



International Radio Corporation

13620 Tyee Road
Umpqua, Oregon 97486
☐ [541] 459-5623

Internet address: www.qth.com/inrad
E-mail: inrad@rosenet.net

KENWOOD QRO-820 Modification

Preface to Modification Procedure

This modification has been specifically developed for those amateurs who own a Kenwood TS-820 series transceiver and a high power grounded grid linear amplifier which is not operating at full potential due to lack of drive from the exciter.

In addition to the increase in output power, there is a marked improvement in ALC performance by alteration of time constant componentry.

Precautions to be Taken

Do not use a soldering iron of greater than 60 watts. A chisel type tip is also recommended for use with solder wick braid in order to facilitate easier removal of components from the printed circuit board.

It is recommended that persons unfamiliar with solid state technology do not attempt to install this modification without the guidance of an experienced technician as damages could result from improper wiring changes. All modifications made to your equipment are done at your own risk.

Before starting the modification process, it is advisable to lay out a large turkish towel or an old blanket on the workbench to prevent scratching or marring the transceiver in any way.

Parts List

- One (1) 3.3K, 1 watt resistor 294-3.3K
- One (1) 1N4733A Zener diode 583-1N4733A
- One (1) 0.22uF, 50v capacitor 140-PF2A224K
- One (1) 12K, ½ watt resistor 293-12K
- Two (2) 6293 tubes

Resistors may be obtained from: Mouser Electronics at www.mouser.com - Tubes, if needed, may be purchased from AES at www.aesham.com

Modification Procedure

- A. Remove the top and bottom covers from the transceiver and put the screws in a container with a lid so as not to misplace them.
- B. Place the radio right side up and locate the RF/Driver board, X44-1150-00. This board is along the side the drive control shaft on the right hand side of the radio.
- C. Unsolder the capacitor from the variable capacitor frame, and at the feed through insulator on the front of the PA cage. Remove the retaining screw from the rear bracket. Disconnect the three Molex harness connectors from along the top edge of the board. Remove the shield from the 12BY7, and then remove the tube itself from the socket. Gently rock the printed circuit board from end to end and gently apply upward pressure until the connectors at the bottom loosen and disengage. Remove the board from the transceiver and lay it on the bench, component side up.
- D. Locate R25, a 12K Ω 1 watt unit on the top of the board using the plate supplied for the RF board in your Owners Manual. Turn the board over and de-solder the resistor (brown red orange) from the appropriate points. Replace the resistor with the 3.3K Ω unit supplied in the kit parts bag. (Orange orange red).
- E. Locate Zener diode D-8 which is a 9.1 volt component. Remove D-8 from the printed circuit board and replace it with the 5.1 volt Zener supplied in the kit parts bag.
- F. Locate capacitor C-39 on the printed circuit board. It is a .47 Mfd. 50 volt unit. Remove the capacitor from the board and replace it with the .22 Mfd. unit supplied in the kit parts bag. This completes the modifications to the RF/Driver board. Replace the board in the TS-820 and secure it back as it was before the modification process had commenced.
- G. Locate Terminal PD2 on the board X56-1200-00. This board is located on the left side of the transceiver at the rear. Clip the white and brown striped wire at PD-2 and fold it back out of the way. Cover the exposed end with a piece of tape.

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- H. With a piece of hook up wire supplied, solder one end to terminal PD-2. Run the opposite end of the wire around the shield partition over to the rectifier board X43-1090-02. Trim the wire to the proper length and solder it to terminal 300A. This terminal is located on the output side of R5.
- I. Locate the power transformer secondary taps and find the 230 volt tap. It can be identified by the green wire which runs to D-6. Unsolder the green wire from the 230 volt tap and resolder it to the 300 volt tap.
- J. Locate the bias pot on the rear apron and open the yellow white striped wire which runs to it. Solder the 12K Ω resistor in series with the wire and then back to the potentiometer.
- K. Turn the radio over and remove the protective cage from around the final amplifier. Remove the two S-2001 tubes in the radio and replace them with the two type 6293 tubes as supplied in the kit. Replace the protective cage around the final amplifier.

At this point you have finished all wiring changes. Now go back and double check your work for errors. A mistake could be very expensive.

- L. Having checked the wiring and found it to be correct, you may now apply power to the transceiver. Set the radio up on 28.800 and tune it up as regularly into a dummy load for maximum output. Using a diode detector type field strength meter, couple the center conductor of the antenna connector on the 820 to the FSM with a short clip lead.

Shut the Screen Grid Voltage Switch to the OFF Position!

With the transceiver in CW mode, key the rig. There should be a slight to moderate up scale reading on the meter. With an insulated tool, adjust the neutralizing capacitor for minimum reading. Once this has been achieved, the radio is ready to be put back in service.

- M. Replace the covers. Tune the radio up into an antenna. You will now notice that the PA bias will probably need adjustment back to .060 ma. With the bias set properly, the plate current will now be considerably higher... typically .350 ma. to off scale under tune up conditions. If it goes off scale on 1p, turn the meter switch to RF output and peak the highest reading you can get. Using your station wattmeter, you will see that there is a lot more output power than before and under SSB conditions, the LC works much faster. Happy Operating!!

PLEASE NOTE regarding the Kenwood 820 QRO kits: Although we have received no negative comments about this modification since we purchased the company in May 1997, we want to point out that the modification increases the 6146 screen voltage beyond the maximum rating for the tubes.