Another look at upgrading the Realistic DX150/160 receivers

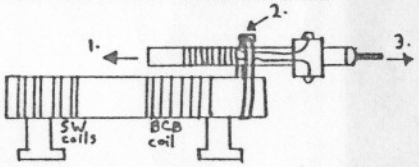
by Karl J. Zuk

This article is based upon the ideas set forth in A DXer's Technical Guide, only this will take you one step further.

There are four modifications that are suggested in the handbook. The first produces the most dramatic results. This receiver, for the most part, relies on the built-in antenna coil to gather its signals for BCB reception. I had disappointing results with a 300 foot antenna and a sizeable ground system connected to the rig using the provided antenna terminals. I couldn't figure out why the signal was so attenuated. It seems that the only way out is to follow the guide's advice, and couple your loop or antenna/ground system directly to the antenna coil. The guide suggests that you attach the antenna to one end of a ferri-loopstick, and the ground to the other, and to mount the loopstick to the fiberboard backing of the set. This gives you a loose coupling with the antenna coil if you mount it either in parallel or in-line with the coil.

I found, through experimentation, that the coil's interaction is critical for optimum signal transfer. It is better to connect your antenna and ground temporarily to the ferri-loopstick and move the loopstick along the side of the antenna coil to find the point of optimum signal transfer.

How to mount coupling coil

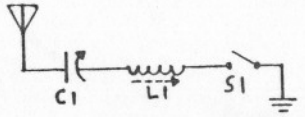


(Antenna coil view from rear of receiver)

1. Move coil for optimum signal transfer
2. Secure in best spot with "ty-wrap"
3. Tune coil for maximum signal

Then, to mount the coil, you should solder two wires to the coil, about a foot long apiece, and mount the ferri-loopstick in the spot you selected with a cable tie "ty-wrap". This will secure it in place better than twist-ties, and yet be temporary enough so that you can remove it at a later date, should you care to, with just a cut of a scissor. Then, to finish off your coupler coil assembly, mount a two screw terminal strip to the fiberboard back of the rig, and solder the wires from the loopstick to the screw terminals. This will give the project a professional look, and make it easier to change antennas, or move the rig. Then, before you close the back of the set, make sure you adjust the coil's slug for the best signal transfer. You will now probably have more signal than you can deal with!

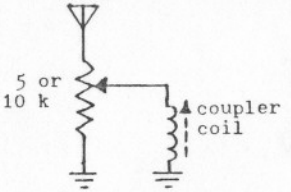
Instead of using one of the many tuners presented by Brian Sherwood in the manual, I found that, in this case, the tuning of the antenna only increased the problem of too much signal, and that I was detuning the antenna to obtain results, instead of tuning it. With a much shorter antenna, tuning would be more useful. I found that using a potentiometer in series with the antenna produced only fair results, and not enough variation in gain to be useful. Instead, I used a 365 pf variable capacitor in series with the antenna to increase or decrease the amount of signal to be presented to the coil by coupling. Not only did this prove to be a simple and effective "RF gain control" but it seemed to improve the match of my antenna system to the set, so that with the plates fully closed (maximum capacity), I was getting more signal to the set than I would have if it was directly connected without the variable capacitor.



C1 365 pF "RF gain control" coupler capacitor
L1 coupler coil
S1 ground switch; turn "off" for dramatic attenuation

I found that this system worked very well for BCB, but when I switched to the shortwave bands, there were no signals to be found. Why? The coupler coil was mated to the antenna coil for BCB and was far away from the antenna coils for the other bands. To cure this problem, I simply took a piece of wire and attached it to the original antenna terminals of the set, and alligator-clipped it to the antenna at the 365 pf "RF gain control" and got all the signal I needed for SW reception.

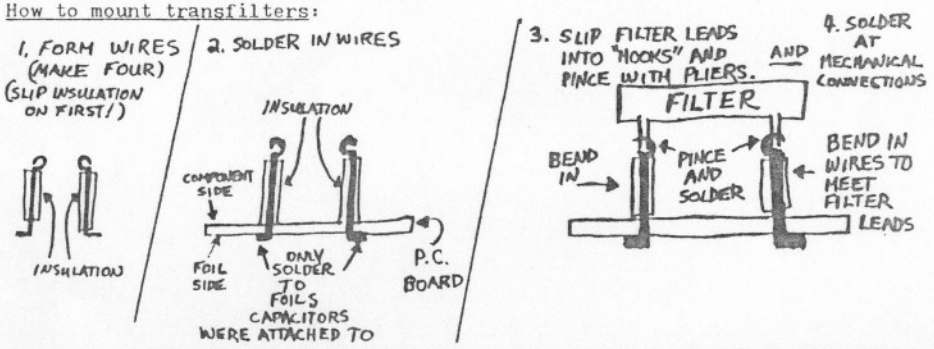
(ed. note: On the DX150 receivers and some of the DX160s, the SW antenna coils are not mounted on the same ferrite rod as the AM antenna, but are in separate shielded transformers. On these sets also, the antenna must be connected to the original terminals for SW listening.//Karl's "RF gain control" coupling capacitor may not work on smaller random wires as it is more likely to form a series resonant condition with the inductance of the coupling coil and the effective capacitance of an antenna less than one quarter wavelength long. Another possibility for an external RF gain control is shown at left.)



The second modification deals with the RF gain control in the set. The RF gain control does two things. It controls the incoming signal directly at the antenna terminals, and at the same time, controls the gain of the RF and IF stages. This is done by using a dual potentiometer. It is suggested that you jump the section of the double pot that controls the RF/IF section with a fixed resistor, so that it operates at full gain, instead of changing with the level of signal input at the antenna. This is a beautiful system only IF you are using the antenna connections on the back of the set. If you use the ones that you just installed to couple with the antenna coil directly, you will find that the RF control now does nothing, as the gain control is now connected only across the original antenna terminals and not the new ones. (Another ed. note: Derek Claridge points out that the gain control modification can be performed by removing the wire running from the wiper terminal of the pot section in question, and attaching it to the "hot" terminal of the same pot. The obvious sometimes escapes your editor!)

The third modification is to replace emitter capacitors in the IF strip with emitter ceramic bypass filters, such as those available from Radio West and Gilfer. It is suggested that you remove the existing capacitors by cutting away the ceramic of the caps, and then delicately taking the remaining wire stubs and drop soldering the filters to the stubs to prevent over heating and damaging the filters. This makes a lot of sense, except in my case, where the caps were mounted so low to the board that there were no stubs left when I cut away the ceramic. Instead, I removed the caps by holding the ceramic with needle-nosed pliers, and applied heat with the soldering iron from the foil side of the PC board , then pulled the cap out of the board. Be sure not to hold the iron on the board too long because you are working very close to the IF transistors, and you can fry them easily. After you remove the two caps, cut four pieces of wire about a half-inch long, and form them into an "S" shape (see diagram). The center of the "S" can be insulated with a tiny piece of "spaghetti" insulation. Solder the four wires into the holes left by the caps. Then, carefully slip the ends of the filters into the loops in the wires and close the loops by pincing them with a needle-nose plier. This will give you a reasonable mechanical connection. Then solder the four joints as quickly as possible, not leaving the iron on the joint for more than a half-second. This whole procedure is necessary because the transfilters' leads do not line up with the holes drilled to mount the capacitors that you removed, and cannot be formed to fit the holes.

How to mount transfilters:



This modification will tighten up the selectivity of set nicely. For

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example, I am now able to separate WBAL-1090 from local WHLI-1100 with 10 kw, about 5 miles away, in daytime conditions, with no sweat.

Finally, replace the front-end protection diodes D1 and D2 with silicon 1N914s, as suggested in the original article. This cleared up my cross modulation problems dramatically. I have two 50 kw stations only about four miles away from (WNBC and WCBS), which I can easily pick up by connecting a ceramic earphone to my fillings. They caused all sorts of cross modulation and pesty spurs, and changing these two diodes made them disappear.

A couple of other things to try. Put a switch in your ground line so that you can switch the ground on and off. This seems to help you separate skywave and groundwave signals, and will also act as a signal attenuator when listening to locals because you're opening your antenna circuit.

Also, if you find while tuning the BCB, that your antenna trimmer control works bes turned fully clockwise, use your set with the bandspread at "0" instead of "100". Because of interaction between the bandspread and antenna trimmers, this will make the antenna trimmer work more effectively through its span.

Check out the original article in the technical manual before you proceed (pp. 82-83). The book is worth every cent!

(The editor returns: The preceding plug for the Technical Guide was unsolicited, but most welcome. In spite of Karl's large antenna and proximity to strong locals, he has found few spurs in his modified DX160 using the external antenna coupler. My DX150A would melt in a similar situation, so approach the modification with an open mind; you may not have as good results.)

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From Glen Kippel comes word that now Sanyo has a long-distance portable, the RP6260A. (Radio Shack of course is offering their GE look-alike, the 12-650) Does anybody have any experience of either of these radios? Glen would also like to know if anyone has had any experience with the National-Panasonic RD-9830 preselector. If you do, write to him at 3394A G St., Merced, CA 95430. *******Thazzit, folks. 73, NHP