

From: k6ll@JUNO.COM (David O Hachadorian)  
To: cq-contest@contesting.com  
Subject: [CQ-Contest] TS-850 contest mods (long)  
Date: Tue, 03 Jun 1997 22:22:00 EDT  
Message-ID: <19970604.022911.12311.0.k6ll@juno.com>

There was a huge number of requests for the TS-850 mods, so  
I'll just post them here.

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KENWOOD TS-850:  
MODIFICATION FOR EXTERNAL KEYING WHILE USING THE INTERNAL KEYER

BY: N7EX (ex-N0DH), Dave Henderson

One of the minor draw backs to the TS-850 as a CW contest machine is the inability to use the internal keyer in conjunction with an external keying circuit such as a personal computer or auxiliary memory keyer. As designed you must manually throw a switch from internal to external keying to switch between one or the other. To make matters even more inconvenient this switch is on the back of the unit and is not readily accessible during normal operation.

Simply said this modification involves running a new keying line from the junction of S1 and D51 on the IF Board. For convenience this additional keying line can be wired to the DSP1 and/or DSP2 RCA phono jacks if you do not use the external DSP unit.

The modification to the unit to resolve this problem takes less than 30 minutes to accomplish and can be done without "permanently" modifying the unit which would detract from its future resale value. If you don't use the external DSP unit then the two RCA phono jacks marked DSP1 and DSP2 can be used as additional keying input jacks as will be outlined below. If you use the external DSP unit then the modification can still be accomplished by running the external keying line out on a "pigtail". I highly recommend the purchase of a service manual which will greatly improve your ability to indentify the circuit points involved in the modification. Considering that the radio costs \$1500 what's another \$30 to keep from messing it up! By the way compared to the two TS-930's that I nursed through the 80's, this radio is a breeze to trouble shoot and repair which I have had to do twice through no fault of Kenwood (long stupid story ~8>).

>From here you proceed at your own risk, if you fry the radio DON'T CALL ME. A precision low wattage solder pencil for doing surface mount soldering is recommended, If all you have is a 150 watt Weller solder gun then read no farther your better off taking the unit to an expert rather than "melt" the circuit traces.

I assume no risk for the accuracy or completeness of the enclosed information. All yee who enter here embrace all hope for you may likely have a better contest radio when you are done.

1) Turn the unit upside down with the back of the TS-850 toward you.

2) Remove the bottom cover.

3) In this position the IF board is on your left.

4) Remove all the screws holding the IF board to the chassis.(put them in a jar or something for safe keeping).

5) Unplug enough of the cabling to allow you to tilt the board up so that you can access the bottom side of the board underneath S1 the

"External/Internal" keying switch.

6) On the bottom side of the board directly underneath S1 you will see 6 solder pads arranged in two rows of three pads each.

7) The middle pad on S1 nearest the back of the radio should be GROUND, solder the braid of an approximately 9 inch piece of small audio style shielded cable to this point, being careful to dress the coax so as not to short to other circuitry.

8) The middle pad on S1 in the next row up of three pads is the keying line. Solder the center of the shielded cable to this point.

9) Route the other end of the shielded audio cable through the chassis in the vicinity of the DSP jacks above.

10) Carefully inspect all solder joints for shorts, etc. Replug the wire harnesses unplugged in step 5 above and reassemble the board to housing. Reassemble the bottom cover.

11) Turn the unit over and remove the top cover.

12) Find the DSP input board with the three RCA phono jacks on it at the rear of the unit. The two DSP jacks are on the right when facing the rear of the unit. There are two connectors on this board (a 2pin and a 4pin). Unplug the 4 pin connector. Obtain another 4 pin connector and connect as follows (or directly solder to the underside of the board as follows) If you only need one additional CW jack then ground is pin 2 (closer to center of the radio) connect the braid of your new key line to this pin. The input from the middle RCA phono plug is pin 1 connect the center conductor to this pin. Like wise if you want two additional CW jacks then do as above plus add a short between pins 1 and 3. If you want a small RF choke or some ferrite beads on the center conductor of the audio cable may prevent keying problems in high RF field environments..

14) Close the unit up and switch S1 to INTERNAL keying. You should now be able to key the unit via the internal keyer (Via the standard key input jack) or with an external keyer or computer via the old DSP jacks, without having to switch S1!

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TS-850 front panel cw sidetone level adjustment mod by  
N6TR. Refer to NCJ, Vol 22, Issue 2, Page 23.  
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TS-850 Separate Receive Antenna Modification #1.  
This modification was developed by Brian WA3WJD

Make a short loop of white teflon cable with a male and female BNC connector.

Loop it out of the back of the rig so just enough of the coax sticks out so the BNCs can be joined with a barrel connector.

Locate the little header connector on the filter board in the TS-850 that is on the receiver side of the TS850 antenna relay. Pull that connector loose.

Spend a little time tracking down male and female header connectors that match what Kenwood uses. Install those on the ends of the white teflon coaxes sticking in the back of the radio.

For normal use, just connect the BNCs with a barrel connector and the rig is normal. For Beverage use, connect an extra antenna switch common and ant #1 to the BNC connectors, and put ur Beverages on the other positions.

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TS-850 Separate RX antenna input mod #2.  
This mod was developed by N6TR.

This is near the top of everyone's list when they are asked "What things bug you about the TS-850S". I initially overcame this deficiency by modifying my amplifier so I could connect a different receive antenna to the TR relay. However, I wanted to change things so there wasn't as much RF getting into the RX antenna due to close proximity to the amplifier's output. This became a problem when using the same receive antenna on a second radio (you know two radio operating was going to work its way in here somehow).

Ville, OH2MM had provided me with instruction on how he modified his TS-850S to have a separate RX input and this inspired me to try it. Here are some simple steps to hopefully inspire others:

It took me an unrushed two hours to do all this.

1. Remove the top panel (you don't need to take off the bottom one.
2. Remove the plate which sits between the fan and the back of the radio. This covers the output filter PC board.
3. Unsolder the connections to the SO-239 output connector.
4. Remove the three cables from the PC board next to the SO-239. This includes two coax and one 3 conductor harness.
5. Remove the two screws holding in the PC board and remove it.
6. Locate the trace that goes from the relay's normally closed contact. You can use an ohm-meter to find it - probe from the wire that went to the SO-239. You will find a short trace on the back of the board which runs to a chip capacitor. Cut this trace and solder some very small coax to each side of the cut - connect ground to the nearby ground trace.

Make the cables about 4 inches long.

7. Remove the antenna tuner. There are 2 screws in the back and front (you will need a magnetic screw-driver) and one on the side. You will need to carefully unplug two wire harnesses and one coax connector.

8. Drill two holes for phono jacks on the back of the radio. Be careful not to obstruct the screw hole for one of the screws in the back of the antenna tuner. The best place is between the RF output connector and the groundpost. Put them on top of each other and as close to the bump on the back panel as possible. I used a vacuum cleaner while drilling to make sure no metal chips went anywhere.

9. You will find a small hole under the SO-239 where you can feed the two coaxes through. Solder them to the phono jacks and reassemble everything. I put back to back diodes on the RX antennas input, but you may not want to do this. A better thing would be to add a relay to

disconnect the RX antenna input when transmitting. I took care of that in project #2.

10. Obviously, you will need a jumper cable to make your receiver work again.

PROJECT #2 - The switch box:

Parts list - 4 position rotary switch  
DPDT 12 VDC relay  
1 K Ohm pot (optional)  
12 phono jacks (or you can get by with 9)  
mini box for above and knobs.  
Clamp diode for relay coil if not included in relay

This box does two things: disconnects the receive antenna input when transmitting and allows selection of the transmitting antenna or one of three RX antennas when receiving. The pot can be used for RF attenuation if your rig doesn't have one.

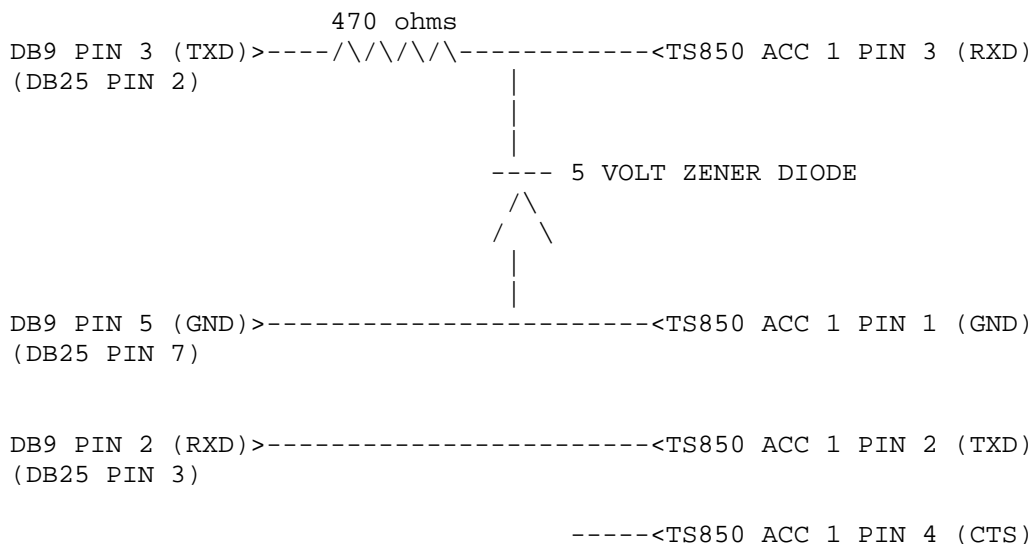
The relay gets controlled by the PTT output from your rig that normally would go to your amplifier. Then one set of the contacts is used to key your amplifier. Don't forget to put a diode across the coil of your relay if there isn't one internally. Otherwise, you will have undesired arcing across the contacts of the relay in your radio.

The other set of contacts disconnect the output of the rotary switch when transmitting. The rotary switch selects either the signal coming from the transmitting antenna (from the TR relay in your rig) or one of three receiving antennas. I use two phono jacks per RX antenna so I can feed them to other boxes for other radios. I also use two jacks for +12 volts so I can jumper power to another box.

You can build up one of these boxes in an hour or two. You can epoxy the relay to the mini box.

If you want the pot there to act as an attenuator, I just hook it up like you would a volume control: one end is ground, the other end goes to the output of the rotary switch and the wiper goes to the output. Use shielded cable as much as possible to avoid stray pickup.

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Computer Interface for the TS-850, without using the IF-232 Level Converter. Mod developed by N6TR and possibly others, with zener idea added by K6LL.



-----<TS850 ACC 1 PIN 5 (RTS)

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TS-850 Power Output Control - VR7 on the RF Board (bottom side of radio). 125 watts or so on cw is safe. Do not exceed 100 watts on SSB, since distortion will broaden the transmitted signal.  
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TS-850 Level Attenuator for DRU-2 playback audio. Mod by K6LL.

1. Remove the little hatch on the top of the radio.
2. With the front of the radio facing you, find connector CN505. It is a five pin connector near the filter DIP switches. The white wire on the leftmost terminal carries the DRU audio output.
3. Cut the white wire and insert a 100K ohm micromini pot, shunted with a 220 pf capacitor. Adjust the pot until DRU playback level matches live microphone level.

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From: Tom Wagner <tomwagner@mindspring.com>  
To: cq-contest@contesting.com  
Subject: Re: [CQ-Contest] Kenwood TS850 opinions  
Date: Tue, 03 Jun 1997 21:38:33 -0400

TS-850 Setup for Running Stations  
Without Using RIT

The TS-850S is a great contest radio, except that it has a poor RIT control system. It has no RIT clear, and worse, the control itself is too small. One can always run split, but if you land on an odd frequency (like 14179.37) trying to remember your transmit frequency is hard. This is especially true if you are tired.

The procedure below uses the Quick Memo feature of the TS-850S to save backup "copies" of your run frequency setup. This way you make the MR button serve the RIT clear function.

Step

- ( 1. Choose frequency on VFO A (e.g 14179.37)
- ( 2. Press A=B. This will tune both VFO's to same frequency.
- ( 3. Choose to transmit on VFO B (split). I.e. Press TX B. Now, A=14179.37, B=14179.37.
- ( 4. If you want Fine tuning on, press it now (key 8).
- ( 5. Press M.IN in the Quick Memo box five (5) times.
- ( 6. Press MR in the Quick Memo box. You may now use the main tuning knob to tune in off-frequency stations.
- ( 7. After each QSO, press MR in the Quick Memo box 2 times. This will set the receive frequency back to the original frequency (14179.37). Unfortunately, you cannot do this while transmitting.

( 8. If you somehow mess up your A or B VFO's, you have four more "copies" of your frequency stored in memories 2-5. Just press MR in the Quick Memo box, and turn the M.CH/VFO.CH knob, until you get a good one again. To set all MR frequencies to your run frequency, choose one of the correct "copies" and press M>VFO and go to step 5 above.

Procedure to "Jump" to a Spotted Frequency  
(While Running Using Procedure Above)

Step

( 1. Direct your computer program to set your radio frequency to the spotted station.

( 2. Press TX-A (if necessary).

( 3. Work the station -- don't take too long!

( 4. Press MR in the Quick Memo box 2 times. You are back on your run frequency, ready to go.

( 5. Say, "No, this is MY frequency. I have been running stations here for 2 hours!"

Tom - N1MM

From: wrt@eskimo.com (Bill Turner)

To: "Ken N4UK" <ramirez@emi.com>

Cc: cq-contest@contesting.com

Subject: Re: [CQ-Contest] Kenwood TS850 opinions (long)

Date: Wed, 04 Jun 1997 00:30:57 GMT

I noticed a lot of the guys commented on the lack of a RIT zero button. May I offer a suggestion? Don't use RIT at all. Put the rig in the split mode and press A=B. Then use the main knob for tuning instead of using the little RIT knob. If you want to see what freq the TX is set to, just touch the TF-SET button and you can retune the RX as needed. Works like a charm.

Also one fellow commented that there have been no service bulletins issued since day one. Sorry, not so. If you buy the service manual you'll get a bunch of them included with it. I didn't take an exact count but it looks like about a dozen.

73, Bill W7TI

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