MSS-1-1

Collins F455FD Mechanical Filter Mod
For The Hammarlund HQ-180(A)

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(c) August 1990

I have used a mechanical filter immediately after the first mixer in an HQ-180A for many years. My article "'180 + Collins F455FA40 Mechanical Filter = Super-'180" which appeared in DX News a number of years ago explained how to use any of the Collins FA or FB filters with a Hammarlund HQ-180(A). Since then I have used R-390A N-type filters with the same mod, except (naturally) the input and output filter resonating capacitors were different. I always wanted to try a F455FA60 filter because its 6 KHz bandwidth permits all the HQ-180(A) bandwidths to be used. However, I never found an FA60 filter at a reasonable price, and I was unwilling to pay the $260 + retail price for a factory fresh filter.

Recently I obtained some Collins F455FD58 filters at a reasonable price on the military surplus market, with the obvious intention of trying to use one in an HQ-180(A). A disadvantage of the FD filters is that they require a 2000 ohm source and load. If they were used directly in the circuit I developed for FA, FB, and N filters, there would be excessive signal loss and terrible bandpass ripple. Fortunately, there is a simple solution to the bandpass ripple problem which also avoids most of the signal loss. The "before" and "after" simplified schematics are shown in Fig. 1. The schematics are simplified in the sense that the bandswitching required for switching to the 3035 KHz IF for bands 5 and 6 is not shown. As can be seen in Fig. 1, at the input I used a standard L network to match the 100K source impedance of T1 to the 2000 ohm source resistance required by the FD filters. At the output I used a 2000 ohm resistor in the AGC feed to provide the output termination required by the FD filters. There is some signal loss in the L network, which I recovered by changing the cathode circuit of the 6BA6 gate. The 1100 pF input and output resonating capacitors are for the FD58 filter only, and are not suitable for the other FD filters. The following table gives the complete lineup of FD filters, Collins part numbers, and resonating capacitors. Any of these filters will work in the circuit of Fig. 1 since all have 2000 ohm sources and loads. Of course, the narrower bandwidths should not be used for voice reception.

Filter Type	Collins Part No.	Resonating Cap.	Min. 4 dB BW	Max. 60 dB BW
F455FD-04	526-9689-010	350 pF	0.375 KHz	3.5 KHz
F455FD-12	526-9690-010	350 pF	1.2 KHz	8.07 KHz
F455FD-19	526-9691-010	330 pF	1.9 KHz	5.4 KHz
F455FD-25	526-9692-010	510 pF	2.5 KHz	6.5 KHz
F455FD-29	526-9693-010	510 pF	2.9 KHz	7.0 KHz
F455FD-38	526-9694-010	1000 pF	3.8 KHz	9.0 KHz
F455FD-58	526-9695-010	1100 pF	5.8 KHz	14.0 KHz

All of the components following R107 up to the 0.01 filter output coupling capacitor in Fig. 1 were enclosed in a small metal box. Parts were mounted on a small printed circuit board, with a metal partition through the center of the box to shield the input of the filter (and associated parts) from the output of the filter. Miniature RG-187A/U Teflon coax was used to connect the filter box to the HQ-180A. The box was mounted on the bottom side of the chassis beside the L-bracket which supports the BANDWIDTH and U/L/BOTH switch assemblies.

The remaining parts replaced HQ-180(A) parts, and so existing tube pins and terminal strip lugs were used as tie points. The orange wire which connected the bottom of R99 to the second section of the RF gain control (R15) was removed, and the bottom end of the 180 ohm resistor was grounded.

In my opinion, a 6 KHz bandwidth filter is ideal for the HQ-180(A).

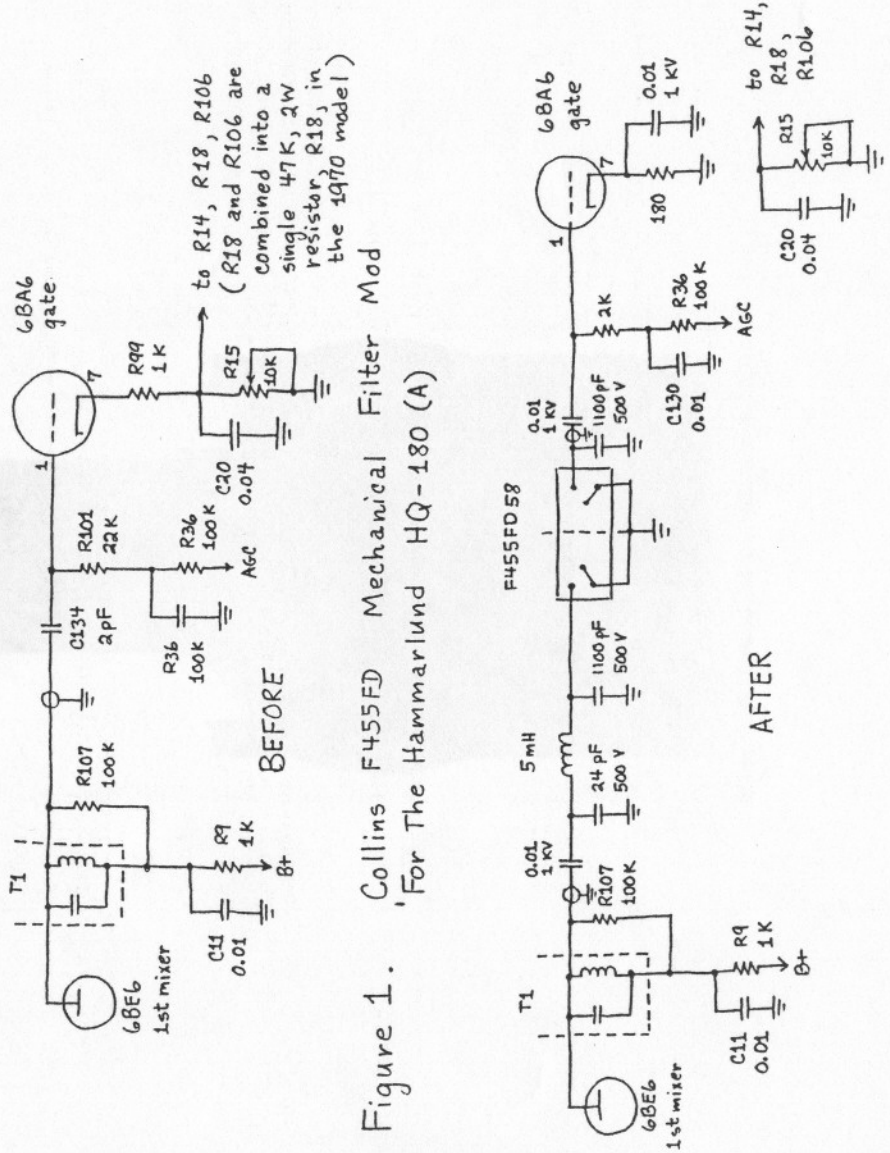

Figure 1. Collins F455FD Mechanical Filter Mod For The Hammarlund HQ-180(A)