Switchable IF Bandwidth for the DX-394

Tom Holden VE3MEO November 17, 2002

The modification described in this article allows the user to select between the wide AM filter and the narrower SSB/CW filter in any mode. Thus for clear, strong signals, the listener can enjoy better sounding audio. The narrower filter can be selected to discriminate against interference. In the author's experience, this ability to choose is much preferred to prior modifications that resulted in the loss of the wider bandwidth.

The Radio Shack DX-394 has two filters in its second IF stage, one for AM reception and one for SSB/CW reception that are automatically selected by the mode switch. Both are relatively wide for their intended modes. While it is impractical in this receiver design to use a much narrower filter for SSB/CW¹, such is not the case for AM. A replacement filter has been available commercially from Kiwa² and two modifications posted by Frank Cathell to the Usenet Newsgroup rec.radio.shortwave advocated using the narrower SSB/CW filter for AM. One removed both filters and reinstalled the SSB filter in place of the AM³; this disabled SSB/CW functionality unless a second mod was done. That led to his subsequent version that was physically easier to implement – simply apply an unswitched voltage to the diodes that select which filter is active so that the SSB filter is active in all modes⁴.

The subject of this paper is a schematically simple variant of Frank's modification that adds a SPST switch to apply or remove the control voltage so that either filter can be used with any mode. Credit goes to Frank for his original ingenuity and for words that have been paraphrased below.

The modification is shown on the accompanying excerpts of the schematic and the main printed circuit board layout. The full pcb layout can be found on this site. At over 1.1MB in size, it is too large to include in each modification article.

¹ The centre frequency of readily available filters is too far removed from the BFO frequencies of 451.5/458.5 kHz. For more, read Holden, Tom: *Understanding the Principles of DX-394 Frequency Tuning*, 21 September 2002, <u>RADIOSHACKDX394 Forum</u> or <u>www.mods.dk</u>.

² <u>Kiwa Electronics DX-394/LFH-4S Price: \$20.00US</u>

³ Frank moved the SSB/CW filter in place of the stock AM filter as reported to rec.radio.shortwave on <u>1998/02/08</u> after having replaced the former with a sharper Murata filter with less than happy results. Later, he would describe substituting the SSB filter for the AM one as the poor man's Kiwa, with almost as good performance.

⁴ See Frank's posting to rec.radio.shortwave on <u>1998/09/11</u> entitled *More Mods for that "awful" DX-394*.

Figure 1



To perform the mod, remove resistor R102 (2.2K) completely. Removing surface mount devices is tricky; use solder wick (fine copper braid) to draw away most of the solder. It will be easier if you have an iron that can simultaneously heat both ends of the resistor; otherwise, alternately heat the ends while gently prodding it with a toothpick.

Now solder one end of a 2.2K, 1/8 watt axial leaded resistor to the C57/R60 junction end of where R102 was. The other end of the resistor is wired to a SPST switch mounted on the front panel⁵ and from there back to the receiver's 7 volt bias rail that is produced at the emitter of Q10.

The 'narrow' filter is selected when the switch is closed; the wide filter when it is open.

⁵ See Holden, Tom: *Adding Front Panel Switches to the Radio Shack DX-394 General Coverage Receiver*, 27 July 2002, in the <u>RADIOSHACKDX394 Forum</u> and at <u>www.mods.dk</u>.

Figure 2

