

# 75-Ohm Cable: Additional Options

There's more than one way to make 75-ohm cable work in a 50-ohm system. Here are some more possibilities.

While we were working on CO2KK's article about using 75-ohm coax in 50-ohm systems, there was a discussion on the Internet VHF reflector that started with this message asking about connectors: "I just acquired, at the world's lowest price, all the CATV aluminum jacket hardline two people could pick up and put in my truck. Any idea about connectors?"

Most of the replies had nothing to do with connectors, but about matching networks and the reasons that hams use 50-ohm cable and CATV systems use 75-ohm. Here are some highlights."

## A Bit of History

Jerry Johnson, KØCQ, had quite a bit of information to offer. According to Jerry, 50-ohm cable first came into common use because it was easy to make hardline from 1-1/2-inch (shield) and 1/2-inch (center conductor) copper water pipe. The impedance of those lines was approximately 50 ohms and it became a standard. Jerry says the cable industry's use of 75-ohm line is based on a 1948 article in an electronics magazine (he didn't say which one), which—based on computations for copper lines with air dielectric—showed that 75-ohm feedline had less loss than an equivalent length of 50-ohm line. Jerry notes that additional losses from other dielectrics probably cancel out that advantage.

## Matching Devices (Commercial, Too)

KØCQ says the easiest way he knows to match 75-ohm coax to a 50-ohm system is by using three variable capacitors spaced 1/8-wavelength apart, as follows:

In a box, mount three variable capacitors, reactance say 25 ohms at maximum capacitance. Ground the rotors. Between the capacitors, put a 1/8-wavelength piece of good coax.

Connect (one) outer capacitor to the transmission line to be matched and (the other) to the radio (with bridge for tuning). Adjust for your desired radio load impedance.

Two other hams note that impedance transformers are available commercially. Greg Stahlman, KJ6KO, says the Olde Antenna Lab of Denver offers "Z-verters" for 2 meters and up (see address below). Owner W6OAL describes them as 1/4-wave sections that transform 75 ohms to 50; but he also notes that, in most cases, the 75- to 50-ohm mismatch results in only a 1.5:1 SWR on an otherwise sound system. The other ham (full name and call not given) wrote that a company called ZD Engineering will make custom 1/4-wave matching transformers cut to any band you want, and they include the N connectors that the original writer was looking for. He didn't have ZD's address, and, unfortunately, neither do we. Perhaps one of our readers has it and can pass it along to us.

## Homebrew Connectors

Finally, Rod Johnson, KA7YOU, offered a "recipe" for homebrewed connectors for 1/2-inch hardline, using brass tubing fittings. Rod said he found this idea "many years ago" in a magazine and has now forgotten which one it was and who wrote the article. But he remembered these details:

I use the type of tubing couplings which are called compression fittings. They have a nut and a ferrule on each end and a short center piece with the nuts screw onto. There is a short area in the middle, with a reduced diameter, which acts like a stop for the ends of the tubing when it is assembled. This needs to be drilled out with a 1/2-inch drill.

I install one end cap and a ferrule on the back side of a PL-259 (it just fits over the back end) and solder the ferrule on. The hardline is prepared to fit into the PL-259 by cutting back just enough of the aluminum jacket to allow

the center conductor to come out through the center contact far enough to solder it. Leave as much of the foam insulation as possible to maintain the impedance characteristics.

The second nut, ferrule, and the center portion of the brass coupling are slid over the hardline in that order. Then the hardline is pushed into the prepared PL-259 assembly, and the nuts are tightened down on the hardline. I prefer to use some form of anti-oxidation paste on the aluminum jacket prior to installation.

(If anyone remembers the original source of this idea, please let us know so we can give proper credit. Thanks.)

## For More Information...

If you want to get the full technical low-down on impedances and transmission lines, W6OAL recommends Walt Maxwell's classic book, *Reflections*, available from the ARRL (225 Main St., Newington, CT 06111; Phone: (860) 594-0200). Jerry Sevick's book *Baluns and Ununs* will also be helpful (CQ Communications, 76 N. Broadway, Hicksville, NY 11801; Phone: (516) 681-2922; Fax: (516) 681-2926). And you can contact Dave, W6OAL, at the Olde Antenna Lab of Denver, 6224 S. Prince St., Littleton, CO 80120, to find out about his "Z-verters." Dave tells us he is planning to move to larger quarters later this year, so keep an eye on his ads here in *CQ VHF* for any address changes.

Finally, you can join the VHF reflector on the Internet (it's really a weak-signal reflector, with a fair amount of useful information squeezed in among the gripes and flames that you find on most any unmoderated reflector) by sending an e-mail message to <vhf-request@w6yx.stanford.edu>. Just write "subscribe" and your callsign in the first line of the text and you're in. You should get an acknowledgment message almost immediately. And be prepared to receive a lot of e-mail.

—W2VU