

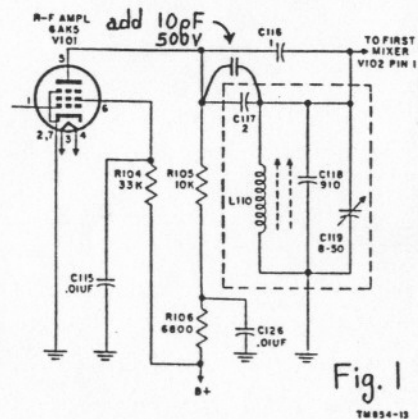
M54-1-1

51J-/R-388 Band 1 Mod And AGC Mod

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In my article, "Collins 51J-4 Review," *DX News* 56, 1 (Mon., Oct. 3, 1988), pages 6-8, I mentioned that the Collins 51J- series and R-388 receivers were insensitive on band 1, and suggested a band 1 mod and AGC bias mod to improve band 1 sensitivity. However, in a subsequent article, "Collins 51J-4 Technical Notes," *DX News* 56, 13 (Mon., Dec. 26, 1988), pages 29-32, I recommended against those mods after I discovered they degraded dynamic range on all bands.

Recently, I took another look at the band 1 sensitivity issue. Previously I had remarked that a carefully aligned 51J-/R-388 series receiver is not seriously insensitive on band 1, but merely somewhat less sensitive than on the other bands. Specifically, typical sensitivity is 0.25 microvolts on bands 2-30 and 1.0 microvolt on band 1 (for a 10 dB S+N/N ratio and 6 KHz bandwidth). I knew that improving band 1 sensitivity slightly on band 1 would not make it possible to hear more and better DX. Nevertheless, uniform sensitivity is desirable because it simplifies optimization of antennas, which is an important factor in determining what DX you hear. Also, I was curious if band 1 sensitivity could be made about the same as for the other bands without degrading band 1 dynamic range. The solution turned out to be simple. Add a 10 pF 500 volt mica capacitor across C117; see the simplified schematic in Fig. 1.



The simplified schematic in Fig. 1 is taken from an R-388 manual, but applies to all 51J- series receivers. The dashed line enclosing C117, L110, C118, and C119 is not accurate because those components are not contained in a shielded enclosure. In particular, C117 is attached to solder lugs on adjacent bandswitch wafers. It is not easy to access C117 because of its position beside an L bracket and because of two insulated wires which pass through one bandswitch wafer and are soldered to lugs on the other bandswitch wafer above one end of C117. These two wires must be unsoldered, disconnected, and pushed out of the way to access one end of C117.

The dynamic range before and after this mod was the same - 73 dB (5 KHz spacing), which is 4 dB better than an NRD-525. Sensitivity was improved to 0.35 microvolts, which is almost the same as for band 2.

After using a 51J-4 for almost 2 years I must say that it has extremely poor AGC for such an otherwise fine receiver. The AGC suffers from the worst kinds of defects one could imagine - low frequency audio on the AGC line, which causes noticeable audio distortion on very low frequency audio (below 100 Hz), and attack and release times which are not suitable for MW graveyard and SW DXing. Fortunately, there is a simple cure for both of these problems (if you don't care about SSB or CW). Add a 1 mF 250 volt capacitor across C205B; see the schematic fragment in Fig. 2. In the original circuit, the release time is determined by R144 and C205B according to the formula $T = RC$, where R is in ohms and C is

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Farads (the result T is in seconds). Thus, the original release time is about 50 milliseconds. Adding a 1 mF capacitor across C205B increases the release time to about 550 milliseconds, which is satisfactory for MW and SW AM broadcasts. This mod does slow the attack time from about 5 milliseconds to about 50 milliseconds, which makes the receiver less suitable for SSB and CW. If you want both improved AM and SSB/CW AGC performance, you will need to do my fast attack and slow release AGC mod. Send me an SASE for details of this more elaborate mod.

