Kenwood TS940 repair notes: low power output, low RX sensitivity.

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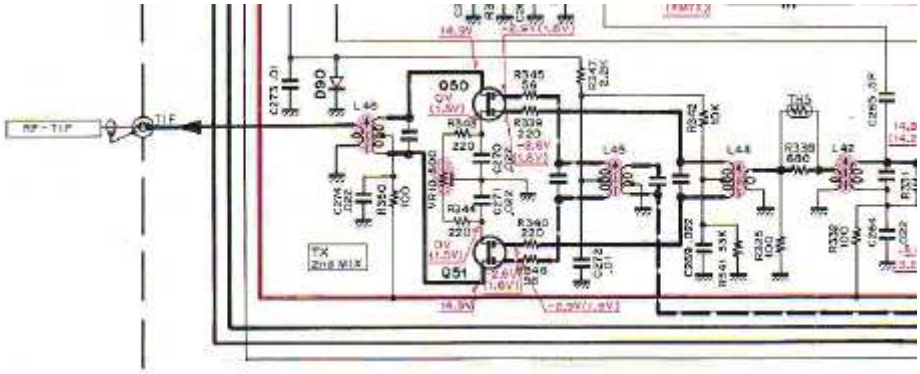
These repair suggestions might also apply to the TS930 and TS950 sharing certain circuits.

I received a virtually dead TS940 from Clarence Jones who suspected dead drivers as this is defect number one with this type of radio. I previously published an article on how to replace these MRF485 transistor by Mosfets.

Unfortunately the transistors were still ok, as well as the finals and the predriver. So I stepped through the complete TX chain to find no defective semiconductors at all. This was a hard nut to crack…

After several hours of searching and more sleepless nights I decided to start retuning the cores, something I usually never attempt unless the radio belonged to a CB-amateur. This was definitely not the case as I suspect the radio was never opened before. Then I discovered the purple cored 45 MHz IF transformer on the IF board was completely misadjusted, even worse, maximum output coincided with a totally screwed-in core. Not normal…

This transformer type has a built in parallel capacitor, that obviously became too small. Only one explanation I have: ageing… The cure was mounting an external capacitor of 27 pF over the two 56 ohms resistor ends going towards the gates of Q50 and Q51. L42, L44 and L46 also needed some slight readjustment, but the difference with L45 was over 30 dB !

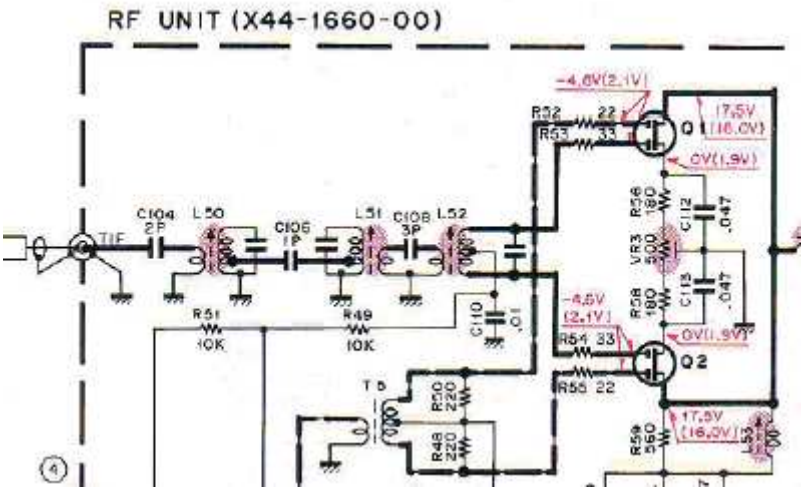


On the schematic diagram you can see **L45** and the built-in capacitor printed on the drawing without a value next to it. The cure is adding an external capacitor at this point.

If you observe the same on your radio (turn the core inwards, you will see the power rising…) then you probably are dealing with the same problem. I have seen radios that only suffered a bit, lowering the output power to a mere 50W. This is probably the very same problem…

And if this happens you probably also lost some sensitivity to a similar problem in the receiver…more about that later.

On the RF board retuning the input coils L50, L51 and L52 also scored a few dB gain.

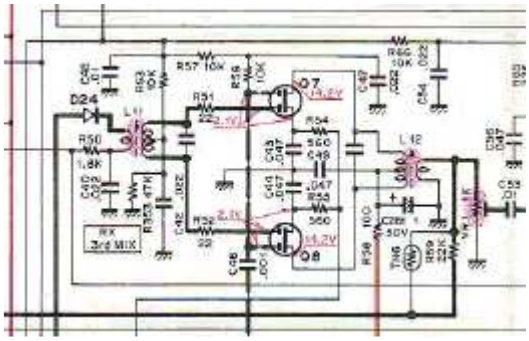


After this added capacitor and retuning I had a radio that gave back full 100 W ouput, but it was extremely deaf… I started by doing the modification posted by **Ricardo Nelson PY1NR** concerning the two mirror-mounted fets Q4 on the IF board and Q10 on the RF board. Don't listen to the sceptical voices and the Kenwood factory idiots saying this man is wrong and changing them might affect stability. BULLSHIT ! These fets are really mounted WRONG !

This improved reception a few dB but still not ok. I also noticed the area around the Q7 and Q8 fets and transistor Q6 on the RF board gets extremely hot, so take a close look at these solder points as they might be affected by the heat. The PCB looked a bit smoked but all operated ok..

Then I started thinking that maybe there was a similar coil in the RX chain, and indeed there was…

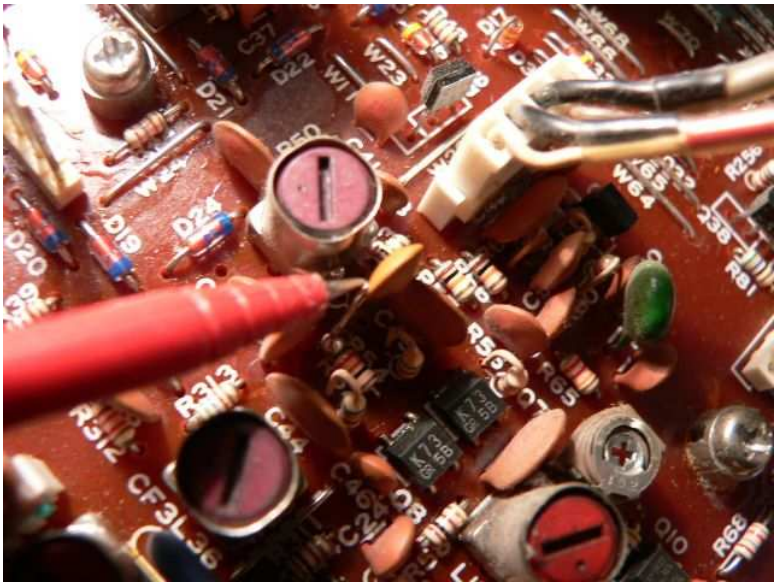
The same problem was found in **L41**, the 45 MHz IF transformer at the input of the third RX mixer:



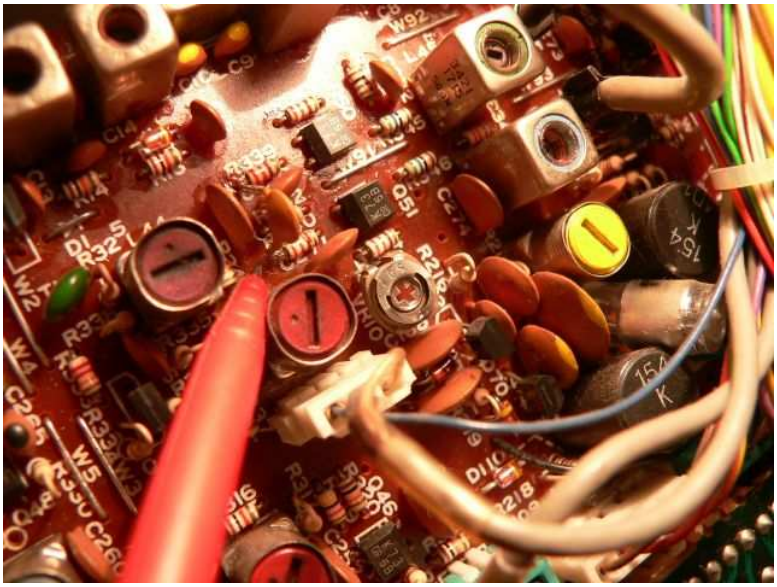
It is impossible to tune this transformer. I suspect the internal capacitor had changed his value due to chemical processes. It is the very same purple core device as in the TX chain. The solution is similar: add a capacitor between both 22 ohm resistors at the opposite end of the gate. Then it tunes flawlessly.

Enclosed below some pictures that are self explaining:

IF ageing in RX IF plus added capacitor 27 pF:



IF ageing in TX IF plus added capacitor 27 pF:



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Fully Licensed transceiver surgeon...

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