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Options On the IF

The IF (intermediate frequency) bandwidth of your receiver is determined by the "Q" of the circuits, IF transformers (cans), ceramic or crystal filters and the number of them. The better they are, the narrower the width. A *perfect* receiver would have specs of 500 Hz. at 6 dB., 1 kHz at 60 dB. for CW (code), 2.4 KHz at 6 dB., 3.1 kHz at 60 dB. for SSB and 4 kHz at 6 dB., 4.7 kHz at 60 dB. AM. I say perfect in the realm of the possible. The ideal receiver would have no differential at all. As it is, the figures stated are just shy of a million to one.

The most expensive single component -- sometimes

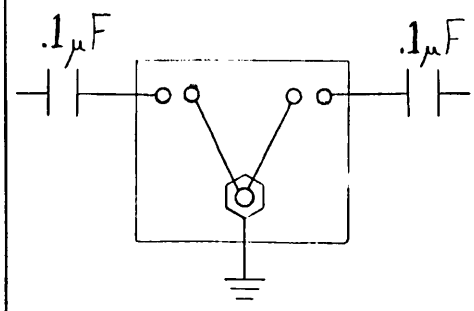
In a ham transceiver, the crystal filter is the most expensive single component. Unfortunately, in a shortwave listener's receiver, the filter is no more expensive than an IC or other discrete part, usually about 3 to 5 dollars. If you think the manufacturers believes you will never know the difference, you're right! They also want the sets to be easy to tune, damn the interference.

Now to read it. If your receiver uses an NTK LFC-3 -- rather common -- this means the bandwidth is 3 kHz at 3 dB. (half an "S" unit) and about 12 kHz at 50 dB. The Murata CFU-455H is the size of a child's game dice (as opposed to the NTK which is about 1/3 the size of a domino). It's specs are roughly the same, except it "mushes out" to around 15 kHz. The CFW units are twice the size of the CFU and are a bit tighter.

I think you know what I'm going to say. The smaller the number and higher the letter, the tighter the filter. For instance, an LFC-2 or a CFU/CFW I cuts the width almost in half and you don't lose anything except your interference. All you need is solder wick and a steady hand to replace the unit.

Ike Kerschner's dual crystal filter modification on page 80 of the February, 1988, *Monitoring Times* is an excellent way to go for those with older tube type and inexpensive solid state radios such as the DX-150. Otherwise, one needs to go for a ham/commercial grade filter which sells for $100.00 UP.

Fig 1: Filter Installation



Filters are available

Such filters can be found at Fox Tango, P.O. Box 15944, W. Palm Beach, FL 33406 in the FT-44A. This is an 8 pole crystal unit at 455 kHz, made for the Icom R-71A after market. The specs are 2.4 kHz at 6 dB. and 3.1 kHz at 60 dB. This is about as close to a doorway as you'll ever get. The filter is large, about 2"x1"x1" and will *not* fit in a small portable. Suggested installation for universal application is shown in figure 1.

Passband tuning, or "IF shift" is a simple way to run around and pick and choose the one of several signals present in the IF strip. It's somewhat frequency dependent in that the technique works better at an IF frequency above 455 kHz.

Figure 2 shows what may be expected and figure 3 is a common circuit in the first IF. It uses a varactor diode in the secondary of the IF transformer and the coupling to the next stage is done via the capacitor. This creates a "peaking" effect, shunting the unwanted area to the side. Another way to go is with a "Q multiplier."

This is a high gain circuit attached to the IF that boosts the "Q" factor by several thousand before it goes into oscillation. Heathkit made a good one for many years, but stopped in the 1960s. God only knows why, as it is a cheap and clean way for a quantum improvement. Parts placement is critical and in all of my "cookbooks" I couldn't find an easily duplicable circuit. In other words, I don't need a hundred letters telling me that "all it does is squeal."

I intend to work on the problem, and if anyone has a good circuit and is nice enough to send it to me, they'll sure get all the credit when I write it up!

To summarize, selectivity is the factor to describe the bandwidth, or "window" your receiver will accept. If it is very wide, it lets the whole crowd in. On the other hand, if it is narrow, you only hear the signal you want, presuming there isn't another station on the *same* frequency -- then, it's tough.

Enjoy. SASE for questions, please.

mt

Fig 2

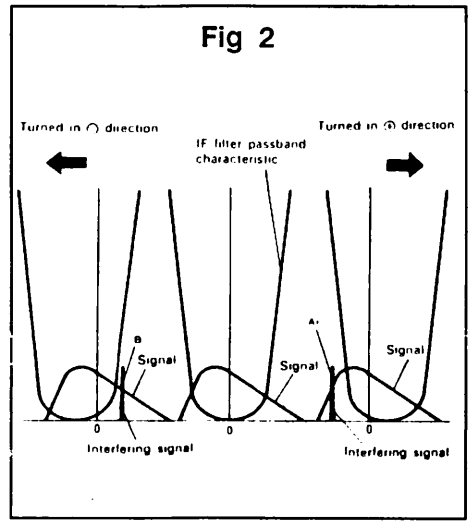


Fig 3