

## Auxiliary CW Input for the TS-950

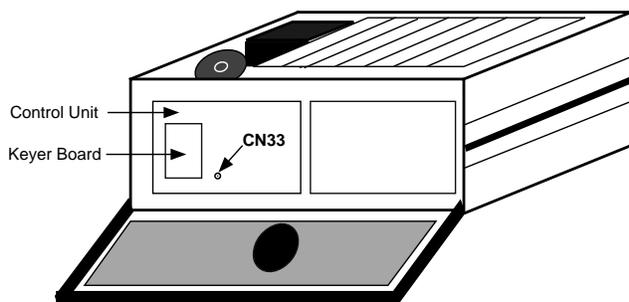
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This simple modification adds an auxiliary key line input to the TS-950. It does not affect rig functionality in any other way, as it uses a rear panel pin that is otherwise unconnected. The modification allows simultaneous use of the internal keyer and an external memory keyer/straight key/multi-mode controller/or "CT" or equivalent. After the modification, the rear panel KEYER control switch may be left on; you will no longer have to pull the rig out from its resting place to switch it again, nor will you have to change keying cables.

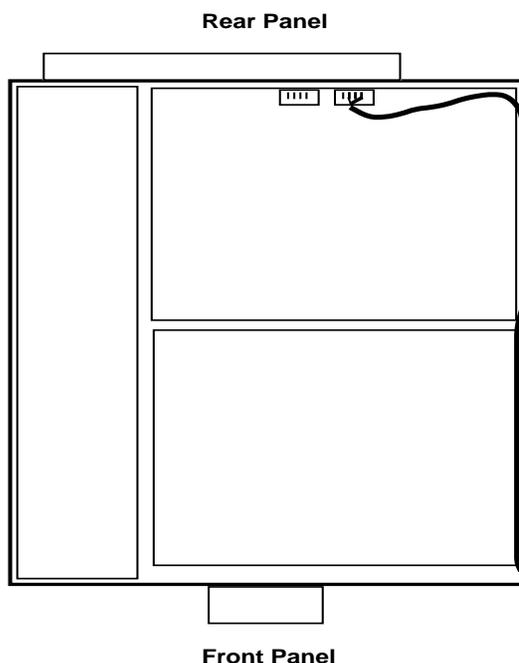
Why bother with the internal keyer? Good question. Like you, I have a fine keyer that I'm perfectly happy with. It is configured to interface with the multi-mode controller and the PC for contesting. However, the internal Kenwood keyer has a circuit that automatically compensates for the keying weight reduction malady the TS-950 is known for in QSK mode. Besides, it's there!

### Rig Modification

An investigation of the TS-950 Service Manual and a thorough search inside the rig show that the key line is accessible through connector CN33 on the Control Unit PC board. CN33 is an unused single pin connector, and can be used with either a push-on terminal or by direct soldering. Keying polarity is the standard positive-to-ground (key open = +5V, grounding keys the transmitter). The internal keyer output is of the open collector type, so directly paralleling an additional input is fine. The rear panel connector, ACC 2, a 13-pin DIN jack, has a few non-connected pins. Of these, Pin 2 is easily visible. Pin 4 is a chassis ground. Run a wire from Control Unit CN33 to ACC 2, Pin 2 inside the rig. Outside, install a 1/4" phone jack and shielded line to the 13-pin DIN plug that came with the rig. This is the auxiliary key line input. Activate the internal keyer by flipping the KEYER slide switch on.



TS-950 with covers removed and front panel tilted down showing the Control Unit PC Board, including CN33, and the keyer "daughter" board.



Rig bottom showing cable routing to ACC 2.

### Notes

Older TS-950s will benefit from a medium sized bypass capacitor across the key line: Dave, W6QHS, recommends 1 $\mu$ F. This varies a bit; one rig needed far more for a decent QSK waveform, and a late serial number unit with corrected keying got overly "weighty" with 0.33 $\mu$ F. **At least 1000pF to 0.01 $\mu$ F should be used for RF bypassing.** Solder the capacitor inside the rig, directly on the back contacts of ACC 2, between pin 2 and pin 4. See "Better QSK" for an improved method of keying waveform correction.

The internal keyer provides the before mentioned automatic QSK timing correction feature. It breaks from tradition in another way, also. Kenwood decided to change the dot/dash sense from the standard "bug" style system of dashes connecting to the tip of the 1/4" stereo plug, and dots on the sleeve. Kenwood is backward. Worse, you cannot simply re-wire the internal connectors so that all of your existing equipment remains compatible, because the dot line doubles as the main key input when the keyer is off. If you did, a straight key would not function when plugged into the paddle input jack (in case this was desired in the future). Diabolically, Kenwood routes the key input through the keyer IC, on the same IC pin as the dot input. The simplest solution requires making a 1/4" stereo phone plug to 1/4" stereo phone jack cable with the dot/dash wires crossed.

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