Dynamics

Build Guide

Dannysound

1 Introduction

The Dannysound Dynamics was originally designed to process drums but like most processing devices, it can be used for a wide variety of applications.

The module comprises of:

- Compressor / Expander
- Sub Bass Enhancer
- 3 Band Inductor-based EQ
- Harmonic Exciter

The compressor/expander section uses a discreet transistor-based circuit that allows for soft clipping when overdriven.

The envelope detector is known as a feed forward type of circuit; taking it's input from the signal before it goes to the compressor rather than after. This type of circuit is known for having fast attack times.

The Sub Bass enhancer has its own compression circuit that "ducks" the initial transient. This allows the sub bass to be increased without increasing the overall level.

There is a MIX control to allow the unprocessed signal to be mixed back in with the processed signal.

The 3 band EQ is an inductor based design. After trying out various EQ topologies this was the design that sounded the nicest. When overdriven it gives a nice "bite" to the sound and it has a certain characterful charm that's hard to put into words. The controls have a response that are subtle to begin with and get more pronounced as the controls are increased.

The Harmonic Exciter adds a little distortion to the high frequencies which bring out the sparkle of cymbals or the snap snare drums. The operating band width can be switched between Low (snare drum snap) or High (Cymbals sparkle).

There are inputs for side chaining and control with an external envelope as well as an envelope out to make the envelope detector output available to drive other modules.

It also features separate inputs and outputs for the Compressor/Expander and EQ sections, so they could be used as 2 separate modules.

Features:

- Compressor / Expander
- Sub Bass Enhancer
- 3 Band Inductor-based EQ
- Harmonic Exciter

Controls:

Compression/Expansion
Initial Offset
Attack
Release
Sub Bass
Amplifier Drive
Input Level
Mix

Switches:

1 x Sub bass enhancer boost
1 x Dynamics bypass
1 x Exciter frequency band

Connections:

Inputs
1 x Audio input
1 x Side Chain input
1 x Envelope input
1 x EQ section input (normalled to Compressor / Expander output)

Output
1 x Compressor / Expander section output (normalled to EQ input)
1 x Envelope detector output
1 x EQ section output

Width
12 HP

Depth
45mm (Internal depth measured from panel)

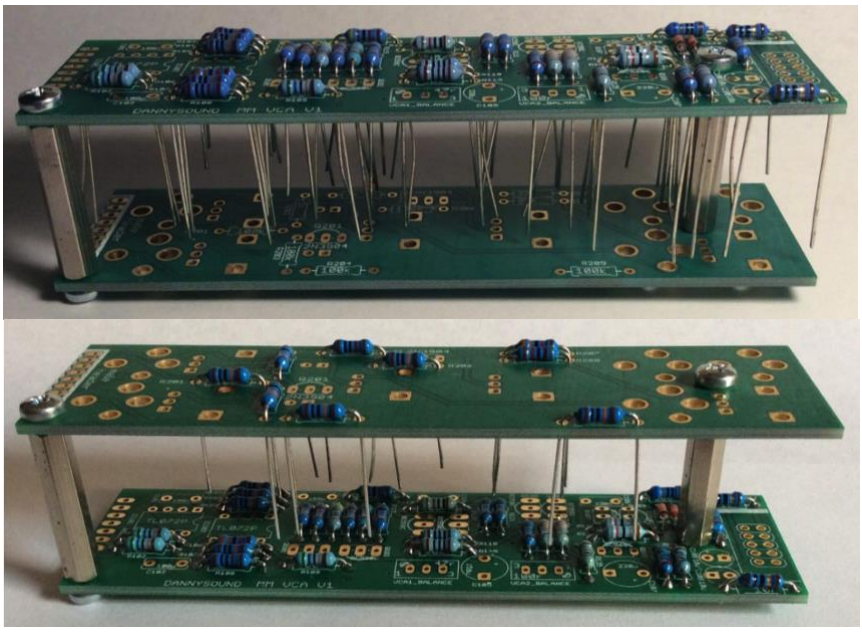
Current
+12 = 85mA
-12 = 61mA

2 Construction Tips

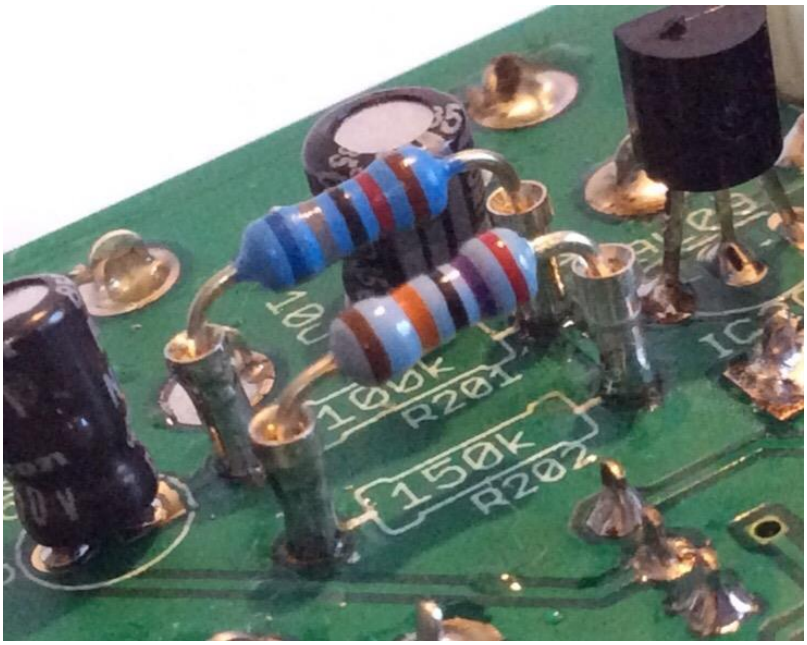
These tools come in very handy, especially if you do a lot of DIY projects. They should be available from most electronics hobbyist stores.

The blue bending gauge is for bending the resistor and diode legs to the right size.
The black IC straightener is for straightening pins of op-amps etc.
The silver standoffs are 25mm Female to Female.

You can use this setup with the 25mm standoffs for inserting the resistors and diodes.



The top picture is for stuffing the Outer Board. It has the advantage of being much quicker to place all the resistors etc and it's easy to fix any mistakes. You can then solder everything from the top in one go (make sure you have decent temp. solder iron with not too fat tip!). Then unscrew the standoffs and clip all the legs. Reverse both boards as in the lower picture for the Pots Board.



Cutting the pins from a SIL connector and soldering as shown above is useful for experimenting with different component values if you want to try out any of the modificatio

3 Parts Lists

DYNAMICS OUTER PARTS LIST

RESISTORS		
10r	2	R140 R141
220r	1	R126
470r	1	R110
560r	2	R105 R106
820r	1	R118
1k	1	R139
4k7	1	R123
5k1	2	R124 R125
8k2	1	R104
10k	7	R127 R130 R132 R133 R134 R137 R138
47k	1	R131
51k	1	R122
68k	1	R112
91k	2	R135 R136
100k	13	R101 R102 R103 R109 R111 R114 R115 R116 R117 R119 R120 R128 R129
220k	2	R108 R113
330k	1	R121
470k	1	R107

CAPS		
220p 2.5mm pitch ceramic	1	C116
10n MKT polyester box - 5mm pitch leads	1	C120
22n MKT polyester box - 5mm pitch leads	1	C110
47n MKT polyester box - 5mm pitch leads	1	C117
100n MKT polyester box - 5mm pitch leads	1	C102 C103 C104 C107 C108 C109 C112 C113 C115 C121 C122 C123
680n MKT polyester box - 5mm pitch leads	1	C114
1u MKT polyester box - 5mm pitch leads	3	C101 C106 C119
10u electrolytic	4	C105 C111 C118 C124

DIODES		
BAT42	1	D106
1N4148	6	D101 D102 D103 D104 D105 D107

OPAMPS		
TL072	1	IC101
TL074	2	IC102 IC103

DIL SOCKETS	
8 PIN	1
14 PIN	2

TRANSISTORS			
2N3904	2	Q102 Q103	MATCHED PAIR
2N3904	4	Q101 Q104 Q105 Q106	

HEADERS	
1 X 3 FEMALE	2
1 X 5 FEMALE	1
1 X 7 FEMALE	1
Shrouded 2 x 3 power socket	1
Shrouded 2 x 5 power socket	1

DYNAMICS MID PARTS LIST

RESISTORS		
470r	2	R203 R208
560r	2	R213 R215
820r	1	R204
1k	1	R242
1k8	1	R211
2k7	4	R237 R244 R245 R246
4k7	1	R218
5k1	2	R210 R212
10k	11	R205 R206 R207 R219 R221 R229 R230 R233 R236 R241 R243
15k	2	R225 R228
27k	2	R231 R232
33k	1	R202
39k	2	R209 R226
82k	4	R222 R223 R224 R238
100k	6	R214 R216 R217 R234 R239 R240
180k	2	R220 R235
220k	1	R227
560k	1	R201

CAPS		
22p 2.5mm pitch ceramic	2	C215 C216
220p 2.5mm pitch ceramic	2	C208 C209
2n2 MKT polyester box - 5mm pitch leads	2	C210 C211
100n MKT polyester box - 5mm pitch leads	6	C202 C203 C212 C213 C214 C217
470n MKT polyester box - 5mm pitch leads	1	C207
1u electrolytic	3	C201 C204 C205
10u electrolytic	1	C206

DIODES		
1N4148	2	D201 D202

OPAMPS		
LM4562	1	IC205
TL072	1	IC203
TL074	3	IC201 IC202 IC204

DIL SOCKETS	
8 PIN	2
14 PIN	3

TRANSISTORS			
2N3904	2	Q202 Q203	MATCHED PAIR
2N3904	1	Q201	

HEADERS	
1 X 3 MALE	2
1 X 5 MALE	1
1 X 7 MALE	1
1 X 6 FEMALE	2
1 X 4 FEMALE	2
1 X 11 FEMALE	1

DYNAMICS POTS PARTS LIST		

RESISTORS		
47r	1	R305
100r	1	R307
150r	1	R311
470r	1	R303
1k	1	R308
10k	2	R306 R312
33k	1	R304
47k	2	R301 R302
100k	1	R310
150k	1	R313
560k	1	R309

CAPS		
15n MKT polyester box - 5mm pitch leads	1	C304
33n MKT polyester box - 5mm pitch leads	1	C301
1u MKT polyester box - 5mm pitch leads	2	C302 C303

INDUCTORS		
1H	1	L303
22mH	1	L302
10mH	1	L301

TALL TRIMMERS		
5k LIN	1	MIX
100k LIN	2	AMP_DRIVE SUB
100kA LOG	1	INPUT_GAIN

ALPHA POTS		
100k LIN	1	INIT_LEVEL
25k LIN	1	ATTACK
1M LOG	1	RELEASE
10k LOG	1	EXCITER
10k LIN CENTRE DETENT	3	TREBLE MIDDLE BASS
100k LIN CENTRE DETENT	1	COMP/EXP

LED		
AMBER 3MM	1	

TRANSISTORS		

2N3904	1	Q301

SOCKETS		
PJ301	7	

PUSH SWITCH		
TL2201 LATCHING	3	BYPASS SUB_BOOST XTR_BAND

HEADERS	
1 X 6 MALE	2
1 X 4 MALE	2
1 X 11 MALE	1

DYNAMICS HARDWARE

STANDOFFS	
M3 MALE-FEMALE 11MM	4
M3 FEMALE 11MM	4

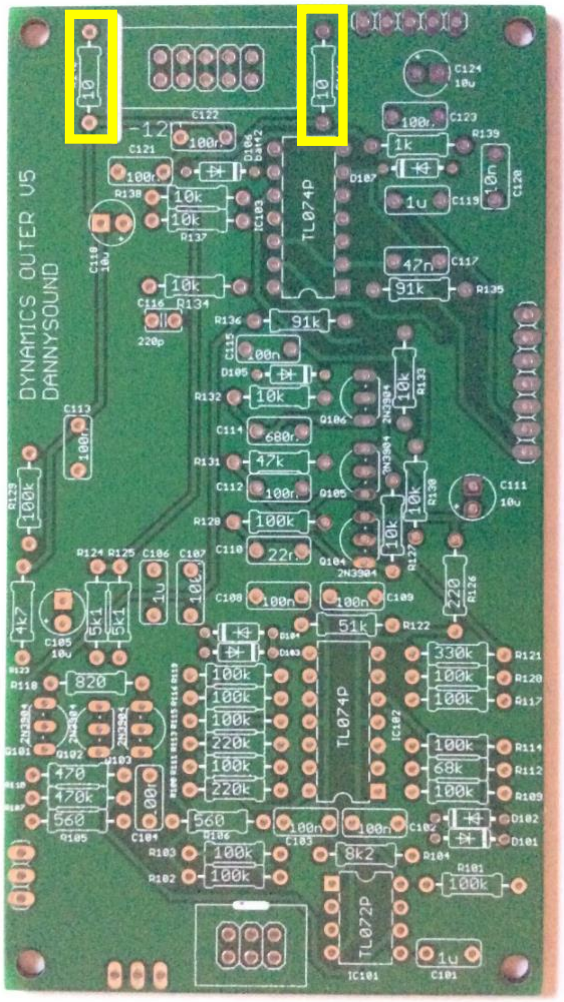
SCREWS	
M3	8

KNOBS	
ROGAN SMALL WHITE	4
ROGAN SMALL BLACK	4
WHITE BUTTON	2
RED BUTTON	1

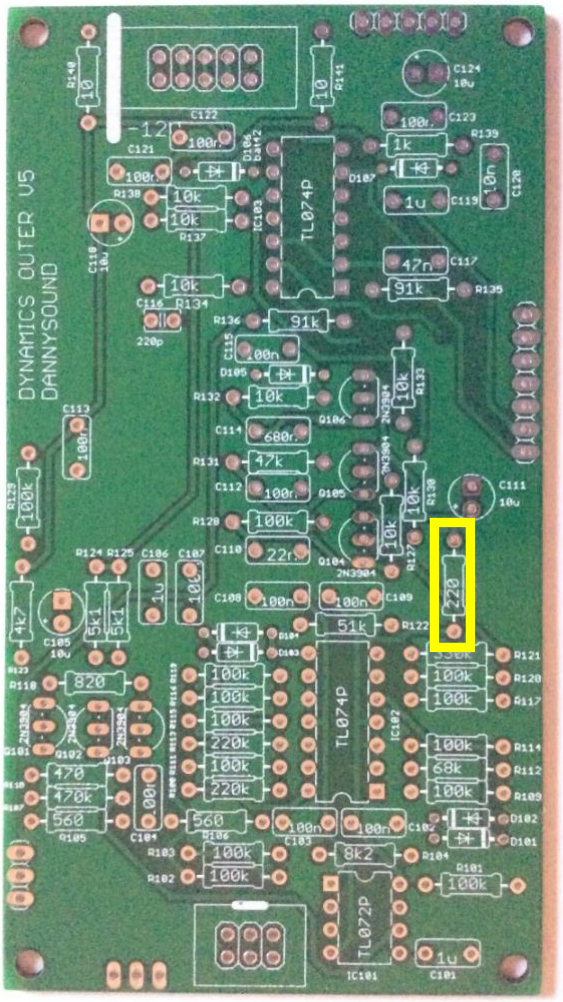
LIGHTPIPES	
5mm	1

4 Outer Board

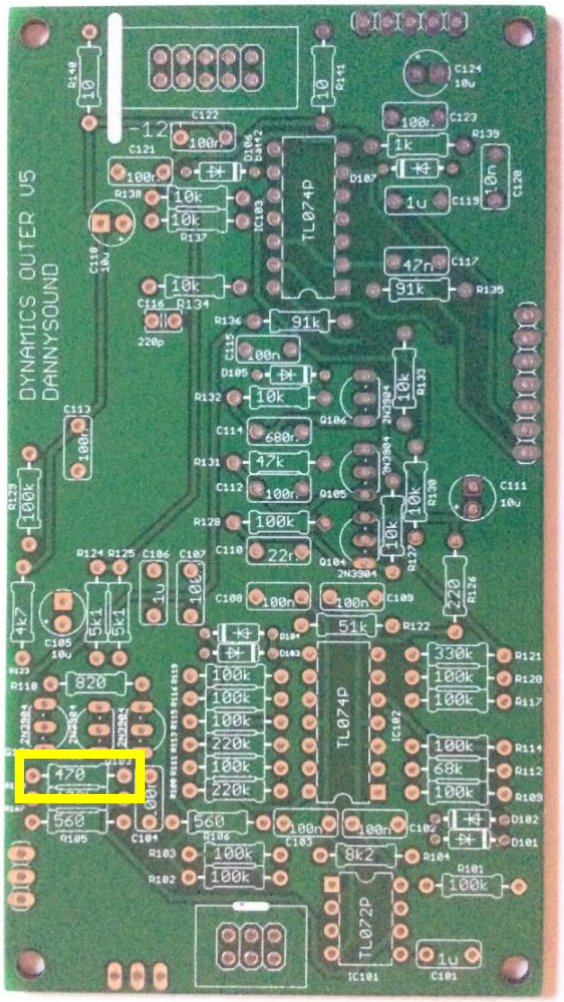
DIODES and RESISTORS



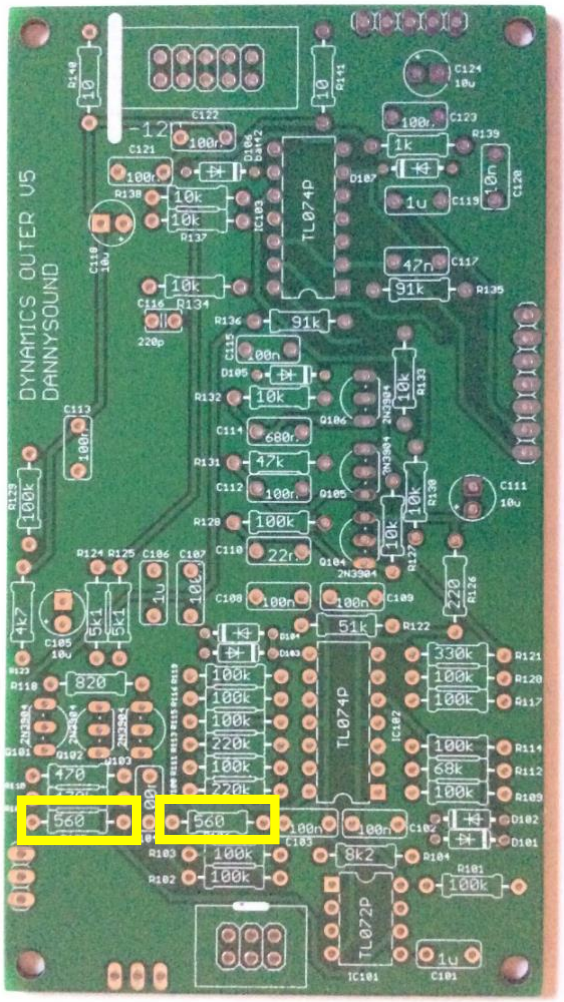
1) – 2 x 10r (R140, R141)



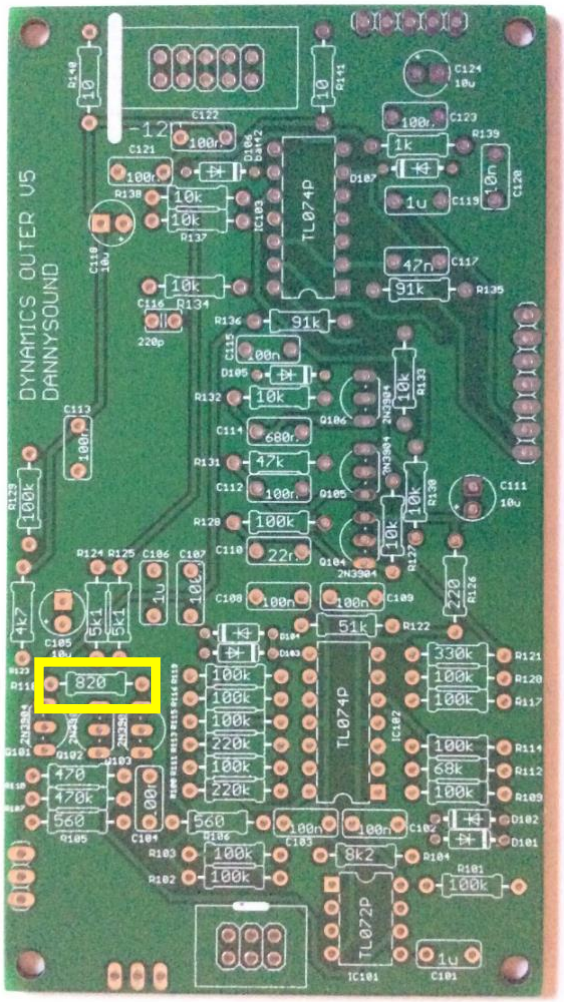
2) – 1 x 220r (R126)



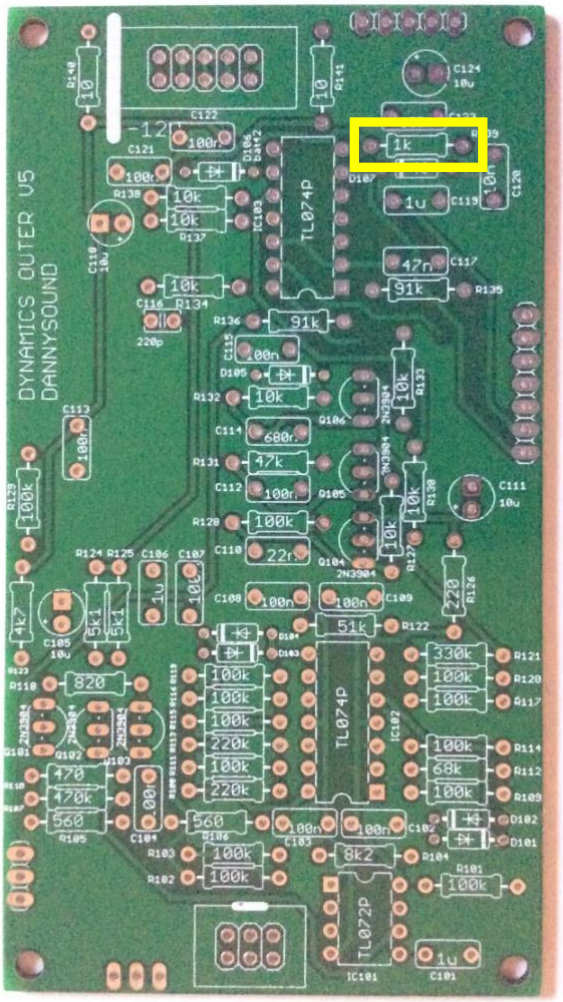
3) – 1 x 470r (R110)



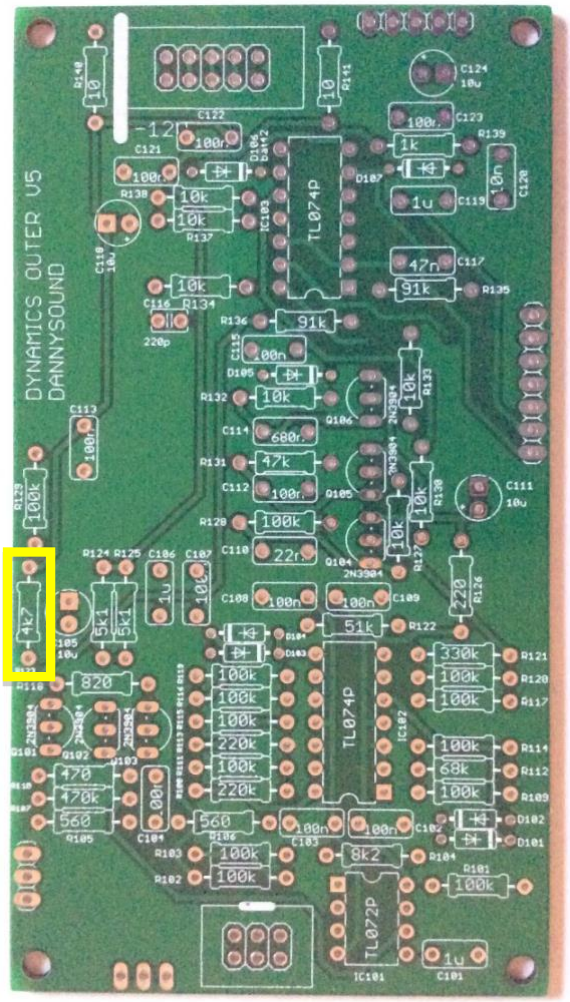
4) – 2 x 560r (R105, R106)



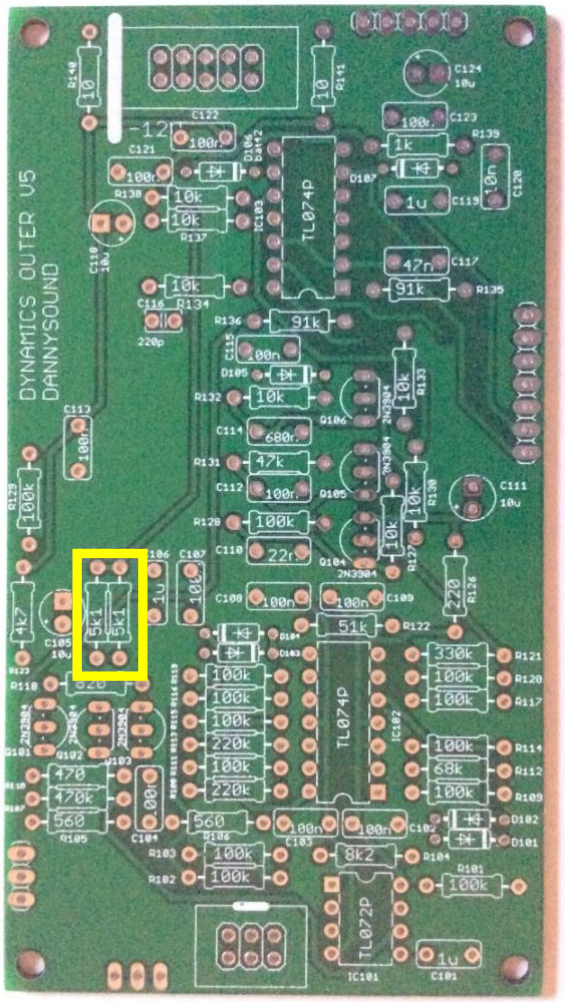
5) – 1 x 820r (R118)



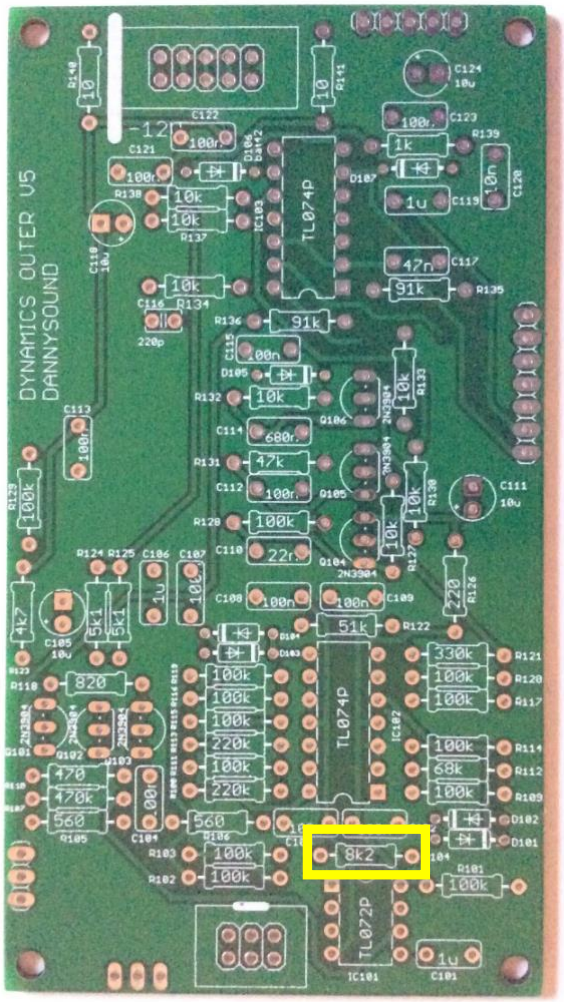
6) – 1 x 1k (R139)



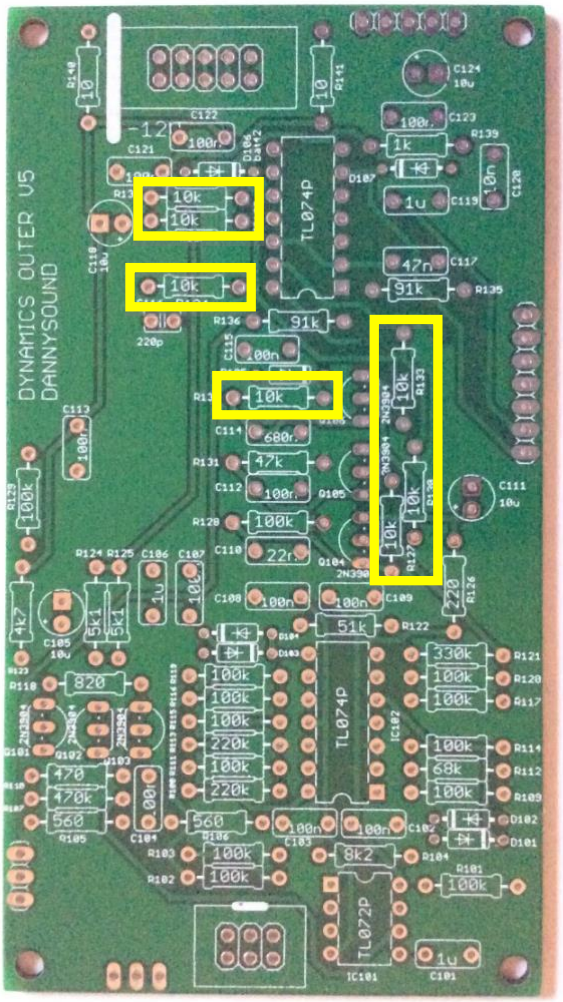
7) – 1 x 4k7 (R123)



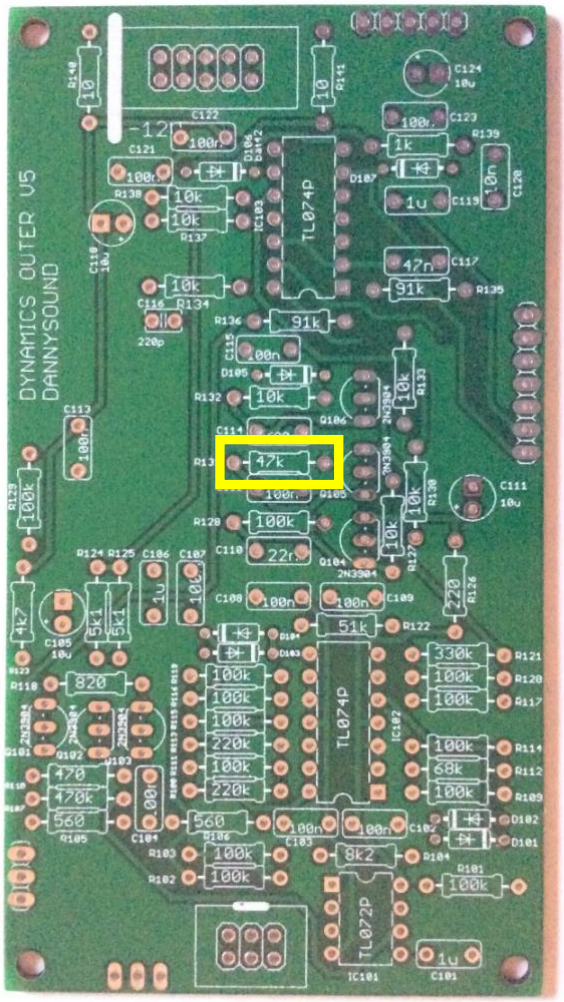
8) – 2 x 5k1 (R124, R125)



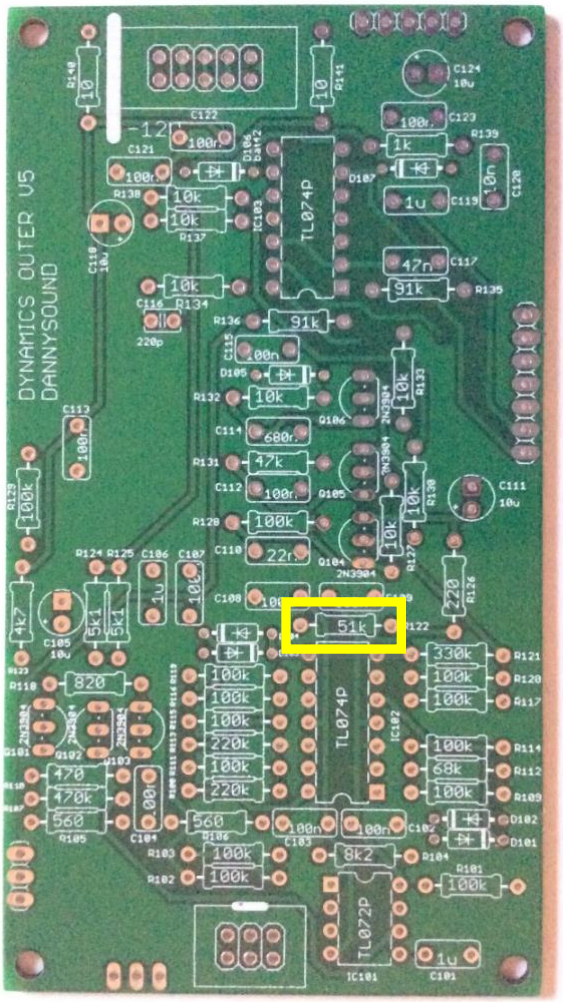
9) – 1 x 8k2 (R104)



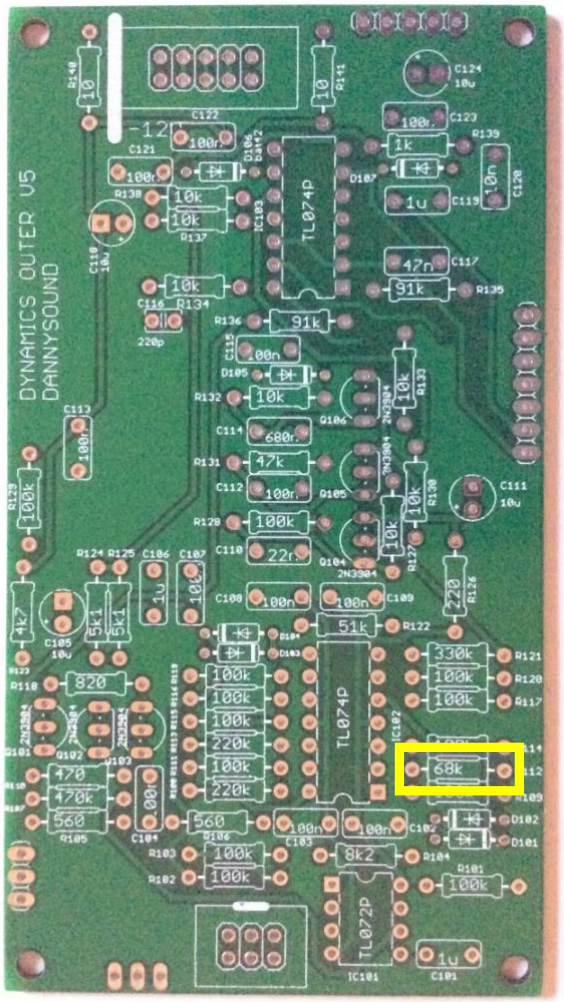
10) – 7 x 10k (R127, R130, R132, R133, R134, R137, R138)



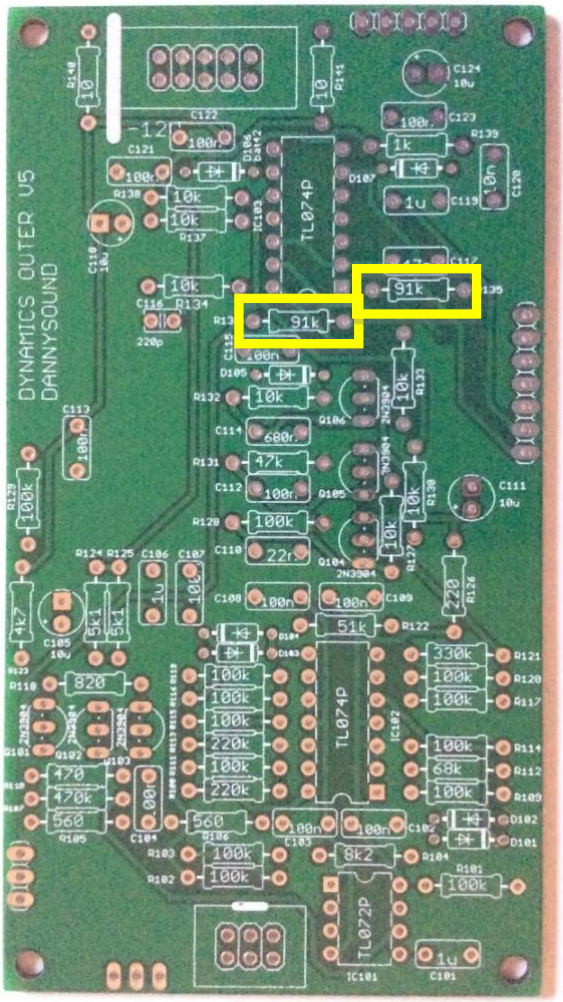
11) – 1 x 47k (R131)



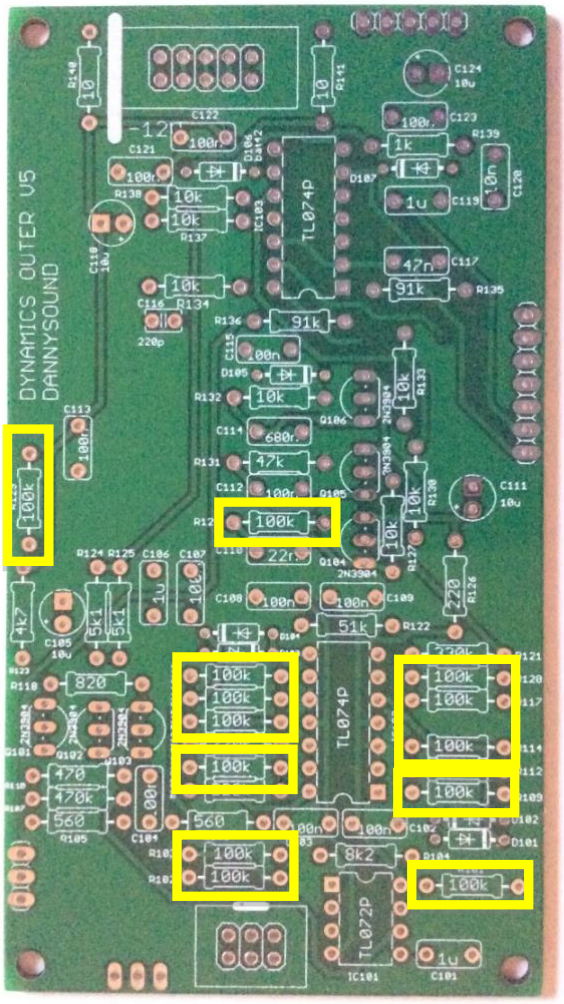
12) – 1 x 51k (R122)



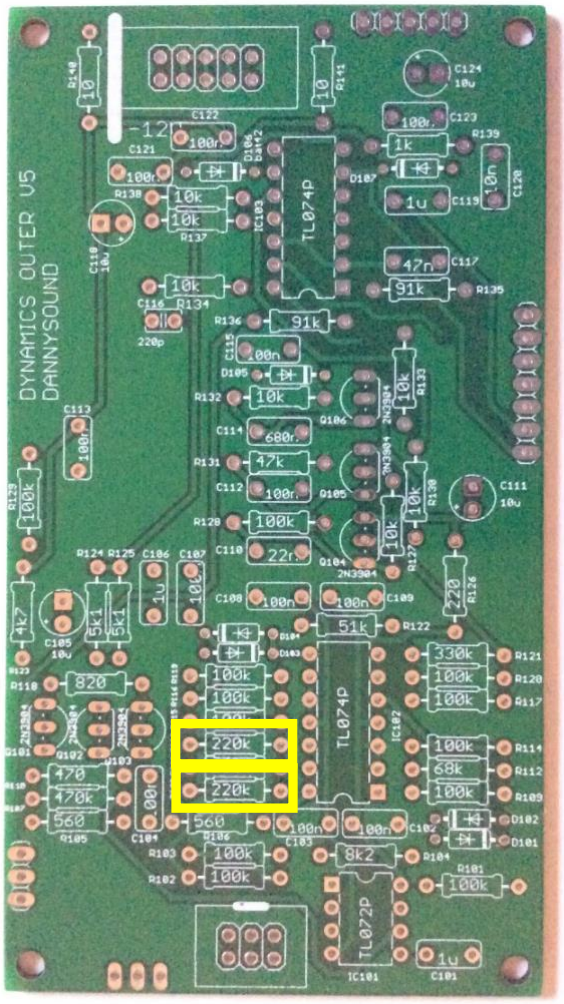
13) – 1 x 68k (R112)



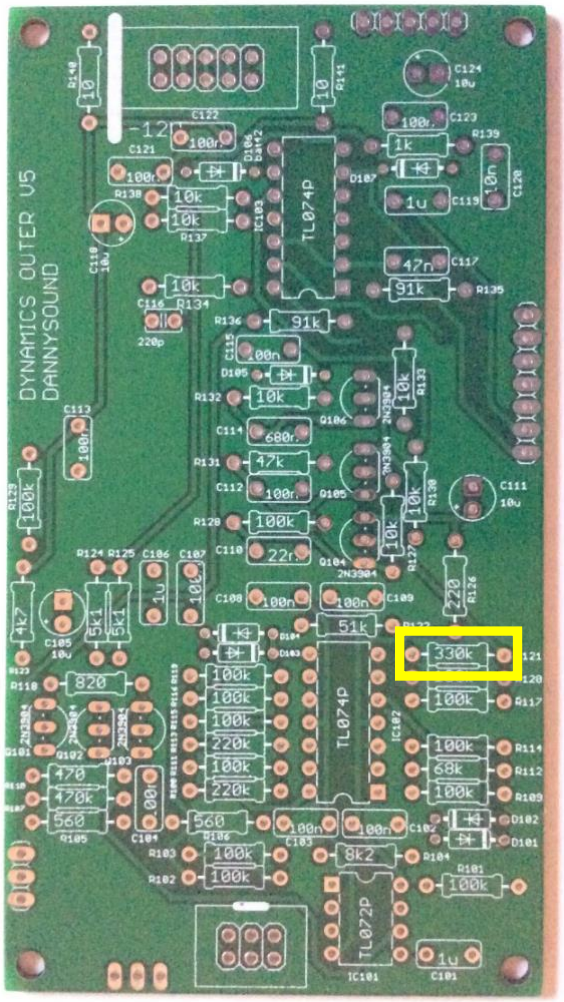
14) – 2 x 91k (R135, R136)



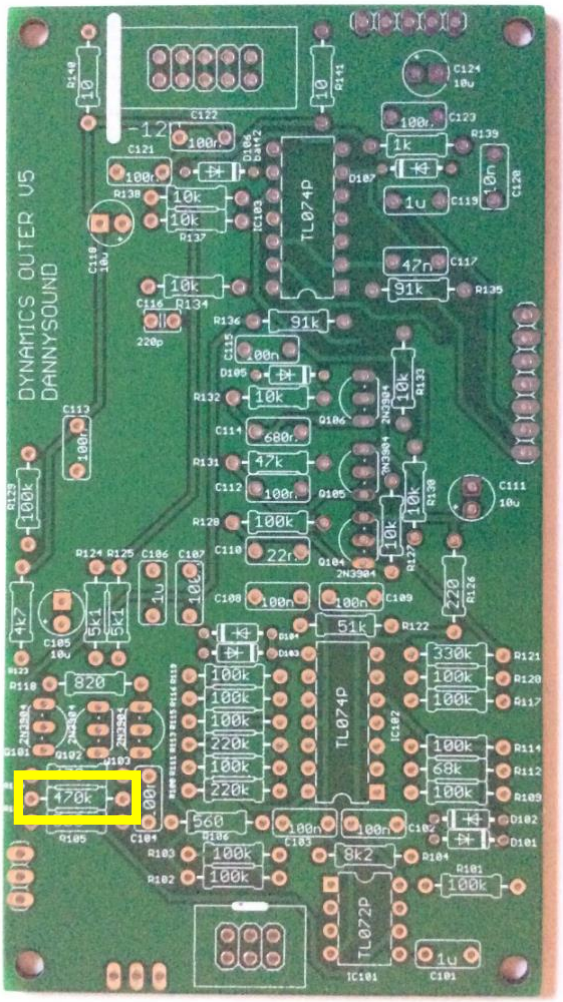
15) – 13 x 100k
(R101, R102, R103, R109, R111, R114, R115, R116, R117, R119, R120, R128, R129)



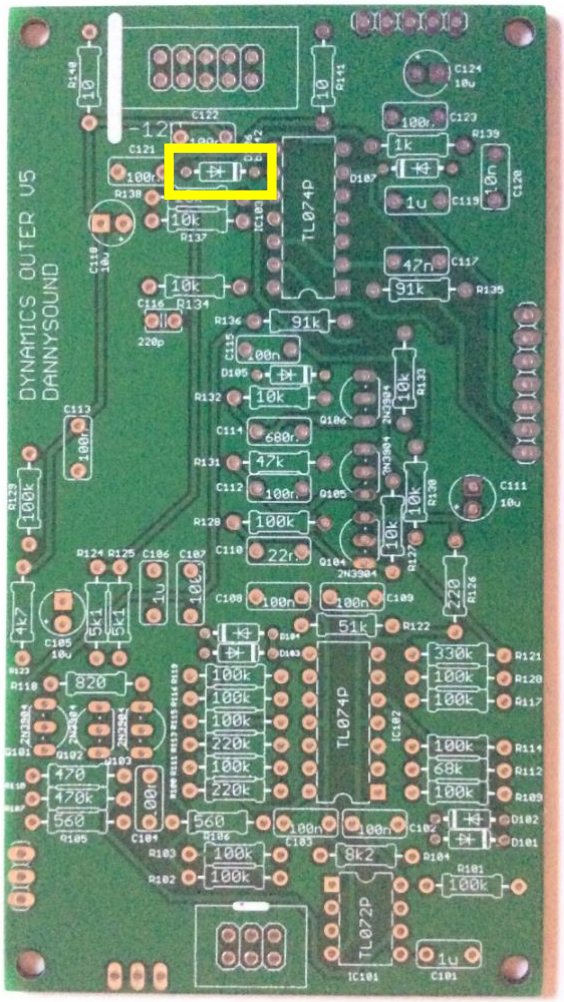
16) – 2 x 220k (R108, R1130



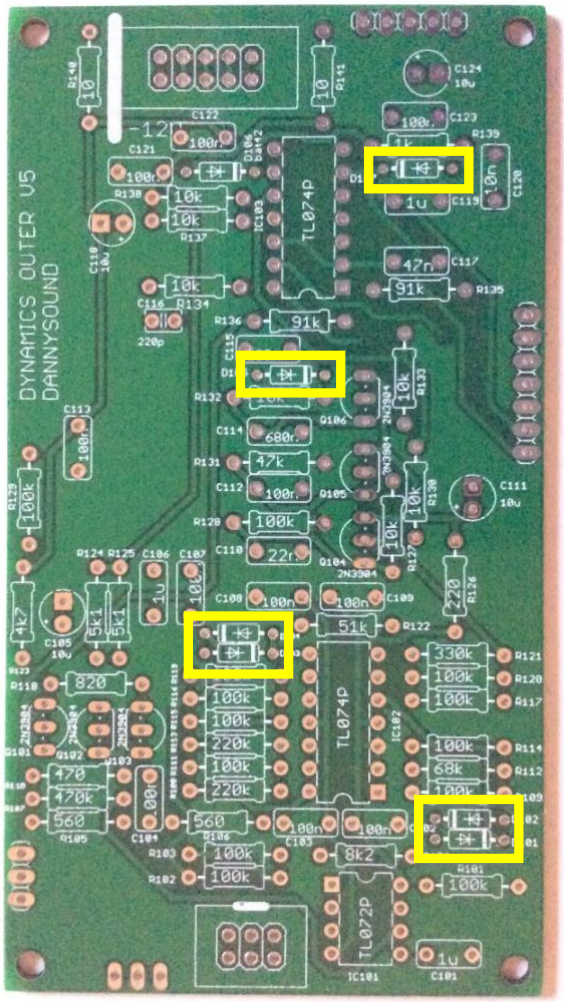
17) – 1 x 330k (R121)



18) – 1 x 470k (R107)



19) – 1 x BAT42 DIODE (D106)

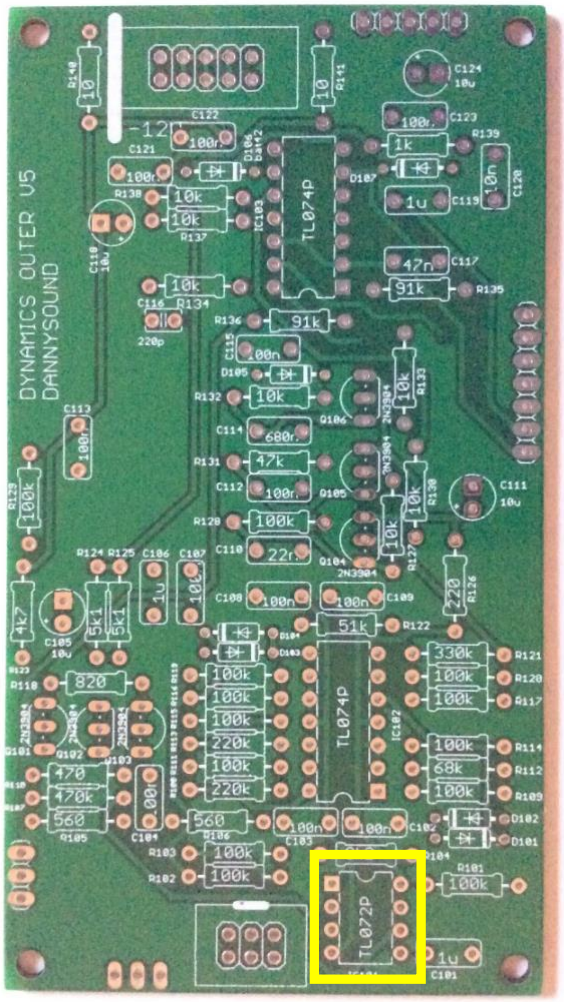


20) – 6 x 1N4148 DIODE
(D101, D102, D103, D104, D105, D107)

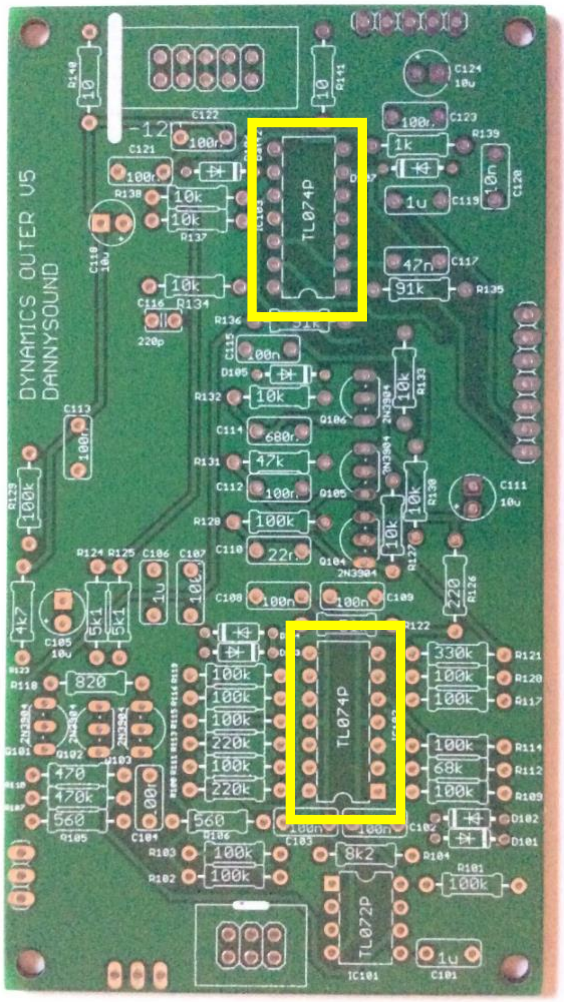
Solder the BAT42 first into D106 (near power header) followed by the 6 x 1N4148

Note: orientation of all diodes is vital - be sure to match the line on the component with that on the PCB silkscreen

IC SOCKETS



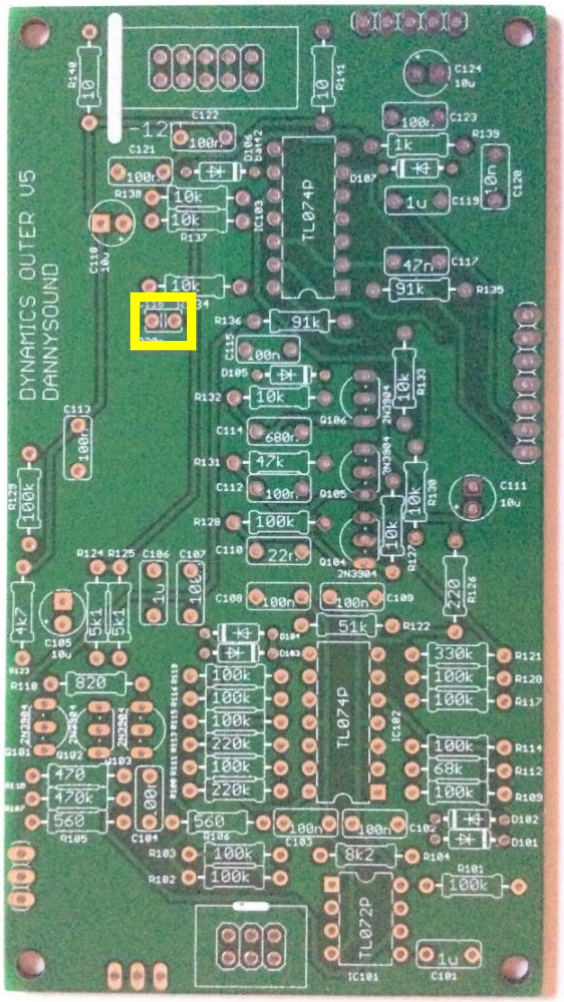
21) – 1 x 8 pin (IC101)



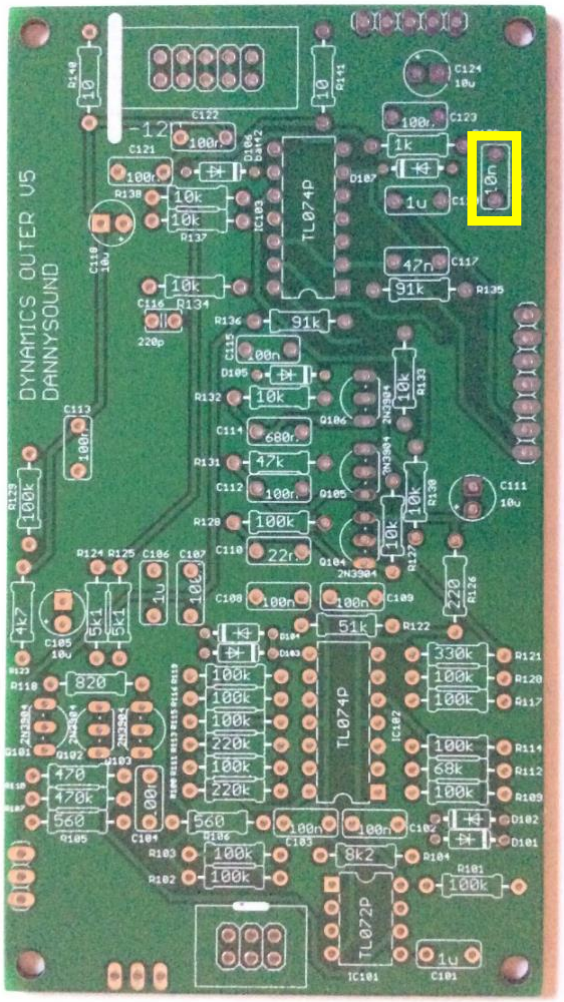
22) – 2 x 14 pin (IC102, IC103)

Note: Mind orientation – match the notch on each socket with the notch on the PCB silkscreen.

CAPS

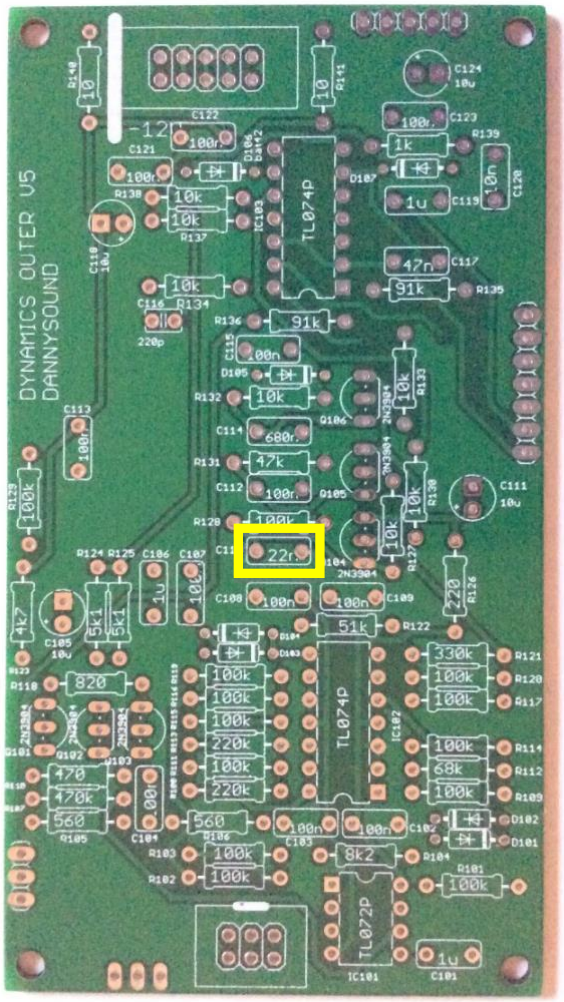


23) – 1 x 220p ceramic (C116)

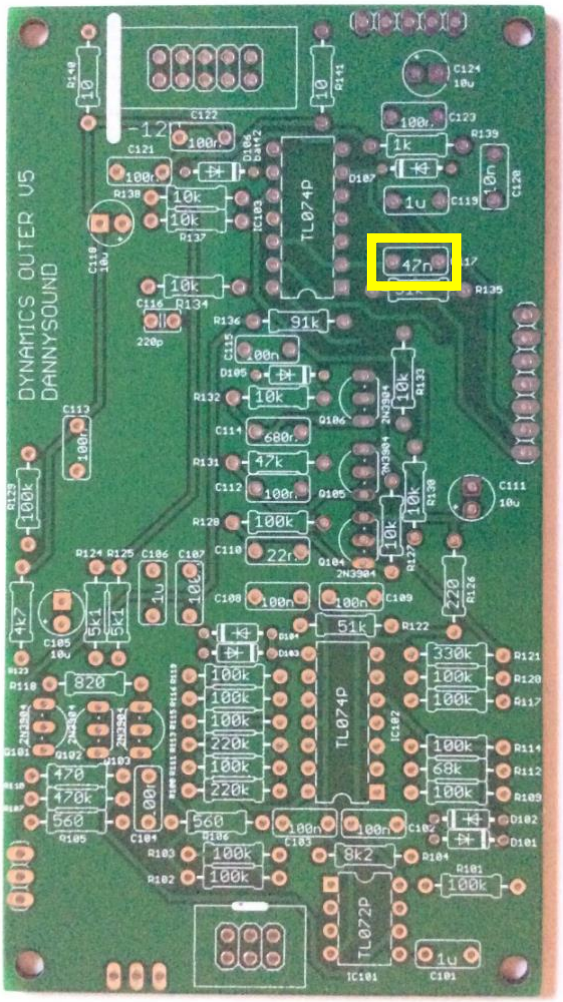


24) – 1 x 10n film (C120)

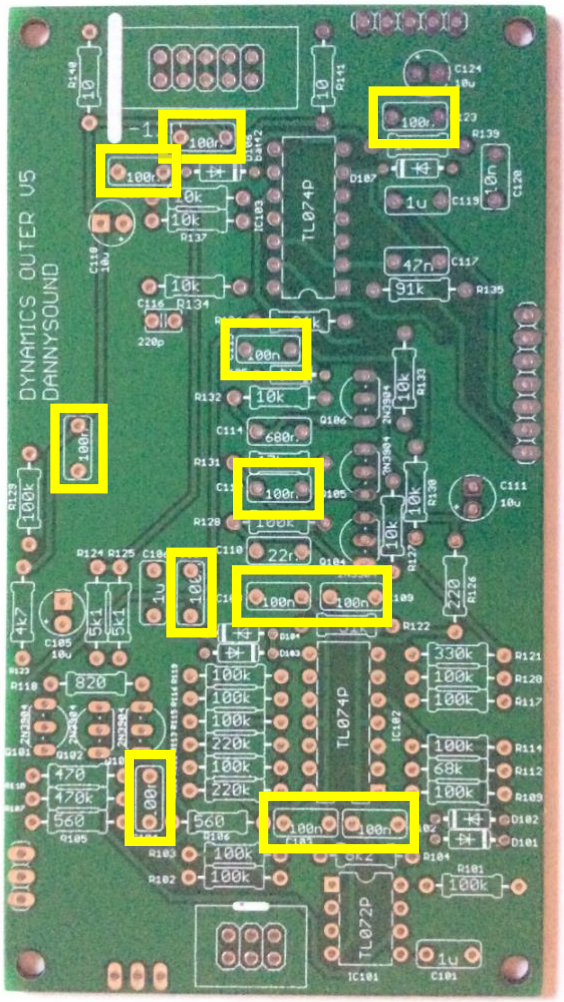
Note: don't confuse the 22p caps with the 220p – read the bag label to identify the correct parts.



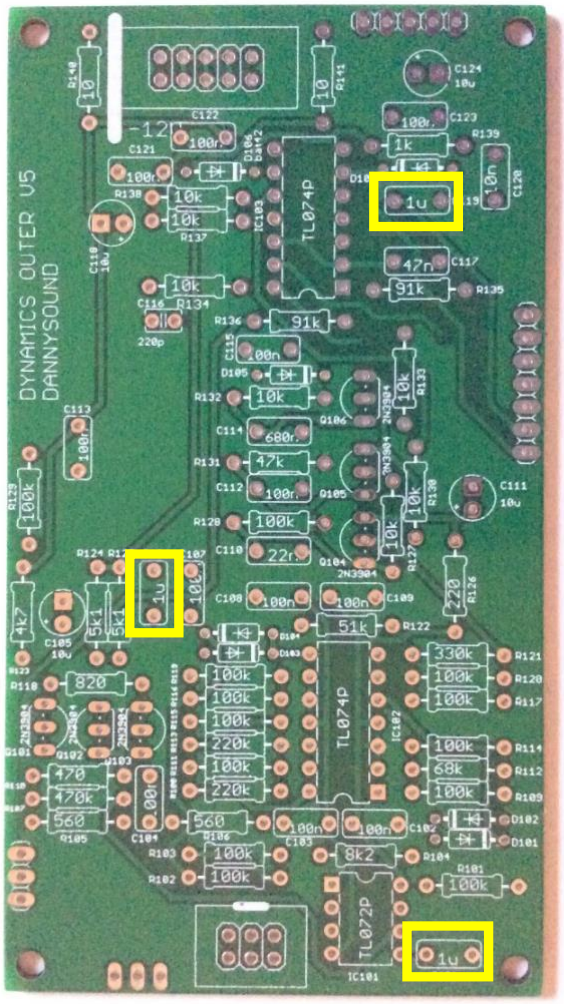
25) – 1 x 22n film (C110)



26) – 1 x 47n film (C117)

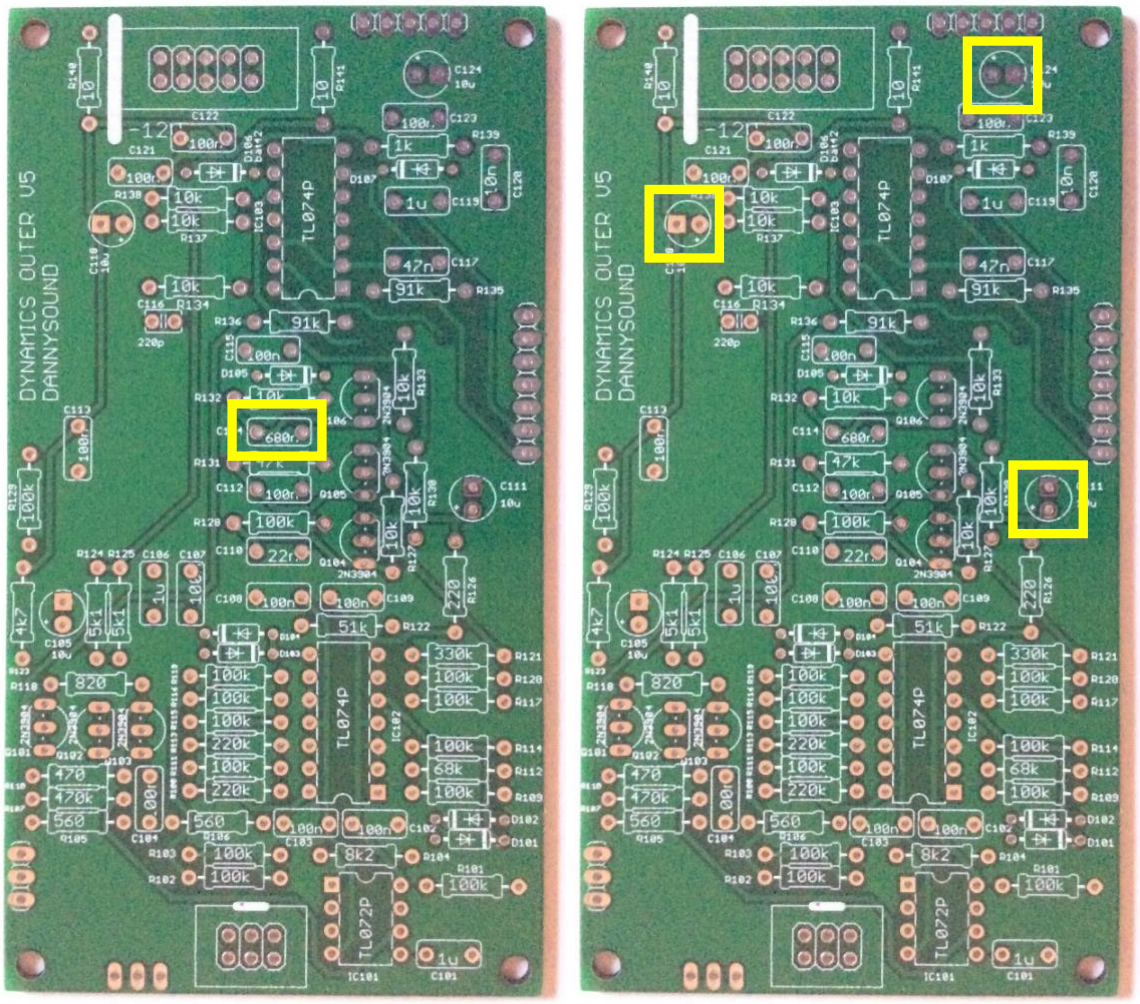


27) – 12 x 100n film
(C102, C103, C104, C107, C108, C109, C112, C113, C115, C121, C122, C123)



28) – 3 x 1u film (C101, C106, C119)

TRANSISTORS

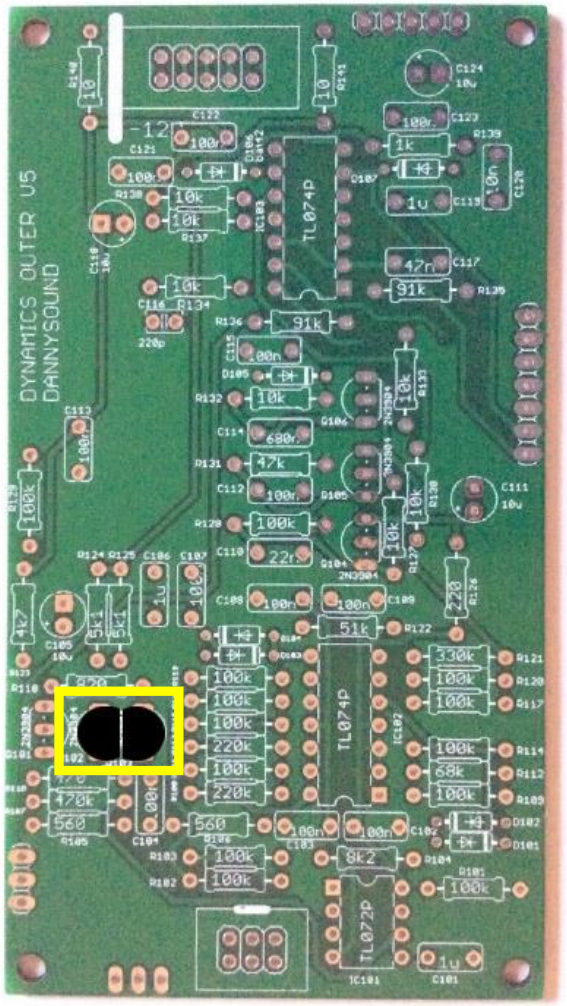


29) – 1 x 680n film (C114)

29) – 4 x 10u electro
(C105, C111, C118, C124)

Note: mind polarity - the negative short lead should go to the square pad on the PCB

TRANSISTORS



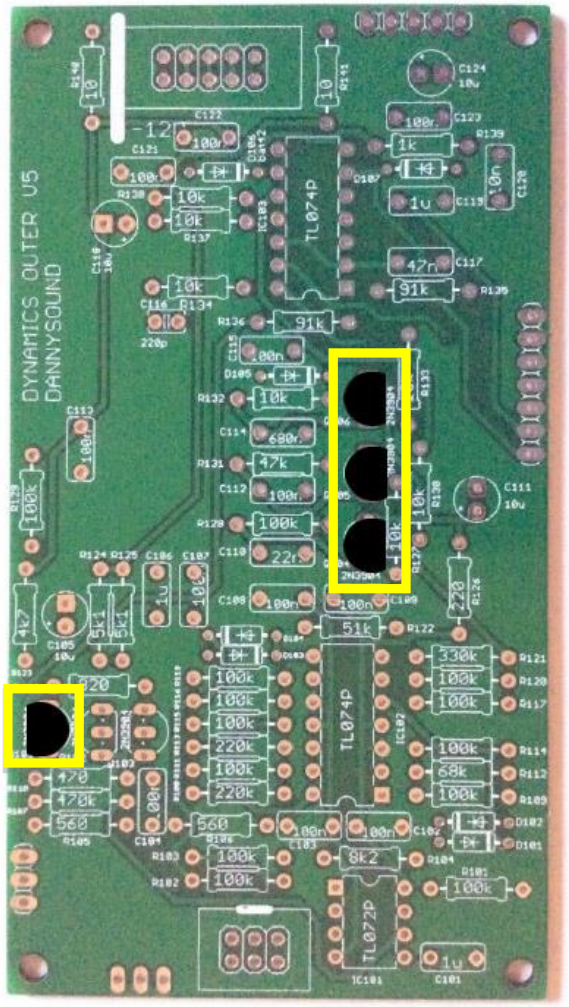
30) – 2 x 2N3904 (MATCHED PAIR) (Q102, Q103)

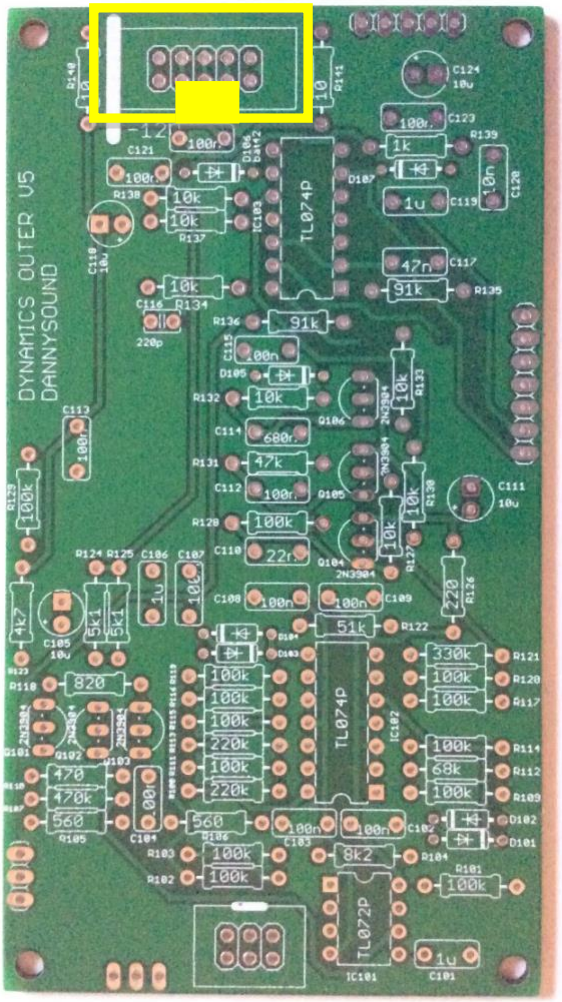
Note: 2N3904 matched pairs are located in the bag which contains the PCBs

--Do not confuse with 6 x unmatched transistor--

Note: mind polarity – match curve of each component with PCB silkscreen)

HEADERS



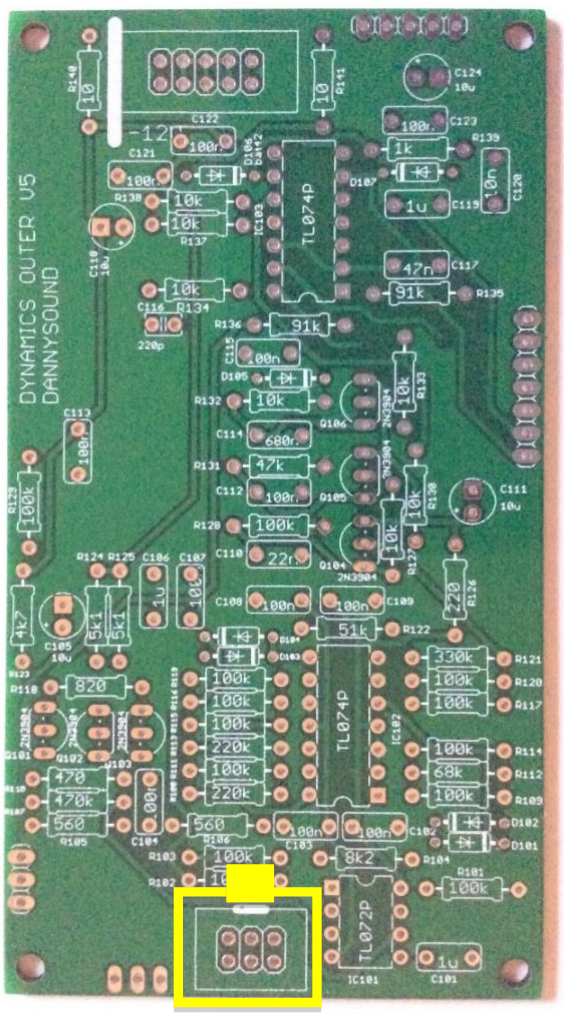


31) – 4 x 2N3904 (NOT MATCHED)
(Q101, Q104, Q105, Q106)

Note: Do not use matched pairs here
Note: mind polarity – match curve of each component with PCB silkscreen)

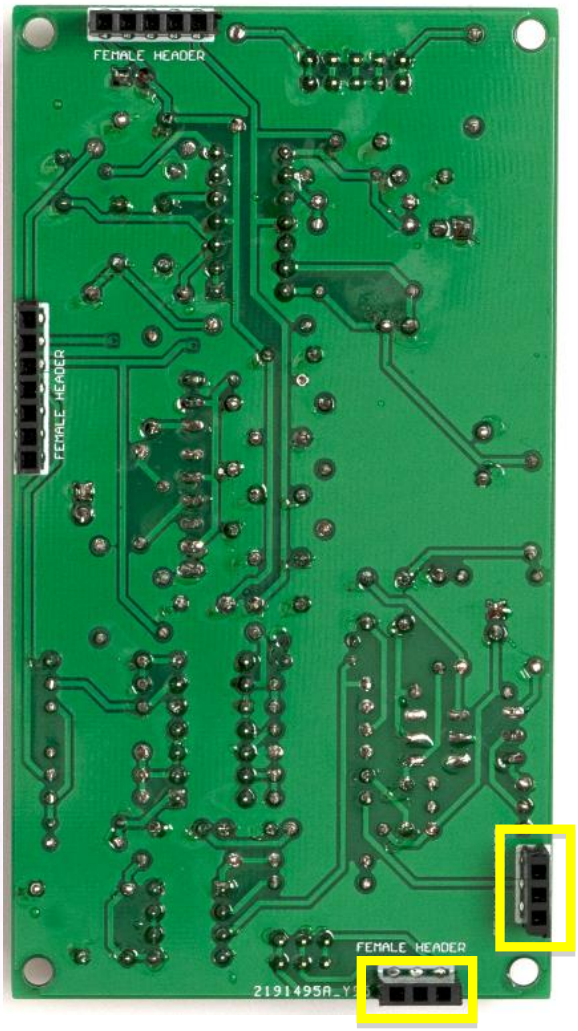
32) – 1 x 2x5 Shrouded Socket

Note: orientation of header is vital! Be sure that the slot faces away from the edge of the PCB as indicated above



33) – 1 x 2x3 Shrouded Socket

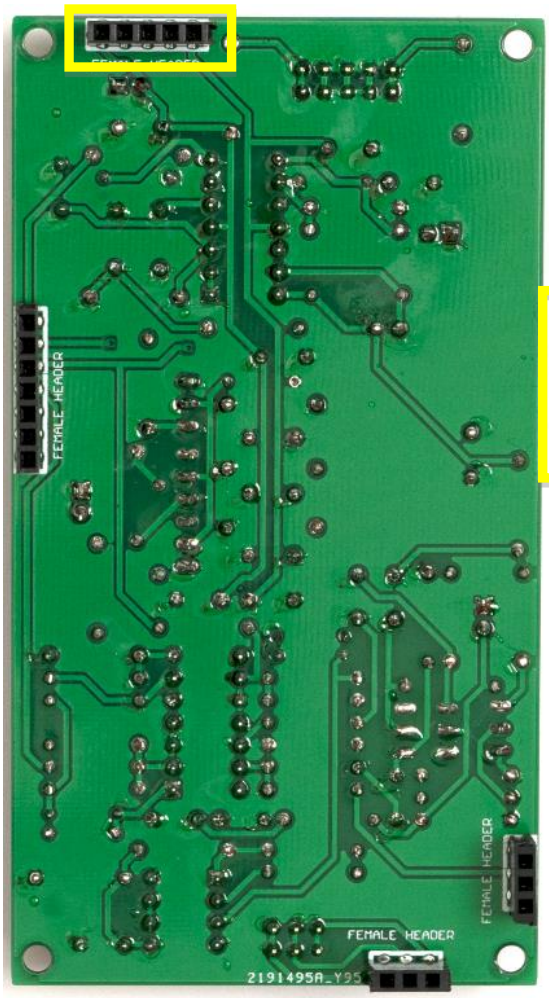
Note: orientation of header is vital! Be sure that the slot faces away from the edge of the PCB as indicated above



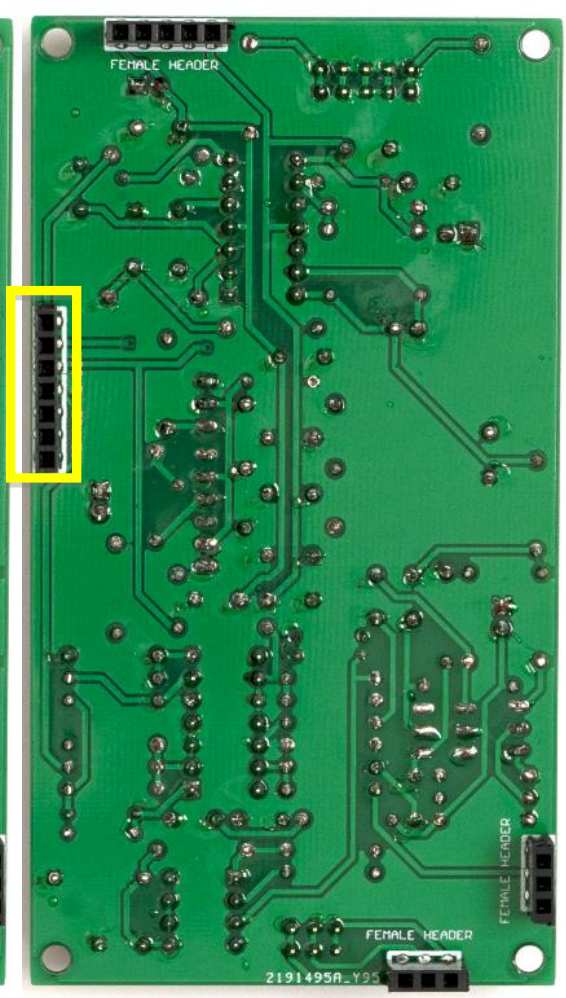
34) – 2 x 3 pin FEMALE headers

Note: the female headers are placed on the opposite side to all other components on this PCB

Remove 1 pin from two of the 4 pin headers to convert them into 3 pin



35) – 1 x 5 pin FEMALE header

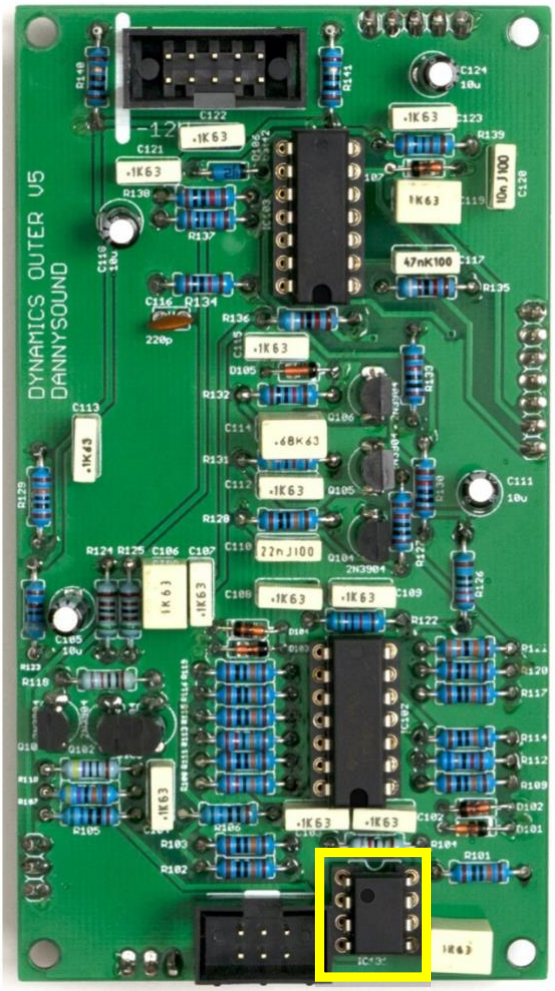


36) – 1 x 7 pin FEMALE header

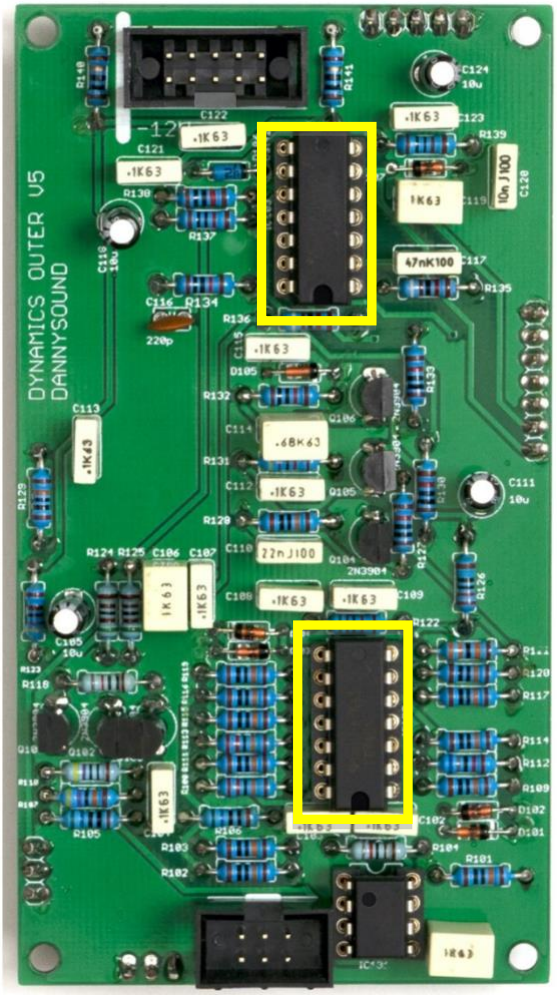
Note: the female headers are placed on the opposite side to all other components on this PCB

Create the 7 pin header by cutting the 20 pin header

ICs

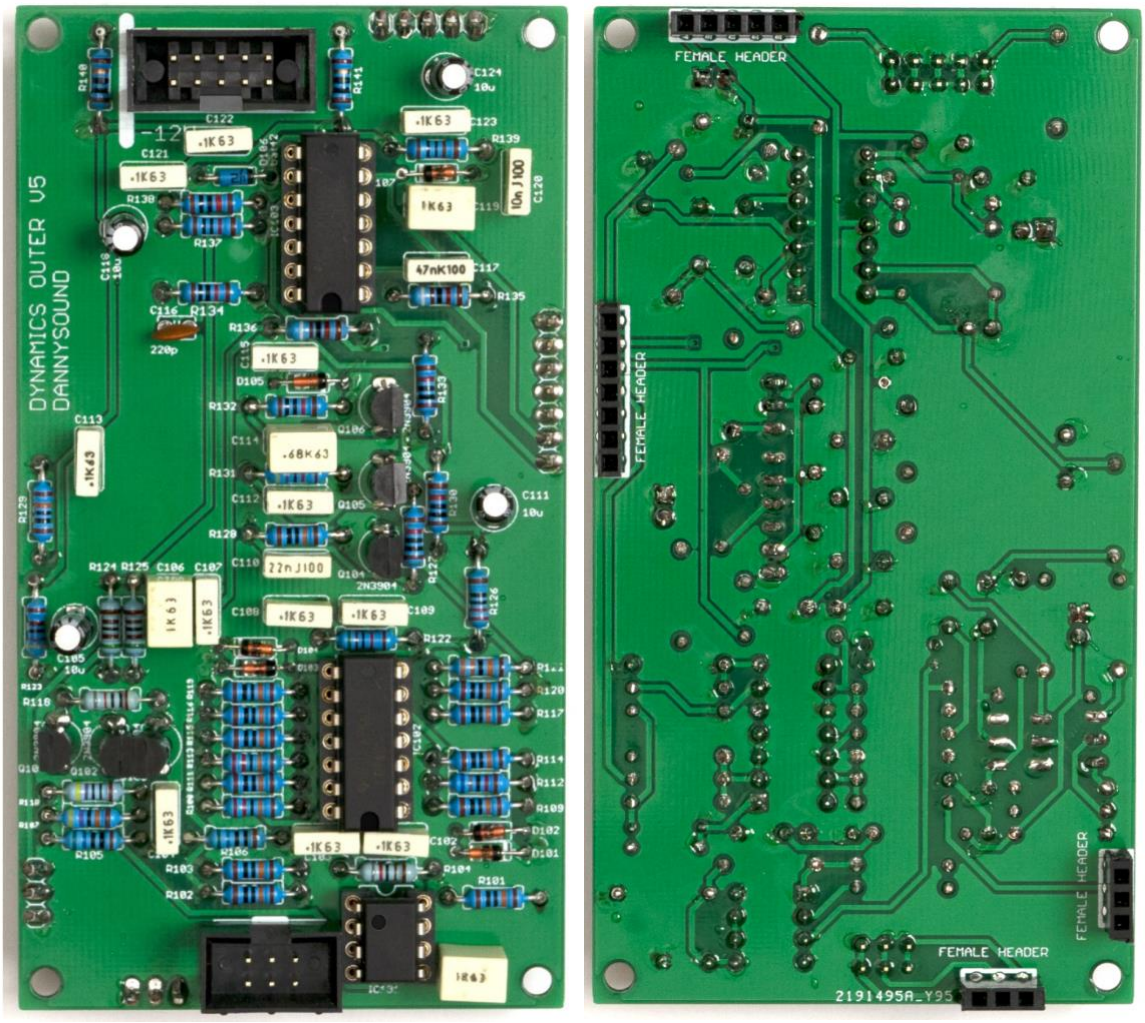


37) – 1 x TL072 (IC101)



38) – 2 x TL074 (IC102, IC103)

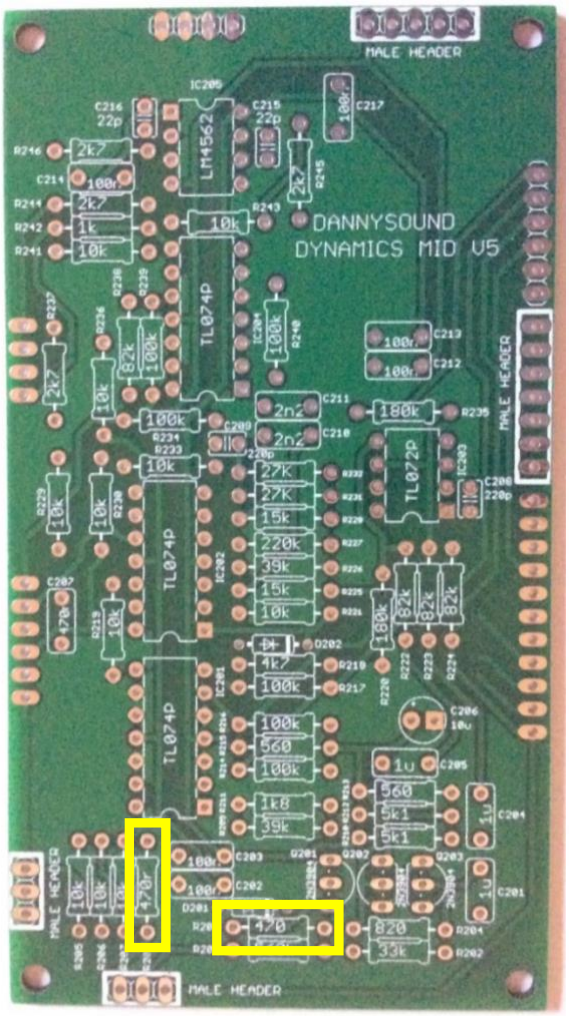
Note: Mind orientation – match notch or dot on each chip with the notch on PCB silkscreen and IC socket as shown above.



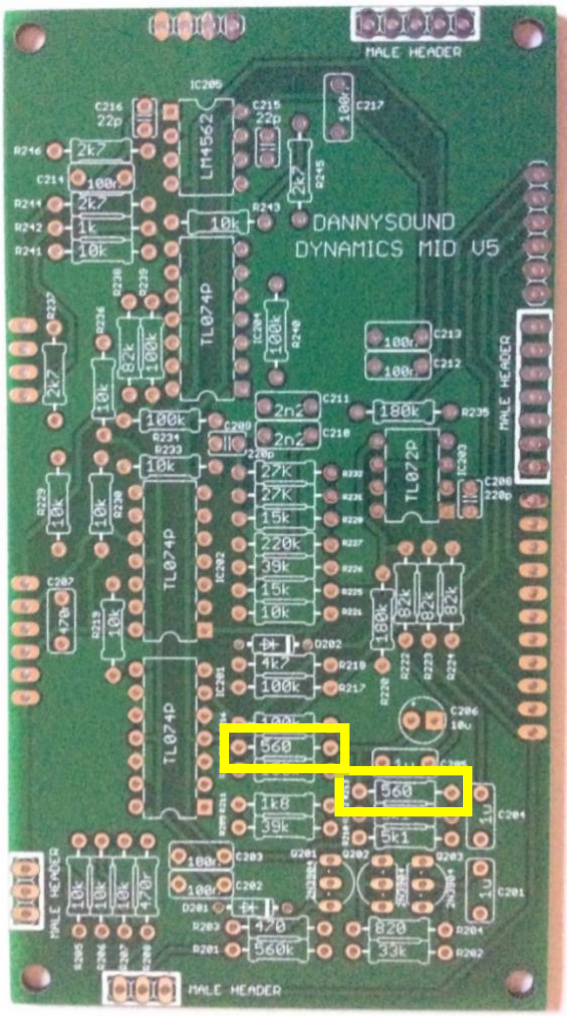
Outer board soldering is now complete! Take a break before continuing ☺

5 Mid Board

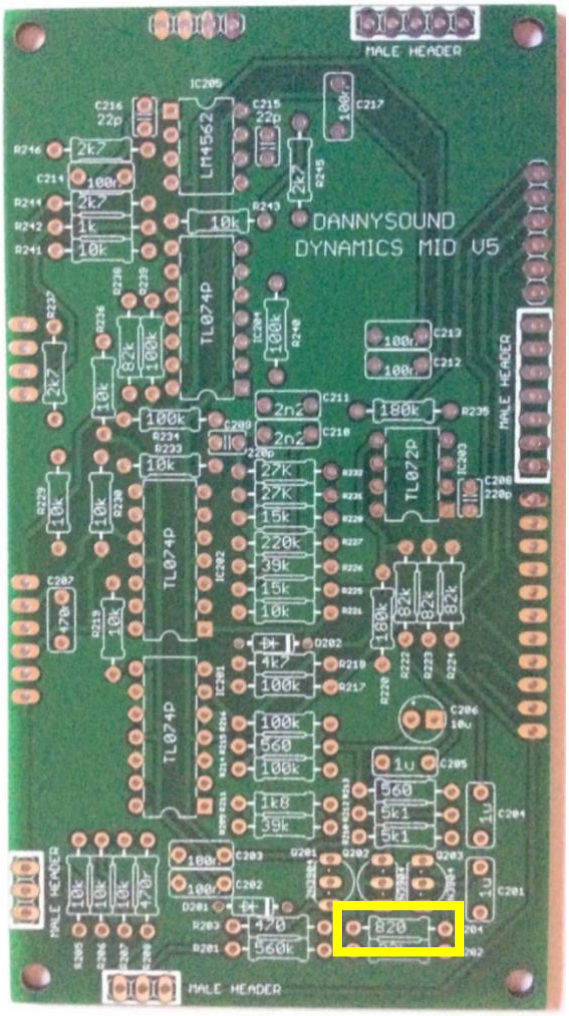
RESISTORS



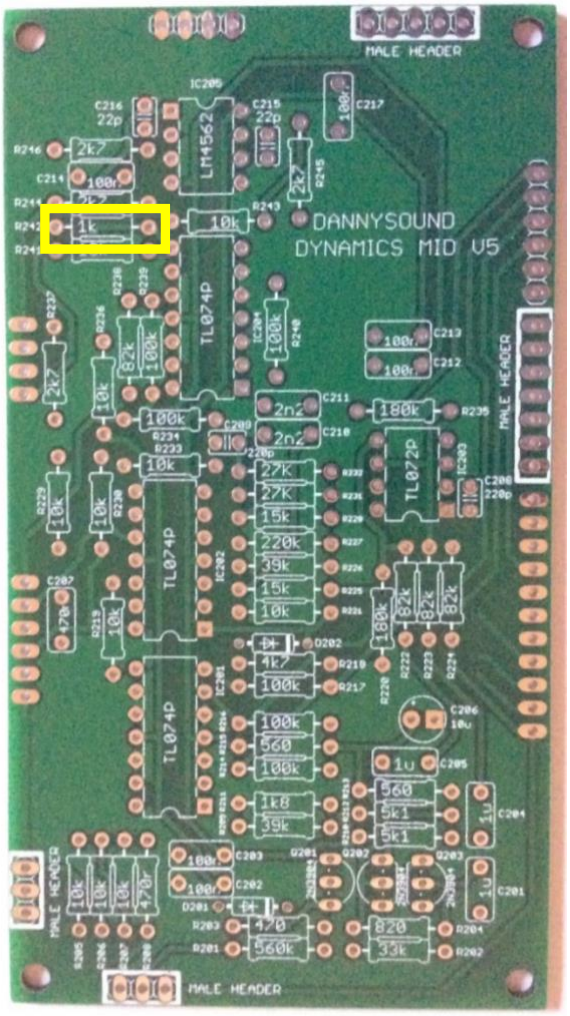
39) – 2 x 470r (R203, R208)



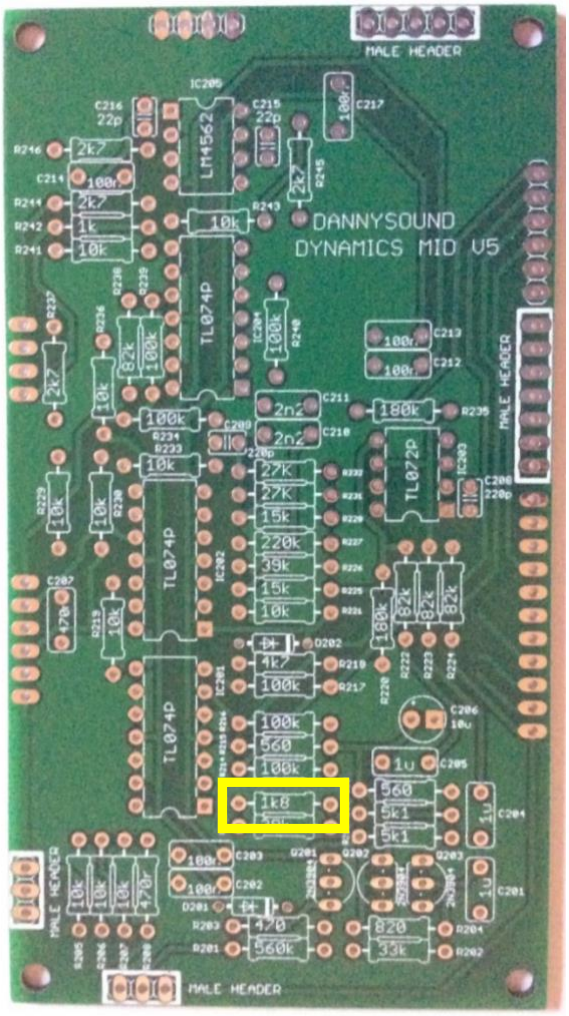
40) – 2 x 560r (R213 R215)



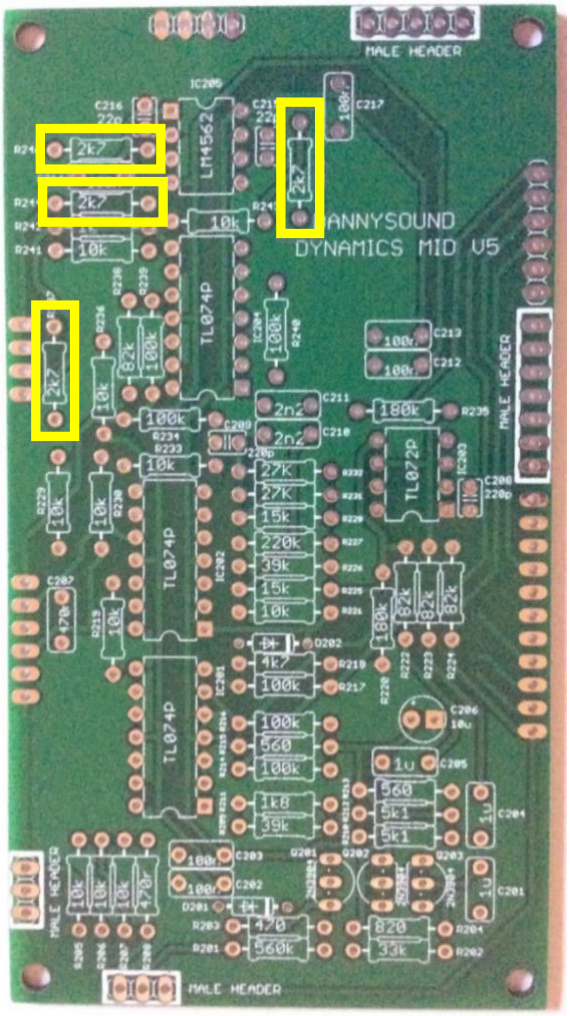
41) – 1 x 820r (R204)



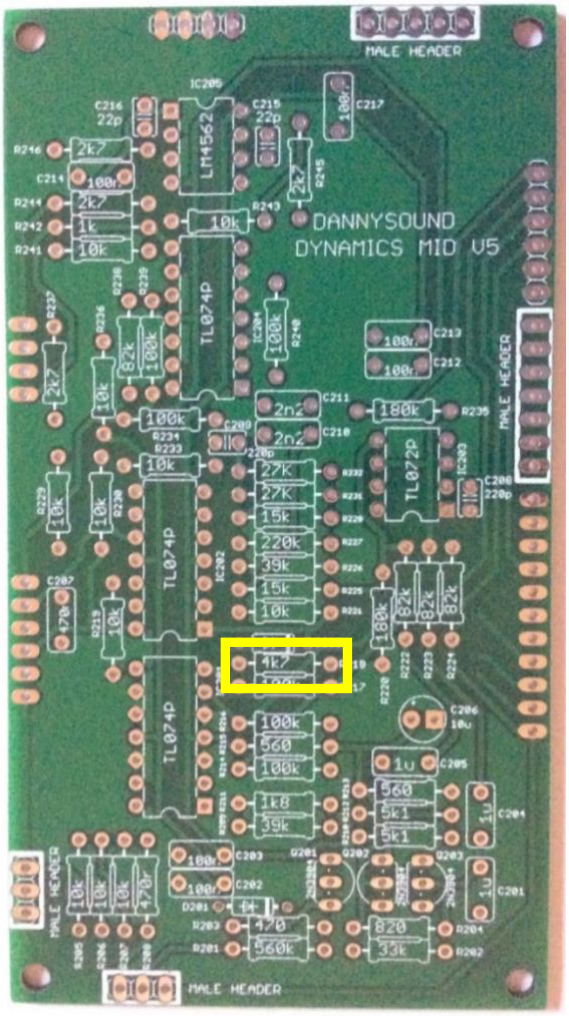
42) – 1 x 1k (R242)



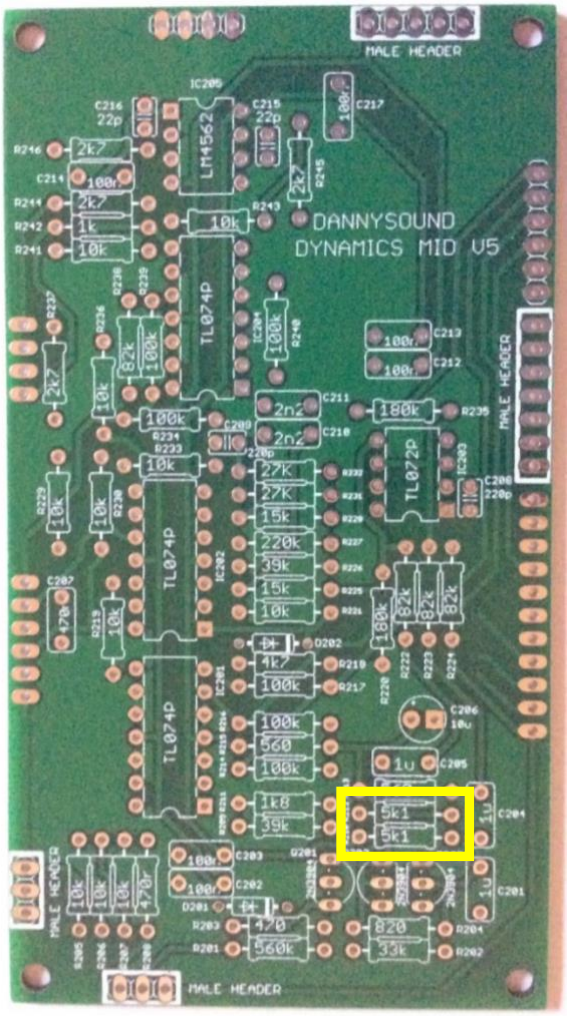
43) – 1 x 1k8 (R211)



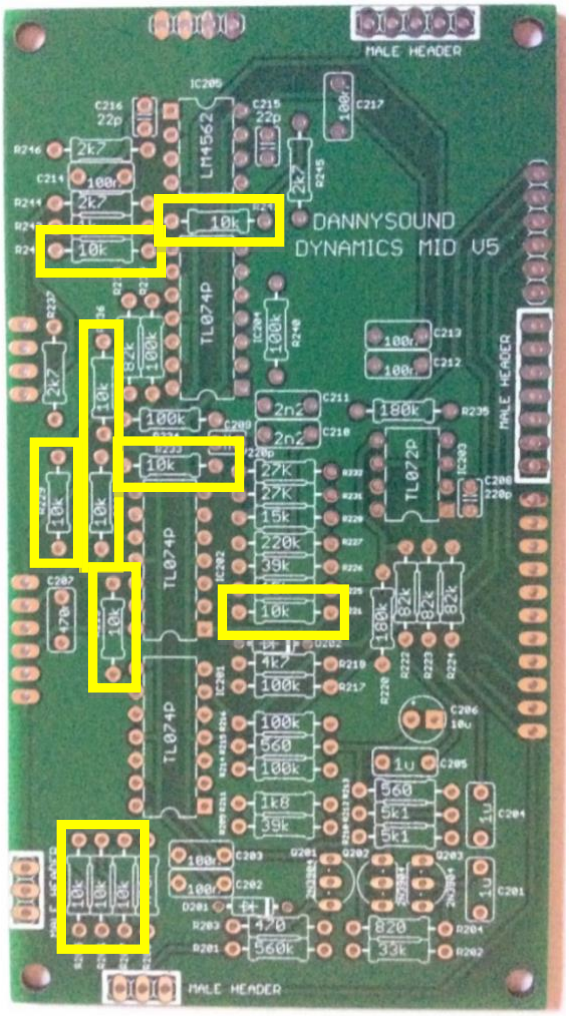
44) – 4 x 2k7 (R237, R244, R245, R246)



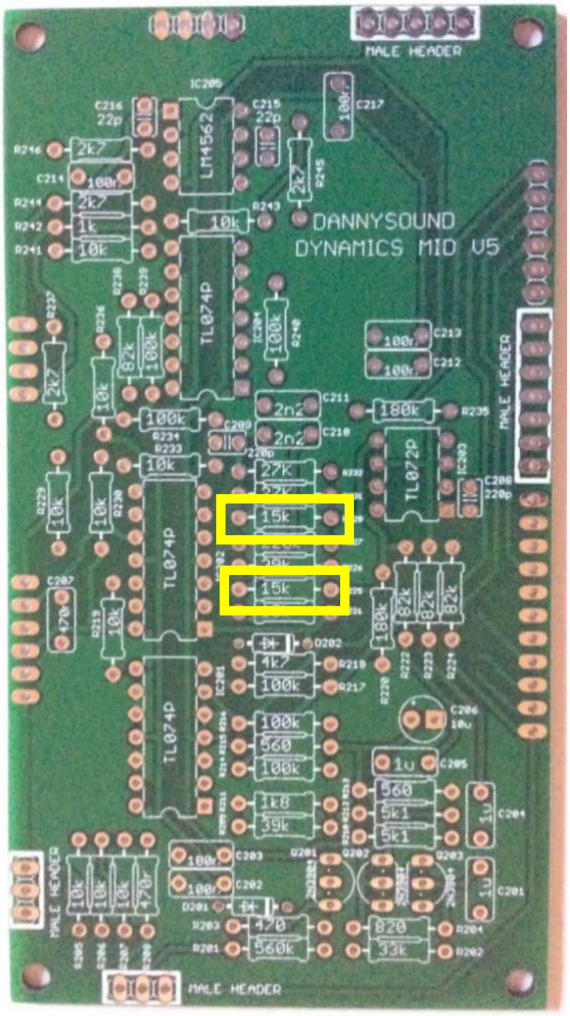
45) – 1 x 4k7 (R218)



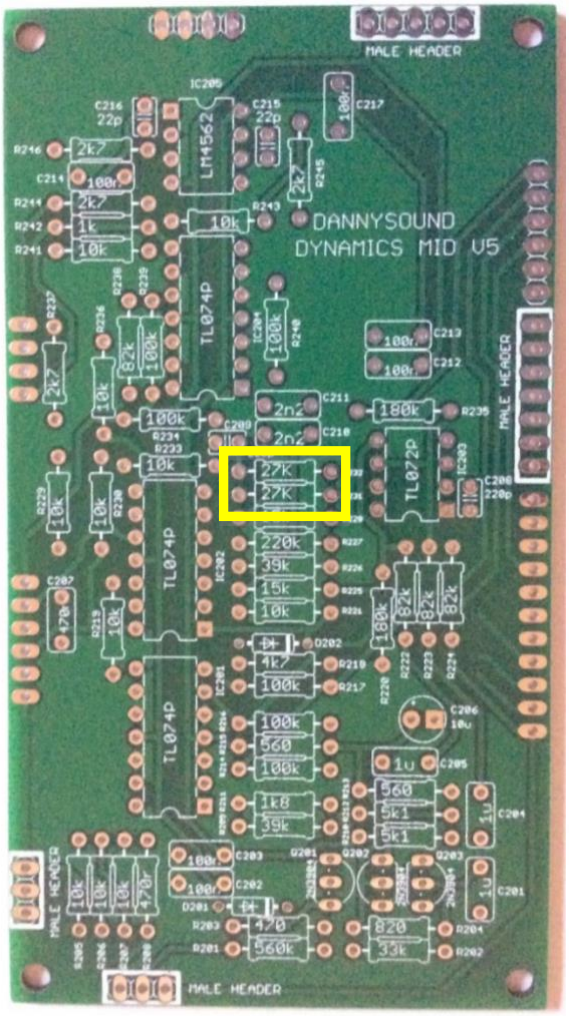
46) – 2 x 5k1 (R210, R212)



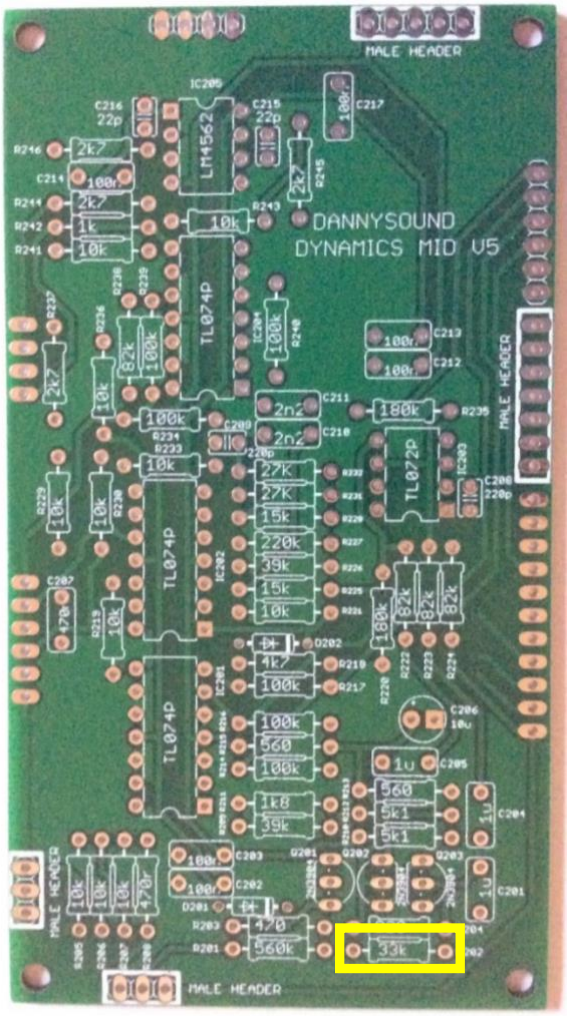
47) – 11 x 10k
(R205, R206, R207, R219, R221,
R229, R230, R233, R236, R241, R243)



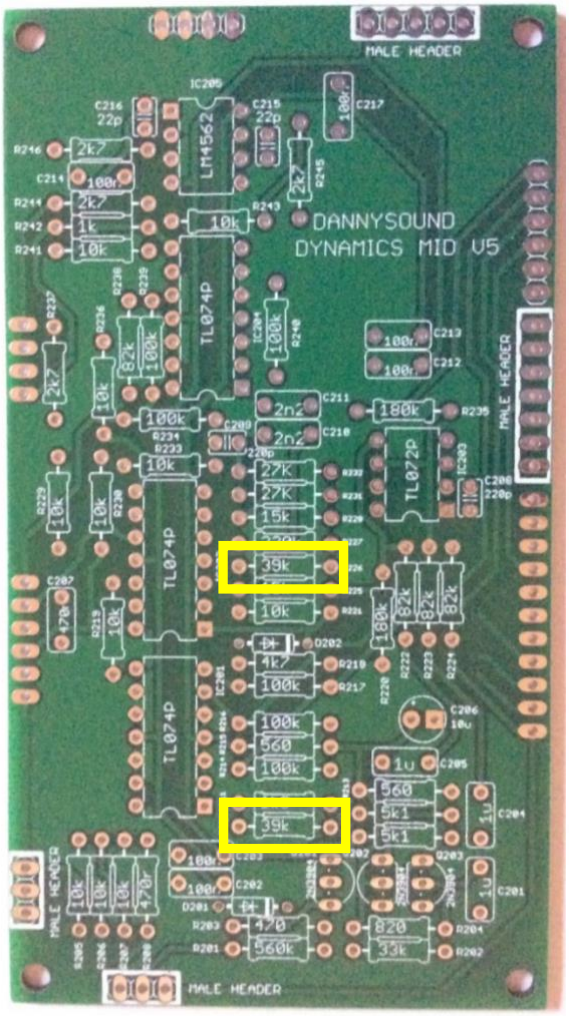
48) – 2 x 15k (R225, R228)



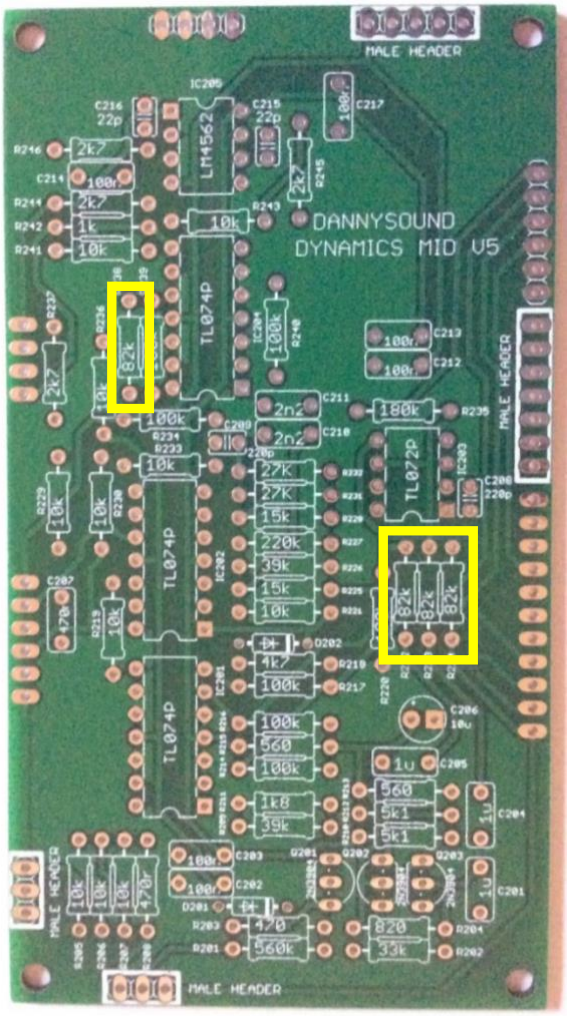
49) – 2 x 27k (R231, R232)



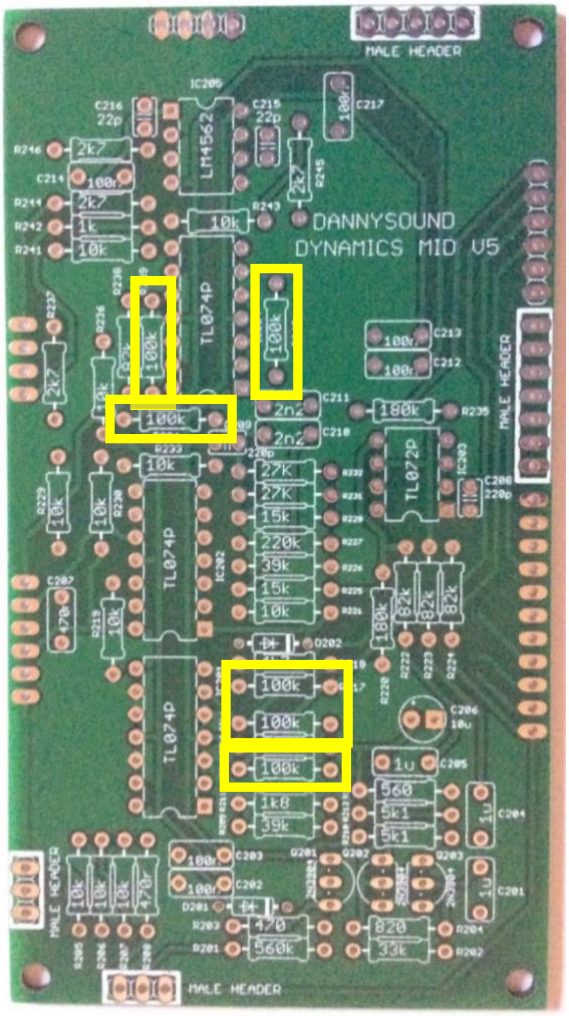
50) – 1 x 33k (R202)



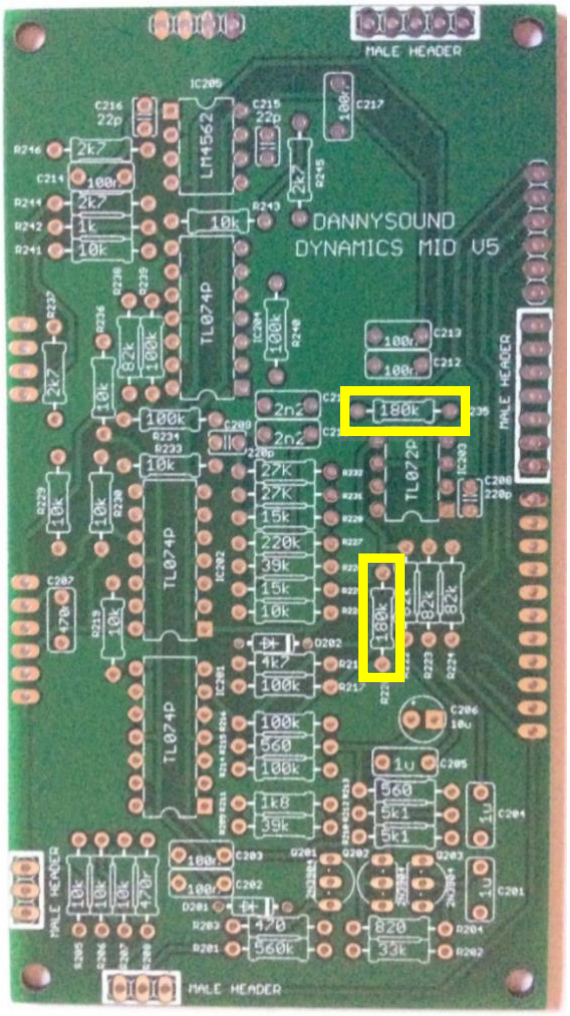
51) – 2 x 39k (R209, R226)



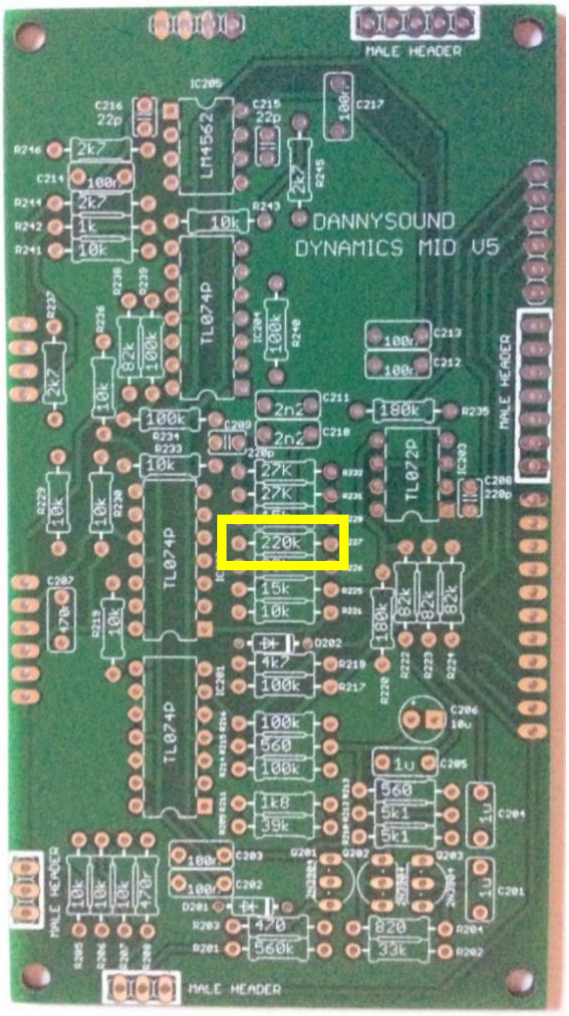
52) – 4 x 82k (R222, R223, R224, R238)



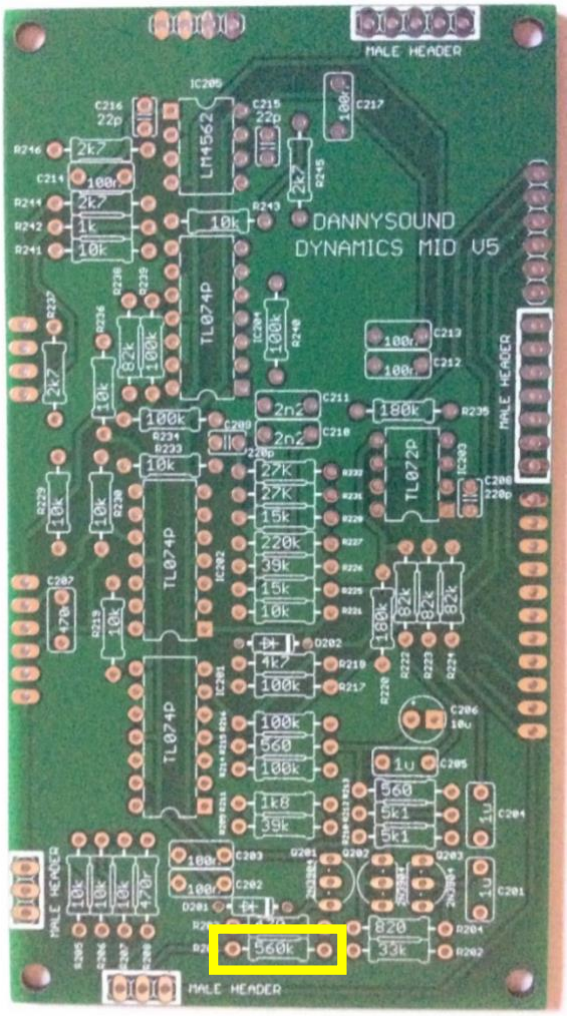
53) – 6 x 100k
(R214, R216, R217, R234, R239, R240)



54) – 2 x 180k (R220, R235)

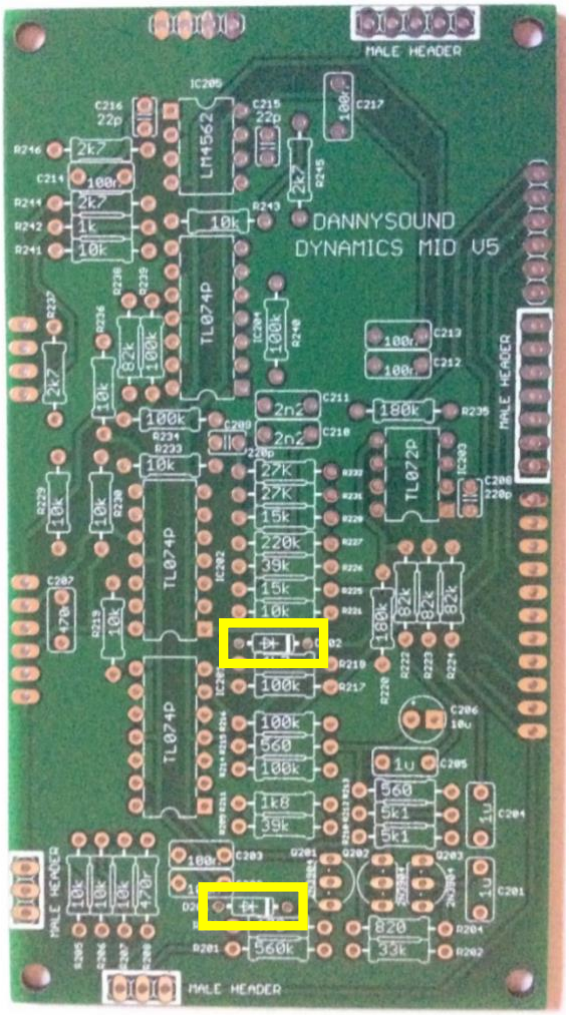


55) – 1 x 220k (R227)



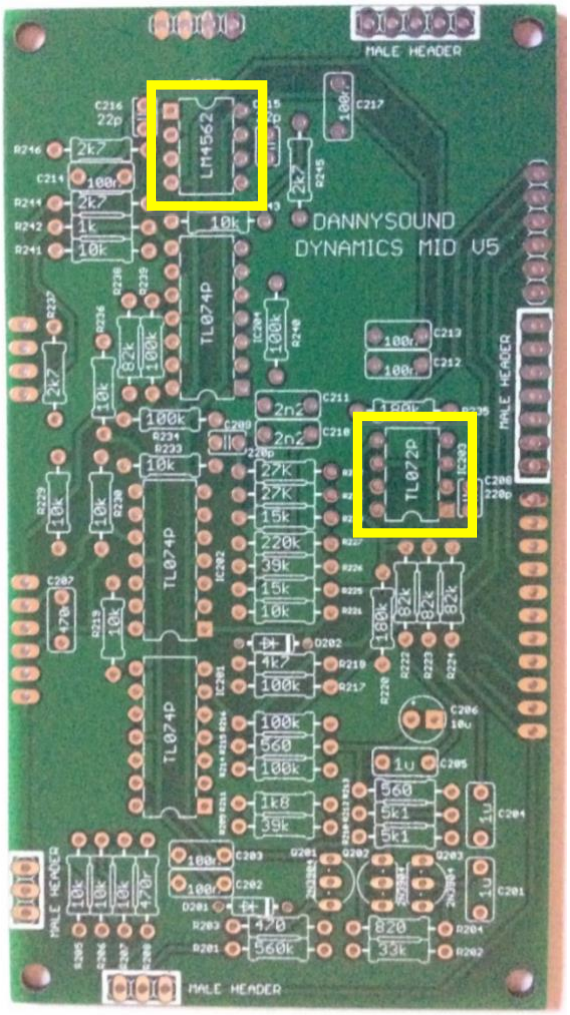
56) – 1 x 560k (R201)

IC SOCKETS



57) – 2 x 1N4148 DIODE (D201, D202)

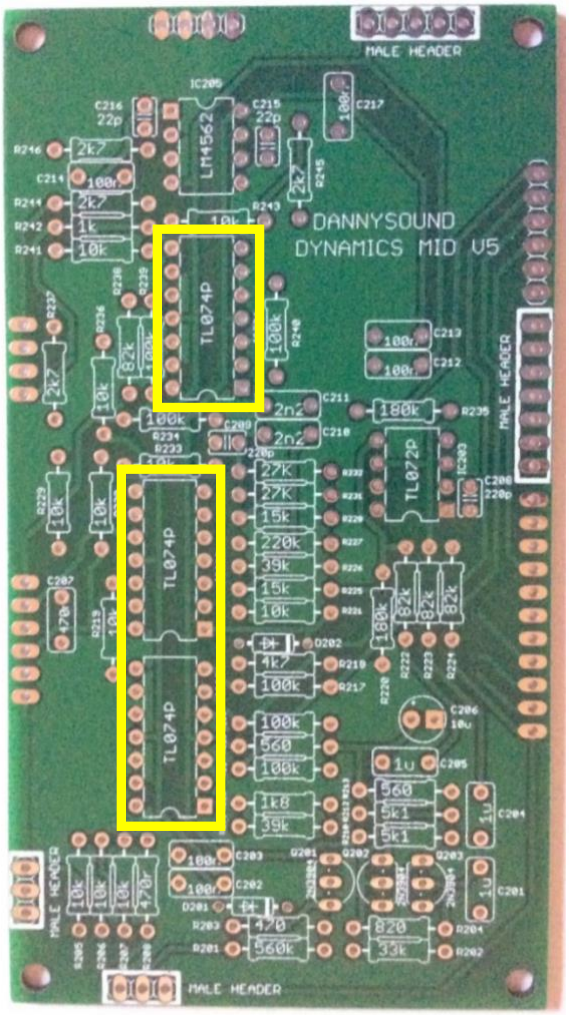
Note: orientation of the diodes is vital - be sure to match the line on the component with that on the PCB silkscreen.



58) – 2 x 8 Pin Socket (IC203, IC205)

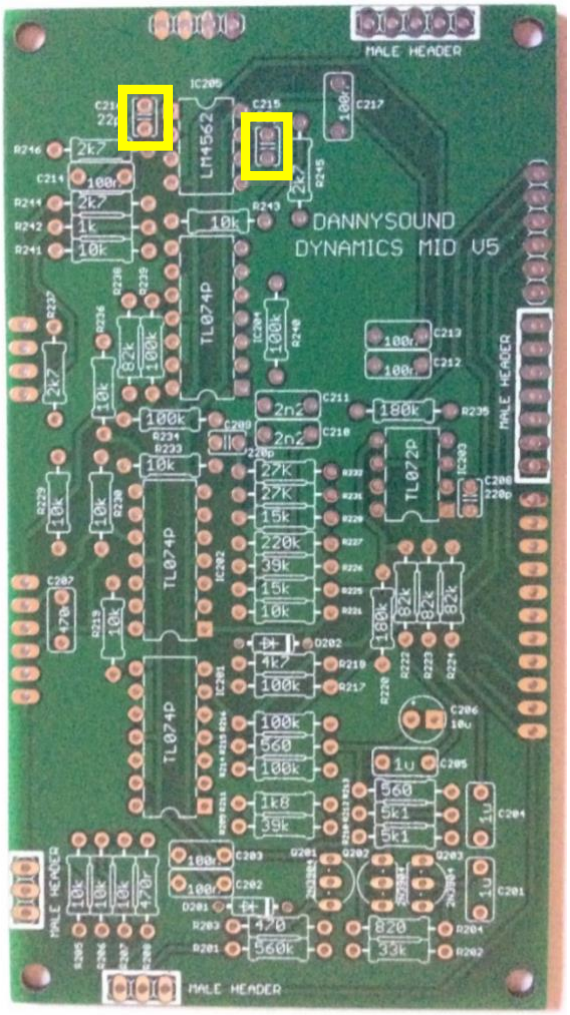
Note: Mind orientation – match the notch on each socket with the notch on the PCB silkscreen.

CAPS



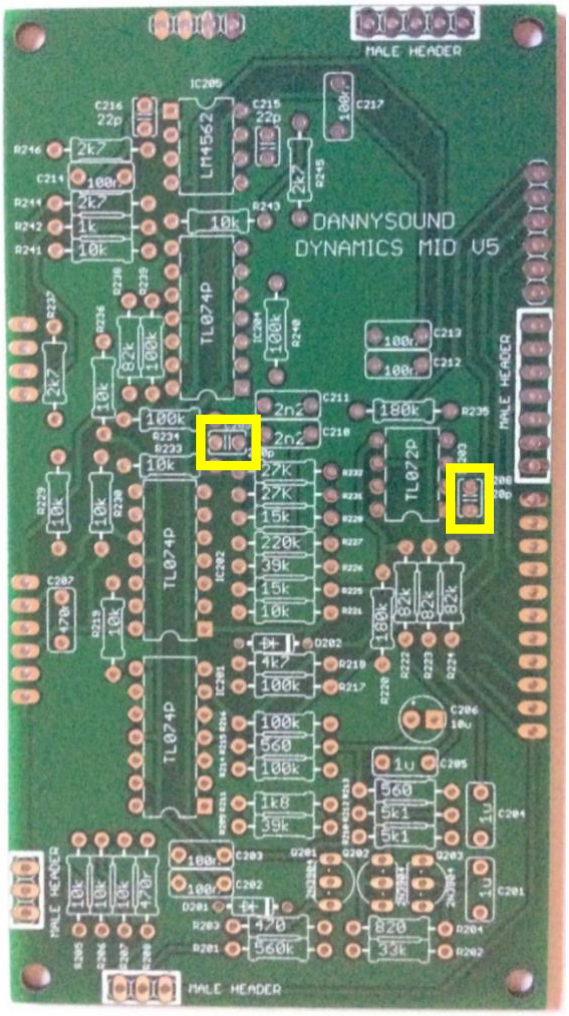
59) – 3 x 14 Pin Socket
(IC201, IC202, IC204)

Note: Mind orientation – match the notch on each socket with the notch on the PCB silkscreen.

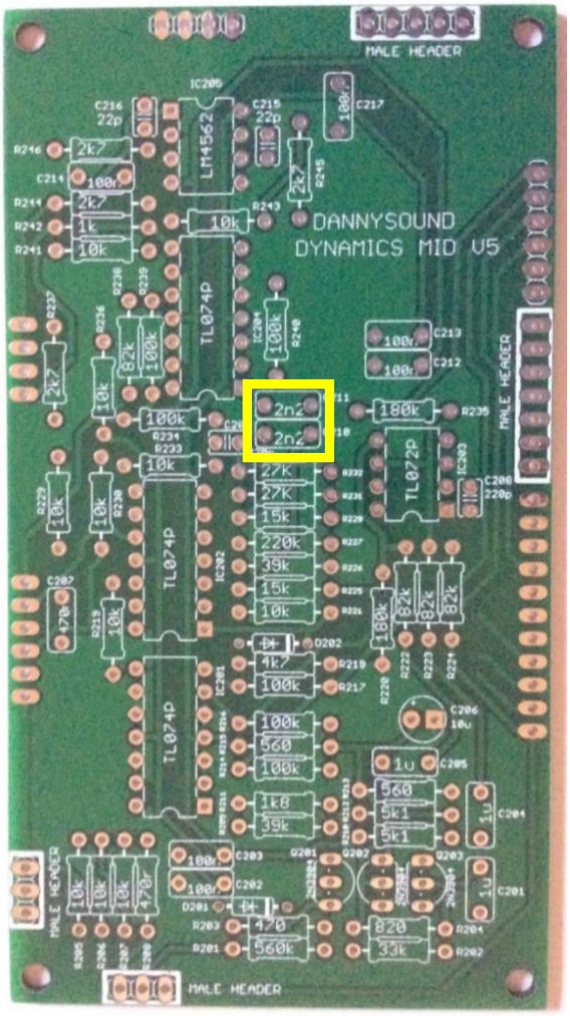


60) – 2 x 22p ceramic (C215, C216)

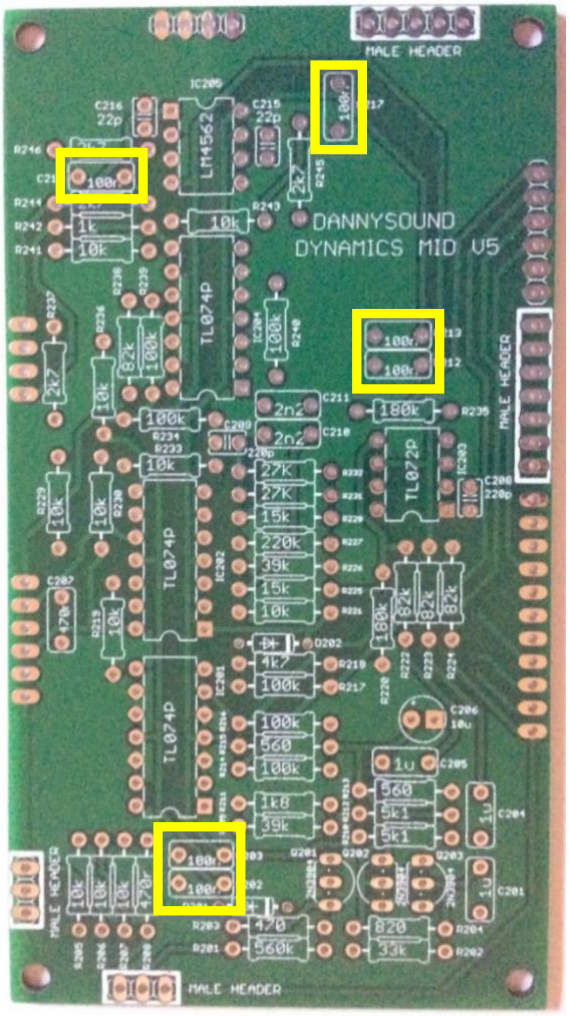
Note: don't confuse the 22p caps with the 220p – read the bag label to identify the correct parts



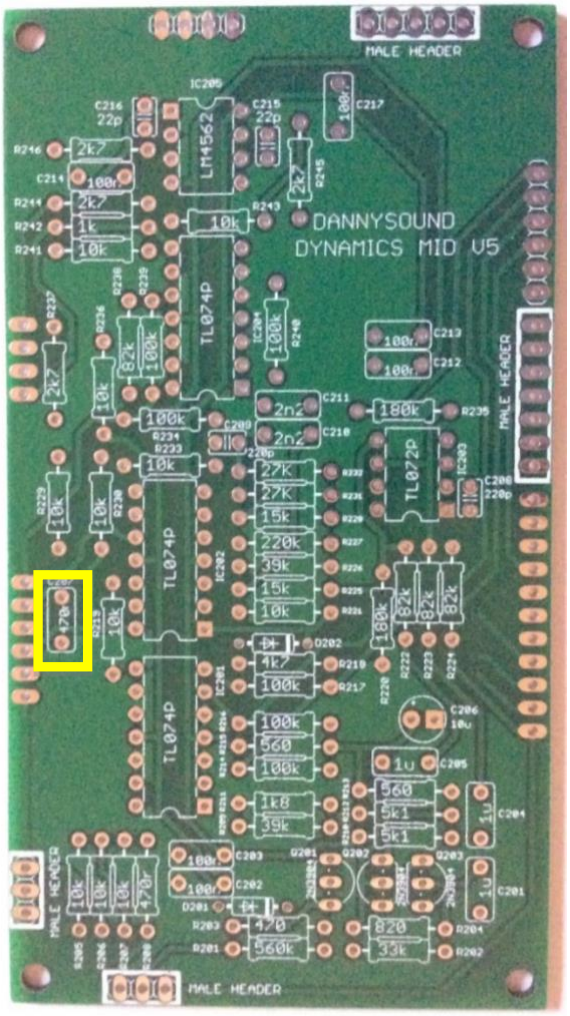
61) – 2 x 220p ceramic (C208 C209)



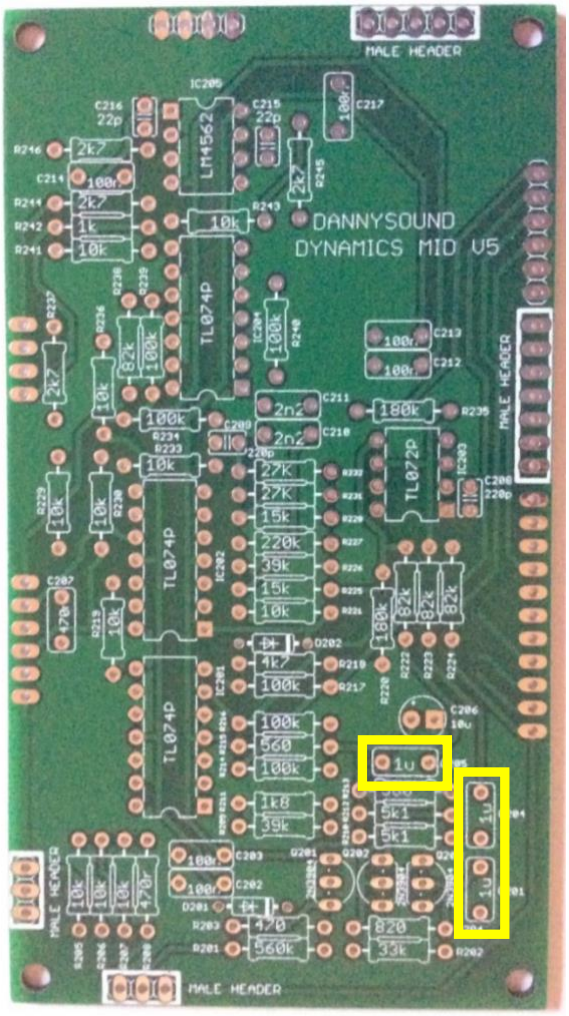
62) – 2 x 2n2 film (C210 C211)



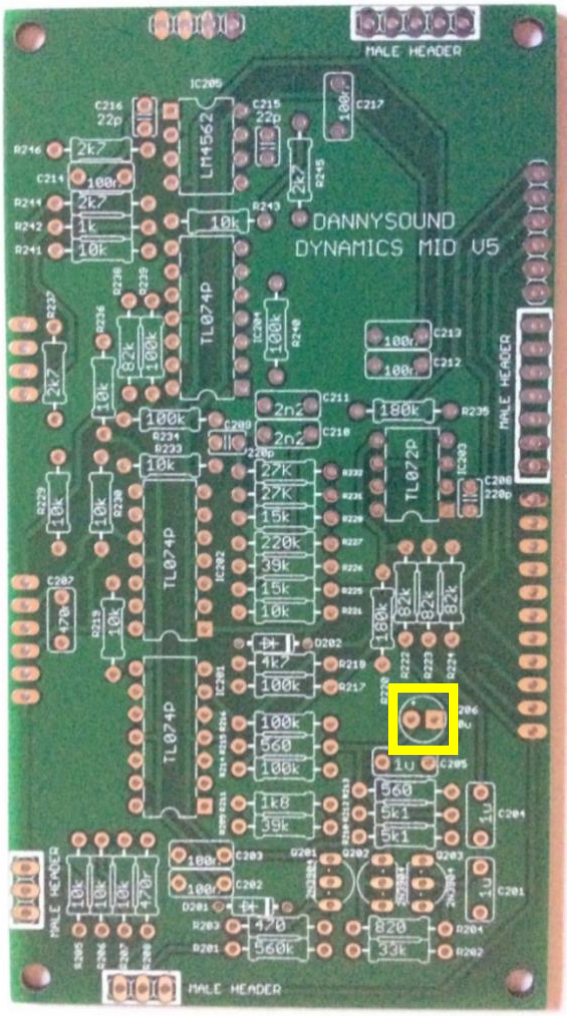
63) – 6 x 100n film
(C202, C203, C212, C213, C214, C217)



64) – 1 x 470n film (C207)



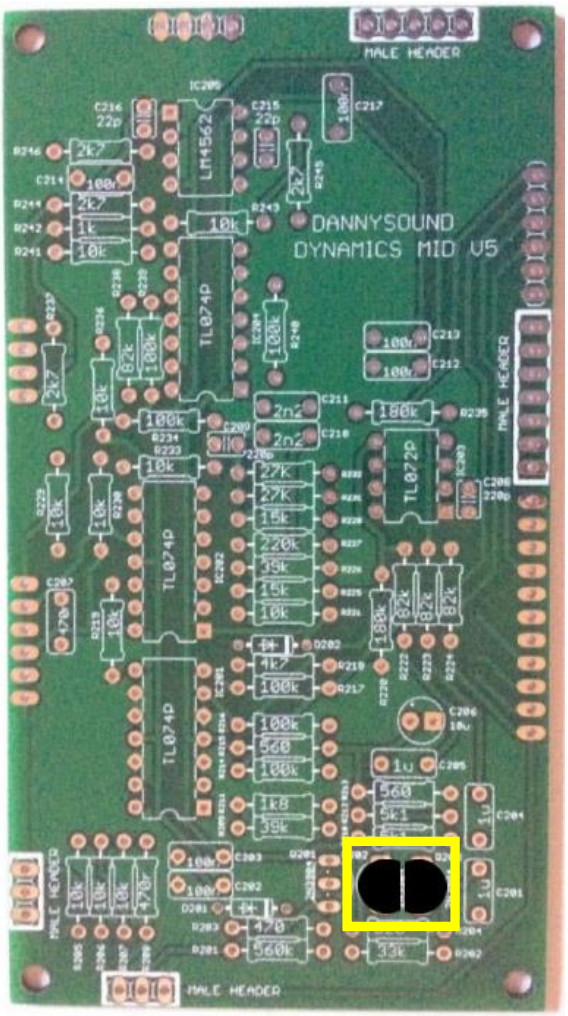
65) – 3 x 1u film (C201, C204, C205)



66) – 1 x 10u electro (C206)

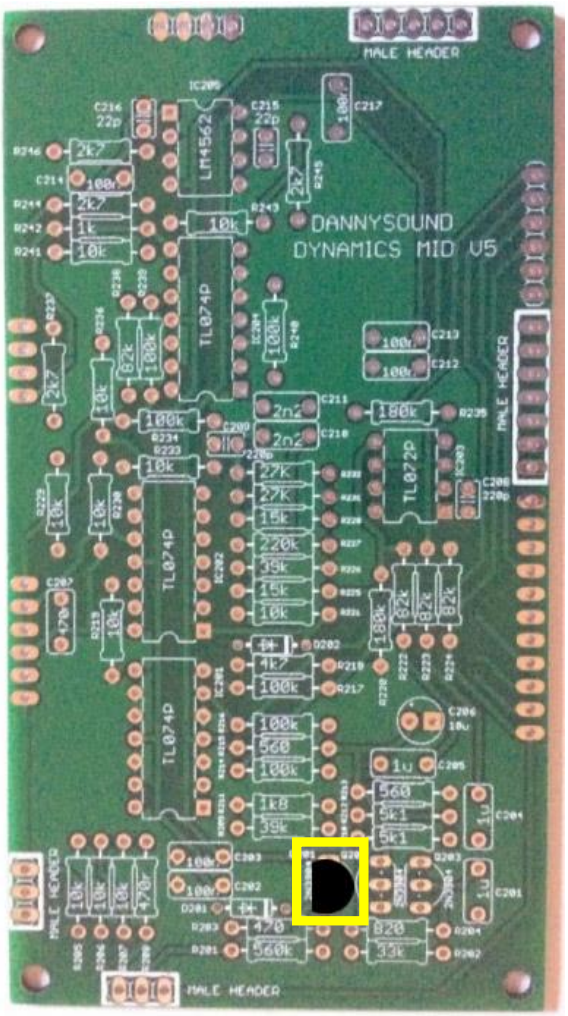
Note: mind polarity of the electro cap - the negative short lead should go to the square pad on the PCB.

TRANSISTORS



67) – 2 x 2N3904 (MATCHED PAIR)
(Q202 Q203)

Note: 2N3904 matched pairs are located in the bag which contains the PCBs
Do not confuse with 6 x unmatched transistors

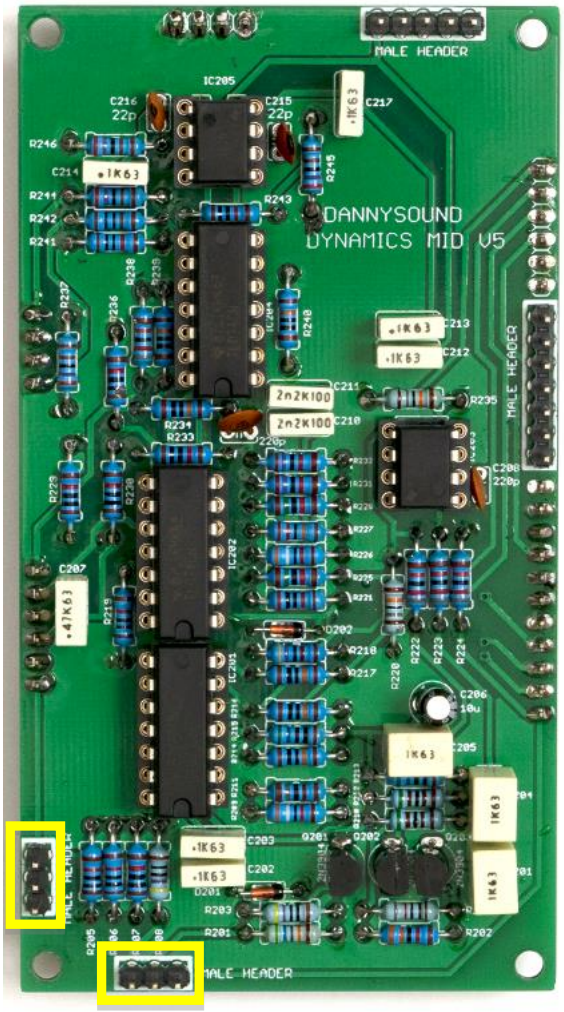


68) – 1 x 2N3904 (NOT MATCHED)
(Q201)

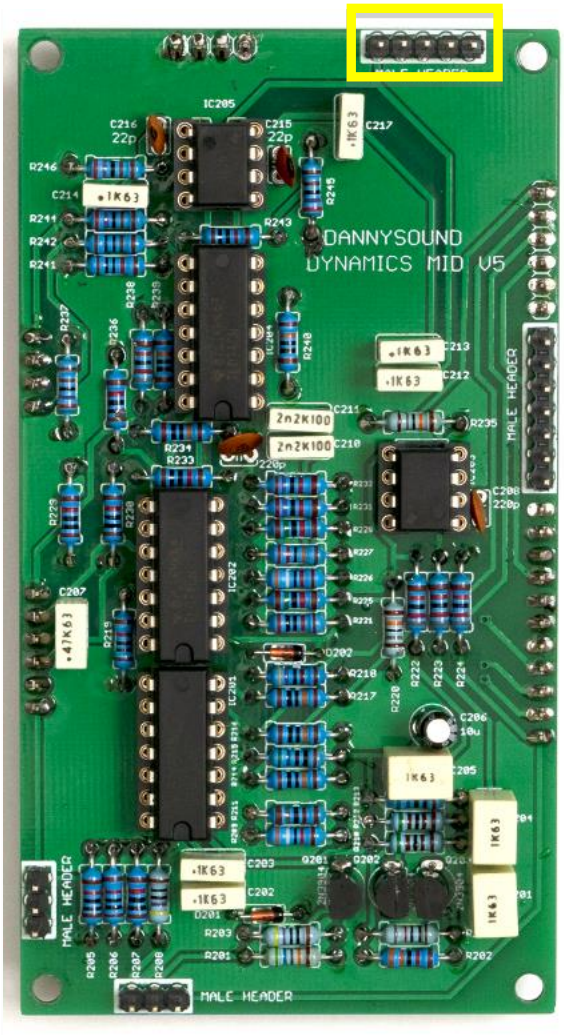
Note: Do not use matched pair here

Note: mind polarity – match curve of each component with PCB silkscreen

HEADERS



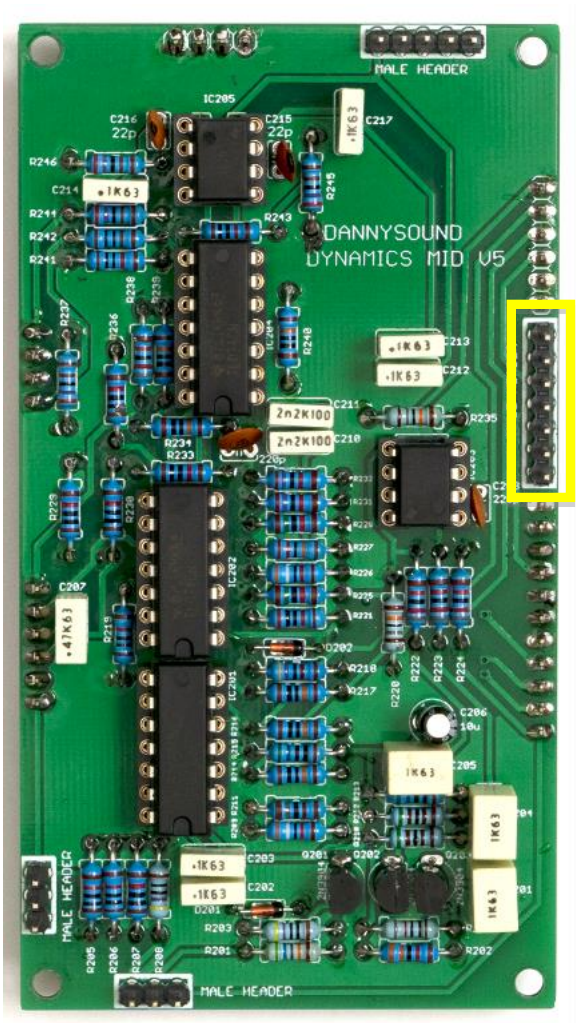
69) – 2 x 3 Pin MALE header



70) – 1 x 5 Pin MALE header

Note: these male headers must be places on the same side as all previously soldered components on this PCB.

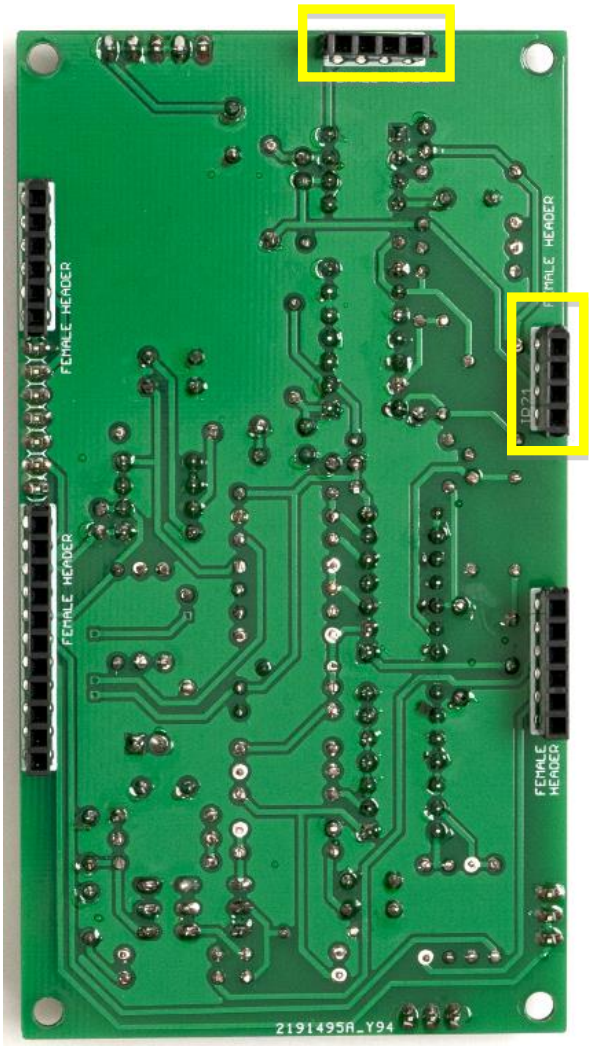
Break off these headers from the long 36 pin strip



71) – 1 x 7 Pin MALE header

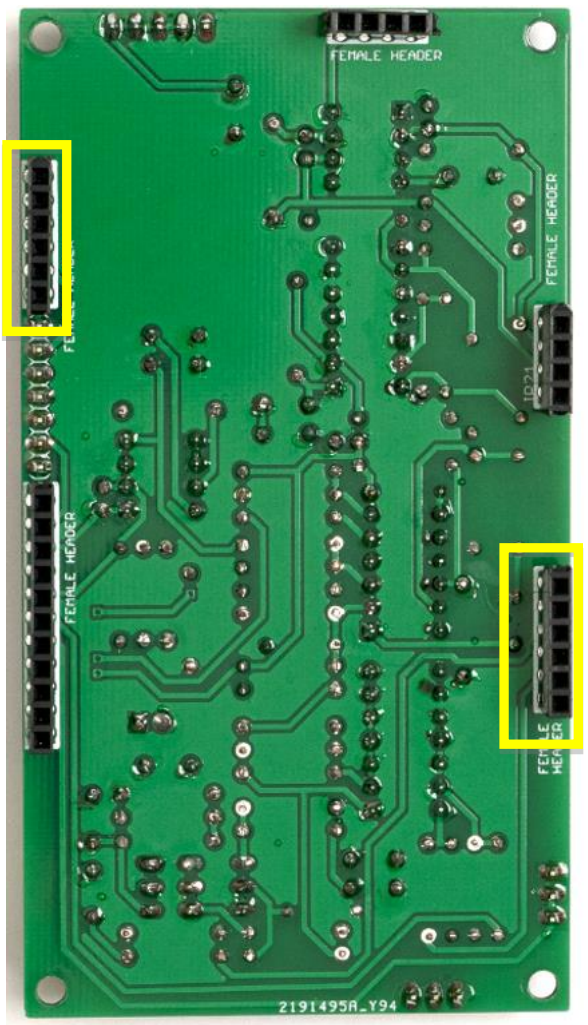
Note: the 7 pin male header is placed on the same side as all previously soldered components on this PCB. **Be sure to place inside the white outline on the PCB.**

Break off this male header from the shorter 18 pin strip

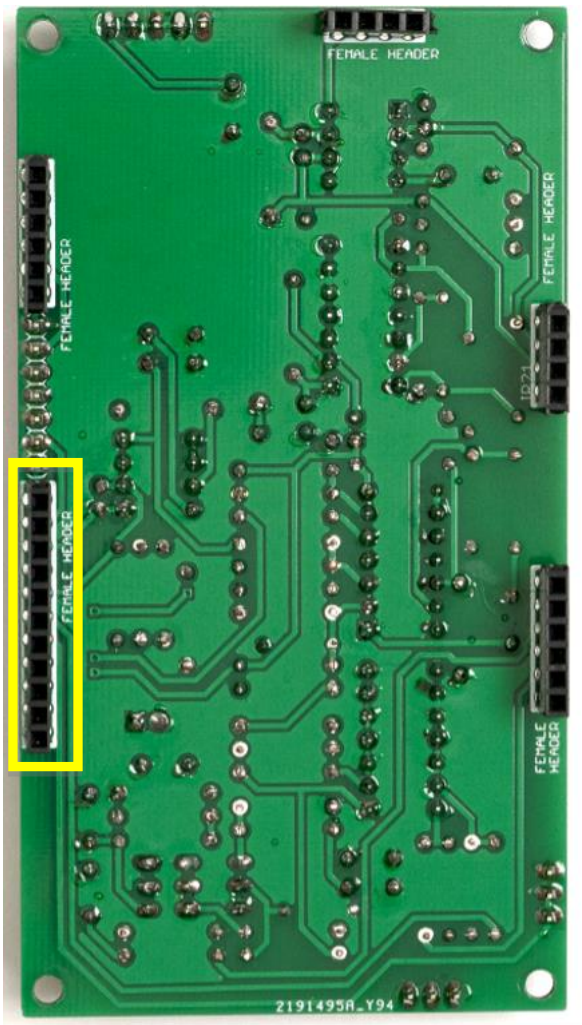


72) – 2 x 4 Pin FEMALE header

Note: the female headers are placed on the opposite side as all previously soldered components on this PCB.



73) – 2 x 6 Pin FEMALE header

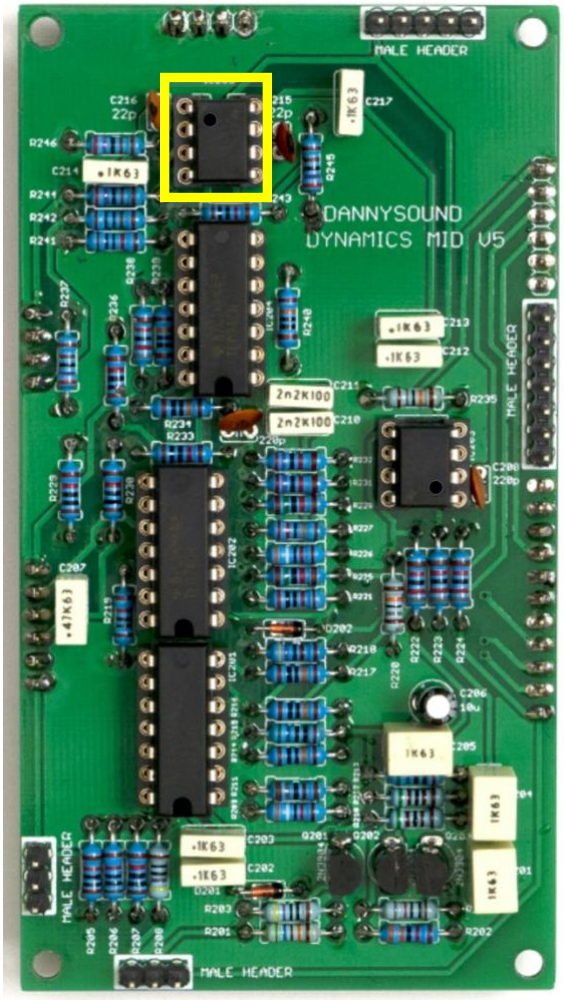


74) – 1 x 11 Pin FEMALE header

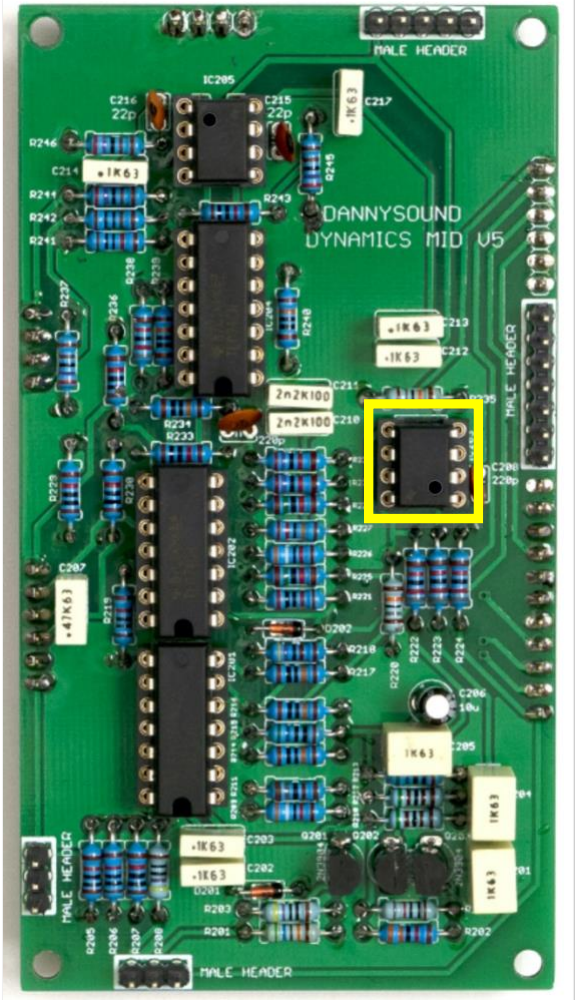
Note: the female headers are placed on the opposite side as all previously soldered components on this PCB.

Be sure to place headers inside the white outline on the PCB.

ICs

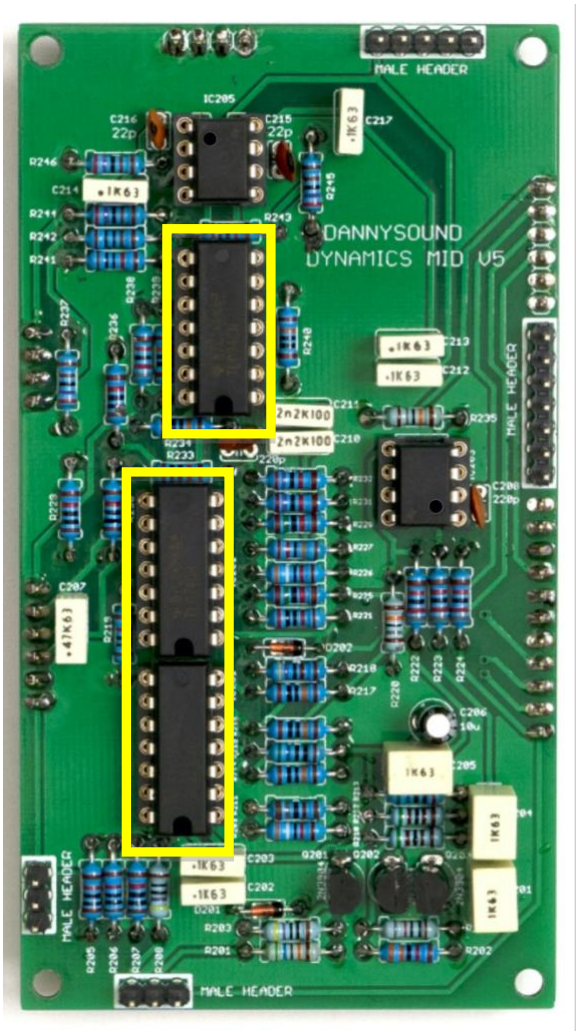


75) – 1 x LM4562 (IC205)



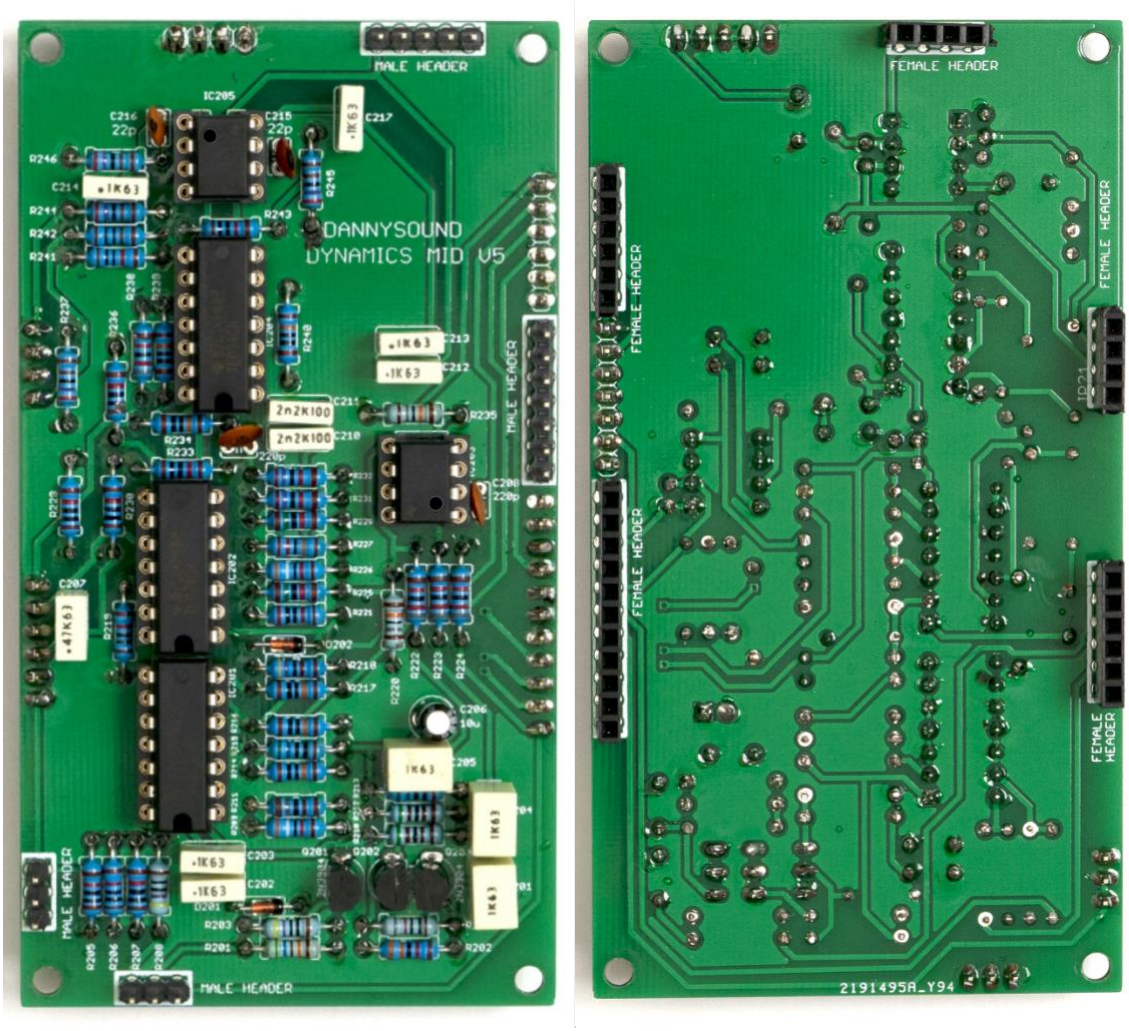
76) – 1 x TL072 (IC203)

Note: Mind orientation – match notch or dot on each chip with the notch on PCB silkscreen and IC socket as shown above.



77) – 3 x TL074 (IC201, IC202, IC204)

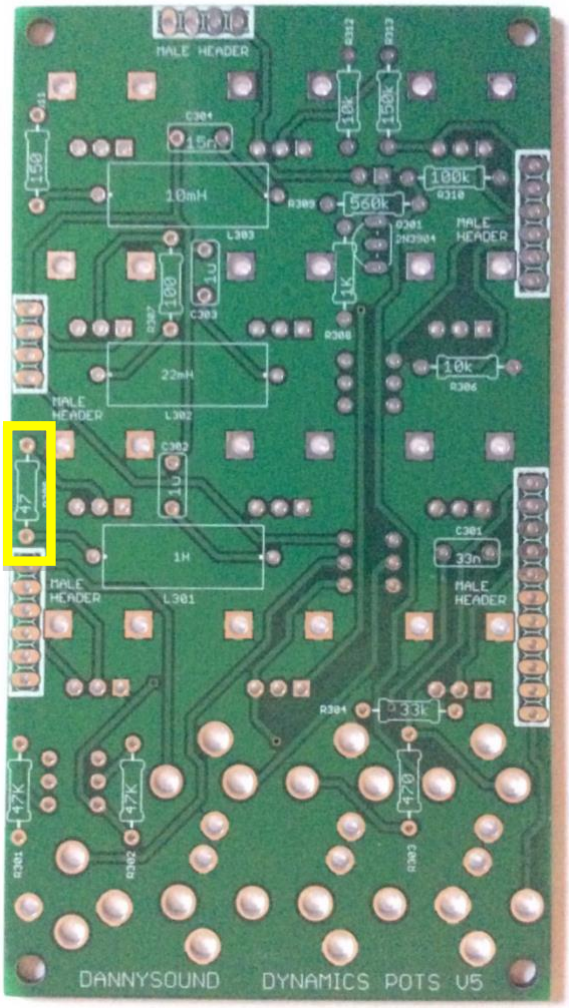
Note: Mind orientation – match notch on each chip with the notch on PCB silkscreen and IC socket as shown above.



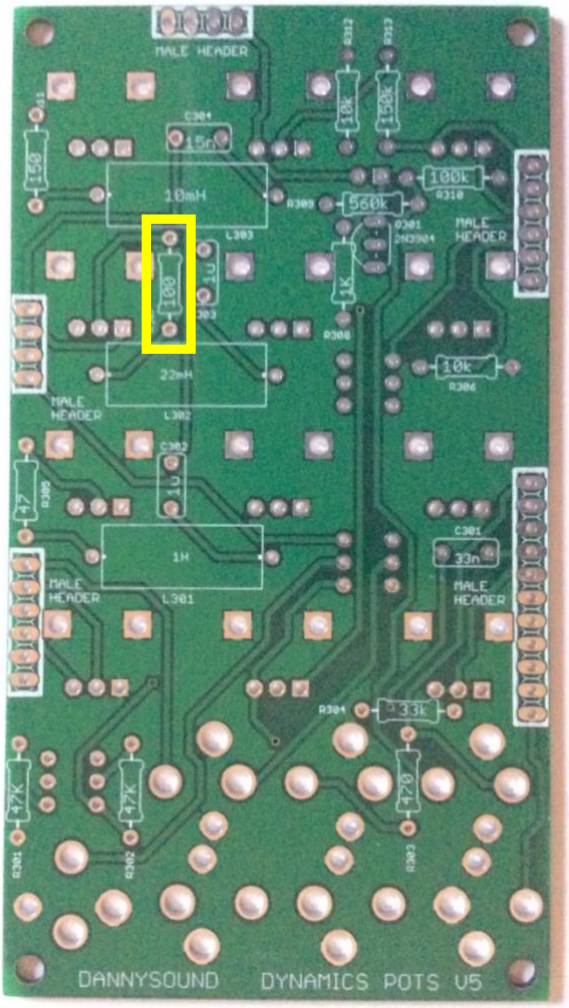
Soldering on the mid PCB is now complete – a good time to take another break ☺

6 Pots Board

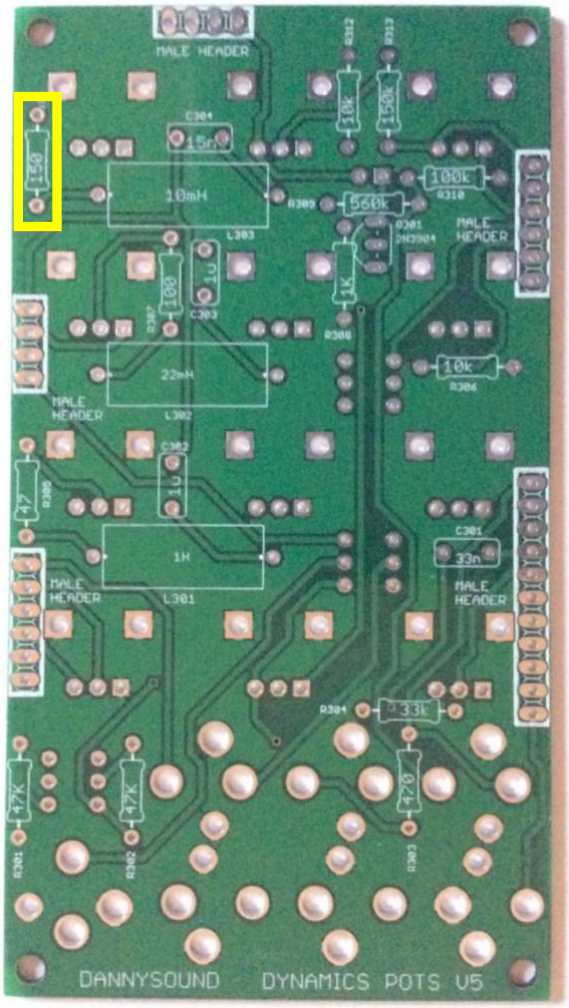
RESISTORS



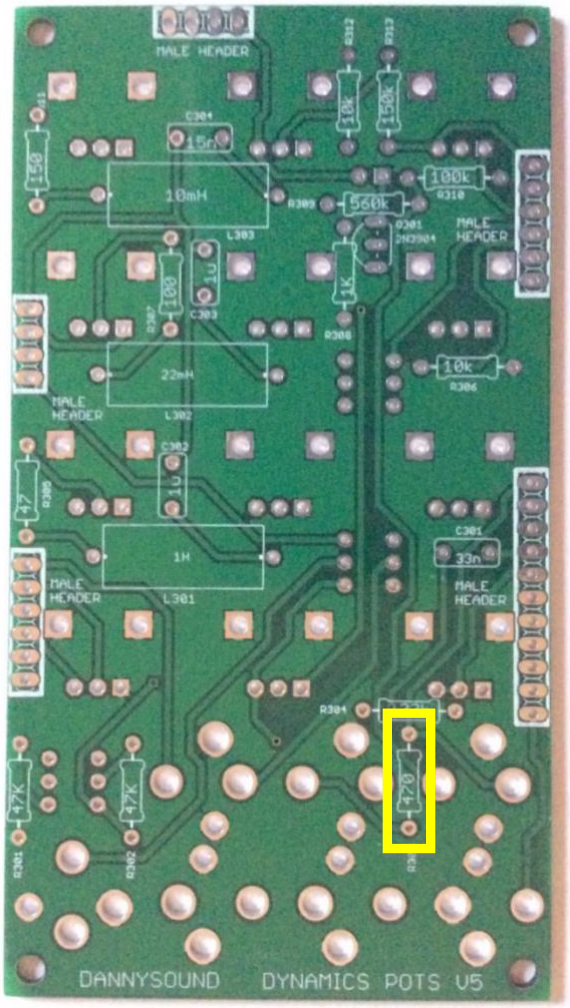
78) – 1 x 47r (R305)



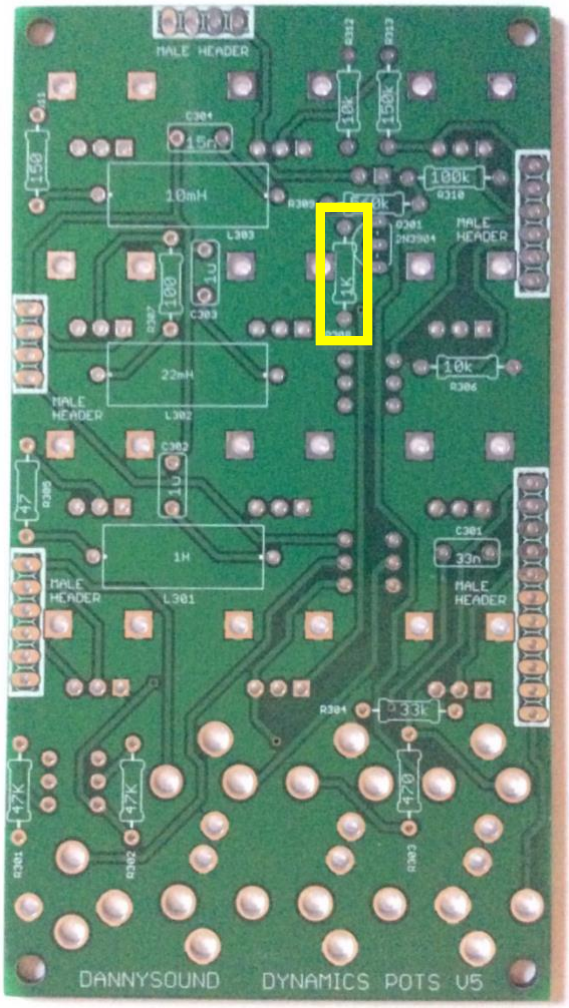
79) – 1 x 100r (R307)



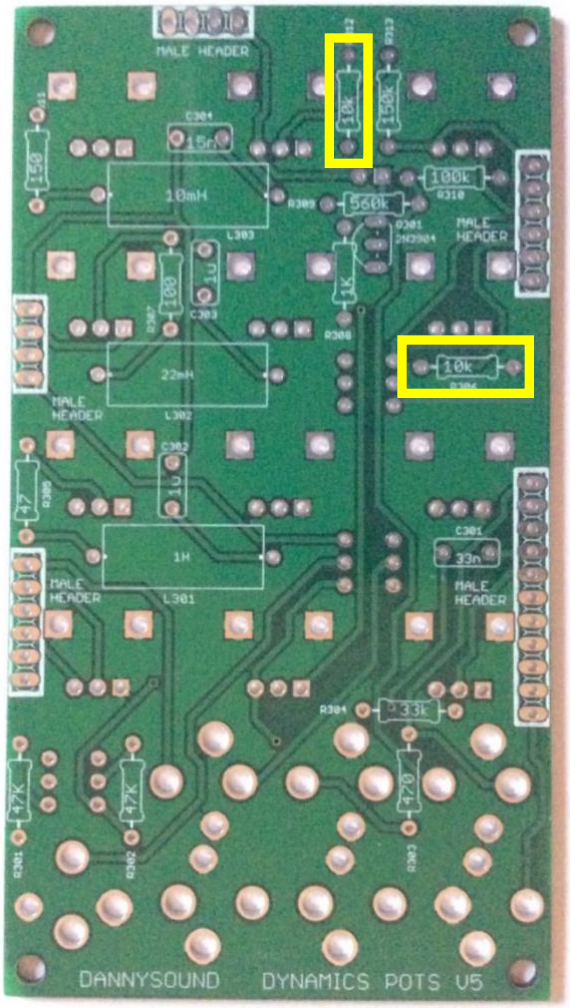
80) – 1 x 150r (R311)



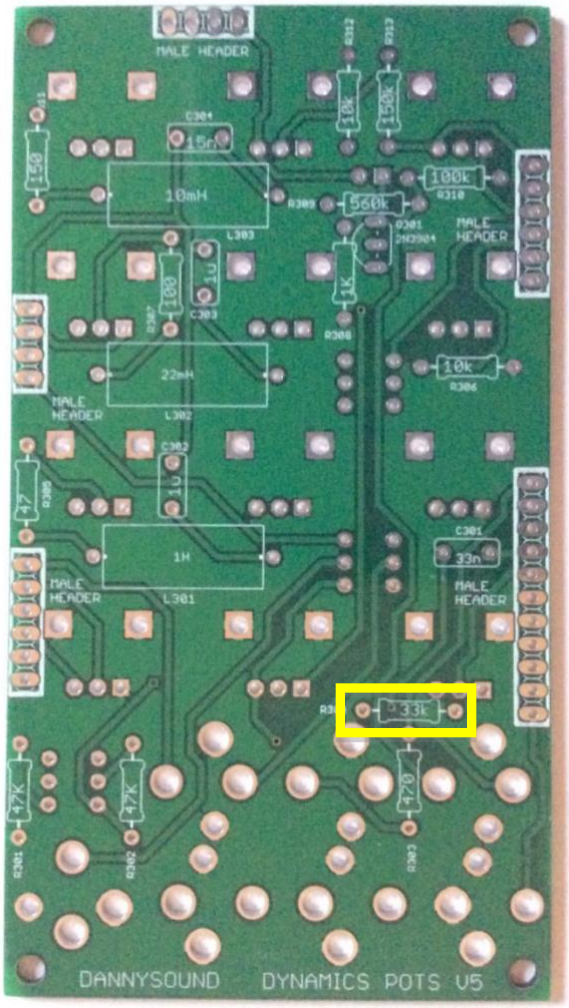
81) – 1 x 470r (R303)



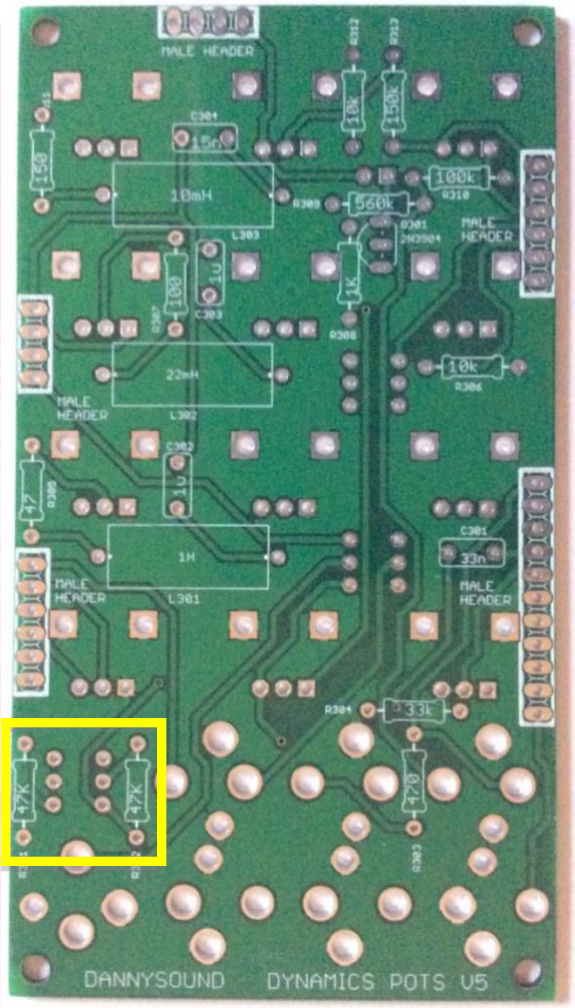
82) – 1 x 1k (R308)



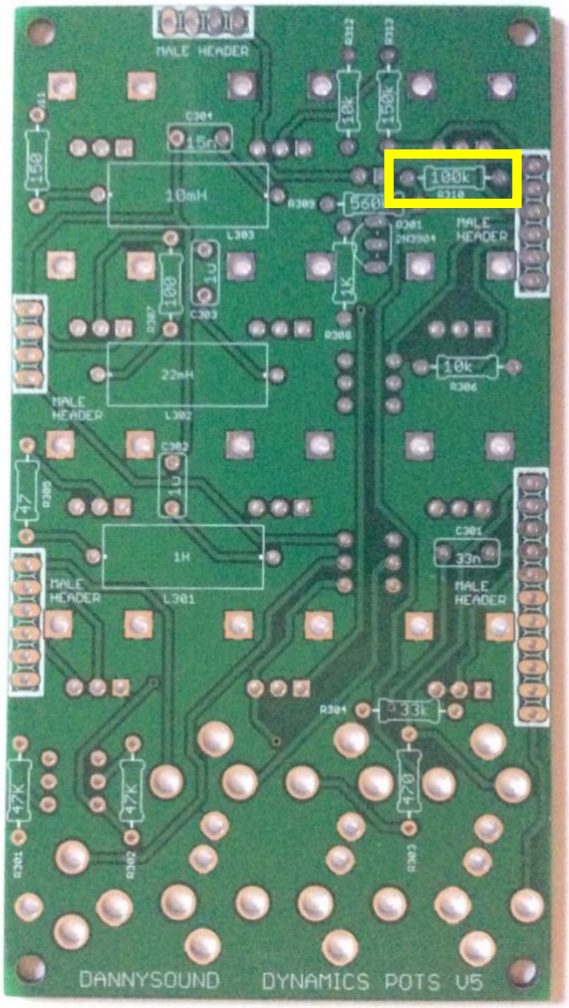
83) – 2 x 10k (R306, R312)



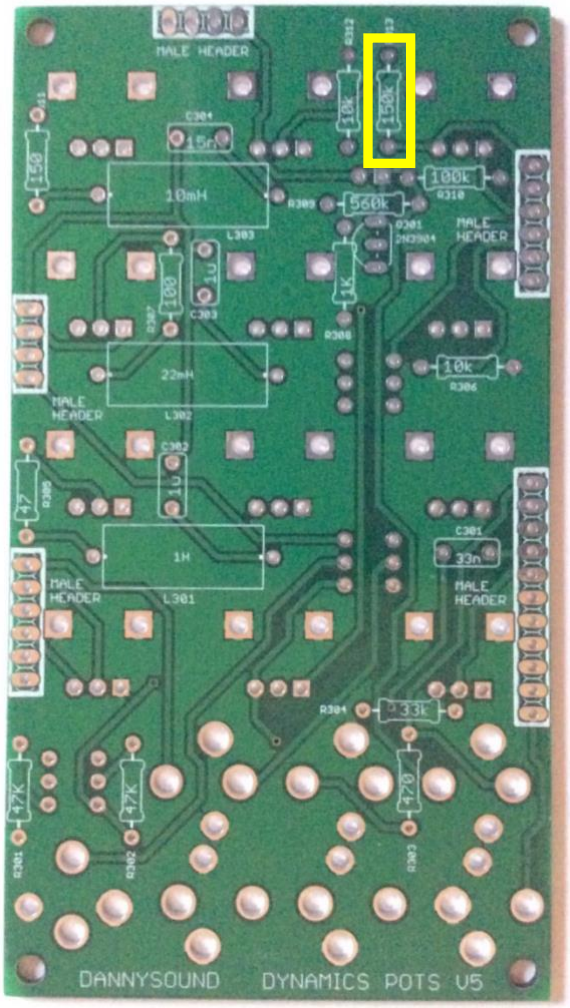
84) – 1 x 33k(R304)



85) – 2 x 47k (R301, R302)

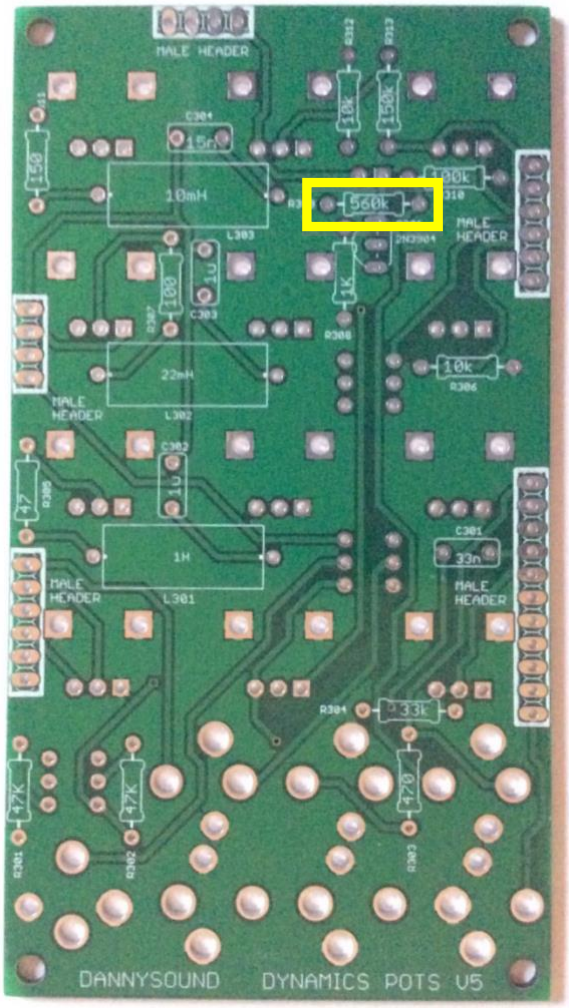


86) – 1 x 100k (R310)

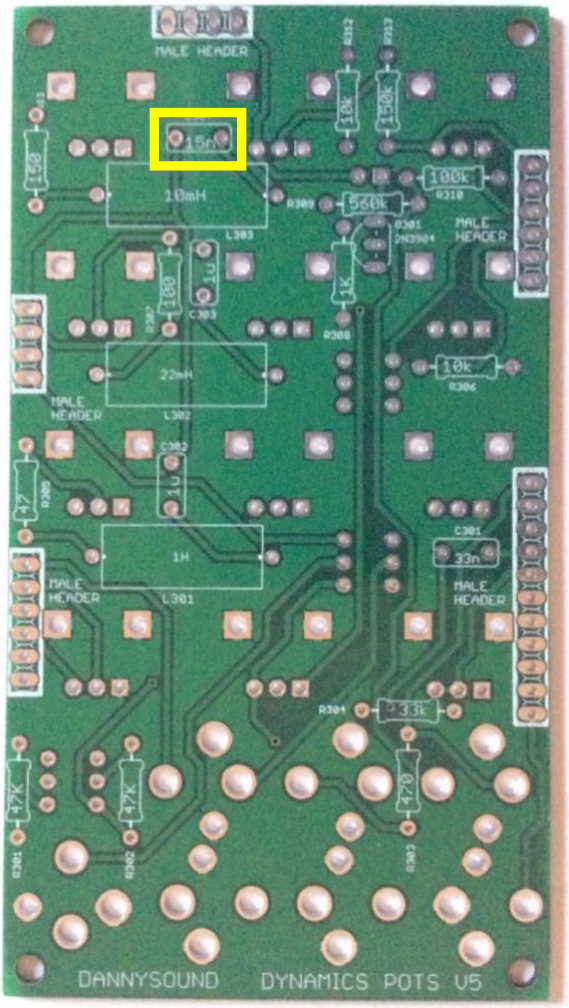


87) – 1 x 150k (R313)

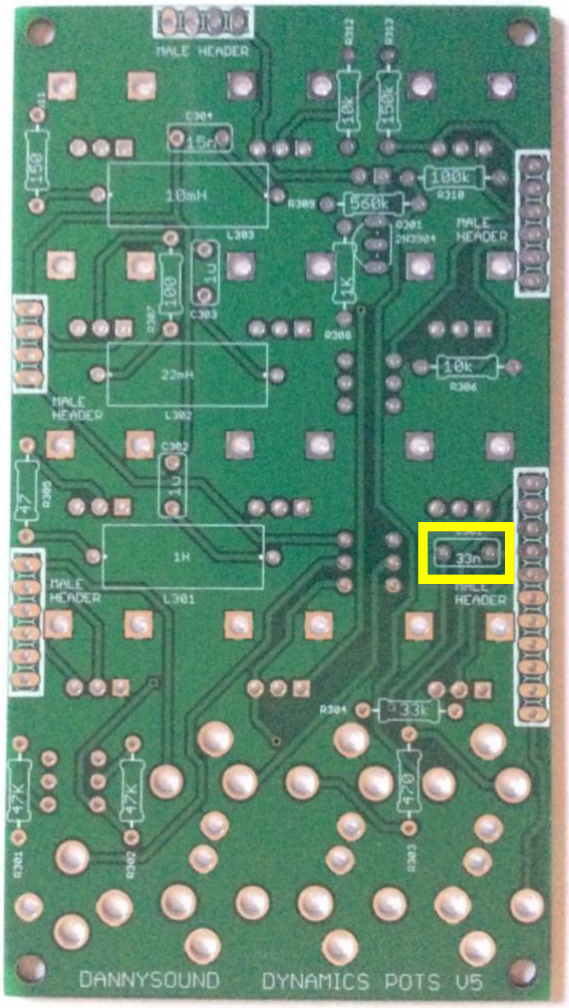
CAPS



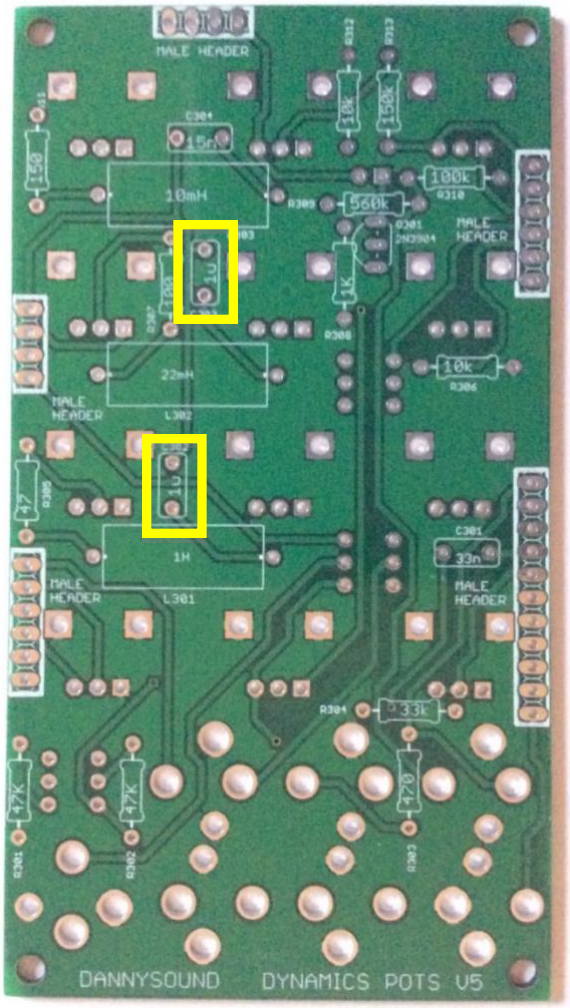
88) – 1 x 560k (R309)



89) – 1 x 15n film (C304)

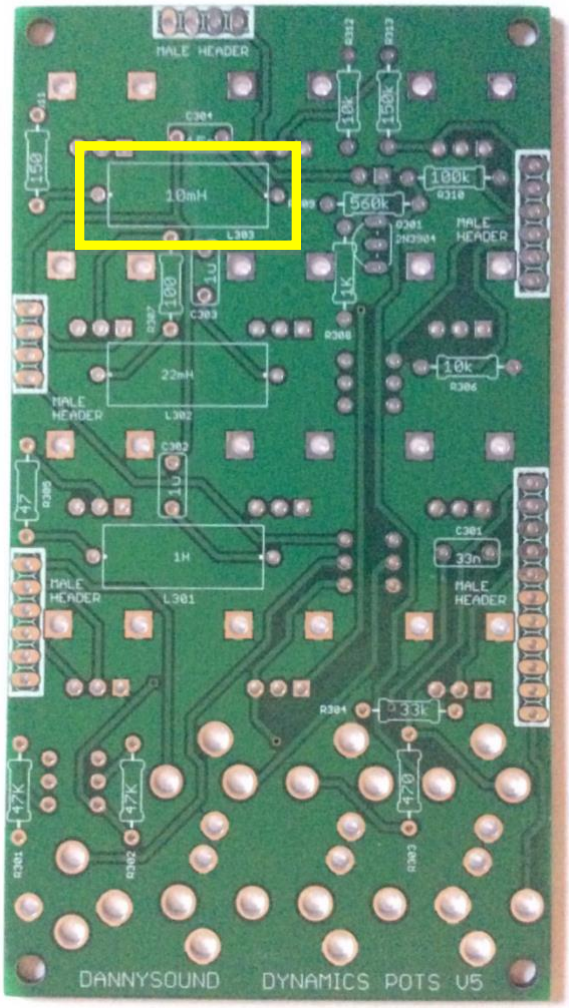


90) – 1 x 33n film (C301)

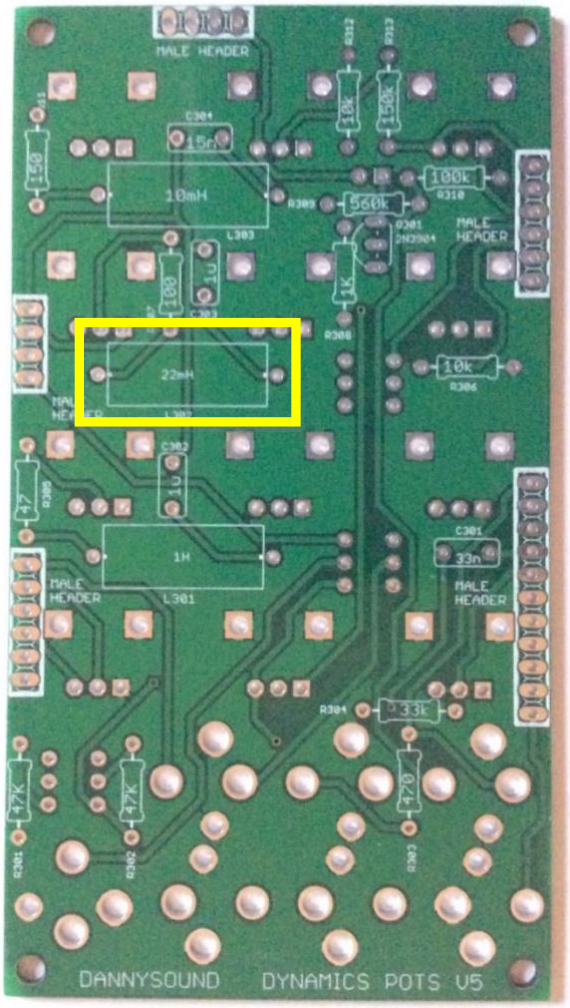


91) – 2 x 1u film (C302, C303)

INDUCTORS

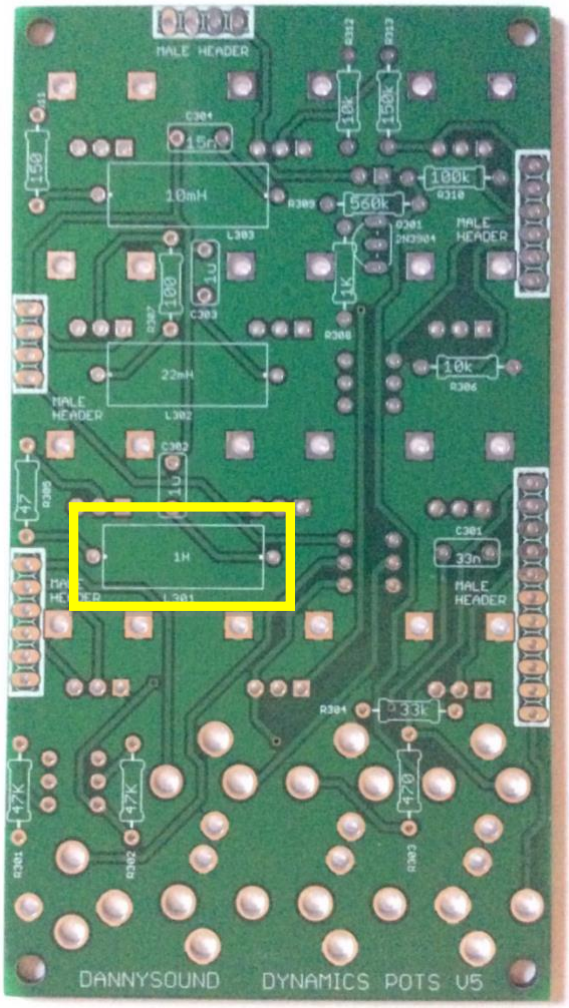


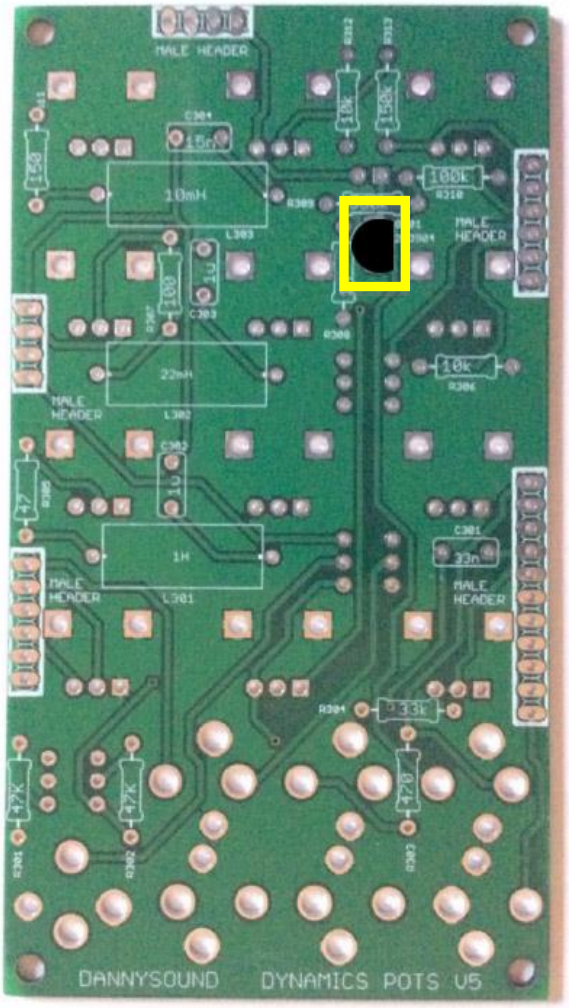
92) – 1 x 10mH (L303)



93) – 1 x 22mH (L302)

TRANSISTOR



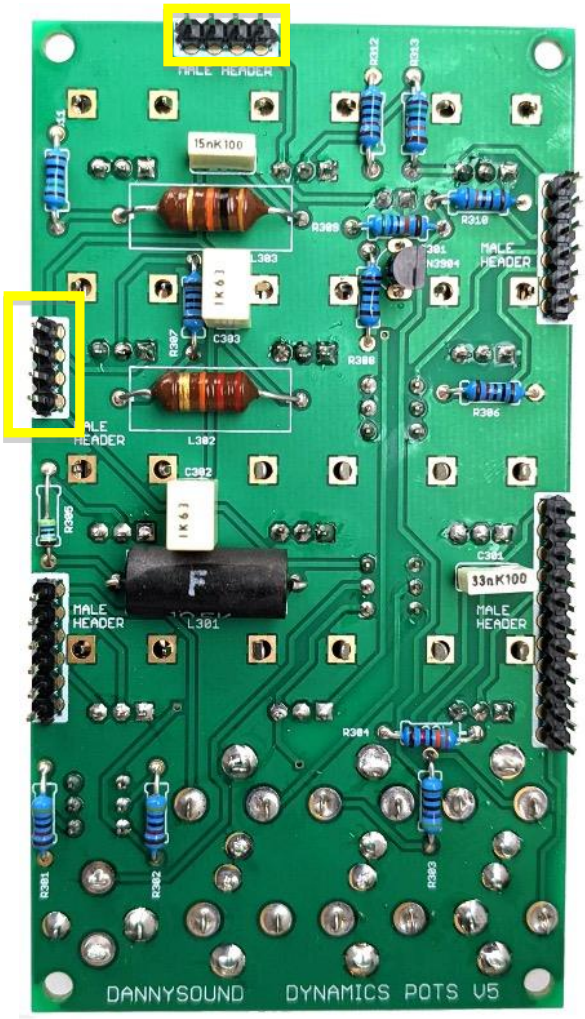


94) – 1 x 1H (L301)

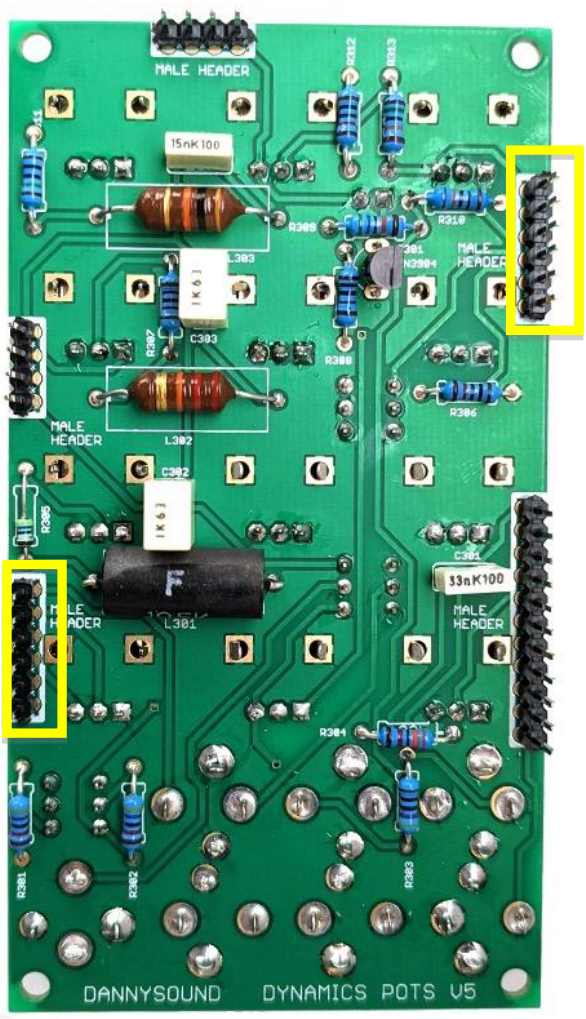
95) – 1 x 2N3904 (Q301)

Note: Do not use matched pairs here
Note: mind polarity – match curve of the component with PCB silkscreen

HEADERS



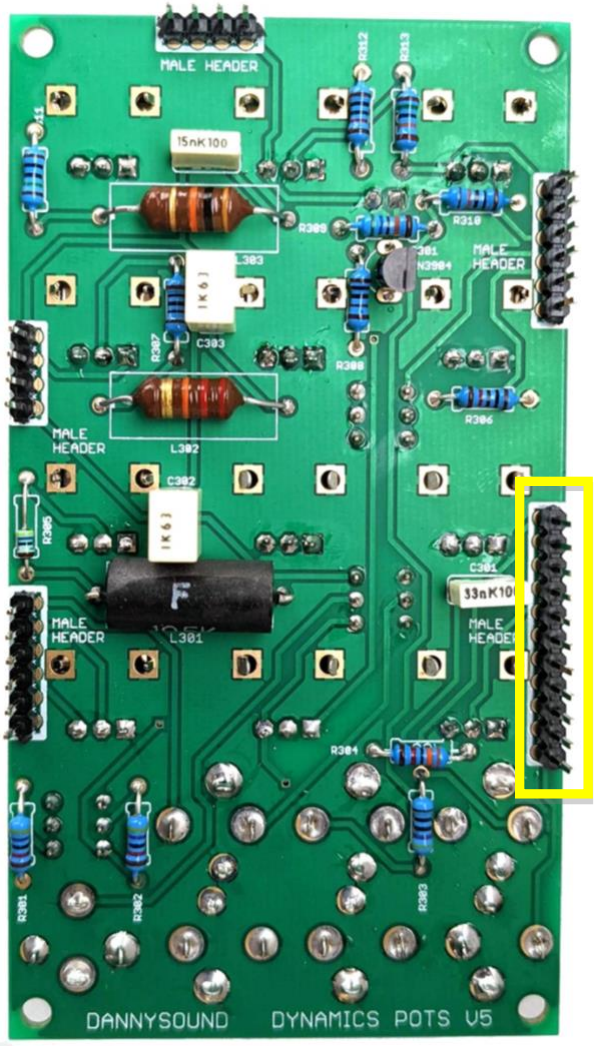
96) – 2 x 4 Pin MALE header



97) – 2 x 6 Pin MALE header

Note: these male headers must be places on the same side as all previously soldered components on this PCB.

Break off these headers from the longer pin strip

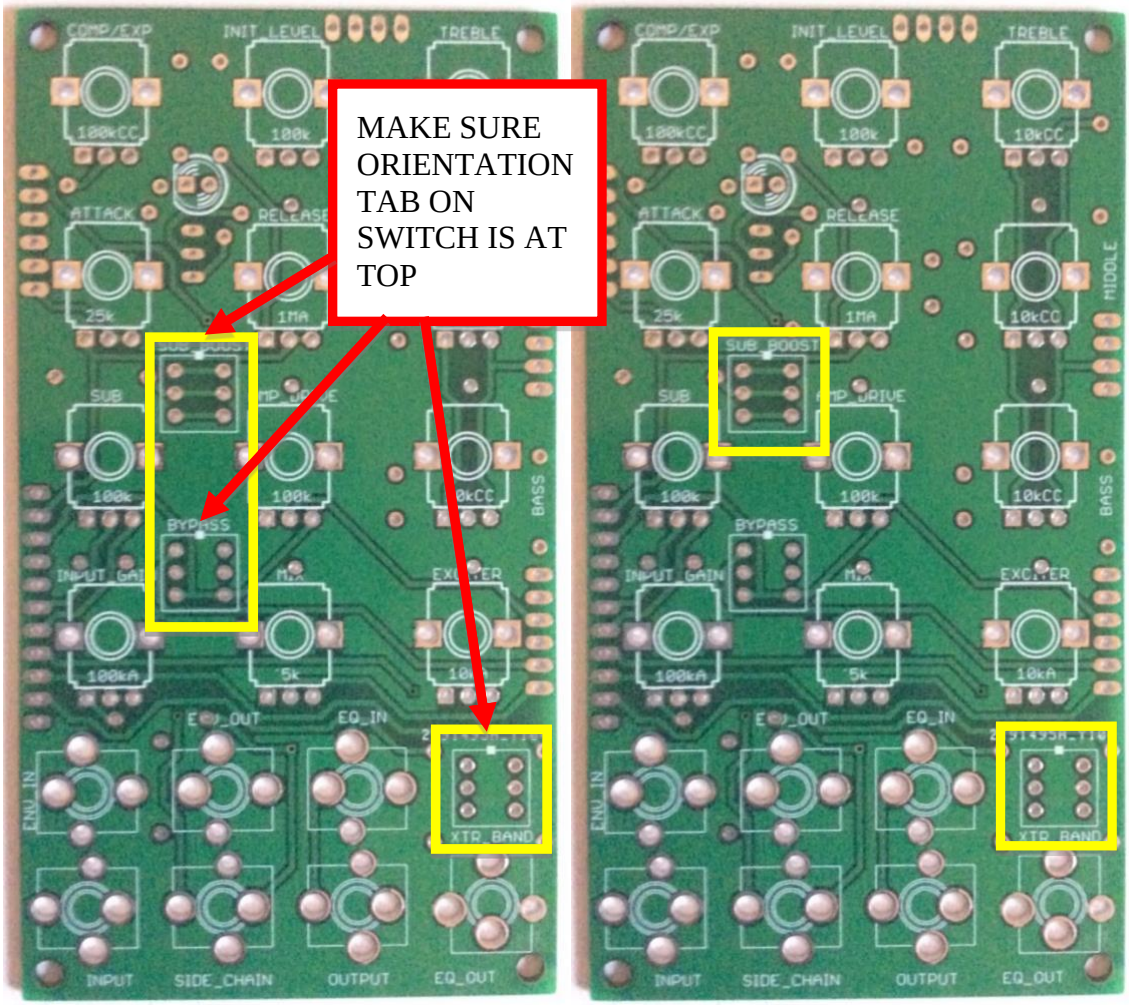


98) – 1 x 11 Pin MALE header

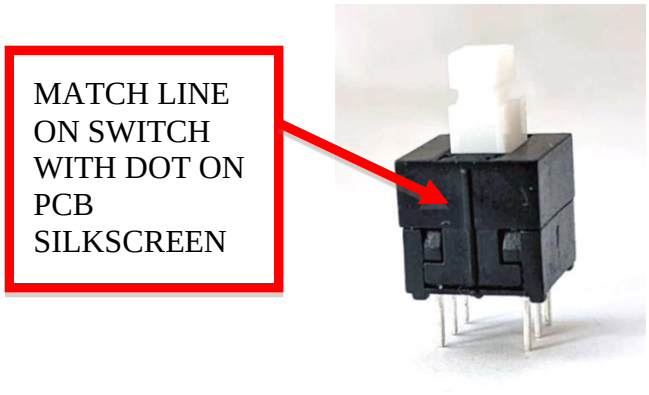
Note: this header must be placed on the same side as all previously soldered components on this PCB.

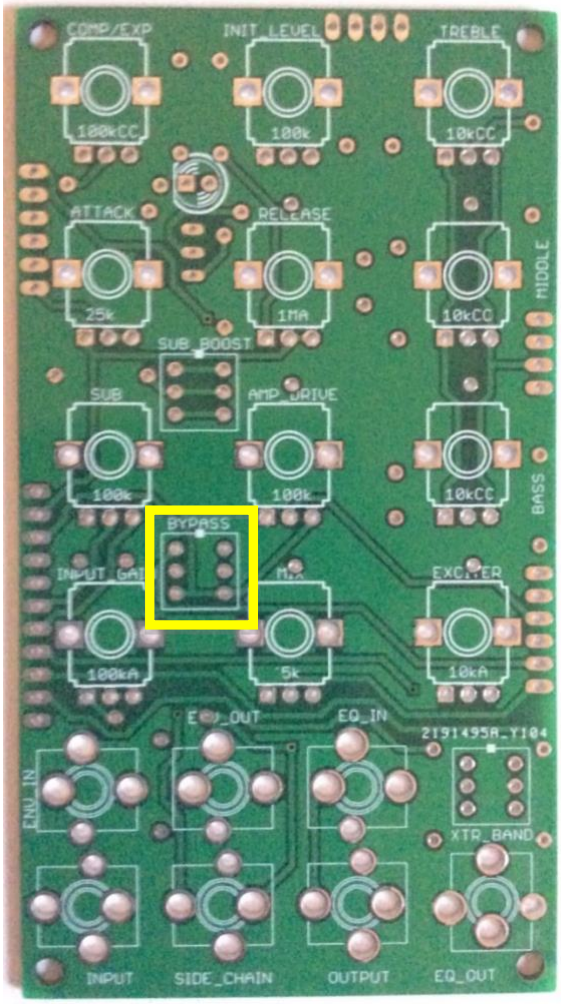
7 Panel Components and Final Assembly

SWITCHES
The switches have a slight ridge on one side that indicates the orientation. Make sure this is facing the correct way as indicated on the PCB.
(TIP ONLY SOLDER ONE PIN OF THE SWITCHES UNTIL PANEL IS FITTED TO ENABLE EASY REPOSITIONING IF REQUIRED)



99) – 3 x PUSH SWITCHES **100) – 2 x WHITE BUTTON CAPS**

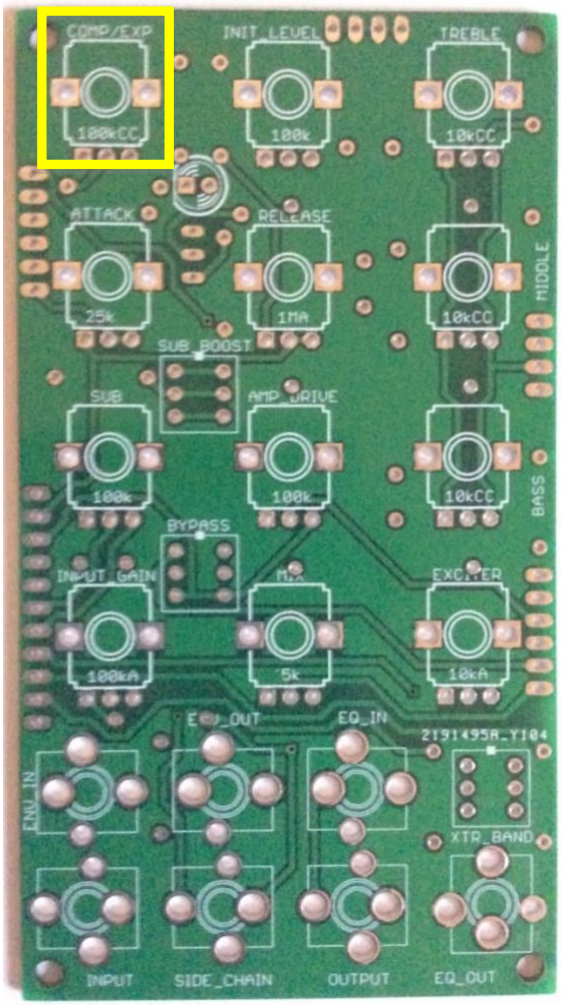




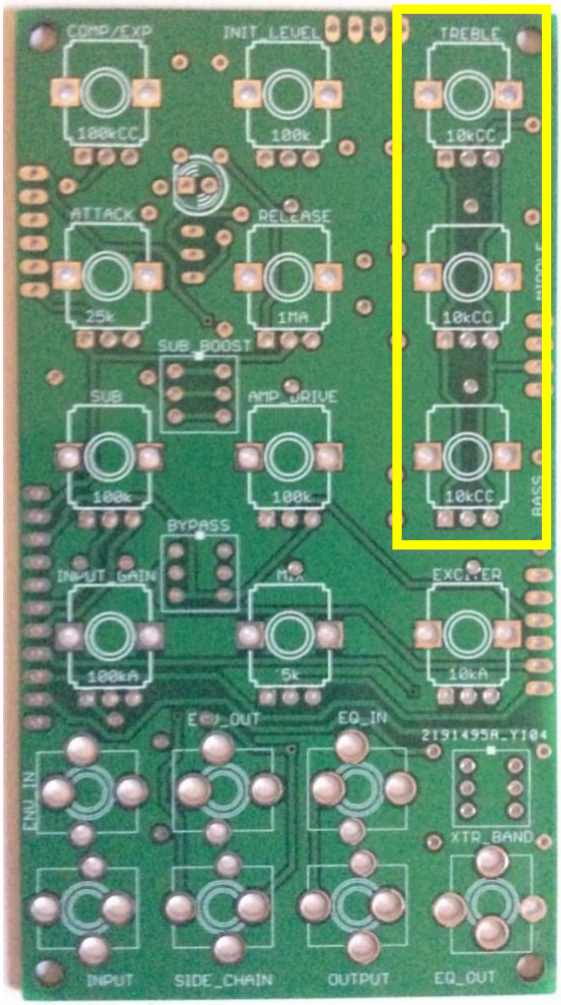
101) – 1 x RED BUTTON CAP

POTS, JACK SOCKETS AND LED

These Components should be inserted but NOT SOLDERED until the panel has been placed on top of the PCB. This is to ensure that the PCB fits the panel properly.

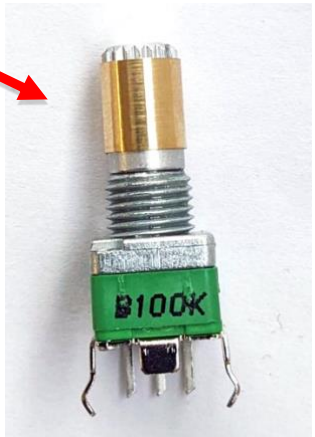


102) – 1 x Alpha B100k pot Centre-detent (Metal, green)

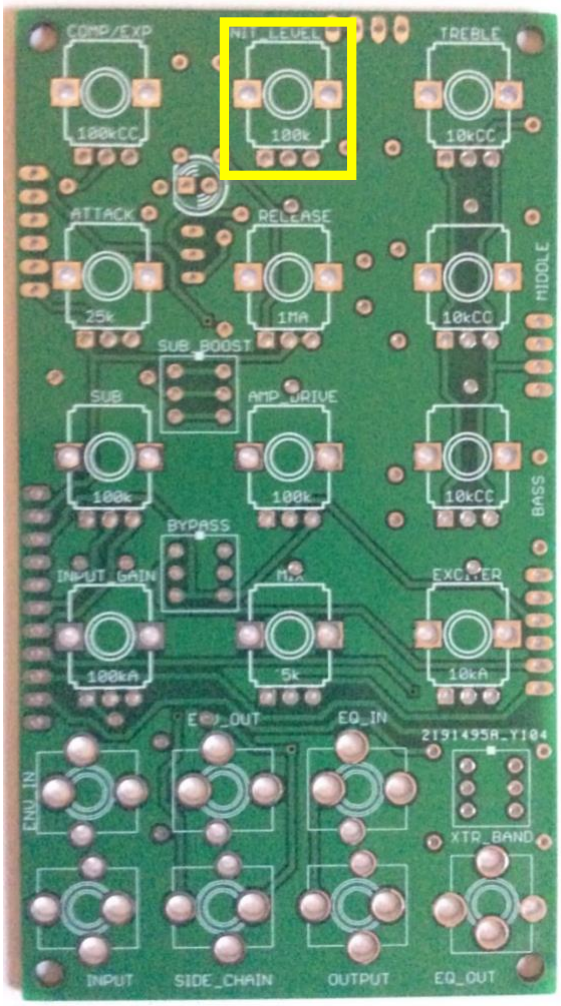


103) – 1 x Alpha B10k pot Centre-detent (Metal, green)

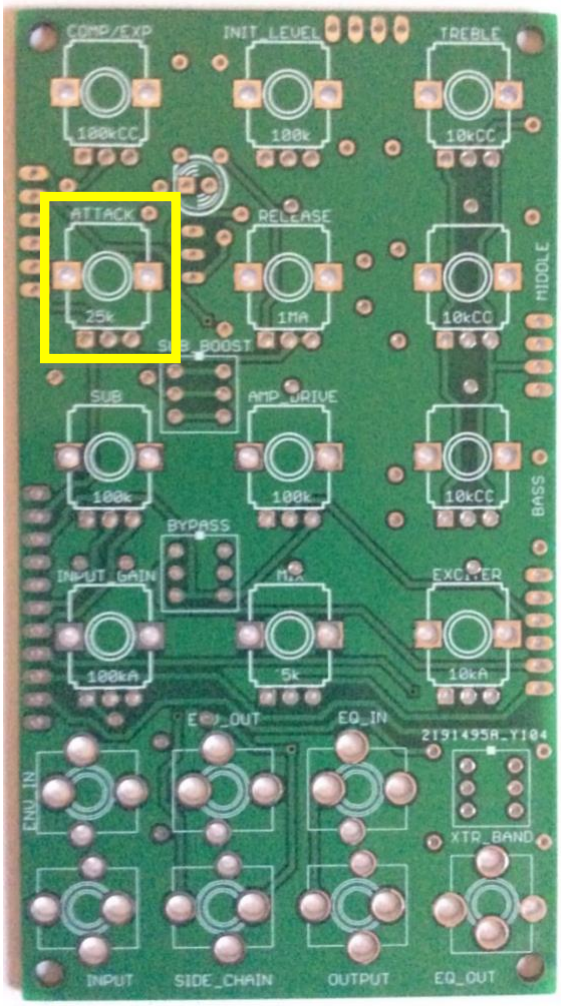
Note: some Thonk kits include a T18 shaft B100K centre-detent pot with brass adaptor. In this case attach the brass adaptor onto the pot like this



Remember: Place but don't solder yet

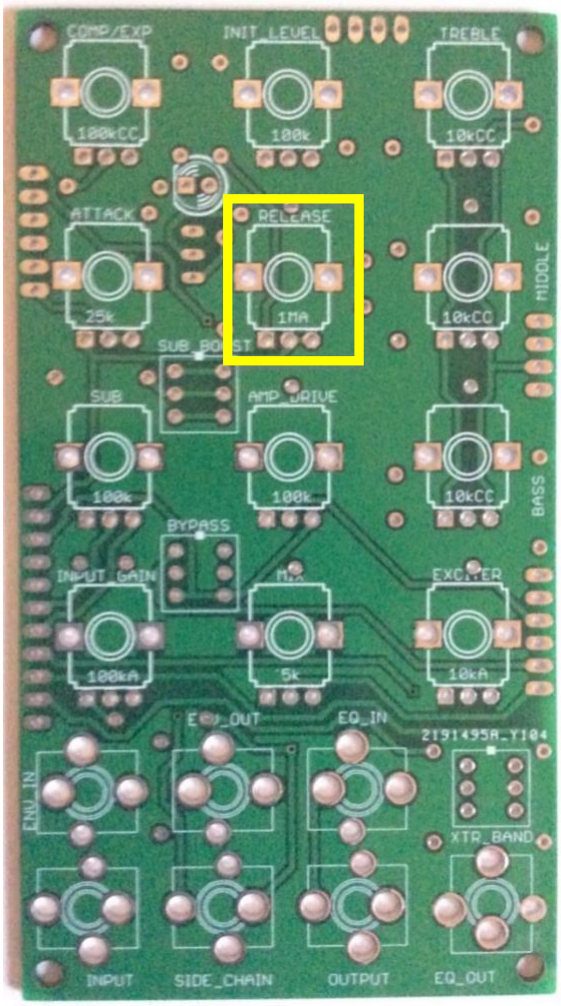


104) – 1 x B100K ALPHA POT
(Metal, green)

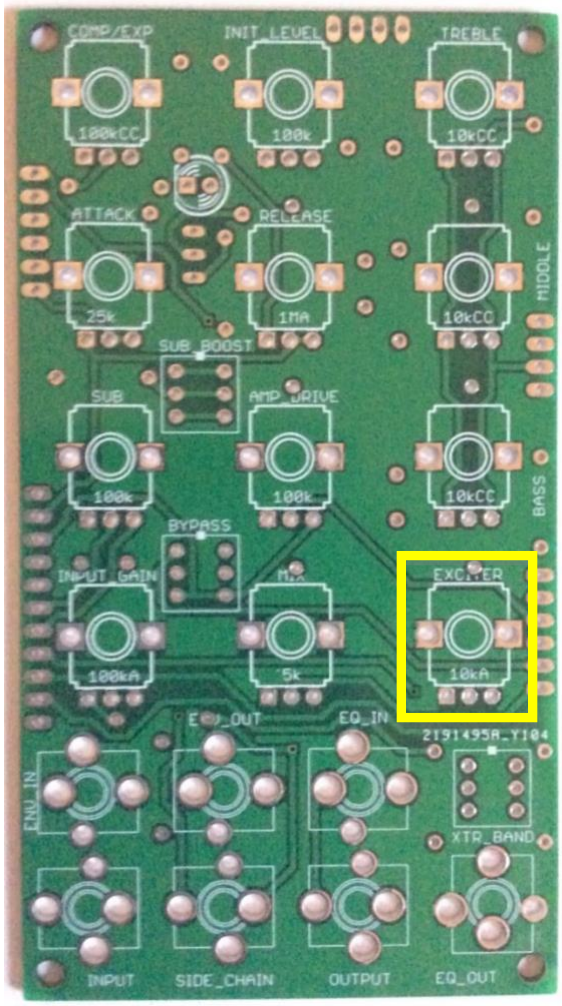


105) – 1 x B25K ALPHA POT
(Metal, green)

(Place but don't solder yet)

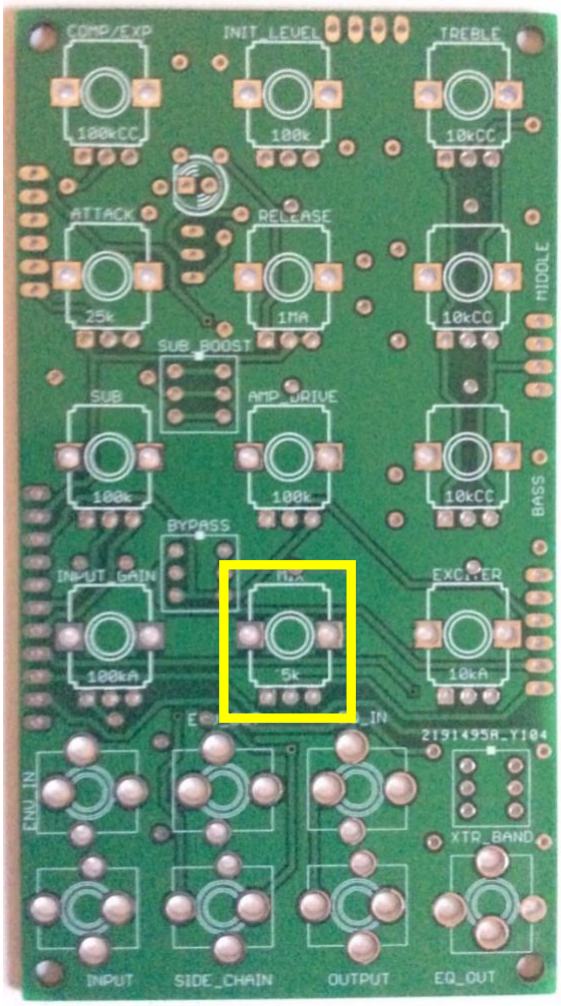


106) – 1 x A1M ALPHA POT
(Metal, green)

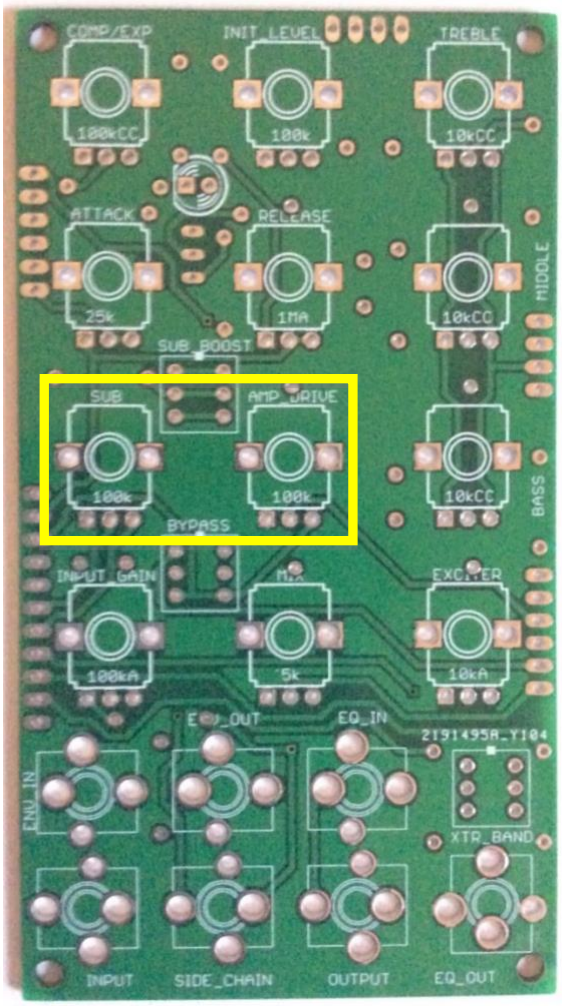


107) – 1 x A10K ALPHA POT
(Metal, green)

(Place but don't solder yet)

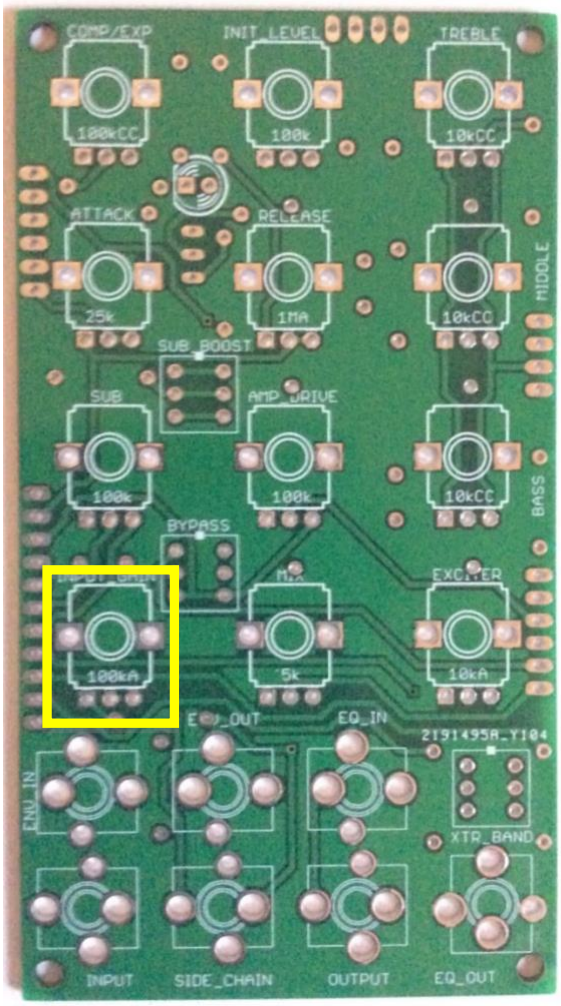


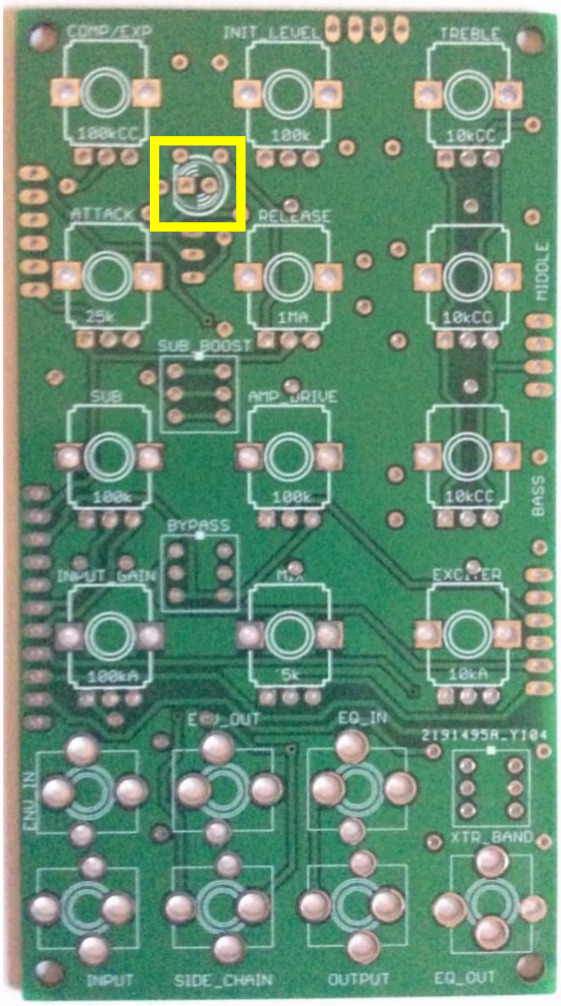
108) – 1 x B5k TALL TRIMMER
(plastic, blue & black)



109) – 2 x B100k LIN TALL TRIMMER
(plastic, blue & black)

(Place but don't solder yet)



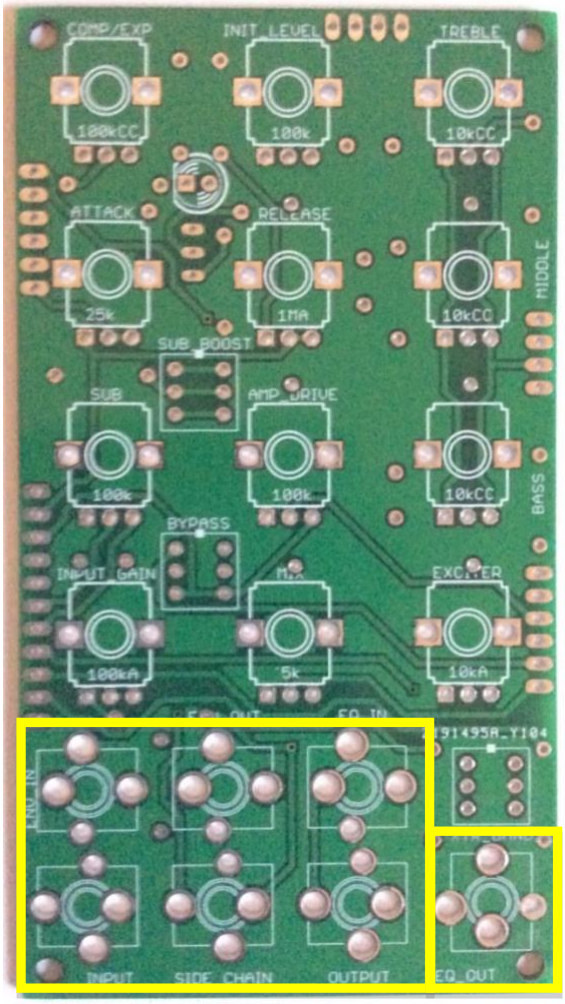


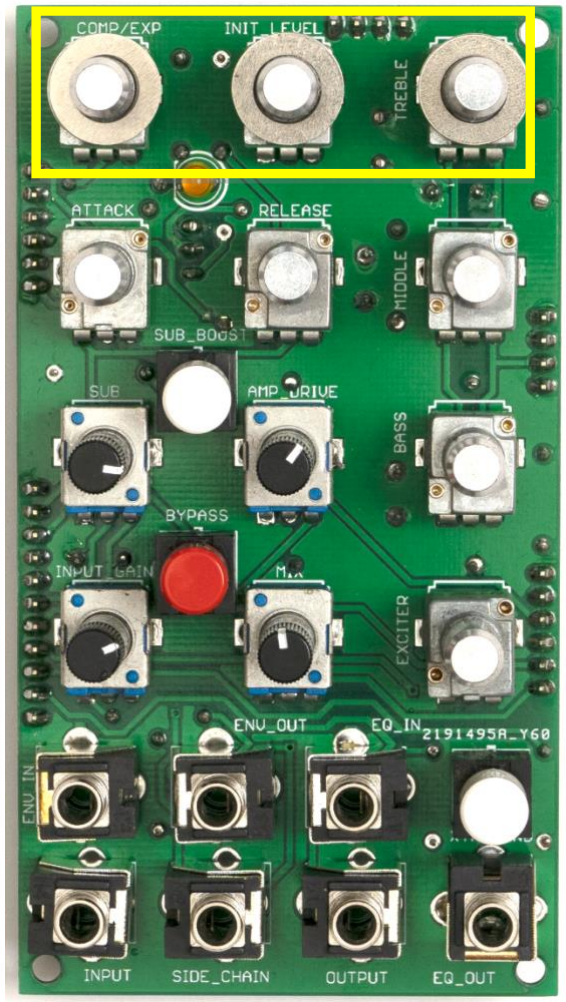
110) – 1 x A100k LOG TALL TRIMMER
(plastic, blue & black)

(Place but don't solder yet)

111) – 1 x AMBER LED

NOTE: orientation is vital for the LED, the shorter leg should go to the square pad

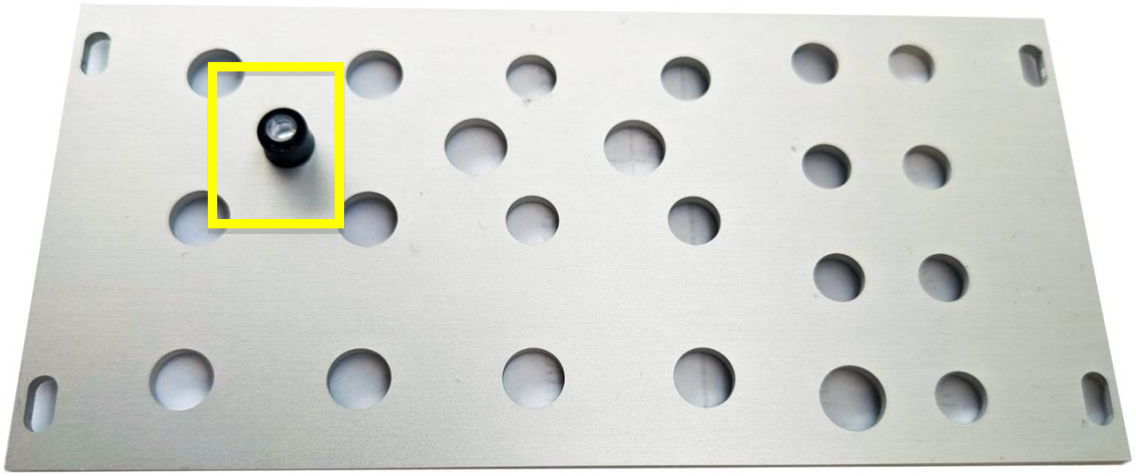




112) – 7 x JACK SOCKETS
(Place but don't solder yet)

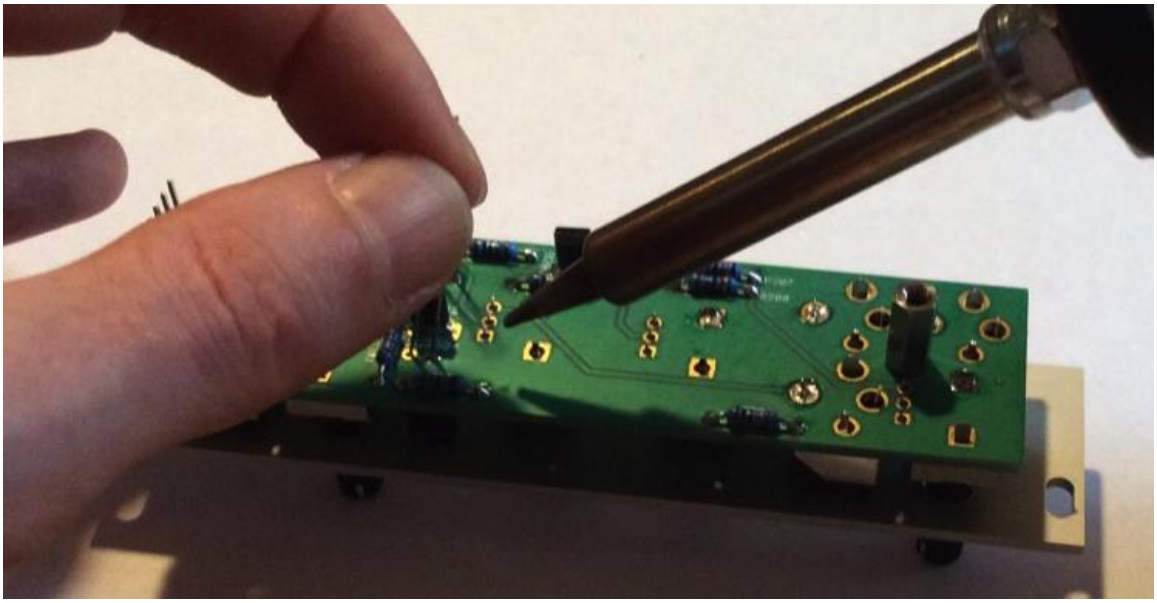
113) – 3 x 3 ALPHA WASHERS

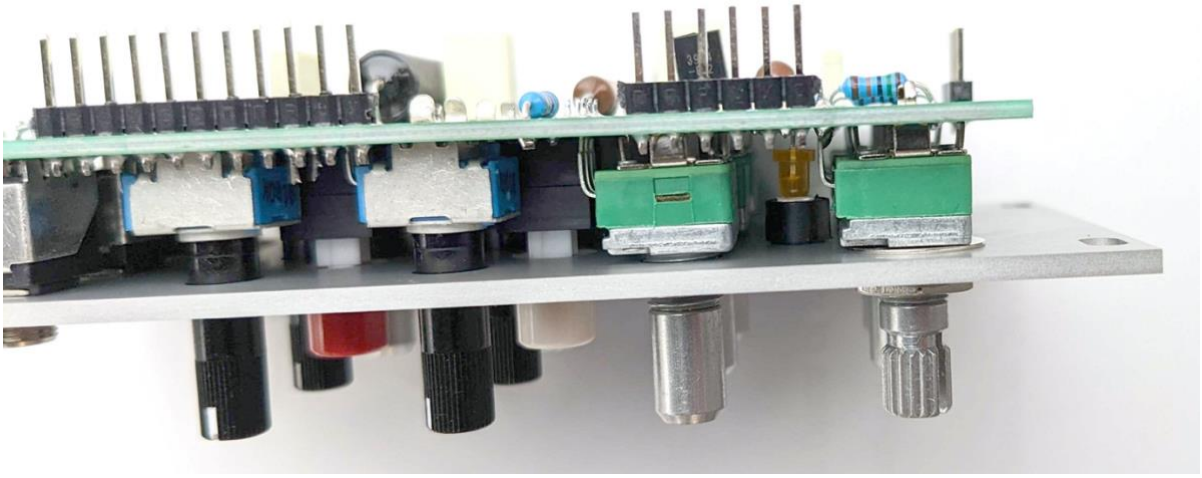
114) – Insert the Light Pipe into the panel and secure with rubber holder.



115) – Check all parts are placed correctly and then carefully fit the panel in place. Then add a nut on the COMP/EXP, INITIAL LEVEL and TREBLE pots to keep the panel in place.

116) – While holding everything together turn over and solder one pin of the INPUT jack socket and one pin of the EQ_OUT jack socket. Ensure these sockets are pressed to the PCB properly (reflow the solder whilst applying pressure to the socket if it's not flat to the PCB at first). Then attach nuts to these 2 sockets to keep everything in place.





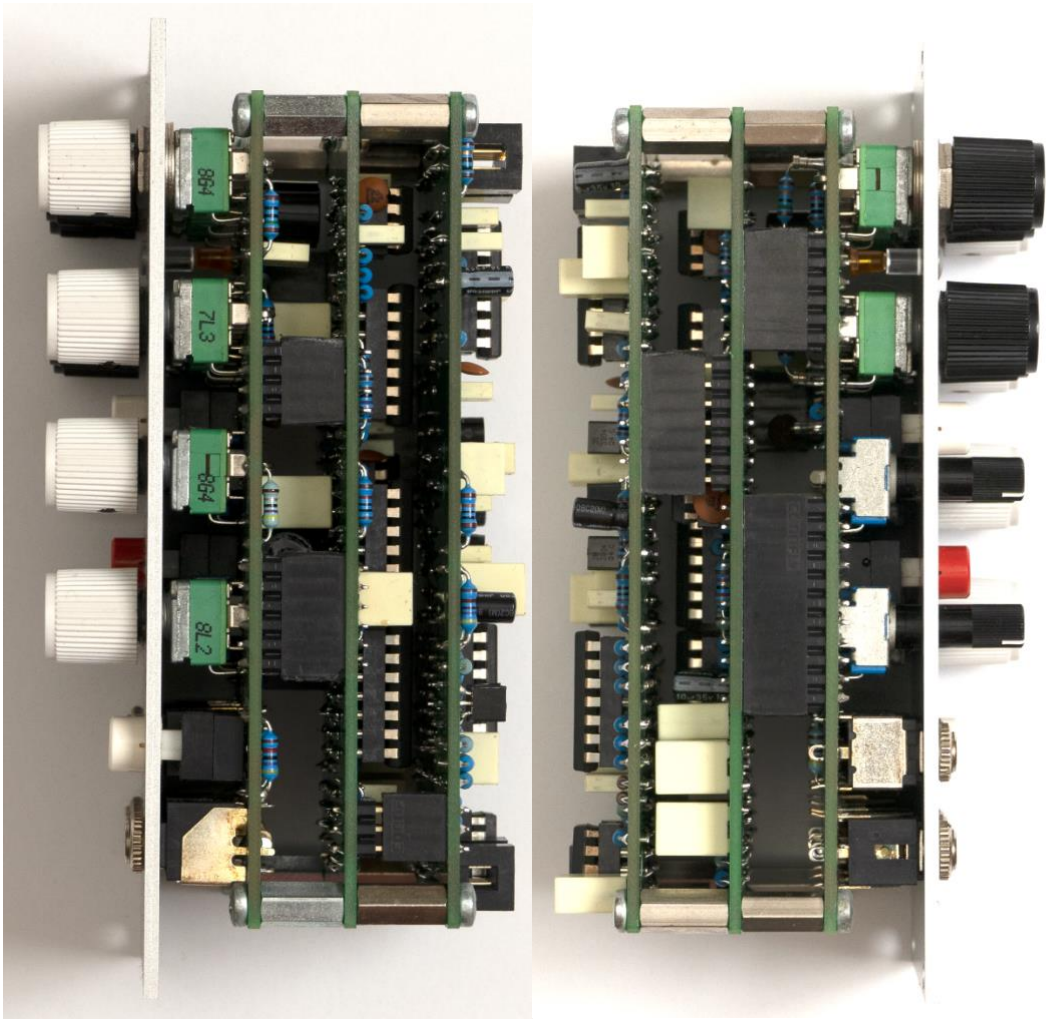
117) – Solder the LED.

TIP – Solder only one leg of the LED, you can then reflow the solder on that pin while holding the LED legs to position it against the light pipe when the pots PCB is attached to the panel. (Above pictures are for illustration purposes only)

18) – Attach the 8 x knobs to the alpha pots and then solder one of the ground tabs of each pot (including the tall trimmers). There is a little room for adjustment of the tall trimmers and pots, so if they look out of alignment against the graphics or if the tall trimmers slightly rub when you turn them, you can reflow the solder whilst applying a little pressure to get them positioned perfectly.

Note: if you have a brass adaptor, it's easiest to first insert the adaptor inside the knob after loosening the hex screw and then place the knob with adaptor inside onto the pot.

119) – Add the rest of the nuts to the jack sockets to hold everything together firmly. Once that's all done and looking good you can solder all the rest of the pins of each panel component.



120) – Add the 11mm female-female standoffs to the pots PCB. Then connect the mid PCB and add the 12mm male-female standoffs. Then connect the outer PCB and screws.


DYNAMICS
COMPRESSOR / EXPANDER
EQ + EXCITER
COMP/EXP
INITIAL LEVEL
TREBLE
ATTACK
RELEASE
MIDDLE
BOOST
SUB BASS
AMPLIFIER DRIVE
BASS
BYPASS
INPUT GAIN
MIX
EXCITER
ENV IN
ENV OUT
EQ IN
EXCITER BW
INPUT
SIDE CHAIN INPUT
COMP/EXP OUT
EQ OUT
DANNYSOUND

121) – Finally!

8 Testing

If you feel confident about your build you can just start using it but if you're not sure here's a list to help check all the controls.

1. Set MIX control to 0 (compressor output).
2. Set all other controls to 50% (12 o'clock).
3. Connect +/- 5V sinewave to Input.
4. Connect COMP/EXP OUT to mixer.
5. Ensure that you can hear the sine wave and that the amber LED is lit.
6. Bypass the Dynamics module by pressing the red BYPASS button so it's "in" and ensure you can still hear the sinewave.
7. Adjust the INPUT GAIN up and down and ensure the volume goes up and down. It shouldn't go completely off though as it's a sensitivity setting rather than a volume control.
8. Un-bypass the module by pressing the BYPASS button and adjust the AMPLIFIER DRIVE up and down. The volume should go from 0 to full then start to soft clip towards the end of the control travel. This is also dependant on INPUT GAIN and the compressor settings so if it clips too early/late you can adjust the INPUT GAIN and INITIAL LEVEL to compensate.
9. Turn the COMP/EXP all the way to the left so it's fully compressed. You should here the volume drop to 0 or thereabouts.
10. Turn the INTIAL LEVEL to 0.
11. Turn the COMP/EXP right to 100% so it's fully expanded. You should here the sinewave at full volume.
12. Change the sine wave to a square wave and connect the mixer to the EQ OUT.
13. Adjust each of the TREBLE, MIDDLE, BASS and EXCITER controls to ensure they function as expected. You might need to adjust the frequency of the square wave for each band to hear the controls working.
14. With the EXCITER control around 12 0'clock – press the EXCITER BW button to change the frequency of the Exciter. You might need to use a noise source or drums with cymbals or hi-hats, instead of the square wave, to hear the Exciter working.
15. Connect a +/- 5V rhythmic source such as drums or a pulse signal to the INPUT.
16. Set INPUT GAIN to around 60%.
17. Adjust the ATTACK and RELEASE controls and ensure that the LED changes accordingly. You might need to adjust INPUT GAIN if your source is not +/- 5V.
18. To test the SUB BASS enhancer you can just adjust the control up and down and listen. It works at a fairly low frequency so it's best to listen on good headphones or speakers with an audio source the already has some low frequency stuff in it.
19. Lastly press the BYPASS button again to ensure that the bypassed signal is also going to the EQ OUT socket.

20. To test the ENV OUT socket you can connect it to an oscillator FM input or a filter frequency CV or just an oscilloscope to ensure that the envelope is present.
21. To test the SIDE CHAIN input connect the rhythmic source to the SIDE CHAIN input. Connect an oscillator to the INPUT. Set the COMP/EXP control to 0 and INITIAL LEVEL to 60%. Adjust the ATTACK and RELEASE controls to hear the oscillator level being changed in time with the rhythm.
22. To test the ENV IN remove the rhythmic source from the SIDE CHAIN input and connect the output of an envelope to the ENV IN socket.
23. Trigger the envelope and ensure it changes the oscillator level. You can set the INITIAL LEVEL to 0 and the COMP/EXP to full if you want to use the Dynamics as a simple VCA.

9 Modifications

I have done quite a bit of testing with different values to get the character for this design right but if you want try these mods you're more than welcome.

ENVELOPE DETECTOR BASS FILTER CAP
C301 is a 33uF capacitor that filters out some of the bass of the signal that drives the envelope detector. This helps to even out the response of the envelope detector across the frequency range. If you want the detector to respond more to the bass, simply increase the value or remove this cap altogether.

SUB BASS ENHANCER COMPRESSION
The Sub Bass enhancer has it's own compression circuit to allow the sub bass to be enhanced whilst keeping the overall peak levels the same. The compression can be reduced by increasing the value of R122 from 51K up to around 100k.

EQ SECTION
The EQ section can be modified a number of different ways. The inductor and capacitor in the LCR circuit determine the centre frequency of the band.
The equation for the centre frequency is $f = \frac{1}{2\pi\sqrt{LC}}$.
The value of the resistor determines the Q factor, lower resistor values increase the Q making a more resonant, narrower peak.
The equation for the Q factor is $Q = \frac{1}{R}\sqrt{\frac{L}{C}}$ and the bandwidth is $BW = \frac{f}{Q}$
The components for each section are:

TREBLE	MIDDLE	BASS
L303 = 10mH C304 = 15nF R311 = 150r	L302 = 22mH C303 = 1uF R307 = 100r	L301 = 1H C302 = 1uF R305 = 47r
$f = \frac{1}{2\pi\sqrt{10x10^{-3}x15x10^{-9}}} = 13kHz$ $Q = \frac{1}{150}\sqrt{\frac{10x10^{-3}}{15x10^{-9}}} = 5.44$ $BW = \frac{13x10^{3}}{5.44} = 2.4kHz$	$f = \frac{1}{2\pi\sqrt{22x10^{-3}x1x10^{-6}}} = 1.07kHz$ $Q = \frac{1}{100}\sqrt{\frac{22x10^{-3}}{1x10^{-6}}} = 1.48$ $BW = \frac{1.07x10^{3}}{1.48} = 723Hz$	$f = \frac{1}{2\pi\sqrt{1x1x10^{-6}}} = 159Hz$ $Q = \frac{1}{47}\sqrt{\frac{1}{1x10^{-6}}} = 21.28$ $BW = \frac{159}{21.28} = 7.5Hz$

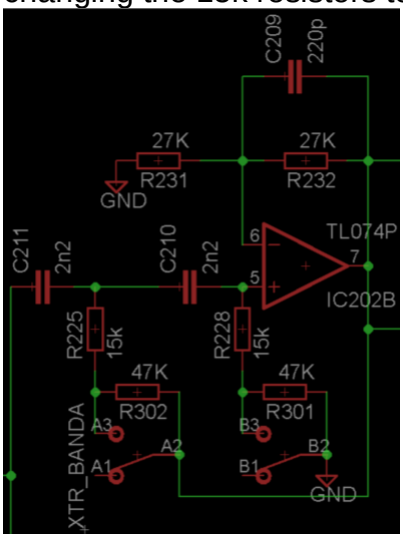
$f = \frac{1}{2\pi\sqrt{10x10^{-3}x15x10^{-9}}} = 13kHz Q = \frac{1}{150}\sqrt{\frac{10x10^{-3}}{15x10^{-9}}} = 5.44 BW = \frac{13x10^{3}}{5.44} = 2. =$
$21.28 BW = \frac{159}{21.28} = 7.5Hz$

The Treble, Middle and Bass pots are also in series with the LCR circuit. The values of these pots are 10k and the combination of the series resistance greatly reduces the Q factor of the circuits. This basically means the peak of each EQ starts broad with not much resonance but as the control is increased so does the Q factor and the peaks become narrower and more resonant.

If you want to retain the Q of the filter more, then reducing the value of these pots to as low a value as you can get should help.
You can also try searching the web for a series RLC circuit calculator if you can't be bothered with the maths!
http://calctool.org/CALC/eng/electronics/RLC_circuit

HARMONIC EXCITER FREQUENCY BAND

The Harmonic Exciter frequency band can be changed by increasing or decreasing the resistor pairs in the filter circuit.
R225 and R228 are both 15k and R301 and R302 are both 47k. So you could try changing the 15k resistors to 10k and the 47k ones to 68k or something.



Here is a picture of the schematic, if you want to calculate different components for alternate frequency responses it's best to try an online calculator as the equations are a little long.
This one seemed quite good http://sim.okawa-denshi.jp/en/OPseikiHikeisan.htm