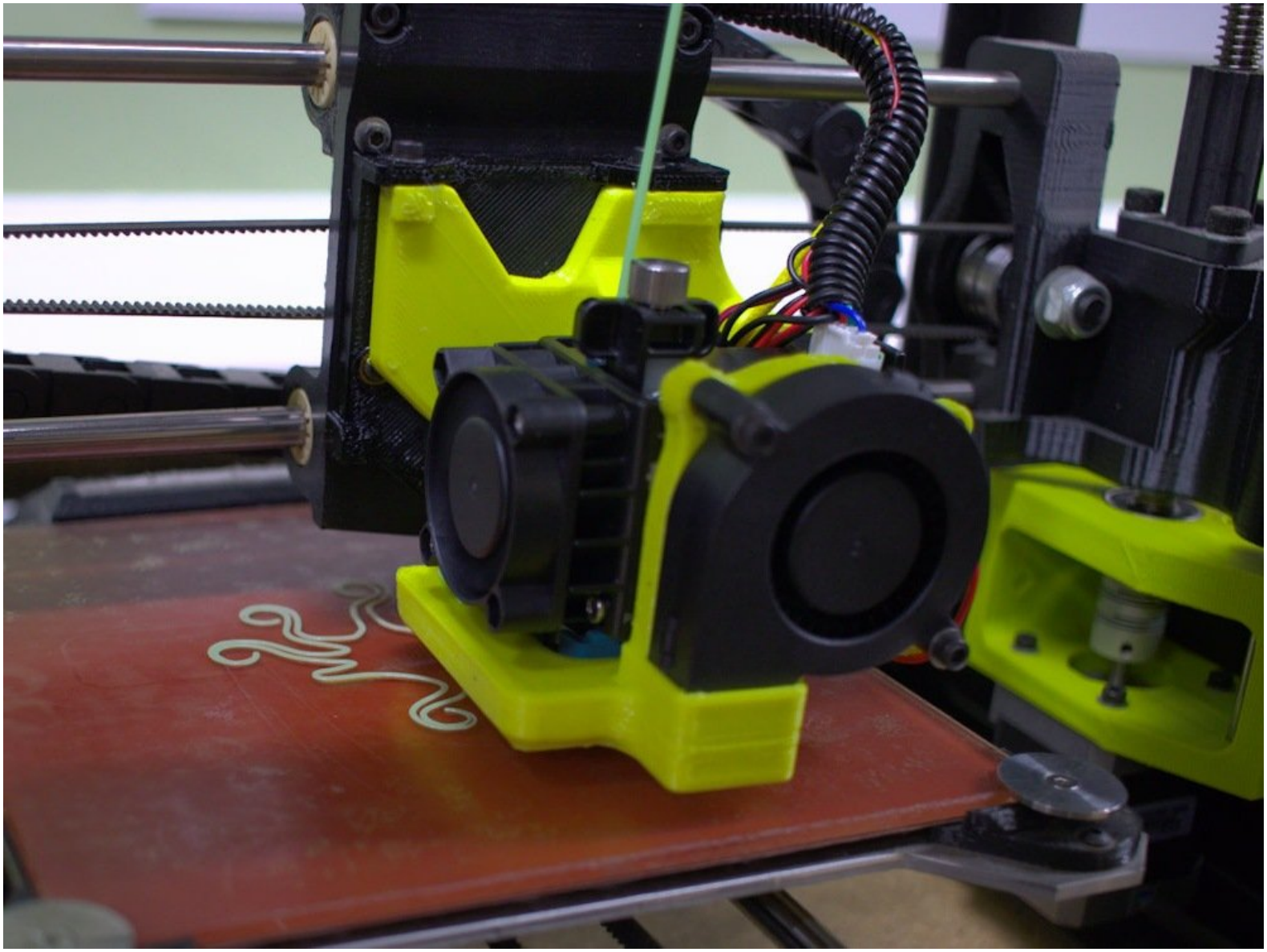
# LulzBot Mini Hemera Upgrade

Add a Hermes extruder to your LulzBot Mini

Written By: Joe Spanier





# INTRODUCTION

Purchase your Hemera here: https://e3d-online.com/e3d-hemera-175-ki...

For the printed parts please see:

https://www.thingiverse.com/thing:400889...

Please note that this guide is assuming the use of a fully assembled and hot tightened Hemera unit if you have not yet fully assembled and hot tightened your unit please see: Hemera Assembly Guides

Mounting a Hemera to a Lulzbot Mini is easy, and we provide most of the tools you'll need. Please note, though, that you should be very careful of the following safety cautions:

- Be aware of your electronics. Don't work on your printer while it is plugged in or turned on.
- Be aware when you heat up your new hotend not to burn yourself on the heater block nozzle or heater cartridge.
- The standard Hemera is capable of printing up to 285°C, do not exceed these temperatures unless you have replaced the Thermistor cartridge with a PT100, the Aluminium heater block with a Plated copper heater block, and the Brass nozzle for a Plated copper, Hardened steel or Nozzle X.
- Firmware modification is not optional it is a mandatory step,
- Make sure you have ordered and received the correct voltage heater and fan to match the power supply of your printer. All of our current heater cartridges should have the voltage and wattage laser engraved on the cartridge. Taking an ohm reading is the most reliable method of testing what voltage/ wattage you have received.
- Connecting 12v parts to a 24v power supply can result in overheating, component damage, or fire. If you are unsure double check the rating on your power supply.
- Your HotEnd and your printer are your responsibility. We cannot be held responsible for damages caused by the use, misuse or abuse of our products.



## TOOLS:

- Pin Crimpers (1)
- 2.5mm Allen Key (1)
- 2mm Allen Key (1)

## PARTS:

- 5v 40x10mm 5cfm+ fan (1)

**5v 40x10mm 5cfm+ fan**

*https://www.digikey.com/product-detail/en/cui-inc/CFM-4010V-070-273/102-4361-ND/7620535*

- molex sl 24-30 awg crimp-terminal pin x30 (1)

*https://www.lulzbot.com/store/parts/molex-sl-24-30-awg-crimp-terminal-pin-x30*

- M3 Heat sets (1)

*https://www.lulzbot.com/store/parts/heat-set-insert-tapered-m3-05mm-internal-thread-38mm-l-x20*

- 20pos Molex terminal (1)

*https://www.digikey.com/products/en?keywords=wm2527-ND*

- 50x50x15mm centrifugal blower fan (1)

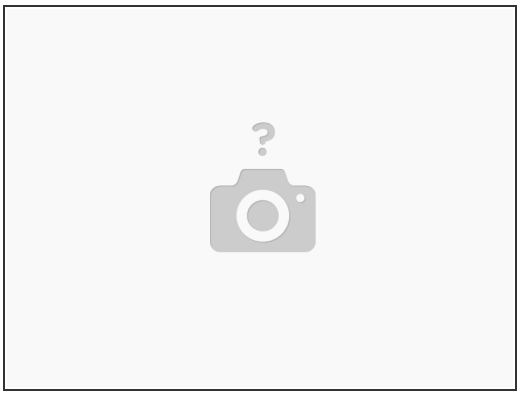
*https://www.amazon.com/SoundOriginal-50x50x15mm-Humidifier-Aromatherapy-Replacement/dp/B0755BY9RH*

- M3x12mm Socket Head Cap Screw (6)
- M3x20mm Socket Head Cap Screw (2)
- M3x10mm Flat Head Cap Screw (5)
- M3 washers (4)
- 18g ring terminal with at least 3mm hole (1)
- Mini 1 Universal adapter (1)

*https://www.lulzbot.com/store/tool-heads/universal-tool-head-adapter-mini-1*

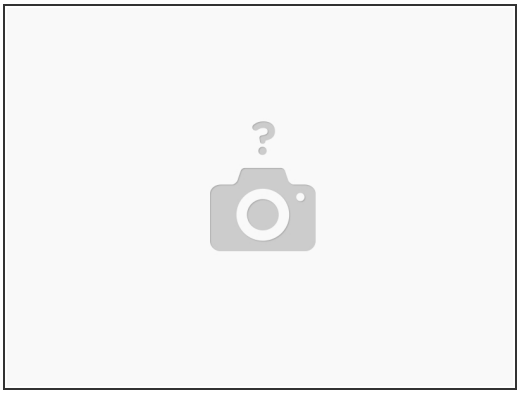
- Printed Lulzbot Hermes adapter (1)
- Printed Fan Duct (1)

## Step 1 — Prep Your Machine



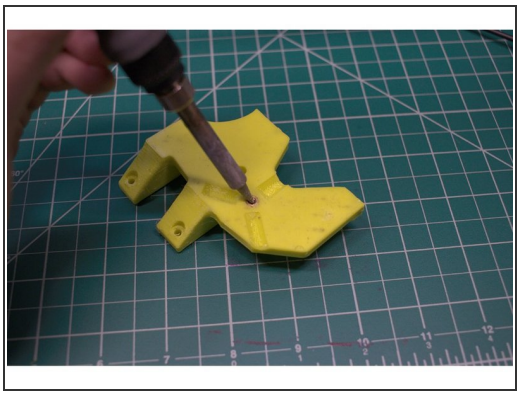
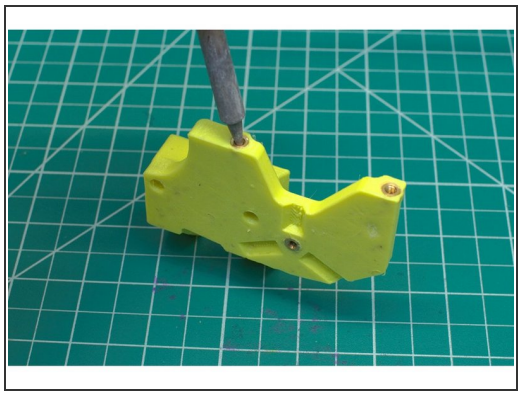
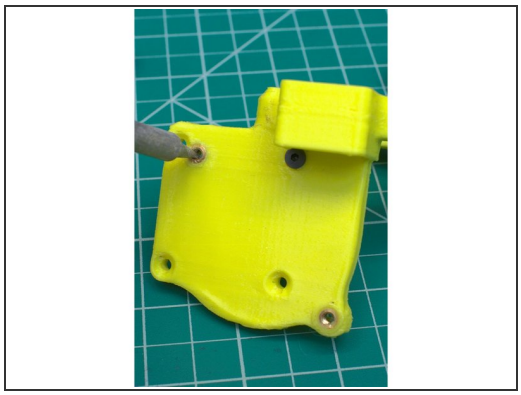
- Raise Gantry to the top of the machine to give yourself room to work.
- Unload the filament and allow your nozzle to cool
- Once the nozzle is cool, power down and unplug your machine to prevent any damage to the machine.

## Step 2 — Gather



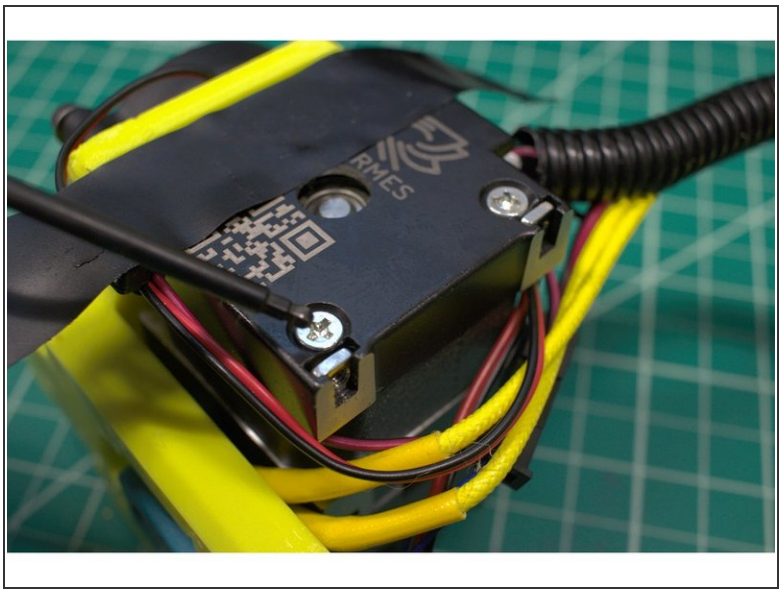
- M3 Heatsets
- Printed LulzBot to Hermes Adapter
- Printed Fan Duct
- Soldering Iron

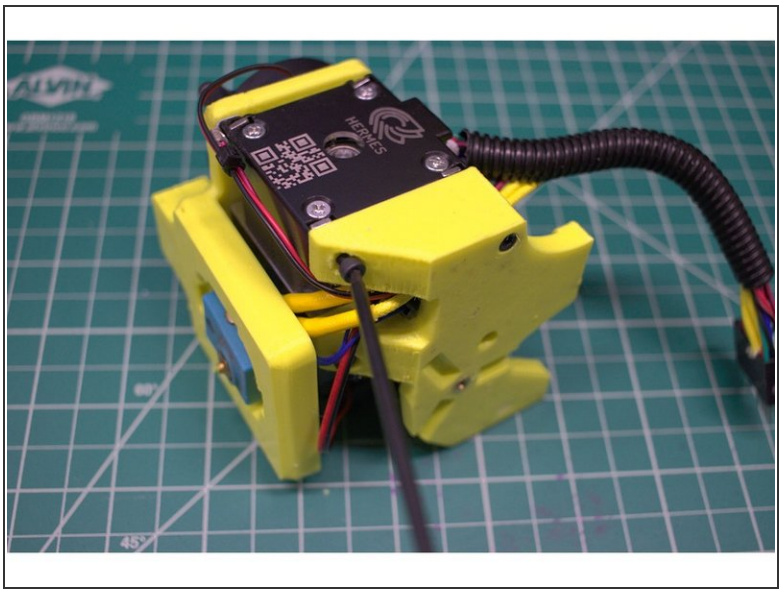
## Step 3 — Assemble Heatset Inserts

- Insert single heatset into center hole in the back of the LulzBot Hermes Adapter
- Insert 2 heatsets into holes in the top of LulzBot Hermes Adapter
- Insert 2 heatsets into the two large non-chamfered holes in the front fan mount

## Step 4 — Assemble the Hermes to the LulzBot Hermes Mount

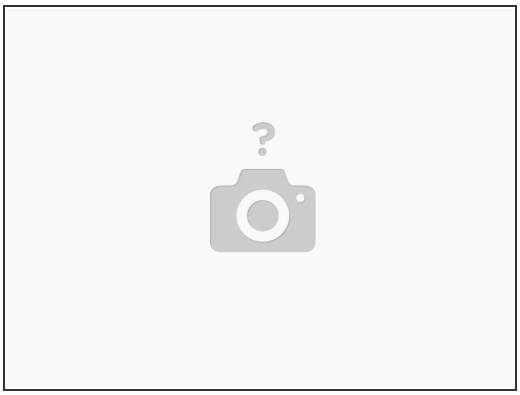




- Gather your Hermes Mount
- Insert 2 T-nuts into the back two slots. If you are looking at the back of the motor insert them into the slots on the right
  - Pro-tip - cover the t-slots with a piece of tape after the nuts are inserted so they can't fall out during assembly
- Add 4 M3x12mm socket head cap screws in the four holes in the back of the Hermes mount
- Align Hermes to the bolts and screw them in using a 2.5mm allen key.

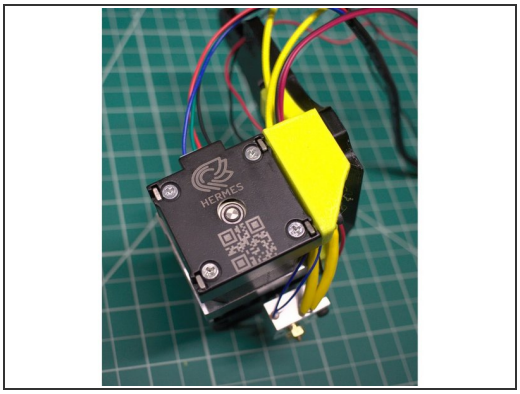
⚠ Be aware it is possible to crack the t slots if you use screws that are too long and bottoms out. Our recommendation is to use screws that protrude 3mm +- 0.25mm from the mounting surface to go into the T-Slots. Over tightening also risks snapping the T slot.

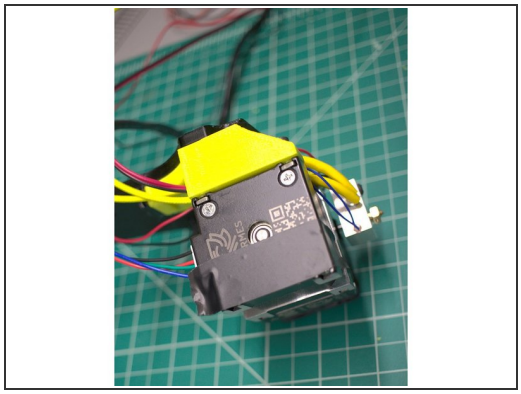
## Step 5 — Add Part Cooling Fan - Gather

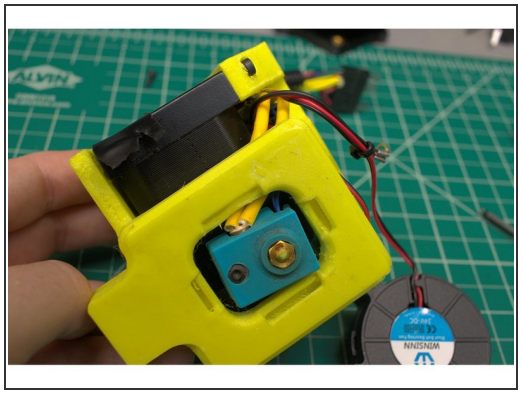


- 4 M3x10mm Flat head cap screws
- 2 M3x20 Socket Head Cap Screws
- 2- M3 washers
- Printed Fan Duct
- 50mm Fan
- 2 - M3 T-nuts

## Step 6 — Part Cooling Fan- Assemble





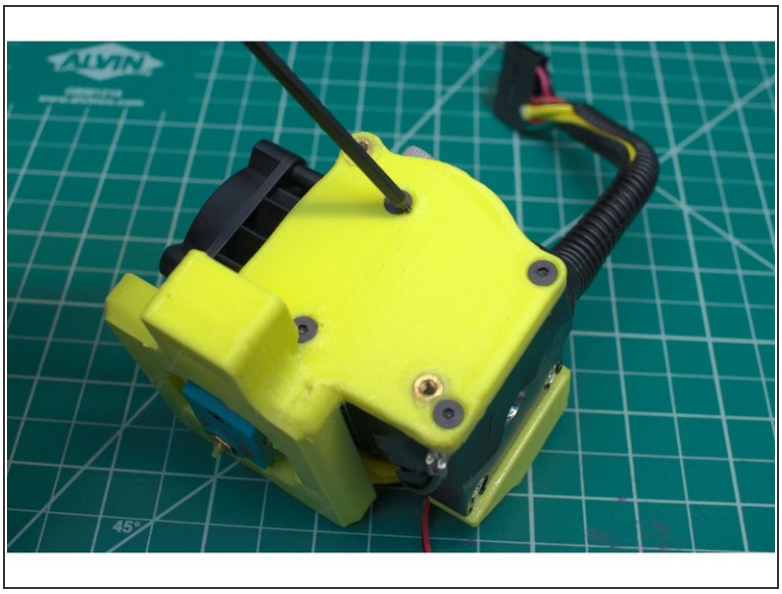


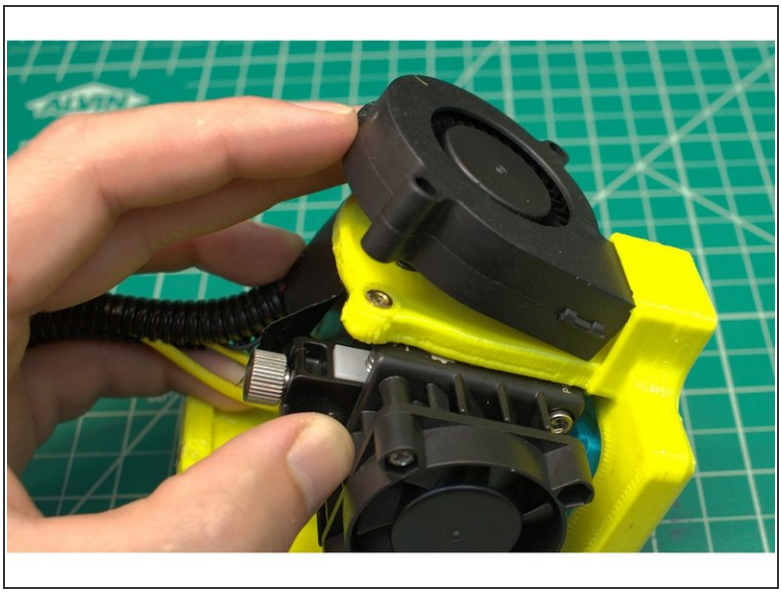
- Add 2 t-nuts to the t-nut slots on the front of the motor. Add tape to hold them while working
- Carefully fit fan duct into place. Make sure it doesn't crush heater cartridge wires and everything is routed nicely



## Step 7 — Add bolts and Fan





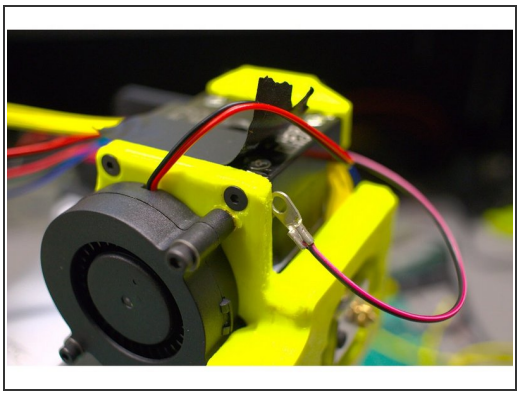
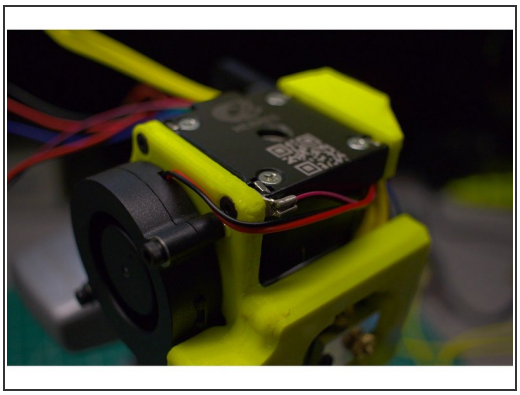
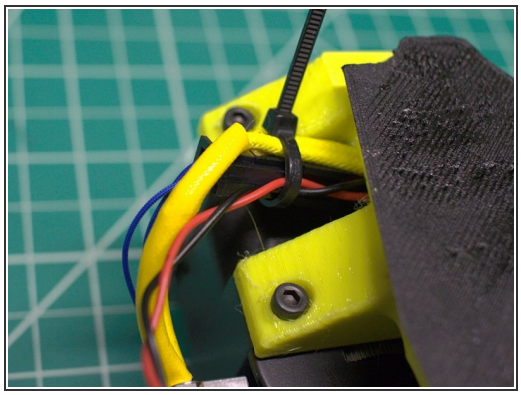
- Add 4 M3x10 flat head cap screws into countersunk holes
- Fit fan into place. The duct is fairly tight, I found it was easiest to tilt the fan up and slip it in as I fit it to the mounting holes
- Add two M3x20 socket head cap screws to mount the fan in place.

⚠ Be aware it is possible to crack the t slots if you use screws that are too long and bottoms out. Our recommendation is to use screws that protrude 3mm +- 0.25mm from the mounting surface to go into the T-Slots. Over tightening also risks snapping the T slot.



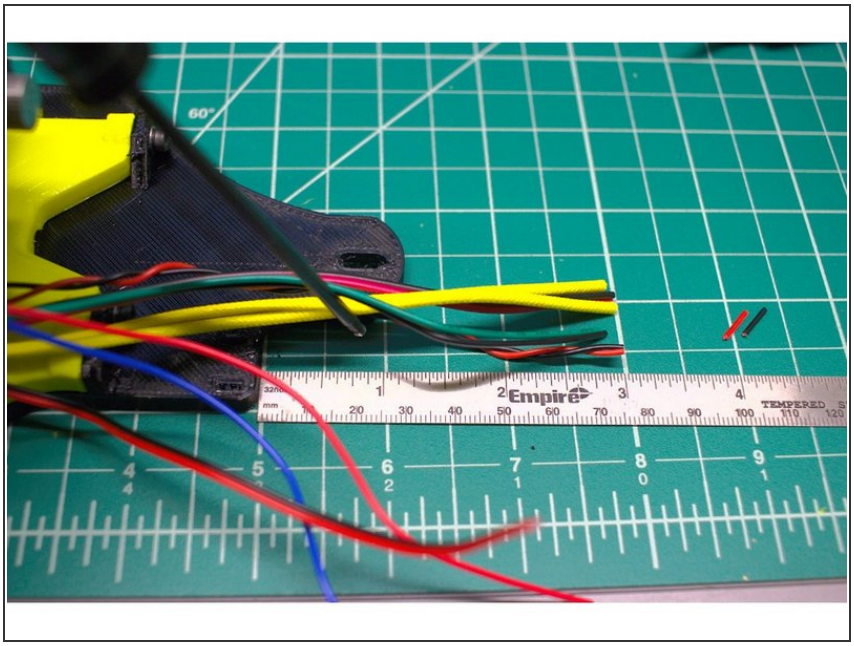
 

## Step 8 — Wiring and Routing

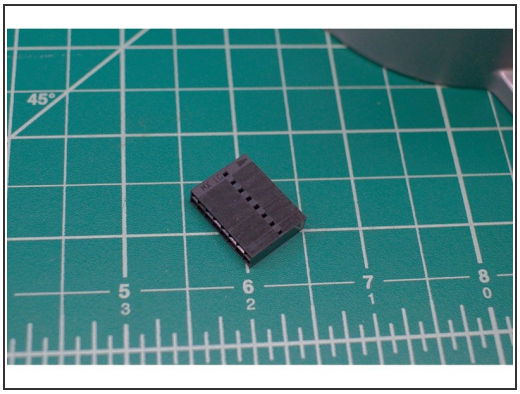
- Add sense wire - This mounts to the bare metal on the stepper motor between the cooling duct and the motor. I used the extra wire from my thermistor harness to make this wire.
  - Strip off 4mm of insulation and crimp the ring terminal on a piece of 300mm wire
  - Put the ring terminal in between the fan duct and the stepper at the lower right t-nut on the front. We will sandwich it here using this bolt
- Slip the heater, thermistor, sense pin, 24v cooling fan and 5v heatsink fan wires through the channel in the between the Hermes mounting points
  - Once through add a zip tie near the thermistor molex connector to the full bundle to help retain the wires and keep strain off the thermistor. Feed the wires the rest of the way into the channel.

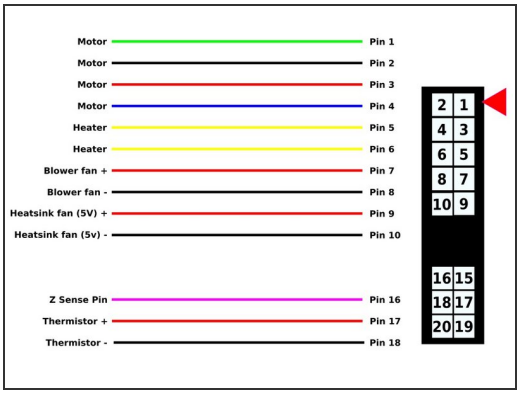
## Step 9 — Trim Wires

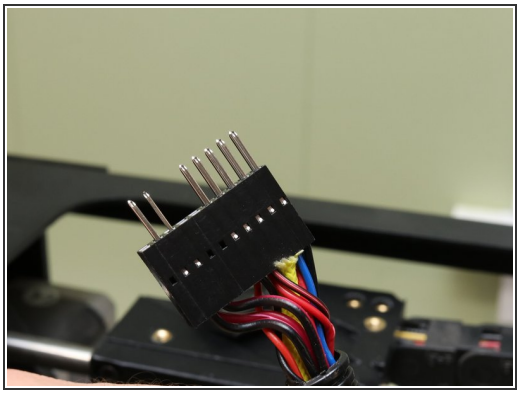



- Trim wires 100mm longer than the top of the Hermes mount. This gives freedom to manage the wire connector for the Mini.

## Step 10 — Pin wires for Molex Connection

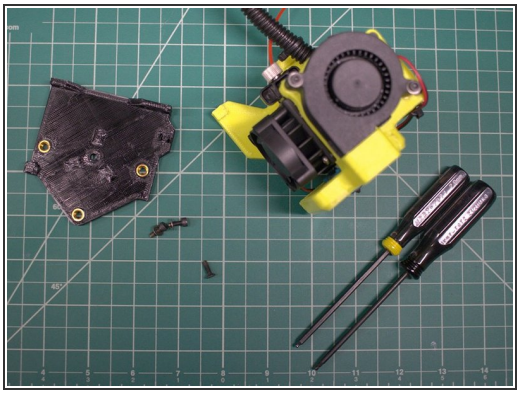
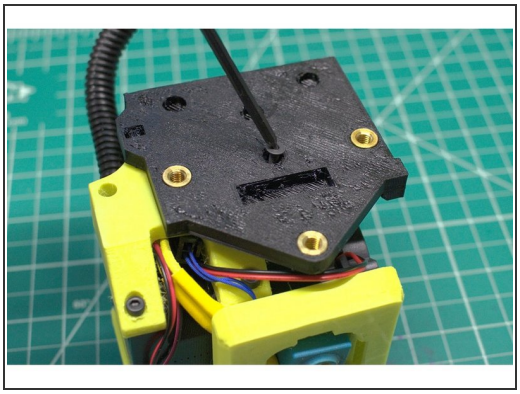


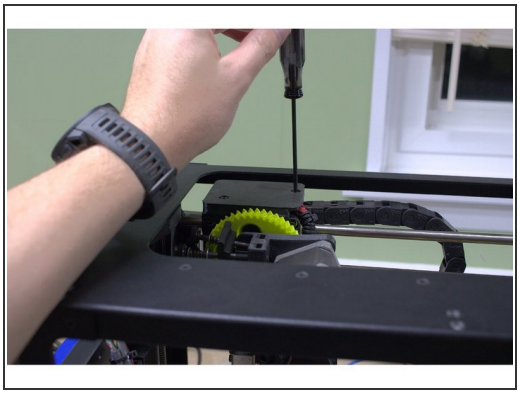
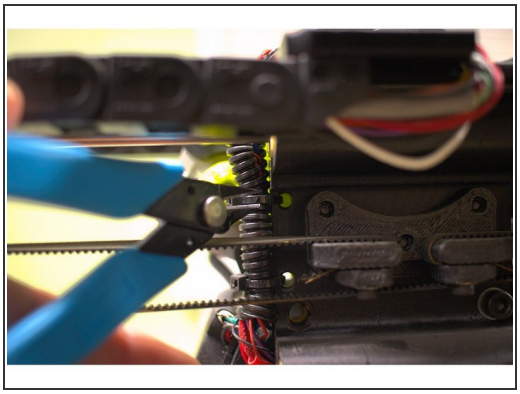
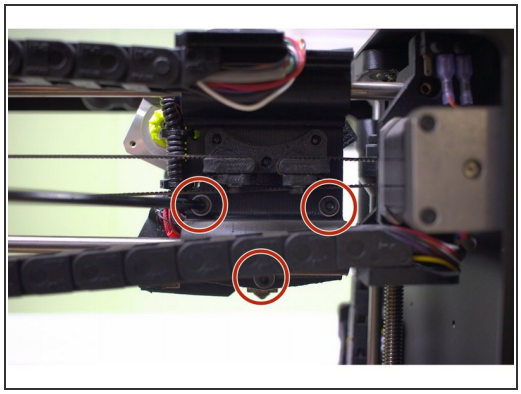
- Strip about 3-4mm of insulation off each wire to prep for adding pins
- Crimp the pins onto the wires using the appropriate crimpers and then add them to the 20 position socket following the wiring diagram
  - Pin 1 is the one shown here with the arrow at the top right. The diagram is numbered from the back so the pins will be facing away from you if you are looking at the numbers in the top left of the diagram.

## Step 11 — Assemble Hermes to Mini Universal Mount


- Gather Mini Universal Mount
- Align Hermes mount to the Taz 6 Universal Mount and insert 1 M3x10mm Flat head cap screw in the center hole in the back of the Universal Mount into the center M3 Heat set in the Hermes Mount
- Add 2 M3x12 socket head cap screws with M3 Washers to the two holes in the top of the Hermes Mount to fully mount it to the Universal Taz 6 mount

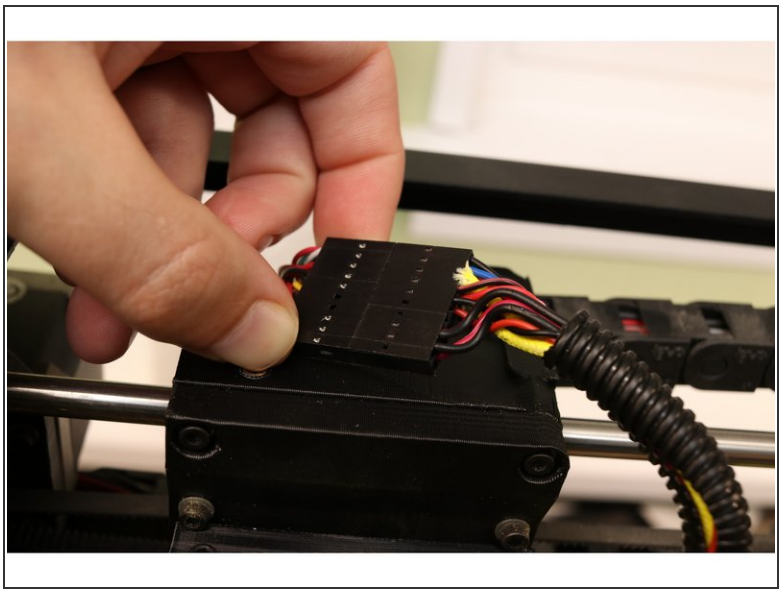
## Step 12 — Remove Old Tool Head

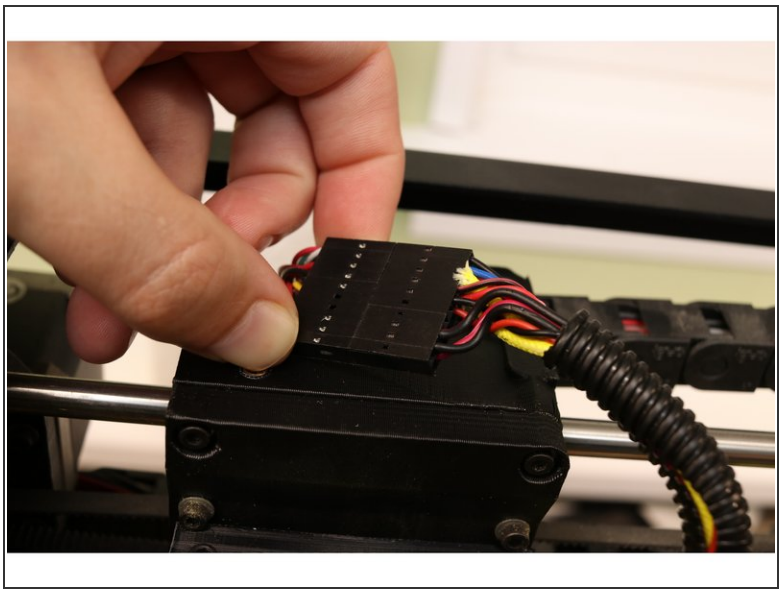




- Remove two M3 Bolts from top of Wire Cover
- Snip wire tie on side of tool head holding harness in place
- Remove three M5 Bolts from back of tool head. Two in middle and one and center of bottom

ⓘ Set these aside to mount new tool head

## Step 13 — Connect Wires and mount new tool head





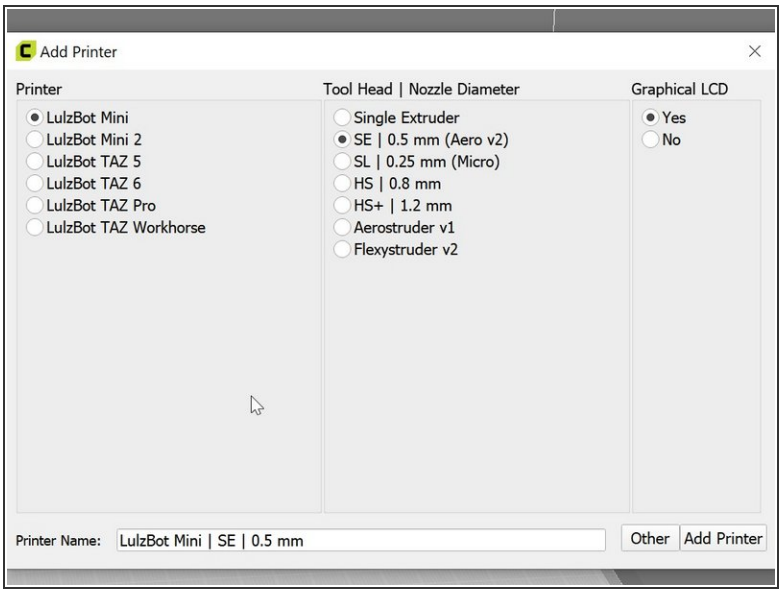
- Mount Hermes in place using M5 Bolts and the reverse of previous step.
- Pay attention to socket orientation and connect wires on top of X axis carriage
- Place the wire connectors down into their socket on the X Axis and replace the wire cover and M3 Screws.

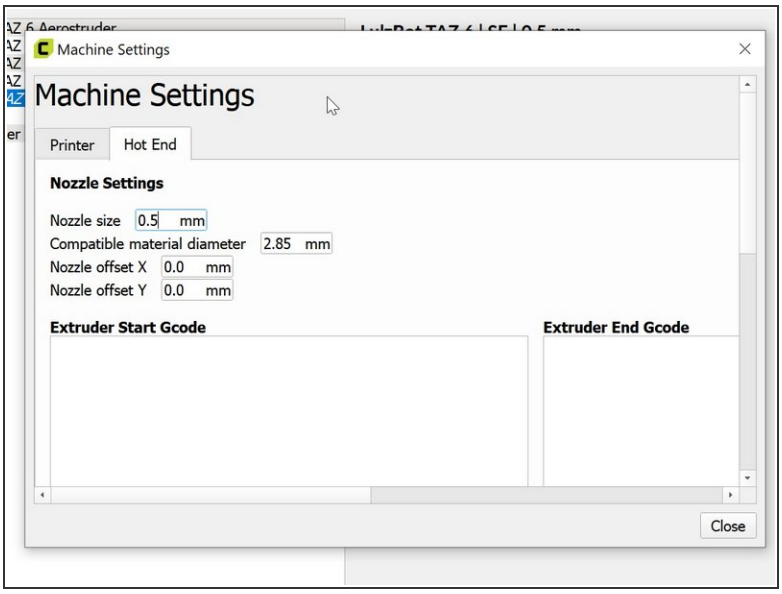
  ⚠ Pay special attention to wire placement when replacing the cover so as not to pinch any wires



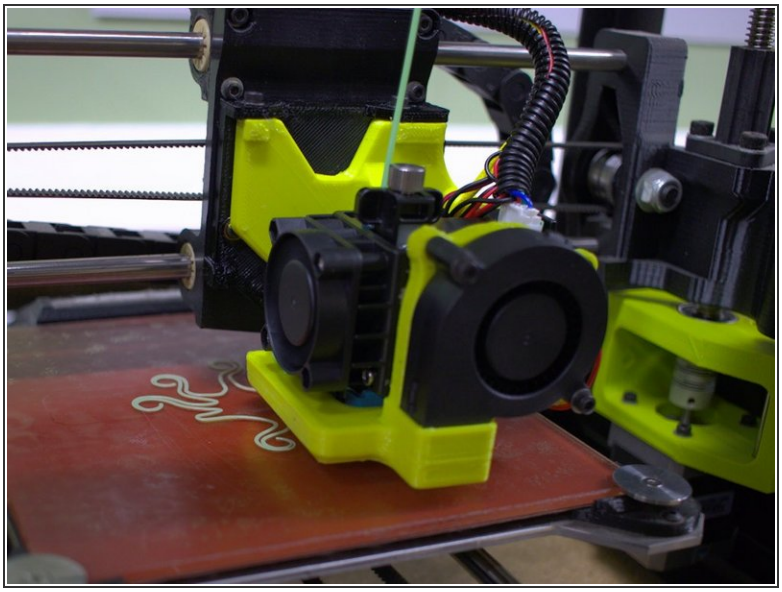
## Step 14 — Flash Firmware

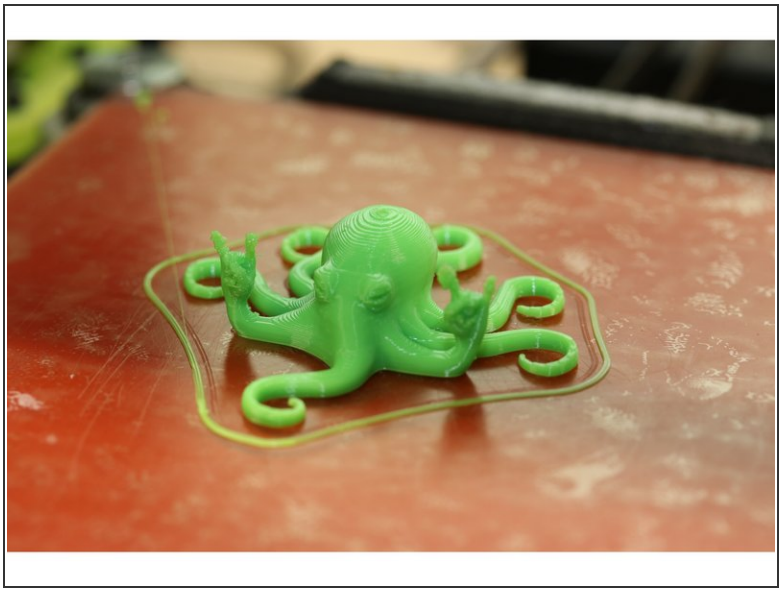



- Flash new Firmware through Lulzbot Cura.
  - Choose the Mini Aero 2|SE firmware
- Make sure you set your nozzle size correctly in machine settings. It will be defaulted to .5mm
- Through the in cura console we will need to change the e-steps from 840 to 409 to match the Hermes. Use the Following code:
  - M92 E409 ;set steps to 409
  - M500 ; save to eeprom

## Step 15 — Time To Print!!





- Get printing!!