

TYPE	PART NUMBER	TRANSMISSION	MODE	CABLE
Generation I	6828094-1	Simplex	Multimode	1.6-2.0-mm Tight-Jacketed Fiber
	6828095-1		Singlemode	
	6828129-1	Duplex	Multimode	
	6828130-1		Singlemode	
Generation II	2123265-1	Simplex	Multimode	
	2123265-2		Singlemode	
	2123524-1	Duplex	Multimode	
	2123524-2		Singlemode	

Figure 1

1. INTRODUCTION

This instruction sheet covers the termination of LC connector kits to tight jacket fiber optic cable. With the use of a field-installable duplex clip, all simplex connectors can be joined into a duplex form. For part numbers and components, see Figure 1.

Each connector is designed to mate with two LC connectors installed onto an LC adapter, but is capable of mating with a fixed ferrule device, such as an optical transceiver or build-out attenuator. However, when mating a Generation I connector with a fixed ferrule device, it will be necessary to apply force to the housing of the LC connector, not the boot, to achieve a fully latched connection. The Generation II connector is optimized to mate to a fixed ferrule device by applying force to the boot of the LC connector.



NOTE

The kits are provided with a protective cover installed onto the connector subassembly. Keep the cover in place until the connector is ready for installation.



NOTE

Dimensions in this instruction sheet are in metric units [with U.S. customary units in brackets]. Figures are not drawn to scale.

Reasons for re-issue of this instruction sheet are provided in Section 5, REVISION SUMMARY.

2. ASSEMBLY

2.1. Required Tools and Consumables

- Epoxy 504035-1 (EPO-TEK 353-ND epoxy) or Loctite 648 anaerobic adhesive and 7649 activator (recommended)



NOTE

Refer to material safety data sheet (MSDS) for handling of the epoxy.

- cable preparation template (LC connector jumper) 1588756-1 for Generation I connectors or cable preparation template 1828843-1 (LC tight jacket) for Generation II connectors
- Miller strip tool 1754708-1
- aramid yarn shears 1278637-1
- alcohol pads or isopropyl alcohol and lint-free cloths
- epoxy applicator kit 501473-3
- fiber protector 1457630-2 (for use with epoxy only)
- LC/SC/FC die set 1588175-1 and PRO-CRIMPER* III hand tool frame assembly 1976850-1 (408-10242)
- heat cure oven assembly 502134-1 (120 V) or 502134-2 (240 V) (408-9460) and oven block assembly 1457628-1
- heat gun

- sapphire pen cleave tool 504064-1 (408-4293)
- polishing bushing 1754074-1
- polishing pad 501523-1
- polishing plate 501197-1
- 5- μ m polishing film 228433-8
- 9- μ m polishing film 1374484-1
- fine diamond polishing film 503887-1
- 0.3- μ m polishing film 228433-5
- 200 \times microscope kit 1754767-1 and 1.25-mm universal microscope adapter 1754765-1



NOTE

Items from list that are included in LC connector termination kit 1754462-1 (for use with epoxy or anaerobic adhesive) are Generation I cable preparation template, die set, polishing bushing, microscope adapter, and 9- μ m and fine diamond polishing films.

Items from list that are included in LC connector termination kit 1754603-1 (for use with anaerobic adhesive) are the fiber protector and oven block assembly.

The termination kits are used to expand professional installer's kits 501258-[] for connector termination.

2.2. Select Epoxy or Anaerobic Adhesive

The recommended epoxy is packaged in pre-measured bags. It will cure between 115° and 120°C [239° and 257°F] in 30 minutes.

The recommended anaerobic adhesive is packaged in two bottles (adhesive and activator). It will cure at 22°C [71.6°F] in approximately 3 minutes.

2.3. Prepare Cable



DANGER

Always wear safety glasses when working with optical fibers. **Be very careful** to dispose of fiber ends properly.

1. Slide the boot (small diameter end first) onto the cable. Then slide the crimp eyelet/heat shrink assembly (heat shrink end first) onto the cable. See Figure 2.

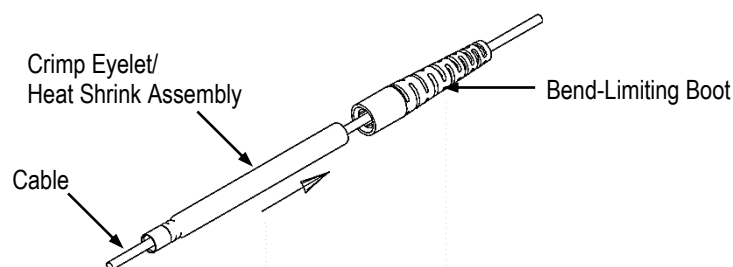


Figure 2

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- Using the strip tool and shears, strip the cable using the applicable cable preparation template (refer to Paragraph 2.1 for part numbers). Templates at the time of publication of this instruction sheet are shown in Figure 3.

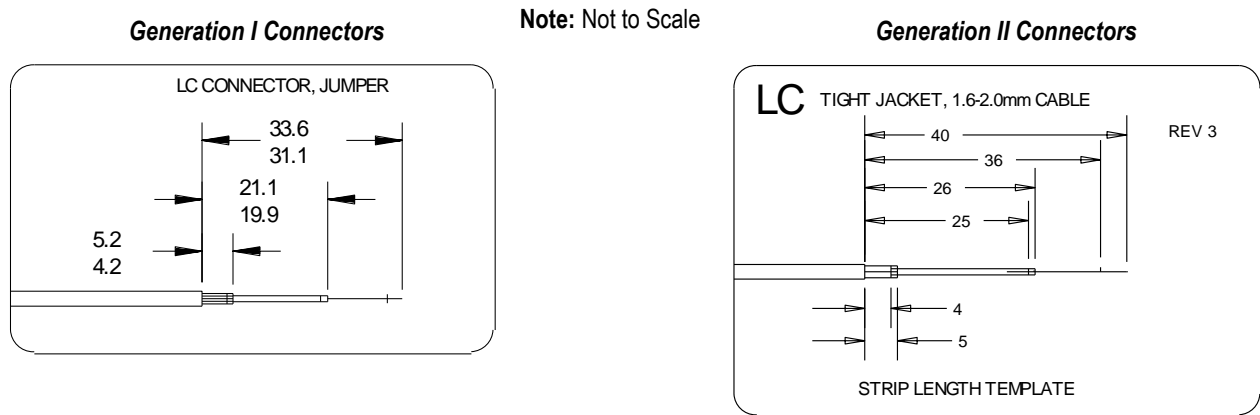


Figure 3

- Clean the cable glass cladding using the alcohol pad or lint-free cloth dampened with alcohol to remove any coating residue.



DANGER

Never clean buffer or fiber with a dry cloth.

- If using the anaerobic adhesive, dip the fiber and buffer into the activator or use a brush to apply the activator to the buffer and fiber. Allow 30 seconds for the activator to dry.



NOTE

For optimum results, the activator must be applied properly and allowed to dry.

2.4. Prepare and Apply Epoxy or Anaerobic Adhesive

A. Prepare Epoxy

- Remove the separating clip from the bag of epoxy, and mix the epoxy inside the bag thoroughly for 2 minutes.



NOTE

When mixed properly, the epoxy should have a uniform, translucent, amber color.

- Using the epoxy applicator kit, install the needle tip onto the epoxy applicator. Make sure that the tip is secure. Remove the plunger.
- Cut the epoxy bag diagonally at one corner. Squeeze the epoxy into the back of the applicator. Re-assemble the plunger. Loosen, but do not remove, the cap. Hold the applicator vertically (with needle tip upward), and slowly push the plunger until the entrapped air escapes and a bead of epoxy appears at the tip. Remove the cap.
- Using the alcohol pad or alcohol-dampened lint-free cloth, clean the tip of the applicator needle.

B. Prepare Anaerobic Adhesive

- Install the needles onto the two applicators making sure that they are secure.
- Remove the plunger from one of the applicators, and load the adhesive into the back of the plunger. Re-install the plunger.
- Holding the applicator vertically (with needle tip upward), allow the adhesive to drain away from the needle then slowly push the air out of the applicator until a bead of adhesive appears at the tip of the needle.

4. Use the second applicator for the activator. With the plunger fully forward, draw a small amount (approximately 3 to 5 ml [.101 to .169 oz]) of activator into the applicator.

C. Apply Epoxy or Anaerobic Adhesive

1. If using the epoxy, remove the protective cover from the connector subassembly, and attach the fiber protector as shown in Figure 4.
2. Hold the connector subassembly in an upright position, and insert the needle tip into the rear body and support tube until the needle tip touches the bottom of the ferrule. See Figure 4.
3. Keeping the base of the ferrule against the needle tip, slowly inject adhesive or epoxy into the connector subassembly until a small bead of adhesive or epoxy exits from the endface of the ferrule at the front of the connector.
4. Retract the applicator slightly (approximately 1.0 mm [.04 in.]). Hold for one second, then withdraw the applicator needle quickly without injecting more adhesive or epoxy into the connector subassembly.



CAUTION

If too much epoxy is injected into the connector subassembly, the connector subassembly will not function properly.

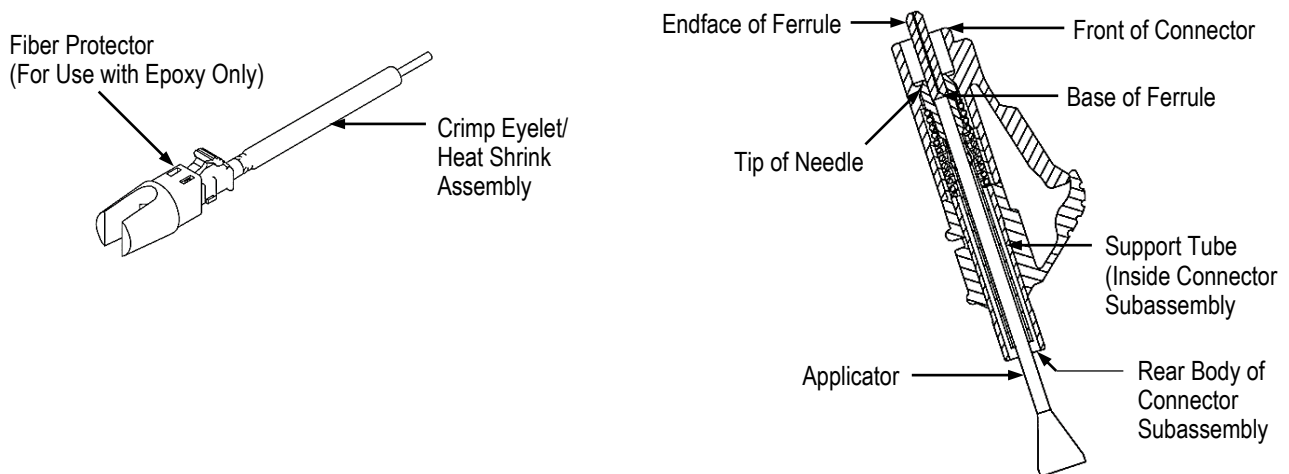


Figure 4

2.5. Terminate Connector

1. Carefully insert the fiber into the rear body of the connector until the buffer bottoms on the base of the ferrule. With the buffer bottomed, the cable jacket should be just short of the rear body. The fiber should extend approximately 6.4 mm [.25 in.] from the ferrule endface.



CAUTION

Do not allow the cable strength members to enter the connector.

2. Uniformly distribute the cable strength members around the rear body of the connector. See Figure 5, Detail A.
For the *Generation II* connector, ensure that the aramid strength members do not contact the housing; otherwise, excess aramid can be caught under the bend-limiting boot. See Figure 5, Detail A.
3. Slide the crimp eyelet/heat shrink assembly over the cable strength members until the crimp eyelet end bottoms against the connector. See Figure 5, Detail B.
4. Place the crimp eyelet end of the crimp eyelet/heat shrink assembly into the crimping chamber of the dies. Align the back of the connector with the edge of the die as shown in Figure 5, Detail C. Hold the connector subassembly in place, and actuate the hand tool.
5. Remove the assembly from the hand tool, and inspect it for a straight and even crimp.

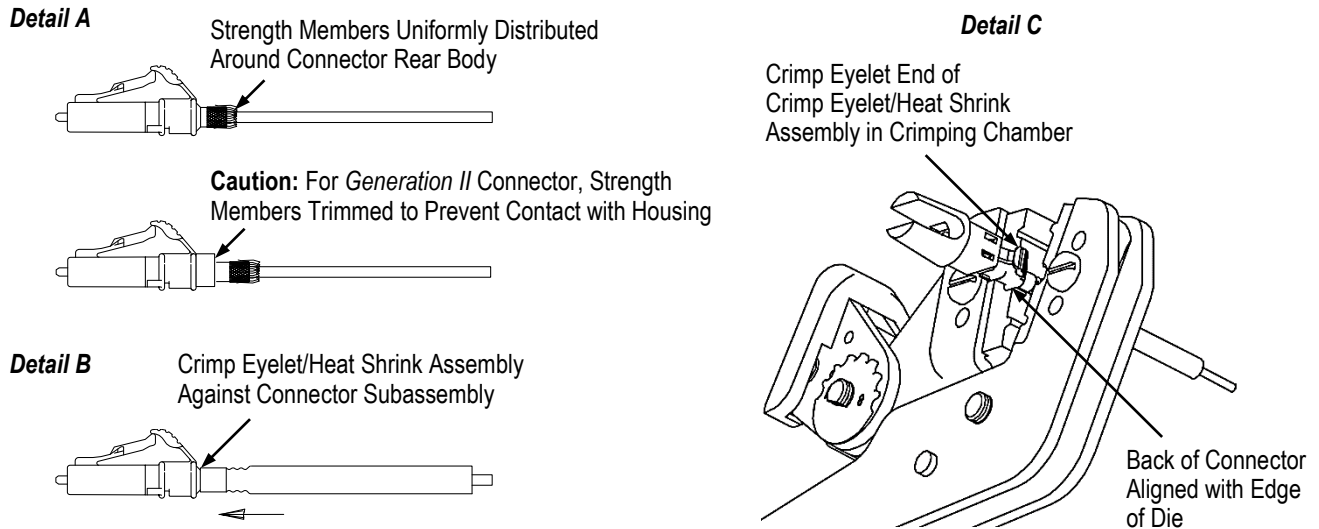


Figure 5

2.6. Cure Epoxy or Anaerobic Adhesive

A. Epoxy



CAUTION

Remove excess epoxy before curing; otherwise, excess epoxy will be difficult to remove after curing.

1. Place the connector subassembly (with attached cure protector) in the heat cure oven according to the instructions packaged with the oven. Cure the epoxy between 115° and 120°C [239° and 257°F] for a minimum of 15 minutes. This will also shrink the crimp eyelet/heat shrink assembly.



CAUTION

To avoid damage to the assembly, do not expose assembly to excessive temperatures.

2. After curing, grasp the cable, and gently lift the assembly out of the oven. The assembly will be hot—allow sufficient time for the assembly to cool before proceeding.



CAUTION

To avoid damage to the assembly, allow the assembly to cool.

B. Anaerobic Adhesive

1. Using the applicator, dispense a drop of the activator over the bead of the adhesive on the endface of the ferrule.
2. Allow the adhesive to cure at an ambient room temperature of 22°C [71.6°F] for approximately 1 to 3 minutes.



NOTE

For optimum results, the adhesive must be applied properly and allowed to cure.

3. Using the heat gun, evenly heat the heat shrink of the crimp eyelet/heat shrink assembly until it shrinks into place. Do not over-heat.



CAUTION

Over-heating can cause the fiber bending, breakage, or high insertion loss.

2.7. Cleave Fiber



DANGER

Always wear safety glasses when working with optical fibers. Be very careful to dispose of fiber ends properly.

1. If used, carefully rotate the fiber protector to remove it from the connector subassembly.

2. Firmly support the connector assembly.
3. Place the blade of the scribe tool directly above the epoxy or anaerobic adhesive. Do not allow the blade to make contact with the epoxy or anaerobic adhesive. Refer to Figure 6.


CAUTION

Allowing the blade to touch the epoxy or anaerobic adhesive could damage, chip, or crack the cutting tip of the blade.

4. Lightly draw the beveled edge of the blade across the fiber parallel to the tip of the ferrule. After scoring the fiber, pull it straight away from the ferrule. The fiber should shear cleanly at the scribed point.

2.8. Install Bend-Limiting Boot

Slide the bend-limiting boot over the cable until it is against the rear body of the connector subassembly. See Figure 6.

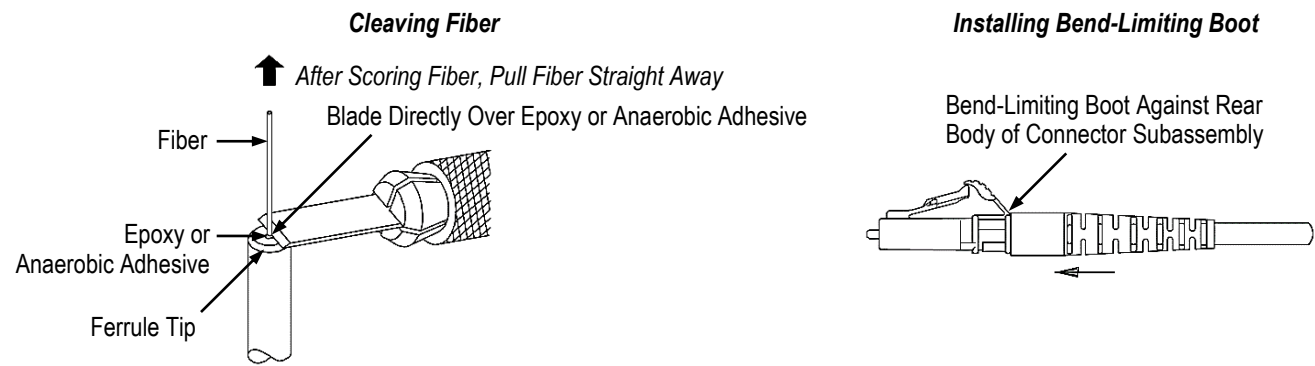


Figure 6

2.9. Polish Fiber

It is recommended polishing the fiber using a polishing machine. *Machine polishing produces the best results.* Polish the fiber according to the machine manufacturer's instructions. If machine polishing is not possible, hand polish the fiber according to the following:

1. Using a small piece of the 5- μ m polishing film, lightly polish the endface of the ferrule in a small circular motion to remove the fiber stub down to the level of the epoxy or adhesive and until the fiber stops leaving a trace on the film.
2. Install the connector subassembly onto the polishing bushing.
3. Place the polishing pad on the polishing plate, then place the 9- μ m polishing film on the polishing pad.


CAUTION

Always place the polishing bushing on a clean area of the polishing film. Never start polishing across a dirty area of the polishing film. For optimum results, keep the polishing films clean.

4. Hold the polishing bushing and connector subassembly, and using light pressure on the polishing bushing, polish the tip of the fiber in an elongated figure-8 pattern (approximately 50.8 mm [2.0 in.] long). Make 15 figure-8 patterns.
5. Clean the endface of the ferrule and the polishing bushing with the alcohol pad or alcohol-dampened lint-free cloth.
6. Remove the 9- μ m polishing film from the polishing pad, and place the fine diamond polishing film on the polishing pad. Hold the assembly and, using very light pressure, polish the tip of the fiber in an elongated figure-8 pattern (approximately 50.8 mm [2.0 in.] long). Make 6 figure-8 patterns.
7. Inspect the fiber according to Paragraph 2.10. If small peripheral chips are evident in the fiber, continue polishing the fiber with the fine diamond film. Inspect the fiber again. If the fiber is not acceptable, it might be necessary to use the 9- μ m polishing film, then use the fine diamond polishing film to remove small peripheral chips.

8. Clean the endface of the ferrule and the polishing bushing with the alcohol pad or alcohol-dampened lint-free cloth.



NOTE

Make sure to clean the endface of the ferrule and the polishing bushing between film changes.

9. Remove the fine diamond polishing film from the polishing pad, and replace it with the 0.3- μm polishing film.
10. Holding the polishing bushing and connector subassembly, place the polishing bushing on the film, and using light pressure on the ferrule, polish in an elongated figure-8 pattern (approximately 50.8 mm [2.0 in.] long) according to the following:
 - multimode connector: 3 figure-8 patterns
 - singlemode connector: 12 figure-8 patterns
11. Clean the endface of the ferrule and the polishing bushing with the alcohol pad or alcohol-dampened lint-free cloth.

2.10. Inspect the Fiber



DANGER

Before inspecting the fiber, disconnect the fiber from the power signal source.

1. Using the fiber optic inspection microscope kit, inspect the endface of the ferrule and fiber according to the following criteria (refer to Figure 7):
 - Make sure that all epoxy or adhesive is removed from the ferrule. Use a sharp blade to remove epoxy or adhesive from the chamfered edge of the ferrule. Do not touch the fiber.
 - Dirt may be mistaken for small pits. If dirt is evident, clean with the alcohol pad or alcohol-dampened lint-free cloth, then dry.
 - Fine polishing lines are acceptable.
 - Small peripheral chips at the outer rim of the fiber are acceptable.
 - Large chips in the center of the fiber are unacceptable, and the fiber must be re-terminated.
2. If not installing the connector immediately, install the protective cover onto connector subassembly to prevent contamination to the endface of the ferrule.

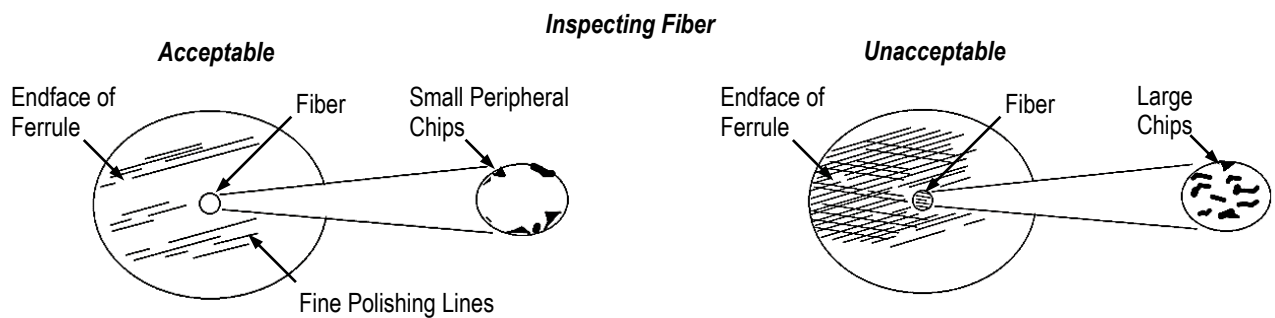


Figure 7

2.11. Duplex Clip

A. Install Connectors

1. Identify channel A connector of the patchcord, and locate cavity A of the duplex clip.



NOTE

To determine the polarity of a patchcord, light one fiber path. One of the two connectors should be illuminated. Designate the lit connector as channel A and the other connector as channel B.

- Center the rear body of the connector over the cavity of the duplex clip as shown in Figure 8, and using a biasing force, insert the connector into the cavity. Correct placement is denoted by an audible “click.”



NOTE

For correct installation, the arrow on the duplex clip should point toward the connector, and the rib of the duplex clip must align with the recess in the rear body of the connector. Refer to Figure 8.

- Repeat Step 2 for channel B of the connector and cavity B of the duplex clip.

B. Remove Connectors

If necessary (for example, to inspect, insert into a photo-detector adapter, or correct a polarity error), remove the duplex clip by holding either the connector that will not be removed or the duplex clip, grip the connector to be removed, and gently rotate the connector until it snaps out of the duplex clip. See Figure 8.



NOTE

Removing the connector from the duplex clip in this way should prevent damage to the duplex clip and allow for re-use.

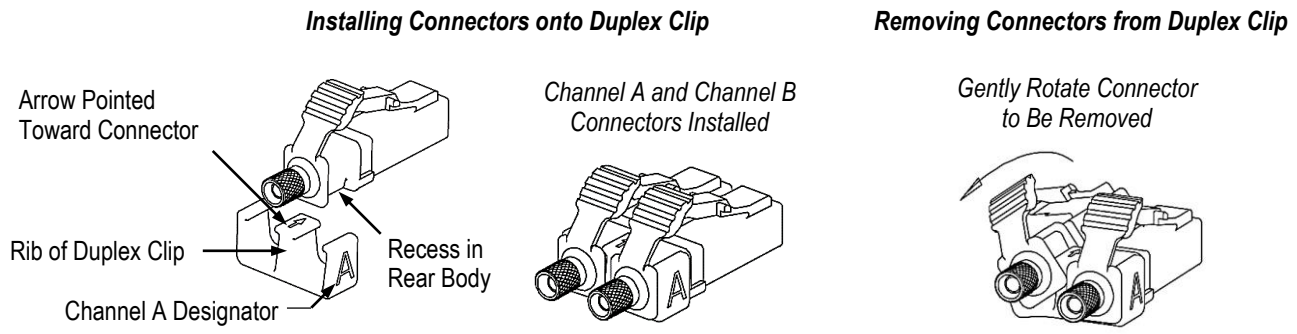


Figure 8

2.12. Mate Connectors

Align the endface of the ferrule(s) with the mating connector or device, and push them together.

For the *Generation I* connector, to achieve a fully latched connection, forward force must be applied to the housing (not the bend-limiting boot). For the *Generation II* connector, the mating force can be applied to the bend-limiting boot.

3. CLEANING

3.1. Connector



DANGER

To avoid personal injury, compressed air used for cleaning must be reduced to less than 207 kPa [30 psi], and effective chip guarding and personal protective equipment (including eye protection) must be used.

- Wipe completely around the ferrule with an alcohol pad or lint-free cloth dampened with isopropyl alcohol. Then wipe completely around the ferrule using a dry lint-free cloth.
- Place the dry lint-free cloth on a smooth, flat surface. Holding the connector perpendicular with the surface, wipe the endface of the ferrule across the cloth.
- Blow compressed air across the endface of the ferrule.
- Using the microscope, examine the endface of the ferrule for debris. If debris is present, repeat steps 1 through 3.



CAUTION

This is the final step prior to connector installation. Do not wipe the ferrule or allow it to touch anything before mating the connector.

5. Mate the connector to the receptacle. If the attenuation is too high, unmate both connectors (if applicable), repeat steps 1 through 4, and clean the receptacle according to Paragraph 3.2.

3.2. Receptacle

1. Blow compressed air through the receptacle. If both connectors are mated, blow compressed air into the open end of the receptacle.
2. Re-mate the connector(s) to the receptacle, and repeat Paragraph 3.1. If attenuation is still too high, repeat the cleaning procedure (Paragraphs 3.1 and 3.2).

4. REPLACEMENT AND REPAIR

Kit components are not repairable. Replace any damaged components. Do not re-use terminated connector subassemblies or crimp eyelet/heat shrink assemblies by removing the cable.

5. REVISION SUMMARY

Revisions to this instruction sheet include:

- Changed protective cover art and cable size in Figure 1
- Modified part numbers in Figure 1