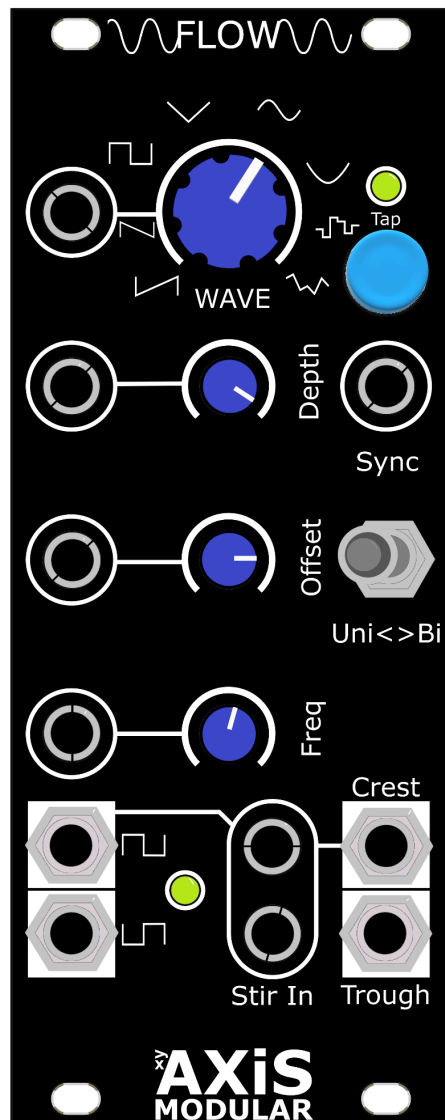


FLOW Build Guide



Hello fellow DIYer! Thank you for purchasing the FLOW DIY Kit!.

This is an ideal intermediate DIY soldering project. It's not too difficult however please read through the manual carefully. There are certain steps you need to take to make a successful build.

Also, as there are various IC's(FLOW IC, TL074 and TL072) please take precautions for antistatic discharge such as an antistatic band.

It is recommended that you do have some soldering experience, this is not an ideal build for a beginner to soldering. Please check out these useful guides [here](#).

By undertaking the construction and soldering yourself you agree that it is your responsibility to complete the final build safely and confidently. This kit is sold almost exclusively through Think and you can find full terms and conditions [here](#).

EBB/FLOW B.O.M.

Note: Below is listed the ideal recommended order for board component placement.

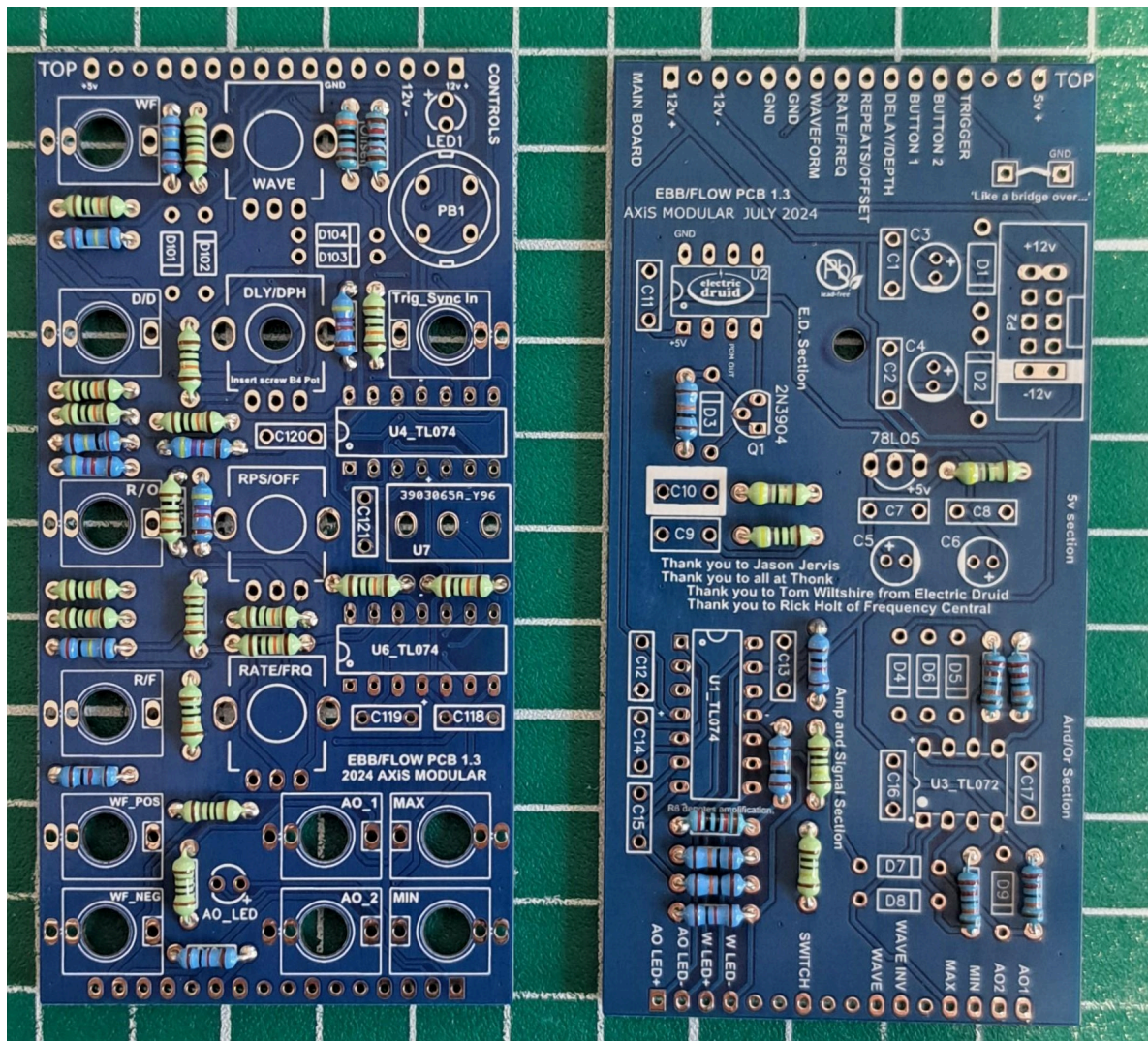
Resistor and capacitor designations below 100 can be found on the main board, any 100 and above are found on the control board.

Order	Name	Designator	AMT	✓
Low level components				
1	47r Resistor	R1,R4	2	
2	10k Resistor	R2,R5,R7,R8	4	
3	470r Resistor	R3	1	
4	20k Resistor	R6	1	
5	220k Resistor	R9,R10,R11,R12	4	
6	1.0M Resistor	R13,R14	2	
7	1k Resistor	R15,R16,R107,R124	4	
8	200k Resistor	R101,R102,R103,R127	4	
9	4k7 Resistor	R104,R114,R115,R123	4	
10	30k Resistor	R105	1	
11	12k Resistor	R106	1	
12	100k Resistor	R108,R109,R110,R111,R112,R113,R116,R117,R118 ,R119,R120,R121,R122,R128,R129,R130	16	
13	180r Resistor	R125,R126	2	
14	1N4148 Diode	D3,D4,D5,D6,D7,D8,D9,D101,D102,D103,D104	11	
15	4001 Diode	D1,D2	2	
16	Button GND Jumper Wire	J3 to J4	1	
IC Sockets				
17	8 pin IC socket EBB/FLOW IC and TL072 socket	U3, U2	2	
18	14 Pin IC socket	U1,U4,U6	3	
Capacitors, regulator and transistor				
19	100nf Ceramic Capacitor	C1,C2,C7,C8,C11,C12,C13,C16,C17,C118,C119,C1 20,C121	13	
20	10nf Ceramic Capacitor	C14,C15	2	
21	100nf Box Capacitor	C9	1	

22	78L05 Power Regulator	U5	1
23	2N3904 NPN Transistor	Q1	1
24	Box Power header	P2	1
25	1uf Box Capacitor	C10	1
26	22uf Electrolytic Capacitor	C3,C4	2
27	100uF Electrolytic Capacitor	C5	1
28	10uF Electrolytic Capacitor	C6	1
		Note: Place all control board parts and attach the front panel before soldering.	
29	Thonk Mono Jacks	AO_1,AO_2,TRIG, WF,D/D,R/O,R/F,WF_INV,WF_POS,MIN,MAX	11
30	M3 nylon spacer, washer and screw	<i>Place screw through hole as shown in build guide add 1 washer on other side and screw on the spacer.</i>	
31	PUSHB_MOMENTARY Switch	PB1	1
32	Waveform green metal Alpha Potentiometer 100k	WAVE	1
33	Delay/Depth Song Potentiometer 100k	DLY/DPH	1
34	Repeats/Offset Song Potentiometer 100k	RPS/OFF	1
35	Rate/Freq Song Potentiometer 100k	RATE/FRQ	1
36	MTS SPDT ON-ON SWITCH	U7	1
37	BI COLOUR LEDs	AND_OR_LED, LED1	2
<p>Note: For this build to make green indicate positive voltage ignore the normal rules and place the LED around the wrong way.</p>			
<p>Short leg to + and long leg to the other hole. (see build image). Red will indicate negative voltage.</p>			

Headers				
<i>Note: Male headers go on the control board, female headers on the main board.</i>				
38	CB_1, CB_2 16 pin male header	J1, J2	2	
39	HDR-F-2.54_1x16 16 pin female header	MB_1,MB_2	2	
Note: Now is a good time to check the board thoroughly for any solder bridges and shorts, most of the connections have been handily labelled for you.				
Op amps and EBB/FLOW IC				
40	TL074ACN Op Amp	U1,U4,U6	3	
41	TL072CP Op Amp	U3	1	
42	EBB or FLOW IC	U2	1	
<i>Screw boards together using the other nylon m3 screw.</i>				
43	T-18 Davies knob Blue/Green		1	
44	Trimmer topper Blue/Green		3	
45	Power Cable		1	
46	Rack screws		4	

Resistors



Begin your build by populating and soldering all the resistors. Although I've printed the values for you it's still wise to check each one with a multimeter before placing and soldering in its designated location on the PCB.

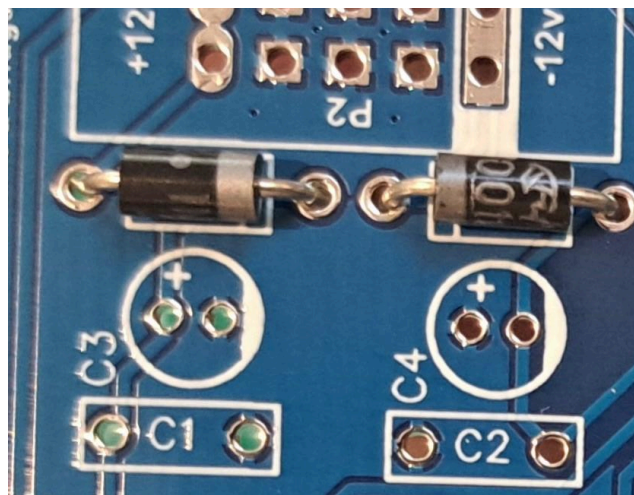
1	47r Resistor	R1,R4	2	
2	10k Resistor	R2,R5,R7,R8	4	
3	470r Resistor	R3	1	
4	20k Resistor	R6	1	
5	220k Resistor	R9,R10,R11,R12	4	
6	1.0M Resistor	R13,R14	2	
7	1k Resistor	R15,R16,R107,R124	4	
8	200k Resistor	R101,R102,R103,R127	4	

9	4k7 Resistor	R104,R114,R115,R123	4	
10	30k Resistor	R105	1	
11	12k Resistor	R106	1	
12	100k Resistor	R108,R109,R110,R111,R112,R113,R116,R117,R118,R119,R120,R121,R122,R128,R129,R130	16	
13	180r Resistor	R125,R126	2	

Done? Trim and reflow any(or all) solder joints of the resistors. I find it more successful to do this rather than wait until the whole PCB is populated.

Note: Save a resistor leg for the Bridge connection.

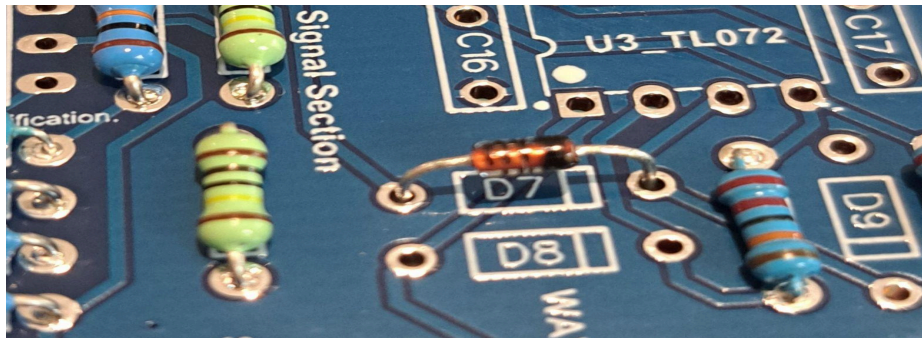
Diodes.



14	4001 Diode	D1,D2	2	
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Find the two 4001 diodes and locate D1 and D2. The line on the component should match the line on the PCB silkscreen(as shown in the image above).

Next find and place all 11 1N1418 diodes, again making sure to follow the silkscreen.

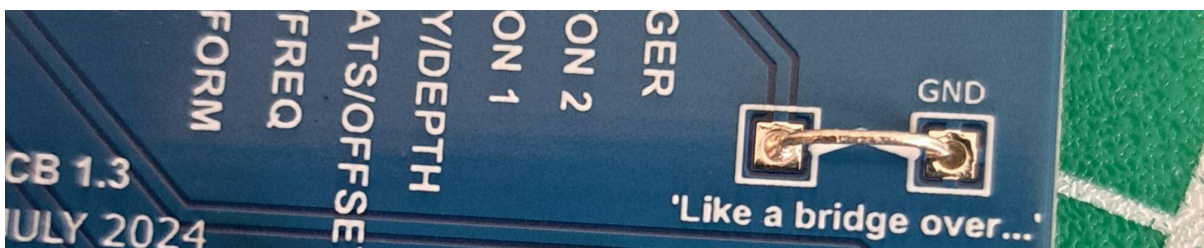
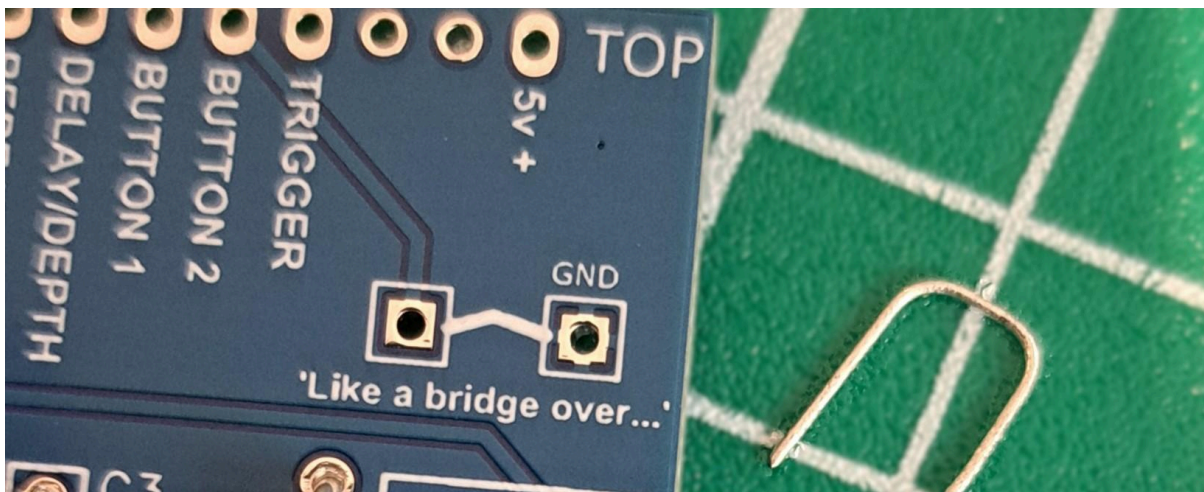


15	1N4148 Diode	D3,D4,D5,D6,D7,D8,D9,D101,D102,D103,D104	11
----	--------------	--	----

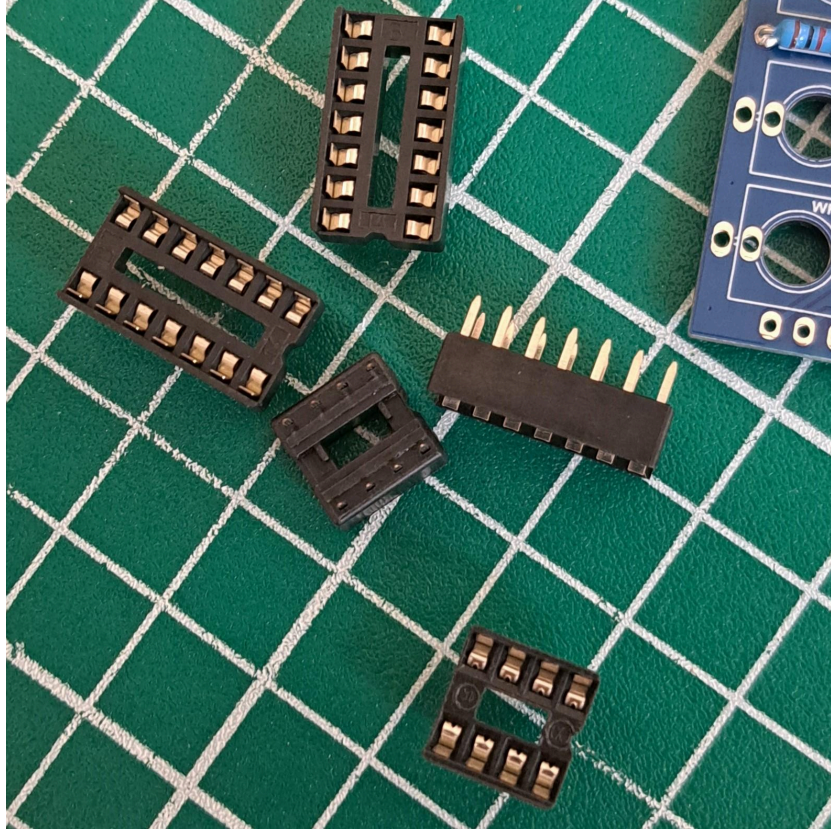
Jumper Bridge

16	Button GND Jumper Wire	J3 to J4	2
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Remember that saved resistor leg? Bend it into a curve and solder it in place as shown.



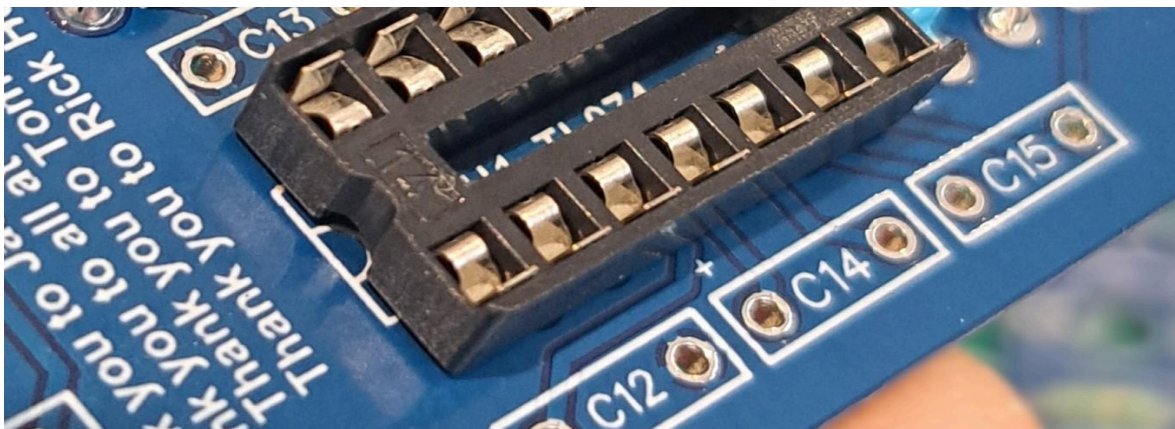
IC Sockets



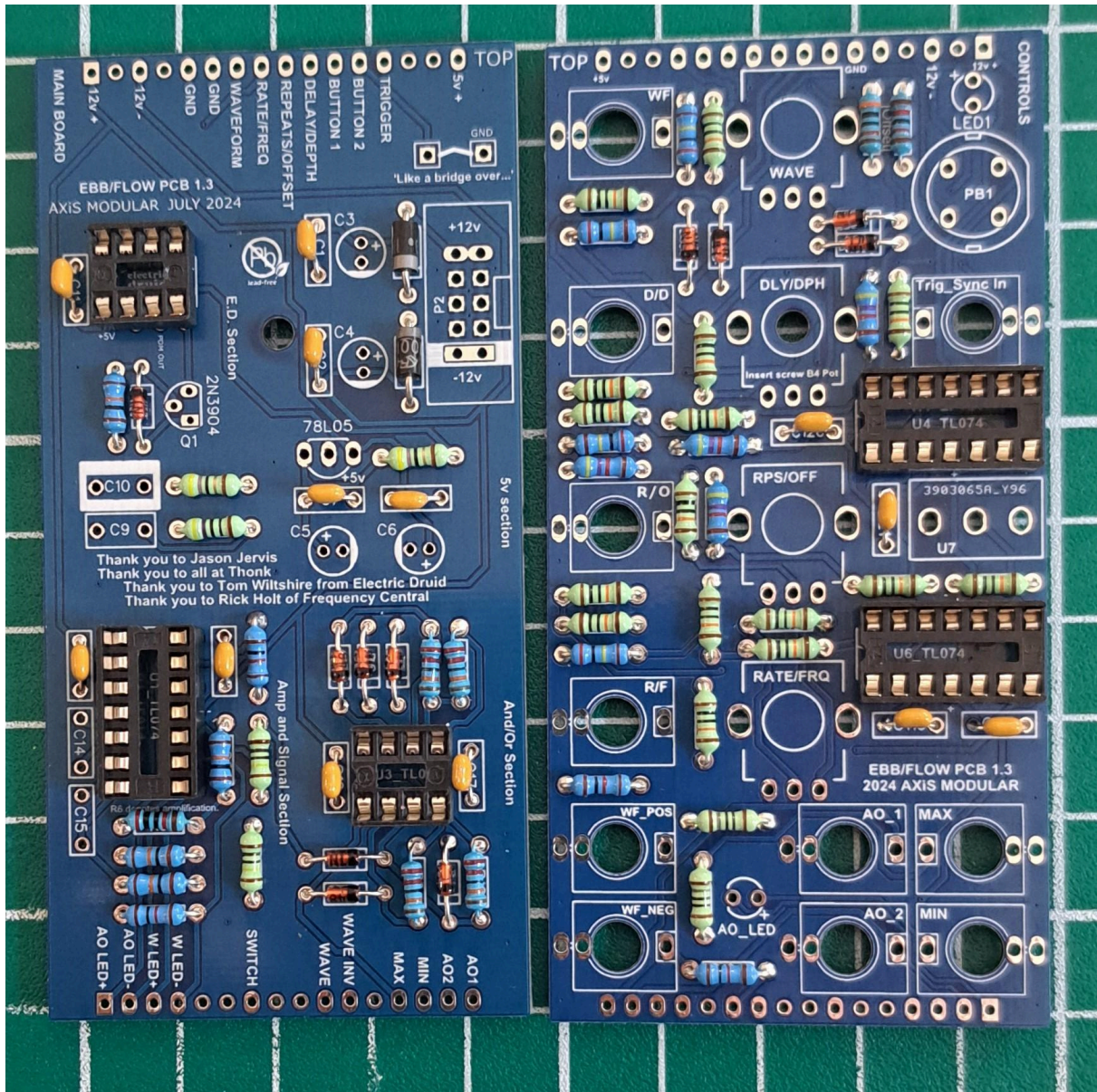
Place the 5 IC sockets into the PCBs, use either tape or bend a couple of corner legs to allow you to flip the PCB over to solder without them falling out.

8 pin IC socket EBB/FLOW	U3, U2	1	
17 IC and TL072 socket	U1, U4, U6	3	

Don't forget to match up the notch with the silkscreen image(as shown below).

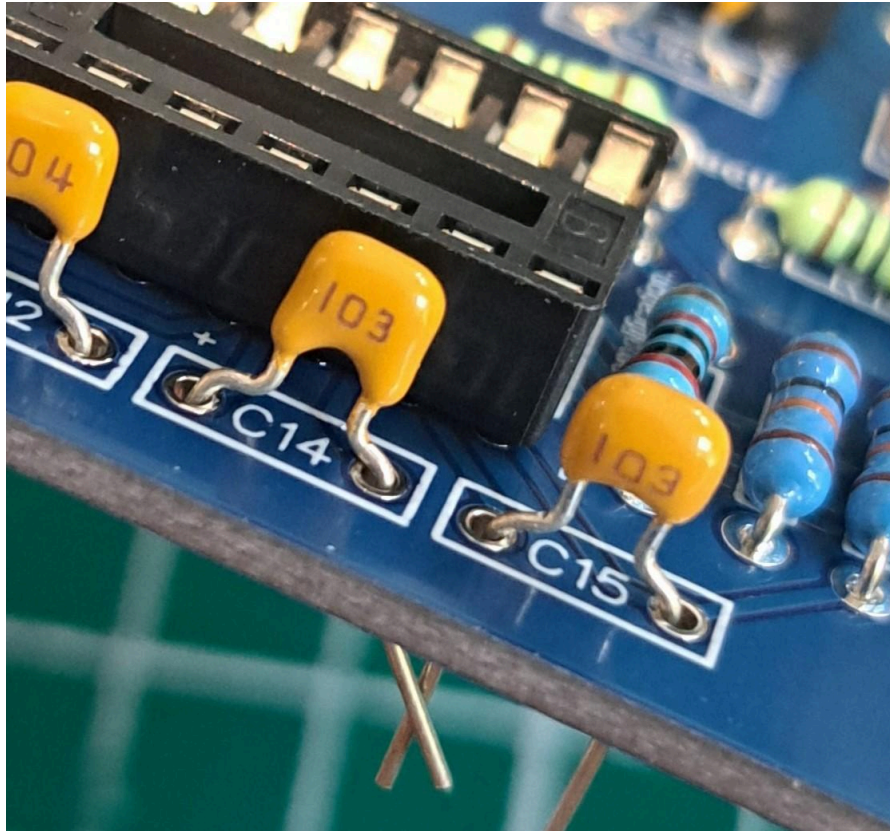


Ceramic capacitors



Locate the 11 100nf capacitors(labelled 104) and place at:

19	100nf Ceramic Capacitor	C1,C2,C7,C8,C11,C12,C13,C16,C17,C118,C119,C120,C121	13
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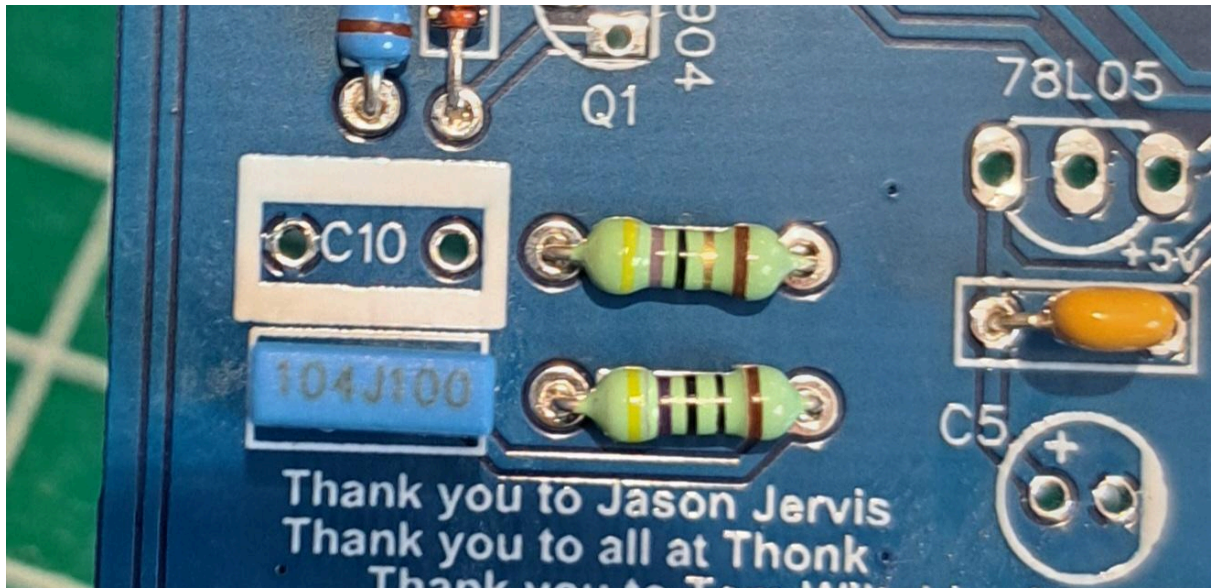


Next locate the two 10nf capacitors(labelled 103) and place it at:

20	10nf Ceramic Capacitor	C14,C15	2	
----	------------------------	---------	---	--

Solder, trim all the legs and reflow if needed.

1. 100nF Box capacitor.



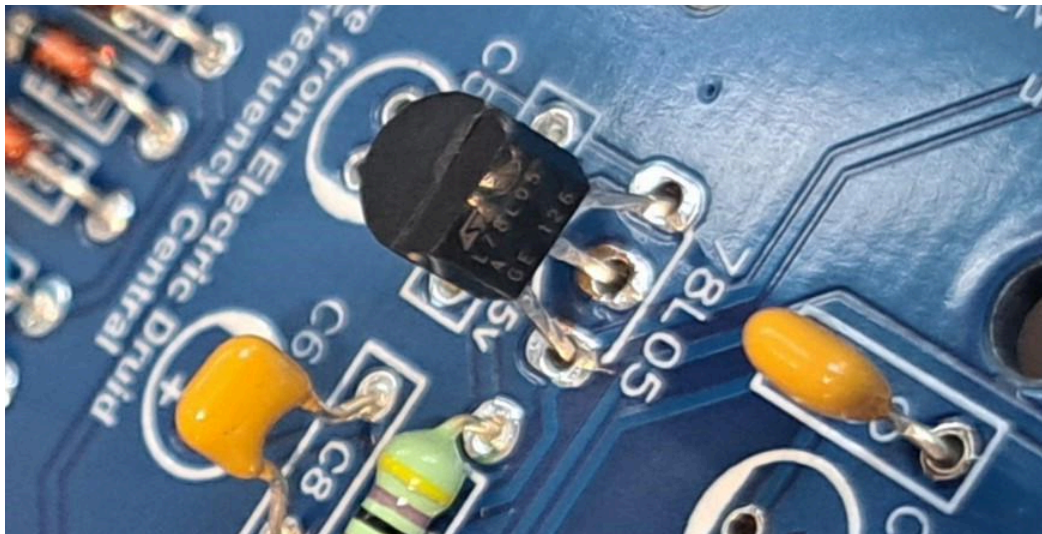
Next up you have one 100nf box capacitor(marked 104J100) Solder, trim, reflow if needed.

21	100nf Box Capacitor	C9	1
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Power regulator

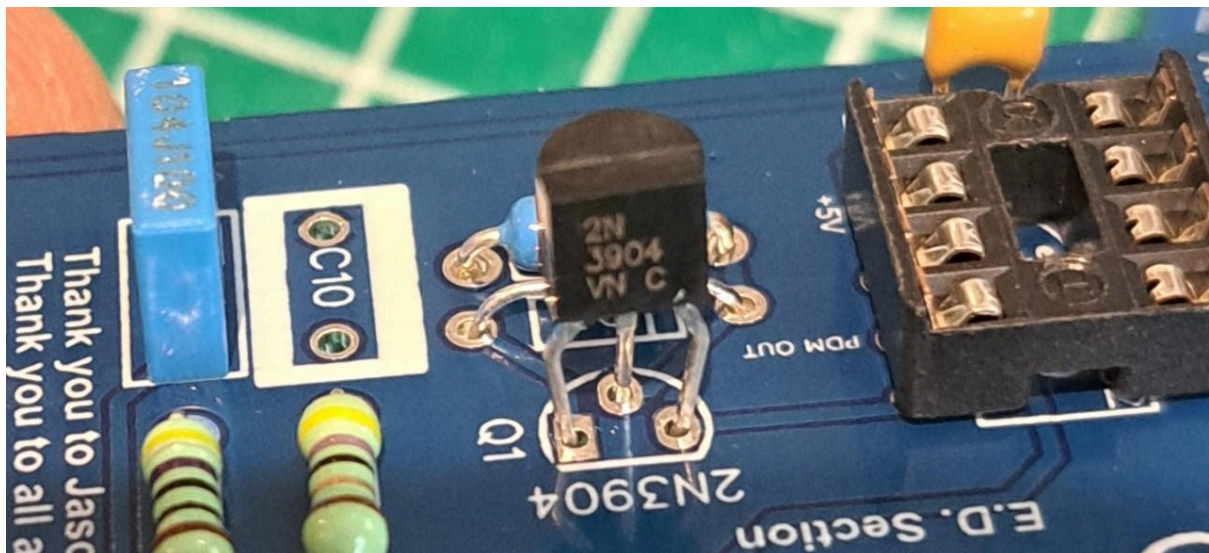
Find the 78L05 power regulator and place as shown making sure to follow the silkscreen.

22	78L05 Power Regulator	U5	1
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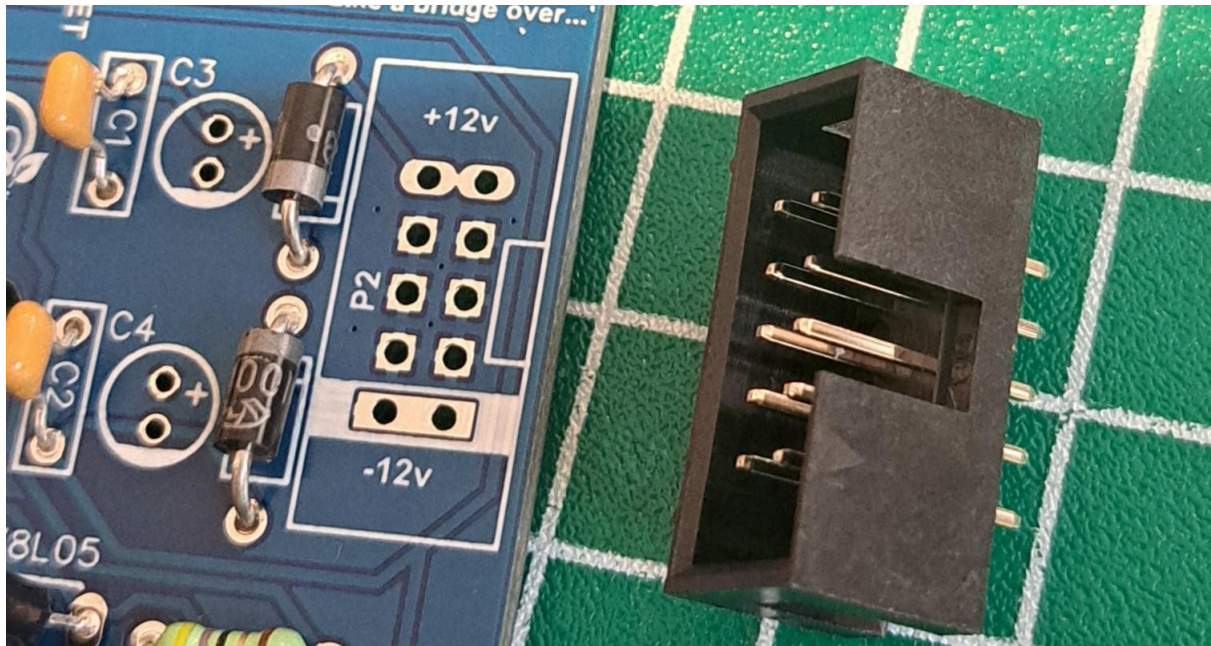


Next locate the 2N3904 NPN Transistor and again, make sure to follow the silkscreen.

23	2N3904 NPN Transistor	Q1	1
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Power Header



24	Box Power header
----	------------------

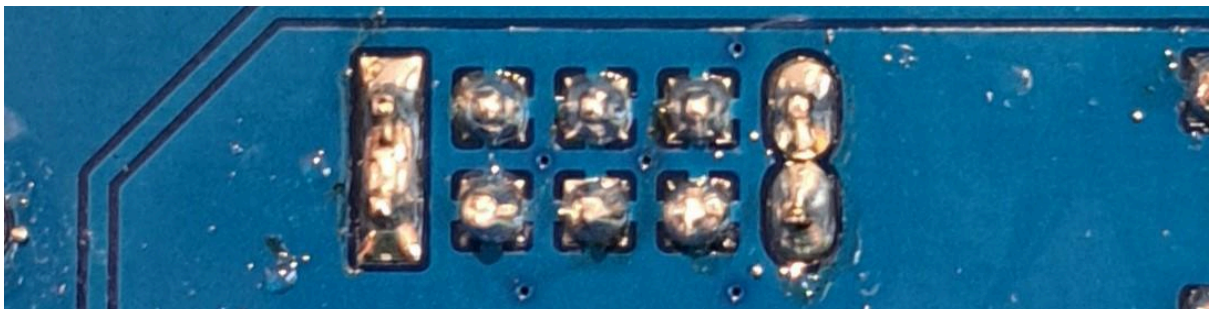
P2

1

Place the 10 Pin power header onto the board following the silkscreen. The cutout side is indicated and facing outwards from the PCB.

Turn the board over and solder one leg ensuring the box header sits flat against the PCB. If it doesn't you can reflow the solder and reposition it. Once happy, solder all pins.

Note: If you notice I have designed the pin sockets for a stronger joint on the +12/-12v rails and the 6 central ground pin sockets should be easier to solder. If however you have difficulty soldering the ground pins, use extra flux(if you have any) and turn up your iron heat slightly(400 degrees should be ample).



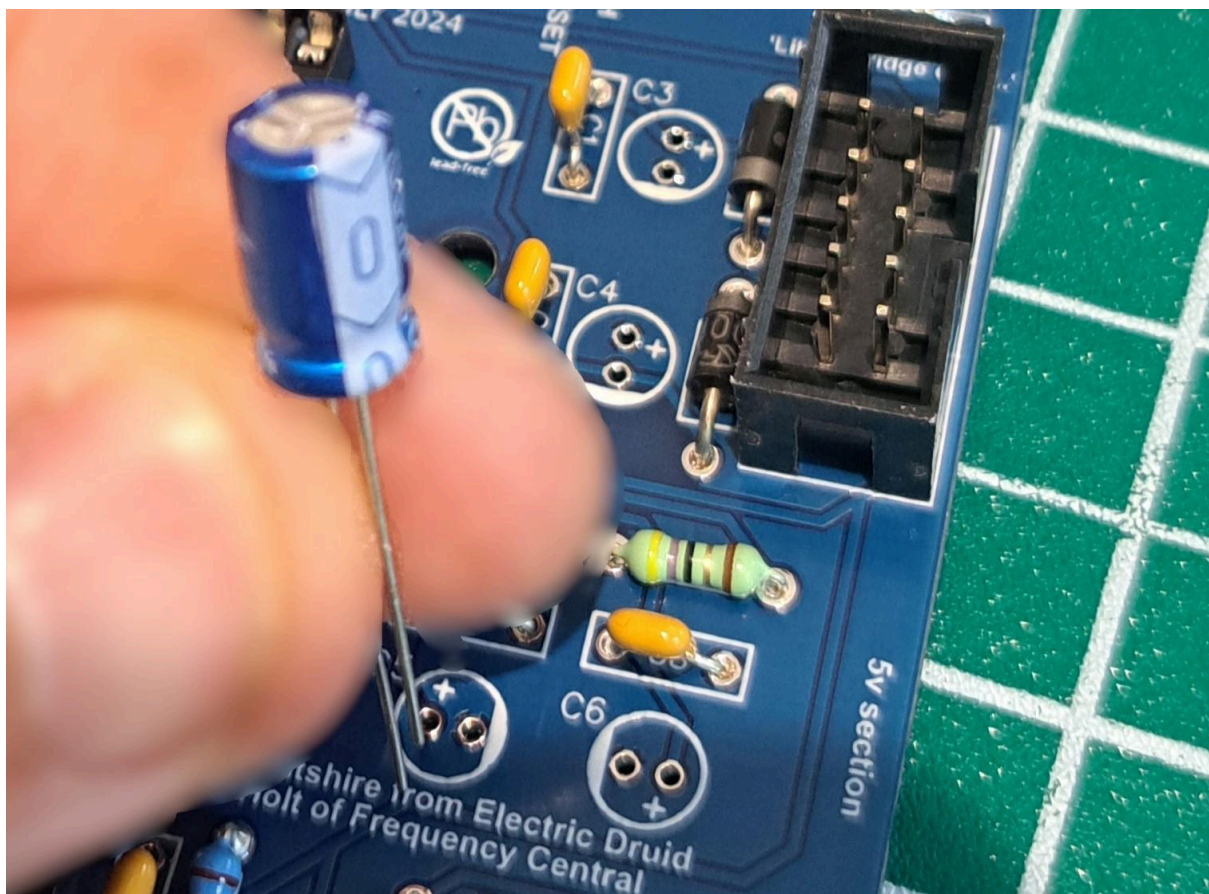
1uF Box capacitor



24	1uF Box Capacitor	C10	1	
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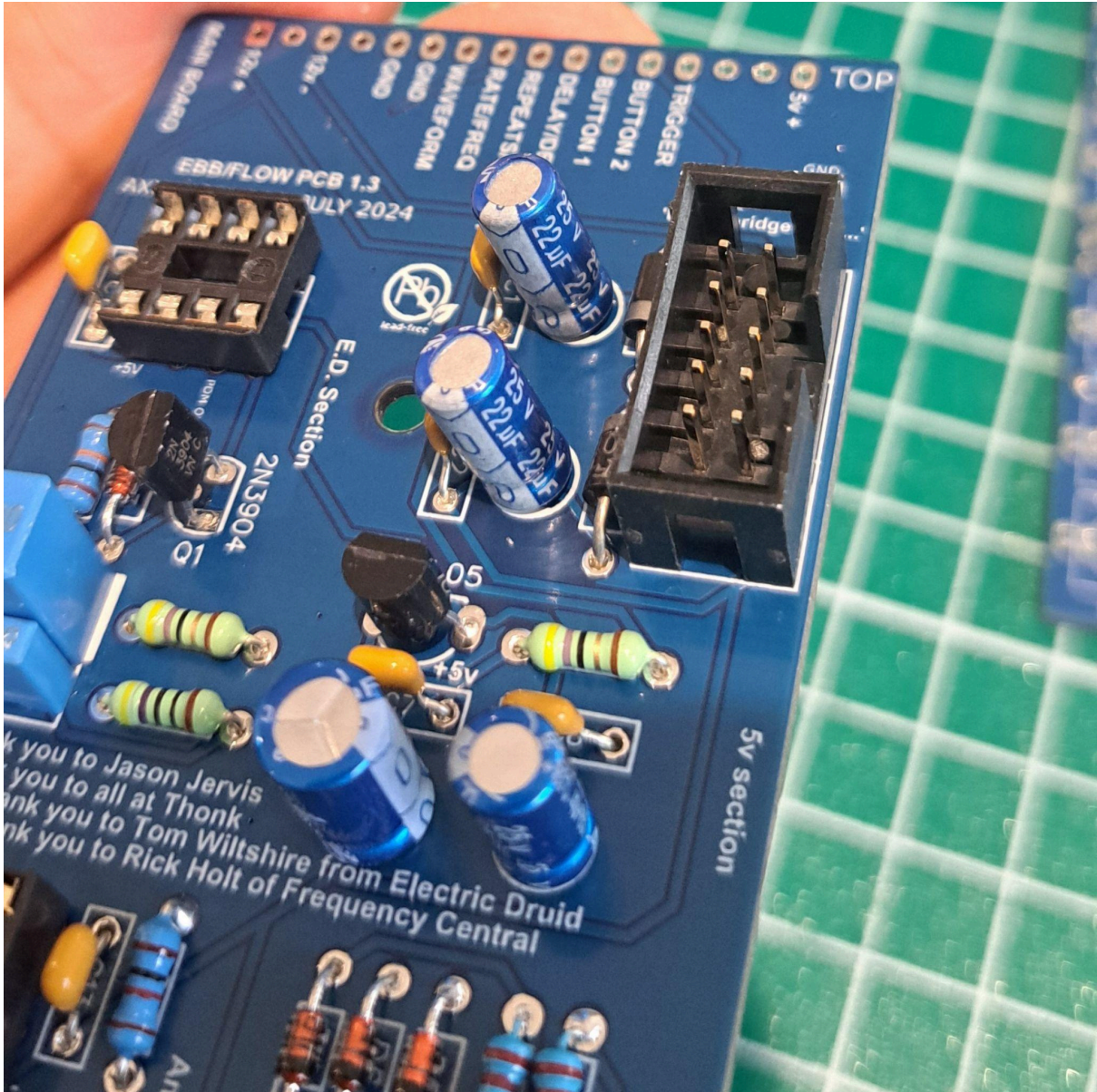
Place the 1uF Box capacitor and solder. Again if you have difficulty soldering the pin that goes to ground, turn up your iron and use flux if needed.

Electrolytic capacitors



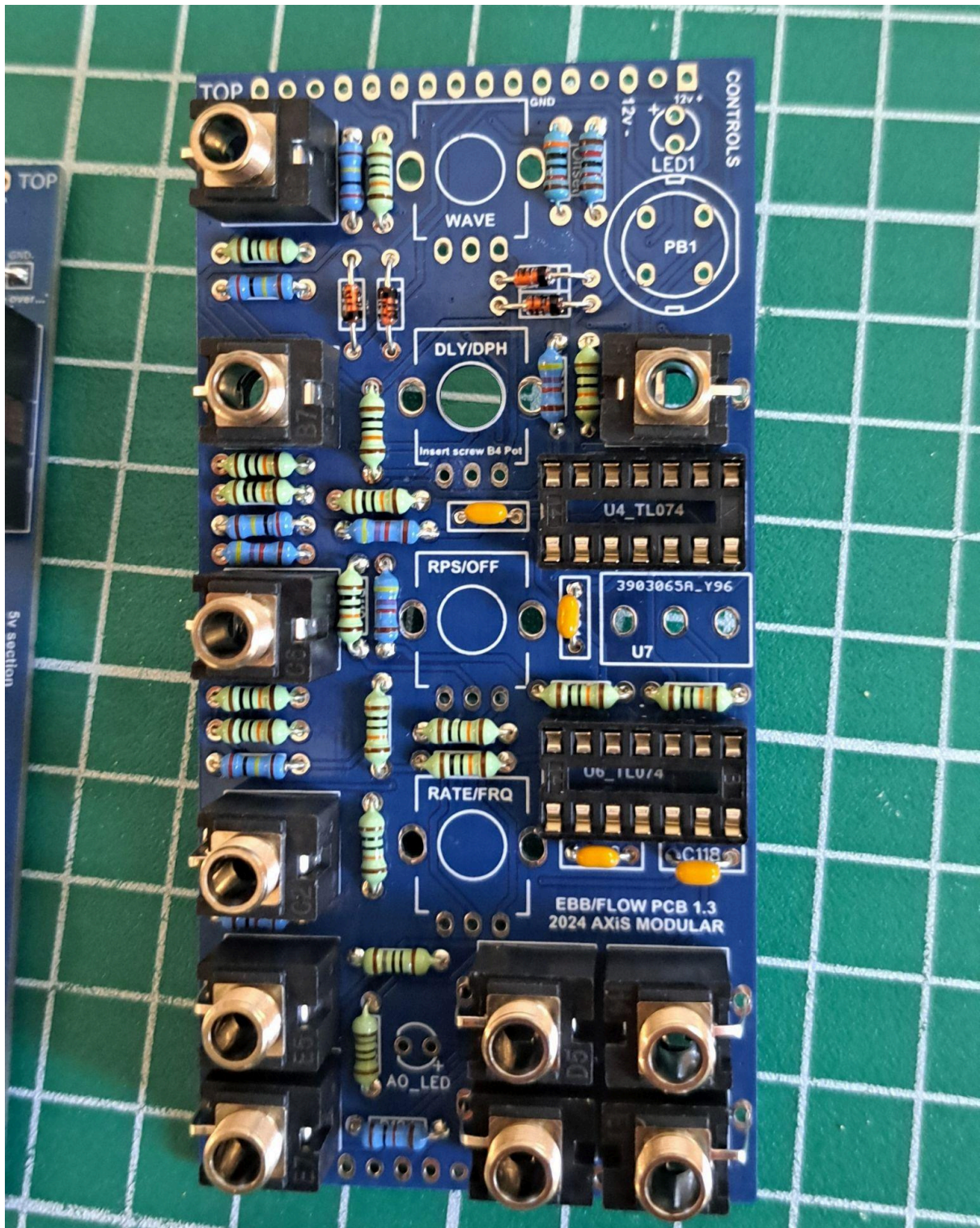
Find and place all four electrolytic capacitors. Make sure to orientate them correctly. The negative side is the striped side, positive is the longer leg.

25	22uf Electrolytic Capacitor	C3,C4	2	
26	100uF Electrolytic Capacitor	C5	1	
27	10uF Electrolytic Capacitor	C6	1	



The 100uF capacitor to C5 and the 10uF to C6 on the board.

Jack sockets



28 Thonk Mono Jacks

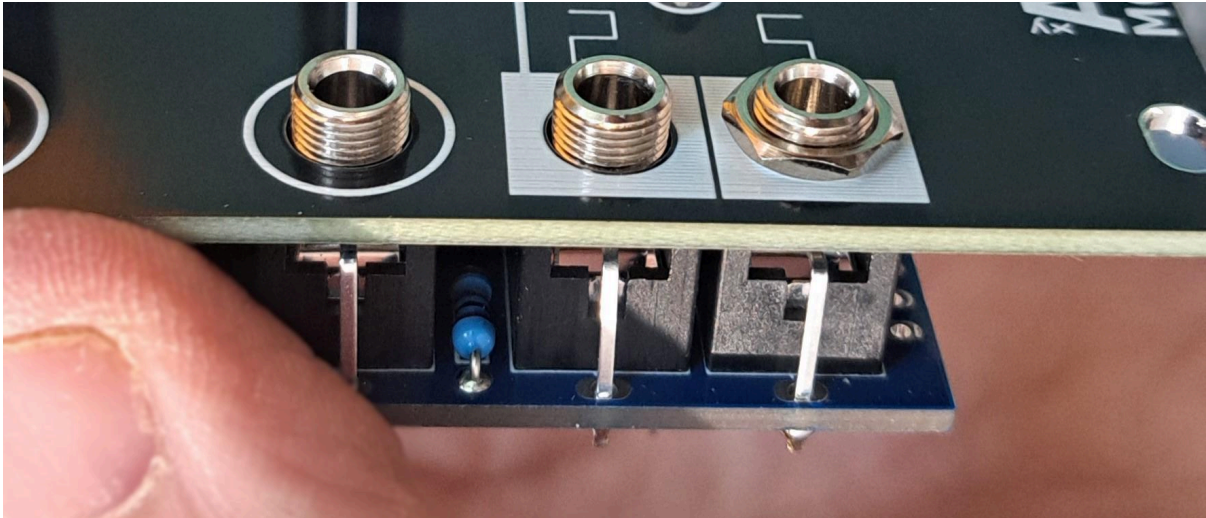
AO_1,AO_2,TRIG,
WF,D/D,R/O,R/F,WF_INV,WF_POS,MIN,MAX

11

Place all mono jack sockets following the silk screen, put the panel on and secure with a couple of nuts. You can also use a bit of masking tape to secure the panel to

the PCB. Turn over and carefully solder a single pin on one jack making sure the jacks are flush with the PCB.





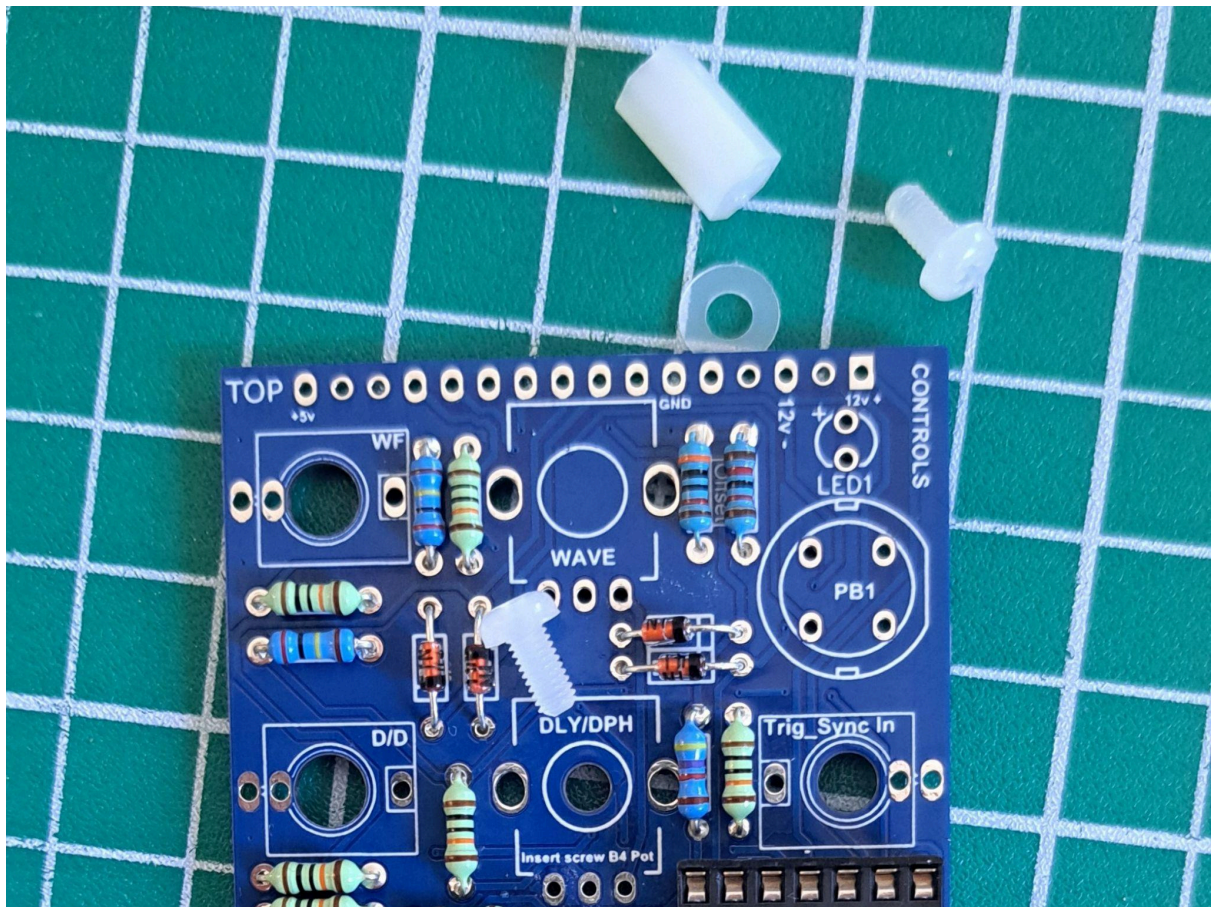
Once happy, solder all jack pins to the PCB. Then remove the panel.

TAKE A BREAK.

Next we will be placing the control board components but not soldering until the panel goes on to hold things in place once more.

Turn your iron off to save power and money for a little while.

Nylon Spacer



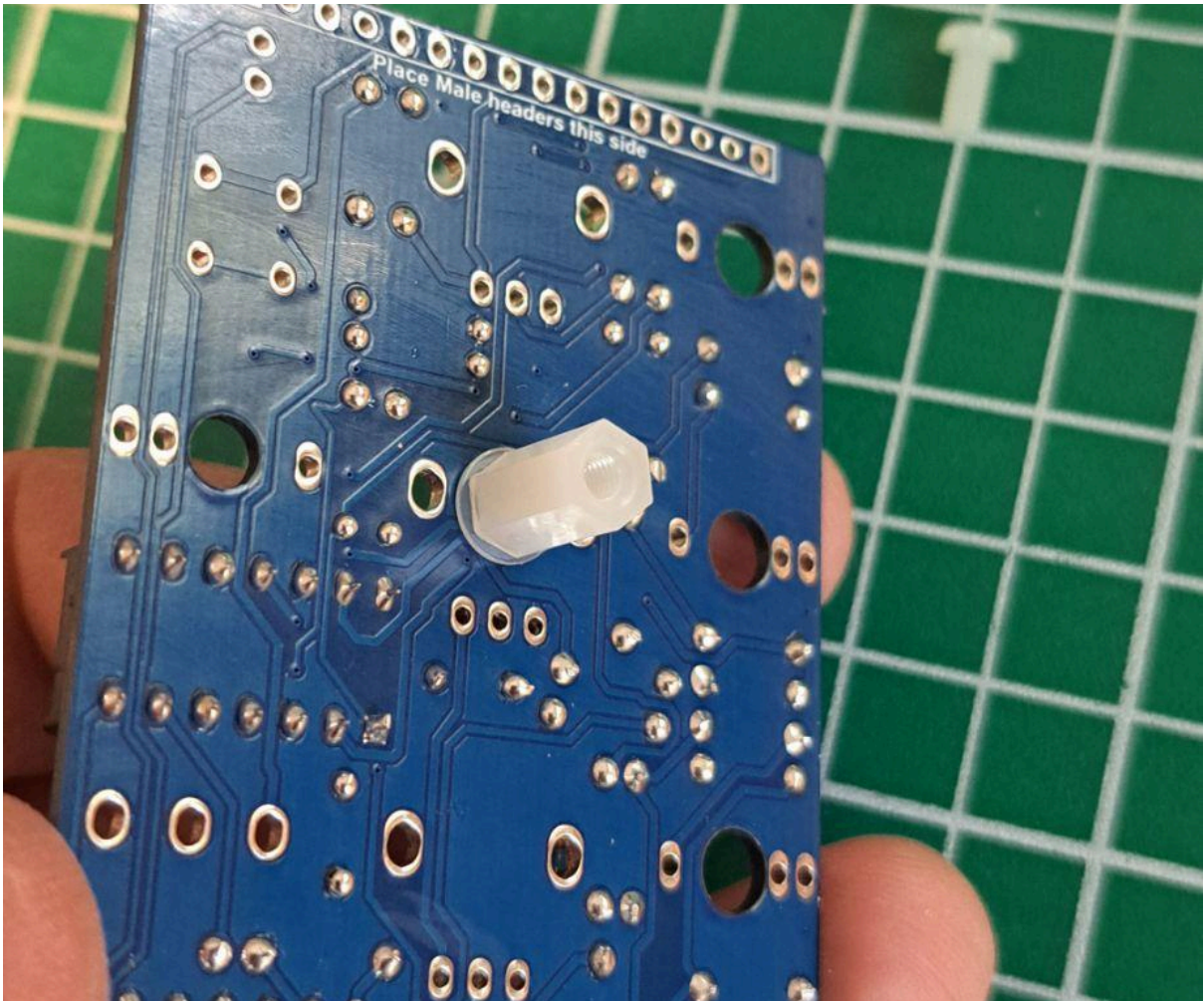
In the kit you'll find two nylon M3 screws, one spacer and a washer. It's important to fit this in part now as it will fix the PCB sandwich in place near the end of the build.

29	M3 nylon spacer, washer and screw	Place screw through hole as shown in build guide add 1 washer on other side and screw on the spacer.	1
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Locate the hole where the DLY/DPH potentiometer silkscreen is and place one M3 screw through it.

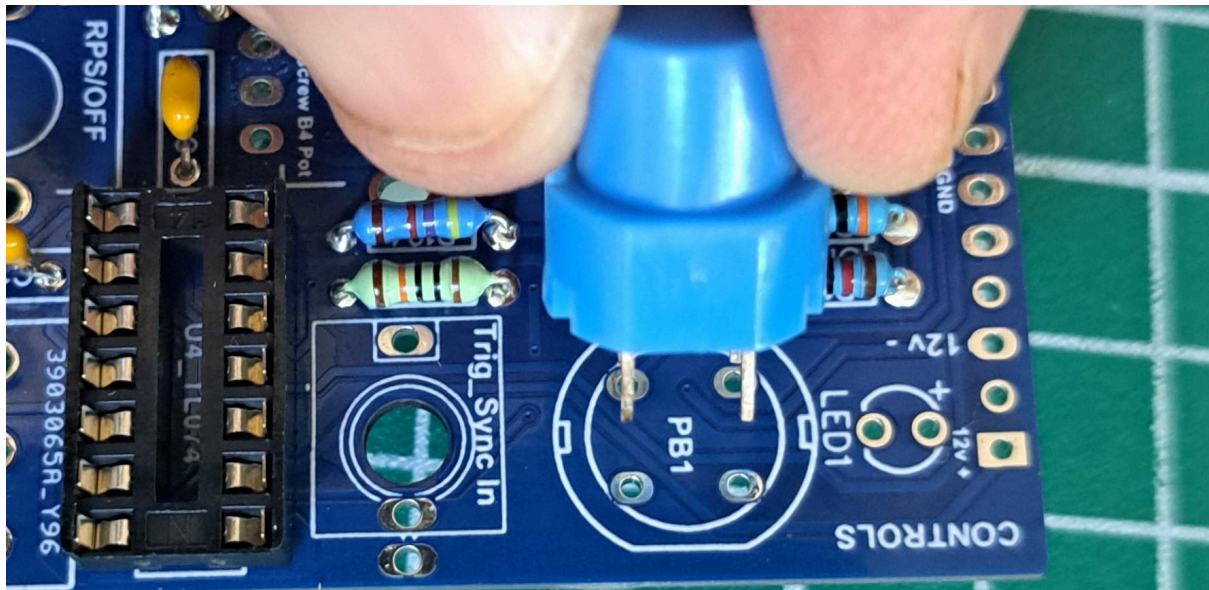
Turn the board over and place the washer over the screw as shown below. Then screw on the nylon spacer and tighten. You can use a phillips head screwdriver to tighten the spacer to the board(or use your fingers to finger tighten).





Push Button

Locate your momentary button and place, again following the silkscreen orientation.



Match the flat side with the image. @Gnommi you know all about this.

30	PUSHBUTTON_MOMENTA RY Button	PB1	1
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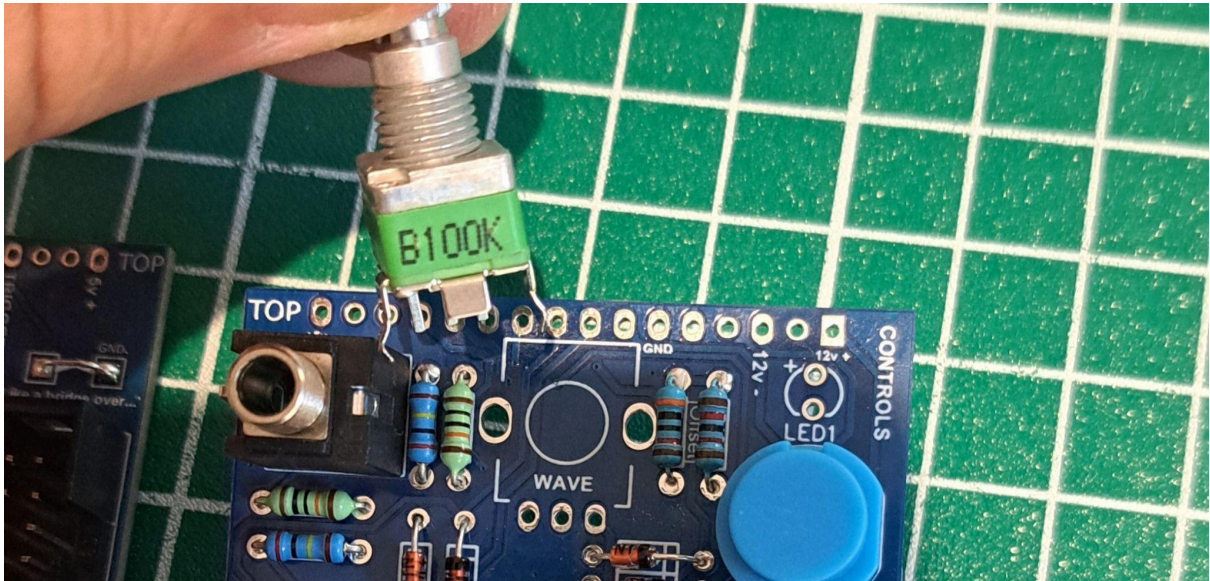
Do not solder yet.

Potentiometers

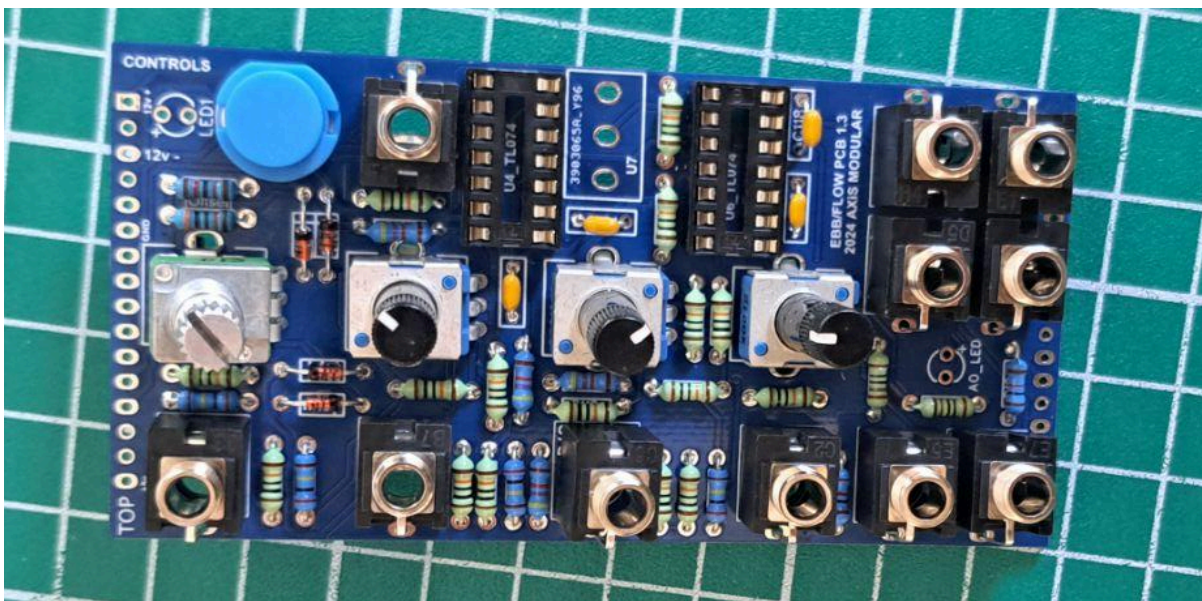
In your kit you will find four potentiometers, one metal shafted and three plastic. All are B100k.

31	Waveform Alpha Potentiometer 100k	WAVE	1
32	Delay/Depth Song Potentiometer 100k	DLY/DPH	1
33	Repeats/Offset Song Potentiometer 100k	RPS/OFF	1
34	Rate/Freq Song Potentiometer 100k	RATE/FRQ	1

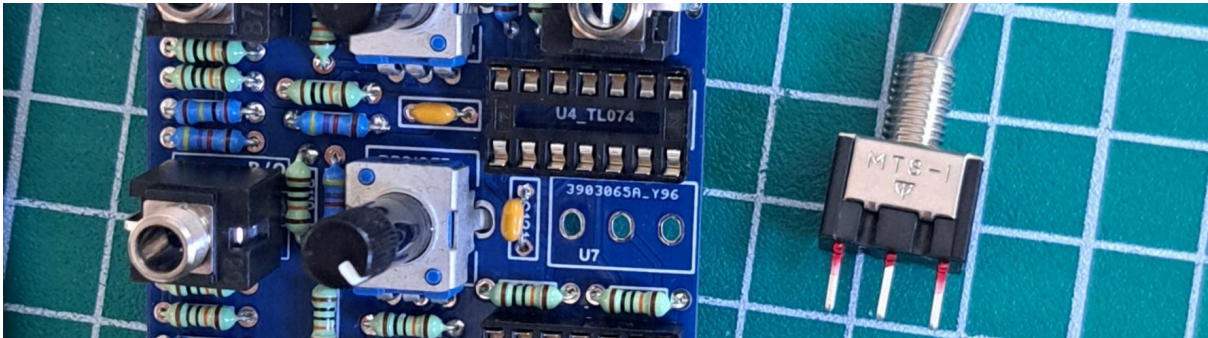
Place the metal alpha one at the top of the PCB following the silkscreen. Then, place the other three.



Locate and place the three B100k song huei potentiometers. Do not solder yet.

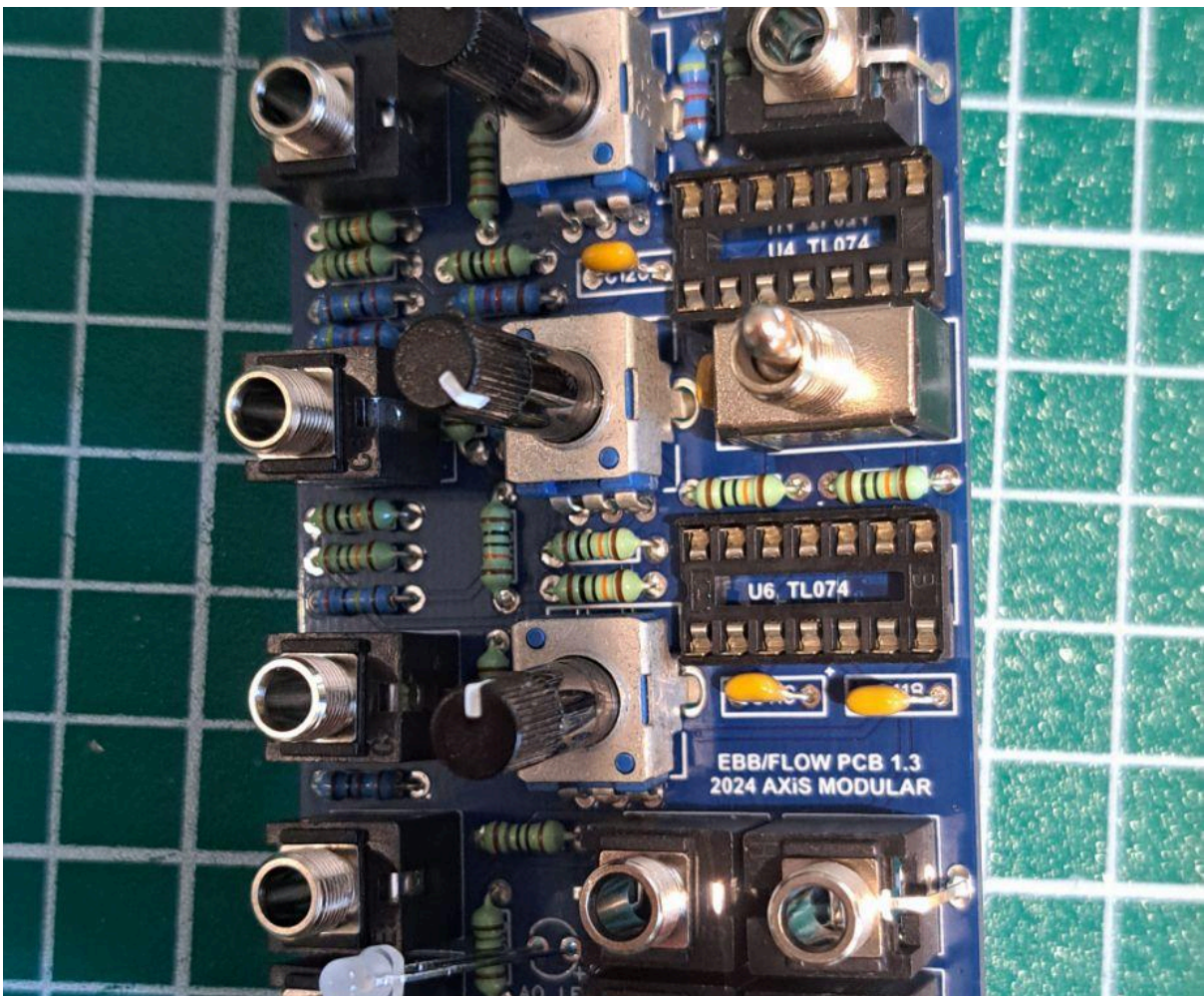


Switch



Place the switch where indicated on the PCB.

MTS SPDT			
35 ON-ON SWITCH	U7		1



LEDs

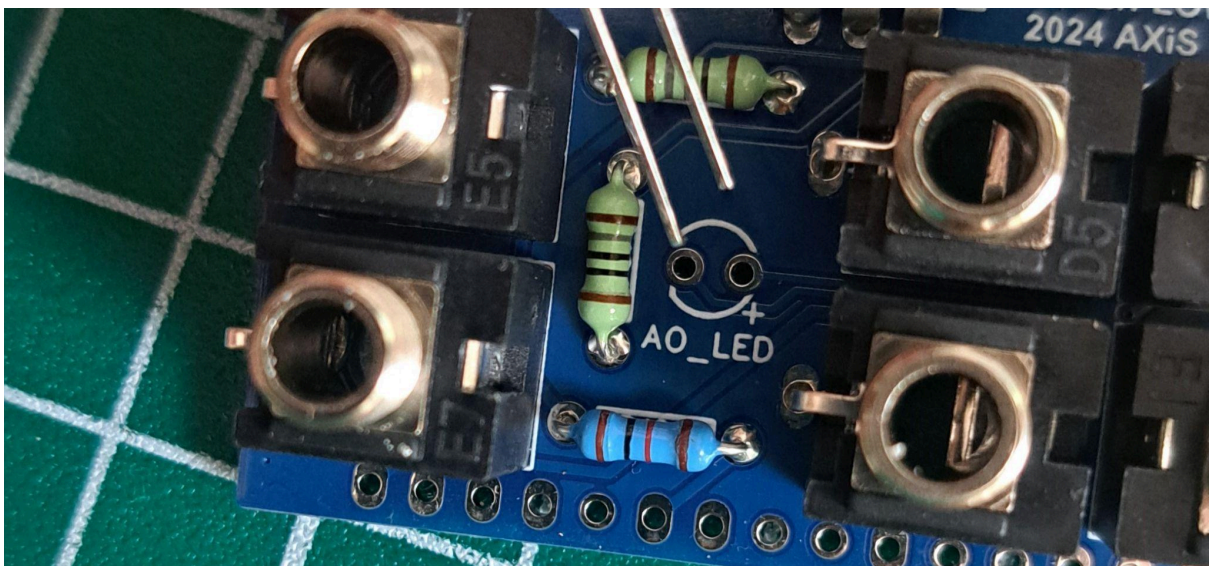
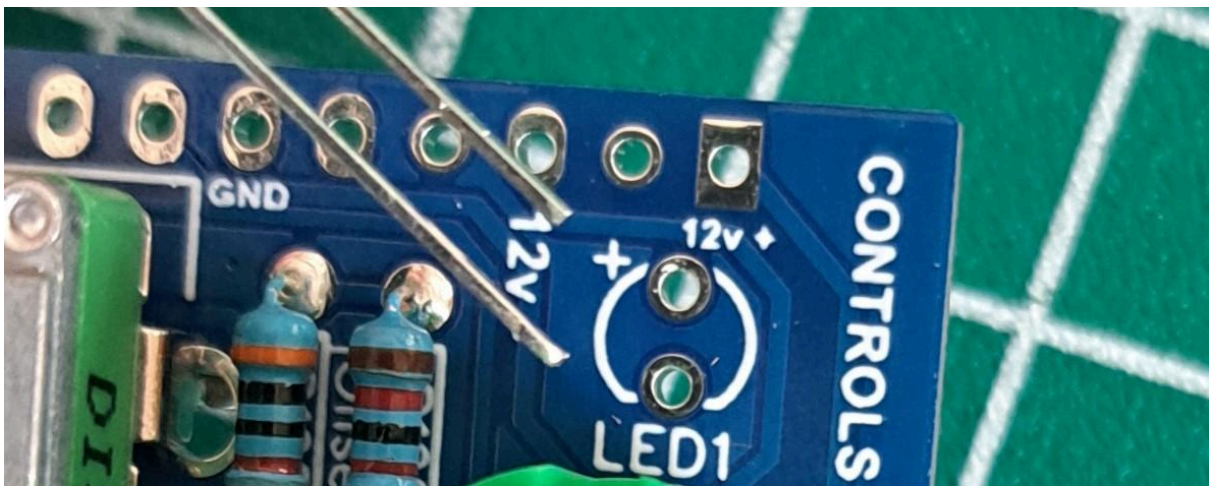
FLOW uses bicolour LEDs. The one used at the bottom in the output and mixer section will light up either red or green depending on whether positive or negative voltage is 'FLOW'ing. The LED at the top indicates the waveform type so will only display one colour.

36 BI COLOUR LEDs

AND_OR_LED, LED1

2

For FLOW we break the rules and place the LEDs the wrong way around as the LED model lights up green for negative current and red for positive. So for both LEDs place them with the long leg next to the flat side of the silk screen as shown below.



Don't solder yet!

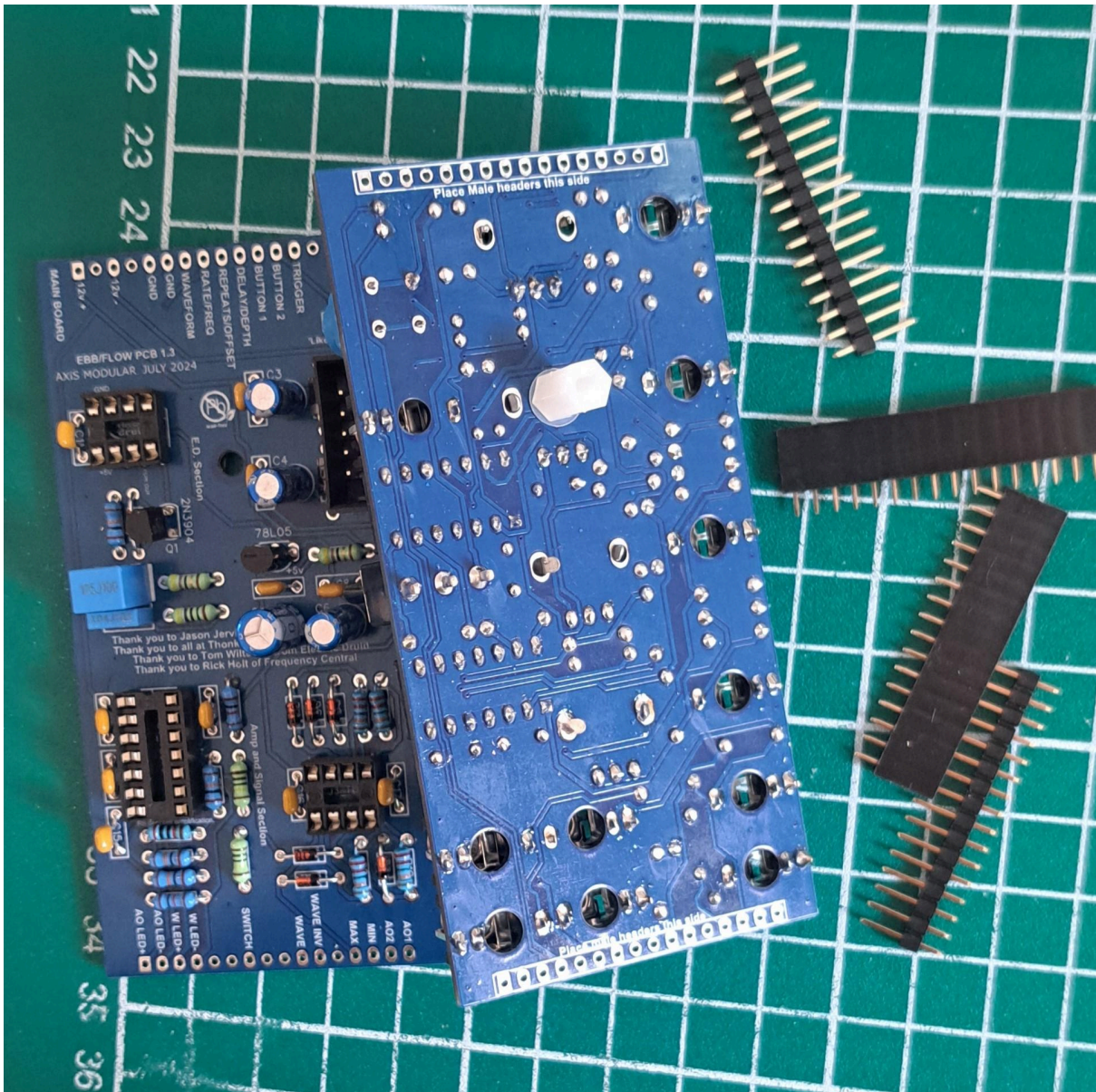
Place the panel over the control PCB and fix a few sockets, the top potentiometer and switch in place.



Use some tape to hold the button in place and make sure the LEDs are sitting into their holes on the panel, turn over and solder all the control parts you have just fitted. Take care and don't rush.

Once done, remove the panel once more.

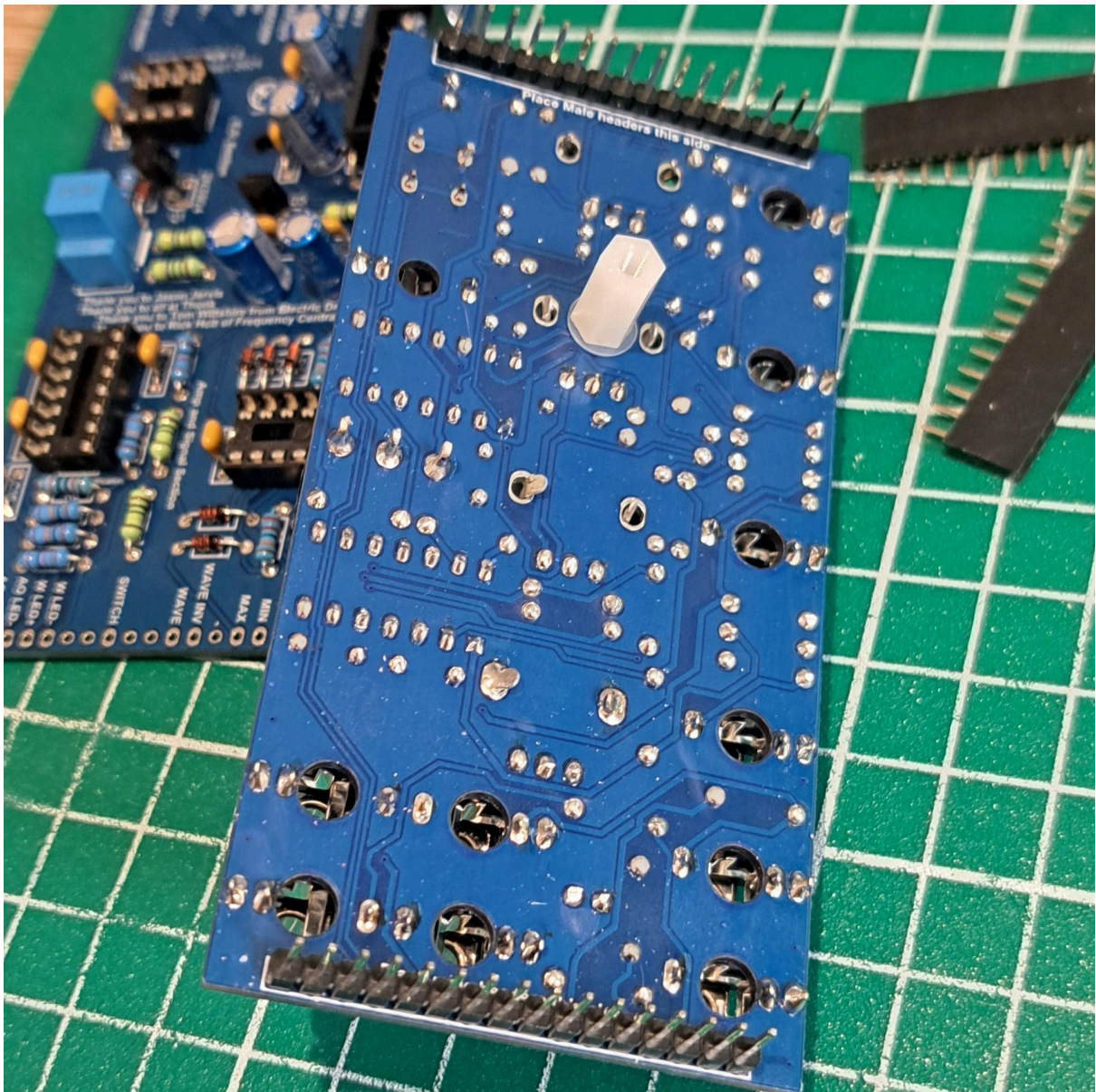
16 Pin Headers



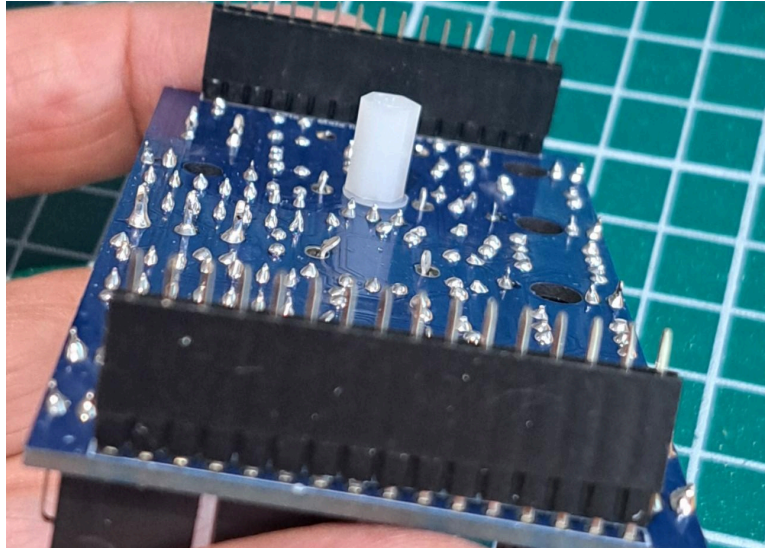
37	CB_1, CB_2 16 pin male header	J1, J2	2	
38	HDR-F-2.54_1x16 16 pin female header	MB_1, MB_2	2	

In your kit you will find two female and two male 16 pin headers.

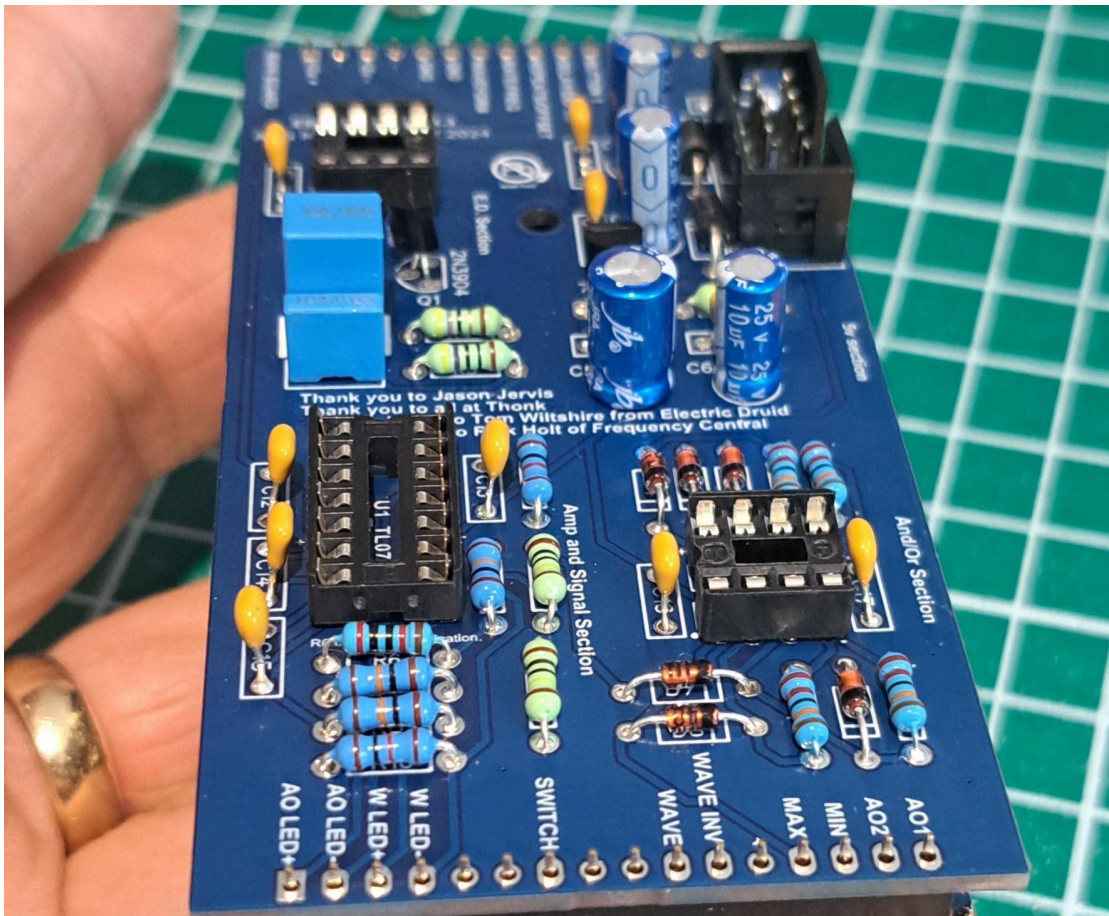
Male headers are placed on the control PCB as shown.



Next push the female headers onto the male pins.

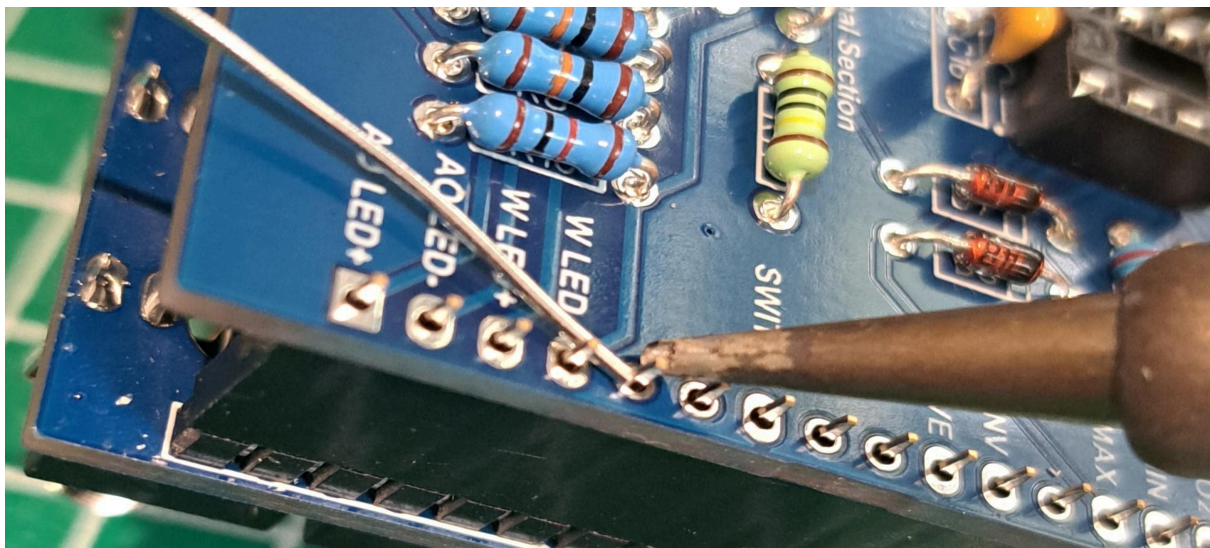


Then place the Main PCB onto the female headers.
Make sure they are the correct way up as shown.





Next, add in the remaining M3 nylon screw and tighten. This will hold the PCB sandwich in place and allow you to solder all the pins.

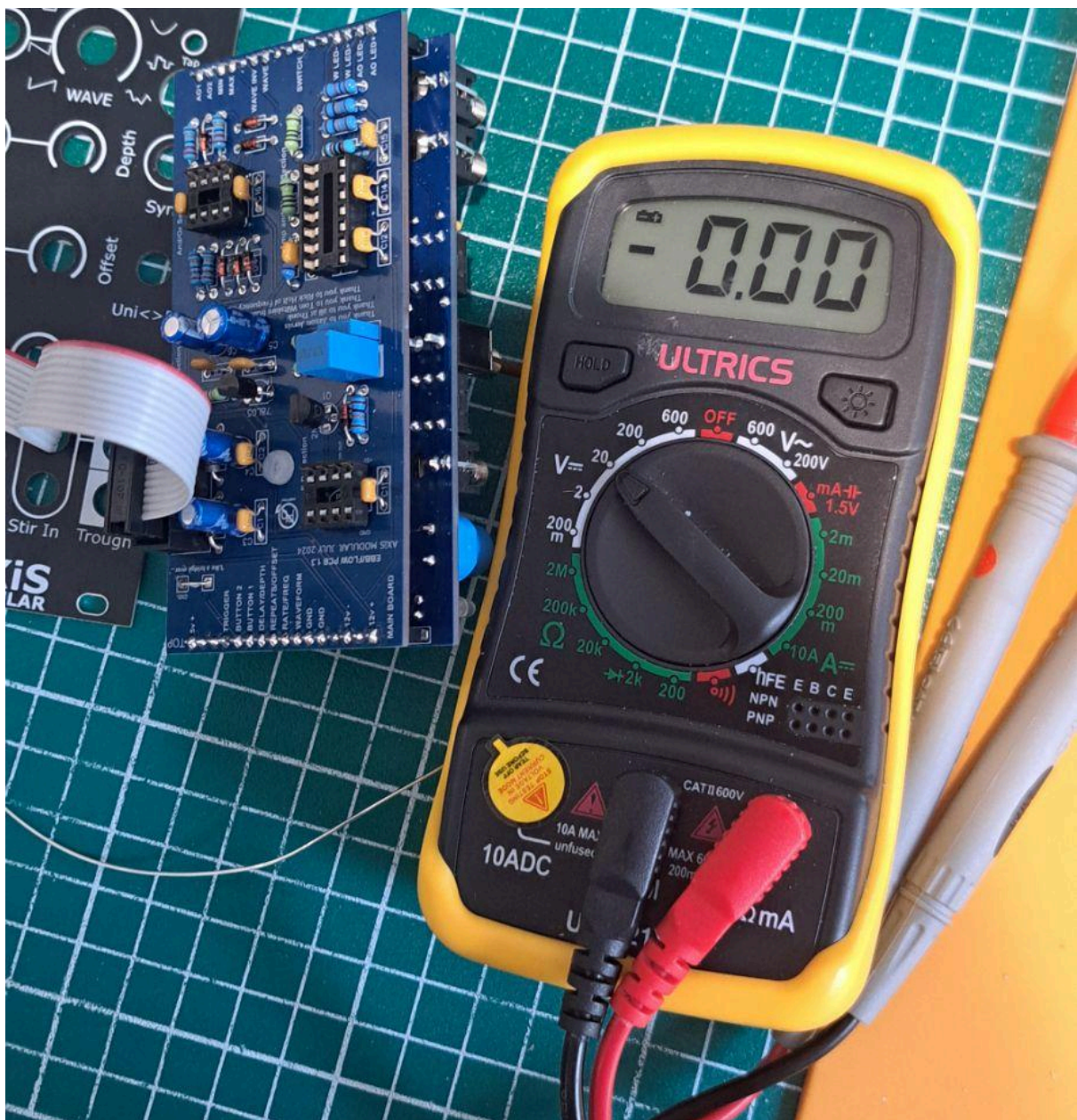


Now go make a cuppa or get a nice cold drink.....

Visual checks and multimeter checking.

Before inserting the ICs you can visually check for shorts and if you have a multimeter, use that to check for them too.

If you have a eurorack power supply handy, plug it in and check that you are getting the correct voltages. To the IC and header pins. I've labelled things up on the PCB to help you with this.



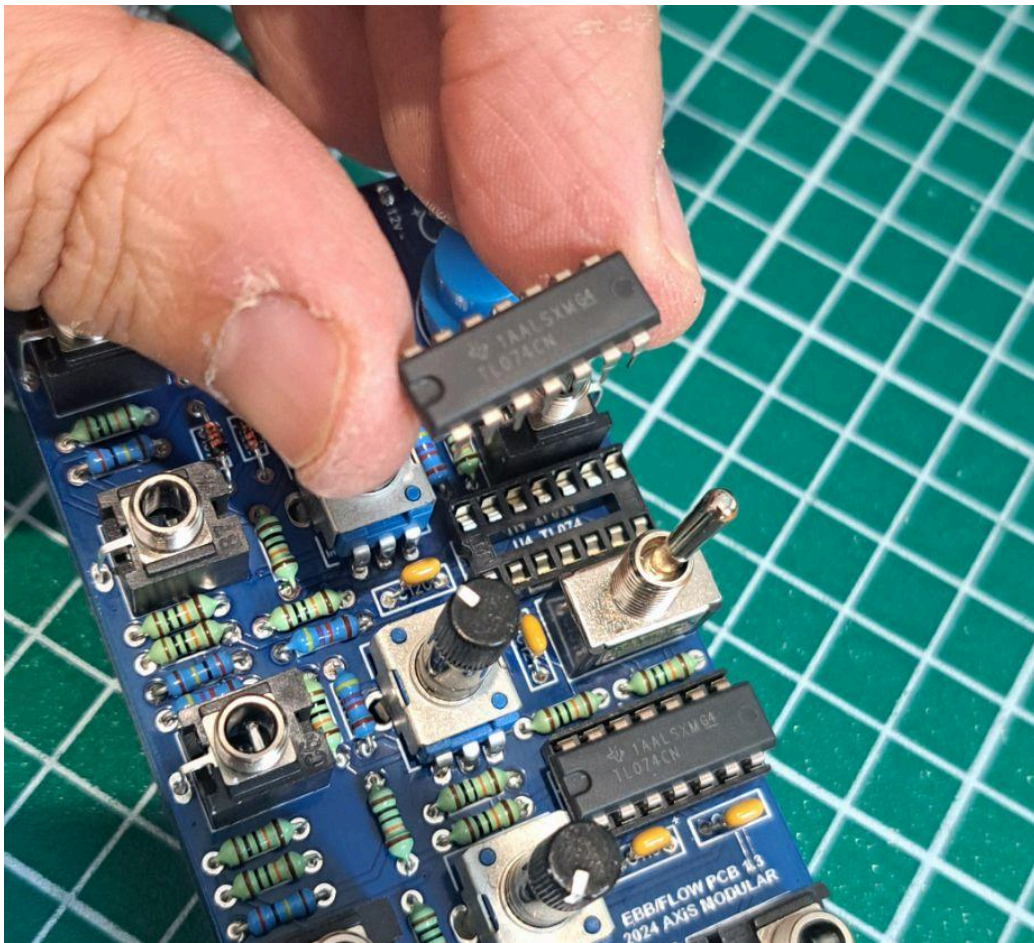
All good?? Great!

Not good? Oops, recheck and reflow joints if needed.

If you have some PCB cleaner, now would be a great time to clean the boards too.

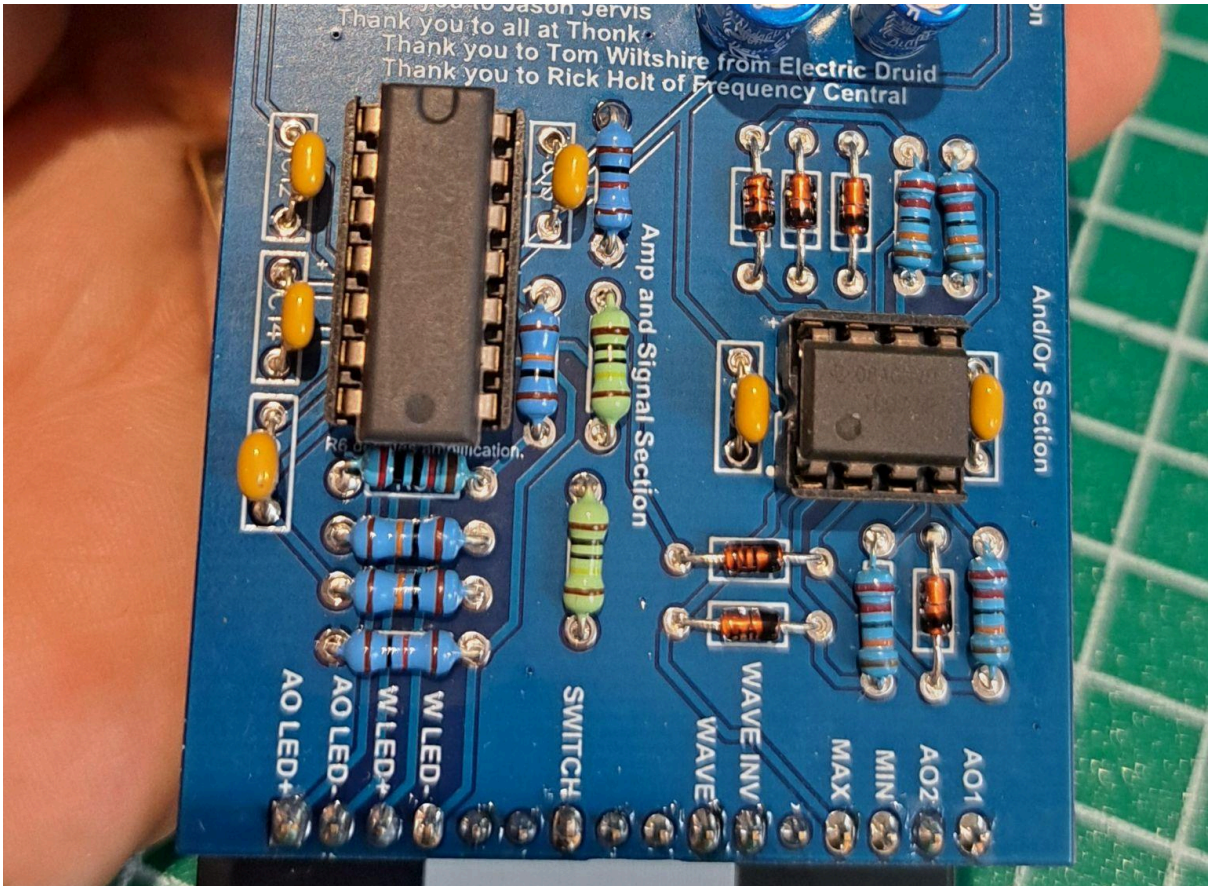
ICs

Insert two TL074 op amps into their sockets on the control PCB making sure they are the correct way round and the notch is the same as indicated on the socket.



39	TL074ACN Op Amp	U1,U4,U6	3	
40	TL072CP Op Amp	U3	1	
41	EBB or FLOW IC	U2	1	

Next grab the remaining IC's and place in their sockets on the main board PCB, again taking care and placing them the correct way round.



Panel and Knobs

Before placing the front panel, please do a final inspection and maybe even plug the 'panelless' module into your eurorack power to check to see if the LEDs light up. If they do then proceed with fixing the panel one last time and add the knobs to finish your build.

	T-18 Davies knob			
42	Blue/Green		1	
43	Trimmer topper Blue/Green		3	

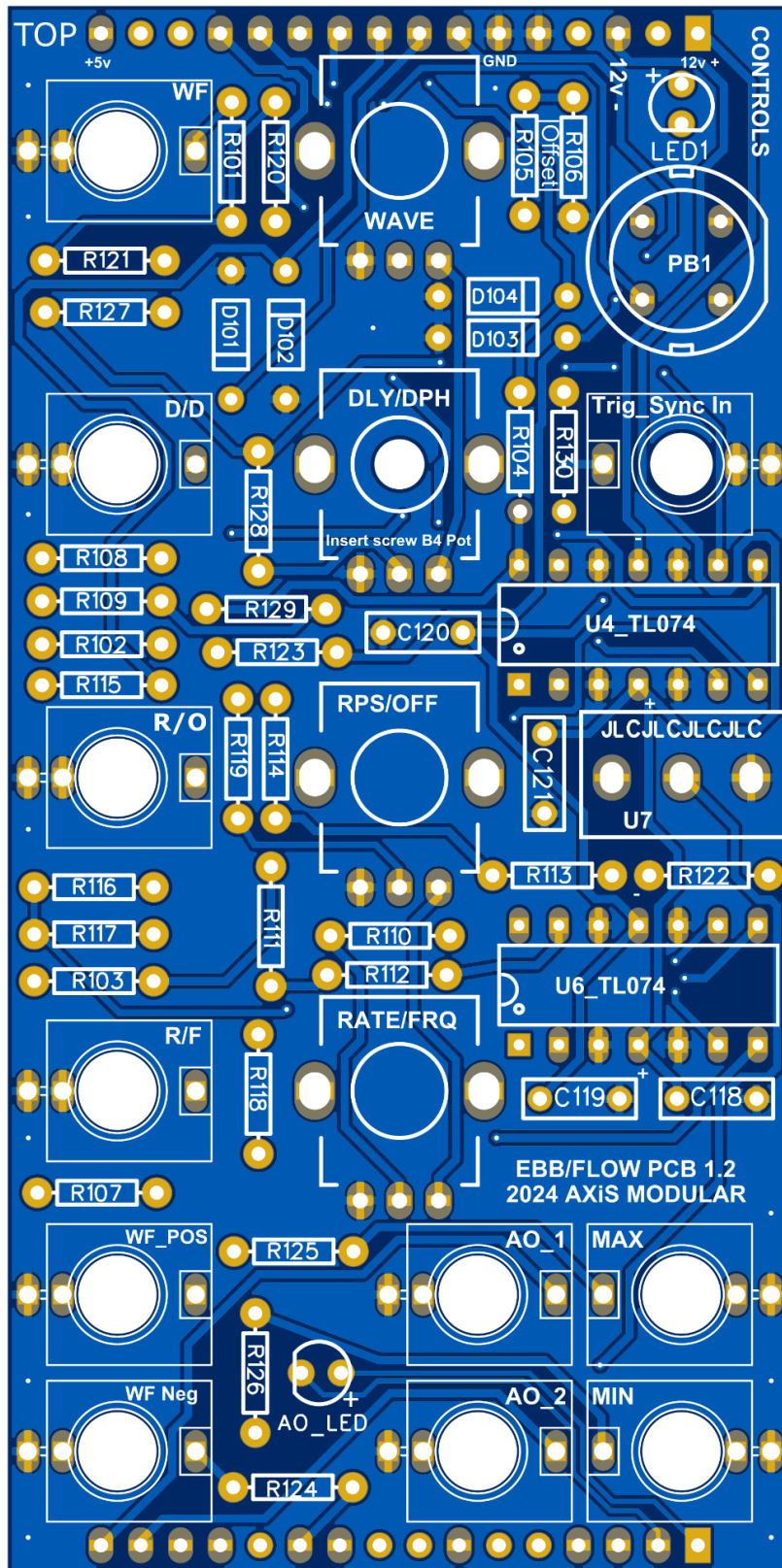




Well done! You've now completed the build!

Enjoy! 😊

CONTROLS BOARD:



Features:

- Fully featured Tap Tempo LFO using the Electric Druid StompLFO IC.
- 4 simultaneous outputs.
- Unipolar or Bipolar operation.
- 8 waveforms from the main output and a further 8 inverted.
- A Tap tempo button with sync input.
- And/OR CV/audio mixer section with Max/Min(Crest/Through) outputs.
- CV inputs and level controls for Waveform, Depth, Offset, Frequency.

Specs:

- Width: 10HP.
- Power Consumption: +12v 42ma, -12v 28ma.
- Depth: 44mm including cable.