OpenSplitDeck Build Guide

V1.0

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Parts And Tools List

Case Cutting and Modification:

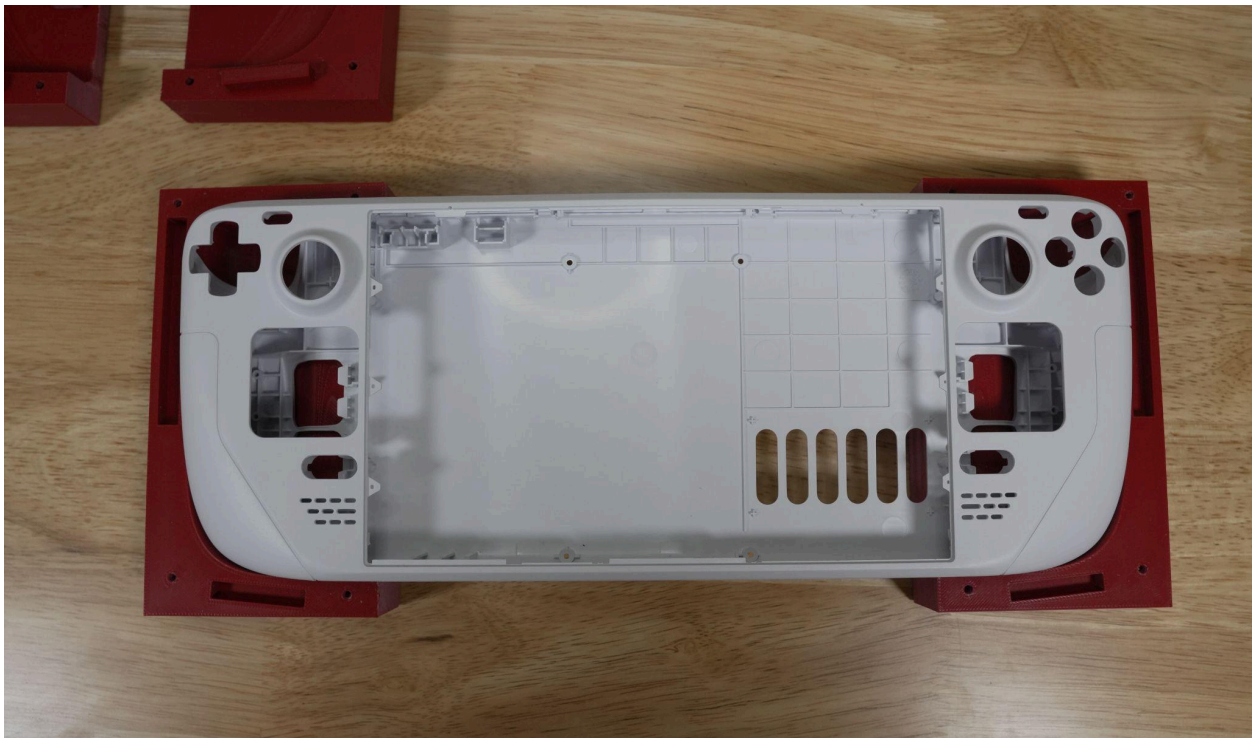
-Clamp to hold it down
-8x M3 20mm Self-Tapping screws
-4x 3d printed cutting Jigs
-Coping Saw(Hacksaw or any similar saw should work)
-Extremerate Case(Affiliate Link)
-Small round file(NOT PICTURED)
-220 Grit Sandpaper(NOT PICTURED)
-Flush Cutters/Snips(NOT PICTURED)

Full Assembly:

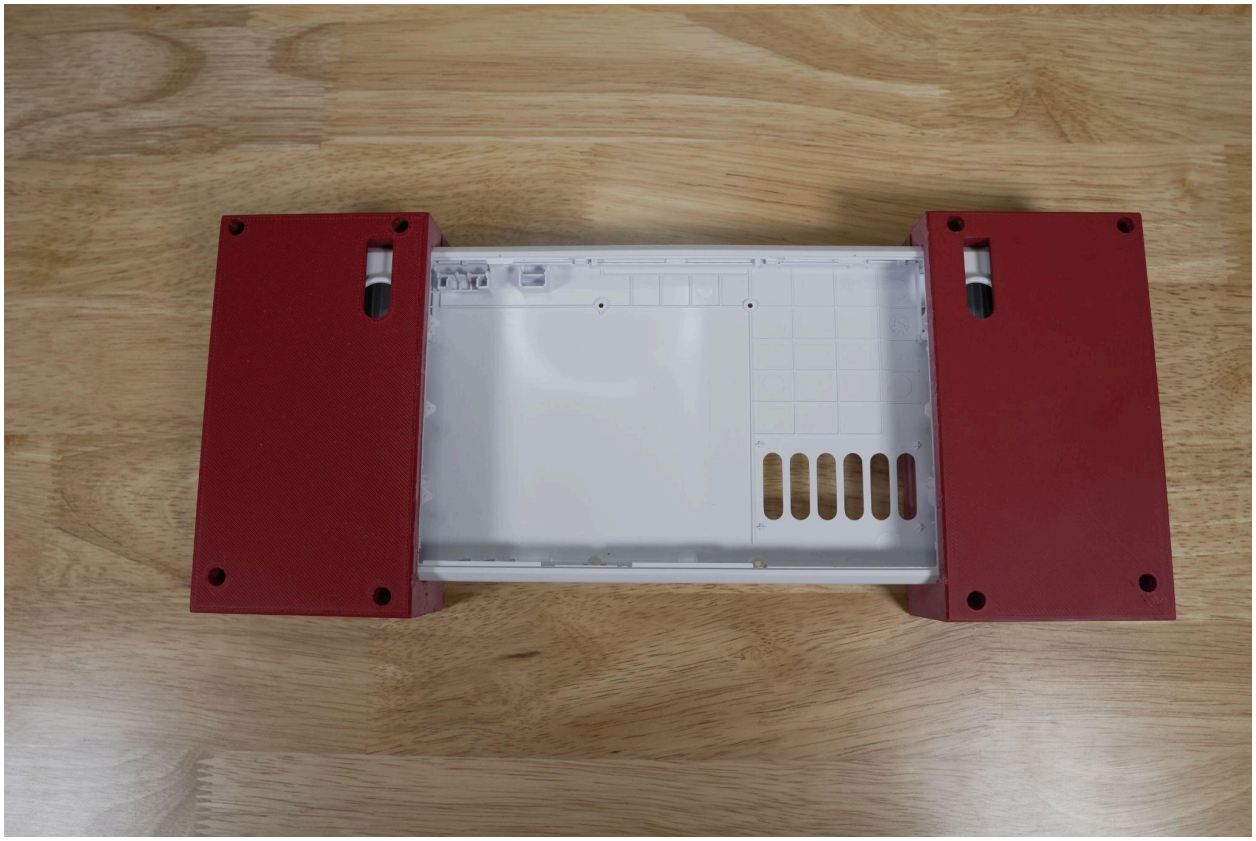
-Cut Extremerate Case
-Buttons(Every case comes with matching button, I mix and matched mine)
-Set of Steamdeck screws(Comes with case)
-Trackpad Double sided tape(Comes with case)
-4x 3D printed connector pieces
-2x 3D printed trackpad springs(PETG)
-3D printed dongle case(Top and Bottom)
-1x Seeed Xiao nrf52840
-HandheldDIY or Guilikit hall-effect Steamdeck OLED replacement sticks
-Left and Right trigger for steamdeck OLED(From ifixit)
-Left and Right shoulder buttons(They include the PCB)
-D-pad and Action rubber membrane OR Extremerate Clicky Mod kit
-2x Assembled Trackpads
-2x Seeed Xiao nrf52840 Sense Plus
-8x Neodymium Bar Magnets, 12 x 6 x 3mm
-2x Semi-Assembled Controller PCBs
-1x Magnetic Pogo Pin Connector
-2x JST Connector for Battery(Optional, but I recommend it)
-2x Lipo 400mah Battery
-2x LRA Motor
-2x Trackpad Click Button
-2x Home Button
-2x 0.91” 128x32 Oled Screens
-2x Power Switch

-2x M2.3 5mm Self-Tapping Screws
-6x M3 12mm Self-Tapping Screws
-4x 10pin 50mm FPC cable
-Some thin wire, 28 Gauge should work
-Solder and Soldering Iron(NOT PICTURED)
-Hot Glue Gun(NOT PICTURED)
-Kapton or Electrical tape(NOT PICTURED)
-Precision Screw Driver Kit(NOT PICTURED)
-Wire Stripper(NOT PICTURED)
-Tweezers(NOT PICTURED)

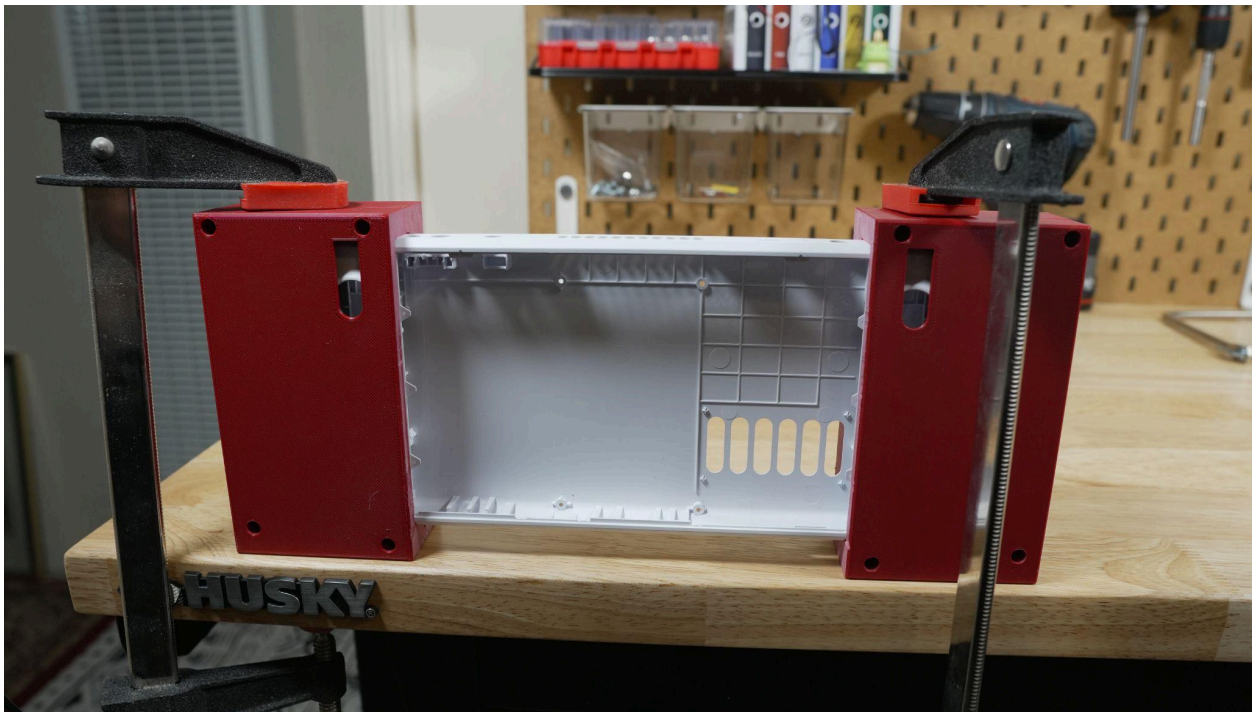
Cutting Case and Case Modifications

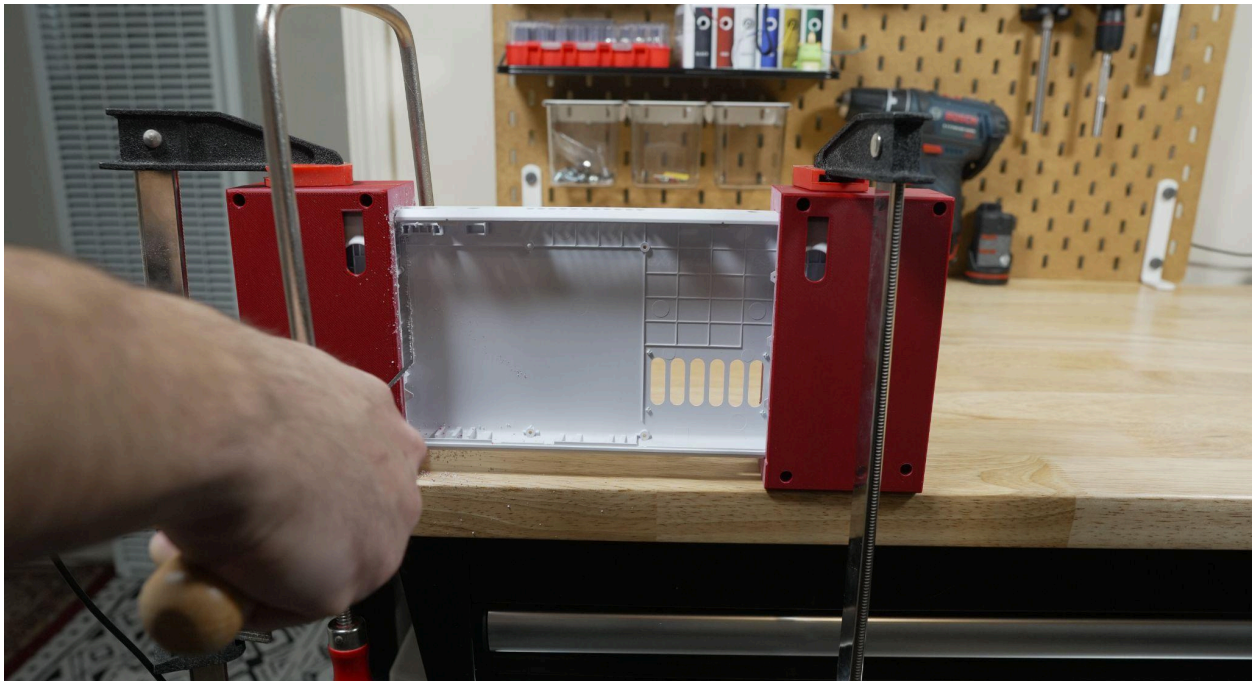


Snap the 2 halves of the case together and put it in the jig using all 8 M3 x 20mm Self-Tapping screws to hold it all together

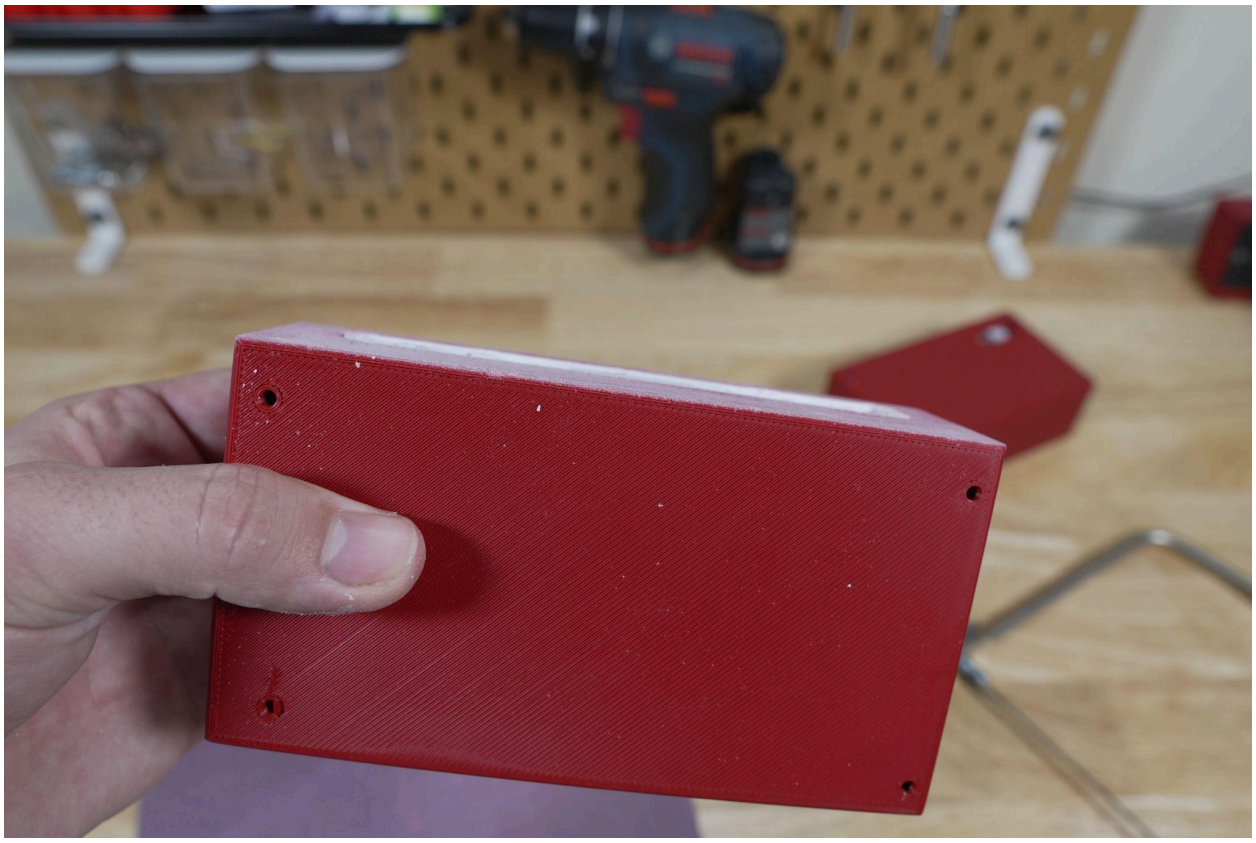


Clamp to the table and cut with the saw. Try to cut close but it does not need to be super accurate because we will clean things up.

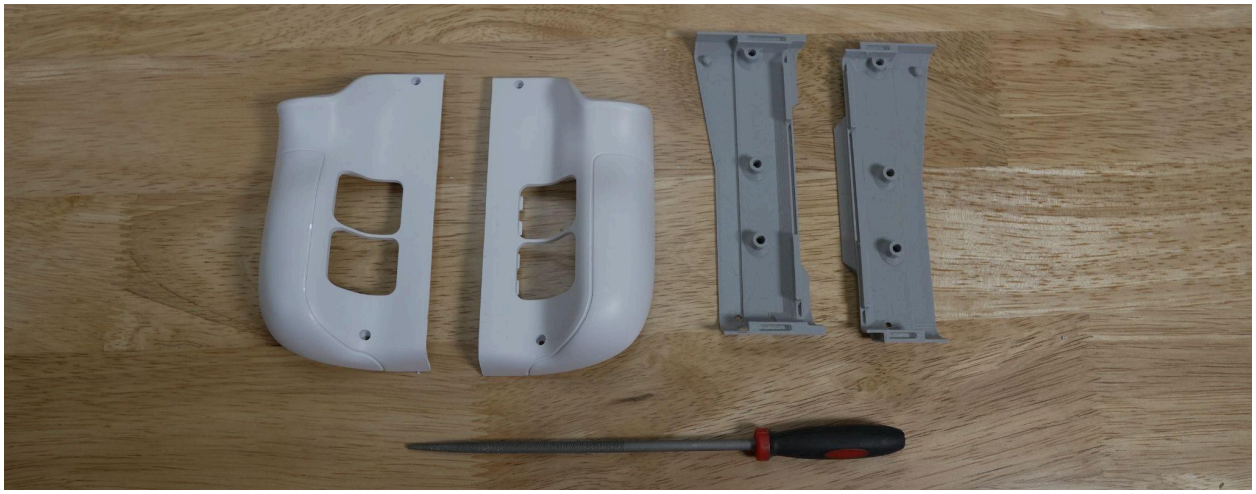




Using sandpaper and a flat surface sand the edges to be flush with the jig. I like to print the jig in PLA because it does not sand well allowing me to more easily sand the plastic case.

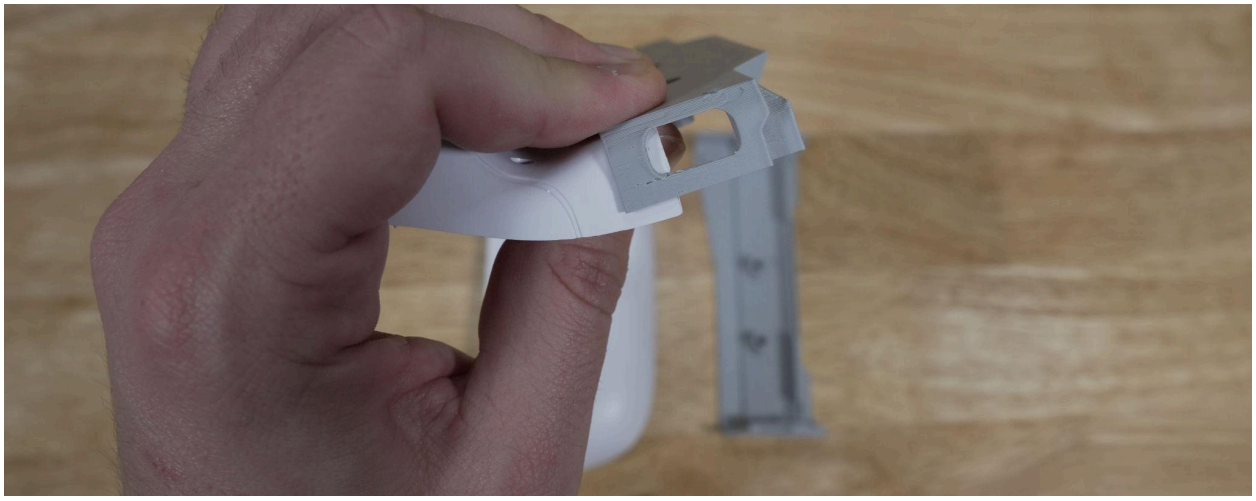


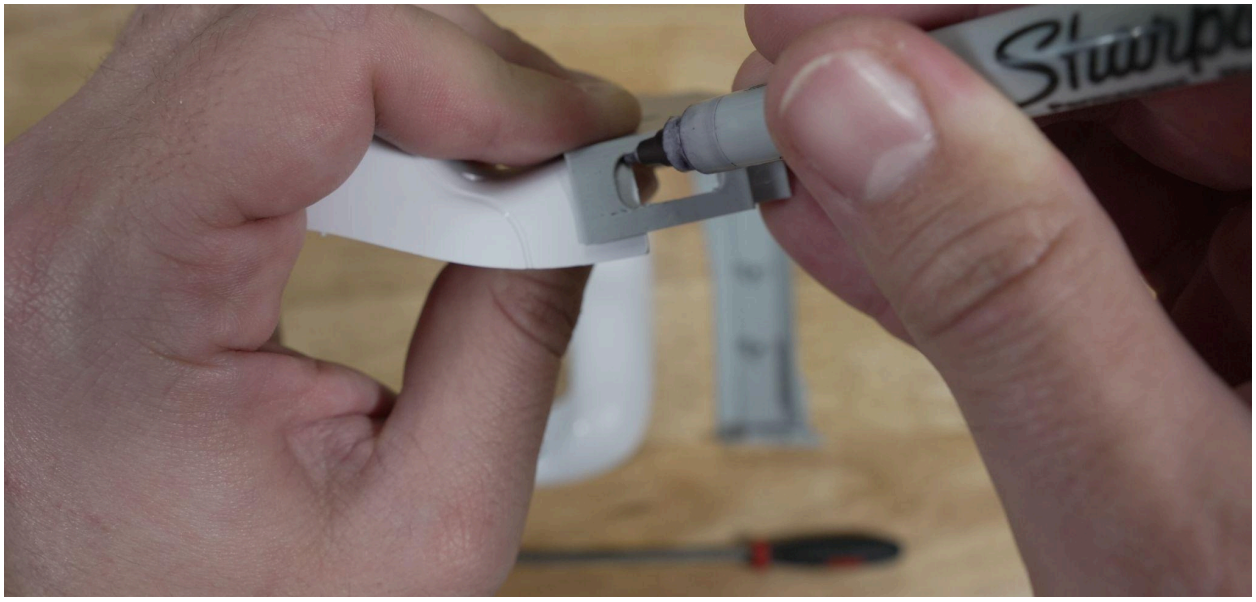
Take the controller out of the jig and use some extra sandpaper to clean up the edges

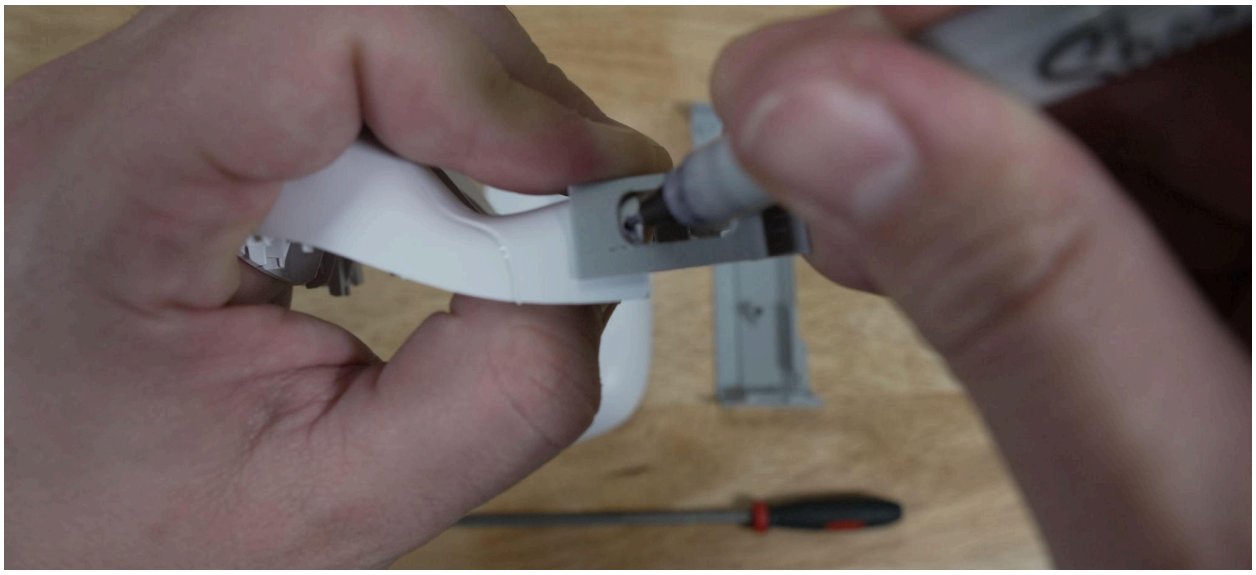


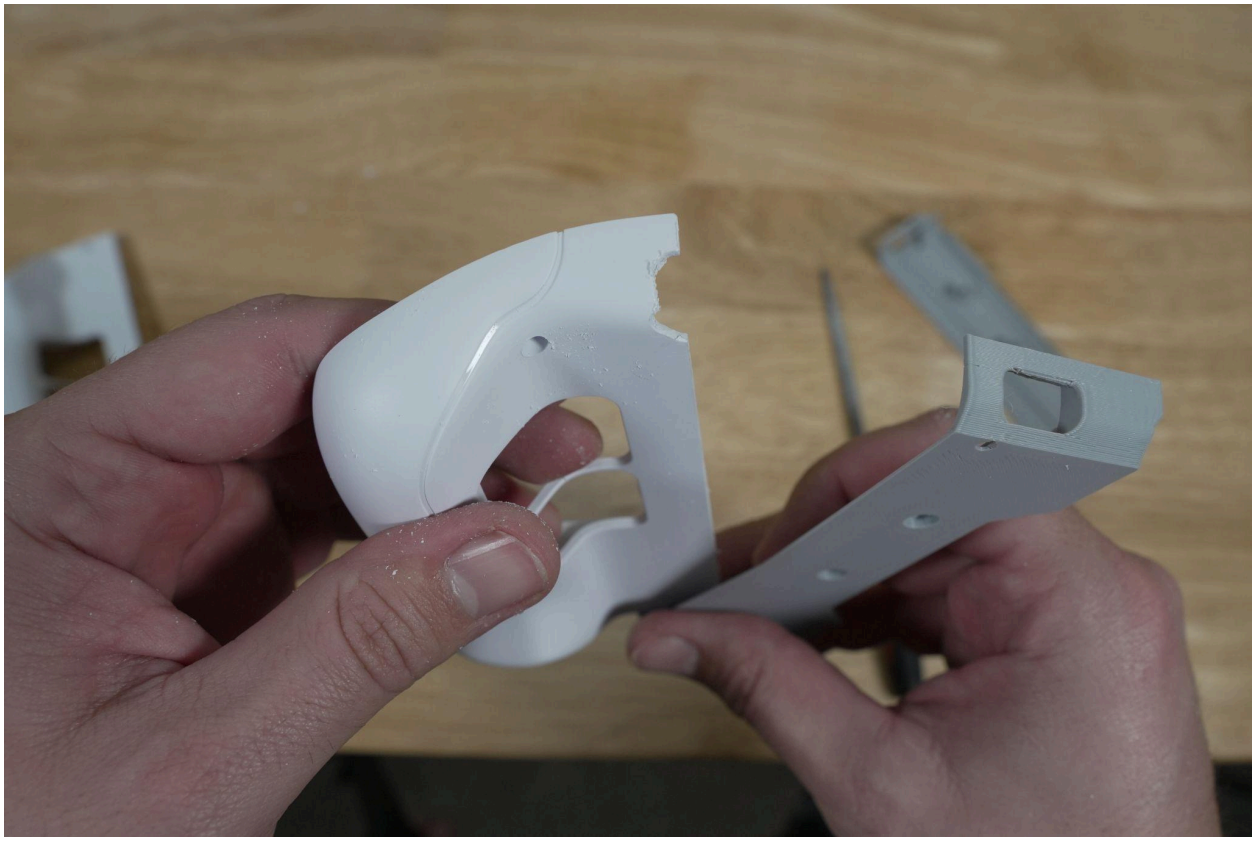
Now we have to add a small modification to the case using a small round file. You can see here the cutout for the usb port has a bit of overlap. It is very easy to remove material so this step will not take long. We also don't need to be super careful as the 3d printed part will cover any ugly edges.

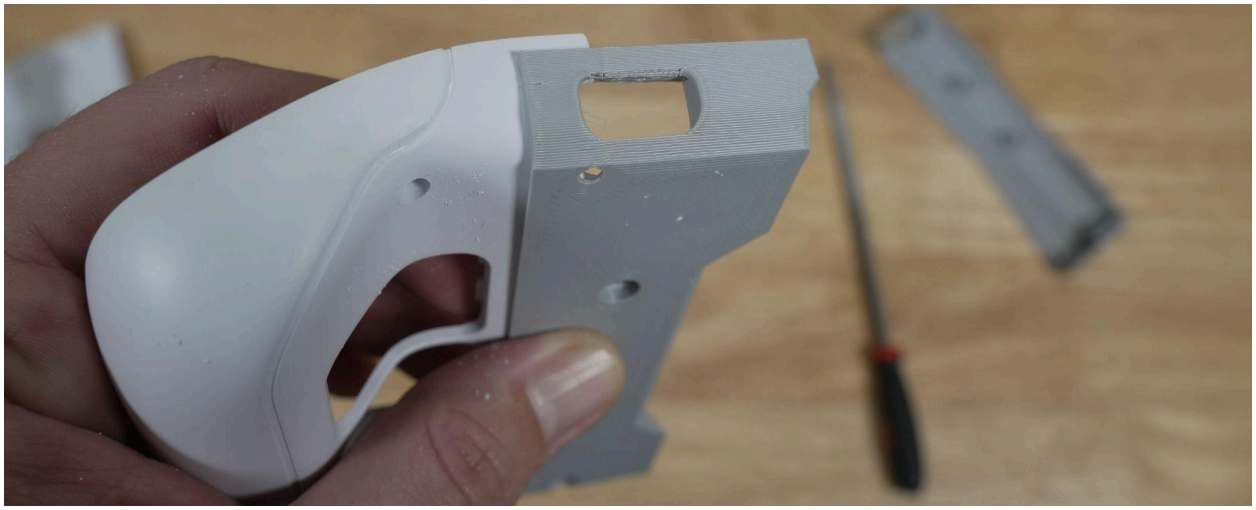
NOTE: The left half has an extra hole on the bottom we need to clear the plastic from too. This hole is to allow us to press the reset switch.

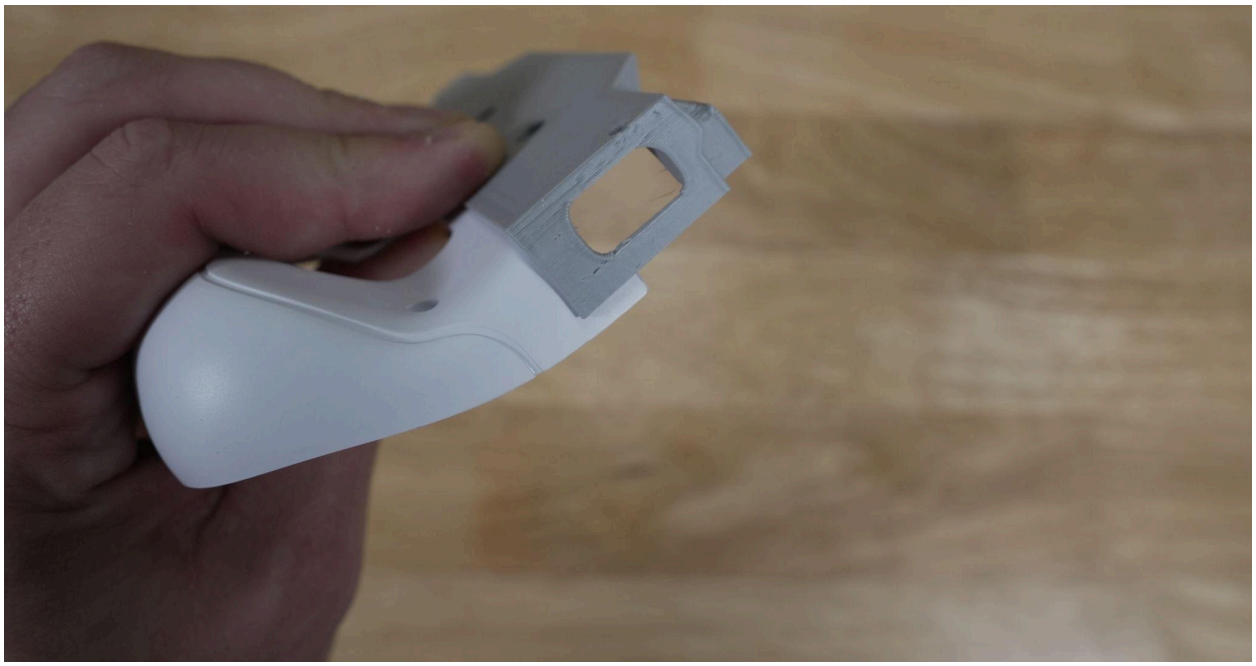




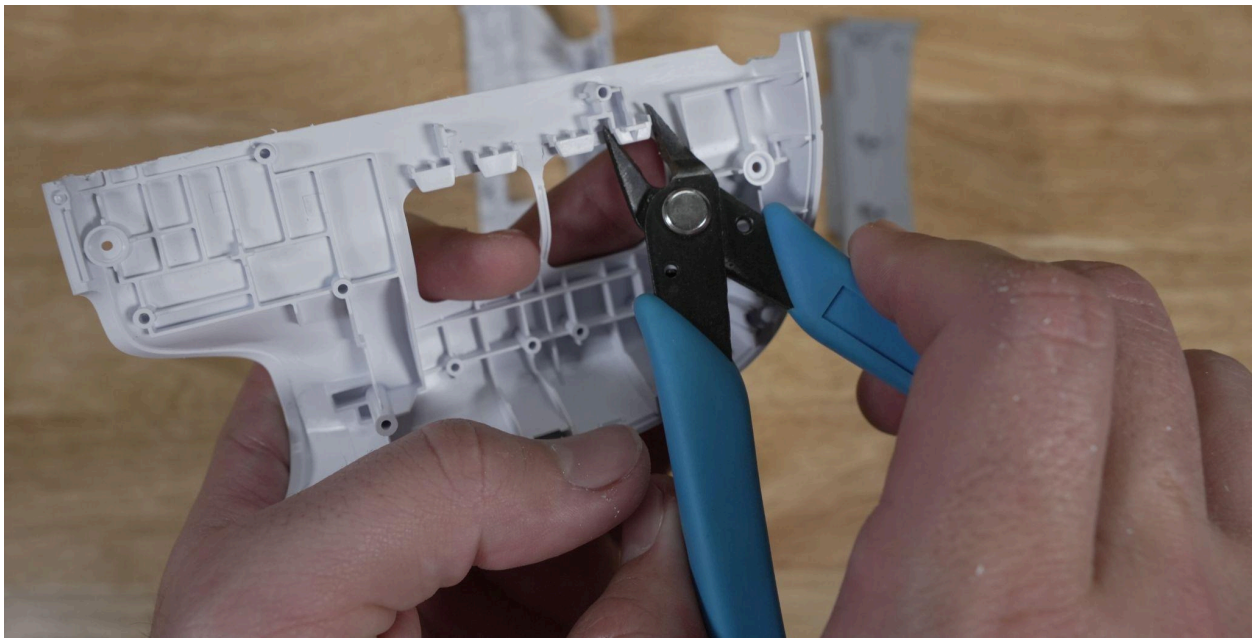


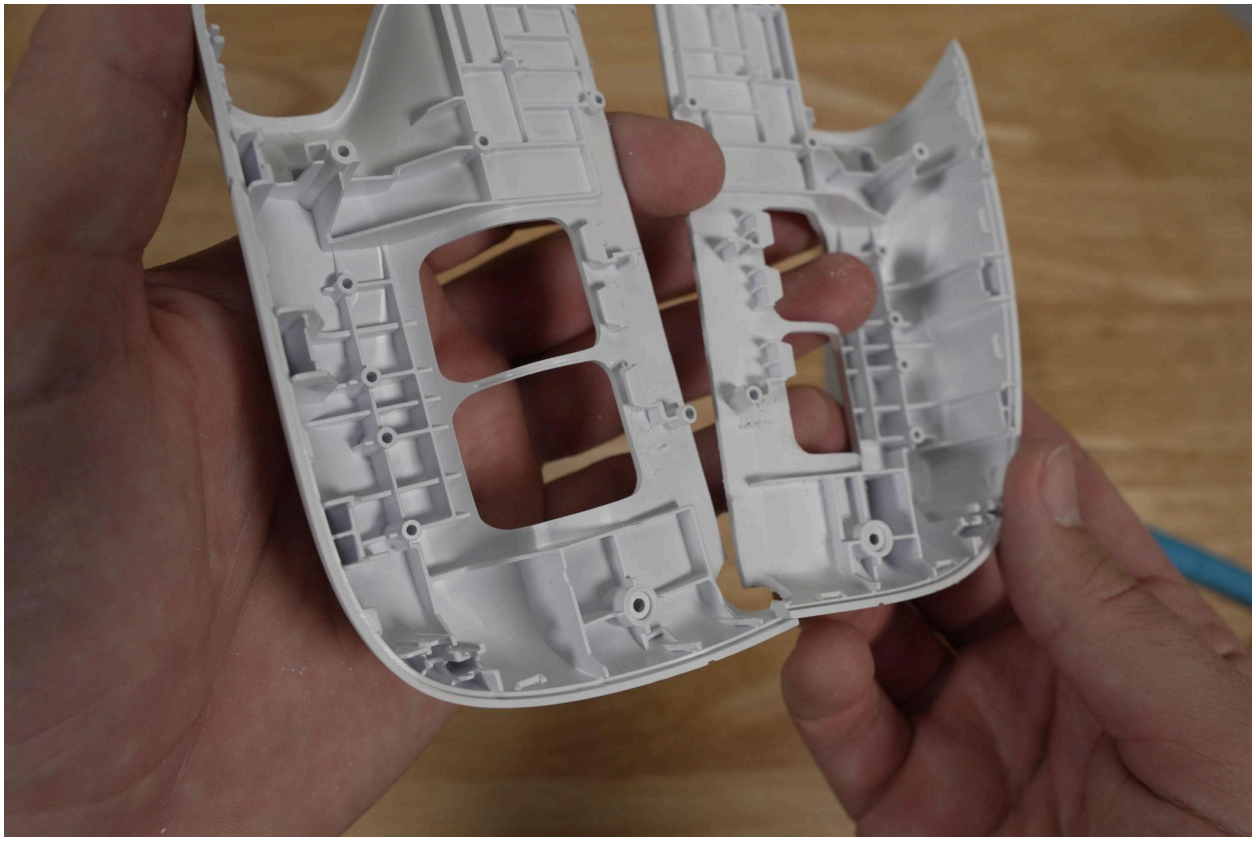






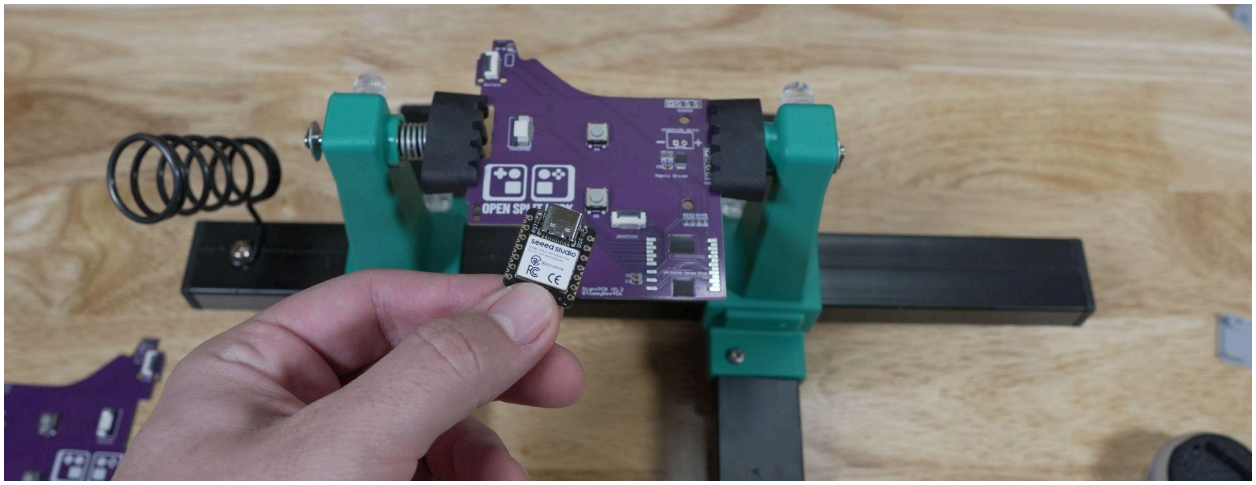
The last thing we need to do is snip off this lowest tab of the back half of the case. I can snip it clean off with flush cutters. This allows the PCB to fit more easily.

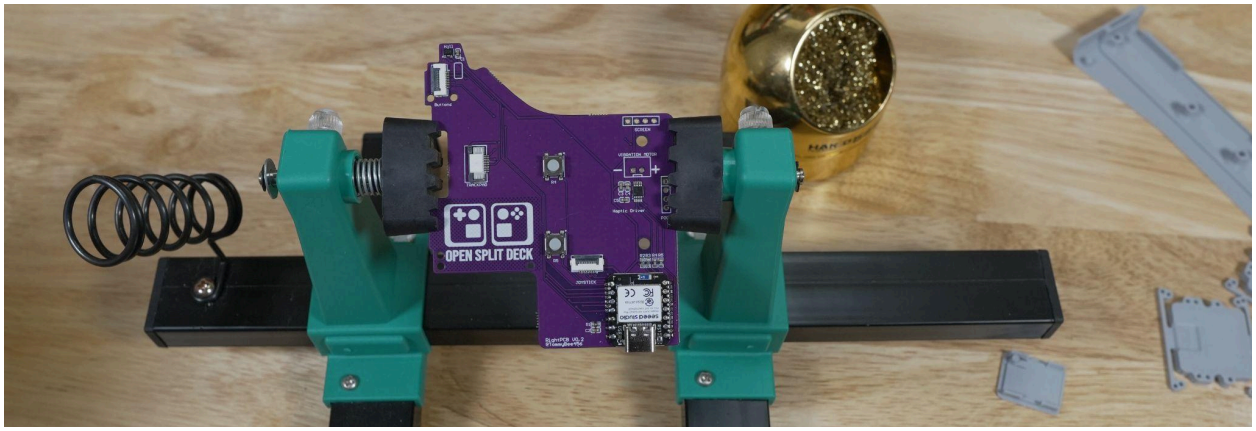


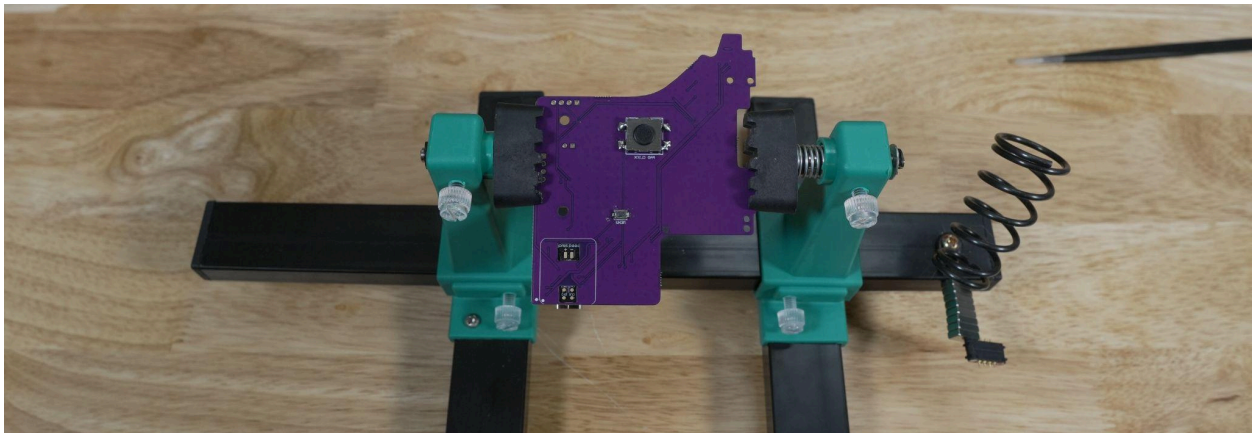


Controller Half Assembly

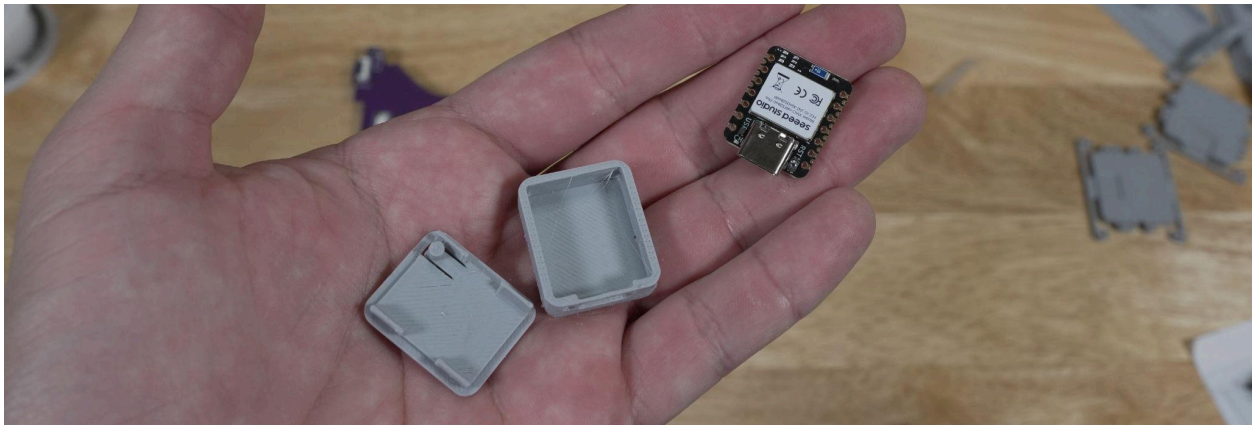
My PCBs came mostly assembled but I still need to solder on the Xiao nrf52840 Sense Plus, trackpad click button, and home button. Instructions are the same for both sides so I will show the right half unless there is something different.

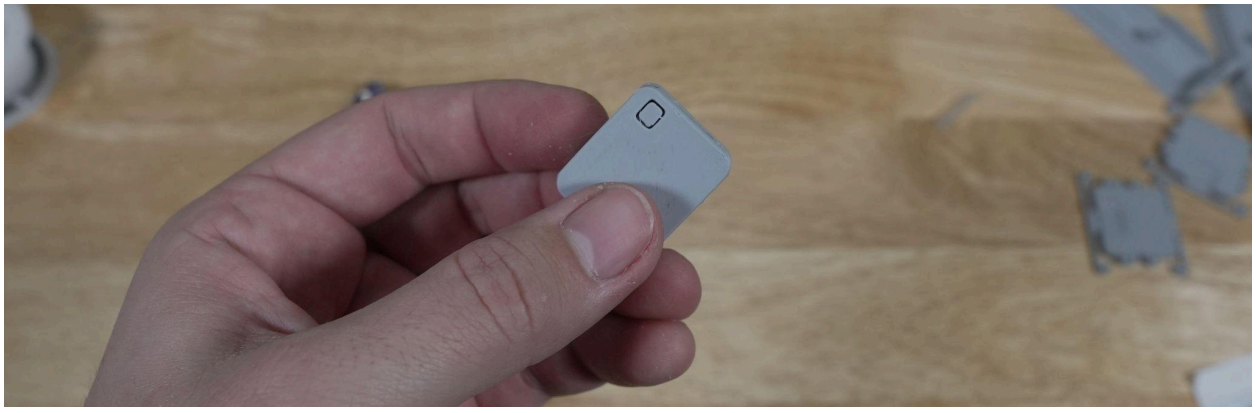






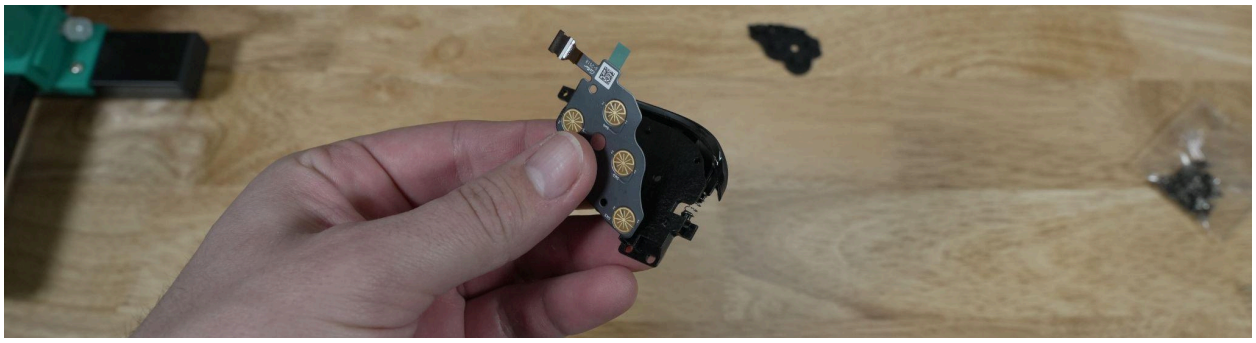
Put the dongle in case, top piece snaps into place. The small rectangle is a print in place button so you can access the reset button. This is a good time to flash firmware to the dongle and controller halves so that you can periodically check if the controller is working.

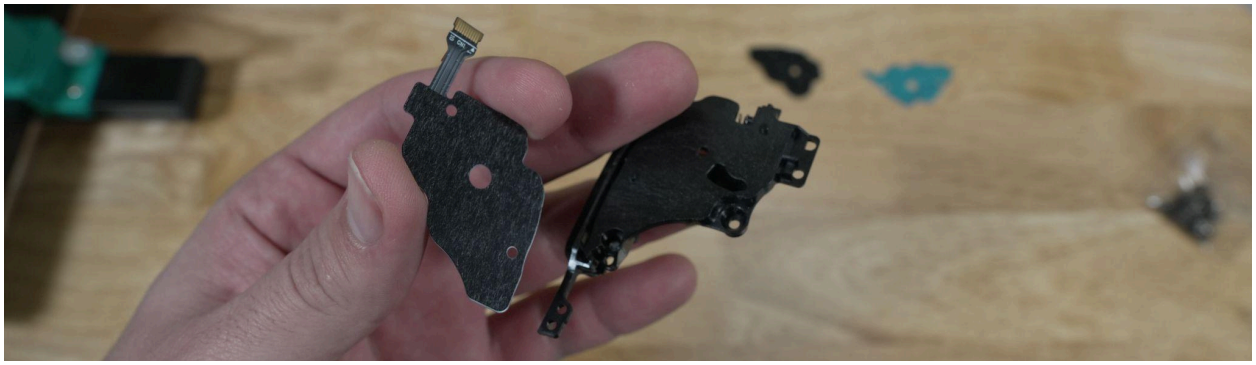


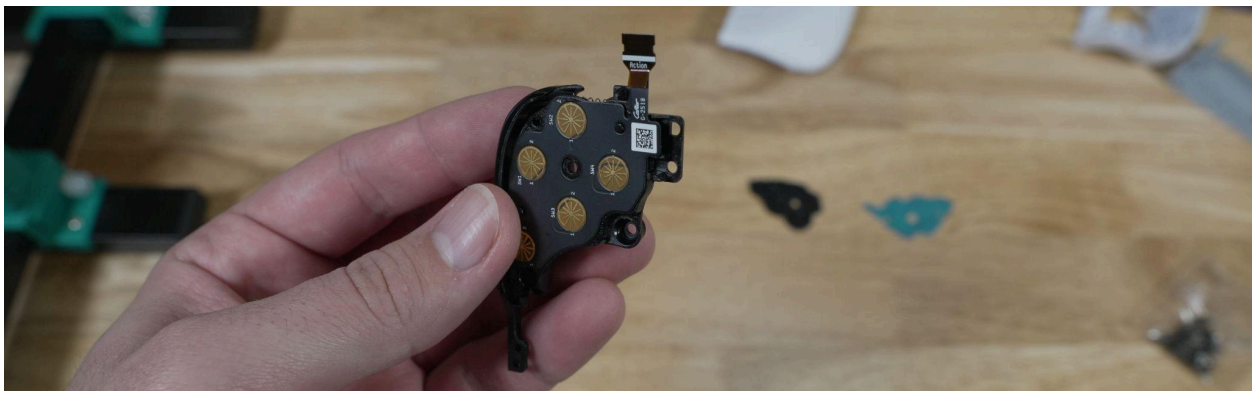


Next Step is getting the bumper/buttons ready

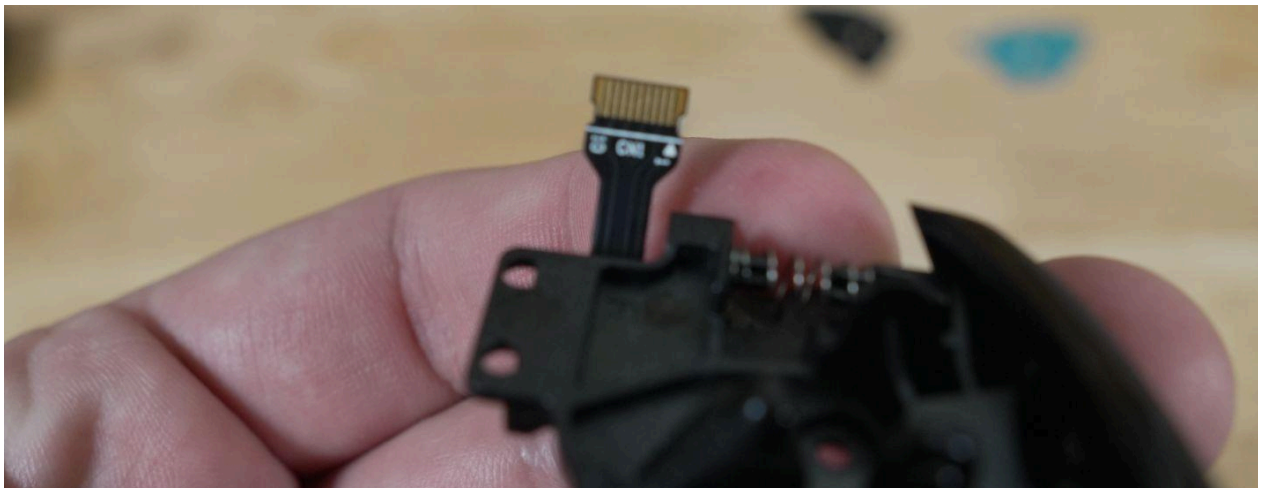
Each ifixit bumper comes with a button pcb with double sided tape to attach to the bumper module. We will attach it now.

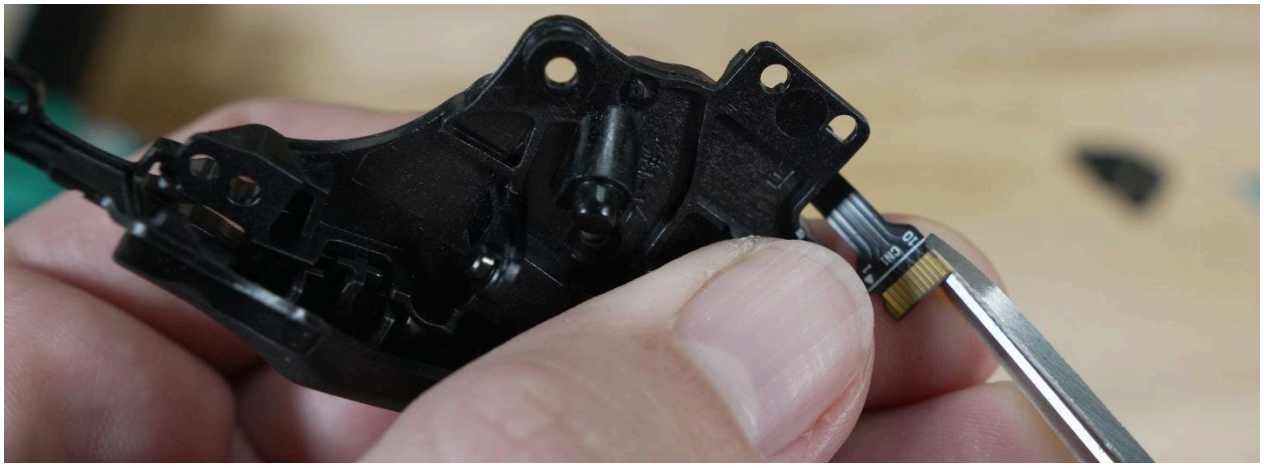


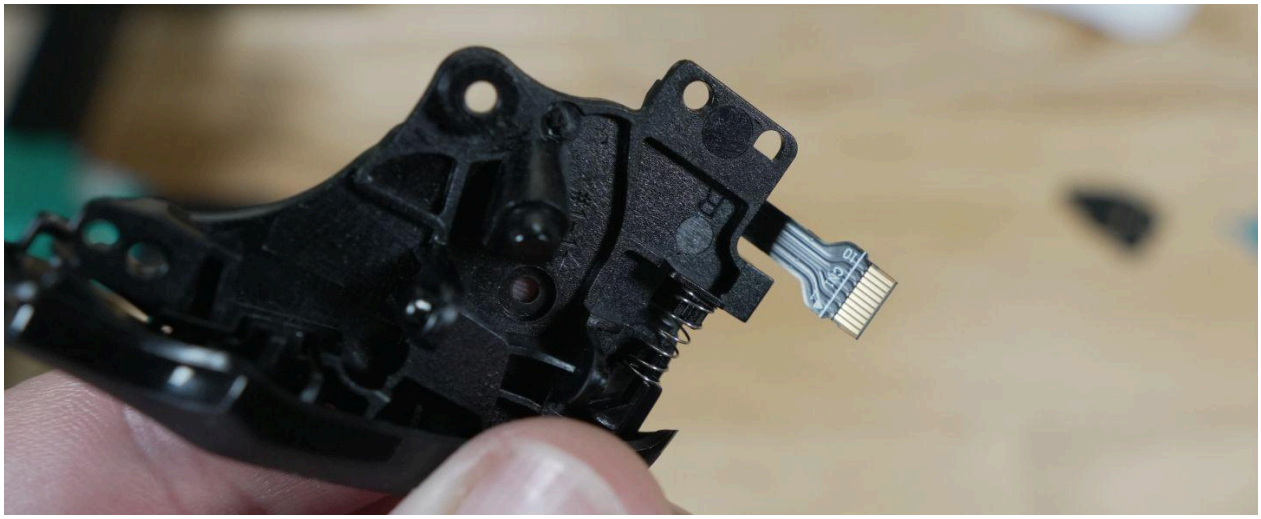




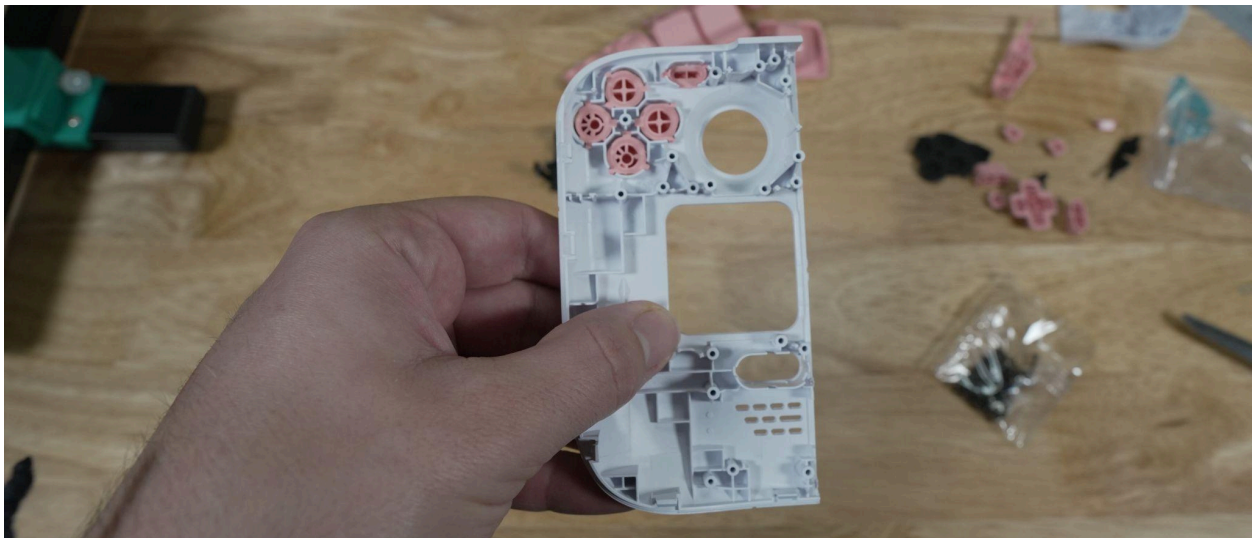
We need to slightly modify the ribbon connector. The steamdeck uses some sort of locking shape that I have yet to find the part for so to make it fit the PCB I designed we need to snip off the extra on the sides. You can see the extra bit on the sides next to the copper connectors. These can be easily trimmed with some scissors.

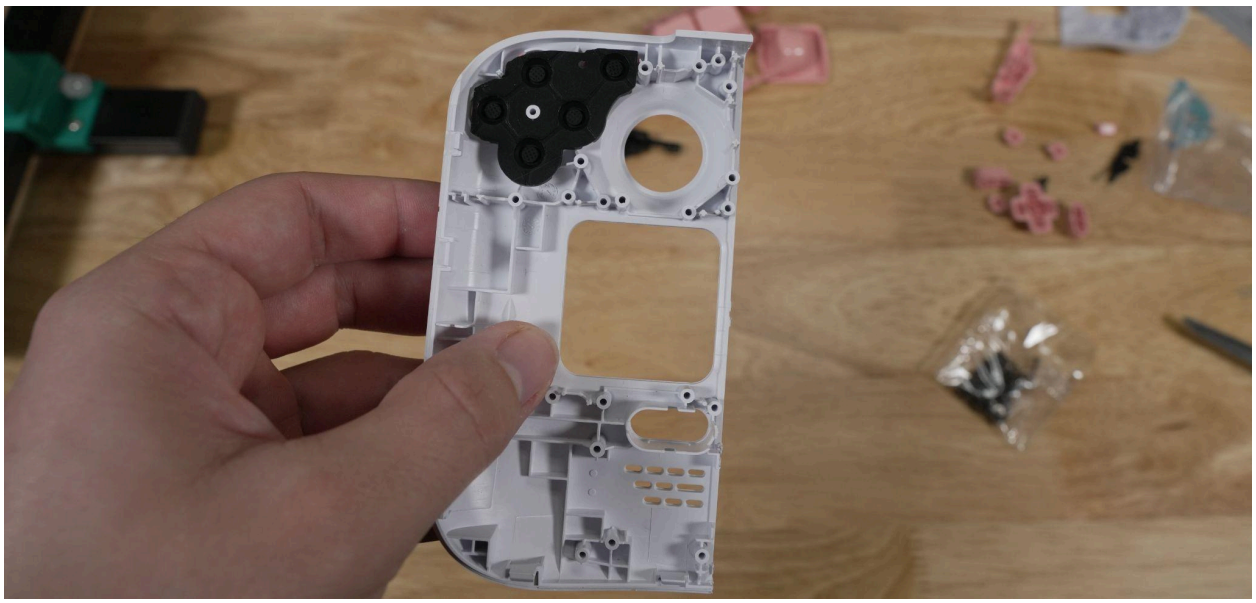




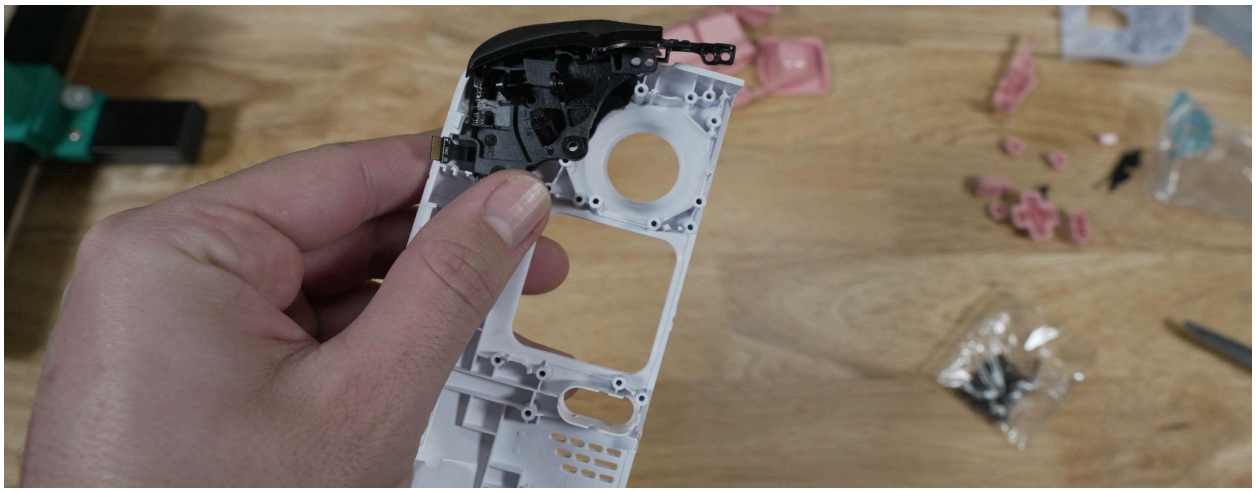


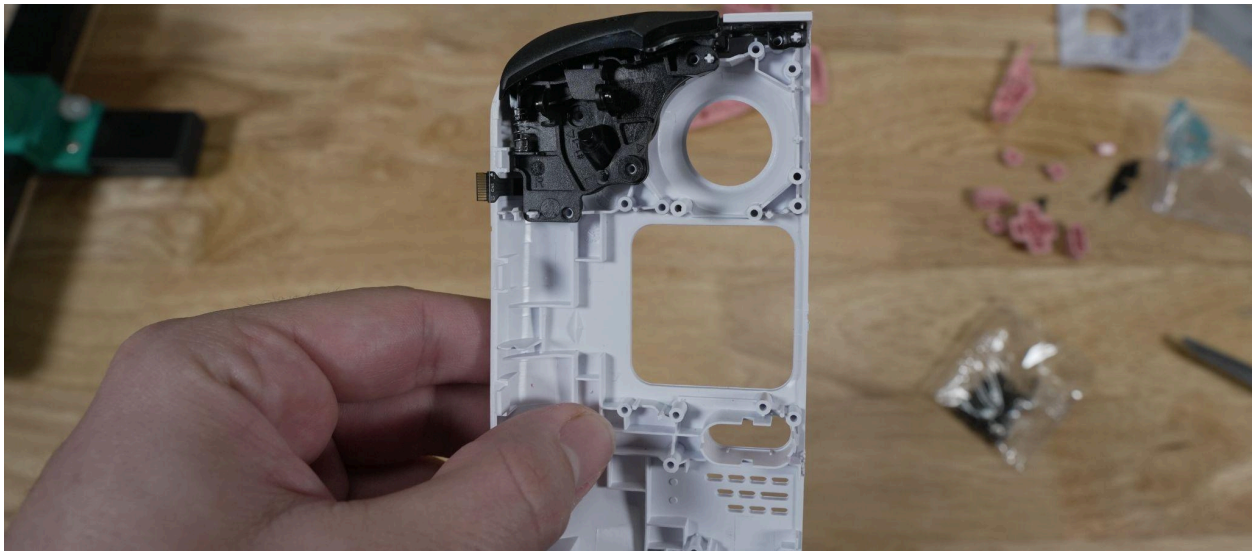
Next we add the buttons(ABXY + Start OR D-pad and Select) into the case followed by the membrane.



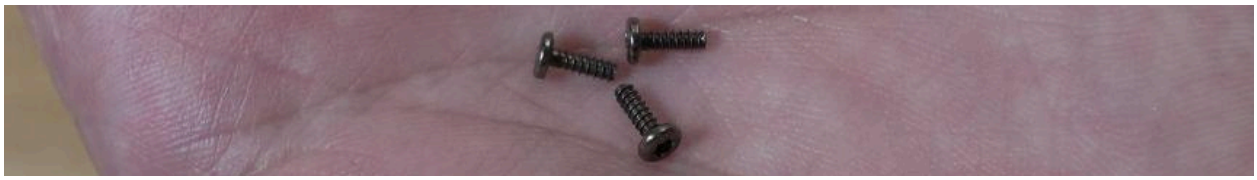


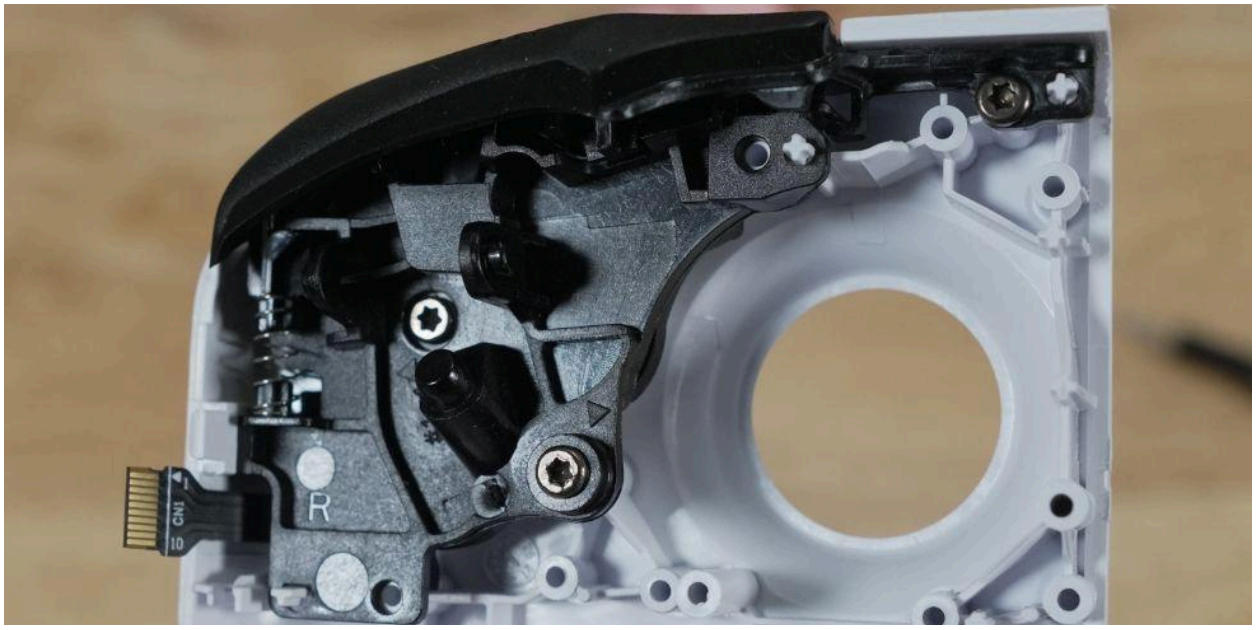
Next add in the Bumper module. This can be a bit tricky. I find it easiest to put the side in first. There is a small tab that sticks out and tucks in under part of the case. Make sure it is lined up straight and then the rest should go in smoothly. Also switch out the bumper here with the bumper in the case set if you want to have it match. This is not required but you will see later I went back to make the bumper pink.

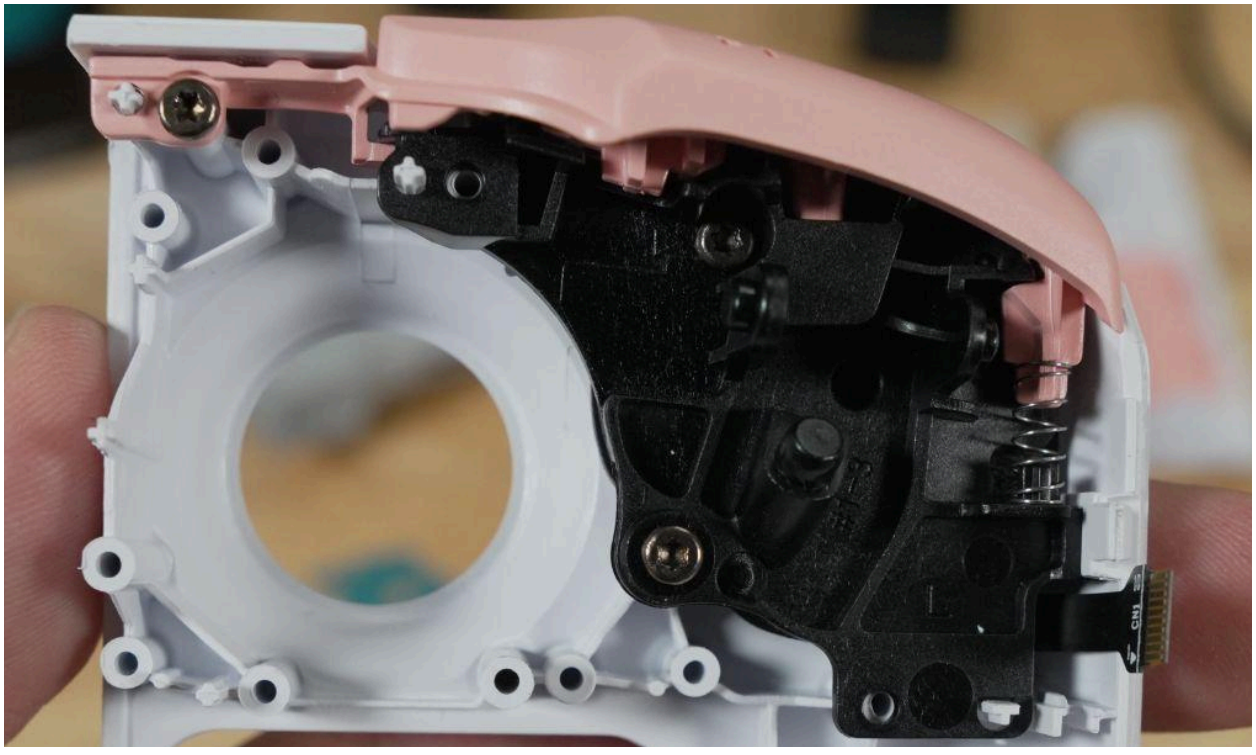




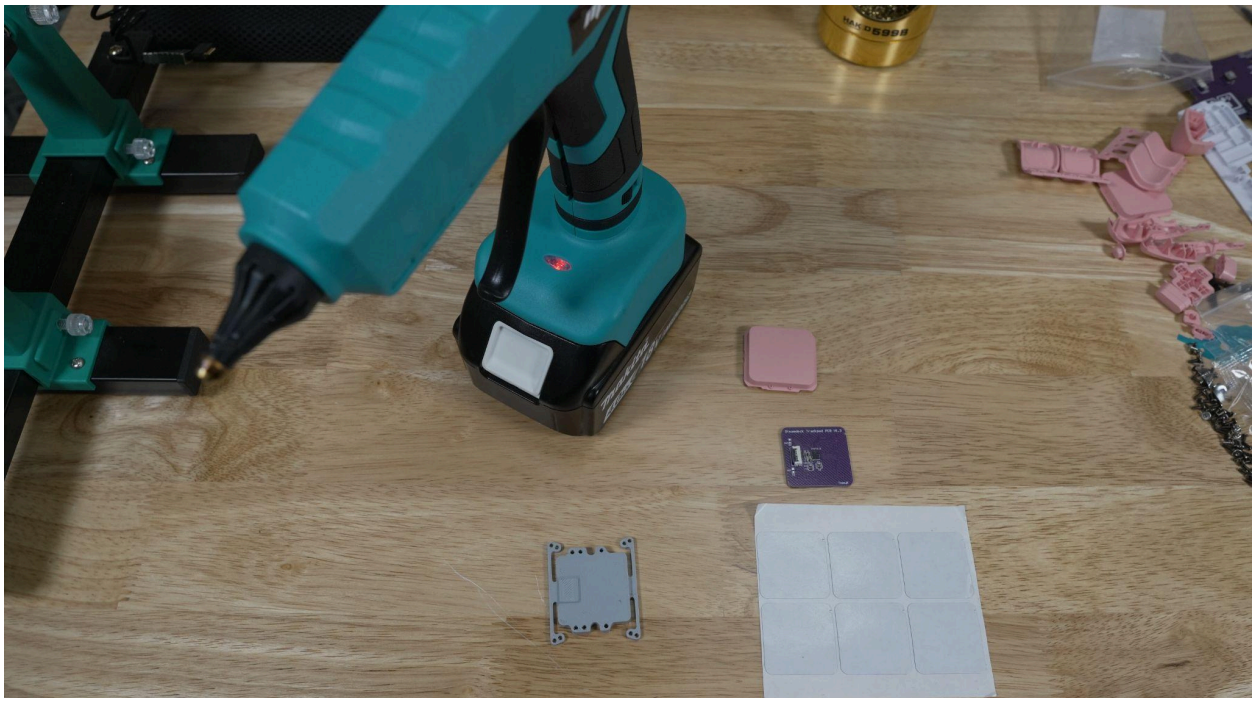
Next we need to screw it down with 3 screws. The 3 spots we are screwing into are pictured below. The screws we are using are the longest ones in the kit. The spec is that they are 5.9mm long and use a torx t6 bit. Make sure to only screw into the holes pictured below. Careful not to overtighten the top most screw, it can mess with the performance of the bumper.



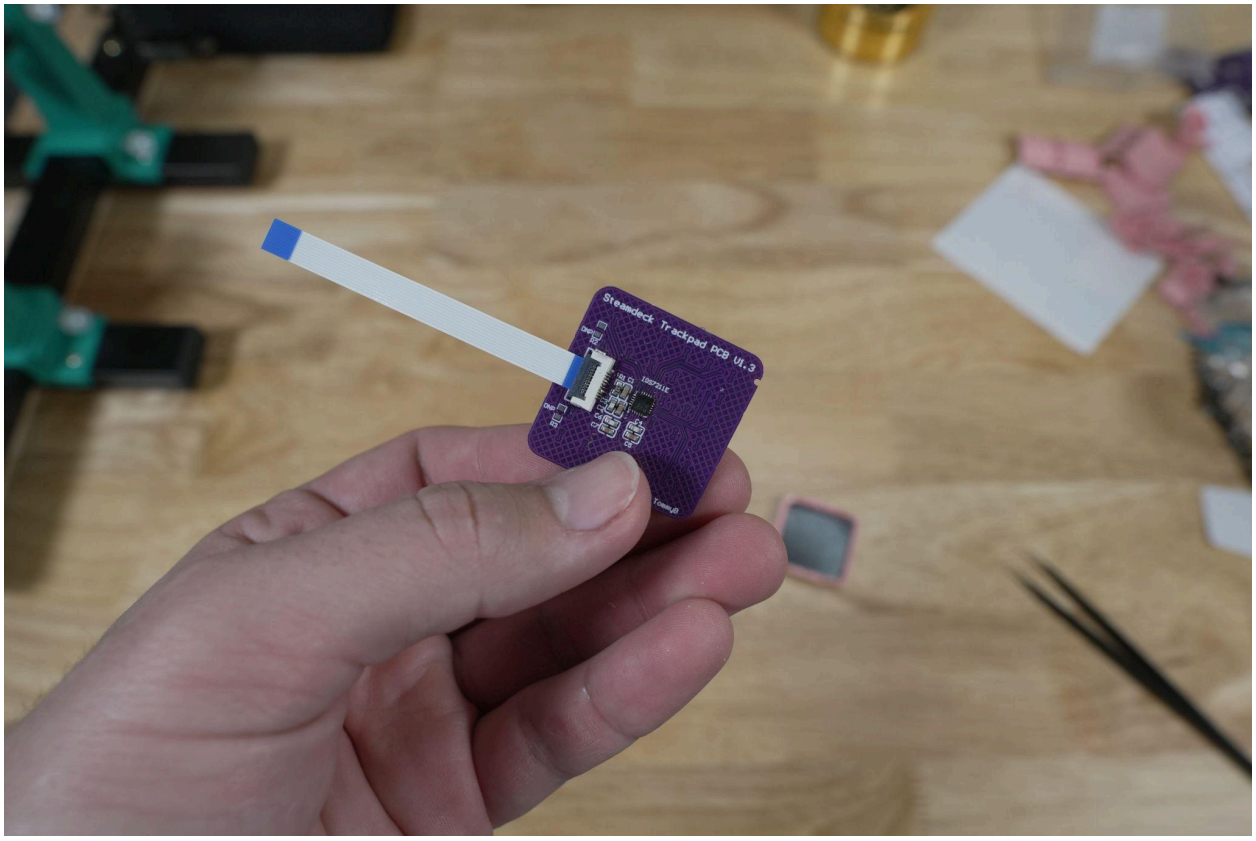




Next we are going to assemble the trackpads. We need the hot glue gun and the double sided tape that came with the Extremerate case. They are pre-cut to fit exactly. There is a notch so it can only be installed one way. It helps to have tweezers here to remove the back of the adhesive when it is installed in the overlay.

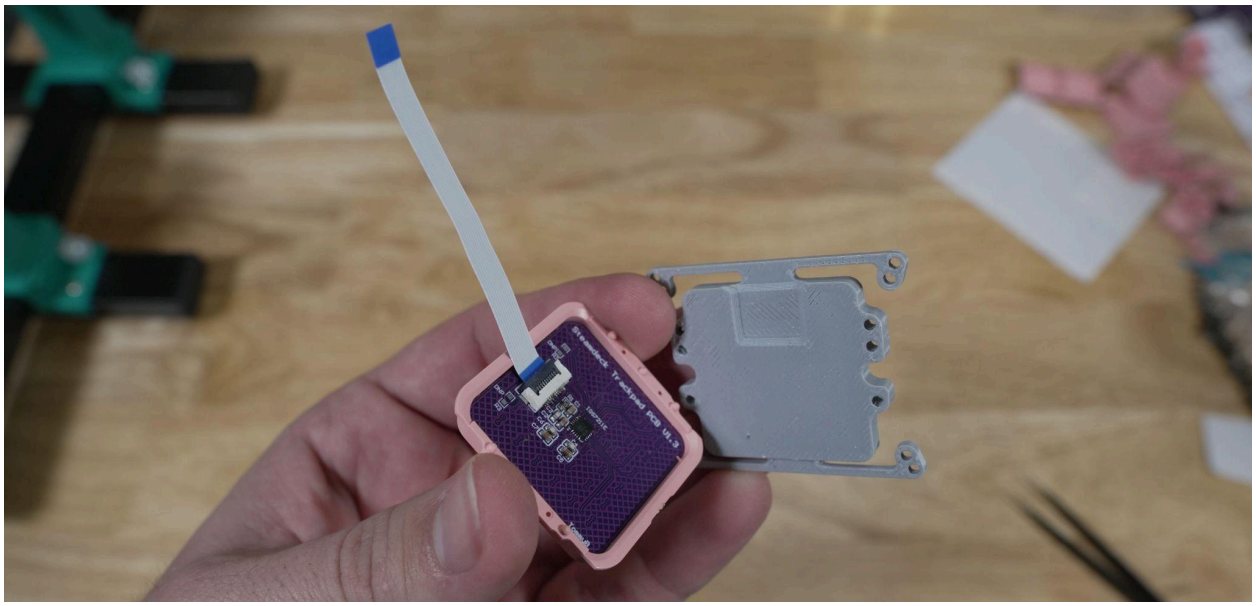


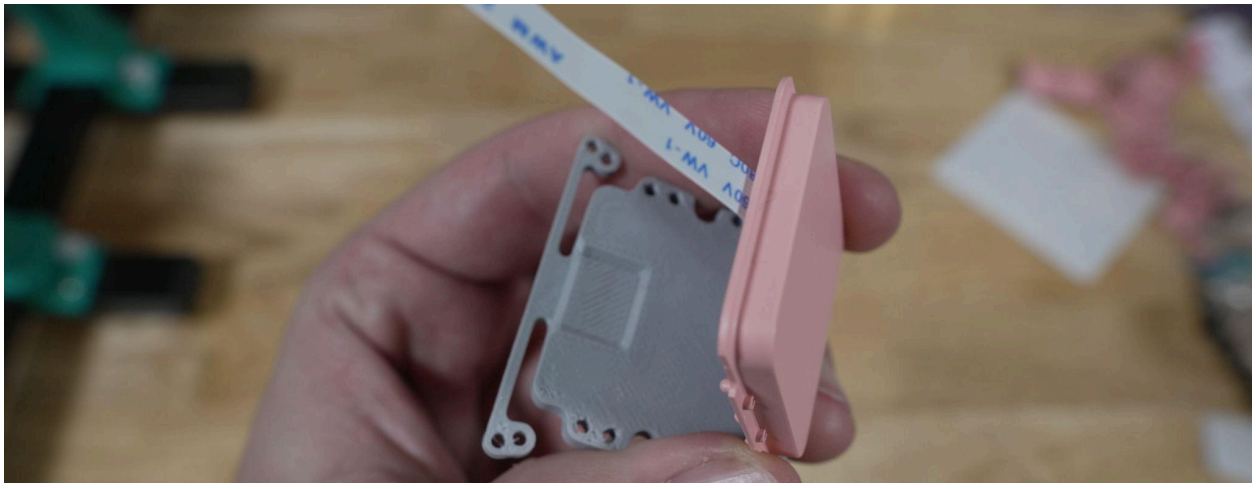
Here it might help to preinstall the FPC cable being sure to release the FPC connector all the way before locking it into place and putting the trackpad into the overlay. The trackpads are also notched so they only fit in the overlay one way.

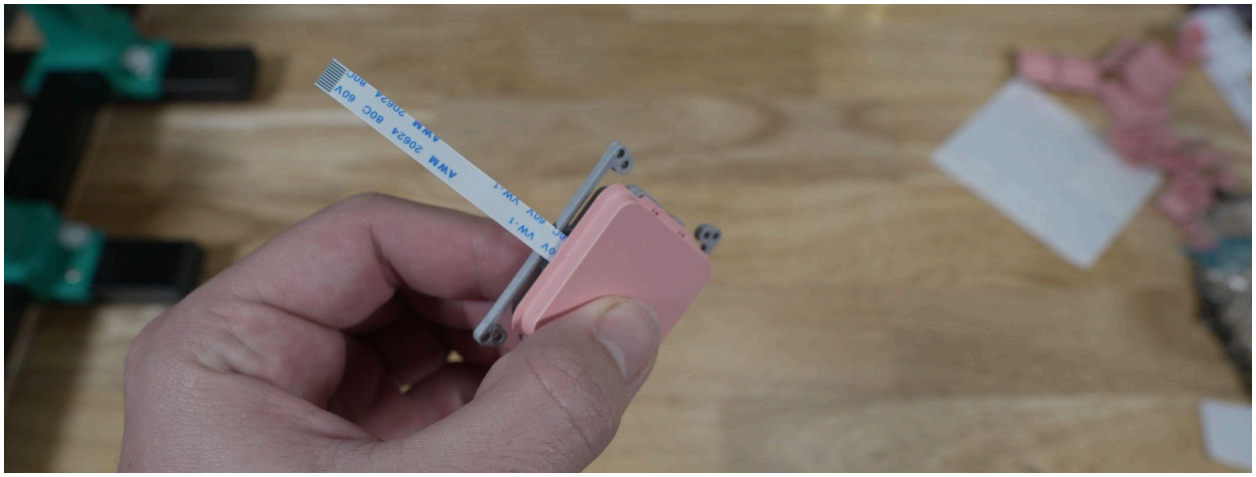

Steamdeck Trackpad PCB V1.3


Steamdeck Trackpad PCB V1.3

We are going to hot glue the overlay to our 3d printed spring. First line up the FPC cable so it goes on the side where there is a small indentation.

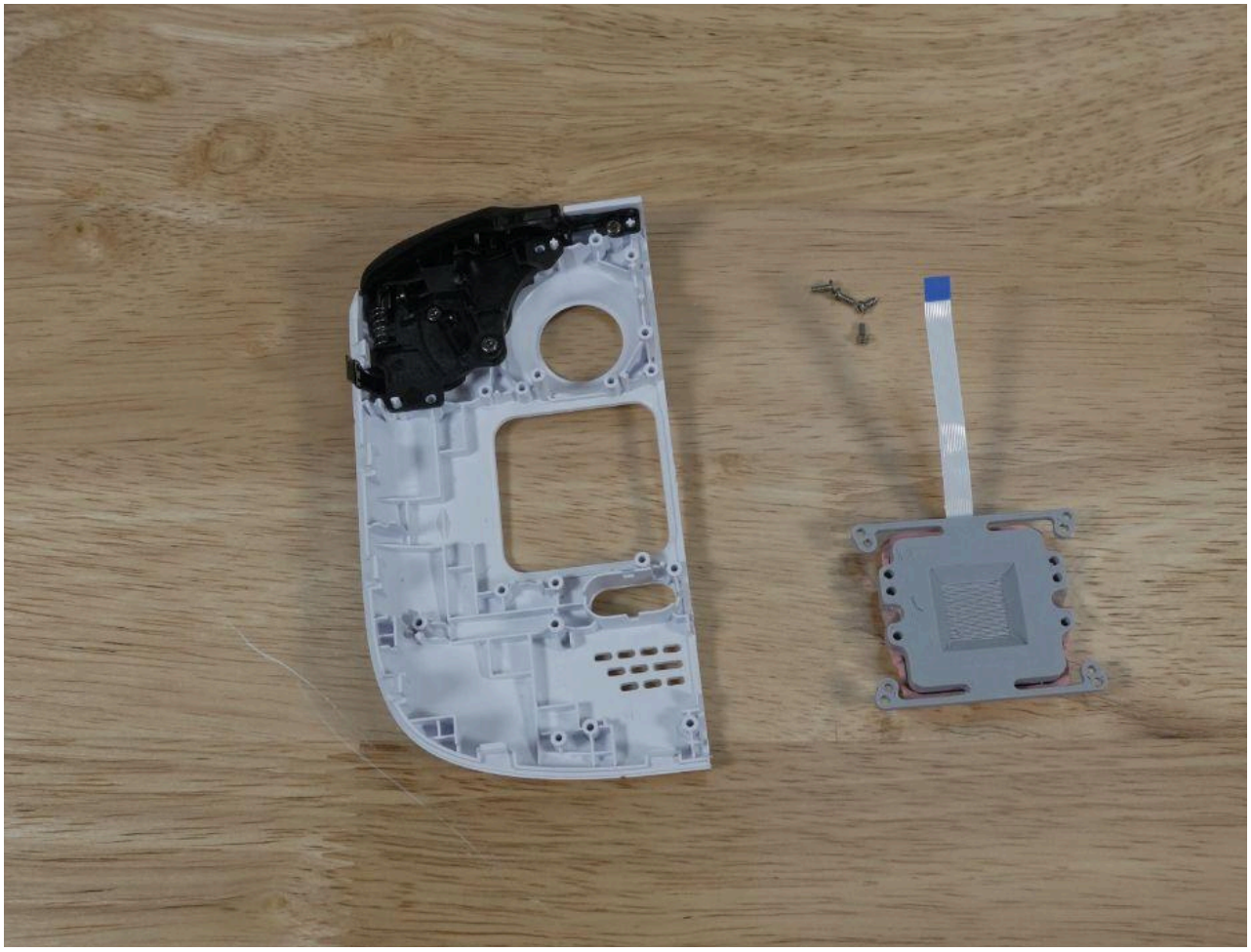




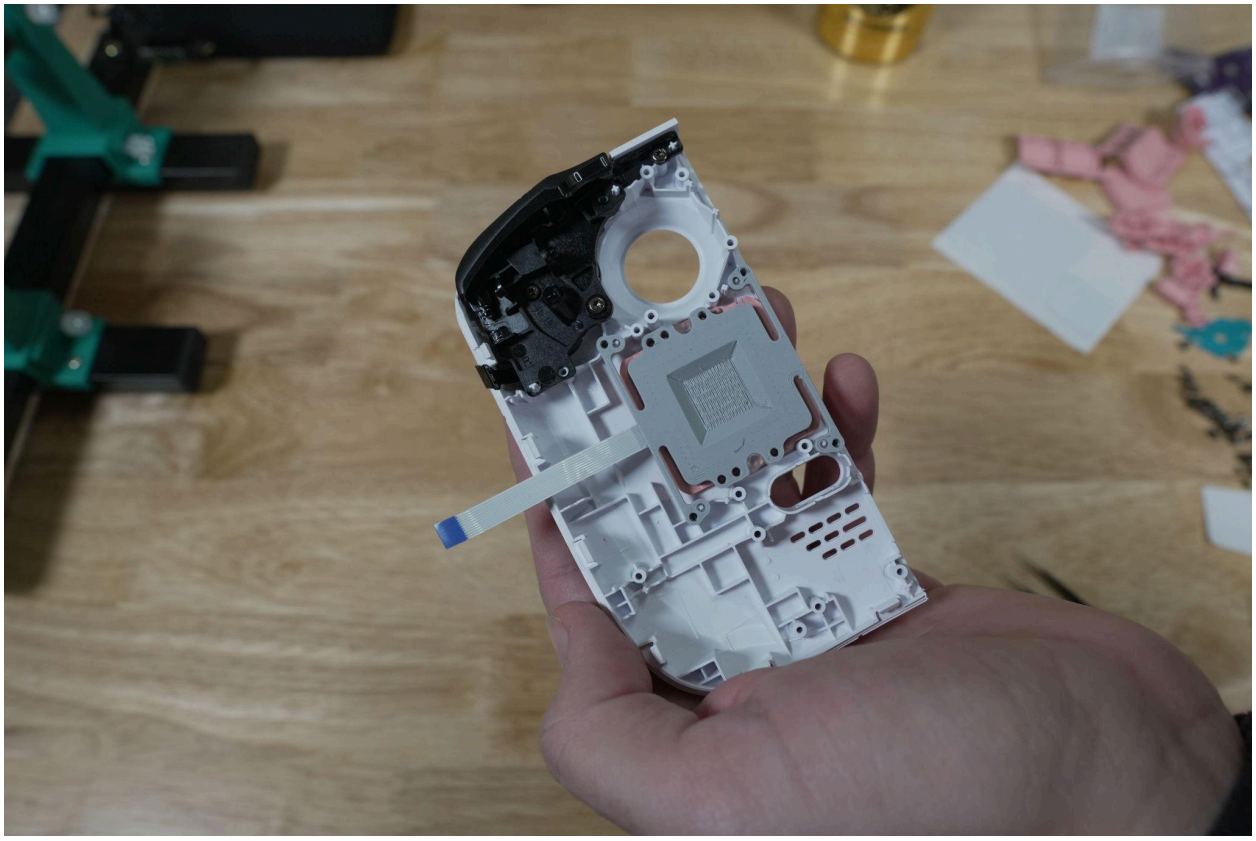


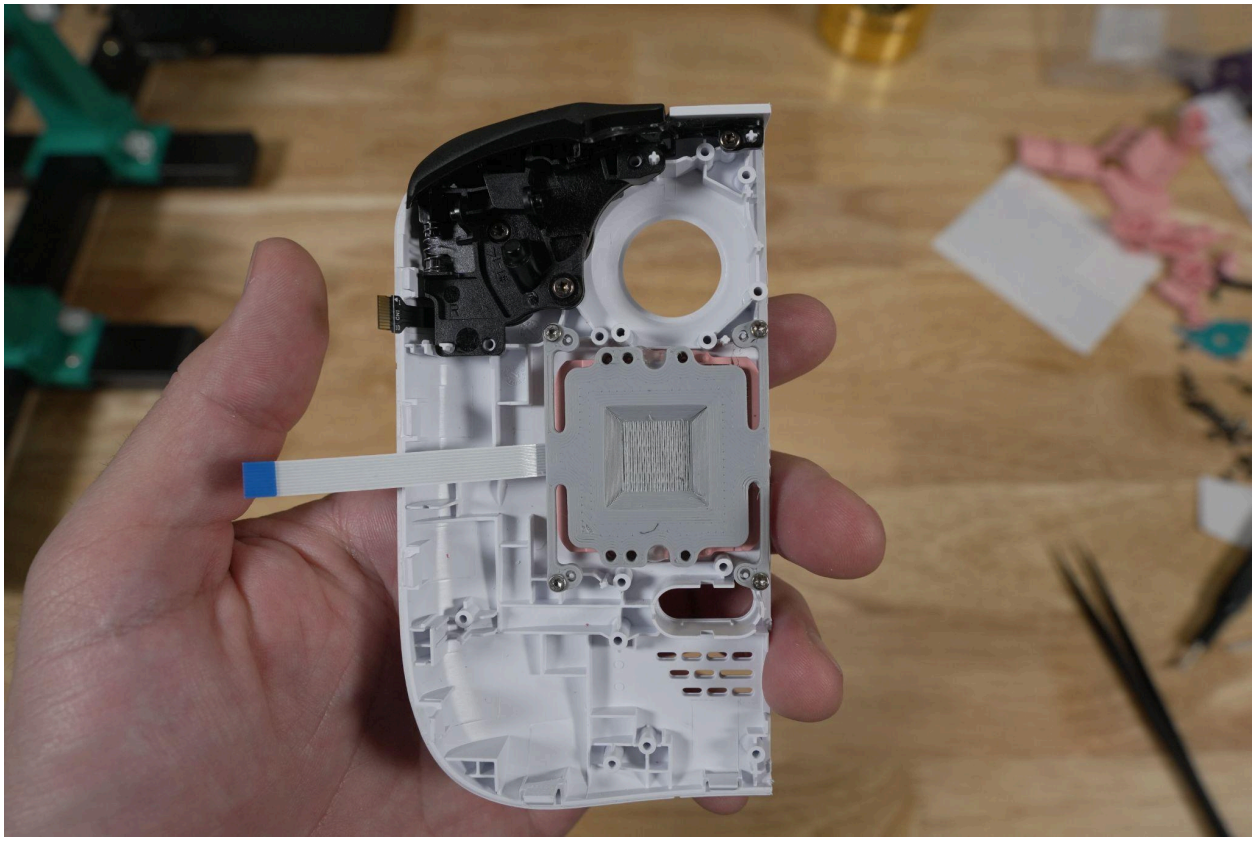
Next add some hot glue into these indentations being sure it touches both the overlay and 3d printed spring. It needs to keep the overlay in place. If you want to be extra secure you can add some extra glue on the corner where there is one of the overlay tabs still exposed. Be sure to let the glue completely cool while you are holding them together. Hot Glue cools slower than you might realize.

Next we will add the trackpad into the case

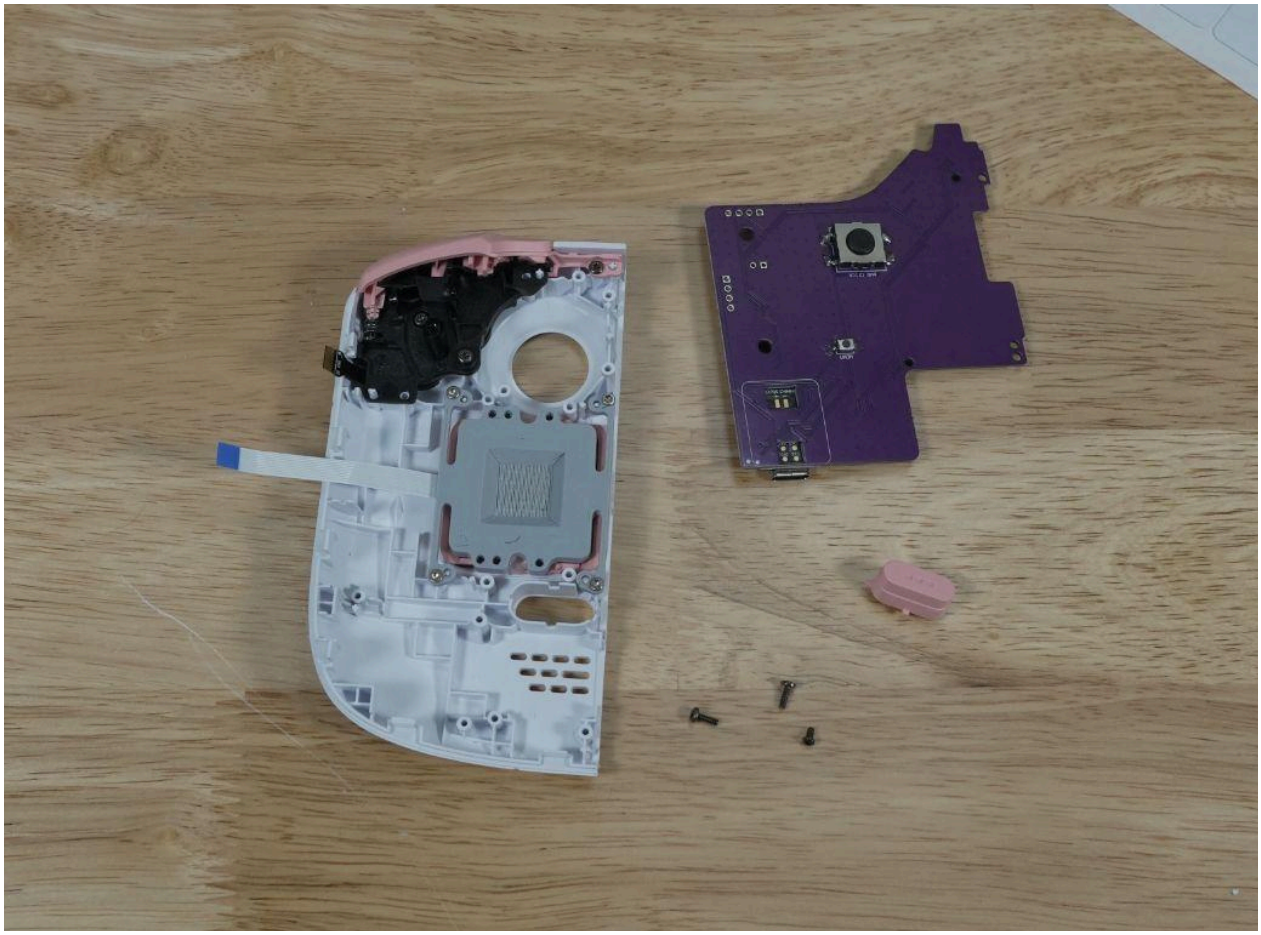


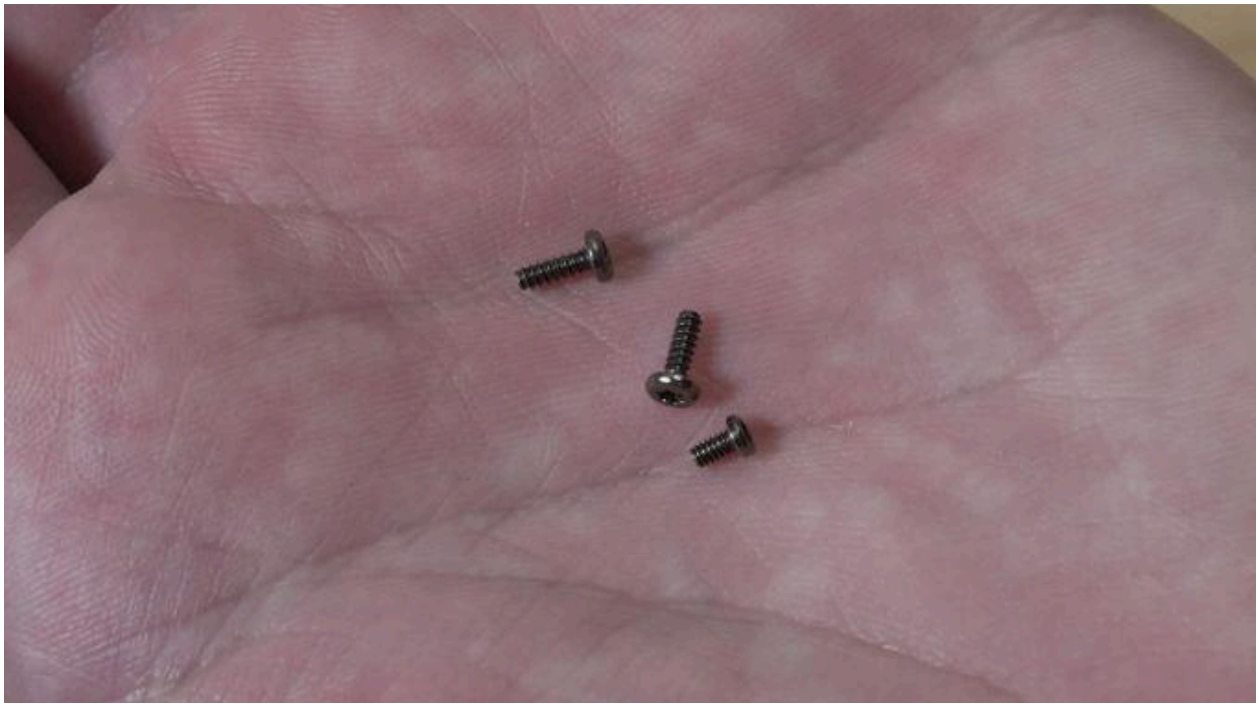
This just requires using these 4 silver screws. I can recognize them because they are the only silver screws with this shape in the kit. However the are 6mm long and also use a t6 bit



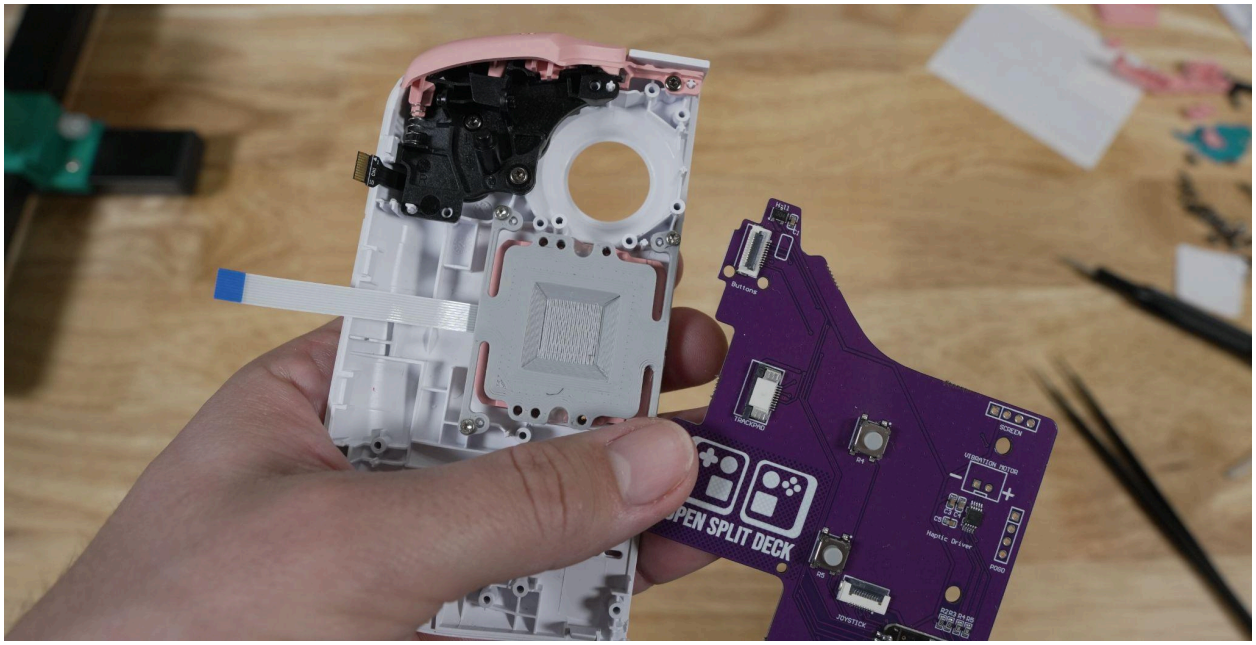


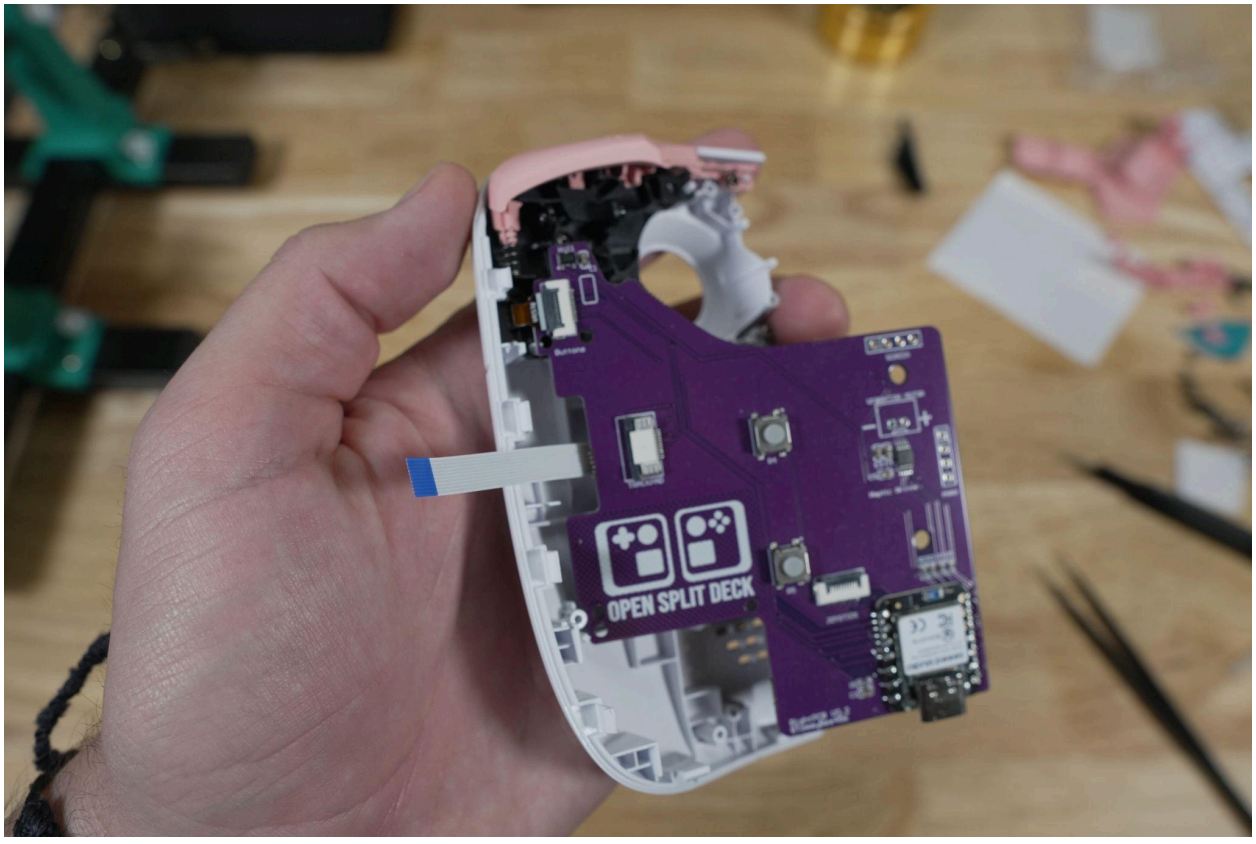
Next we will attach the PCB to the case. It requires 3 screws. 2 long ones(same as the ones we used for the bumper) and 1 short small screw(4.9mm).



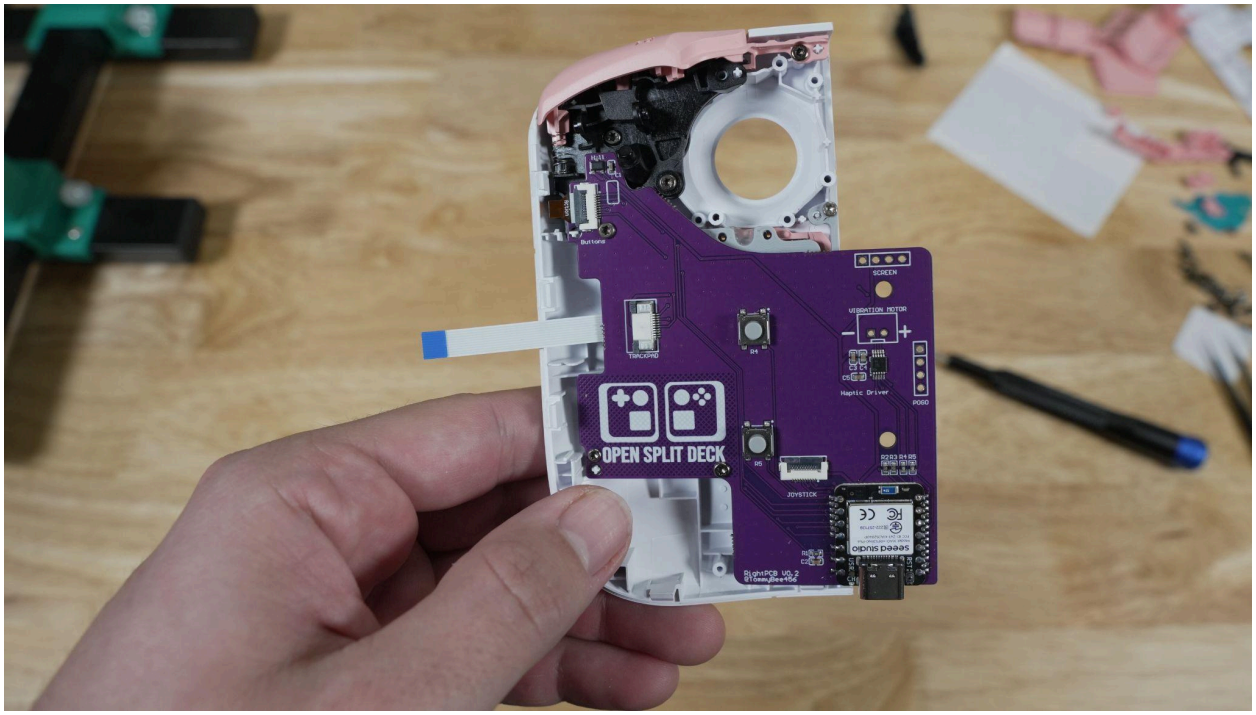


I find it easiest to attach the button(or d-pad) fpc connector before screwing it down. Be sure to release the connector all the way and then install.





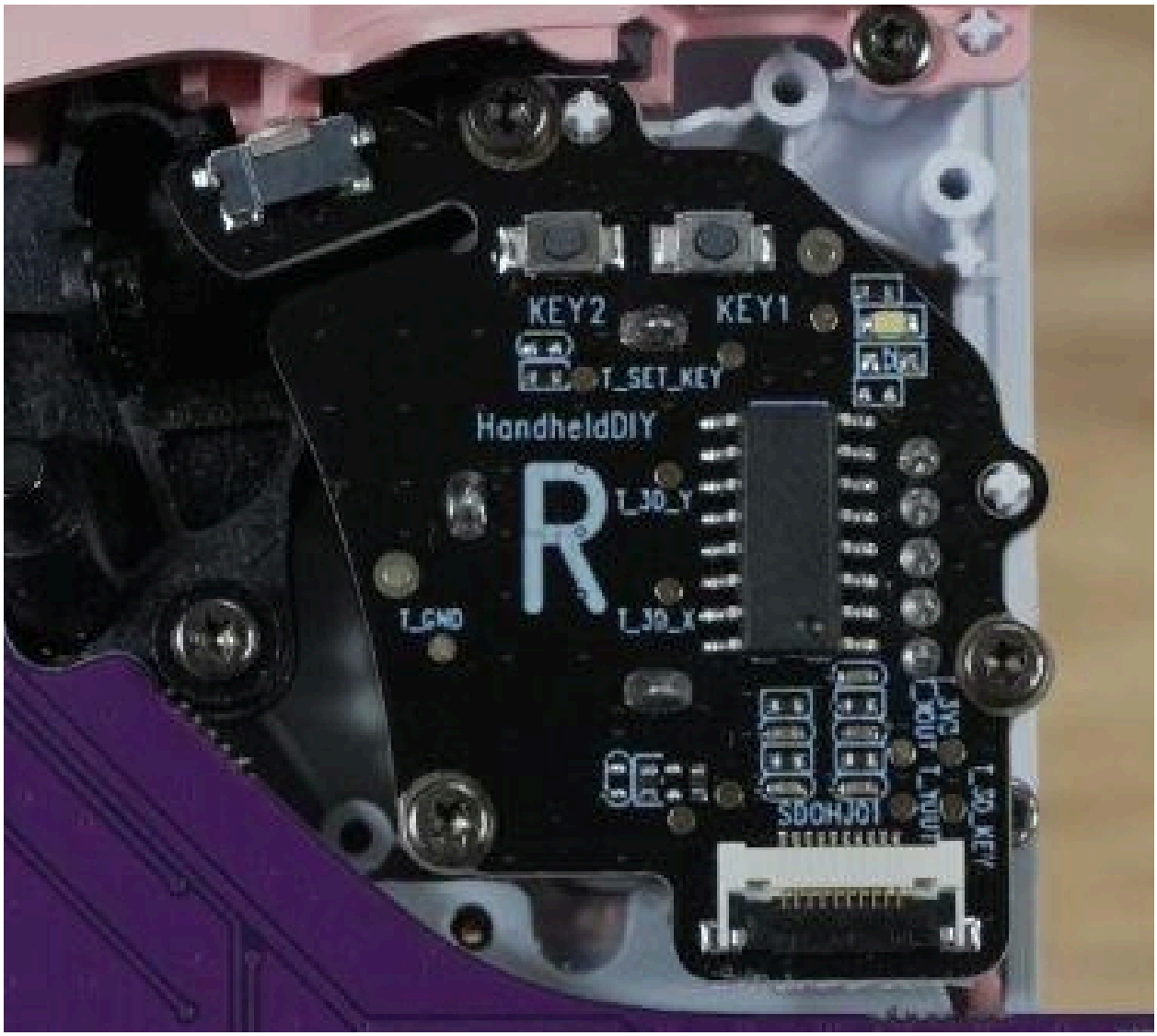
The short screw goes into the corner closest to the sides where the OpenSplitDeck logo is. The other 2 screws go next to the button FPC connector and the other side of the OpenSplitDeck logo



Next Connect the trackpad FPC cable. It does connect upside down, do not worry.

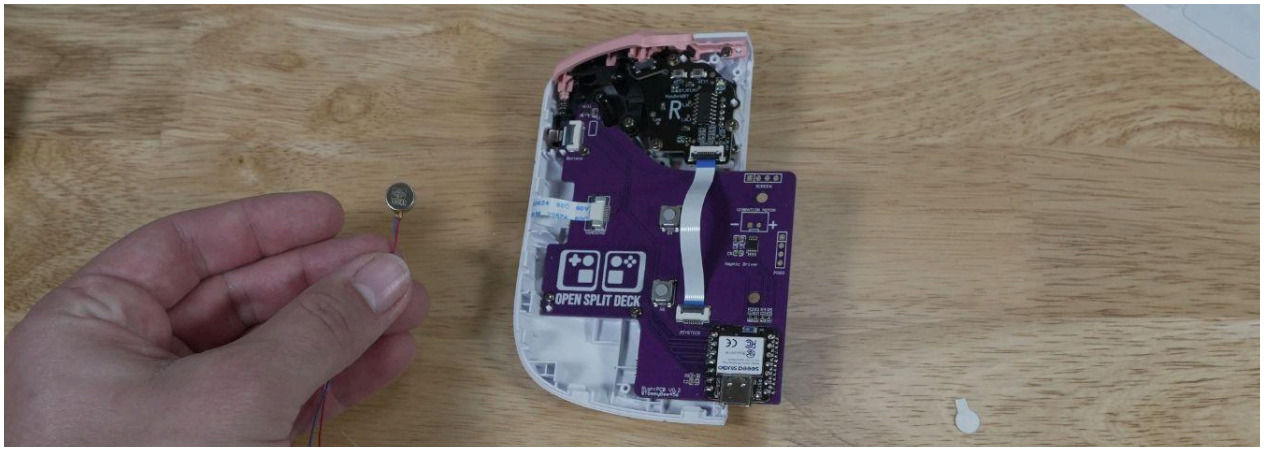
Next I am going to install the Joysticks. For this example I am going to use the HandheldDIY stick but the instructions are the same for either. This step requires 3 screws. We will use the same long ones as the bumper installation.

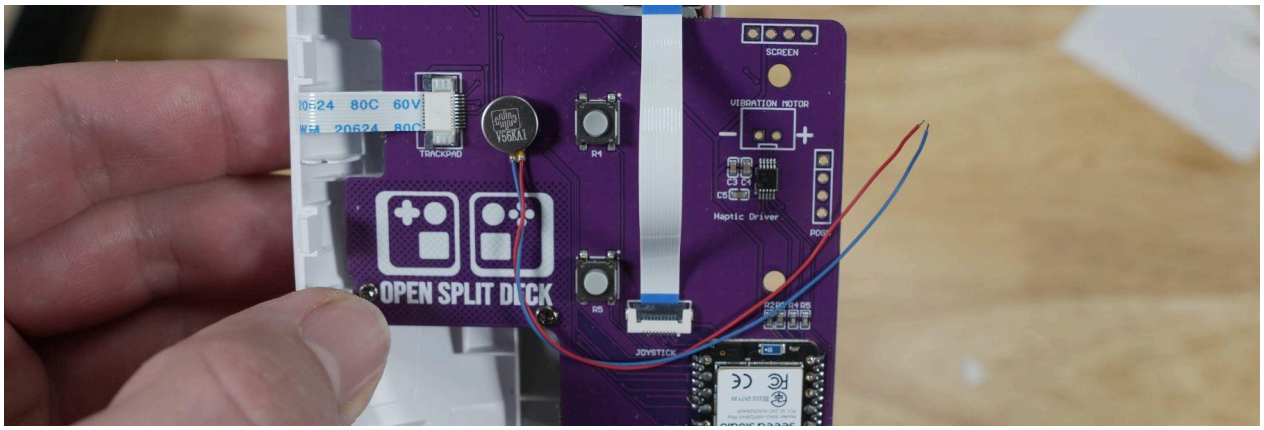
Put the screws in these 3 holes. IMPORTANT NOTE: Check that the bumper can be triggered easily. If there are issues with the bumper try loosening the bumper screw and/or loosening the joystick screws and trying to tighten again while pushing the module away from the bumper. In the worst case, you can use a knife to shave some plastic from the bumper button on the part that makes contact with the switch on the joystick module. If you find there is rubbing on the joystick on the case. Try firmly pushing on the joystick. The thumbstick cap may have not been installed completely.



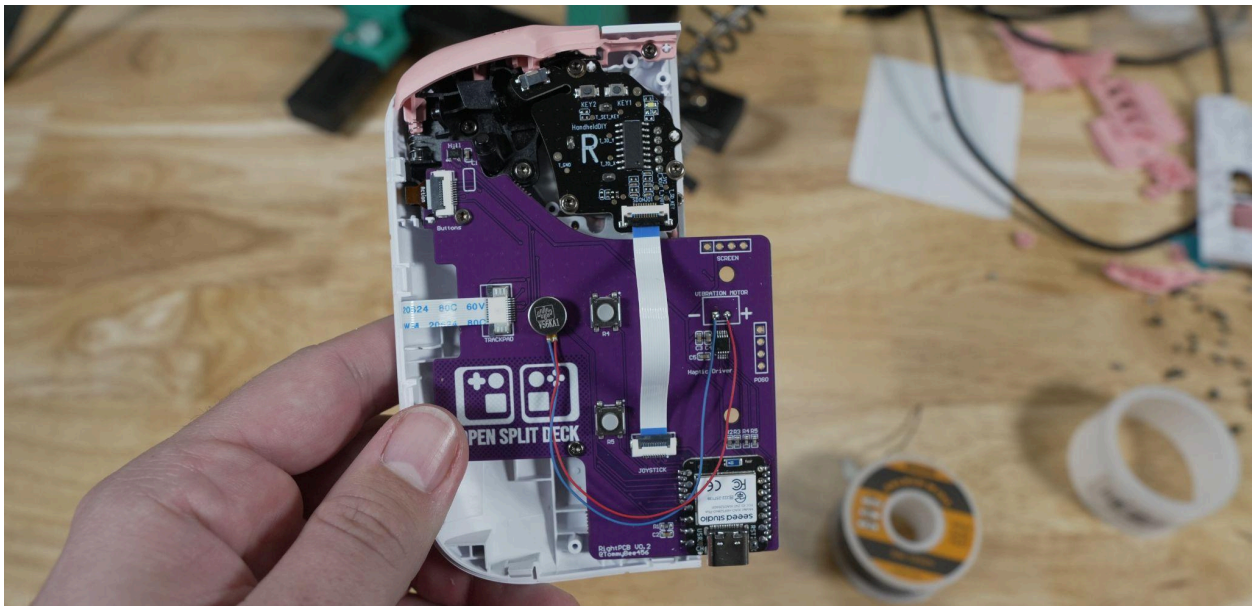
Next Install the ribbon cable. You will find that the joystick module connector is wider than the cable so be careful to line it up in the center. This is also a good time to check with the dongle on a computer if the joystick, buttons, and trackpad are all working. Note about the trackpad: It takes a few seconds to turn on please be patient and this should be improved in newer firmware revisions.

Next we are going to add the LRA haptics motor. Below is the place I prefer to place it. I find it is a good combination of trackpad haptics and haptics you can feel in the hand, however feel free to add it wherever you want. It is attached with double sided tape.

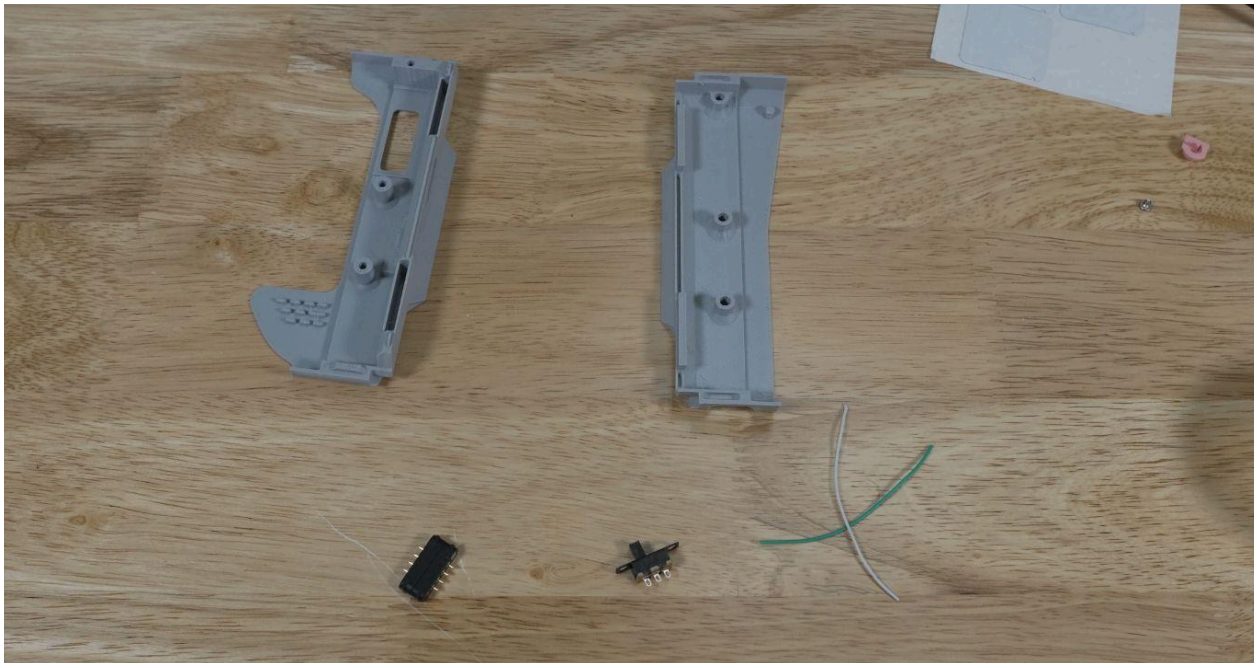




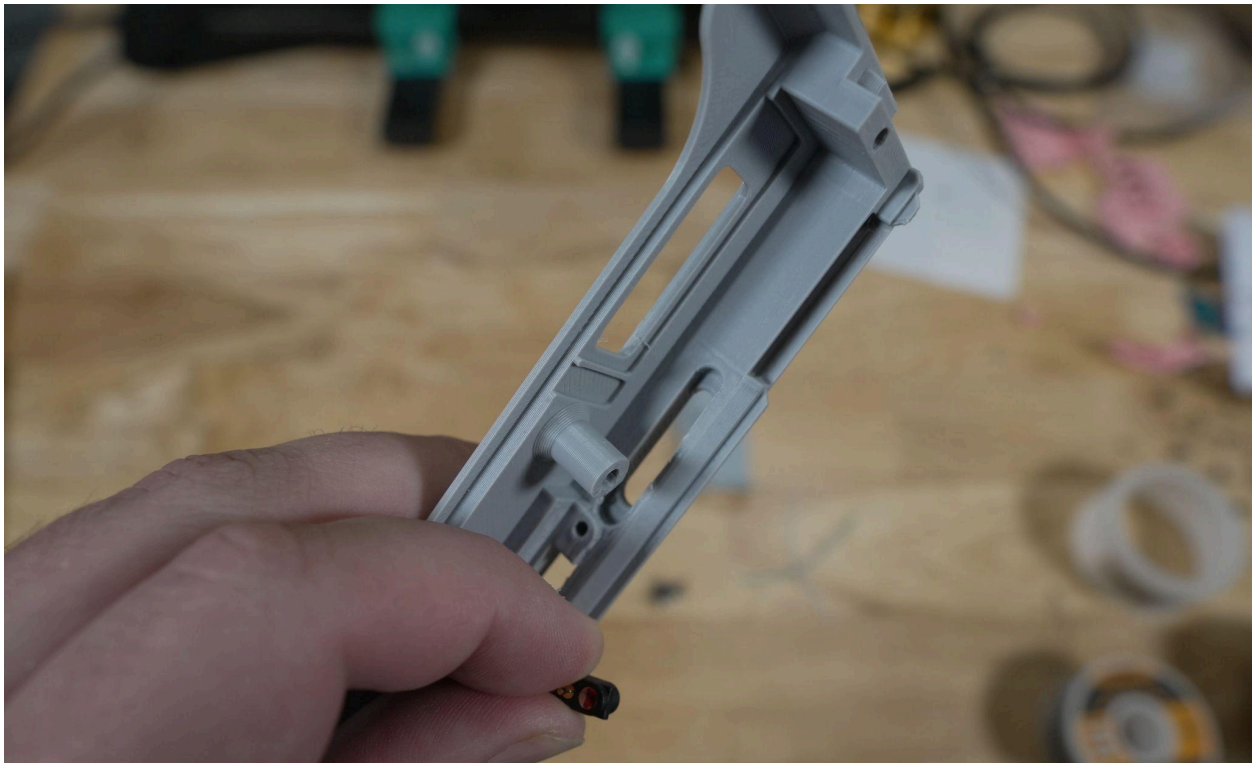
The motor is then soldered in at the “+” and “-” at the through hole labeled “Vibration Motor”. Solder the red wire to the plus and blue wire to the minus.



Next we will assemble the top half of the connector piece. We need the pogo pin, the power switch and 2 wires about 70mm long. Use different colors of wire. You can use black and red but I prefer to use another color since the battery wires will be black and red.



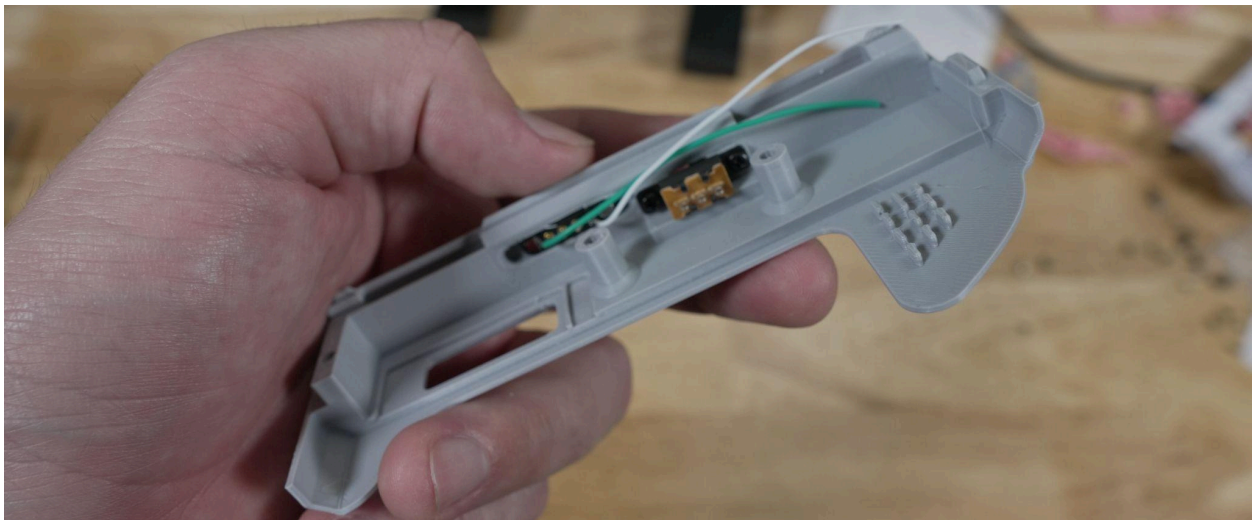
First put the pogo pin connectors in the slot here. It will be a tight fit so make sure it is installed all the way. I like to install the side with the pins on the right half but you can set up your controller however you like. The pogo pins only fit together in 1 orientation so check it when you go to install it in the other half.

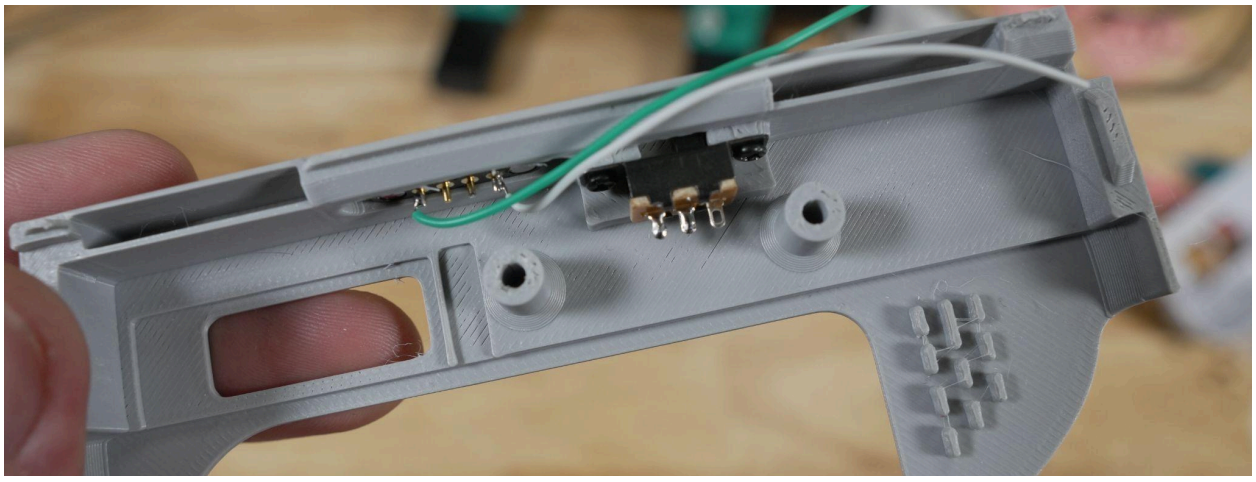


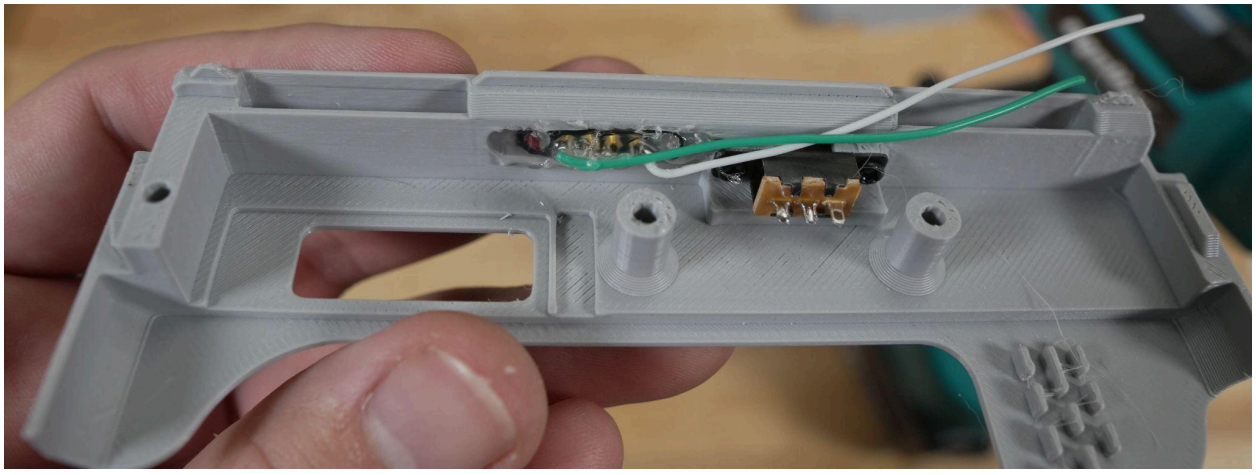
Example of not installed all the way

Example of installed all the way(should be flush with surface)

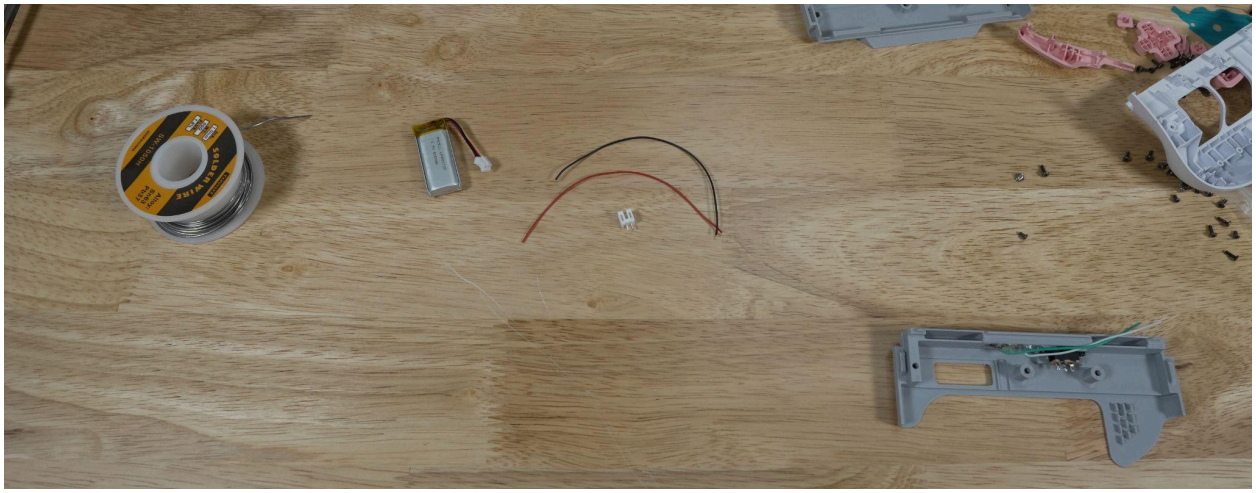
Next we will use the self-tapping M2.3 5mm screws to install the power switch here. We will also solder a wire to the 2 outer most pins of the pogo connector. Be careful here because the magnets also like to pull in the soldering iron. Note which color wire is closest to the power switch, this one will be ground, the other wire will be our 5V. Next I like to cover the connections with a bit of hot glue and add some hot glue on the sides of the connector.



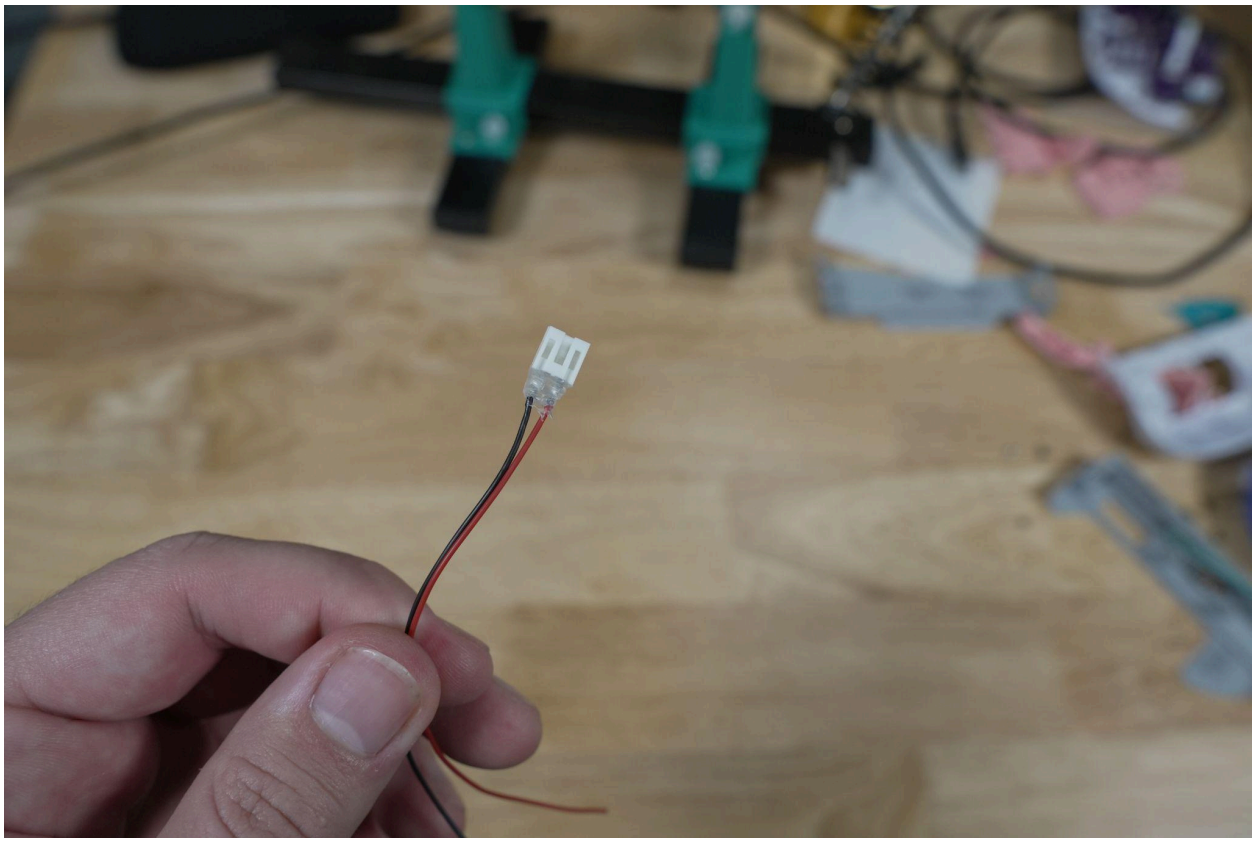




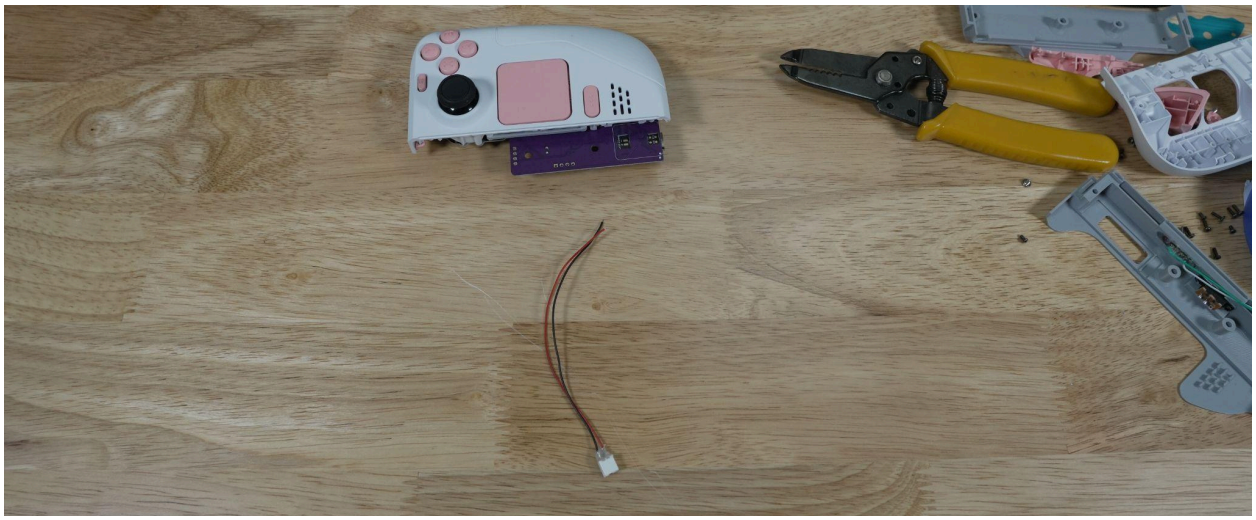
Next using 110mm of wire we are going to solder the battery connector to some wire. It is important to match the colors or keep track of what side will be positive and what side will be negative for the battery. THIS IS VERY IMPORTANT.



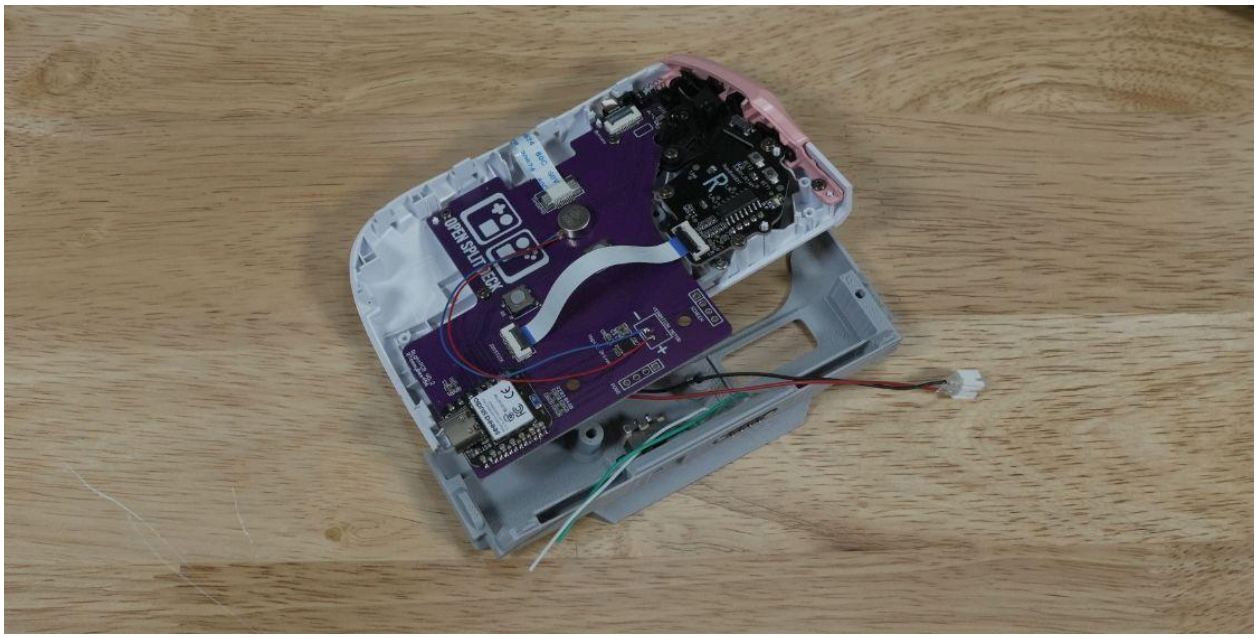
I like to use some hot glue to cover the connection to add strength and protection but you can also just use some heat shrink.



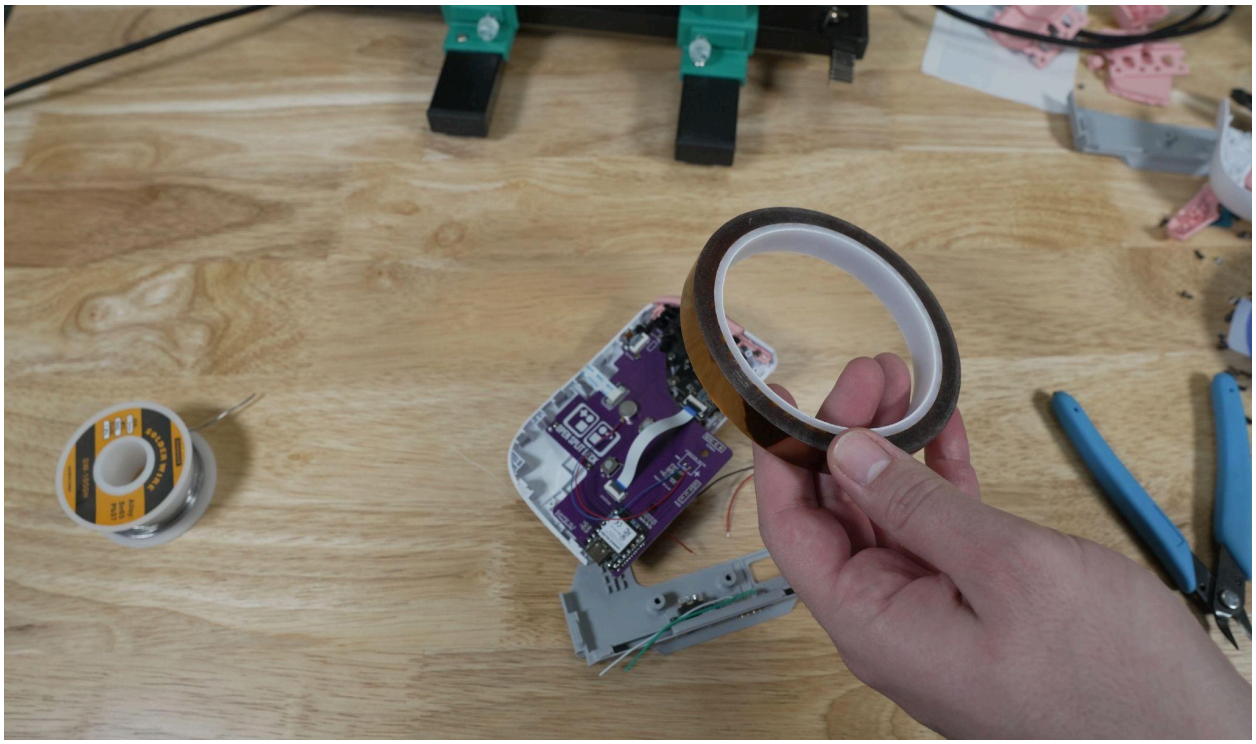
Now we will solder this wire onto the PCB. You will see a hole right under the XIAO board that exposes a “+” and “-” pad. Solder the wires to these pads accordingly. I would also recommend covering this connection with hot glue to protect the pads from getting ripped off just in case of any mistakes.

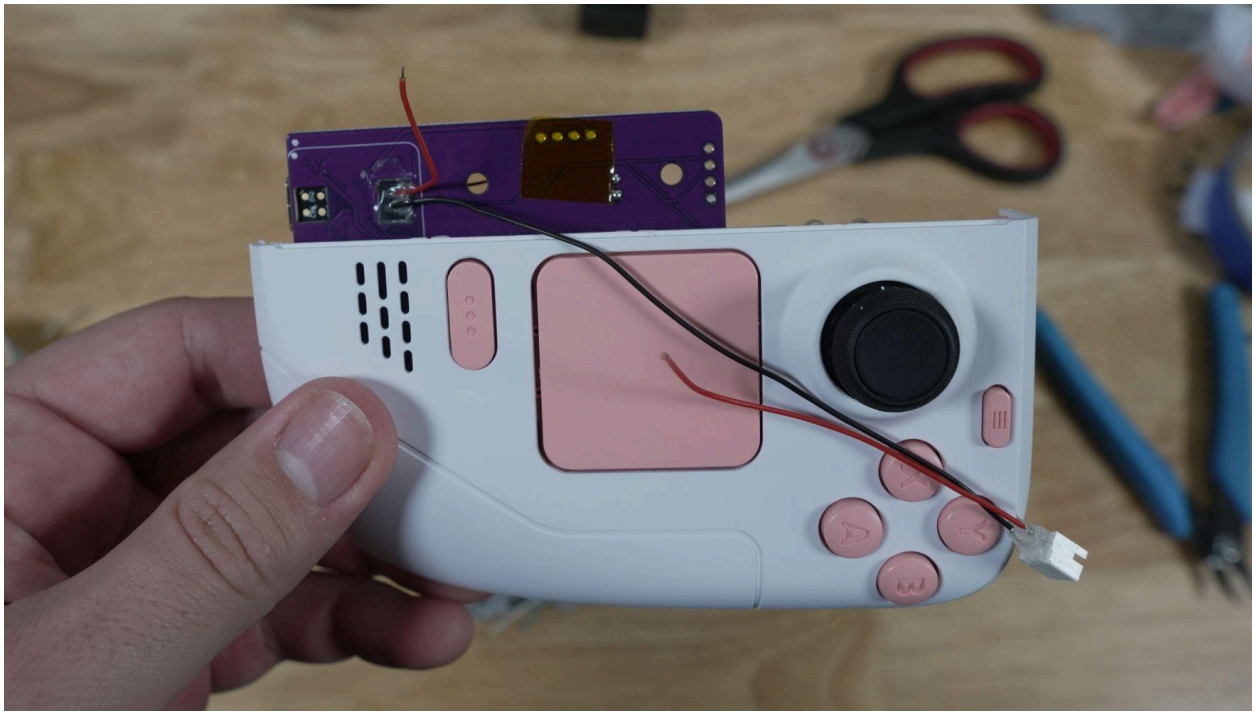


Next we need to connect our power switch. So using the connector piece as generally a guide we can see we want to cut the wire at about 35mm from the PCB

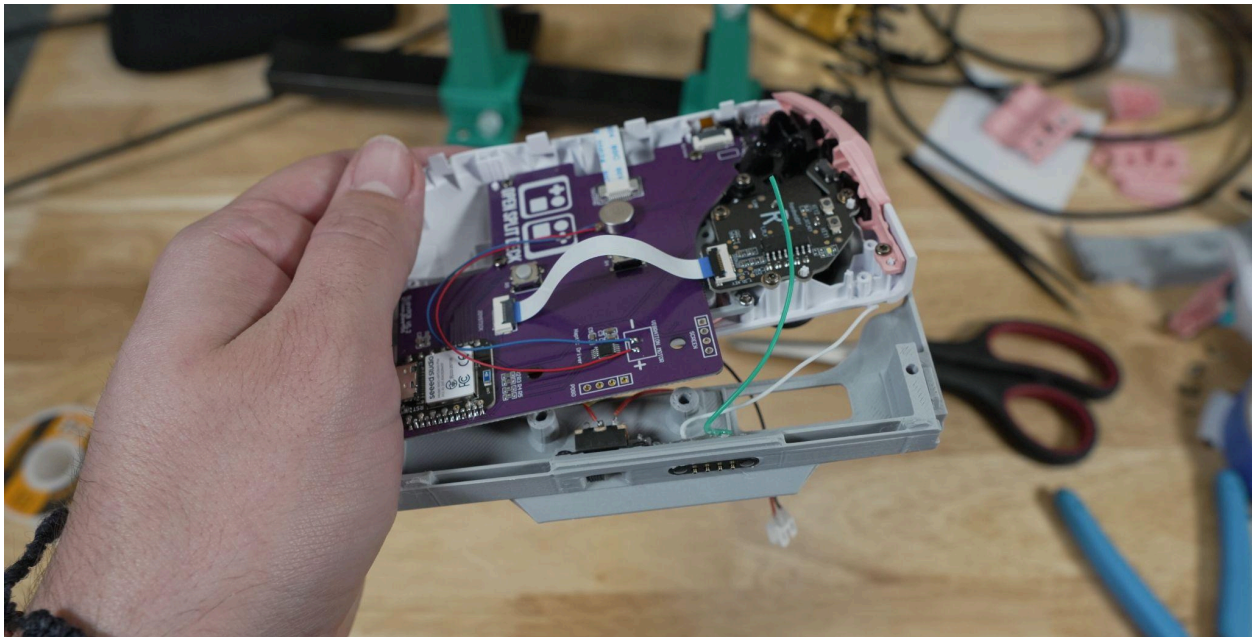


This is also an important step. The clearance between the POGO pin solder points and the power switch is a little closer than I'd like so we are going to use some kapton tape or electrical tape to cover the bottom side of these pins. This step will probably be removed for the next version of hardware.

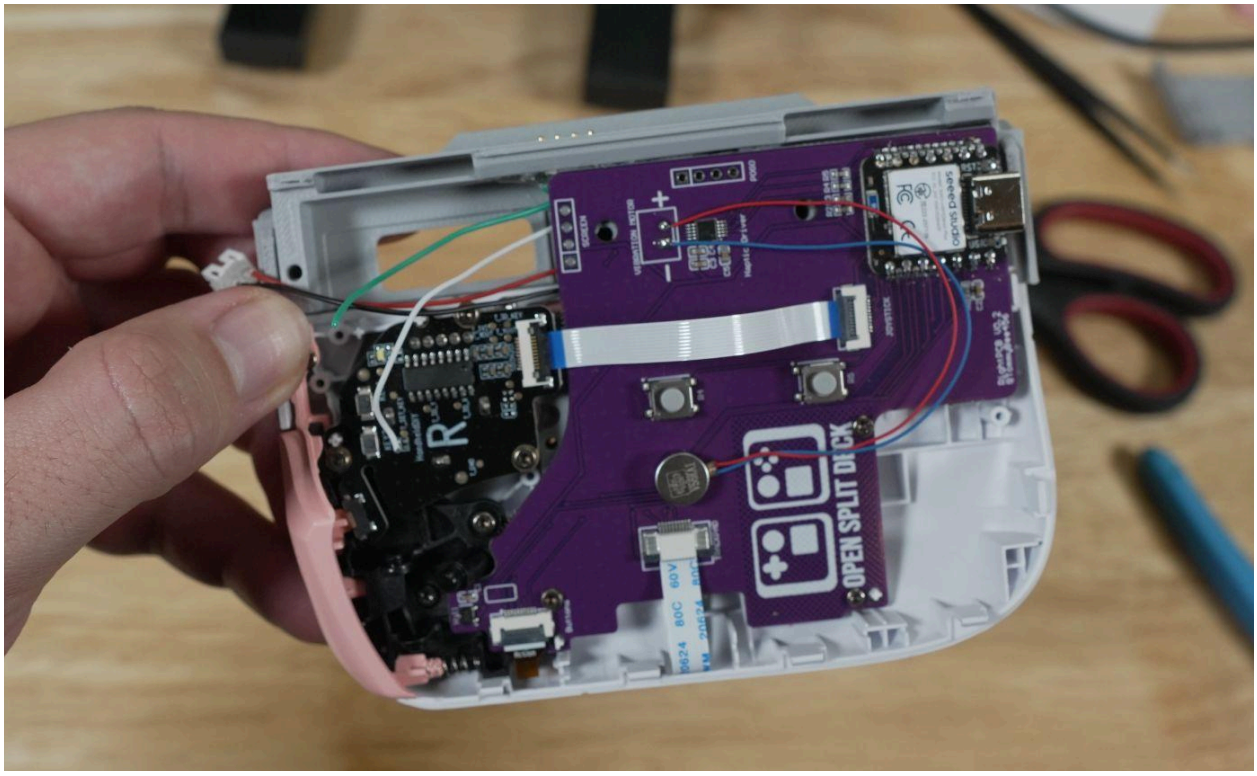




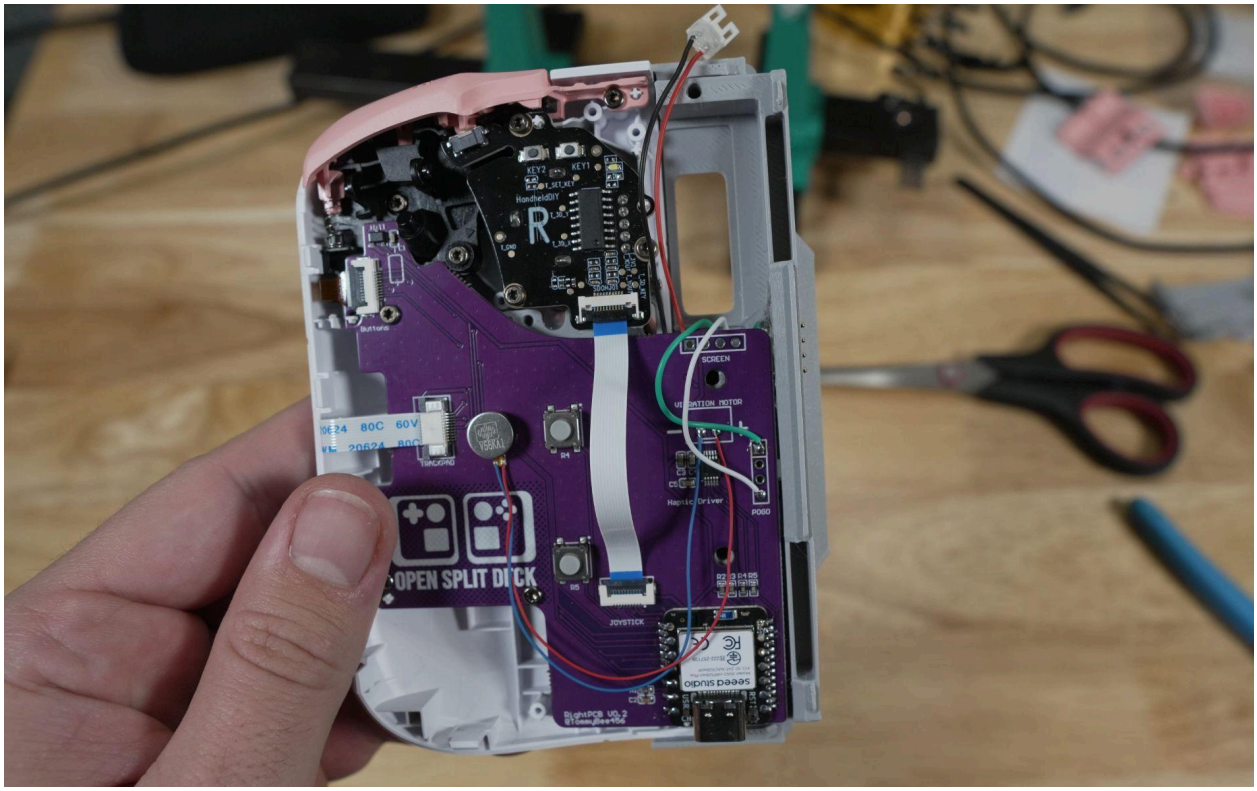
Next we will solder in the 2 red wires from the battery connector. I like using the middle and “top” pin so that when the switch is up it is in the On position.



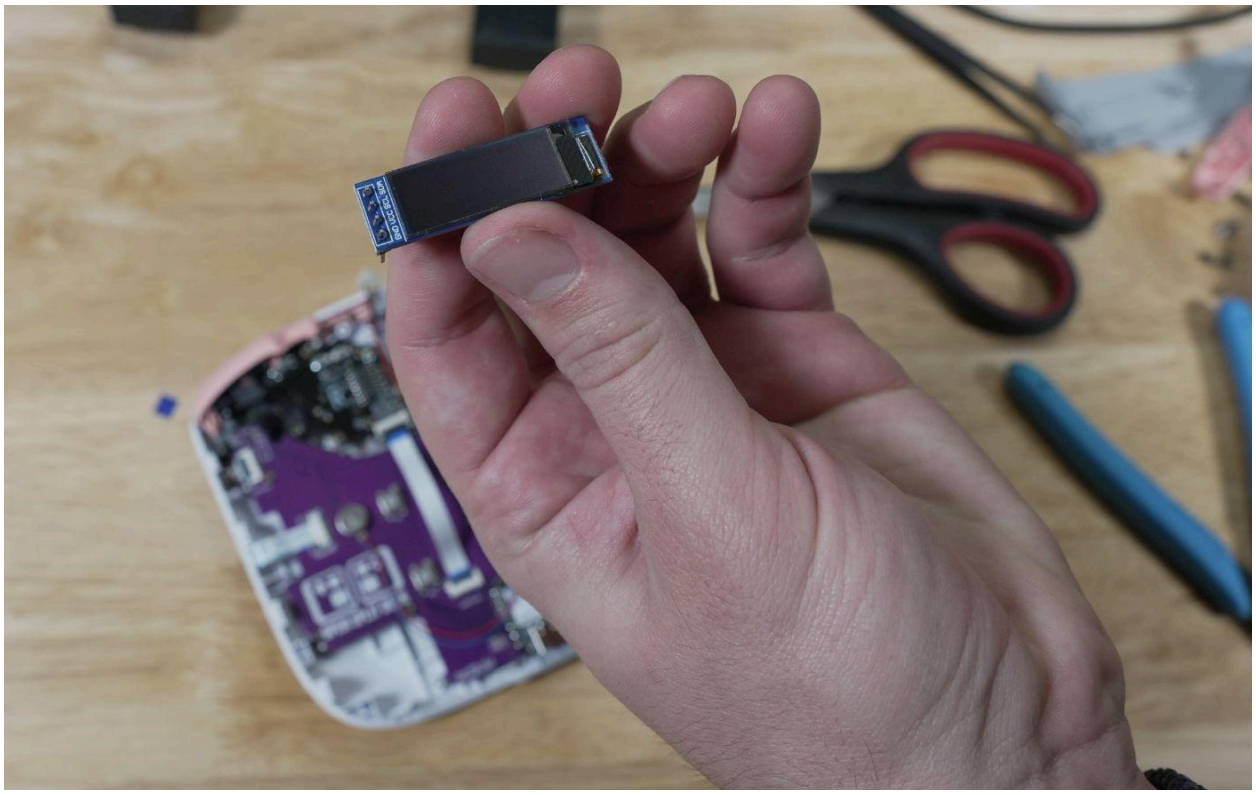
We can now push the connector into place making sure to keep all the wires out of the way of the screw posts and running all the wires up towards the top.



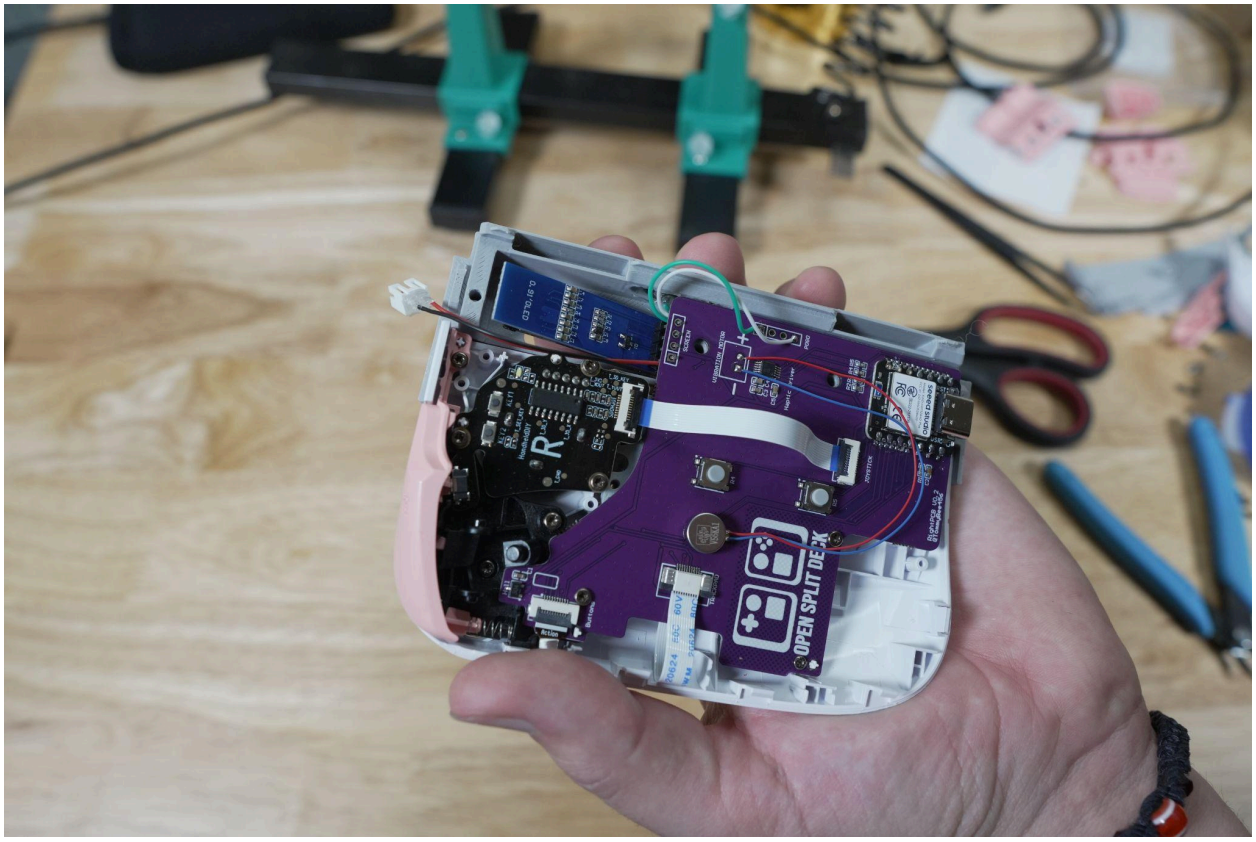
We can now solder in the wires from the pogo pins. The top most hole is the 5V and bottom is GND.



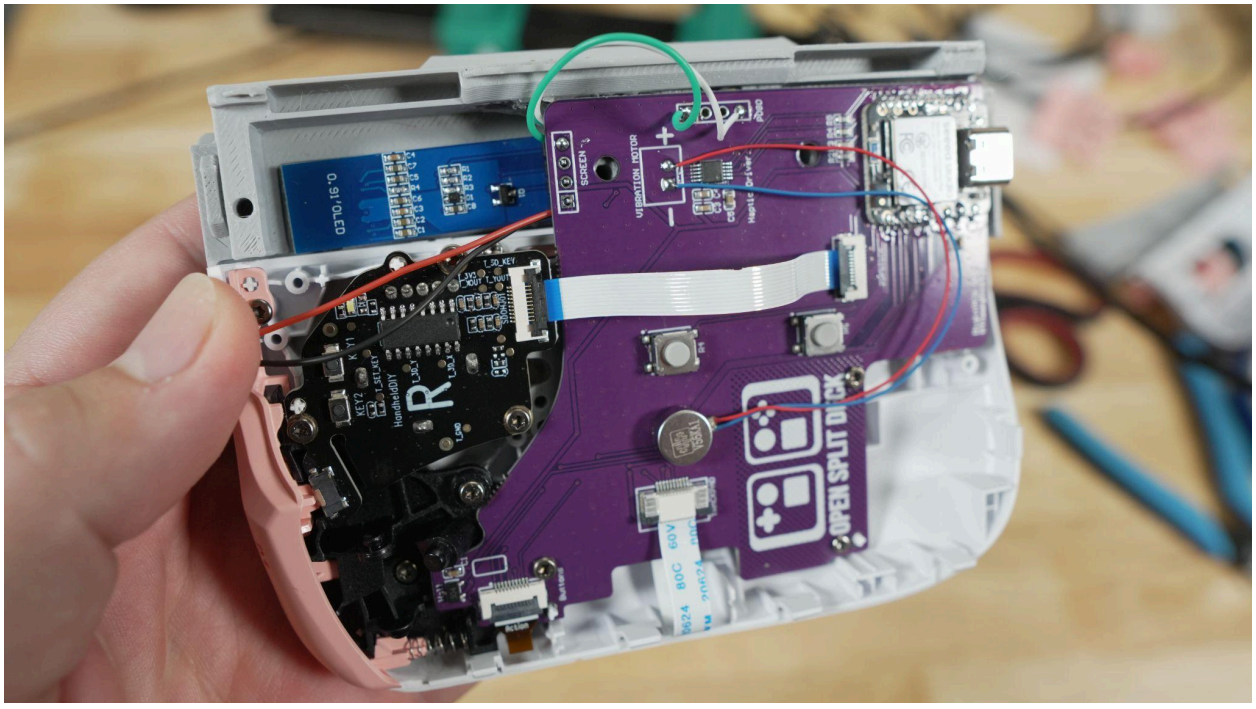
Next is to install the screen



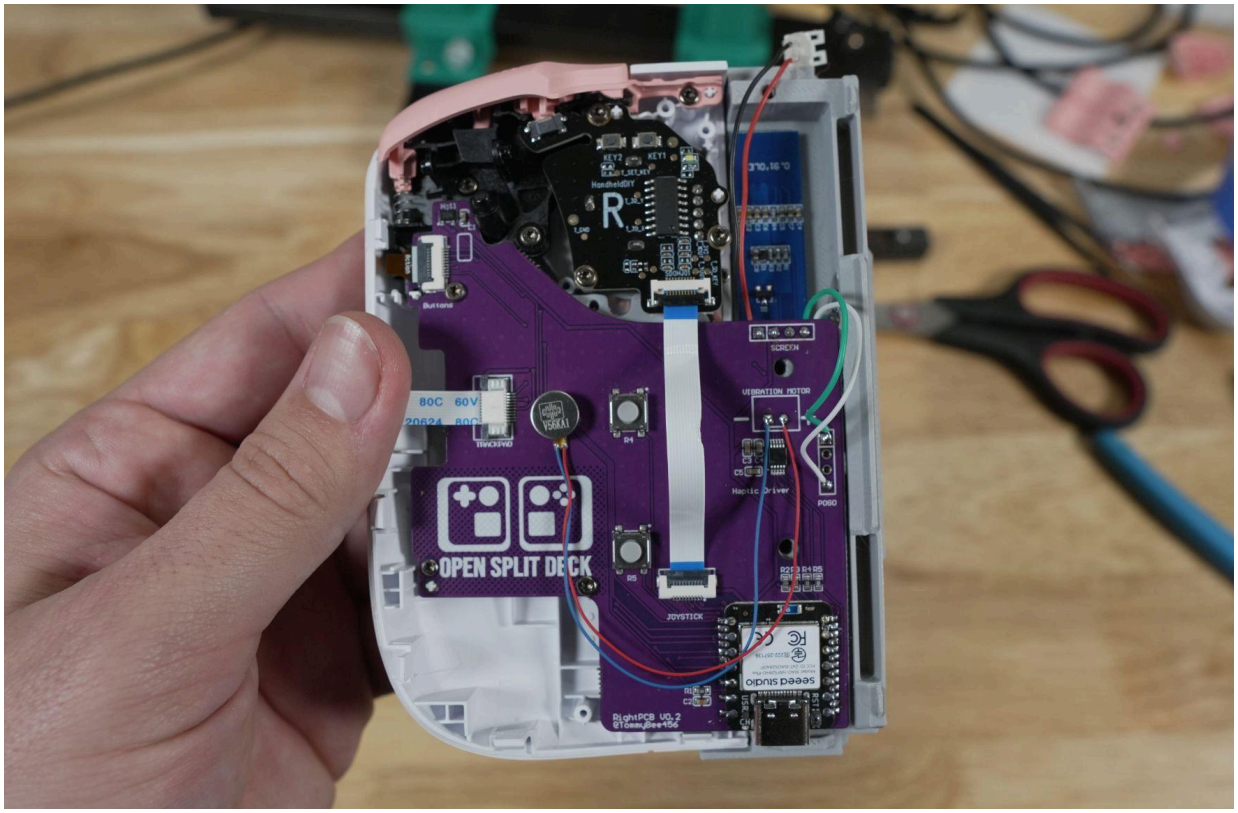
We can fit it in place by first tilting the side with the pins in and lining it up with the through holes and then laying flat.



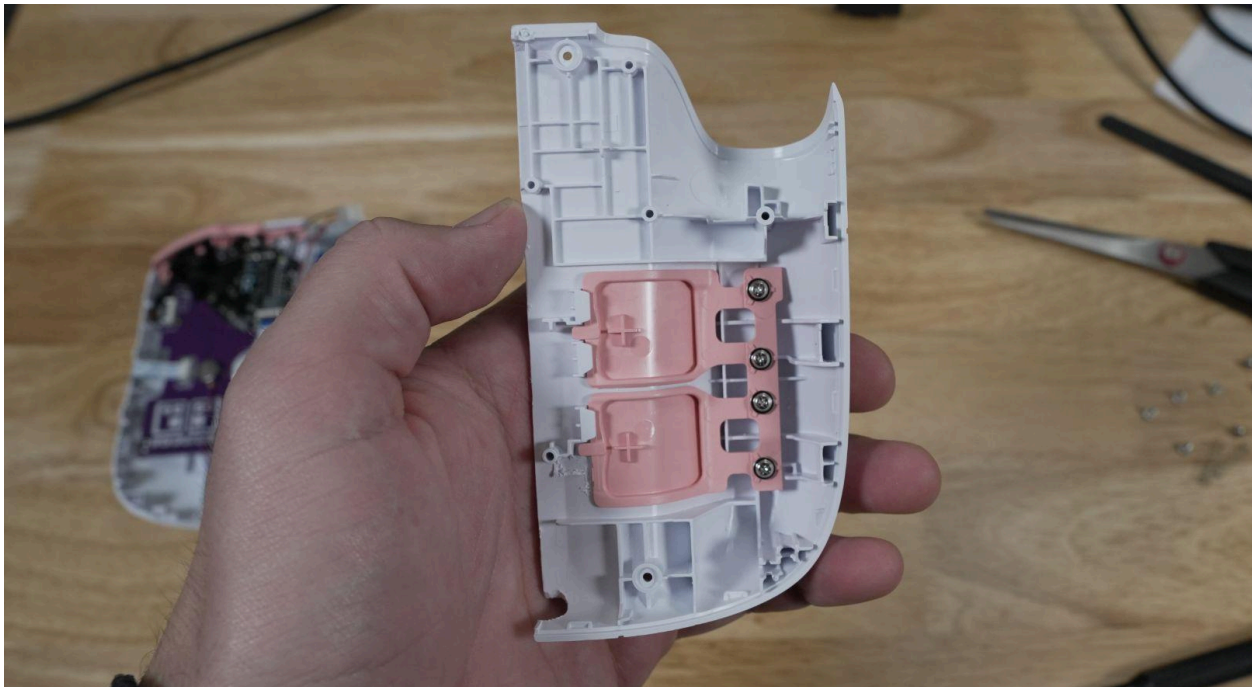
By soldering in just 1 pin we can heat up just this pin and line up the screen straight with the case.



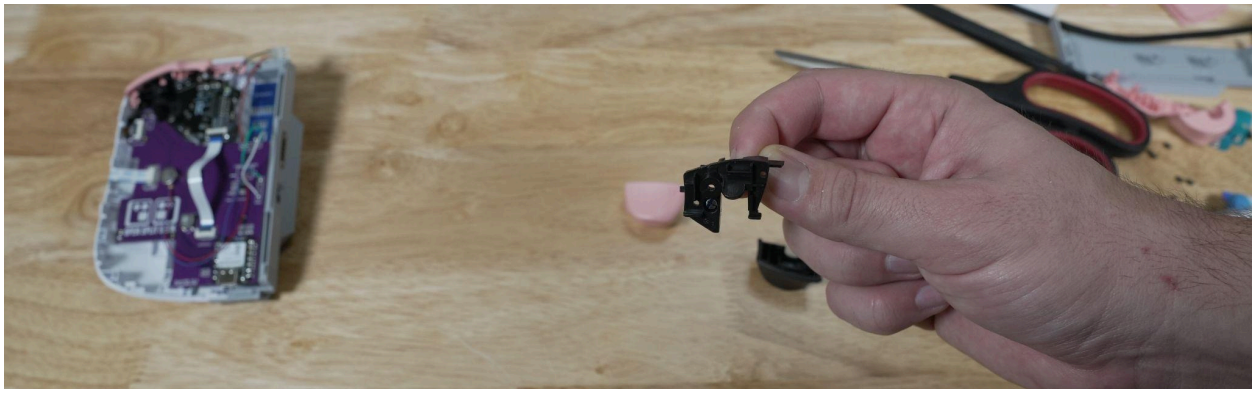
Once lined up, solder in all 4 pins.

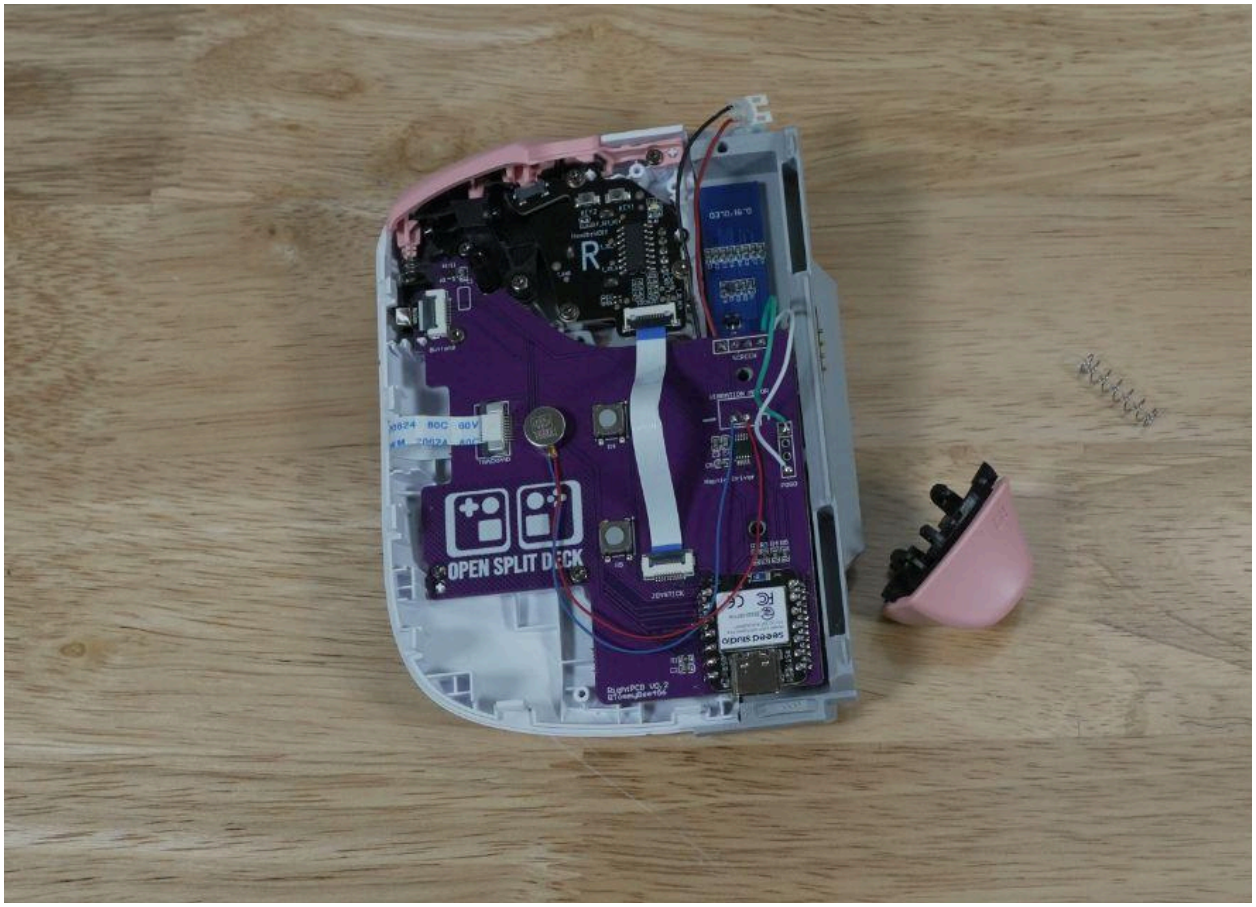


We are almost done! Got a few last steps. We need to screw in the back paddle buttons using the philips screws that are in the bag with the springs. Keep a spring handy.

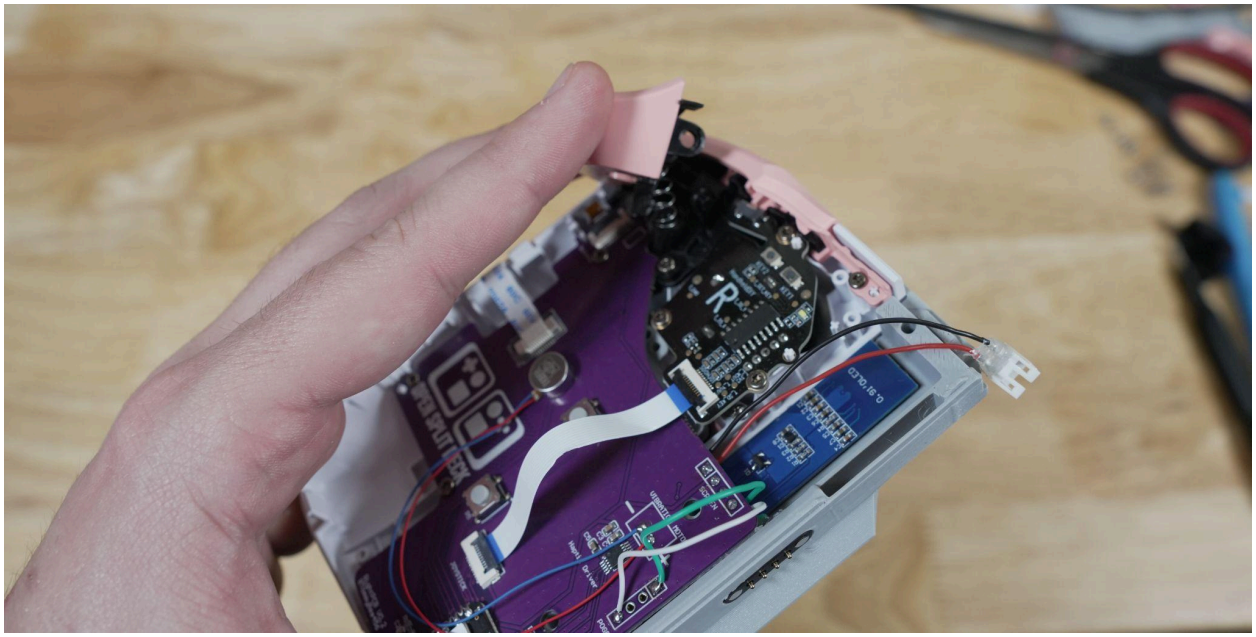


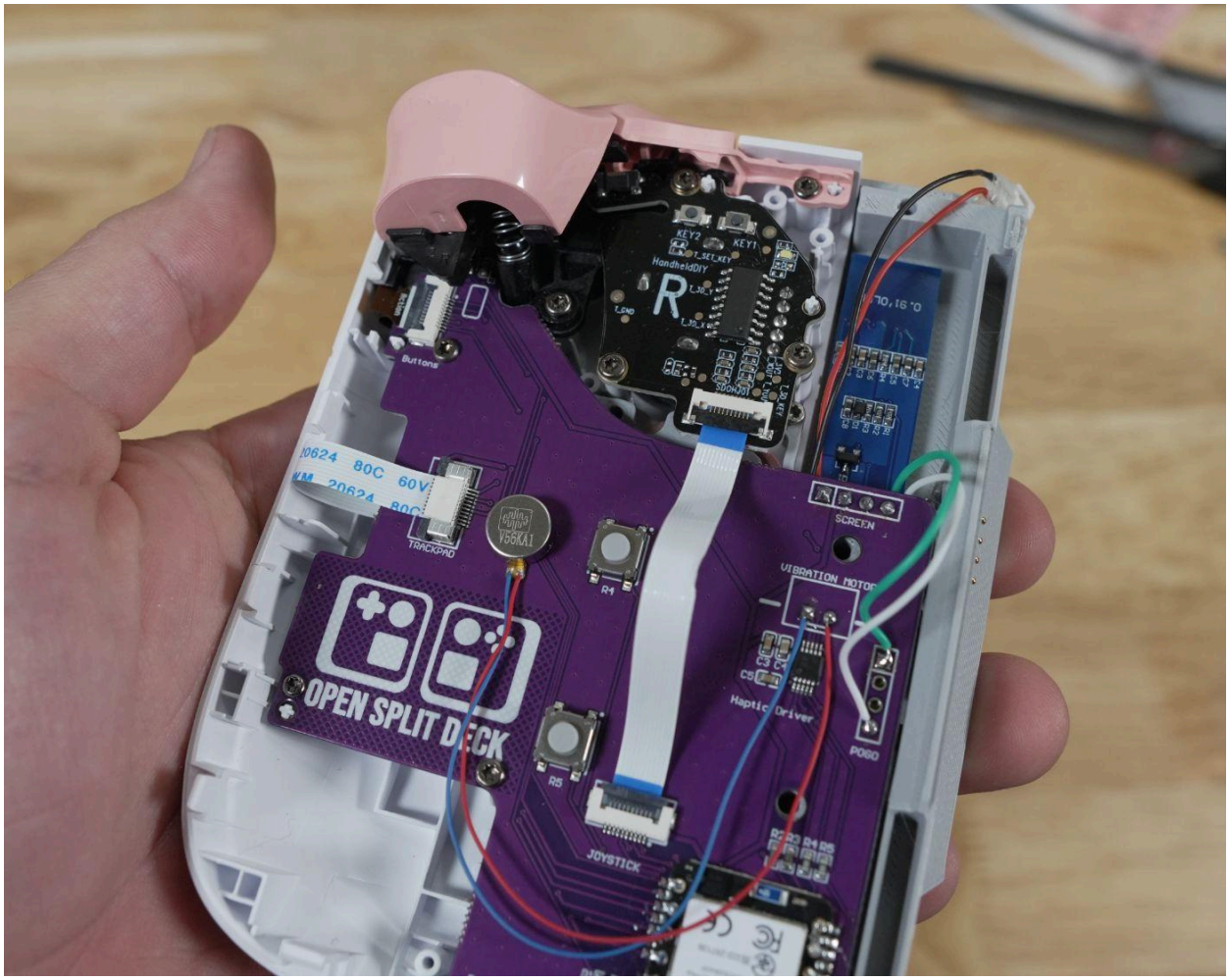
This step is optional but here I am going to pull the inner structure that houses the magnet from the trigger ifixit trigger and put it into my replacement trigger





Next we are going to use a spring and install the trigger. This can be a little tricky. I find lining up the outer side first and then flexing the other pin on.





This is a good time to plug in the battery and test it out. Note: sometimes when the battery is very low, the controller, and especially trackpad can misbehave. So maybe try charging if you are having significant problems.

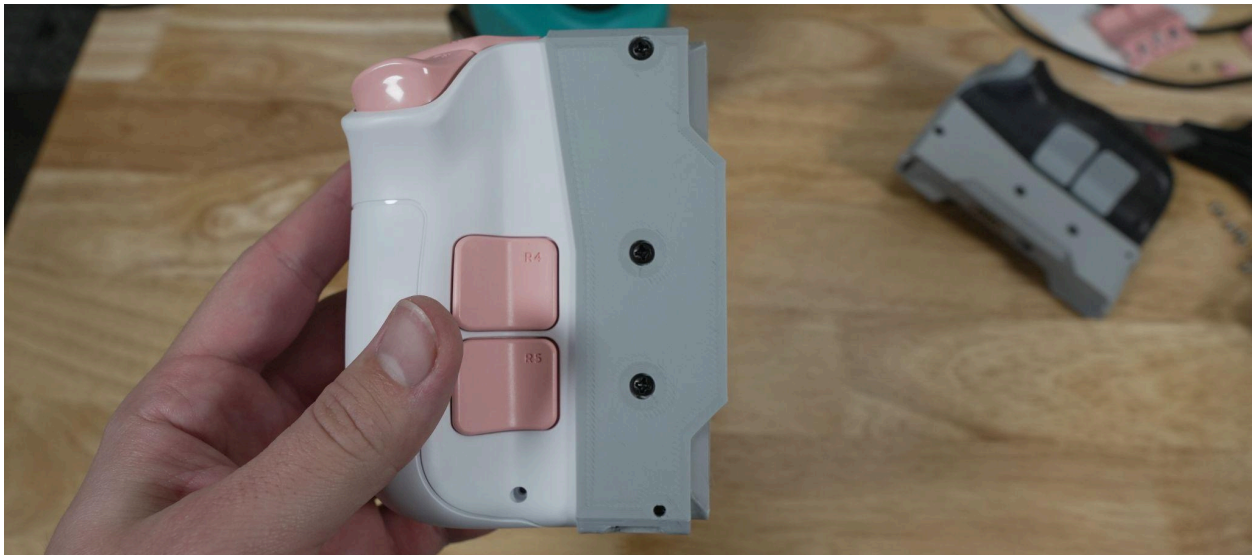
Once we have confirmed everything this is how the battery fits. Put the connector next to the joystick and have the battery go in with wires coming from the bottom.

Next we can put the back of the controller on starting with the extremerate case

We can now add in 4 of the bar magnets. The important part here is to make sure when you assemble the other half that you orient the magnets correctly.

Make sure there are no wires in the way of the case closing or the screw posts

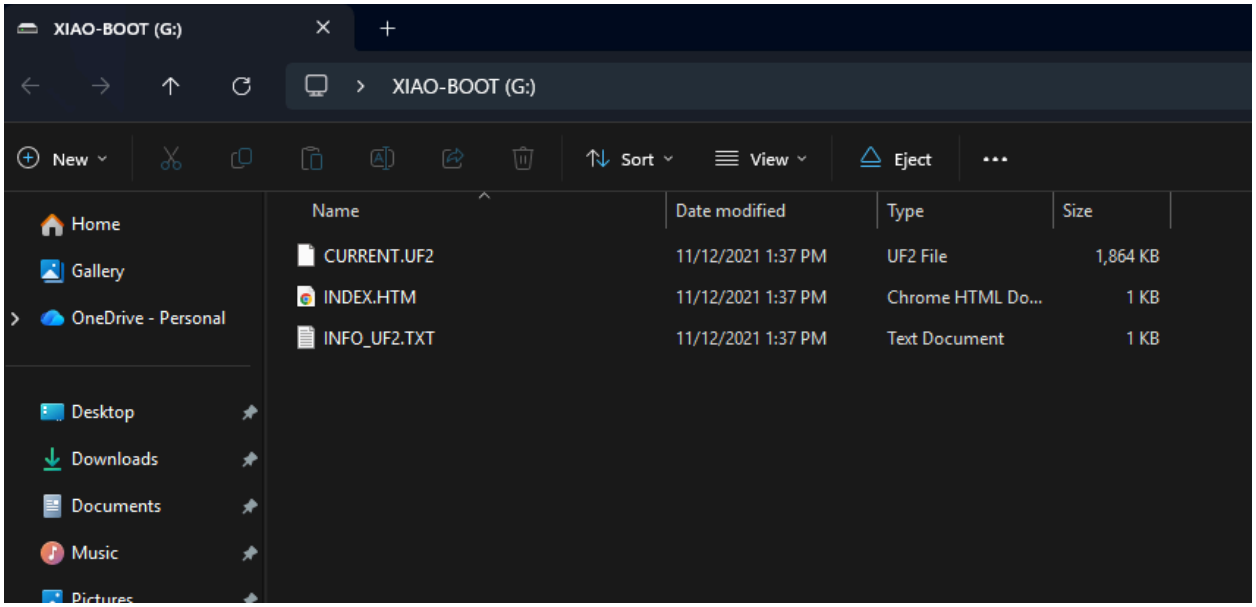
Now we can push the back of the case on. It will mostly lock into place and then can we screwed into place with the 3 self-tapping M3 by 12mm



Now just repeat all the steps again for the other side.

Firmware Flashing Instructions

Firmware is easy to flash. Plug the dongle or controller half and double click the reset button. The small button next to the USB port. You should see it pop up as a flash drive.



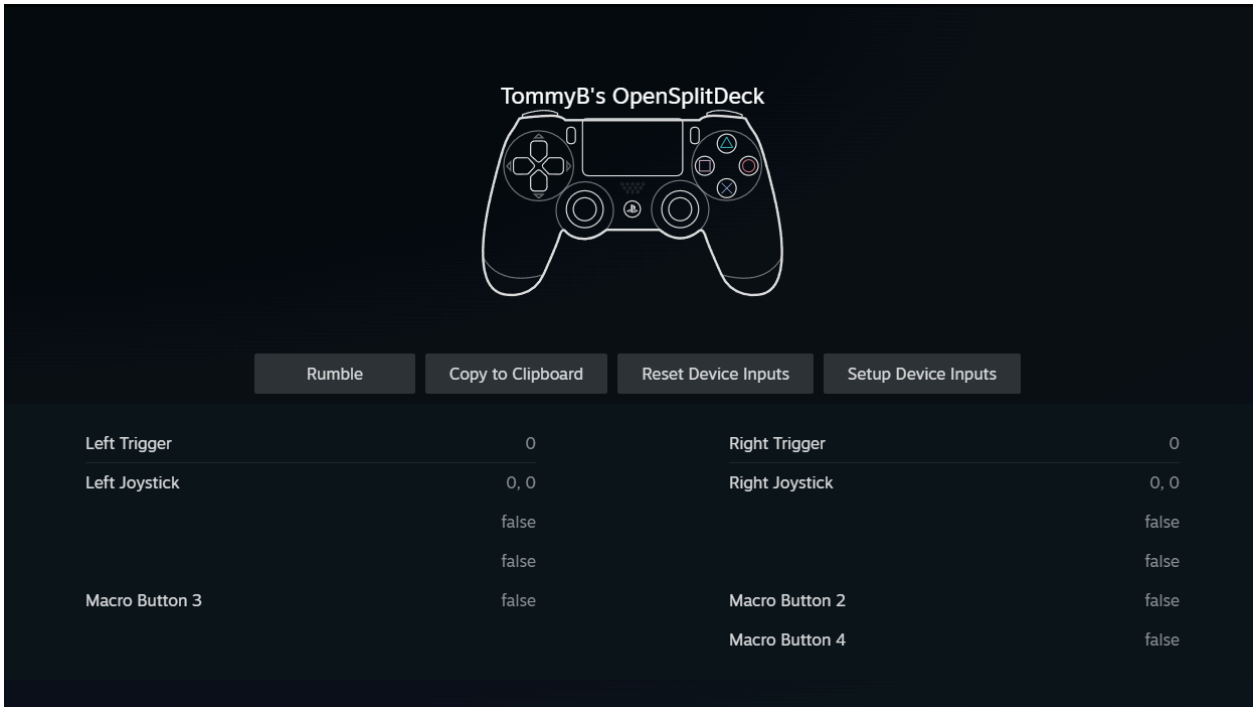
You can then just copy and paste or drag and drop in the appropriate firmware.

Controller Usage and Features

To charge the controller: Make sure the power switch is on and plug in the controller. The controller will be on during charging so we can put the controller into sleep mode by pressing Start + L1 or Select + R1 for 5 seconds to put the controller into sleep. You will get feedback from the vibration motors confirming it enters sleep mode. To wake just press the steam or quick settings button.

To calibrate the sticks: Press and hold the trackpad button and the joystick click for 5 seconds. You will see the screen change. Don't touch the controller for the first 3 seconds then spring the joystick in circles and press and depress the triggers. The controller will save this calibration to flash but you can always run calibration again if you have any issues.

Steam Input: This controller is fully compatible with steam input. It will show as a ps4 controller but with extra back paddle buttons. This behavior is a bit odd because a PS4 controller does not have extra back buttons so these buttons will show without glyphs:



You can see the 2 “false” above the macro buttons. These are the back buttons. You can rebind them in steam input but you may need to guess which button is which with trial and error because of the missing button glyphs.

Note: If the controller shows in Steam and wants you to set the bindings, replug the device. It should show like this with a “Begin Test” button. This is a bug I am working to resolve and happens rarely.