Pathogen V2.4.1

BUILD GUIDE

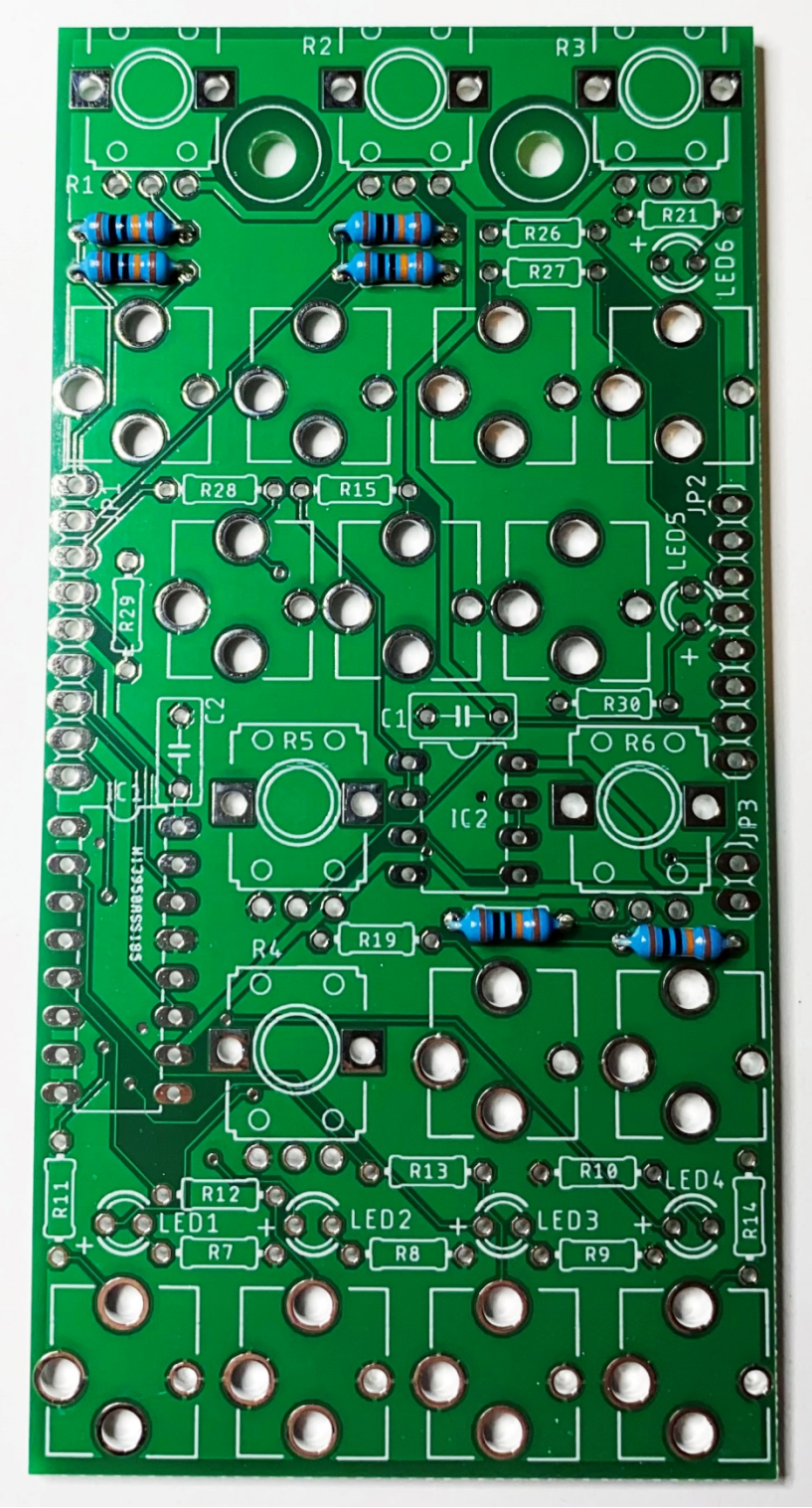
www.beast-tek.com

Pathogen IO Board BOM			
IC1	74HC595		1
IC2	TL072		1
C1, C2	100nf Blue Monolithic Capacitor	104	2
R1, R3, R4	9mm T18 shaft 10KB Potentiometer		3
R2, R6	9mm Round shaft 10KB Potentiometer		2
R5	9mm Trimmer Potentiometer 10KB to 25KB		1
LED1, LED2, LED3, LED4, LED6	3mm Red LED		5
LED5	3mm Bi-color LED (2 pin)		1
R7, R8, R9, R10, R21	220 Ohm Resistor 1%	Red-Red-Black-Black-Brown	5
R11, R12, R13, R14, R15, R19, R26, R27, R28, R29, R30	1K Ohm Resistor 1%	Brown-Black-Black-Brown-Brown	11
R18, R20, R22, R23, R24, R25	100K Ohm Resistor 1%	Brown-Black-Black-Orange-Brown	6
JP1	9 Way Pin Header Single Row MALE		1
JP2	8 Way Pin Header Single Row MALE		1
JP3	2 Way Pin Header Single Row MALE		1
	PJ301BM "Erthenvar" 3.5mm Mono Jack		13

Pathogen Main (CPU) Board BOM			
IC1, IC5, IC6, IC7	MCP602/MCP6022 High precision op-amp		4
IC2	7805 5v 1A Voltage Regulator		1
IC3	ATMEGA328P-PU		1
IC4	79L05 -5v 0.1A Voltage Regulator		1
IC8	TL072		1
Q1	20mhz Crystal		1
R1	100uH Inductor R.F. Choke		1
C8, C9	22pf Ceramic Capacitor	22	2
D1, D2	IN4004 Power Diode	IN4004	2
C1, C4, C5, C6, C7, C11, C12, C13, C14, C15, C16	100nf Blue Monolithic Capacitor	104	11
C2, C3, C10	100uf Electrolytic Capacitor	100uf	3
R2	10K Ohm Resistor 1%	Brown-Black-Black-Red-Brown	1
R6, R7, R14, R16, R17, R18	100K Ohm Resistor 1%	Brown-Black-Black-Orange-Brown	6
R3, R9, R11	1M Ohm Resistor 1%	Brown-Black-Black-Yellow-Brown	3
JP1	9 Way Pin Header Single Row MALE		1
JP2	8 Way Pin Header Single Row MALE		1
JP3	2 Way Pin Header Single Row MALE		1
ICSP	ICSP - do not populate		
POWER	Shrouded 10pin (2x5) IDC Header (Eurorack Power)		1
EXPAND	4 Way Pin Header DUAL Row MALE		1

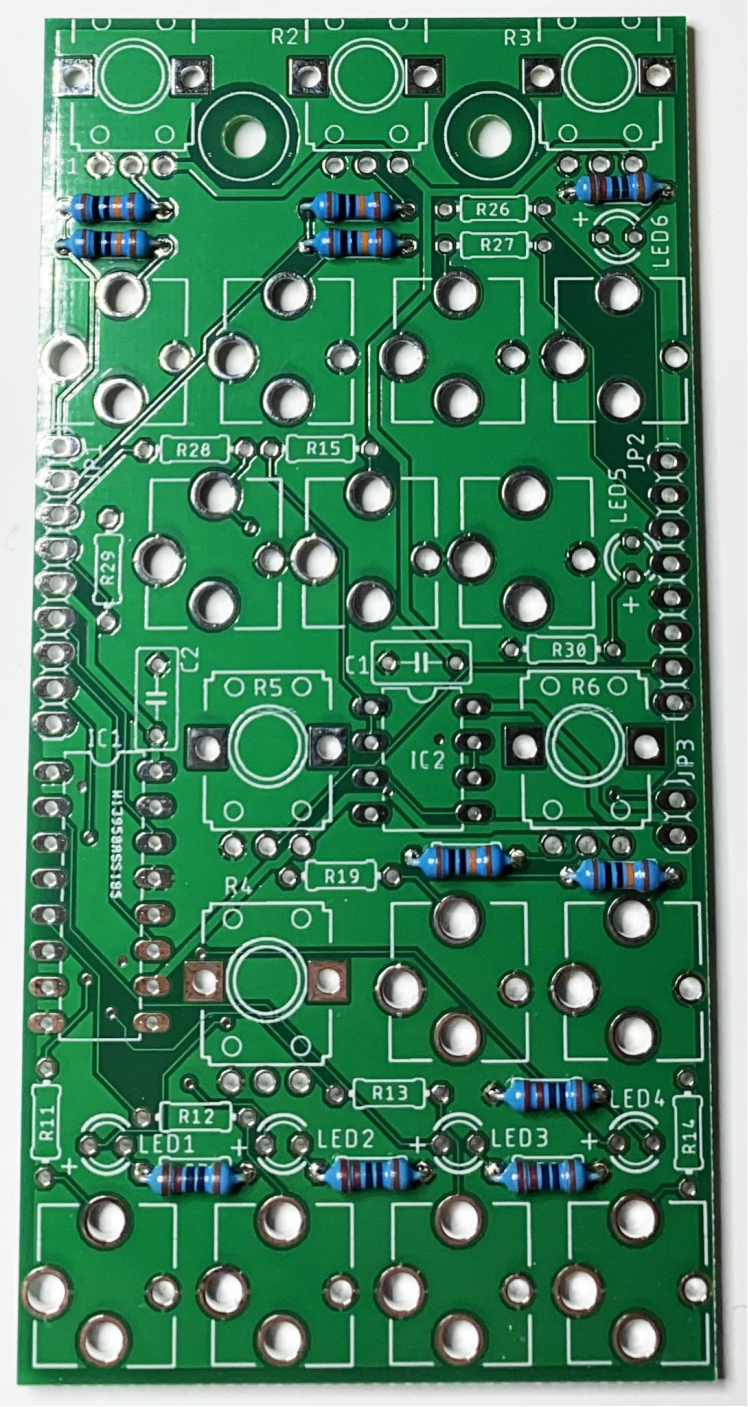
IO Board – Step 1

Install and solder the six 100K resistors R18, R20, R22, R23, R24 and R25



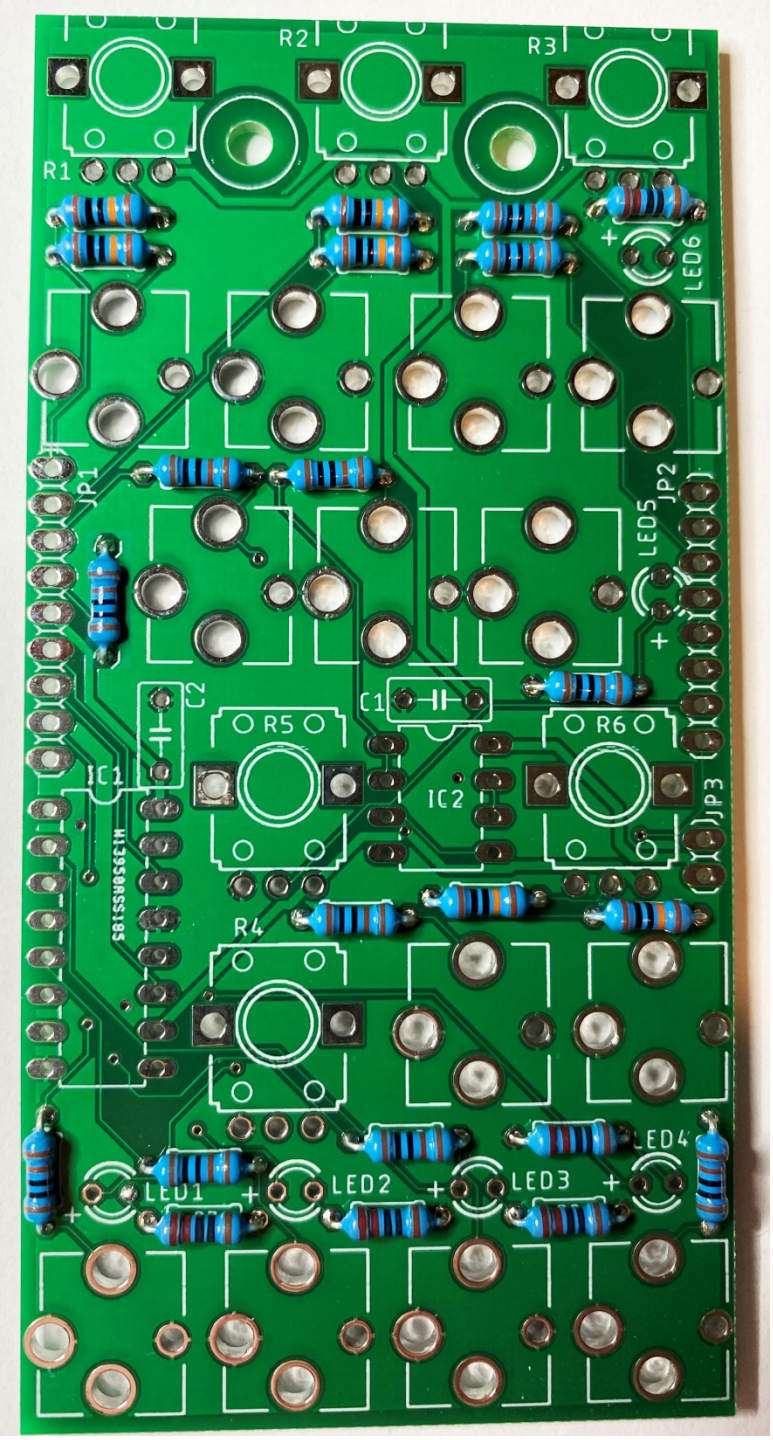
IO Board – Step 2

Install and solder the five 220R resistors R7, R8, R9, R10 and R21



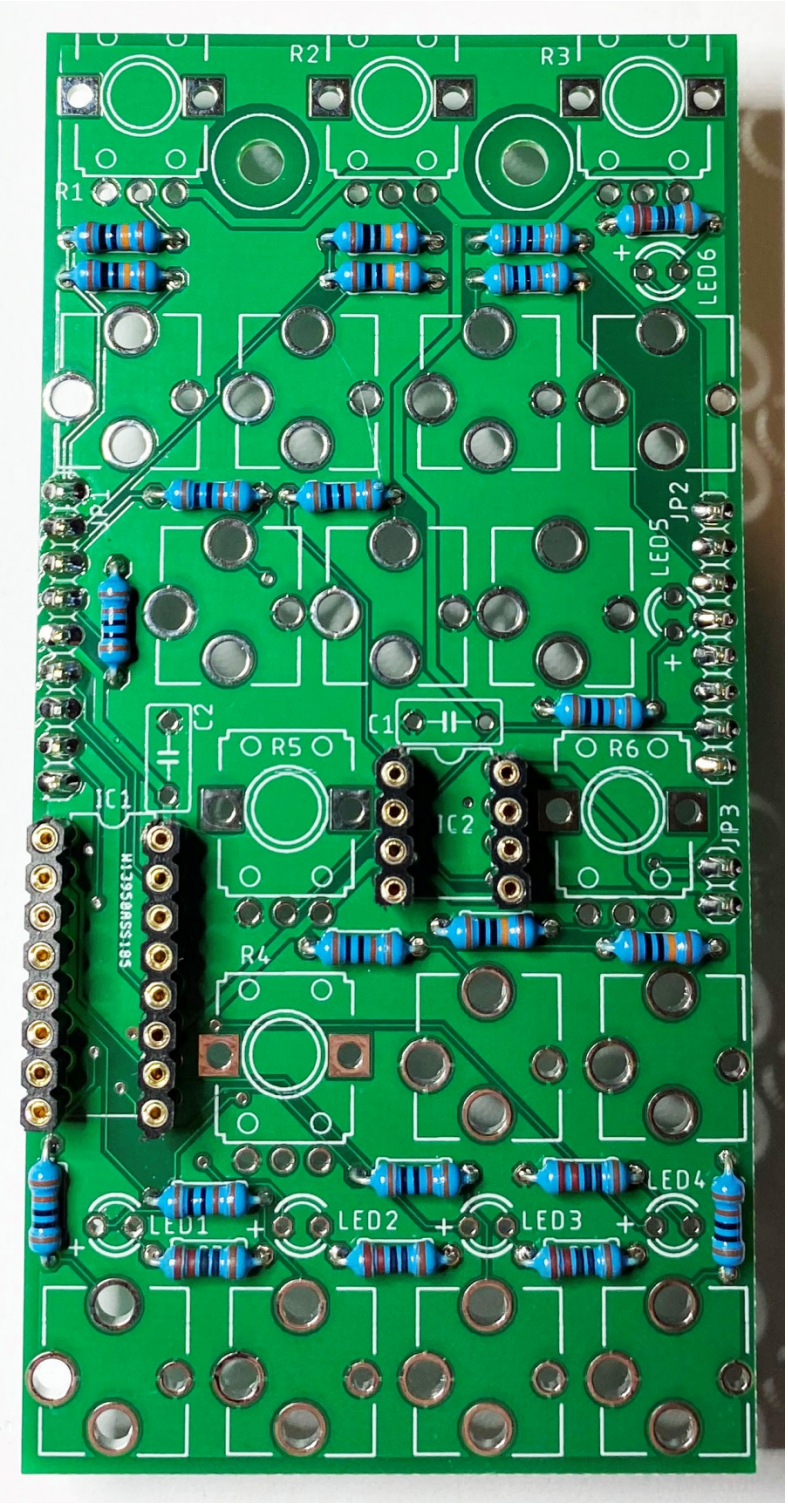
IO Board – Step 3

Install and solder the eleven 1K resistors R11, R12, R13, R14, R15, R19, R26, R27, R28, R29 and R30



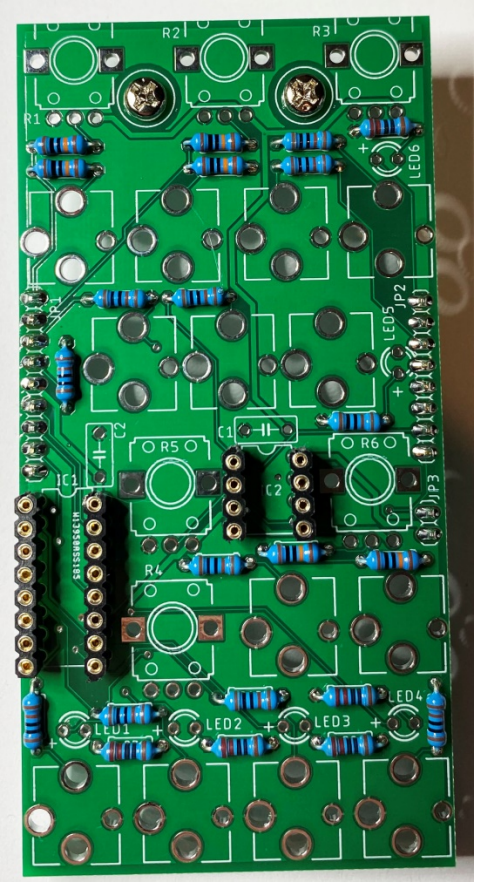
IO Board – Step 4

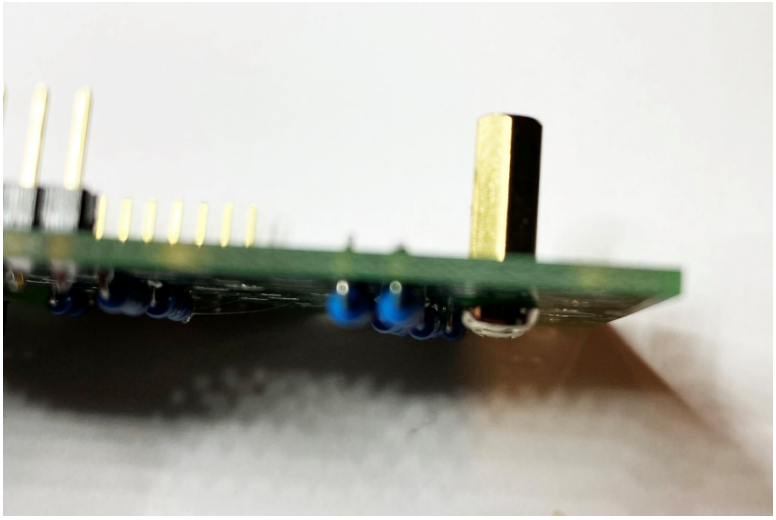
Cut IC sockets from the machine pin strips and install and solder them. Cut one 9 pin, one 8 pin and one 2 pin pieces from the male header pin strip and install and solder into JP1, JP2 and JP3



IO Board – Step 5

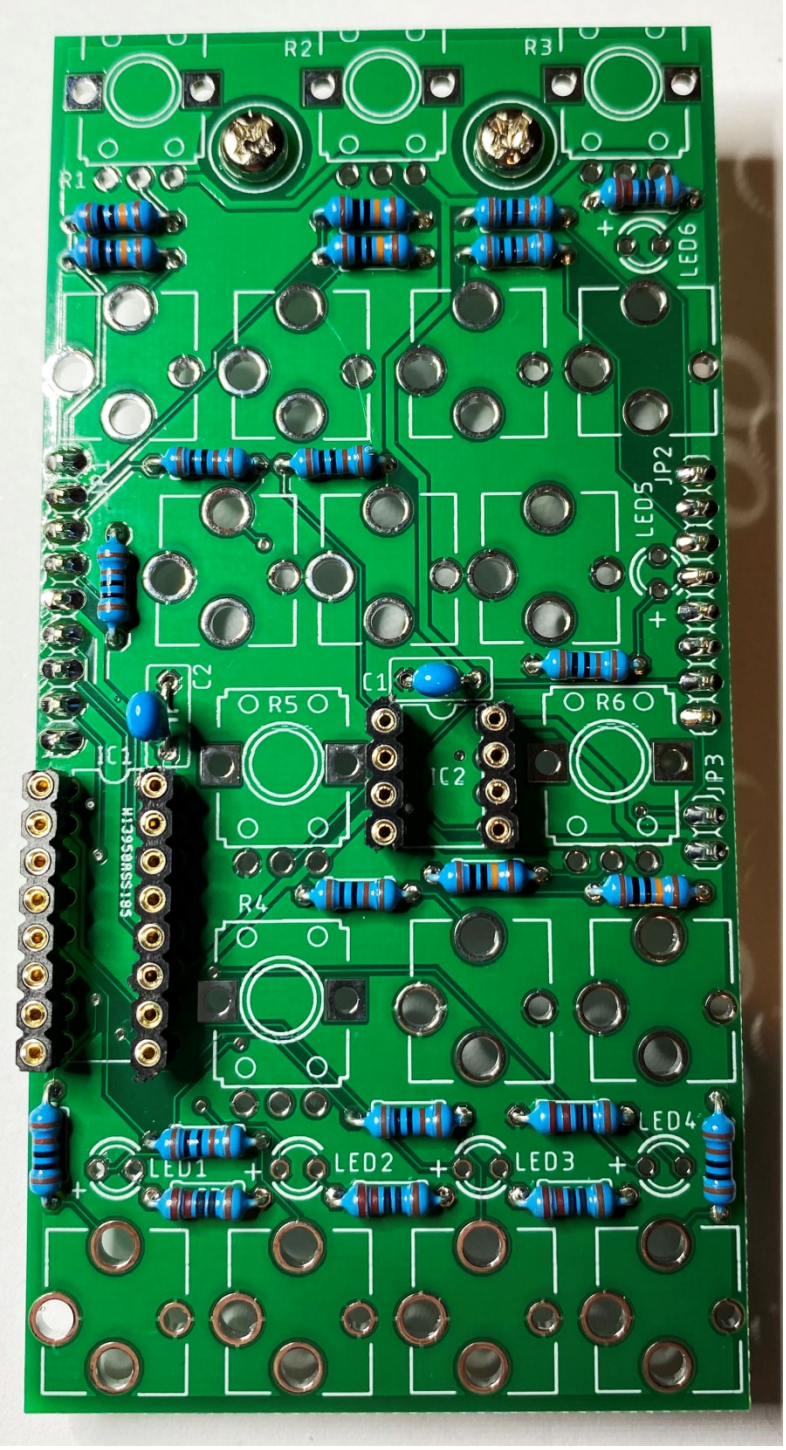
Install the two brass stand-offs using 6mm M3 screws





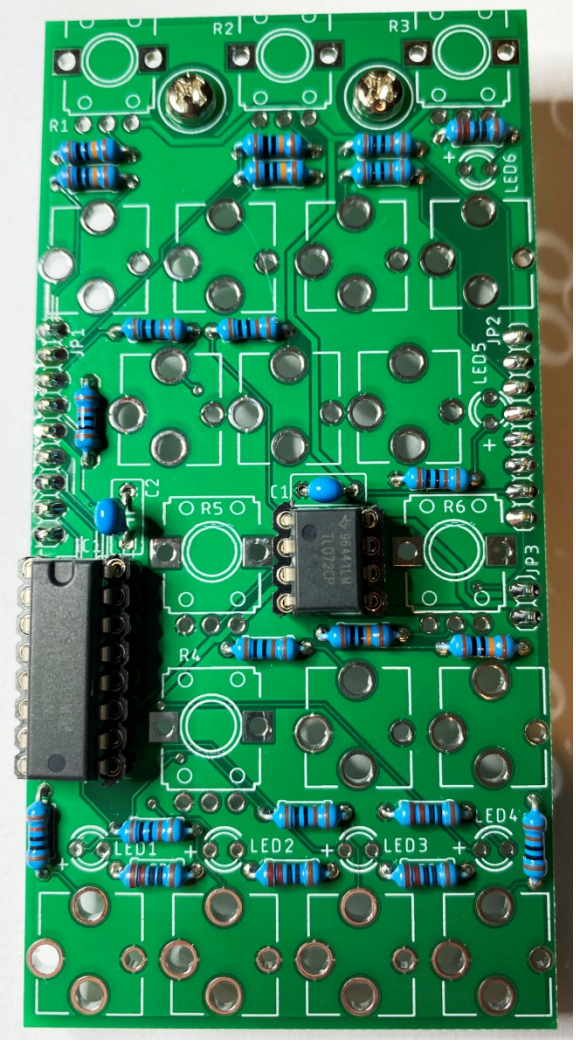
IO Board – Step 6

Install and solder the two 100nf capacitors C1 and C2



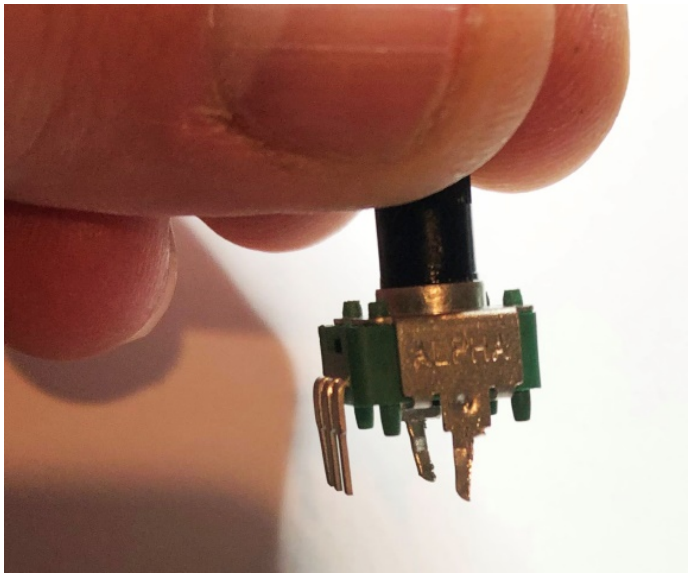
IO Board – Step 7

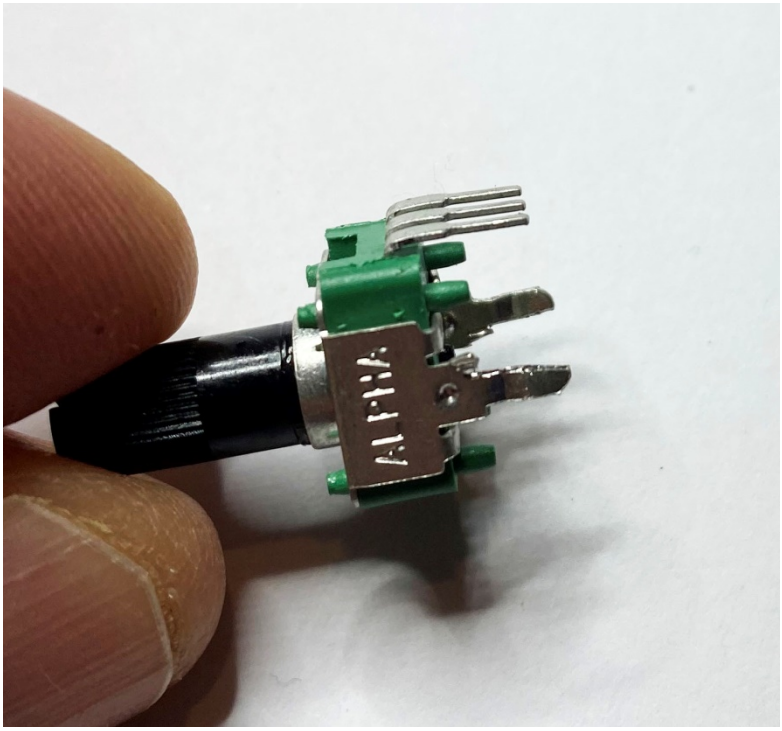
Install the 74HC595 IC into IC1 and the TL072 IC into IC2



IO Board – Step 8

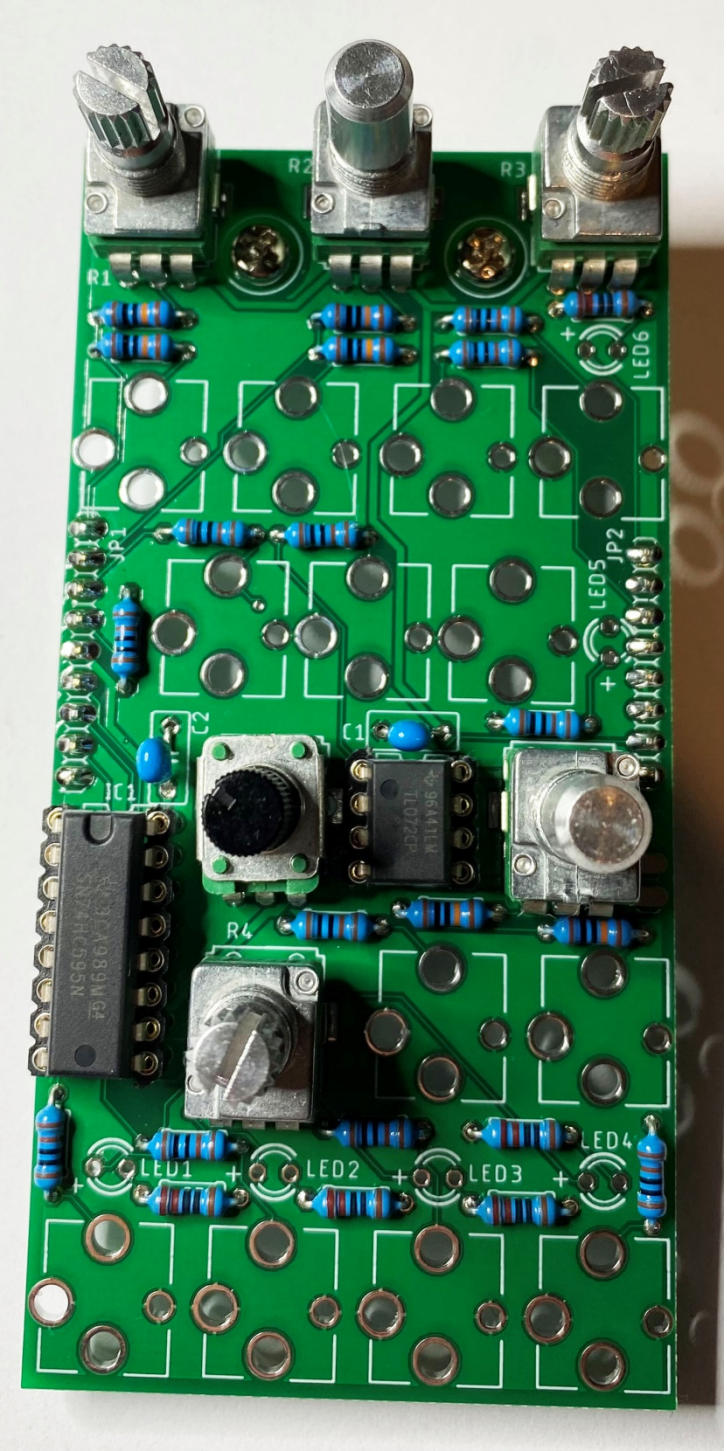
The trimmer pot needs its mounting supports trimmed in half so that they will fit into the PCB footprint. Use side cutters, go slow and be gentle.





IO Board – Step 9

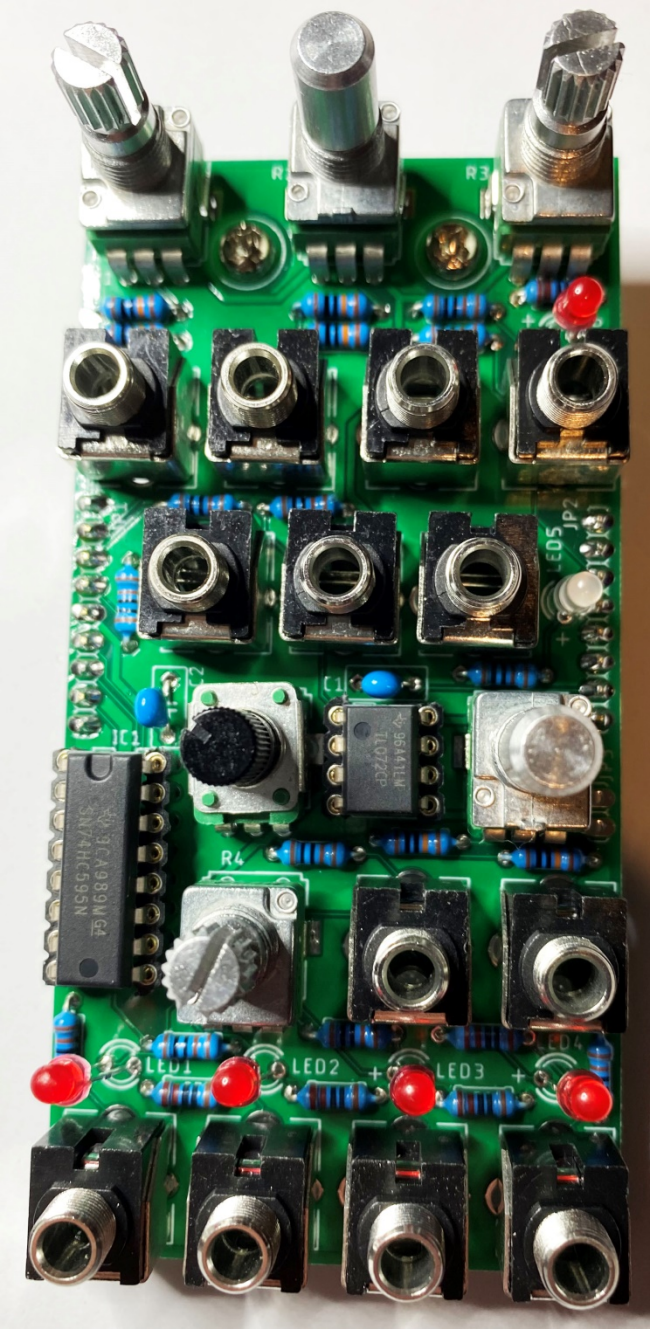
Install the potentiometers into place – DO NOT SOLDER THEM YET



IO Board – Step 10

Seat the jacks (DO NOT SOLDER) and install the five red LEDs into LED1, LED2, LED3, LED4 and LED**6** along with the bi-color LED into LED**5**. Again do not solder them yet. You may need to gently ben the pins on the LEDS to allow the board to rest on the desk unless you are using something to hold the PCB off the desk.

Note: the longer pin on the LED is the positive pin which is marked with a + on the silkscreen.



IO Board – Step 11

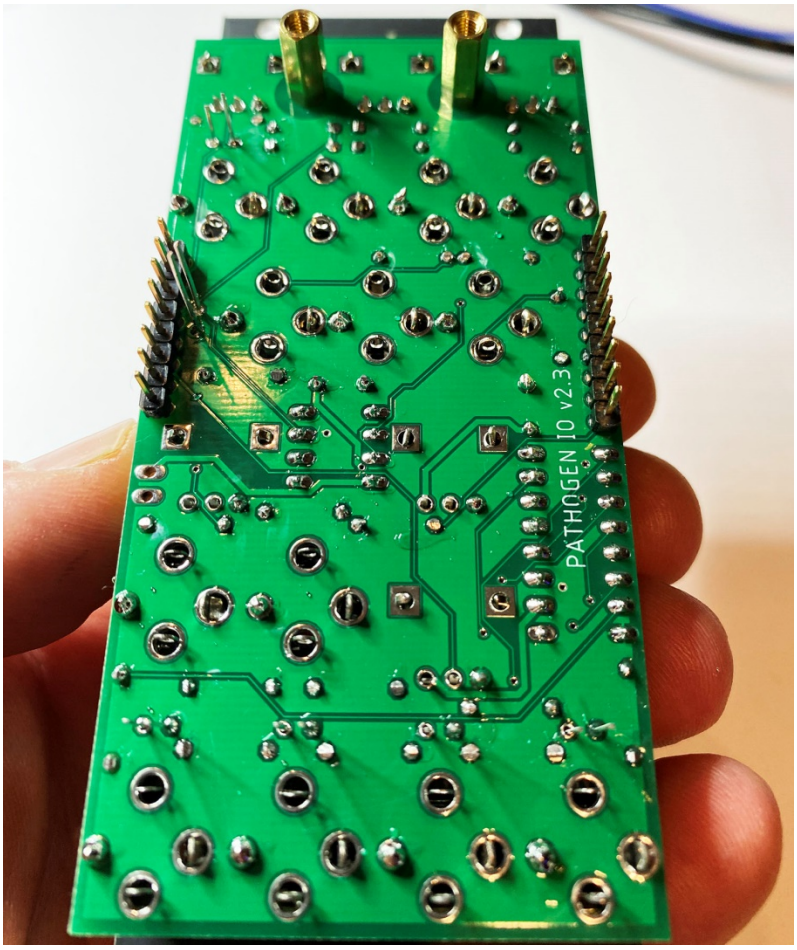
Carefully slide the panel over all of the seated components.

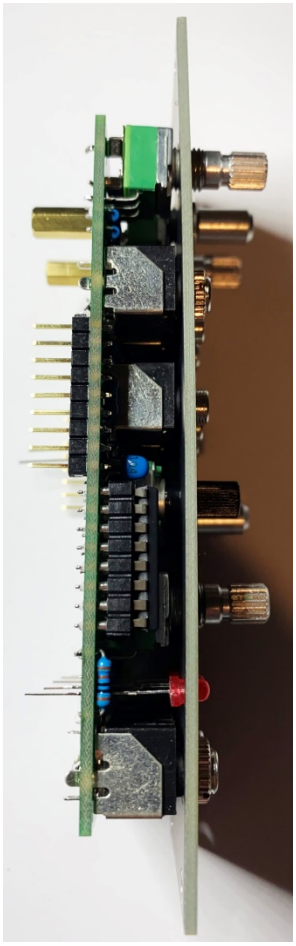
IO Board – Step 12

Install a few of the knurled nuts (I did 4) firmly and install washers and nuts onto the two round potentiometers – FINGER TIGHTEN only otherwise if you overtighten the potentiometers will lift off the PCBS and/or twist. This was enough tension to allow me to flip the board over to solder everything without it falling apart. Carefully test it out – you may need to install knurled nuts onto more jacks to get more tension.

IO Board – Step 13

Flip the board over and solder one pin of each jack and potentiometer to hold it into place. If you bent the LED pins to sit it against the desk, bend them straight again. Direct the LEDs into their holes and push them in firmly. Turn the board on its side and inspect the LEDs are seated correctly and that everything is seated nicely. When you are happy that everything is seated well, solder the rest of the remaining jack, pots and LEDs.



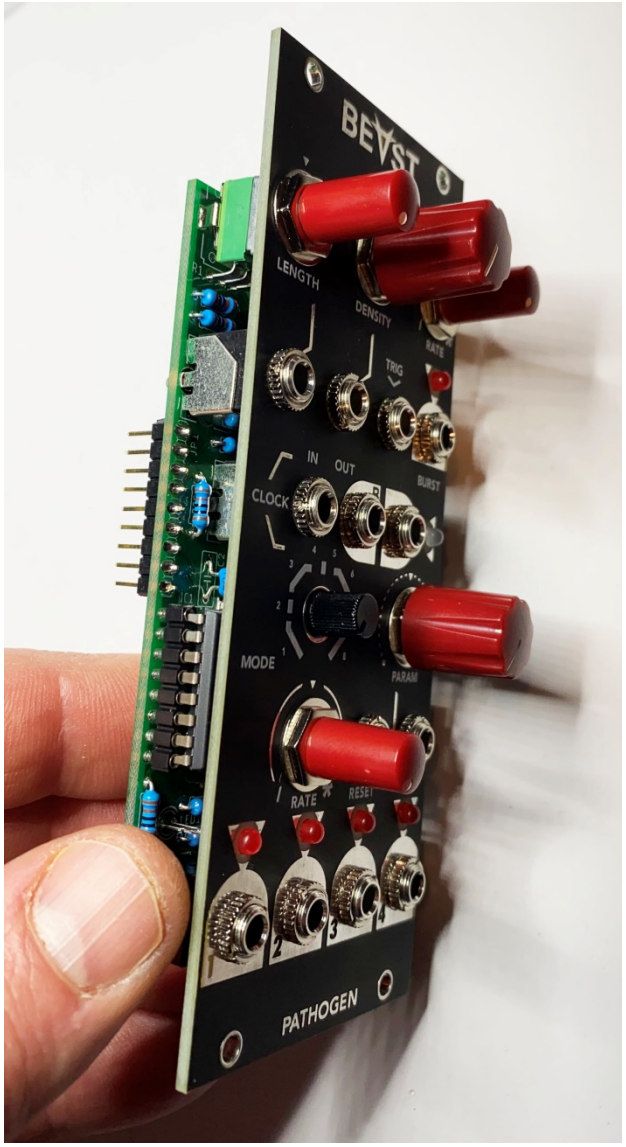


IO Board – Step 14

Install the remaining knurled jack nuts and potentiometer washer/nuts. Now that the potentiometers are soldered in tight, you can tighten the nuts but don't go overboard. Double check everything is seated correctly then flip over and solder the rest of the pins.

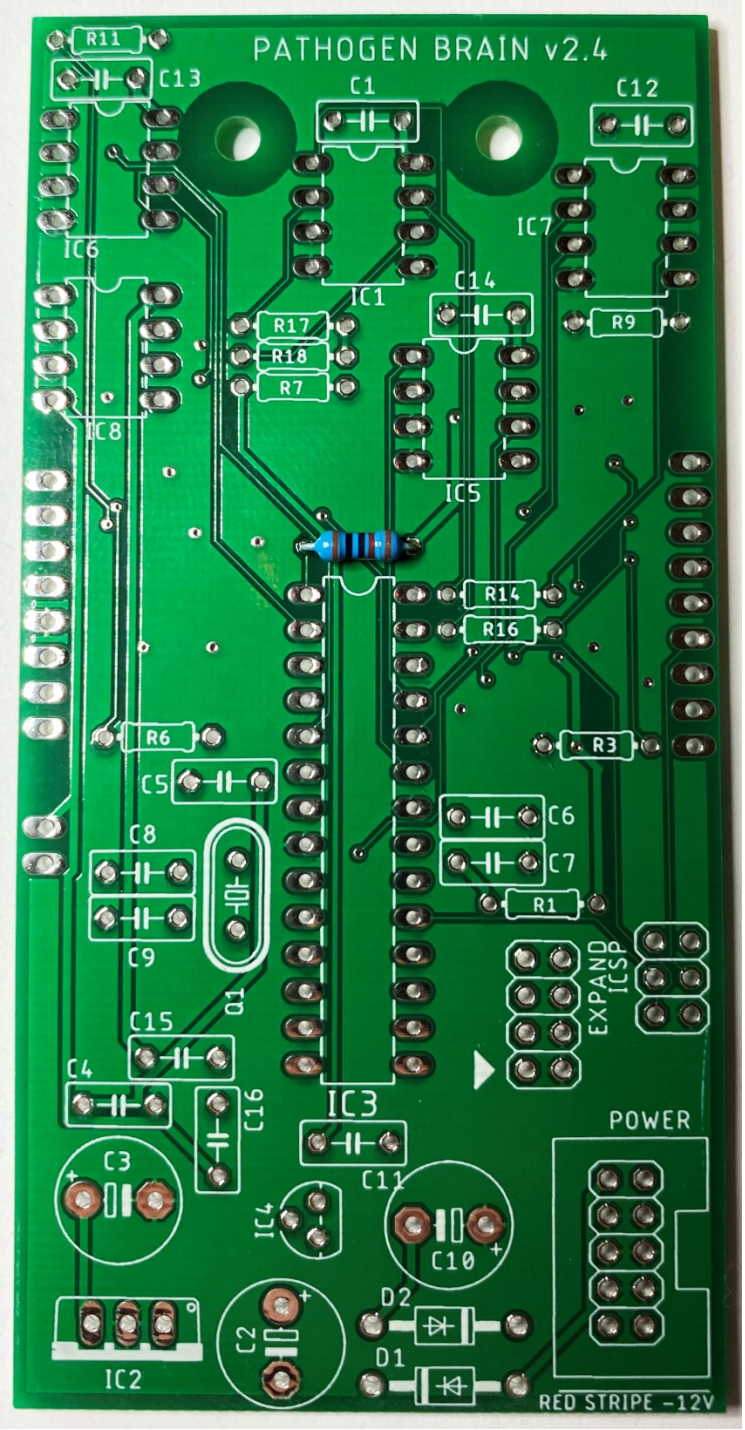
IO Board – Step 15

Lastly install the knobs and then move onto the Main board assembly.



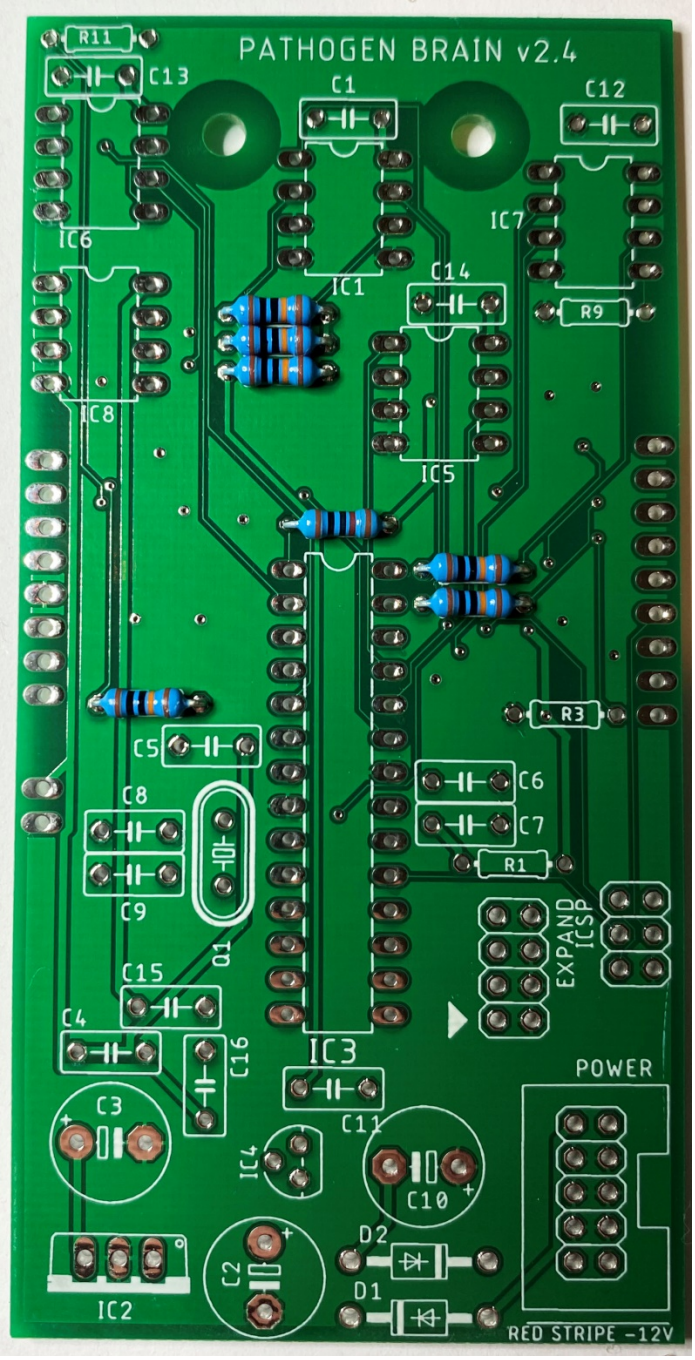
MAIN Board – Step 1

Install and solder the one 10K resistor R2



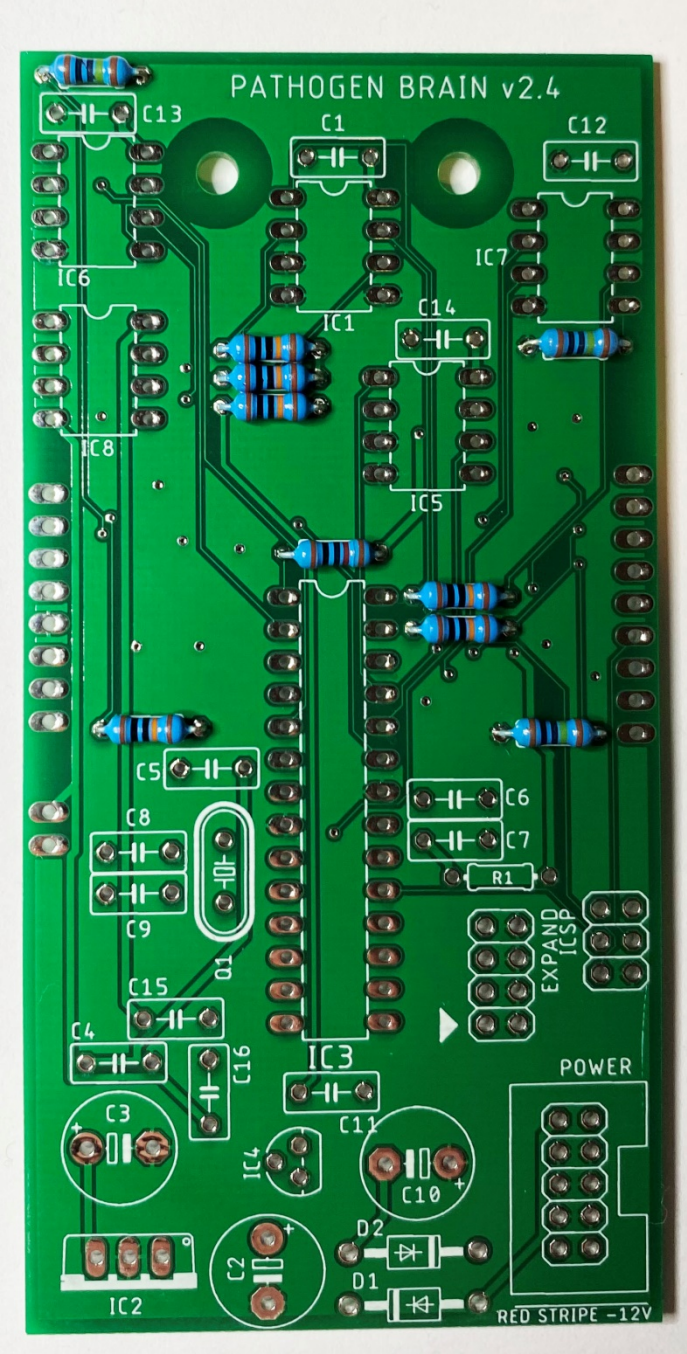
MAIN Board – Step 2

Install and solder the six 100K resistors R6, R7, R14, R16, R17 and R18



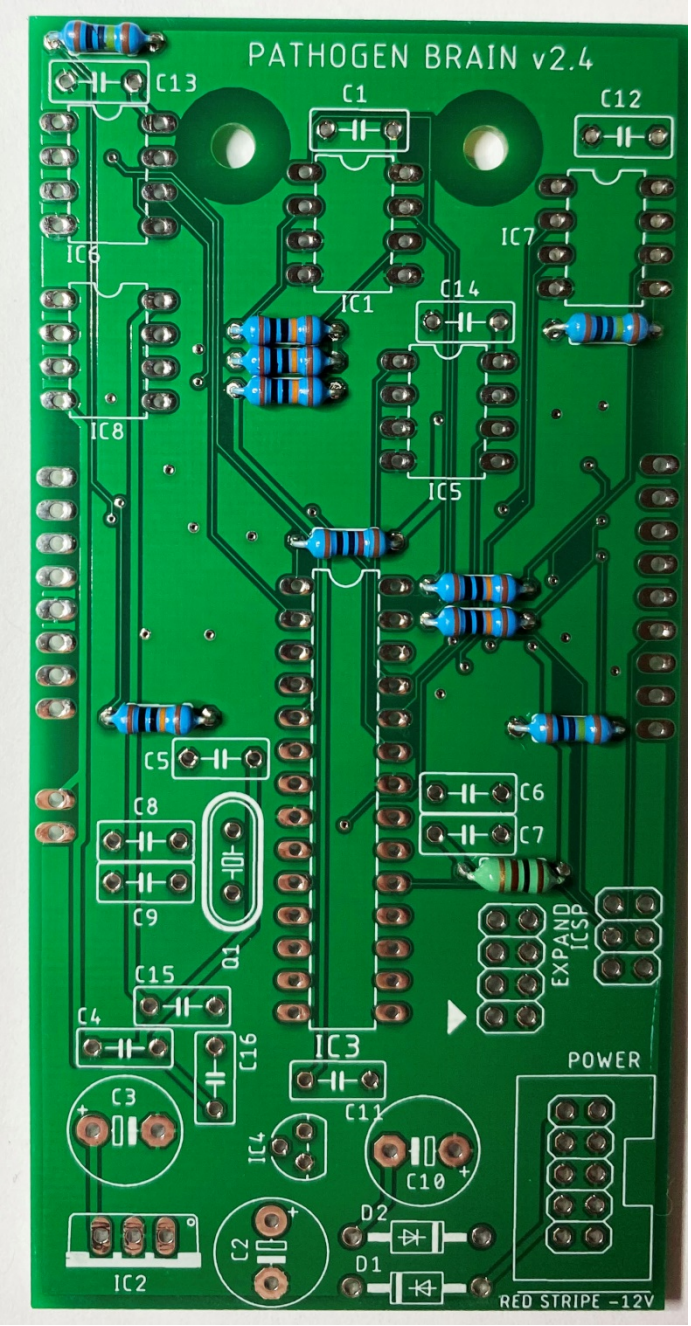
MAIN Board – Step 3

Install and solder the three 1M resistors R3, R9 and R11



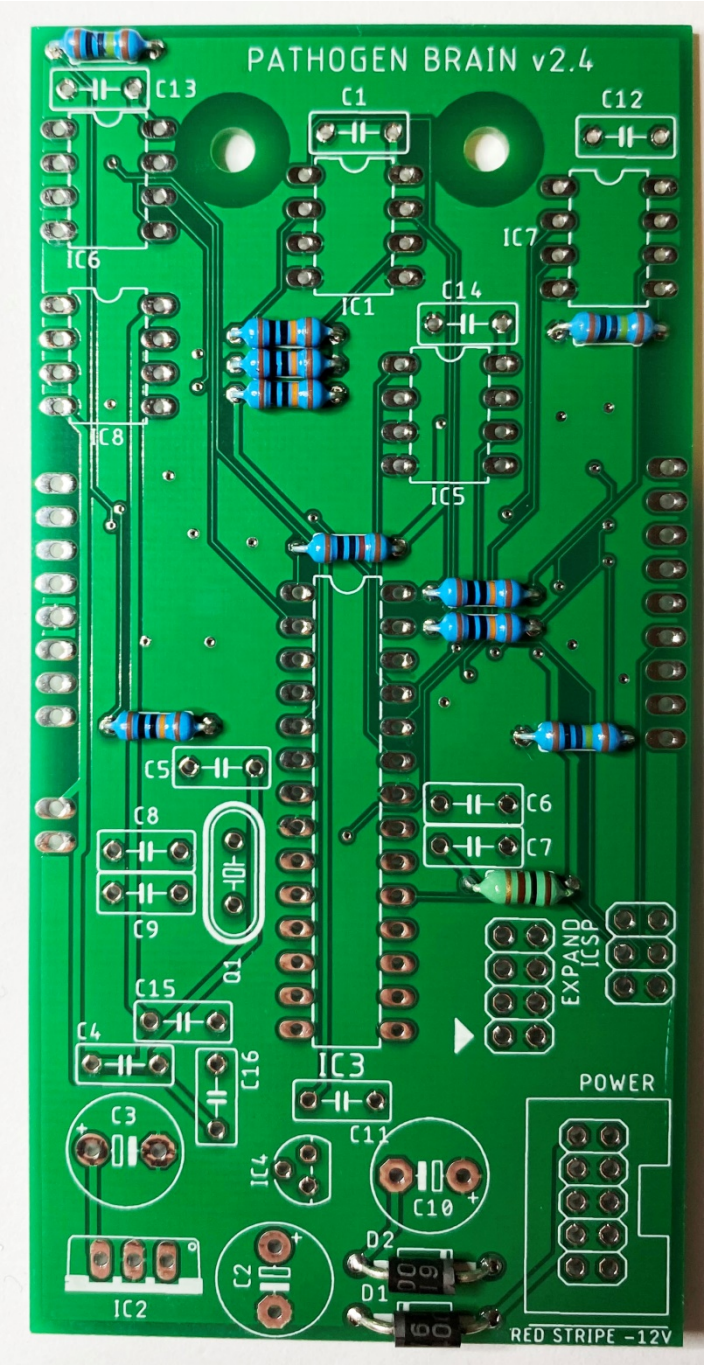
MAIN Board – Step 4

Install and solder the 100uh inductor into R1



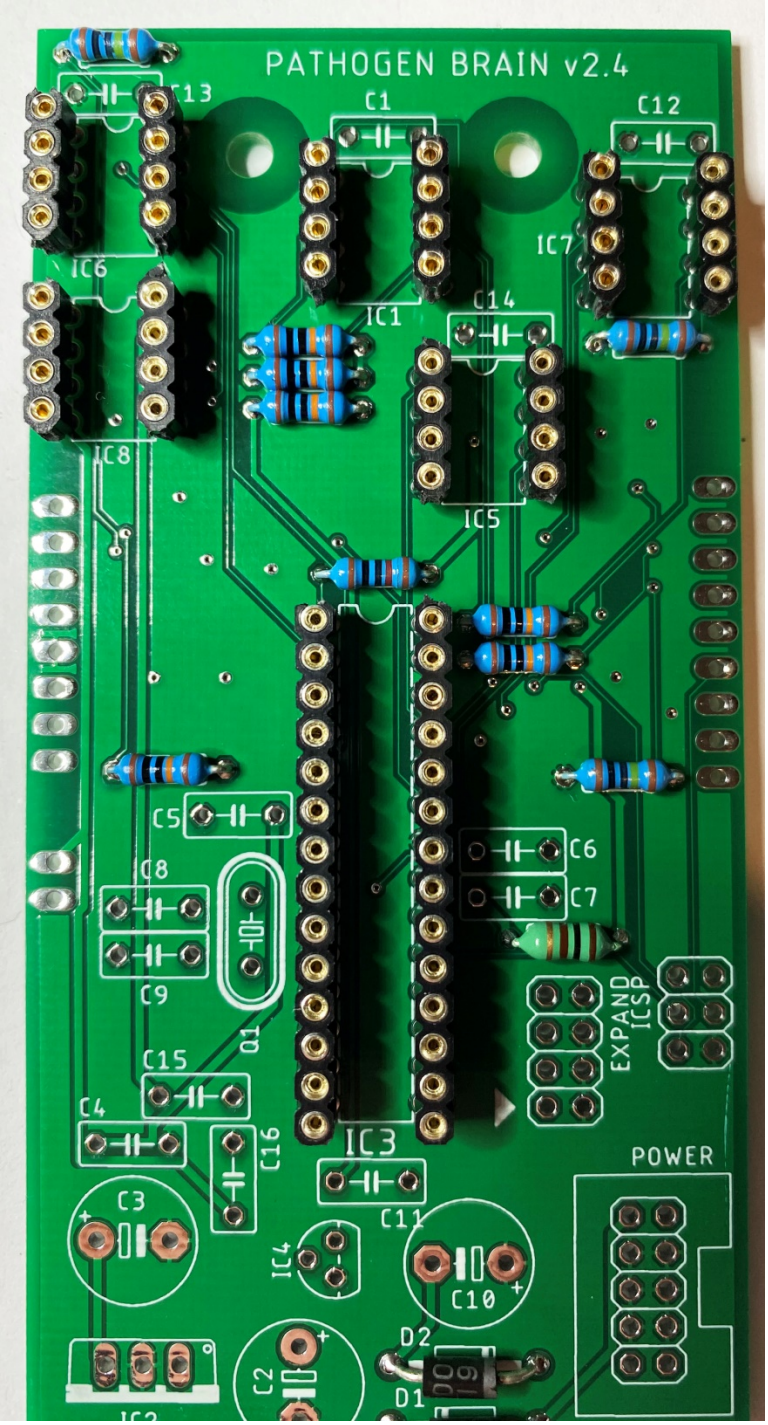
MAIN Board – Step 5

Install and solder the two 1N4004 power diodes into D1 and D2 paying attention to the polarity indicated on the silk screen.



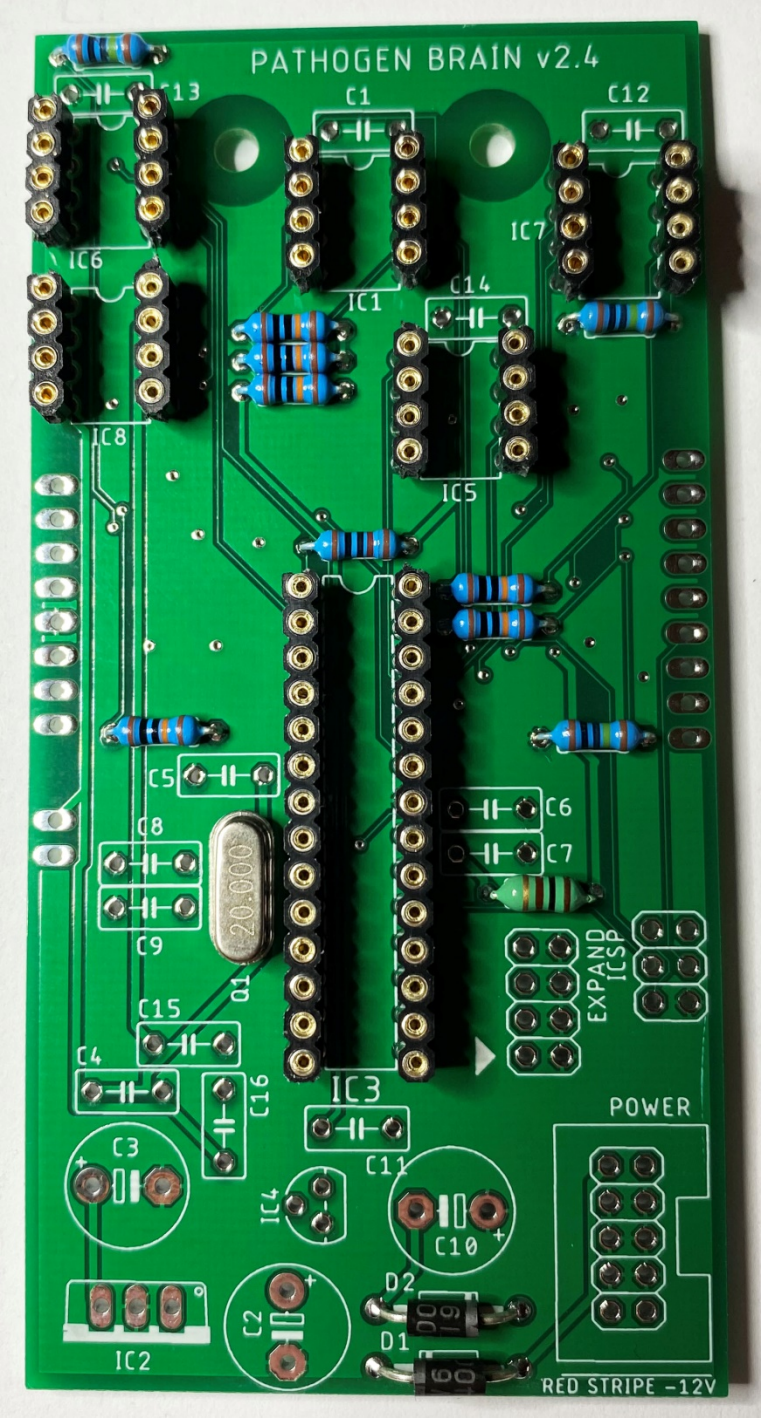
MAIN Board – Step 6

Cut the remaining IC sockets from the machine pin strips. Install and solder them into place.



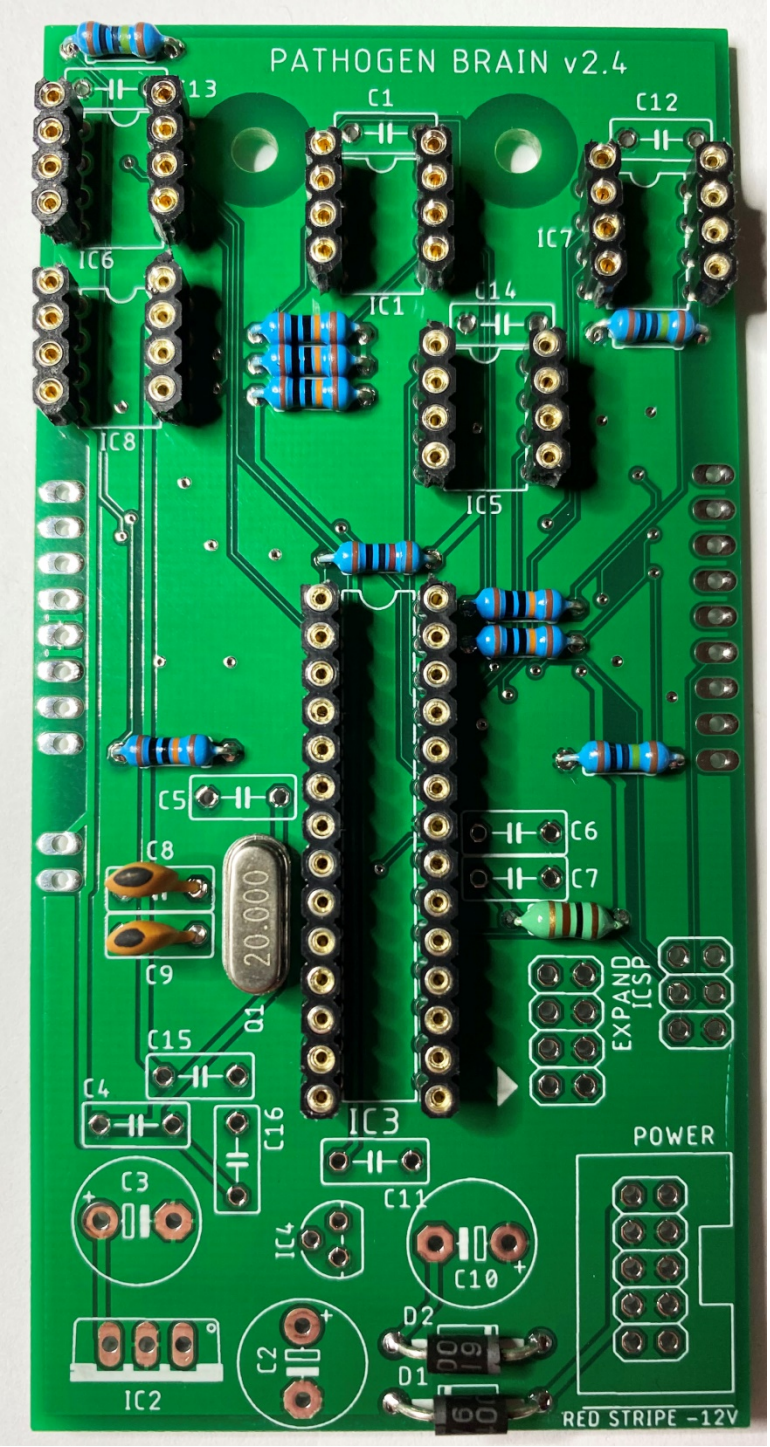
MAIN Board – Step 7

Install and solder the 20mhz crystal into Q1



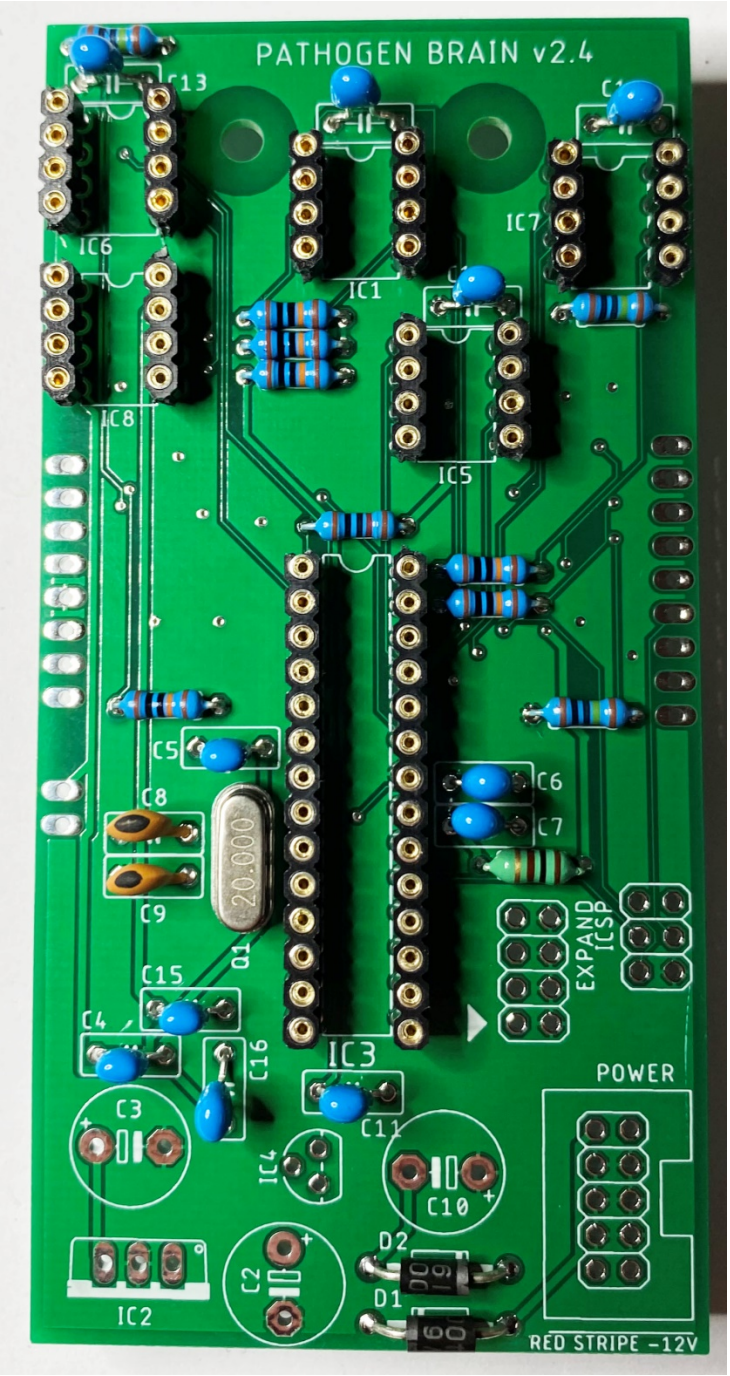
MAIN Board – Step 8

Install and solder the two 22pf capacitors into C8 and C9



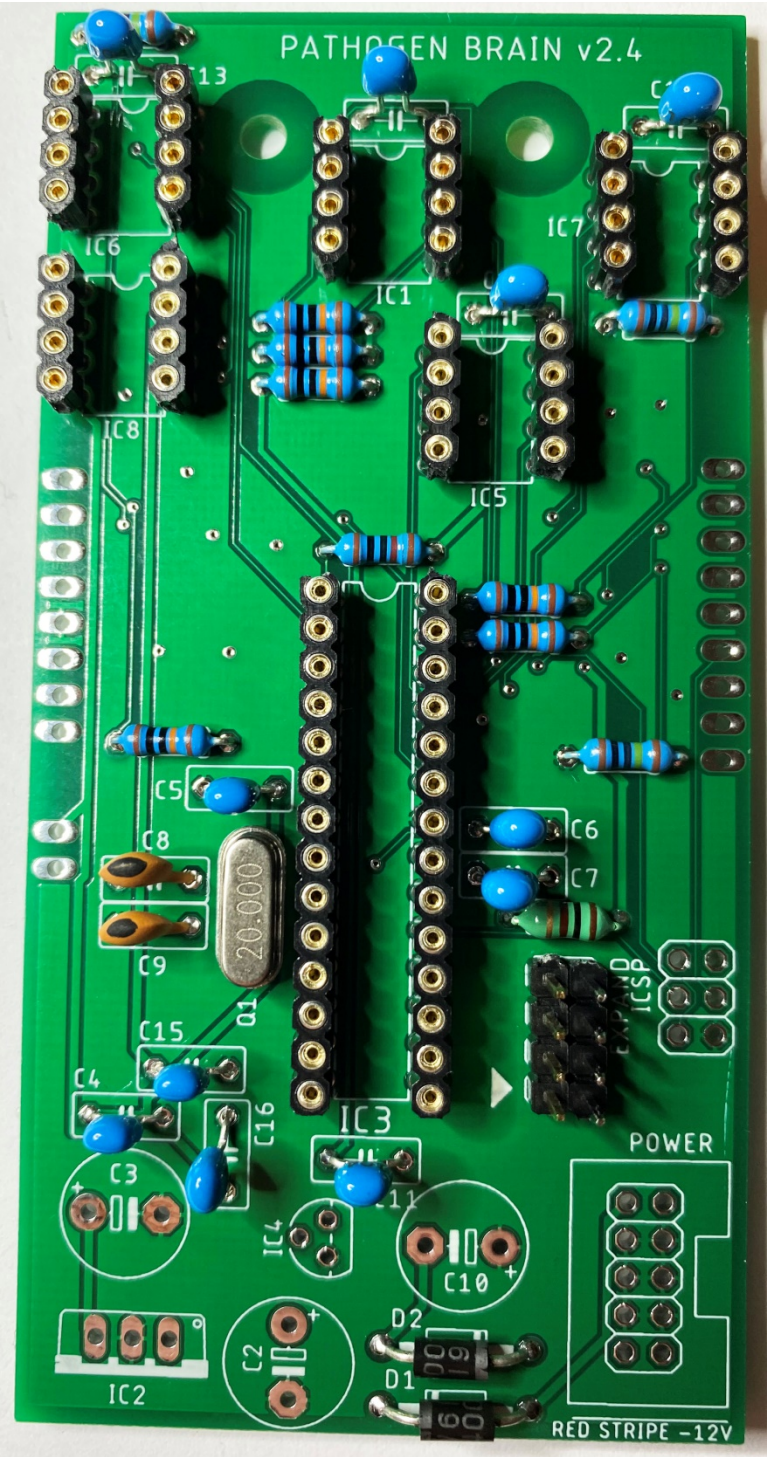
MAIN Board – Step 9

Install and solder the eleven 100nf capacitors into C1, C4, C5, C6, C7, C11, C12, C13, C14, C15 and C16



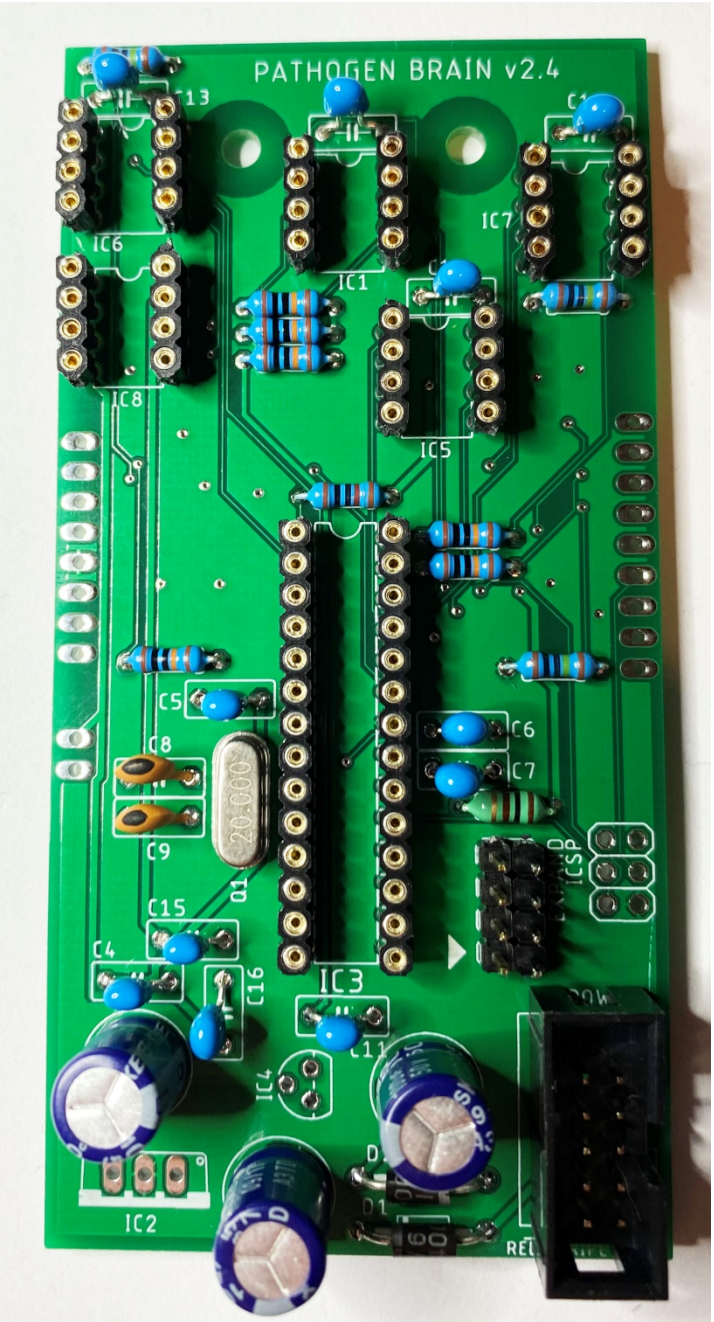
MAIN Board – Step 10

Cut two 4 pin pieces from the male pin header strip and install into the EXPAND header



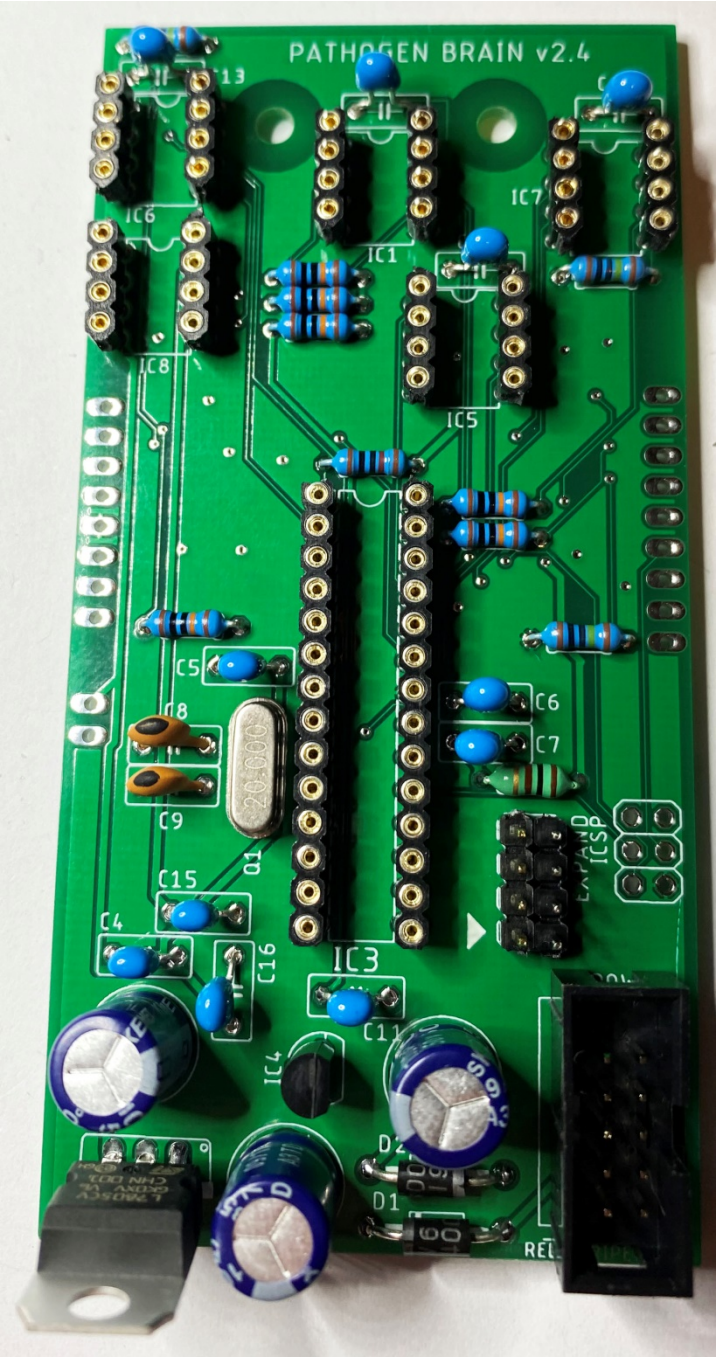
MAIN Board – Step 11

Install and solder the power header, paying attention to the cut out or “notch” indicated on the silk screen. Next install and solder the three 100uf electrolytic capacitors C2, C3 and C10 paying attention to the polarity. The longer pin is positive (anode) and the shorter pin marked with a strip is the negative (cathode)



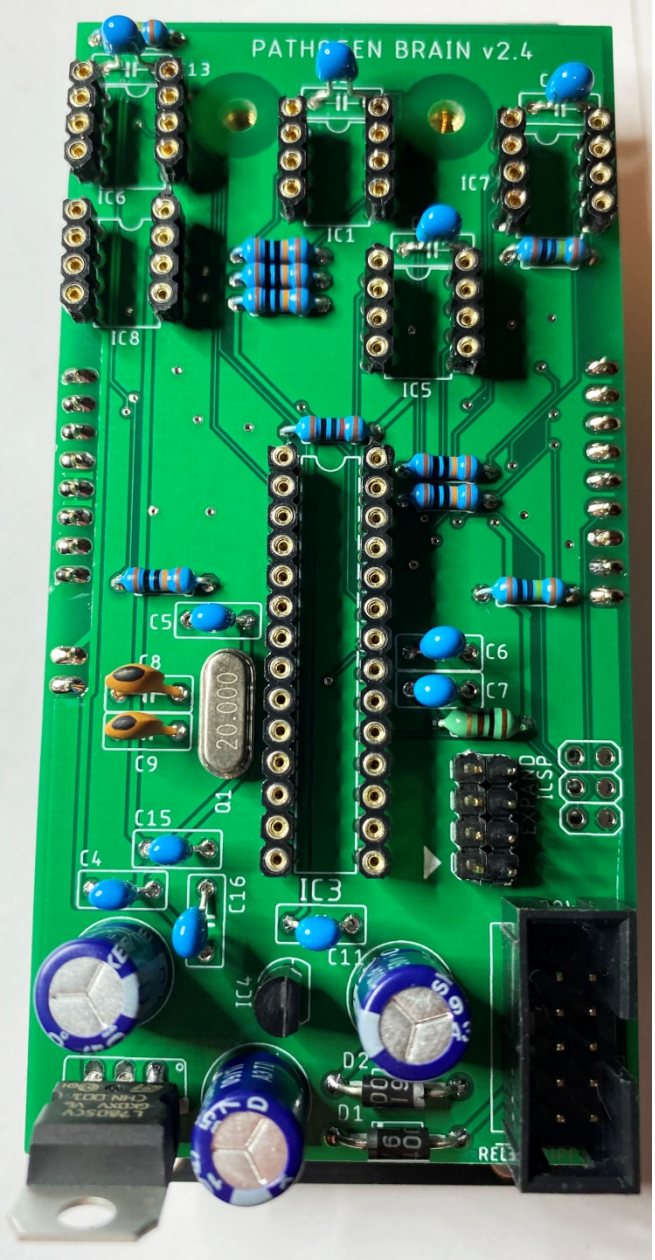
MAIN Board – Step 12

Install and solder the two voltage regulators IC2 and IC4, paying attention to the orientation marked on the silk screen.



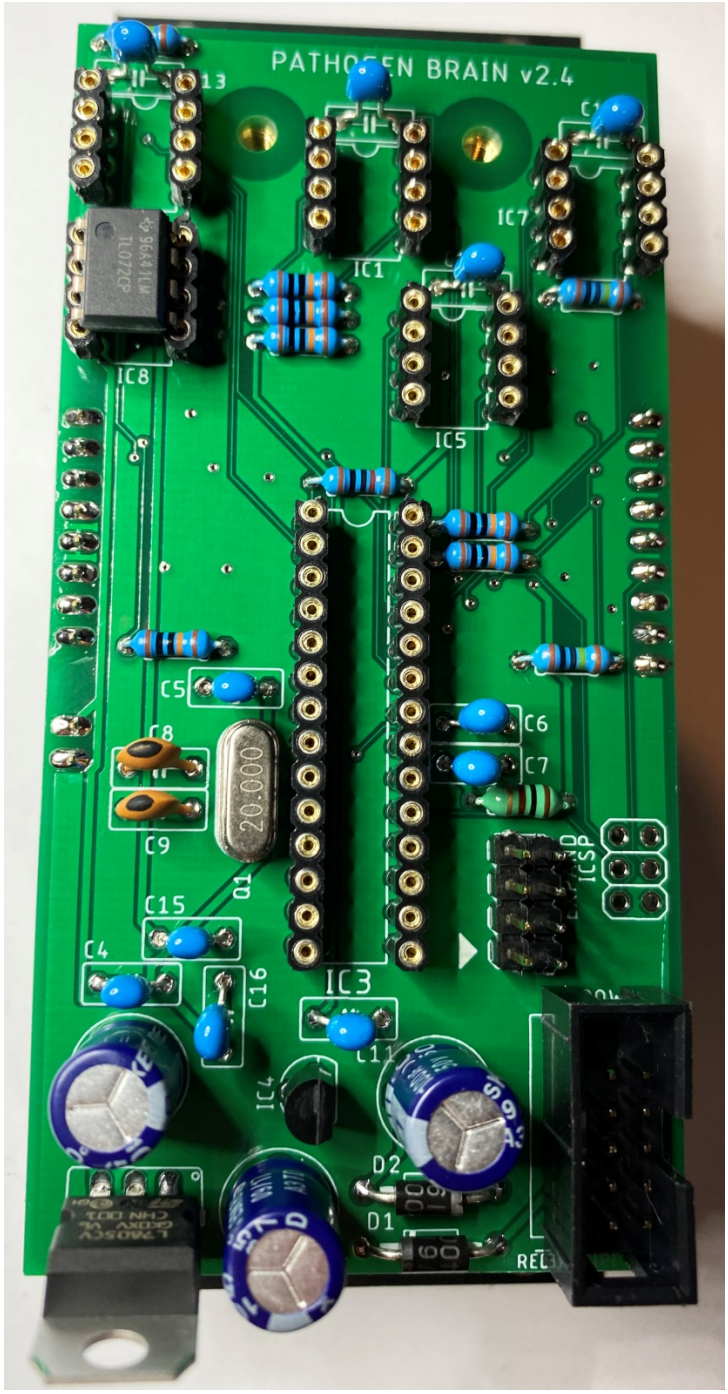
MAIN Board – Step 13

Cut three pieces of FEMALE pin header (one 9 pin, one 8 pin and one 2 pin) and install and solder into place. This may be easier if you first place the female header onto the matching male header on the IO board and then seating the boards together before soldering.



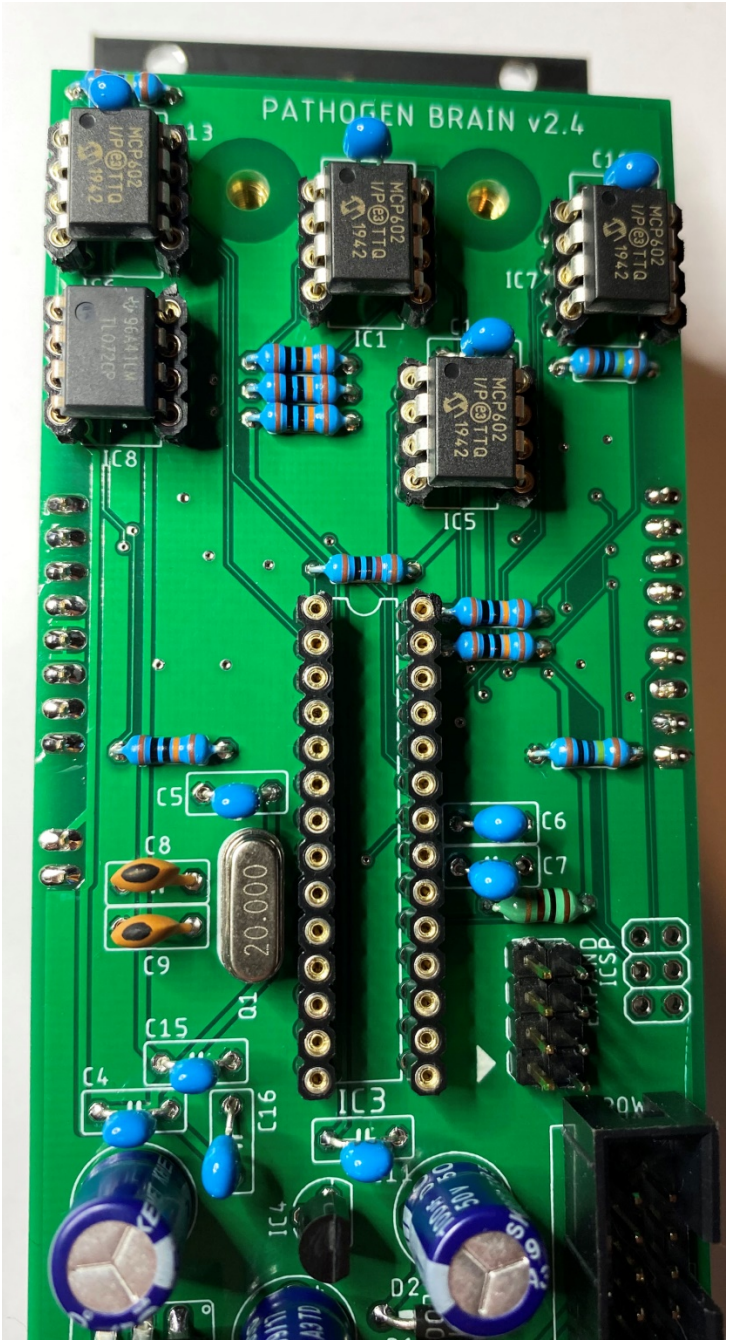
MAIN Board – Step 14

Install the TL072 IC into the IC8 socket.



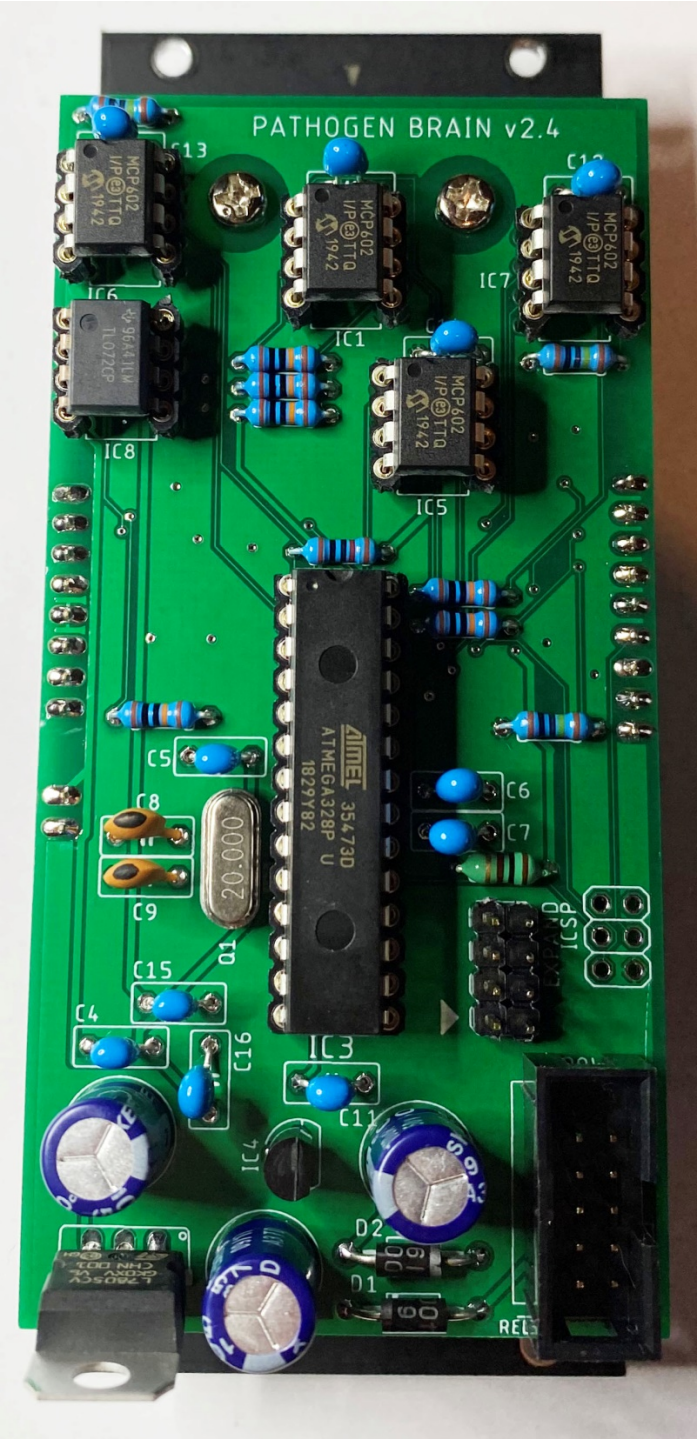
MAIN Board – Step 15

Install the four MCP602 IC's into their sockets (IC1, IC5, IC6 and IC7)



MAIN Board – Step 16

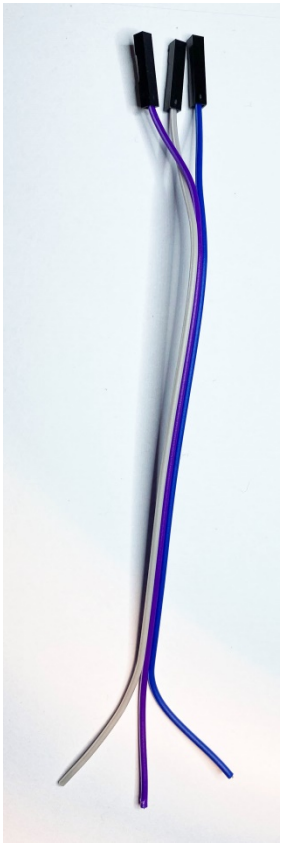
Install the Atmega CPU into IC3 and secure the boards together using the two remaining 6mm M3 screws.

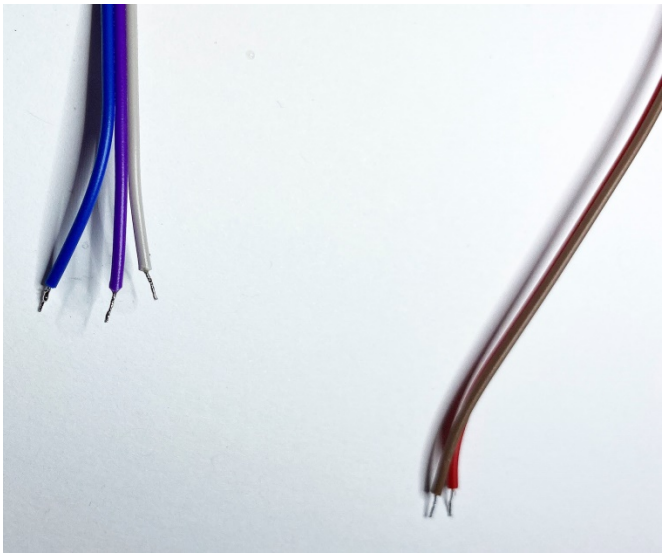


PG – Pathogen Expander (optional)

PG Expander – Step 1

A 3-wire and 2-wire dupont connector are provided. Strip the ends of the wires and tin them with solder.

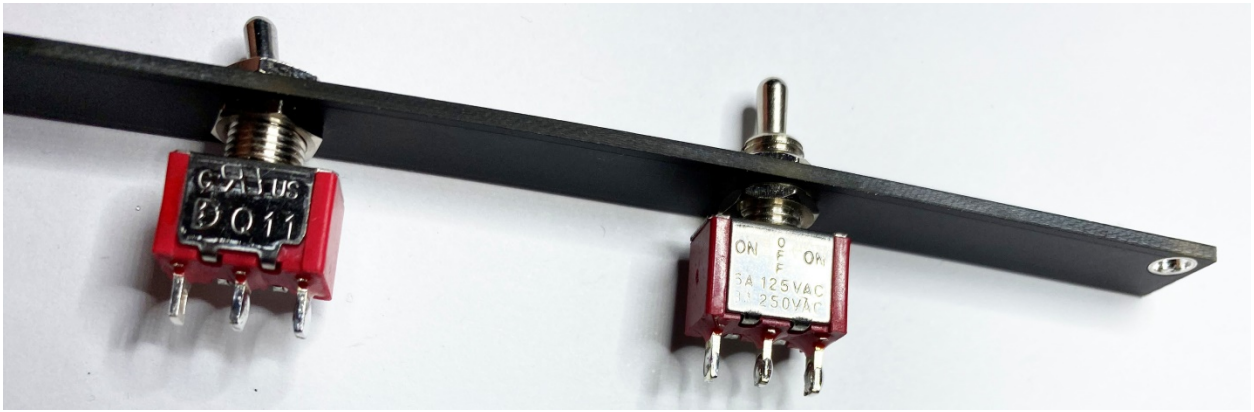




PG Expander – Step 2

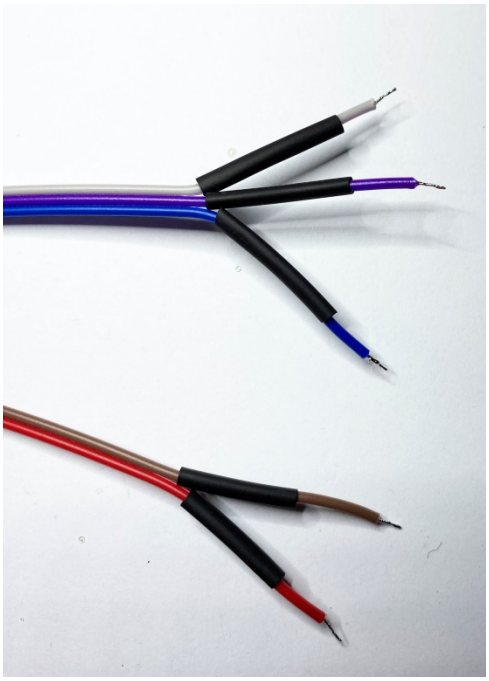
Install the 2 toggle switches onto the panel. The SPDT (ON-ON) switch is for the DIV RANGE option and the SP3T (ON-OFF-ON) switch is for the TRIG Step/Edge option.

Apply a very small amount of solder to the lugs of the switches.



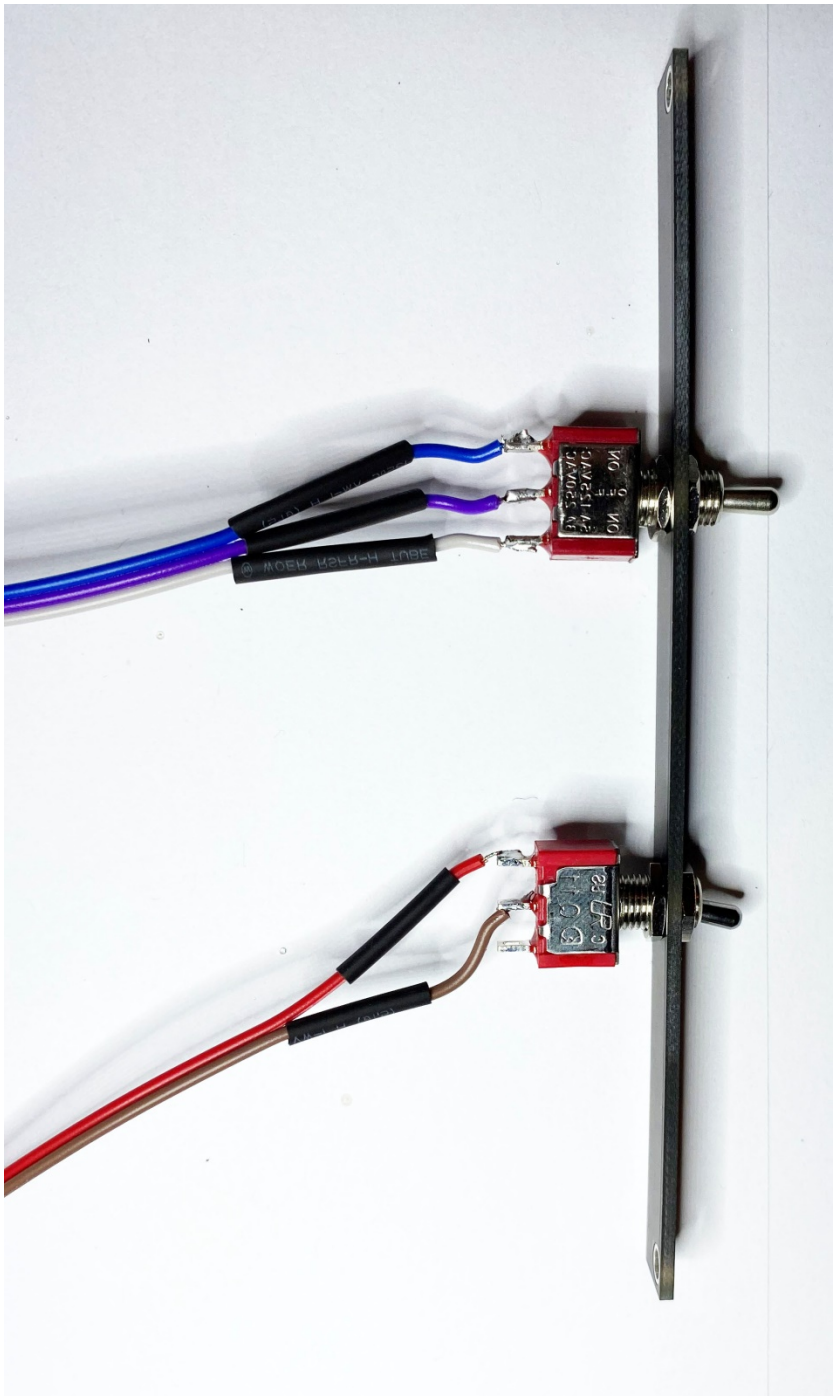
PG Expander – Step 3

Cut the heatshrink tubing into 5 pieces approx. 15-20mm in length each. Thread these over each wire once tinned, leaving approx. 10-20mm of wire exposed.



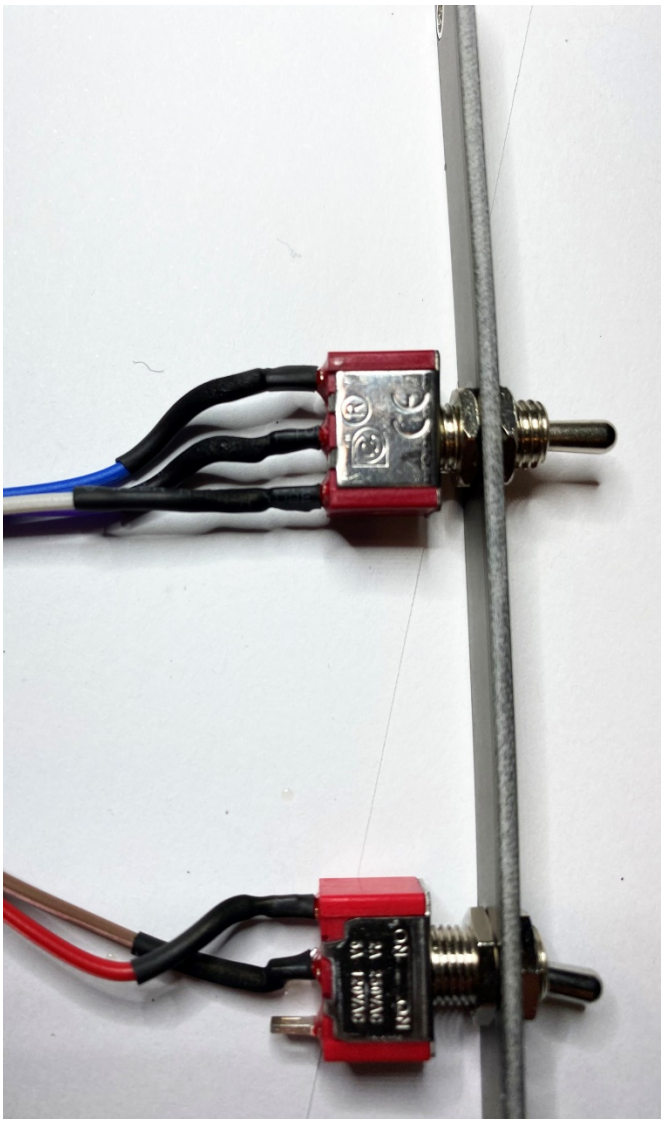
PG Expander – Step 4

Solder the 3-wire piece onto the ON-OFF-ON switch. Solder the 2-wire piece onto the middle and top lugs of the ON-ON switch



PG Expander – Step 5

Slide the heat shrink tubing down over the lugs and use a cigarette lighter or heat gun to shrink the tubing into place.



PG Expander – Step 6

Finished!! For connection instructions please see the user guide!