

Instructions for Cobalt Series Coaxial Cable Termination Kits

Introduction

This document details the procedure for terminating a coaxial cable using the Blue Trail Engineering Cobalt Series Coaxial Cable Termination Kit, which features a custom MCX jack intended for RG174, RG316, RG-188A, or LMR100 coaxial cables.

This procedure requires experience with terminating coaxial cables as well as familiarity with potting techniques used with 2-part epoxy.

The cable to be terminated must have a bondable outer jacket (preferably polyurethane). If the outer jacket is not bondable, it is possible to insert the cable into a length of polyurethane tubing, which then becomes the outer jacket. This technique will be shown in these instructions. In either case, the diameter of the cable jacket should be no greater than 6.4 mm.



Included materials

The Cable Termination Kit includes:

- qty. 1. Connector Shell
- qty. 1 Connector Insert (made from PEEK plastic)
- qty. 1 MCX Connector (in three parts: body, center contact, and crimp ferrule)
- qty. 1 Locking Sleeve
- qty. 1 O-Ring

Required tools and materials

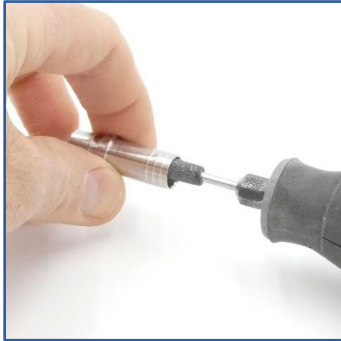
The following tools and materials are used in this procedure:

- soldering iron and solder
- wire strippers
- coaxial cable crimp tool
- Dremel tool or equivalent
- 6mm (¼") diameter grinding bit
- drill press or arbor press with vise
- syringe with needle (3 cc syringe with 16G, 30mm needle recommended)
- acetone
- suitable epoxy adhesive*
- optional: polyurethane tubing for outer jacket, such as BTE part number TUB-1101

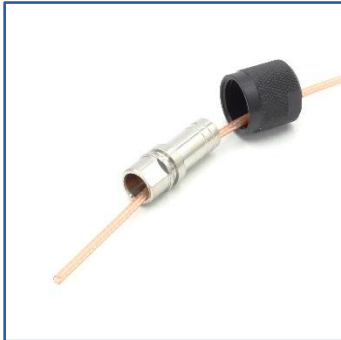
*Blue Trail Engineering has tested 3M DP-420 epoxy in this application. Other epoxies or potting materials may work, but it is the customer's responsibility to test them thoroughly in this application.

Procedure

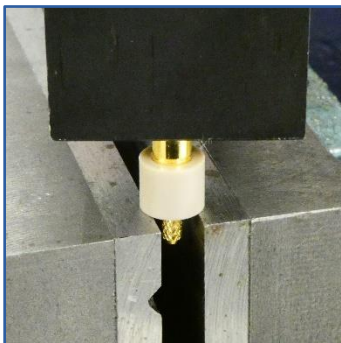
1. Use a 6 mm (¼") grinding bit in a Dremel tool to thoroughly abrade the inside of the Connector Shell where the cable will enter. When done, the inside of the Connector Shell should be visibly and thoroughly abraded. However, do not abrade the portion where the Connector Insert will go.



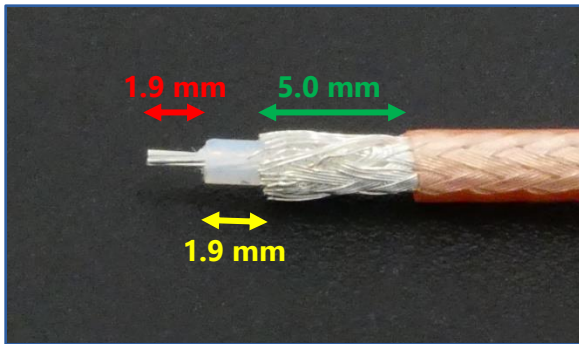
2. Clean the inside of the Connector Shell with acetone and allow to dry.
3. Slide the Locking Sleeve onto the cable with the internally threaded part of the Locking Sleeve facing towards the end of the cable. Then slide the Connector Shell over the cable. The end of the Connector Shell that has the flat surface should be facing the end of the cable. If you are using polyurethane tubing as your outer cable jacket, slide it over the coaxial cable as well (below, right). **VERY IMPORTANT: the Locking Sleeve and Connector Shell must be installed at this point in the process. They cannot be installed later.**



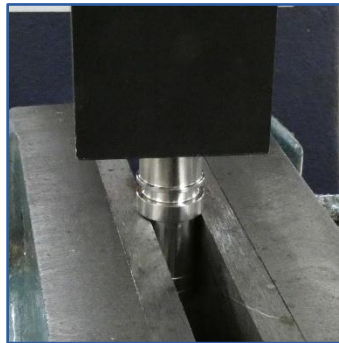
4. Using a drill press or arbor press and a vise, press the MCX Connector into the Connector Insert as shown below.



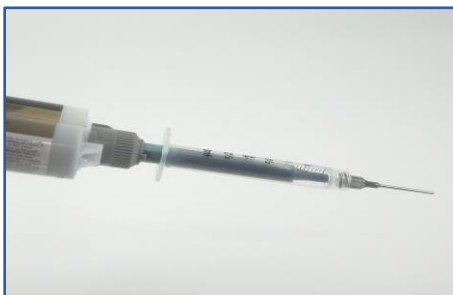
5. Terminate the coaxial cable with the MCX Connector using the strip lengths shown below. Optional: cover the crimped area with heat shrink tubing.



6. Abrade the last 3 cm of the cable jacket with sandpaper and clean with a paper towel that has been slightly moistened with acetone to prepare it for potting. From this point on, be careful to keep this part of the cable jacket clean.
7. Gently clamp the Connector Shell vertically in a vise. Using a drill press or arbor press, push the Connector Insert into the Connector Shell. Ensure that the face of the Connector Insert is flush with the end of the Connector Shell.



8. Prepare the epoxy for the potting operation. It is helpful to warm up the epoxy slightly to ensure that it flows easily. It should be at least at room temperature, preferably slightly warmer.
9. Install a mixing tip on the epoxy cartridge (mixing tips greatly reduce the likelihood of getting bubbles in the epoxy). Discard the first 1-2 ml of epoxy that comes out of the mixing tip. Insert the mixing tip deep into the syringe and inject the epoxy or into the syringe. Try to fill the syringe without getting any air bubbles into the epoxy. Alternatively, the needle might fit directly on the mixing tip. In this case, you do not need a syringe.



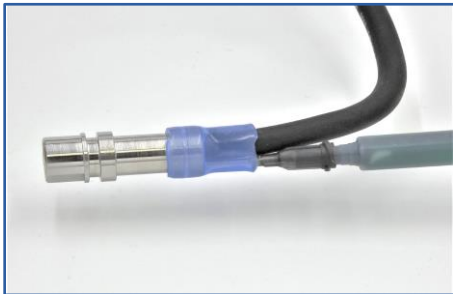
10. Insert the syringe with needle deep into the Connector Shell. Inject the epoxy into the Connector Shell until the epoxy starts to come out the rear of the Connector Shell. Move the cable around inside the Connector Shell to ensure that both the outer surface of the cable jacket and the inner surface of the Connector Shell are fully wetted with epoxy. If necessary, inject the epoxy at several places around the circumference of the Connector Shell. Continue injecting epoxy while withdrawing the needle from the Connector Shell. Avoid injecting any air bubbles into the Connector Shell.



11. Clean off the excess epoxy with a paper towel and acetone or alcohol.
12. Allow the epoxy to cure fully without disturbing the assembly.
13. Lubricate the O-ring and install it in the groove on the Connector Shell, making sure that the groove and the O-ring are free from lint, hair, or other contamination.

Tips and Tricks

1. You can get a clean, professional-looking result by using a piece of silicone tubing as a “mold” for the epoxy. Choose silicone tubing with an inner diameter equal to the cable’s outer diameter. Cut the silicone tubing to about 20 mm long. Slide it onto the cable between the Locking Sleeve and the Connector Shell as shown below. When the time comes to inject the epoxy, push the silicone tubing over the end of the Connector Shell (this may be difficult). Push the needle under the silicone tubing and inject epoxy until the epoxy comes out the end of the silicone tubing. Keep injecting more epoxy while withdrawing the needle. Move the cable around inside the Connector Shell to ensure that both the outer surface of the cable jacket and the inner surface of the Connector Shell are fully wetted with epoxy (keep the silicone tubing in place while you do this). Clean up the excess epoxy with alcohol or acetone. When the epoxy has cured, carefully cut off the silicone tubing. The epoxy at the end of the Connector Shell should have a nice, tapered shape.



2. If you do not have a suitable vise for holding the Connector Shell (see step 7 above), you can clamp a 2-piece shaft collar around the Connector Shell. Then place it on an arbor press base plate as shown below to complete the pressing operation.

