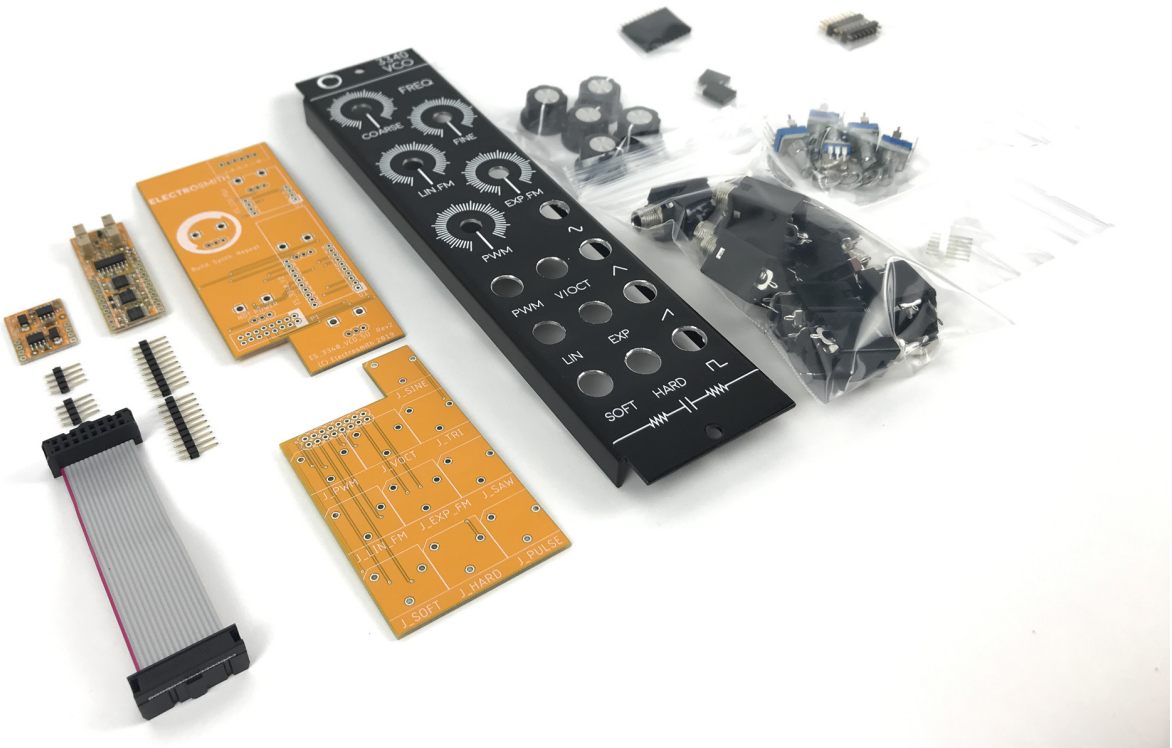
Electrosmith 3340 VCO MU Build Guide

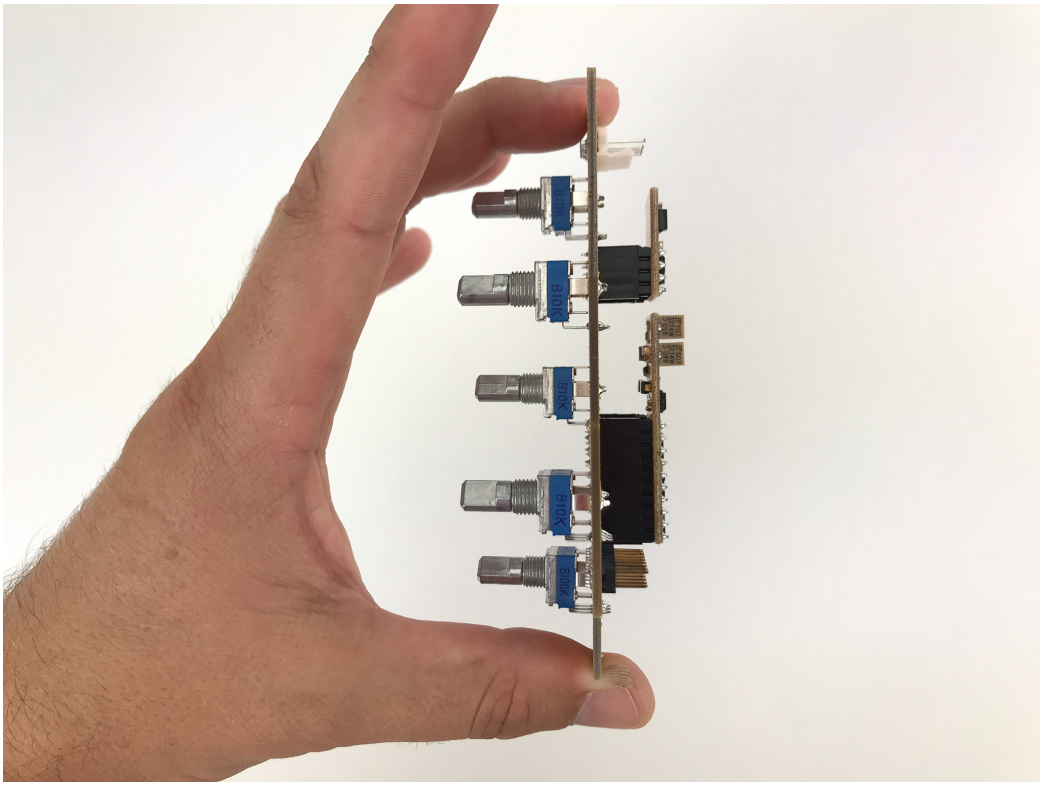


Contents

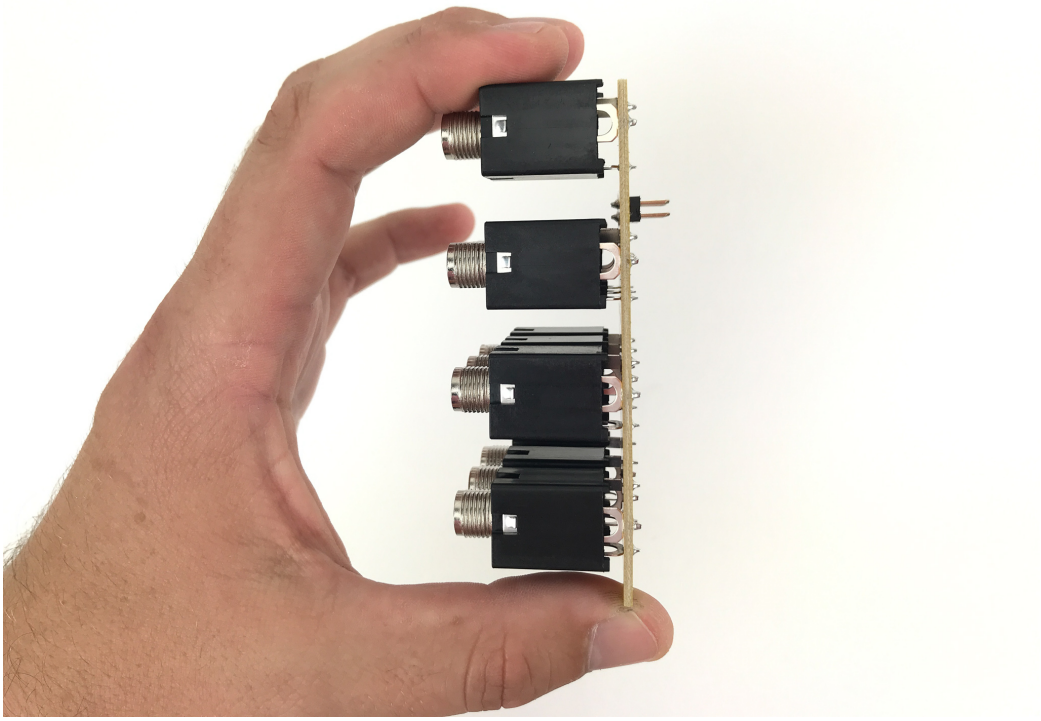
Overview of the included parts

- x5 10k Potentiometers
- x10 MU Jacks
- x1 Electrosmith 3340 Submodule
- x1 Electrosmith 12V PSU Submodule
- x1 Electrosmith 3340 VCO 1MU Top PCB
- x1 Electrosmith 3340 VCO 1MU Bottom PCB
- x1 Electrosmith 3340 VCO Front Panel
- x2 2x8 Male Headers
- x1 1x6 MU Power Header
- x2 1x10 Female Headers
- x2 1x10 Male Headers
- x2 1x4 Female Headers
- x2 1x4 Male Headers
- x5 Knobs

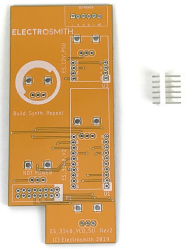
Build



Build



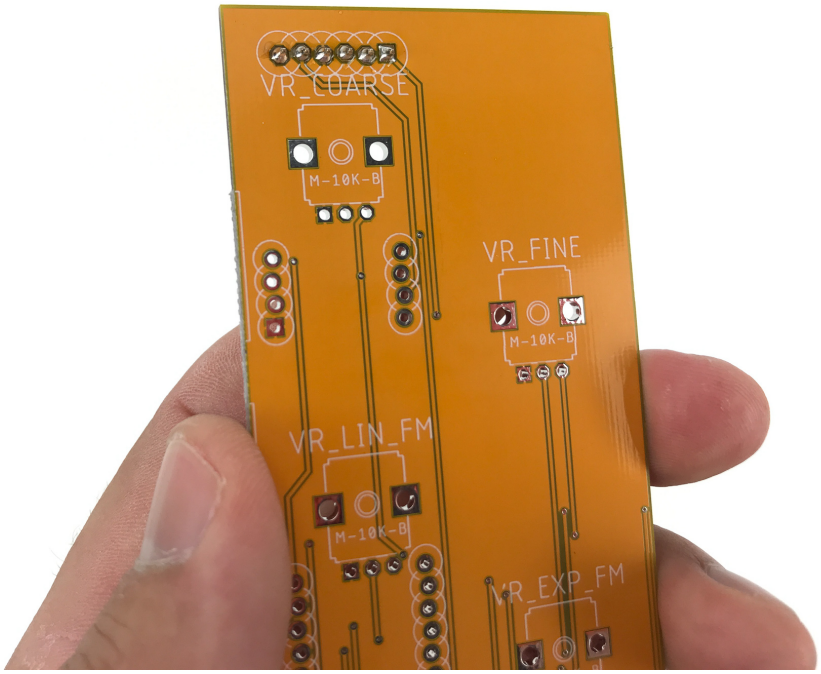
1. Power Header



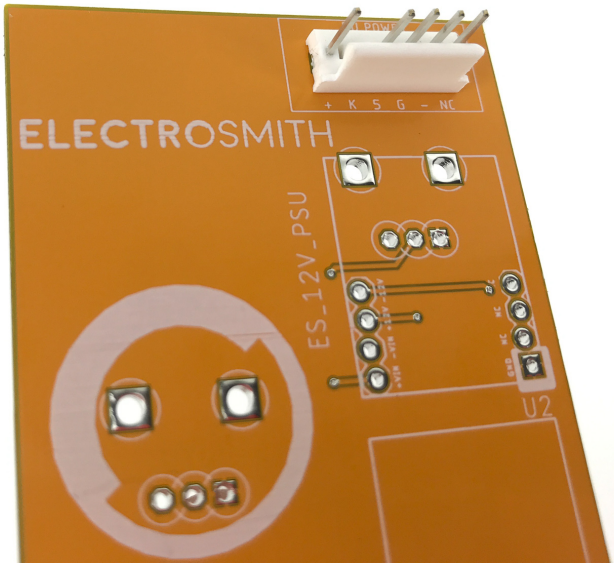
The short pins should be pointing through to the top-side of the PCB, while the plastic and longer side of the pins should be visible on the back of the PCB. Make sure the plastic lock tab is facing down.

The side of the PCB with the text “5U POWER” is the bottom side of the PCB.

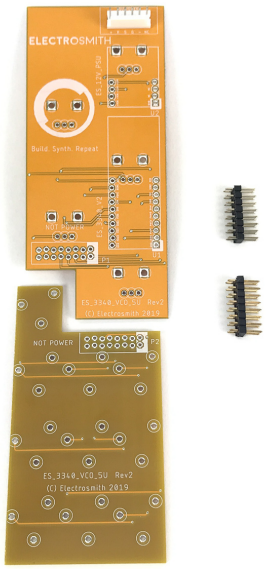
The holes for the power header are offset slightly in both positions so that once inserted, the power header will stay in position while you solder it.


VR_COARSE
M-10K-B
VR_FINE
M-10K-B
VR_LIN_FM
M-10K-B
VR_EXP_FM

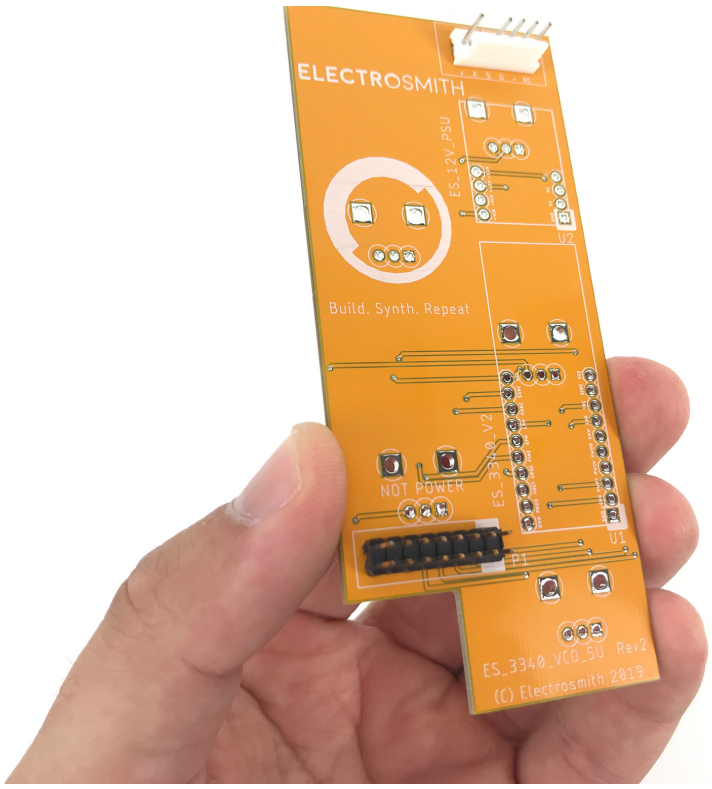
Once soldered, clip the pin labeled “K” from the power header.

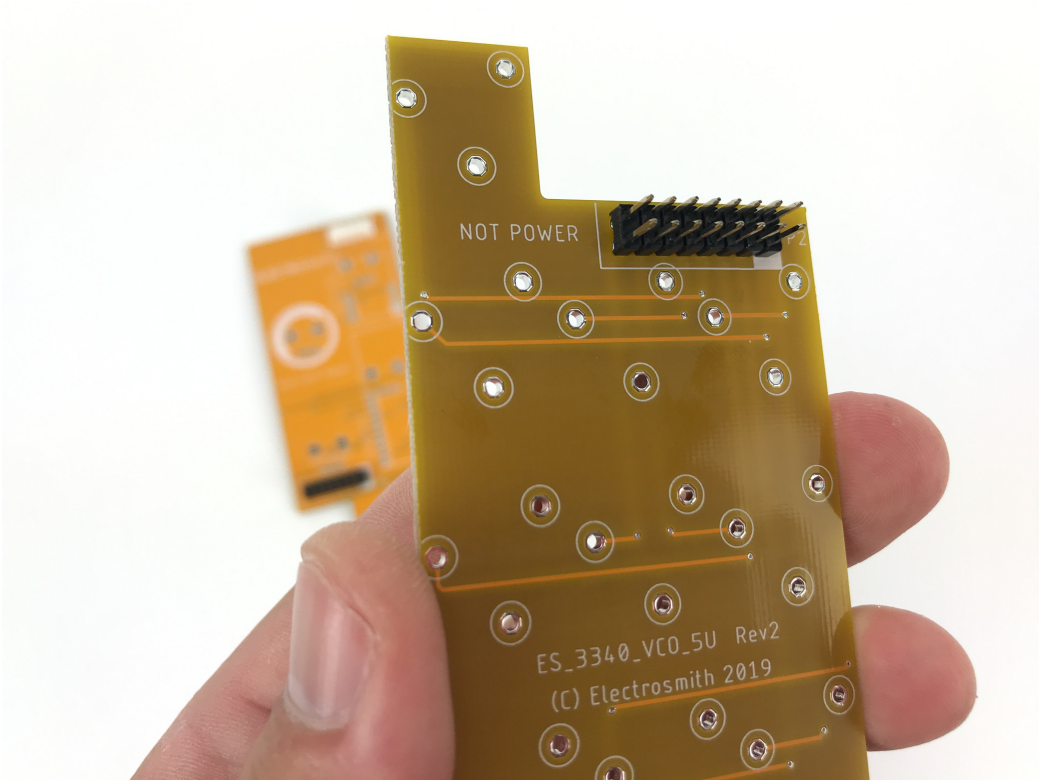


2. Link Headers

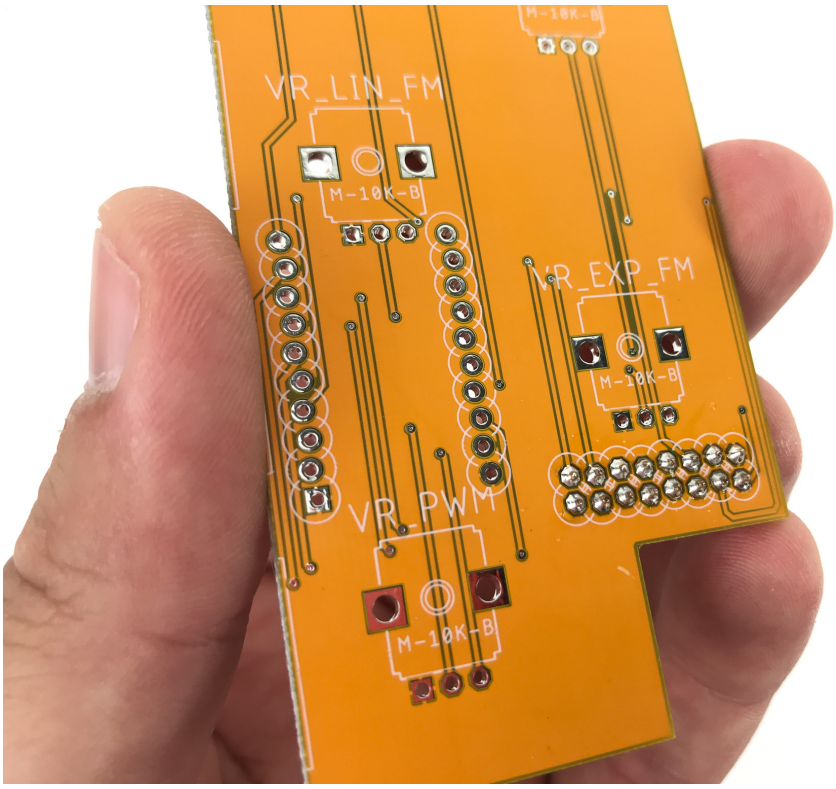


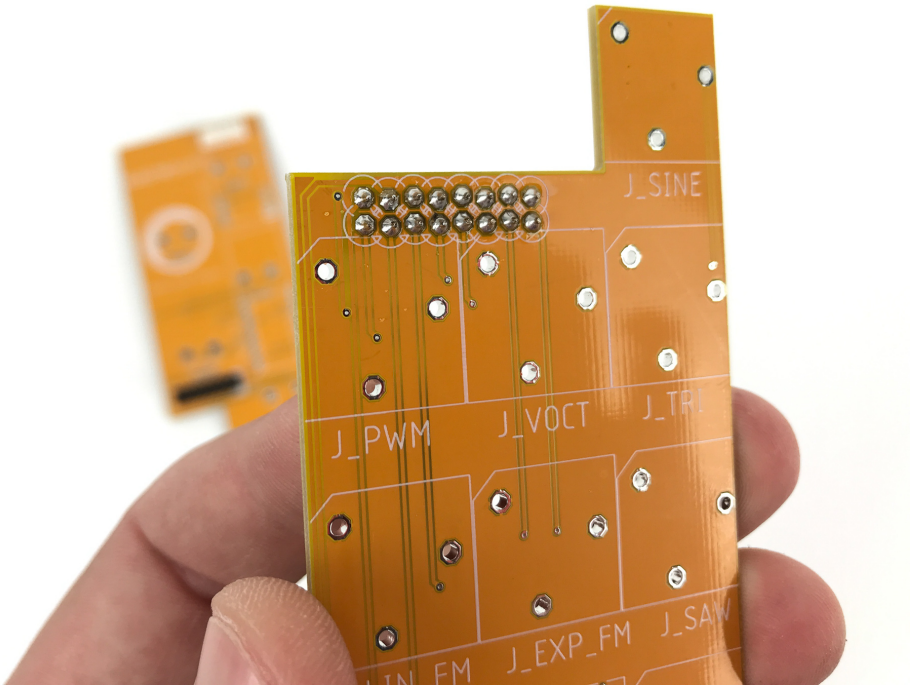
Populate both PCBs with the 2x8 male headers. The short pins should be pointing through to the top-side of the PCB, while the plastic and longer side of the pins should be visible on the back of the PCB.



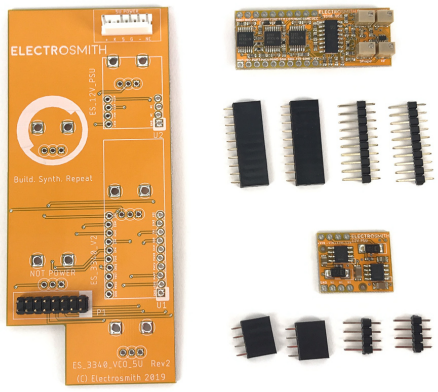

NOT POWER
ES_3340_VCO_5U Rev2
(C) Electrosmith 2019

All of the connections that need to be soldered are highlighted with white circles to visually assist in the build process

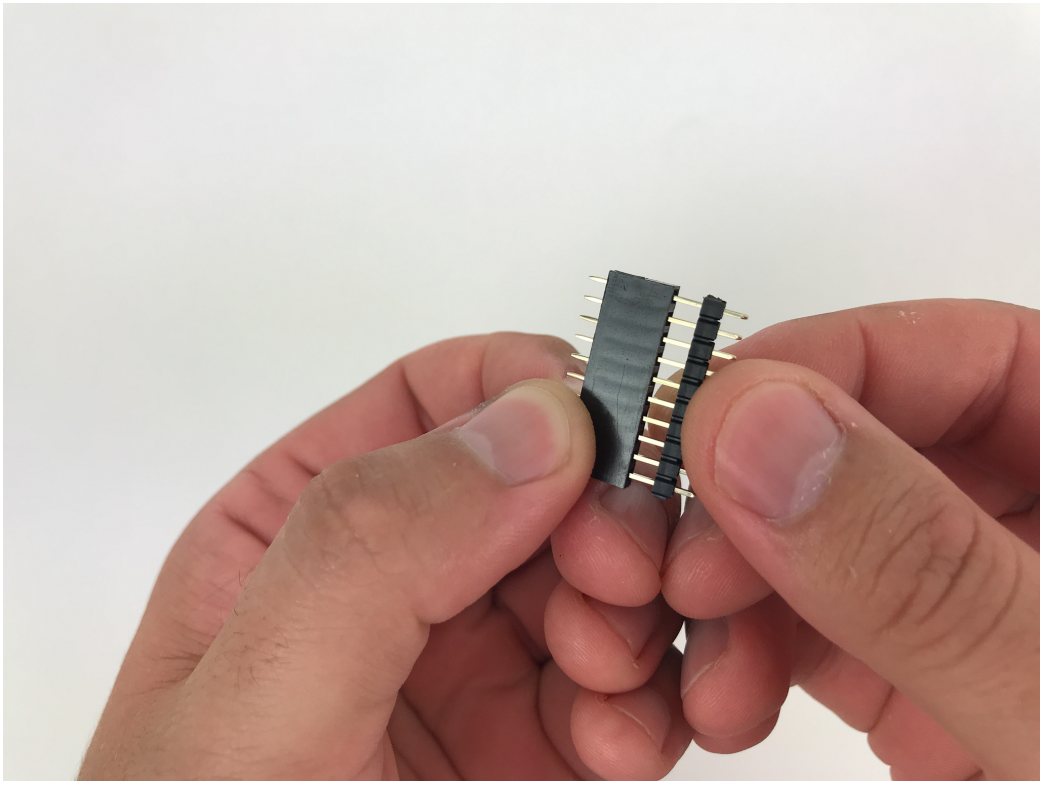



J_SINE
J_PWM
J_VOCT
J_TRI
J_EXP_FM
J_SAW

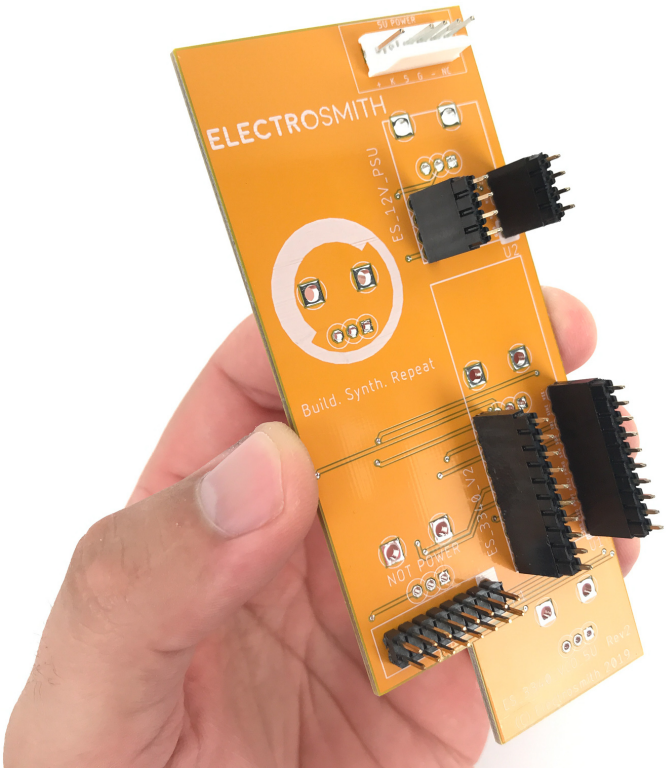
3. Submodule


ELECTROSMITH
Build. Synth. Repeat
NOT POWER
ES_3340_V01.50 Rev2
(C) Electrosmith 2019

Connect the female and male headers together.



With the board face down, insert the female headers into the 1MU PCB.

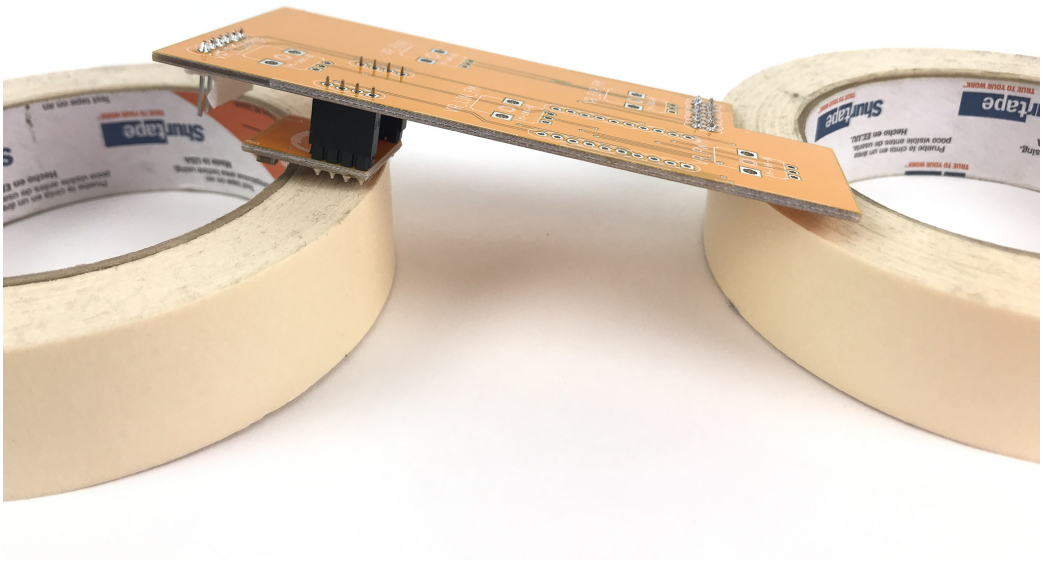


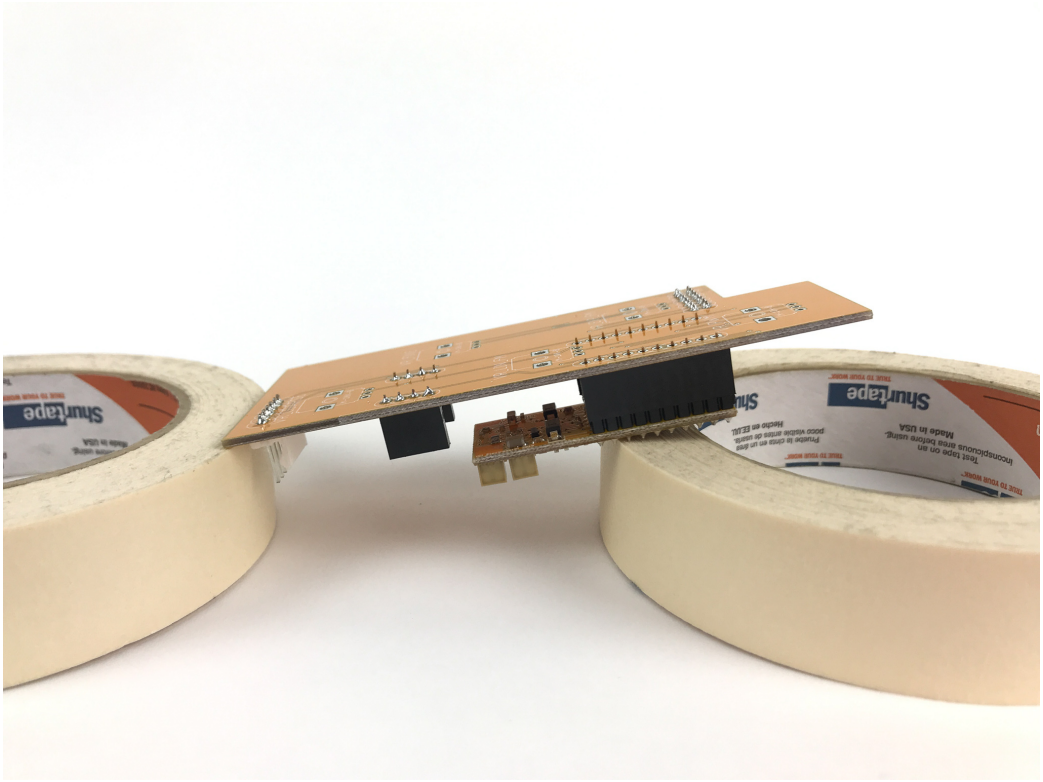
Place the Electrosmith 3340 submodule and 12V PSU submodule with pin 1 (indicated by a square pad) aligned with the marker on the 1MU PCB. The trim pots, and logos should be pointing up.

Solder the submodules onto the headers.

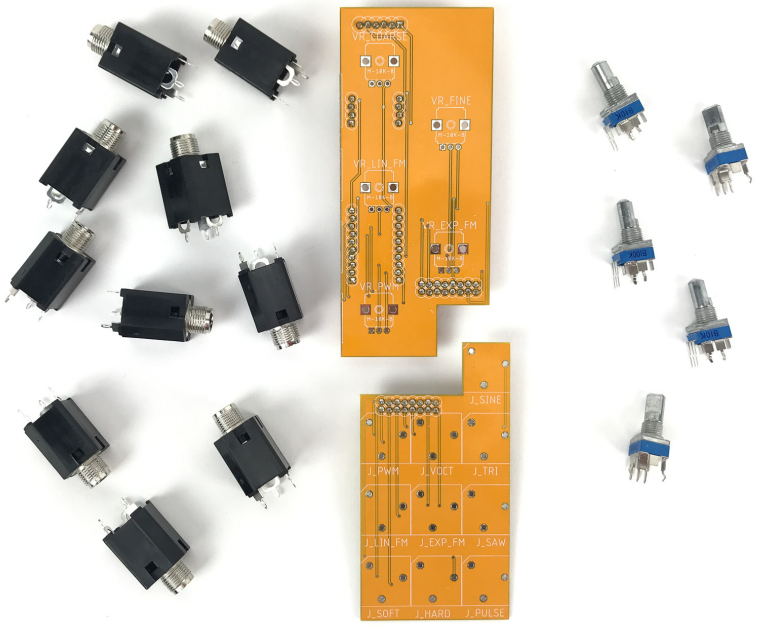
Flip the module over, leaning the now connected submodule against a surface that will keep all of the headers flush with the 1MU PCB.

Solder the female headers into the 1MU PCB.

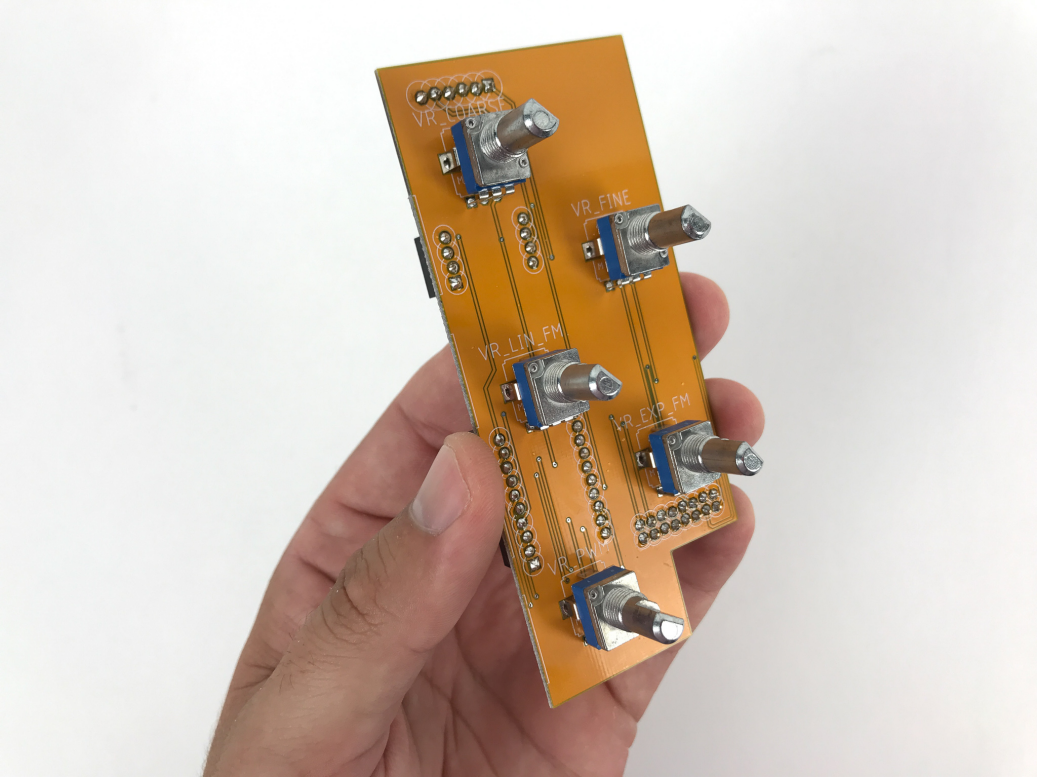



ShurTape
ShurTape

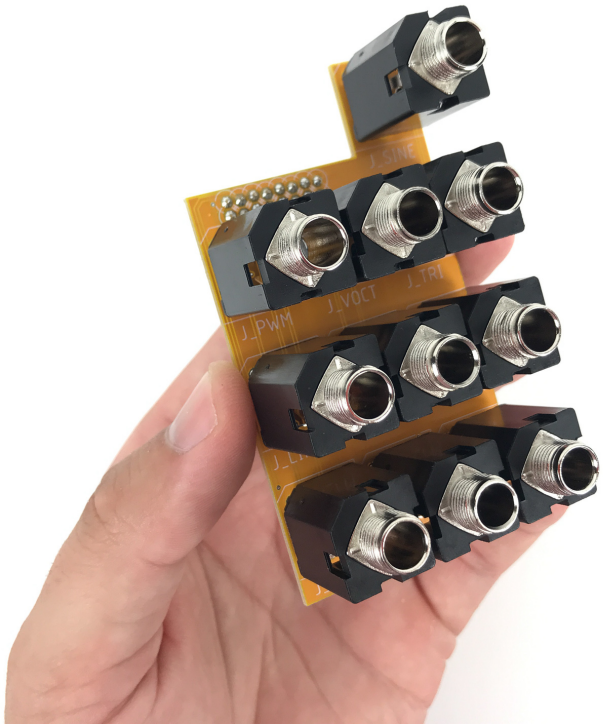
4. Jacks and Pots



Populate the PCB with the 5 10k Potentiometers. They should be seated onto the top side of the PCB (easily verified by the boxes indicating the "M-10K-B pots).

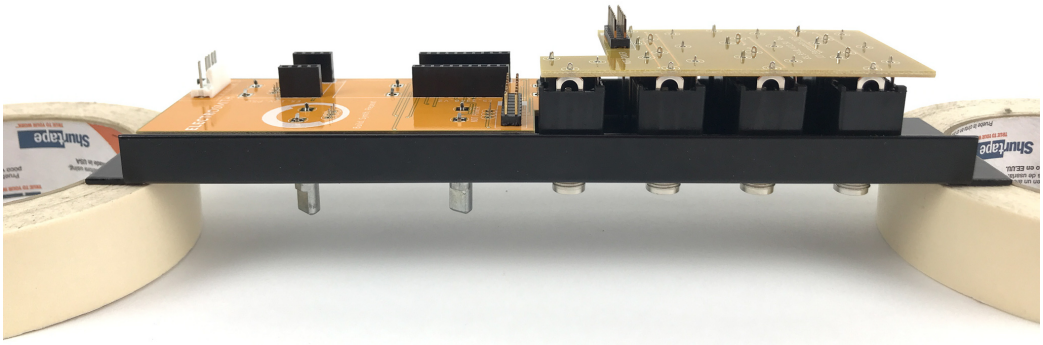


Populate the additional PCB with the 10 MU Jacks. They should be seated onto the top side of the PCB (easily verified by box shapes around where the jacks will be placed).



Install the front panel so that all of the jacks and pots fit into their holes.

Flip the module over, and place the front panel on two objects of equal height to ensure that gravity is holding the PCB against the jacks.



On the bottom side of the PCB all of the connections that need to be soldered are highlighted with white circles to visually assist in the build process.

In total there will be 55 solder joints to hit on the bottom side of the PCB.

Finish

Affix the front panel to the jacks and pots using the included hex nuts. Once you've tightened them you can attach the knobs to the potentiometers by matching the cutout on the bottom of the knob with the position of the pot shaft, and pressing down.


3340
VCO
FREQ
COARSE
FINE
LIN FM
EXP FM
PWM
PWM
V/OCT
LIN
EXP
SOFT
HARD

Attach the link cable aligning the red stripe to the white indicator on both pcb's

You're done! Enjoy!

Test

Double check that Pin 1 (GND) of the Submodule, indicated by a square copper pad, matches the pin 1 indicator on the 1 MU PCB.

Attach the power cable to the Electrosmith 3340 VCO.

Power on the module.

A tone should emit from the top four jacks (Sine, Triangle, Ramp, Square)

Adjusting the top two pots (Coarse, and Fine) should change the frequency of the tone.

The Bottom knob (PWM) should change the sound of the square wave by adjusting the pulse width.

Plugging another oscillator (ramp or square wave) into Sync should change the sound by resetting the phase on the edges of the incoming signal.

Adjusting the Soft/Hard toggle should change the way Sync sounds.

Plugging a moving signal into LFM and adjusting the LIN FM knob should change the frequency of the tone.

Plugging a moving signal into EFM and adjusting the EXP FM knob should change the frequency of the tone.

Plugging a signal into VOCT should change the frequency of the tone.

Calibrate

To calibrate the Frequency CV input for 1V/Octave or other musical interval tracking, you will need:

- a well calibrated voltage source (musical sequencer or quantizer), or a variable DC voltage supply.
- a frequency counter, musical tuner or golden ears
- a tiny flathead screwdriver

To calibrate the Sine waveshape you will need one of the following or both:

- Oscilloscope
- Ears

There are four trim pots on the ES 3340 Submodule, labelled V/OCT, HF, Symm, and Shape

V/OCT Trim

1. Tune to a fundamental frequency that can be easily verified several octaves up (e.g. 20Hz, 50Hz or 100 Hz). This can also be a musical note, if a chromatic or stroboscopic tuner is being used.
2. Apply 1V to V/oct input
3. Adjust trimmer to 2x the initial frequency.
4. Apply 0V to V/oct input
5. Readjust tuning to match initial frequency.
6. Repeat steps 1-5 until 1V is 2x the original frequency.
7. Repeat steps 1-6 for each subsequent octave until the first 6-8 octaves are calibrated, or until satisfied with the range that is calibrated.

HF Trim

This will only affect tracking at high frequencies where there can be a slight drop in current within the exponential generator inside of the 3340 IC.

1. Calibrate the V/oct trimmer first
2. Tune to a very high frequency (e.g. 4kHz, 8kHz)
3. Apply 1V to V/oct input
4. adjust trimmer to fine tune the high frequency tracking
5. Apply 0V to V/oct input

6. Retune the fundamental you started with.
7. Repeat 3-6 until that octave is calibrated
8. Repeat 3-7 for each successive Voltage/octave, and/or until satisfied.

Symmetry Trim

This adjusts the dc offset applied to the sine waveshaper.

Rotating the trimmer will push the waveform more toward the positive or negative rail.

Ideally you will rotate this until the curve on the top of the waveform looks the same as the curve on the bottom of the waveform.

If you do not have an oscilloscope to view the signal, you can compare the sound to a digital sine wave, and try to adjust these two trimmers to match that sound.

Shape Trim

This adjusts the overall amount of shaping being applied. This affects both the top and bottom of the waveform simultaneously.

At its extremes you will end up pointy like a triangle wave, or something flat like a square wave.

Ideally you will rotate this until the curve is sinusoidal. This can be hard to do with out a reference, but the goal is to have a nice rounded edge on either side of the waveform.