

# FRG-7 MOD-1 Kit



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**TECHNICALLY SPEAKING:** This modification is in two parts. The first is to adjust the agc release time and the S-meter swamping. These effects are obvious from the sluggish action of the S-meter and the de-sensitizing of the receiver as you rapidly tune across the spectrum.

The second part is to substitute a 15-section ceramic ladder filter for the original equipment 6-section filter. This reduces the nose bandwidth from 6 kHz to 4 kHz and the -60 dB bandwidth from about 20 kHz wide to about 10 kHz wide. In addition, the 455-kHz i-f stage gain is increased by a change in emitter resistor value and substitution of a ceramic filter for the emitter bypass capacitor.

**UNPACKING:** Your FRG-7 Mod-1 Kit should contain a MuRata CFS-455-I filter on lead extenders, a MuRata BFB-455-D emitter bypass filter, two resistors (36 and 68 ohms) and two miniature electrolytic capacitors (22 ~~uF~~ uF.).

**REMOVING the ORIGINAL PARTS:** Although the following procedure is not difficult, it does require your having some method at hand to carefully de-solder (either a wick or a solder sucker mechanism) the filter and various components. A small tip low-wattage soldering iron is also required--which must be used very sparingly as excessive heat will affect adjacent components. In de-soldering, as well as in soldering in the new components, use the least amount of heat necessary to insure a good electrical connection.

Disconnect the receiver from the power line and from its antenna. Remove the 7 gray Phillips head screws (3 topside, 2 on sides and 2 on the bottom) and the 2 hex screws at the rear bottom of the cabinet. For ease in removing the cabinet it may also be necessary to remove the two rear feet. Slip the chassis free of the cabinet and familiarize yourself with the areas of concern as shown in Photos "A" and "B".

*If you are ONLY interested in improving the selectivity, not changing the agc release time and S-meter swamping, you may eliminate the first three steps.*

**STEP 1:** Locate the shielded (usually colored blue) lead with the white insulated center conductor that comes from the S-meter to PC board PB-1528. Note the 100 uF capacitor (C5) soldered from the center lead (+ side of the capacitor) to one of the grounded PC board foil patterns. De-solder, or clip, this capacitor and discard. This capacitor controls the S-meter swamping and is too high in value.

**STEP 2:** De-solder the leads of capacitor C426 shown located between the point of the arrow in Photo "A". Pull the capacitor free (see Photo "C") and make sure that the two holes are free of solder. This capacitor controls the agc release time--which needs to be halved for good agc control and release while DX'ing.

**STEP 3:** Insert the leads of the new 22 uF capacitor in the holes left by removal of C426.

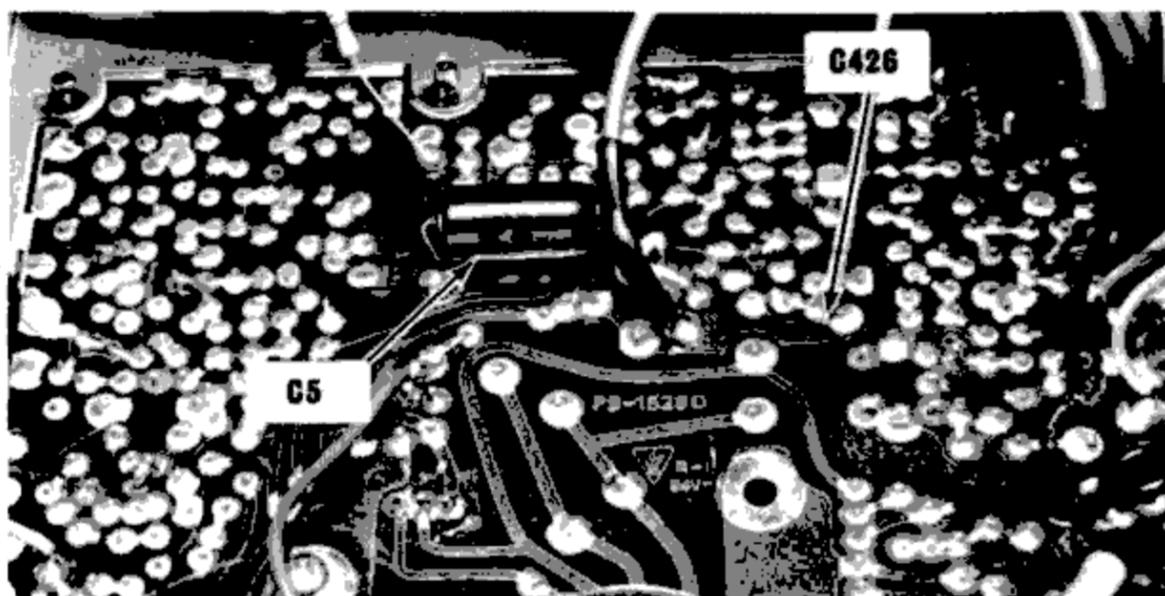


PHOTO "A" Look for this area under the chasis on PC Board 1528. Up is toward the front panel. The shielded lead in the center comes from the S-meter.

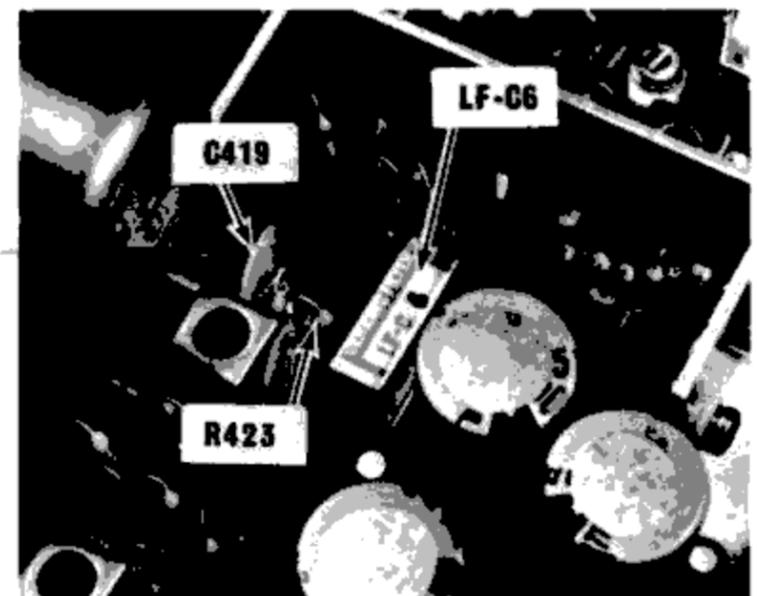


PHOTO "B" From the top of the PC board remove the three components indicated here by the arrows.



PHOTO "C" After de-soldering the leads of C426 from the PC pattern it is pulled free of the chassis.



PHOTO "D" The new MuRata CFS-455-I filter is soldered to the PC foil so that it hangs upside down. Note the new position of the C5 substitution capacitor.

In some Mod-1 Kits an axial lead capacitor may be substituted for a radial lead capacitor. If so, the negative lead will be pre-formed and you need only be careful to correctly insert the + side of the capacitor in the PC board marked + position. Solder in the new  $\mu$ F capacitor (see Photo "D") in its new position with the + lead to the meter lead. Clip off any excess wire from the new C426.

STEP 4: De-solder the 4 pins to filter LF-6C that were hidden under the original location of C5 (some older receivers may have C5 in the "new" location of Photo "D"). Don't forget to de-solder the shield can lead between the two ground leads of LF-C6. When the solder is removed the old filter can be pushed free and the holes cleaned of any residual solder.

STEP 5: De-solder capacitor C419 and resistor R423 (leads shown in Photo "E"), pull both components free and discard. Clean out the holes and in place of C419 insert the leads of the red BFB-455-D ceramic filter. In the holes of R423 insert the pre-formed leads of the 36-ohm resistor (orange/blue/black/gold). Solder the filter and resistor in place. Clip off excess lead of the new R423.

STEP 6: From the bottom of the chassis carefully insert the 5 leads of the new ceramic filter--the ground leads are all in line--and push it upwards until it's positioned approximately as shown in Photo "D". Carefully solder in place being sure not to create bridges. Turn the receiver chassis over and clip off any excess wire from the 5 leads.

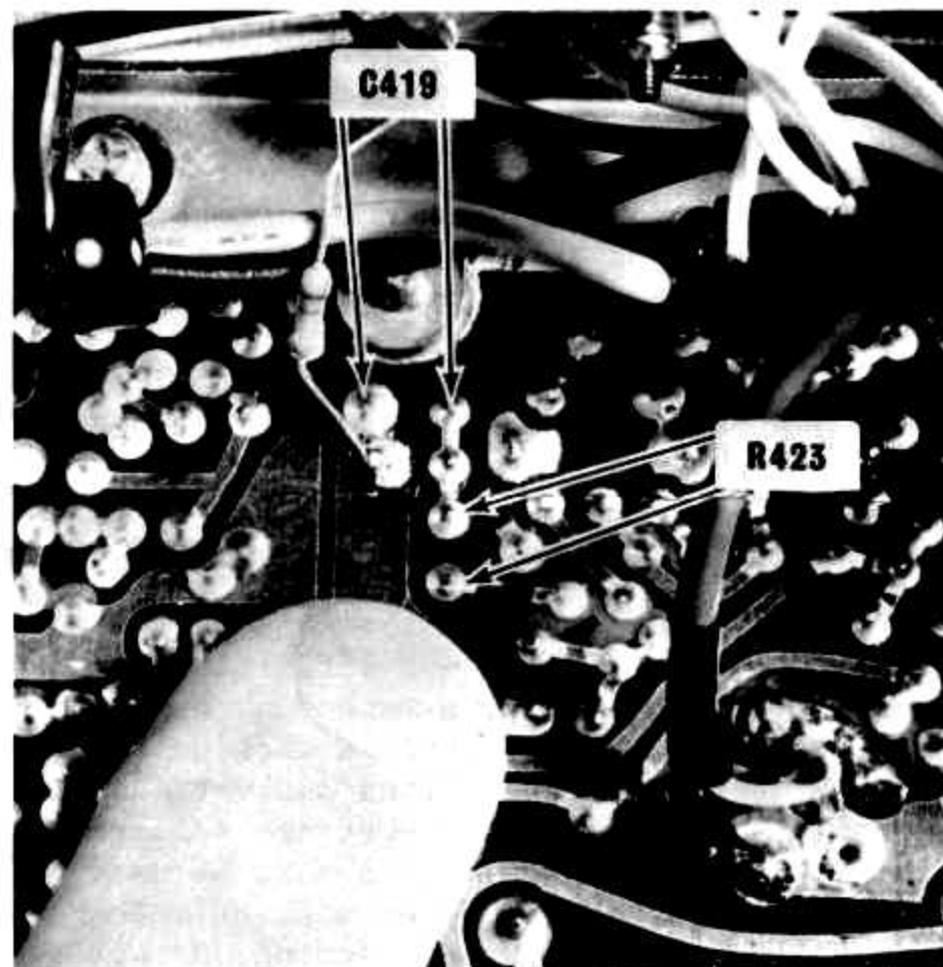


PHOTO "E" Gain of the 455-kHz i-f stage is a function of the emitter biasing circuit. To compensate for the very minor loss of gain in the i-f stage, remove R423 and C419, shown here by the arrows. In adding a ceramic filter to the emitter it will further improve skirt selectivity.

This completes the modification of your YAESU FRG-7 receiver. If all parts are placed and carefully soldered, your receiver should now have excellent selectivity, better agc release and better S-meter, albeit still not linear, characteristics.

(NOTE: In a few FRG-7 receivers the beta of Q405 may be excessively high and the substitution of a 36-ohm resistor for R423 may make it "howl" on very strong signals. If this happens, remove the 36-ohm resistor and substitute the 68-ohm resistor (red/gray/black/gold).

## IMPROVING NOISE LIMITER PERFORMANCE

The clipping level of the FRG-7 noise limiter is controlled by the value of capacitor C433 (0.01 uF) and is nominally about 15%--much too low for effectiveness. Increasing the value of C433 will raise the clipping level of this simple series diode limiter circuit.

The location of C433 is clearly marked on the top side of the audio/BFO/IF printed circuit board (near the right hand edge looking in from the front). You can either de-solder C433 and discard, or shorten the leads of the new supplied 0.033 uF mylar capacitor and then tack-solder it to the foil pattern (under the board)--paralleling the 0.01 uF capacitor. The latter method is preferable.

If you remove C433 and substitute the 0.033 uF capacitor, the clipping level will be raised to about 30%. If you parallel the two capacitors the clipping level will be approximately 40%. Neither clipping level will distort weak or medium strength signals.

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