VFO-820 X-Lock Stabilizer

Simplified Installation for Kenwood VFO-820
Retains RIT Function

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This article describes an easy method of installing the Cumbria X-Lock VFO stabilizer in the Kenwood VFO-820. This version of installation retains the RIT function and uses a modern regulated adjustable step-up DC-DC converter to enable the use of the native 9 VDC supply of the VFO and radio to provide 12 VDC to the X-Lock without modification. I prefer to install the X-Lock in radios in such a way as to easily remove them for use in other radios and projects if necessary. I used the unmodified X-Lock stabilizer 3 for this project and a XL6009 DC-DC ADJUSTABLE STEP-UP POWER CONVERTER MODULE bought off of ebay for about $3.50 each. They have these specifications:

- Output Ripple：50mV (the higher the voltage , the greater the current , the greater the ripple)
- Load Regulation：± 0.5%
- Voltage Regulation：± 0.5%

The installation of the module only requires a few connections and no modifications of the VFO itself. The DC-DC module takes it's input voltage from PIN 9 (Or the "B" PIN of the VFO circuit board if you want the X-Lock only on when the VFO is ON) of the back panel VFO connector and is affixed to the back panel with double sided foam tape (Fig. 1). The input ground is taken from the chassis ground connector on the back panel. The voltage is adjusted with the multi-turn precision pot to obtain 12 VDC at the output prior to installation.

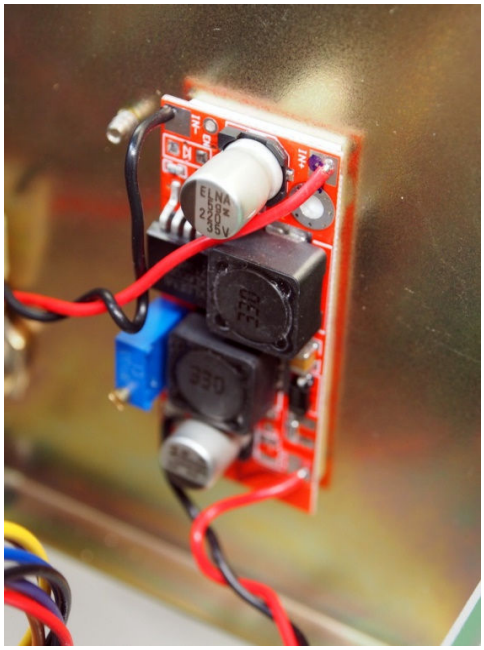

Fig. 1 DC-DC step-up module on back panel.

The X-Lock was mounted at the back of the existing circuit board in the VFO by one screw (Fig. 2). More elaborate mounted could be done but this seems to work and requires no modifications. The bottom panel can be removed as normal without altering the X-Lock or other new circuitry.

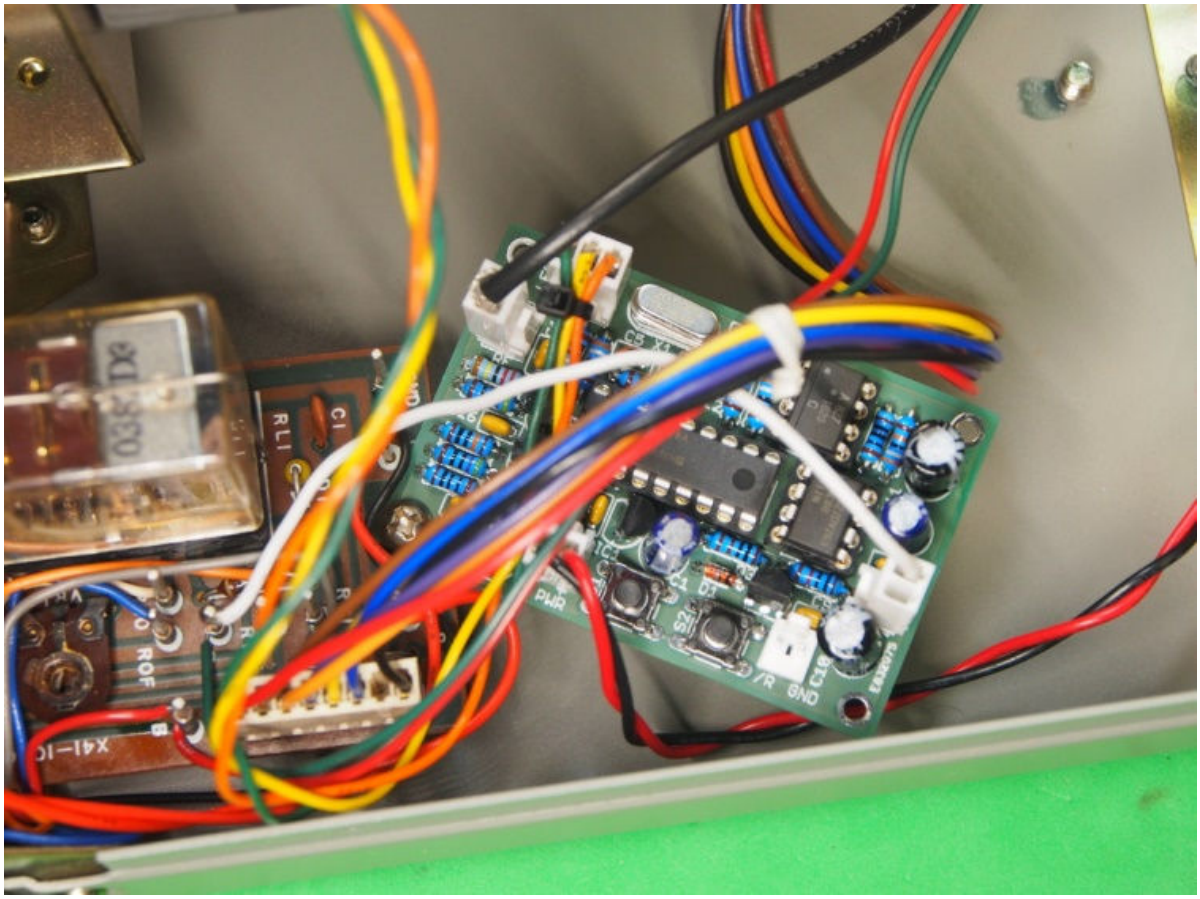

Fig. 2 X-Lock mounted to native circuit board with connections.

Power output of the module is connected to the PWR connector of the X-Lock. The RF sample for the X-Lock is taken from the vfo back panel connector PIN 1 and adjacent PIN 2 ground for the RG-174 used in this installation. The only other connection is a single wire from the VAR output of the X-LOCK to the RV3 pin (Fig. 3 White wire) of the native VFO circuit board that has the relay. This point is common to the VFO varactor input and the RIT input to the same varactor. This X-Lock installation utilizes the internal varactor of the VFO unit in the same way the normal RIT function operates. No matter if the VFO or RIT is functional the X-Lock will stabilize the VFO. The varactor components supplied with the X-Lock are **not** used in this installation.

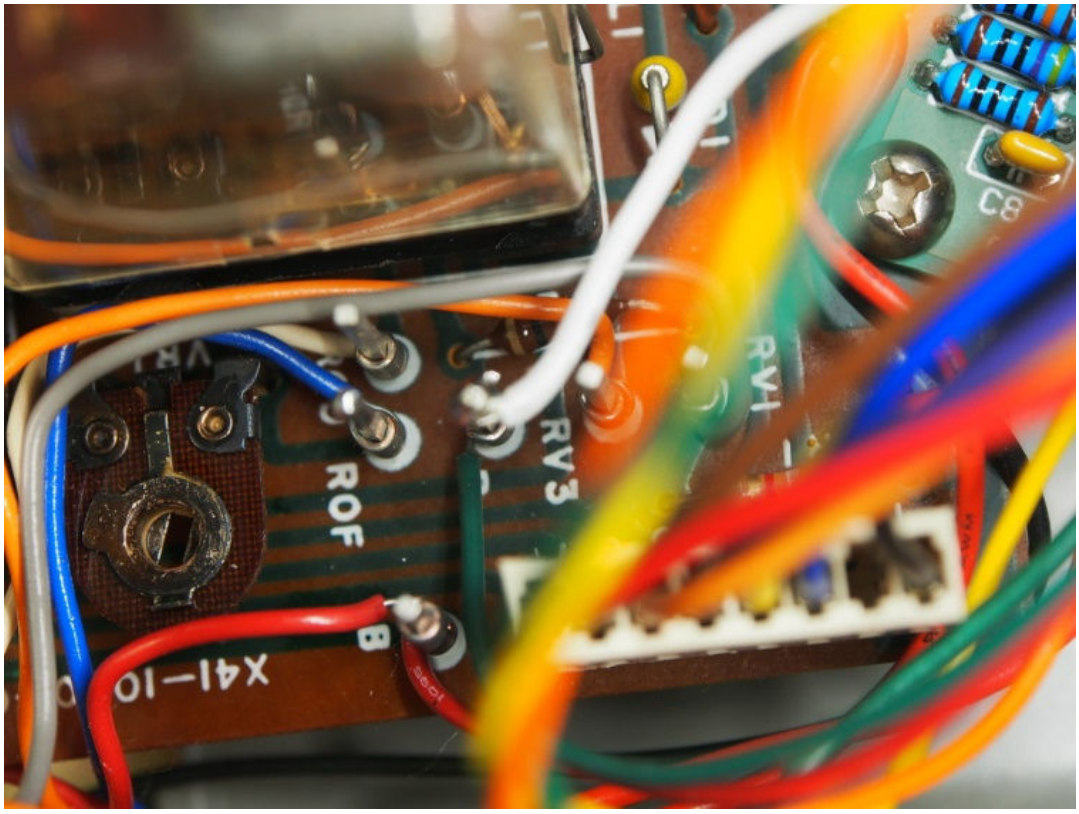

Fig. 3 White wire from VAR output of X-Lock to RV3 pin of the native VFO circuit board. VR1 also seen in this picture for adjustment of the RIT after installation.

The RIT pot (VR1) needs to be readjusted to account for the added voltage coming from the X-Lock after installation The VR1 is adjusted with the RIT off to get the same frequency as when the RIT is turned on with the Knob at center position. This can be done by "ear" or by monitoring the VFO output frequency. Once the adjustment is made, the VFO will have the same stabilized frequency with the RIT on or off. After 10-15 warm-up the VFO drift is only about 1-2 hz in the first two hours with my VFO. The VFO-820 should be cleaned and lubricated with Triflow or Corrosion-X prior to installation of the X-Lock to help stabilize the VFO to make the operation smooth. All friction points and VFO capacitor rotor were cleaned and lubricated with Corrosion-X in this installation. The VFO is very smooth and stays stable.

I used the tri-color LED included with the X-Lock as a remote visual verification of current status. A set of twisted three wires was used with the remote LED behind the gap for the light bulb at the VFO dial. The LED is held in place by nylon wire ties and positioned at the back corner.

The VFO-820 can also be used with the Kenwood TS-520S. This method of X-Lock installation should also be possible in the VFO-520 as well (shown below).

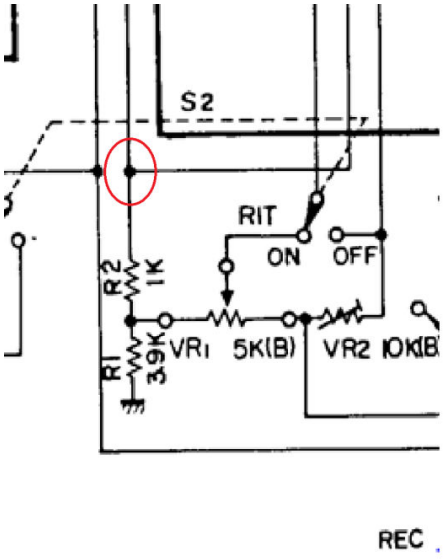

Fig. 4 VFO-520 schematic. VAR output of X-Lock to red indicated point.

VAR output from X-Lock would go to the indicated end of R2. This should be the common point for the VFO with or without the RIT function enabled. I do not have a VFO-520 for testing purposes.