EQP501 Assembly guide

Safety warning

The kits are main powered and use potentially lethal voltages. Under no circumstance should someone undertake the realisation of a kit unless he has full knowledge about safely handling main powered devices.

Please read the "DIY guide" before beginning.
Print or open the following documents :

- EQP501 Schematics
- EQP501 Components layout
- EQP501 Parts list
- EQP501 Setup guide

Follow this guide from item number 1 till the end, in this order. The assembly order is based on components height, from low to high profile, in order to ease the soldering process : The component you are soldering is always taller than the previously assembled ones and it is pressing nicely against the work area foam.

Soldering

All the PCB holes are metallized. It means the connection between the top and bottom pads is already done. The parts must be soldered only from below (unless differently stated).

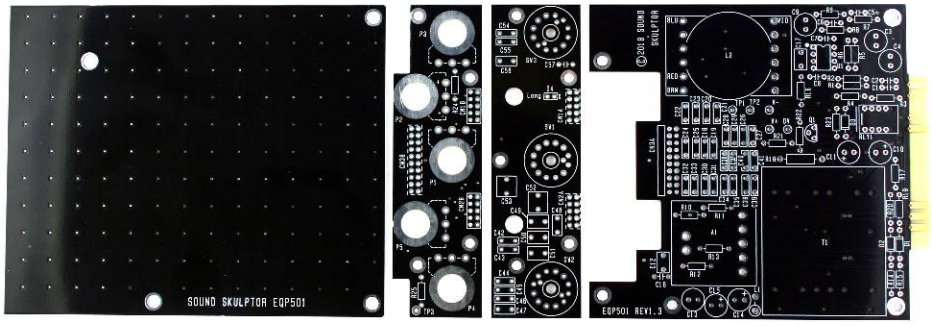
Use only small diameter solder, 0.5 or 0.7 mm, 1 mm maximum. Use the minimum possible amount of solder. Bad joints are almost always caused by too much solder.

Cut the component leads and pins totally flush with the PCB after soldering. A too long tail could create an electric connection with the side plate.

Here are two excellent introduction to soldering videos:
http://www.eevblog.com/2011/06/19/eevblog-180-soldering-tutorial-part-1-tools/
http://www.eevblog.com/2011/07/02/eevblog-183-soldering-tutorial-part-2/

EQP501 Assembly guide – Main PCB

1. PCB split



Split the PCB into 4 parts along the grooves. Use extra thin sandpaper to polish all the rough sides.

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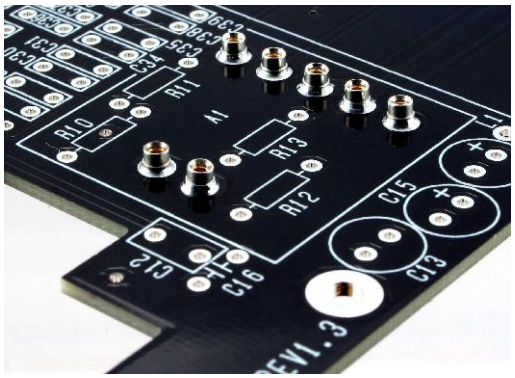
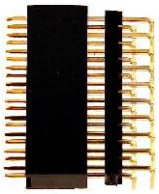
EQP501 Assembly guide – Main PCB

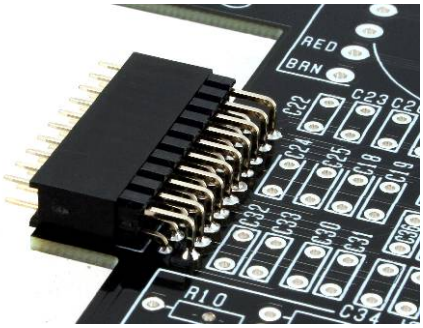
2. DOA Pin Sockets



Solder the 7 pin sockets for the DOA. Solder one at a time. Insert one socket, turn over the PCB and press against a solid surface then solder. The correct positioning of the sockets is very important for easy insertion of the DOA.



3. PCB to PCB connector CN3A



Insert the female 2x10 connector into the male part and position the later on the main PCB. The female connectors must sit flat on its side. Solder two pins, check position then solder the other pins.

After soldering you can remove the female part.

4. Diodes

Add D1, D2, D3. Use a lead forming tool to bend the leads at 0.4".
Warning : Make sure to respect the direction of the diodes which is marked by a ring on the component and a double line on the PCB marking.
Warning : When soldering components close to the golden fingers of the edge connector, be very careful not to touch them with your soldering iron tip. It would cover them with unremovable tin. It is a good idea to protect them with adhesive tape.

5. Resistors

The best method to select and install the resistors is the following:
1. pick a row of resistors in the resistors bag,
2. Measure one of the resistors with your DMM,
3. Look up the parts-list PDF for the closest value,
4. Check the color code and quantity for confirmation,
5. Use the search function on the Layout PDF page with the resistor value: All the corresponding resistors are highlighted,
6. Insert and solder.
(You can use the same method later, for the capacitors)

Add R1 to R23. Control the resistor values with a digital multimeter. Bend the leads at 0.4" with a lead forming tool, except for R18 which is bent at 0.6".

Warning : It is very important to check the resistors value with a DMM because the color code can sometimes be ambiguous. For example 1K (brown-black-black-brown-brown) can be confused with 1 1OR (brown-brown-black-black-brown).

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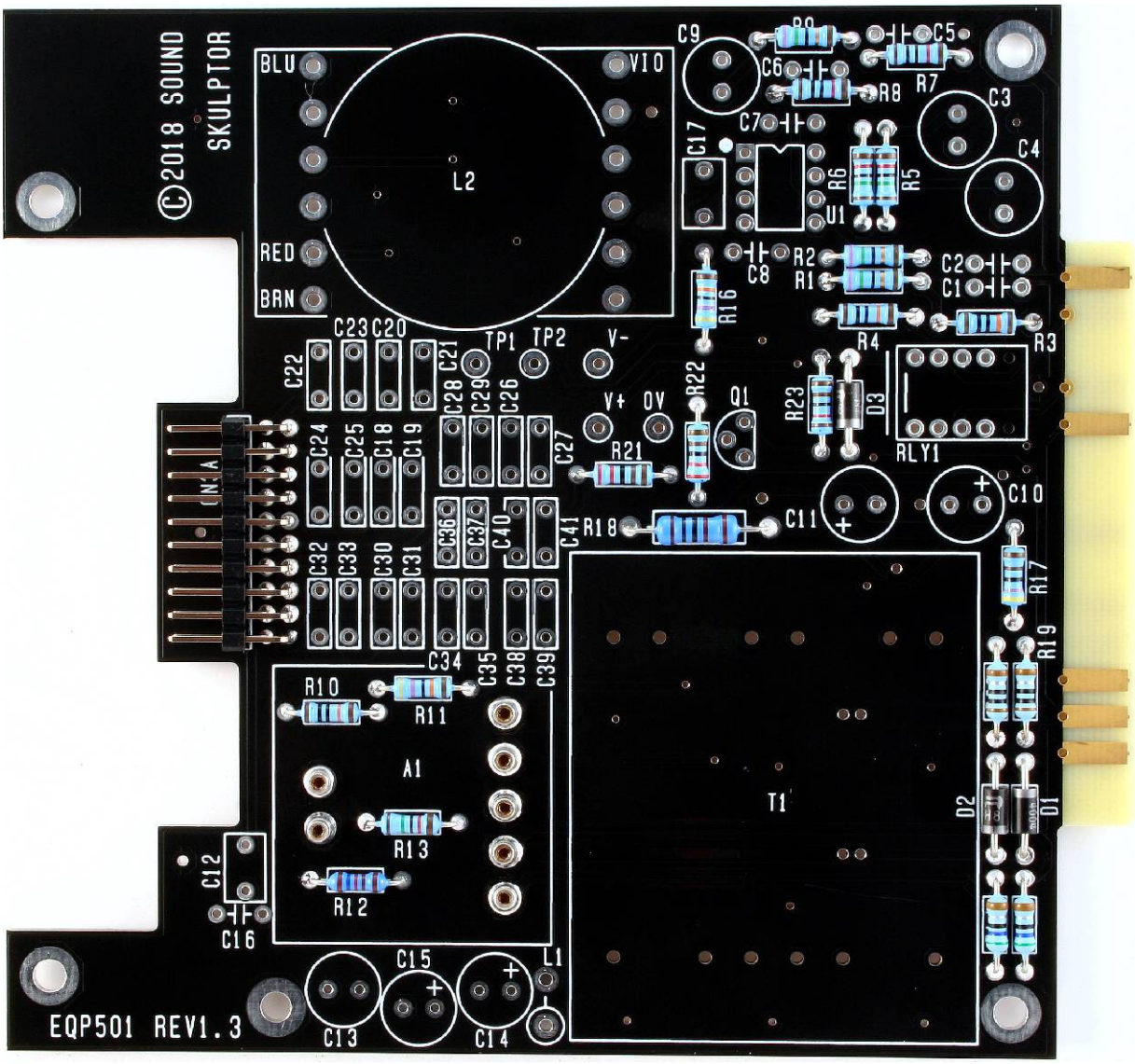
EQP501 Assembly guide – Main PCB

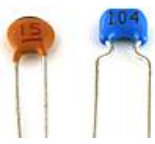


6. IC Socket

Insert and solder the 8 pins socket.
Warning : Make sure to respect the socket direction, marked by a notch.

7. Relay

Add RLY1.
Warning : Make sure to respect the direction of the relays which is marked by a white line on the component and on the PCB marking.



8. Ceramic capacitors

Add C5, C6.
Add C1. C2, C16,
Add C19,
Add C7, C8.

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EQP501 Assembly guide – Main PCB

9. Test pins

Solder 5 test pins TP1, TP2, V+, V- and 0V.

10. Transistor

Add Q1.

Warning : Watch out the devices direction.

11. Film capacitors

Add C18, C20, C22, C24, C26, C28, C30, C32, C34...C41, C12, C17.

C21, C23, C25, C27, C29, C31, C33 are not connected.

12. Non polarized electrolytic capacitors

Add C3, C4, C9, C13.
These caps are not polarized and can be inserted in any direction.

13. Polarized electrolytic capacitors

Add C10, C11, C14, C15.
Warning : The +lead must go into the +hole. Do not reverse (they may explode !)

14. Inductor

Add L1. This inductor is installed vertically.

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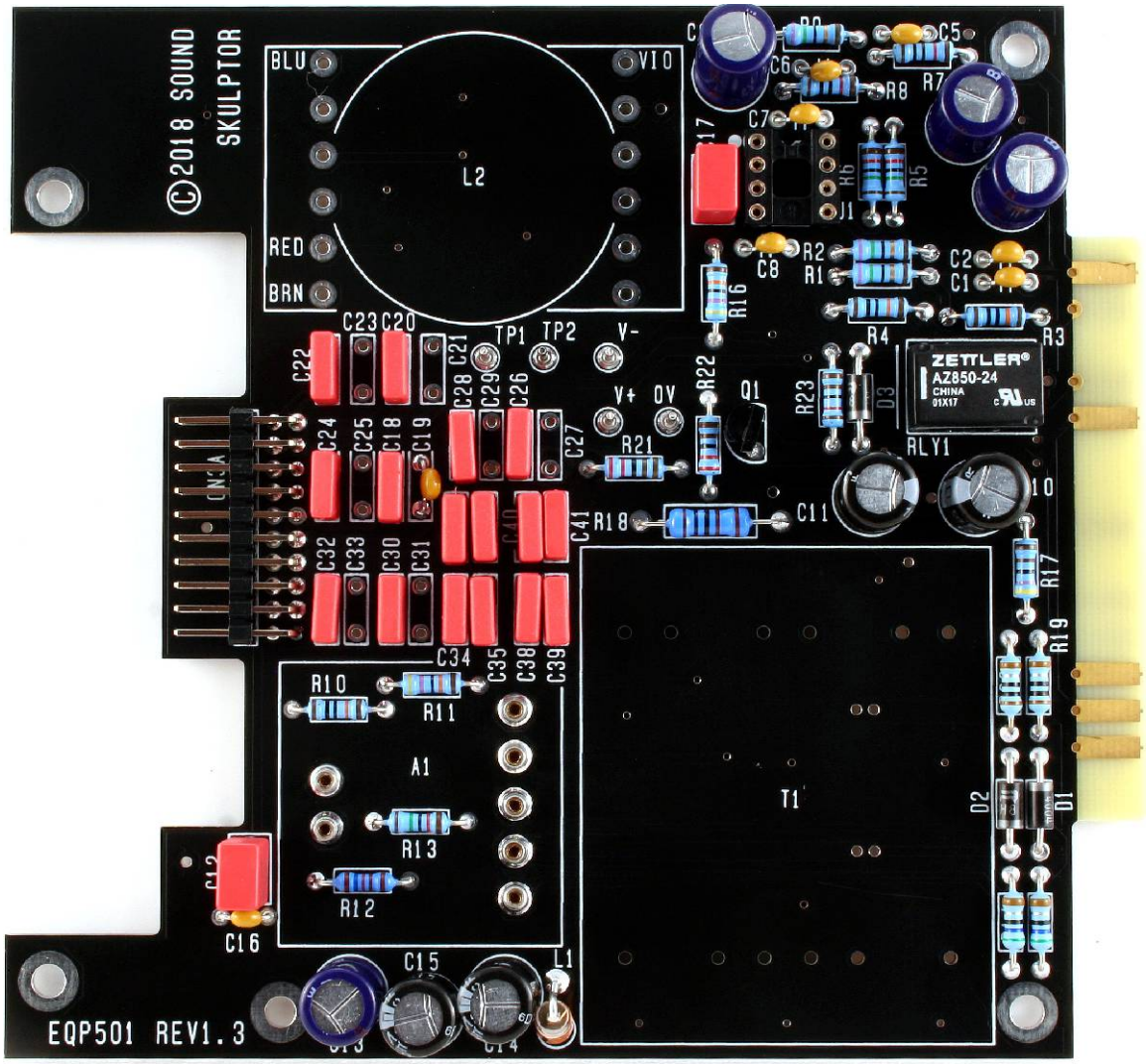
EQP501 Assembly guide – Main PCB



15. Toroid inductor

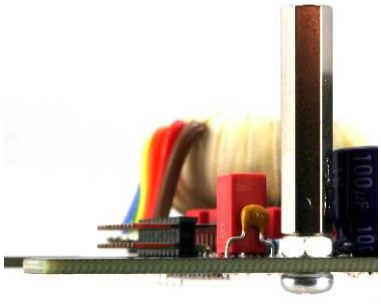
Insert the toroid inductor L2, taking care of the wire color position.

16. Output transformer

Insert and solder output transformer.

17. Spacer

Insert a M3x10 mm screw from below PCB into the hole next to C13 and attach it with an M3 nut. Next attach a M3x25 mm to the screw.



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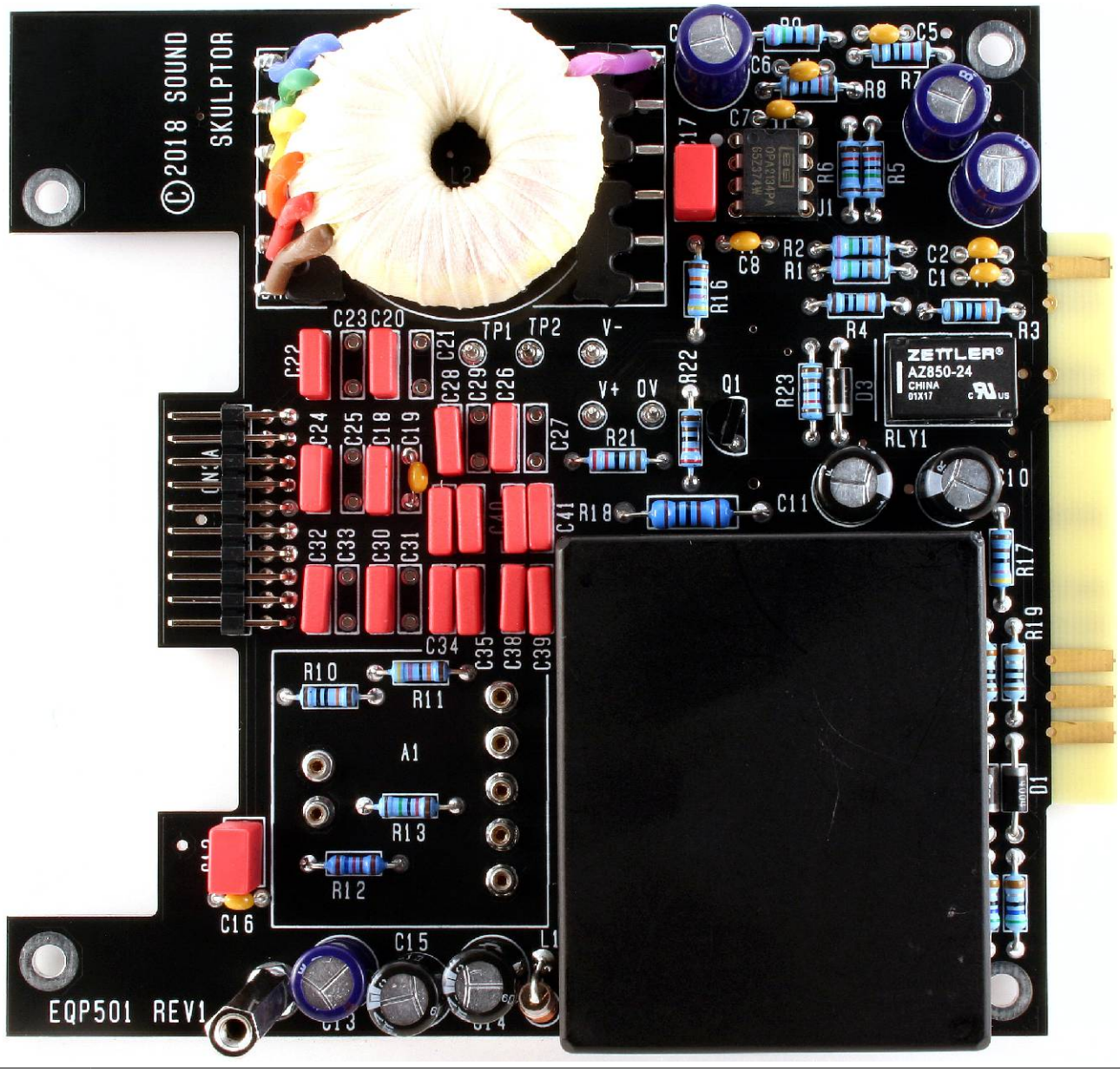
EQP501 Assembly guide – Main PCB

18. IC

Insert U1 into its socket. It is necessary to bend the pins slightly inward before inserting.

Warning : Make sure to insert the IC in the correct direction which is identified by a notch.



19. Visual check

Brush the solder side with a hard tooth brush to remove any remaining solder bits.

Make a full visual check. Any missing component on the board ? Any remaining component in the box ?

When everything looks correct, proceed with the switches PCB assembly.

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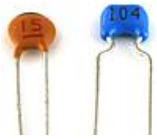
EQP501 Assembly guide – Switches board

20. 2x5 connector CN1A & CN2A

Insert CN1A and CN2A, 2x5 socket connectors *on the back side* of the PCB. That is the side without any writing. Solder on the components side.



21. Ceramic capacitors

Add C57.

22. Film capacitors

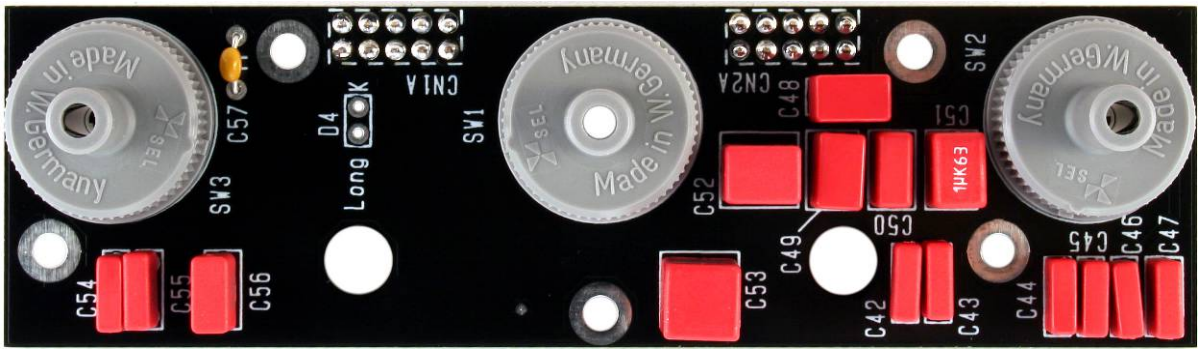
Add C42...C56.

23. Rotary switch

Add the 12 positions rotary switch SW1.

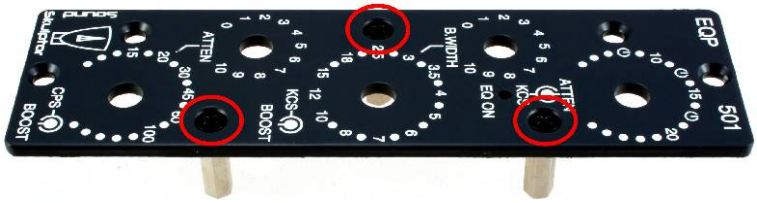
Add the 6 positions rotary switches SW2 and SW3.

Warning : The position of the switch is critical for a good front-plate matching. The switch rests on 3 small feet that must sit perfectly flat on the PCB. Press the switch on the PCB and solder two opposed pins. Check position then solder the other pins.



24. 15mm Spacers

Attach three 15 mm spacers to the front panel with three M3x6 mm black screws.



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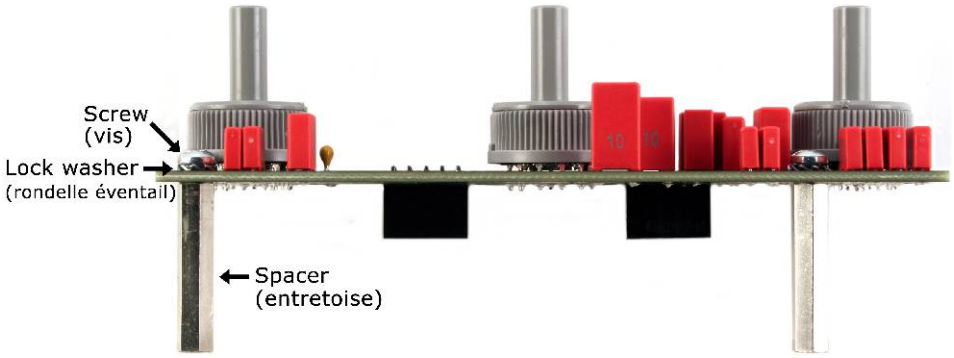
EQP501 Assembly guide – Switches board

25. 25mm spacers

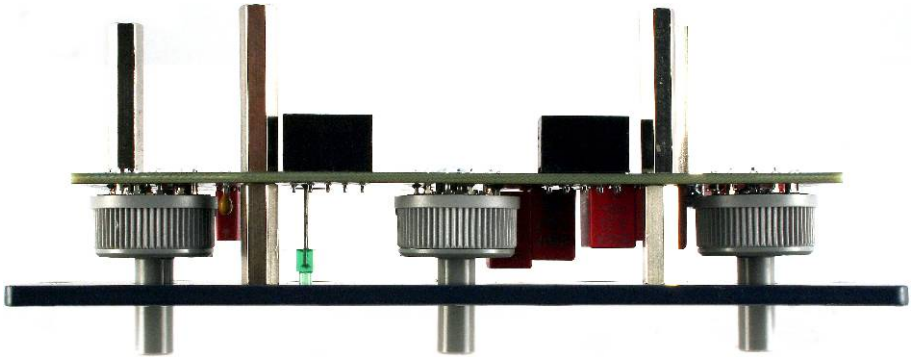
Attach two 25mm spacers (near C44 and C54) with two M3x6mm screws and two lock washers inserted above the PCB.



26. 2mm LED

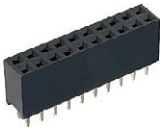
Insert the 2mm LED D4, taking care of the anode/cathode (long/short lead) position. Do not solder yet.

Attach to the front panel with one M3x6mm screw in the center hole and two M3x25mm spacers in the side holes.



Adjust the LED flush with the front panel surface. Solder.

EQP501 Assembly guide – Potentiometers board



27. Connector 2x10 CN3B

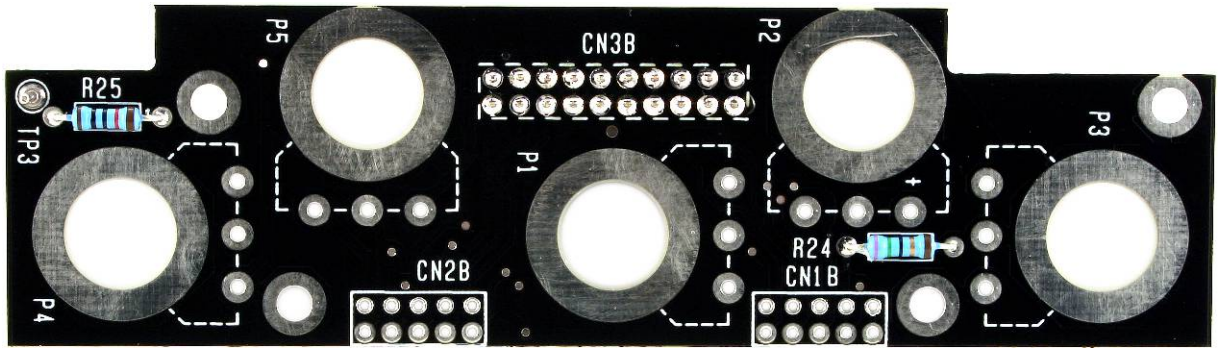
Insert CN3B, the 2x10 socket connector on the backside of the PCB (the side without any writing) and solder.

28. Resistors

Add R24 and R25.

29. Test pins

Add TP3.



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EQP501 Assembly guide – Potentiometers board

30. Potentiometers

Add P1 to P5. Insert the potentiometers into the PCB holes from the solder side, making sure the pins fit into the corresponding PCB pads. Attach with washer and nut on the component side, tighten firmly to ensure a perfect perpendicular position and solder.

Warning : The 5 potentiometers have different values.

Warning : Be careful not to touch the potentiometers shafts with your iron when soldering.

31. 2x5 pins connectors CN1B & CN2B

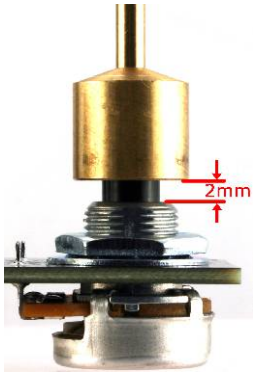
Insert and solder the two 2x5 pins headers.

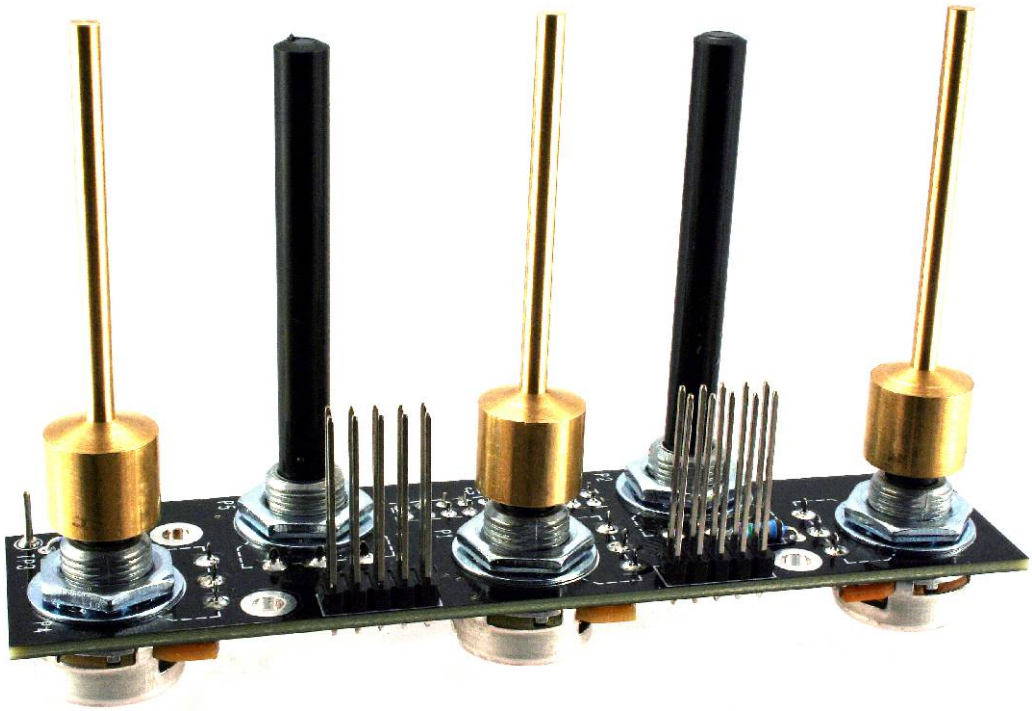
Warning : Make sure to sit them perfectly flat on the PCB for a good position match with the switches board.

32. Shaft adapter

Insert the three shaft adapters on the three shorter potentiometers. Do not push all the way down but leave a 2mm distance between the adapter and the pot bushing.

Attach with three headless screws.





33. Switches & potentiometers boards assembly

Insert the potentiometers into the switches. Insert the connectors and attach the boards with four M3x6 screws and two lock washers on the two extreme screws.

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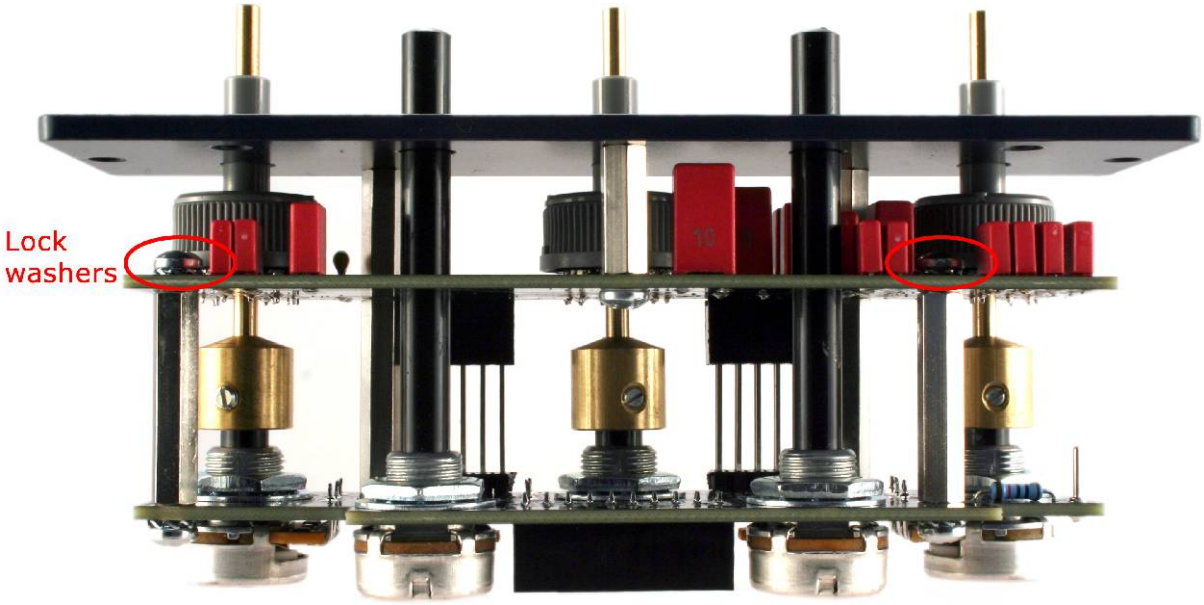
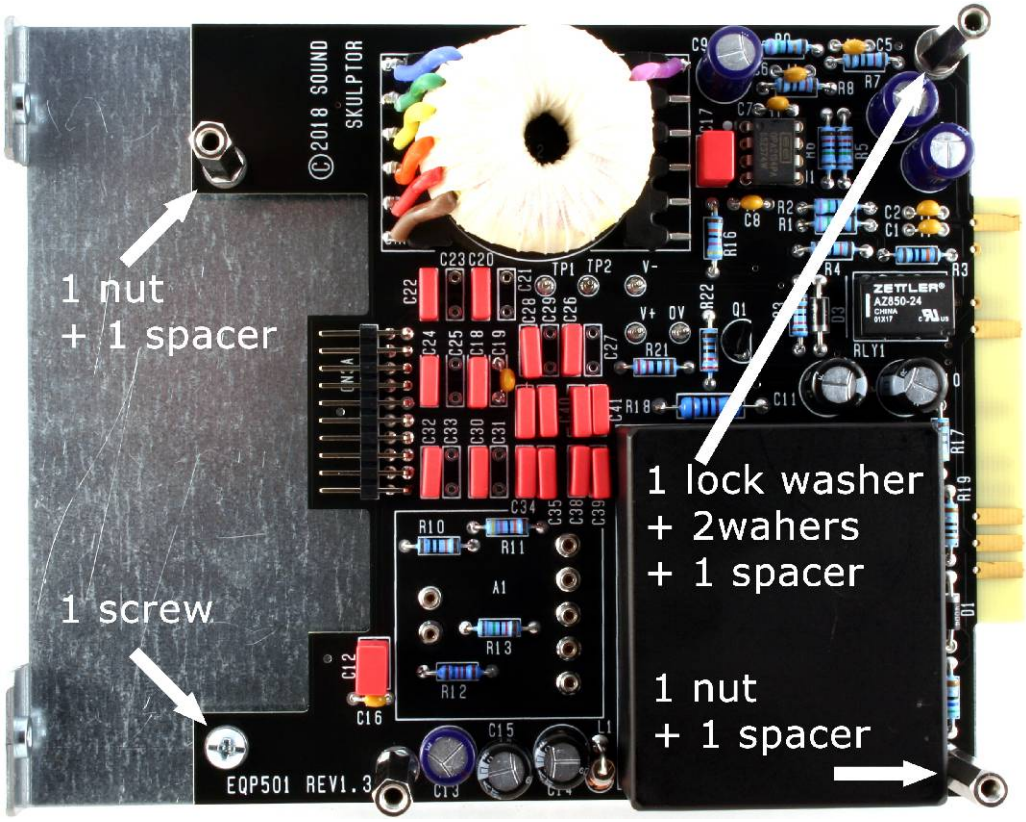
EQP501 Assembly guide – Potentiometers board



EQP501 Assembly guide – Final assembly

34. Chassis & main PCB

Attach the main PCB to the chassis side plate using:
Top left: 1 nut + 1 M3x25mm spacer (first, tighten the nut to the spacer),
Top right: 1 lock washer + 2 metal washers + 1 M3x25mm spacer, in this order,
Bottom left: 1 M3x6mm screw,
Bottom right: 1 nut + 1 M3x25mm spacer.



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EQP501 Assembly guide – Final assembly

35. Front panel & chassis

Insert the main PCB connector into the potentiometers PCB socket and attach the chassis to the front panel with two M3x6mm black screw.

36. Discrete Op-Amp

Insert the DOA.

37. 19mm Knobs

Set all the rotary switches fully anti-clockwise.
Attach the three 19mm red knobs to the 3 rotary switches lining up the white lines to 9 o'clock.
Tighten gently the screws with the supplied 1.5mm hex key.
Warning : To not tighten too hard in order not to warp the switch shaft.

38. 12.7mm knobs

Set all the potentiometers fully anti-clockwise.
Attach the 5 black knobs to the corresponding shafts, lining up the index with the min dot.

39. Test and setup

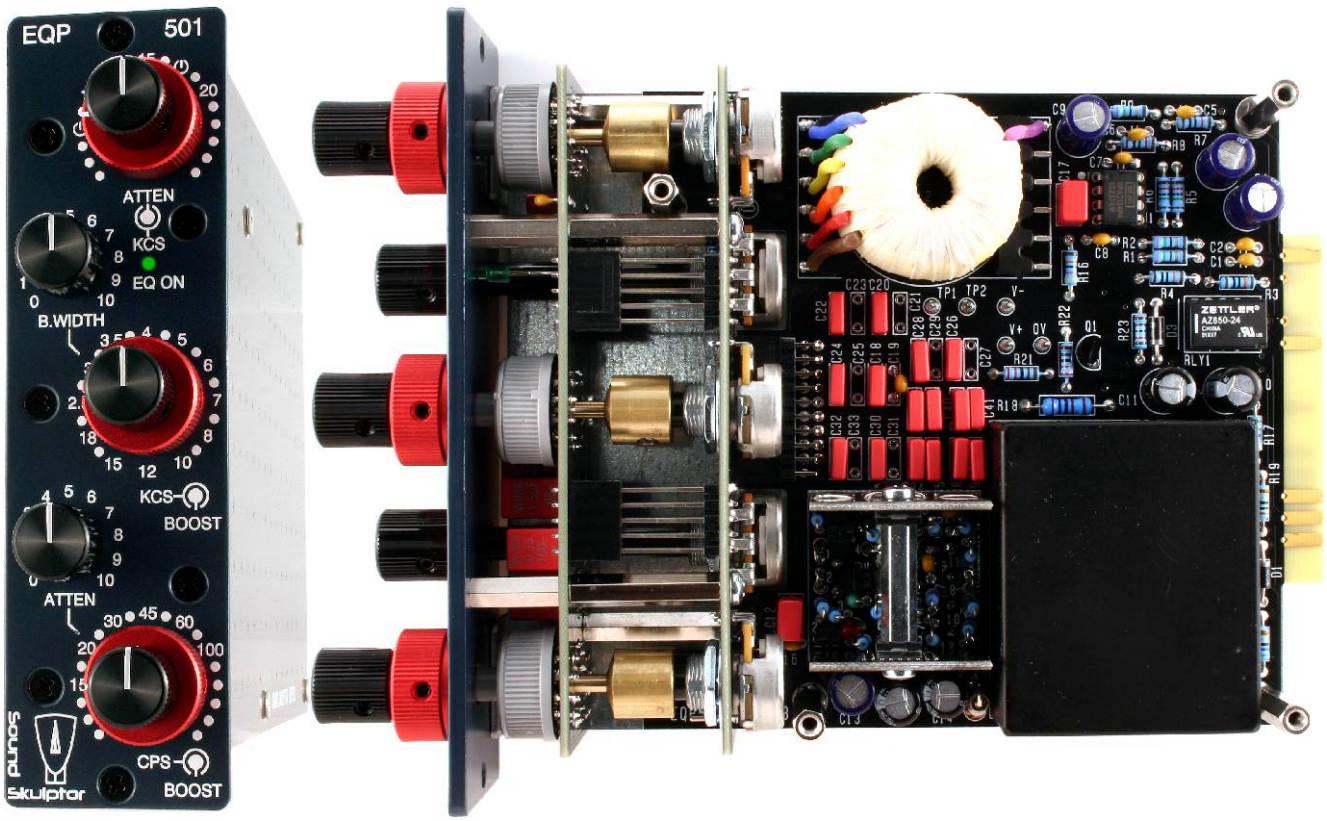
It is time for test. Follow instructions on EQP501-setup-guide.pdf.

40. Closing

Attach the cover PCB with four M3x6 countersunk screws.

41. Congratulations !

You're done !



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