

Hobby Scene



By John McVeigh, Technical Editor

SHIELDING SPEAKER LEADS

Q. *A friend has suggested that I use shielded cables between the output terminals of my amplifier and the speakers, rather than the plain zipcord I have in-*

stalled. What do you say?—Mark Dashner, Columbia, IL

A. In my opinion, there is only one situation in which the use of shielded speaker cables is warranted—when radio-frequency interference (RFI) is a problem. In many audio installations, the speaker cables are at least a few feet long. They can act as fairly efficient antennae, picking up ambient r-f signals and presenting them to the output of the power amplifier. The feedback loop in the amplifier offers these signals a relatively low-impedance path to a low-level stage, where the r-f is rectified into audio by a transistor junction, a diode, or other nonlinear component. The subsequent amplifier stages cannot distinguish the demodulated r-f from the desired program material, so both are amplified and presented to the loudspeaker.

The way to determine whether this is the cause of a given RFI problem is to disconnect the cables carrying signals to the input jacks of the amplifier. If the interference does not stop, disconnect the speaker cables and monitor the output of the amplifier with either a pair of headphones or a small speaker connected to the speaker terminals with *short* lengths of wire. If the interference stops when the long speaker cables are disconnected, that is the route taken by the r-f.

There are several ways to prevent the r-f from entering the amplifier at its speaker terminals. Disc ceramic or silver mica capacitors (about 0.001 to 0.01 μF) can be used to bypass each speaker terminal to chassis ground, which should in any event be connected to a good earth ground. Some manufacturers warn that their products may oscillate if bypass capacitors are used, so the manufacturer of a specific amplifier should be consulted before connecting them.

Another method is to insert r-f chokes in series with each conductor of the speaker cables. If the choke reactances are high enough, the r-f will be blocked from the amplifier. Alternatively, a commercial or homebrew, low-pass filter can be inserted between the speaker output terminals of the amplifier and the speaker cables to block the passage of r-f signals.

Sometimes, merely using high-quality shielded cable to conduct signals from the amplifier to the speakers is enough to cure an RFI problem. Either two-conductor shielded cable ("Twinax") or single-conductor coaxial cable can be employed. If coax is used, the "hot" side of the amplifier output should be connected to the inner conductor and the braid to the common terminal. If two-conductor cable is used, connect either conductor to the "hot" amplifier output terminal and the positive speaker terminal, and the other conductor to the common amplifier and negative speaker terminals. Attach the braided shield to the amplifier chassis. Whether coax or twin-conductor shielded cable is used, the type chosen should feature a tightly woven braid for effective shielding. Also, the amplifier chassis should be firmly bonded to a good earth ground.

Have a problem or question in circuitry, components, parts availability, etc? Send it to the Hobby Scene Editor, POPULAR ELECTRONICS, One Park Ave., New York, N.Y. 10016. Though all letters can't be answered individually, those with wide interest will be published.