# Interfacing the Kenwood TS-990 and ICOM PW1

*Tom Wheeler, NØGSG*

1. Set the TS-990 HF linear amplifier control to "Active High+Relay & TX Delay Ctrl" by navigating to Item 11 on the Advanced Menu (Menu, Advanced) as shown in Figure 1.

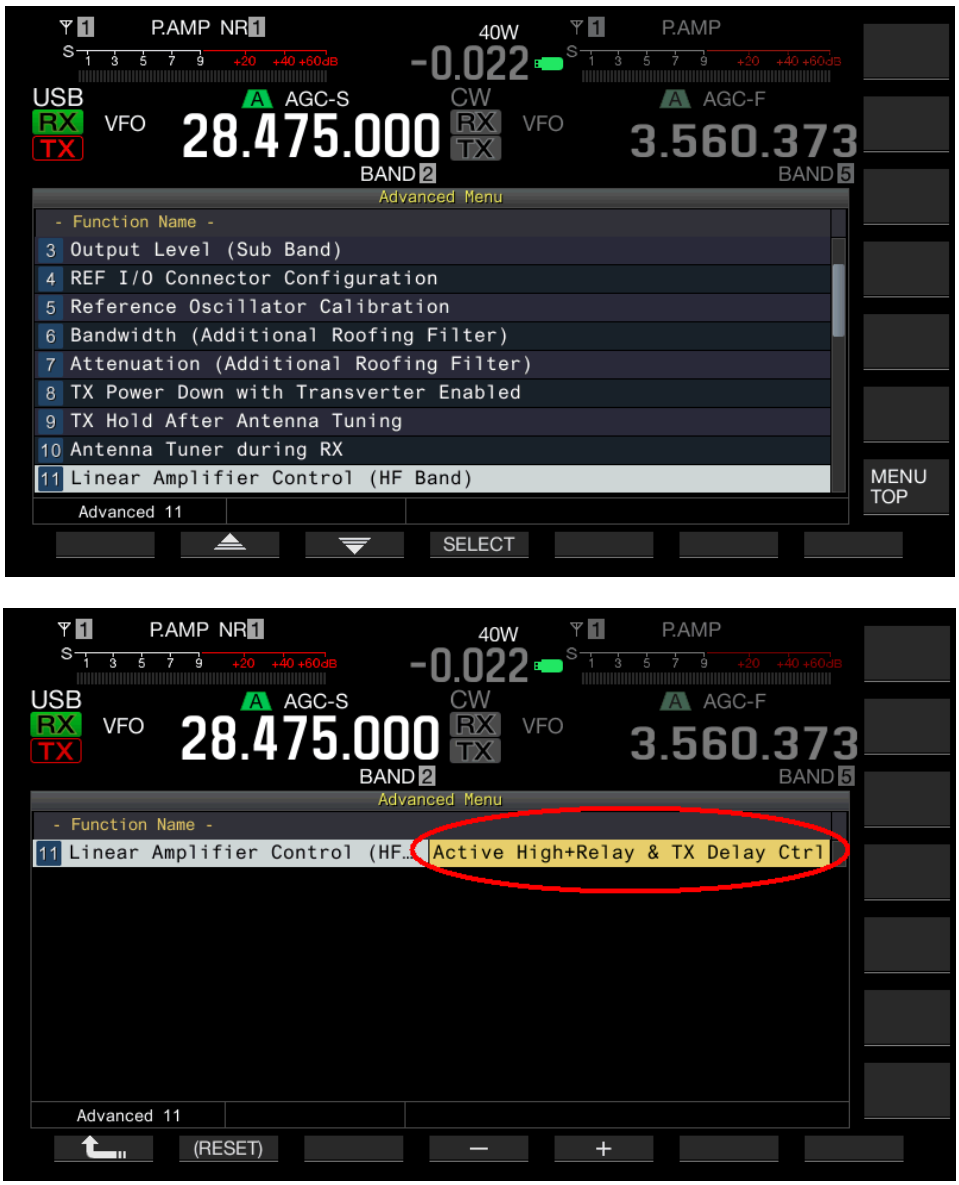


*Figure 1: TS-990 Menu Settings for Linear Amplifier Control*

WARNING: TX Delay Control is required to protect the PW-1 from being hot switched by delaying the RF output of the TS-990 an extra 20 ms at the start of each transmission. This allows time for the linear amplifier T/R relays to settle prior to application of RF.

2. If the station will be used on 6 meters, Repeat Step 1 for 6 meters by navigating to Advanced Menu item 12 and setting it the same way.

3. Wire the TS-990 to PW-1 remote cable as shown in Figure 2:

   a) The connector shell is the TS-990 ground and MUST be connected.

   b) Use shielded cable for both the SEND and ALC cables, which must both be terminated in RCA connectors. Label each cable end clearly.

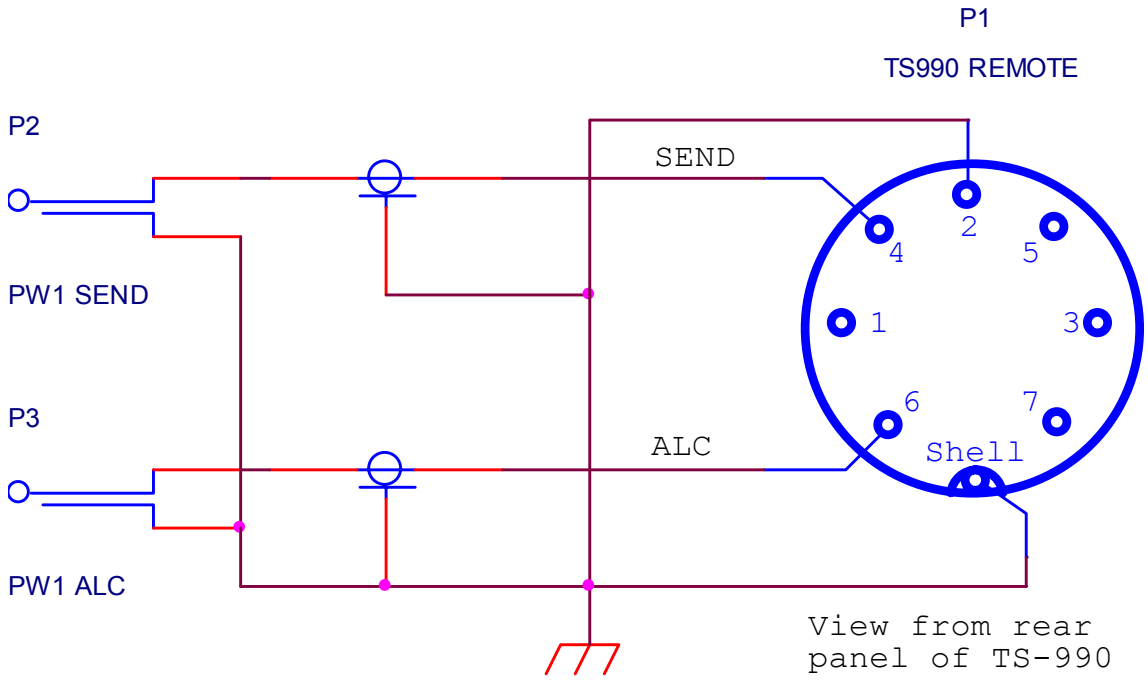


*Figure 2: TS-900 to PW-1 Interface Cable Schematic*

TIP: Unlike prior Kenwood models, none of the TS-990's dry T/R contacts are grounded within the transceiver. These contacts are on pins 4 (SEND - NO), 2 (COMMON), and 5 (RECEIVE - NC) of the connector. See Page 1-7 of the TS-990 owner's manual for details.

4. Test and configure the PW-1 and TS-990 combination:

a) Connect a suitable dummy load (at least 1 kW CW rating) to the PW-1.
b) Connect the TS-990 ANT1 (or other selected output) to PW-1 RF Input #1.
c) Connect the TS-990 REMOTE cable ALC and SEND plugs to PW-1 ALC and SEND inputs for transceiver #1.
d) Set the TS-990 and PW-1 to the same band. Make sure the dummy load is selected on the PW-1.
e) Set the TS-990 to a suitable mode (FM, data, etc) that will result in a steady carrier output when SEND is pressed.
f) Set the TS-990 power output to minimum (5 watts).
g) Turn on the PW-1, but unselect the tuner and amplifier functions.
h) Set the PW-1 METER-1 to Po, and METER-2 to SWR.

i) Key the TS-990 and observe the PW-1 panel. The TRANSMIT LED should illuminate, and the SWR reading should be flat.

If the LED doesn't illuminate, double-check the REMOTE cable wiring and TS-990 settings. If the SWR reading is anything but flat, STOP and find out why before proceeding!

j) Unkey the TS-990.
k) Enable the PW-1 amplifier by pressing the AMP button.
l) Set the PW-1 METER-2 to ALC.

m) Key the TS-990 again, and slowly increase the power output until 1,000 watts is indicated. At the same time, adjust the ALC 1 control on the rear of the amplifier until METER-2 reads mid-scale. Refer to the PW-1 owner's manual if needed for detailed explanation of the ALC setting.

When the ALC is working properly, the PW-1 output will not exceed 1 kW regardless of the transceiver's power level setting.

WARNING: If the ALC does not respond correctly in this step (PW-1 output exceeds 1,100 watts), stop transmitting immediately and determine the cause.

The PW-1 uses ALC to protect itself. The ALC signal must be operational to prevent overdrive and enable protection against high SWR.

**Although the PW-1 is protected against overdrive with additional protective circuitry beyond ALC, a high-power transceiver such as the TS-990 has the potential to cause extensive damage to the amplifier. The PW-1 normally requires only about 40 watts of input for full 1 kW output.**

n) Double-check that the ALC settings are working correctly on several bands.

5. Once you've completed the above steps, the TS-990 and PW-1 are correctly configured to operate on all bands and modes. Enjoy!

TIP: It should only require 38 to 40 watts of drive from the TS-990 to obtain the full 1 kW output on all bands. To protect the amplifier, it's recommended that the TS-990 RF output be limited to this value when using the PW-1, regardless of operating mode.