9. Set the DMC crimping tool to position 4 (for 24 AWG wire), and give the positioner a clockwise twist to ensure that it is set properly and will crimp the contact pins on four sides.
10. Place a contact pin on a lead and check that the lead is inserted completely by looking in the hole in the contact pin; see *Figure 51*. There should be no more than 1 mm (0.04 in.) of exposed conductor protruding from the pin.

    Insert the pin into the DMC tool as far as it can go, and crimp the pin. The DMC tool has a ratchet mechanism that does not release until the pin has been crimped properly.

    Repeat this step for each lead.

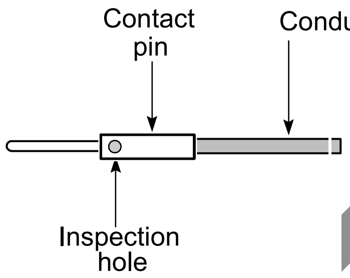


Figure 51 – Attaching a contact pin

11. Arrange the four pins as indicated in *Figure 52*, and insert them simultaneously into the insert; the pins enter the side of the insert that has the white marking. The pins must be inserted simultaneously because the conductors are not long enough to be inserted one at a time. Push each pin until it clicks into position, then confirm that contact is secure by gently pulling on the conductor.

    The white marking on the insert identifies the pins. The white circle identifies pin 1, and pins 2, 3 and 4 follow counterclockwise.

    Use the removal tool if the pins are in the wrong holes.

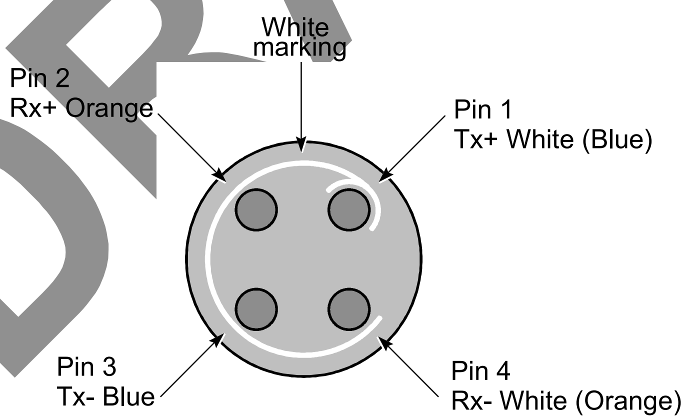


Figure 52 – Inserting the contact pins

12. Put the insert into the insert carrier; see *Figure 53*.

    When assembled properly, the tab on the carrier faces towards the pins, the tab on the insert fits in the cutout in the carrier, and the bevel in the carrier fits on the bevel on the cone washer. The matching bevels pinch the braided shielding when the connector is completely assembled.

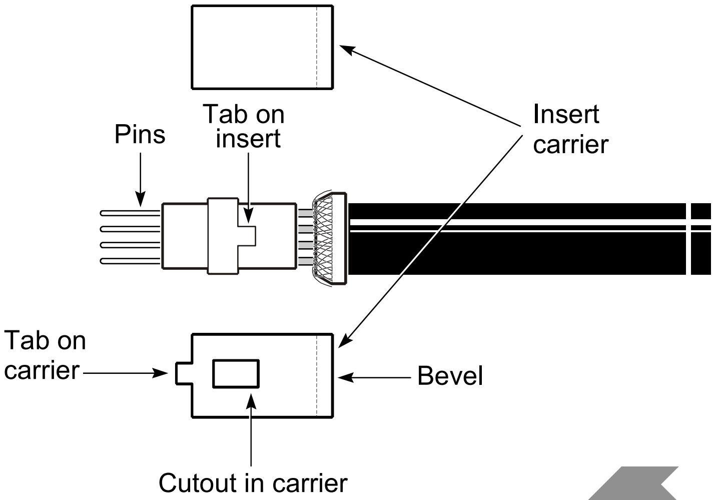


Figure 53 – .Putting the insert into the insert carrier

13. Put the insert carrier into the connector body; see Figure 54.

    The red dot on the outer shell aligns with the tab on the insert carrier. You should feel a slight click when the carrier locks into place. It may be necessary to gently push the cable while carefully rotating the connector body until the click is felt.

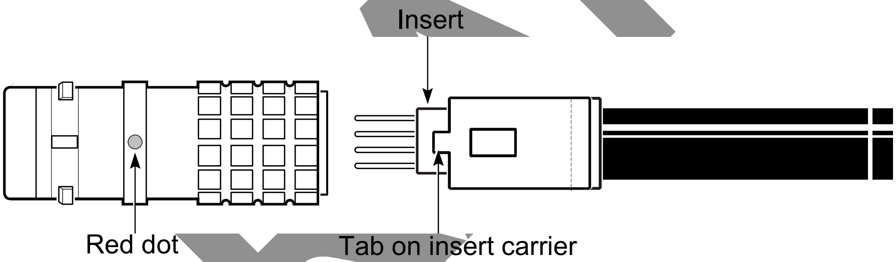


Figure 54 – Inserting the insert carrier into the outer shell

14. Tighten the connector by turning the collet nut to 6.9 Nm (5 ft-lb) of torque; see Figure 55. Do not rotate the connector body.

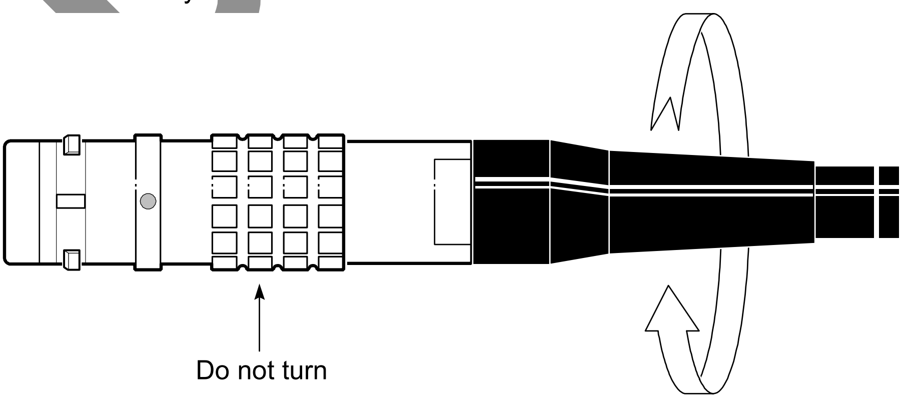


Figure 55 – Tightening the connector

15. Push the bend relief on to the collet nut.

2.9 – Installing an L4PNM Heliax connector

2.9.1 – Overview

The following parts are required:

– Heliax LDF4 cable.

– Heliax L4PNM connector (solder-connect or ring-flare variant).

All tools and hardware required for this procedure except wrenches and soldering tools should be ordered from Heliax. See *Appendix A* for details.

Note - Newbridge Broadband Wireless equipment should only be installed by qualified individuals who are trained and certified for the type of installation task assigned to them.

2.9.2 – To add a solder-connect L4PNM connector

1. Strip 51 mm (2 in.) or more of the cable jacket from the IF cable, ending at the lowest point of a valley between two corrugations, as shown in *Figure 56*.

Note - This step can be done more accurately and quickly if Heliax cable tool 207886 is used to score the cable jacket and cut the outer conductor.

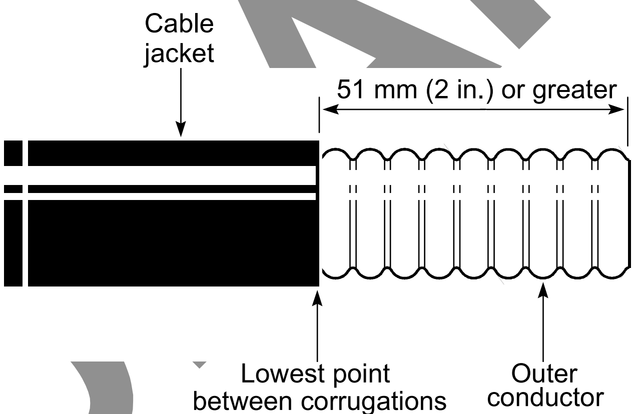


Figure 56 – Removing the insulation

2. Install the O-ring on the first corrugation valley as shown in *Figure 57*.

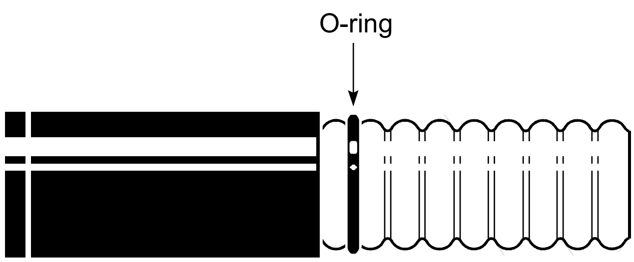


Figure 57 – Installing the small O-ring

3. Use a small grease brush to lubricate the O-ring with the silicone grease shipped with the connector.
4. Install the clamping nut on the cable by sliding it over the cable end until it is stopped by the O-ring. The fingers of the clamping nut should stop exactly half-way through a corrugation peak, as shown in *Figure 58*.

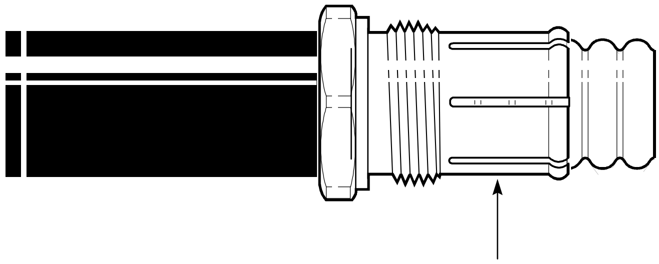


Figure 58 – Installing the clamping nut

5. Remove the portion of outer conductor that is not covered by the clamping nut.

Note - Substep i is unnecessary if Heliax cable tool 207886 was used in step 1 to score the cable jacket, and cut the outer conductor. If the Heliax cable tool was used, proceed to substep 2.

   1. Use a fine-tooth saw to cut through the outer conductor flush with the clamping nut fingers. Do not cut deeper than the outer conductor, and make sure that the cut is made along the entire circumference where the clamping nut fingers meet the outer conductor; see *Figure 59*.

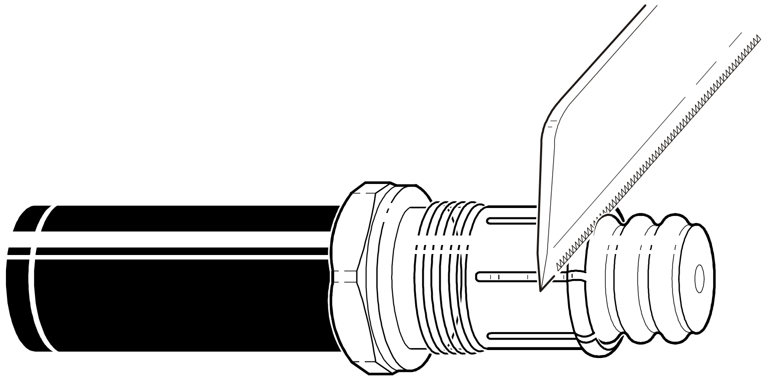


Figure 59 – Cutting the outer conductor

   2. Grasp the outer conductor with pliers, and carefully pull it off. When removed, the foam dielectric is exposed, as seen in *Figure 60*.

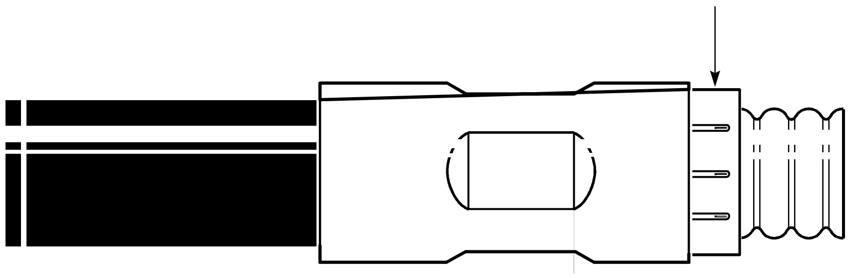


Figure 60 – Foam dielectric

6. Remove the foam dielectric from the inner conductor.

    1. Use a knife to cut the foam dielectric flush with the outer conductor, to the depth of the inner conductor, then cut along the length of the inner conductor several times until all the foam dielectric is removed from the inner conductor; see *Figure 61*.

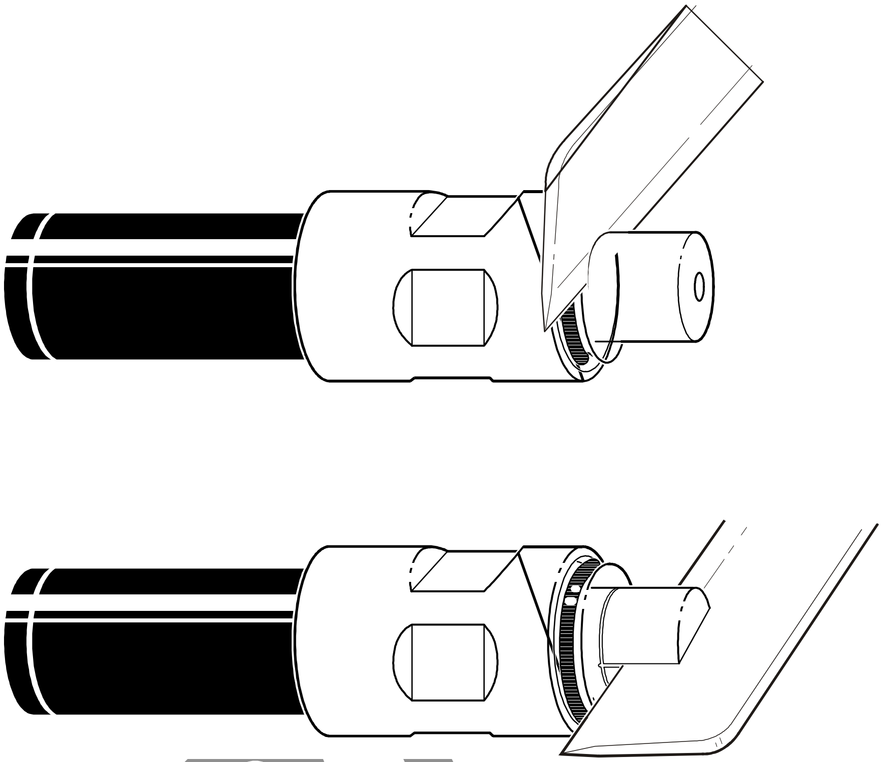


Figure 61 – Removing the foam dielectric

    2. Use a knife to carefully scrape any remaining dielectric foam adhesive from the inner conductor. Be careful not to damage the inner conductor.

7. Trim the inner conductor.

    1. Use a fine-tooth saw to trim the inner conductor to 5 mm (7/32 in.) from the outer conductor and clamping nut fingers, as shown in *Figure 62*.
    2. Use a small file to remove any burrs on the end of the inner conductor.
    3. Use a clean wire brush to remove any debris from the foam dielectric.

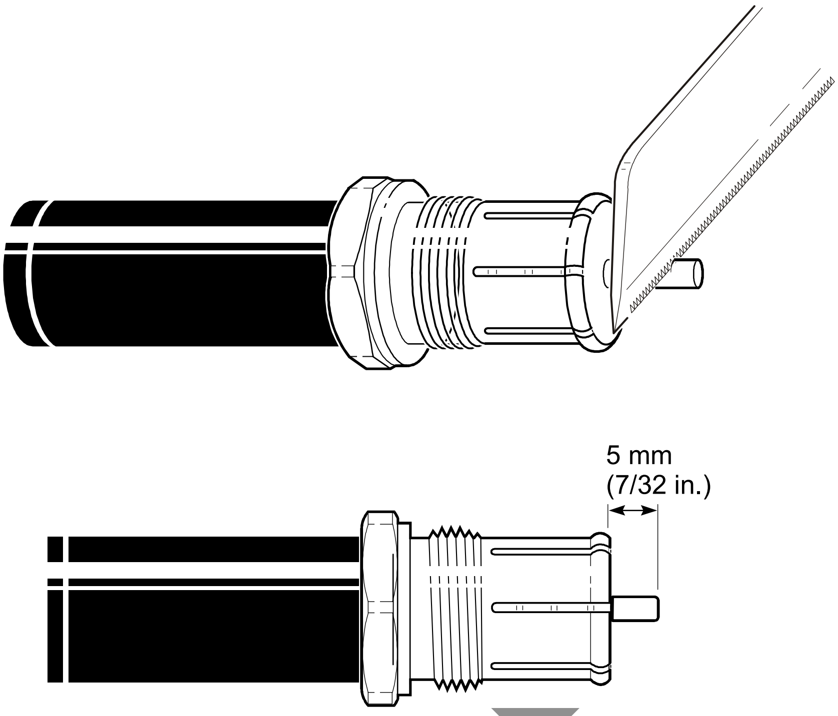


Figure 62 – Trimming the inner conductor

8. Use a knife to compress the foam dielectric away from the outer conductor as shown in Figure 63.

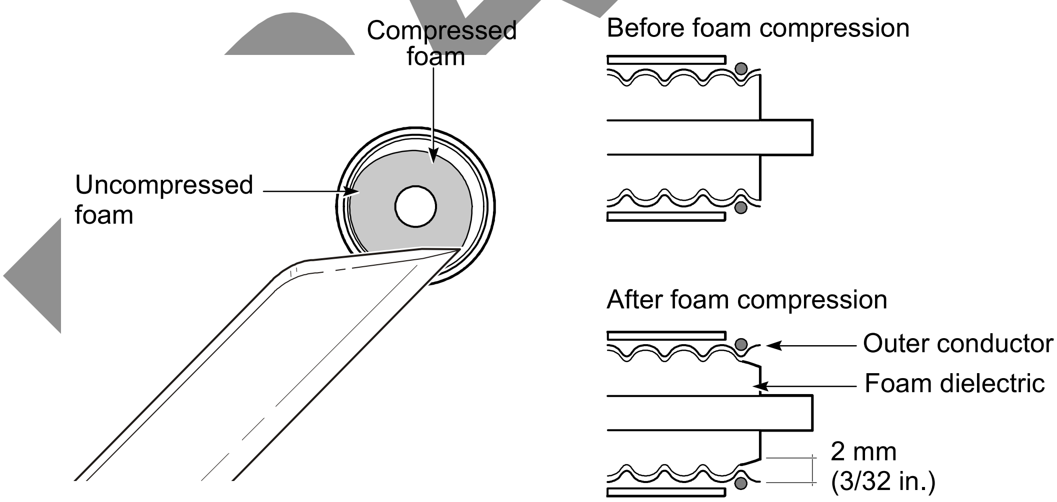


Figure 63 – Compressing the foam dielectric

9. Flare the outer conductor:
   1. Use a flaring tool to flare the outer conductor, as shown in Figure 64. The flared outer conductor should not extend past the clamping nut fingers.
   2. Use a small file to remove any burrs or irregularities on the end of the inner conductor.
   3. Use a clean wire brush to remove any debris from the foam dielectric.

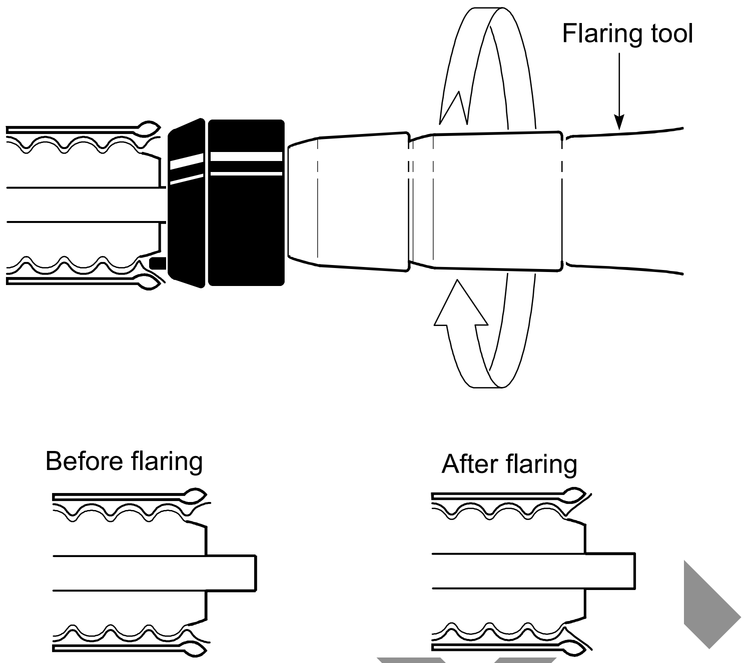


Figure 64 – Flaring the outer conductor

10. Solder the pin to the inner conductor:
    1. Cut 1 mm (0.040 in.) diameter solder to a length equal to the depth of the pin cup, roll the length into a ball, and insert it into the pin cup. When the pin cup is heated by the soldering iron, this solder will melt and provide a even solder bond on the inside of the pin cup.
    2. Use the heat shield, soldering pliers and soldering iron to solder the pin to the inner conductor, as shown in *Figure 65*. Apply extra solder to the holes in the pin cup if required.
    3. Remove excess solder from the solder holes using wire cutters and/or emery paper.

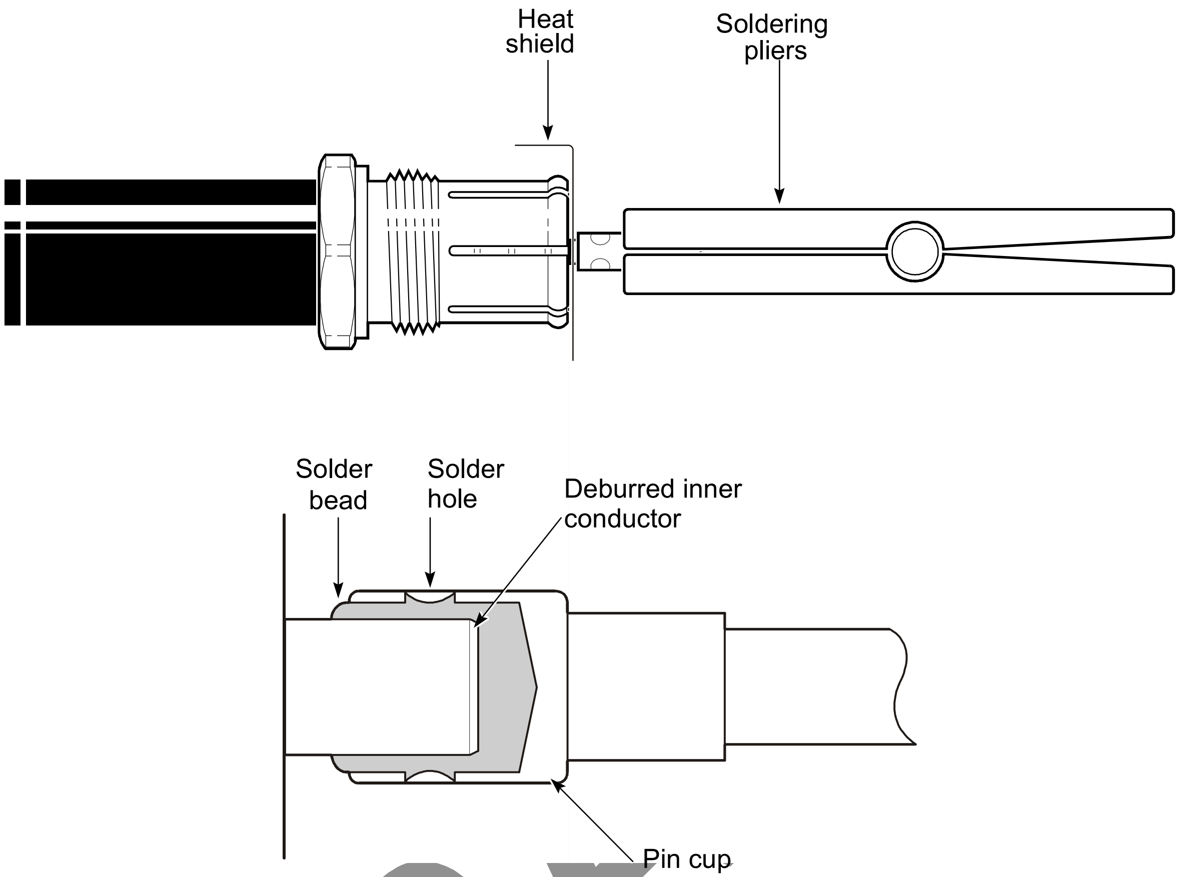


Figure 65 – Soldering the pin

11. Verify that the pin is installed at a 90° angle with respect to the clamping nut, as shown in *Figure 66*. If the pin is not straight, and cannot be corrected, remove it, and start the procedure again.

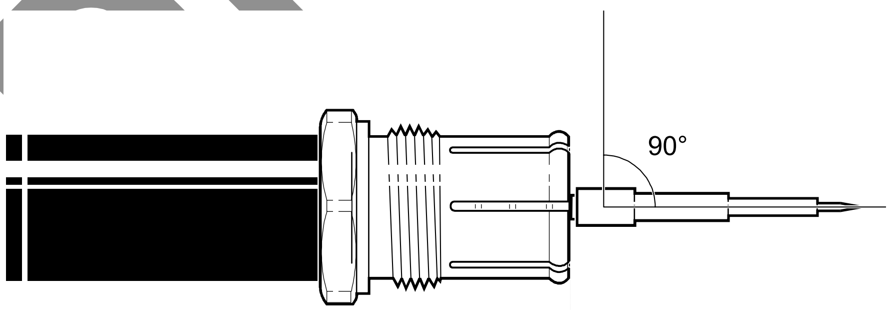


Figure 66 – Checking the pin

12. Add the large O-ring to the clamping nut, as shown in *Figure 67*.

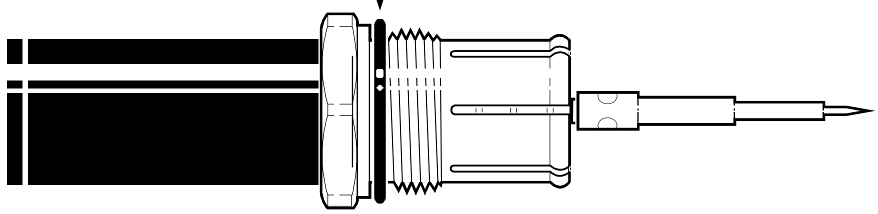


Figure 67 – Adding the large O-ring

13. Use a small grease brush to lubricate the O-ring with the silicone grease included with the connector.
14. Add the outer connector body to the clamping nut and pin. Hold the clamping nut stationary with one wrench, and thread the connector body onto the clamping nut with another wrench; see *Figure 68*. Do not turn the clamping nut, only turn the connector body. Tighten to 1.9 to 2.4 Nm (16.8 to 20.8 in.-lb) of torque.

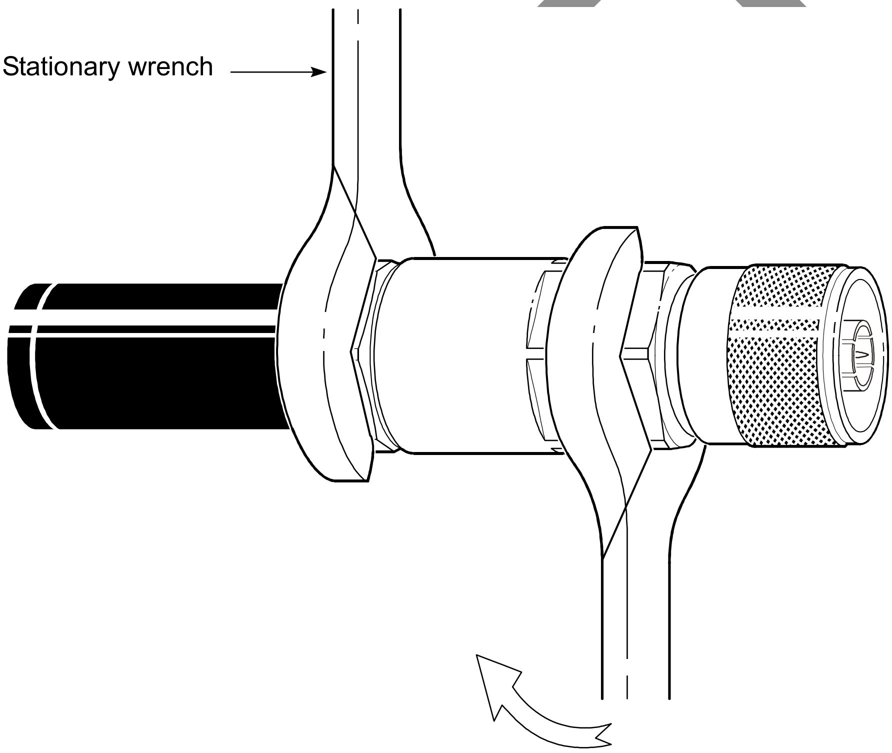


Figure 68 – Assembling the connector

2.9.3 – To add a ring-flare L4PNM connector

1. Strip 51 mm (2 in.) or more of the cable jacket from the IF cable, ending at the lowest point of a valley between two corrugations, as shown in *Figure 69*.

Note - This step can be done more accurately and quickly if Heliax cable tool 207886 is used to score the cable jacket and cut the outer conductor.

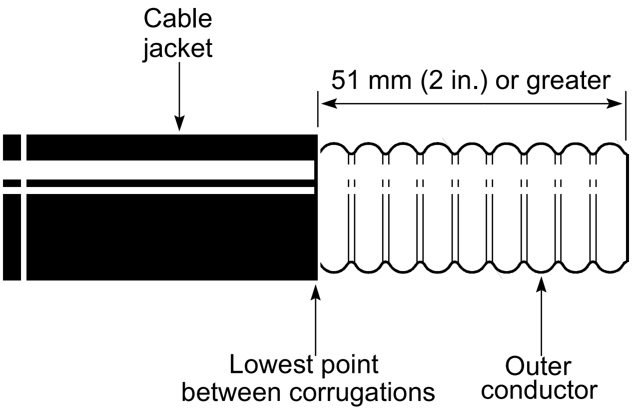


Figure 69 – Removing the cable jacket

2. Install the O-ring on the first corrugation valley as shown in *Figure 70*.

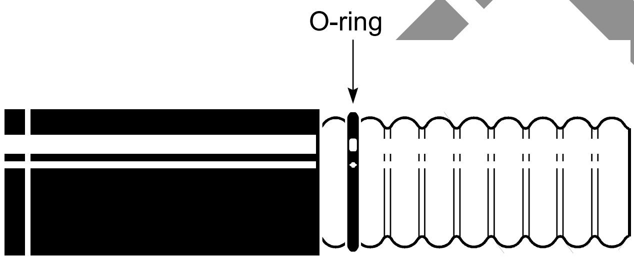


Figure 70 – Installing the small O-ring

3. Use the small brush to lubricate the O-ring with the silicone grease included with the connector.
4. Install the connector body on the cable by sliding it over the cable end until it is stopped by the O-ring, as shown in *Figure 71*. Install the spring ring on the first corrugation valley after the cable body, as shown in *Figure 71*.

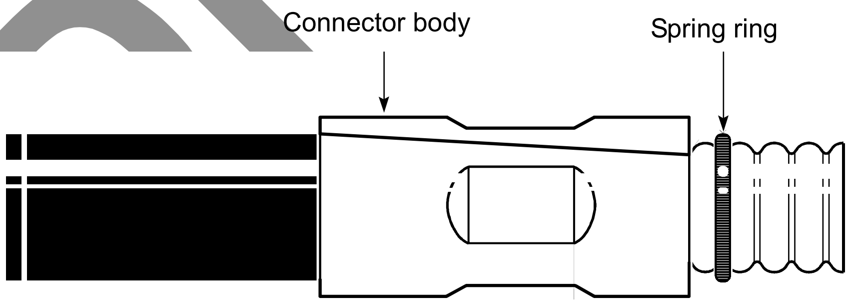


Figure 71 – Installing the connector body and spring ring

5. Slip the outer conductor cutting guide over the cable and onto the spring ring, as shown in *Figure 72*.

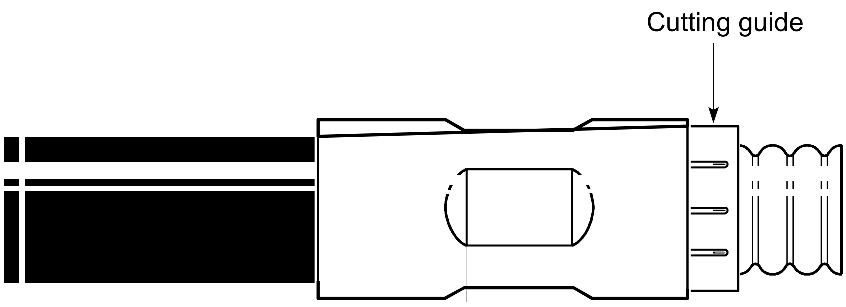


Figure 72 – Adding the cutting guide

6. Remove the outer conductor:

Note - Substep 2 is unnecessary if Heliax cable tool 207886 was used in step 1 to score the cable jacket, and cut the outer conductor. If the Heliax cable tool was used, proceed to substep 2.

1. Use a fine-tooth saw to cut through the outer conductor flush with the cutting guide. Do not cut deeper than the outer conductor, and make sure that the cut is made along the entire circumference where the cutting guide meets the outer conductor corrugation peak; see *Figure 73*. Remove the cutting guide when the cut is complete.
2. Grasp the outer conductor with pliers and carefully pull it off, exposing the foam dielectric, as shown in *Figure 74*.

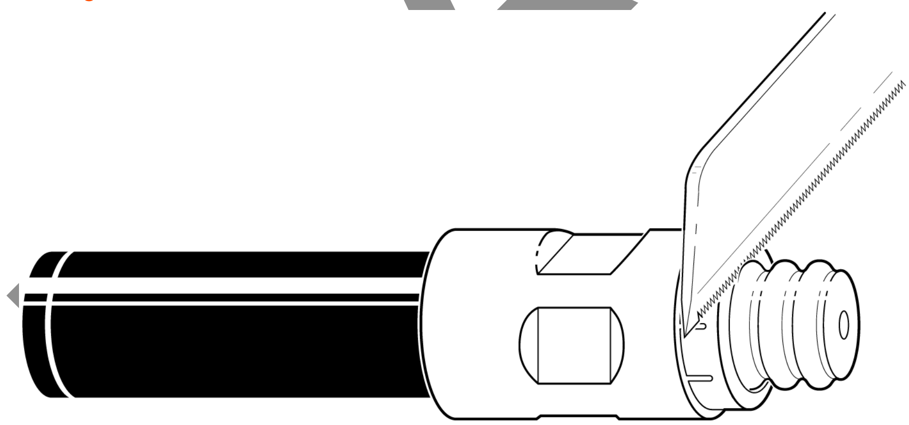


Figure 73 – Cutting the outer conductor

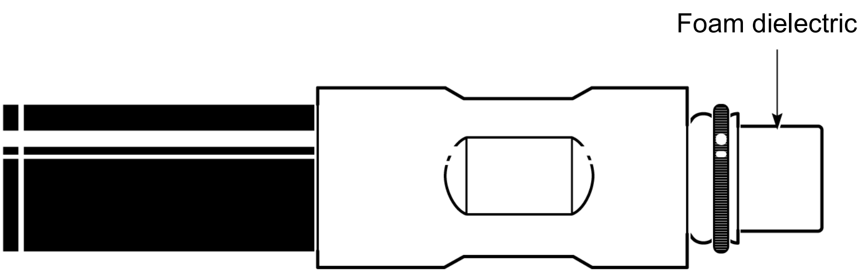


Figure 74 – Foam dielectric

7. Remove the foam dielectric from the inner conductor:
   1. Use a knife to cut the foam dielectric flush with the outer conductor, to the depth of the inner conductor, then cut along the length of the inner conductor several times, until all the foam dielectric is removed; see *Figure 75*.
   2. Use a knife to carefully scrape any remaining dielectric foam adhesive from the inner conductor. Be careful not to damage the copper coating on the inner conductor.

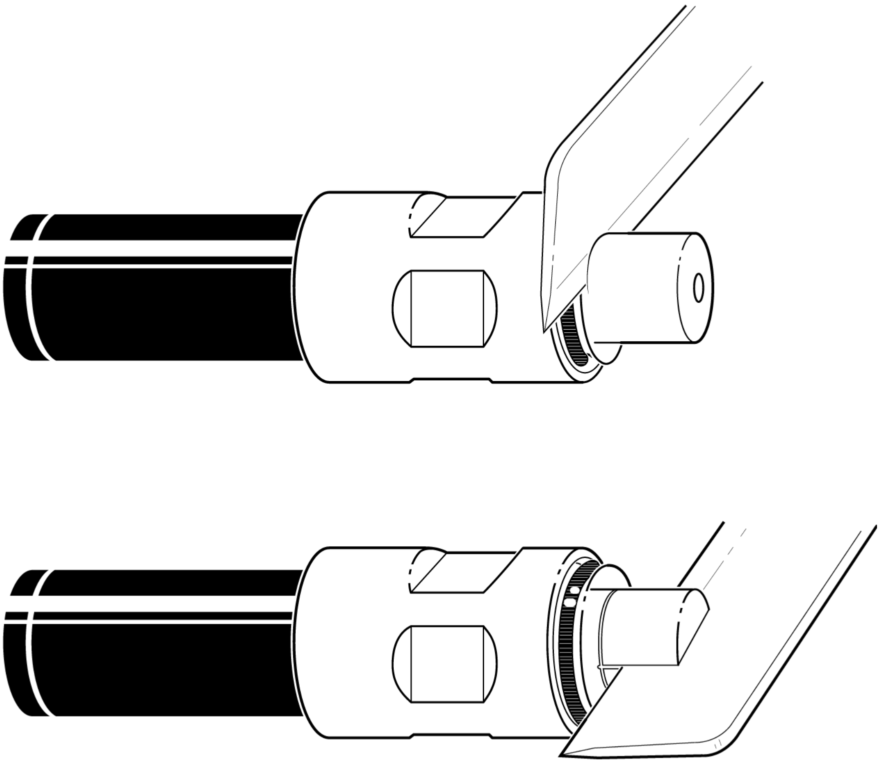


Figure 75 – Removing the foam dielectric

8. Trim the inner conductor:
   1. Add the inner conductor cutting guide, as shown in *Figure 76*.
   2. Use a fine-tooth saw to trim the inner conductor flush with the cutting guide, as shown in *Figure 77*.
   3. File the outer conductor to the specifications shown in *Figure 77*.
   4. Use a clean wire brush to remove any debris from the foam dielectric.

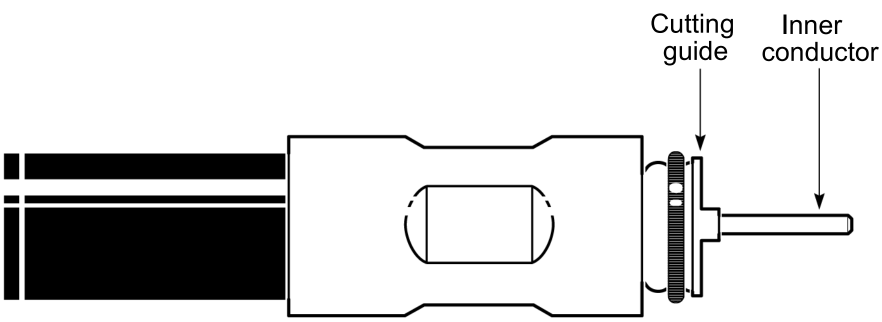


Figure 76 – Adding the inner conductor cutting guide

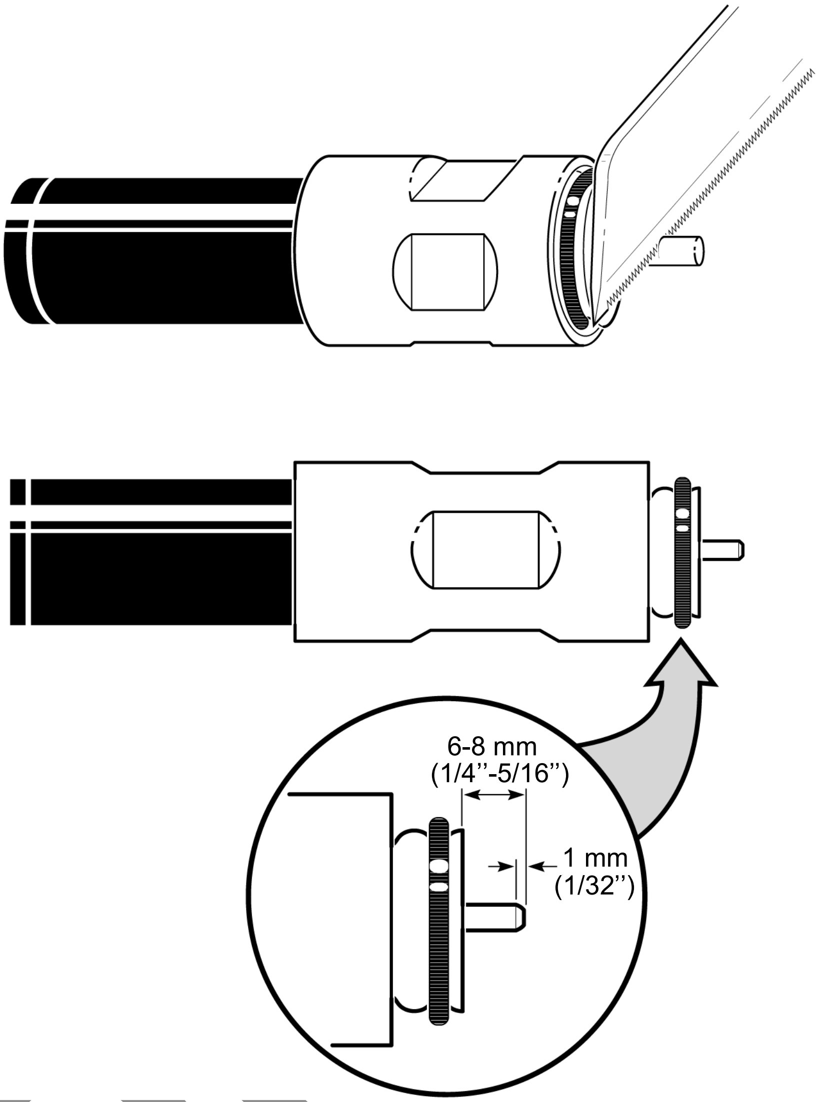


Figure 77 – Trimming the inner conductor

9. Use a knife to compress the foam dielectric away from the outer conductor as shown in *Figure 78*.

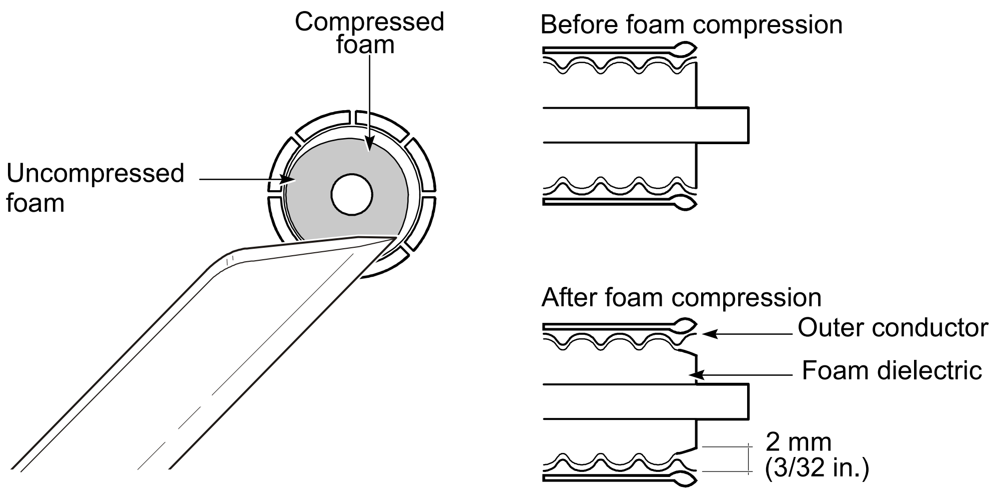


Figure 78 – Compressing the foam dielectric

10. Flare the outer conductor:
    1. Use a flaring tool to flare the outer conductor, as shown in *Figure 79*.
    2. Examine the flare, and use the small file to remove any burrs or irregularities from the flared outer conductor.
    3. Use a clean wire brush to remove any debris from the foam dielectric.

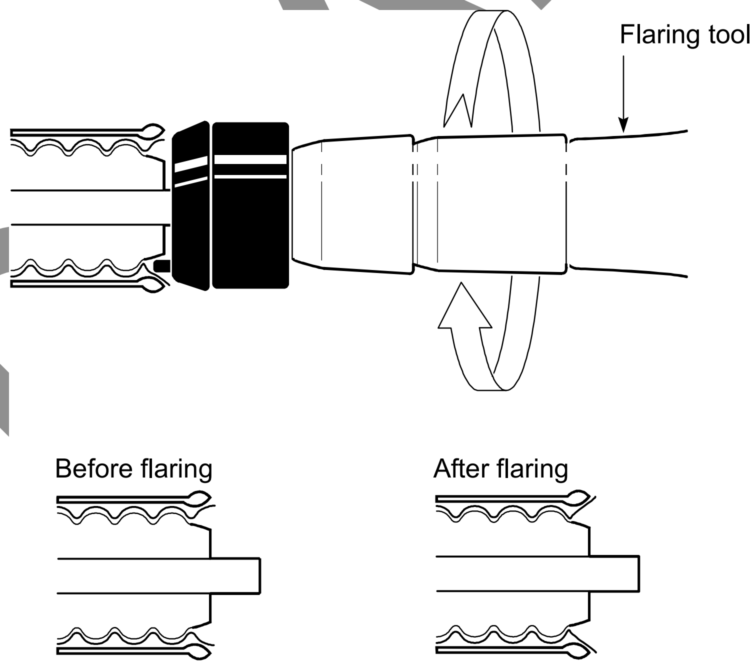


Figure 79 – Flaring the outer conductor

11. Add the large O-ring to the end of the connector, as shown in *Figure 80.*

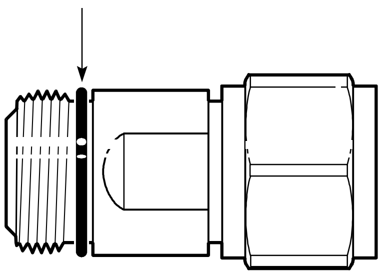


Figure 80 – Adding the large O-ring

12. Use the small grease brush to lubricate the O-ring with the silicone grease shipped with the connector.
13. Add the end of the connector to the connector body. Hold the end of the connector stationary with one wrench, and thread the connector body onto the connector end by turning it with another wrench; see *Figure 81*. Do not turn the connector end, only turn the connector body. Tighten to 1.9 to 2.4 Nm (16.8 to 20.8 in.-lb) of torque.

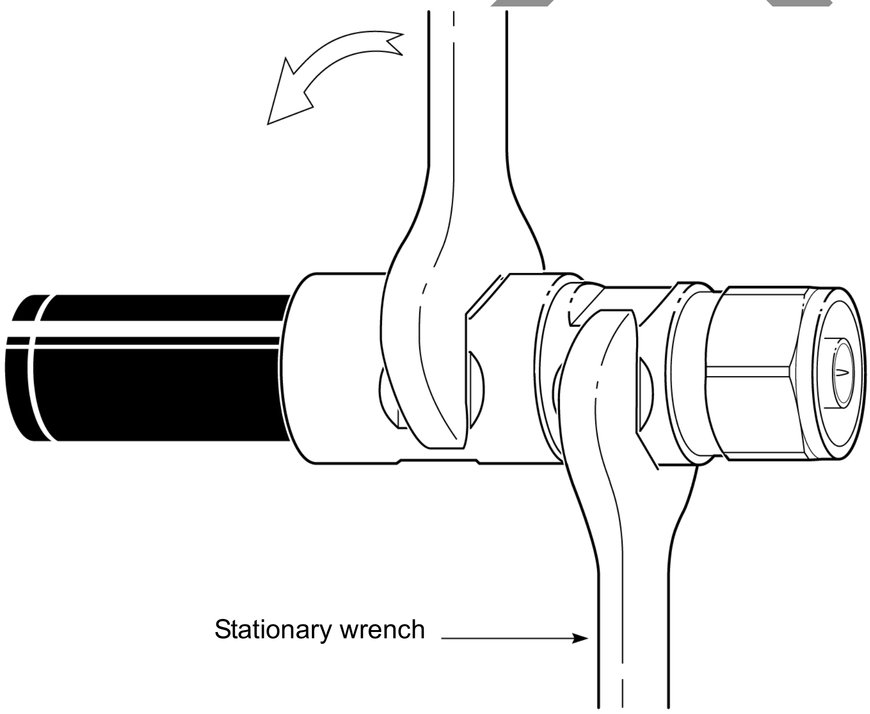


Figure 81 – Assembling the connector

2.10– BT system loss calibration

2.10.1– Overview

This chapter demonstrates how to measure and calibrate the system according to the required upstream and downstream losses.

In both upstream and downstream loss calculations, losses due to connectors and connections, cable runs, and passive devices, such as the Bias-T or 12:2 Combiner/Splitter, are part of the measured loss.

The downstream path loss is measured from the IBS-TLX card Tx SMA cable to the end of the IF cable that connects to the X-Pol RBS Tx. The upstream path is measured from the IBS-TLX card Rx SMA cable to the end of the IF cable that connects to the X-Pol RBS Rx. If the measured upstream or downstream loss is less than the value required, an attenuator is installed between the 12:2 Combiner/ Splitter and the Bias-T.

Table 27 lists the equipment required to calibrate the upstream and downstream IF cable losses.

Figure 82 shows the equipment setup used to measure upstream or downstream cable loss. Measurements should be made at the lowest and highest frequencies of the upstream and downstream IF bands for your system. The average of the pair of measurements is used to determine the nominal amount of attenuation needed in the upstream and downstream paths.

Equipment	Supplier
Signal generator capable of generating a sine wave at 2050 MHz	Hewlett Packard: Model ESG-4000A
50 Ω power meter	Hewlett Packard: Model E4419A

Table 27: Test equipment required for BS IF system loss calibration

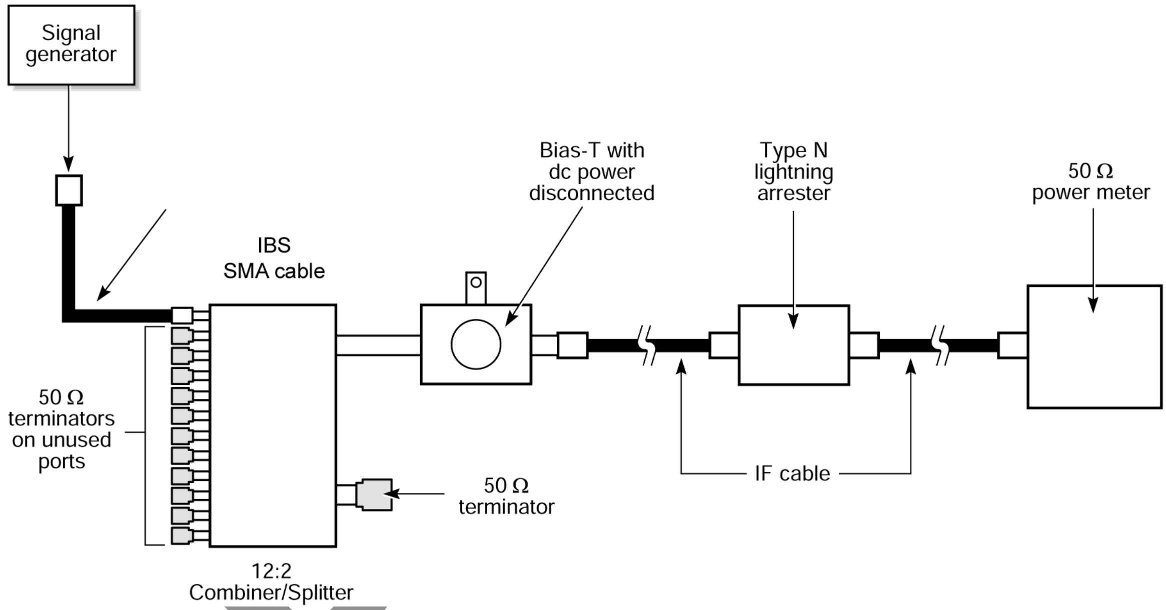


Figure 82 – BS IF cable calibration equipment setup

2.10.2– To calibrating the upstream and downstream cable runs

Perform the following procedure for the downstream and upstream cable runs.

1. Ensure the dc power to the surge protector is disconnected.

⚠ If dc power is not disconnected from the IF cables, the test equipment will be damaged. To remove dc power, switch off the appropriate circuit breaker on the power distribution system to isolate the individual IF channel.

2. Disconnect the dc power cables from the Bias-Ts.
3. Disconnect the SMA cables from the IBS card.
4. Disconnect the IF cables from the X-Pol RBS Tx and X-Pol RBS Rx.

5. Measure the losses at the lowest and highest frequencies in the frequency band used by the system.
   1. Set the signal generator frequency to the Llow frequency and the RF output power level to 0 dBm.
   2. Connect the signal generator to the appropriate SMA cable (IBS-TLX). Connect the power meter to the X-Pol RBS Tx/X-Pol RBS Rx IF cable. *Figure 82* shows the test setup.
   3. Measure the RF power level with the power meter. Record this value as the upstream or downstream L_{low} value.
   4. Repeat this step at the L_{hi} frequency.
6. Use the equation below to calculate the mean attenuation. Record the result as the downstream or upstream $L_{A\ nom}$ value.

$$L_{A\ nom} = ((L_{low} + L_{hi})/2)$$

   where

   LA nom represents the required attenuation value (nominal)

   Llow represents the loss measurement at the lowest frequency

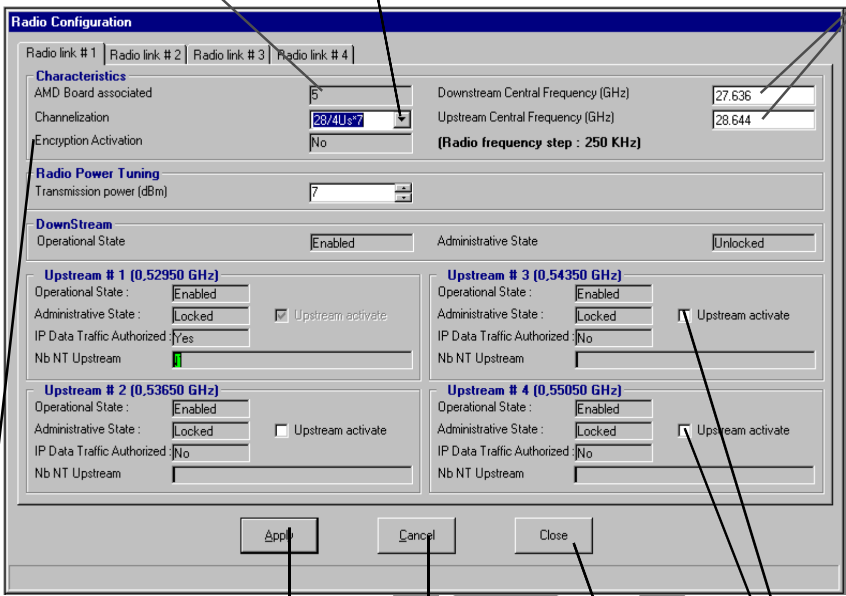
   Lhi represents the loss measurement at the highest frequency

   LR represents the required loss value (27 dB ±1 dB for the downstream path, 24 ±1 dB for the upstream path)
7. Enter in 7390LT radiolink intallation screen recorded attenuation value for downstream and upstream cables.
8. Reconnect the SMA and IF cables.
9. Reconnect the Bias-T power cables.
10. Reapply the dc power.

Click on the arrow to select the **bandwidth**: 14/4 Us*3.5, 28/4 Us*7 MHz (by default: not configured)

No. of the **AMD** board associated with the sector

Click here to enter the **central trequencies** of the **upstream** (reception) and **downstream** (emission) channels (see radio scheduler)



Encryption activation: No

Click here to **cancel** the modifications

Click here to **apply** the modifications

Click here to **return** to the BS details screen

Click here to **activate** the **upstream**.

2.11– Simplified description of the Base Station (7390BS)

The A7390 system Base Station (**7390BS**) consists of the following main elements:

- one or more (up to eight) external transceivers, comprising the **radio and the antenna** part and designated "**X-Pol RBS**" (Radio Base Station);
- one modem rack, including the power supply unit and interfaces; this is the "**indoor**" part and designated **DBS** (Digital Base Station);
- a **cables** linking the X-Pol RBS and the DBS ("X-Pol RBS/DBS link");
- a network management and configuration station (**7390LT**), based on the use of a PC with appropriate software.

2.12– Technical specifications of the Base Station (7390BS)

2.12.1– X-Pol RBS specifications

Designation	Description	Standards	Observations
Mechanical specifications of the X-Pol RBS assembly (antenna + pole mounting)			
HxLxD	644(mm)x221(mm)x720(mm)		D taken from axial tube 11,43 to 7,3cm (4 $^{1/2}$ into 2 $^{1/2}$ in)
Weight	15 kg		-
Physical interfaces: X-Pol RBS/DBS indoor-outdoor cable			
Connector type	N/female		weatherproof
Medium	50Ω coaxial cable		-
Environmental specifications			
X-Pol RBS Classification	-		equipment for premises not sheltered from the weather
Operating temperature	-33°C to + 55°C		-
Relative humidity at 30°C	100%		-

2.12.2– DBS specifications

Designation	Description	Standards	Observations
Mechanical specifications: Rack-mounted DBS assembly standard 19"			
HxLxD	1250(mm)x600(mm)x600(mm)		cf. diagram in § 3 Installation
Weight	<135 kg (including 85 kg for empty rack)		-
Mechanical specifications: DBS shelf without rack			
HxLxD	844.55(mm)x482.6(mm)x540(mm)		19-inch cf. diagram in § 3 Installation
Weight	< 50 kg		-
Power supply and consumption			
Primary voltage range	36 V to 60 V		48 V rated voltage
Maximum con-sumption	750W		including 8 X-Pol RBS
Protection	overvoltage, short-circuit (40 A fuse), polarity inversion, thermal protection (ventilation failure)		-

Note: *Power supplies are floating level voltages; the ground cable can be connected to + 48V or - 48V according to the country standards.*