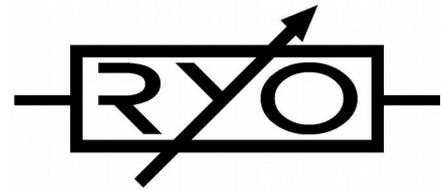


Produced by:

Roll Your Own
ljunggrenaudio.com



Schematic & PCB Design by:

KYMATICA DEVICES
www.kymatica.com

2xVCX version 1.0

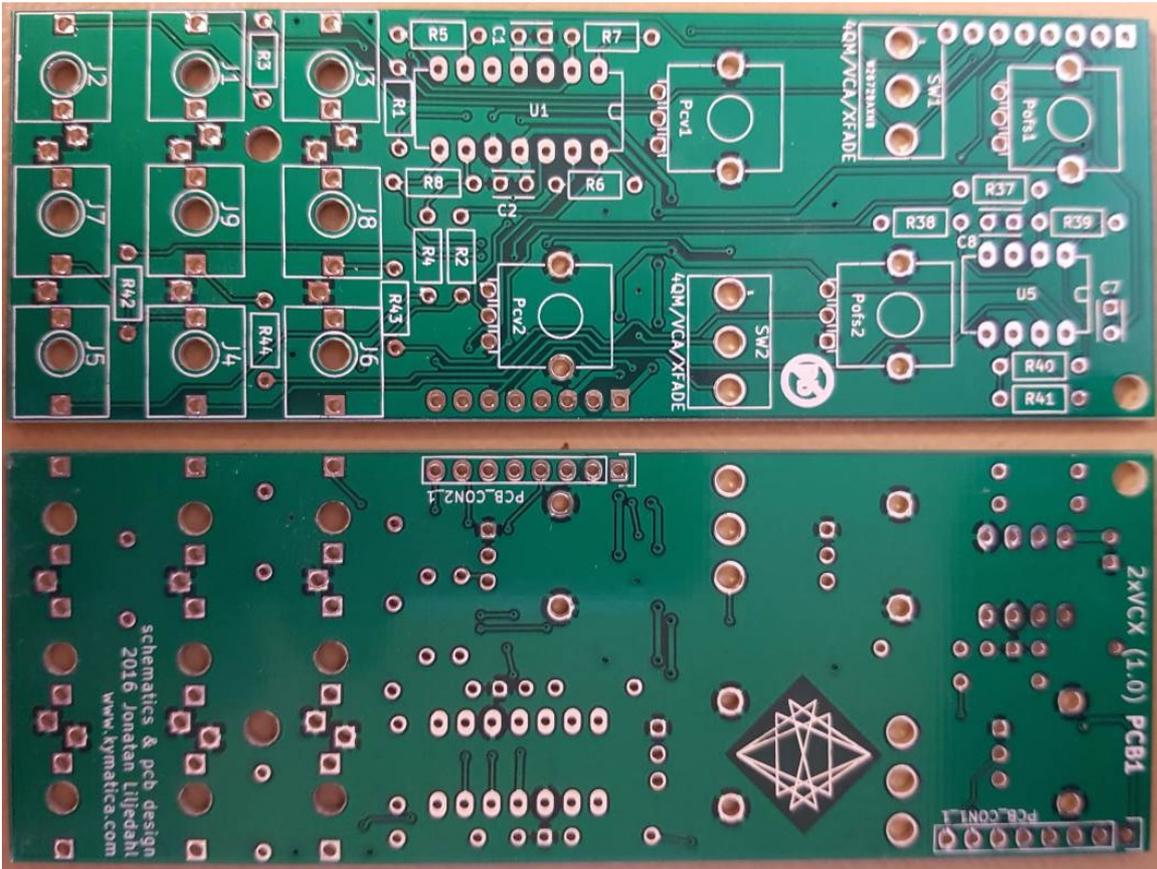
Bills Of Material **Bold = PCB1**

C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12	12	100nF	Capacitor bypass MLCC X7R 2.5-2.54mm pin pitch
C13 C14	2	10uF	Capacitor electrolyte 2mm pin pitch, 5mm dia, max 10mm height. Min 25V.
CON1	1	IDC 10-pin	IDC 10 pin power connector (2x5 pin)
D1 D2 D3 D4 D5 D6	6	1N4148	Signal diode
D7 D8	2	1N5818	Schottky diode (or 1N5817, 1N5819)
J1 J2 J3 J4 J5 J6 J7 J8 J9	9	3.5mm jack	Thonkiconn 3.5mm jack socket
PCB_CON1_1 PCB_CON2_1	2	8 pin header male	PCB connector PCB1 (1x8 pin)
PCB_CON1_2 PCB_CON2_2	2	8 pin header female	PCB connector PCB2 (1x8 pin)
Pcv1 Pcv2	2	100k	Linear Pot Alpha/Song Huei 9mm
Pofs1 Pofs2	2	22k	Linear Pot Alpha/Song Huei 9mm 20-25k
Q1 Q2	2	BC557B	PNP transistor
R1 R2 R3 R4 R5 R6 R7 R8 R10 R12 R16 R17 R19 R20 R37 R38 R39 R40 R41	19	100k	Resistor 1/4W 1% ca 7mm long
R21 R22 R29 R31 R47 R48	6	10k	Resistor 1/4W 1% ca 7mm long
R23 R24 R27 R28	4	22k	Resistor 1/4W 1% ca 7mm long
R25 R26 R30 R32	4	470R	Resistor 1/4W 1% ca 7mm long
R42 R43 R44	3	1k	Resistor 1/4W 1% ca 7mm long
R45 R46	2	10R	Resistor 1/4W 1 to 5% ca 7mm long
R9 R11 R13 R14 R15 R18 R33 R34 R35 R36	10	200k	Resistor 1/4W 1% ca 7mm long
SW1 SW2	2	on-off-on	SPDT on-off-on mini toggle switch. Mouser# 108-1MS3T2B3M2QE-EVX
TRbal1 TRbal2	2	50R	Trimpot Bourns 3296W or equivalent
TRgain1 TRgain2	2	50k	Trimpot Bourns 3296W or equivalent
U1 U2 U3	3	TL074	DIP-14 quad op-amp (or TL084)
U4	1	LM13700	DIP-16 dual OTA
U5	1	TL072	DIP-8 dual op-amp (or TL082)
U1 U2 U3	3	DIP14	IC Socket
U4	1	DIP16	IC Socket
U5	1	DIP8	IC Socket
	2		PCB spacer 11mm
	4		Knobs
	1		16 to 10 pin IDC ribbon cable
	1		Panel

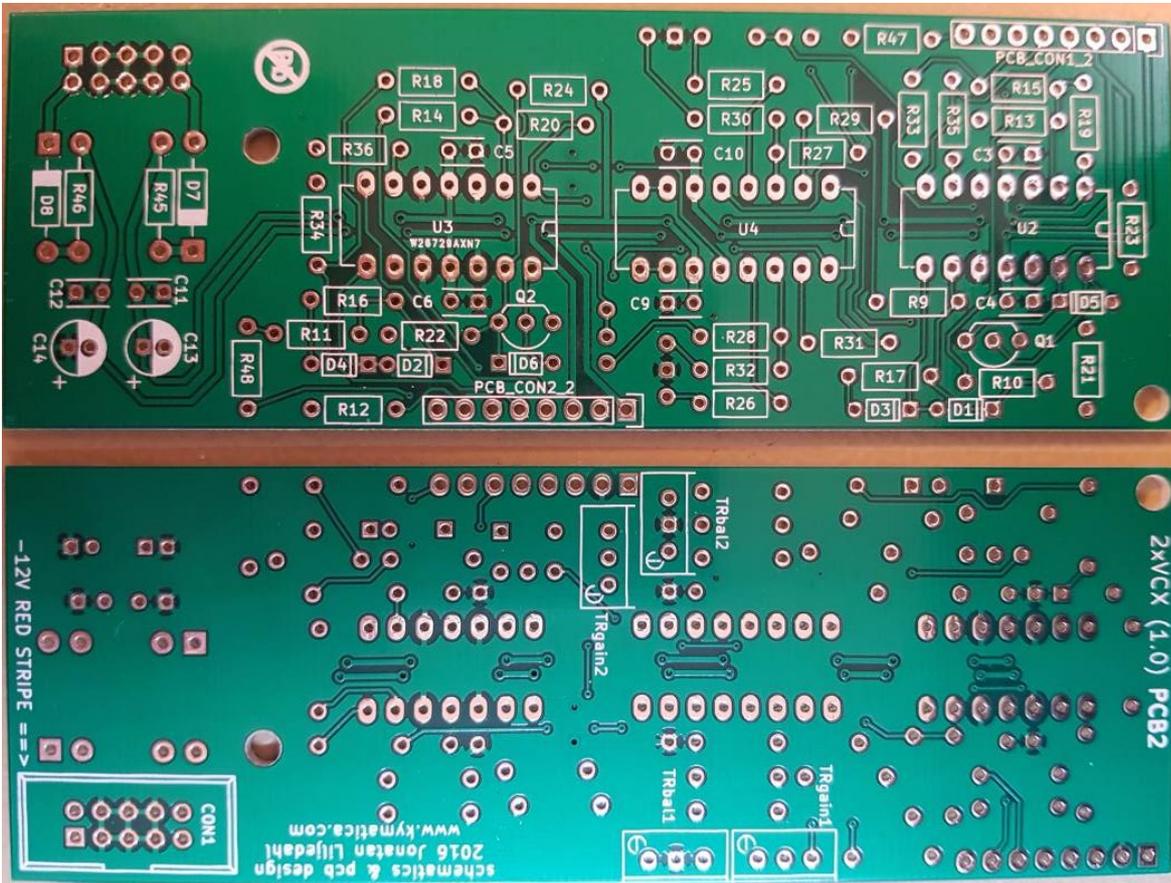
Calibration instructions can be found on the last page.

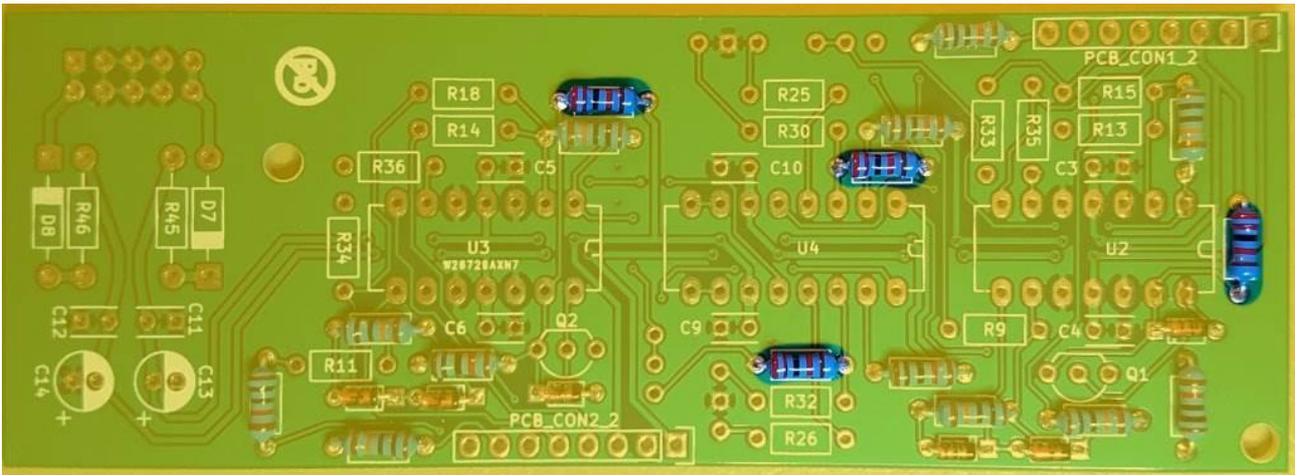
PCB pictures

PCB1

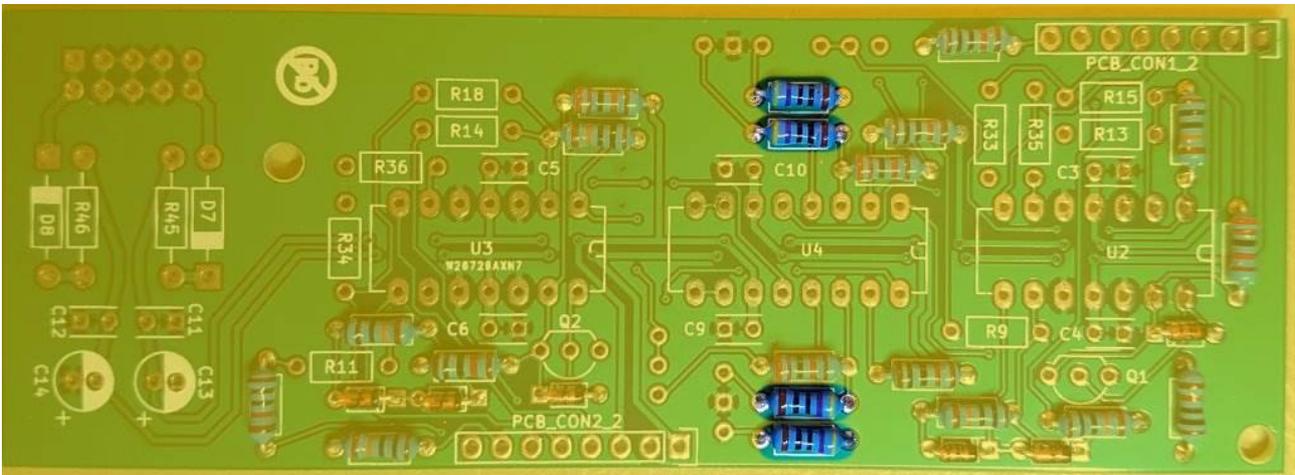


PCB2

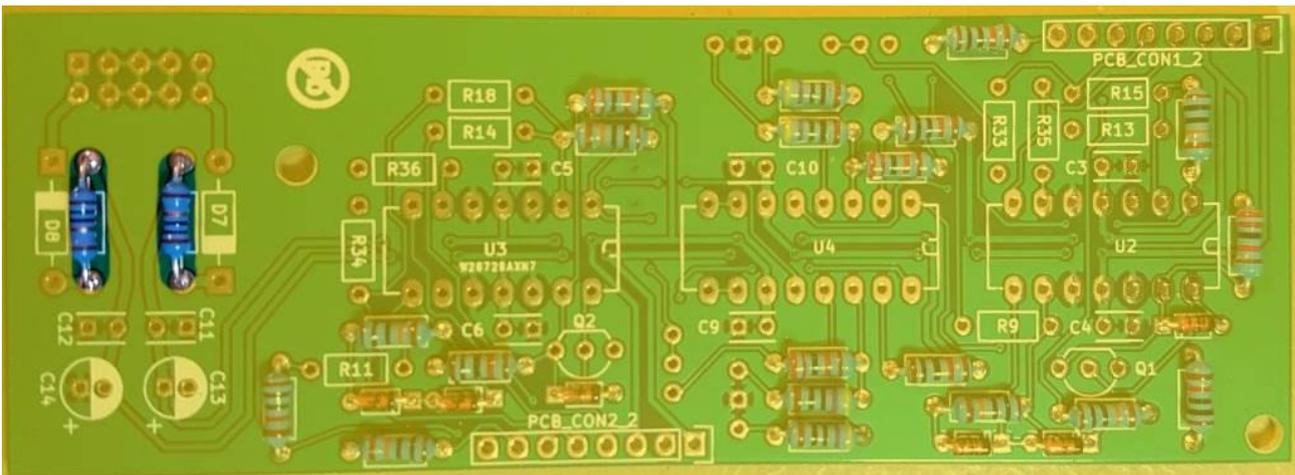




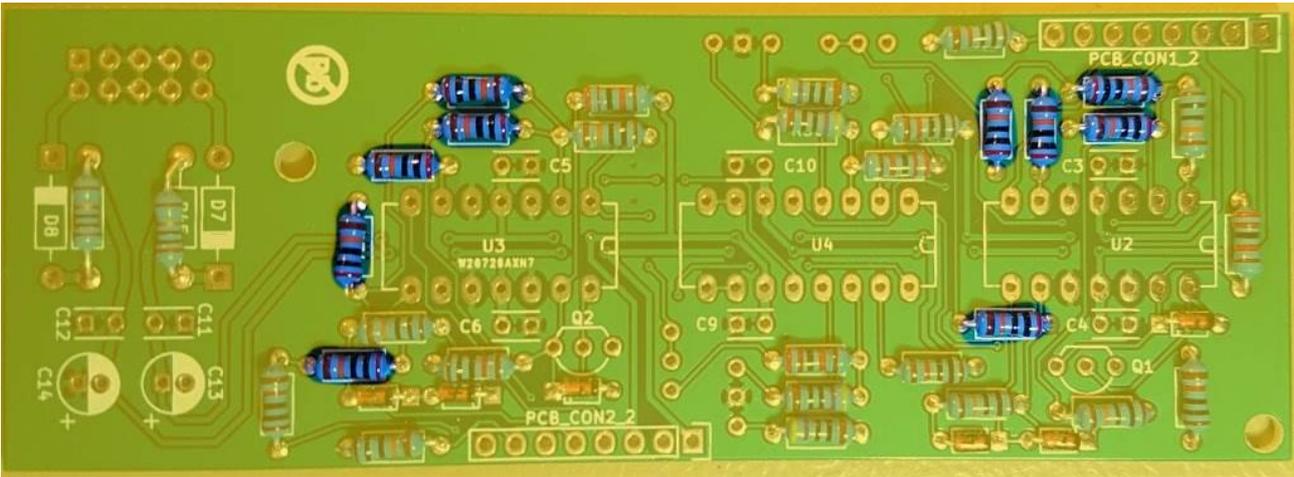
R23, R24, R27, R28 22K 4pcs



R25, R26, R30, R32 470R 4pcs



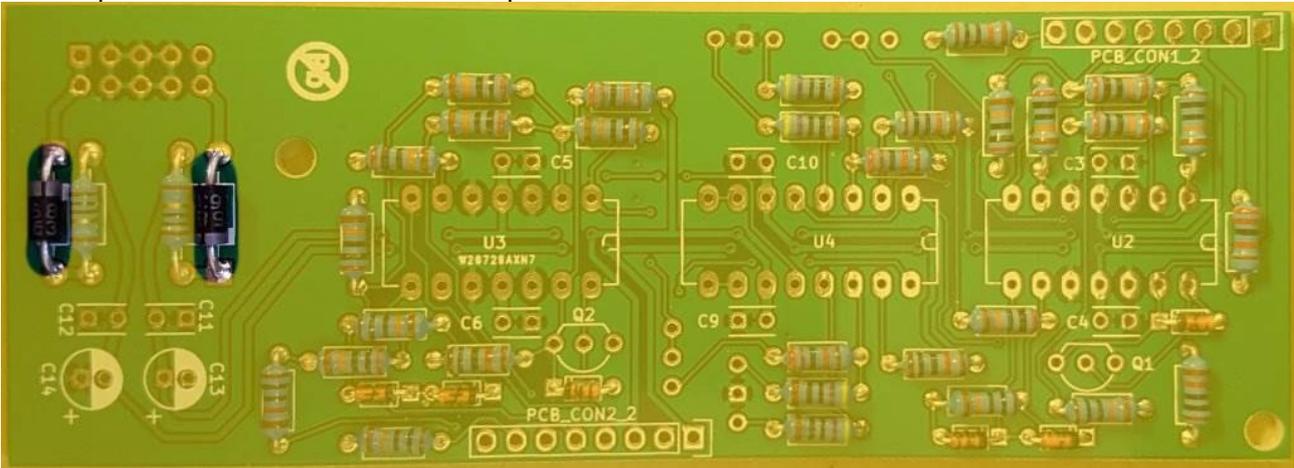
R45, R46 10R 2pcs



R9, R11, R13, R14, R15, R18, R33, R34, R35, R36 200k 10pcs

Step 3

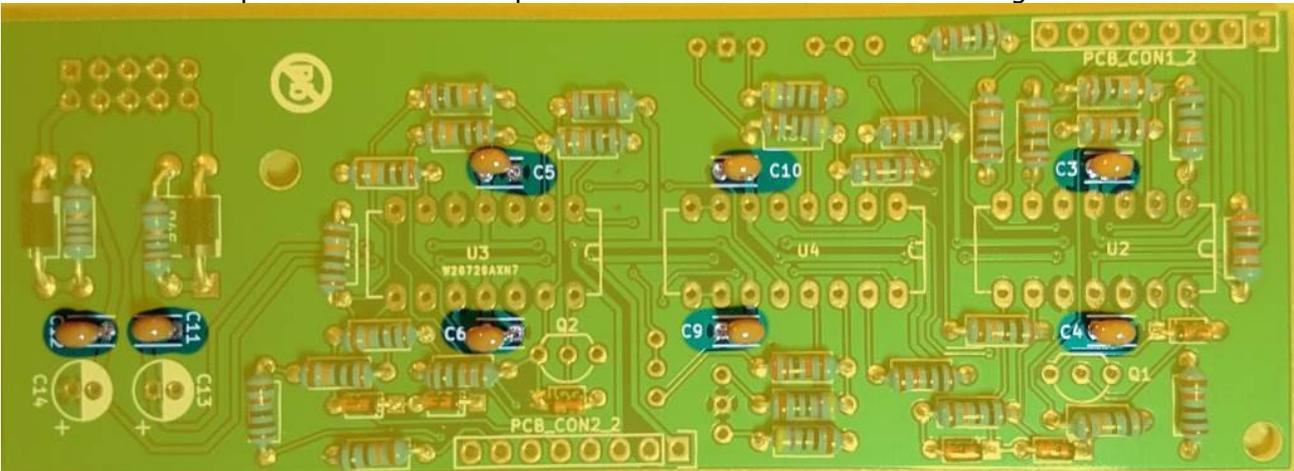
Solder power polarity protection diodes. Diodes are sensitive to mounting direction, make sure the stripe on the diode match the stripe on the silkscreen.



D7, D8 1N5818 2pcs

Step 4

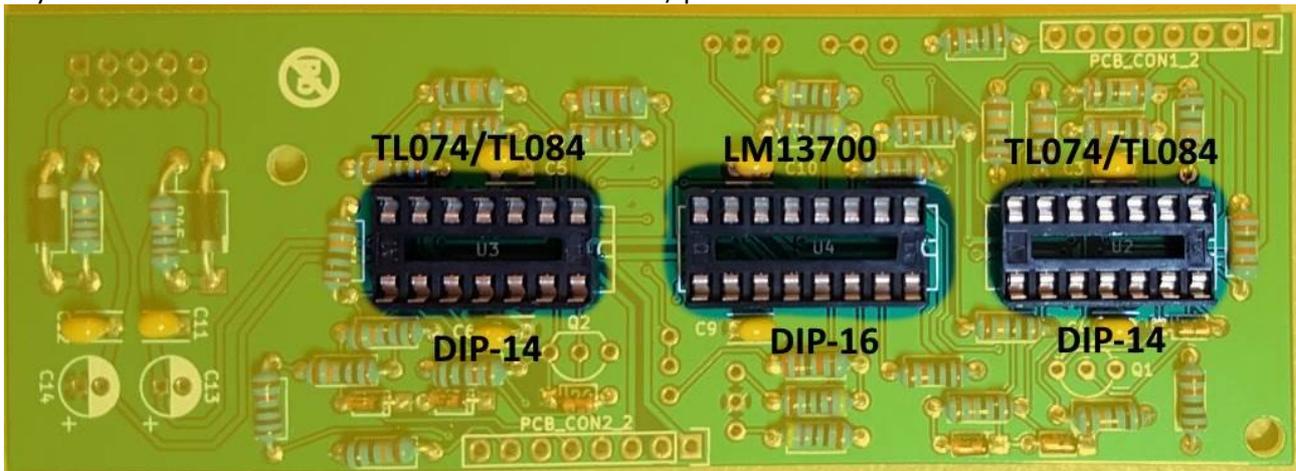
Solder ceramic capacitors. Ceramic capacitors are not sensitive to mounting direction.



C3, C4, C5, C6, C9, C10, C11, C12 100nF 8pcs

Step 5

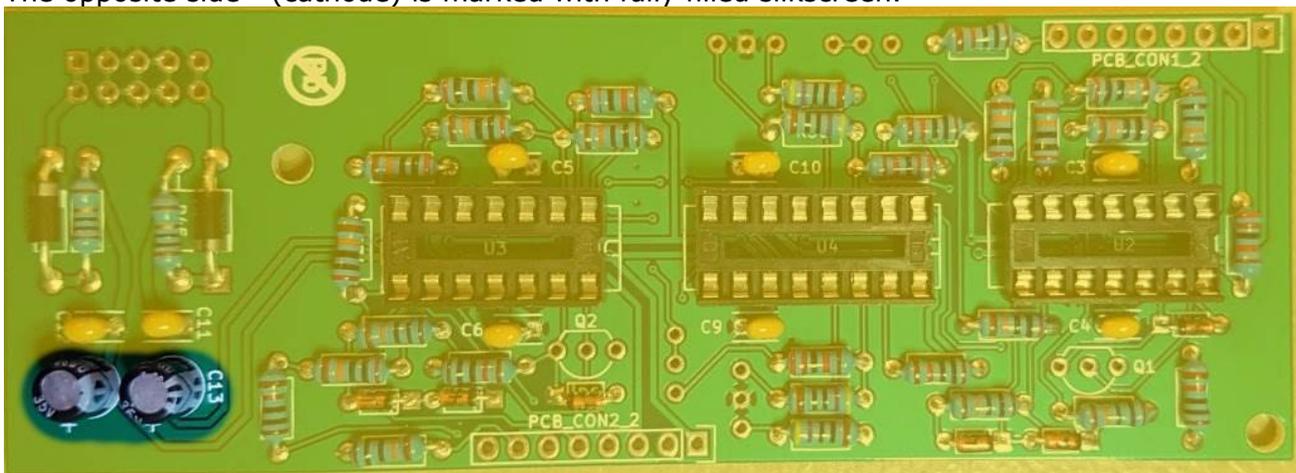
Solder IC sockets. Match the IC sockets indent (marking pin 1 side) with the silk screens. If you feel the least uncertain on the IC direction, please search the web for IC orientation.



U2, U3 14 pin DIP sockets (DIP-14) IC's will be mounted later. 2pcs
U4 16 pin DIP socket (DIP-16) 1pcs

Step 6

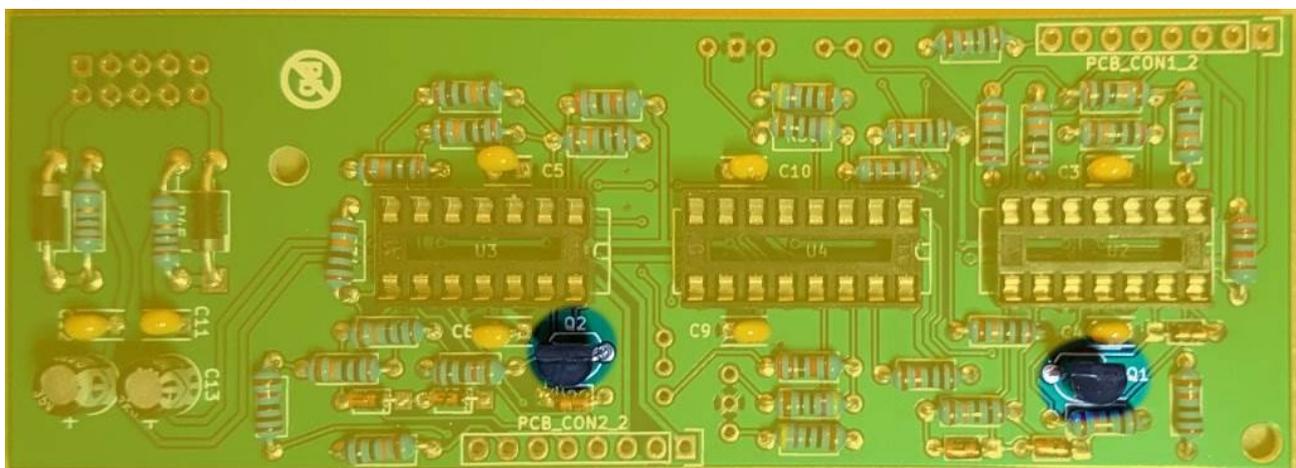
Solder electrolytic capacitors. Electrolytic capacitors are sensitive to mounting direction. Put the long pin in the hole marked with a + (anode) on the silk screen. The opposite side - (cathode) is marked with fully filled silkscreen.



C13, C14 10 μ F 2pcs

Step 7

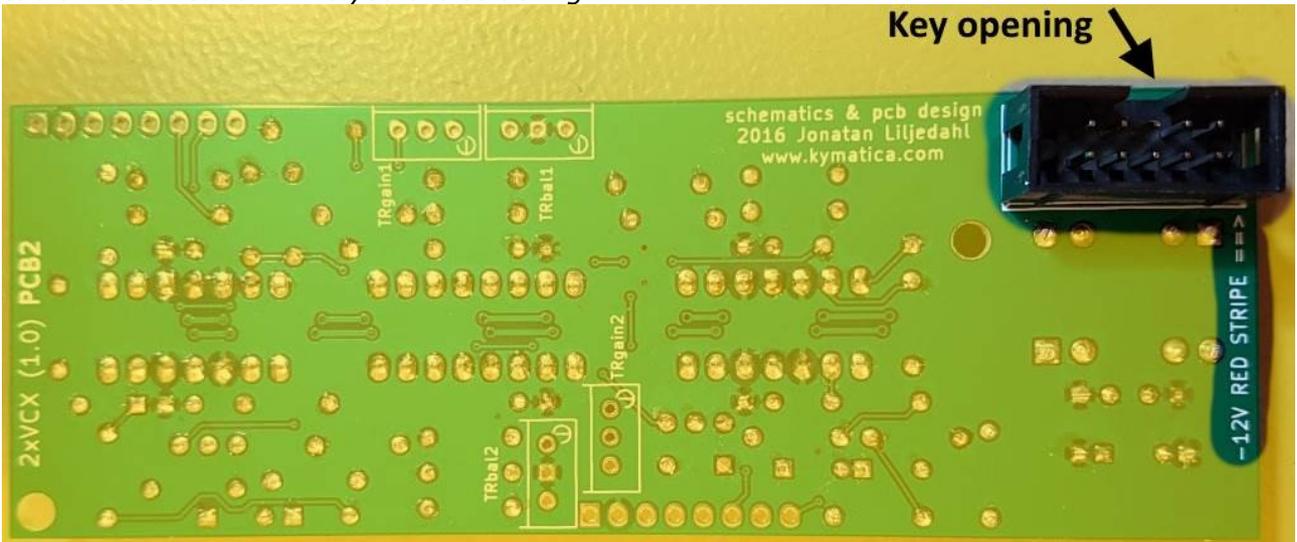
Solder transistors, transistors are sensitive to mounting direction. Match the curved side on the transistor with the curved side in the silkscreen.



Q1, Q2 BC557B 2pcs

Step 8

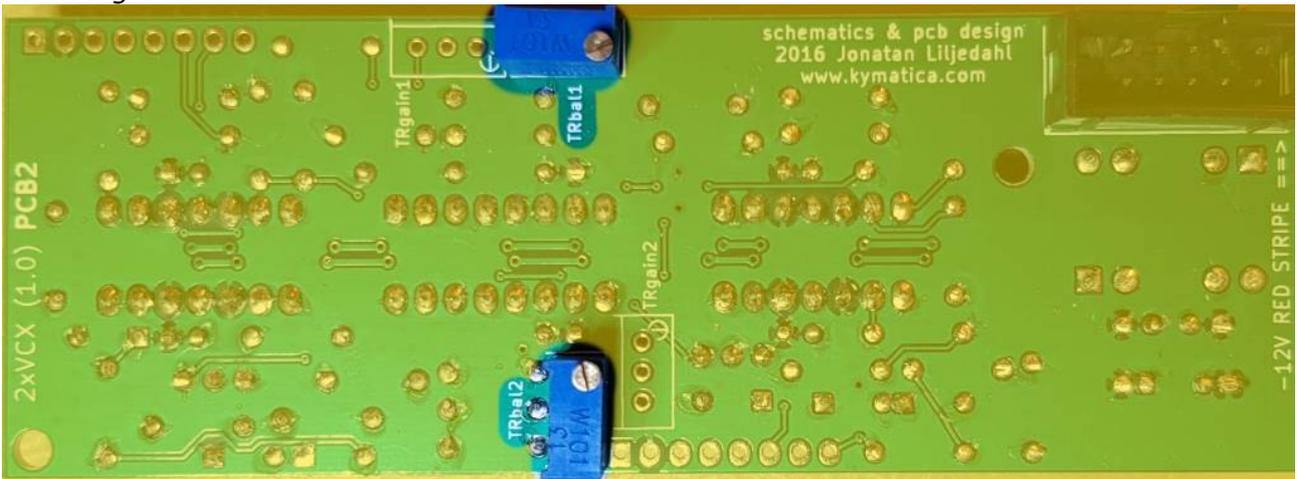
Flip PCB2 to the bottom side. Solder the power header. Make sure the key opening is oriented in the same way as in the picture below. It's easier to avoid bent pins if you attach the power cable in the header while you are soldering.



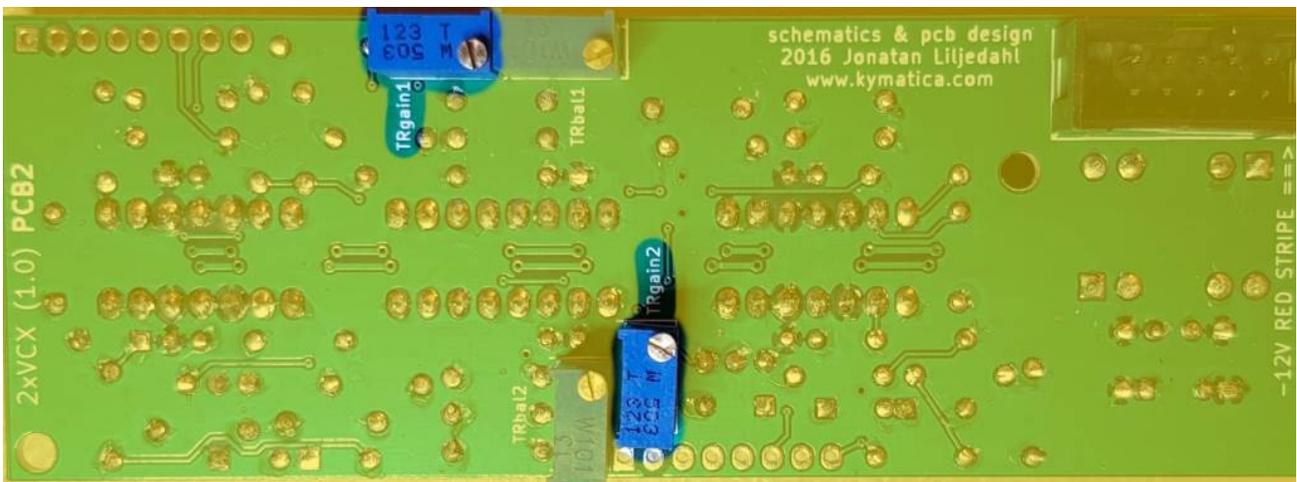
CON1 2x5pin

Step 9

Flip PCB2 to the bottom side. Now it's time to solder trimmers. They are not sensitive to mounting direction.



TRbal1, TRbal2 50R multi turn trimmer 2pcs



TRgain1, TRgain2 50k multi turn trimmer 2pcs

Step 10

Insert the ICs in the sockets. If you feel the least uncertain on the IC direction, please search the web for IC orientation.



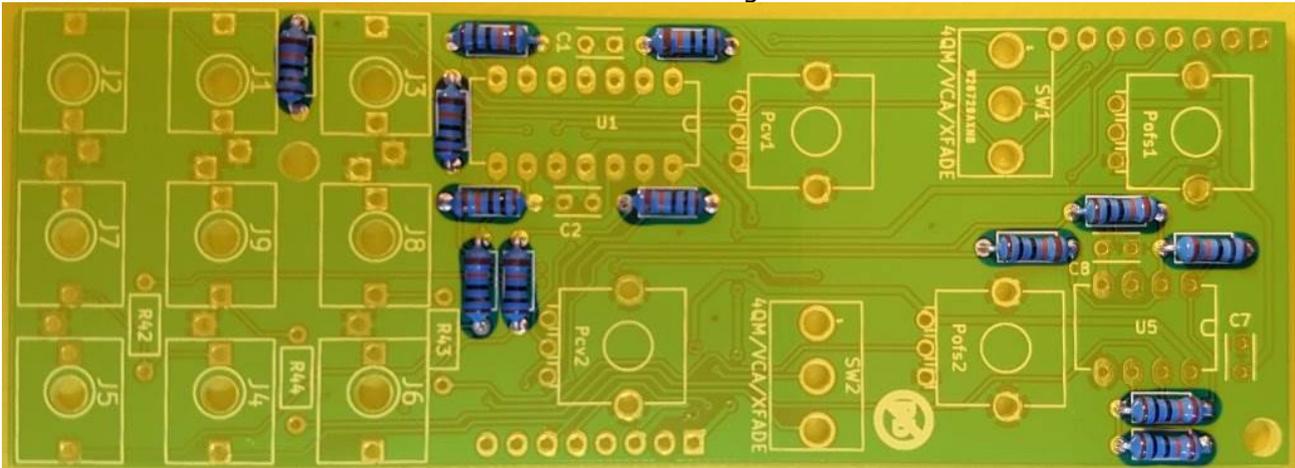
U2, U3 TL074/TL084 2pcs

U4 LM13700 1pcs

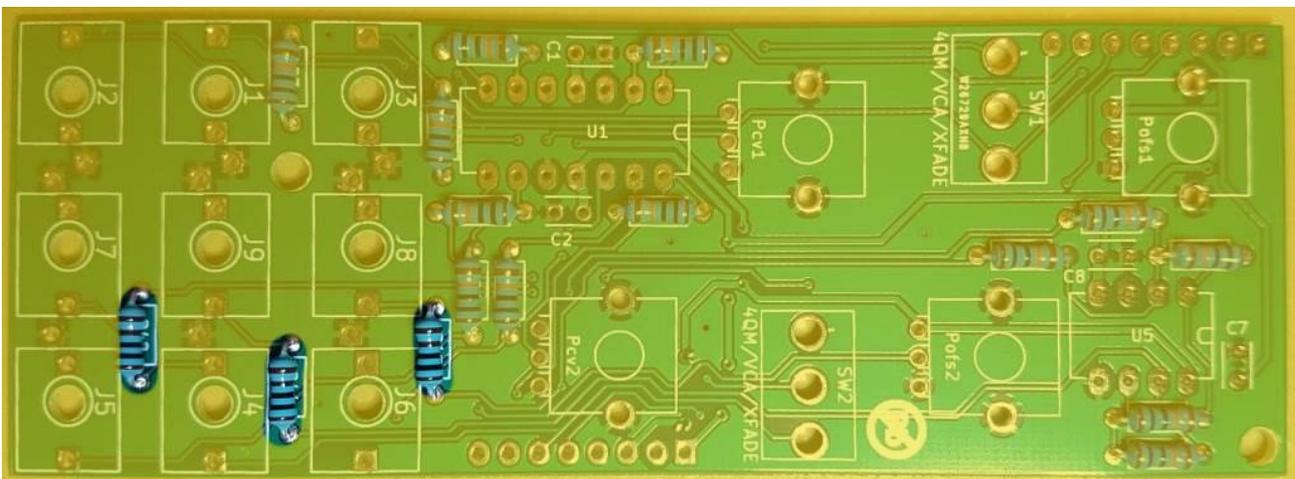
Leave PCB2 on the side with the PCB to PCB connectors not soldered. Now it's time for PCB1.

Step 11

Solder resistors. Resistors are not sensitive to mounting direction.



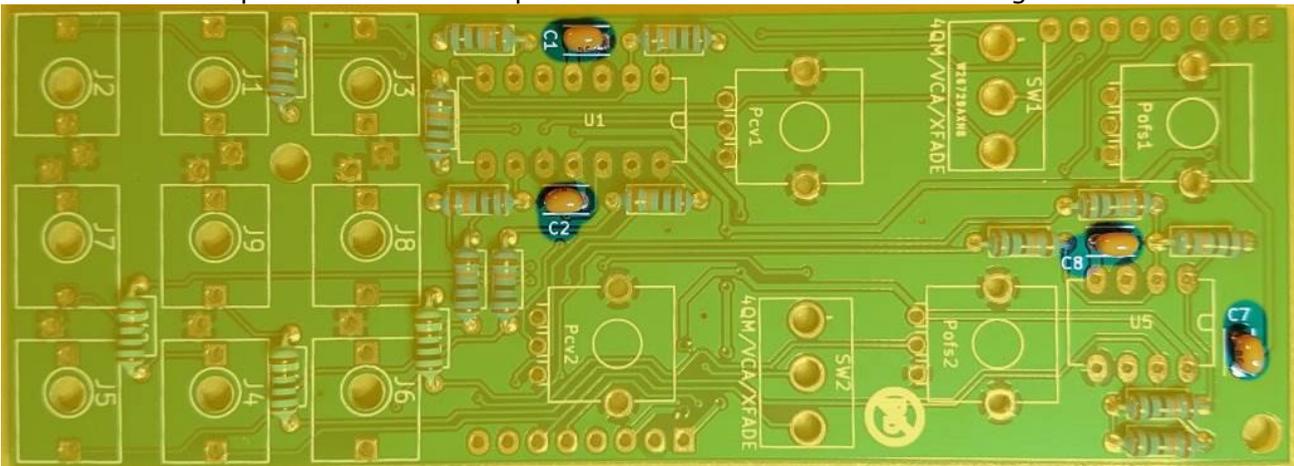
R1, R2, R3, R4, R5, R6, R7, R8, R37, R38, R39, R40, R41 100k 13pcs



R42, R43, R44 1k 3pcs

Step 12

Solder ceramic capacitors. Ceramic capacitors are not sensitive to mounting direction.

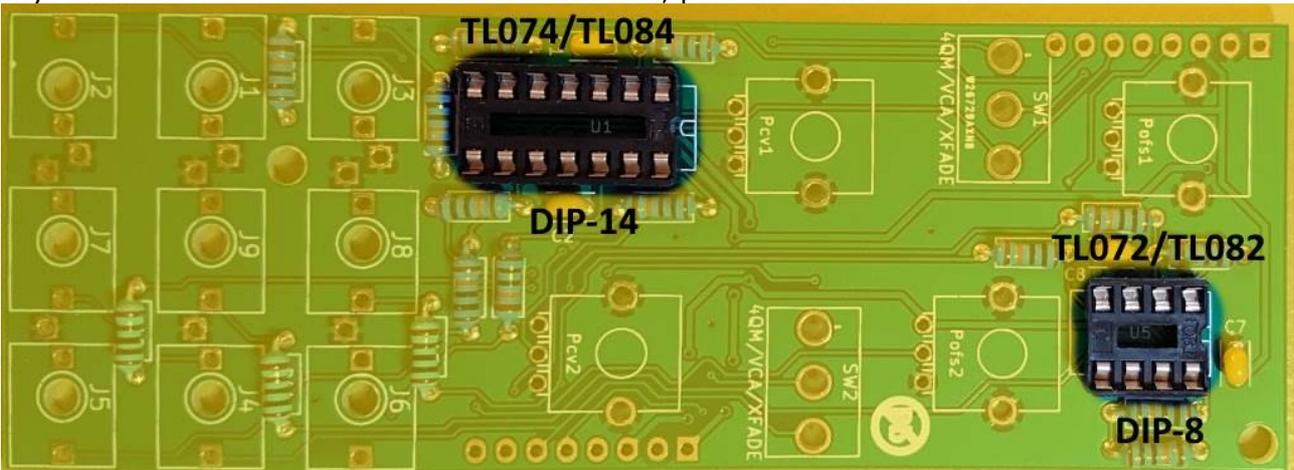


C1, C2, C7, C8 100nF 4pcs

Step 13

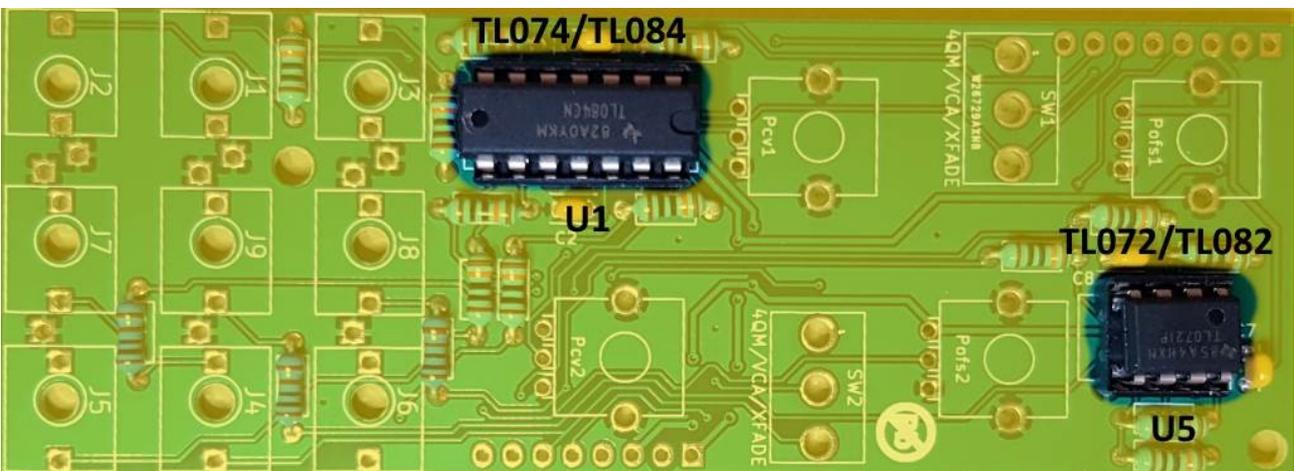
Solder IC sockets and insert IC's. Match the IC sockets indent (marking pin 1 side) with the silk screens.

If you feel the least uncertain on the IC direction, please search the web for IC orientation.



U1 14 pin DIP socket (DIP-14)

U5 8 pin DIP socket (DIP-8)

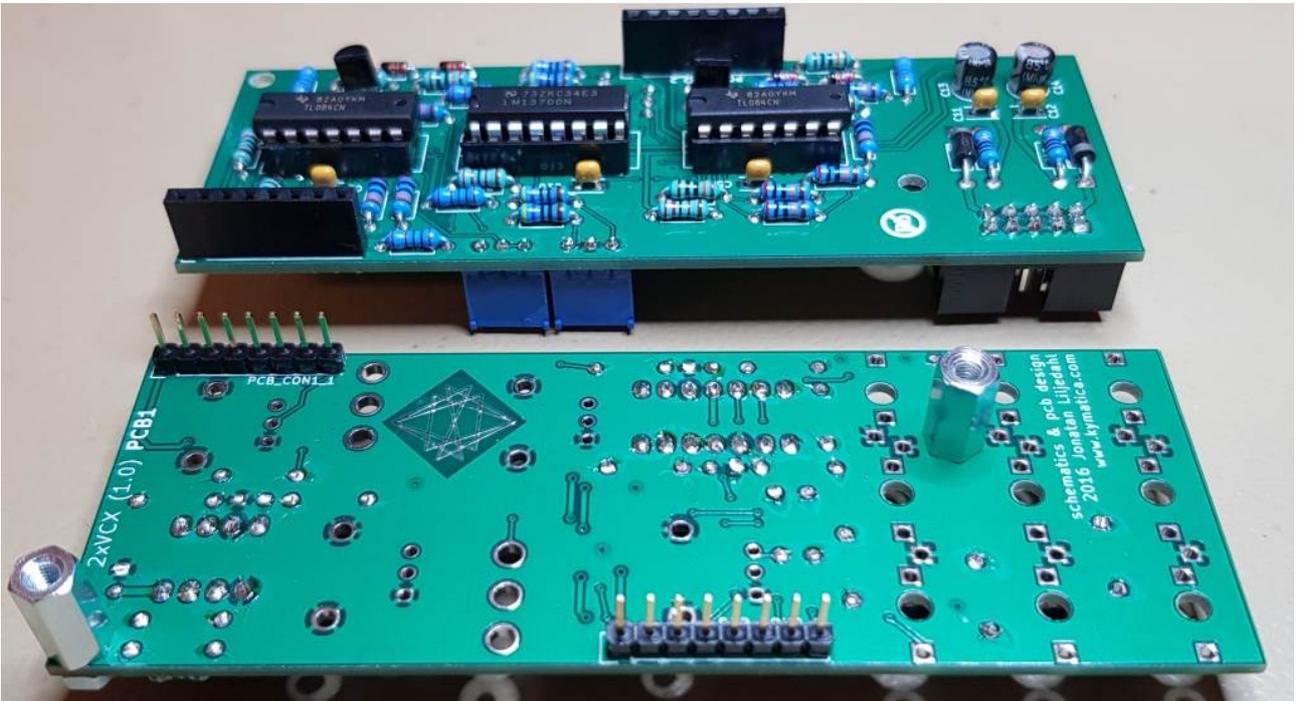


U1 TL074/TL084

U5 TL072/TL082

Step 14

Mount the spacers with the nuts on PCB1. You can have the screw-side on PCB1 as well if you feel that it's more comfortable.



Step 15

Put the pin & socket strips into each other. Place them between PCB1 and PCB2 in their respective places. **Take a firm grip with a plier around the spacers and screw the screws into place.** If the nuts gets loose, tighten them again.

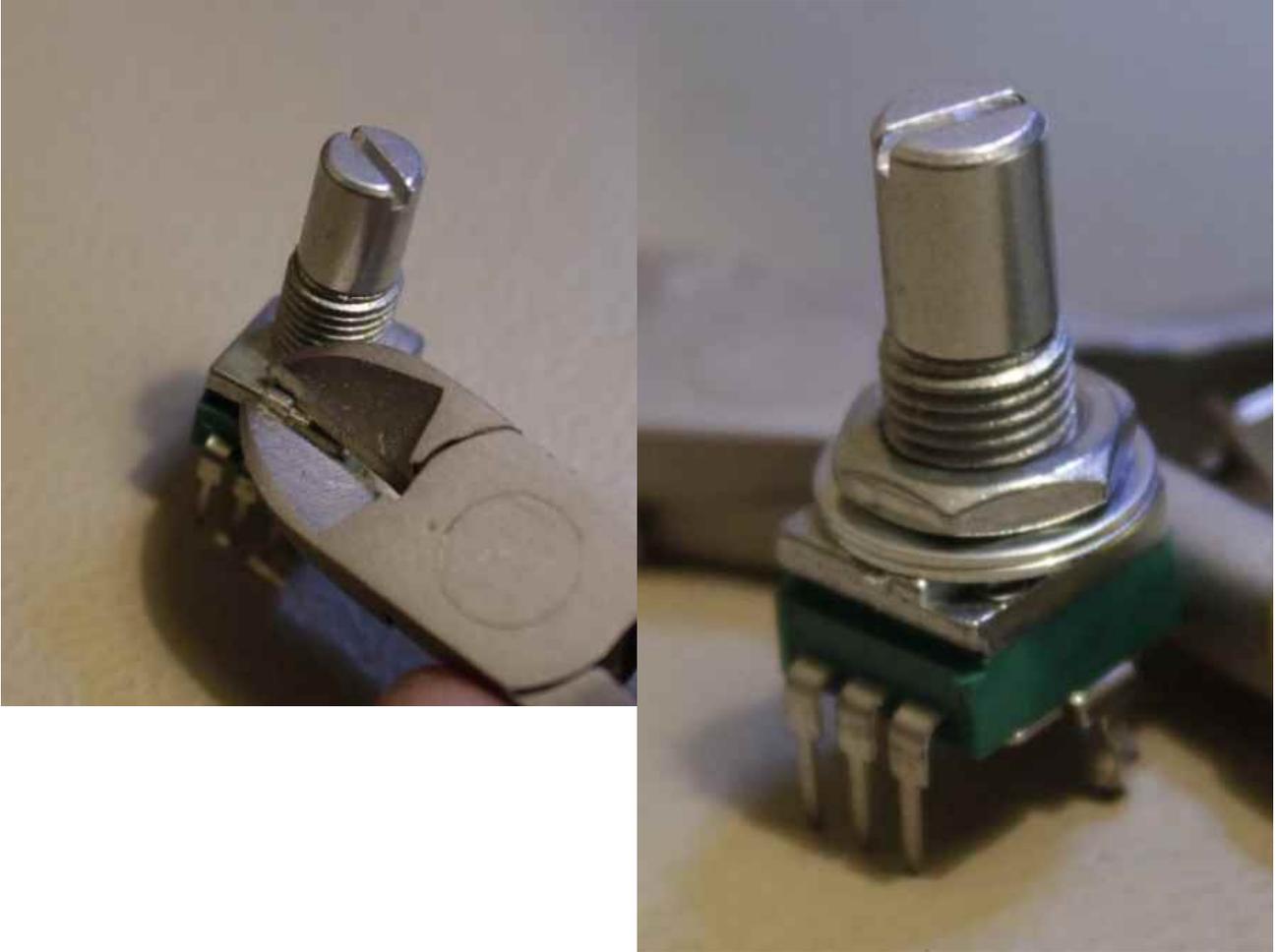
Remove them again after the pin & socket strips are soldered.



Solder the connectors.

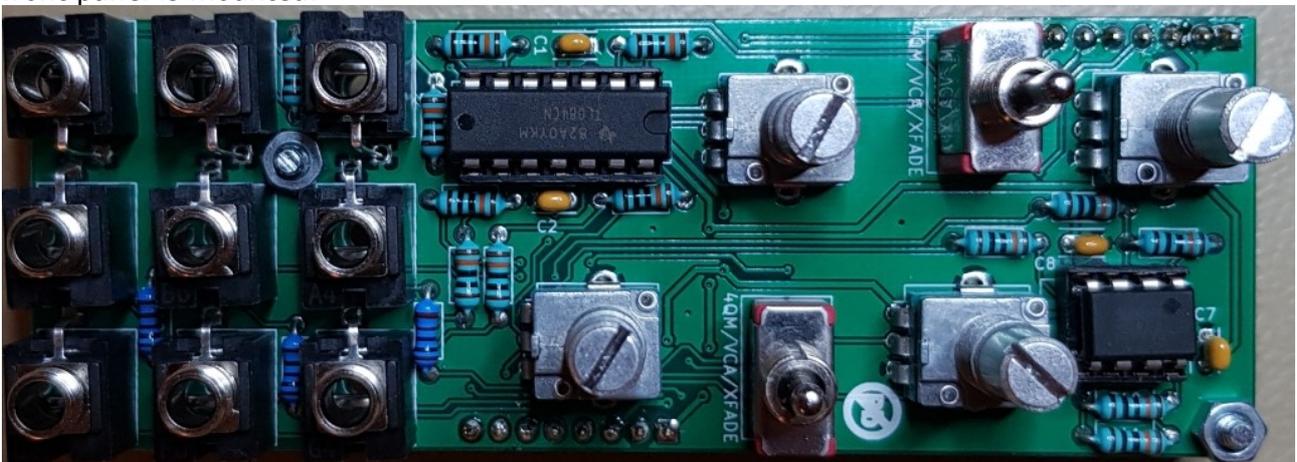
Step 16

Cut off the small metal tab sticking out on the potentiometers. Use a cheap plier/nipper for this step, save your expensive ones for other tasks. Mount 1 washer and 1 nut on each potentiometer. Make sure the nuts are tight. Sometimes we ship the kits with Alpha potentiometers and they are clearly marked with "Alpha". In that case you don't need any washer or nut under the panel.



Step 17

Place potentiometers, jacks and switches in their positions but wait with soldering until the front panel is mounted.



You will need to bend the ground pins a little bit on the jacks.

Step 18

Place the front panel on top and add 1 washer and 1 nut to each potentiometer and jack, 1 nut to the switches. Use a socket wrench to avoid scratching of the frontplate.

The switches have big pad holes to allow more different switches to fit but it also means you need to be extra careful to make sure the switch is aligned straight. The switches have their own nuts, Make sure to keep them separate from the jacks nuts as they look very similar and the switch nuts will fit on the jacks but the jack nuts won't fit on the switches.

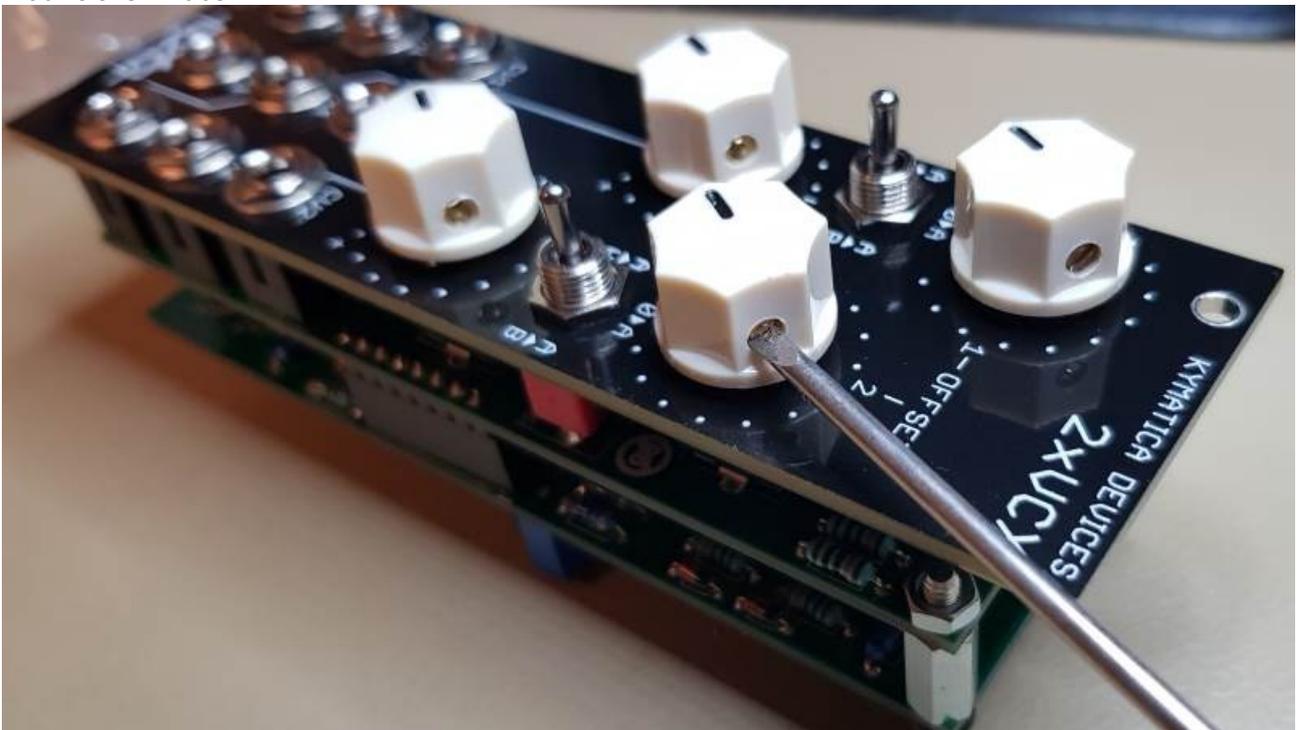


Now you solder all panel components in place.

Step 19

Now attach PCB2 to the module and screw the spacers together like in step 14-15. Remember the firm grip with the pliers.

Mount the knobs.



Now attach the power cable with the stripe indicating pin 1 on the -12V side.

Cablibration

For best result, let the module warm up with power on for 20-30 minutes before calibration. Use either your hearing or an oscilloscope.

- 1) Patch an unconnected cable to the A1 input.
- 2) Set the toggle at the right (B>A) position, turn OFFSET 1 knob to 0% and CV attenuator 1 knob to 100% +.
- 3) Patch VCO to CV1 input and adjust TRbal1 for minimum CV feed-through on OUT1.
- 4) Move VCO patch cable to B1 input, turn OFFSET knob to 100% and adjust TRgain for minimal amplitude on OUT.
- 5) Repeat until satisfaction. Do the same for the second channel (2).

Finished module!

