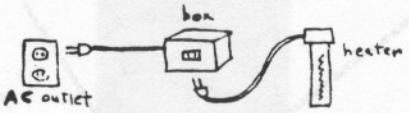
T33-1-1

SILENCING QRN FROM A FISH-TANK HEATER

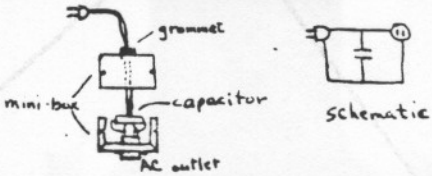
Have you ever been tuning around the low end of the band with the gain up full when an almighty burst of noise blew the headphones off your head? Once you've regained your equilibrium (not to mention your hearing) you might describe the noise as a rasping sound of some intensity but of short duration, most noticeable below 900 kHz. The cause of this QRN could be the lowly fish-tank heater. These devices are simply electic heaters controlled by a cheap thermostat, enclosed in a glass tube, which is supported on the inside of an aquarium. The QRN results from arcing between the contacts of the thermostat, which was only designed to help keep tropical fish warm, not keep DX'ers happy.

A friend loaned me his aquarium heater (he didn't need it--his fish died), which had interfered badly with his listening to CBU-690, a 50 kw'er about 50 miles away. It soon lived up to its reputation by sending jolts of noise through my receiver which was 30 feet away. Almost all this noise was being radiated from the powerline between the heater and my receiver. Past experience suggests that the QRN can travel several hundred feet through powerlines, as I was once bothered by a heater a few houses away. An apartment building with several tropical fish enthusiasts would be a DX'ers hell. Direct radiation seems minimal more than a few feet away from the offending heater.

The heater I examined had a .006 uf capacitor connected across the AC leads to the device, presumably to cut down RF interference. Obviously, the capacitor didn't do the trick for a BCB listener, but it was soon discovered that larger capacitors did the job. A .25uf capacitor across the AC line reduced the noise level significantly; a 1 uf capacitor virtually eliminated it. It was impossible to replace the capacitor inside the heater with a larger value, as there was no extra room in there. However, a small metal box can contain the capacitor and be placed between the AC wall outlet and the heater, like so:



For safety the capacitor should have a rating of 600 volts DC (or an AC rating in excess of 200 volts) and can be between .25 and 1 uf in value--this should not be an electrolytic capacitor. A small mini-box will do fine to enclose the capacitor, and you will need an AC plug with a short length of lamp cord, a rubber grommet to fit around the cord where it enters the box, and a small AC outlet such as Radio Shack's #270-642.



Be very careful that none of the wiring touches the metal box. One should put spaghetti-type insulation on the capacitor leads. This is simply a suggested way to set up the noise filter--use your own ingenuity, but remember that this is 115 volts AC you're fooling around with, and that's been known to electrocute in the right (or wrong) circumstances.

If you're troubled by this type of QRN, try to find the owner of the offending aquarium heater--wander around with a portable receiver listening for the area of strongest noise. Or ask around to see who keeps tropical fish in your immediate area. Chances are that's the culprit. Bring your portable rx near the heater, and jiggle the device slightly to let the owner hear the unholy RF racket he's generating. You may also be able to see the arcing in the thermostat. Concoct one of these filters, making sure it looks pretty, and (hopefully) your troubles will be over. You have only your QRN to lose.

--de Nick Hall-Patch