Yaesu FT-736R PSU repair

Updated for DigiKey (North American) sources & data

I gratefully acknowledge OZ1DB and his original repair documentation and DL7VHF for his schematic diagrams

The built in AC/DC power supply on the FT-736R commonly fails after about 10 years of normal use. The reason is usually faulty electrolytic capacitors (dried out) or bad solder joints on the switch mode power supply board FP-1274A.

The first symptoms of the failing internal power supply are that it fails to start properly and only a few LEDs on front panel are dimly lit. If the power supply doesn't fail outright, the problem ultimately leads to a rig that will not power up at all with the internal power supply. The most likely sources of this problem are C9 (a 220uF/35 V capacitor with a defective ESR of 450 ohms or more!), and C12 1uF/50V (with a defective ESR of 60 ohms or more). There are likely other capacitors that are suffering from similar aging problems.

Step #1 - Remove the PSU from the main frame and disassemble the unit.

a. unplug the AC cord;
b. remove the radio's bottom cover
c. remove the 3 long M3 screws from the back securing the PSU heat sink bridge plate to rear chassis plate
d. remove the 2 screws from the bottom side of the base (in the middle, holding the PSU base plate on the chassis)
e. lift out the PSU unit
f. remove the PSU cage screws and the 4 PCB securing screws holding the base plate.

Step #2 – Visual inspection of the PSU board

The board is usually discolored between the two 470µF/200V electrolytic capacitors and the transformer. The reason for this (and the short life of the capacitors) is two very hot 33ohm, 2W resistors (R17 and R18). See figure 1.

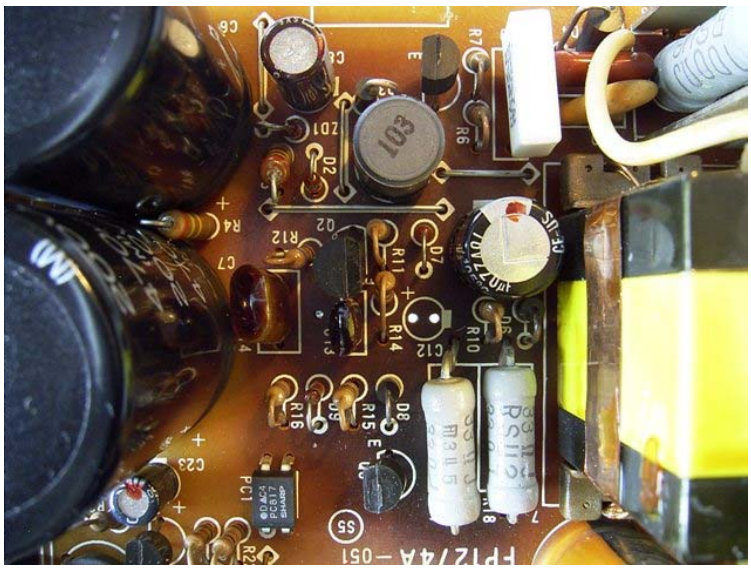


Fig 1. - Check C8, C9, C12 (C12 is removed here) and C22. They are likely out of spec.

Step #3 – Repair & replacement

a. I suggest you replace at least C8, C9, C12 or preferably all electrolytic capacitors on the PSU PCB with +105 C versions, but not necessarily the rectifier filter's 470 uF/200 V big caps, if they seem OK and you can measure their value or even better, the ESR too.
b. Replace R17 and R18 (optional) with a pair of 5W, 33ohm resistors (DigiKey p/n 45F33RE-ND). Install the new resistors on end, and do not trim the long lead…instead coil it so that it can dissipate some of the heat from the resistor (wrap it around a drill bit to coil it).
c. Re-solder (with fresh solder and flux) all the cracked or "cold" solder connections on the PCB (especially around the transformer).
d. Remove solder splashes (and possible solder bridges) with brush carefully.
e. Reinstall the base plate, cage and secure the unit in place in the chassis and temporarily connect the AC cable and see if the unit now works. If it does, unplug AC cord and now reassemble the rest

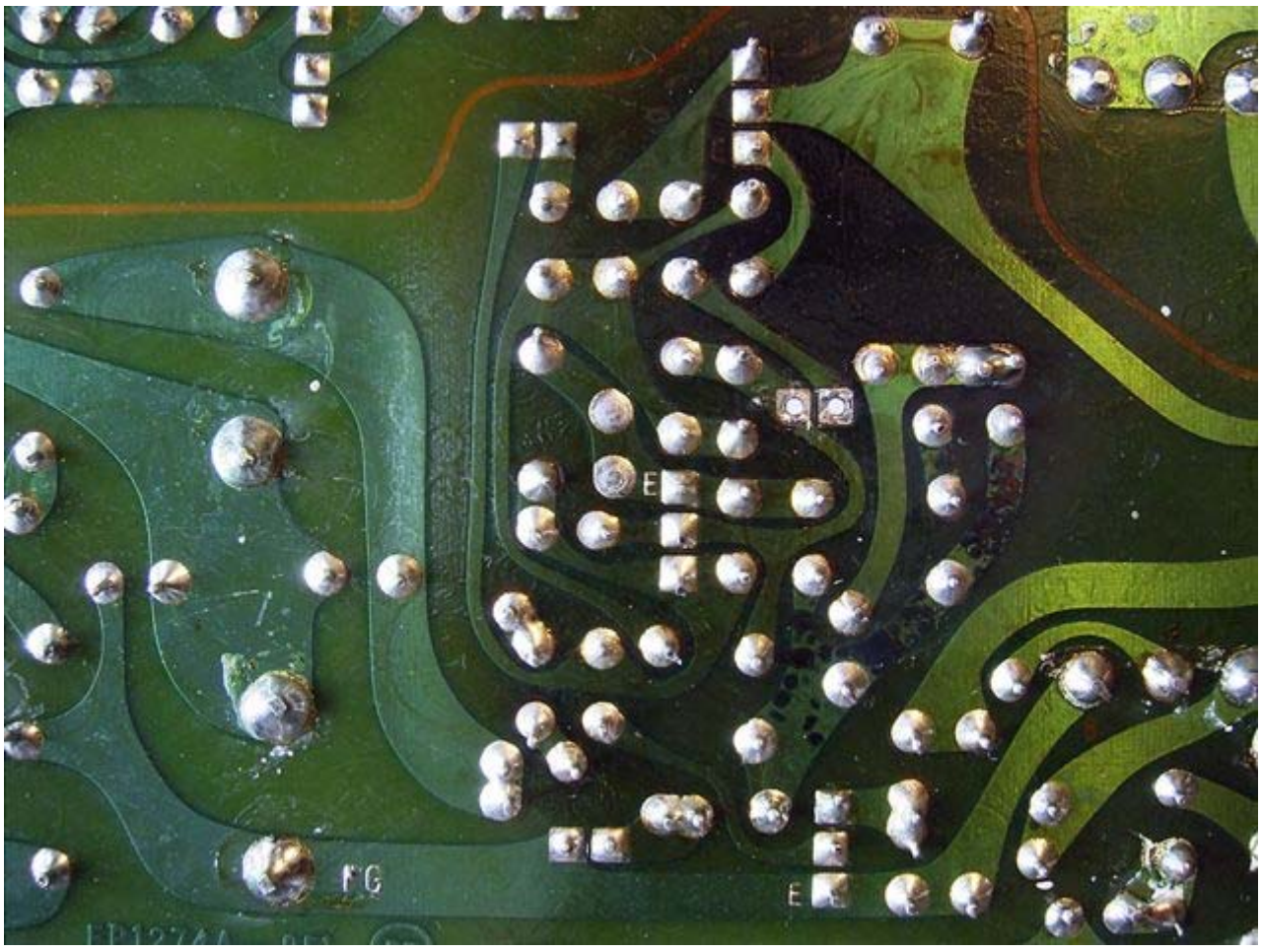


Fig 2. Thoroughly inspect the solder side of the board for cracked solder joints - the next picture shows several bad joints.

Fig 3. Close up photo showing cracked solder connections

DigiKey carries low ESR replacement capacitors (Nichicon FC Series):

Ref	Existing Value	recommended alternative	DigiKey-p/n
C8	56µF/50V		P10322-ND
C9	220µF/16V	220uF/35V	P10297-ND
C12,C25	1µF/50V		P10312-ND
C21,C22	1000µF/25V	2700µF/25V	P10286-ND
C26	680µF/35V	1000µF/35V	P10305-ND
R17,R18*	33ohm, 2W	33ohm, 5W, 1%	45F33RE-ND
FAN*	n/a	6.8CFM (w/o zener)	CR015-ND
Zener*	n/a	5.1V, for fan speed reduction	1N4733AFSCT-ND

Table 1. Replacement Component list (* = optional items)

Step #4 – Optional Cooling Fan Installation
You can also install a 12V fan 40x40x10 mm inside the perforated box to reduce the component temperature and improve their lifetime; DigiKey p/n: CR015-ND

You may install the fan in the middle of the PCB long side on the perforated cover - see pics. Test for sufficient room between the fan and inside PCB components.

Fig 4. Modified cover with two oval shaped holes for the fan. These holes were enlarged up to 3.8 mm before filing them into an oval shape.

Fig 5. Fan with 2 x 3.5 mm screws

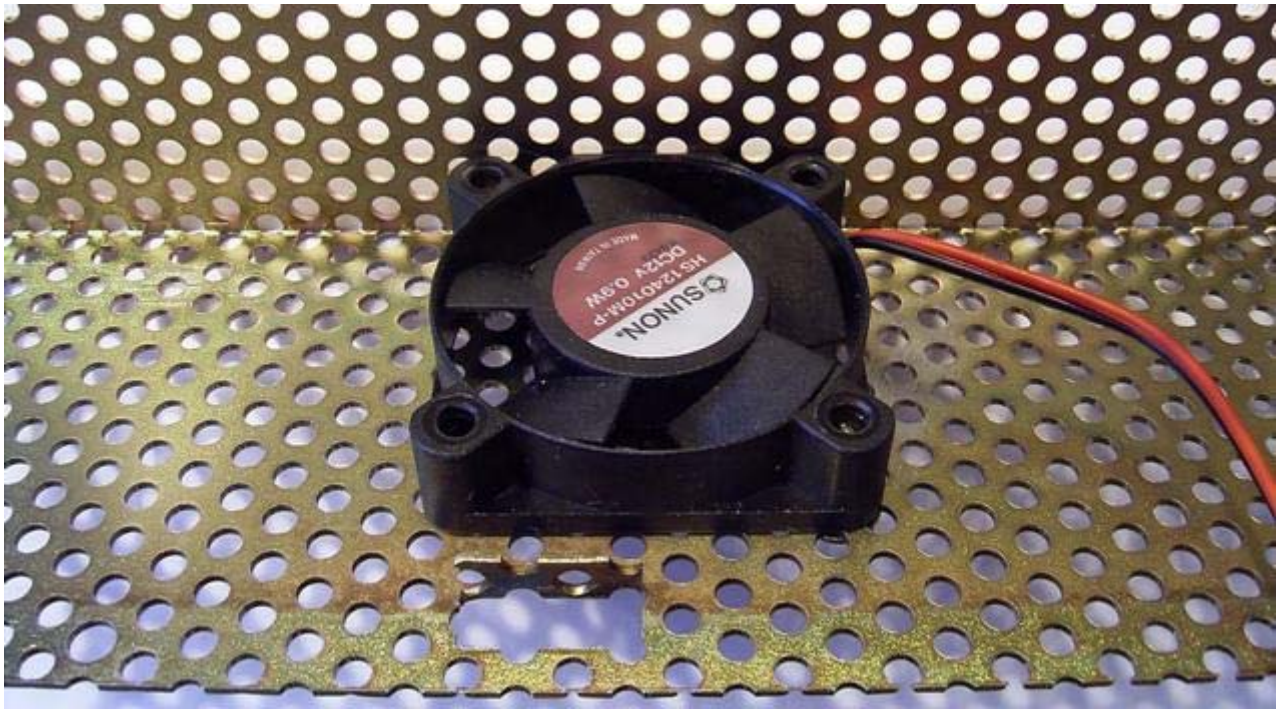


Fig 6. Fan at site, wires are cut 12 cm from fan

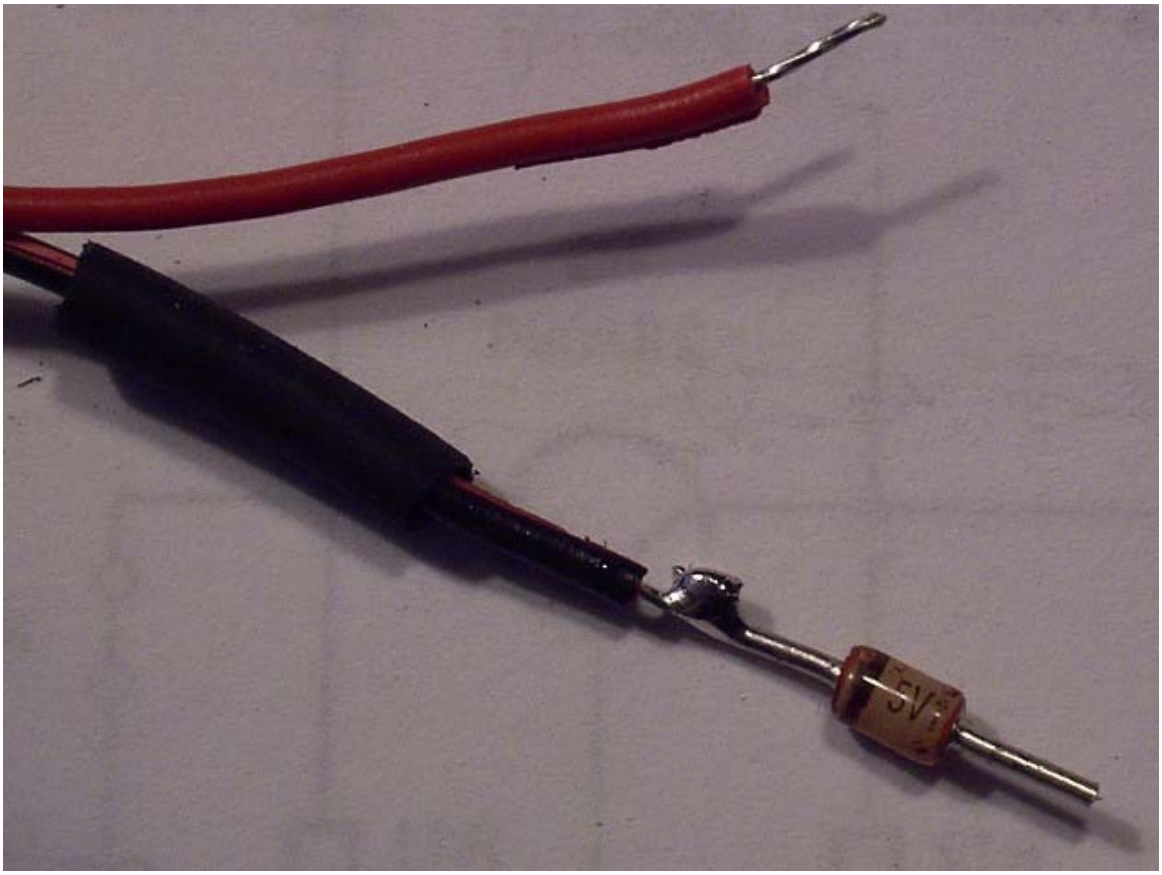


Fig 7. A 5V/1W zener diode plus a piece of shrink tube are added to the minus wire (the fan speed is reduced to improve lifetime and reduce noise)

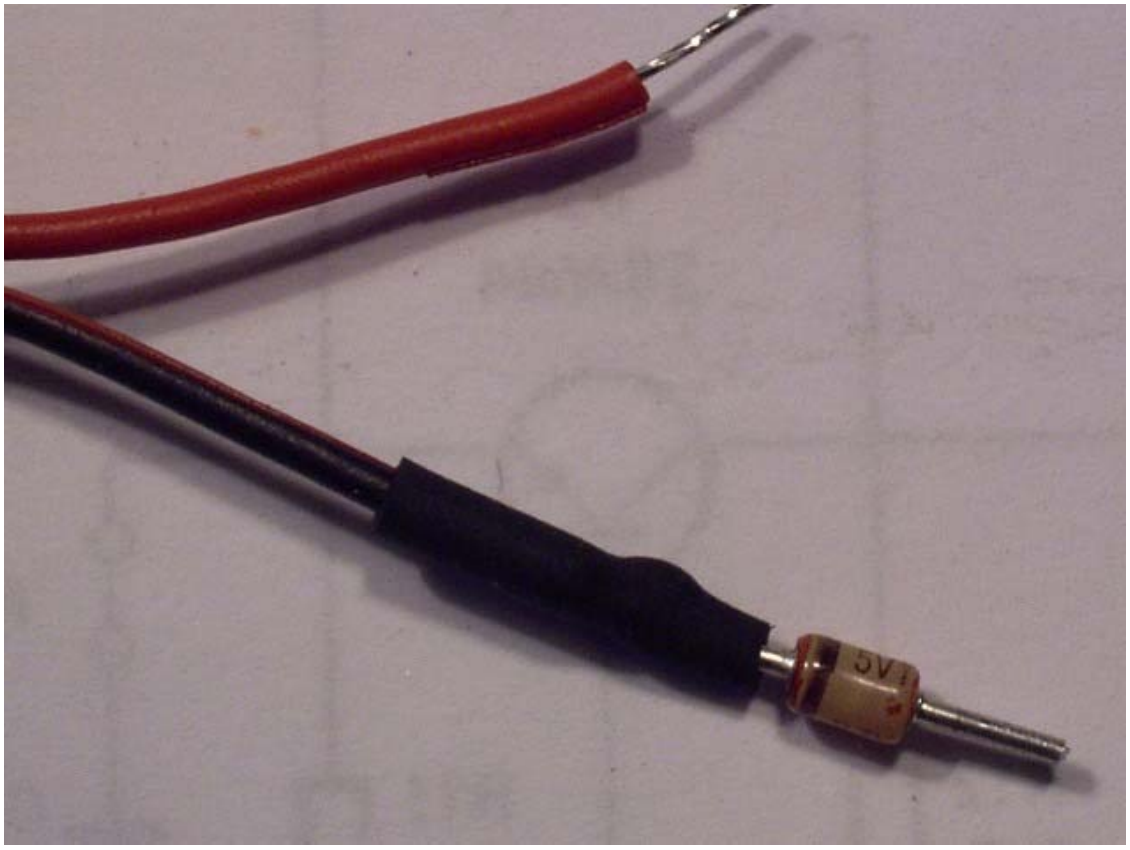


Fig 8. The wire and diode is ready to insert the PCB-holes and solder

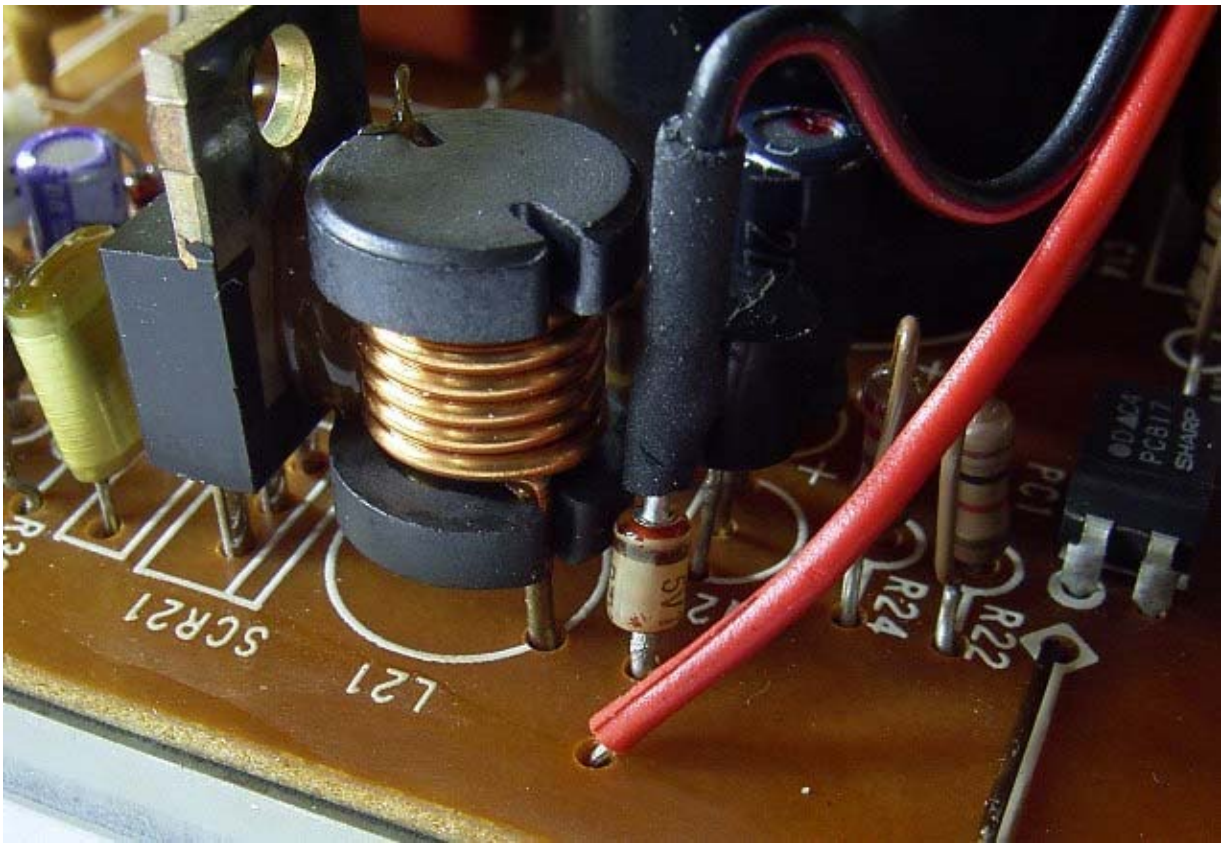


Fig 9. Notice where and how the wire and diode are inserted into the PCB

Fig 10. Showing the fan through the perforation

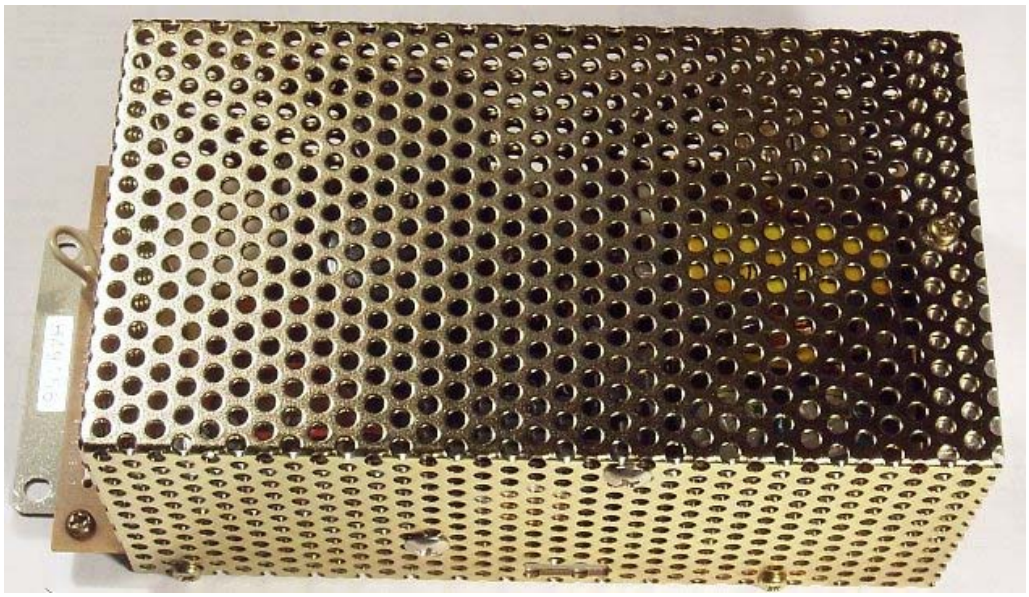
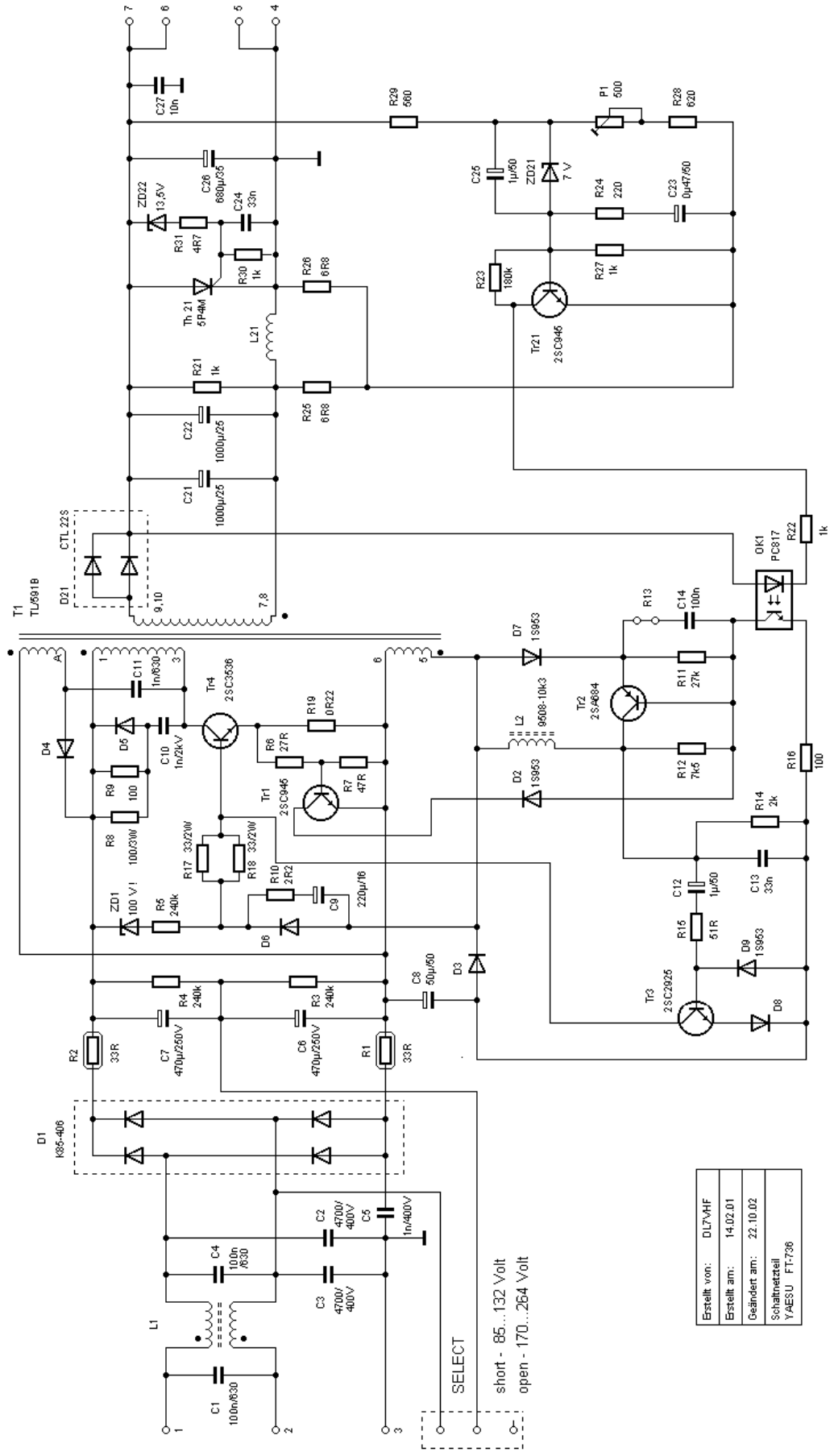
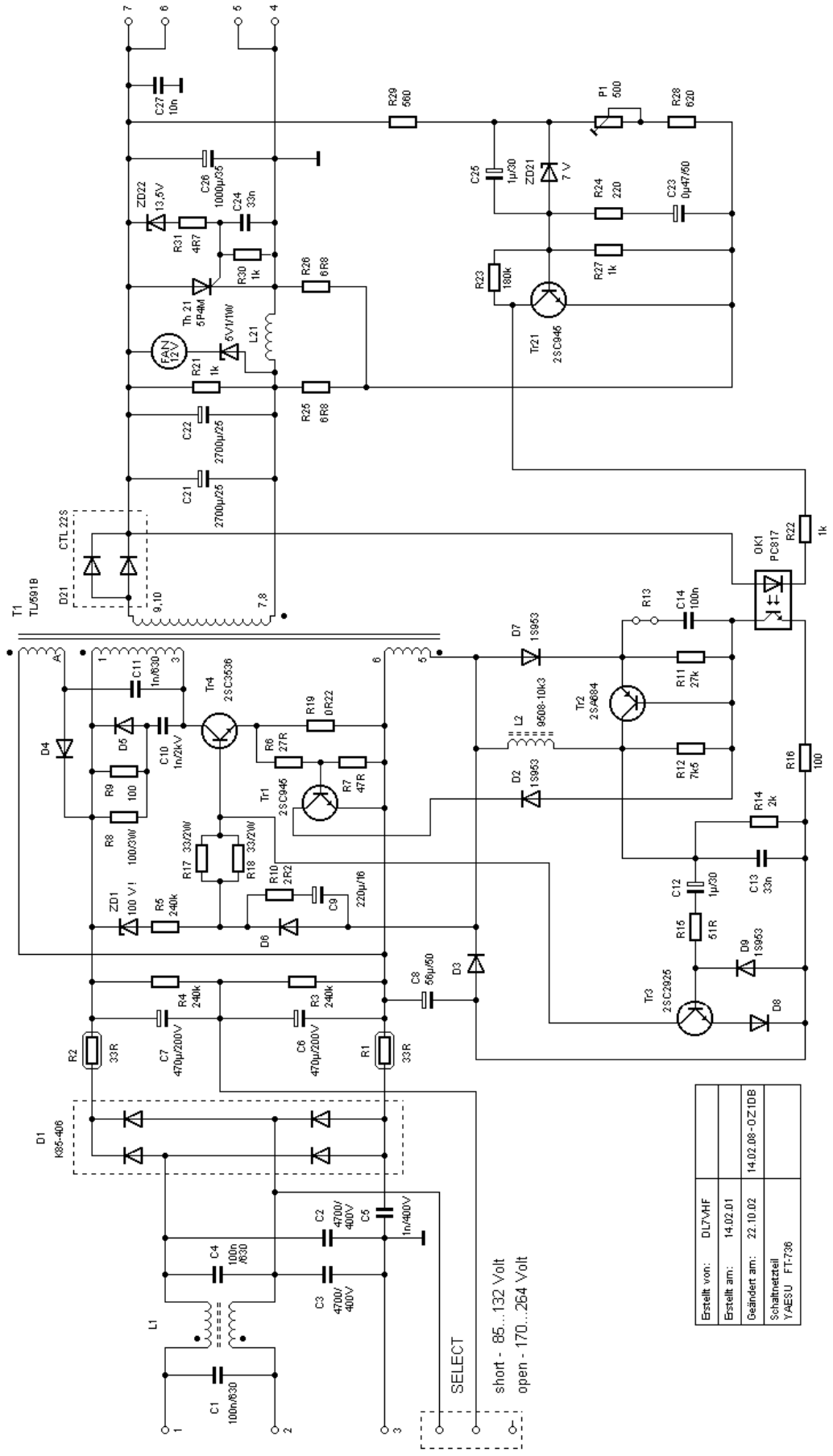


Fig 11. Completed power supply ready to install into FT-736R.

Be sure to roll and shake the unit to check for any loose parts inside. Remove any objects that do not belong there.



DL7VHF's FT-736R Power Supply Schematic



DL7VHF's Modified FT-736R Power Supply Schematic