Deluxe Code Reception--VU2 Style!

BY R. JAYARAMAN,* VU2JN

SOME OF my good W/K ham-friends have remarked: "Jayaram! The Eu QRM is so bad today, you must be having a tough time copying me through the QRM with your S-40A!" I am tired of that remark and I have finally decided to let all hams know the "secret" of my receiving technique.

Hams in the U.S.A. are probably unaware of the fact that the biggest stumbling block to the growth of amateur radio in India is the non-availability of amateur communication receivers. There are several hams in India who are working DX with a domestic receiver and an outboard BFO. I know some hams in the U.S.A. are willing to donate old receivers to Indian hams, but unfortunately our customs regulations are very, very stiff.

As soon as I got my ticket in 1964, I began the customary frantic search for a receiver. I thought I had stumbled into good luck and felt elated when I was able to buy, for 150 rupees, an S-40A with burned-out power transformer from a U.S.-returned engineer. (Although we are told that 1 U.S. dollar = 7.50 Indian rupees, readers can take it that 1 rupee is as dear in India as 1 dollar in the U.S.A.). The transformer was quickly rewound and I was the happiest man on earth when I worked a W-station on 14 MHz.

The Problem

Only after I started working W/K stations did I slowly realize the primitiveness of my set-up. There were more images than signals on 14 MHz., and stations which I could hardly copy were giving me reports of 579 or so. For a while I timidly resorted to the Novice's tactics of delaying my reporting to the second over! (This is known in VU2-land as the (n+1)-system of reporting to W-hams.)

With a self-oscillating mixer and no VR-tube, my receiver just could not cope with DXing on 14 MHz. An added problem was, and still is, voltage fluctuation and poor regulation in the line. Although the shack was fed from a separate fuse-point, when the XYL switched on our 1500-W cooking oven in the kitchen, the line voltage dropped by 18 volts and the receiver drifted by several kHz. I added a VR-150 and provided regulated voltage to the screen of the mixer and the plate of the BFO, but somehow that did not improve matters much. With no other solution in sight, I had to keep my fingers permanently on the tuning knob of the receiver, always alert to match the maneuvers of the XYL in the kitchen.

I never suspected any fraud in this until one day, leaving the receiver on, I came downstairs to get a cup of coffee and overheard the following conversation between the XYL and our little son:

"Mummy! Please let me hear the siren again. Won't you, please!"

"Only if you promise to be quiet, Ram! . . . Now listen carefully to the *noise* coming from upstairs."

Click . . . and sure as heck, the tone of the UA9 station (which was already not too stable) started rising steadily, and believe me, in less than a minute the station had disappeared completely! As a new station came up, I mused: "The old station drifteth, yielding place to new . . ."

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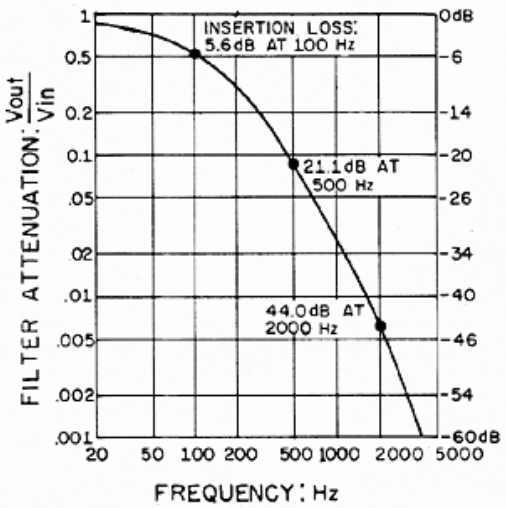

Fig. 1

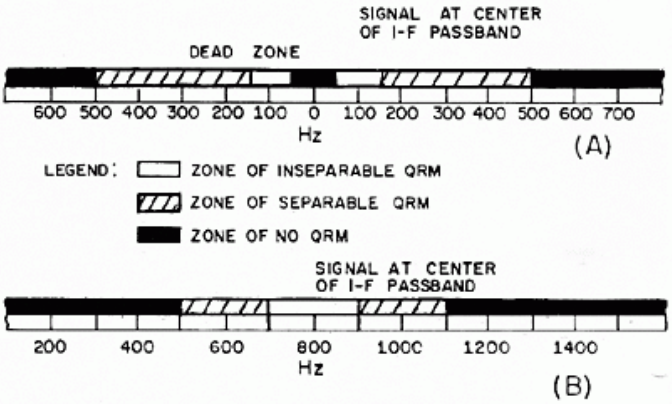

Fig. 2

The Solution

I took stock of the situation. *A better receiver was badly needed*, but after weighing the pros and cons for nearly a week, the idea was reluctantly given up. For one thing, good receivers were hard to get; and even if the elusive AR-88 or HRO could be located, they cost an awful lot, around 600 rupees! So the only alternative was to add some receiver accessory to improve the stability of my receiver – and of course the sensitivity and selectivity, too! I made a dash to the nearby USIS library and plunged into back issues of *QST*. (Excuse me for the digression, but American readers should know that the Vietnam war is affecting us too – we no longer find *QST* in the

local USIS library![1] I followed up the issue, but it seems the matter needs some push in Washington D.C.!)

Ambition knows no bounds and first in the order of priorities emerged a deluxe 7360 converter. But how to manage the 7360 and a 17.5 MHz crystal? The former is just not available in India, while the latter, made to order by a private company, costs as much as 60 rupees! The only way open was to work a lot of Ws and hope for the best! Well, W/K hams didn't let me down, and in course of time the 7360 and the crystal did arrive. I was keeping the chassis and other parts ready for the past several months, so the converter was built in a single hectic evening.

The converter was hooked up to the receiver, and . . . my goodness! What a difference did it make! For the first time, *I could take my hands off the knob* and relax in the chair while copying a DX station in the head! Even my S-40A was quite steady when receiving the 3.5 MHz tunable output of the converter.

With my worst problem solved, I turned my attention to improving the selectivity of the receiver. Install a mechanical filter? . . . Ugh . . . There is no point in yearning for impossible things! Taking clue from the *Handbook*, I ran a piece of stiff wire from the plate of each i-f amplifier to near its grid terminal. Then I made a special tool to adjust it from outside the cabinet. By midnight I had succeeded in adjusting the two wires such that, with no signal and full rf gain, both i-f stages were on the verge of oscillation. That brought down the bandwidth by a few kHz, but the receiver was still "wide open."

It was at this stage that I hit upon a new idea. By nature I prefer to listen to cw at a low beat-note. I gradually developed this ability and in a few months I was able to copy code comfortably at 100 Hz. Copying code at a low note has some remarkable advantages which, unfortunately, are not generally appreciated. At very low notes, the human ear, properly trained, can act as a highly selective discriminator which no super-duper mechanical filter can ever equal. Although it is true that an unwanted signal about 200 Hz away on the other side of zero-beat can come through with the same pitch, this difficulty can often be eliminated by a *very slight* rotation of the BFO pitch control, throwing the interfering signal into the "dead zone" (see Fig. 1).

Then all that is needed for deluxe code reception is to cut out all but the very low audio frequencies with a low-pass cascaded filter, and copy the cw signal at a note of 100 Hz. I honestly believe that this method of cw reception is not only simpler but far superior to the use of an 800-Hz toroidal filter, and almost as effective as the use of a mechanical filter. It sums up to this: When you get QRM 50 Hz off the signal frequency, even the best mechanical or crystal filter won't help you a wee bit if you are listening to the signal at a pitch of 800 Hz. On the other hand, if you are copying the same signal at a pitch of 100 Hz, *you don't need a filter at all* to discriminate against the QRM 50 Hz off! I know many readers are raising their eyebrows, but please take a good look at the chart in Fig. 2 which compares the "passband characteristics" of my 50-cent cw filter (A) and a $25 mechanical filter used in the conventional way (B). If you are still skeptical, won't you spare an evening and give it a fair trial!

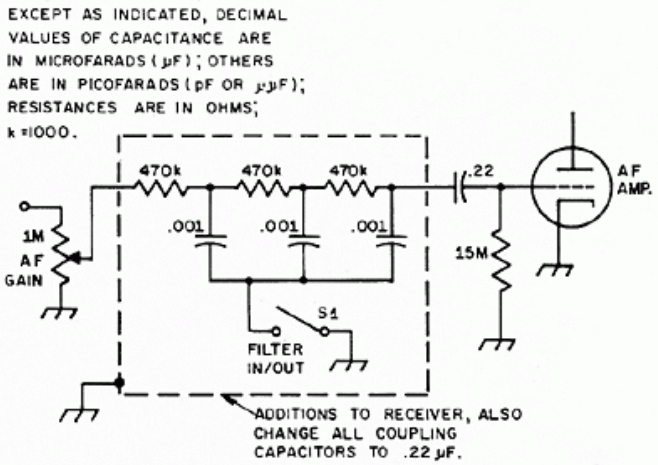

Fig. 3

The next Sunday morning I pulled out the receiver chassis, changed the coupling capacitors in the audio stages to 0.22 μF, installed a brand-new 35-rupee hi-fi loudspeaker, and added the low-pass filter shown in Fig. 3. The receiver was switched on, and . . . gosh! It was now as "hot" and as quiet as the 75S-3 which W3AU proudly showed us when he was operating from Trivandrum. No background noise, no QRM, no QRN . . . just the *dull thump* of the signal. Although the signal sounded a bit monotonous in the beginning, I soon got accustomed to it. Last but not least, the XYL is happier and agrees that the shack is now quieter. (I have a strong suspicion that YLs can't hear very low frequencies as well as OMs.)

Now that this filter is giving me excellent performance for the past year and is likely to become popular with other hams, I humbly submit that the filter be referred to as the "VU2JN CW Filter"! QST

[1] [EDITOR'S NOTE: The author reports that the USIS library at Trivandrum has since been wound up due to other reasons, much to the regret of the local hams.]

Strays

The Southern California ATV Club is starting a new "news letter." If interested, contact WB6FXL, 21709 Reynolds Dr., Torrance, CA 90503.

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W1TH and W9CP had an enjoyable QSO in December. What's so unusual about that? It was, to the day, the 50th anniversary of their first QSO back in 1921!

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We hate to report sad news, but we do it in the hope that it will prevent similar accidents. Fifteen-year-old WNØFCD was electrocuted in December while helping a friend erect an antenna. Somehow the wire came in contact with a 7000-volt power line. Think "switch to safety!"

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Another coincidence QSO . . . K2FB worked K4FB. K4FB's last name is Watkins and he is located in Lost Creek. K2FB's last name is Filkins and he is located in Fly Creek!

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