

A Different Way to Assemble PL-259 Coax Plugs

This is the way Tim Duffy, K3LR, puts together coax plugs for his mega contest station.

Robert Bastone, WC3O

What could possibly go wrong with a PL-259 UHF coax plug? That is a question I pose when I do my little skit about how to solder a venerable PL-259 onto a piece of RG-8 size coax. At Skyview Radio Society we have an Elmer night every month to talk about some subject or to build some small project. One month we had a discussion about how to solder a PL-259. When the evening was over we learned one thing: Everyone has a different way to do the job! But what is the best way? Good question.

Yet Another Way

I would like to describe a unique way of connecting a PL-259 that you will never find in any official instruction manual. I have adopted this technique and have decided that this is the best method to attach a PL-259 to the end of a piece of RG-8 size coax. This method leaves you with a rock-solid absolute connection. You can't go wrong.

So what can go wrong with a PL-259 anyway? Lots. I have soldered many connectors over the years and, if you're like me, you have ruined many connectors and pieces of coax. Have you ever thought you had good solder flow between the PL-259 body and the shield, but you didn't? Have you ever over-heated the coax and melted the inner dielectric? Have you ever had a single piece of shield wire short out your connector, but you found out only after you soldered the thing on? Yes, I've done it all. You likely have too.

How to Do It

This technique of soldering a PL-259 is commonly known as the K3LR method. If you are familiar with contesting then you know very well who Tim Duffy, K3LR, is. Tim owns and operates a major contest station in western Pennsylvania that has an impressive antenna farm (see www.k3lr.com).

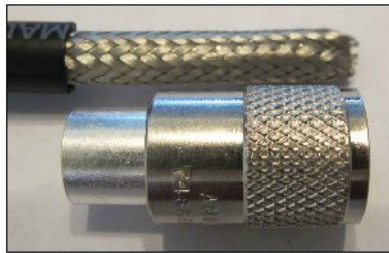


Figure 1 — First line up the tips and cut the outer jacket off to expose the shield braid.



Figure 2 — Push the shield back so that you can get under it with a small set of wire cutters.



Figure 3 — Cut around the shield braid leaving about 1/2 inch of exposed shielding then push the remaining shield braid back over the coax jacket.

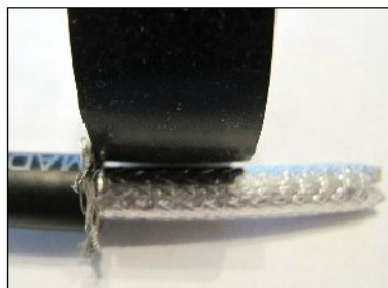


Figure 4 — Wrap one tape width over the dielectric.

com). Tim credits this unique soldering method to Bill Maxson, N4AR, an Elmer he had years ago. Tim says he has hundreds of these connections in his multi-multi, high-power contest super-station and has never had a single failure. You can find the details of this soldering technique on his website, as well as in a YouTube video.

So how is it done? It's simple. The major difference with this method is that the coax shield is soldered onto the outside of the PL-259 body. You start by leaving the threaded sleeve on the connector. Tim says he uses only silver plated PL-259s, in particular Amphenol connectors with part number 83-1SP. It pays to know where your connectors come from and that every detail is correct. After all, you plan on using these for a very long time!

Now hold the complete connector up to the RG-8 type coax, lining up the tips, and cut the outer jacket off to expose the shield braid (see Figure 1).

Push the shield back (see Figure 2) so you can get under it with a small set of wire cutters. Cut around the shield braid leaving about 1/2 inch of exposed shielding (see Figure 3). Now push the remaining shield braid back over the coax jacket.

Use good quality standard electrical tape such as Scotch 33 or 88 to wrap one tape width over the dielectric (see Figure 4). You can use the width of the tape to measure from the pulled-back shield to where you will be cutting the inner dielectric. Cut and slide that dielectric off of the center conductor (see Figure 5), give the center conductor a twist and tin the wire.

If the coax you are using has a foil shield under the braided shield, leave the foil on. Just make sure that the foil is cut back slightly and can't accidentally short to the center conductor. Wrap the tape around the inner dielectric three or four times. This helps keep the dielectric centered inside the connector body. Next slide the coax up through the PL-259 and solder the



Figure 5 — Use the width of the tape to measure from the pulled-back shield to where you will be cutting the inner dielectric. Cut and slide that dielectric off of the center conductor.



Figure 6 — Wrap the remaining shield braid around the outside of the PL-259 body and work it around so that the braiding stays close to the shell.

center conductor. If you measured where you cut the outer jacket as suggested, it should line up to where the connector body ends. Wrap the remaining shield braid around the outside of the PL-259 body and work it around so the braiding stays close to the shell (see Figure 6).

It is important that you use the correct power soldering gun to solder the shield. Don't even think about using a pencil-type iron. I use a 240 W gun. I have also used 125 W guns with good results. You need to get the connector shell hot enough to accept the solder. The 240 W gun really



Figure 7 — Solder the shield to the body all the way around, trying not to allow the solder to flow toward the threaded sleeve.



Figure 8 — Wrap the soldered shield with good quality electrical tape so that any ragged shielding is safely covered.

shines here. It helps, but is not necessary, to have two people here. If there are two, one can rotate the coax and one does the soldering. Solder the shield to the body all the way around, trying not to allow the solder to flow toward the threaded sleeve (see Figure 7). I have found that attaching an SO-239 socket or PL-258 barrel connector onto the PL-259 keeps the sleeve from sliding back and getting in your way while soldering.

After soldering, and while the connector body is still warm, wrap the soldered shield with good quality electrical tape so that any ragged shielding is safely covered. The heat of the connector will help the tape stick. I have also

done these with heat-shrink tubing for a more finished look and added strain relief (see Figure 8). That's it — you're done!

Now, what's wrong with this picture? You will hear people say that by making this type of connection, you will be inserting an impedance bump (a short section with a Z_0 other than 50 Ω) in the feed line. This is not an issue, at least at HF. In fact, the PL-259/SO-239 combination does not make a 50 Ω connection, either — it's more like 35 Ω . You need to move to connector families such as BNC, Type N or HN to obtain constant impedance through the connectors — that's why they are recommended for UHF and above, where it does matter.

Go ahead and give the K3LR method a try. I think you will agree that this is the definitive way to solder a PL-259. You will do it and never look back. Thanks, Tim, K3LR, for the great tip.

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