

Talos 3d Printer Assembly

Step 1 – Bottom Frame

Tools needed

- 3mm allen key/wrench
- Optionally blue lock-tite
- square

Parts needed

- 2 4 high Al extrusion
- 2 3 high Al extrusion
- 16 M5 x 8mm screws
- 12 M5 extrusion nuts
- 2 7 left plate hole plates
- 2 7 hole right plates

Attach plates to the ends of the 4 high extrusions. Ensure the three holes are pointed inwards – toward each others when 4 high extrusions are aligned parallel from each other.

To avoid cross threading the steel screws in the Al extrusion, back out the screws while in the hole until you feel the screw seat properly in the hole. Then proceed to tighten the screws into the extrusions.

<see photo>

When attaching the 3 high extrusion make sure you don't tighten the screws all the way until ALL 12 screws have been lightly threaded in the nuts. Take the square and place on the inside of corners of the extrusions and while the end of the three level extrusion is against the taller one tighten all three set screws.

Step 2 – Print Head Assembly

Tools needed

Parts needed

- Proximity sensor
- Shrouded fan
- 30mm fan
- Belt connector body
- Part cooling fan discharge duct
- Extruder assembly
- Extruder mounts
- Stepper motor

- Extruder teeth
- Probe mount
- Hot end retainer clip
- Hot end plate
- M3 x14mm screw x5
- M3x10mm screw x6
- M3x12mm screw x2
- M3x16mm screw x2 (more like 18, but I only have 16)
- M3x20mm screw x1
- M3 nut x8
- E3d extruder – preferably fully assembled – kit
- M3x10mm round screw

Using the probe mount, Push M3x14 screw through horizontal hole and connect to M3 nut. Do not tighten this down, just get a couple of threads into the nut. Tap two vertical screw holes with M3 tap. Then using the M3x10mm screws attach to the extruder mounting plate.

Use a soldering iron to melt in place two M3 nuts in place on the top of the hot end retainer clip. Melt a third nut into the part fan mount. Gently place the forth nut into place. Then using the m3x16mm screw attach the part fan to the hot end retainer clip. Ensure that blow how is facing down and center fan duct is facing outwards. Now take M3x20 mm and install the part fan discharge duct, lightly tighten down the duct on the fan.

Insert the fan set screws into the hot end retainer clip and screw down the 30mm fan. Ensure that the fan tables are pointed up in relationship to the mount. At this point place the hot end in the retainer clip and place the entire assembly on the hot end (metal) mount. Then take the two m3x12mm screws and tighten the entire assembly to the mount make sure you go through the extruder motor mount when doing this. If you didn't melt the nuts into place take a putty knife and insert it between the part fan and the hot end mount – this will keep the nuts in place long enough for the screws to get a bite on the threads. Also ensure that the hot end is angled in such a fashion as to ensure that the least amount of surface area is adjacent to the part fan shroud.

Take the other extruder motor mount , two M3x10mm screws, and two m3 nuts and attach it to the plate on the opposite side of the extruder. Use nylon lock screws or a bit of blue lock tight on the threads to ensure that the screws stay in place.

Melt a M3 nut into the belt tension holder to ensure it doesn't move. Install one end of the belt into the belt holder. At this point check to ensure that the belt will stay in place within the teeth of the belt holder. If it does not, then you should use some epoxy to glue down the belt. While this does prevent reuse of this belt holder and the belt it is preferable to having it pop out later. Now install the belt tension holder onto the extruder mount with the m3x10mm round button screws. You can optionally tap these holes prior to installing the belt holder

Step 3 – Gantry

Tools needed

- 3mm allen key/wrench
- 2mm or 2.5 mm allen key/wrench
- Tape measure
- Dark colored sharpie
- square

Parts needed

- 2 4 hole c shaped support
- 2 triangle left handed 5 hole support
- 2 triangle right handed 5 hole support
- 4 15 inch vertical extrusion
- 2 17.5 inch horizontal extrusion
- 1 right hand z rod support
- 1 left hand z rod support
- 32 M5 extrusion nuts
- 48 M5 screws

Measure length of 4 extrusion and place a mark at 9" (half way) – take your measurement from the edge of the extrusion, not the plates. Take your square and draw a complete line at the 9" point. Measure inside of the c-shaped support. Make a mark at the 1.5" spot (half way) and square a line.

Drop 4 extrusion nuts into the top slot of the 4 rail high extrusion. Ensure these nuts align with the c support holes while the sharpie lines on the support and the extrusion are in alignment. You can do this by gently moving the nuts with the allen wrench. Once aligned tight down the screws into the nuts – make minor adjustments to ensure that the sharpie lines are aligned. Double check to make sure that the nuts are holding properly inside the rails of the extrusion. Perform same operation for the other side of the unit.

Now attach the vertical 15" extrusions to the plates you just attached. Don't worry about making these square – lightly tighten down the nuts so they provide stability. Once the horizontal supports have been attached we'll make these square.

Once the four vertical extrusion are in place install the z axis plates along with the horizontal extrusions. Once they are loosely screwed in now square the top of the vertical extrusions with the top horizontal extrusions. Tightly screw down the nuts. Now square the vertical extrusions with lower horizontal extrusions.

Step 2 – Extruder and X-Axis Gantry / Z-axis

Tools needed

- 3mm allen key/wrench
- Square
- 10mm open ended wrench or adjustable wrench
- 8mm or another adjustable wrench

Parts needed

- 17" two high Al extrusion
- 2 arrow shaped supports
- 4 M5x25mm screws
- 2 M5x30mm screws.
- 6 vWheel kits
- 2 eccentric stand offs
- 4 smooth stand offs
- 6 M5 x 8mm button screws
- 4 M5 extrusion nuts
- 6 M5x25mm flat screws
- 6 M3 x 10mm button screws
- 6 M3 .05 pitch nuts
- 2 M5 Pulley kits

Install arrow head supports at the end of the Al extrusion. Make sure the arrow points are facing the same direction. Lightly tighten this parts as we'll need some give in a later step.

Install the v-wheels. Start by installing the v-Wheels that are closets to the extruder/x-axis gantry. The screw should be installed so that the head of the screw is on the inside of the part. Then place the smooth stand off on the bolt, then the v-wheel (with the bearings installed), and then the nylon locking nut. Tighten this assembly down, but not too tight as the wheel should move freely. Be sure to avoid any ability for the vwheel to wooble on its axis. This is generally accomplished by tightening it down and then backing off a quarter turn Repeat this process for other three other remaining spots.

Now install the vwheel with the eccentric spacer. DO NOT attempt to install it on the gantry yet. You first want to get screw down the nut on the vwheel so that the eccentric spacer can seat all the way down in the hole provided by the support. Not do this will effectively make it impossible to install the wheel on the gantry. Once it has been seated evenly you can now unscrew the nut and take off the wheel. The eccentric spacer will stay in place after removing the screw. Rotate the spacer so that the widest edge is pointed toward the other wheels. This will help with installing the wheel in the next step. The screw should then slide through the support, the eccentric spacer, and the vwheel. Now tighten the nut as described above. Performmm the same operation on the other side. At this point the gantry should move freely up and down.

You must remove any back and forth movement in the gantry (when facing the gantry) take the 10mm wrench and slowly adjust the eccentric spacer to remove any play in the gantry. This step should not inhibit the movement of the gantry, make sure the gantry can move up with out binding and drop easily without having to be pushed.

Install the x-axis / z-axis support on the extrusion. Use one pulley set on each side – the pulley should be on the outer hole on the side without the x-axis motor mount. The pulley should be on the inside of hole on the other side. The pulley should have a washer on either side of bearings, the nylon washer should go between the bearings. Don't worry about tightening these down yet as they'll be tighten when installing the z-axis motors. Ensure that the pins on the stepper motor point toward the hole on next to the stepper motor mount – these are used for cable management later.

Remove the z-axis nuts from the shaft of the stepper motor and then install the z-axis stepper motors on the top of the gantry by using the 8 M3 screws. Do not tighten down the z-axis motors.

Then with the help of a square tighten down the x/z axis mounts so that they are square and do not inhibit the z-axis from turning. This might require you to re-seat the z axis stepper motors for the optimal position between the mounts on the top of the gantry and the mounts for the x/z axis. This does not have to be perfect – as you will find out there's a bit of wobble which prevents a perfect alignment. Once completed thread the z-axis nuts back on the threads. Screw them up until they hit the z-axis mount and attach them by using M3 x 10mm machine screws and the M3 nuts to screw them onto the z-axis nut and mount. Apply a bit of blue lock-tite on the threads of the screw to ensure that the nuts hold in place. It will take some effort to maneuver the M3 nuts under the z axis nuts – so seat the screws up through the bottom and then attach nuts on the top. However, it is possible to attach the nuts from the bottom – it just requires a magnetic screw driver to hold the nut in place while you drive the M3 screw into it. Once this has been done you can now tighten the z-axis motors on the top of the gantry. Manually move the x axis/extruder gantry about 50% up from the resting position – this will give you some room to install the y-axis in a later step.

Step 3 – Extruder and X-Axis Mounting Plate

This should occur after the gantry and after the plate has been populated above.

Tools needed

- 3mm allen key/wrench
- Square
- 10mm open ended wrench or adjustable wrench
- 8mm or another adjustable wrench
- 2.5mm allen key/wrench

Parts needed

- One large v-wheel kit
- Two small v-wheel kit
- Two Al spacer
- One off set spacer
- Three M5x25mm flat head screws
- 4 M3x8mm button screws
- Stepper motor

Take extruder/x-axis mounting plate, offset spacer, and the large v-wheel kit. Assemble the large v-wheel - push the screw through the larger hole at the end of the mount and place the off set spacer on the opposite side of the plate. Then place the wheel on the offset nut then place and screw down the nut on wheel until the offset nut completely seats on the plate. Remove the large wheel and then adjust the offset nut so that the large edge points toward the small end of the plate.

Install the two smaller v-wheels on the plate. Place the screw into the smaller holes opposite the offset spacer. On the other side place the Al spacer, one washer (from the kit), the small v-wheel, another small washer and then the nut. Repeat for the second small v-wheel. Tighten the nuts on the wheel until there is no play (or wobble) in the wheel while still allowing it to spin freely. Once this is complete, reassemble the large v-wheel while holding the plate over the extruder/x-axis gantry. Before tightening the nut on the large v-wheel down make sure that all the wheels are set in the top groove of the gantry. Once the nut is set on the large wheel slowly adjust the offset spacer so that the plate can move freely but provide little to no play vertically while being pushed across the gantry horizontally.

Once complete the extruder/x-axis mount should move freely in the horizontal direction along the gantry.

Install the x-axis stepper motor using 4 M3x8mm screws. Ensure that the power cable mount is facing toward the center of the gantry along the x-axis.

At this point you can attach the stepper motor 20 tooth (or your preferred size) pulley and the GT2 belt. You will have to trim the belt a bit and attach the other end to the belt connector. If there is any movement of the belt in the belt connector you will have to put some epoxy on this end too and allow to dry. After you get the belt connector in the connector body tighten the belt so that the extruder head exhibits no slop when moving the head back and forth – for every movement of the print head there should be movement of the stepper motor. This can be checked by holding onto the stepper motor pulley while pushing the extruder assembly – as you hold the pulley tightly the extruder head should not move when pushed or pulled gently.

Step 4 – Y-Axis

Tools needed

- 3mm allen key/wrench
- Square
- Black sharpie
- 8mm wrench or socket
- 10mm open ended wrench

Parts needed

- 8 M5 x 8mm button screws
- 4 M5 x 25mm tall button screws

- 4 M5 extrusion nuts
- 2 18" extrusions
- Small and large y-axis plates
- 2 offset spacers
- 2 normal spacers
- 4 large v-wheel kits

Find the center point for both the extrusions on the front and back of the printer. Also find the center point for both y-axis plates. Install the plates on to the frame of the printer using the topmost portion of the extrusion. Ensure that the center lines are aligned and that the plate is square to the frame.

Place both 18" extrusions across the middle of the frame, use the M5 button screws to lightly screw down the extrusions. Only tighten one of the extrusions completely – make sure that it is square with the frame as well as sitting firmly on the top of the frame. If you find yours are a bit off the frame, adjust the y-axis plates until the y-axis extrusions are sitting on top of the frame. Leave the other y-axis extrusion slightly loose for the next step.

Step 5 – Y-axis mounting plate

Tools needed

- 8mm wrench or socket
- 3mm allen wrench
- 10mm open ended wrench

Parts needed

- 4 large v-wheel kits
- 4 M5x25mm screw
- 4 M5 nylon nuts
- 2 Al spacers
- 2 offset spacers
- Y-axis mounting plate

Install two large v-wheels on y-axis mounting plate. Push the bolt through the smaller hole toward the center of the plate, place the normal spacer on the other side of the plate, then the v-wheel, then place the nylon nut on the screw. Repeat for the other side. ensure that the nuts are tightened enough to prevent the screw from wobbling, but allows the wheels spin freely.

Turn your printer on its side now and place the plate in a position where the v-wheels are sitting in the rail positions. Now install in the other wheels using the offset spacers, again making sure that the bearings are free to move – during this step it is important that the wheels remain in the groove of the y-axis extrusion. Then spin the offset spacers so that the y-axis mounting plate moves freely but does

not move outside of the grooves of the extrusion. Also during this step it is important to tighten down the y-axis extrusion. It might take a few tries between adjusting the offset spacers and positioning of the y-axis extrusion to allow the y-axis mount free movement. However, when you are complete the plate should move freely without binding at any position on the extrusion.

Step 6 –Install axis electronics

Tools needed

- 2.5mm allen wrench

Parts needed

- 6 M3x8mm button screws
- Stepper motor
- Y-axis stepper motor mounting plate
- 2 pulley kit
- 4 M5 extrusion nuts
- 3 M5x8mm screw
- 2 M5x30mm screw
- 2 Al ¼" spacer
- 3 M5 washers (you'll have a few left over)
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Identify from the last step the side in which the y-axis mounting screw holes are on the build plate mount. You will want to install the two pulleys and y-axis stepper motor on the y-axis extrusion rail that is on the same side.

Use the four M3 screws to secure the stepper motor to the y-axis belt mount. Place two M5 extrusion nuts toward one end of the extrusion rail. Then use one M5x8mm screw and extrusion M5 nut to attach the plate to the y-axis extrusion rail. Push one of the M5x30 nut through a belt pulley and attach the ¼" spacer to the other side of the pulley. Push this assembly through the stepper motor plate and screw down securely into the M5 extrusion nut. Assemble another M5 pulley – this time placing the ¼" spacer and three washers on the other side of the pulley. Then screw into the rail using another M5 extrusion nut toward the other end of the rail. Keep enough space for you to be able to feed the belt around the pulley.

Now assemble the Y end stop mount. Secure the end stop break out board with 2 m3x8mm screws. Now take the M5x8mm and extrusion nut and attach the end stop assembly onto the frame near the y axis motor. Test operation of this end stop by making sure the switch is triggered when the v-wheel comes into contact with the switch.