

## FOA Reference Guide



## Virtual Hands-On Coax Cable Termination



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This FOA virtual hands-on (VHO) tutorial on fiber optics is intended to help understand the process of terminating coax cable with a crimp-on F-type connector. It is copyrighted by the FOA and may not be distributed without FOA permission.

## Coax Connectors

- BNC (left)
  - Network, video
  - Used for RG-58, 62
  - Uses separate pin for contact
- F (Right)
  - CATV, satellite TV
  - RG-6
  - Center conductor is pin for connector



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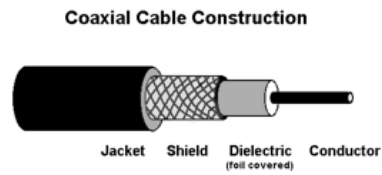
The two most common coax connectors are the BNC and F types. The BNC is used for RG-58 50 $\Omega$  or RG-62 75  $\Omega$  cable. RG-58 has been used for networking, eg “Thinnet,” a cheaper version of Ethernet on coax, also called 10Base2. RG-62 is more widely used for CCTV or other video circuits. The BNC connector has a separate center pin that is crimped or soldered on the end of the center conductor of the cable during termination.

The F connector is the standard connector for CATV and satellite TV. It uses a very stiff center conductor that acts as the center pin of the connector, saving cost and termination time. Trivia: the center conductor of the RG-6 CATV cable is made of steel coated in copper. The higher conductivity of copper is not needed, since the high frequency of TV signals (~100 MHz) causes the signal to remain on the surface of the conductor, called the “skin effect.” The use of the center conductor as a pin for the connector makes the F connector simple to terminate and inexpensive.

We will show the termination of RG-6 with F connectors. The termination of BNCs is similar but requires crimping a contact onto the center conductor.

## Coax Cable Construction

- Hard center conductor
- Foam dielectric
- Foil shield
- Braided shield
- Jacket



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### Coax Cable Construction

Hard center conductor

Foam dielectric

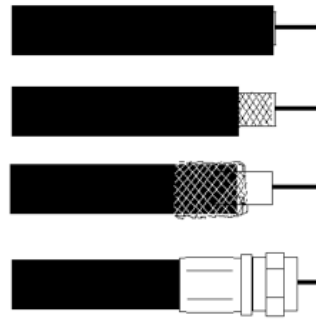
Foil shield

Braided shield

Jacket

## Termination Process

- Strip center conductor
- Strip jacket
- Roll back shield
- Push on connector
- Crimp
- Alternate: screw-on connector



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The Termination Process:

Strip center conductor

Strip jacket

Roll back shield

Push on connector

Crimp

Alternate: Screw-on connectors can be used. The cable is stripped then the connector is screwed onto the cable with a screwdriver-like device or T-handle.

## Stripping Coax

- 2 step process
- First remove everything down to the center conductor
- Many types of strippers available
- Adjust for full cut



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Stripping coax is a 2 step process

First remove everything down to the center conductor using a coax cable stripper to expose 3/8 inch (~10 mm) of center conductor

Many types of strippers are available. Most use adjustable blades for the two cuts, as this cut is done deeply, while the second cut is much shallower.

## Strip To Conductor

- After cutting with the stripper, remove everything down to the center conductor
- Helps to twist foam core to break loose from conductor



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The first step is to strip to the center conductor

After cutting all the way into the conductor with the stripper, remove everything down to the center conductor

Sometimes it helps to twist the foam core to break it loose from conductor

## Cable Stripped To Conductor

- You should have the cable stripped completely to the center conductor
- Length determined by the connector, but usually 3/8 inch (~10 mm)



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### Cable Stripped To Conductor

You should have the cable stripped completely to the center conductor, exposing 3/8 inch (10 mm) of the center conductor

Length may be determined by the connector

## Second Strip - Jacket Only

- Set stripper blade to cut jacket but not damage shield braid
- Peel off jacket



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### Second Strip - Jacket Only

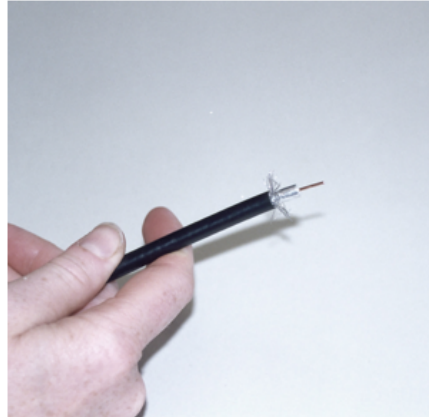
Set stripper blade to cut through the jacket but not damage shield braid. This may require making several test cuts and adjusting the coax stripper blade

Peel off jacket, exposing the braided shield



## Fold Shield Back

- Fold the braided shield back over the jacket to contact the connector body
- The “pin” formed by the center conductor is visible
- Foam holds pin in place



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### Fold Shield Back

Fold the braided shield back over the jacket to contact the connector body

The “pin” formed by the center conductor is visible

Foam holds pin in place

## Slide Connector Onto Cable

- Push the connector on the cable to the proper depth
- Pin should protrude slightly



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### Slide Connector Onto Cable

Push the connector on the cable to the proper depth, where the pin should protrude slightly

## Crimp

- Crimp with die specified for the connector
- Some require two crimps



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### Crimp

Crimp with the die size specified for the connector

Some connectors require two crimps, one close to the nut that is larger and a smaller one on the cable

## Finished Connector

- Here is the finished connector
- Can also use a “screw-on” connector, but not as good performance



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Here is the finished connector

You can also use a “screw-on” connector, which has not as good performance or a compression connector which is as good as better than the crimp connector. These require stripping in the same fashion but use a screwdriver or T-handle to screw the connector on the cable.

## Testing Coax

- Generally only test continuity with ohmmeter or coax cable tester
- Problems:
  - Opens: no contact on connector shell
  - Shorts: braid wire contacts center conductor
  - Kinking: causes frequency response



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### Testing Coax

Generally, installers only test coax cable continuity with ohmmeter or coax cable tester. You can loop it to test from one end with a terminator or a clip lead.

#### Problems:

Opens: no contact on connector shell, the braid did not get crimped to the shell properly.

Shorts: braid wire contacts center conductor. Stray wires from the braid may get twisted around the center conductor, shorting the cable. Check closely for all braid wires before putting the connector on.

Kinking: causes frequency response, especially at higher frequencies. Severe kinks require replacement.

# FOA Guide - Virtual Hands-On

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