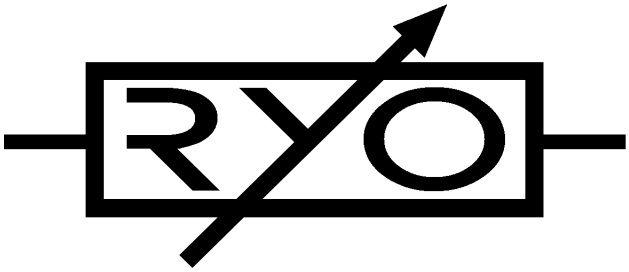
Ljunggren Audio
Roll Your Own
VC Sequencer



Version PCB1: VC Sequencer 1.22
Version PCB2&3: VC Sequencer 1.3
For previous version PCB2 1.22 & PCB3 1.2:
http://ljunggrenaudio.com/products/VCSEQ/vcsequencer1.2.pdf

Bills Of Material

PCB1

TYPE	PART	VALUE	PCS	NOTE
Capacitor	C8,C9,C10,C11,C12,C13, C19	100nF	7	X7R 2.5mm
Capacitor	C30	22pF	1	C0G 2.5mm
LED	D5,D6,D7,D8,D9,D10,D11,D12	Orange	8	3mm
IC Socket	IC3,IC4,IC5	14 pin	3	
OpAmp	IC3	TL084	1	Or TL074
OpAmp	IC4,IC5	LM324	2	Or TL064, TL074, TL084
Rotary Pot.	POT1 to POT8	100k lin	8	9mm vertical mount.
Jack	J1,J2,J3	3.5mm	3	PJ301BM
Resistor	R5,R24	2.2K	2	R24 is the LED resistor.
Resistor	R22	100K	1	
Resistor	R23	1K	1	
Resistor Network	RN4,RN5,RN6,RN7,RN8,RN9,RN10	100K	7	SIL8 isolated. Not sensitive to mounting direction. *
Transistor	Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8	FJN3303R	8	
Switch	S1	SPDT	1	On-Off-On
Socket strip	CON1, CON2	10 pin	2	

*) Each resistor network can be replaced with 4pcs 100k resistors vertical mounted through hole device or 0805 surface mount device in the same arrangement as an isolated resistor network (SIP8 4 resistors).

PCB2

TYPE	PART	VALUE	PCS	NOTE
Capacitor	C36,C37,C38,C39,C40,C41,C42,C43	1nF	8	C0G 2.5mm
Capacitor	C1,C2,C15,C17,C20,C31,C35,C46	100nF	8	X7R 2.5mm
Electrolytic	C3,C4	10uF	2	2mm pin pitch, 5mm dia, 5mm height
Electrolytic	C5	100uF	1	2.5mm pin pitch, 6.3mm dia, 7mm height
Diode	D1,D2	SB130	2	or 1N5818. Power polarity protection.
Diode	D4,D16,D17,D18,D19,D20,D21, D22,D23,D24	1N4148	10	
Diode	D3	BAT42	1	
IC Socket	IC7,IC8,IC9	16 pin	3	
CD4xxx	IC7	CD4516	1	
CD4xxx	IC8	CD4050	1	
CD4xxx	IC9	CD4051	1	
IC Socket	IC10, IC11	8 pin	2	
Comparator	IC10	LM393	1	
OpAmp	IC11	LT1013	1	Originally LM358 was used but it have undesired results in VC mode at low frequencies for the Trig Xpander.
Resistor	R27,R28,R29,R40,R41,R42,R43, R44,R45,R46,R47,R48,R49	1M	13	
Resistor	R3, R8, R70, R78	27K	4	
Resistor	R1,R2	10R	2	
Resistor	R7,R50	100K	2	
Resistor	R4	2.2K	1	
Volt Reg	RG1	5V	1	LM2931*50
Pin strip	CON1, CON2, CON3	10 pin	3	
Expand header	EXPAND-16STEP, EXPAND-CHANNEL	10 pin	2	2 rows x 5 pins
Power header	POWER	10 pin	1	boxed

PCB3

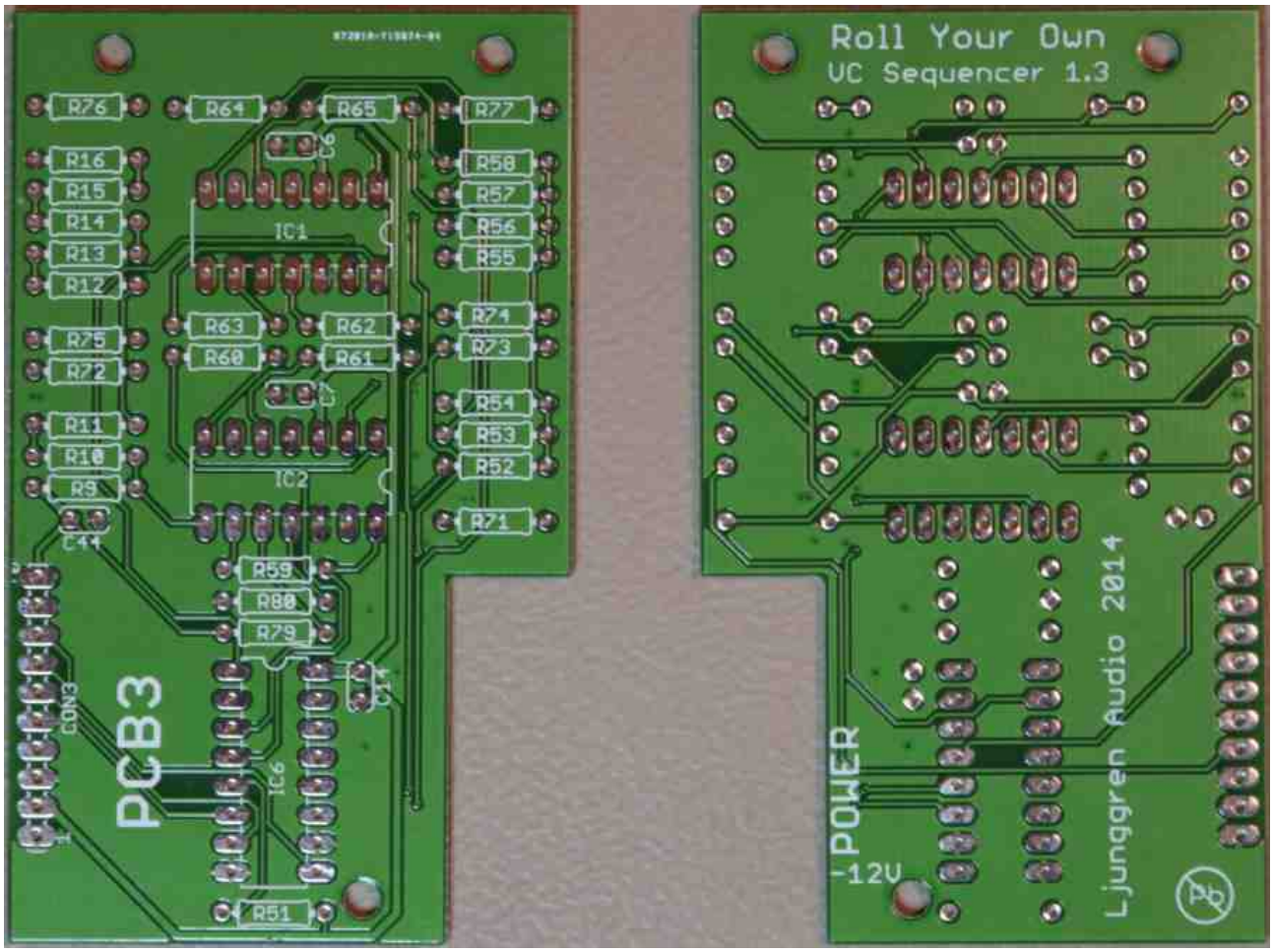
TYPE	PART	VALUE	PCS	NOTE
Capacitor	C6,C7,C14,C44	100nF	4	X7R 2.5mm
Resistor	R9,R10,R11,R12,R13,R14,R15,R16	3.3K	8	
Resistor	R52,R53,R54,R55,R56,R57,R58	1K	7	
Resistor	R59,R60,R61,R62,R63,R64,R65	1M	7	
Resistor	R51, R79, R80	100K	3	
Resistor	R71, R72, R73, R74, R75, R76, R77	27K	7	
Socket strip	CON3	10 pin	1	
IC Socket	IC1,IC2	14 pin	2	
Comparator	IC1,IC2	LM339	2	
IC Socket	IC6	16 pin	1	
CD4xxx	IC6	CD4532	1	

Other

Faceplate	1 pcs
PCB	3 pcs
Knobs	8 pcs
Spacers	5 pcs
Power cable	1 pcs
Mounting screws	4 pcs

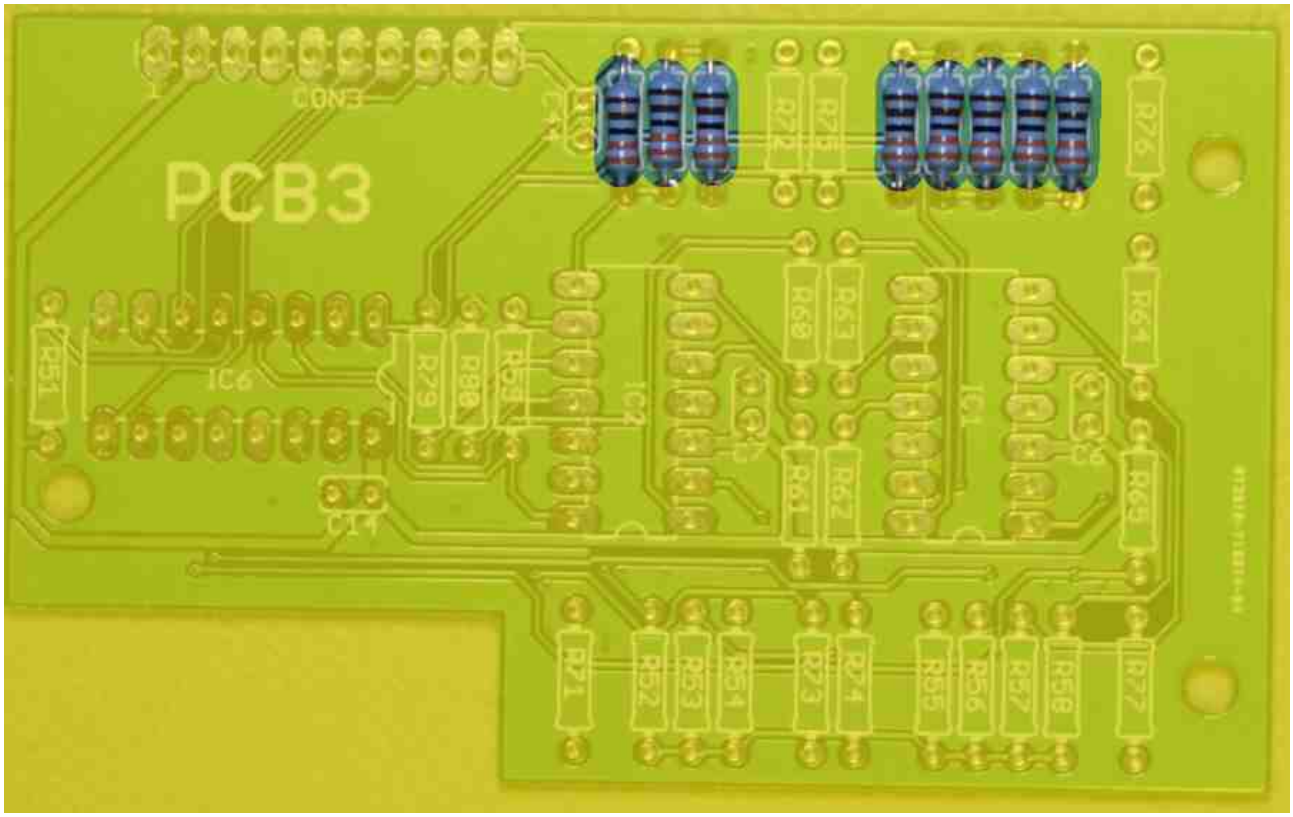
Assembly instructions

We start with PCB3.

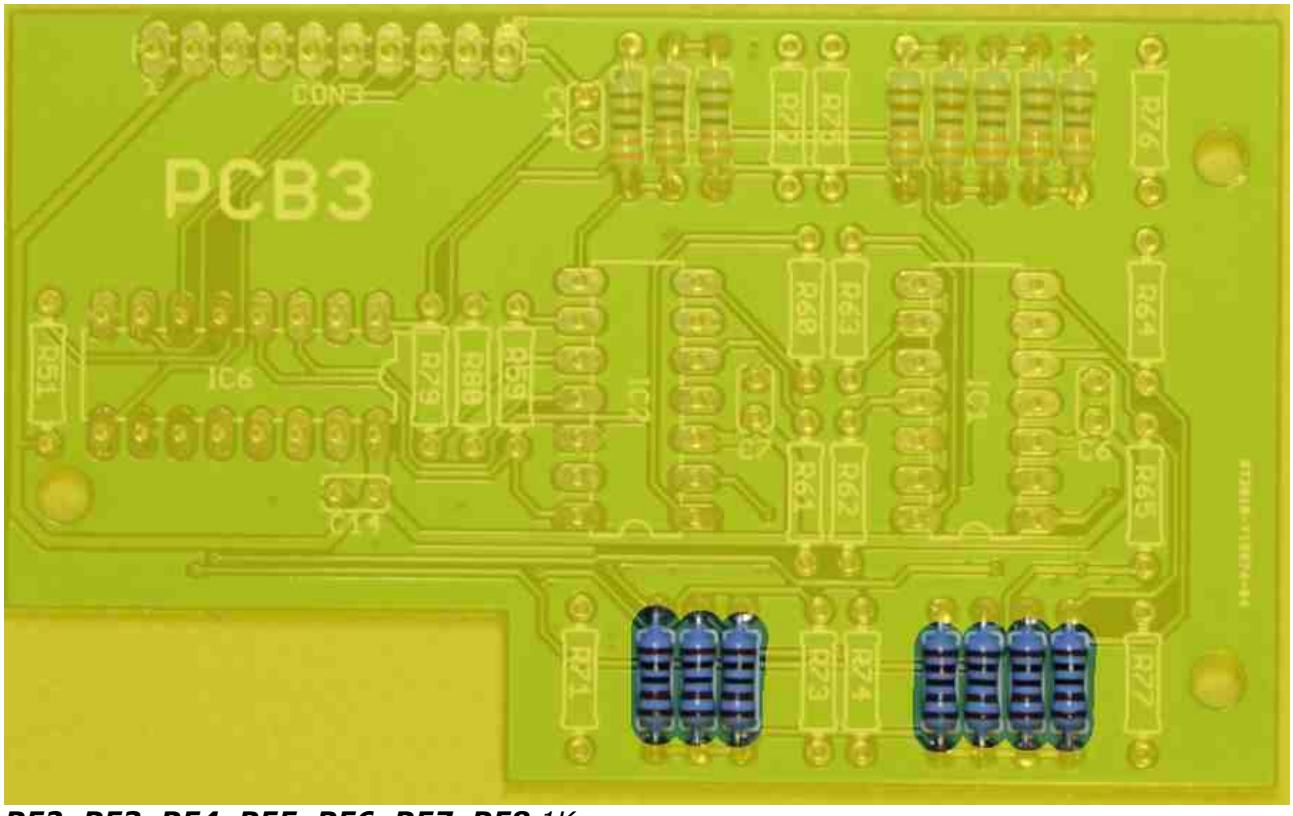


Empty PCB3 top & bottom.

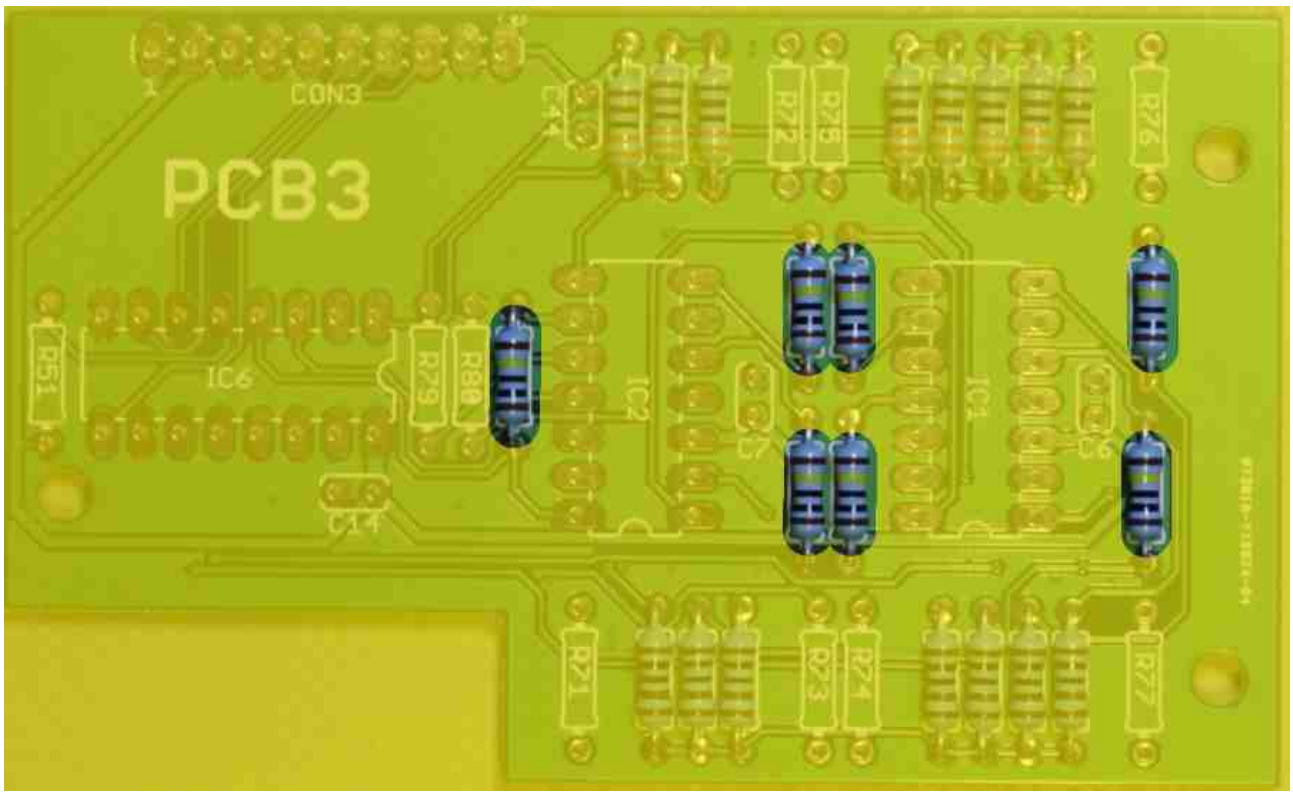
Step 1
Solder resistors. Resistors are not sensitive to mounting direction.



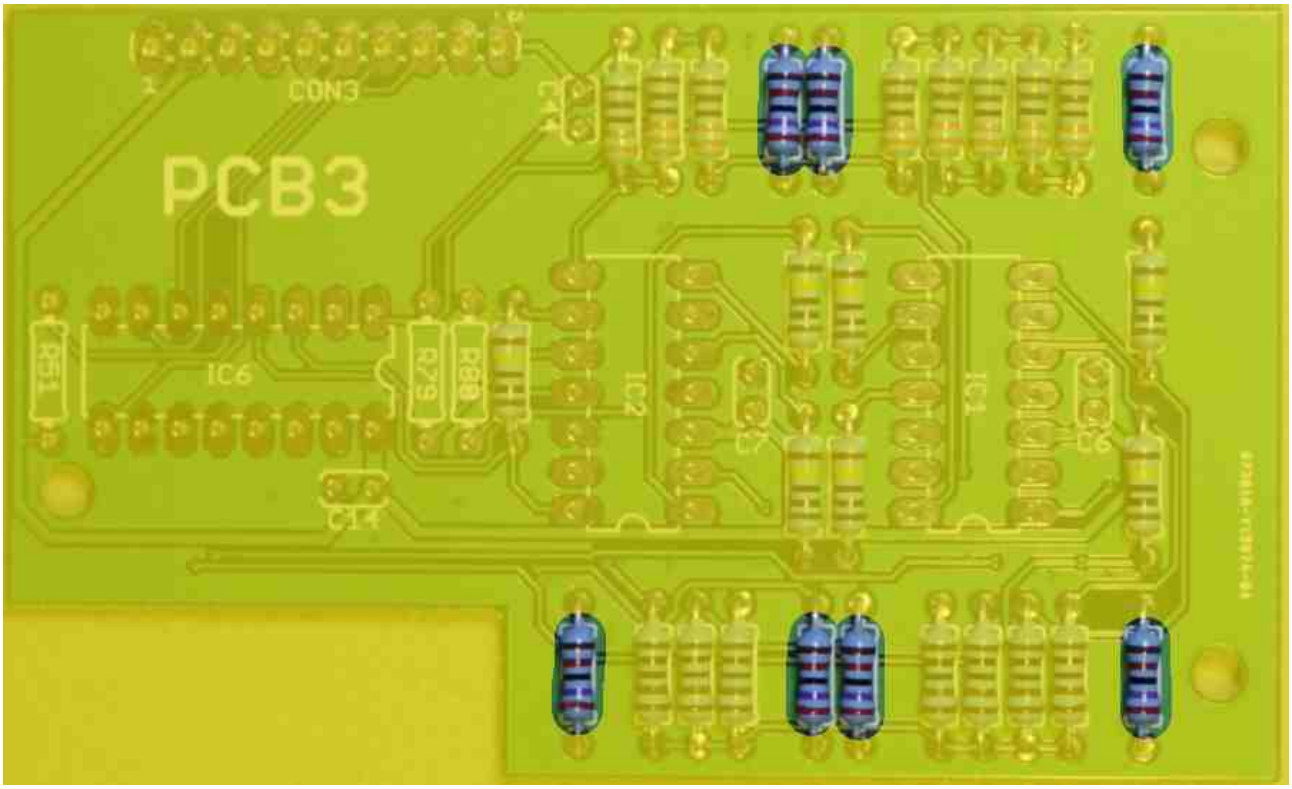
***R9**, **R10**, **R11**, **R12**, **R13**, **R14**, **R15**, **R16** 3.3K*



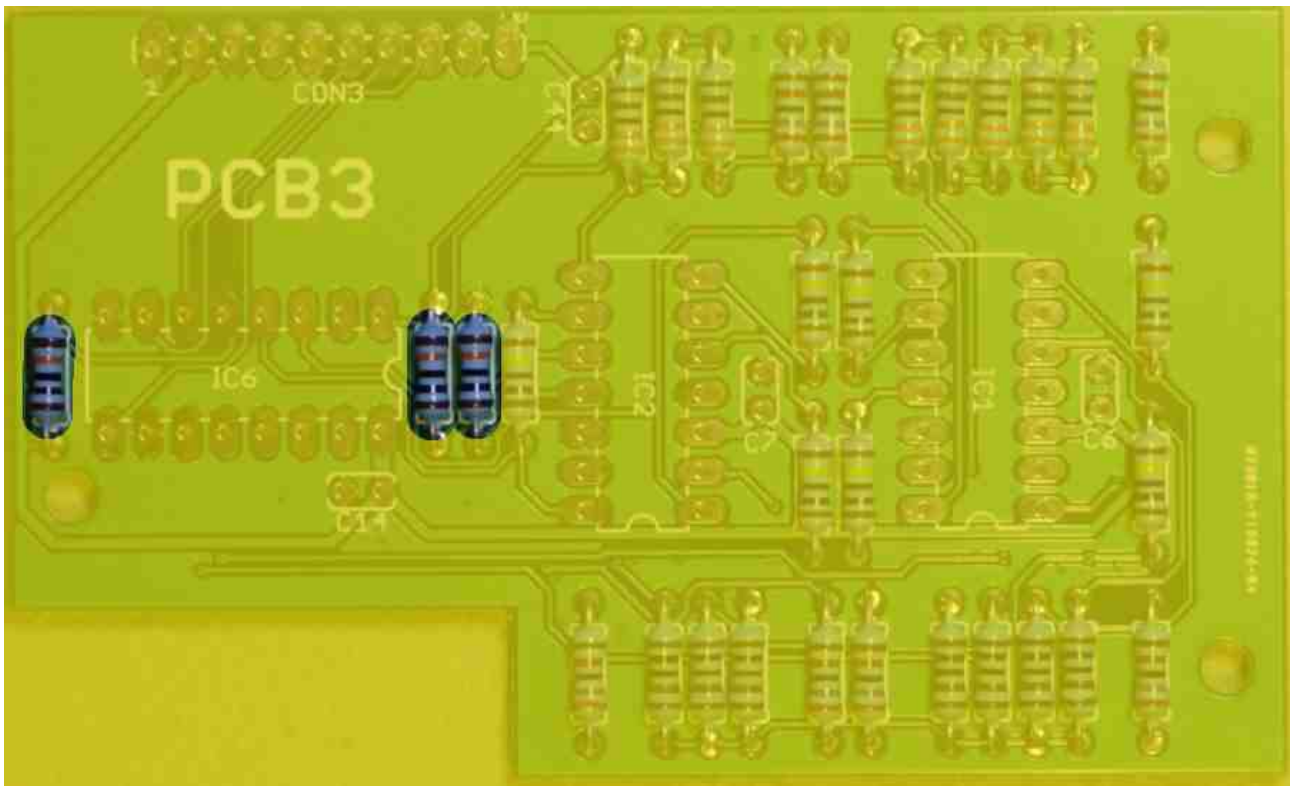
***R52**, **R53**, **R54**, **R55**, **R56, R57, R58** 1K*



***R59**, **R60, R61, R62, R63, R64, R65** 1M*



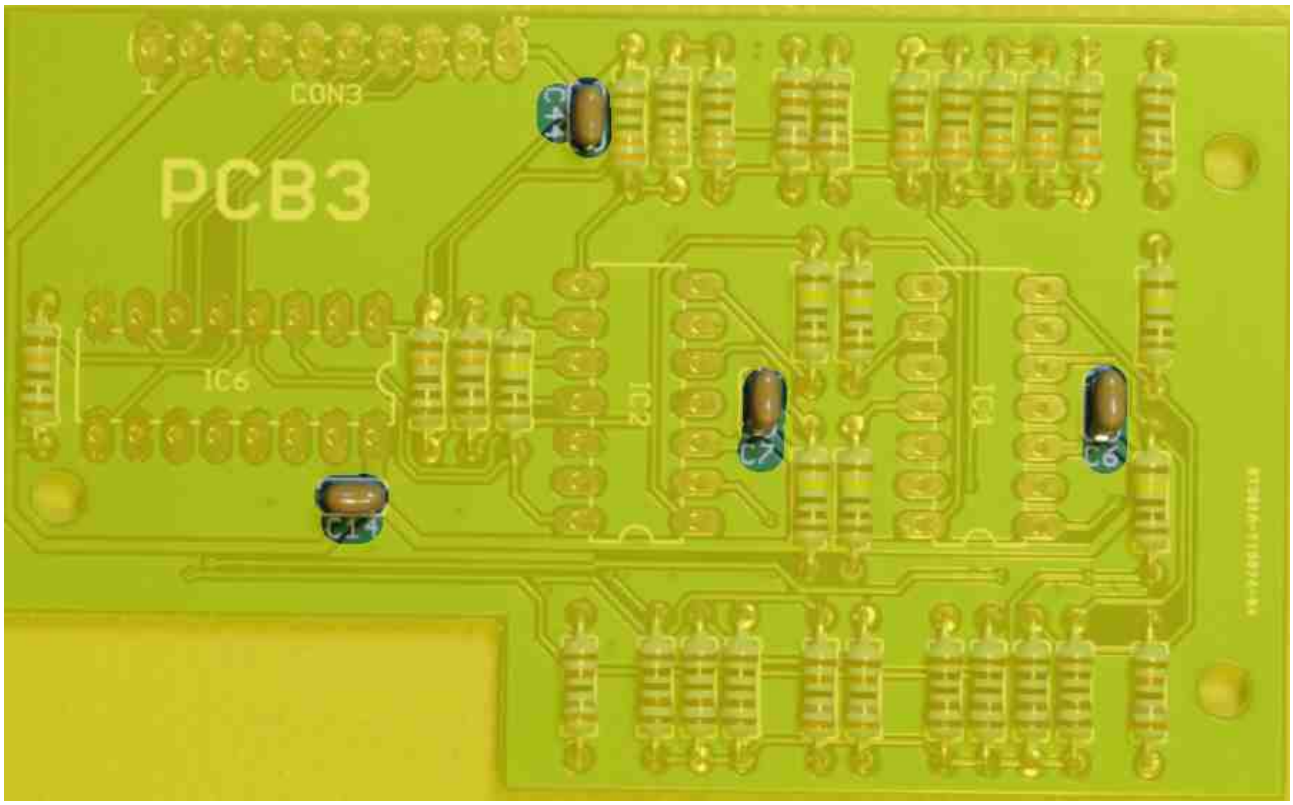
***R71, R72, R73, R74, R75, R76, R77** 27K*



R51, R79, R80 *100K*

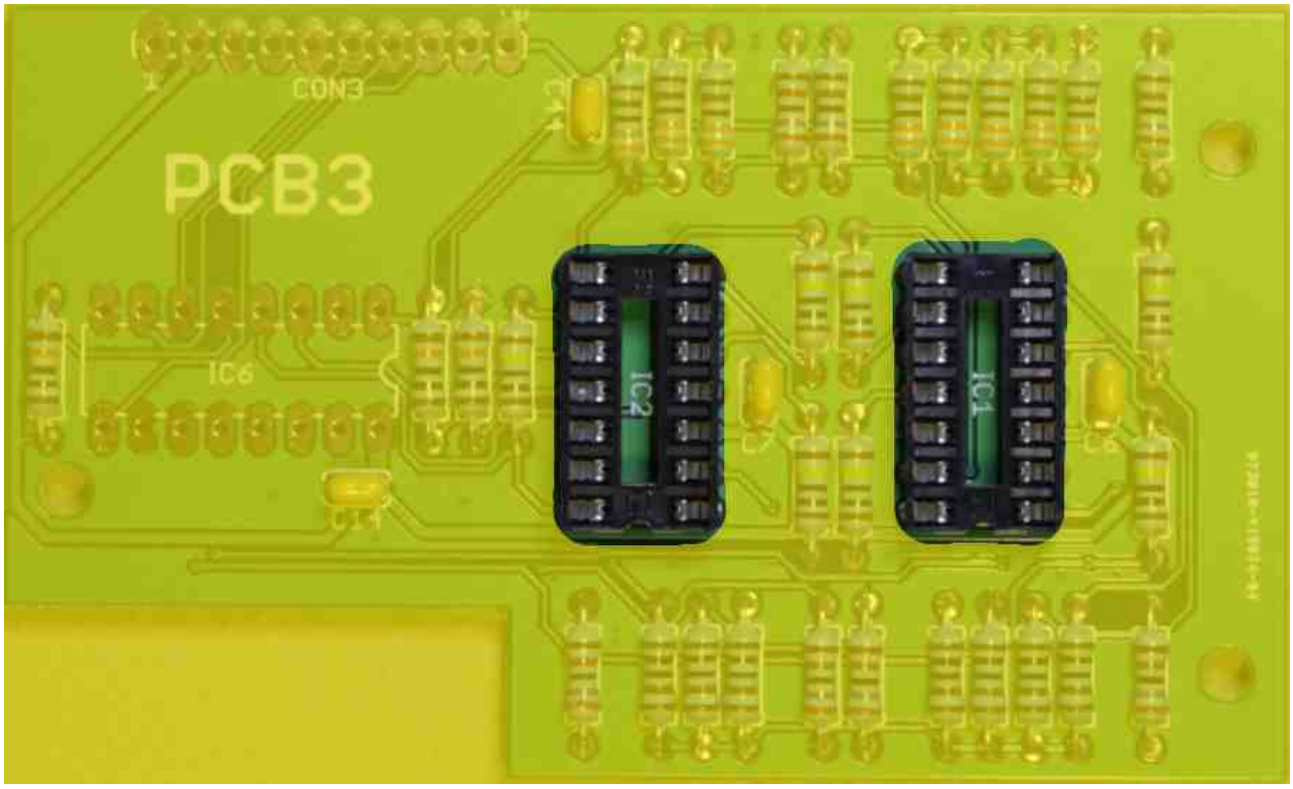
Step 2

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

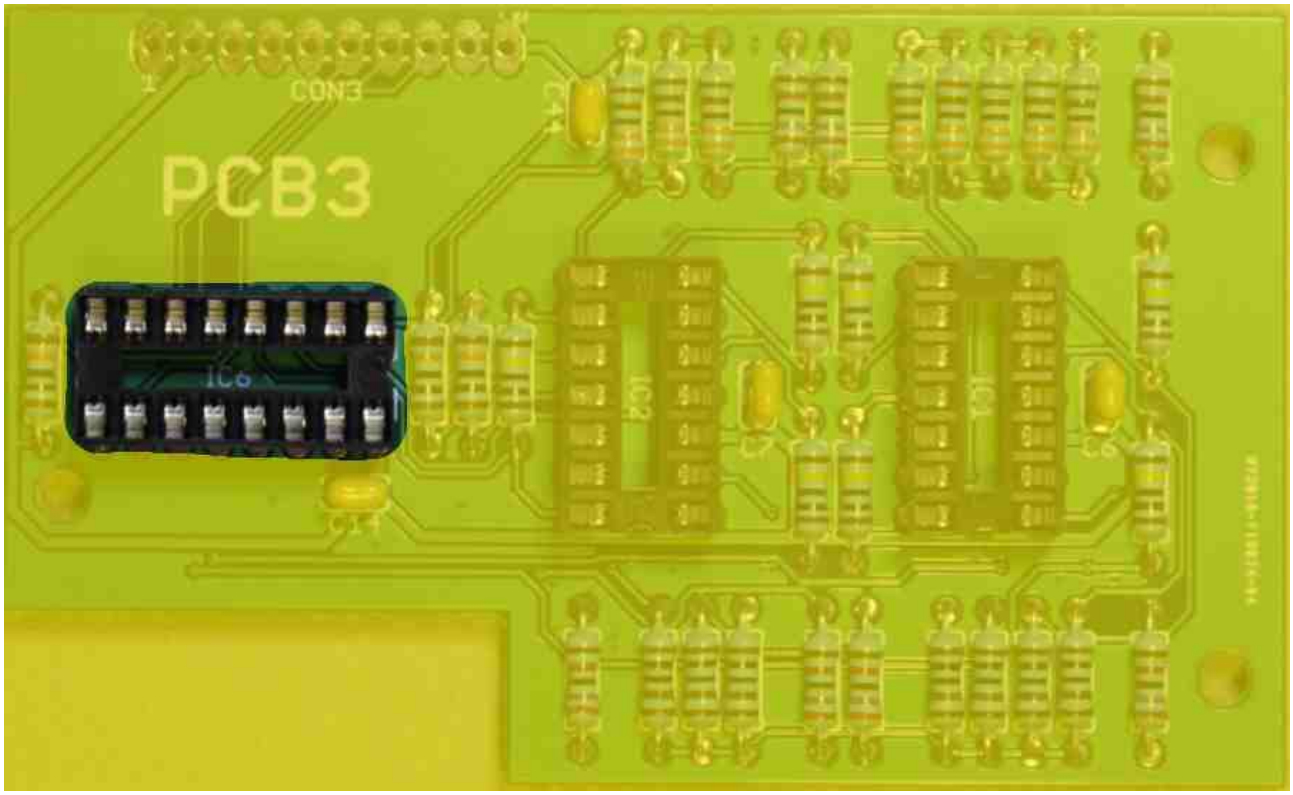


C6, ***C7***, ***C14***, ***C44*** *100nF*

Step 3
Solder IC sockets. Match the IC sockets indent (marking pin 1 side) with the silk screens.

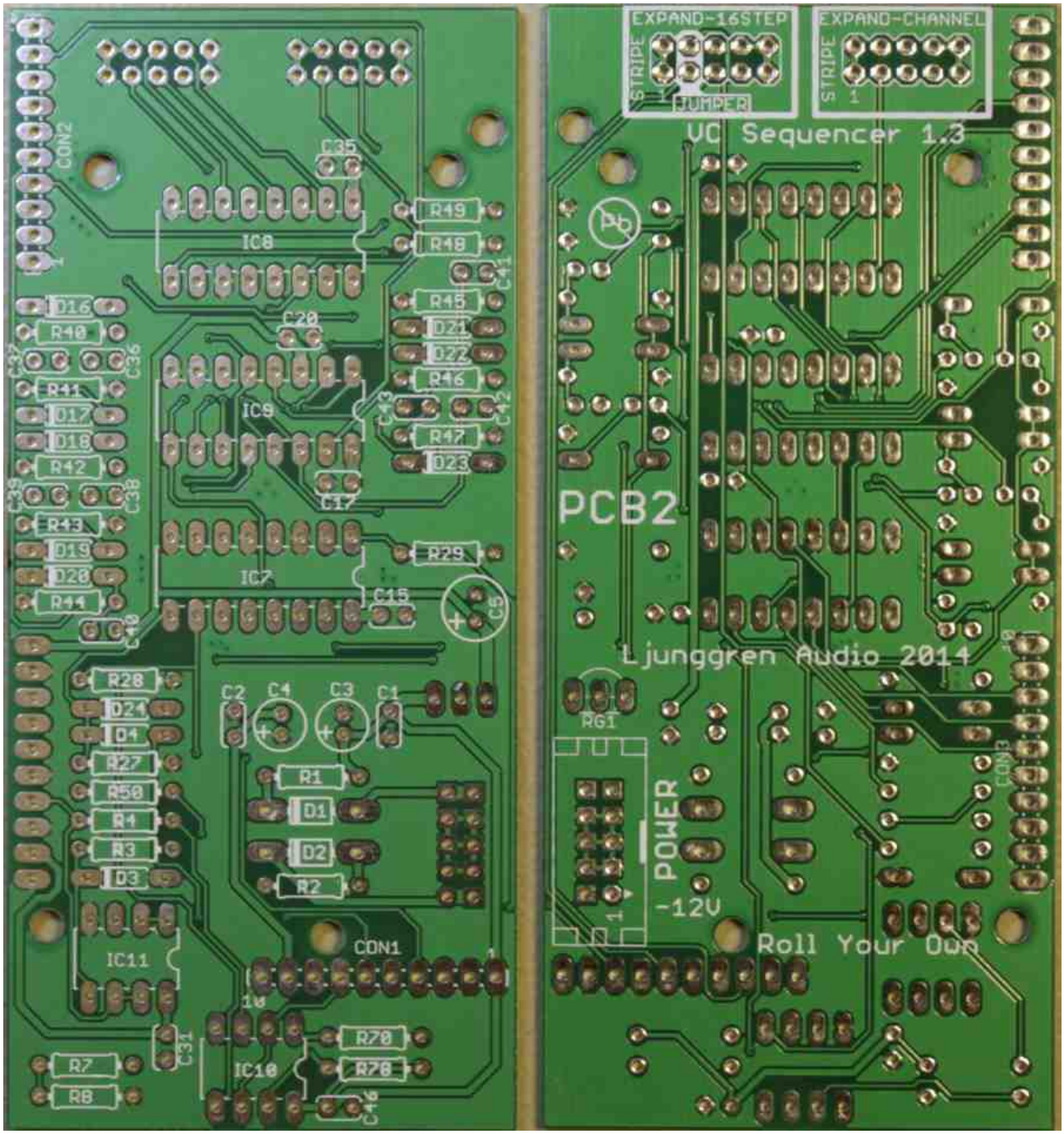


IC1, ***IC2*** *14 pin DIP sockets. IC's will be mounted later.*



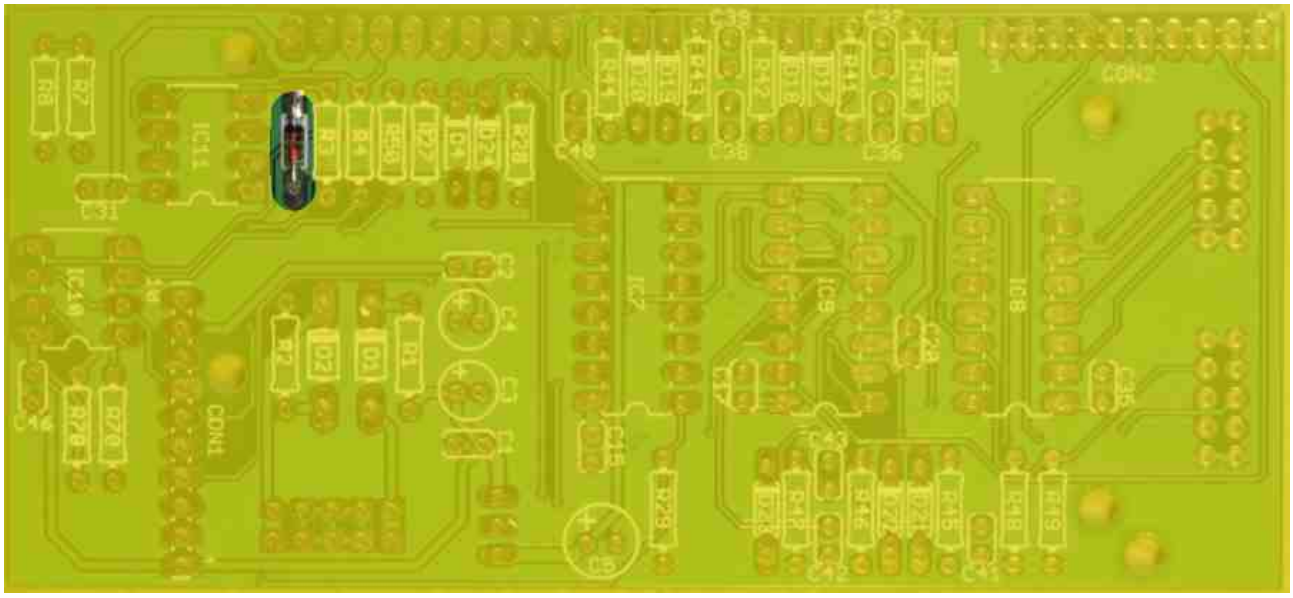
IC6 *16 pin DIP socket. IC will be mounted later.*

Step 4
Leave PCB3 on the side with CON3 not soldered.
Now it's time for PCB2.

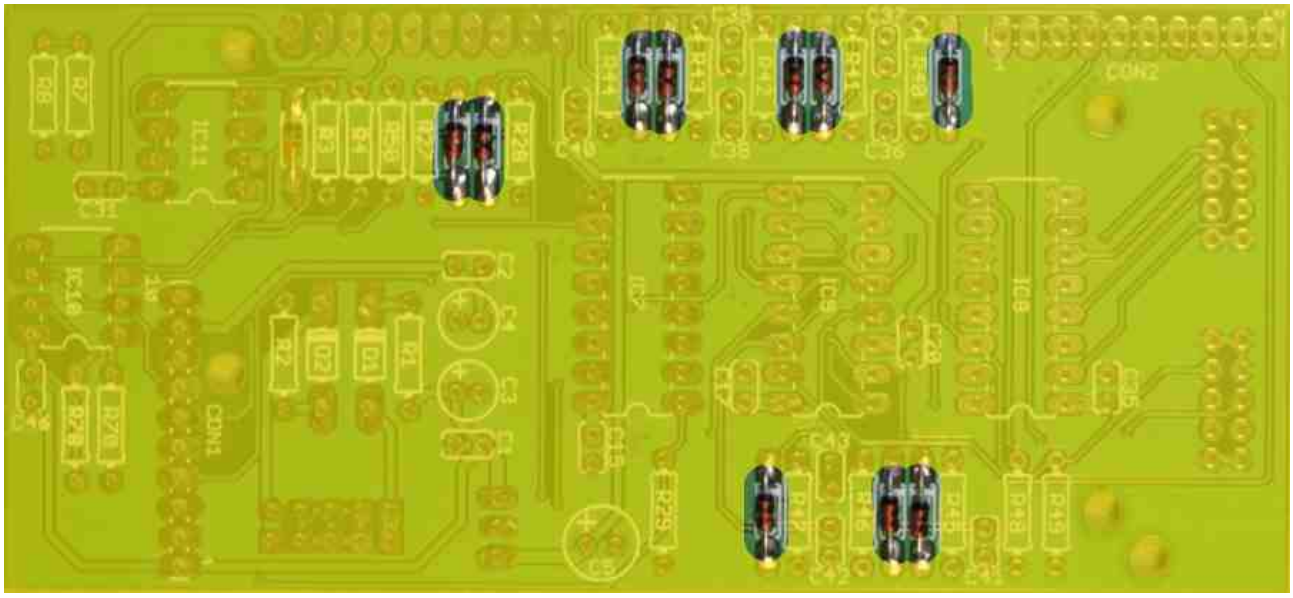


Empty PCB2 top & bottom.

Step 5
Solder small diodes. Diodes are sensitive to mounting direction, the stripe on the diodes must be on the same side as indicated in the silk screen.

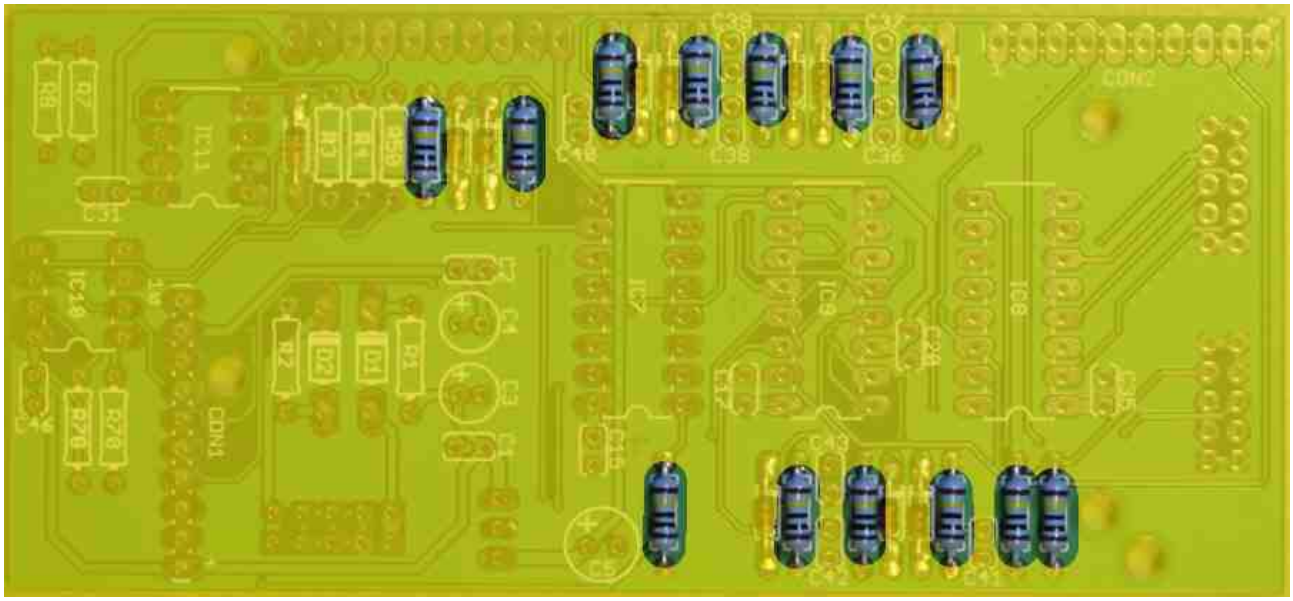


D3 *BAT42*

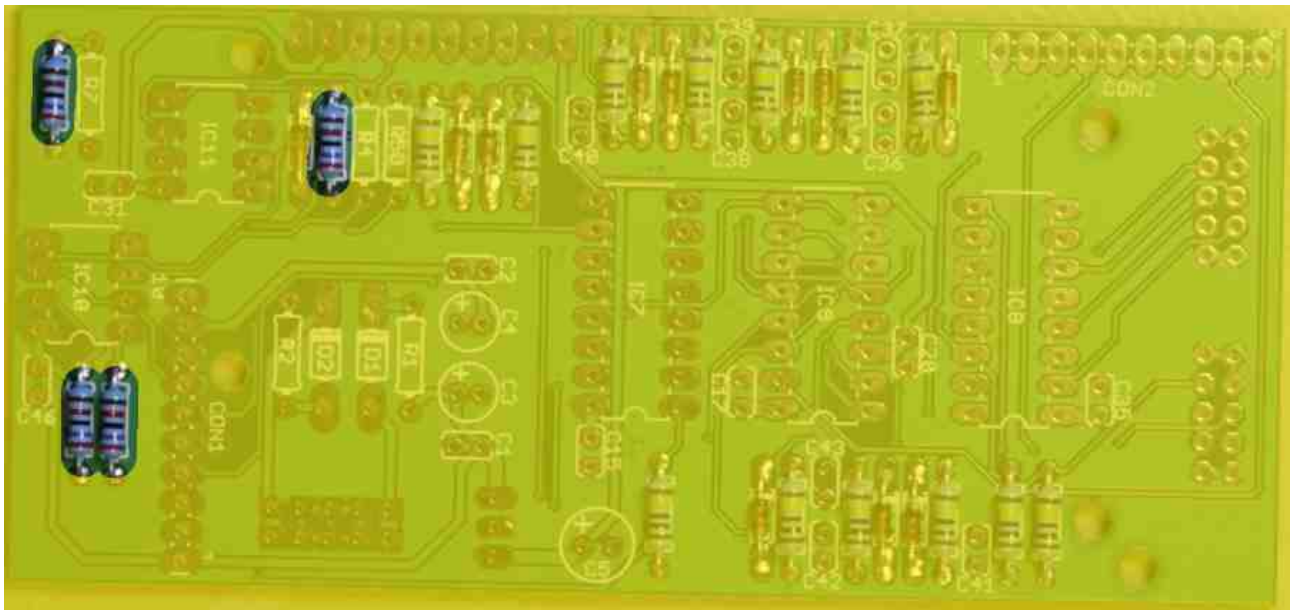


D4, D16, D17, D18, D19, D20, D21, D22, D23, D24 *1N4148*

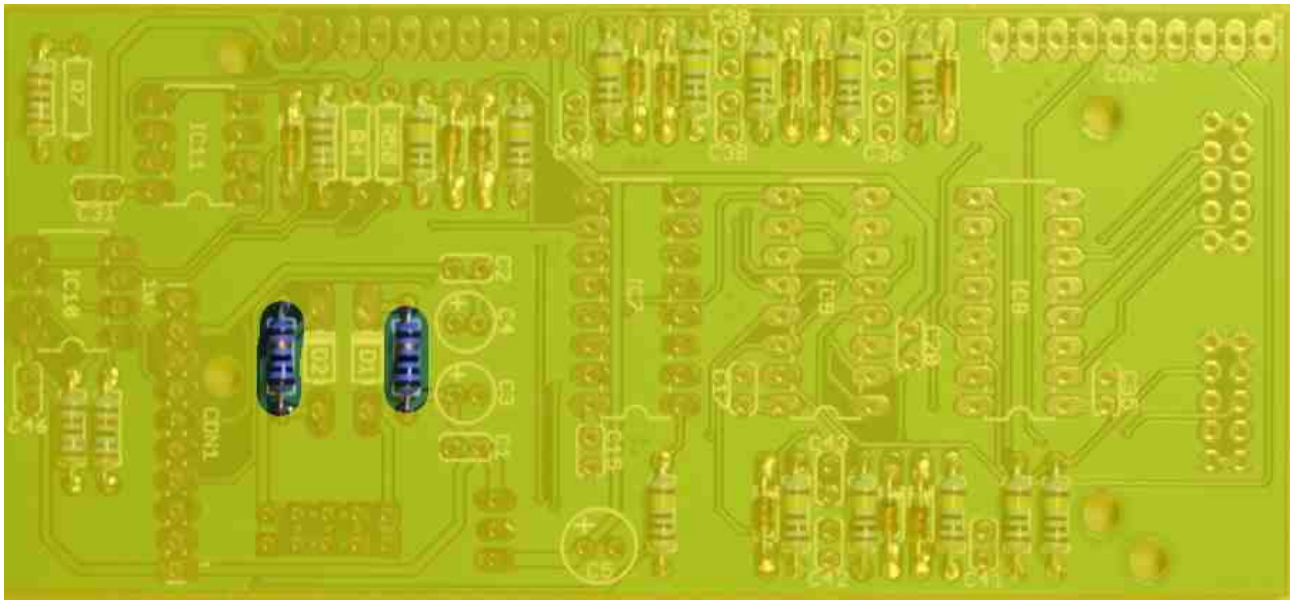
Step 6
Solder resistors. Resistors are not sensitive to mounting direction.



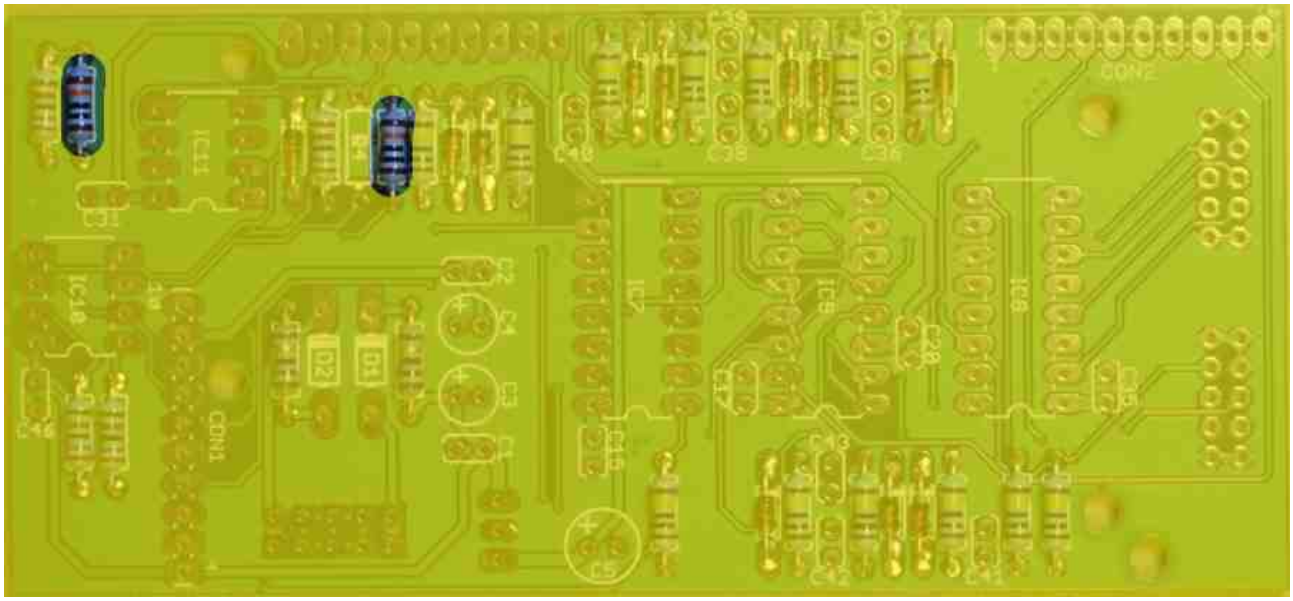
R27, R28, R29, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49 *1M*



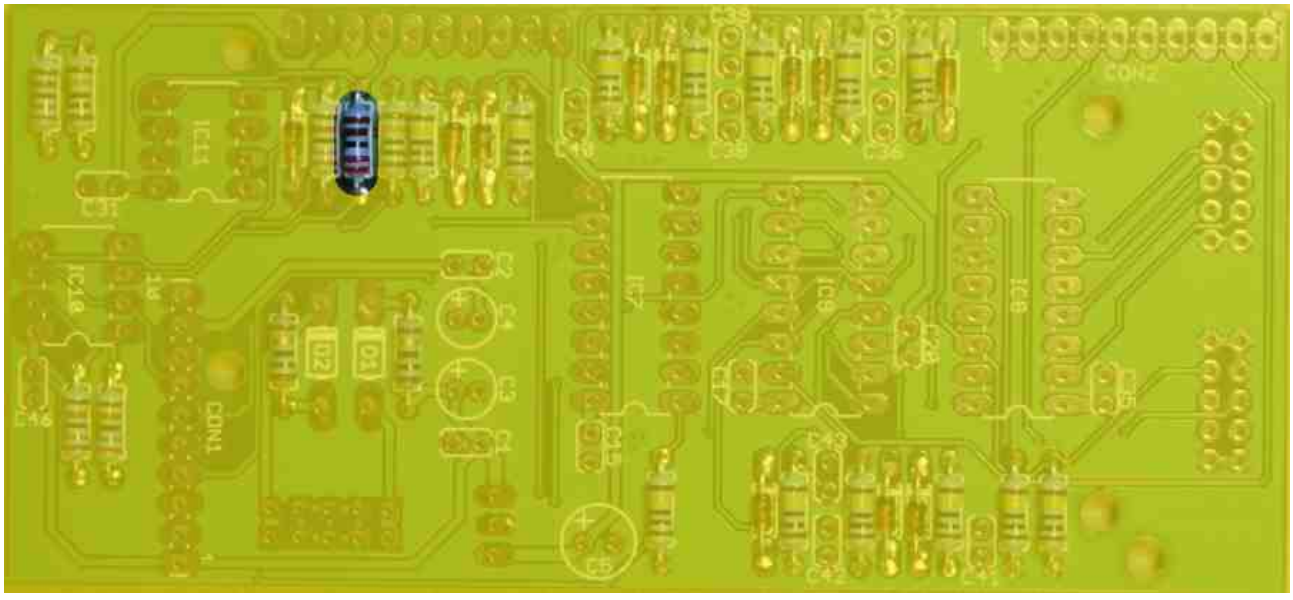
R3, R8, R70, R78 *27K*



R1, R2 *10R*

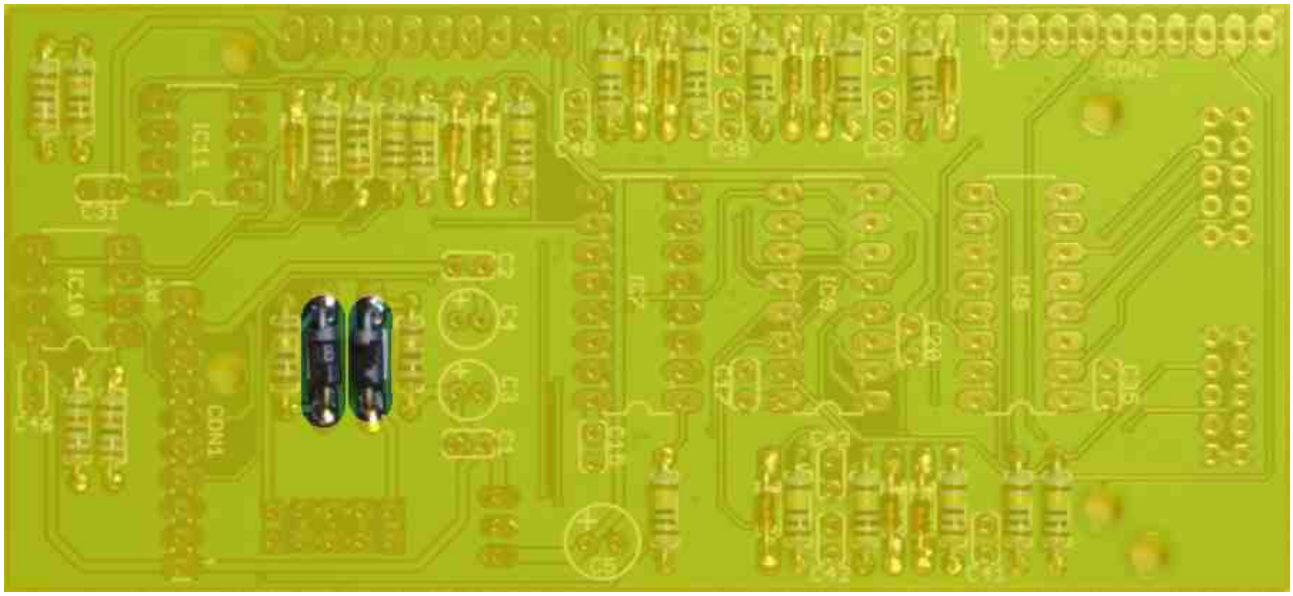


R7, R50 *100K*



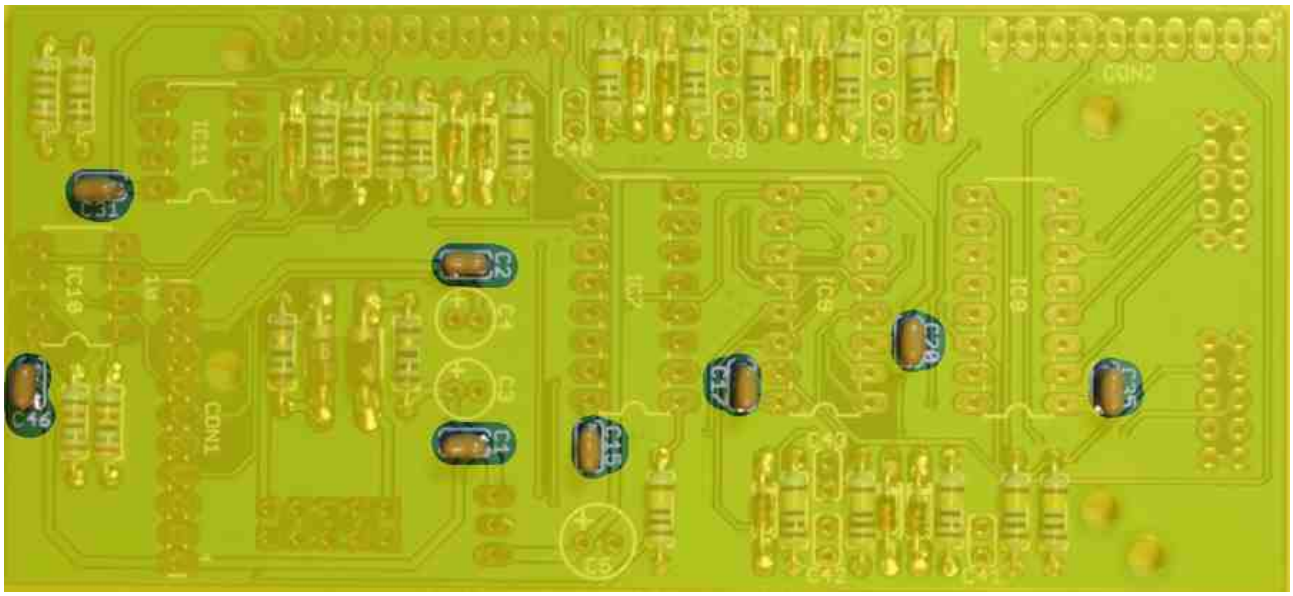
R4 *2.2K*

Step 7
Solder reverse polarity protection diodes. Diodes are sensitive to mounting direction, the stripe on the diodes must be on the same side as indicated in the silk screen.

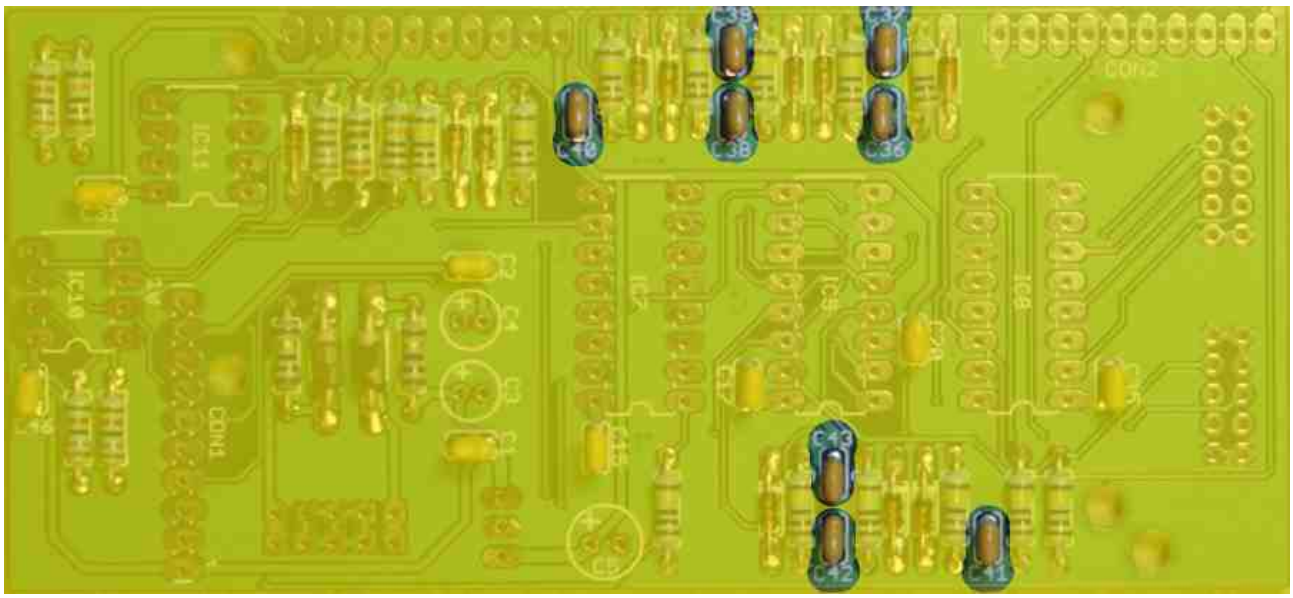


D1, D2 *SB130*

Step 8
Solder ceramic capacitors. Ceramic capacitors are not sensitive to mounting direction.



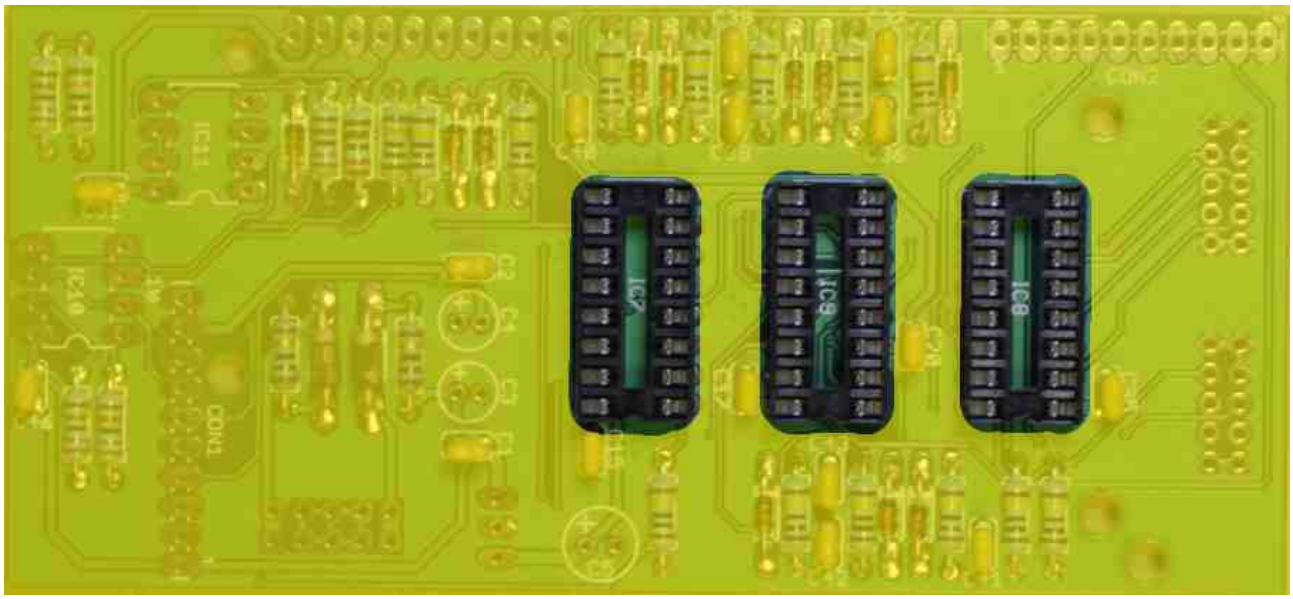
C1, C2, C15, C17, C20, C31, C35, C46 *100nF*



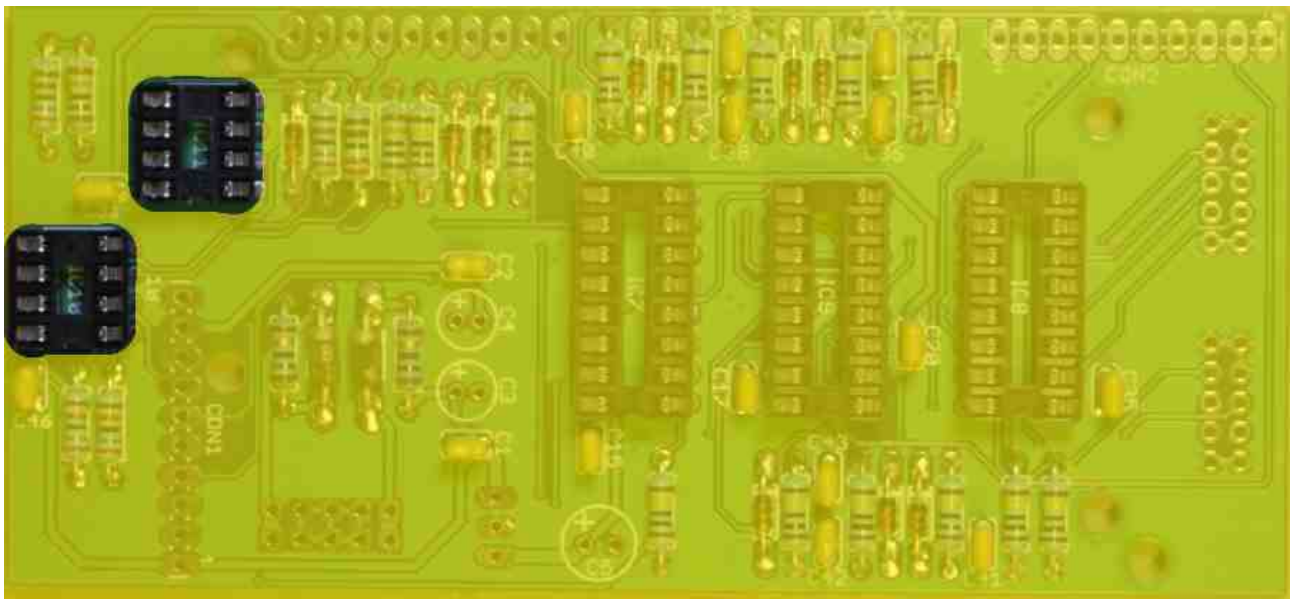
C36, C37, C38, C39, C40, C41, C42, C43 *1nF*

Step 9

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



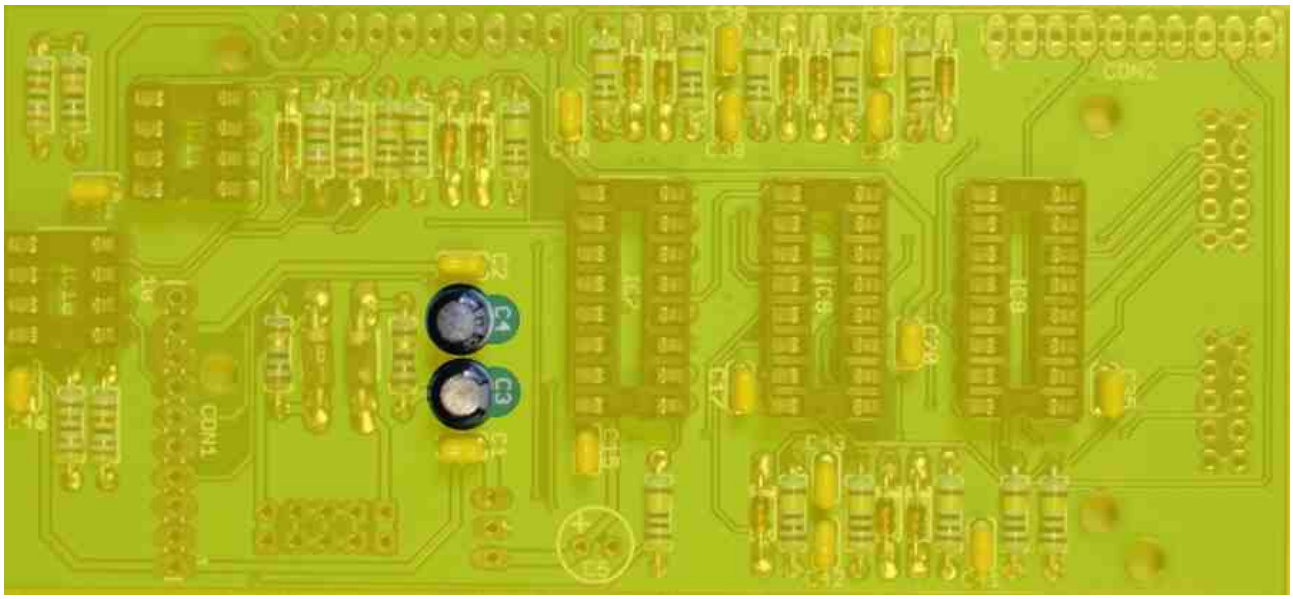
IC7, IC8, IC9 *16 pin DIP sockets. IC's will be mounted later.*



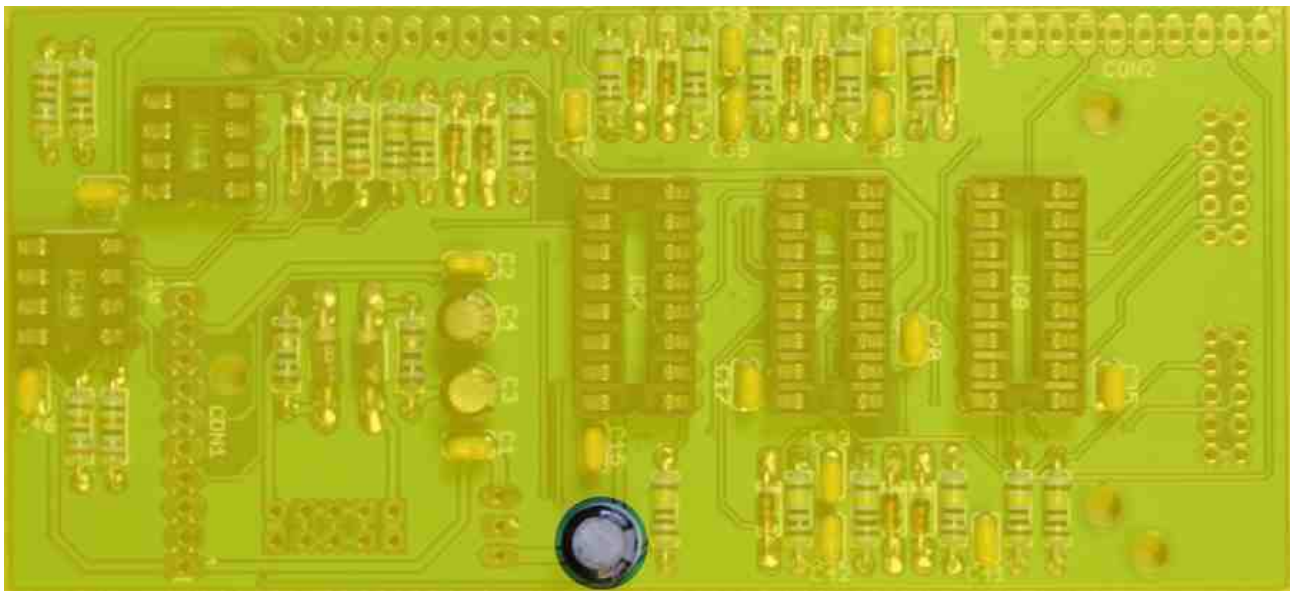
IC10, IC11 *8 pin DIP socket. IC's will be mounted later.*

Step 10

Solder Electrolytics. Long leg is + (anode).

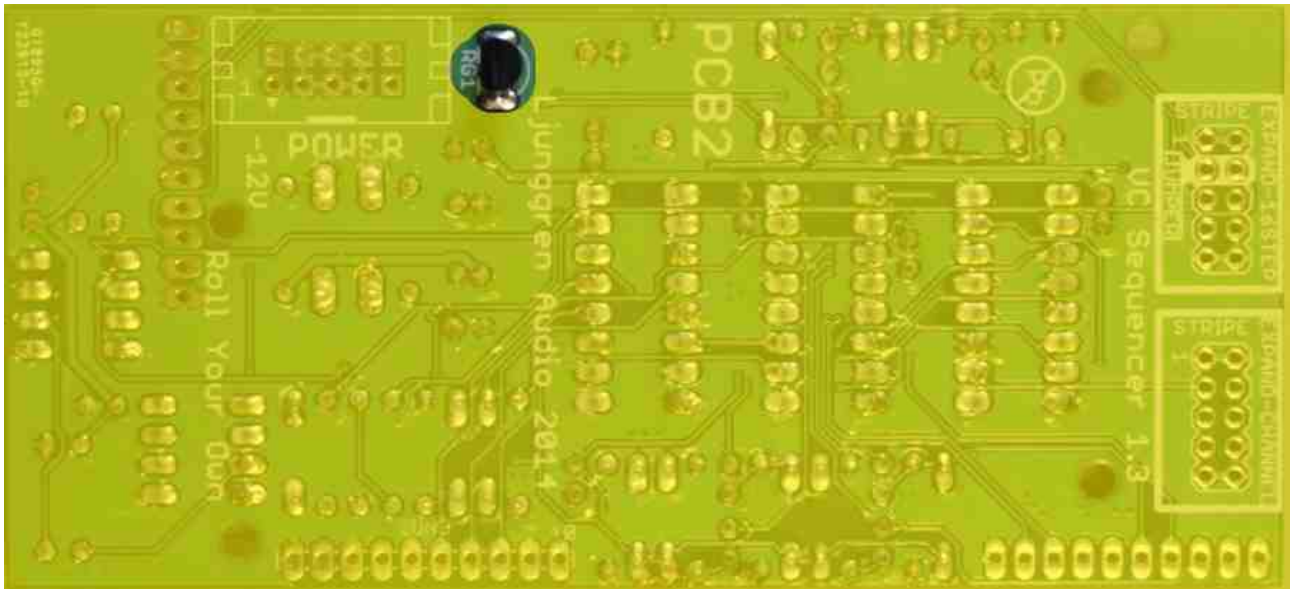


C3, C4 *10µF*



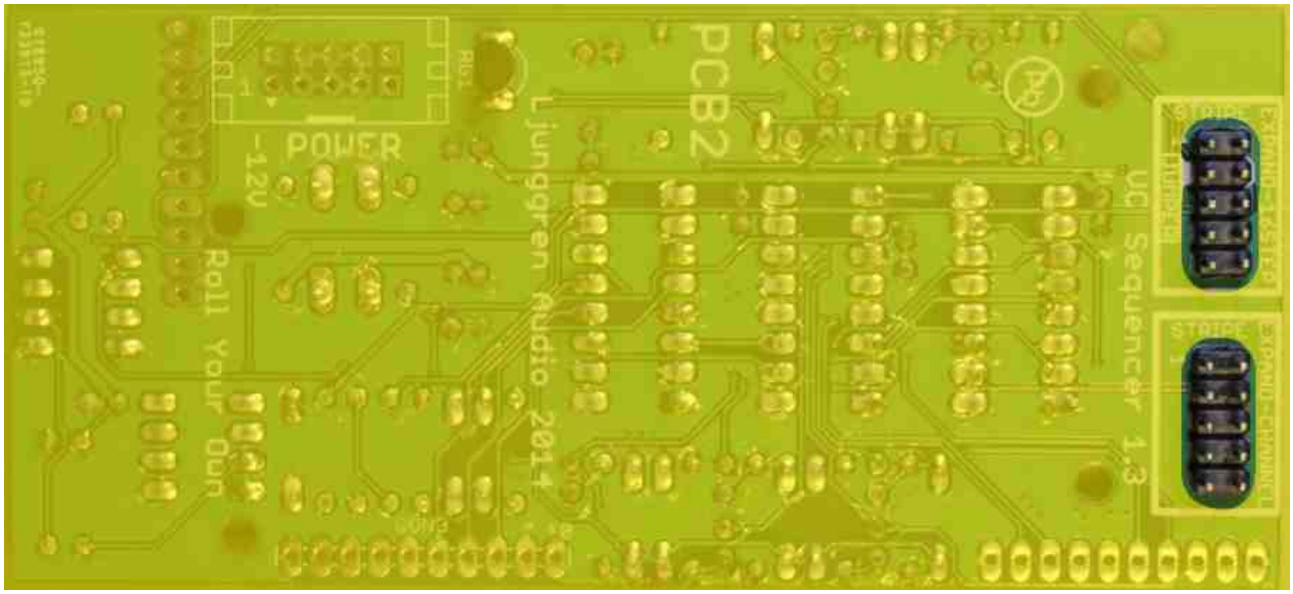
C5 *100µF*

Step 11
Mount the voltage regulator.



RG1 *LM2931*50 5V*

Step 12
Solder expander headers. It's a good idea to take the 10-pin side of the power cable and plug it in the header you are soldering. It makes it easier to avoid heating the pins up too much and make them unaligned by moving around.

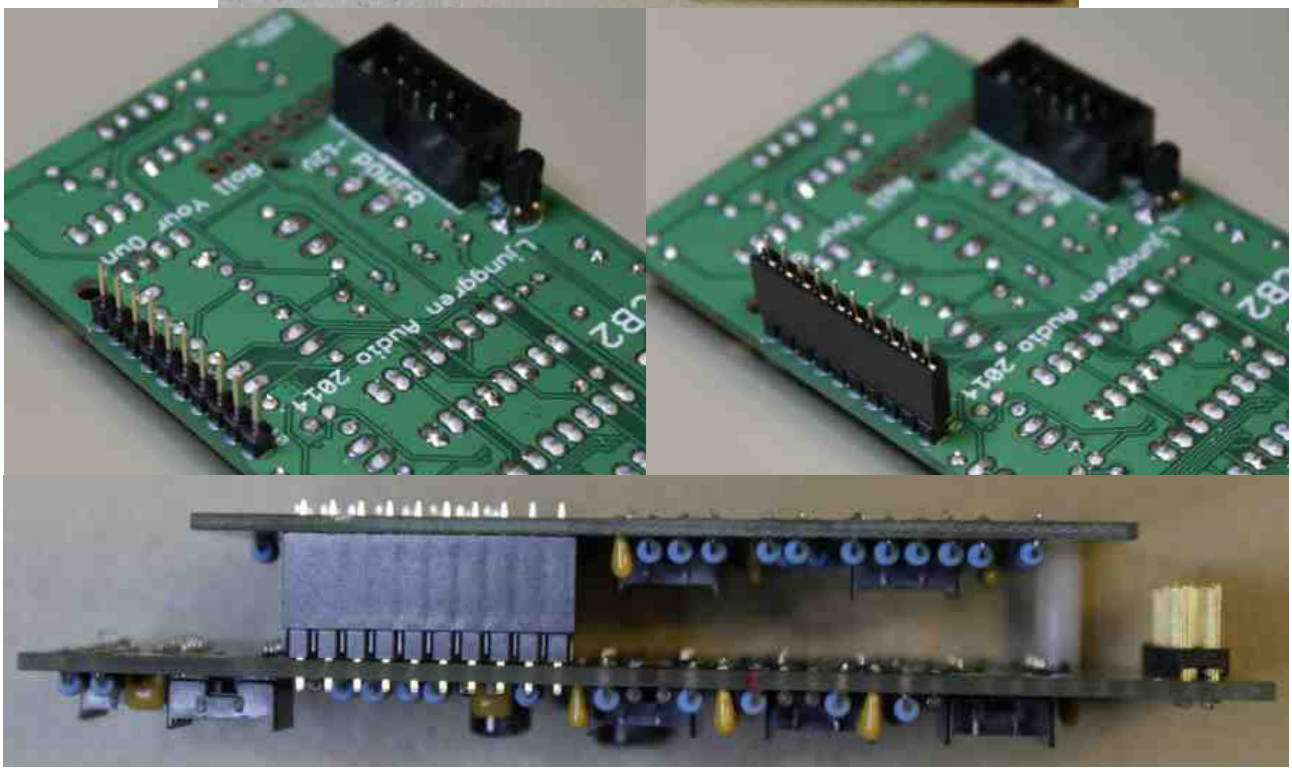


EXPAND-16STEP, EXPAND-CHANNEL *10 pin open header*

Step 13
Solder the keyed boxed power header. Pay extra attention to the direction. The triangle (pin 1) must be at the -12V side. It's a good idea to use the power cable in the same way as in the previous step. In the picture below the slot opening (key) is pointed to.

POWER

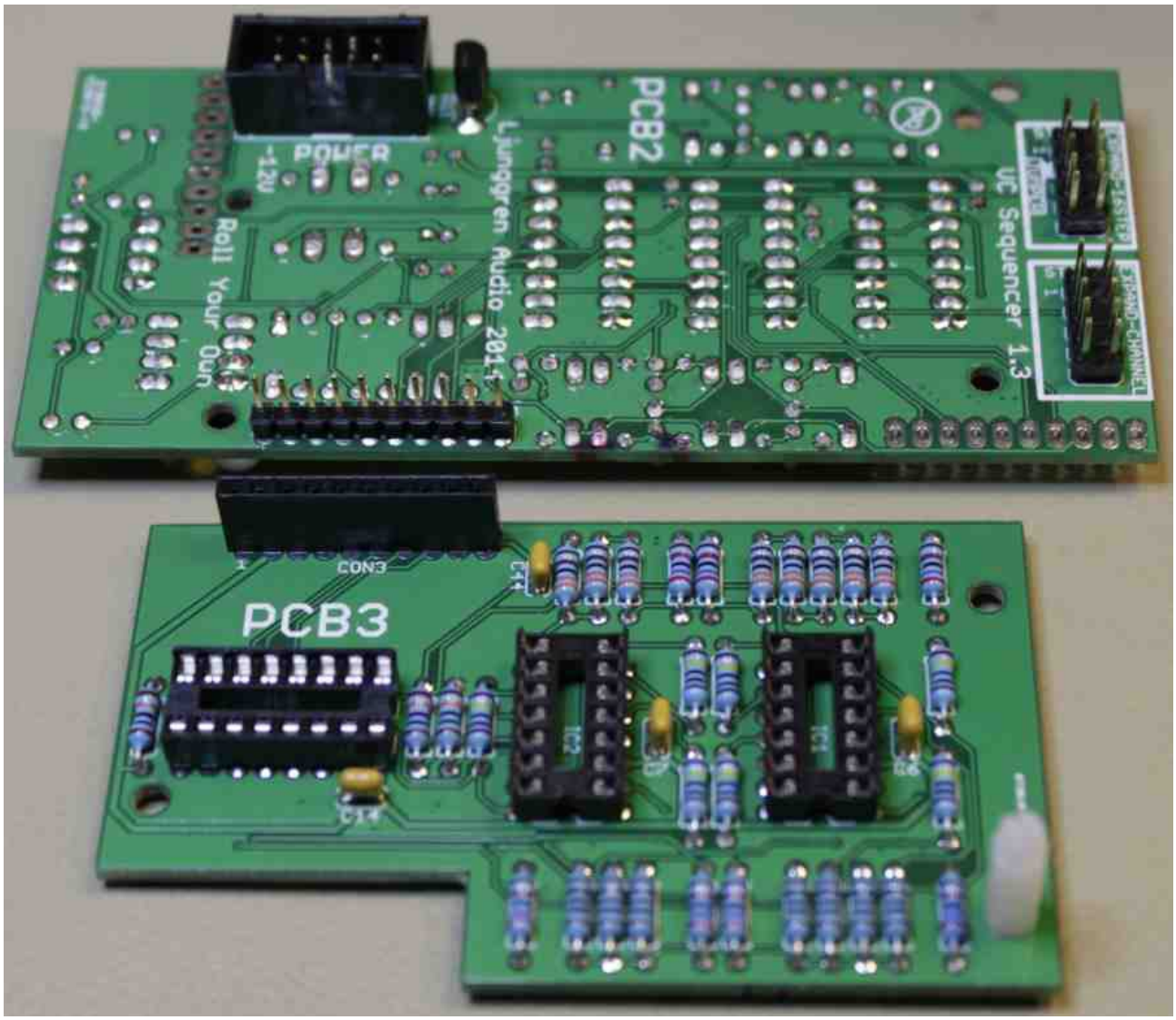
Step 14
Solder the connector between PCB2 & 3. Add one of the nylon spacers in the position shown in the first picture below. This will give support while soldering, if you use all 3 spacers it will be more difficult to take it apart again.



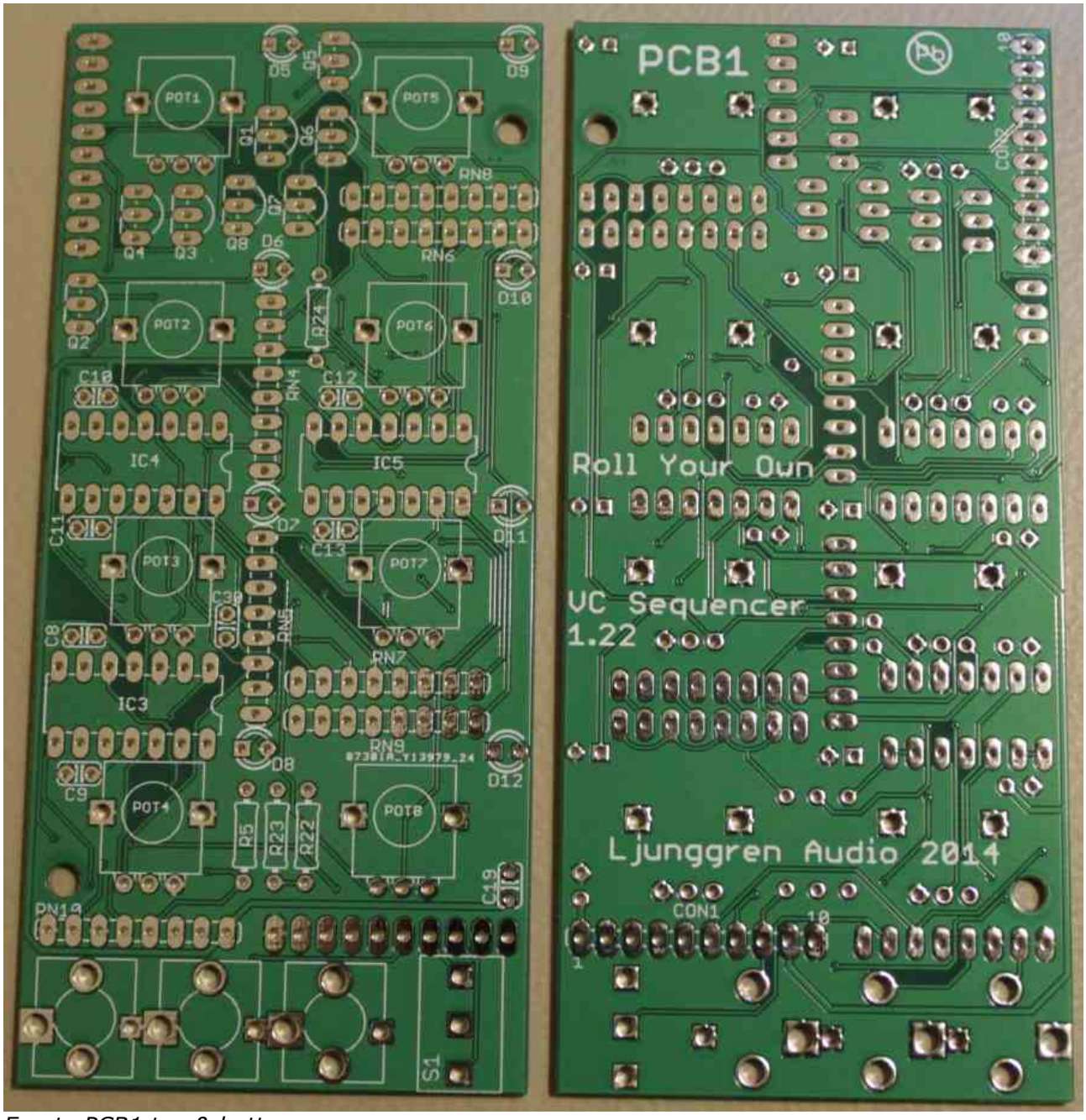
CON3 *10 pin*

Solder both sides when it's put together like this and try to align the position of the PCBs as best you can so one PCB don't stick out of the side of the module.

You should end up with something like this.

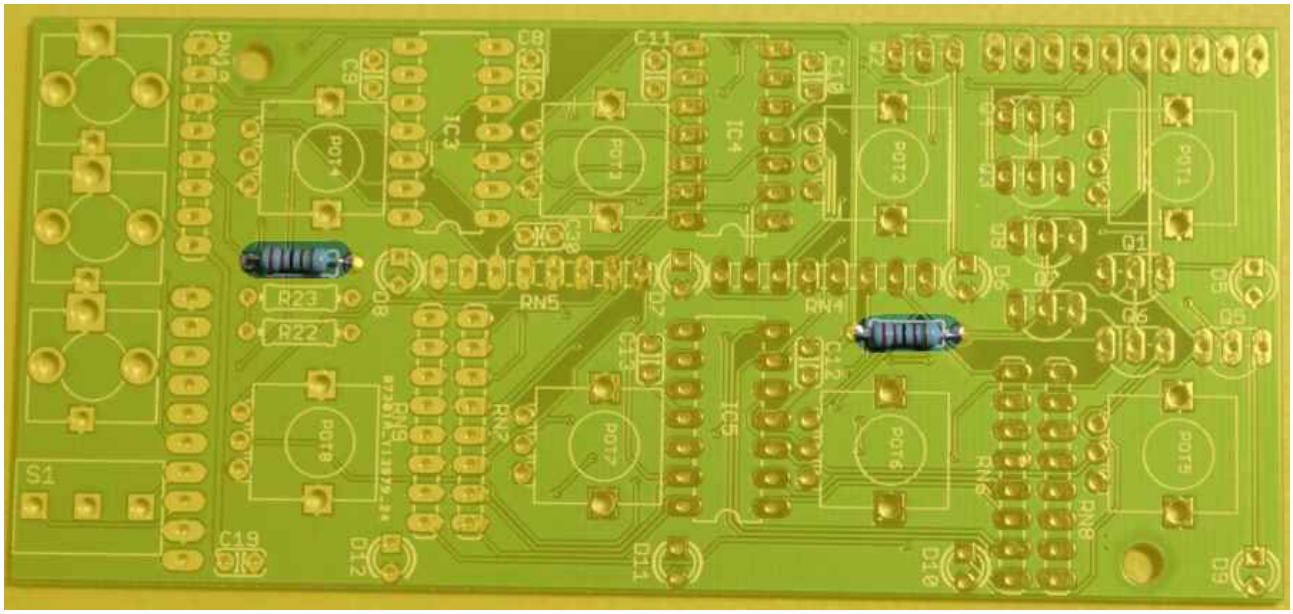


Step 15
Leave PCB2 & 3 on the side.
Now it's time for PCB1.

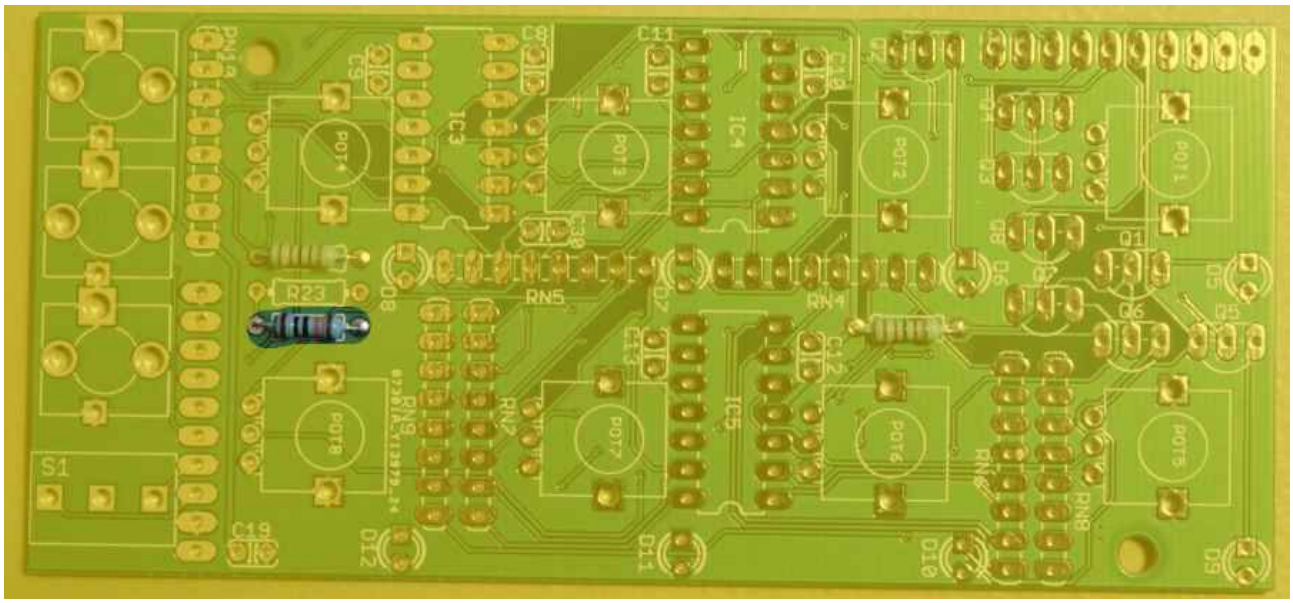


Empty PCB1 top & bottom.

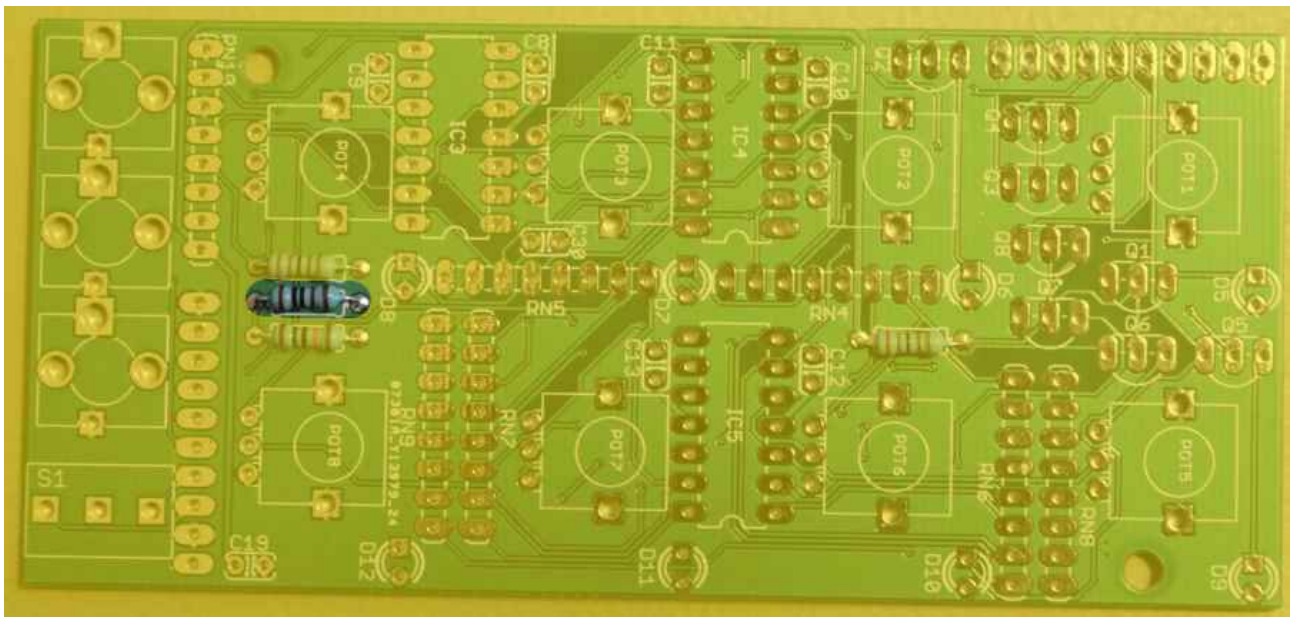
Step 16
Solder resistors. Resistors are not sensitive to mounting direction.



R5, R24 *2.2K*



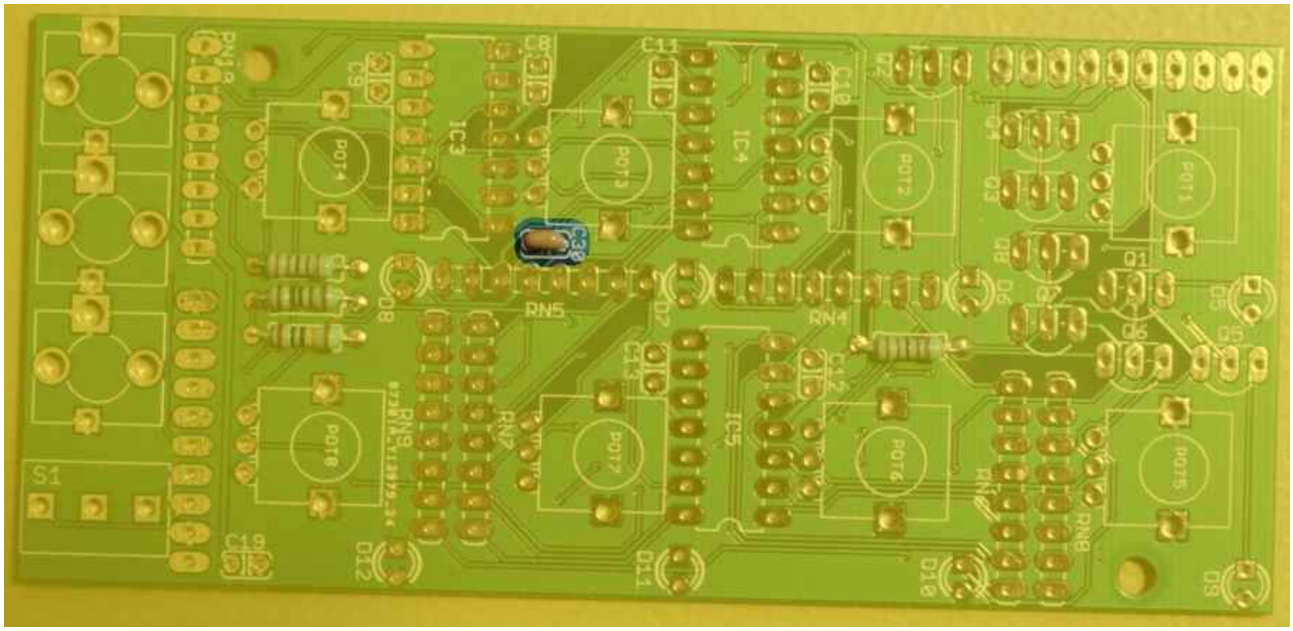
R22 *100K*



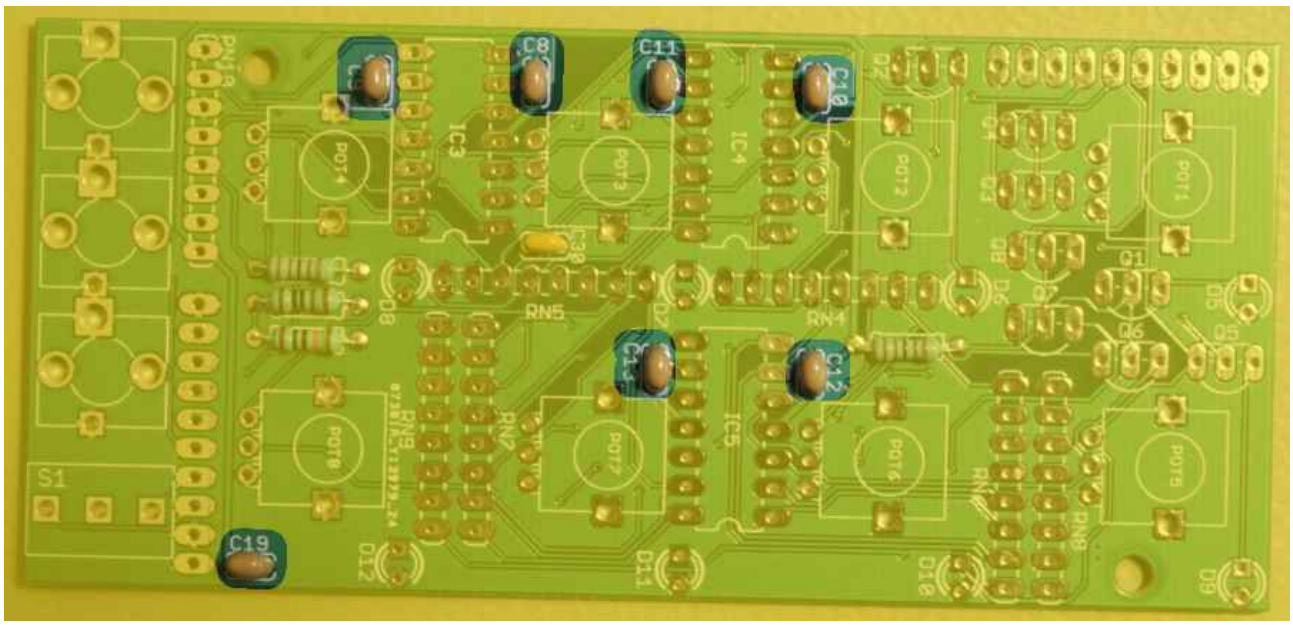
R23 *1K*

Step 17

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



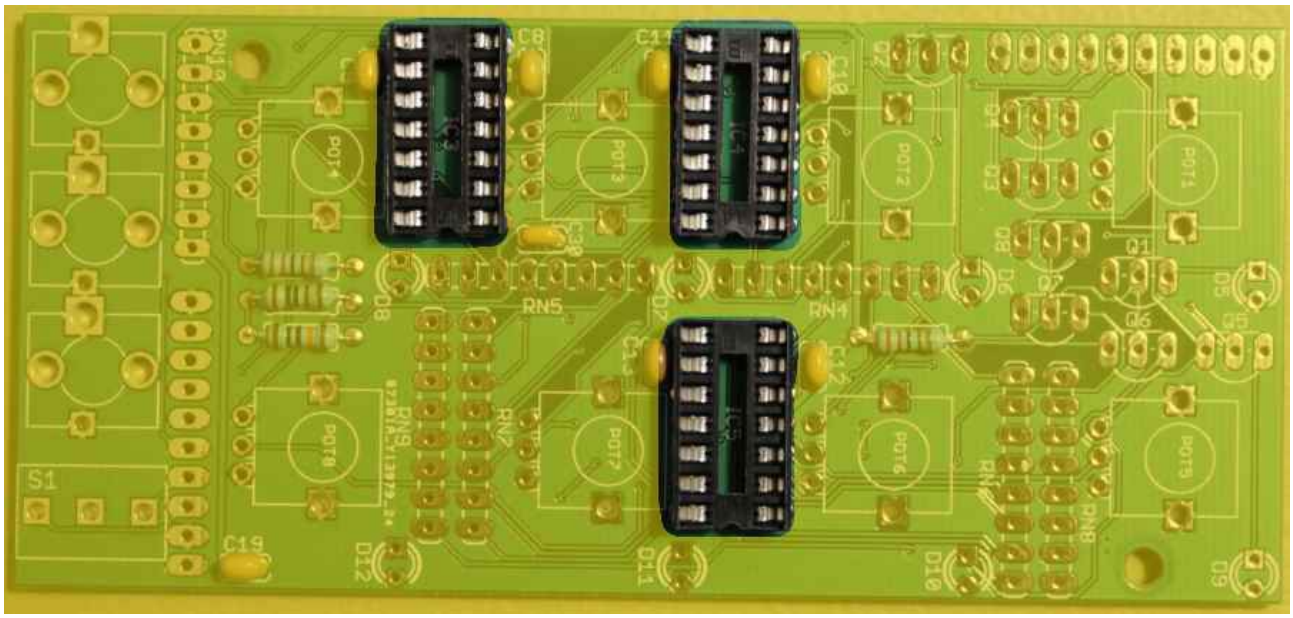
C30 *22pF*



C8, C9, C10, C11, C12, C13, C19 *100nF*

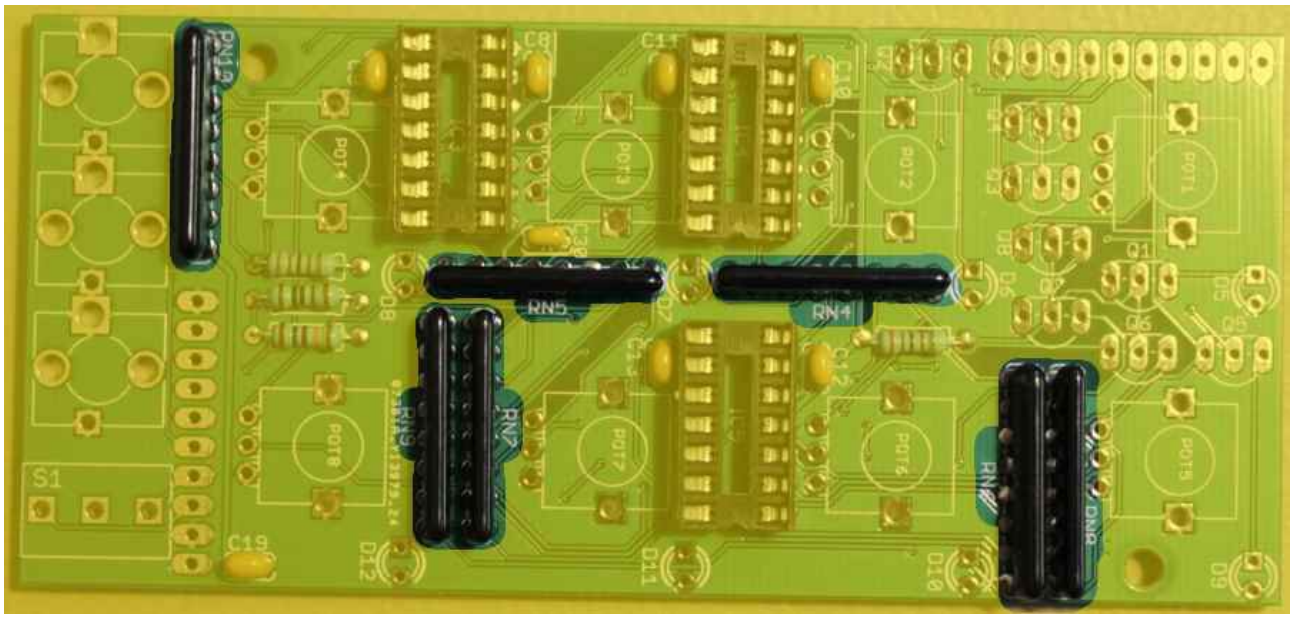
Step 18

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



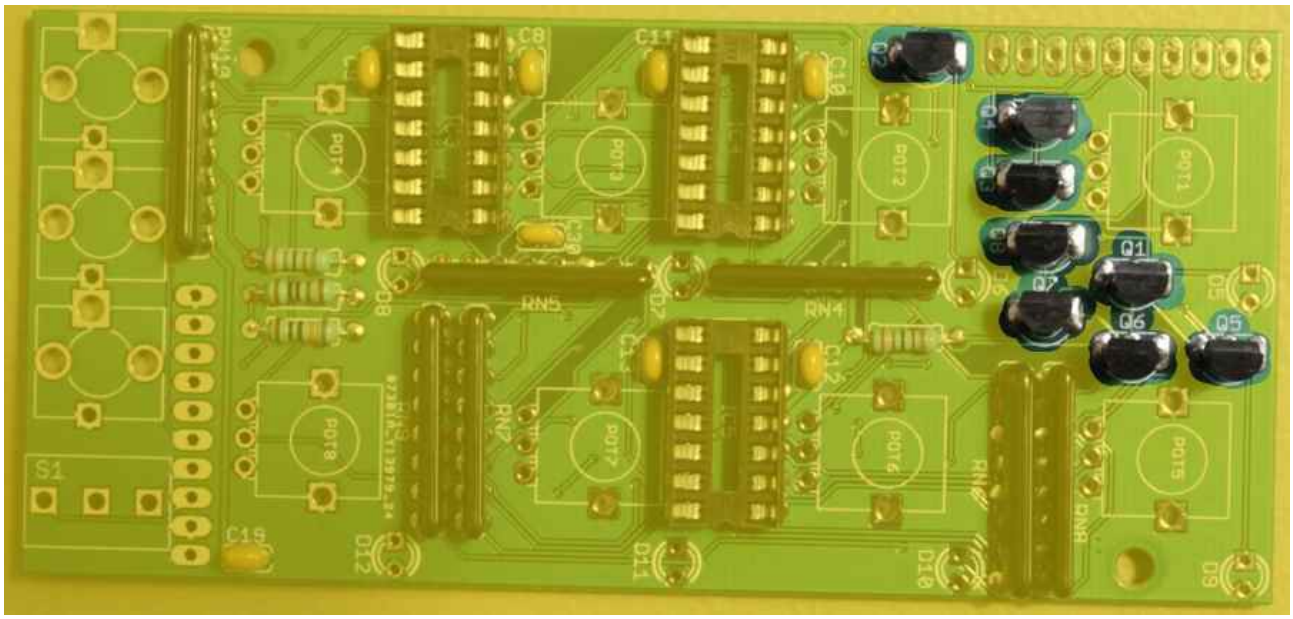
IC3, IC4, IC5 *14 pin DIP sockets. IC's will be mounted later.*

Step 19
Solder resistor networks. This kind of resistor network is not sensitive to mounting direction.



RN4, RN5, RN6, RN7, RN8, RN9, RN10 *100K isolated*

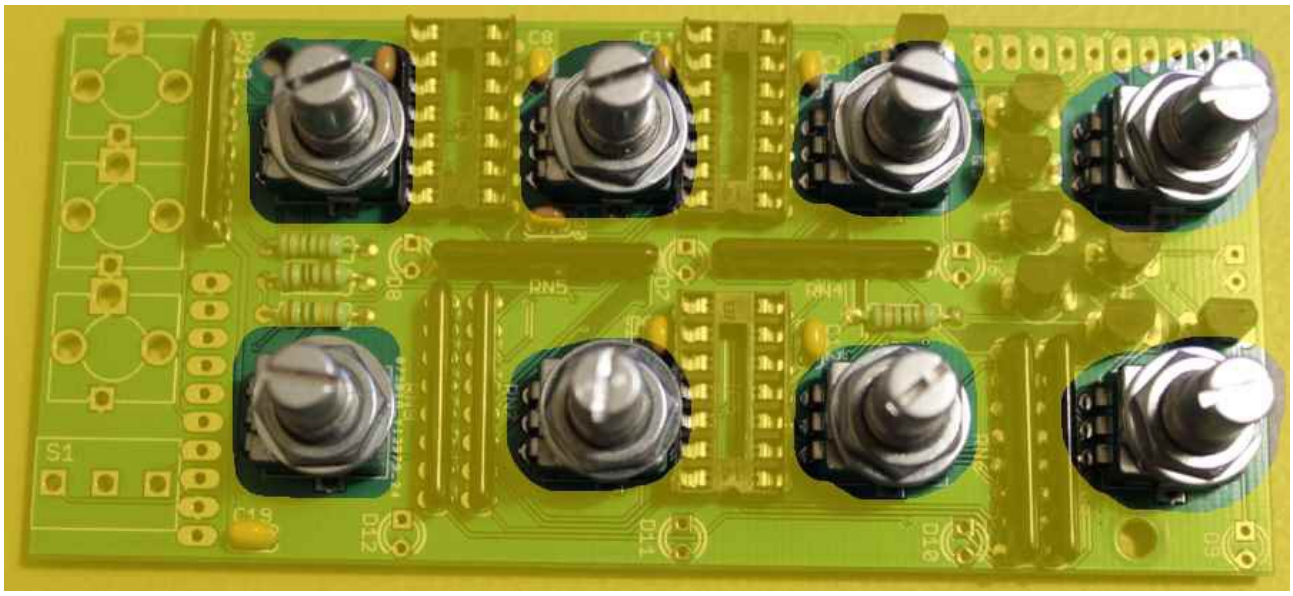
Step 20
Solder transistors. Match the curved side with the silk screen.



Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8 *FJN3303R*

Step 21
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 2 washers and 1 nut on each potentiometer.

Place the potentiometers in their positions but don't solder them yet. Make sure the nuts are tight.

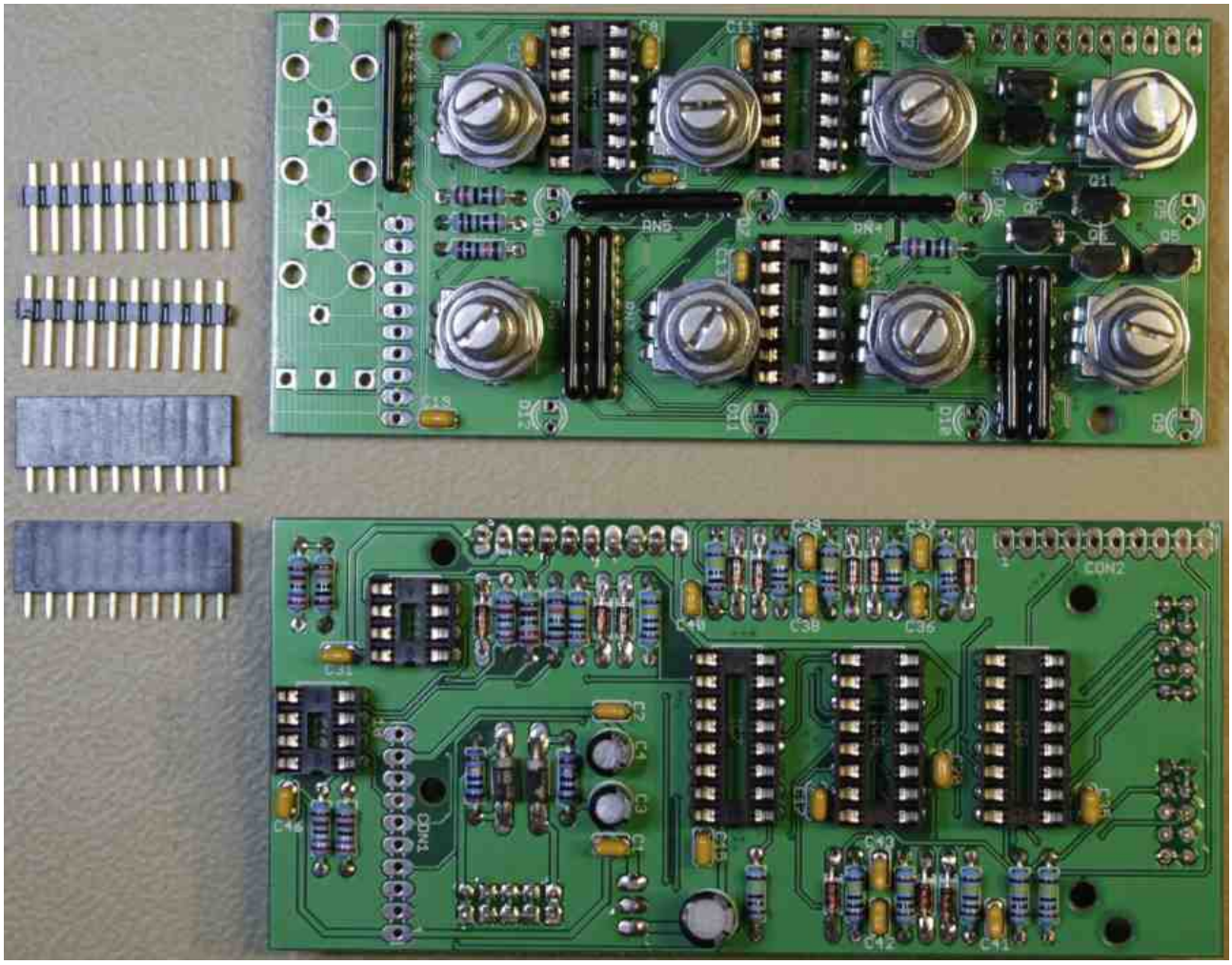


Place the frontplate on top and add 1 washer and 1 nut to each potentiometer. Use a socket wrench to avoid scratching of the frontplate.

Now you solder them in place.

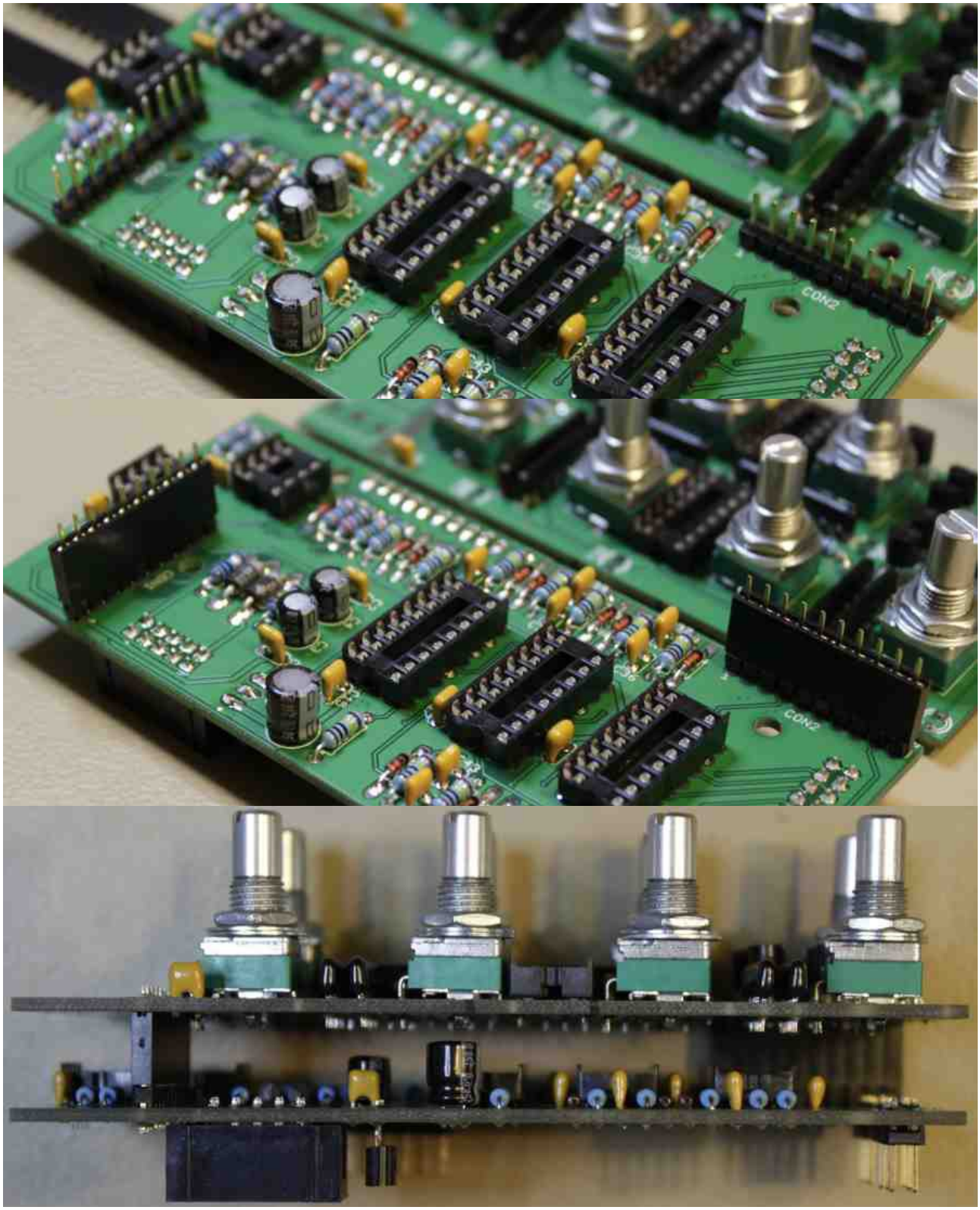
Step 22

Solder the connector between PCB1 & 2. No nylon spacers are normally needed for soldering support here.

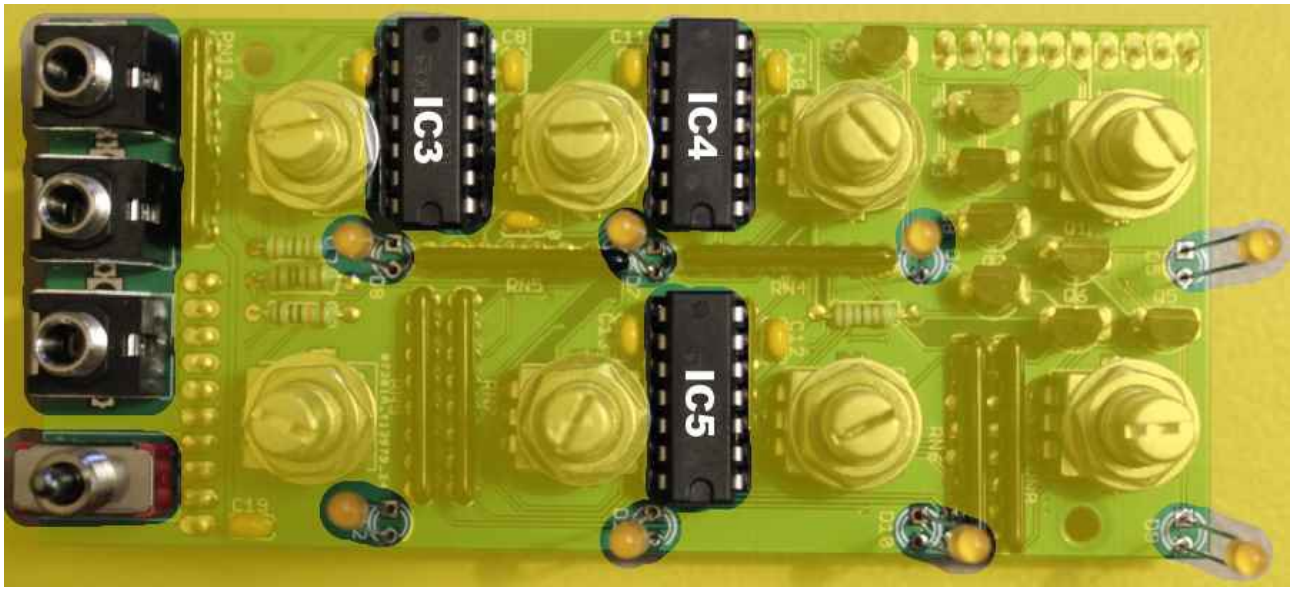


CON1, CON2 *10 pin*

Solder both sides when it's put together like this and try to align the position of the PCBs as best you can so one PCB don't stick out of the side of the module.

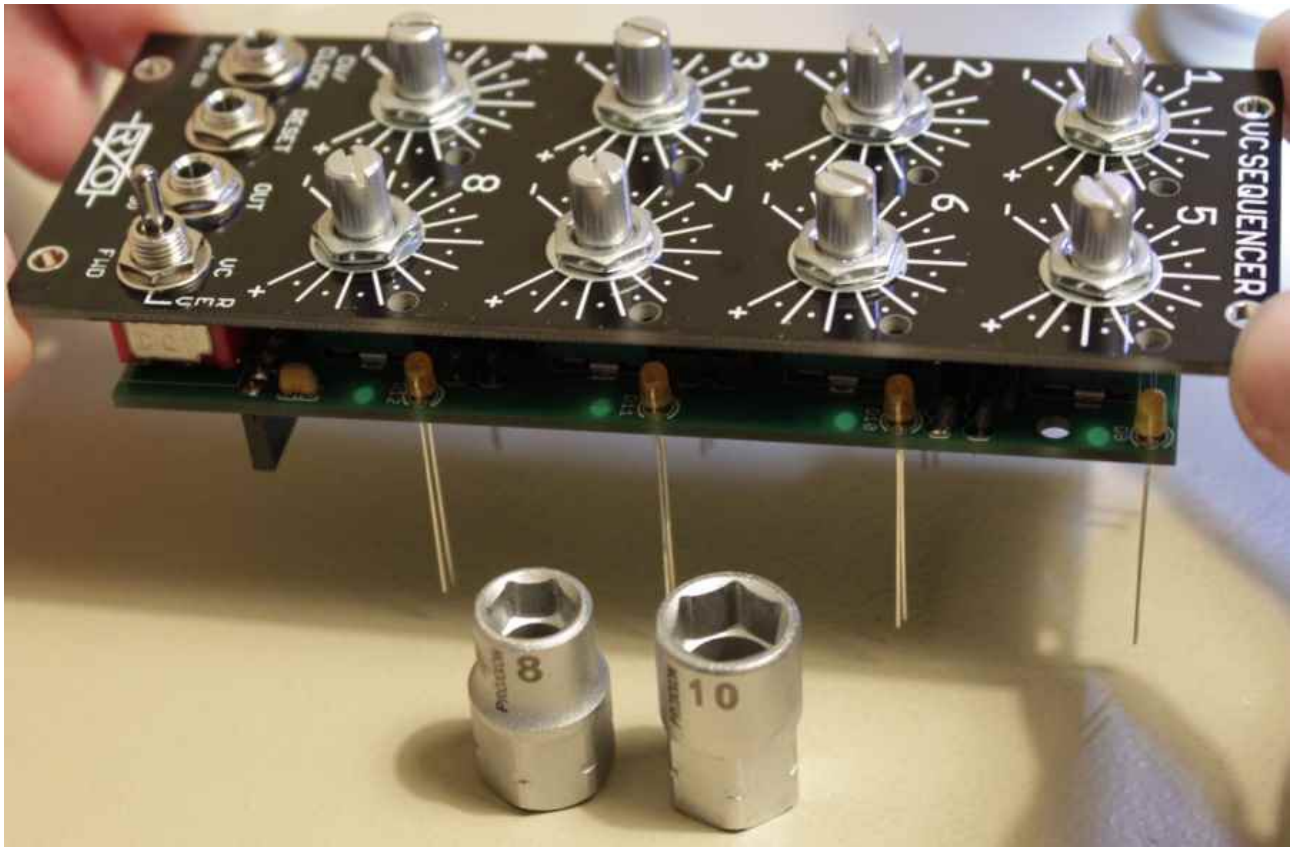


Step 23
Mount the ICs of PCB1 in their sockets. Place the jacks, switch and LEDs in their respective places without soldering them. The long pin of the LEDs are anode (+) and goes in the hole with a square pad. If you are unsure about soldering the LEDs close to the ICs you can leave the ICs unmounted and remove the frontplate later to mount them.

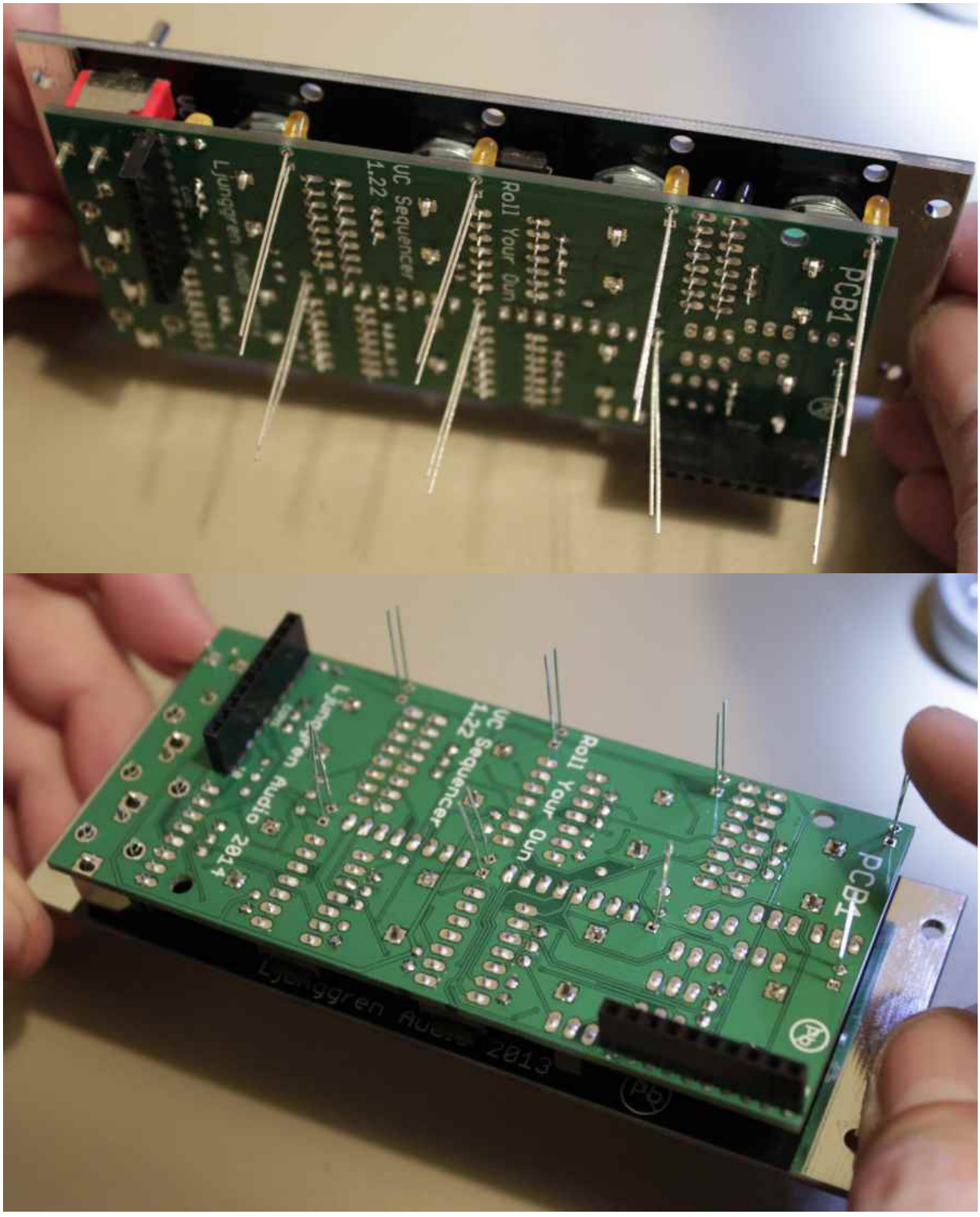


IC3 *TL074 or TL084*
IC4, IC5 *LM324*

Mount 1 washer and 1 nut on each potentiometer, jack and switch. Use a socket wrench to keep the risk of scratching the panel to a minimum.

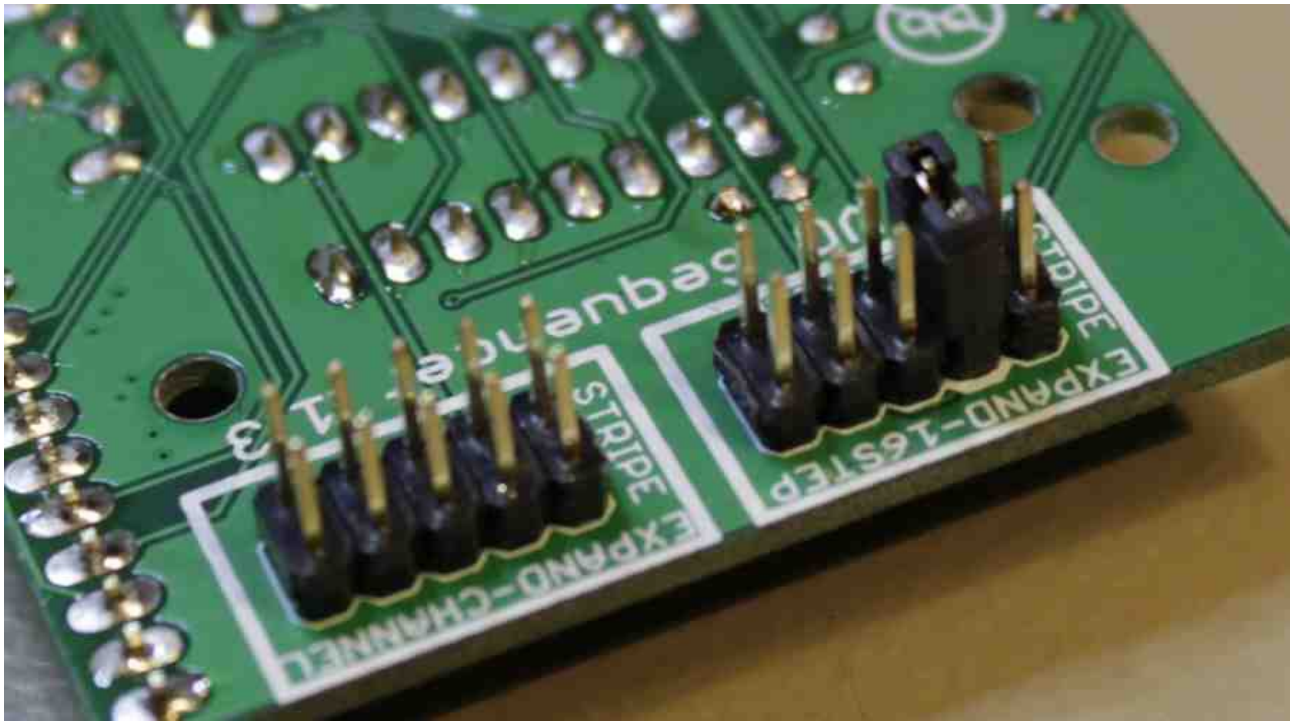


Carefully flip the module-part over and adjust the position of the LEDs using your hands.

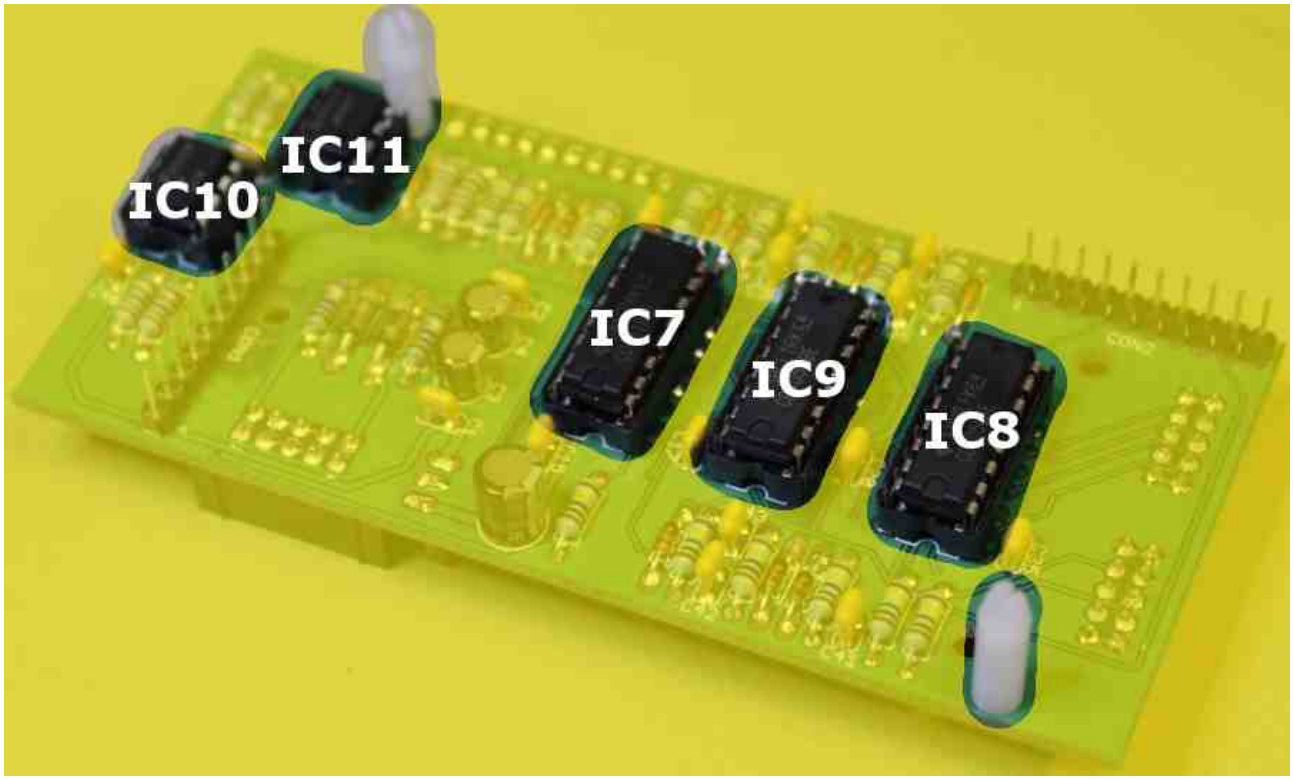


Solder the LEDs, jacks and switch. Be careful when soldering the LEDs close to the ICs although they shouldn't be more sensitive than the transistors.

Step 24
Now go back to PCB2. Mount the jumper on the EXPAND-16STEP header if you aren't going to attach an expander there.

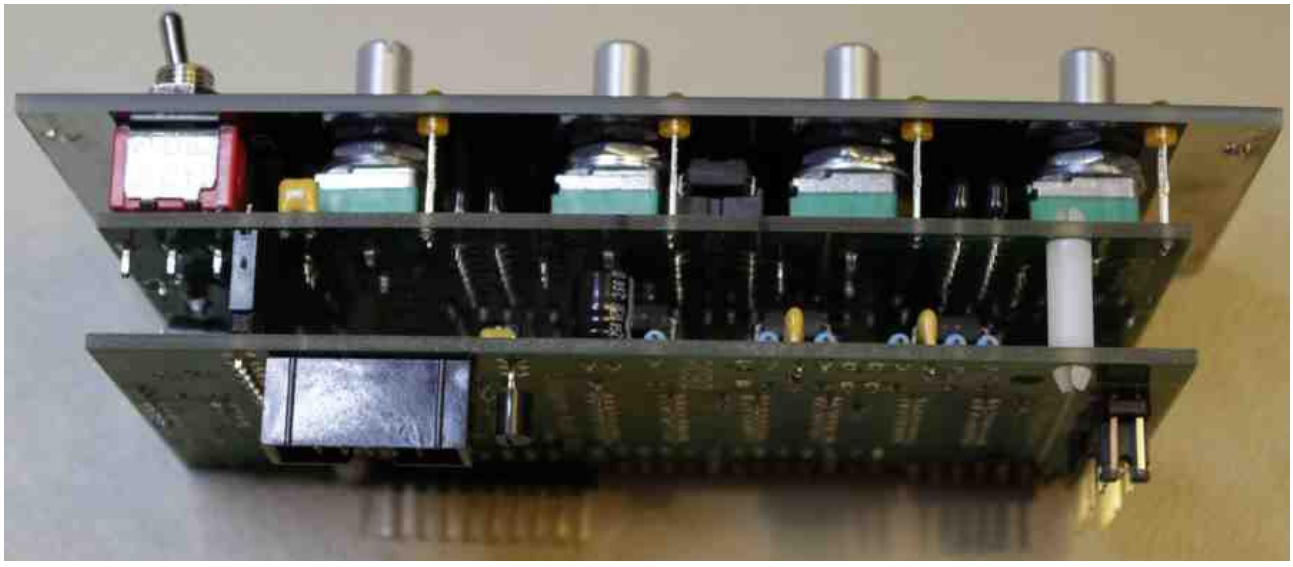


Step 25
Mount the ICs in the sockets of PCB2 and also add the nylon spacers shown in the picture below.

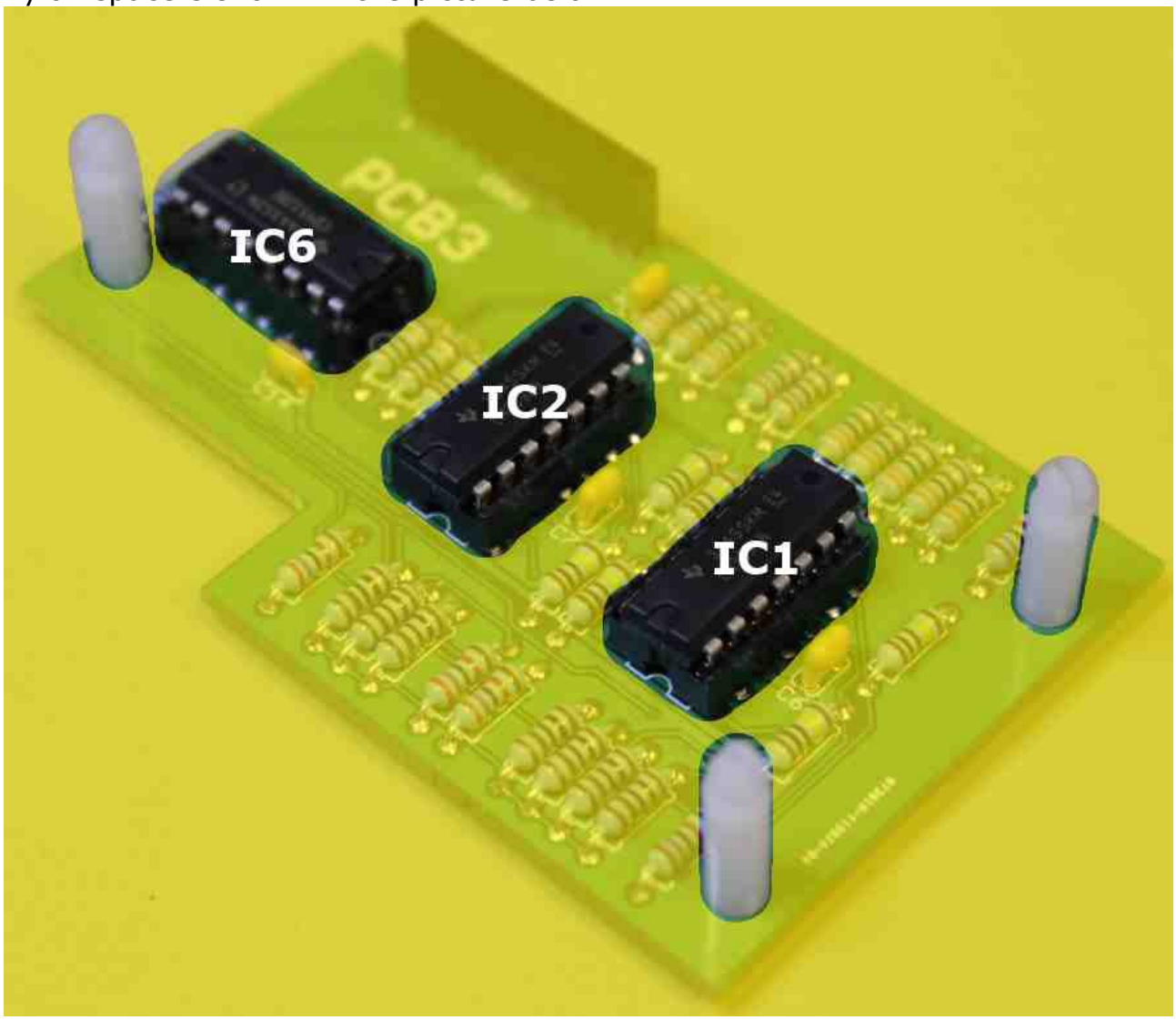


IC7 *CD4516*
IC8 *CD4050*
IC9 *CD4051*
IC10 *LM393*
IC11 *LT1013*

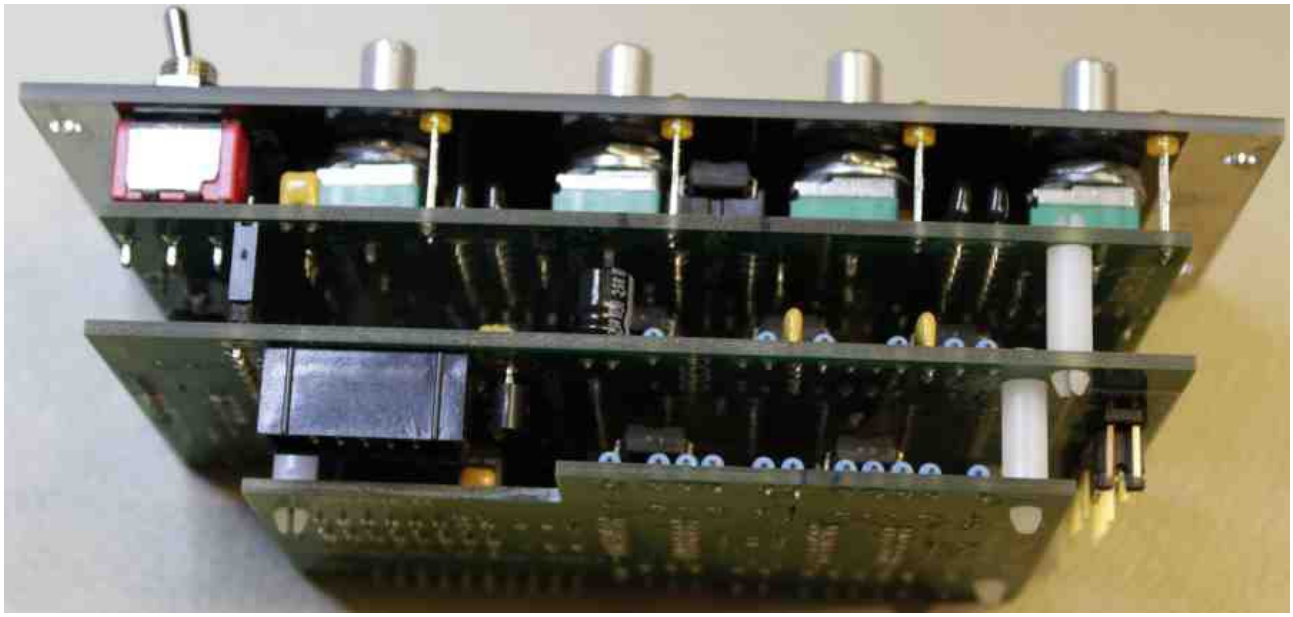
And connect PCB1 & PCB2 together.



Step 26
Now bring out PCB3. Mount the ICs in the sockets of PCB3 and also add the nylon spacers shown in the picture below.

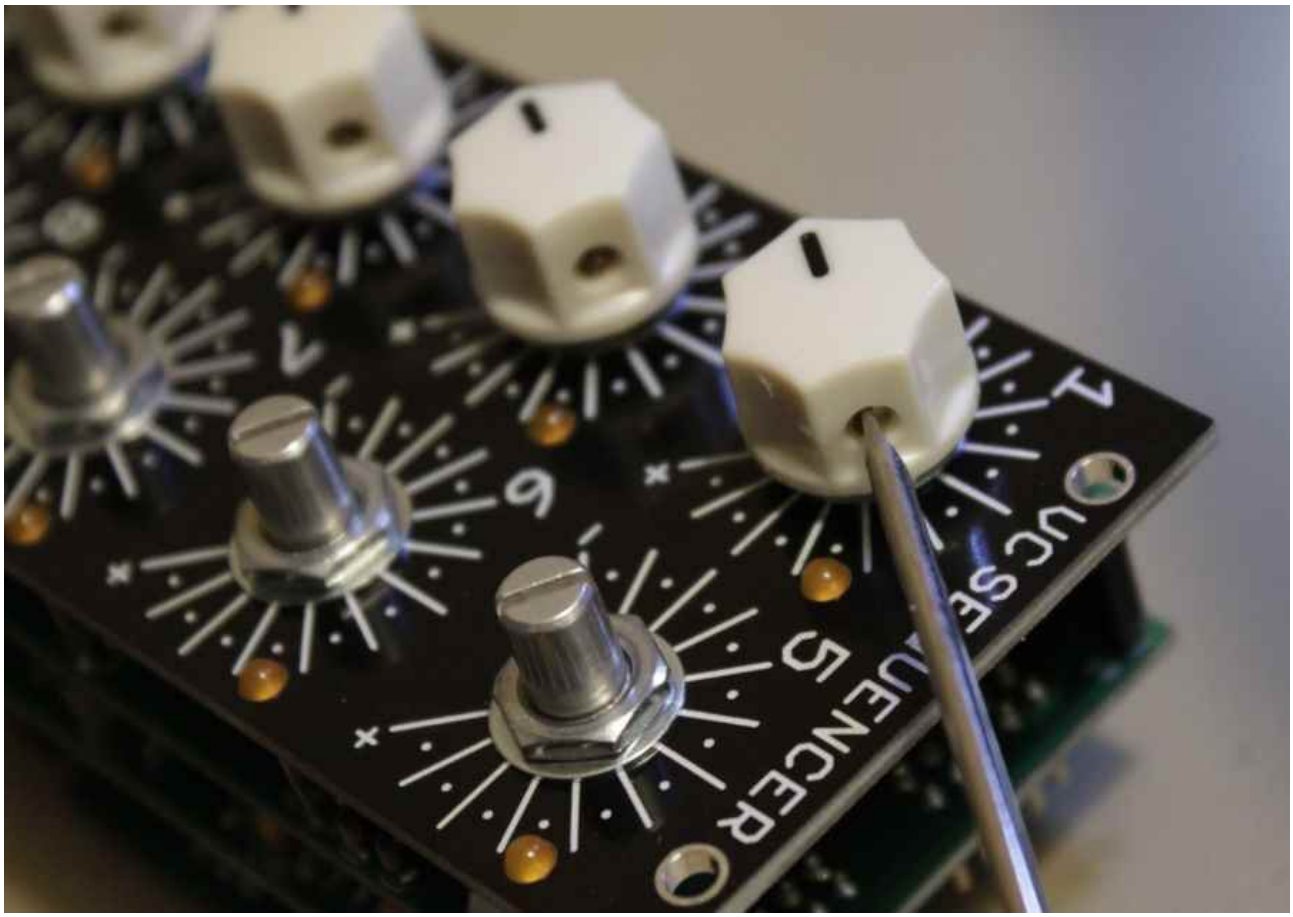


IC1, IC2 *LM339*
IC6 *CD4532*

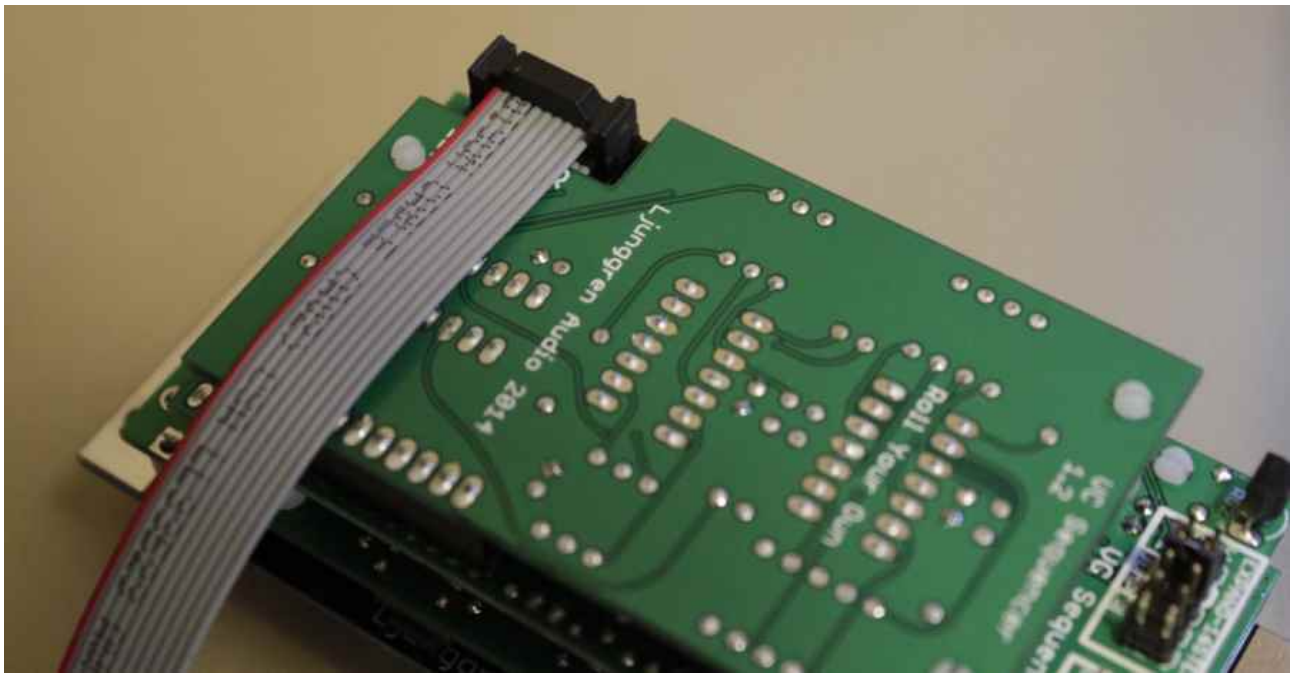


And connect PCB3 on the back of the module.

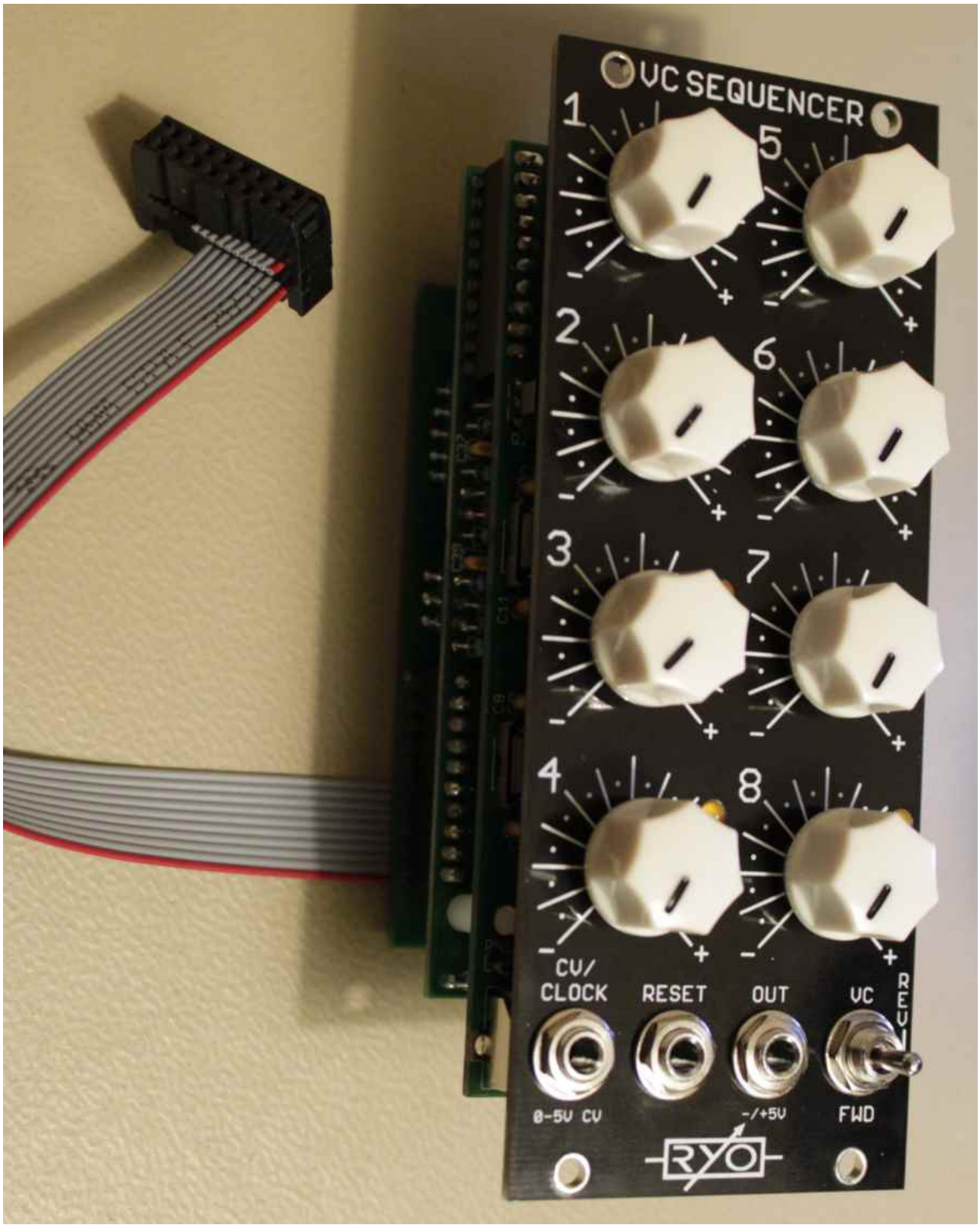
Step 27
Mount the knobs.



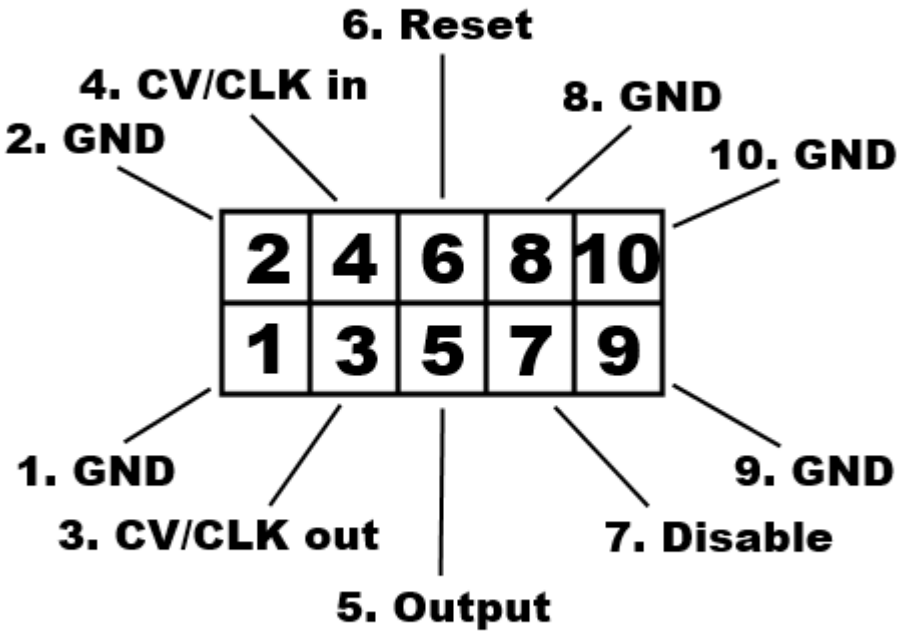
Step 28
Attach the power cable. Make sure the stripe indicating pin 1 is on the same side as -12V.



Finished module!



EXPAND-16STEP



EXPAND-CHANNEL