

Many amateur radio stations today are experiencing terrific RFI (Radio Frequency Interference) that is impeding their audio signals and causing very garbled and distorted audio. Careful listening indicates that MANY SSB signals on the air today exhibit RFI – sometimes not enough for the other stations to notice (because they are listening on a 3" speaker in their transceiver), but careful listening in a wideband receiver with VERY high quality receiving equalizers and studio monitor speakers allows this slight interference to become VERY annoying. And, of course, there are also signals on the bands that have terrible problems with RF getting into their audio lines, causing all sorts of problems.

1. Shielding of the Mic Connector

We, here in the Heil Sound lab, have discovered a very interesting fact. Most of the major transceivers today do NOT ground their microphone shields! That's correct – the mic connector shields FLOAT! Now wasn't this one of the FIRST things we learned about building RF transmitters with speech audio sections? GROUND those shields! So, we came up with a very simple fix that just about anyone can make to their rig. You don't have to get inside the radio, so you don't void any warranties. The fix is simple and effective.

This applies to the 4 and 8 pin Foster (that's the Japanese company that builds those dang little mic connectors!!) microphone connectors so common on today's rigs.

First, unplug your Heil (what – you don't have one yet??) microphone cable from the front panel of the transceiver. Do this first, because you don't want the mic plug connected to the sensitive circuitry inside the radio while you're soldering.

Remove the two small #4 Phillips head screws and the cable clamp they hold. Then remove the tiny Phillips head screw that holds the rest of the metal sleeve. Slide that back onto the mic cable. Now, cut off the end of a resistor, or get a piece of #20 solid, tinned wire about 3" long. Locate the mic pin that has the shield of the mic cable soldered to it.

With a small iron, carefully solder this solid wire to that shield and pin. Bring the sleeve back up the cable and attach to the connector with the small screw. This leaves the solid wire coming out the back of the connector. Replace the cable clamp, and (as you do that), tightly wrap that solid wire around one of the #4 Phillips head screws and tighten the clamp assembly very well.

What you have accomplished is grounded the shield to the transceivers chassis ground through the ring on the mic connector. (Make sure that ring is tight). This has been a big help to many stations with RFI problems and should help you clean up your signal.

2. Eliminating Common-Mode Current from Shields

Common-mode current can be a serious problem in amateur radio stations. This current, which can start flowing due to mutual coupling between an antenna and your coax, frequency-sensitive problems in your station ground, or a floating ground in your rig's power supply, can create any number of headaches, including RFI on your microphone line. In a nutshell, "ground" can "rise above ground" on some frequencies.

Several remedies are available.

A simple one is to wind a coil in your coaxial cable, about 8 or 10 turns of about 6" diameter, as close to the rig as possible. Hold the turns in place with black tape. This forms an RF choke like the one often used at the feedpoint of a dipole, Yagi, or Quad, and for the same reason. This choke can break up the current flow, and may have miraculous results (both in terms of effectiveness and simplicity!).

Another tactic is to slip snap-on ferrite cores onto the microphone line. On an AD-1 boomset adapter cable, snap one core onto the PTT line, another onto the microphone line, and another over the combined cable. If you are hearing RFI in your headphones, slip one or more cores onto the headphone line.

Earlier, it was mentioned that your rig's power supply might be involved. Many power supplies, especially switching-mode types, use a floating ground. A number of Astron® power supplies, which are very popular because of their low cost and excellent performance, use a floating ground. This can cause an amateur transceiver to take off scanning when you transmit, or set up common-mode current. The solution is to connect a short strap from the power supply's Black (negative) output terminal to the chassis of the power supply (often there is a convenient ground lug inside the cabinet). Then, connect 0.01 μ F and 0.001 μ F 50-Volt disc ceramic capacitors from the red (+) to the black (-) output terminals: the capacitors will shunt any RF on the DC line to ground, which now really is ground. Please use caution when doing any work inside your power supply, and utilize the services of a qualified electrician if you have any doubts about your capabilities. Heil Sound, Ltd. specifically disclaims any responsibility for personal injury or damage to equipment caused by improper modification work on station components.