

Haunted Pliers

Hey There,

It looks like you've got your hands on a Destino module! Thanks for supporting this first product from Haunted Pliers, a tiny enterprise that hopes to make it easier for people to get into Eurorack and grow their synths without spending big bucks or sacrificing aesthetics. Destino is the first in what is hoped to be a series of cool little DIY modules with very competitive pricing.

Destino is designed to be a simple and useful headphone amplifier that is easy and fun to put together. This makes it an ideal beginner project for people who are interested in building their own Eurorack modules. Because of this, I've aimed these build notes at novices, so more advanced builders can feel free to skip over things that they are already familiar with.

If you are a complete beginner to soldering then I recommend you check out some online tutorials before starting this kit. In particular, Adafruit have loads of great resources for learning various electronics skills, such as this soldering guide: <https://learn.adafruit.com/adafruit-guide-excellent-soldering>


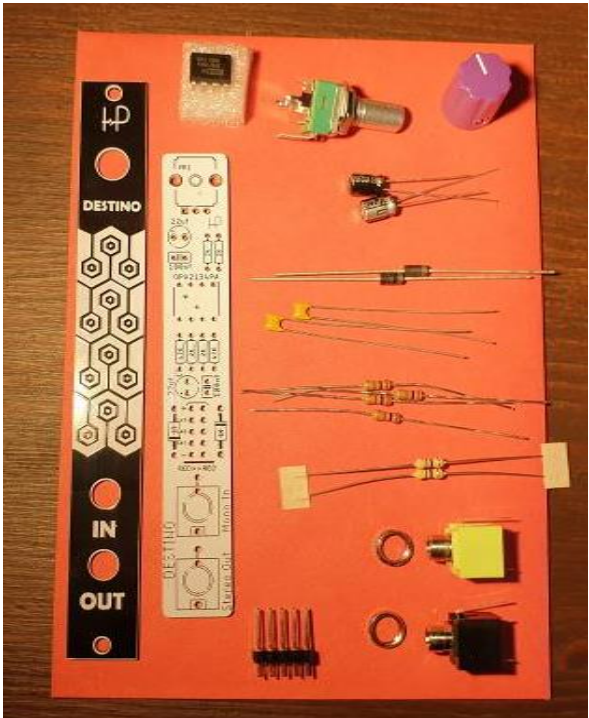
If you get stuck or have any comments then feel free to email at hauntedpliers@gmail.com, or direct message me on Instagram @hauntedpliers. I'd love to see where Destino ends up, so please send me pictures of Destino in your rig to feature on the Haunted Pliers website and Instagram. 😊


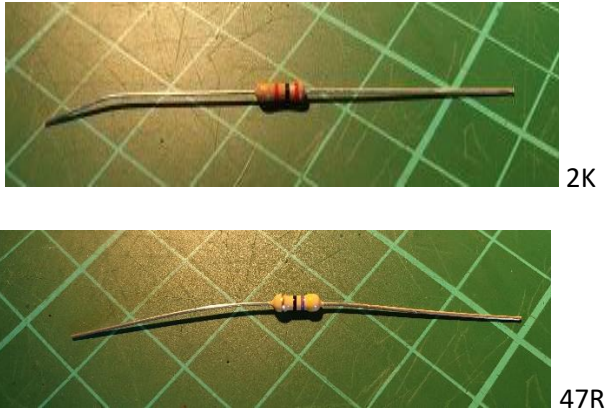

Happy Building!

Ad

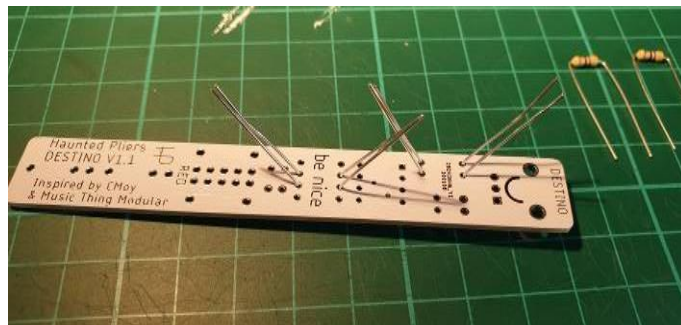
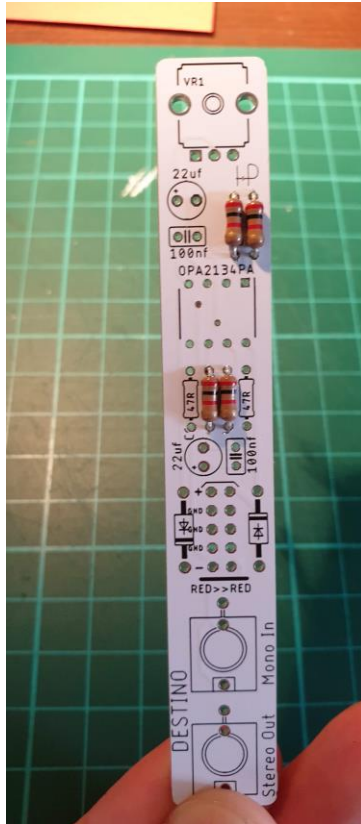
Bill of Materials

Type	Quantity	Value
Resistor	4	2K
Resistor	2	47R
Diode	2	1N4001
Capacitor	2	100nF
Electrolytic Capacitor	2	22uF
Operational Amplifier	1	OPA2134PA
Power Header	1	---
Mono Socket	1	---
Stereo Socket	1	---
Alpha Potentiometer	1	100K
Knob	1	---
Knurled Nuts	2	---

<p>Tools</p>		<p>Tools!</p> <p>You're going to need a soldering iron, some solder (lead free is fine) and some side cutters. You'll also need a small flat head screwdriver for the potentiometer knob.</p> <p>If you are interested, the soldering iron in this picture is an Antex CS18, which is excellent value and great for building most modules, but not really suitable for precision work.</p> <p>I recommend using something to protect your work-surface. I'm using a cutting mat from an arts & crafts store.</p>
<p>Parts</p>		<p>Parts!</p> <p>Unpack the parts and look at this all this stuff!</p> <p>You may find it a bit weird that the parts are in some sort of envelope rather than a plastic bag. This is just because I'm trying to reduce the environmental impact of these kits. I choose the components based on the ones with the least plastic packaging when I order in bulk from my suppliers.</p> <p>If you want to check that you have everything then you can compare your parts with the bill of materials on page 1.</p>

<p>Step 1</p>		<p>PCB (Yeah, You Know Me)</p> <p>Take out the Destino PCB and flip it over to the side with the electronics symbols printed on it. This layer of print is called the silkscreen and serves as a guide to where the components will go and in which orientation.</p> <p>In this guide we're going to add the components in groups by their type. We'll start with the components that sit lowest on the board and work up to bigger parts. This allows us to keep the components nice and close to the PCB while we're soldering.</p>
<p>Step 2</p>	 <p>2K</p> <p>47R</p> 	<p>Resistors</p> <p>Destino uses two values of resistor. 2K (which means 2000Ω) and 47R (which means 47Ω). You can tell the difference by looking at the coloured bands on the resistors.</p> <p>2K: Gold-Red-Black-Red</p> <p>47R: Gold-Black-Purple-Yellow</p> <p>Sort the resistors into two groups and bend the legs down close to the body.</p>

Step 3

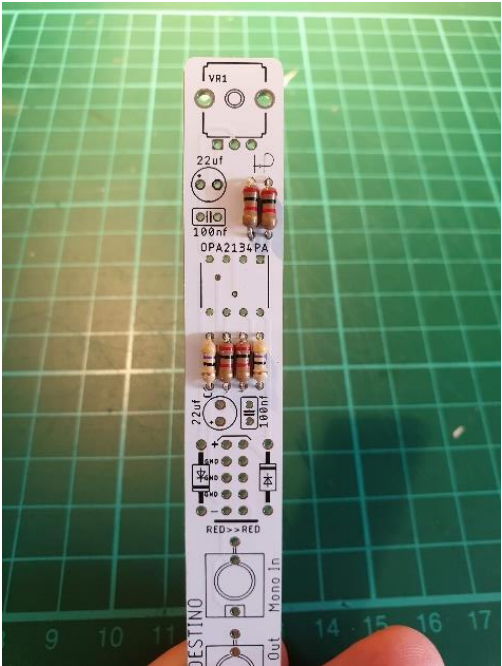
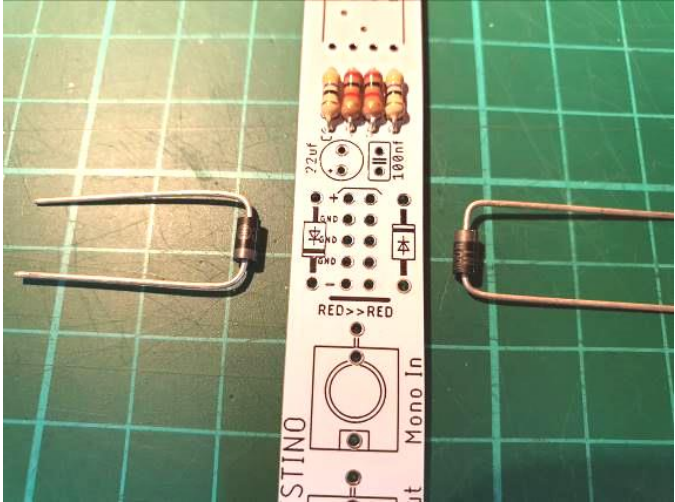


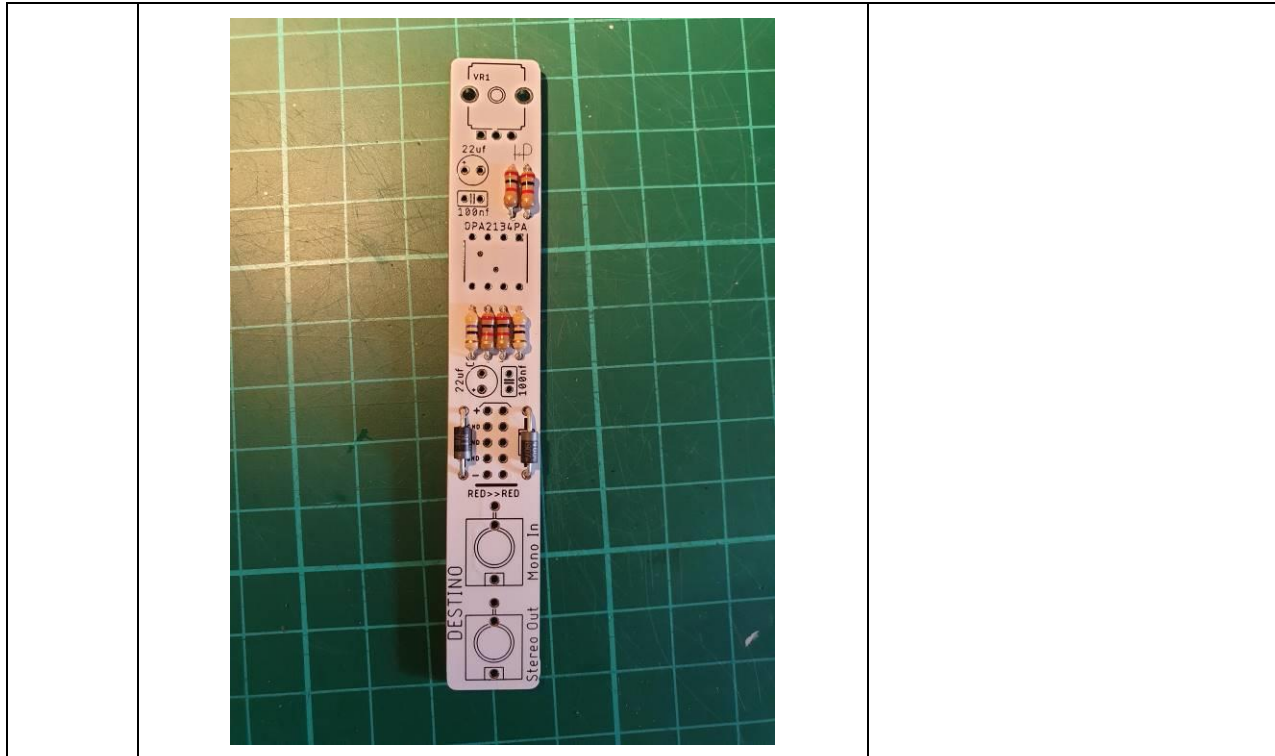
Place the four 2K resistors into the PCB in the locations shown in the picture. Make sure you get the 2K resistors in the gaps labelled 2K.

Resistors are non-polarised components, so it doesn't matter which way you put them in the holes.

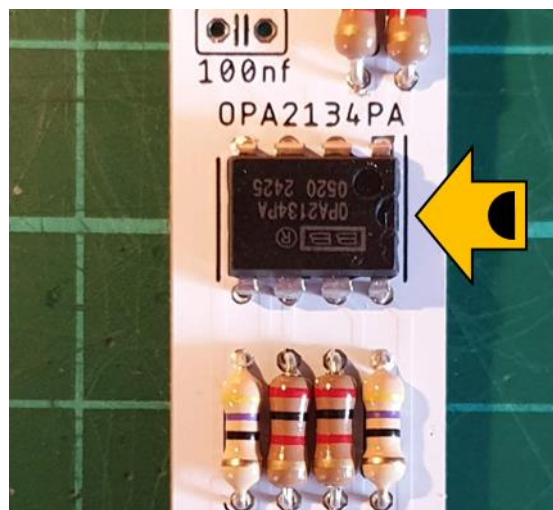
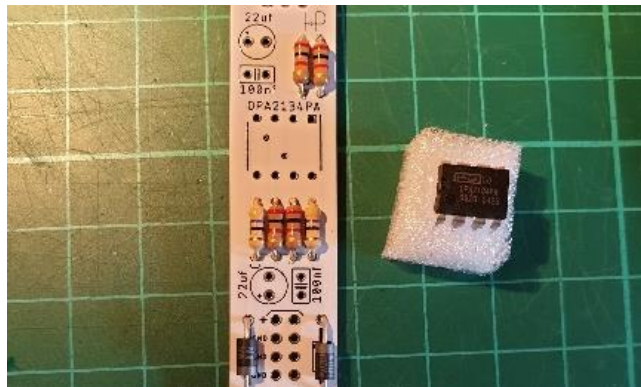
After you've placed the resistors, turn the board over and lay it on your work surface to keep the resistors close to the PCB when you are soldering them. If you like, you can bend the legs out a little to stop the PCBs moving around during soldering. You can do this with all components that have long legs.

Once soldered, snip the excess wire off with your side cutters.

<p>Step 4</p>		<p>Place the 47R resistors in the remaining resistor holes and solder as before.</p>
<p>Step 5</p>		<p>Diodes</p> <p>Next are the diodes, which are slightly larger than resistors. Bend the legs of these using the PCB as a guide to get the right spacing, as shown in the picture.</p> <p>The diodes are polarised components. This means that they have to be inserted the correct way round or they won't work and your module won't handle power correctly.</p> <p>The silver stripe on each diode needs to line up with the black stripe on the pictures on the silkscreen. So, the one on the left faces down and the one on the right faces up.</p>



Step 6



OP-AMP (the chip)

The heart of Destino is the little chip, which is also called an IC (Integrated Circuit). This chip contains an audio amplifier circuit.

Just like the diodes, the chip has to be put into the circuit the correct way around or the module will not work. To do this, the little semi-circle notch has to face to the right of the PCB. You may need to bend the legs of the IC **slightly** inwards to make it fit in the holes.

Soldering chips while keeping them nice and flat against the PCB can be tricky, as they don't have long legs to bend like resistors or diodes. Because you are already holding the soldering iron and solder wire,



you have no hands free to keep the chip aligned.

Though there are tools that hold components in place when soldering, one trick is to first flip the board over so it is resting on the component, then solder just one of the legs, such as the top right one.

After you've done that, use your non-dominant hand to lightly push down on the board while briefly re-heating the solder on that same one leg using your soldering iron.

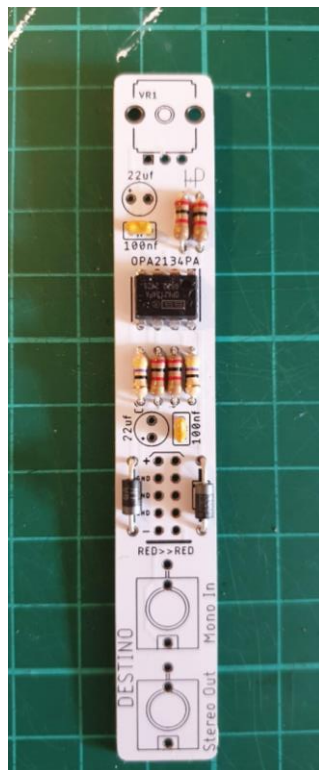
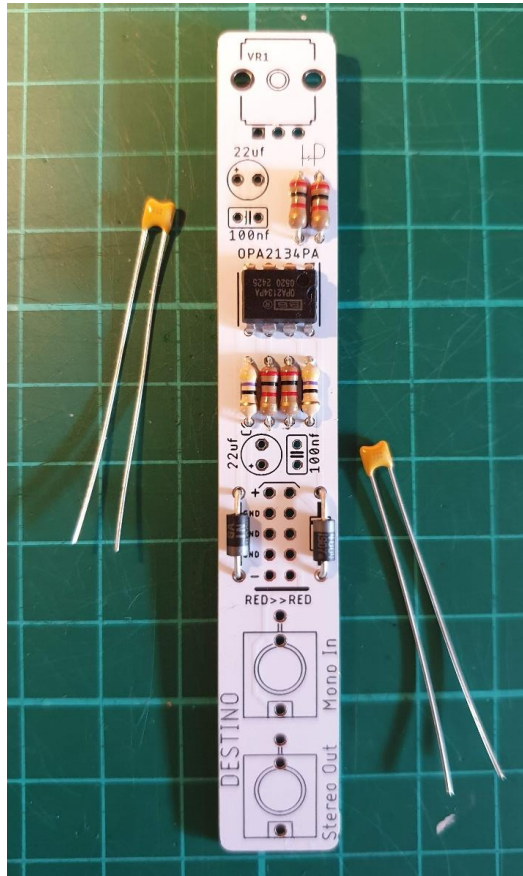
The solder on that leg will melt and the chip should move into position nice and flat against the board.

When you remove the soldering iron the solder will become solid and the chip will be held in place.

Check that the chip is now sitting flat against the PCB. If it is, you can go ahead and solder the rest of the legs.

This soldering trick is pretty handy for other components with short legs, such as header pins (Step 9) and phono jacks (Step 10).

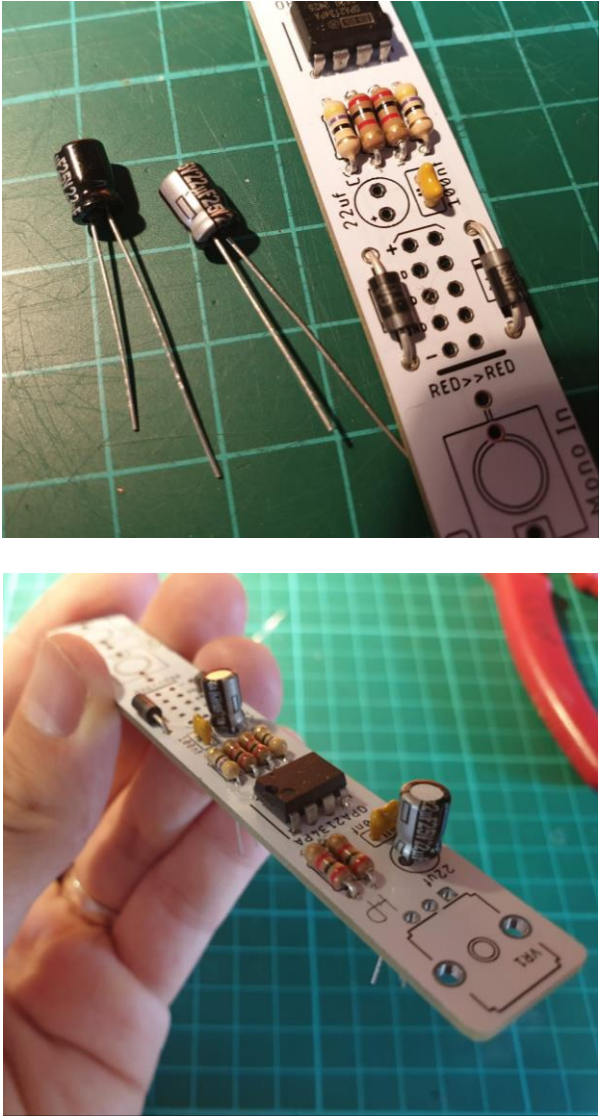
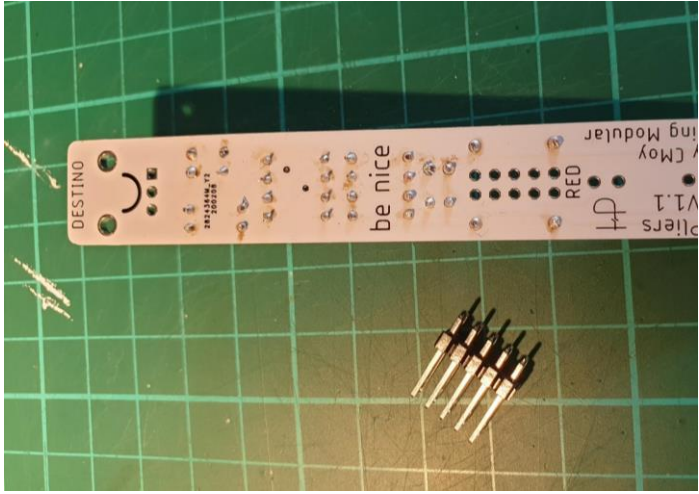
Step 7

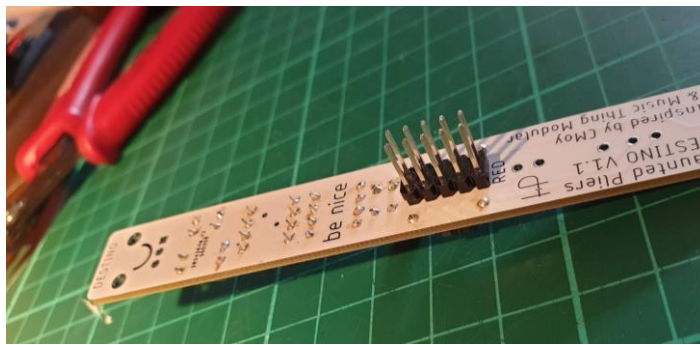


Capacitors

There are two types of capacitors in Destino. The first ones we'll put in are the 100nf capacitors (nf = nano-farad), which are smaller than the other type. Because they are non-polarized, they can go into the PCB in either direction.

Again, you can bend the legs to keep them in place when soldering (as we did with the resistors).

<p>Step 8</p>		<p>Electrolytic Capacitors</p> <p>The 22uf (uf = micro-farad) electrolytic capacitors are cylindrical, with one leg marked with a silver strip and a minus sign, as shown in the picture. This is the negative leg of the capacitor, while the other leg is the positive leg. The positive leg is also longer.</p> <p>You have to put the positive leg into the positive hole (marked with a small + symbol) on the PCB.</p> <p>You can double check your electrolytic capacitor placement against this photo if you are unsure. For both capacitors, the silver strip should point towards the closest set of resistors.</p>
<p>Step 9</p>		<p>Power Header</p> <p>The power header is used to connect Destino to the power supply of your synth. It needs to go on the opposite side of the PCB to all the other components.</p> <p>As with the Op-Amp (Step 6), it's a good idea to just solder one pin at first, to get everything lined up nicely.</p>

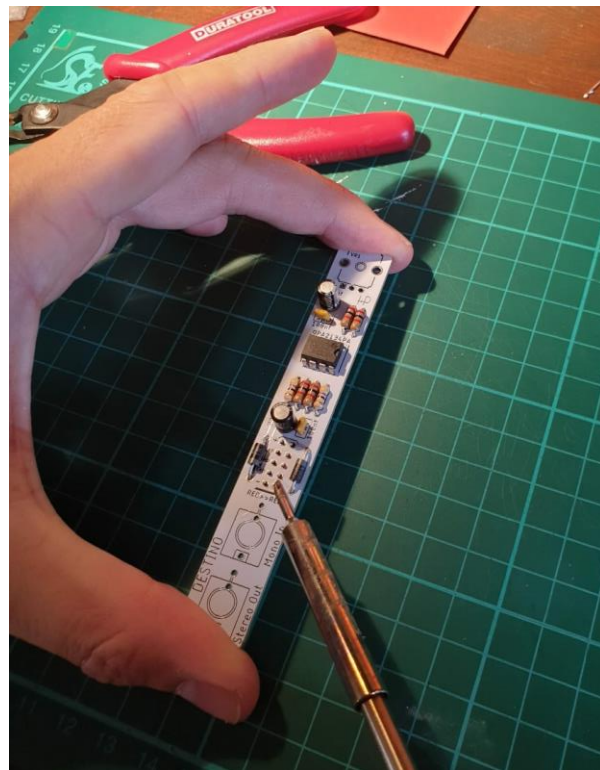


Because the header sticks out quite a bit compared to the op-amp, it can make the PCB quite wobbly during soldering.

In this picture I'm resting the top of the PCB on a handle of my side cutters for stability while soldering the bottom right pin.

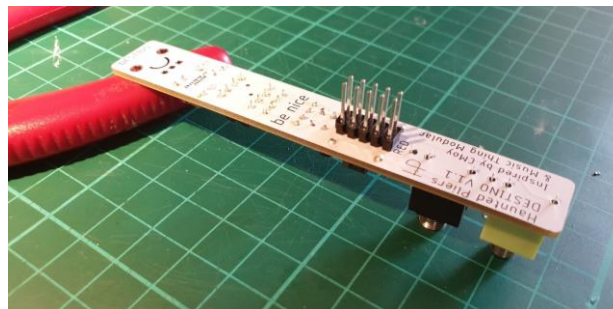
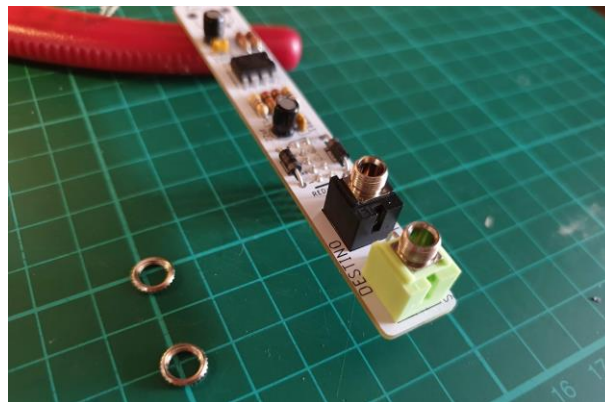
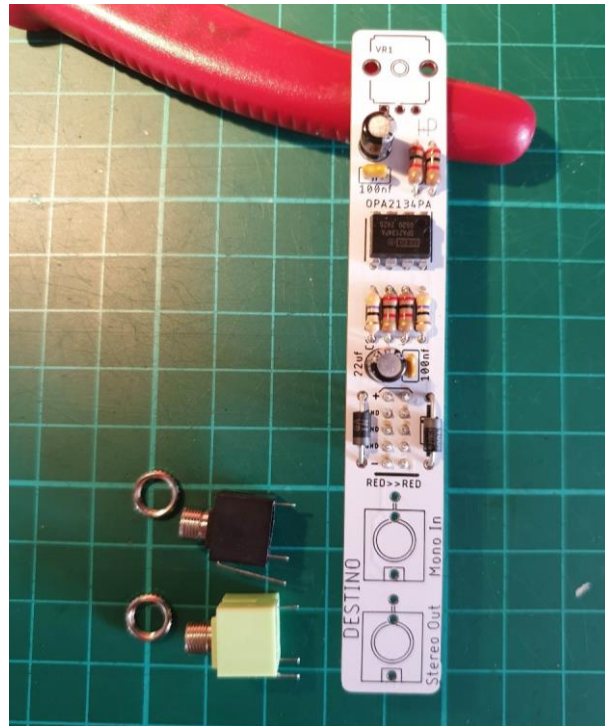


As in Step 6, I'm then using my non-dominant hand to lightly push down on the board while re-heating the solder to get the header pins flat with the PCB. Be careful not to hold the soldering iron on the pin too long while doing this or you may melt the plastic part of the header.



Once you've got it all nicely aligned with the first pin soldered, you can solder the rest of the pins. Be careful with those other nearby components, it can get tight.

Step 10

**Audio Jacks**

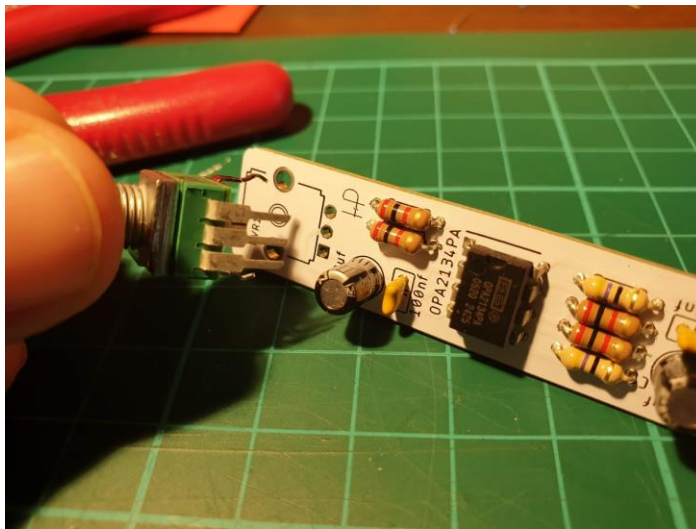
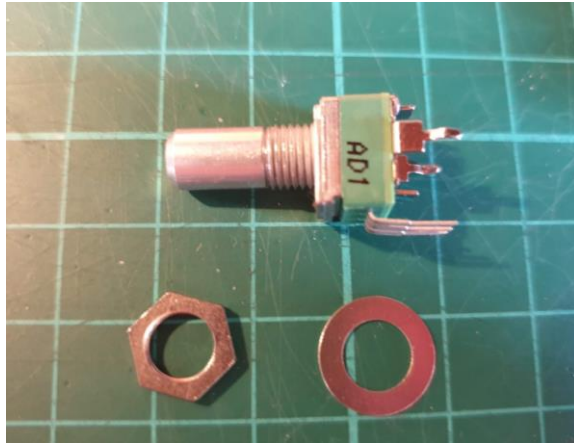
There are two audio jacks. A black mono one (because Eurorack signals are mono) and a green stereo one (because headphones and speakers are usually stereo). If you are colour blind then the stereo jack is slightly wider than the mono jack.

If the little round bevelled nuts are already screwed onto the phono jacks then unscrew them now and keep them handy.

Place the jacks onto the PCB, with the green stereo one at the bottom.

As before, flip the board over and rest the top end on something to keep it roughly flat. Solder one leg of each jack, get them lined up nicely before soldering the other legs. When lining up the jacks, try and keep them inside the outlines on the PCB. This will make the panel fit on nicely.

Step 11

**Potentiometer**

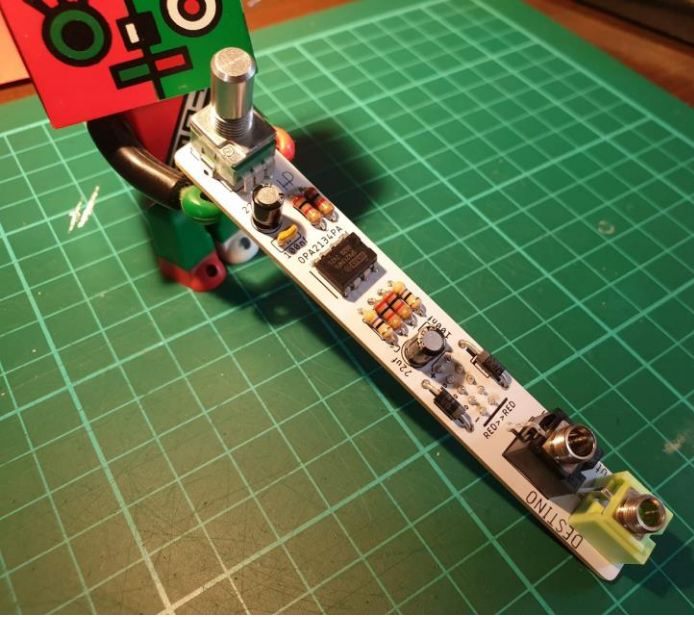
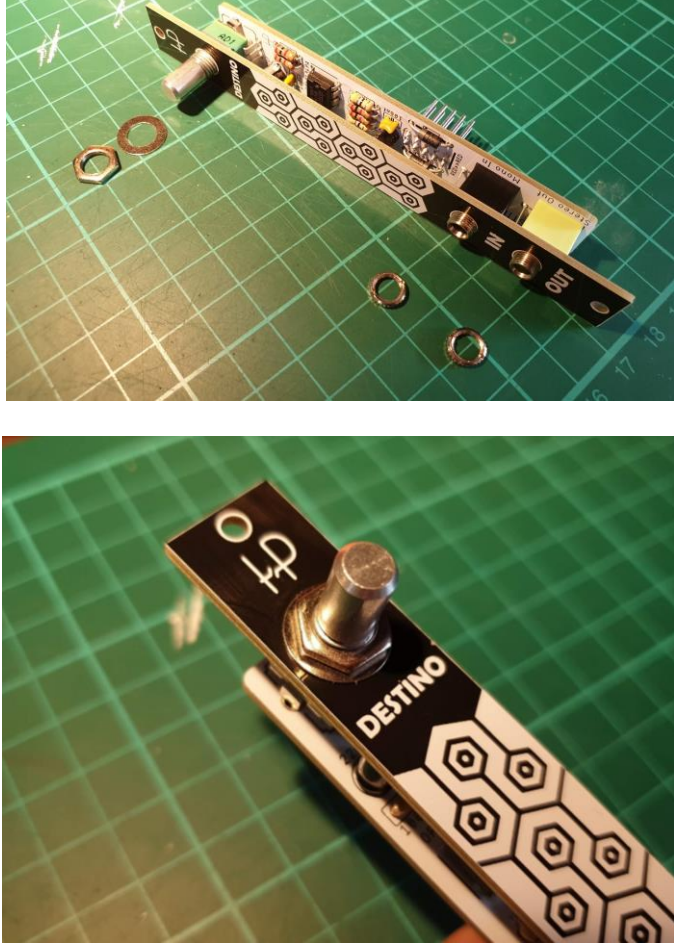
The potentiometer is the volume control for Destino.

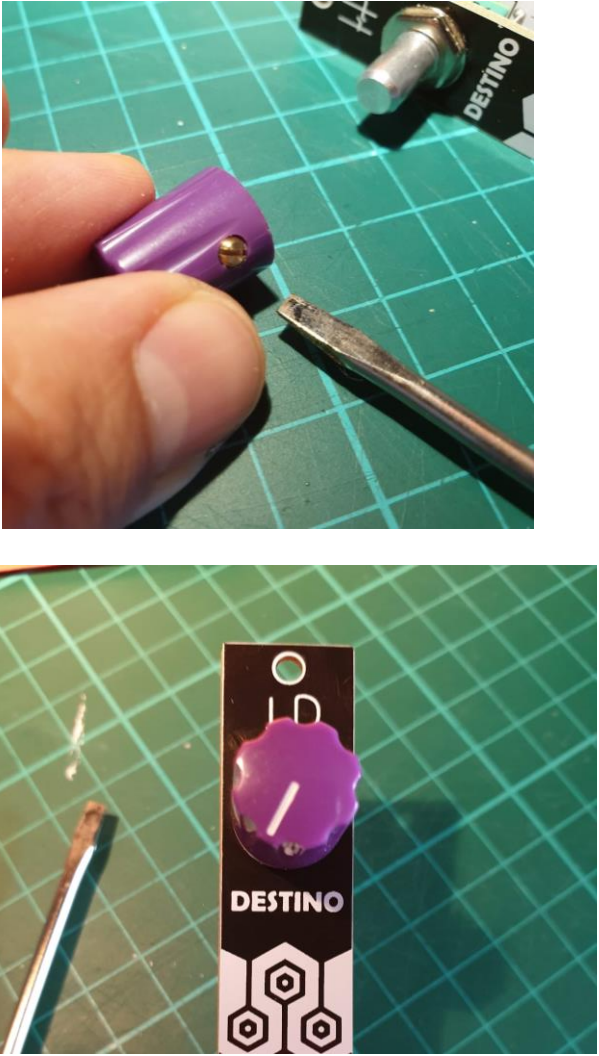
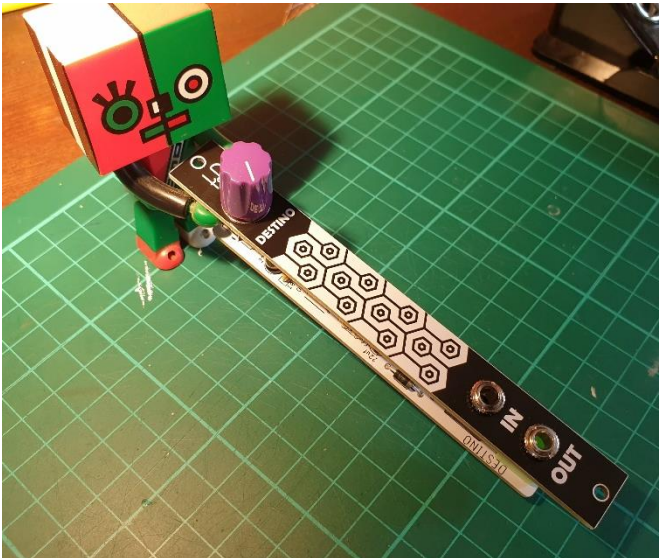
First, remove the nut and washer, but keep them handy.

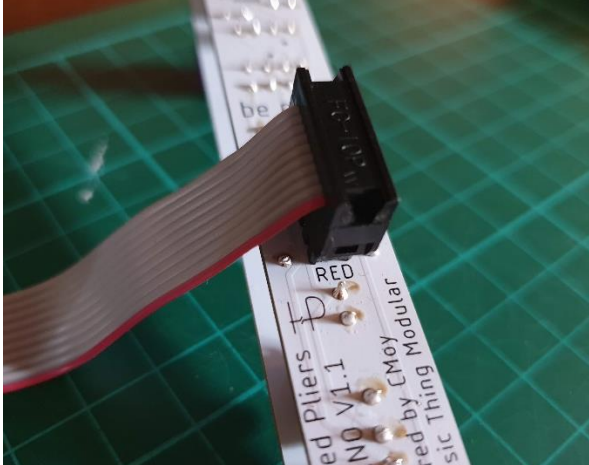
When you place the potentiometer in the PCB, you'll notice that it has three regular legs and two bendy legs. These bendy legs clip into the bigger holes at the top of the PCB and keep the potentiometer firmly in place during use.

I used my side cutter handles to keep the board stable while soldering the three straight legs of the potentiometer.

You don't have to solder the bendy legs of the potentiometer, as the clip design already holds them in place nicely.

Step 12		<p>Check your handiwork</p> <p>Your Destino PCB is now fully populated with electronic components. Doesn't it look great?</p> <p>Now, it's time to check your solder joints for any you may have missed or look bad, as it will be a bit more of a faff to fix these after we put the panel on in the next step.</p> <p>Also check that all the components match those in the picture, in terms of placement and orientation.</p>
Step 13		<p>The Panel</p> <p>The holes in the panel simply fit over the threaded parts of the potentiometer and audio jacks.</p> <p>Note that the potentiometer and the audio jacks are different heights, so the panel will not sit parallel to the PCB. Don't worry, you won't be able to tell when it's in your rack</p> <p>Apply the washer and nut to the potentiometer and the knurled nuts to the audio jacks to hold everything together. I find that 'finger tight' is normally fine, but you should probably use tools for tightening if you are going to be moving your rack around a lot.</p>

<p>Step 14</p>		<p>The Knob</p> <p>To install the knob, first turn the potentiometer fully anticlockwise. This position corresponds to zero volume.</p> <p>Then, use a flat head screwdriver to loosen the little screw on the knob.</p> <p>Now, put the knob on the potentiometer so that it points between the D and E of 'Destino' and tighten the screw. This will make the sweep of the volume knob symmetrical.</p>
<p>DONE!</p>		<p>Finished</p> <p>And that's a wrap! Pat yourself on the back, particularly if this is your first DIY module.</p> <p>I hope you enjoyed building Destino and the instructions were clear. If there were any issues then please let me know what they were and I'll try and fix them for future users.</p> <p>Now, there's just one thing left.</p>

<p>Finally...</p>		<p>Connect the Power</p> <p>Now that we're done it's time to connect the module to your power supply and add it to your Eurorack system.</p> <p>Make sure you insert the connector so that the red wire is next to the 'RED' label on the PCB.</p>
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