

The Ruinovo DNA30 – “How-To” Guide



Special Thanks to all the Modders out there! It is only through you all sharing your ideas and experience that this was possible.

Extra Special Thanks to mamu on ECF. Most of the parts and techniques used were based on her Arlo build which can be found here.....

<http://www.e-cigarette-forum.com/forum/battery-mods/538730-arlo-dual-18650-dna20-30-step-step-how.html>

Thanks also to bapgood on ECF whose tutorials were an invaluable part of this build.

Parts List

NB. All prices were correct at the time of writing. Prices do not include any shipping costs involved. I have also not included the cost of items that I already had so the Total Cost does not truly reflect the cost of building this Mod.

1. 1 x Ruinovo Battery Pack - \$12.99



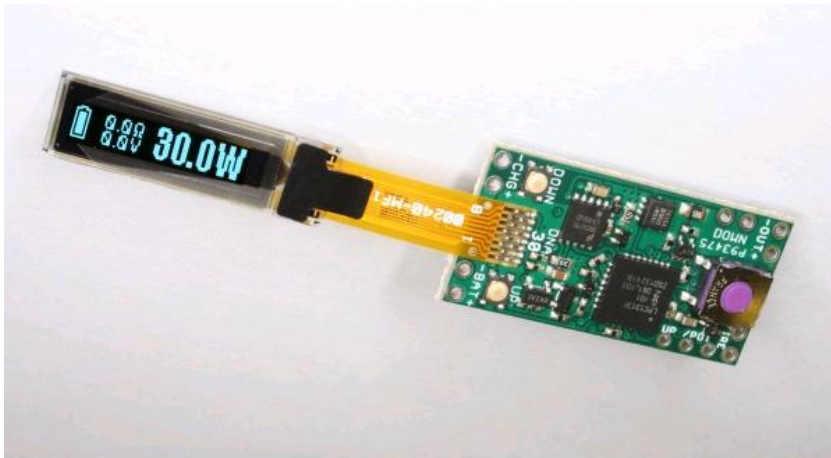
<https://www.fasttech.com/products/1340502>

2. 1 x Stainless Steel Flat Top Cap for Chi You - \$4.35



<https://www.fasttech.com/products/0/10005381/1589801-stainless-steel-flat-top-cap-for-chi-you-king-mod>

3. Evolv DNA30D - \$49.99



http://www.thehouseofvapor.com/product_p/1384.htm

4. 3 x Tactile Switches - \$1.63 = \$4.89



<http://au.mouser.com/Search/ProductDetail.aspx?R=KSJ0M43180SHLFTvirtualkey61170000virtualkey611-KSJ0M431LFT>

5. 1 x Keystone 18650 Battery Holder - \$3.27



<http://au.mouser.com/Search/ProductDetail.aspx?qs=%2f7TOpeL5Mz6j%2fnxeOA1rsg%3d%3d>

6. 2 x Keystone Positive Battery Contacts - \$0.37 = \$0.74



<http://au.mouser.com/Search/ProductDetail.aspx?R=5240virtualkey53400000virtualkey534-5240>

7. Contact Probe - \$3.23



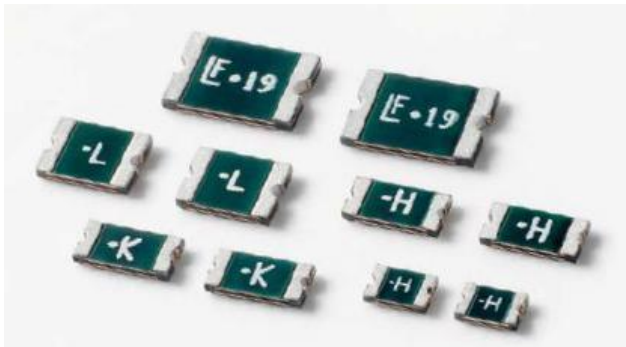
<http://au.mouser.com/Search/ProductDetail.aspx?R=101402-000virtualkey53060000virtualkey818-101402-000>

8. 1.5mm W-Stop DNA Screen Housing by bapgood - \$3.30



<http://www.shapeways.com/model/1620023/1-5mm-w-stop-dna-screen-housing.html?li=shop-results&materialId=6>

9. 4 x Resettable Fuses - \$2.90 = \$11.60



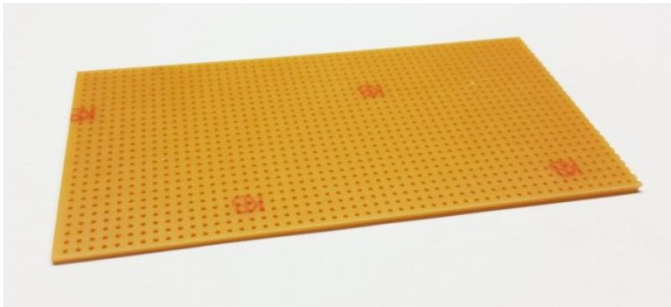
<http://au.mouser.com/Search/ProductDetail.aspx?R=1206L300SLWRvirtualkey57610000virtualkey576-1206L300SLWR>

Total Cost = \$94.36

Free Stuff (that I already had lying around!)

1. Unclad Punched Laminate

<http://www.jaycar.com.au/productView.asp?ID=HP9562&CATID=75&form=CAT2&SUBCATID=959#1>



2. Omron E32-TC200 – Fibre Optic cable

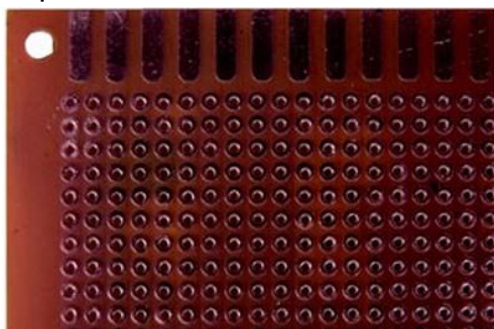


3. Stay-Brite Silver Solder Kit



<http://www.jaycar.com.au/productView.asp?ID=NS3045&CATID=74&form=CAT2&SUBCATID=953#1>

4. Experimenters Board



<http://www.jaycar.com.au/productView.asp?ID=HP9552&CATID=75&form=CAT2&SUBCATID=959#1>

5. Wire 0.75mm² V90HT in various colours & 0.2mm² in various colours



6. JB Weld Steel Epoxy



<http://www.jaycar.com.au/productView.asp?ID=NA1518>

7. Selleys Araldite Ultra Clear

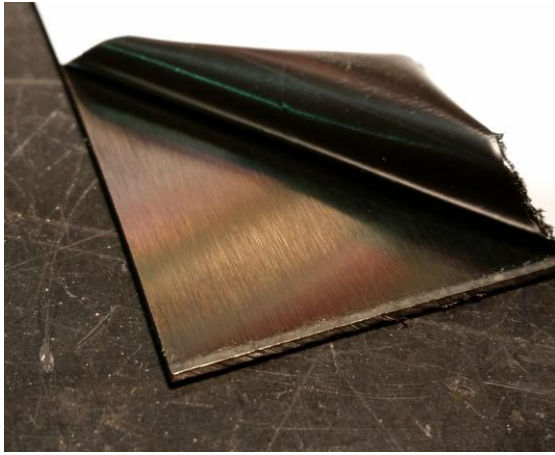


http://www.bunnings.com.au/adhesive-araldite-selleys-24ml-ultra-clear_p1231026

8. 2mm Clear Perspex



9. 1.5mm Brushed Stainless Steel Sheet



10. Liquid Electrical Tape



<http://www.jaycar.com.au/productView.asp?ID=NM2836>

11. 0.75mm Rubber Sheet



12. Heat Shrink Tube



13. M2x12mm Stainless Steel Countersunk Screws x 4

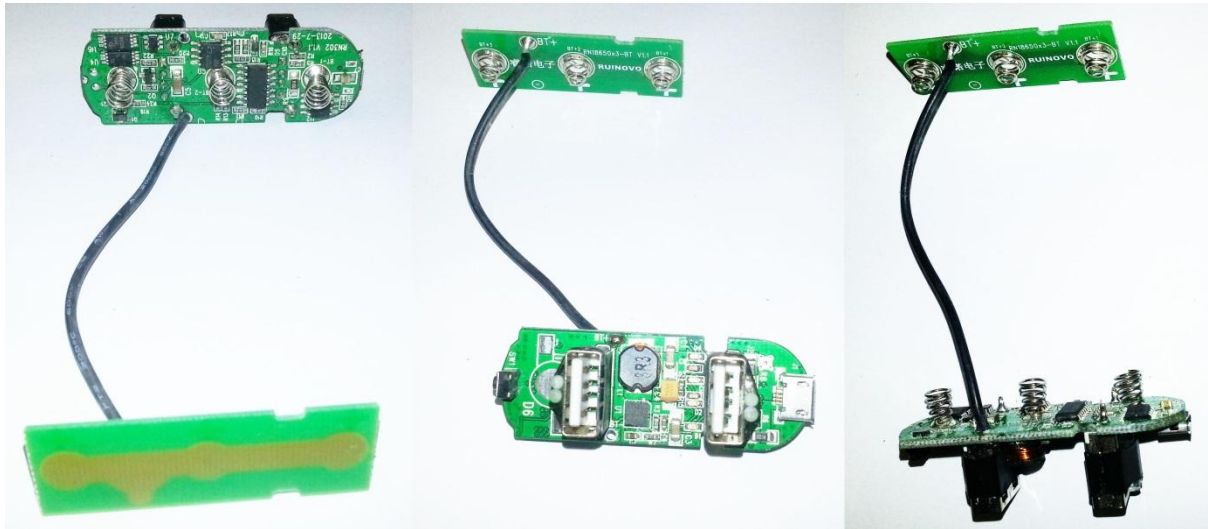


14. Sony VTC5 18650 Batteries x 2



Internals

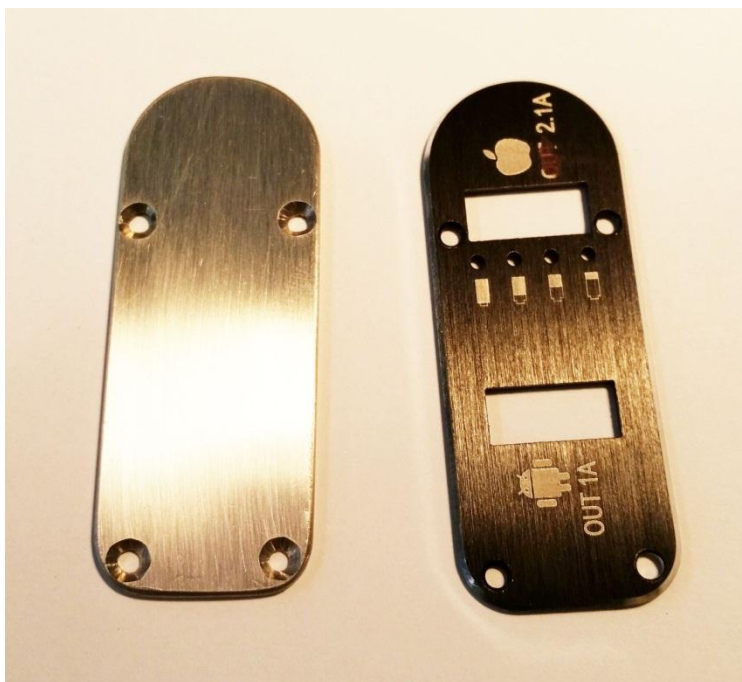
The first step is disassembly. Here are three views of the internal boards. Nothing was fixed inside, the whole assembly relies in the battery springs to hold everything in place inside the enclosure.....



I proceeded to unsolder the positive battery connection from the charge board and remove the flimsy battery springs.

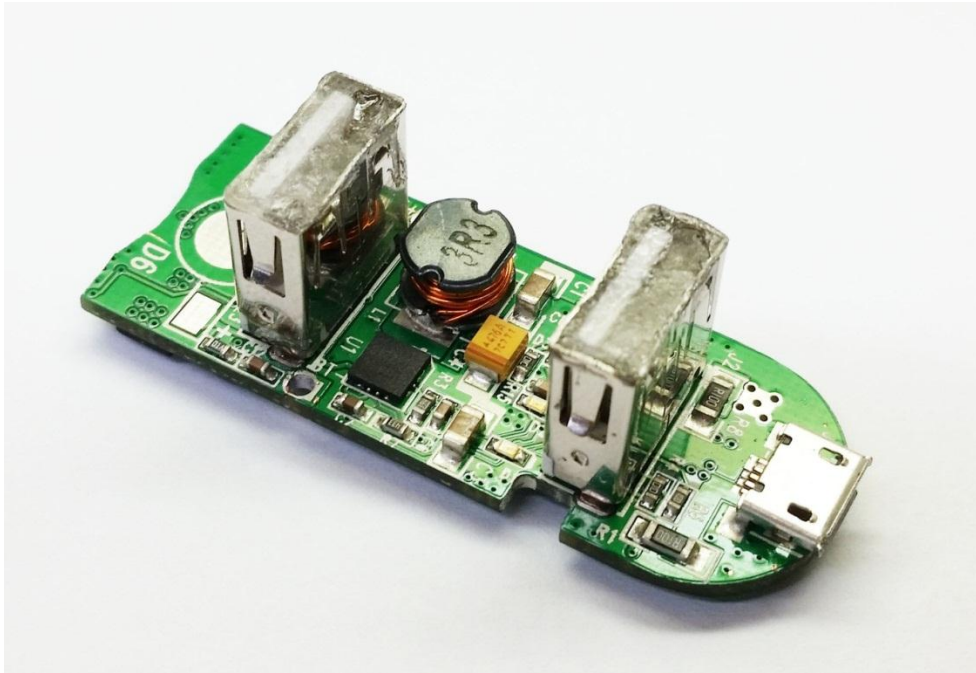
Bottom Plate

The first decision I made was to not use the USB charging outlets from the device so I knew I was going to make new top & bottom plates. I used the original plate to cut a replacement out of 1.5mm Stainless.

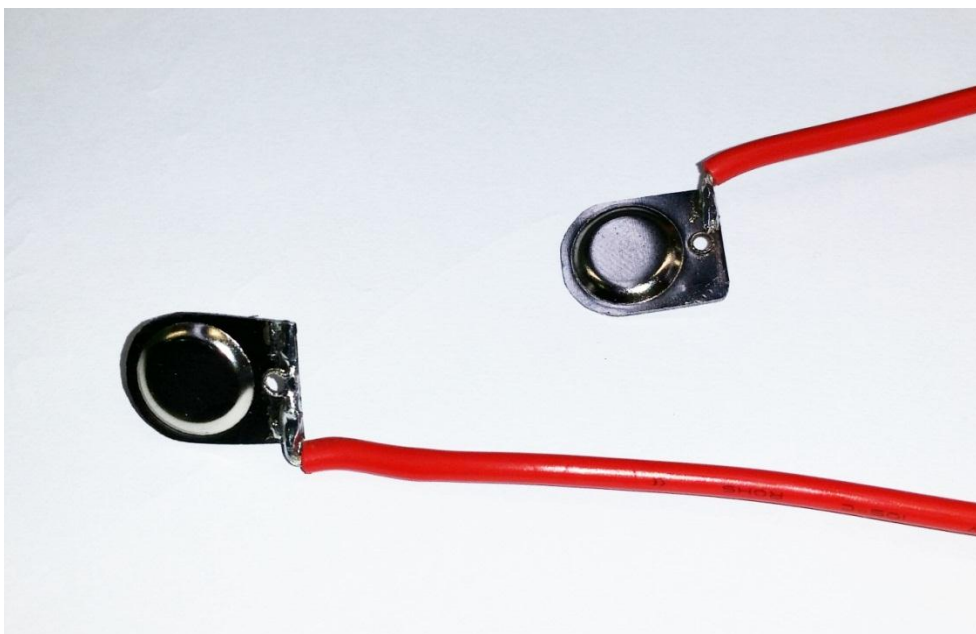


Charge Board

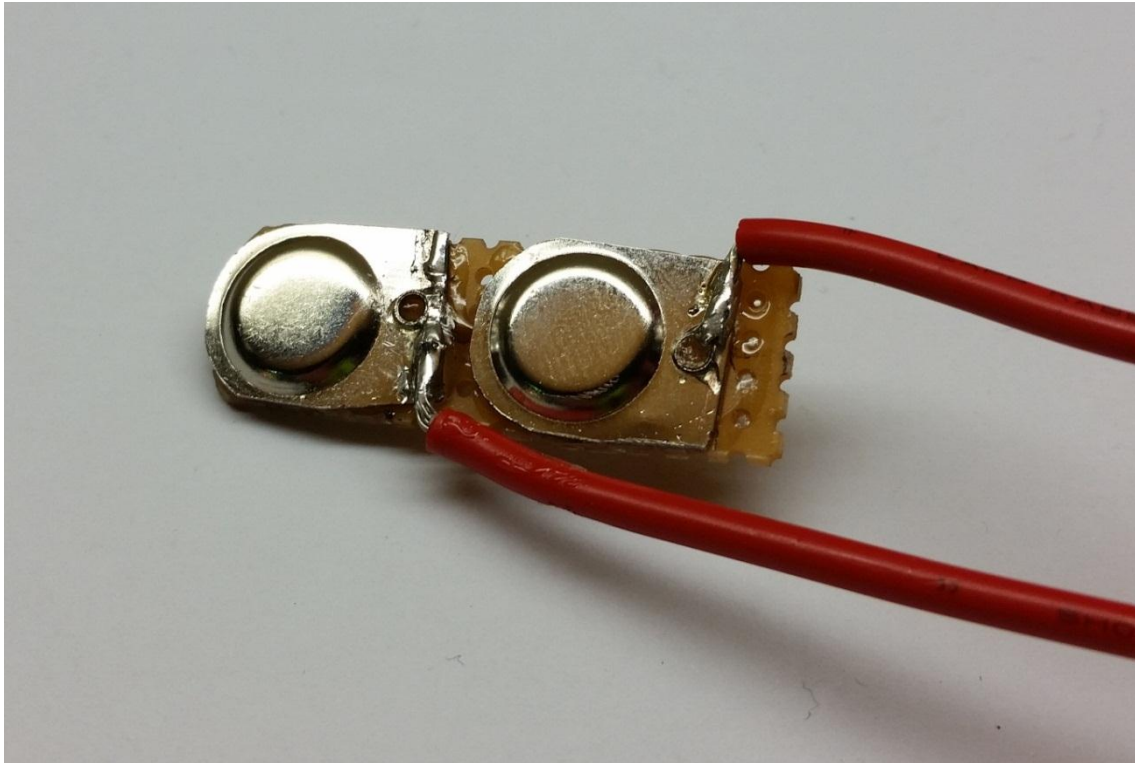
Next I had to sort out what to do with the Charge Board. As the USB ports protruded through the original Bottom Plate I had to grind them down so they fit inside the new Bottom Plate. I left the USBs in place to add support to the board once fitted. I filled them with epoxy to ensure there was no electrical contact with the Bottom Plate. I then removed the original Charge Button Tactile Switch and ground away part of the board to allow access for the Charging Wires to pass from the top of the board down to the DNA30 board.



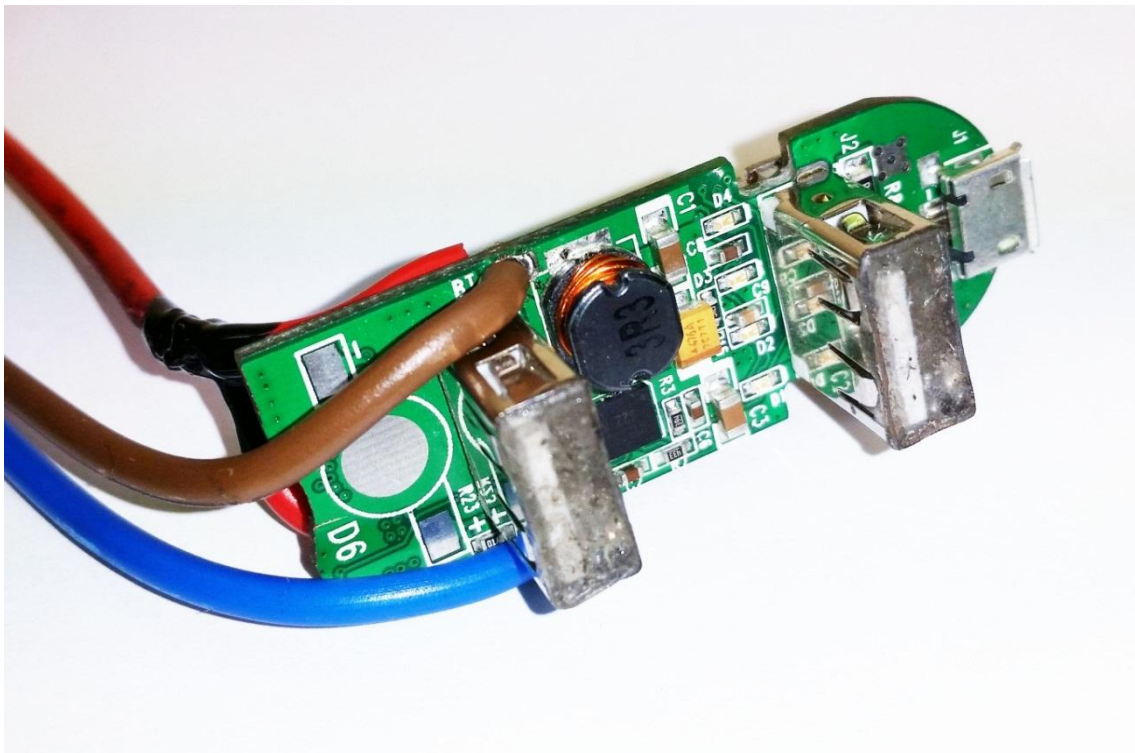
I next had to create some positive battery connections that were isolated from the Charge Board. I used two Keystone Positive Battery Contacts and ground them to the required size and shape, then soldered on some 0.75mm² V90HT wire (RED).

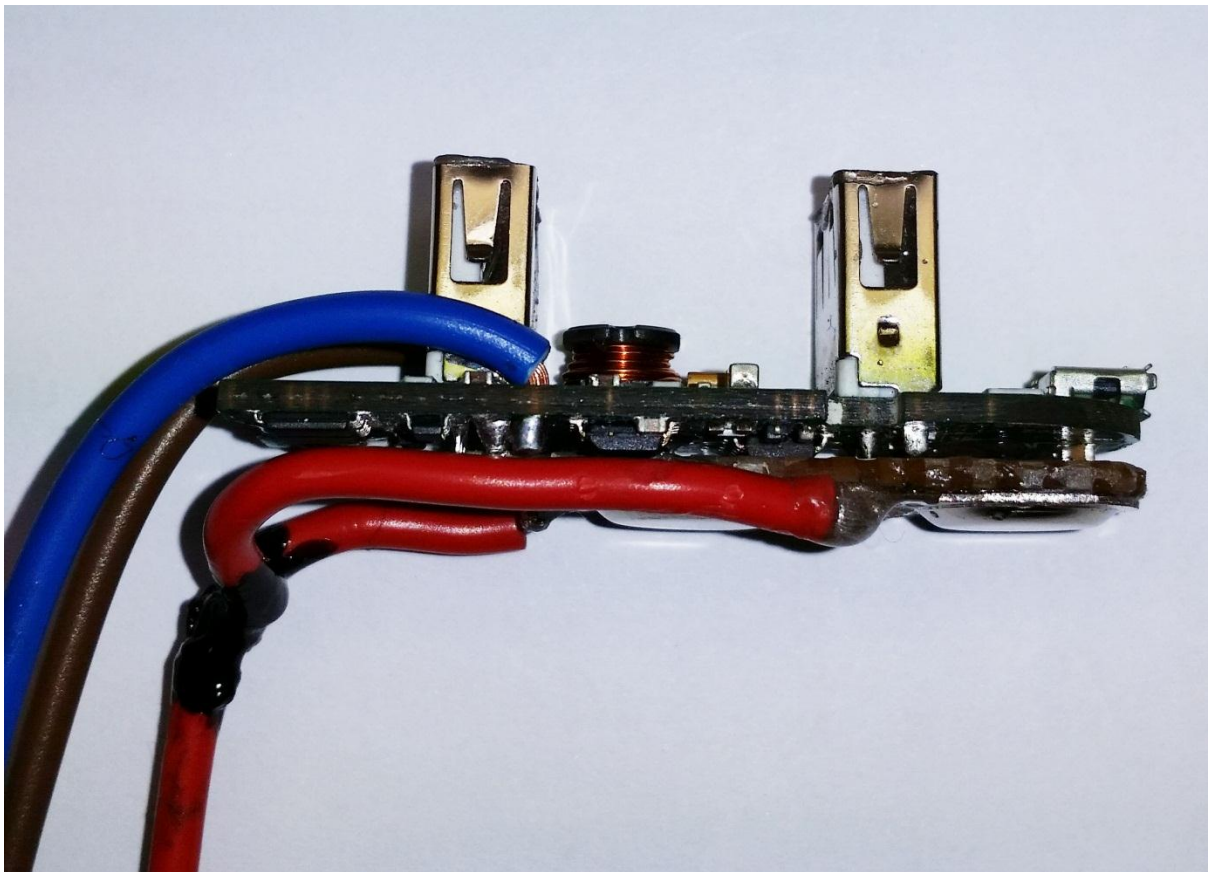
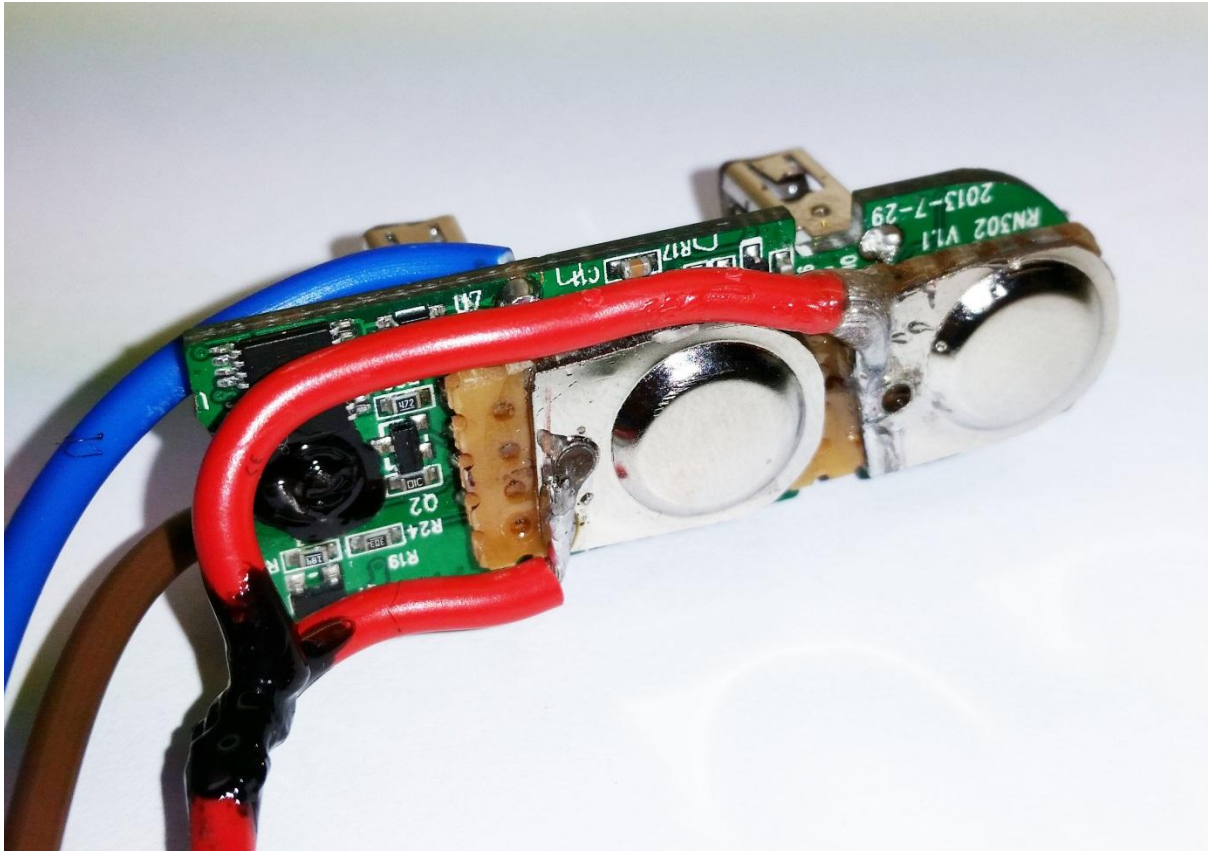


I then cut some of the Unclad Punched Laminate to the right size and shape, and attached the contacts with epoxy. I now have a Battery Positive Contact Board!

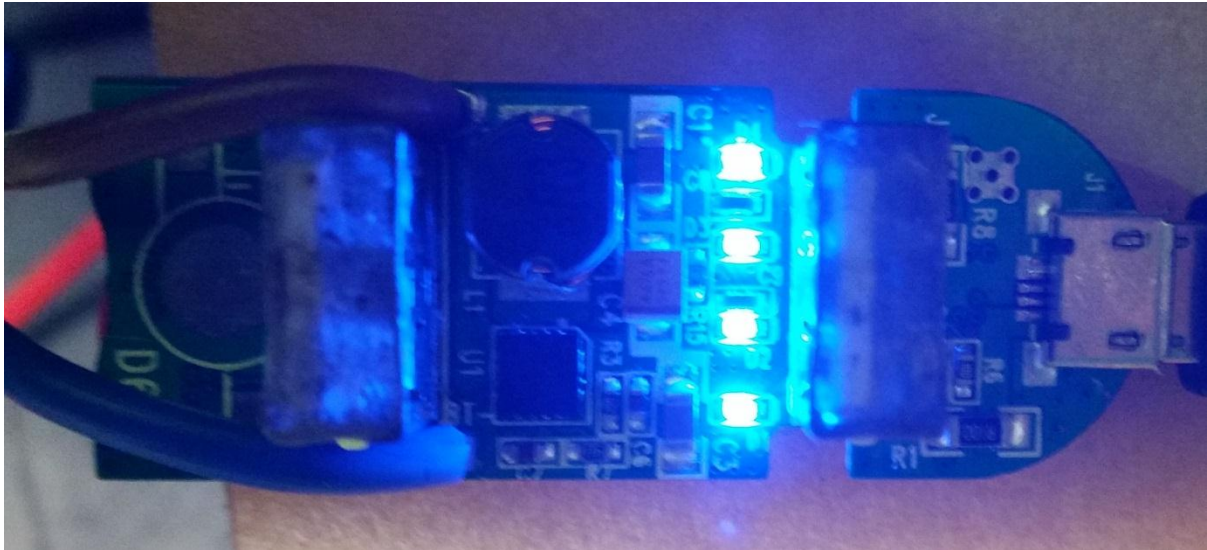


Next I soldered on the Charge Board wires (BROWN & BLUE), attached the Battery Positive Contact Board to the Charge Board, and connected the two positive battery contact wires together. I used some Liquid Electrical Tape to insulate the connection.

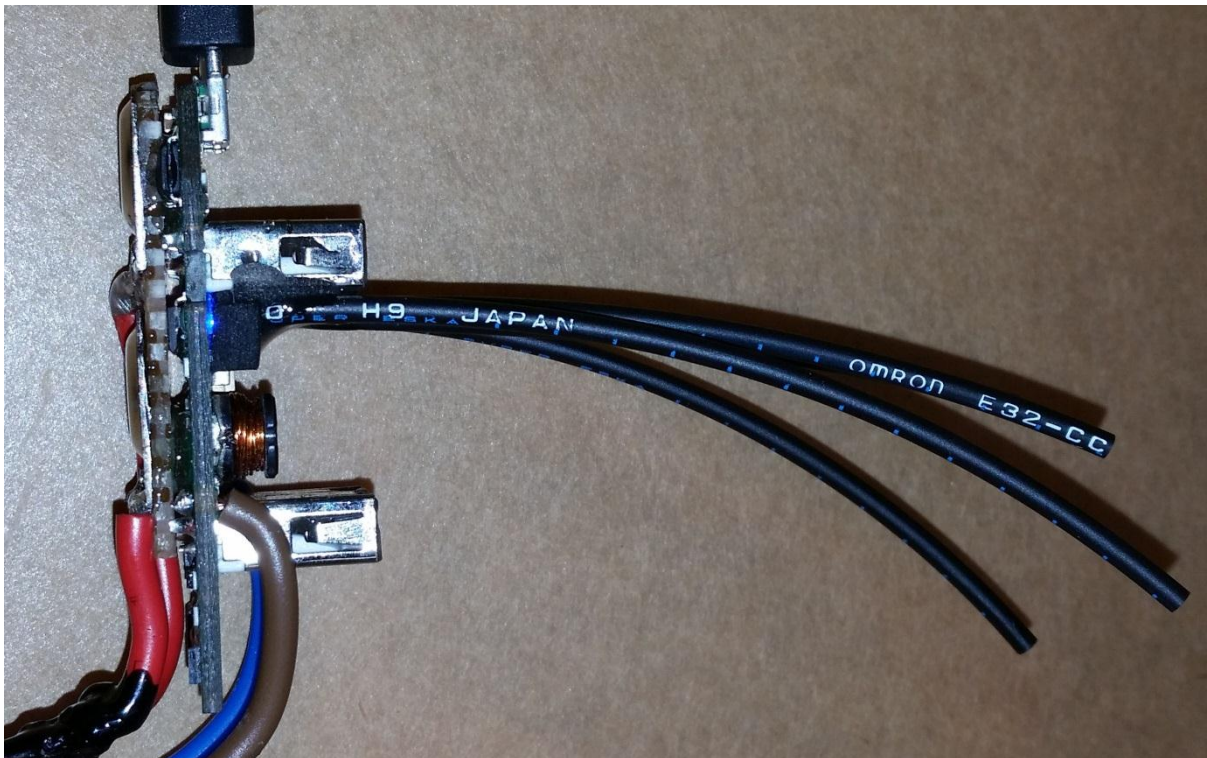




Now I wanted the charge light working but originally the light pipes went straight out the bottom.



I had to turn the light 90° in a very small space. Luckily I had just the thing! Fibre optic cable I use on light sensors. I cut four short pieces, used the original piece of sticky foam and epoxied them all in place.





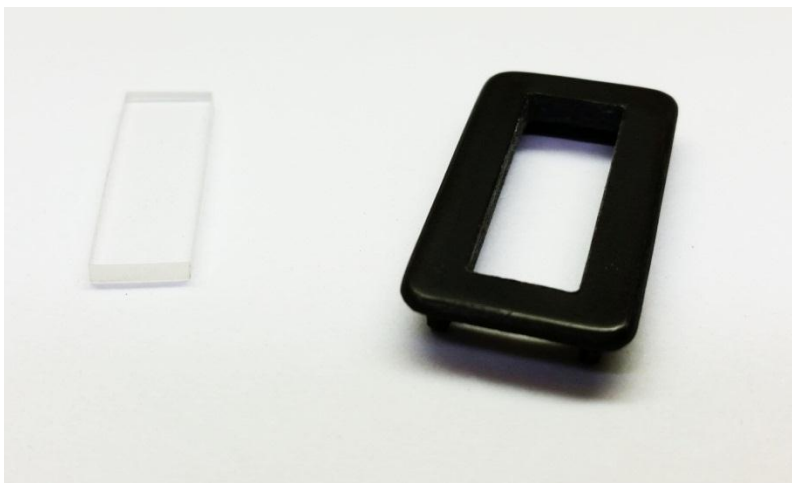
The Charge Board Assembly is now complete!

Screen Cradle

I bought the screen cradle in “Detail Plastic” and instead of painting it I decided to try and polish it. I sanded it, first with 400 then 800 then 1200 grit paper, then I gently introduced it to the buffing wheel, turned out great!

Now, the 2mm polycarbonate for the window. This was, by far, the most frustrating part of the whole build. Just cut a piece to fit the opening in the screen cradle and epoxy it in. I do not have the right equipment for plastic so I cut some pieces (a bit too large) on the band saw and filed/sanded them to press fit in the cradle. File a bit too much or not square, bin it and start again. Get one perfect but get a big gluey fingerprint on it, bin it and start again. I must have made about eight before I got something acceptable, but still not perfect.

Another good hint is to use a black permanent marker around the edges of the Perspex, this stops the crystallly look you can get after you glue the window in.



Body

After a lot of measuring, re-measuring, test fitting etc. this is how I ended up cutting and drilling the enclosure.



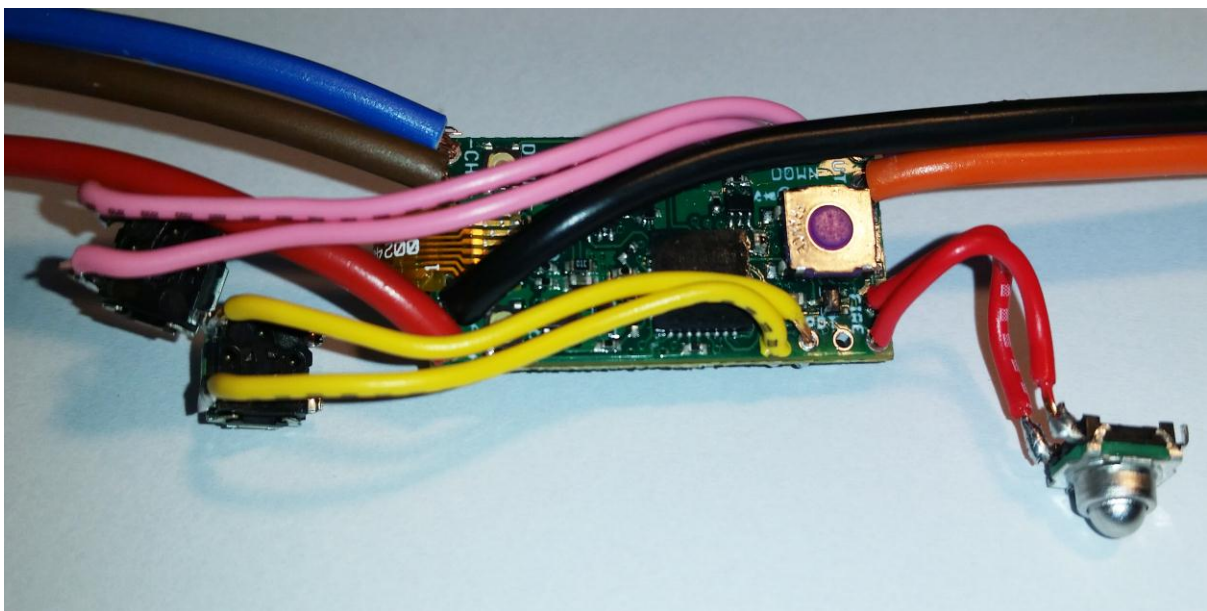
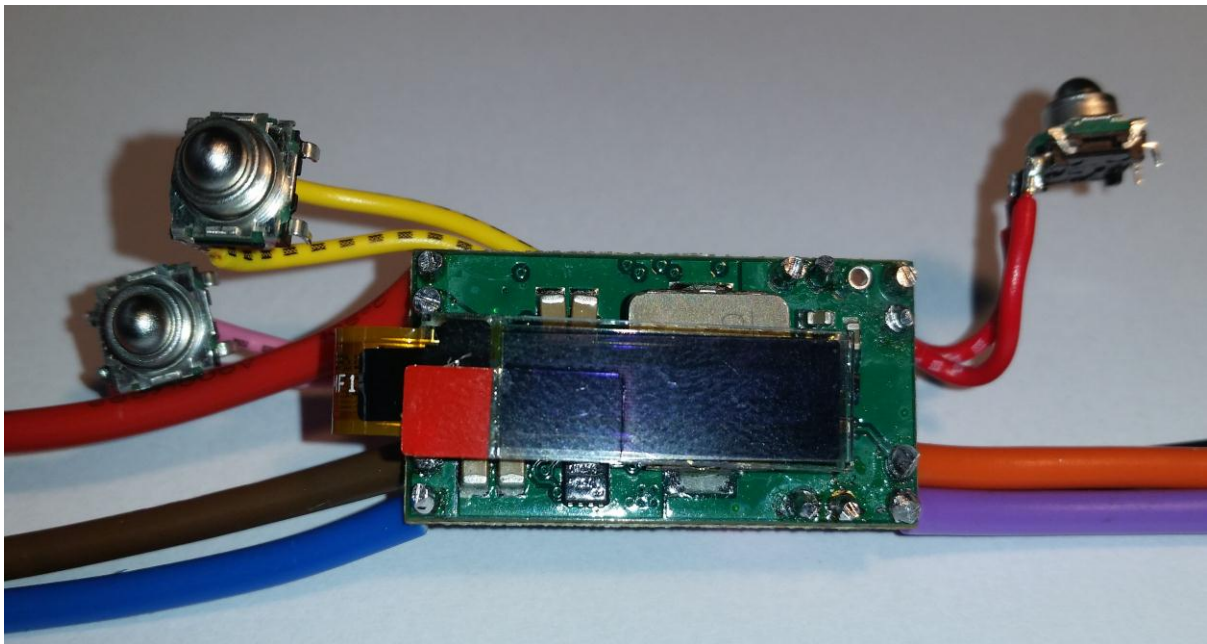
I also tapped the ends to m2x0.5 so I could replace the screws with some stainless ones.

DNA30

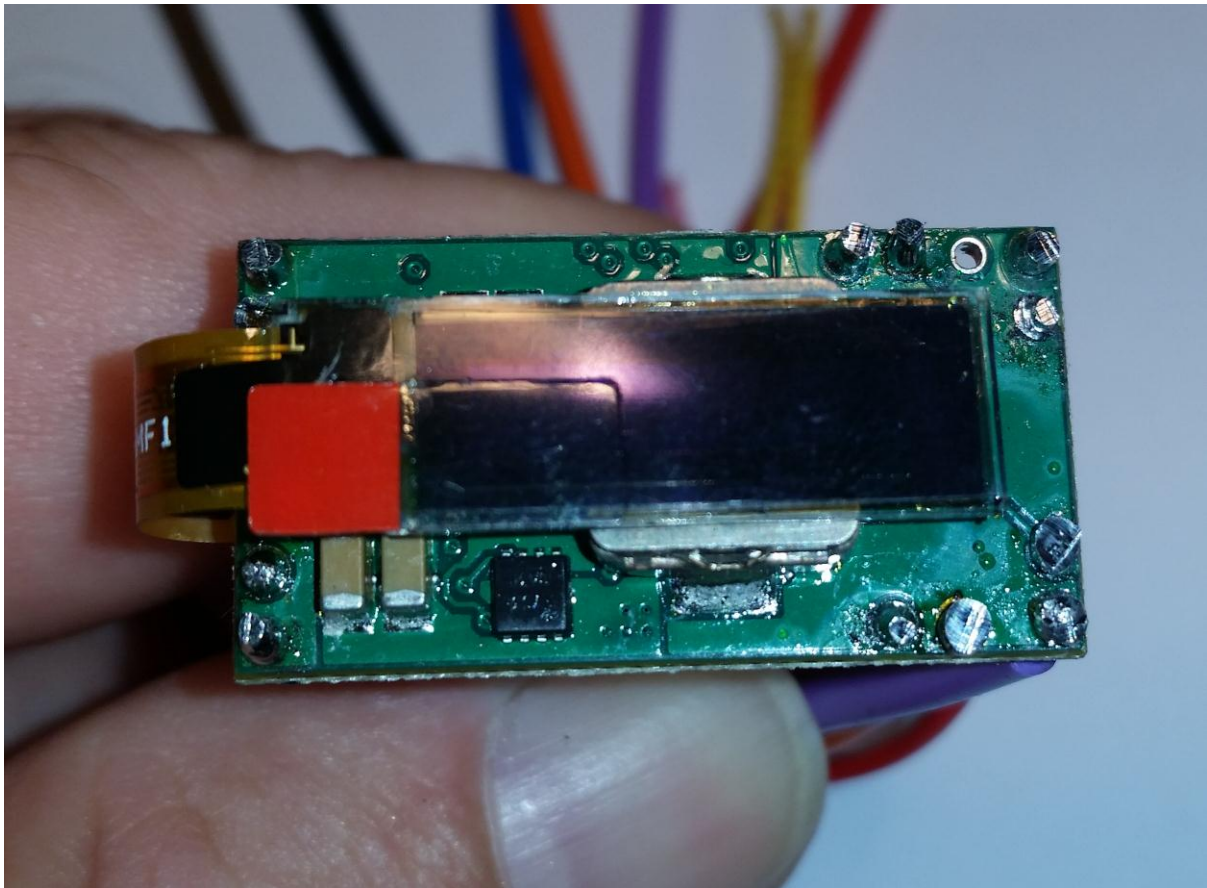
The first step with a DNA board is to ALWAYS apply a drop of SuperGlue in between the board and the ribbon cable. DNA boards are notorious for having the screen detach from the board. Then I temporarily attached the screen to the board with some double-sided tape, keeping it out of the way during the soldering process.

I have used 0.75mm² wire because I have a lot of it here and it's free, however it is too large to fit through the solder points on the board, so I had to strip some strands of wire before I could solder them on. This size wire is also quite large when trying to fit everything in a tight enclosure. Next time I will buy some 0.5mm² or 20 Gauge wire.

Here's the board with the soldering complete.....



After everything is soldered and tested, I epoxied the screen onto the board permanently.

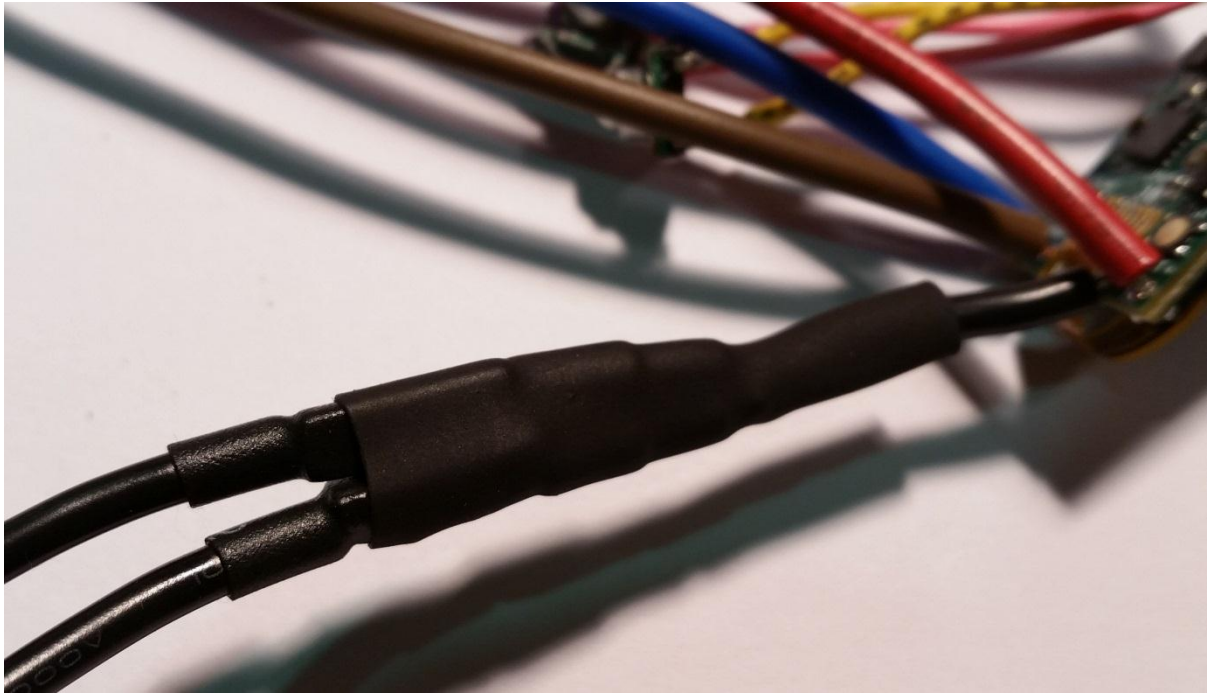


Fuses

First cut two pieces of Experimenters Board, four holes long and one hole wide. Stack two 3A resettable fuses on top of each and solder into place.



Using two 3A fuses in parallel for each battery give you 6A per battery with half the resistance. Two Batteries in parallel gives a total of 12A protection, just right for the board. Now just attach some wires and parallel them up to the board. Cover them up with some heat shrink tube and you end up with a tidy little packet.



510 Connector

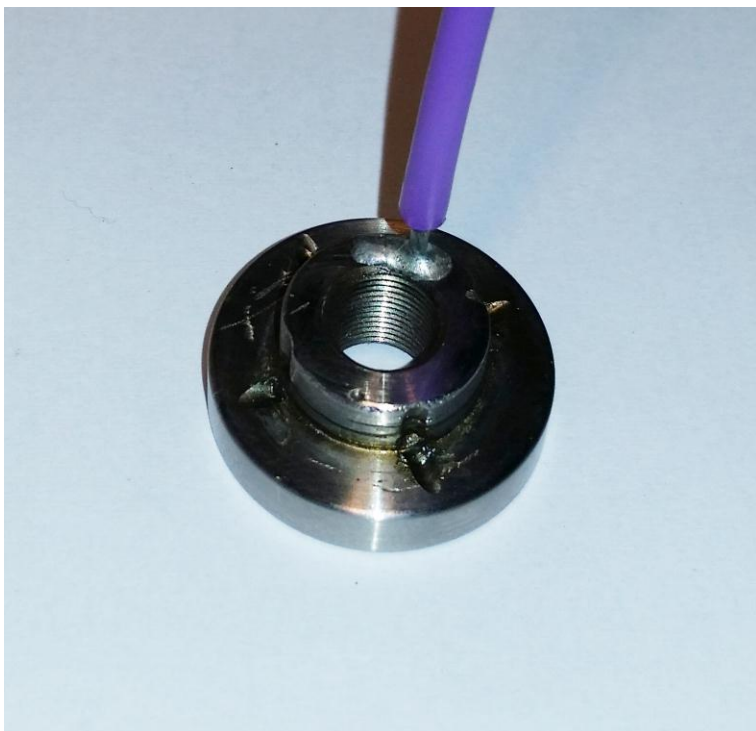
As the Chi You Flat Top Cap is 23mm OD, for the first step I had to call in a favour from the Machine Shop and get it turned down to 22mm. I also got the threads machined off to a diameter of 14mm.



First I brushed the Top Cap using 400 grit paper and Scotch Brite so it will match the Top Plate. I then drilled a 1.5mm hole for the negative connection and cut some deep grooves and scores in the underside to allow the epoxy to “key”.



Using the “Stay-Brite” soldering kit, first I dripped some flux in the hole, and left it for 15 minutes for the acid to work its magic. I cut a small piece of solder and dropped it in the hole. With the Top Cap sitting on half a brick I then used my blow torch (the same one I use for coils) and slowly heated the area around the hole. The second the solder started to flow I jammed in my pre-tinned negative wire and held it in place until the solder solidified. I was happy to see there was next to no discolouration of the Stainless Steel.



I then put the Spring Contact in a Pistol Drill and used a Flat File to take off the flange. Here's a before and after shot.....



Now the adjustable 510 pin has to be drilled out to 3.3mm. After removing the Battery Rattle Adjustment Screw I drilled straight down through the existing thread. I then filed it down until it was flush with the insulator. (I have since discovered that a few of my Atomisers don't sit quite flush, so when I do this again I will be reducing the size of the assembly (including the insulator) by 1mm.

Here's a before and after shot.....



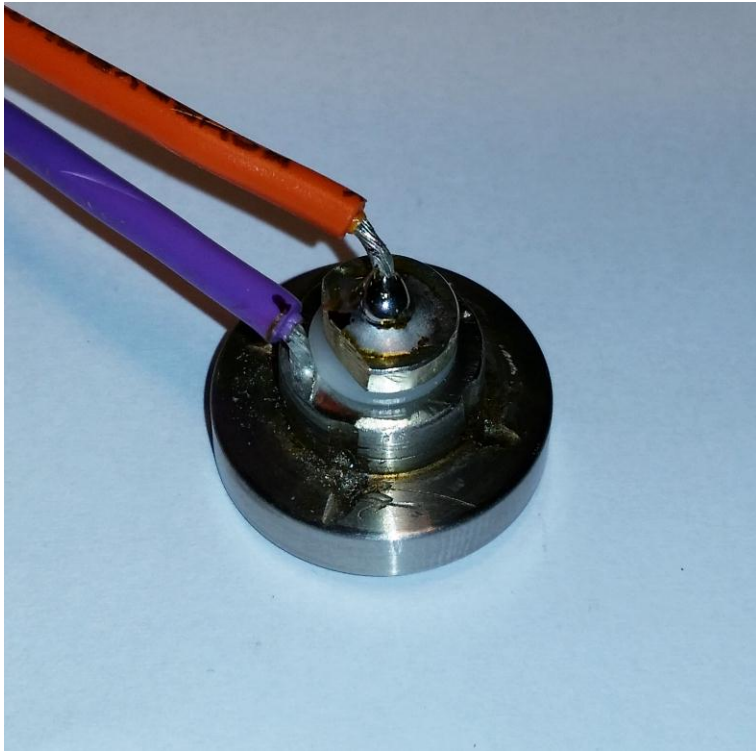
The Spring Contact was now a nice press fit, I had to tap it in lightly with a hammer.



Soldered on the positive wire, I allowed the solder to flow around the joint between the Spring Contact and the Chi You centre pin.



When assembling it I found the negative wire was very close to contacting the Centre Pin so I filed a bit off for clearance.



Then I potted the whole assembly with epoxy to provide insulation and stability.



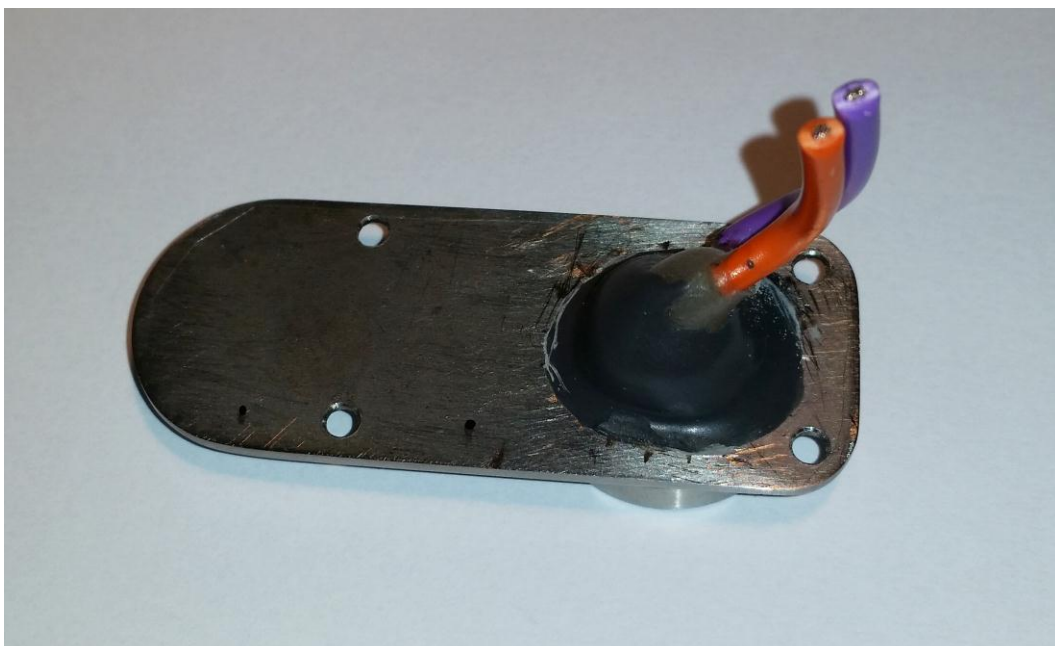
Top Plate

The Top Plate is just a duplicate of the Bottom Plate with the addition of a hole for the 510 Assembly. Originally the hole was perfect but I miscalculated the position by a few mm and had to move the hole, hence the oval shape!



Top Cap Assembly

I scored the Top Plate to promote better adhesion, and used JB WELD epoxy to join the two components together.

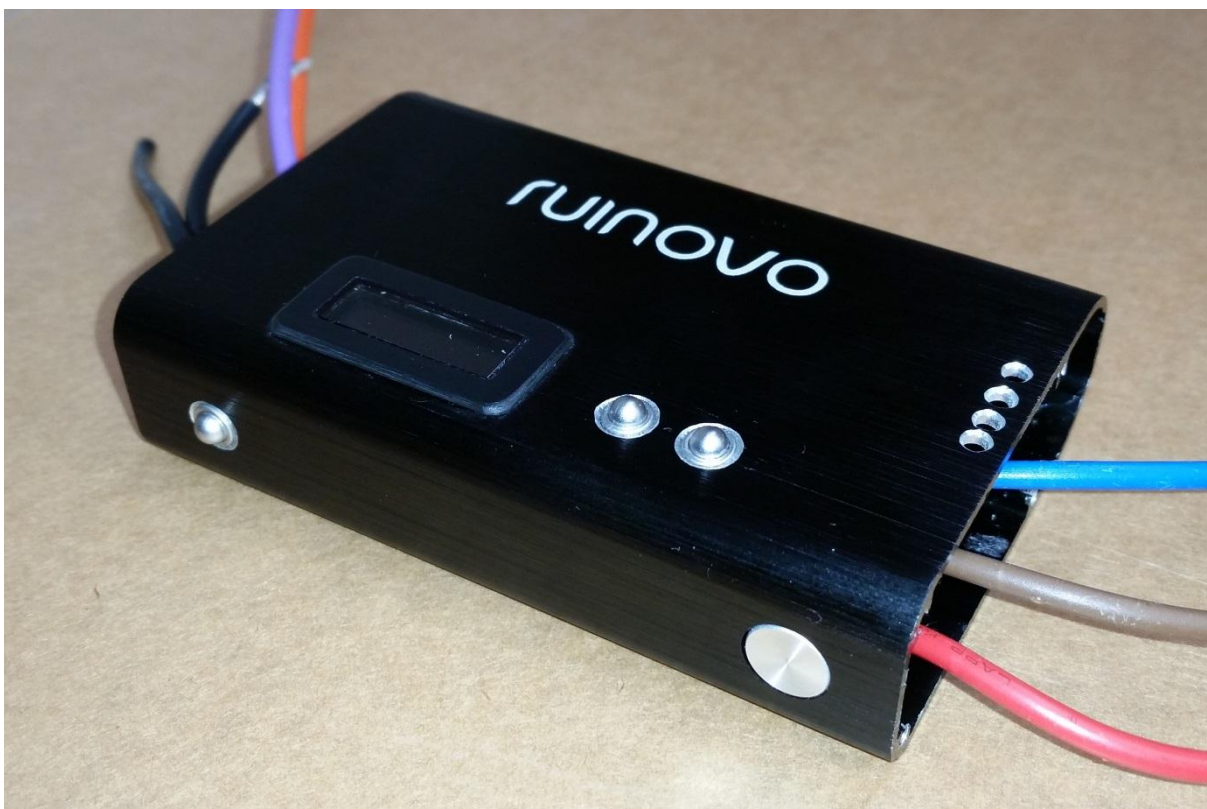


Assembly

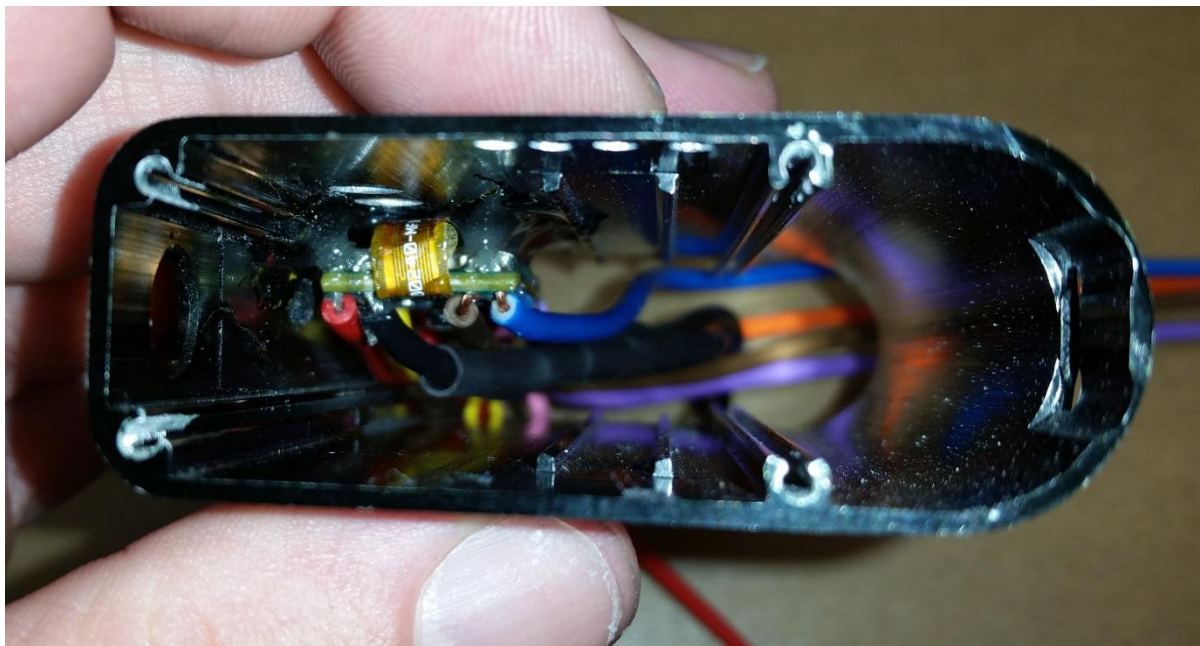
Screen Cradle in. A smear of epoxy around the flange, then more from inside.



DNA and buttons next. Oh and the charge button cover.

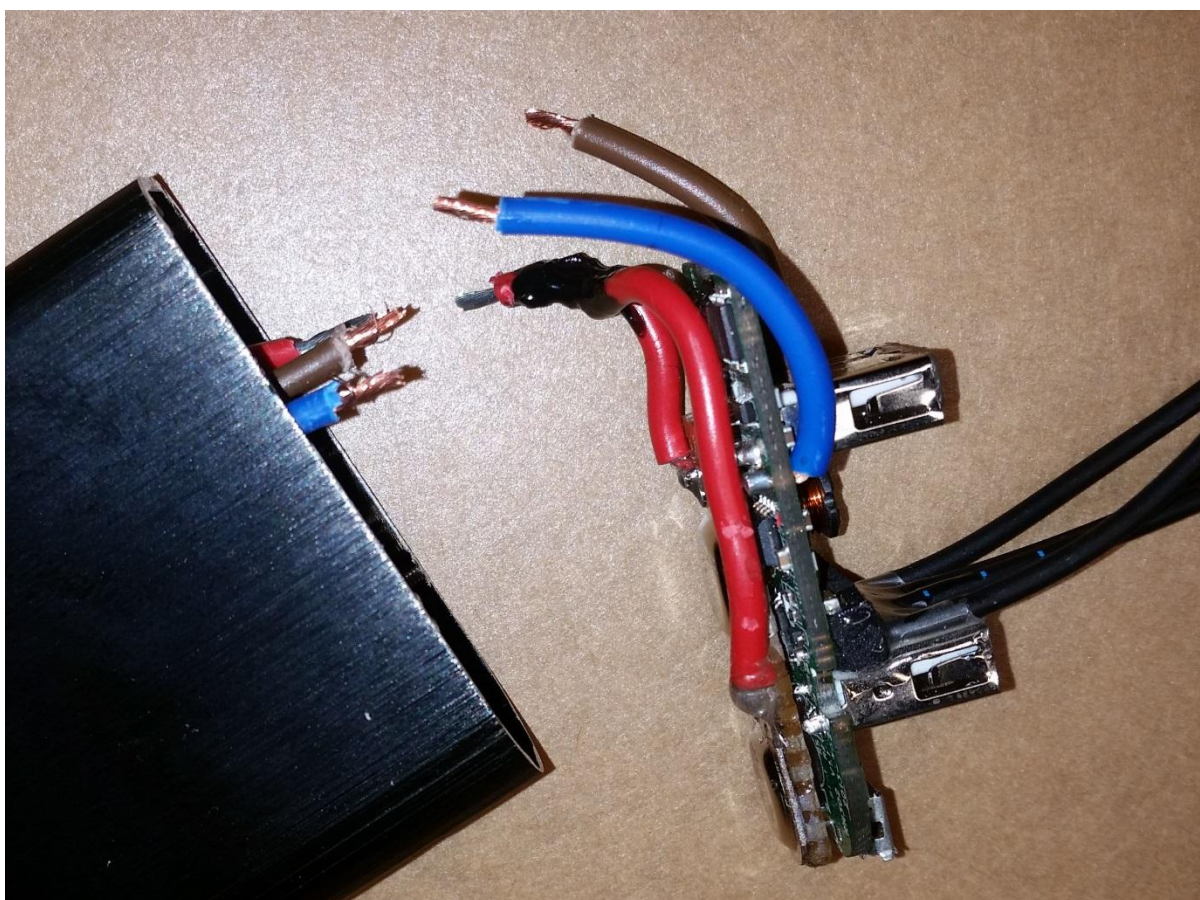


From inside.....

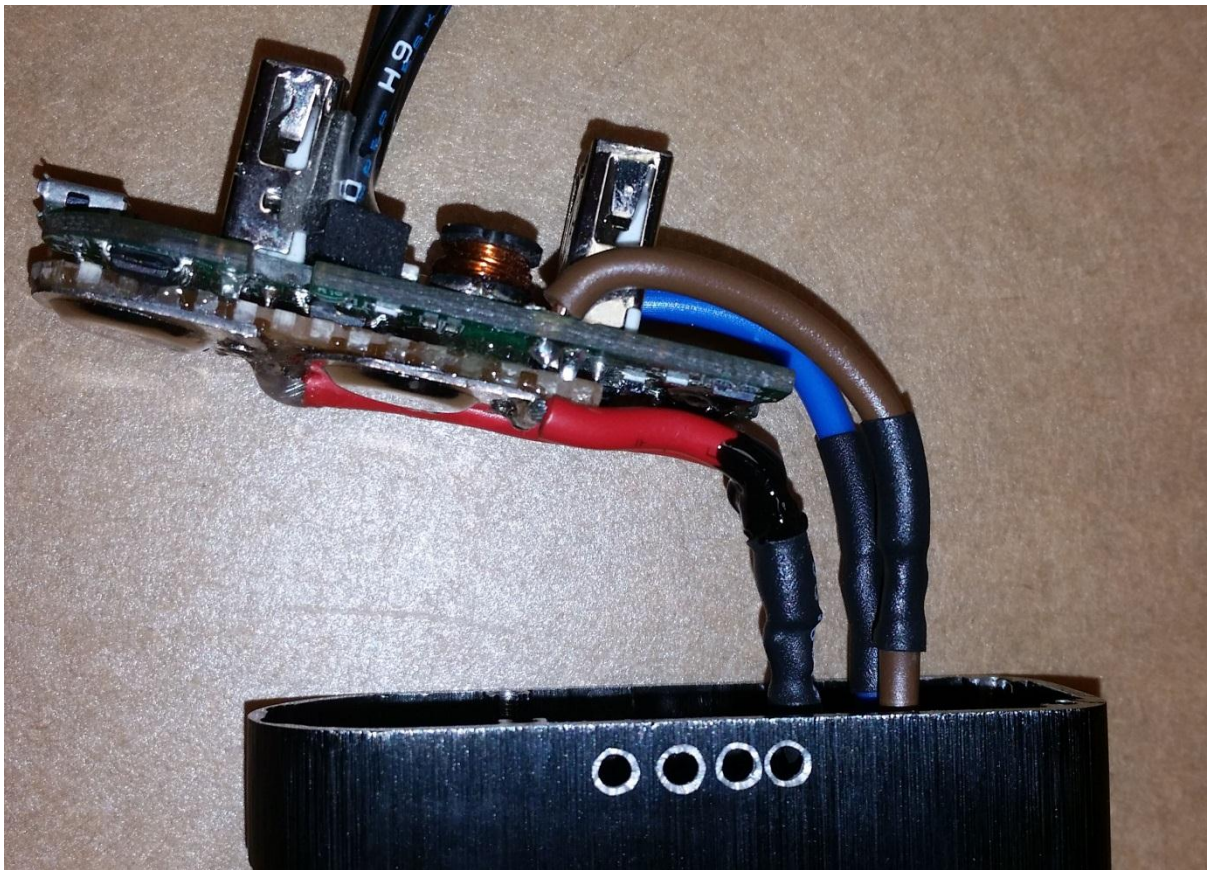


Now to get the Charge Board in.

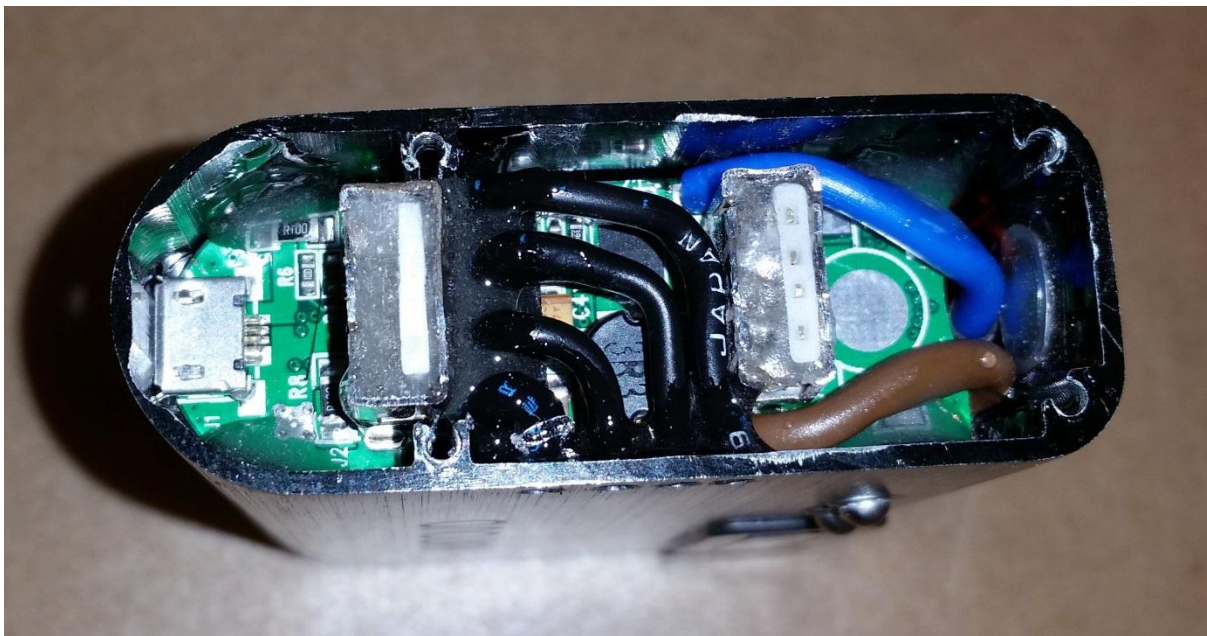
Cut all the wires as short as you can, while still being able to solder them together.



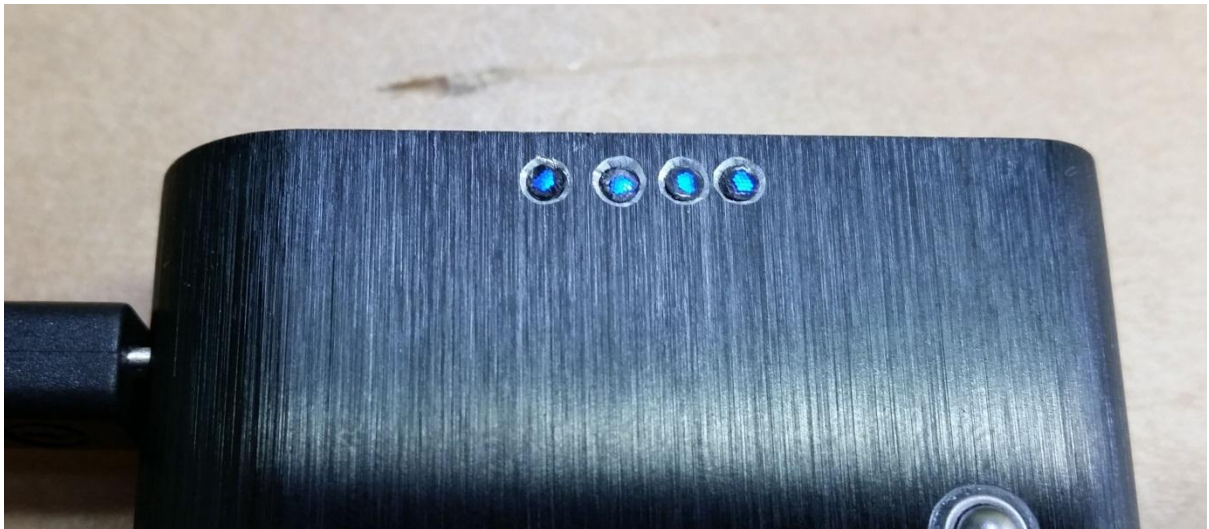
Don't forget to put the heat shrink on BEFORE you solder!



Now ease it all down into place and epoxy in. A bit of heat and the fibre optic bends easily. Cut to size and poke the ends through the holes in the case, and yet more epoxy!



And test!



Bottom Cap on!

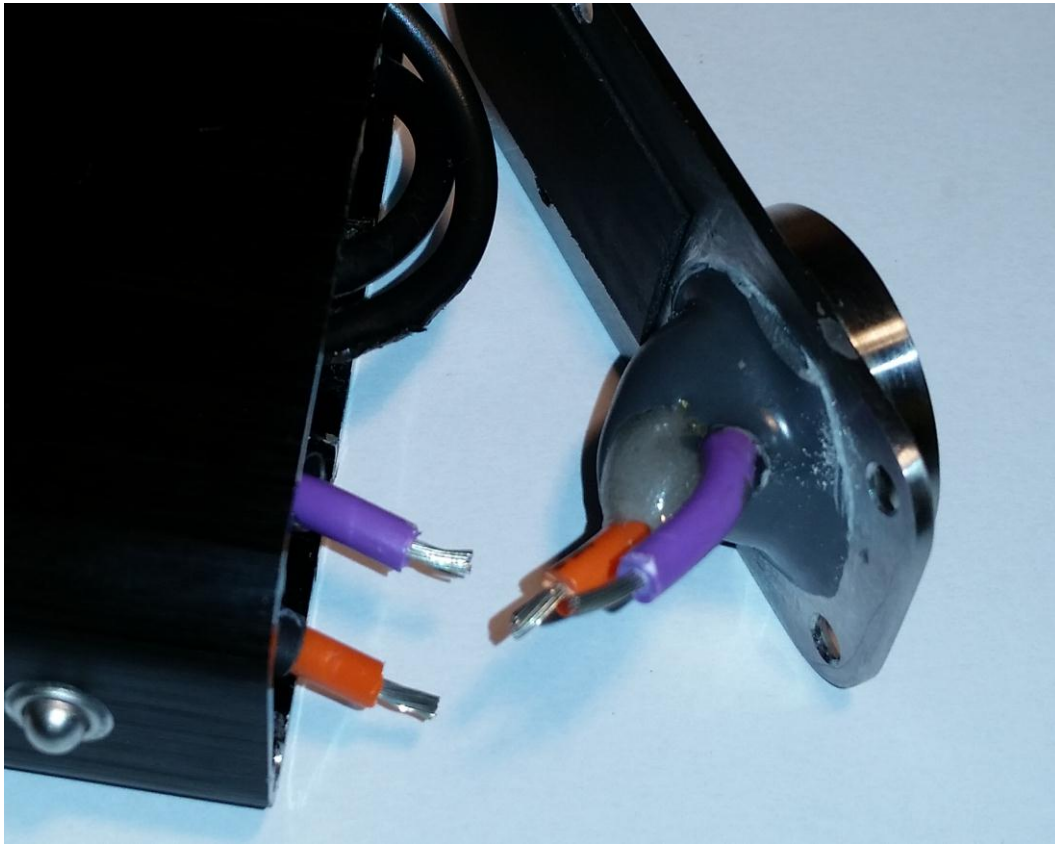


Next I get a look at how much room is left for my negative contacts.



And the answer is "NOT MUCH!"

So I decided to solder the Top Plate on first so I knew what space I was dealing with. Same as with soldering the Charge Board wires, first cut as short as you can manage and make sure your heat shrink is on.



Done.



Negative Battery Contacts.

Initially I was planning to use the Keystone Negative Battery Spring Contacts, you know, these ones.....



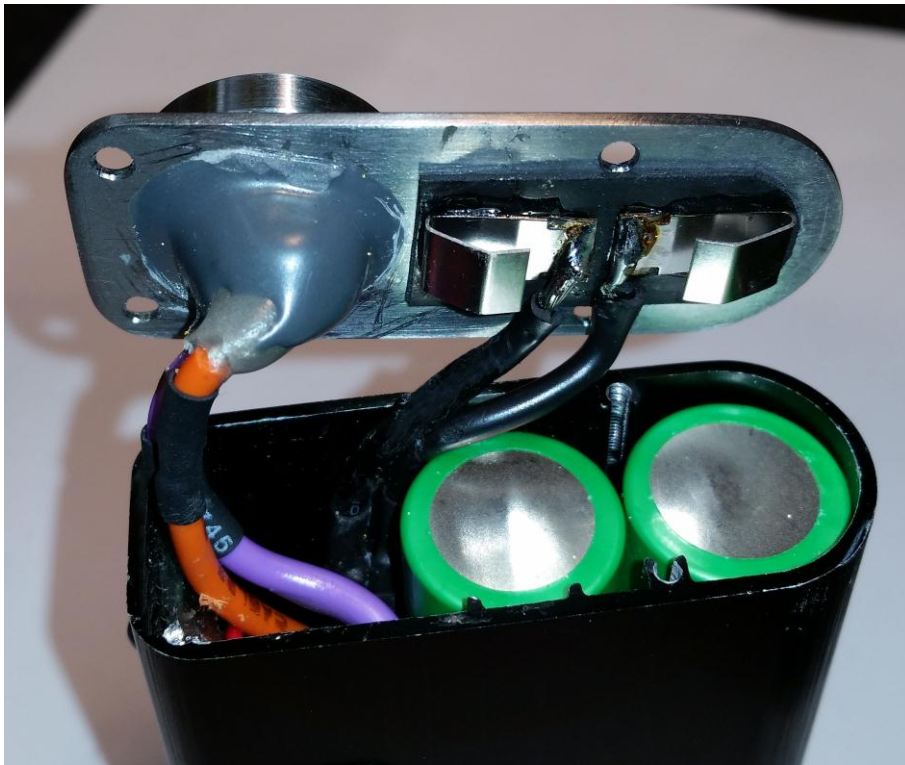
But even after shortening them there was still not enough room so I had to come up with something else. The first step was to use the thinnest insulator I could find. I found some 0.75mm rubber gasket material and epoxied that on first. Then I sacrificed one of my Keystone Battery Sleds, and stole the contacts out of it.



I cut the little tabs off, epoxied them on and soldered the negative battery wires, this is the result.



All that's left now is to screw the top on.....



.....and go have a Vape!

