Improving "Boat Anchor" Receiver Performance

By

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For about $2.00 (or even less), the sensitivity of many "boat anchor" receivers can be improved up to 20 dB (or even more!). This improvement involves no modifications to the receiver except, possibly, to remove the external ground jumper from the antenna terminal strip on the back of the receiver.

Many of the older receivers were designed for balanced antenna feeds with an impedance of from 300 to 600 ohms. Just take a look at the service manual. For example, my HQ-140X manual states that the antenna impedance is 400 ohms. My Collins 51J-2 has an antenna impedance of 300 ohms. The Hallicrafters S-85 manual says antenna impedances from 52 to 600 ohms, the same thing for the S-107. The list goes on.

Back in late 1966, I was given Collins 75A1 serial number 4. Frankly, it was a "basket case", but I was able to pull a "Frankenstein" and revive the old girl from the dead. Unfortunately, I traded it off during the mid 1970s when these "boat anchors" were not worth the gasoline to haul them off (sure wish I had it back!). After getting the 75A1 working, I put the "normal" jumper on the antenna terminals (the antenna terminal nearest to the ground lug connected to it). Frankly, the sensitivity of the receiver "sucked"! After trying all sorts of things, I finally built a small antenna tuner just for the receiver and that worked like a charm.

After getting rid of the receiver, I did not think much upon this "low sensitivity" problem for a number of years. Then, after acquiring a number of receivers from the same era, I found the same problem: low receiver sensitivity when connected to an antenna. Since I now have a "fairly" good test bench including several service monitors, the receivers were "put to the test". Each one was fully aligned and the sensitivity, using the "normal" 50 ohm output of the service monitors, was noted. They were "OK", but not what I really thought they should be.

Remembering my days with old s/n 4, I realized that the impedance of the coaxial fed antennas was not matching well into the receivers. However, I was just too lazy to build a tuner for each receiver. Also, I wanted a method of using the receivers without having to retune every time I decided to change bands. Then a "light bulb" went on over my head (remember the old cartoon strip characters?).

How about using those "cheap" TV baluns that can be had from all sorts of sources (including free with video tape players, etc.).

A trip to the kitchen cabinet, where my wife stores all of the little accessories that came with various appliances that we have purchased over the almost 30 years we have lived in this house, produced a couple of the TV type baluns. After adapting the type "F" connector to take a PL-259, I hooked the coaxial fed antenna into the receivers. Every one of them really "perked up" from the performance prior to the installation of the balun.

Next, since my 51J-2 was sitting on the floor next to my service bench, I made some measurements using the calibrated attenuator in one of my service monitors. Depending on the band, the signals improved by a minimum of 10 dB to almost 20 dB when comparing the direct 50 ohm feed into the receiver as opposed to using the TV balun. Frankly, this is a pretty good improvement!

About this time, a couple of local amateurs got "new" 75A1 receivers and found that they were just not as sensitive on the bands as their "newer", coaxial matched receivers. I suggested putting in one of the TV baluns and both amateurs reported that the sensitivity of their 75A1 had improved to be at least equal to their newer equipment.

One of these amateurs, before he retired, was in the CATV business for over 30 years. He has run bandwidth tests on many baluns over the years since they have to pass a minimum frequency of 5 MHz. This is because of certain signals that may be present on the CATV system. Most of these baluns made it down to the broadcast band with no problems at all. Of course when mentioning the $2.00 price he laughs. It seems that the CATV people get these for well under a "quarter" and he still had several lying around his shack.

Not every "boat anchor" receiver seems to need these. My Collins 75A2, 75A3, and 75A4 work fine with the direct feed from the coax. However, my Hallicrafters SX-100, S-85, and S-107 like the baluns as do my Hammarlund HQ-140X and National NC-2-40D. The newer receivers like my 75S1, 75S3A, SB-301, AX-190, etc. all were designed for 50 ohm coax and definitely do not need the assistance of the TV balun.

The TV type baluns are designed to convert 300 ohms into 75 ohms. But, they do an excellent job of matching the 50 ohms feed to the balanced requirements of the "boat anchor" receiver. Is it exact? Of course not! But, the nominal impedance of the receiver varies with the particular band, and, especially on general coverage receivers, within the band itself.

Therefore, as a "cheap", but effective, method of "perking up" "boat anchor" receivers, the TV balun cannot be beat! Try it, you'll like it! Besides, they are "cheap"!