

Bill Of Materials

Part	Quantity	Link
Self Tuning VCO V3 PCB & Panel	1	https://duskwork.net/shop.html
AS3340D (SOIC-16)	1	https://www.thonk.co.uk/shop/alpha-as-series-ic-chips/
MCP41100	1	https://www.mouser.co.uk/ProductDetail/Microchip-Technology/MCP41100T-I-SN?qs=ibllfa22dKKStX41bG1ShFw%3D%3D
10k Trim Pot	2	https://cpc.farnell.com/bourns/3296w-1-103lf/pot-trimmer-10k-25-turn-10/dp/RE06690?st=10k%2otrim%20pot
100k Potentiometer (fine-tune)	1	https://www.mouser.co.uk/ProductDetail/317-2090F-100K
100k Potentiometer (wave-mixer)	3	https://www.mouser.co.uk/ProductDetail/652-PTV09A4025FB104
3mm Green LED	1	https://cpc.farnell.com/multicomp-pro/mc1034gd/led-3mm-70-green/dp/SC15400
3mm Amber LED	3	https://cpc.farnell.com/multicomp-pro/mc1034bd/led-3mm-70-amber/dp/SC15402
Momentary Push Button	1	https://cpc.farnell.com/unbranded/sw05491/push-button-switch-no-black/dp/SW05491?st=momentary%20switch
3.5mm Socket (PJ-392)	2	https://www.banggood.com/10Pcs-PJ-392-3-Pin-3.5mm-Stereo-Headphone-Audio-Video-Jack-Socket-Plug-With-Nut-p-1015146.html?rmmds=myorder
2*5 header (eurorack power)	1	https://cpc.farnell.com/multicomp/2213s-10g/header-2-row-vert-10way/dp/CN14515
2*3 (ISP Programming Header)	1	https://cpc.farnell.com/multicomp/2213s-06g/header-2-row-vert-6way/dp/CN14513
Potentiometer knobs (D-shaft)	3	https://www.thonk.co.uk

Tools required

Soldering Iron (with a small tip for the surface mount components!)

Solder

Flat blade screwdriver (to adjust the trim pots)

Tuner (phone app will do)

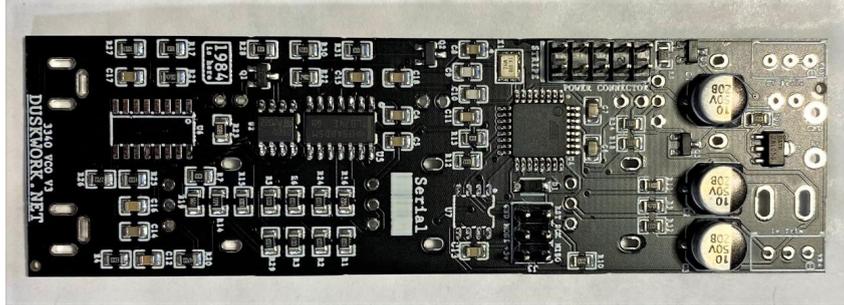
Side cutters

Multimeter

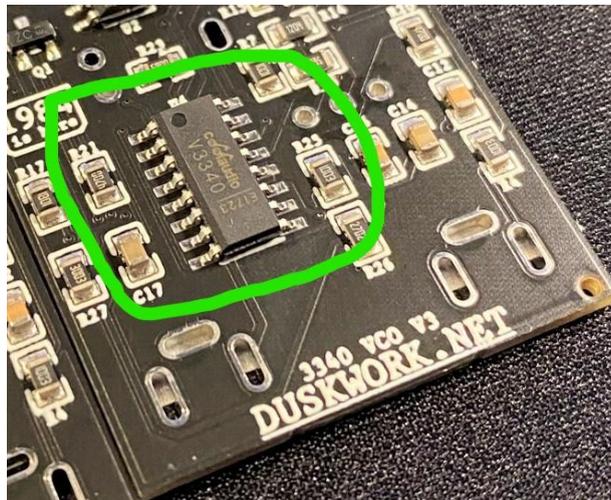
[USB ISP Programmer](#)

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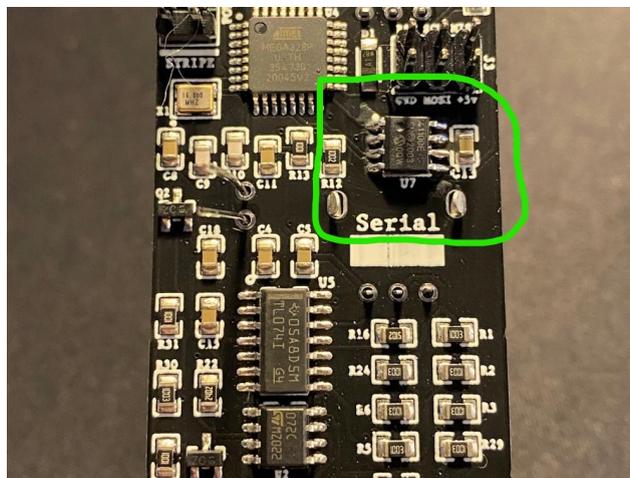
Step 1: Check the version of the board that you have. The version number is found at the bottom of the main PCB with all the components on. This build guide is for V3 only, check the website for other revisions. *Note: All V3 PCB's arrive pre-programmed as standard.*



Step 2: Solder the surface mount 3340 VCO chip into U6. Pin 1 is marked by a white dot at the top left of the chip. Make sure to get the orientation correct on this. I used the Cool Audio V3340 (SOIC-16) version on mine. Make sure to use a small soldering iron (or SMT heat gun) on this to avoid making shorts between pins!

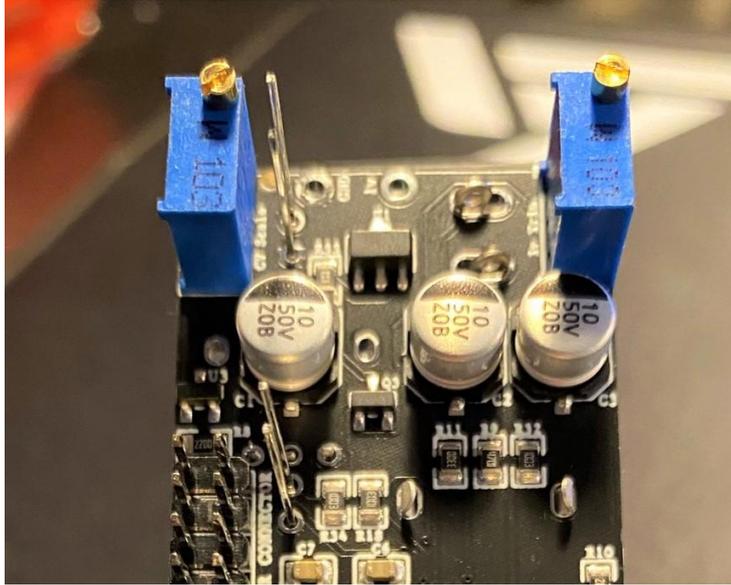


Step 3: Solder the surface mount MCP41100 chip onto U7. Again, using a small soldering iron tip on this and be sure to not short any pins. Always use a multimeter to check for shorts before powering up if unsure.



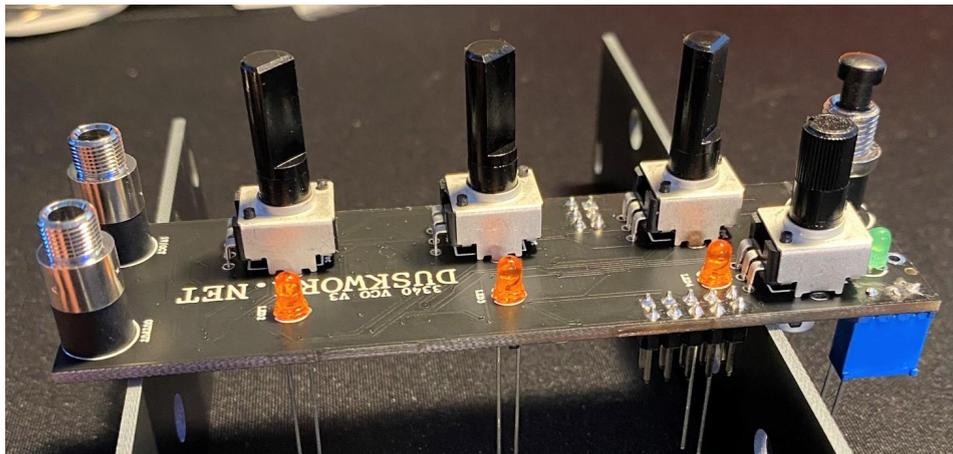
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Step 4: Now it's time to start soldering the through hole components. Start with the 2 x 10K trim pots at the top of the board. One is to adjust the 1v reference signal, the other is to adjust the 1v/oct CV tracking



Step 5: Now it's time to install the 3 main pots which will be used for the wave-mixer. These should 'click' into place when inserting them onto the PCB. Don't solder these in yet though! We need to put the other parts loosely in place before so that the panel all lines up nicely.

Step 6: Next we need to fit the pot used for the manual fine tune. We'll need to trim the support tabs off of this so that it can fit in its designated place. Cut these off with some side cutters and pop it in the position of the pot marked "Fine Tune"



Step 7: We now need to fit the 4 LEDs. Be sure to get the green one into the top position (LED1). The rest (LED 2, LED 3, LED 4) must be the amber LEDs. Again - do not solder these yet. We need to line everything up first.

Step 8: It's time to pop in the 2 jack sockets & the momentary push button. Another reminder to not solder these in just yet.

Step 9: Time to line that panel up! Hold the PCB horizontally and let the components all rest in their natural position - you'll need to feed the LEDs through the holes manually. The Jack sockets should be flush to the PCB, and the momentary switch should be raised slightly. Before soldering, it is imperative that we fit the nuts/washers onto the jack sockets & button - tighten those up, and once you've made sure the PCB is flat and parallel to the face plate, it's time to solder all of those in!

Start by soldering the middle leg of each pot - then move on to the jack sockets and button. When you solder these in, make sure you're happy with the placement of the PCB against the front panel. Once these are soldered, it will be tricky to change! Get the rest soldered, and then it's time to calibrate and test.



Note: -12v is at the bottom of the socket for power

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Step 10: Time to plug in the VCO, but don't worry about a CV input or output just yet! We need to calibrate the 1v rail by using the top right-hand trim pot. Grab a multimeter and use the "volts" setting to measure across the 1v & GND which are located just beneath the 10 pin power header. Adjust the trim pot (marked "1v trim") until you measure exactly 1v. This is regulated by a precision voltage regulator and this is what feeds the Self-Tuning circuit.

Step 11: Now time to run up the VCO on your system so we can calibrate the 1v/oct setting. You'll need to use an external tuner for this part – I just use the built in one on Ableton, but a phone app, or hardware tuner should work just the same. This step is the same on any 3340 VCO build – you need to make sure each 'C' note is exactly one octave apart. Adjust VR5 (top left trim pot) until these are exactly in tune.

And that's all folks!

