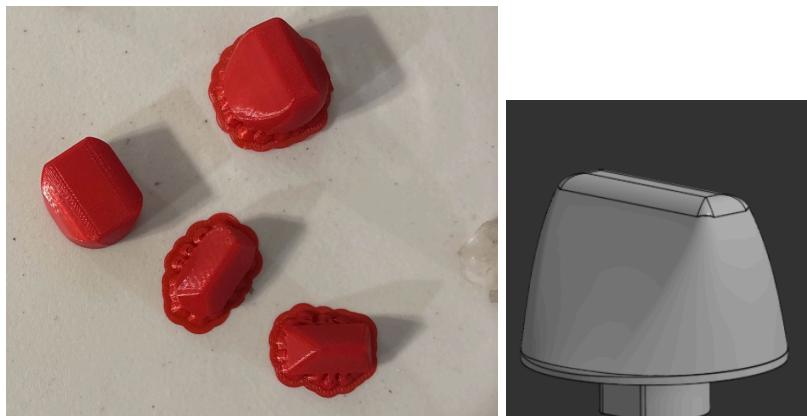
1hr

Continued research and explored how to get a PCB manufactured and how a metal tip (metal tip needed to not melt, be sanitary, and transfer heat well) can be made. CNC is very difficult for complex geometry but metal 3dp is available online.

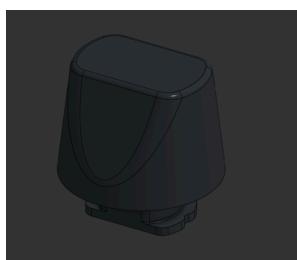
11/14/25

5hrs

I started on the pen design and tested different tip geometry by printing them on a plastic 3d printer and then pressing them against my face. Most of these were bad because I did not really know how to design smooth geometry like this but eventually I made progress and settled on a final design.



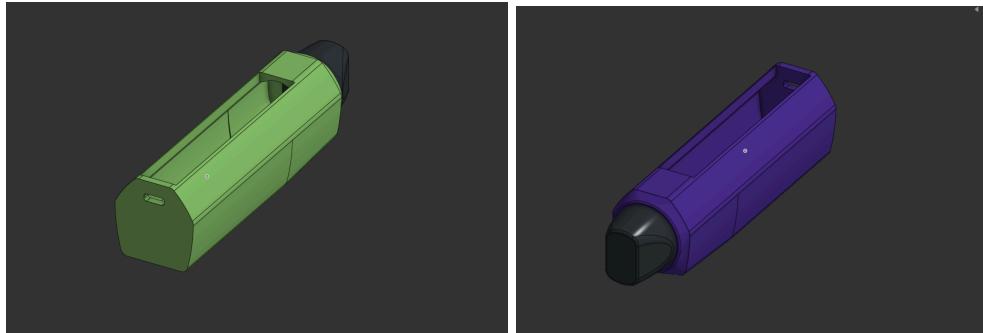
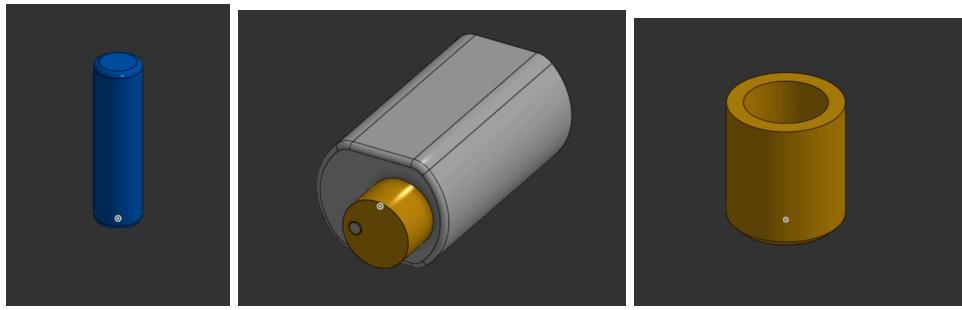
Final:



11/24/25

2hrs

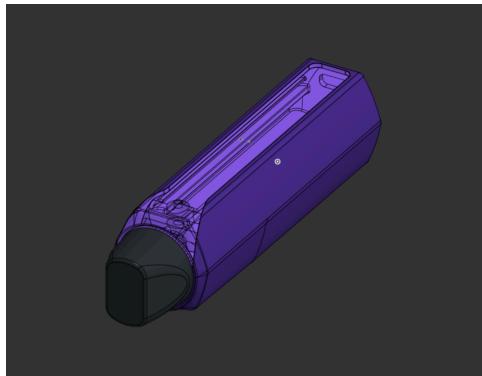
Caded the parts I found on Amazon earlier like batteries and the motor and I found a dummy board for sizing, started on a v1 body.



11/27/25

2hrs

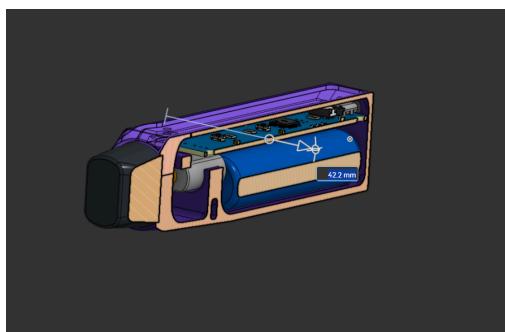
Restarted the body as a new file and added the removable top



11/28/25

.5hrs

Minor changes, put electronics in



PCB Timeline

11/12/25

5hrs

I began researching how to design a PCB. We knew we needed to, have a battery, a motor, thermistor, and the main pcb element to power it all. Our first idea was to use an arduino nano and power everything via USB C cable. This would be easy as the motor could be hooked up to a digital port and powered there and the thermistor to the 5v output. We narrowed down our thermistor to the one found in an ender 3 and the vibration motor to be one from amazon.

After taking a break, I assembled together a quick arduino nano to test out a small DC motor I had lying around that looked similar with no vibrations. It worked and was spinning quite fast. Success! I then got my old ender 3 and took out the thermistor and tried hooking it up, and I realized that the arduino did not have enough power to supply the thermistor. On top of this, after plugging in the thermistor, the heat would grow but as soon as I touched it, the temp would rapidly decrease.

11/13/25

4hrs

I realized that making this would require a fully custom PCB and could not be used through an arduino. I went to Flux AI to figure out how to actually find the components and it suggested me using an ATMini microchip to power the entire device and that I should check LCSC for parts and pair it up using EasyEDA.

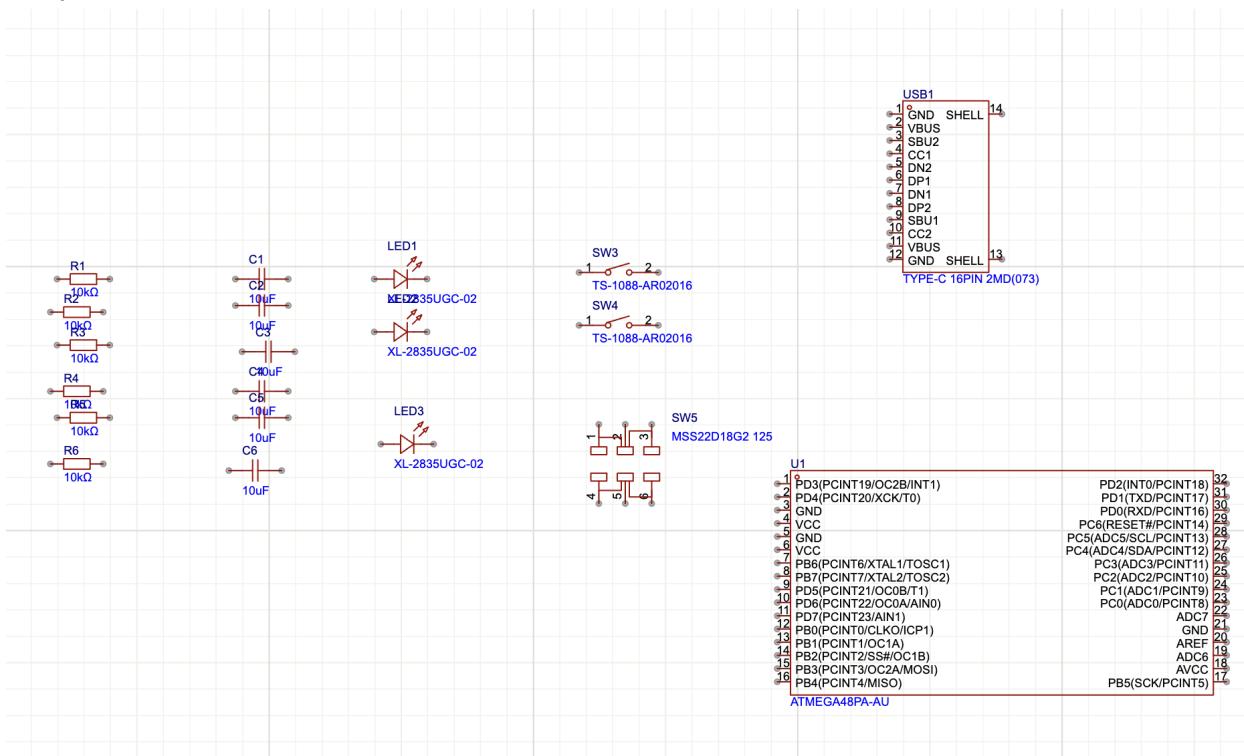
I started following this tutorial on how to design

pcb.<https://www.youtube.com/watch?v=8RiLKnczvxs&pp=ygUQZWFzeWVkYSB0dXRvcmlhbA%3D%3D>

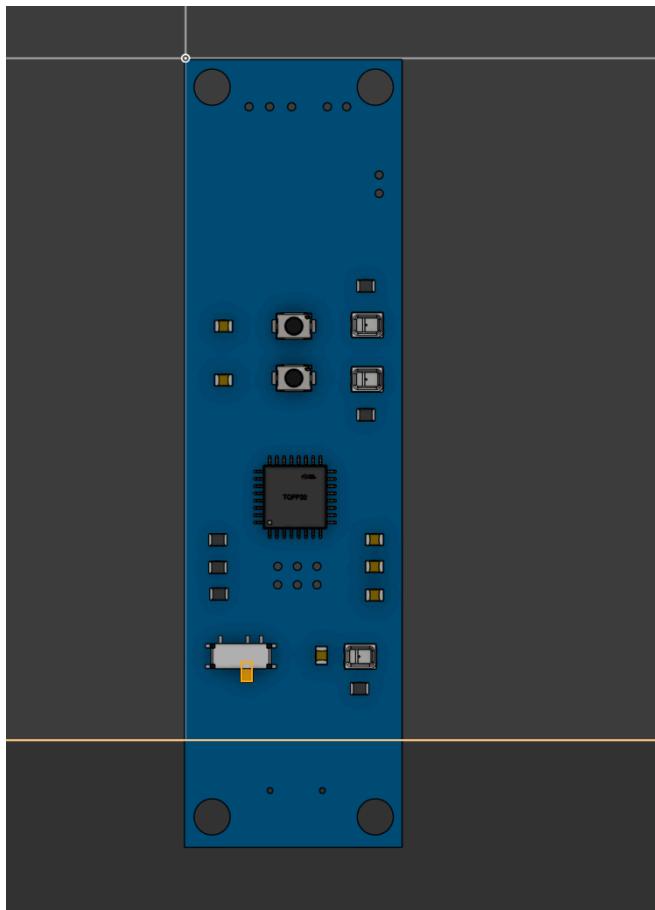
11/25

3hrs

I started making my PCB and got the schematic ready. I laid out what parts I need and how many resistors and capacitors.



I then started laying out how I want the PCB done and soldering ports for the wires to go into.



11/28/25

2hrs

I mainly went back to the board and fixed up a couple of placement issues with the LED's, switch, button, and mounting hole to be easier to use

