

# Milo-DNA20D



## Parts list:



- 1) Hammond 1590ABK ([digikey.com](http://digikey.com), [mouser.com](http://mouser.com), [onlinecomponents.com](http://onlinecomponents.com)).
- 2) 3 tactile switches with round silver actuator, 300g or 100g ([madvapes.com](http://madvapes.com)).
- 3) Atty connector ([madvapes.com](http://madvapes.com), [avidvapers.com](http://avidvapers.com)).
- 4) #12 finishing washer (Lowe's).
- 5) 2 PTC resettable fuses 16v, 3A (part #16R300GU).
- 6) Evolv micro-USB charging board.
- 7) Evolv DNA20D.
- 8) 2, 1200mAh 25C li-poly batts ([ebay.com](http://ebay.com), [aliexpress.com](http://aliexpress.com)).
- 9) Piece of Lexan clear polycarbonate cut to 38mm x 92mm (1.5" x 3-5/8") with rounded corners and a micro-USB cutout (I bought the Lexan sheet at Lowe's. You can alternatively use a piece of clear acrylic that Lowe's also stocks).
- 10) Optional: window tinting film (Auto Zone).
- 11) Black and red 20 gauge wire. Black, red, blue, yellow, and white 24 gauge Wire. Unless otherwise noted, cut all wires 2" long and then trim as needed.

**Misc Supplies:**

- 1) Electrical tape or Kapton tape.
- 2) Heat shrink tubing.
- 3) Double-sided tape.
- 4) Scotch clear mounting tape (restickable mini tabs or the thin squares or sheets – not the thick mounting tape).
- 5) Versachem Plastic Welder 15' set time.
- 6) Versachem Clear 5' set time.

**Tip:** apply soldering flux to each bare wire end and each connection before soldering.

## I. Working with the case:

- A. Drill one 11/32" hole at the top center of the case for the atty connector.
- B. Drill three 13/64" holes along the side of the case for the fire button, down wattage control button, and up wattage control button. You may have to ream the holes a bit in order to insert the button.



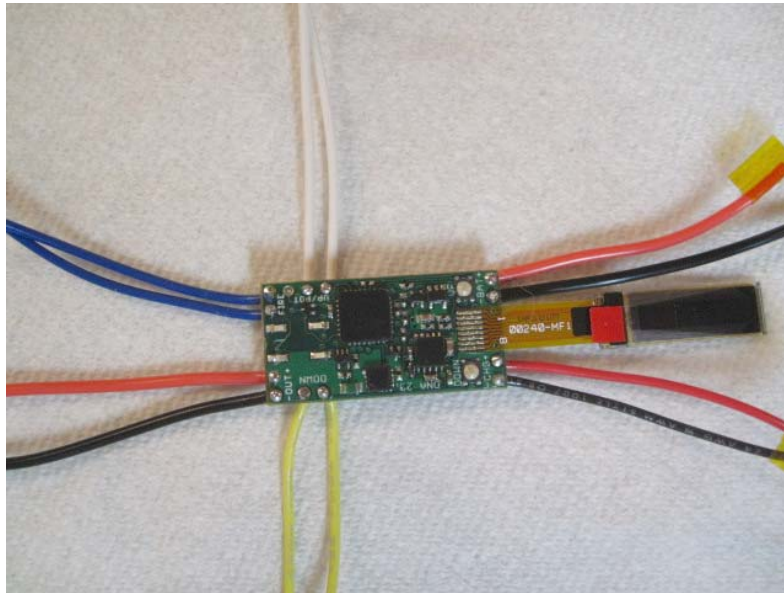
## II. Working with the fuses and batts:

- A. Solder the legs of the fuses together in parallel.
- B. Adhere the 2 batts together with double-sided tape.
- C. Cut the positive (red) wire of each batt to ~1", solder the free ends together.
- D. Slide a piece of heat shrink tubing over the red wires of the batts. Solder the free end of the red wires to one end of the fuses. Slide the heat shrink tubing over the soldered connection and apply heat.
- E. Cut the negative (black) wires of each batt to ~1". Solder the free ends together. Wrap the soldered connection with electrical tape or Kapton tape.



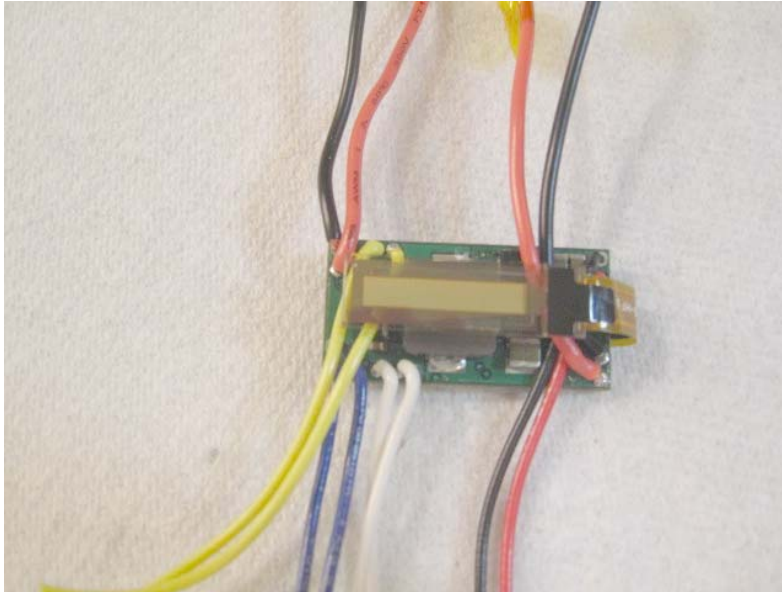
### III. Working with the DNA20D

- A. Desolder and remove the onboard tactile fire button – or – carefully remove the membrane and its holder and then carefully dremel the tact button to the same height as the components on that side of the board.



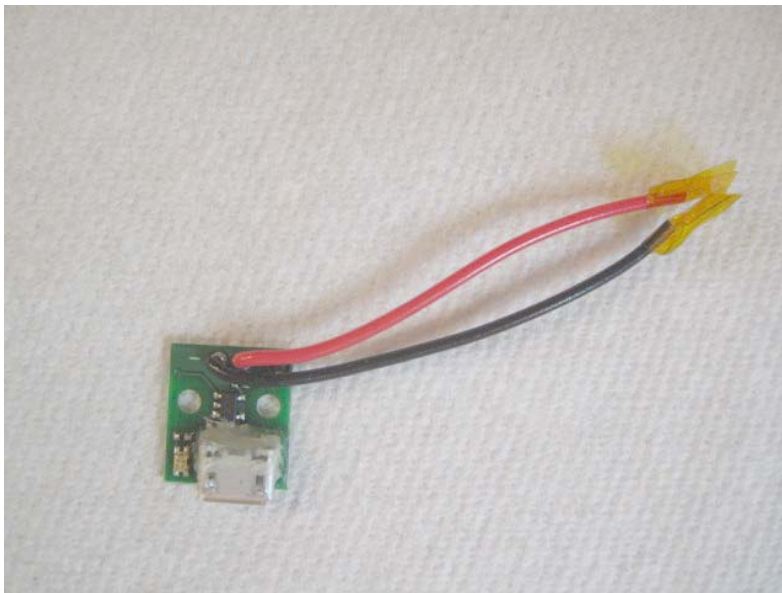
Using Evolv's wiring guide for the DNA20D:

- B. Wire the 24g blue wire to the fire button pins.
- C. Wire the 24g yellow wire to the down wattage control pins.
- D. Wire the 24g white wire to the up wattage control pins.
- E. Wire the 20g red wire to the positive (+) input and positive (+) output pins. Wrap the free end of each wire with electrical tape or Kapton tape.
- F. Wire the 20g black wire to the negative (-) input and negative (-) output pins. Wrap the free end of each wire with electrical tape or Kapton tape.
- G. Wire the 24g black wire to the charger's negative (-) pin and wire the 24g red wire to the charger's positive (+) pin. Wrap the free end of each wire with electrical tape or Kapton tape.
- H. Direct the input and output wires up and direct all other wires down.
- I. Optional: if using tinting film, because tinting plus the black transparent plastic piece will make the display too dark, I remove the black transparent piece covering the OLED. I use a craft knife and slip it under a corner of the plastic piece then slide the craft knife along the underside of the plastic piece.
- J. Apply a small piece of the thin clear mounting tape to the underside of the OLED and adhere it to the transducer on the back of the board.



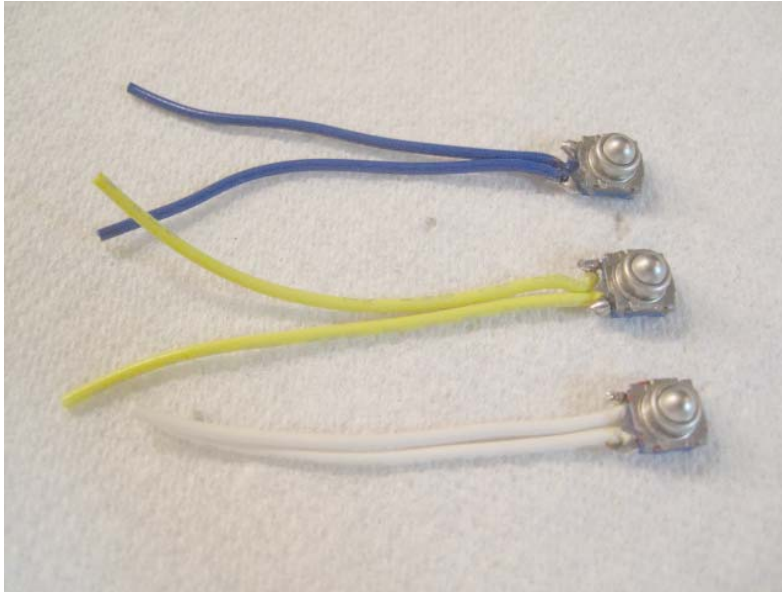
#### **IV. Working with the micro-USB charging board**

- A. Wire the red 24g wire to the positive (+) pin of the charging board.
- B. Wire the black 24g wire to the negative (-) pin of the charging board.
- C. Wrap bare wire ends with electrical tape or Kapton tape.
- D. Reinforce the micro USB part with epoxy being careful not to get any epoxy on the LED.



#### **V. Working with the up/down/fire buttons**

- A. You only need 2 legs of the 4 legs on each button. Cut the 2 legs not needed close to the button's body. Straighten the remaining 2 legs.
- B. Wire the 24g blue wire to one of the buttons.
- C. Wire the 24g yellow wire to the second button.
- D. Wire the 24g white wire to the third button.



## VI. Working with the atty connector

- A. Remove the center post and insulator from the connector. I use a  $\frac{1}{4}$ " round flat punch to push the center post out.



B. Wire a 20g red wire to the underside of the center post.



C. Wire a 20g black wire to the inside wall of the underside of the connector. It helps to first scruff up the area to be soldered on the connector, then apply flux, then apply a dab of solder.



## VII. Assembly

Note: for aluminum cases I use 2 types of epoxy for added adhesion. First layer I use Versachem Plastic Welder 15' set time, then when that dries I apply a layer of clear 5' set epoxy.

A. Epoxy the micro-USB charging board in it's position in the case. I first glued a piece of Lexan to the back of the board then glued the Lexan to the case, then applied epoxy to the underside and top side of the charging board. Be careful not to get any epoxy on the LED.

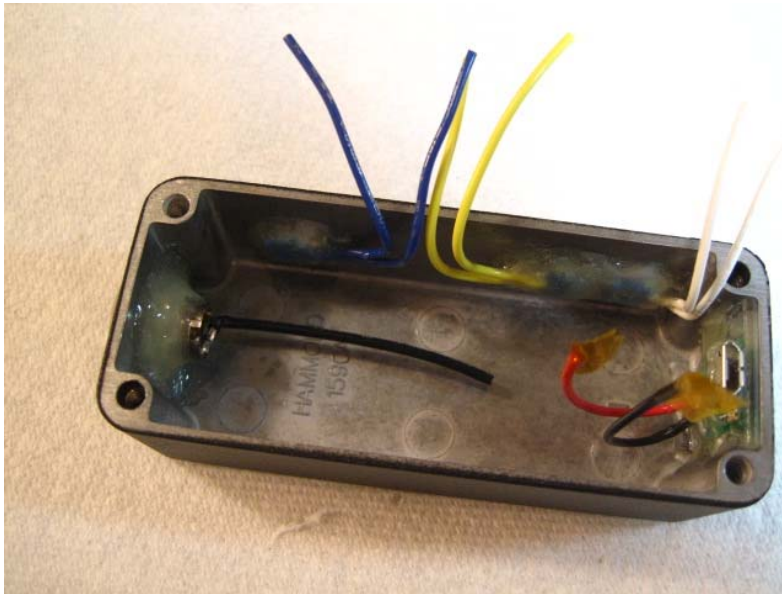
- B. Screw an atty or carto on the connector and insert the finishing washer through the connector. You will need to first enlarge the center hole of the finishing washer. I insert a ¼" (6mm) tapered punch into the center hole of the washer and then use a hammer to punch a larger hole. Alternatively, you can dremel the hole larger.

Apply epoxy to the underside of the washer and secure to the atty connector hole in the case.



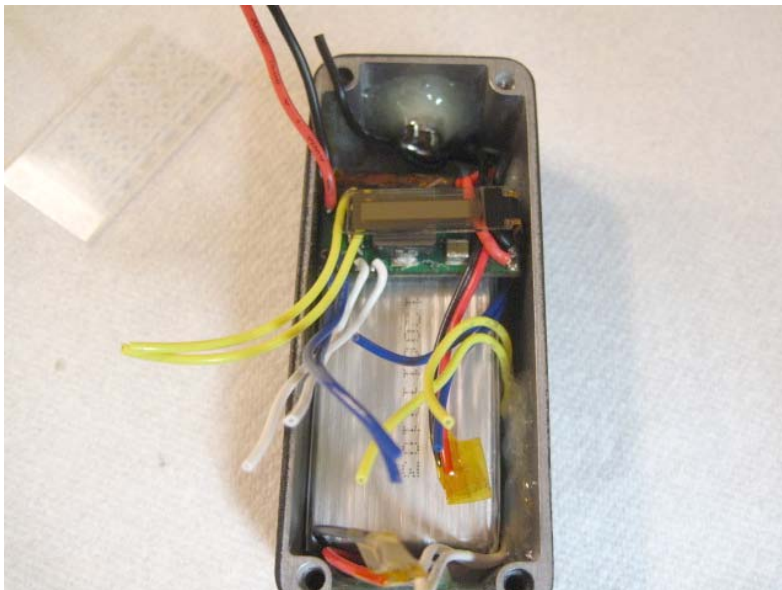
- C. When the epoxy dries, epoxy all around the part of the atty connector that sits inside the case.
- D. Epoxy the tact button with the blue wires (fire button) to the top hole in the side of the case.
- E. Epoxy the tact button with the yellow wires (down button) to the middle hole in the side of the case.
- F. Epoxy the tact button with the white wires (up button) to the lower hole in the side of the case.



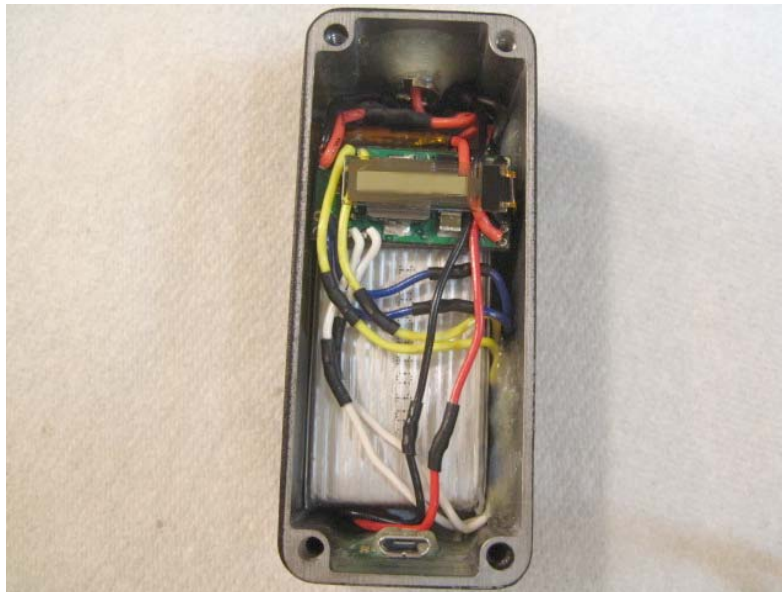


### VIII. Final wiring

- A. Adhere the back of the DNA board to the batt using clear mounting tape. The top of the DNA board should be  $\sim 1/4$ " or so down from the top of the batt.
- B. Cut  $\sim 1$ " off the input positive (red) wire. Slide a piece of heat shrink tubing over the wire and solder the free end of the wire to the free end of the fuse. Slide the heat shrink tubing over the soldered connection and apply heat. Wrap the fuse with Kapton tape and secure the fuse with tape to the top side of the batts.
- C. Cut  $\sim 1/2$ " off the input negative (black) wire. Solder this wire to the free end of the negative batt wires. Slide heat shrink tubing over the soldered connection and apply heat.
- D. Position the batts/DNA into the case.



- E. Cut ~1" off the output negative (black) wire. Slide a piece of heat shrink tubing over the wire and solder the free end of this wire to the free end of the black (negative) atty connector wire. Slide the heat shrink tubing over the soldered connection and apply heat.
- F. Insert the insulator into position in the atty connector, then insert the center post. Cut ~1" off the output positive (red) wire. Slide a piece of heat shrink tubing over this wire and solder the free end of this wire to the free end of the red (positive) atty connector wire. Slide the heat shrink tubing over the soldered connection and apply heat.
- G. Cut ~1" off each of the blue, yellow, and white wires of the DNA board. Slide heat shrink tubing over each of these wires and solder each to the same colored wires coming from the switches. After soldering, slide the heat shrink tubing over the soldered connection and apply heat.
- H. Slide heat shrink tubing over the remaining red and black wires of the DNA board and solder each to the corresponding colored wire of the micro-USB charging board. After soldering, slide the heat shrink tubing over the soldered connection and apply heat.



- I. Screw the Lexan cover in place. If desired, apply tint first.



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Mamu

