Modifications for the Kenwood TR-9500

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IZ5CCV

TR-9500 fuer 9600bd

Hallo 9600 Baud Fans,

hier ein kurzer Hinweis, wie ich mein 9600 Baud Modem von G3RUH an meinem Kenwood TR9500 angeschlossen habe. Verbesserungen sind sicherlich moeglich. Die Empfangs-NF nehme ich ab an der Verbindung R42/R43 auf der IF-Unit.
Das Sendesignal speise ich ein an der Verbindung C18/C19 auf der CAR-Unit. Die PTT-Leitung verdrahte ich wie gewohnt.
Nun viel Spass beim "High-Speed-PR" auf 70cm.

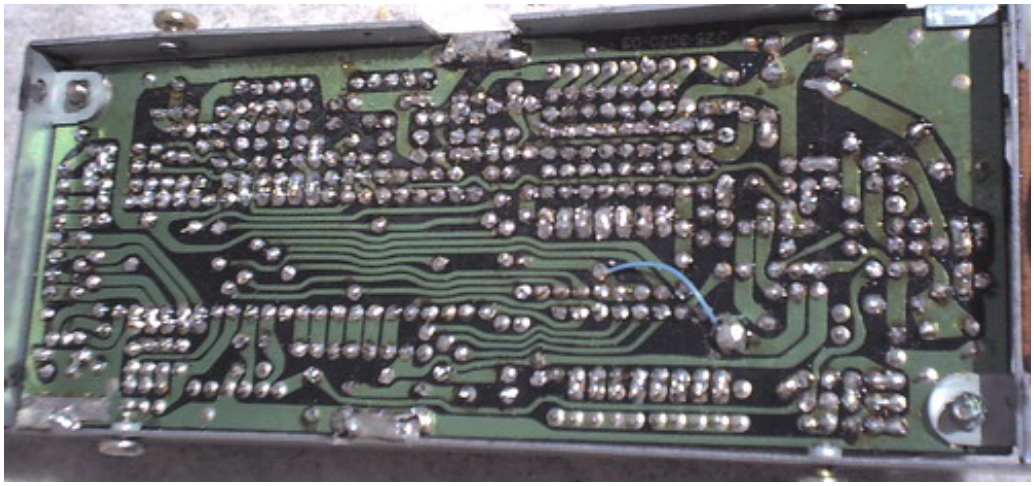
TRIO TR-9500 UHF All Mode Problems and Modifications

1) For a long time I had this problem on my TR-9500:

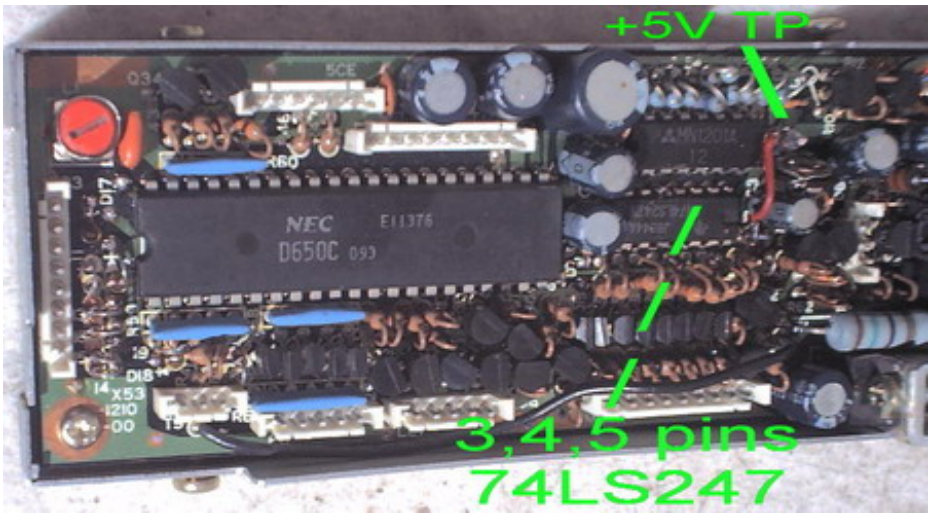
after a short or long time, sometimes 3-30 mins, some other times after several hours (or days !), all digits of display are "turned-OFF", except the 2 decimal points. Even if without frequency-display the radio working normally (on TX & RX).

Remove the upper cover. Now you are looking for the "Control Unit" which leaves behind of Front-panel (see my photos).By using a long & bent terminal for your Volt-meter, check the Voltage on pins 3,4,5 of 74LS247N (Q11,TTL BCD to 7 segments).
If you measure a LOW logic Voltage, below of 2.5-3 Volts on these 3 pins, the problem is here from some "cold" solder into PCB. The correct Voltage on these Pins it must be 4.8 - 5 Volts, in other words just the same with Pin 16 (+ VCC) of 74LS247.
Be carefull during Voltage measurement, any accident here (ie short-circuit with terminal) should be probably the source for a serious malfunction !
Easy solution: solder a "by-pass" short cable from +5V TP (Test Point) with these Pins, on the upper-side of PCB. Thus you will save time and hard work, which is necessary to de-assembling the Radio, in order to be able to remove the "Control Board".

Unfortunately, this PCB is a real garbage! It is not just the very-very bad quality of PCB, but the main problem it's the dozens of passes (holes) between Upper & Down side of double-side PCB, as these "passes" are without "Plated-holes". Thus, the good connectivity from the upper to down tracks depend on the solder. These solder-points through the holes, after several years of operation they seem to be not good enough, especially into the holes which it goes through high enough current, like the +5V TTL feeding voltage.



Unfortunately, even if re-soldered all tracks onto down-side of PCB, the problem is unsolved.
On the other hand, the Upper-Side's re-soldering is a really difficult job ! The Upper side is densely populated with various components. The most holes are between these components and sometimes very-very close to component's legs. Thus is impossible to put your solder-iron's nose, without possible damage.
For this reason I suggest the "by-pass" method, by using short pieces of cables (or wire wrap). Trust me !



"Click" to enlarge fotos

Control-Unit Board of TR-9500 (removed)

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2)**Tips for CW-Mode**

On Rear-panel of TR-9500 you will find the Jack for CW-Key. Even if you connect here a CW-key, the radio is ..denied to transmit on CW ! You need also to connect another Mini-Jack on the 2nd hole of Rear-Panel that is named ST.BY (Stand By). In other words, firstly it should be connected in ST.BY Jack a switch and when that is ON, then it will be lit the "ON AIR" Led on Front-Panel! After that your CW-KEY is ready for transmittion! If you have the original Kenwood's Base for TR-9500 (and TR-9000), this unit including the "SEND" switch precisely for this operation.

Because you... havn't this Base-unit (it's very rare), it's necessary to put on ST.BY a small external Switch. Every time you need the CW-Key in order to send "dashes" & "dots", this switch it must be closed.
Keep in mind that, when the ST.BY switch is closed, the receiver is de-activated and as above mentioned the "ON AIR" Led on Front panel is being lit (see picture below). Under this condition the transmitter is ready, but without Carrier's emission. Carrier on the air you have just when the CW-Key is pushed-down.

If you need an automatic activation of ST.BY, that is possible by using a Timer (ie 555 timer) that it could be activated from CW-Key and

it will keep the ST.BY "closed" through a small relay (or switching-transistor) for a short time, ie 0.1-3 Seconds. Thus you will have the well known "Delay", a very common & useful ability on other transceivers.

But if you want a QSK (Full Break-in) operation for CW, it's much simpler. In this case you don't need any SEND switch or Timer. Just connect your CW-Key to... ST.BY Jack (Yes, directly to ST.BY and NOT to the KEY-Jack !). Thus, every time where your Key is pushed-down, you have Carrier "On the Air" ! (..but the internal Relay inside of TR-9500 seems to feel not very comfortable, especially if you are a super fast CW-operator ! As you know under QSK-mode the internal Relay is following your Key, step-by-step ! Bad-news for Relay's health !)

73, Mak SV1BSX

ON4WP's article

Fixing TR-9000-9130-9500 display boards

Who says technical articles are boring !
Hello vintage kenwood all mode rig fanatics... This is the mod you all have been waiting for !!! Are you one of the proud owners of a TR-9500, 9000 or TR9130 ? Is your display erratic and flickering as 95 % of these still existing radios on the planet. Then this is the cure you have been waiting for during the last 25 years. This mod was created because this phenomenon was getting on my nerves and I was so sad nobody did something about it, we even kept buying their rigs, the TS-930 with the rotten finals, the TS440 with the VCO gum problem, the TM255-455 with the distorted SSB TX audio, the TR2600 with the noisy synthesiser... (yes we all know that kenwood sucks but the're still on the market...) I do like the 2000 however, but the user interface is designed for aliens. So far the commercial break.
Back to basics. Essentially there are three different problems with this rig's processor board. Most units I saw suffered from more than one problem. Here we go...
Please start by downloading the service manual from this site. I will use the original kenwood reference numbers. Don't send me silly mails to ask for foto's showing the component locations. If you are a decent ham, you do know how to read a schematic and trace components on a board. If you're not, stop reading and start watching Oprah on the telly. The gossip is that the print batch suffered from bad via's, this is what the plated through holes are called. THIS IS NOT THE TRUTH !!
The whole problem is purely thermal. Bad design. That's what Kenwood stands for.. (not that the other brands are any better, they just want to get richer using cheaper components all the time)

There are mainly three possible problems:
1. Disappearing display segments. Mostly the rigs powers up ok and after some time the christmas tree starts blinking. The causes are bad solder joints at the 7 series resistors (R15-21) of the display leds. If you are good at soldering and have the tools, desolder them, clean the board and resolder them, preferably using silver solder, having a higher meltdown point. Only resoldering will also help but only temporary. It might be a good idea replacing them by 1/2 W resitors, having a bigger body, so better thermal behaviour. Even better is replacing them all by 150R units. This lowers the visibility but decreases the heat. Haven't tried this myself but I suggest it would be even better. Better a faint display than no display at all...

2. Disappearing complete digits. Same thermal problem at the 5 driver transistors Q22-26. Resolder using preferably silver solder.

3. Resetting processor. Unit jumps to 3.000 or 5.000 during operation. This is caused by unsufficient voltage at the processor. You won't believe this: On the board is a test point TP1 next to Q10. This big test pin is soldered on both sides of the board, but this solid pin behaving as a bad resistor is the reason why the processor doesn't get sufficienty juice. Resolder it on both ends (again using silver solder...this is getting boring) and check the voltage on pin 21 of the processor and pin 16 of both other IC's, this voltage must be over 4.5 Volts. If not ok, also check the soldering of D5.
This should cure most of the problems. There are some other faults I found on some units. I just mention them to get you back up and running if the above tips weren't sufficient:
* Defective Q3: 1.5 Volts Vbe and no Ic. Replace by any NPN transistor but observe pinout.
* Defective Q9: replace by any 7805 and try to improve cooling, or increase value of R15-21 to 150R.
* Defective (open) D1 zener: if you have bad luck your processor is toasted by the 8V but I saw some survive this.

This is it from your favourite Radio-Doctor and Transceiver-Guru. If this mod was useful for you, please drop me a small mail with your repair adventures. This keeps me motivated to post these funny mod files. If you are really wealthy, your donations are accepted to keep my multiple repeater sites on the air, so I can use my hobby money for my own fun...

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