ARRL Periodicals Archive – Search Results

A membership benefit of ARRL and the ARRL Technical Information Service

ARRL Members: You may print a copy for personal use. Any other use of the information requires permission (see Copyright/Reprint Notice below).

Need a higher quality reprint or scan? Some of the scans contained within the periodical archive were produced with older imaging technology. If you require a higher quality reprint or scan, please contact the ARRL Technical Information Service for assistance. Photocopies are $3 for ARRL members, $5 for nonmembers. For members, TIS can send the photocopies immediately and include an invoice. Nonmembers must prepay. Details are available at www.arrl.org/tis or email photocopy@arrl.org.

QST on CD-ROM: Annual CD-ROMs are available for recent publication years. For details and ordering information, visit www.arrl.org/qst.

Non-Members: Get access to the ARRL Periodicals Archive when you join ARRL today at www.arrl.org/join. For a complete list of membership benefits, visit www.arrl.org/benefits.

Copyright/Reprint Notice

QST Issue: Dec 1995
Title: Don't Solder to Connector Adapters!
Author: Steve Katz, WB2WIK/6

Click Here to Report a Problem with this File

Hints and Kinks

Conducted By Bob Schetgen, KU7G
Assistant Technical Editor

DON'T SOLDER TO CONNECTOR ADAPTERS!

◊ I read the May "Hints and Kinks" with interest as usual—and gasped in horror when I read WX7E's hint about soldering the braid of small-diameter coaxial cables to the reducer used for PL-259 male connectors.

Cable and connector manufacturers surely do *not* recommend soldering the braid of coaxial cable to PL-259 "UHF" male connectors for a variety of excellent reasons:

1. Silver-plated reducers UG-175 and UG-176 were developed about 40 years ago specifically to *not* require that the braid of the cable they are reducing be soldered to them in the manner described in the May column. The manufacturers are correct in not recommending this procedure. It is completely unnecessary. Rather than resulting in a "better" connection, it is likely to damage the coaxial cable.

2. The polyethylene-dielectric cables normally used by amateurs, and called out specifically in WX7E's hint, have a maximum operating temperature of 90°C. Above 90°C, both outer jacket and dielectric materials will reflow (melt) and lose the properties required of a good coaxial cable. Soldering to a silver-plated brass reducer slipped over the cable's outer jacket will raise the jacket temperature almost immediately to that of molten solder, approximately 230°C—not a very good idea.

3. RG-8X "mini-8" cables are built with a cellular polyethylene dielectric ("foam"), which has a maximum *storage* temperature of 90°C, and a much lower maximum operating temperature. *Never* expose the dielectric to soldering temperatures for longer than one second. (This is from several manufacturers' technical notes, including *Belden Innovations,* the monthly bulletin produced by a large cable manufacturer.) Raising the cellular polyethylene temperature to soldering temperature (again, about 230°C for standard 60/40 tin/lead alloy "radio" solder) will reflow the dielectric almost immediately, causing changes in geometry, spacing of center conductor to outer conductor and insulation resistance.

4. The only small-diameter coaxial cables that fit PL-259 reducers and withstand the procedure recommended by WX7E are those made of high-temperature materials such as Teflon (eg, RG-142 and RG-400) or fiberglass insulating media, which are rare in amateur circles.

To *correctly* install UG-175 and UG-176 reducers (which accommodate RG-58 and RG-59 or RG-8X cables, respectively), do *not* tin the reducer or the braid, but fold the braid back over the reducer, screw the reducer into the PL-259 body, and *then* solder the braid to the body of the connector very rapidly through the four holes in the PL-259 body. The way to "rapidly" solder through the four holes is very easy, but infrequently performed by amateurs:

A. Use only silver-plated PL-259s, preferably with Teflon dielectric. The silver plating allows very rapid heat transfer and solders extremely quickly compared with the bright nickel plating of less-expensive connectors, and the Teflon dielectric can withstand high soldering heat without changing its electrical properties.

B. Apply heat from either a very high-current source (such as an industrial 900-W resistance-soldering station would provide) with its probes properly placed on opposite sides of the connector or from a large-mass soldering iron (*not* a soldering gun or pencil wedged into the soldering space on the connector. Feed solder directly into the soldering hole and allow it to quickly reflow. Even a 250-W or higher-powered gun will *not* transfer heat quickly enough because of the tiny thermal mass of its heated tip. Similarly, a typical 40 to 100-W pencil will not do the job. The correct iron to use is very inexpensive and readily available, but seldom found in a ham shack. Use an old-fashioned, large iron-tip soldering iron, such as a Weller SP120. This is only a 120-W iron, so it takes a long time to reach soldering temperature, but its massive solid iron tip stores a great deal of thermal energy, which quickly heats a PL-259 connector. It transfers enough heat to make solder reflow directly onto the PL-259 body and through the soldering holes in less than one second. Even a very large gun or pencil will not do this.

The trick of soldering PL-259s, with or without a reducer, is to do the job with sufficient heat to make the solder reflow in less than one second, then remove the heat and let the connector cool. Although this raises the cable's soft dielectric temperature to slightly above its 90°C rating, it will do so very briefly—usually not long enough to cause damage—if you're careful. It's a good idea to *not* move or disturb the cable or connector for about one minute after soldering, so that the dielectric can reform to its original state.

My company installs PL-259 connectors, with and without reducers, at an average rate of about 500 per month, so we probably install more of these in three months than most hams do in a lifetime. After each installation, we evaluate the assembly by checking SWR at 300 MHz and also performing a "hipot" (*high-potential,* dielectric withstanding voltage) test at the maximum voltage rating for the cable being used. With careful workmanship, well-trained operators and the special techniques described here, we get about 99% yield on completed assemblies. This means we still throw about a half dozen connectors in the trash each month. With the technique described by WX7E (we've tried it), our yield drops to below 35%.—*Steve Katz, WB2WIK/6, Vice President of Engineering, S&S Cable Co, Northridge, California*

CONTROL 28-V COAXIAL RELAYS WITH A 12-V POWER SUPPLY

◊ Surplus 28-V coaxial relays are often available at hamfests for very reasonable prices. Many people may want a coaxial relay, but pass by the low-cost, 28-V versions because they don't have a 28-V power supply. Actually, a 28-V coaxial relay only needs a *pulse* near 28-V to energize the coil. Once the coil has been energized, a much lower voltage will keep it energized. For example, my 28-V Dow-Key relay energizes at 15 V dc, but stays energized with coil voltages as low as 6.2 V. The simple circuits shown in Figures 1 and 2 allow you to control a 28-V coaxial relay with a 12-V power supply.

The circuit in Figure 1 shows a DPDT switch to control the coaxial relay. This

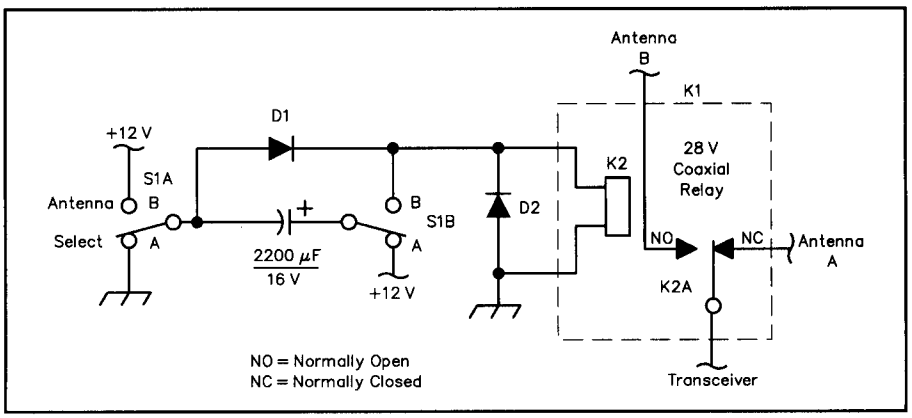

Figure 1—An A/B antenna switch using a 28-V coaxial relay powered by a 12-V power supply. D1, D2—1N4002. S1—DPDT. K1—28-V, SPDT coaxial relay.