

# Odin One



Assembly instructions for the Odin One 3D Printer from Hooklet 3D.

# Introduction

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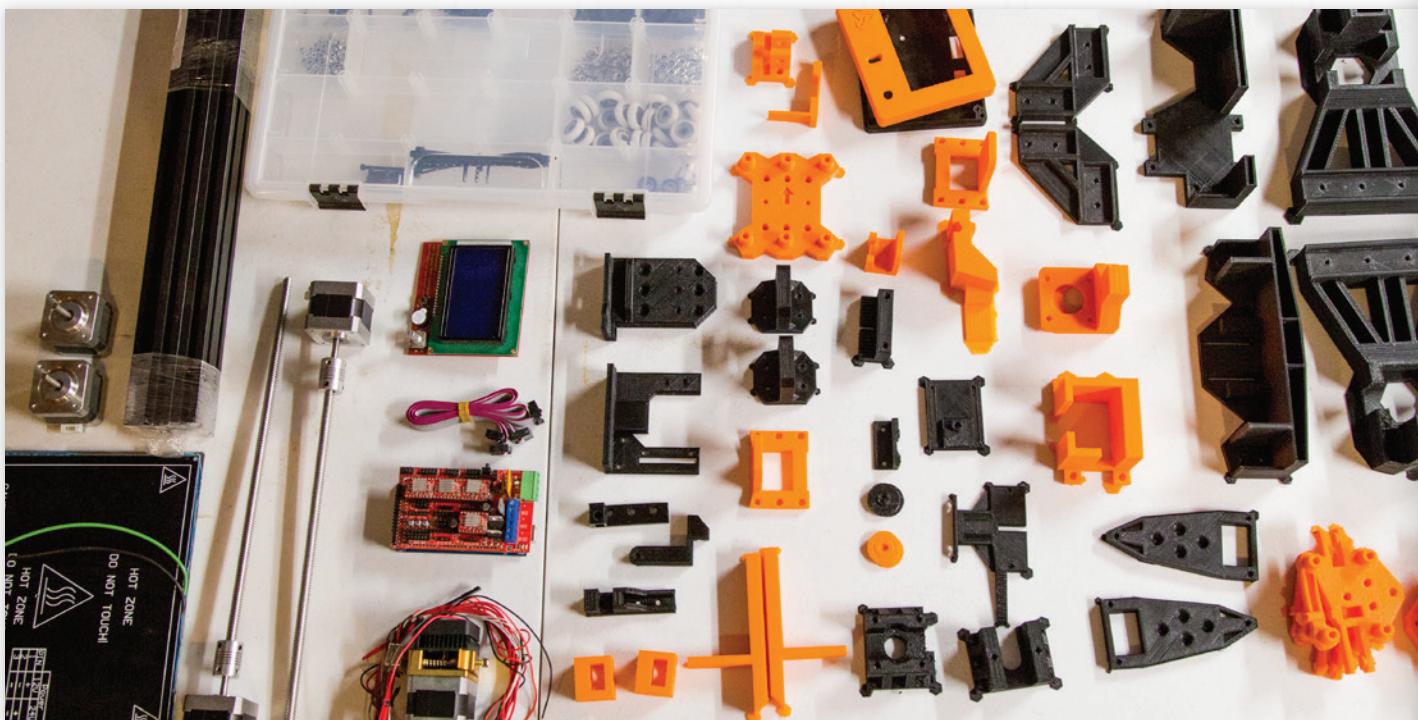
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# Safety

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# Setting up



Before you jump into building your Odin 3d Printer, start by organizing your parts in a way that makes them easy to find—doing this will make your build go faster and smoother.

Many of 3d printed parts in your kit contain additional tabs, these tabs are added during our manufacturing process to help the prints stick to the bed. These tabs must be removed prior to building your printer.

Slowly check each part for these tabs (they will be hexagons) and remove them. Removing these tabs can be done with any cutting device such as a pair of scissors. While you are doing this also check the parts for artifacts left over from the printing process. The parts should be generally clean, however, some cleanup may be needed on 3d printed parts.

## Parts Guide

### Fasteners



M3x8



M3x12



M3x16



M3x25



M3x30



M3x 40



M4x10



M5x25



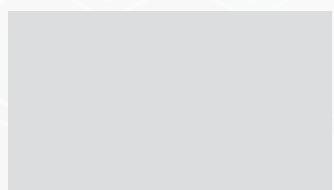
M3 Nylock



M4 Hammer Nut



M5 Nylock



xxxx



## Step 1 Building the skate system

Building the skate system is probably the most time consuming task of building your Odin One, the skates act as linear guides for the printers axis and keep your printer running smooth and quiet. For this portion of the build it goes faster if we build the skates in a series of similar steps.

### Parts List:

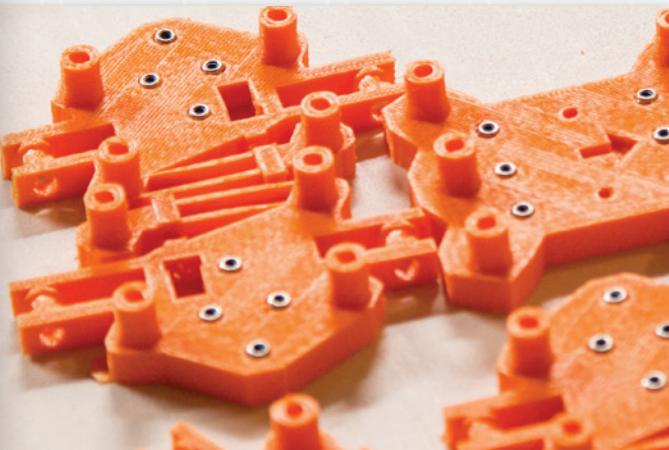
- Extruder Skates x1
- Linear Skates x4
- Nylon Rollers 30
- M5x25 Bolt x 30
- M5 Nylock Nut x 30
- M3 Nylock Nut x 22

The first thing we want to do is gather all of the parts we will be using.

Once we have our parts laid out as shown in the image we can begin with the first step of assembling.

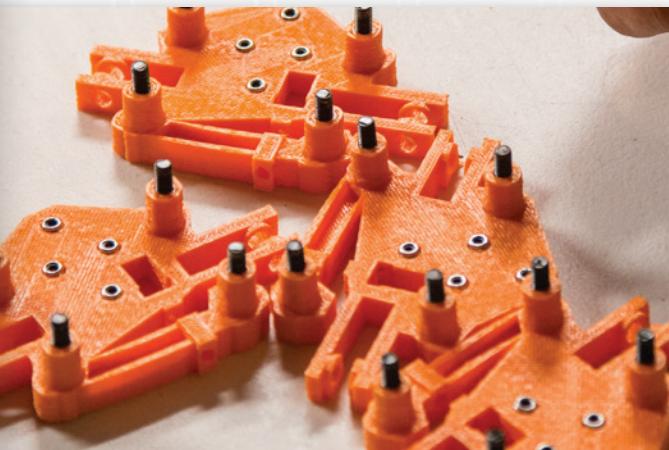


*Note: When tightening fasteners on 3d printed parts be careful not to overtighten. Doing so may split, crack or otherwise damage the part—we use Nylock nuts to ensure the bolts stay in place without the need for overtightening.*



First we want to add nylock nuts to the printed hexagonal holes (4 on the smaller skates 6 on the large skate). It helps to use a pliers to force the nylocks into place, make sure the nylock is properly aligned in the hole prior to pressing into place.

*Note: These nylock holes are found on several Odin parts, in some cases the holes will fail to grab the nut properly. If this happens, the best solution is to use a small flat head screwdriver (or similar tool) to wedge against one side of the nut while you turn the bolt. Use care while doing so to prevent injury.*



Next place a M5x25 countersunk bolt into each of the appropriate holes on the skate (see image). Please note, you will have a total of 5 skates (4 smaller for the X and Y axis, and one larger skate for the extruder carriage). Wait to place bolts in the end carriage of the smaller skates, we will add these at the same time we add the wheels.



Once the Bolts are in place, add a nylon roller wheel to each of the bolts and fasten it with a M5 nylock.

Once you have the wheels in place, similarly attach the end roller wheels to the end carriage (see image).

*Note: You may need to clean up the area between the wheel and skate to ensure free movement.*

## Step 2 Assemble the Bed

Now that we have the wheels assembled we can start building the bed. This consists of

### Parts List:

- Assembled Linear Skate x2
- Bed Skate Mount x 2
- Aluminum Bed Plate x1
- Y Belt Mount x1
- Y Tripper x1
- M3 Nylock x14
- M3x8 Bolt x6
- M3x30 Bolt x2
- M3x16 Bolt x8



Locate the Y Belt Mount and insert 2 M3 Nylocks into the printed hexagonal holes similar to how we assembled the skates.

Now locate the Y Tripper and place Nylocks in the hexagonal holes

Next locate the two Bed Skate mounts.

On one of the Bed Skate Mounts Insert Nylock nuts into all three Hexagonal holes.

On the remaining Bed Skate Mount insert a Nylock only the outer side (side with only one hole).

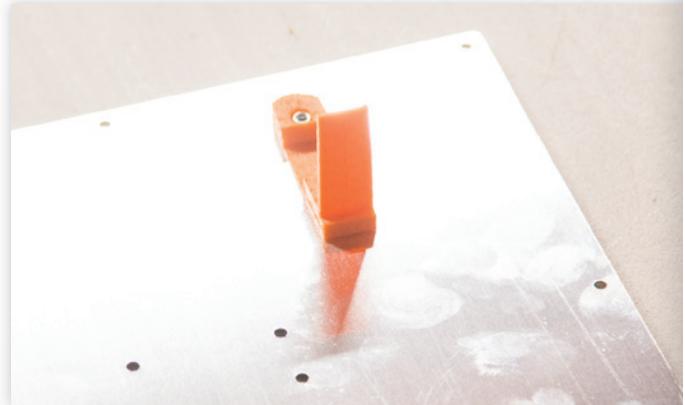
Attach the Y Tripper to the aluminum using 2 M3x8 bolts using the predrilled holes shown in the image.

attaching the Y axis skates to the bed as well as the belt attachment and endstop tripper.

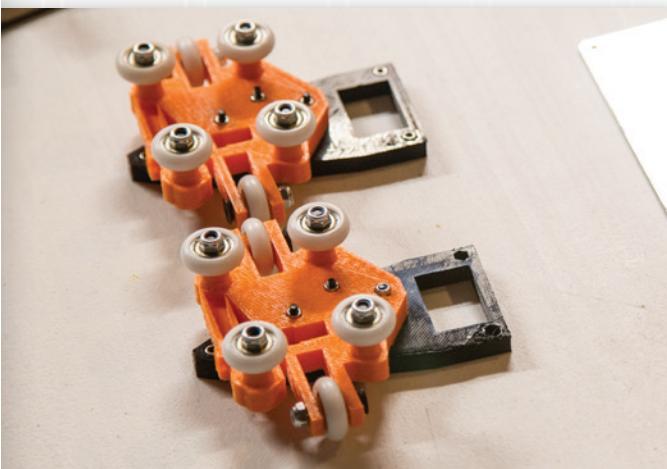
3 x M3 Nylocks



1 x M3 Nylock

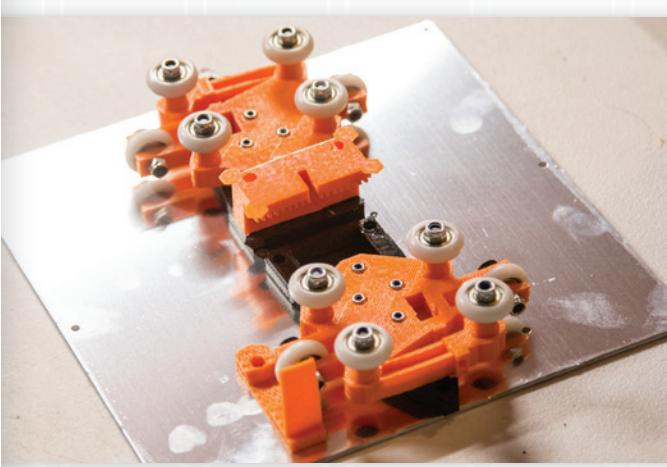


## Step 2 - Assemble the Bed



Next locate two skates and the two Bed Skate Mounts

Attach a skate to each of the bed skate mounts using M3x16 bolts and M3 Nylocks.



Ensure the bed is properly oriented by looking at the placement of the pre drilled holes in the image.

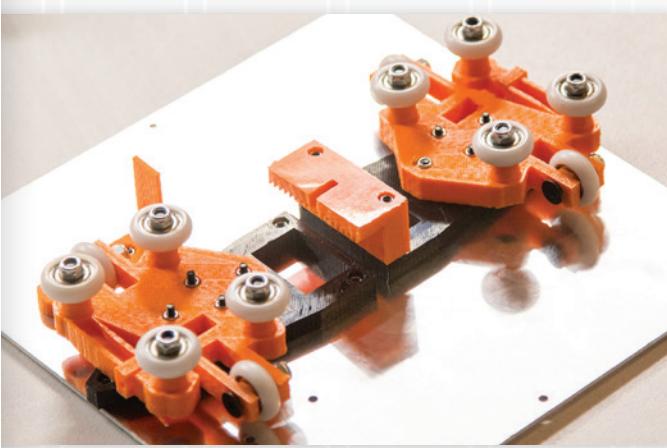


When looking at the aluminum plate, place the left skate in position by aligning the holes.

Fasten the mount into the predrilled holes using 3 M3X8 bolts and Nylocks.

Next place the right skate and bracket assembly in place by aligning it with the predrilled holes.

Fasten only the outer edge using a M3x8 and Nylock.



Next, locate the Y belt guide and place it as seen in the image.

Using two M3x25 bolts fasten the inner edge of the bracket and Belt Mount to the aluminum bed.

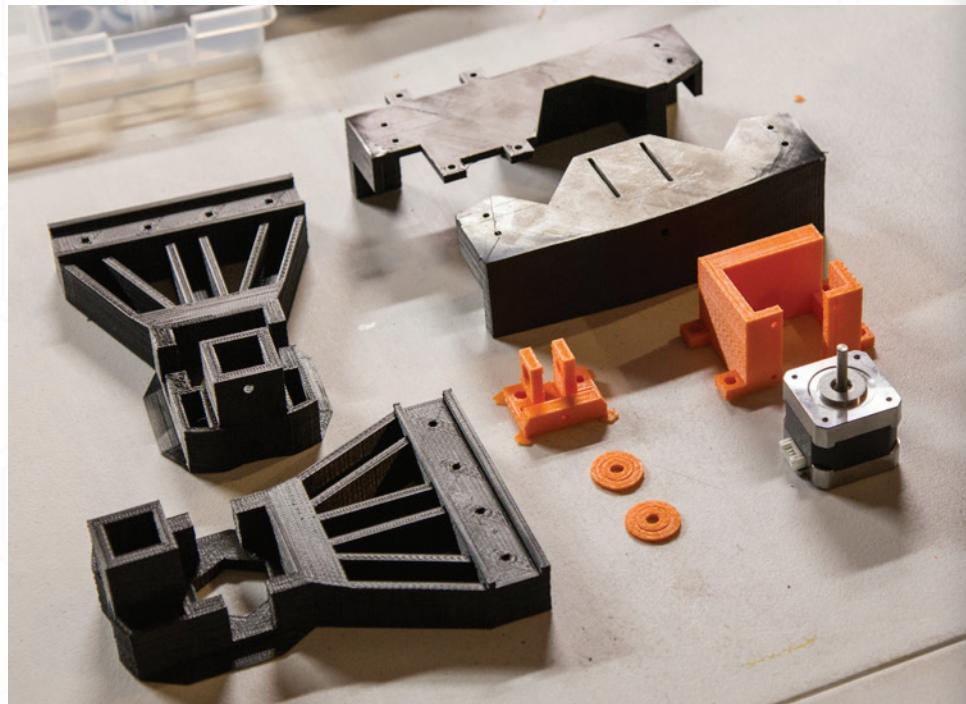
This completes the Bed assembly.

# Step 3 Building the Frame

Before we get too far into building the frame first we want to assemble the Y Idler pulley.

## Parts List:

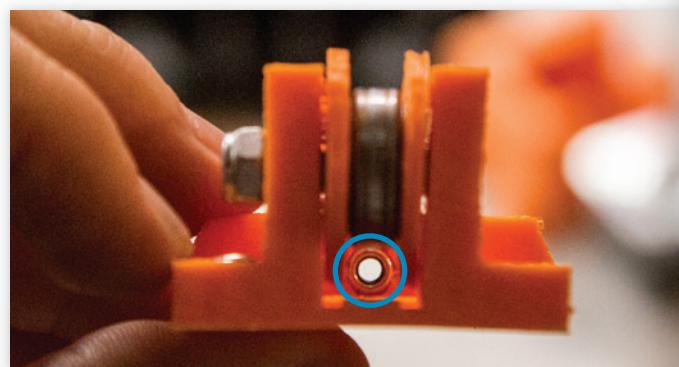
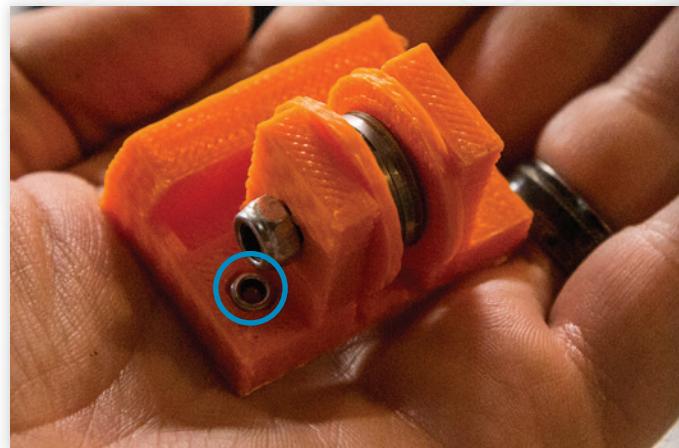
628zz Bearing x 1  
M3 Nylock x 8  
M3x12 x 8  
M3x40 x 1  
M3x8 x 4  
M4x10 x 13  
M4 Hammer Nut x 13  
M5x25 x 1  
M5 Nylock x 1

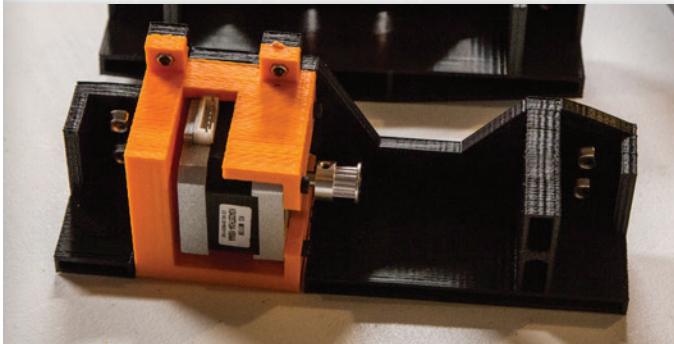
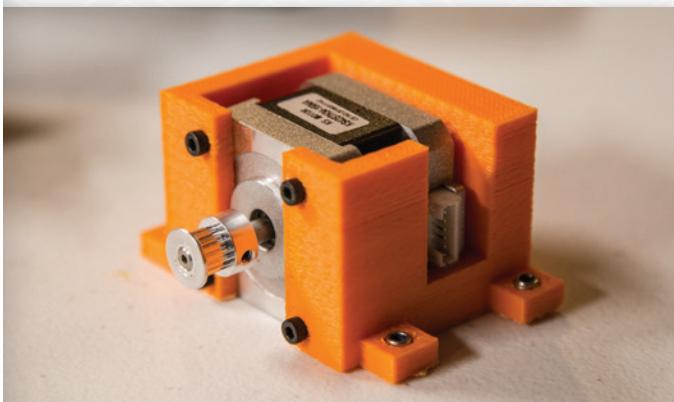
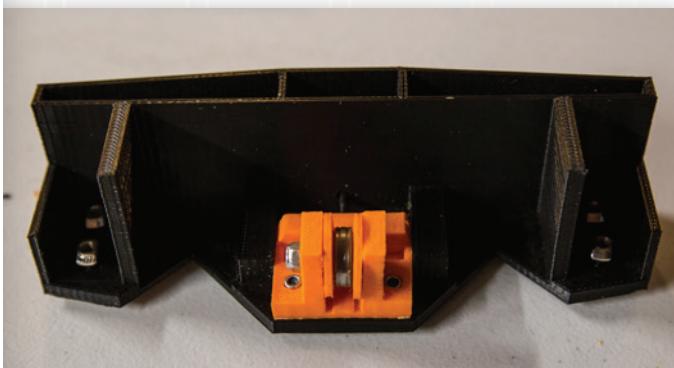


First locate the Y Idler assembly and a 628 bearing from the hardware kit.

Place two Nylocks in the base of the Idler pulley and another in the rear for the tensioner.

Place a printed washer on either side of the 628 bearing and using an M5x25 bolt attach them to the idler assembly.





## A word about hammer nuts

Now that we have the front and rear Base sections complete we need to join them, but before we do, let's talk about the hammer nuts we will be using.

The M4 Hammer Nuts included in your Odin Kit are what we use to fasten parts to the 2020 aluminum extrusions used on the machine. They work by fitting into the slot on the 2020 and allow us to thread an M4 bolt into the nut. When the bolt is tightened it causes the Hammer Nut to rotate and lock into position grabbing the inside edge of the 2020 extrusion.

Using the hammer nuts may take a bit of

Next locate the Base Front.

Place the Idler assembly in the Base Front as shown

Using two M3x12 bolts loosely attach the idler assembly to the base.

Move the idler as far to the rear of the machine as possible.

Using a M3x40 bolt attach the tensioner bolt to the assembly as shown.

Next we will assemble the Base Rear.

Locate the Y Stepper Motor and Y Stepper Motor Mount.

Using 4 M3x8 bolts attach the Stepper motor to the mount as shown in the image.

Next, take the Y Stepper Motor Mount and place 4 Nylock nuts in the hexagonal spaces.

Mount the Y Stepper Motor Mount to the Rear Base using 4 M3x???? Bolts.

practice, in some applications it may be best to slide the Hammer Nut into the extrusion from the side like shown here...

In other cases, we may not be able to do this (or it might not be the easiest way) so we will turn the Hammer Nut parallel to the slot in the 2020 and insert the nut this way.

As you use the Hammer Nuts you will notice that sometimes the Nuts will not turn and lock into the extrusion slot, this will result in the nut being pulled to the part you are fastening—this will not hold the part to the 2020 and you will be forced to try again.

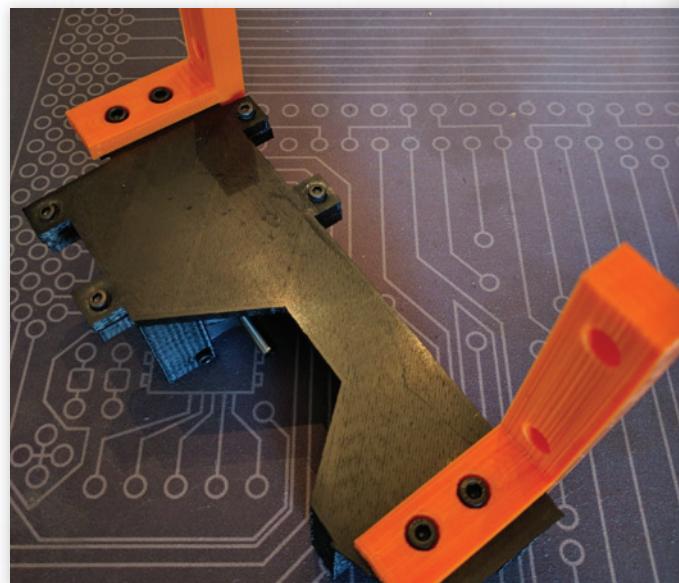
*Try the following technique to make using the Hammer Nuts easier.*

1. First thread the M4 bolt into the part you are preparing to fasten leaving only a few threads between the socket head and the face of the part.
2. Make sure the Nut is threaded onto the bolt as little as the application permits (you want as much exposed thread as possible between the part and the Nut. This allows the Nut clearance to rotate and lock in the slot.
3. Once you have properly aligned the Nuts and positioned the parts together, be sure to hold them flush prior to turning the Bolt.
4. To fasten the Bolt, first turn it  $\frac{1}{4}$  turn counter clockwise, then begin to tighten the bolt. This helps seat the Hammer Nut, if you are having issues with a particular Nut, you can use this technique to force the Nut to lock in place—by tightening the Nut and then backing it off  $\frac{1}{4}$  turn for every full clockwise turn the Nut will typically work its way into place.
5. Once the Bolt is fastened, verify that the Nut has properly locked itself into place. You can do this by either visually inspecting the Nut (if visible) or you by gently applying force to the two parts verifying they are fastened.

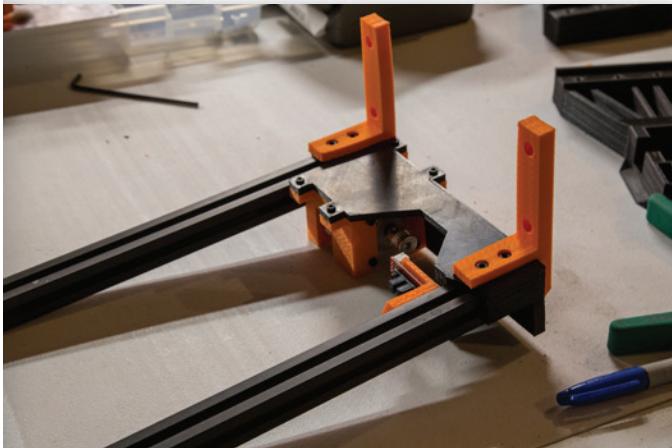
Take the Base Front assembly and insert 4 M4x10 bolts into the holes located on the top of the part. Now fasten 4 hammer nuts loosely onto the M4x10 threads.



Next, take the Base rear assembly and do the same, however, we will be adding the power supply brackets we gathered earlier (see image).

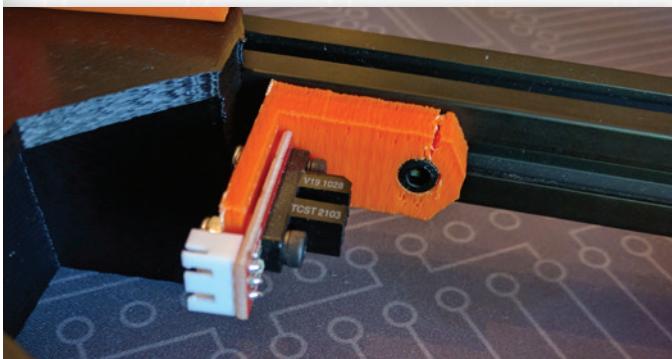


### Step 3 - Building the Frame



Retrieve 2 2020 aluminum extrusion and slide them into the slots on the Base Rear Assembly fastening the M4x10 Bolts into place.

At this point, check that the 2020 extrusions are tightly attached to the Base Front Assembly by gently pulling on the extrusion while holding the Base Assembly.



Now locate the optical endstop and YEnd Mount we assembled earlier.

Slide the Endstop assembly onto the 2020 as shown and tighten it into place.



Before we complete assembling your Odin's base, we need to attach the Base Side parts. Gather the following parts for this step.

Parts List:

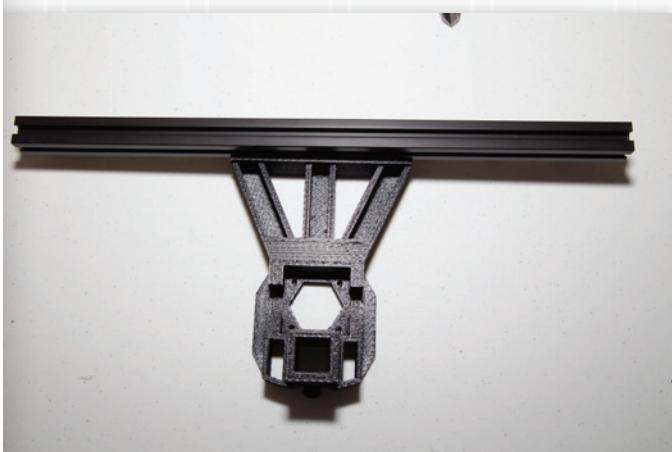
- X4 M4x10 Bolts
- X4 M4 Hammer Nuts
- X2 Base Sides

Ensuring that the Hammer Nuts are parallel to the 2020 slot, gently insert the left Base Side part onto the Left 2020 on the Base Assembly. Once you have this inserted, gently slide the Base side into position and tighten the M4 Bolts into place ensuring they lock into place.

Next, take the right Base Side and do the same. Gently slide the Base Side part into position making sure it is evenly aligned with the left Side Base.

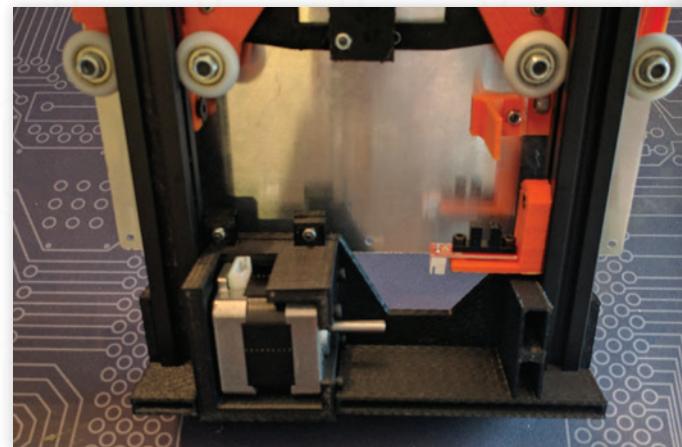
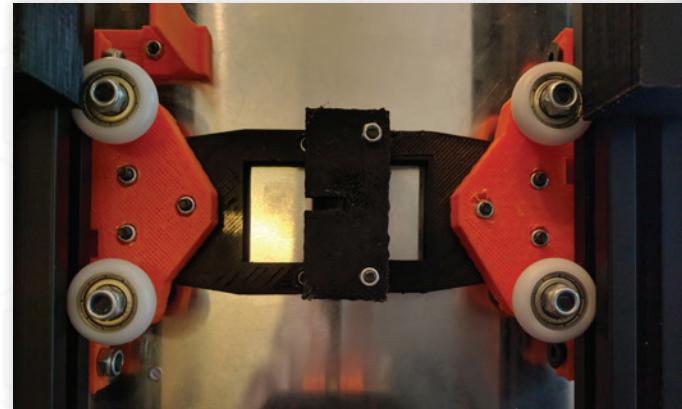
Once you are happy with the positioning tighten the M4 Bolts in the right Base Side as you did on the left.

Verify that the two base side parts are evenly placed.



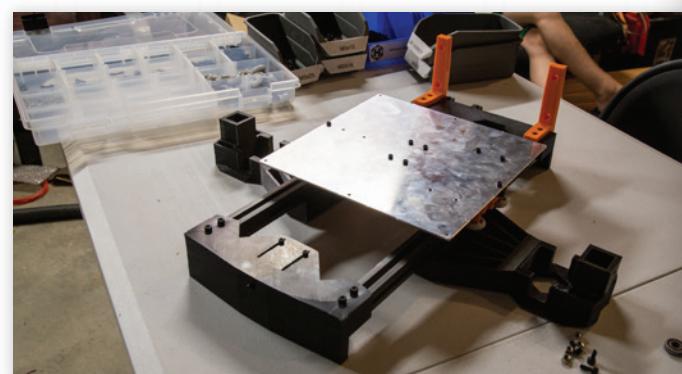
*Note: When positioning the upright, we want to make sure that they are centered on the Base Assembly, however, it's more important to that the right and left uprights are centered with each other. In other words, the distance between the front of the Base Side and the front of the Base Front part should be the same on both the right and left sides. This will ensure your Odin moves evenly on the X axis (left and right) relative to the Y axis (forward and back)*

Locate the Bed Assembly we previously built and slide it onto the extrusions as shown.

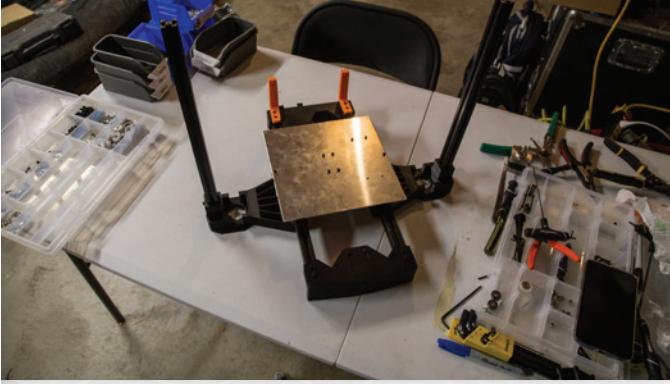
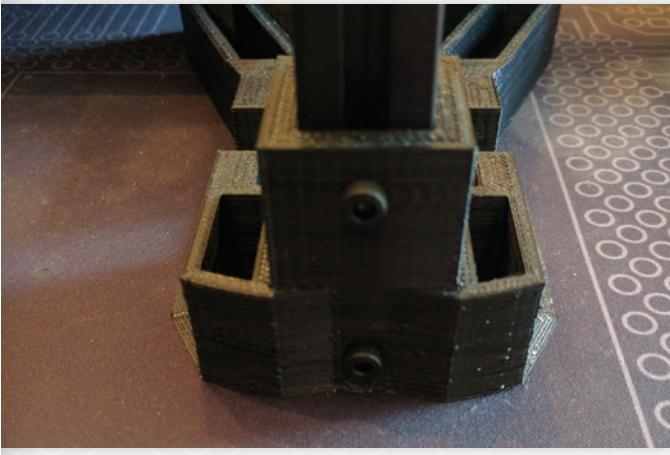


Next, Locate your Base Front assembly and slide it onto the 2020 extrusions and fasten it in the same way we fastened the Base Rear assembly.

*Note: With the added PSU bracket, you will need to make sure the M4 nuts are very loosely threaded onto the M4x10 bolt and that the M4x10 bolt has been threaded fully into the 3d printed parts. The Head of the M4x10 should be flush with the surface of the PSU bracket.*



### Step 3 - Building the Frame



To assemble the uprights thread 2 M4x10 bolts into the side of the Base Side part and loosely thread 2 M4 hammer nuts onto the bolts.

Next, thread 4 M4x10 bolts into the base of the part and loosely thread 4 M4 Hammer Nuts onto the bolts. Repeat this step for the other Base Side part.

Now, take one of the 2020 Aluminum extrusions and insert it into the upright receiver; please note that this should be a relatively tight fit so some force may be necessary. When inserting the 2020 you will want to make sure the Hammer Nuts are properly aligned to allow smooth insertion.

Once seated, make sure that the 2020 is flush with the bottom of the Base Side part. Now tighten the M4x10 bolts verifying that the Hammer Nuts properly lock into place.

Repeat this step for the remaining upright.

Now, take one of the assemblies and position it next to the Base Assembly we previously built.

# Step 4 Assemble the Extruder Carriage

Next we will assemble Extruder Carriage.

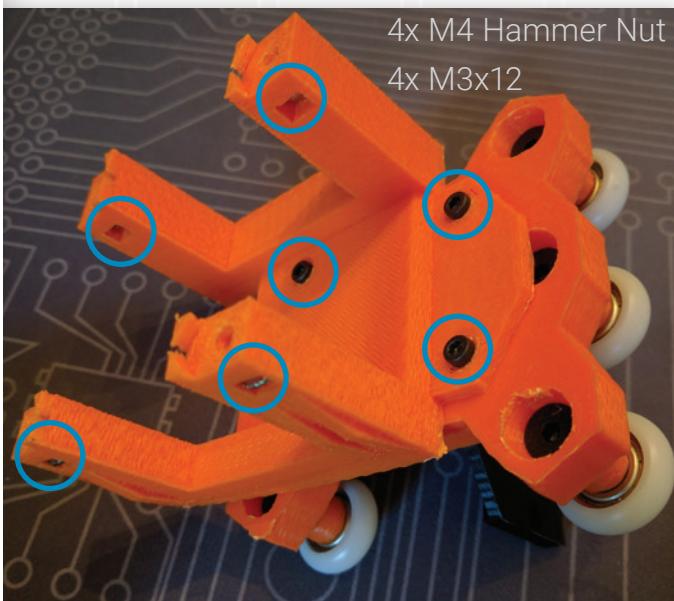
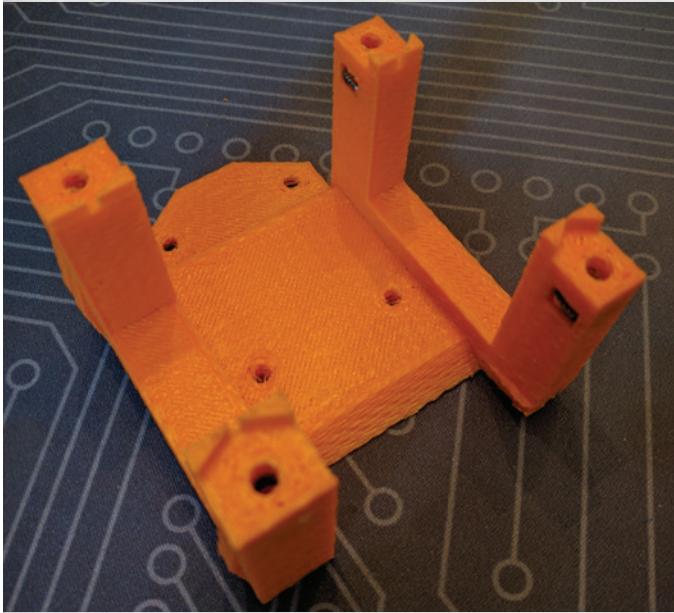
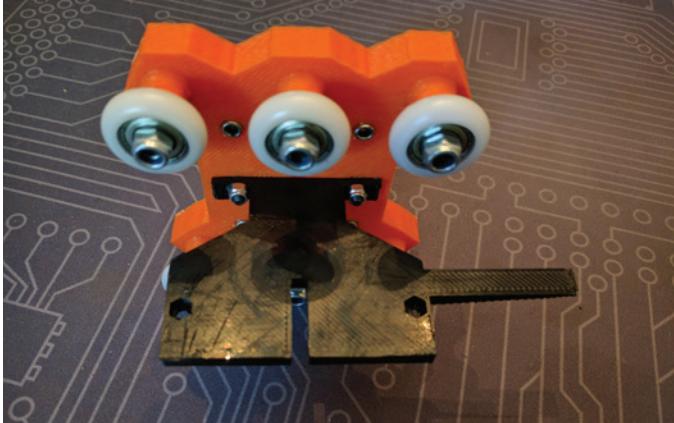
## Parts List:

- Assembled Extruder Skate
- MK8 Mounting Set
- X Belt Mount and Tripper
- MK8 Extruder Assembly
- X2 M3 Nylocks
- X2 M3x16 Bolts
- X4 M3x12 Bolts
- X4 M4 Hammer Nuts
- X4 M4x15 Bolts

Before we start, remember that we added 6 Nylock nuts to the Extruder Skate, for this application we will only be using 4 of these Nylocks. The additional 2 have been added for your convenience, the Extruder Skate was designed to be a universal mounting plate and give you the option to more easily use other extruders or mounts if you choose to do so.

Start by attaching the X Belt Mount to the Extruder Skate, you will notice that the Extruder Skate has an arrow embossed on the face of the part. **Remember that the Arrow must face upward and the face containing the arrow faces away from the Extruder mount.**





Position the Extruder Skate with the Wheels facing you. Now position the X Belt mount so that the tripper portion (the extended arm) is facing right.

Insert an M3x16 bolt into each of the countersunk holes on the face of the Extruder Skate (these holes are in the midsection of the skate and will align with the holes on the X Belt Mount).

Now insert the ends of the M3x16 bolts into the mounting holes on the X Belt Mount.

Once you have done this, hand thread an M3 Nylock onto each of the M3 Bolts.

Now, using a small pliers or needle nose, hold the Nylocks in place and tighten the M3x12 bolt from the other side taking care not to overtighten as this may damage the X Belt Mount.

Next Locate the MK8 Mount Set.

Take the MK8 Mount Base and place it against the face of the Extruder Skate aligning the mounting holes on the MK8 Mount to the mounting holes on the Extruder Skate.

Now insert and fasten a M3x12 Bolt into each of the mounting holes taking making sure they thread cleanly into the M3 Nylocks on the Extruder Skate. As always, check that the Nylocks are not allowed to spin in place, use the previously discussed technique if you run into any issues.

Once the base of the mount is securely fastened to the Extruder Skate, we can gently slide an M4 Hammer Nut into each of the posts.

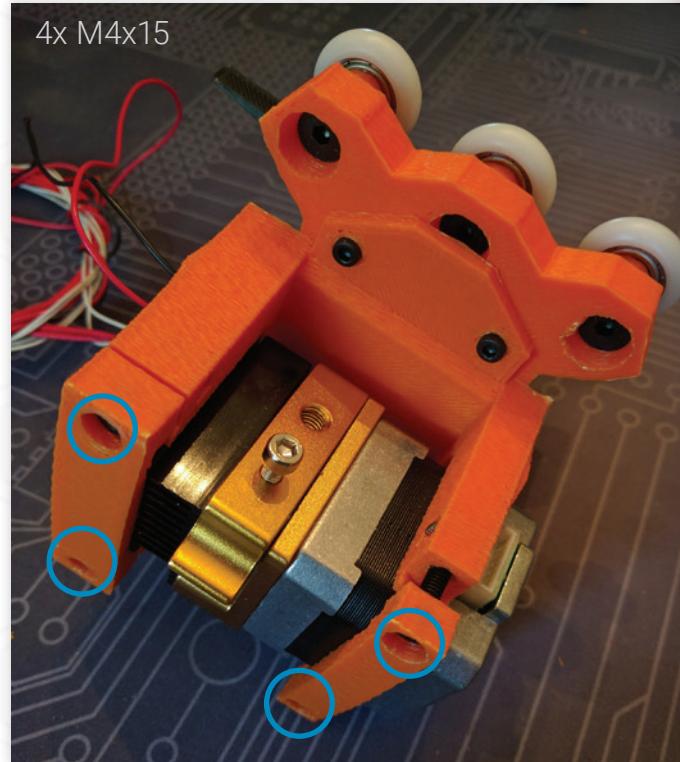
Now, locate your MK8 Extruder and the two mounting brackets and 4x M4x15 Bolts.

*Note: You will notice that you have two different size mounting brackets, these correspond to the two different sized mounting posts on the MK8 Mount Base. When assembling, make sure you place the appropriate bracket on the appropriately sized mounting post.*

Gently insert your MK8 Extruder into the MK8 Mount Base making sure the wider post is positioned on the fan end of your extruder.

Now, place the corresponding bracket onto each post and fasten it in place with a M4x15 Bolt. Make sure you don't over tighten these bolts as the torque may distort and eventually break the bracket part.

Set this assembly aside for now.



## Step 5 Cross Beam Assembly

### Parts List:

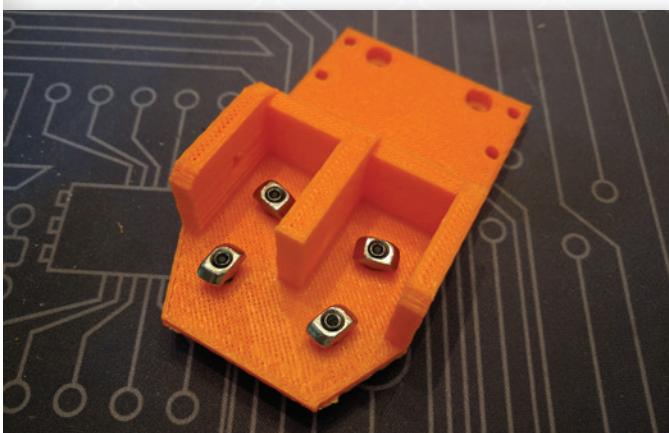
- X2 Beam Endcaps
- X2 Z Skate Mounts
- X1 X Nema Mount
- X1 X Idler Set
- X2 Lead Guides
- X2 Assembled Linear Skate
- X12 M3 Nylock Nuts
- X18 M3x16 Bolts
- X8 M3x12 Bolts
- X4 M3x30 Bolts
- X2 Lead Nut
- X8 M4x10
- X8 M4 Hammer Nuts
- X1 NEMA 17



Locate your Z Skate Mounts and 8 Nylock Nuts.

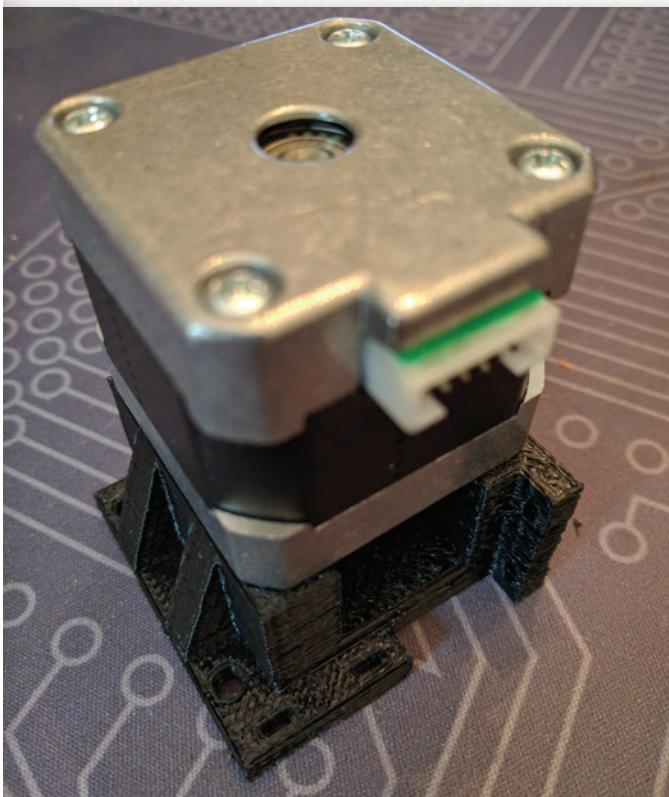
Insert a Nylock Nut into each of the hexagonal holes located on the face of the Z Skate Mount parts.

Set these aside for now.



Now loosely thread an M4 Hammer Nut onto each of the M4 Bolts.

Repeat this process for the other End Cap.



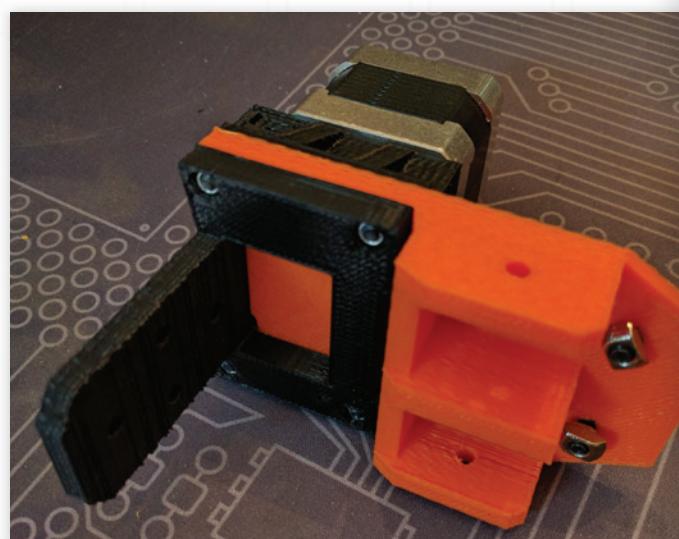
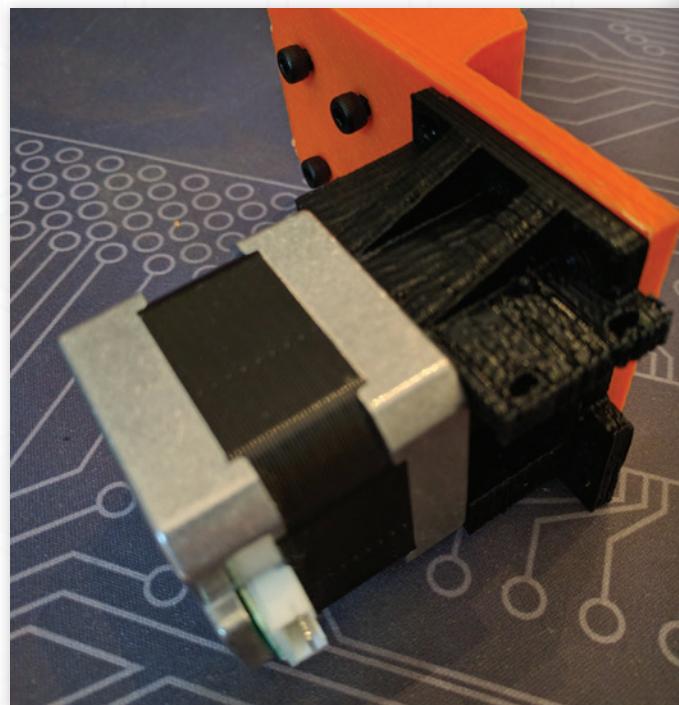
Now locate the X Nema Mount,NEMA motor, 1 Beam End Cap, 1 assembled Linear Skate and the following fasteners.

X4 M3x30 Bolts

X6 M3x16 Bolts

Place the face of the NEMA Mount onto the Face of the End Cap as shown in the image. Please note that the extended clips on the NEMA mount should be facing to the outside.

Now, thread an M3x30 bolt into each of the mounting holes. These bolts will go through both the End Cap and NEMA Mount extending slightly out of the NEMA mount as shown.



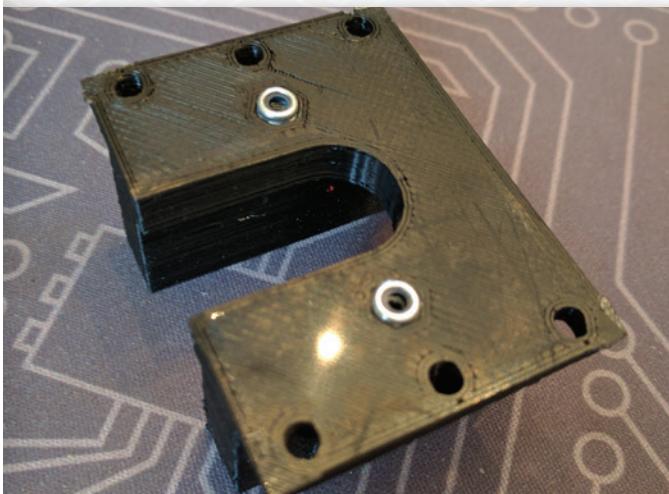
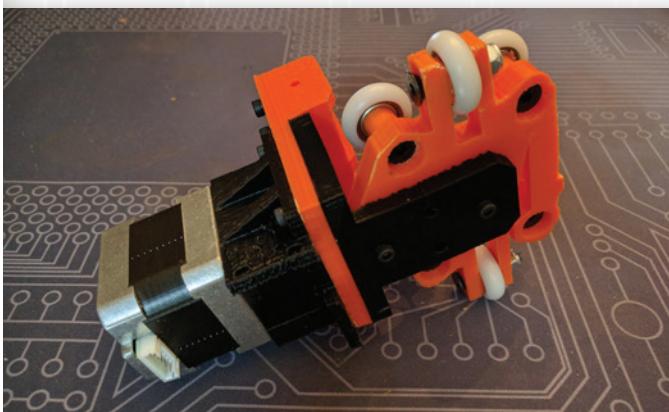
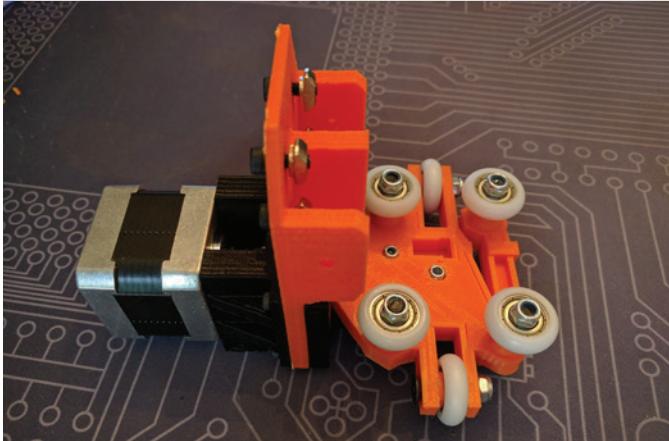
Place your NEMA Motor in place ensuring the plug is facing to the outside of the assembly.

Fasten the M3x30 Bolts into the machined holes on the face of your NEMA motor. You may find that tightening opposite corners of the stepper is easier for this step.

Locate one of your Z Skate Mounts placing it on the face of the End Cap as shown.

Hold the Z Skate mount flat and fasten into place using 4 M3x16 Bolts.

## Step 5 - Cross Beam Assembly



Now take one assembled Linear Skate and Place it on the Z Skate Mount arm, you will notice the arm has mounting holes that match the holes on the Linear Skate. Verify that the position matches the one in the photo.

We will start by inserting two M3x16 Bolts into the outermost holes and fastening the Linear Skate to the arm as shown.

Set this part aside for now.

Locate your X Idler Set, 1 Beam End Cap, 1 628 Bearing, 1 Z Skate Mount and the following fasteners.

X1 M3 Nylock

X1 M5x25 Bolt

X1 M5 Nylock

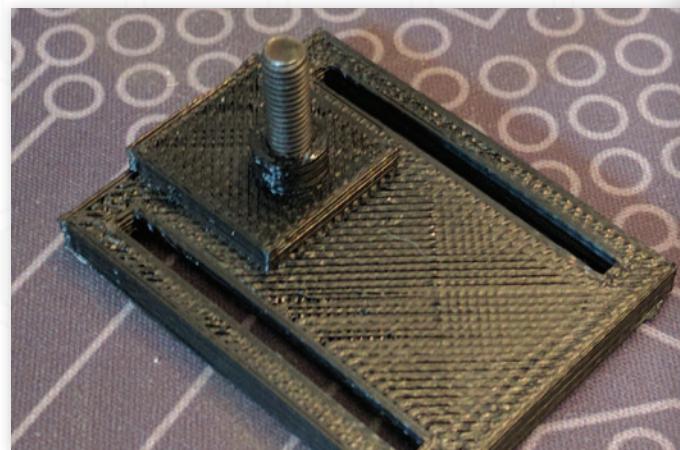
X2 M3x30

X4 M3x16 Bolt

First take the Idler Base and insert 2 M3 Nylock Nuts into the hexagonal holes.

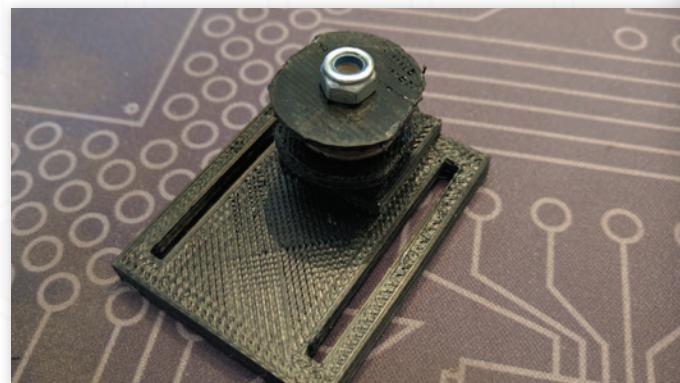
Now locate the Idler Top, the printed Washer Set, your 628 Bearing, 1 M5x25 Bolt and an M5 Nylock nut.

Take the Idler Top part and thread the M5x25 bolt into the mounting hole as shown.



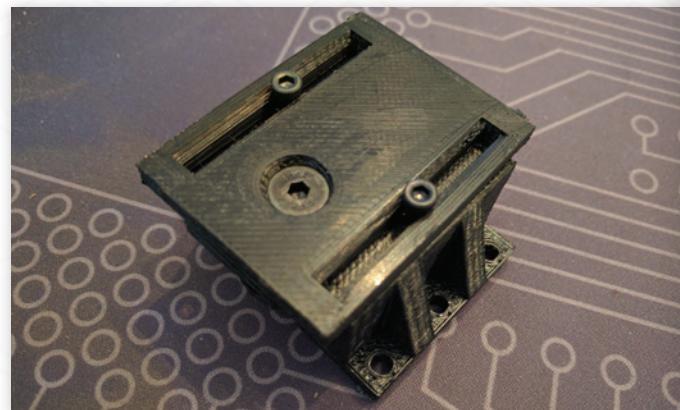
Place the 628 Bearing between the printed Washer Set and slide them onto the end of the M5x25 Bolt we just fastened to the Idle Top part. Fasten these parts together using the M5 Nylock.

Now place the Idle Top into the Idle Base as shown.



Use the Two M3x30 Bolts to fasten the Idle top to the Idle Bottom.

Note: For now you can keep this fairly loose as we will use this later to tighten the X Belt.



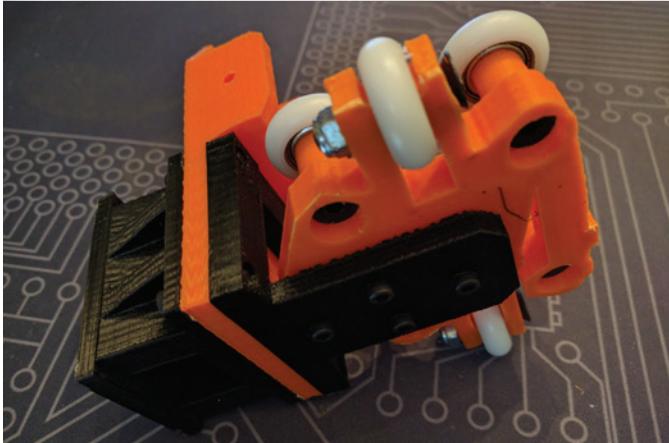
Next locate the Beam End Cap, Z Skate Mount and X Idle Assembly.

Place the Beam End Cap Between the Z Skate Mount and X Idle Assembly as shown in the image.

Use 4 M3x16 Bolts to fasten the 3 parts together.



## Step 5 - Cross Beam Assembly



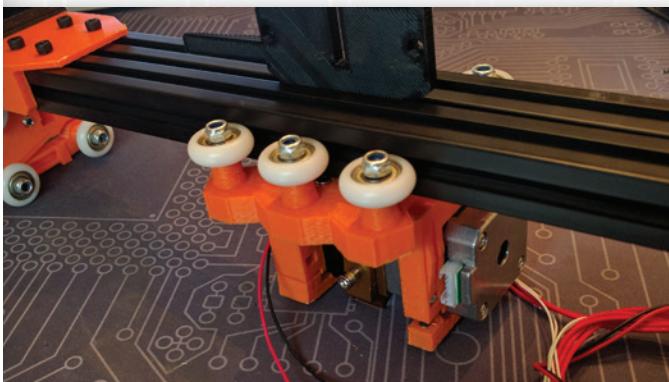
Now, locate your remaining Linear Skate and fasten it to the Z Skate arm using 4 M3x16 bolts as shown in the image.

Set this part aside for now.



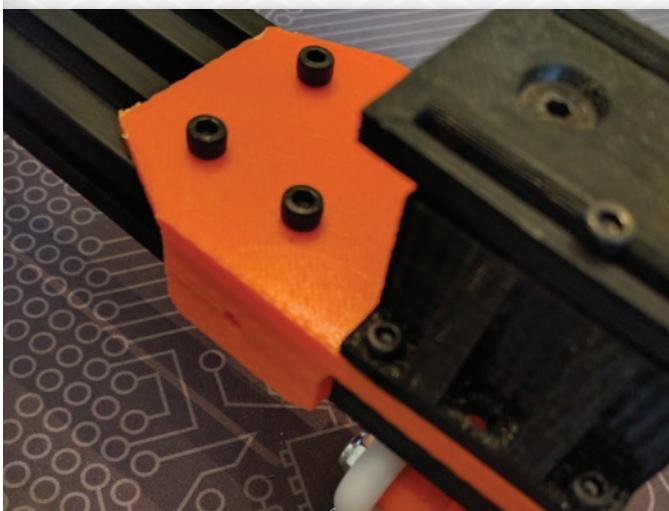
Locate your 2 2020 Aluminum extrusions and the Left Beam Assembly (the one containing the NEMA motor)

Slide the 2020 aluminum extrusions into place and fasten the M4x10 bolts into place as shown.



Now locate your assembled extruder and carriage from the earlier step.

Slide the extruder assembly onto the beams making sure the nylon wheels ride in the 2020 extrusion slot.



Locate the left Beam Assembly and fasten it in the same way as we fastened the left Beam Assembly.

Finally, we will assemble the Lead Guide.

Locate x2 Lead Guides, x2 Lead Nuts and the following Fasteners.

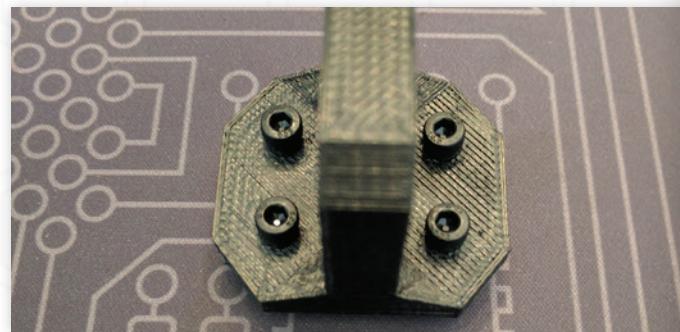
X8 M3x12 Bolts

X8 M4x10 Bolts

X8 M3 Nylocks

X8 M4 Hammer Nuts

Take one Lead Guide and insert four M4x10 Bolts in as shown.



Next loosely thread a Hammer Nut onto each of the M4x10 Bolts as shown.

Repeat this process for the other Lead Guide.

Now locate a Lead Nut and firmly press it into the depression on one of the Lead Guides making sure the mounting holes are aligned. Be sure to clear away any debris that may prevent the Lead Nut from resting flat in the Lead Guide.

Once the Lead Nut is in position, insert 4 M3x12 bolts into the mounting holes as shown.

Fasten the M3x12 Bolts into place using 4 M3 Nylock Nuts.

Verify that the Lead Nut is still resting flat after tightening.

Repeat this process for the other Lead Guide.

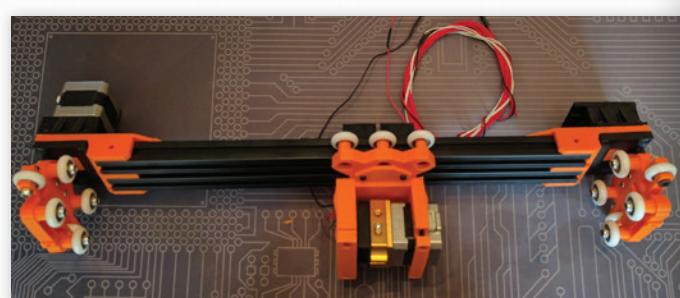
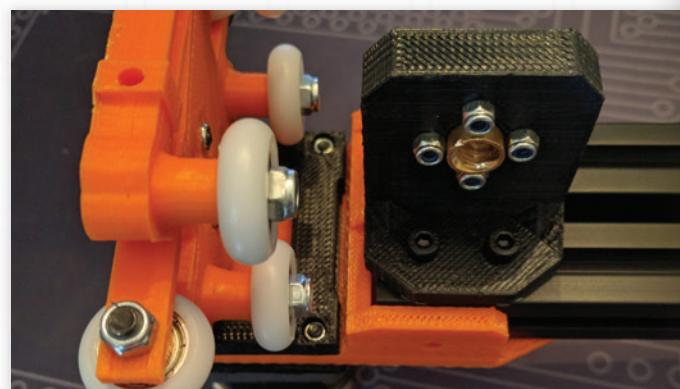
Now, let's fasten the Lead Guide assemblies to our Extruder Beam assembly.

Place your Extruder Beam in front of you as shown.

Now, align the Hammer Nuts located on the back of the Lead Guides so that they are parallel to the extrusion slots and insert each Lead Guide into the extrusion as shown. Lightly tighten the M4x10 Bolts so that the Lead Guides stay in place as we will be adjusting them shortly.

When you're done, the assembly should look like this.

This completes the Beam Assembly.





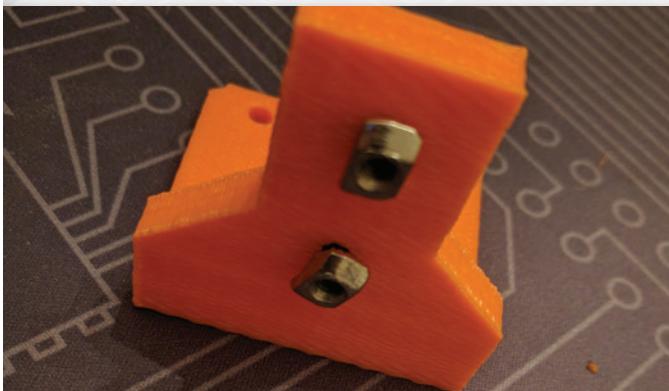
Locate 2 Z NEMA Mounts, 2 Z NEMA Assemblies and the following fasteners:

X4 M4x10 Bolts

X4 M4 Hammer Nuts

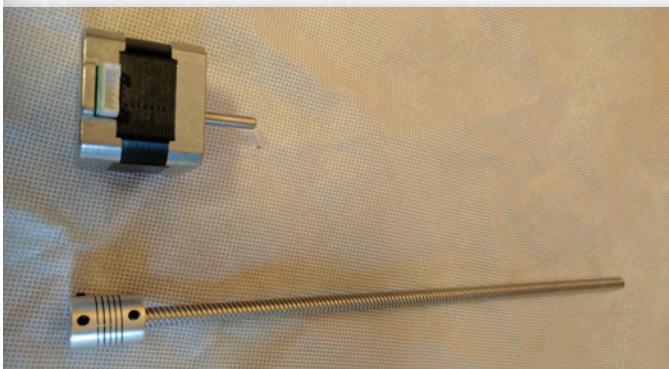
X8 M3x8 Bolts

Start by inserting two M4x10 bolts into the Z NEMA Mount as shown.

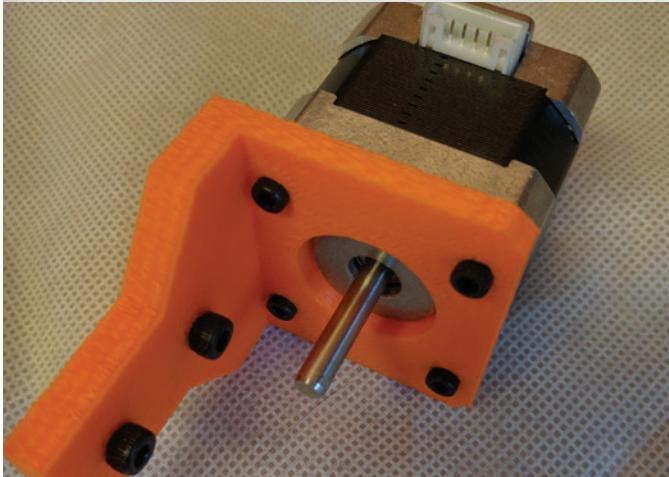


Loosely fasten an M4 Hammer onto each bolt as shown here.

Repeat this process for the other Z NEMA Mount



Next, locate your Z NEMA Motor Assemblies and remove the lead screw and coupling as shown.

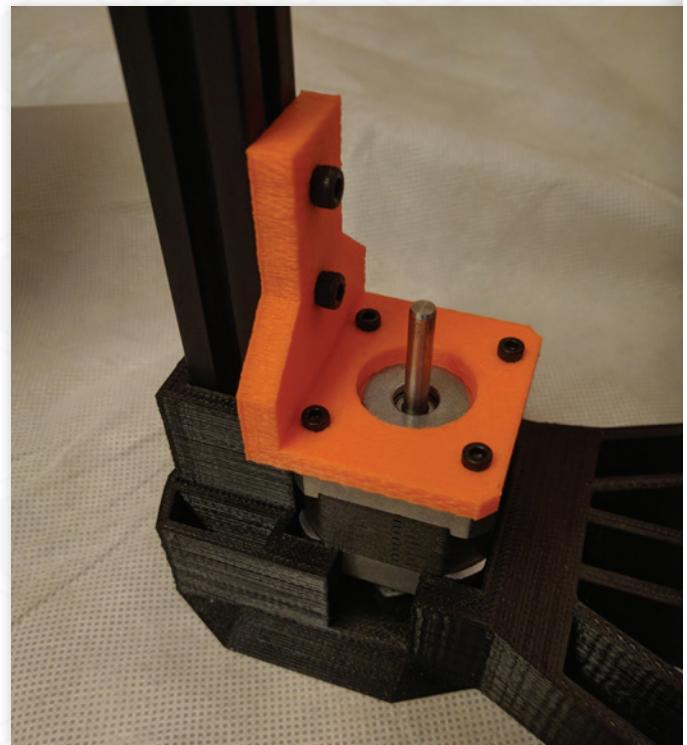


Take 1 Nema Motor and one Z NEMA Mount and Fasten them together using 4 M3x8 Bolts making sure the NEMA plug is facing to the rear.

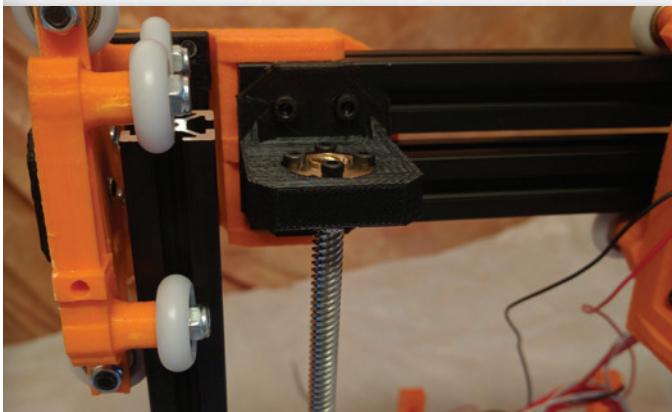
Repeat this process for the other side.

Now, slide the NEMA and NEMA Mounts into place as shown (make sure the plugs are to the rear).

Tighten the M4x10 Bolts to secure the NEMA Motors to the frame.



Now we will reattach the Lead Screw to the NEMA Motors. Make sure that they are tight as this is important for proper printer operation.

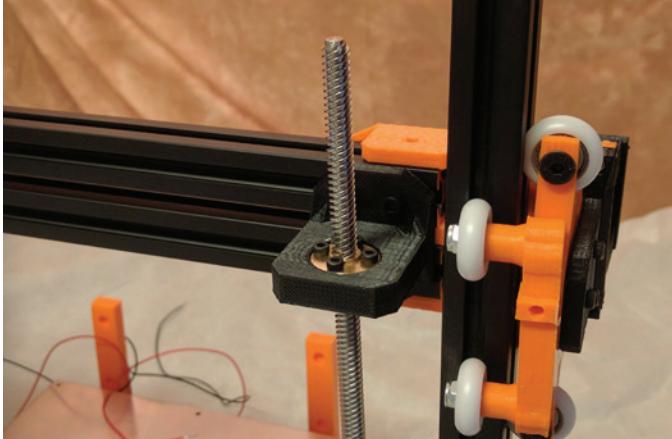


Locate your Cross Beam.

Loosen the Lead Guides and adjust them so that the Lead screws are Parallel to the 2020 uprights. Doing this allows the Odin to raise and lower the Cross Beam with less resistance.

Lift the Cross Beam to the top of the frame while holding relatively level and gently lower it onto the Odin's uprights making sure the Nylon Wheels ride in the 2020 slots as shown.

*Note: You may need to work the Cross Beam Into position, be patient and remember not to force it as this may damage the assembly.*



Once the Lead Nuts are resting on the top of the Lead Screws, begin turning the Lead Screws by hand to lower the beam. Lower the Cross Beam until there is approximately 3 inches of Lead Screw above the Lead Nut as shown.

Once you are comfortable with the positioning of the Lead Guides tighten the M4x10 Bolts ensuring the Lead Guide is secure.

*Note: You should be able to easily turn the lead screws by hand. Make sure when doing this you keep the Cross Beam level to prevent binding.*

## Step 8 Finish the Frame

Locate the following parts:

X1 2020 Aluminum Extrusion

X8 M4x10 mm Bolt

X8 M4 Hammer Nut

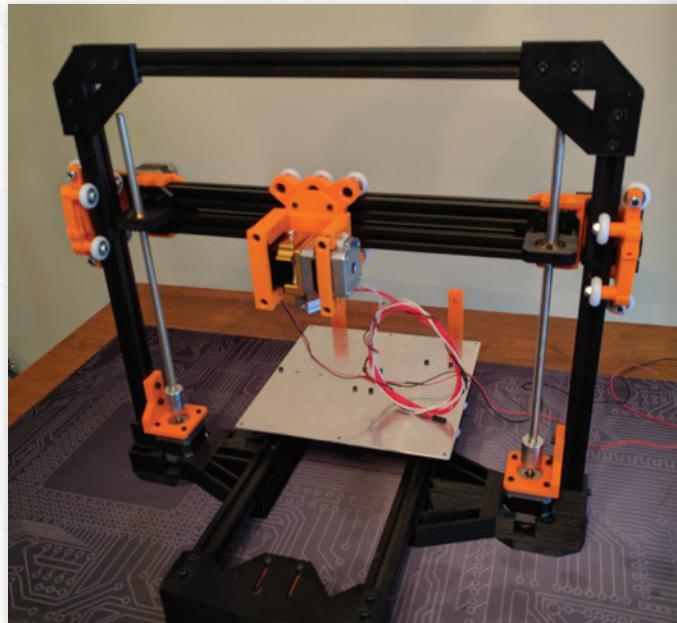
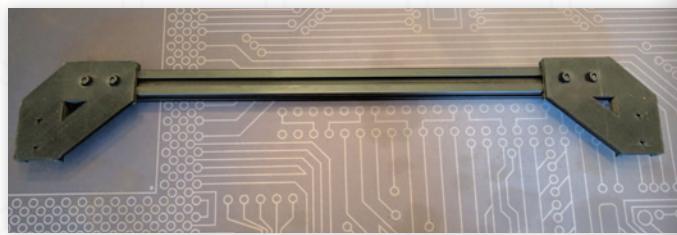
X2 Upper 90 Mounts

Start by threading an M4x10 Bolt into each of the mounting holes of the Upper 90 Mounts. Now, loosely thread an M4 Hammer nut onto the end of each bolt.

Now, take your 2020 Aluminum Extrusion and slide the long end of each Upper 90 Mount onto the extrusion as shown.

Tighten the bolts ensuring the parts are tightly fastened together.

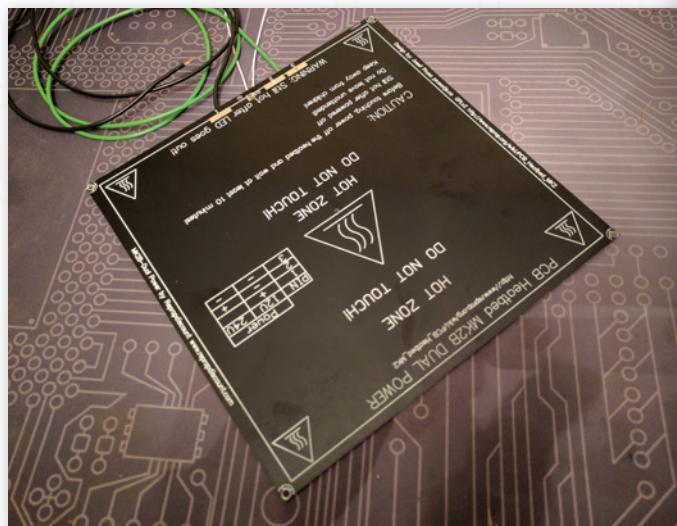
Finally, slide the upper assembly onto the top of the Odin Frame and tighten the bolts as shown.



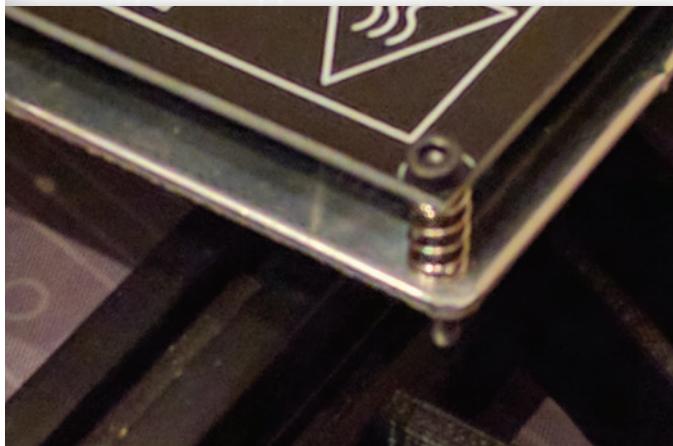
## Step 9 Attach the Heated Bed

*Note: The heated build Plate you received in your kit has been pre-soldered. Prior to mounting the build plate, take note of the wire placement and verify that they have not become loose in the shipping process.*

*Also, prior to shipping soldered parts we coat them in a layer of insulating rubber to both ensure the integrity of the connection and prevent incidental contact with the exposed solder joint.*



You will notice a white wire running to the center of your build plate. This is your thermistor, it is a small glass resistor that reads the temperature of the bed. Be aware that this part is fragile and the cable connecting it is also very fine and fragile—with this in mind—take care when handling this part of your Odin One.



The same rubber insulation has been added to the thermistor, this helps protect the thermistor and also adds a bit of thermal insulation to improve temperature readings. The thermistor is pre mounted and should remain attached to your Heated Build plate.

Gather the Following:

- X1 Pre-Soldered Heated Build Plate
- X4 M3x25 Bolts
- X4 M3 Thumb Screws
- X4 Bed Springs
- X4 Rubber Grommet
- X1 Odin One Printer

Start by placing an M3x25 bolt into each of the mounting holes of the Heated Build Plate.

Next, place the Bed on top of the aluminum plate on your Odin One, while doing this, align and insert each of the M3x25 bolts into the corner holes on the aluminum plate placing a spring between the aluminum plate and build plate at each corner. See Image.

Now place a Rubber Grommet on each of the bolt ends and gently fasten the thumbscrews to the bolts.

*Note: The wires on the Bed should be facing the rear of the machine.*

# Step 10 Attach the LCD Display

For this you will need the following items:

X1 LCD Case Front

X1 LCD Case Rear

X1 LCD Kit

X2 M4x10 Bolts

X2 M4 Hammer Nuts

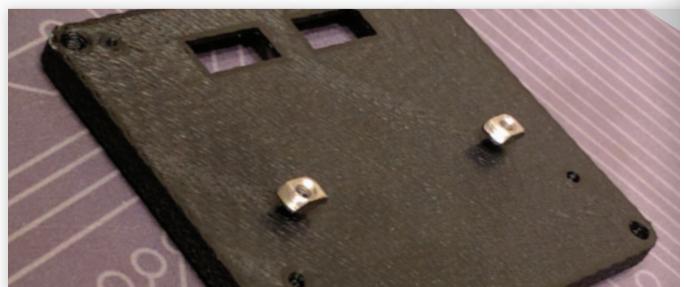
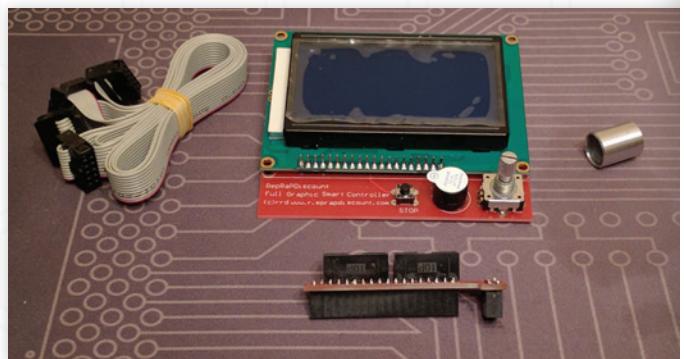
X8 M3x12 Bolts

Before we start let's take a look at your LCD Kit and what it contains.

Your LCD will come in a static bag, this bag has been opened by Hooklet and tested prior to being sent to you.

Your kit will contain an LCD Screen with built in Controller, a Knob, and two attaching cables.

You will also notice a Riser, set this aside for later.



You will notice two plugs on the back of your LCD, these plugs are labeled 'EXP1' and 'EXP2'. See image.

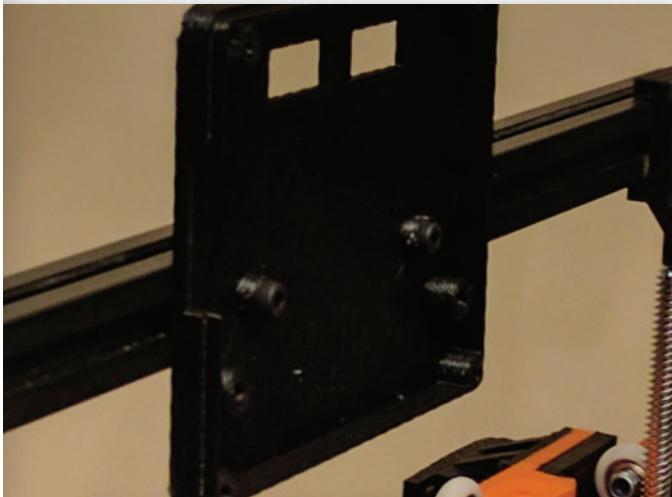
Take note of these locations as we will be using them in a bit.

Locate the LCD Base part and the following fasteners:

X2 M4x10 Bolts

X2 M4 Hammer Nuts

Thread two M4x10 bolts into the middle mounting holes of the LCD Rear part as shown.



Now, loosely fasten an M4 Hammer Nut onto each bolt.

Next we will be mounting the LCD Base part to the top crossbar of your Odin 3d Printer.

Make sure the Hammer Nuts are parallel to the 2020 slot and insert slide the LCD Base into the front of the beam as shown.

Move the LCD Base to where you would like your screen (by default we center it) and fasten the M4x10 bolts.

*Note: We will be placing the LCD screen into the LCD Base, once we do this we won't be able to access these bolts without removing the screen so be sure you are happy with the location now.*

*Note: The LCD Screen is connected to the LCD Base with 4 M3x12 Bolts, these bolts are screwed directly into printed holes on the LCD base. It may take some slight pressure to get the M3x12 Bolts to thread into the printed part. Also, it is best to loosely fasten each corner before fully tightening the Screen into place. This makes it easier to align the LCD Screen holes with those found on the LCD Base.*



Next take your LCD Screen and hold it in place on the LCD Base part.

Taking 4 M3x12 Bolts fasten the LCD screen directly into the LCD base using the mounting holes found in each corner of the LCD screen.



Next we will attach our LCD Face in a similar fashion using 4 M3x16 Bolts. Thread the 4 M3x16 bolts from the rear of the Display case and fasten them directly into the 3d printed parts ensuring they are firmly connected.

Finally, gently slide the knob onto the post. Make sure you don't push the knob in too far as this will prevent you from pushing it for selection. To test this, gently push the knob in, you should feel a slight click when you do so.



## Step 11 Attaching the End Stops

A bit about your Optical End Stops. The Odin One uses high quality optical endstops instead of the typical mechanical endstops found on many 3d printers. Optical endstops work by detecting when an object passes between its sensors. The use of the optical endstop vs a mechanical endstop increases the consistency homing distances. This is particularly important on the Z axis because this sets the distance your extender nozzle will be away from the bed and in turn the quality and success rates of your print.

Since the Optical End Stops need to detect an object visually without contact, you will notice that each axis has a tripper (or flag) that—you guessed it—trips the endstop letting the Odin Know the Axis is home.

In this step in addition to mounting the endstops, we will be mounting the remaining Z Tripper part. Keep the above in mind as you mount this part, the flag will need to pass between the Optical endstops sensors for proper printing to take place.

X2 Optical End Stops

X1 Z End Mount

X1 X End Mount

X1 Z Tripper

X3 M3 Nylock Nuts

X3 M3x12 Nylock Bolts

X1 M4x10 Bolt

X2 M4x30 Bolts

X1 M4 Hammer Nut

## Step 11 - Attaching the End Stops



Start by locating 1 Optical End Stop, your Z End Mount and the following fasteners.

X2 M3x12 Bolts

X2 M3 Nylock Nuts

X1 M4x10 Bolt

X1 M4 Hammer Nut

Mount the Optical end stop to the Z End Mount using the 2 M3x12 bolts and fasten into place using the M3 Nylocks as shown.

Next, thread the M4x10 Bolt into the mounting hole and lightly fasten an M3 Hammer Nut as shown.

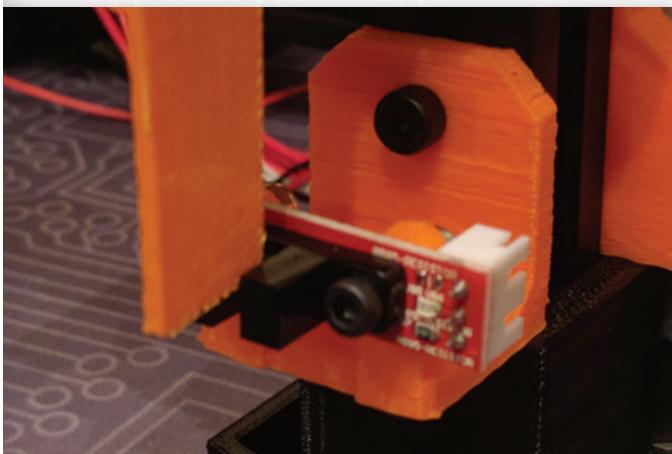


Next locate 1 Optical End Stop, your X End Mount and the following fasteners.

X1 M3x12 Bolts

X1 M3 Nylock Nuts

Fasten the Optical End Stop into place using 1 M3x12 Bolts and the 1 M3 Nylock Nuts as shown. You will be fastening Endstop using the lower hole, or the hole that is furthest away from the white connector plug.

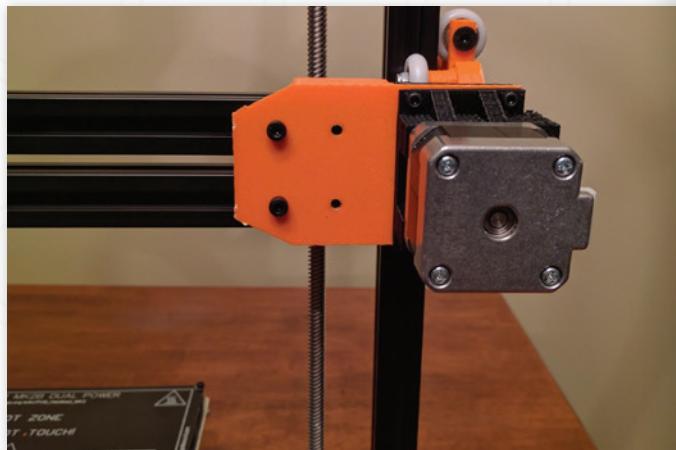


Next take your Z End Mount assembly and fasten it to the left upright by tightening the M4x10 Bolt. See Image.

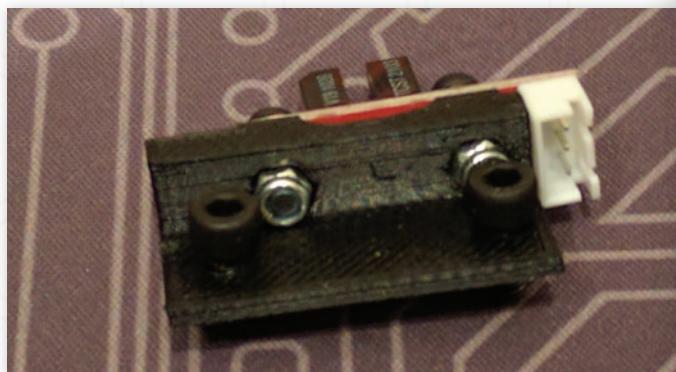
*Note: You will be moving this End Mount to adjust the Z Axis Height so for now simply place it as low as it will go.*

Next, place your Odin 3d Printer in front of you with the back facing toward you.

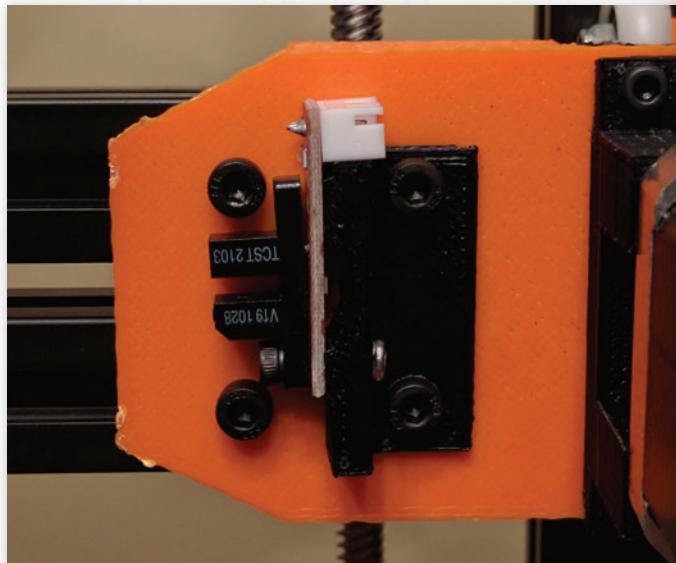
Loosen and remove the two inner M4x10 bolts on right (NEMA side) Beam End Cap making sure the machine stays level while doing so. This will ensure that the M4 Hammer nut stays in place while you mount the X End Mount.



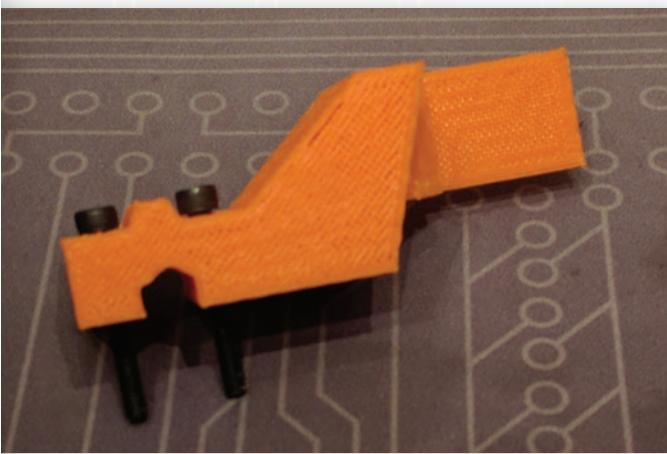
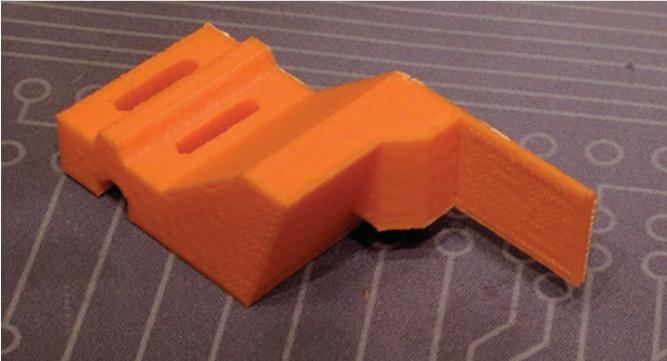
Now take the removed M4x10 Bolts and thread them into the X End Mount as shown.



Gently fasten the X End Mount into position as shown, remember the white plug should be facing upwards.



Step 11 - Attaching the End Stops



Lastly we will attach the Z Tripper.  
Locate the Z Tripper and the following  
fasteners.

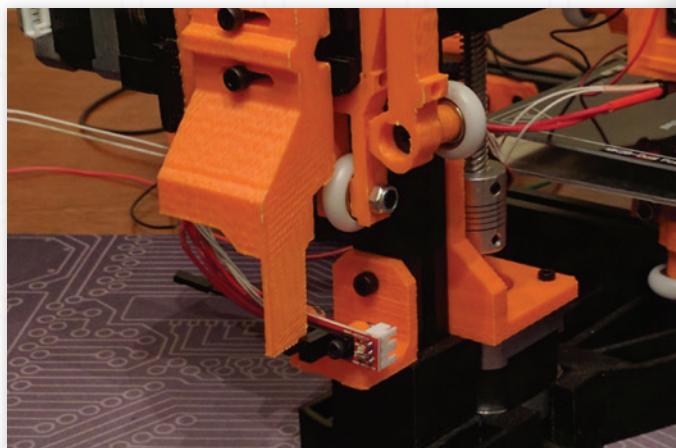
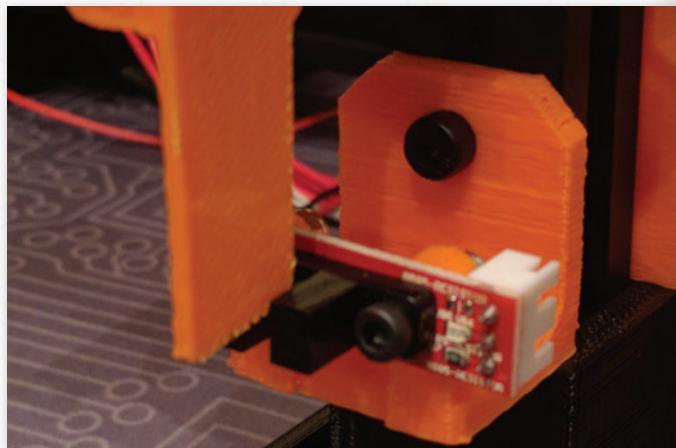
X2 M4x30 Bolt

Place the Z tripper into position on the Left side of the Odin (while the printer is facing you)

Fasten two M4x30 Bolts into place threading them into the adjustment slots of the Z Tripper and into the mounting holes on the Linear Skate.

Now, begin turning the Lead Screws for the z axis by hand to lower the Crossbeam Assembly. Do this until the end of the Z tripper is near the Optical Endstop.

Once you are close you can slide the Z Tripper forward and back to align it with the Optical endstop sensors.



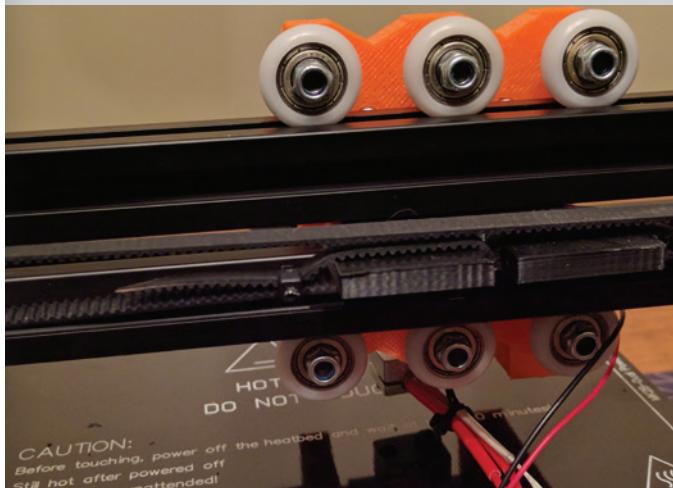
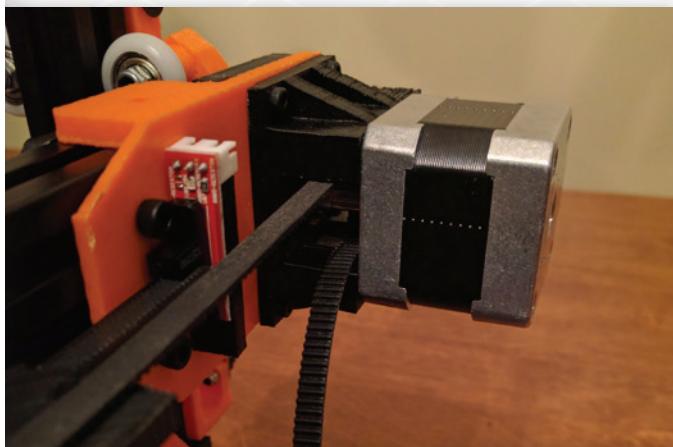
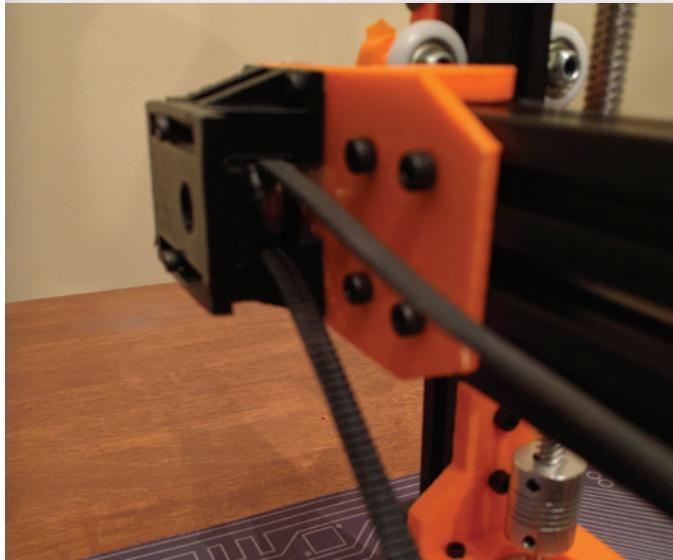
Once you have it in position, verify that the Z Tripper passes between the sensors by lowering the Cross Beam.

Now tighten the Z Tripper in place with the M4x30 Bolts.

*Note: The M4x30 Bolts that hold the Z Tripper in place are fastened directly into the printed part, no nut is required.*

Lastly, manually raise the Crossbeam so that it is approximately in the middle of the Lead Screws. Verify that the Crossbeam is visually level.

The X and Y axis on the Odin One are belt driven, we use high quality GT2 Timing Belt for the function. In your kit you received 2 precut sections of GT2 Timing Belt, make



sure you do not cut the excess length off of your belt until you are sure you have the belt properly attached. It is a good idea to keep a couple inches of excess for later use.

Gather the following:

X2 GT2 Timing Belt Sections

X4 Black Zip Ties

First route the X Belt as shown in the images.

The Odin uses Zip Ties to hold the belt in place, this keeps the belt fastened and ensures that if anything goes wrong the Zip Tie connection will release before the belt breaks or any other part of the printer is damaged.

When connecting the belt simply interlock the teeth of the belt and tighten the Zip Tie.

Verify that the belt is routed properly and pull it relatively tight (we will tighten the belt tension with the X Idler once the belt ends are fastened. When you are confident the routing is correct, fasten the belt ends with the provided Zip Ties.

Next, loosen the adjustment bolts on the X Idler assembly and gently pull the idler to the outside of the machine to tension the belt.

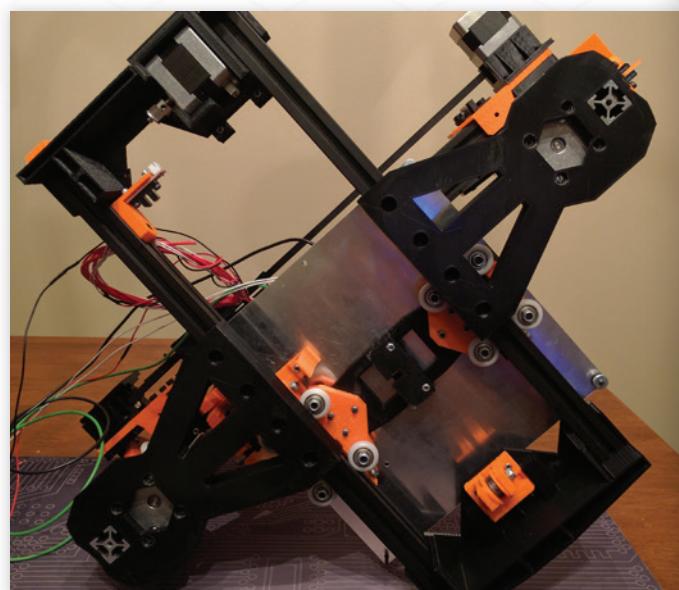
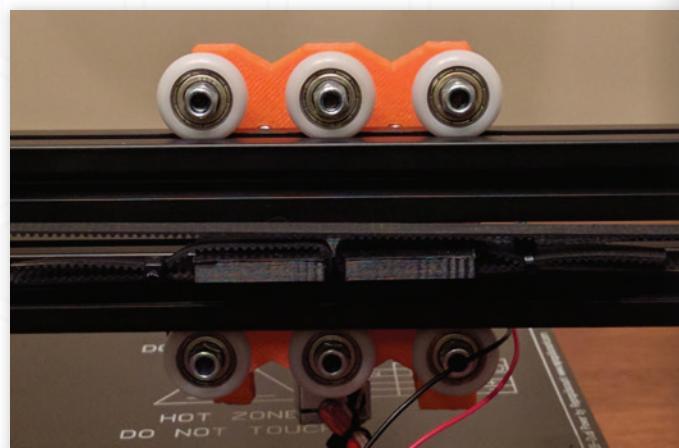
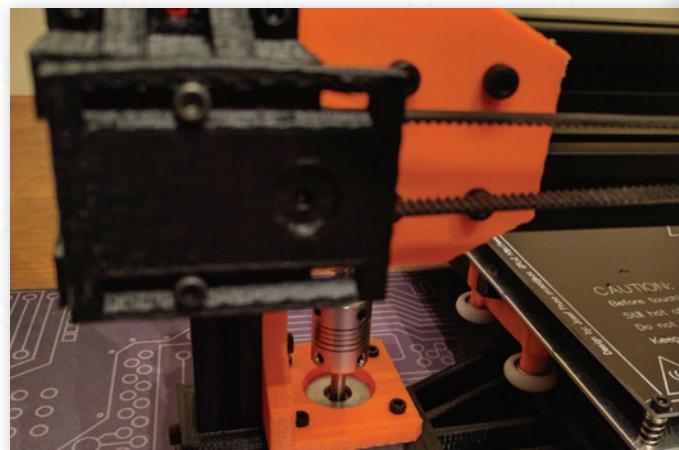
Note: The belt should be tight but not so tight that it causes stress on the printer's parts or causes increased friction during movement.

Remove the excess belt length leaving approximately 2 inches of belt on each side.

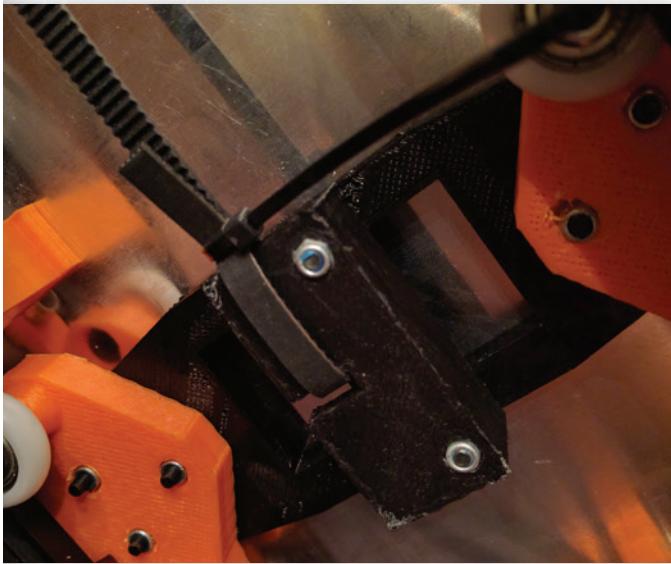
Gently move the Extruder head to each side of the Cross Beam to verify range of motion, make sure the loose cables on the extruder do not get caught on the frame while you do this.

Next we will attach the Y Belt.

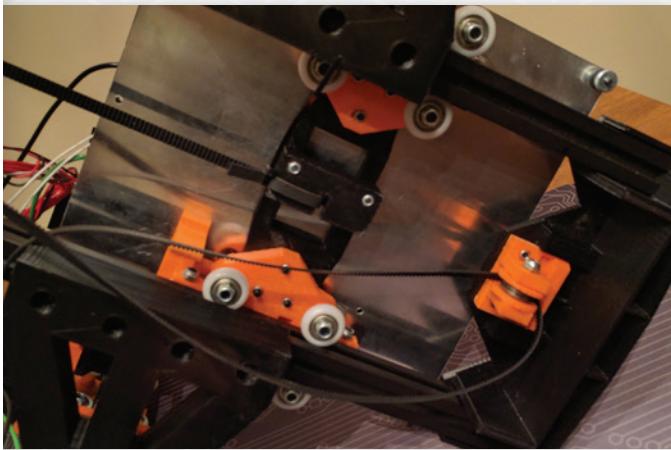
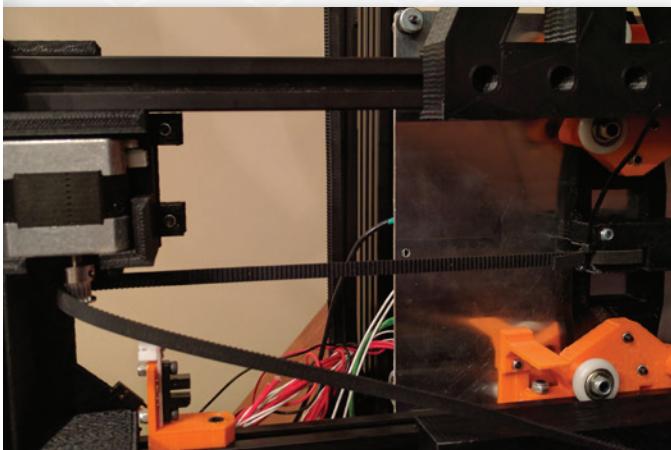
Carefully place your Odin on its side as shown in the image.



Step 12 - Connect the Belts

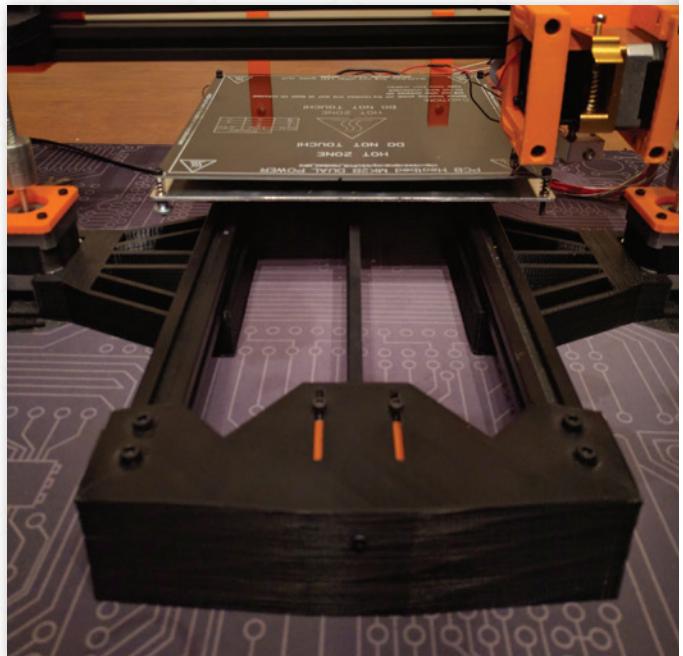
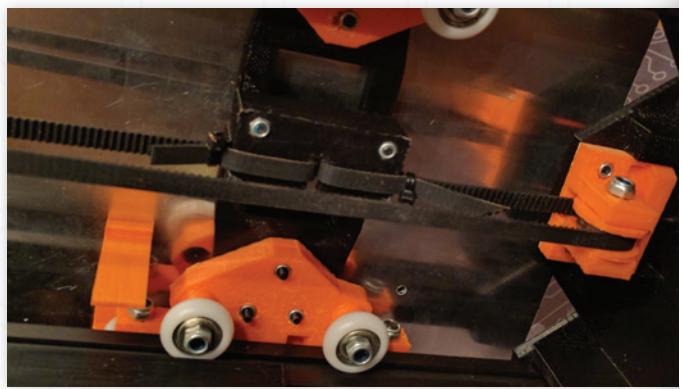


Route your belt as shown in the images.



Verify the belt is routed properly, pull the belt tight and fasten the belt ends using the provided zip ties.





Cut the remaining belt length in the same way you did for the X axis.

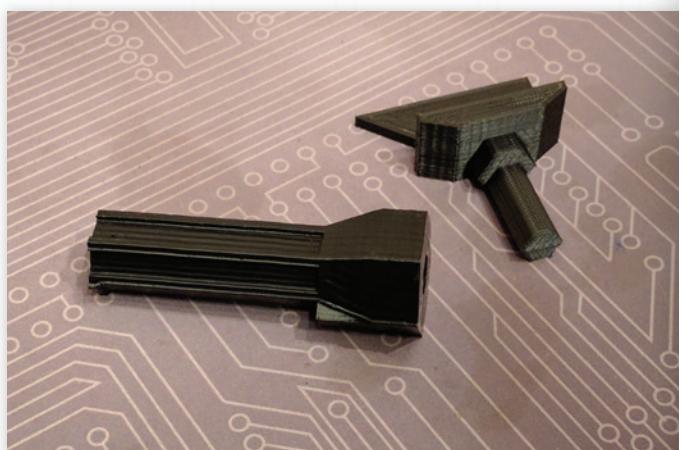
Carefully place your printer on its base.  
Turn the tensioner bolt in the front of your printer to tension the belt.  
Move the print bed to the front and then to the back to verify range of motion.

## Step 13 Attach the Spool Holder

Gather the following:

X1 Spool Mount  
X1 Spool Rod  
X2 M4x10 Bolt  
X2 M4 Hammer Nut

Take the Spool Rod and using some force push the hexagonal peg found on the Spool Mount into the hexagonal hole on the Spool Rod.



Step 13 - Connect the Belts



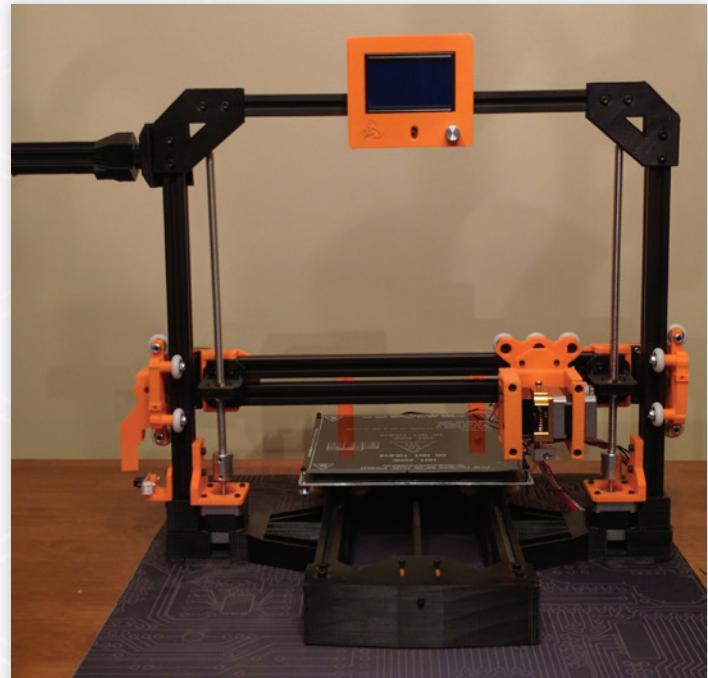
Next take your Spool Mount part and fasten 2 M4x10 bolts into the mounting holes.



Loosely thread an M4 hammer nut onto each M4x10 as shown.



Now attach the Spool Mount Assembly to your Odin by tightening the M4x10 Bolts as shown.



# Congratulations!

Give yourself a big pat on the back, your **Odin One** 3d Printer is now built.

Next we will wire the components and verify movement.

# Step 14 Mounting Your Control Board

When handling your control board only handle it by holding onto the edges of the board, this will prevent damaging the components via ESD (electrostatic discharge).

Gather the following items:

X2 PSU Bracket

X1 Board Mount

X1 Power Supply

X1 Assembled Control Board

X4 M3x8 Bolt

X4 M4x10

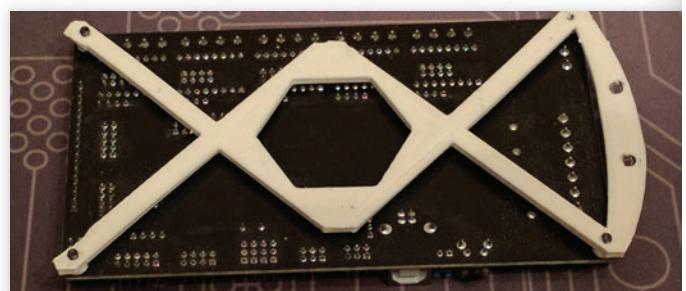
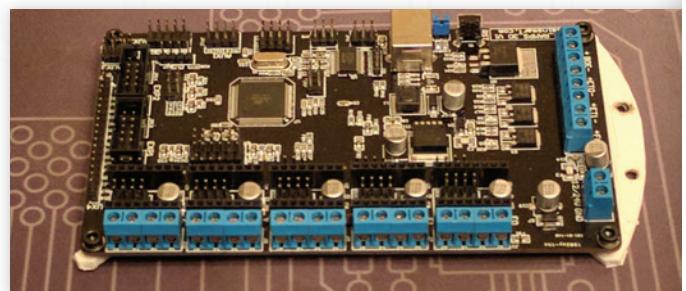
*Note: Many users choose to change the mounting location or the mounting method for their Control Boards and Power Supplies. Your kit comes with a very simple board mount, you may choose to keep this method of mounting or make your own mounting solution.*

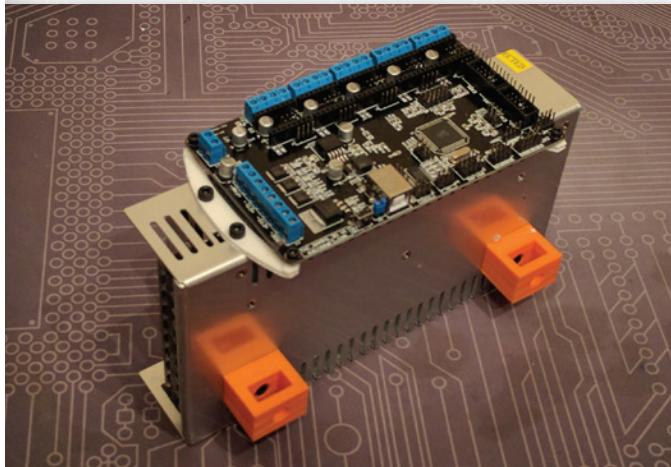
Take your 2 Power Supply Brackets and 2 M4x10 bolts and fasten them to the power supply as shown in the image.



Next, locate your Board Mount.

Take your Control Board and fasten it to the mount using 4 M3x8 Bolts as shown.





Now, fasten the Board Mount to the top of your Power Supply using 2 M4x10 Bolts as shown.

## Step 15 Wiring the Your Printer

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### Disclaimer:

We are about to begin wiring your Odin One, be sure to follow these instructions in the order they appear. These instructions are laid out so that low voltage connections are made first, at this point your printer's power cable should be sealed in its bag. Do not connect power to the Odin One until you are instructed to do so.

These instructions are meant to guide you through the process of wiring the machine in an easy to understand manner. Do keep in mind that you are dealing with electrical current, and basic safety measures and common sense must be used.

Now, keeping all of this in mind, wiring the printer not an overly complicated process and you should remember to have fun while doing it and don't be afraid to ask us for help. We are almost done!

Let's get started.

As we work, it might be a good idea to label the wires so they can be easily identified later. You can do this with a marker and a piece of tape. This is an optional step.

*Note: the 3 pin cables we use to connect the End Stops have a different wiring order on each end—this has to do with the pin order on the board. Make sure your wires match those in the images as you work.*

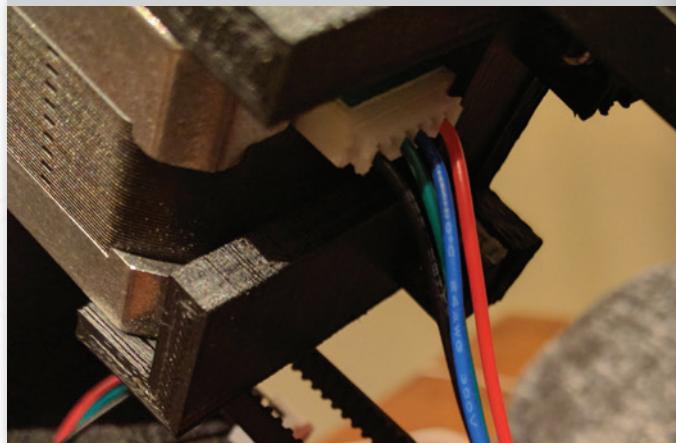
# Connecting NEMAs and End Stops

We will start by wiring the components located on the bottom of the printer. This includes the Y NEMA and the Y End Stop.

Gather the following wires.

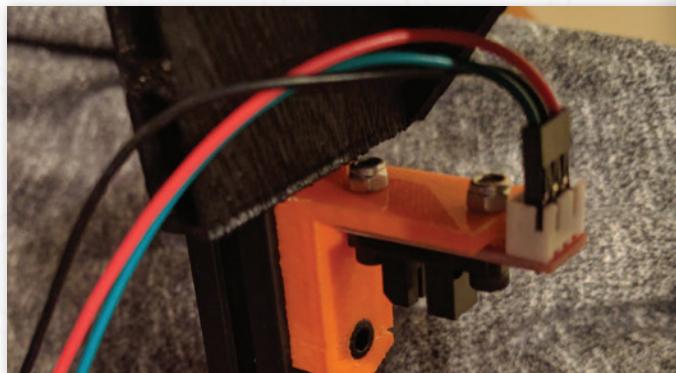
X1 4 Pin NEMA Dupont Cable

X1 3 Pin Dupont Cable



Gently insert the NEMA wire into the Y NEMA Motor and the 3 Pin Dupont into the End Stop.

Verify this matches the image and lay the ends of these wires aside for now.

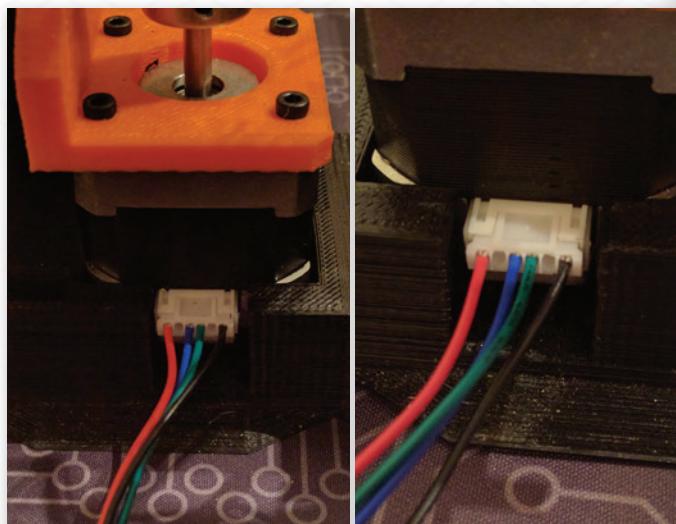


Next we will work our way up to the Z Steppers and the Z End Stop

Gather the following wires.

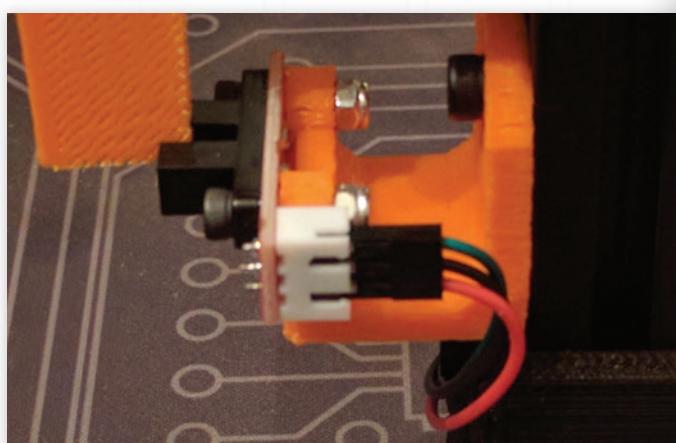
X2 4 Pin NEMA Dupont Cable

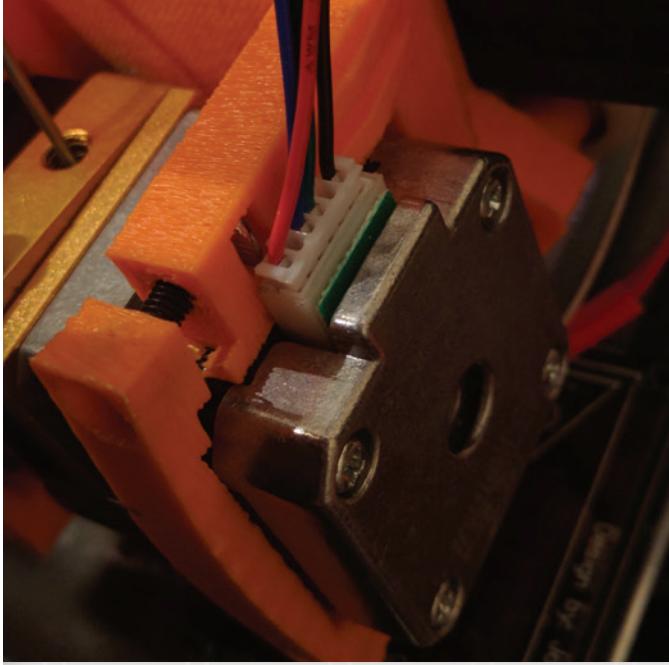
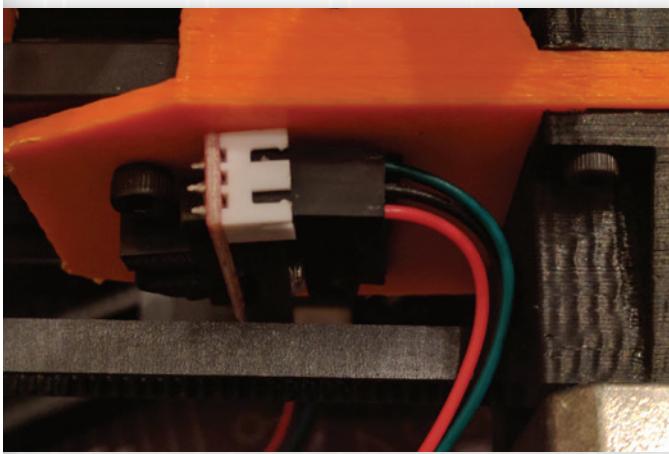
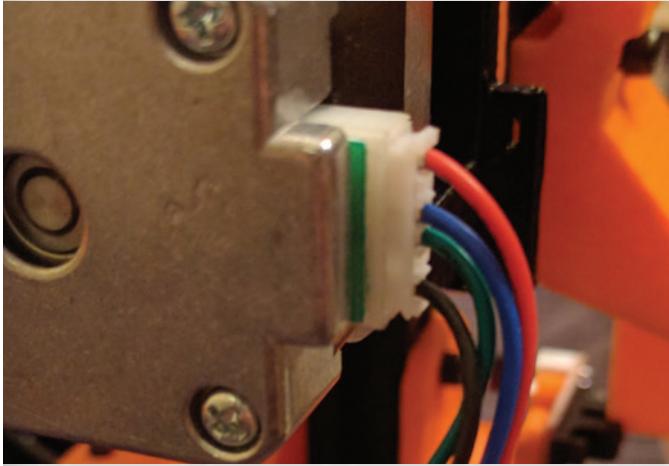
X1 3 Pint Dupont Cable



Attach a NEMA Cable to each of the Z NEMA Motors and a 3 Pin Dupont to the Z End Stop.

Verify this matches the image and lay the ends of these wires aside for now.





Now for the X Stepper and End Stop

Gently insert the NEMA wire into the X NEMA Motor and the 3 Pin Dupont into the End Stop.

Verify this matches the image and lay the ends of these wires aside for now.

Finally, we will wire the Extruder NEMA

Gently insert the NEMA wire into the Extruder NEMA Motor as shown.

Verify this matches the image and lay the ends of these wires aside for now.

## Wiring the Bed

Locate the 2 sets of wire from your bed, there will be a white set as well as a green and black wire.

When fastening wires to the control board make sure they are tightly fastened as loose wires will cause issues. One of these issues is heat, loose wires connected to the heated bed or the extruder will increase the temperature on your board and cause issues.

Also, make sure there is a minimal amount of exposed copper after tightening the wire into the connector. Never allow two exposed wires to make contact. This will cause a short and could damage or destroy your components.

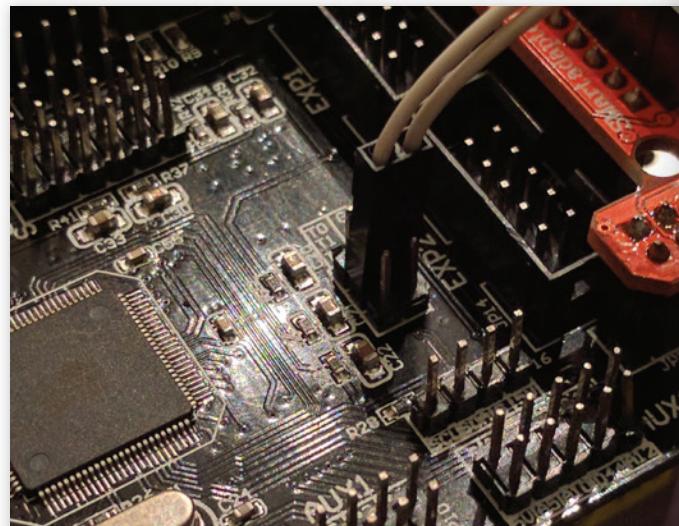
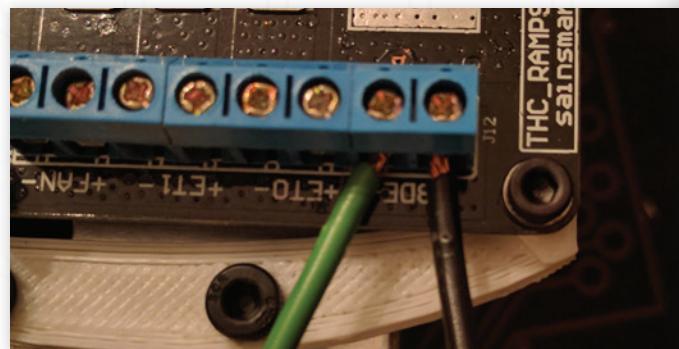
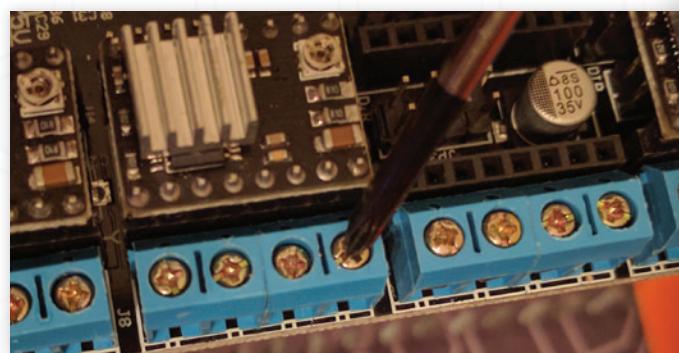
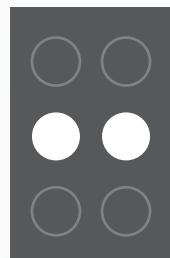
You will notice the control board is labeled. These labels indicate what many of the connections are used for.

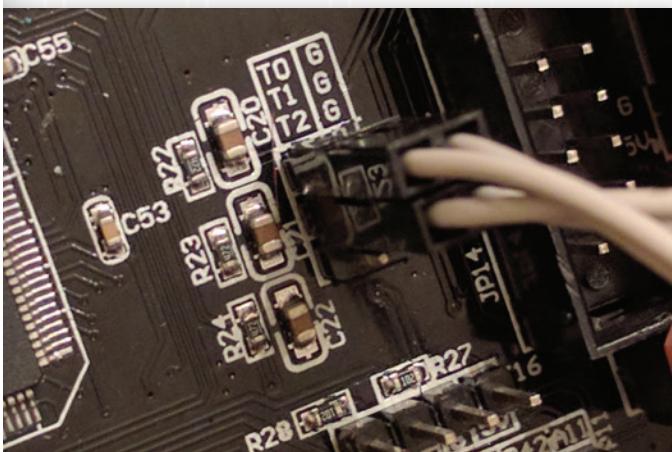
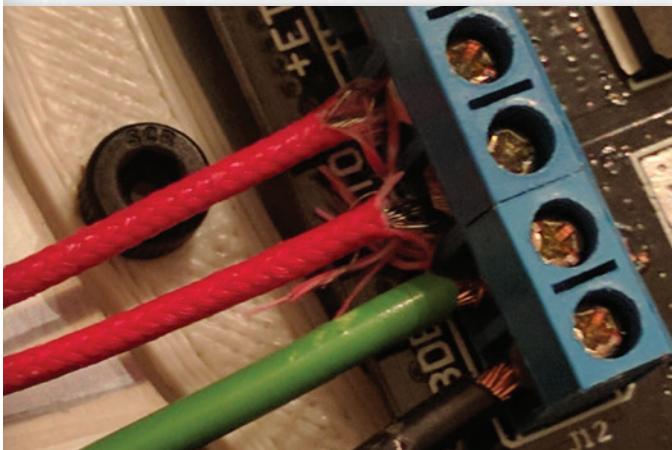
Use a small screwdriver to loosen the clamp screws on the board. Although there is not power running to the board now, make sure that you never attempt to adjust these with power running to the board.

Gently insert the green and black wires into your control board as shown. Tighten the clamp screws to secure the wire.

Plug the white dupont cable (thermistor) into the T1 plug on your control board as shown.

The polarity—or order—of the wires does not matter when connecting the heater and thermistor wires.

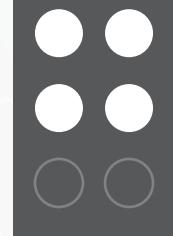




## Wire Extruder to Board

Locate the red extruder heater wires and the white extruder thermistor wires.

Attach the red heater wires to the ET0 plug as shown.

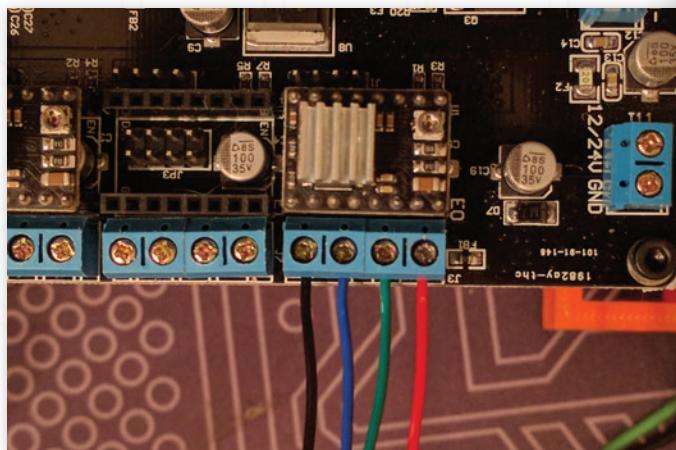


## Wire the Motors

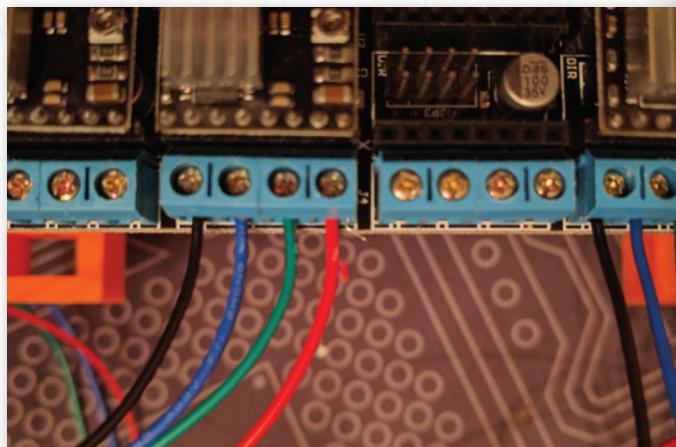
Each motor has it's own connector and driver with the exception of the Z motors that share a driver. The drivers (commonly referred to as step sticks or stepper drivers) are the things with the heatsinks. For this assembly we will not be adjusting these, however, in advanced calibration you may find it necessary to adjust them so it's good to know where they are.

First, locate the 4 Pin NEMA Wire for the extruder. Connect it to the board as shown.

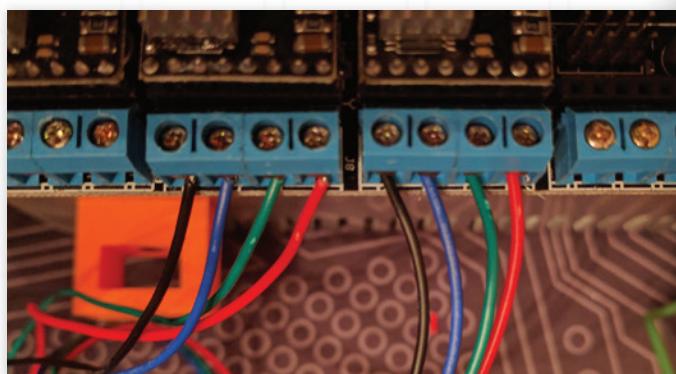
Verify that the wiring order matches the image.



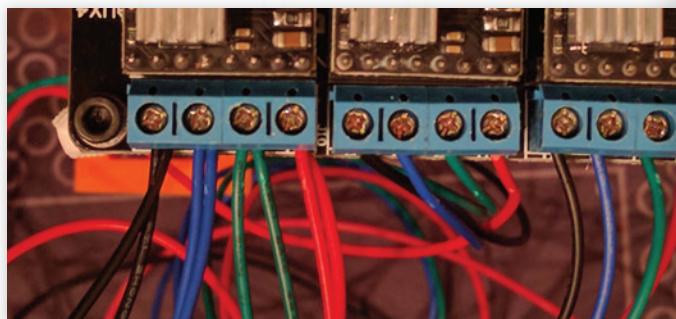
Locate the NEMA wire for the X Axis. Connect it as shown, make sure the order matches the image.

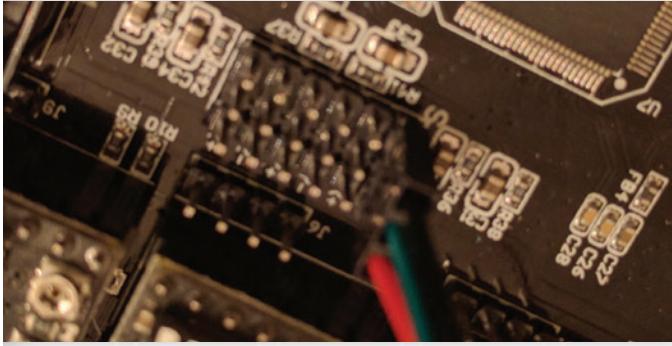


Locate the NEMA wire for the Y Axis. Connect it as shown, make sure the order matches the image.



Lastly, locate the two wires for the Z axis. Twist each set of wires together and connect them as shown. Verify the order matches the image.

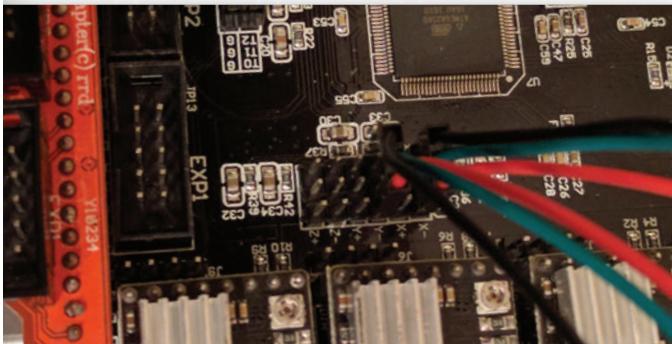




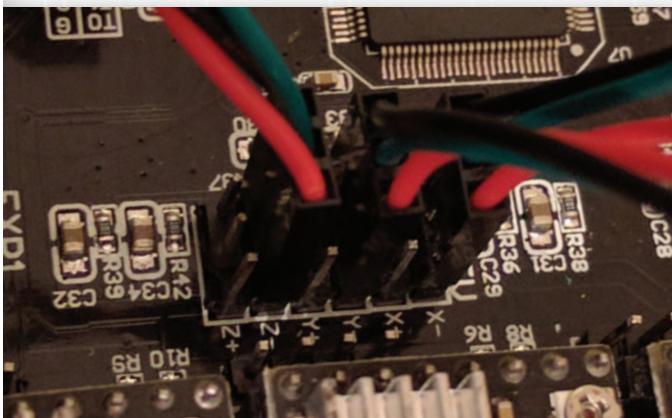
## Wire the End Stops

You will notice the End Stop pins are labeled x-, x+, y-, y+... these represent the min and max end stops for each axis. Your Odin uses only a min hardware endstop so we will only be placing connectors into the min pins. Basically we will be plugging into "every other" pin. The images will illustrate what we mean by this.

Locate your X endstop and plug it into the x- plug. See image for placement and orientation. (the red cable should always be facing the stepper drivers)

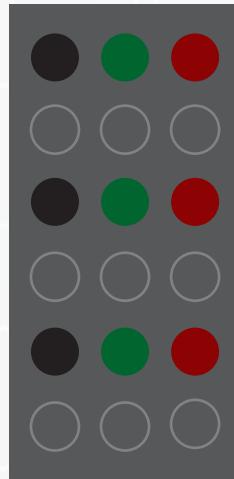


Locate your Y endstop and plug it into the y- plug. See image for placement and orientation. (the red cable should always be facing the stepper drivers)



Locate your Z endstop and plug it into the z- plug. See image for placement and orientation. (the red cable should always be facing the stepper drivers)

Now verify the endstop plugs are still securely fastened to their end stops.



< X End Stop

< Y End Stop

< Z End Stop

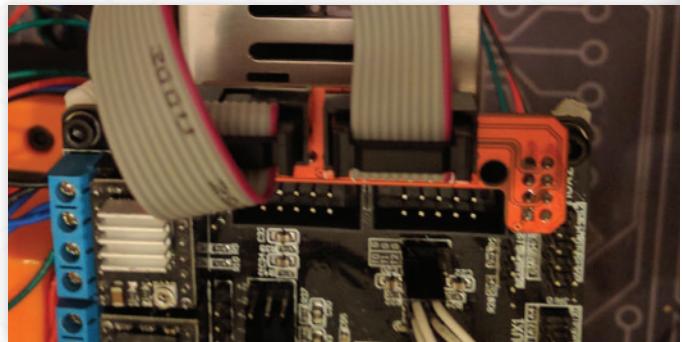
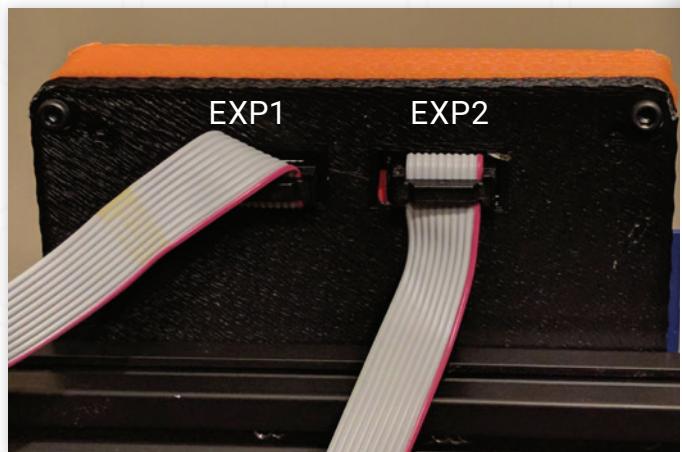
## Wire the LCD

Locate your LCD flat cable.

Connect the EXP1 and EXP2 cables to their respective plugs on the LCD. It is common for the labeling on the LCD riser to be covered slightly by the plug. If you look to the top of the plug you should see at least a portion of the labeling. See image

If you recall we noted the location of these plugs on the back of the LCD display. If you forgot to note these locations, the EXP1 connection is on the left when viewing the screen from the rear.

See image.



## Wire PSU to Board

For this you will need the following.

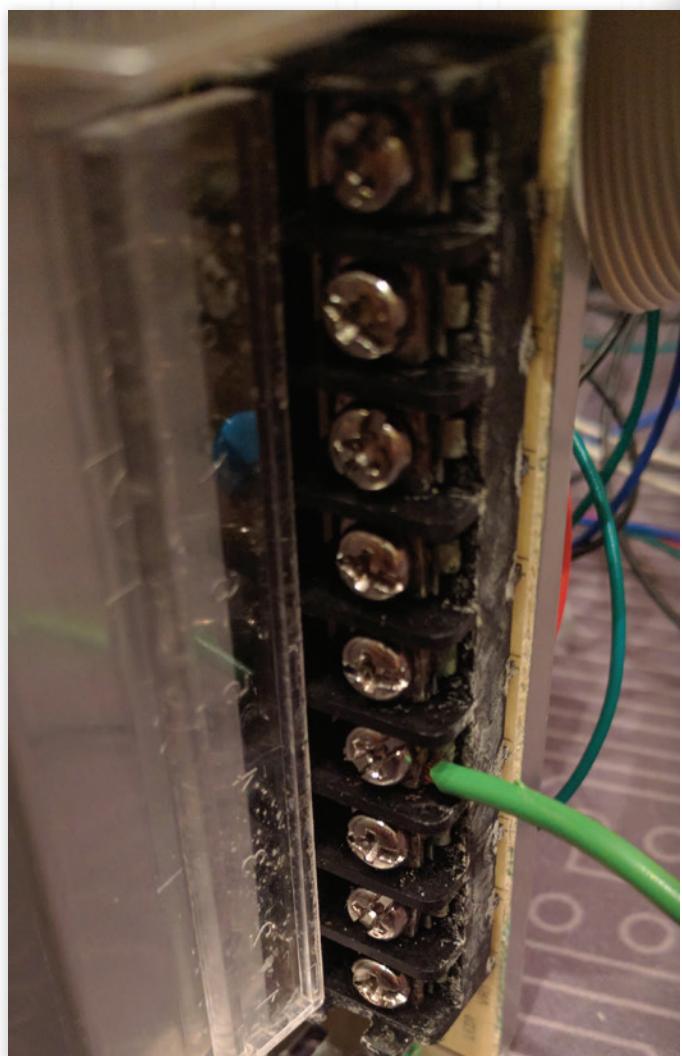
X1 Green 16 Gauge Wire

X1 Black 16 Gauge Wire

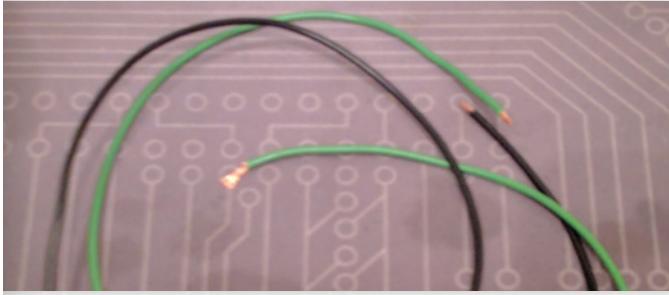
Now we will start connecting the PSU, but before we do, take a look above the PSU connections. You will notice they are labeled with +V, -V, Ground Symbol, N, L.

Your power supply has 3 12v rails, these are represented by the 3 connectors found under each +V and -V labels (+V = positive, -V = Negative) . These are your output power connectors, the other three labels are located above your input power connections.

For now we will only be looking at the +V and -V connectors.



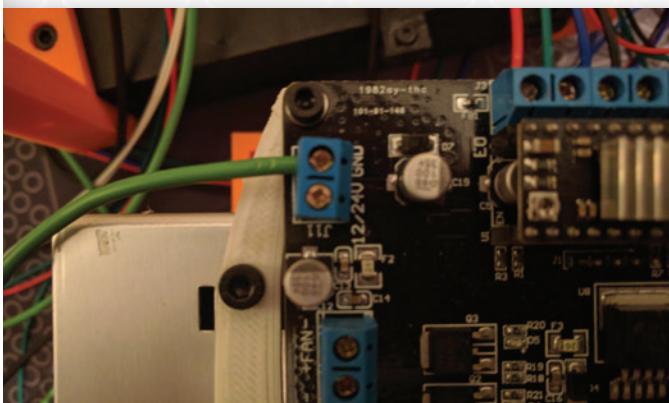
## Step 15 - Wiring the Your Printer



Locate your two 16 gauge wire segments.



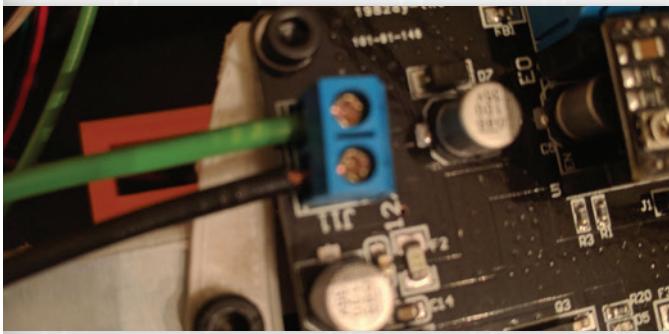
Start by taking the Green wire segment and fastening it into one of the available -V connectors.



Take the other end of the Green cable and connect it to the GND connector on your control board as shown.



Now, take the Black 16 gauge wire and connect it to one of the available +V connectors.

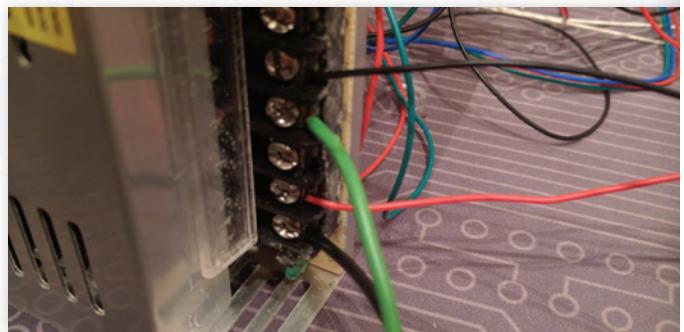
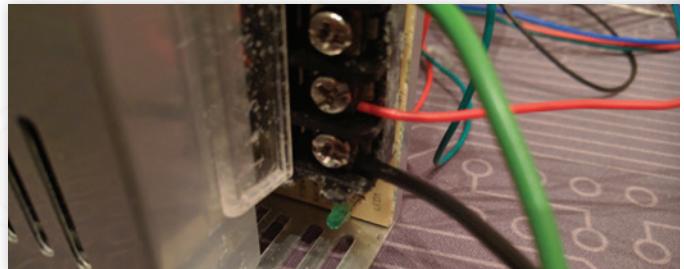
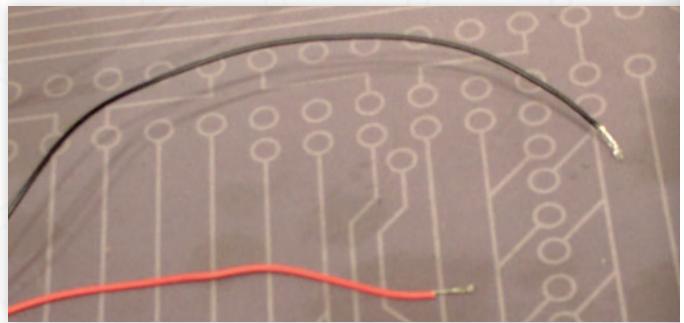


The the other end of the Black cable and connect it to the 12/25V connection on the control board as shown.

## Wire the Extruder Fan

Locate the two wires coming from your extruder fan.

Connect the Red fan wire to an available +V connector as shown.



## Connect the Power Cable

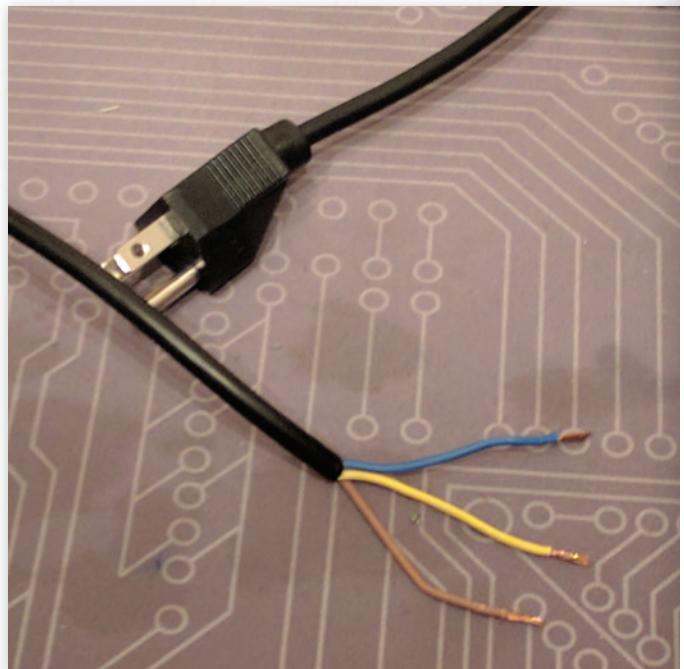
We are about to run high voltage to the power supply. If you don't feel comfortable doing this please ask someone for help, research basic electrical safety online, or contact us for guidance.

As a note, when working with a ground fault wire, you will notice the individual wires are color coded. In some cases, this color coding differs from wire to wire. In short, **Black or Brown** will represent your live or positive, **Yellow or green** will represent your Negative (sometimes this will be a Yellow wire with a Green stripe), and **Blue or White** will represent Neutral.

**Remember, do not connect your printer to power until you are instructed to do so.**

Start by removing your power cable from its bag.

You will notice the cable has three wire that are color coded. (refer to the above notes for details on this coding)



## Step 15 - Wiring the Your Printer



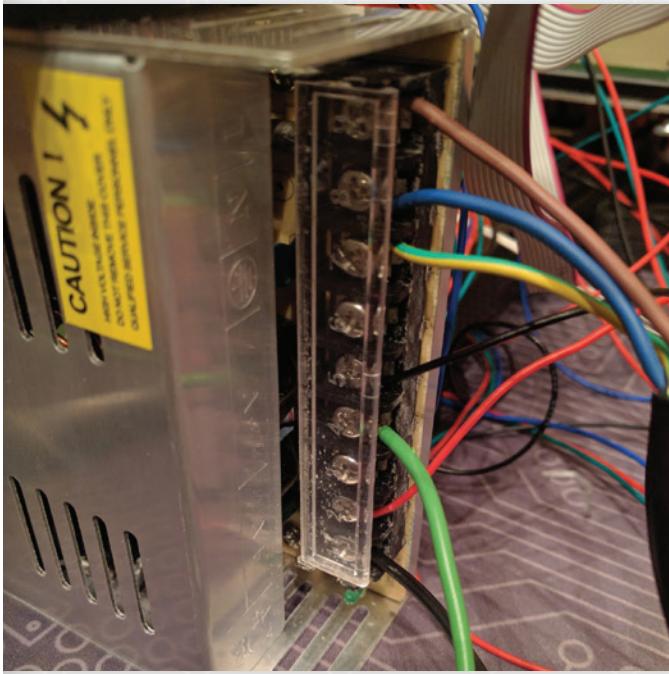
First take your Positive or Live wire and fasten it to the terminal labeled L and ensure it is tightly fastened. See image.



Now, take the Neutral wire and connect it to the terminal labeled N and ensure it's tightly fastened. See image



Lastly, take your Negative wire and connect it to the terminal labeled with the grounding symbol. Again, ensure it is tightly fastened. See image.



As a final step, check all PSU cables are tight by gently pulling on them and verify your wiring matches the image.

Close the plastic protector for the terminals.

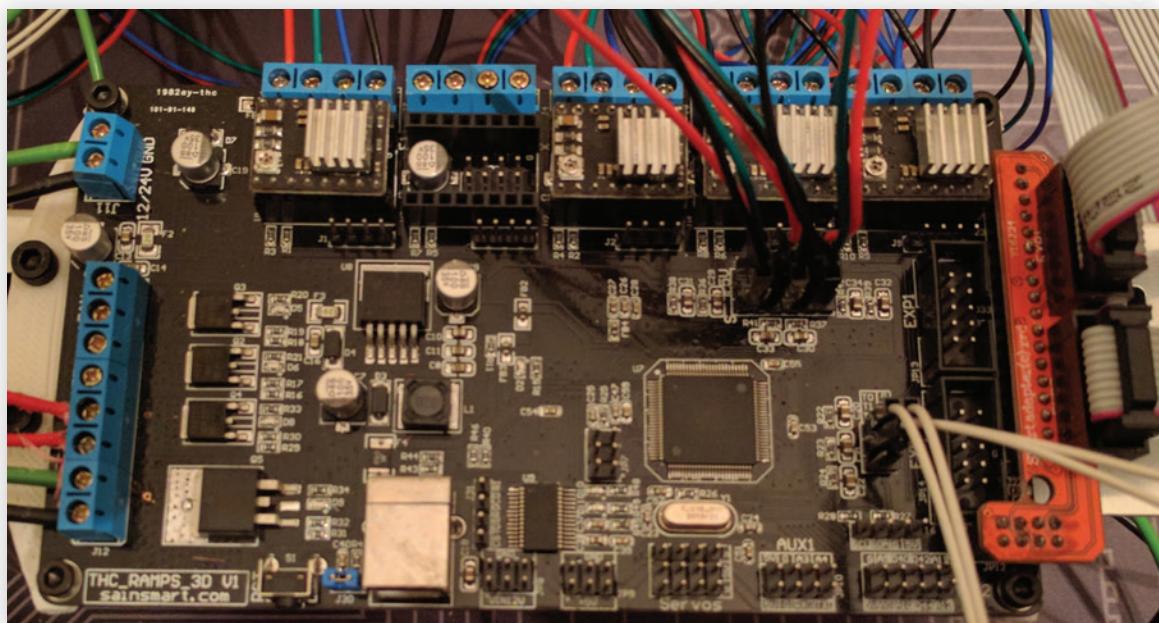
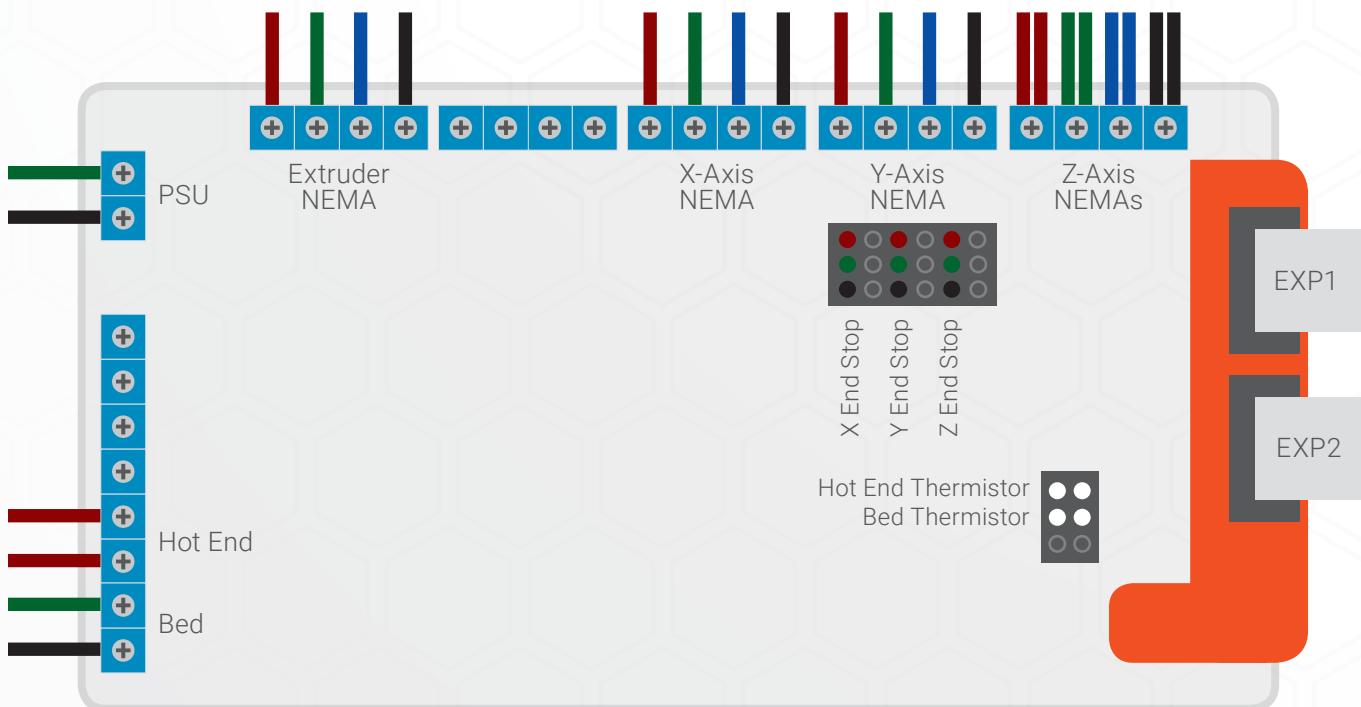
	Positive
	Neutral
	Ground
	Extruder Fan
	GND to Board
	Extruder Fan
	Power to Board

# Step 16 Verify connections.

We are about to verify the construction and wiring of your machine, however, before we do this, verify the following:

- Verify the wiring on your control board matches the image.
- Verify all connections are still secure (sometimes things can become loose during the wiring process)

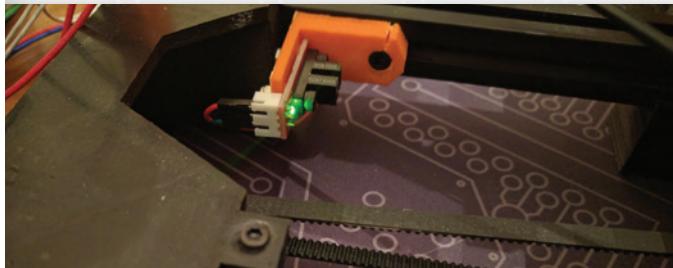
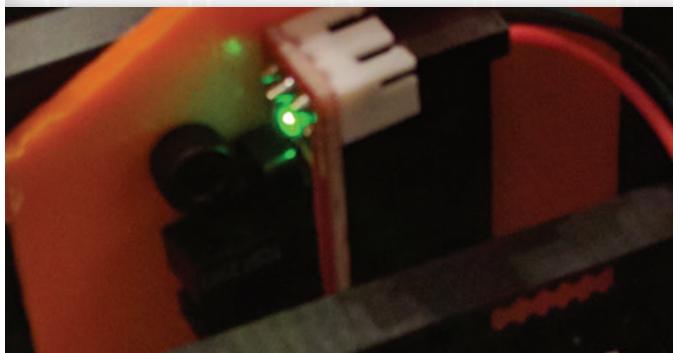
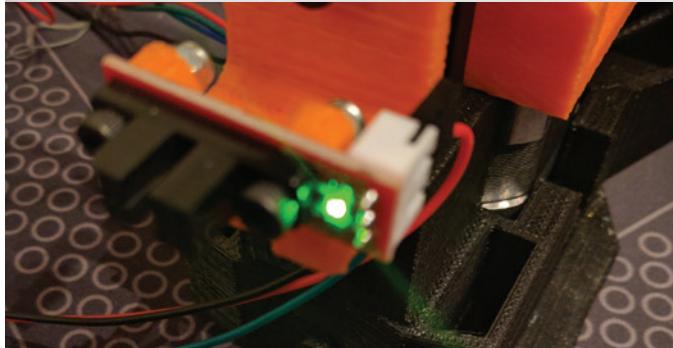
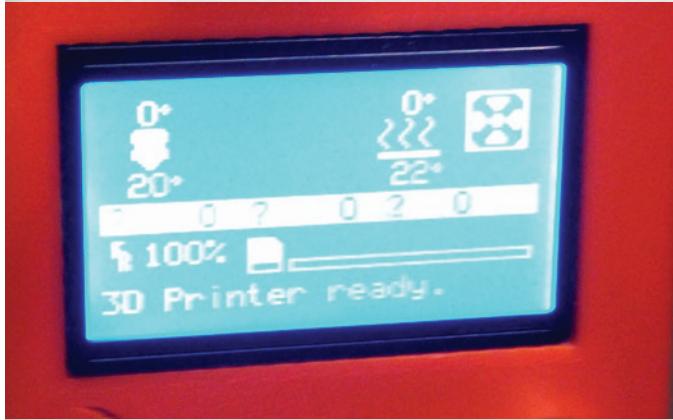
- Make sure wires are clear of moving parts (we will be conducting a basic movement test)
- Verify that your Cross Beam is visually level
- Adjust your Z Endstop Mount so that it is approximately .25 inches above the top of the Base Side part as shown.
- Orient the printer so that the front is facing you.



## Step 17 Plug in and test

We are about to give your printer some basic commands to test it's assembled properly. If at any time you want your printer to stop or

anything seems to be going wrong, unplug it and verify assembly.



Plug in your printer and verify the following:

### LCD on

Make sure that your LCD is on and displaying basic printer information.

Verify that the machine indicates its status as ready and there are no error messages.

### End Stop lights

Verify that the green LED is lit on all end stops.

Take the Hooklet 3d business card that came in your Kit and place it in the sensor gap of your Z Endstop. Verify that when you do this the LED turns off. This lets us know that the endstop will trigger properly.



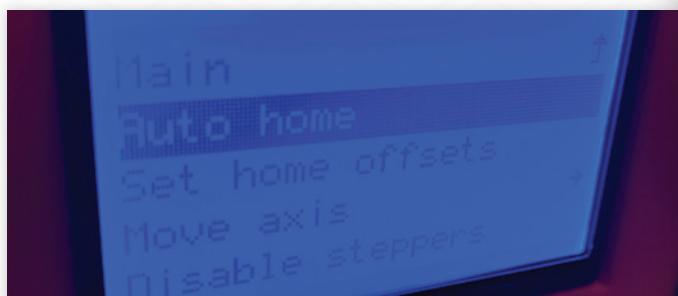
## Extruder Fan

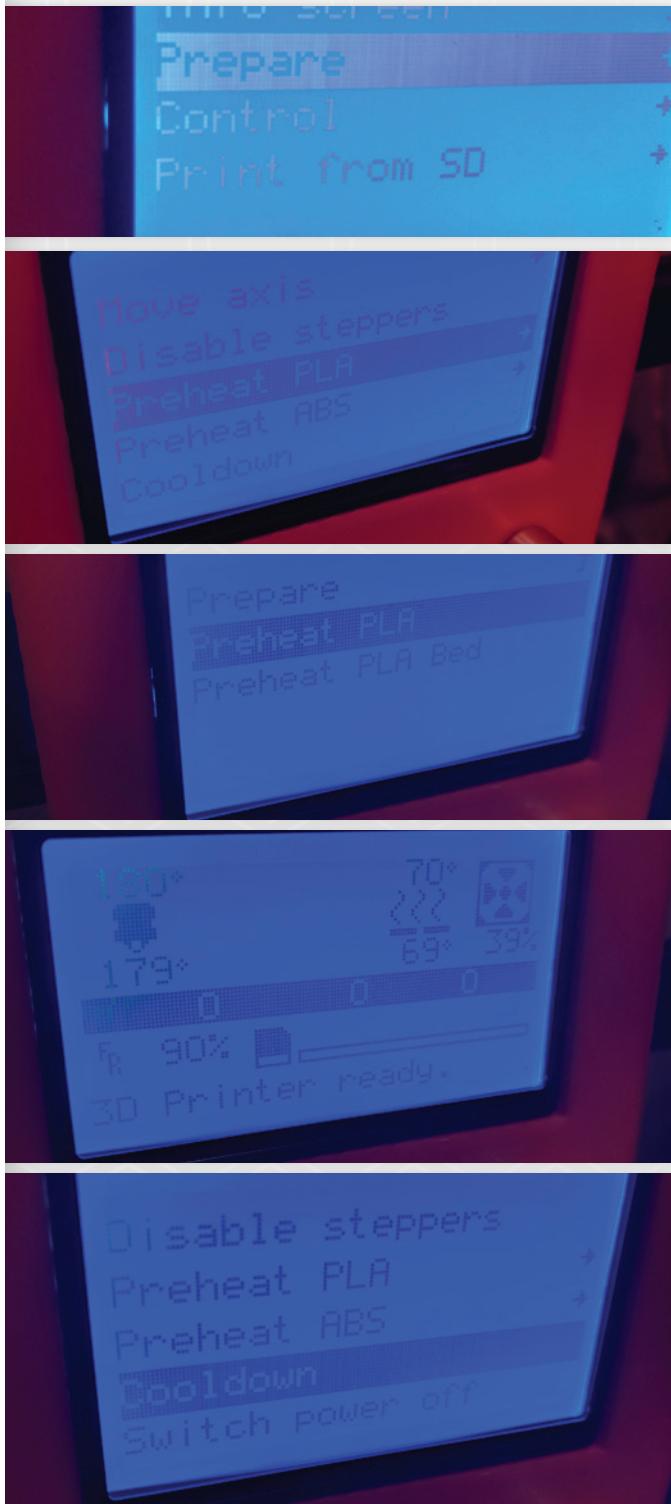
The Extruder Fan should be on

## Auto Home

Click the knob on your LCD and navigate to Prepare and click the knob. Now select auto home and select.

Your machine should move to each endstop and "home" itself.





## Heat Test

Navigate to Prepare again on your LCD and select it. Scroll down to Preheat PLA and select. Select Preheat PLA.

Your machine will begin to heat to the specified temperature set points (see image) on the LCD. Do not touch the extruder or Bed. They will be hot.

Once your machine reaches the target temperatures, navigate to Prepare, and scroll to Cool Down and select.

*Remember if you manually heat the printer, you must always remember to tell it to cool down. Otherwise the printer will remain hot until told otherwise or unplugged.*

# Build Complete!

Congratulations, you can now move on to wire management and your initial calibration.

# Wire Management

Wire management is largely up to you, you may make this process as simple or complex as you wish. Your kit includes several Zip Ties to get you started.

At the very least, you will need to make sure

the wires are free from moving parts and paths of travel. Wires getting caught during movement will cause damage to the machine. Take a look at the image for an idea of how to get started.

## Bed Leveling

This will be a quick guide to leveling the heated bed for 3D printing. While it can be a bit tedious to achieve, a properly

First Auto Home your printer.

Prepare > Auto Home.

Then preheat the printer bed to ABS or PLA temp.

Prepare > Preheat PLA(or ABS) > Preheat Bed

Once the bed has reached, move the nozzle to about 1" in from the corner.

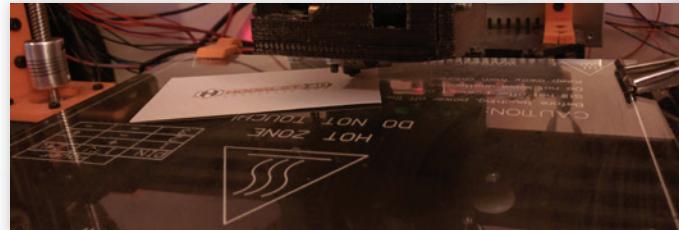
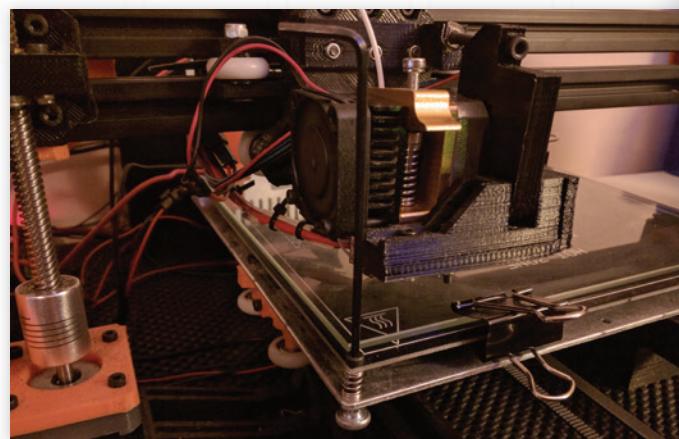
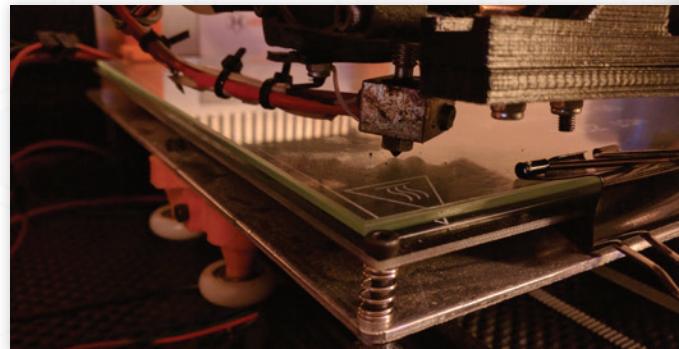
You should be able to slide a business card between the nozzle and bed.

*The goal is to have the nozzle approximately 0.15-0.2mm from the bed. Some business cards are thicker than others.*

Tighten or loosen the bed level screw until the card is tight between nozzle & bed but still slides easily.

Move the nozzle to All 4 corners of the bed, repeating this process until all the corners are level. Remember to cooldown printer when finished.

level printing surface is essential for print adhesions, as well as print quality.



# Terms and Definitions

As you build your Odin 3d Printer and continue to improve your 3d printing knowledge you may come across certain terms or references that are new to you. This is an incomplete list of these items with simple explanation.

## Basic Printer Terms

3d Printer: Reference to the entire 3d Printer assembly.

Cartesian Printer: A Cartesian 3d Printer is a standard printer that operates on the principles of cartesian mathematics—or put more simply—generates movements based on simple X, Y, Z coordinates.

Axis: When we make reference to an axis on a printer we are referring to one of the directions of motion ie. Left, Right, Forward, Back, Up Down.

In general, you will be dealing with 3 axis, the X, Y and Z axis since this is the industry standard, however, you may hear reference to additional axis the most common of which is E.

## Axis Explained:

X Axis: The X Axis is the Left to Right movement, on the Odin, the cross beam holding the extruder head is the X Axis.

Y Axis: The Y Axis is the Forward and Back movement, on the Odin, the bed is the Y Axis.

Z Axis: The Z Axis controls the Up and Down movement, on the Odin, this is controlled by the 2 lead screws that raise and lower the cross beam.

E Axis: When the E Axis is reference we are talking about the extruder, more specifically the drive motor that feeds filament into the extruder. This will typically be referenced as E0, E1 etc...

G Code: G Code is a very simple machine language that has been around since the 1950's. At the most base level G Code sends a machine basic movement commands in the form of coordinates. It dictates where to go, and how fast to do it. Your printer reads this code line by line and executes each basic movement. Although G Code is generic and universal, the Firmware installed on the Printer (or machine) dictates how G Code commands will be executed on that machine.

G Code is widely used in robotics and machine manufacturing, it is the defacto method of issuing machine commands.

Being a fully developed, mature language there is an extensive library of custom commands that may be implemented, however, these are not necessary to operate your Odin.

If you care to know more about G Code start here: <https://en.wikipedia.org/wiki/G-code>

Firmware: Firmware is what is installed on your printer control board, it determines how to send physical signals to the electrical components on the machine. The firmware configuration influences how the machine operates and makes sure commands and movements are dimensionally accurate.

This is also where the physical limitations of the machine are defined, for example, if a Max Movement Speed is set in the firmware and the machine is told to go faster, it will not exceed the speed defined in the Firmware. In other words, in addition to other things, the firmware operates as a safety buffer to keep your Printer running safe and consistent.

Certain firmware settings can be changed from the LCD on your Odin one, these are specific to movement and can be used to fine tune your printers accuracy. Make sure you understand what you are changing prior to doing so.

*Note: In computer science the convention is to begin counting at 0 as opposed to 1, keep this in mind if you are researching technology in general as this can cause some confusion.*

# Calibration

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