SOLDERING A COAX CONNECTOR ONTO RG8X

PL-259 ASSEMBLY INSTRUCTIONS

The PL-259 was invented in the 1930s by E. Clark Quackenbush. It is sometimes known as a “UHF” connector. It is probably the most common RF connector used in any radio service, and arguably the easiest to assemble.

The basic solder on type connector has 2 components: The locking ring, and the main body. This is all that’s needed for most ½ inch diameter coax cables such as RG-8 and RG-213.

Smaller diameter coax cables require an additional part known as a “reducing adapter”. Though at first glance, they all look the same, there are several different models of reducing adapters – the difference being the inner diameter or “hole size” is matched to the diameter of the coax you intend to use.

RG-58 cable requires the use of a UG-175 reducing adapter. The slightly larger RG-8X cable requires a UG-176.

The following instruction depicts my preferred method of installing a PL-259 onto RG-58 coax using a UG-175 reducing adapter. I've seen other ways to do it, but I'm convinced this method works best. The procedure is identical for RG-8X. Larger coax such as RG-8 and RG-213 do not require an adapter. The assembly procedure is quite different and is beyond the scope of this instruction.

Slide the retaining ring onto the cable first. Be sure the threaded end is towards the end of the cable. Slide it well out of the way, and then slide on the reducing adapter. The large diameter end should be AWAY from the cables end.

Prepare the cable by first removing approximately 1 inch of the outer jacket. The exact amount is not critical. Score the circumference of the cables outer jacket with a sharp knife or a razor, but be sure not to nick or cut the braided wire below. Bend the cable sharply at the incision point until it separates fully – all the way around, and then pull it off of the cable.

Dismantle ½ of the shield, and bend it out 90 degrees. Cut this excess off flush with the cable. Scissors are quite effective.

Slide the reducing adapter so that its small diameter end is even with the end of the cables' outer jacket. Dismantle the remaining shield, and fold it back and over the reducing adapter. You may need to trim the length of the shield to prevent it from getting into the threaded portion of the reducing adapter.

Remove most of the center wires' dielectric insulation (the exact amount is not critical). Use a razor or a sharp knife to score the plastic, and then bend the wire sharply at the incision point until the insulation fully separates, and then pull it off.

It is vitally important that you carefully inspect the cable for loose strands of wire that might cause a short circuit. If the center wire is stranded, twist it tightly; making sure EVERY strand is incorporated, and is as straight as possible. Be sure that ALL of shields' strands are down against the reducing adapter. The 2 wires must remain separated!

Coat the exposed center conductor with flux, then “tin” the wire by melting on a thin layer of solder. This will work to insure that a strand cannot peel back and cause a short circuit.

Hold the reducing adapter, slide the main body onto the cable, and twist it on until it is completely mated with the reducing adapter. Sometimes the shield wire strands will get into the threads, and make the final assembly difficult. In most cases, a little “elbow grease” will get the job done. Otherwise you may have to unscrew the connector, and trim down the length of the shield.

Cut off the excess center conductor – flush with the end of the center pin.

Position the connector so that the tip is pointed downward at a 45-degree angle with the “beveled corner” facing up.

Clean the soldering iron tip, melt a bit of solder onto the tip, and insert the tip into the open end of the center pin. Wait a few seconds for the center pin to heat up, and then melt solder into the center pins' opening. Continue melting in solder until the open end has been completely covered. Remove the iron and allow the solder to cool undisturbed.

SHIELD SOLDERING

I have conflicting opinions regarding the soldering of the coax shield to the connector body. It requires a LOT of heat to get an effective solder joint, and you run the risk of melting the center wires' insulation and creating a short circuit that completely ruins your effort. Arguably, it is the "right " thing to do, but my experiences have convinced me that for most applications, there is little to be gained from soldering the shield – especially if you managed to get the shield strands caught up into the reducing adapters' threads. Consider the fact that most other (arguably superior) connectors, such as the TNC and type-N connectors, do NOT utilize solder to connect the coax shield to the connector body – it's not even an option! It you want to take the "purist" approach, or if the connector will be passing high power, then soldering the shield is probably warranted.

Just remember….

It is vitally important that the cable and connector remain completely stationary during the entire soldering process, until it has cooled to room temperature!!!

You are attempting to solder a fairly large wire (the shield) to a large metal connector. A simple 30-watt iron – by itself – is not up to the task. A soldering gun – even a propane torch, is an option, but far from perfect. I prefer to use a heat gun (or a propane torch) to preheat the connectors' body, and then complete the soldering process with the 30-watt iron. This method has proven to give consistent, superior results, and reduces the odds of inadvertently causing a short circuit.

Begin by mechanically securing the connector. Orient one of the shield holes straight up, and then attach a set of vice grips as shown. This will allow access to 3 holes without having to move the connector. Don't over tighten the vice grips – just get a reasonably firm grip.

Apply flux to the shield through the holes in the main body.

Using a heat gun (or a carefully controlled propane torch), preheat the connectors' body (avoiding the center pin). Keep the heat source in constant motion – heating all sides of the body. It should only take about 10 – 20 seconds.

Quickly clean the soldering iron tip, melt on a bit of solder, and firmly apply it to the exposed shield. Melt in solder until the hole is covered. If you've preheated the connector sufficiently, the solder will melt easily and quickly to the shield and the connector body.

Immediately solder all accessible holes then let the connector rest undisturbed until it has completely cooled. Any movement will allow the wires to move through the hot, soft plastic, and cause a short circuit that ruins the entire effort.

Once the connector has fully cooled, bring the locking ring up to the connector body, screw it fully on, and you're done!