

Coaxial Connectors

A Supplement to the conversation at Elmer Night 1/21/09 de W6WTI

At last evening's Elmer Night we talked about Coaxial Connectors. We passed around examples of the primary kinds we encounter on our equipment, but I thought that a brief summary might be helpful.

UHF Connectors

Male = PL-259 (for installation on the end of RG-8, RG-213, 9913 size coax).

Reducer UG-175 for use with RG-58 size coax

Reducer UG-176 for use with 'Mini-8' or RG-8x size coax

Often found as a terminal connector on coaxial cables intended for MF, HF, and VHF frequencies..

Female = SO-239 (for panel mounting) - this one has 'outside threads'.

Often found as female-UHF connectors on the back panel of HF/VHF Transceivers and on antenna connection 'pigtailed' on VHF/UHF Mobile type transceivers.

I recommend the use of **silver-teflon** type connectors rather than the cheaper plated versions. Silver is easier to solder.

When using PL-259s with smaller sizes of coax , **be sure** to use the appropriate reducer.

N Connectors

Male – often used for terminations on RG-8, RG-213, 9913 type coax.

Sometimes found as a terminal connector for coaxial cables for use at VHF-UHF-SHF frequencies.

Female – for panel mounting

Sometimes found as base connectors on vertical antennas intended for use at VHF-UHF-SHF frequencies. Occasionally found as the UHF coax pigtail on VHF-UHF radios.

BNC Connectors

Male – sometimes found as coaxial terminations on RG-58 size coax. Also commonly found as the antenna connector on rubber duck and similar type antennas designed to be used with hand-held radios. (Very common connectors for instruments)

Female -- sometimes found as panel/radio antenna connectors for VHF and UHF applications

Often found as the 'antenna connector' on VHF/UHF hand held radios.

SMA Connectors

Male – often found on adapters for use with RG-8 and RG-58, RG-8x size coax and on the base of rubber duck type antennas intended for use with SMA equipt radios.

Female – often found as the antenna connector on smaller HT type VHF/UHF radios.

Adapters

As operators of HF, VHF, UHF type radios, it is often handy to have a variety of adapters. Some of the more common types that are handy:

UHF-Female (SO-239) to BNC-Male

- for connecting HT BNC female antenna connector to RG-8, 9913 size cable with UHF male (PL-259) termination. (UHF-Male to BNC-Female are also useful)

UHF-Female (SO-239) to SMA-Male

- for connecting HT's SMA female antenna to RG8 size cable with PL-259 termination.

Double Female (barrel connectors) and **Double Male** adapters are available in UHF, BNC and other designs. These are always handy for connecting lengths of coax together to make a longer reach. (A couple 25' sections of coax with UHF or BNC terminations are handy to have, and are easy to connect together for a 50' run, if needed.)

NOTES:

1. Typically coaxial feed lines to installed VHF/UHF Antennas found at emergency radio locations will be terminated with a **UHF-Male** (PL-259) connector. Often a BNC-male to UHF-female adapter will be close by. **BUT**, it is always more reliable to make sure that you have the one you need handy. (Hey, get a couple, put one in your ready kit, glove box, and desk drawer !)
2. If your radio has an **SMA-Female** connector for antenna connection, you should have adapters that provide an SMA-Male to UHF-Female, and perhaps SMA-Male to BNC-Female connector.
3. **N-connectors** are less frequently encountered. However, your personal equipment may have these installed. Adapters from N-Male to UHF-Female and UHF-Male to N-Female are handy to have just in case, particularly if your radio and antenna use them.
4. When using connectors in **exposed outside locations**, ***BE SURE*** to properly seal the connections with a **waterproof** type sealant such as Coax-Seal (available at Radio Shack). Moisture is a common problem with coaxial cables.

CAUTION: - Attaching an HT size radio directly to the end of an RG-8/9913 size coax terminated with an UHF-Male (PL-259) connector can result in a lot of torque on the HT's antenna connection which may be conveyed to the HT's circuit board connection. This can result in **broken connectors, broken wires or cracked solder joints** which will impair the radio's performance. **Flexibility** can be added by using an adapter which includes a short length of smaller (more flexible) size coax. SMA to UHF and SMA to BNC adapters are available with such a short link. Another way to help isolate the radio from the torque is to employ a speaker/mike combination with a coiled cord, or equivalent.

FURTHER READING: As always, refer to the ARRL Handbook for Radio Communications for specific information on Coaxial Cables and Connectors. It contains specific information about the proper installation of connectors.