

FT-980 MODIFICATIONS [Continued]

by Ray Pesek WB8NXR

Out-of-Band TX Modification for MARS Use. Examination of the synthesizer and rf circuits revealed that transmitting in a band segment not associated with ham use (such as above 4MHz) is possible through the use of a special YAESU-supplied and programmed AUX BAND ROM. Examination of the RF Unit revealed that space is supplied for up to three out-of-band rf bandpass filters. A letter to YAESU confirmed this assumption, with the note that this modification is not yet available. Since three segments cannot possibly cover all of the available MARS bands, I sought a way to enable the transmitter using the general coverage VFO. The modification is extensive, but not difficult for those who have an electronics background. But it is definitely not for the faint of heart. There are no "magic diodes" here as in the TS-430S.

Theory of modification:

The FT-980 uses two sets of RF bandpass filters, one set for ham band use and one set for general coverage use. During general coverage operation, the ham band filters are de-selected. Since the ham band filters also pass transmitter drive energy, the transmitter is very effectively inhibited. There is one filter for each ham band, which results in a higher order of out-of-band interference rejection. For general coverage operation, there are only six filters. One set covers 0-1 MHz, one for 1-2 MHz, one for 2-4 MHz, one for 4-8 MHz, one for 8-16 MHz, and finally one for 16-30 MHz. The wisdom of this set-up can be easily seen by selecting a 160 meter frequency on each VFO, and alternating between the HAM VFO and the GEN VFO. The signals will be much stronger on the HAM VFO. This modification uses one of the spare bandpass filter slots to provide transmitter drive when operating on the GEN VFO. The receiver still uses the standard filters, and the HAM VFO still uses the ham band filters. On the final amplifier end, the ten meter low-pass filter is used for all frequencies when using the GEN VFO. When this modification is complete, the transmitter will still deliver a full 100 watts between one and 30MHz.

Parts Required:

2 ea chokes (L58/T24)
2 ea .01 uF miniature ceramic disc caps (C131/C132)
1 ea 100 ohm 1/4 watt resistor (R60)
1 ea 22 uF 25 vdc capacitor (C130)
1 ea 68 pF ceramic disc capacitor (C129)
2 ea switching diodes (D42/D43)
[A kit [980 MARS] of above parts is available from the Club for \$5 including shipping.]

1. Remove the RF Unit PB-2389A from the radio.

2. On the rear of the board, you will find a diode inside a long piece of green tubing. This diode will be connected between the anode ends of diodes D01 to D04 and between Q28. This diode is not shown on the schematic and is used to remove the 13.5 volt power from the Power Amplifier when the GEN VFO is selected. Remove this diode.

3. Remove and save diodes D73, D74, D75, D76, D77, D78 and D79.

4. On the rear of the board, add a diode (one of the removed ones) between Q28 pin 12 and Q28 pin 6 with the anode of the diode connected to pin 12.

5. Cut the circuit trace connected to pin 5 of Q29.

6. Cut the circuit trace connected to pin 4 of Q29.

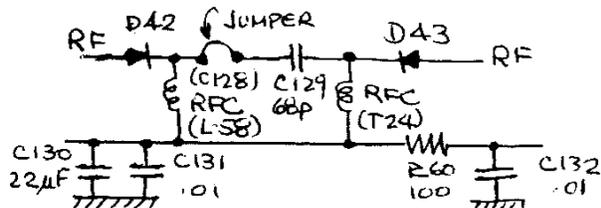
7. Add a diode between Q29 pin 12 and Q29 pin 4 with the anode of the diode connected to pin 12.

8. Add a diode between Q28 pin 12 and Q29 pin 5 with the anode of the diode connected to pin 12.

9. Add a diode between Q29 pin 12 and Q31 pin 7 with the anode of the diode connected to pin 12.

10. Towards the bottom of one edge of the circuit board, extra space can be seen where the YAESU "AUX BAND" Bandpass Filter components would be added. Add the following parts into the same positions as shown on the schematic:

- R60 (100 ohm 1/4 watt resistor)
 - Diodes D42 and D43
 - L58
 - C129 (.68pF ceramic disc). [This is a different value from what is shown on the schematic]. See NOTE 1.
 - C130 (22uF 25 vdc capacitor)
 - C131 and C132 (.01uF miniature ceramic discs)
 - Install a jumper wire in place of C128
 - Refer to the schematic for the placement of the remaining choke. Place one lead of the choke in the hole which is provided for the "bottom" lead of T24. This is the hole which is connected to R60. Place the other lead in the hole which is provided for the "center" lead to T24.
- NOTE 1. When placing C129 make certain that the lead which would normally be placed in the "center tap" hole of T23 is actually placed in the hole provided for the "top" of T23.



If you have placed all components properly, the configuration shown below should match that on the circuit board.

j. Install the RF Unit into the radio after double checking all connections.

Power-On Checks:

1. Receiver operation on any band and either VFO should be unchanged.
2. Q31 pin 7 - This pin should be "high" on any frequency using the GEN VFO. It should also be "high" on the 24 and 28/29 MHz bands with the HAM VFO.
3. Q29 pin 13 - This pin should be "low" for any frequency using the GEN VFO and should be "high" for any frequency using the HAM VFO. As a double check, the voltage on the Q29 side of R-60 should produce the same readings.
4. If these checks are OK, fire it on up. A slightly different setting of the drive knob may be required for full output.

NOTE: The HAM VFO should still be used for any frequency which can be covered by it. This will insure maximum out-of-band rejection for the receiver and possibly a slightly better transmitter SWR.

FILTER CASCADING FOR THE FT-301 [Cont]

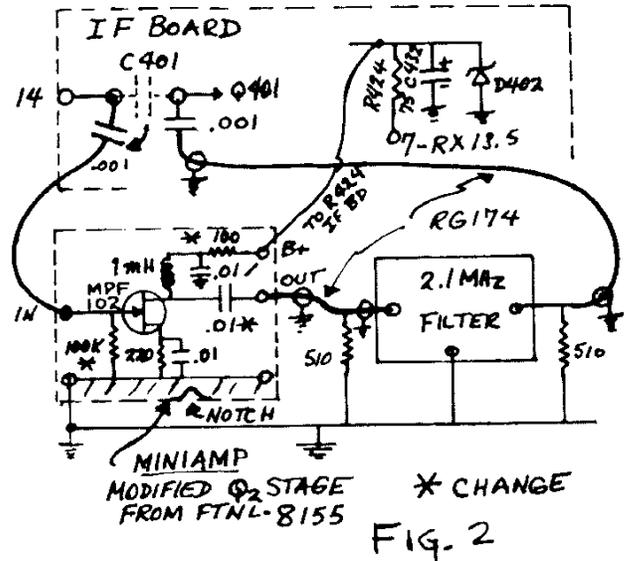
by Bill Good W2CVI, et al

This is a continuation of the article published on pages 8354/55 in which a simple method of filter cascading was described. Its principal disadvantage was that it disabled the Noise Blanker. If this capability is important, the following achieves cascading in a somewhat more complex installation without affecting Noise Blanker operation. N4ML.

Modification For Location #2

This modification is for those who wish to maintain the NB function and also keep the AM filter position in use (AM or narrow CW). In AM the bandwidth will be limited by the new 2.1 kHz filter. This modification requires a Mini-Amp (FT #8B3-1) for isolation between the two filters.

1. Modify the Mini-Amp board by:
 - a. removing the 1000 ohm potentiometer and replacing it with a 100k 1/4W resistor between the holes where the outer terminals of the potentiometer were attached.
 - b. Place a short jumper between the gate lead and the top of the 100k resistor.
 - c. Remove the output coupling capacitor on the Mini-Amp and replace with a 0.01uF capacitor, Fig. 2
2. File a notch in the wide ground trace at the bottom edge of the Mini-Amp. Mount the Mini-Amp at the edge of the IF Unit (PB-1436D) by soldering the foil at the notch to the bridging ground wire, near C401, on the component side of the board, see Figs. 2 and 4.
3. Remove one lead of C401 from the input of Q401 and resolder to the Mini-Amp transistor gate.



A short piece of wire may be necessary. Keep C401 close to the board.

4. To supply the Mini-Amp with power (Rx 13.5V) attach a small wire to R424 (75 ohm) on the end away from connector pin #7, see Fig. 2. Do this on the foil side of the board. Route the wire around the edge of the board by the Mini-Amp. Connect to a new 100 ohm 1/4 W isolation resistor which has been soldered to the positive (+) terminal of the Mini-Amp.

5. Solder the center conductor of a 7 inch piece of RG-174 to the output terminal of the Mini-Amp. Solder the braid lead to the Mini-Amp ground foil.

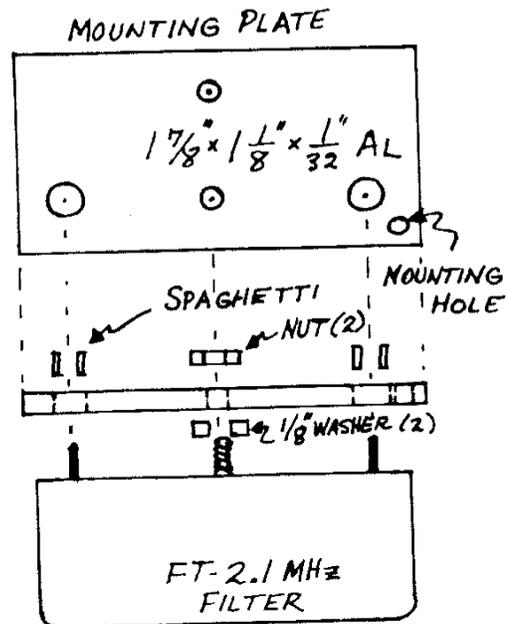


FIG. 3