LA502 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 :

- LA502 Schematics
- LA502 Components layout
- LA502 Parts list
- LA502 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/

LA502 Assembly guide – Main PCB

1. Diodes

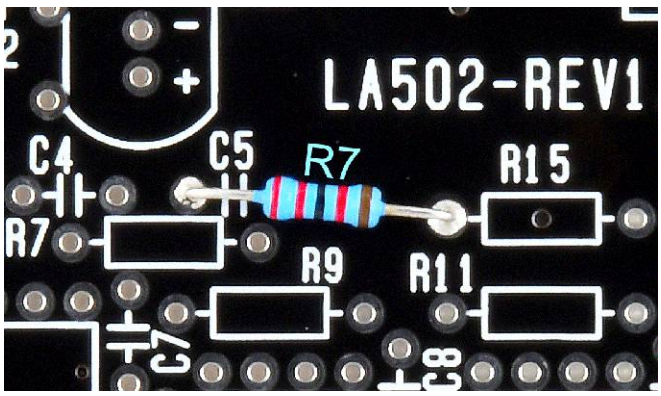
Add D2, D3, D4 then D1, D5 D6. Use a lead forming tool to bend the leads at 0.4".
Warning : Make sure to respect the direction of the diodes which is marked by a ring on the component and a double line on the PCB marking.
Warning : When soldering components close to the golden fingers of the edge connector, be very careful not to touch them with your soldering iron tip. It can be a good idea to protect them with adhesive tape.

2. Resistors – (1)

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)

LA502 Assembly guide – Main PCB

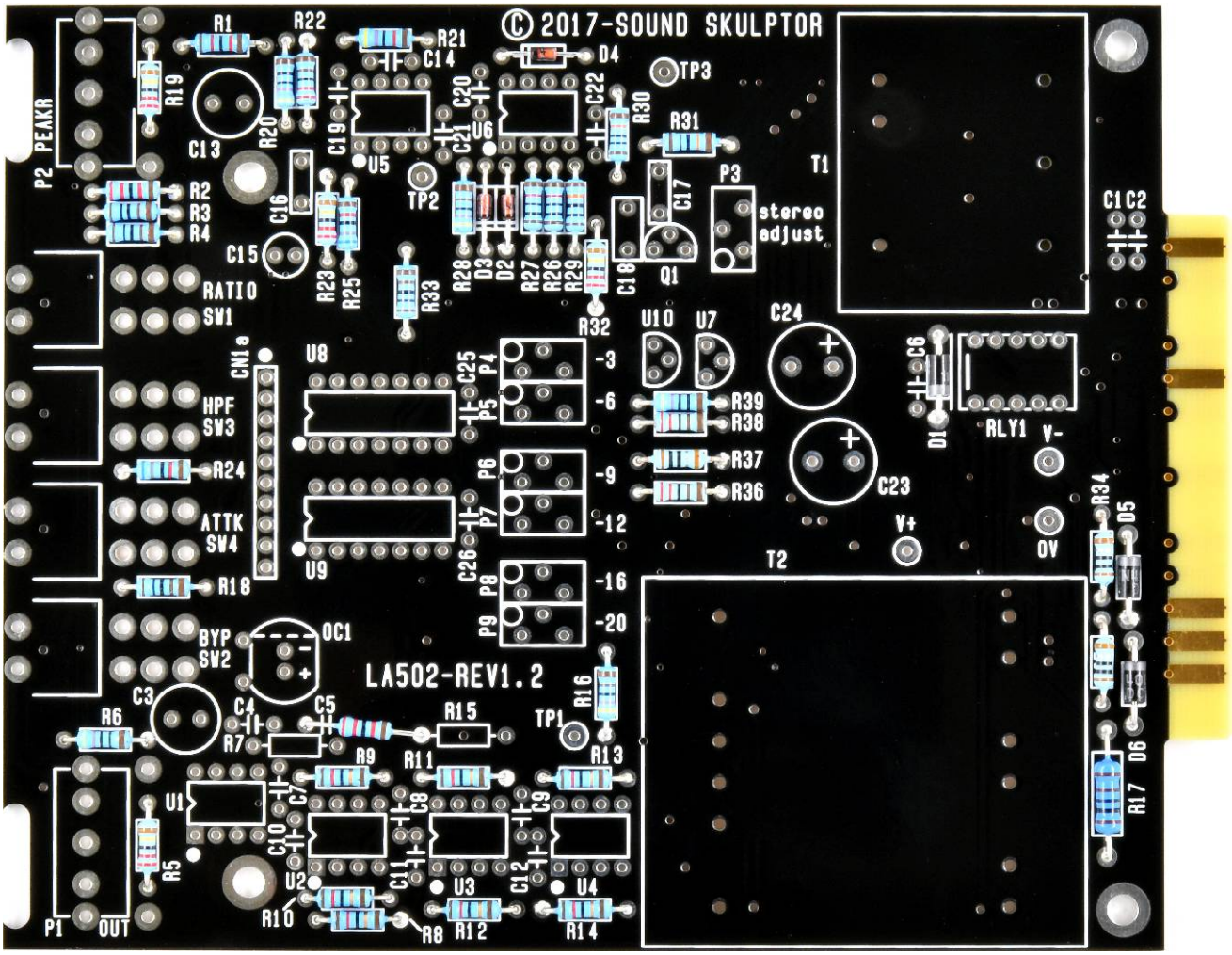
3. Resistors - (2)



Warning : R15 is omitted and R7 is placed differently from the silk screen writings.

Install R7 between left hole of C5 and left hole of R15 (see picture).
Add R1 to R6, R8 to R14 and R16 to R39.
Control the resistor values with a digital multimeter. Bend the leads at 0.4" with a lead forming tool, except for R17 which is bent at 0.6".

Warning : It is very important to check the resistors value with a DMM because the color code can be ambiguous. For example 1K (brown-black-black-brown-brown) can be confused with 110R (brown-brown-black-black-brown).



4. IC Sockets

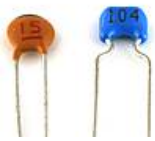
Insert and solder the six 8 pins sockets and two 14 pins sockets.
Warning : Make sure to respect the socket direction, marked by a notch.

LA502 Assembly guide – Main PCB

5. 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.



6. Ceramic capacitors

Add C4,
Add C14.
Add C1, C2.
Add C7...C12, C19...C22, C25, C26.
Add C6.

7. Test pins

Solder the 6 test pins TP1 to TP3, V+, V- and OV.
The pins are inserted squared shortest end first. They require some pressure to fit. Cut short on the solder side after soldering.

8. Film capacitors

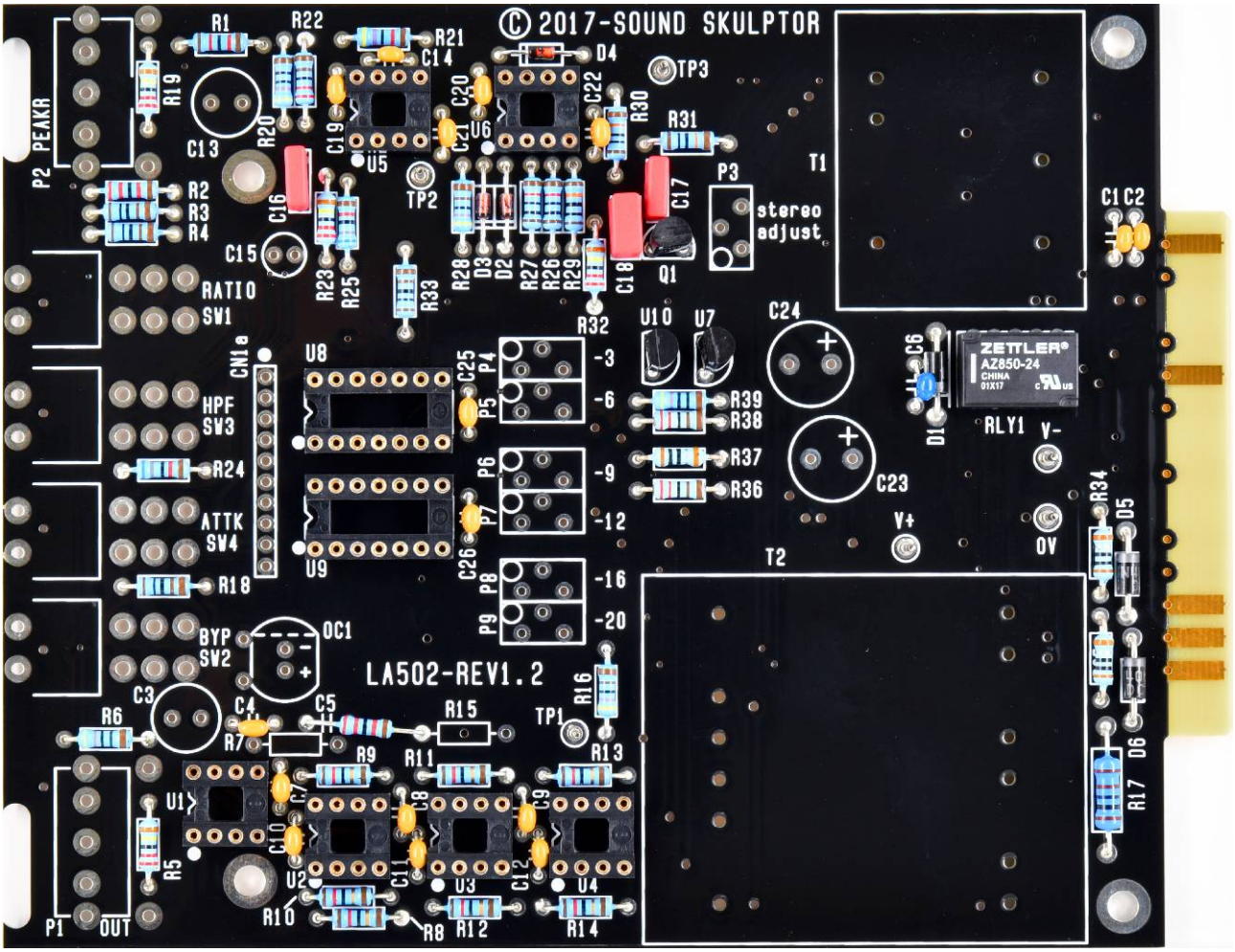
Add C16, C17, C18.

9. Transistors and regulators

Add Q1, U7 and U10.

Warning : Watch out the devices direction.

LA502 Assembly guide – Main PCB



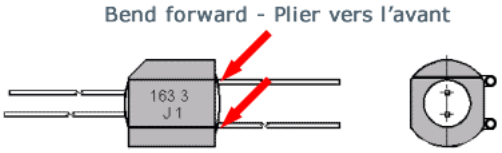
10. Connector

Add CN1a. Solder one pin, check verticality then solder the other pins.

11. Opto-coupler

Bend the 2 wires that are widely spaced against the front. The correct direction is given by the beveled side on the left.

Insert, long lead into + hole and solder.



12. Trimmer potentiometers

Add P3 and P4 to P9. P3 is a different value from the others. Solder one pin, check verticality then solder the other pins.

13. Non polarized electrolytic capacitors

Add C15, C3, C13.
These caps are not polarized and can be inserted in any direction.

LA502 Assembly guide – Main PCB

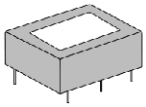
14. Polarized electrolytic capacitors

Add C23, C24.

Warning : The +lead must go into the +hole. Do not reverse (they may explode !)

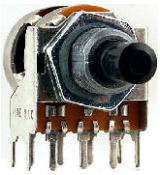
15. Switches

Add SW1 to SW4. The position of the switches is critical for a good front-plate matching. They must sit flat on the PCB. Press firmly the switch on the PCB and solder one of the front pins (housing). Check verticality and horizontality. Then solder the other pins.



16. Input transformer

Insert and solder the input transformer.



17. Potentiometers P1 & P2

Place the bracket on the potentiometer bushing, and attach it with the lock washer and nut. Tighten. Insert potentiometer and bracket into the PCB holes. Solder the central potentiometer pin. Now check that the potentiometer shaft is perfectly parallel to the board.

Warning : Do not only rely on the bracket being flat on the PCB, it sometimes need little visually made adjustments to get a perfect position.

18. Output transformer

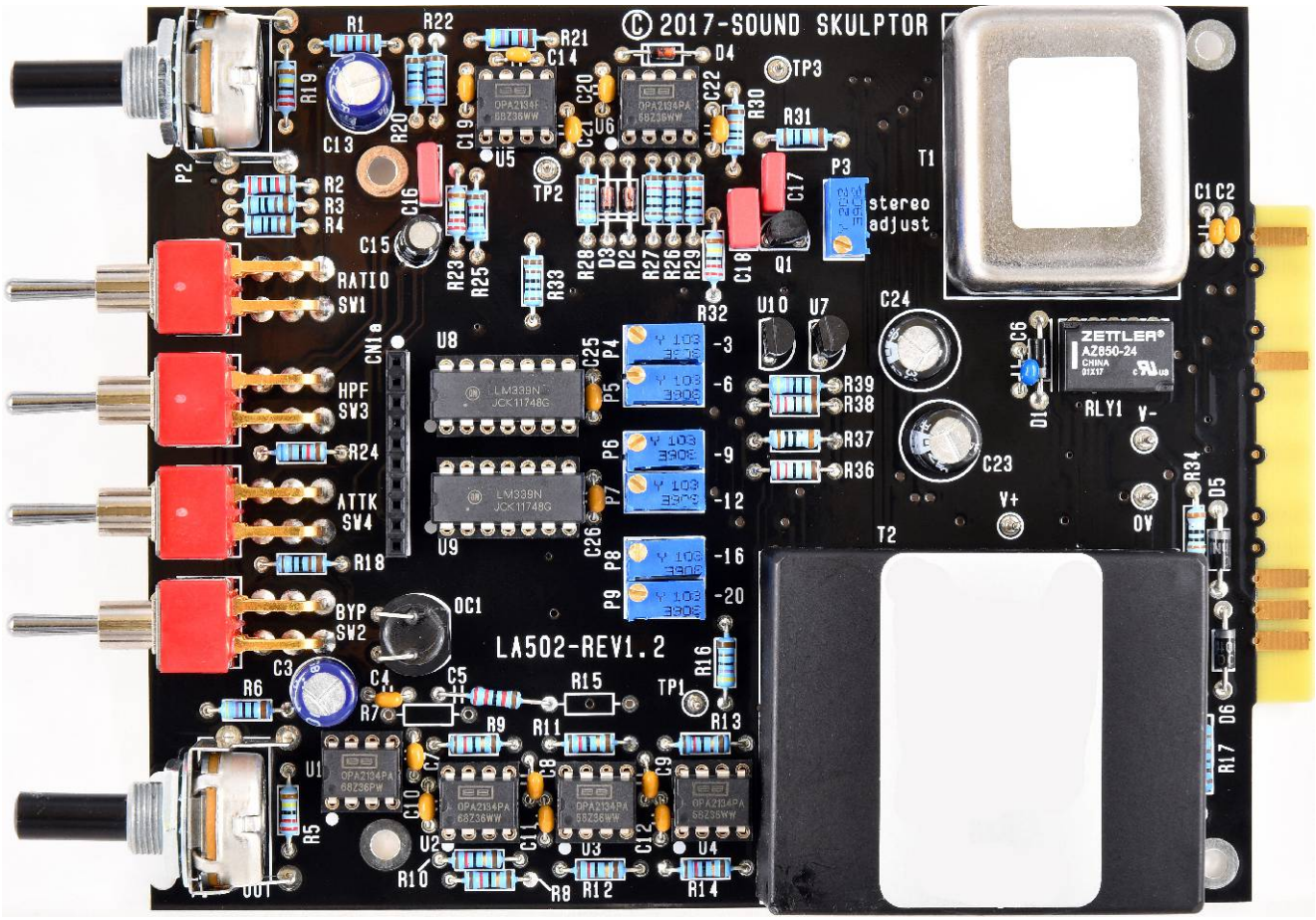
Insert and solder the output transformer.

19. IC's

Insert U1 to U6, U8 and U9 into their sockets. It is necessary to bend the pins slightly inward before inserting.

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

LA502 Assembly guide – Main PCB



20. 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 meter PCB assembly.

LA502 Assembly guide – Meter

21. Meter PCB

Break the meter PCB from the cover PCB. There are actually two but only one is needed.
Smooth out the cut with very fine sand paper.

22. 10 pins connector

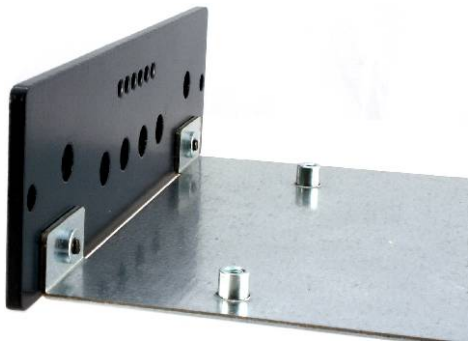
Solder CN1b, the 10 pins connector *on the back side* of the PCB. That is the side without any writing.
Solder one pin first, check verticality, then solder the other pins.

Warning : the connector pins must be exactly perpendicular to the PCB to allow proper insertion into the LA502 board.

LA502 Assembly guide – Meter

23. Chassis

It is now necessary to assemble the chassis and main PCB to make a guide for soldering the LED's.
Attach the side plate to the front panel with two M3x6mm black screws.



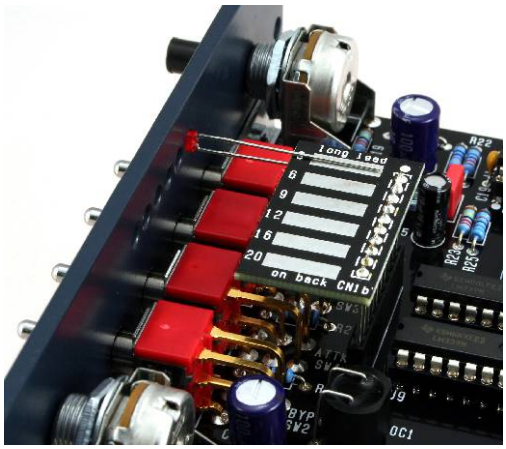
24. LED's (1)

Place the main PCB on the side plate and attach it temporarily with two M3x25mm spacers.

Insert the LED PCB connector into the socket on the main PCB.

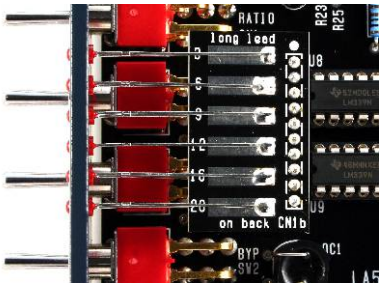
Place the first LED in its hole, longest lead above PCB, shortest lead below. Push the LED forward as far as possible against the front panel and solder the top lead.

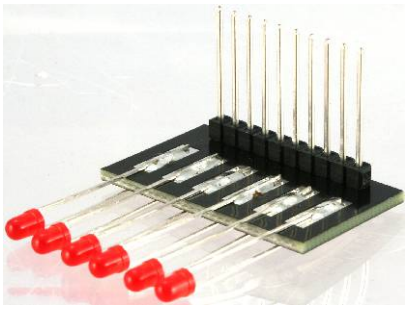
Repeat the process for all six LED's.



25. LED's (2)

When done, remove the chassis from the main PCB by unscrewing the two 25mm spacers, unplug the LED's PCB and solder the short lead of the LED's on the bottom side of the LED's PCB.





LA502 Assembly guide – Final assembly

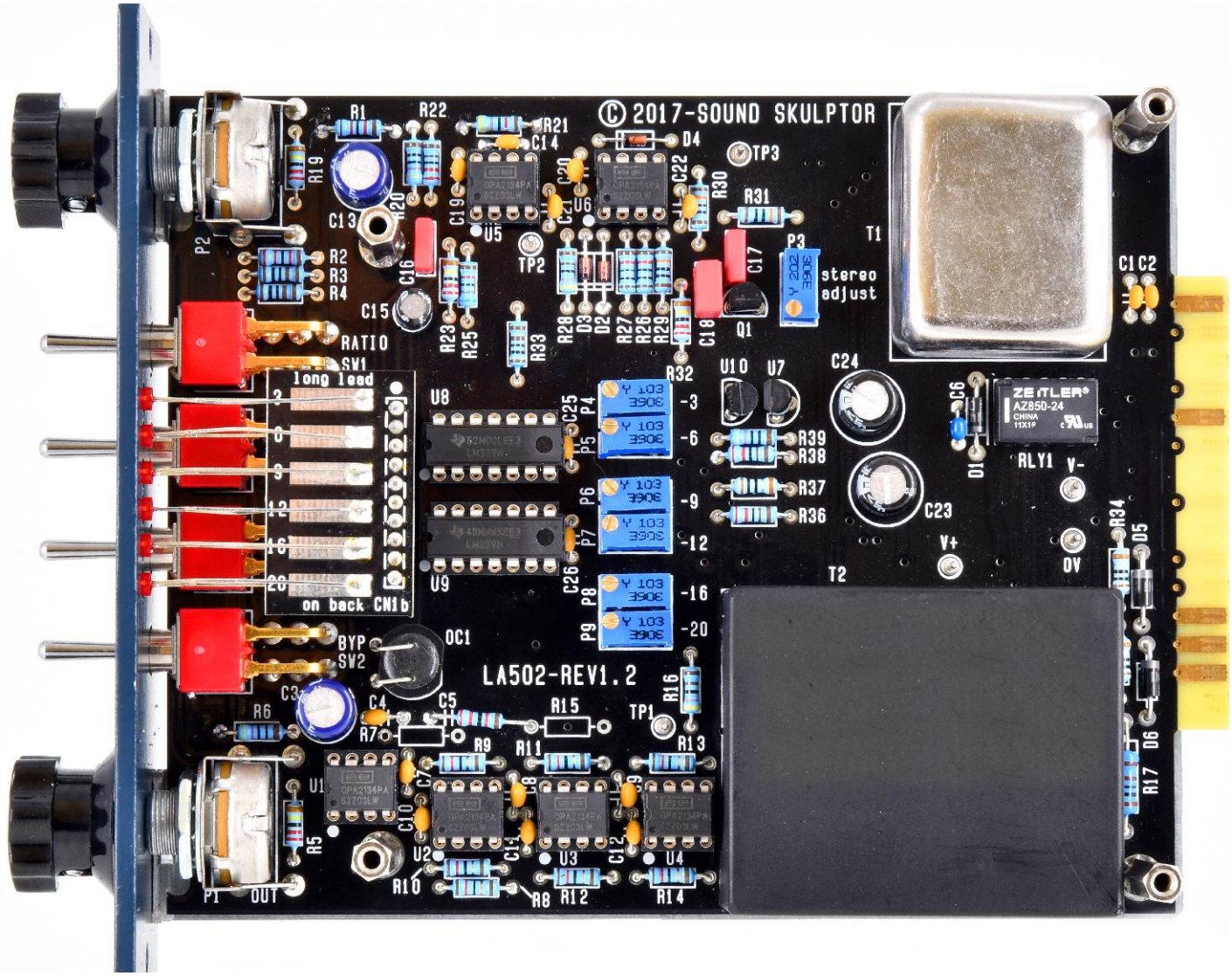
26. Chassis & PCB

Re-plug the LED's PCB and put the main PCB in place on the chassis.
Attach with four M3x25mm spacers and four lock washers.

27. Knobs

Attach the 2 knobs to the 2 potentiometers.

LA502 Assembly guide – Final assembly



28. Test and setup

It is time for test and setup. Follow instructions on LA502-setup-guide.pdf.

29. Closing

Attach the cover PCB with four M3x6 countersunk screws.

30. Congratulations !

You're done !