Goal 3 Outcome

Materials

-Retrolink Nes controller: Can be found on Amazon: http://www.amazon.ca/RetroLink-NES-Classic-USB-Controller/dp/B009DG2WZS/ref=sr_1_1?ie=UTF8&qid=1449074843&sr=8-1&keywords=retrolink+nes

-Solder breadboard

-Lenline brush to scrape the traces.

Build Instructions

1) Install power switch: https://learn.adafruit.com/pocket-pigrrl/switch

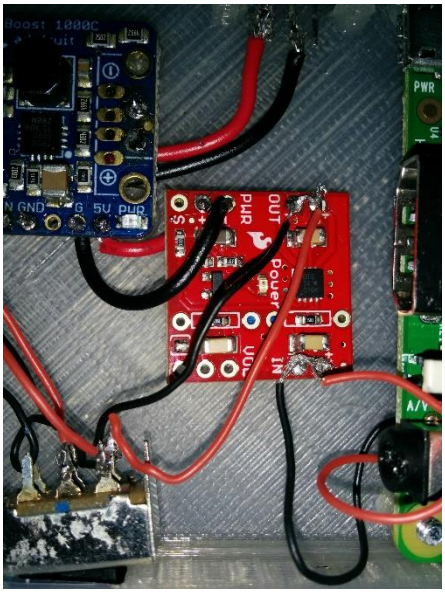
2) Install power boost 1000: https://learn.adafruit.com/pocket-pigrrl/powerboost-1000c

3) Not using the PAM8302, instead using Sparkfun Mono amp found Here: https://www.sparkfun.com/products/11044

Setup is still the exact same as AdaFruit's: https://learn.adafruit.com/pocket-pigrrl/pam8302

5V from powerboost to PWR + on amp

GND from powerboost to PWR – on amp



4) Pi audio: https://learn.adafruit.com/pocket-pigrrl/pi-audio

5) Speaker: https://learn.adafruit.com/pocket-pigrrl/speaker

6) Screen: https://learn.adafruit.com/pocket-pigrrl/2-dot-4-pitft

Buttons taken from a retrolink nes controller:

7) Pi Cable: https://learn.adafruit.com/pocket-pigrrl/pi-cable

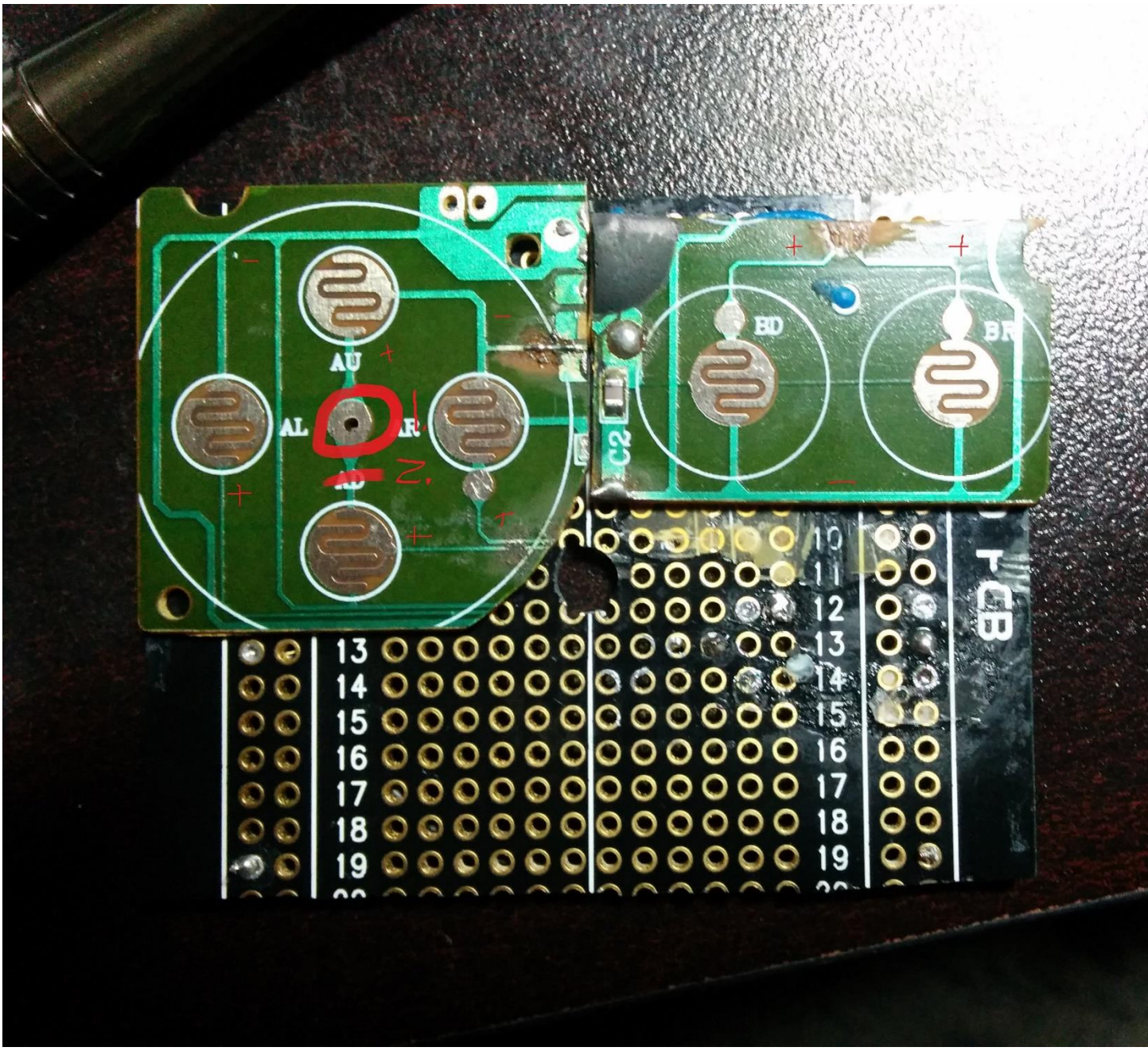
8) Mount display: https://learn.adafruit.com/pocket-pigrrl/mount-display

9) Installing buttons:

-Cut out breadboard that fits snuggly into case aprox(63mm wide, 53mm long)

Take Apart a RetroLink Nes controller and remove PCB board.

Make cuts so that they fit on proto board and line up with the button cut outs on the case



1. Needed drill press to make a hole here so that I could get the up wire to the button
2. Trace cut

\+ are the traces that I wired the buttons to

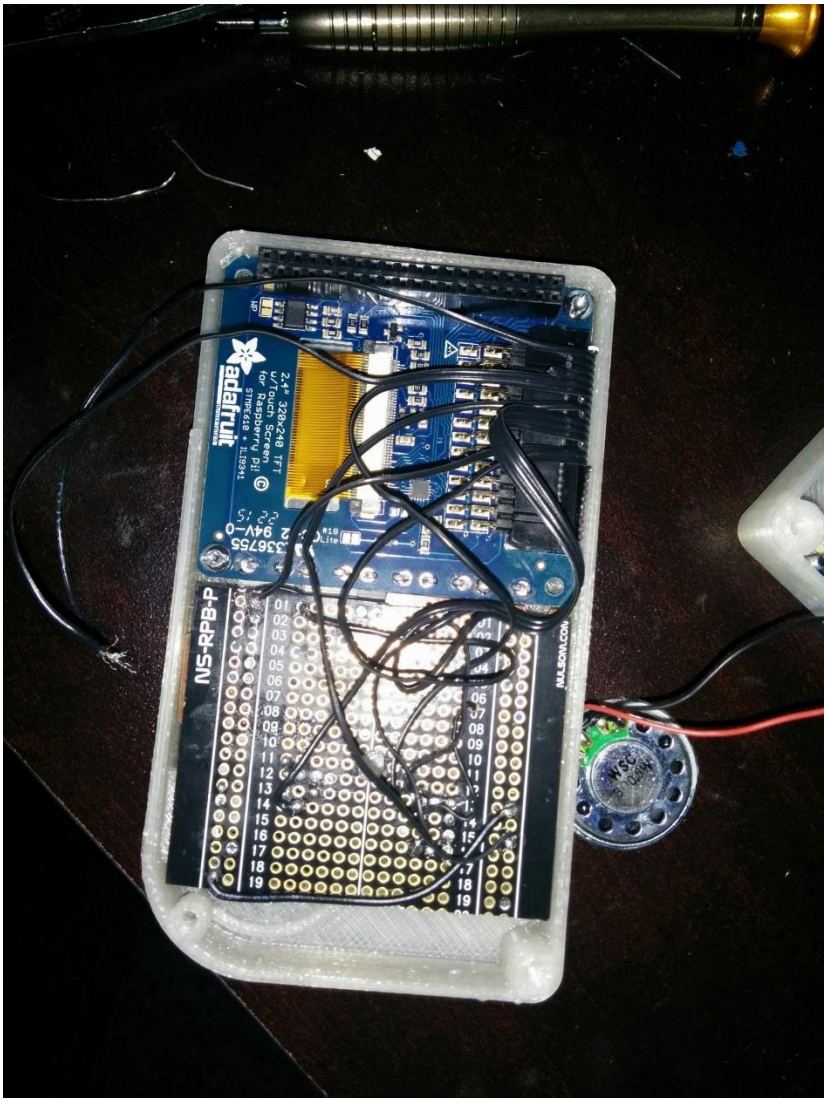
- Are the ground traces.

Make sure that each button has a ground (can be shared), and a positive (where the button will be wired). Expose the trace by scraping it with a Lenline brush, and tin the location you desire to

prepare for the solder. This may require using a drill press as seen in picture above to make a hole in a specific location. As well, you may need to perform trace cuts.

-Also ensure that the wires are not underneath the elastomer gaskets as that will effect the feel and functionality. Instead make sure buttons are wired at enough of a distance away from the elastomer gaskets to allow for some mistakes to be made (if a trace falls off).

-Now solder the button wires from the screen to the breadboard. Buttons can of course go to any location on your breadboard that is convenient but here is my set up in the picture below.



(Wired the buttons to the back of the breadboard, then from the breadboard to the buttons)

The wire numbers are the same as AdaFruit's tutorial found here:
https://learn.adafruit.com/pocket-pigrrl/buttons

Note rows are split in half (ex say row 16 can have wires on both sides)

#9 Ground → Goes to ground of breadboard (I've connected both grounds together as seen above)

#7 Left → row 16 (Dpad side)

#11 Right → Row 15

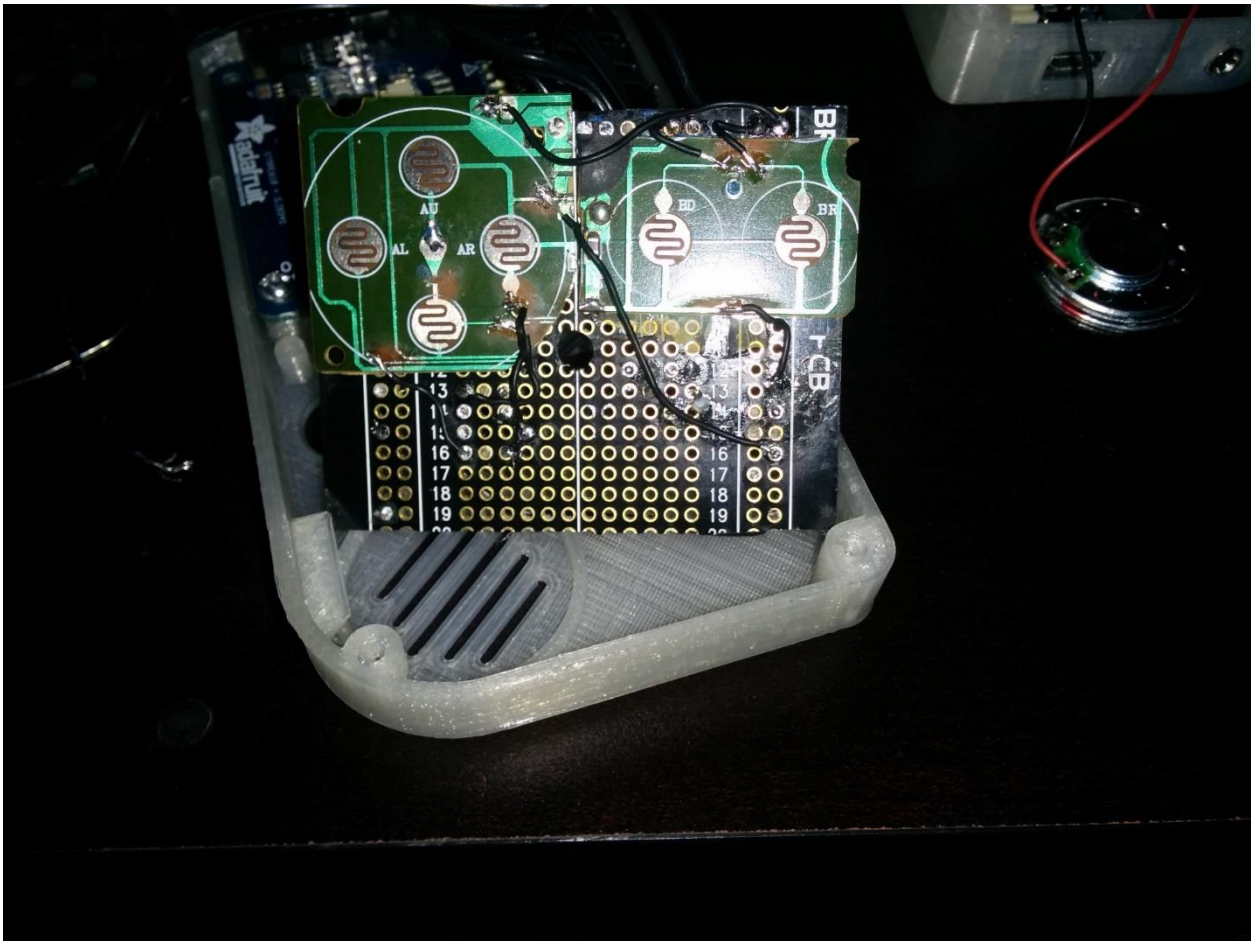
#12 Up → Row 14

#13 Down → Row 13

#15 A → Positive Row (on the buttons side)

#16 B → Row 1

-Now wire from the BreadBoard locations to the correct buttons.

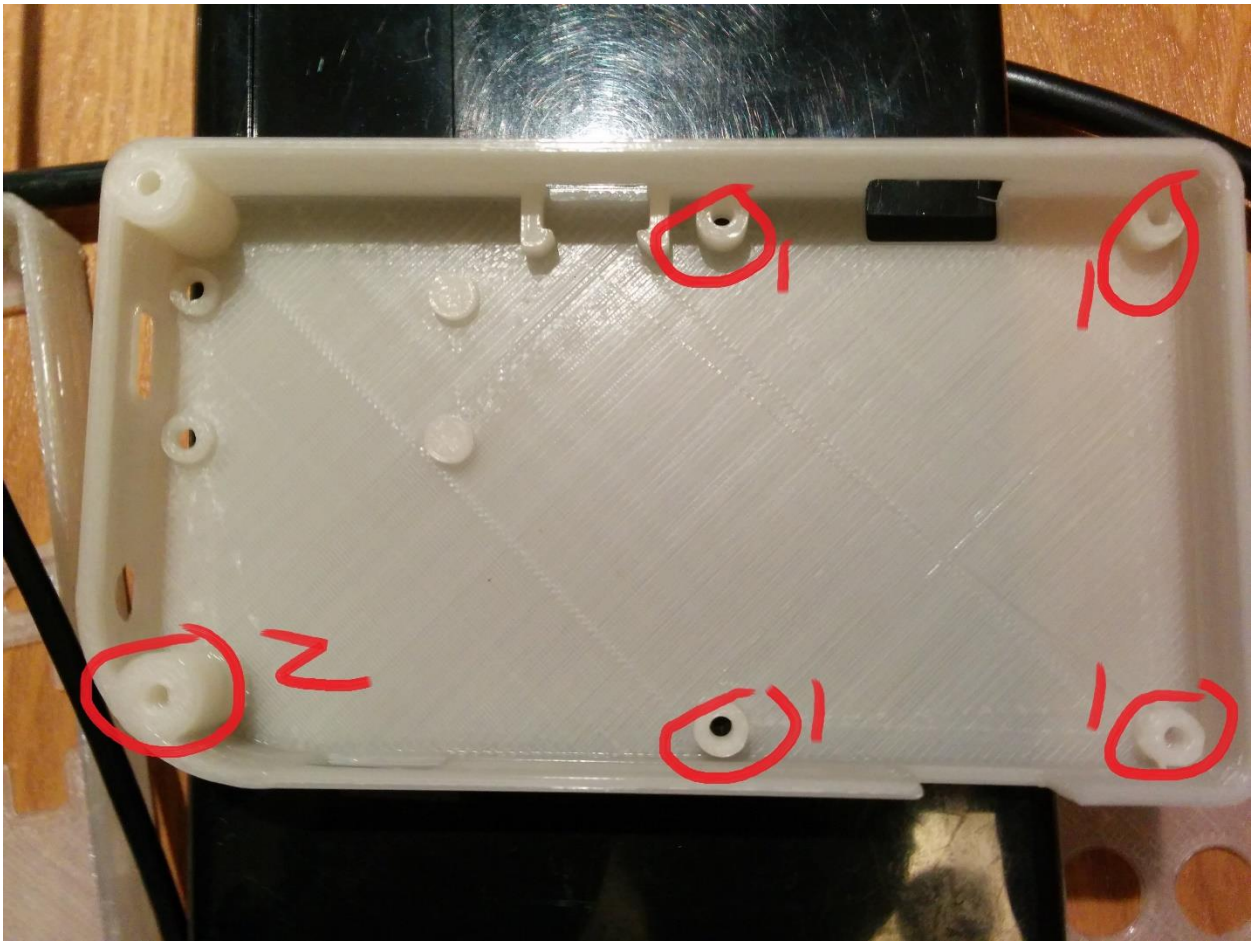


-Place the buttons in the correct slots. Line up the elastomer gaskets on top of the buttons (a small amount of sticky tack may help but too much will hinder it).

-Line the breadboard up with the screw hole standoff (should also be resting on the four corner standoffs) and screw into place with a SIZE screw.

-Assemble the case, same as Adafruit instructions excep that there is a screw in bottom right corner instead of a magnet.

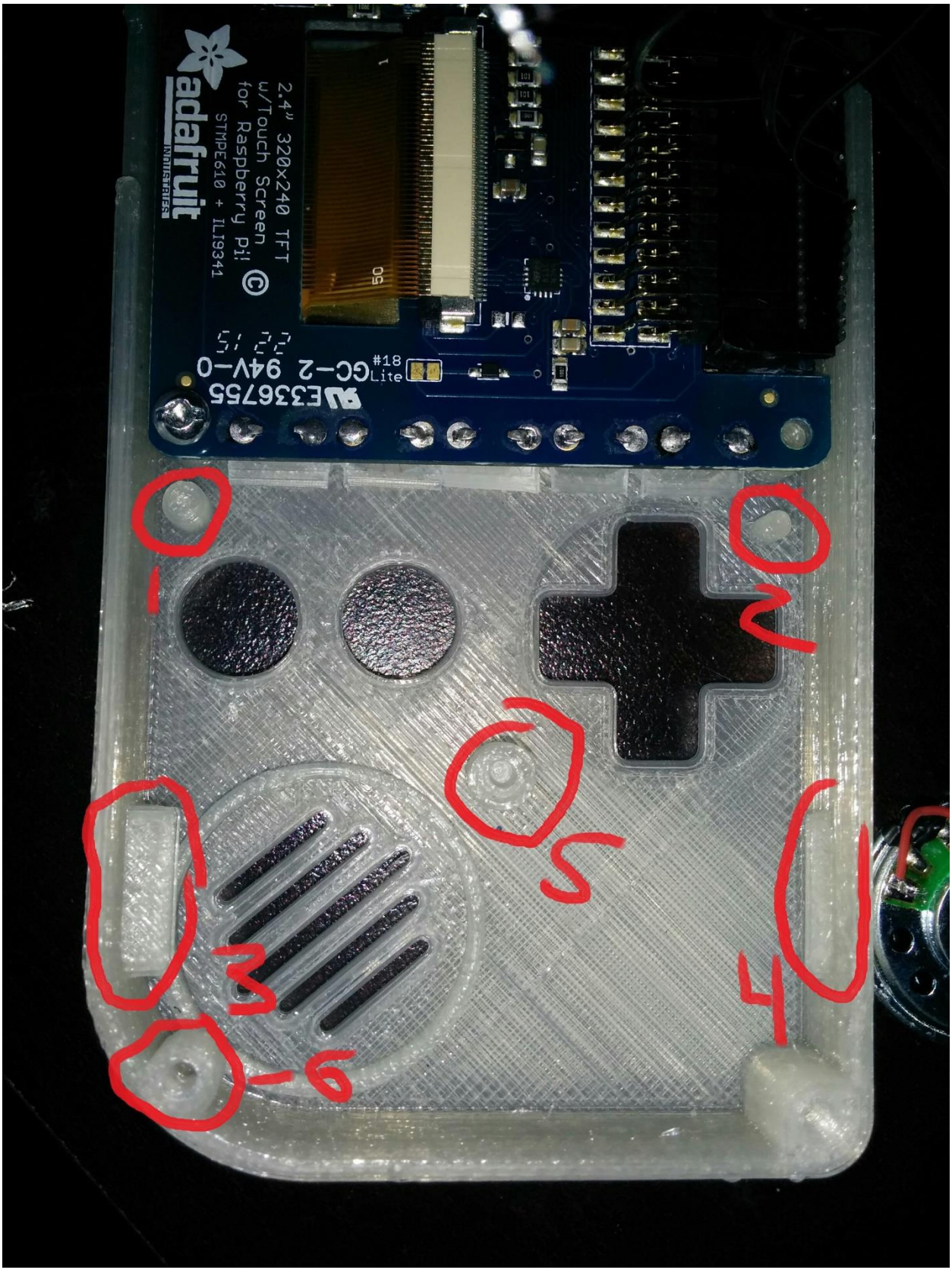
https://learn.adafruit.com/pocket-pigrrl/assembly



(Modifications made to the bottom of the case)

1: Raised screw standoffs for Raspberry Pi by 2mm

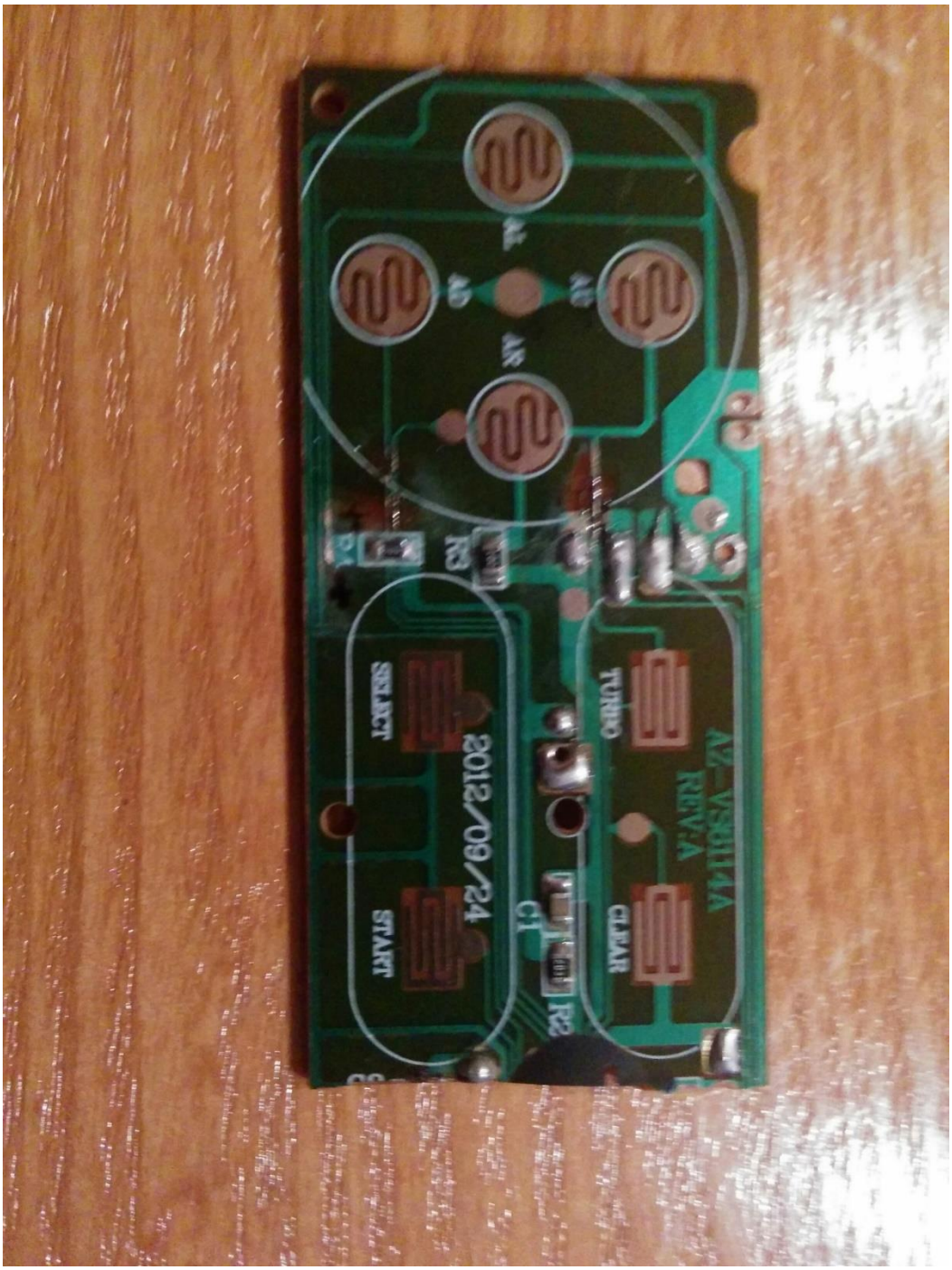
2: Added screw hole for bottom left side of case (will screw into the top case to replace the magnet in Adafruit's design).



(1-4 are standoffs for the breadboard. 5 is a screw standoff to keep the breadboard in place)

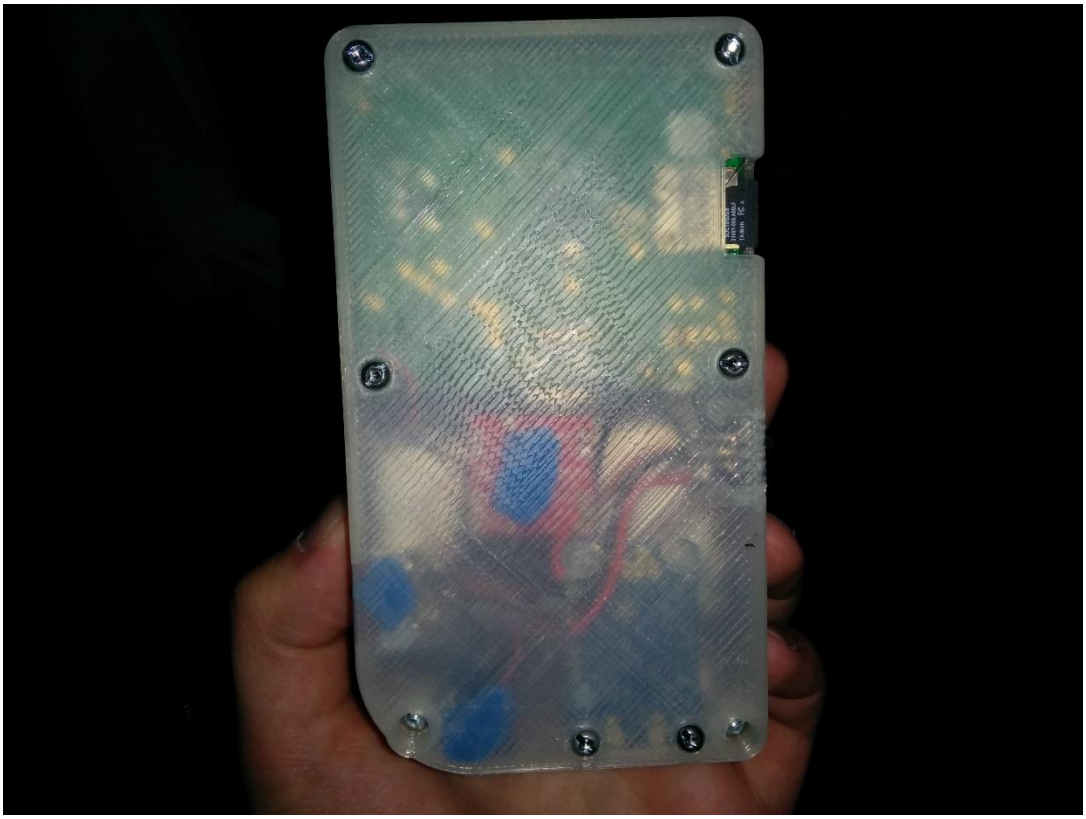
1-4 are to prevent the breadboard from tilting in any direction when a buttons are pressed. 5 is to prevent the bread board from moving horizontally out of place. (The case will be packed enough that the breadboard will not be able to move horizontally out of place.

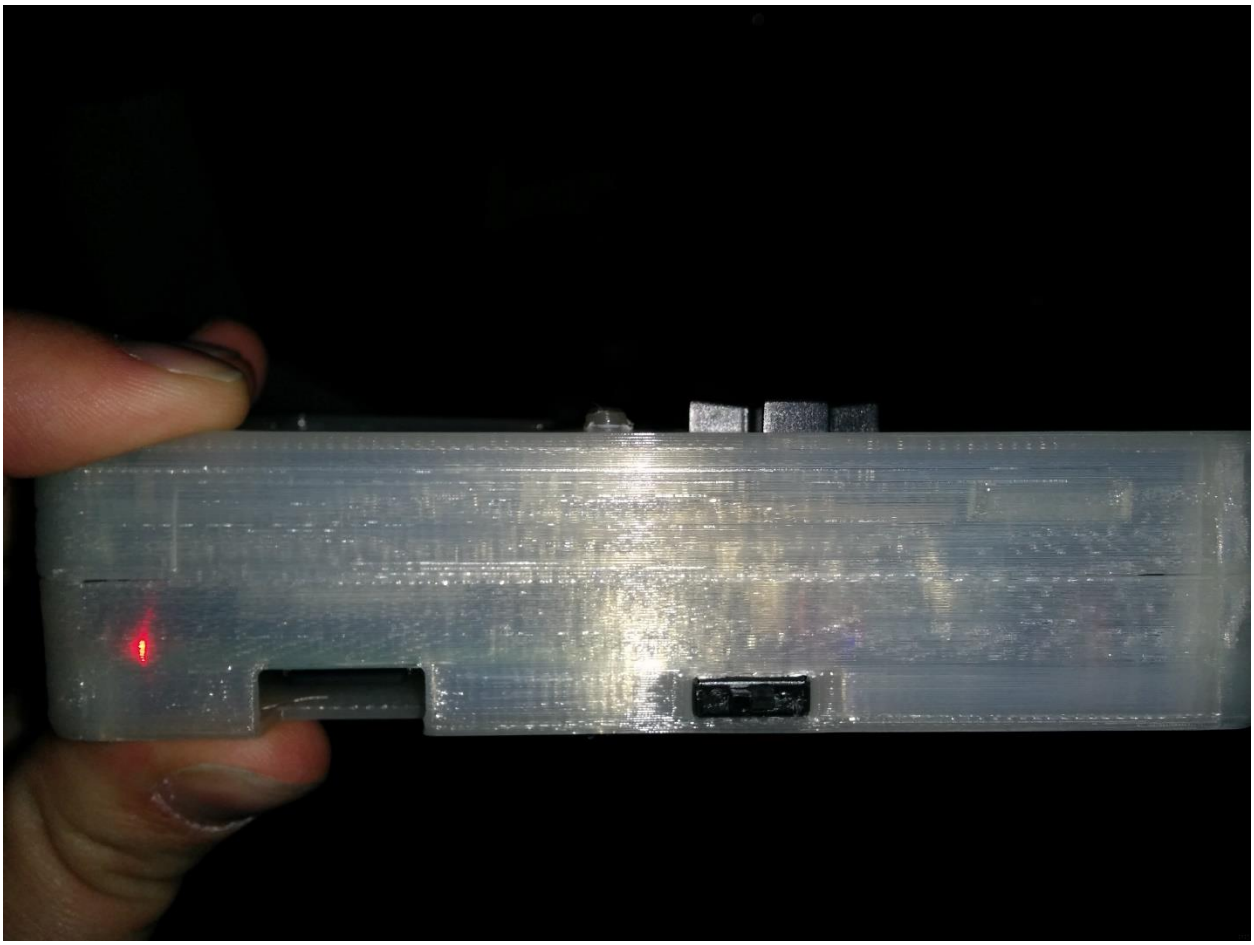
6. Screw hole that replaces the magnet that is in Adafruit's design



(DPAD PCB before the cut)

Result Pictures





Problems

Problem: The buttons could still use some improvement in resistance to presses.

Solution: Minor tweaking with space (lower the standoffs a bit more)

Problem: GPIO pins on pi could fit a bit better into the screen

Solution: Tweak the height of the Raspberry Pi's standoffs (probably just a mm or two)

Lessons Learned

1. This goal ended up being a lot more challenging than initially expected. A general principle I've learned is that when scavenging buttons from a controller it is a good idea to try and implement the same (or similar) design as was being used in the controller you took the buttons from.

2. Don’t have any wires soldered below the elastomer gaskets as they will get in the way of button presses and make the buttons unreliable and uncomfortable.
3. Leave lots of room to solder the wires to the traces as pulling a wire too hard will often rip a piece of the trace off of the PCB.
4. Spacing is extremely important to the feel and functionality of the buttons (resulting in a lot of prototyping in the CAD design).