MP 566 Assembly guide

Safety warning

This kit use high voltages that are potentially lethal. Under no circumstance should someone undertake the realisation of this kit unless he has full knowledge about safely handling high voltage powered devices.

Please read the "DIY guide" before beginning.

Print or open the following documents :

- MP566 Schematics
- MP566 Components layout
- MP566 Parts list
- MP566 Test 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.

Warning : Some components on this board carry high voltages. It is compulsory to cut the component leads and pins totally flush with the PCB after soldering. A too long tail could create an electric arc 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/

MP 566 Assembly guide – PCB split

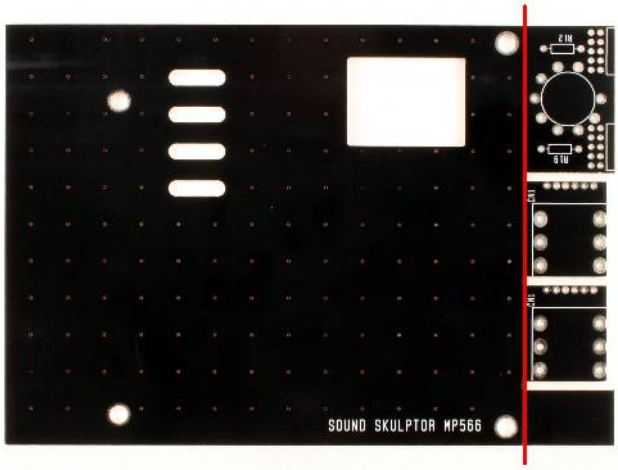
1. PCB split

Split the multiple PCB along the red line on the picture.

This will separate the tube PCB, the DI jack PCB and the protection cover.

Clean up the break line with very thin sand paper.

There is an extra DI jack PCB available which will not be used.



MP 566 Assembly guide – Main PCB, B side

2. B side

The MP566 main PCB carries components on both sides. The A side is the side with the title writing "MP566". We will start by the B side which holds only a few components.

3. Diodes

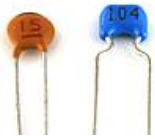
Add D5 to D9. Use a lead forming tool to bend the leads at 0.4".
Warning : Make sure to respect the direction of the diodes which is marked by a ring on the component and a double line on the PCB marking.

4. Resistors

Add R24, R25, R36 to R44.
Control the resistor values with a digital multimeter. Bend the leads at 0.4" with a lead forming tool.

5. Integrated Circuit

Insert U3 and solder. You will need to bend the pins slightly inwards before inserting. Make sure you are not charged with electrostatic electricity before handling the IC (or remove your shoes).
Warning : Make sure to respect the IC direction, marked by a notch. Do not use a socket because it would be to high under the PCB.



6. Ceramic capacitors

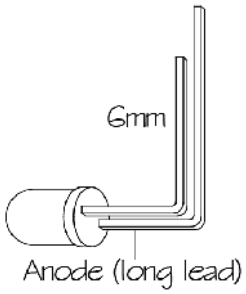
Add C19 & C20.

7. Transistors

Add Q1. It must be placed flat on the PCB, flat side against PCB.

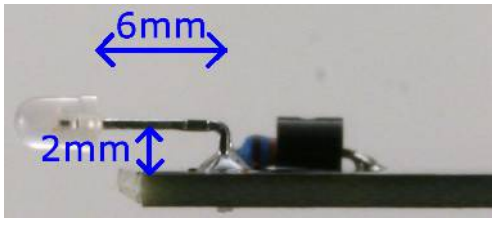
Warning : Watch out the transistor direction.

8. Led

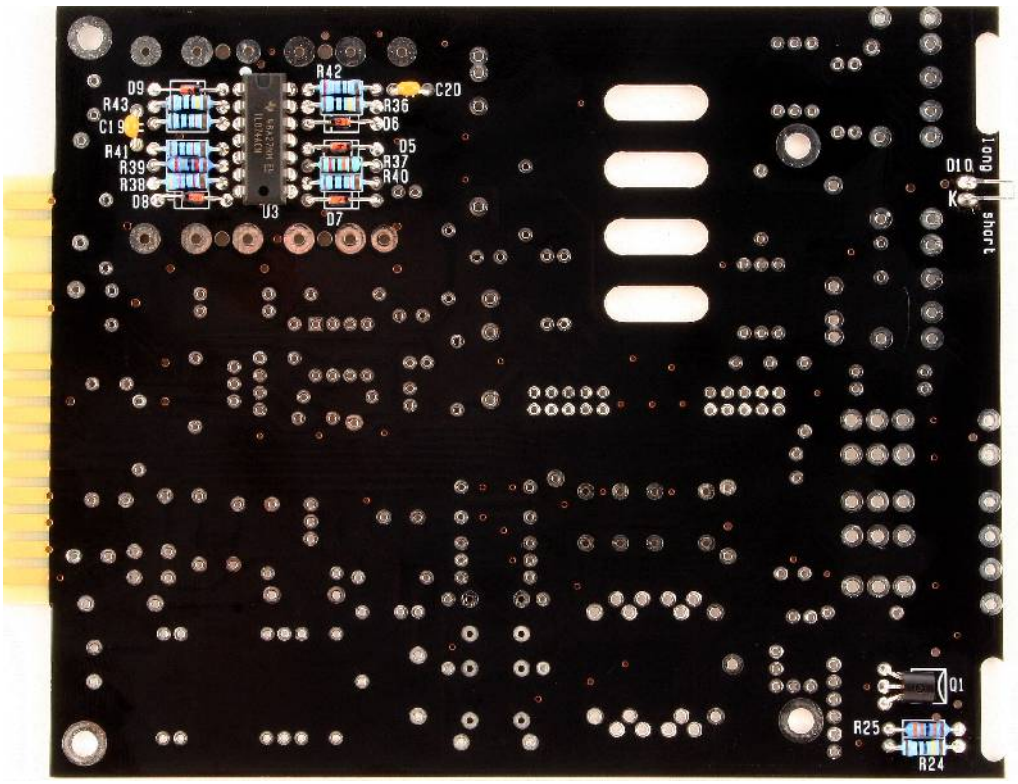


Bend the leads of D5 right angle at 6mm from the body taking care of the anode position (the longest lead).Insert from the PCB B side and solder with the leads at 2mm from the PCB surface.

Warning : it is easy to bend the leads in the wrong direction !



MP 566 Assembly guide – Main PCB, B side



MP 566 Assembly guide – Main PCB, A side

9. A side

Turn the board over, A side up. Make sure all the B side component leads have been cut as short as possible.

10. Diodes

Add D1 and D2, add D3, D4 and D12, add D11. 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.

11. Resistors

Add R1 to R23, R26 to R37, The resistors marked NC (like R33) in the parts-list should not be installed.
Control the resistor values with a digital multimeter. Bend the leads at 0.4" with a lead forming tool except R34 which is bent at 0.6".

12. Axial Inductor

Add L3.

13. IC Socket

Insert and solder the socket of U1. Do not insert U1 at this time.
Warning : Make sure to respect the socket direction, identified by a notch on the socket and a dot on the PCB.

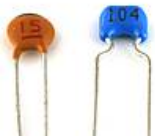
MP 566 Assembly guide – Main PCB, A side

14. Test pins

Solder the 8 test pins TP1 to TP4, 0V, V+, V- and TP8.
These pins are inserted from the top PCB side, long tail up. They may require some pressure for insertion. After soldering, cut flush on the solder side.

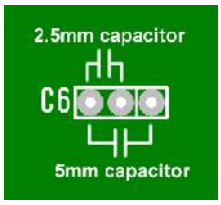
15. Pin header

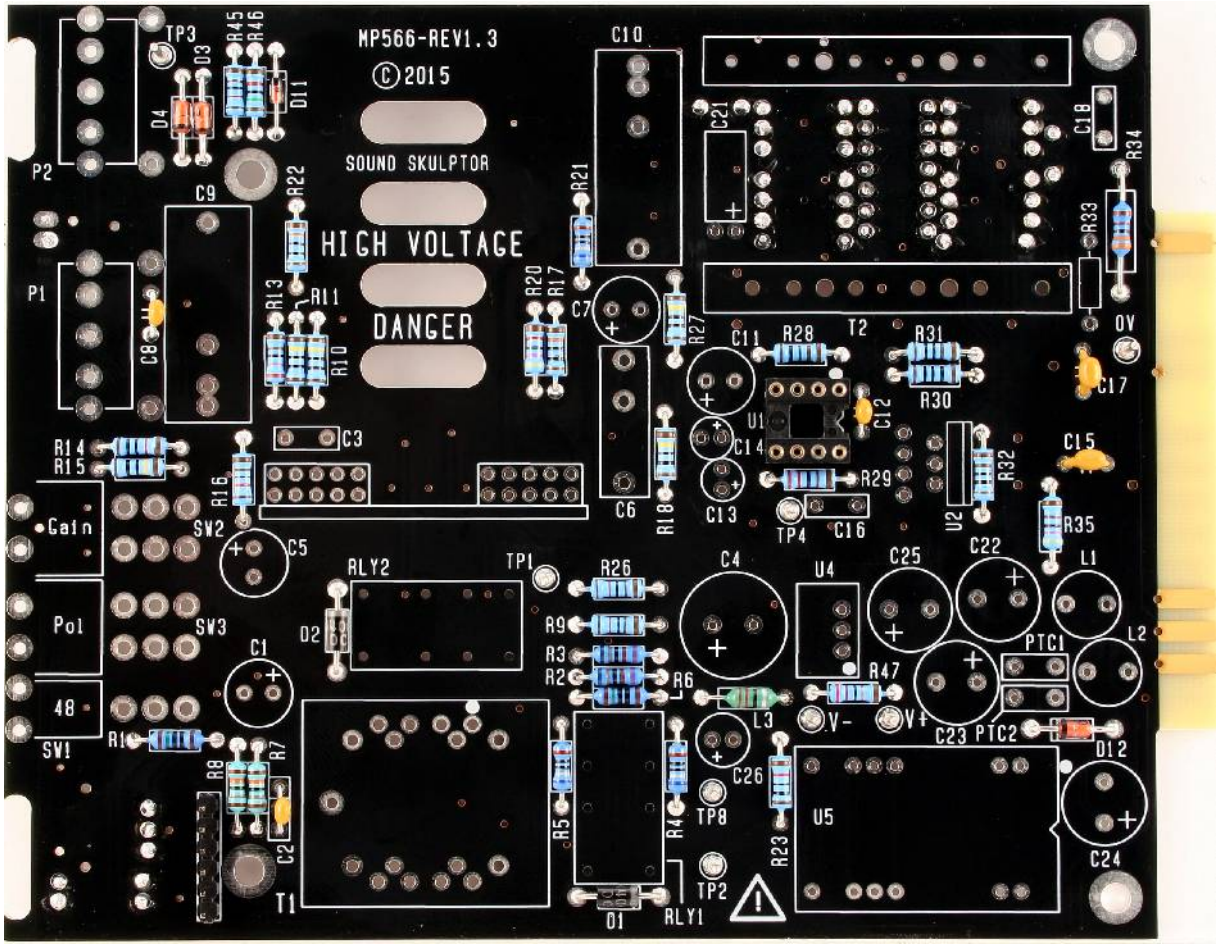
Solder the 6 pins header CN1. Solder one pin first, check verticality, then solder the other pins.
Warning : Make sure the pin are perfectly vertical. This is important for a good position of the DI jack.



16. Ceramic capacitors

Add C2, C8, C12, C15, C17.
Warning : Some capacitors have provision for 2 sizes. Small size capacitors must be inserted in the correct holes as shown in the picture.





17. Small film capacitors

Add C3, C16.

MP 566 Assembly guide – Main PCB, A side

18. Polymer fuses

Solder the 2 resettable fuses PTC1 and PTC2.

19. Electrolytic capacitor C21

Insert the electrolytic capacitor C21 and lay it down flat on the PCB. Solder.
Warning : The +lead must go into the +hole. Do not reverse.

20. U4

Insert and solder U4.
Warning : Do not reverse. Pin 1 is identified by a white dot on the component and on the PCB.

21. U5

Insert and solder U5.

22. Radial inductors

Add L1, L2.

23. Medium size film capacitor C6

Add C6.

24. Small electrolytic capacitors

Add C5, C7, C11, C13, C14, C26.
Solder one lead first, adjust verticality then solder the second lead.
Warning : The +lead must go into the +hole. Do not reverse (they may explode !)

25. Relay

Add RLY1 and RLY2.

26. Switches

Add SW1, SW2 and SW3. 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.

27. Large size film capacitors

Add C9 and C10.

MP 566 Assembly guide – Main PCB, A side

28. Medium size electrolytic capacitors

Add C1, C24, C25, C4.
Solder one lead first, adjust verticality then solder the second lead.
Warning : The +lead must go into the +hole. Do not reverse (they may explode !)

29. Potentiometers P1 & P2

Place the bracket on the potentiometer bushing, and attach it with the lock washer and nut. Tighten moderately. 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.

Once the position is correct, solder the other pins.
Finish tightening the nut, without excess.

30. U2

Mount two heatsinks back to back on U2, with a 10mm screw and a self locking nut.

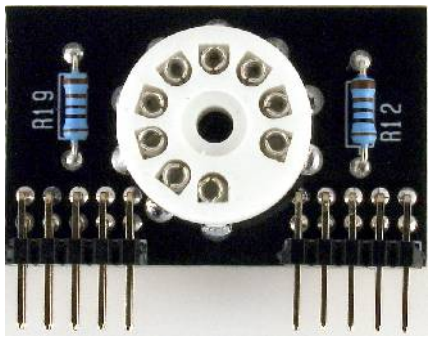
Insert U2 on the PCB and solder one pin. Check the verticality then solder the other pins.

31. Tube PCB

Solder R12 and R19.

Solder the two 2 x 5 pins 90° pin headers. Solder one pin first, check the header sits flat on the PCB, then solder the other pins.

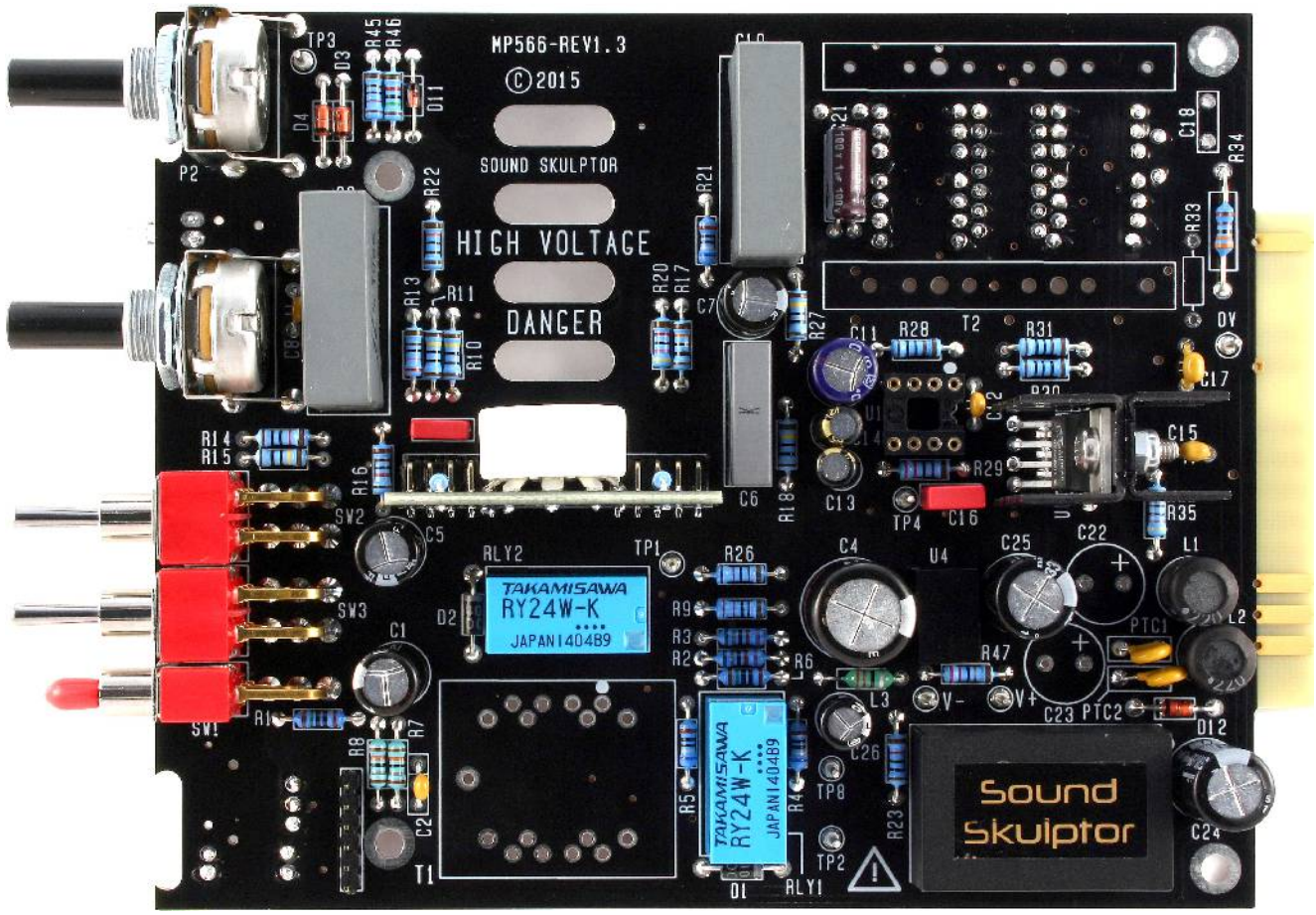
Solder the tube socket and cut the pins flush.



32. Tube PCB assembly

Insert the tube holder PCB into the main PCB. Solder one pin first, check the tube PCB is perfectly perpendicular to the main PCB, then solder the other pins.

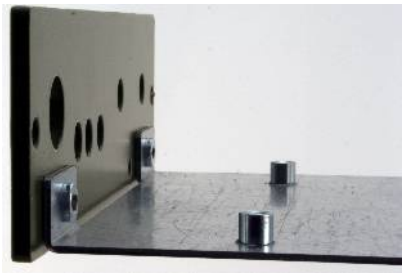
MP 566 Assembly guide – Main PCB, A side



33. Frame assembly

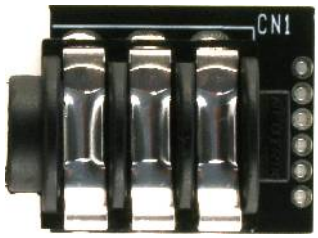
Attach the side panel to the front plate with two M3x6 black countersunk screws.

Warning : Do not confuse the M3x6mm countersunk black screws with the #4-40 3/8" black screw that are used to attach the module in the lunchbox.



34. DI jack PCB

Solder the jack socket to the DI jack PCB, on the side marked CN1.



MP 566 Assembly guide – Main PCB, A side

35. DI jack PCB assembly

Insert the DI jack PCB into the 6 pins header located in the lower left corner of the main PCB. **Do not solder yet.**

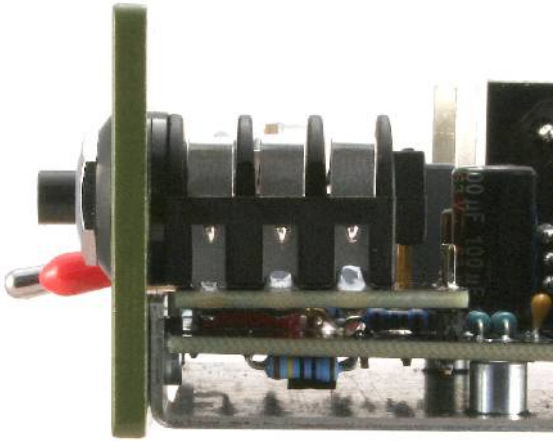
Place a flat plastic washer on the jack socket and put the main PCB in place on the frame, switches and pots going through the front panel. Watch out the LED position.

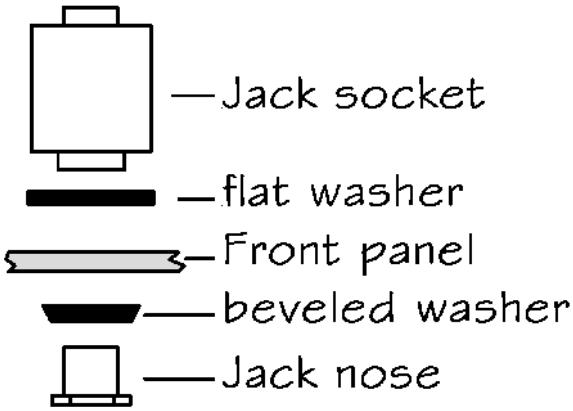
Screw in the jack nose with the bevelled plastic spacer inserted.

Attach the PCB to the frame with three 25mm spacers, leaving out the fourth spacer near the jack.

Solder the 6 pins of CN1 on the DI Jack PCB.

Remove the 3 spacers, the jack nose and remove the PCB from the frame.





36. Input transformer

It is necessary to leave a small gap between the transformer and the PCB surface in order to avoid any electrical contact between the metal case and pads. Fit two layers of double sided adhesive tape, under the transformer, between the pins. It is not necessary to remove the second protective layer from the tape as it is only used as a spacer.

Insert the transformer. Start soldering 2 opposite pins, check the position, adjust if necessary then solder the other pins.

37. Large electrolytics

Add C22 and C23.

Solder one lead first, adjust verticality then solder the second lead.
Warning : The +lead must go into the +hole. Do not reverse (they may explode !)

38. U1

Insert U1 into its socket. You will need to bend the pins slightly inwards before inserting. Make sure you are not charged with electrostatic electricity before handling the IC (or remove your shoes).
Warning : Make sure to respect the IC direction, marked by a notch.

39. Visual check

At this point, 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 test.

MP 566 Assembly guide – Main PCB, A side

40. Functional test

We are going to do a first test **before** soldering the output transformer. Because the clip LED circuit is placed below the transformer, correcting a possible mistake would be easier without it.

Please follow the testing guide MP566-test-guide.pdf.

41. Output transformer

After succeeding the functional test, you can insert and solder the output transformer.

42. PCB mounting

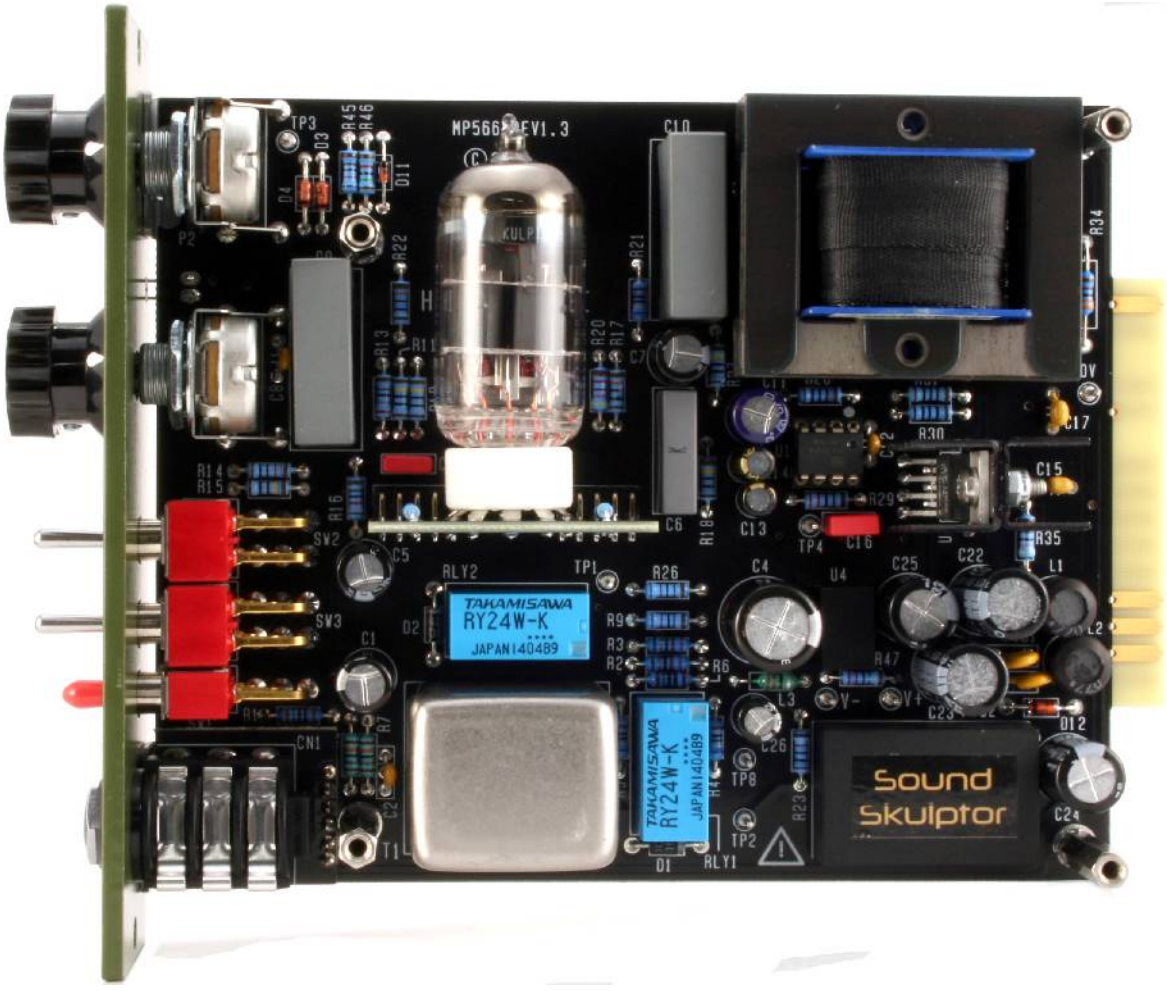
Place a flat plastic washer on the jack socket and put the main PCB in place on the frame, switches and pots going through the front panel. Watch out the LED position.

Screw in the jack nose with the bevelled plastic spacer inserted.

Attach the PCB to the frame with four 25mm spacers, with four lock washers inserted.

43. Knobs

Attach the 2 knobs.



44. Audio test

Please follow the rest of the testing procedure described in the MP566 test guide document.

MP 566 Assembly guide – Main PCB, A side

45. Closing

Attach the cover PCB with four M3x6 countersunk screws.