

X-Lock VFO Stabilizer

Installation for Kenwood TS-830S

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This article describes an easy method of installing the Cumbria X-Lock VFO stabilizer in the Kenwood TS-830S (also applicable to the TS-530S, see note) using the internal RIT function and normal varactor in the VFO. This method does not sacrifice the RIT or XIT function of the radio and requires no physical alterations of the native radio. The built and tested unit was placed on a metal bracket off the back of the counter unit over the filter caps (fig 1). In this location the remaining boards and plugs can be accessed if necessary.

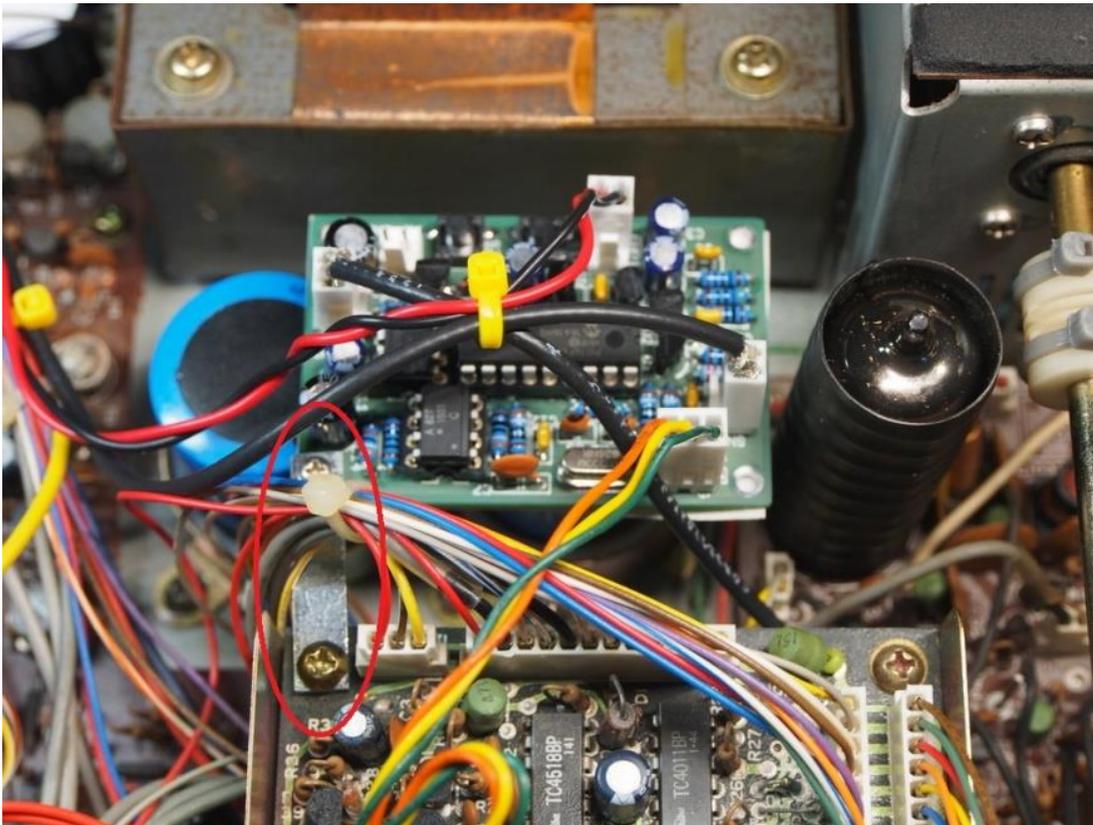


Fig 1. X-Lock unit behind Counter unit with bracket circled in red.

The power for the X-Lock was taken from the 12volt regulated output on the AF unit (Fig 2). The X-Lock will need 12vdc not the 9vdc common to Kenwood circuits.

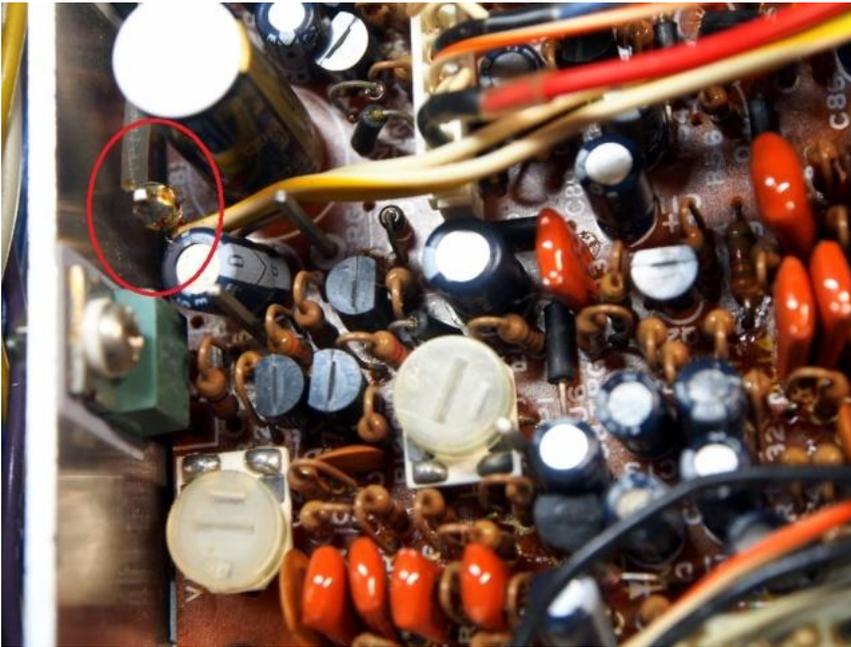


Fig. 2 12vdc access point on AF unit left front corner of board, above the normal 9vdc test point.

The RF sample needed for the X-Lock to function was taken from the External VFO plug at the back of the PLL unit. Plug 6 pin one and two. Pin two is the ground (fig 3). I used RG-174 coax for this connection. The coax was just inserted into the existing plug and secured with nylon wire ties. I choose this method to avoid removing or substituting the plug. In this fashion the external vfo function is still available.

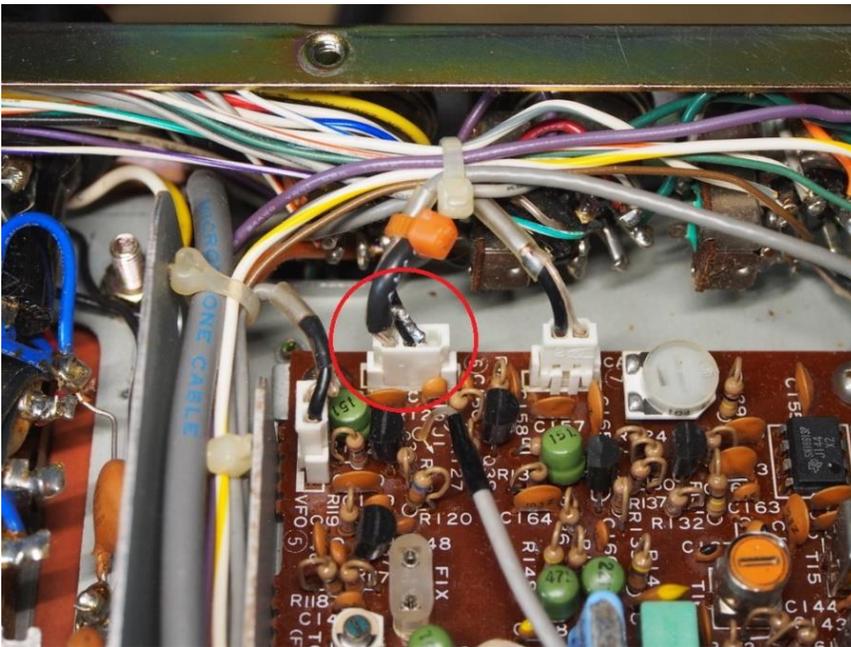


Fig 3. Back of PLL unit Plug 6 (red circle) with black coax inserted into the existing plug.

The output from the X-LOCK labeled VAR is directly connected to the RIT pin on the AF unit. This is plug 7 pin number 9 (Fig 4). I inserted the center conductor of a short run of RG-174 into the existing plug to contact the native pin. The shield of the coax was grounded to a nearby AF unit mounting screw.

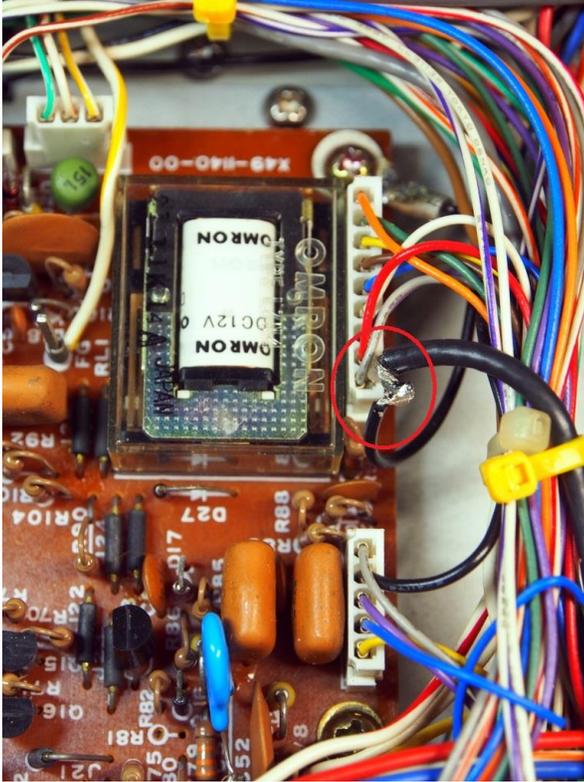


Fig 4. Pin 9 from plug 7 (black coax in red circle).

The RIT pin at this plug is used both by the 5k pot on the AF unit and the 5K RIT pot on the front panel. The front panel RIT push button 'on switch' just substitutes the front panel RIT pot for the one on the AF unit. The voltage generated from either one of these pots is normally routed to the VFO internal Varactor by the RIT line pin 9 to change the VFO frequency. The X-Lock generated voltage (about 3.5 volts at startup) is added to the existing RIT control voltage.

Adjustment required:

The RIT pot on the AF unit (VR2) will need to be readjusted to match the front panel RIT control. The normal method of alignment from the manuals is used. Center the front panel RIT knob. Adjust VR2 on the AF unit until it matches the RIT front panel when activated. This is necessary because the X-Lock adds voltage to the VR2 functionality.

The varactor components supplied with the X-Lock are **not** used in this installation. The VAR output from the X-Lock is connected directly to PIN 9 of the AF unit plug 7. Since the RIT pin is used by both the adjustment pot on the AF unit and the front panel RIT pot, both are controlled by the X-Lock VFO stabilizer without further modification.

I used the tri-color LED included with the X-Lock as a remote visual verification of current status. I used a twisted set of three wires and placed the remote LED behind the S-meter. The LED is held in place by nylon wire ties and positioned in the back corner of the S-Meter. No modifications to the S-meter or bracket was necessary. When the X-Lock is locked the green light (fig 5) is just visible in the corner. The red LED light (fig 6) is easy to see. In either case, the S-meter looks largely the same.



Fig 5. Happy X-Lock with green LED indicator.



Fig 6. X-lock after slight VFO movement to allow the Red LED to be seen.

Conclusion:

This method allows for X-Lock VFO stabilization using the existing RIT functions and internal Kenwood VFO varactor without sacrificing the RIT function. Minimal changes (that are easily reversible) are necessary. Only one adjustment is necessary to sync the RIT front panel control to the AF board VR2. The X-Lock is very quick to stabilize (2-3 seconds) the VFO even during switches to the RIT front panel function or between receive and transmit transitions. Normally the radio changes frequency during CW transmit. This is handled very well by the X-Lock.

Note:

The Kenwood TS-530S should work in a similar fashion. The only difference is the RIT pin for the VAR X-Lock output is located on the IF unit (Pin 3 on plug 13). The RIT adjustment necessary to sync the installation with the Front panel RIT is VR5 on the IF unit. Otherwise this should work the same. I have not tried this on one of my TS-530S radios yet.

