

LC CONNECTOR KIT

PART NUMBER	GENERATION (GEN)	TRANSMISSION	MODE	CABLE SIZE (mm)
6828094-[]	GEN I	Simplex	Multimode	1.6 - 2.0
6828095-[]			Singlemode	
6828129-[]		Duplex	Multimode	
6828130-[]			Singlemode	
2123524-[]	GEN II	Simplex	Singlemode	2.4
2123265-[]				

Figure 1

1. INTRODUCTION

This instruction sheet covers the termination of LC connector kits (shown in Figure 1) to fiber optic cable. These kits are available for termination to 1.6- to 2.4-mm tight-jacketed fiber. With the use of a field-installable clip, all simplex connectors can be joined into a duplex form.

Read these instructions thoroughly before starting assembly.



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

Reasons for reissue of this instruction sheet are provided in Section 6, REVISION SUMMARY.

2. DESCRIPTION (Figure 1)

Each simplex jumper connector kit consists of a connector subassembly, a protective cover, a crimp eyelet/heat shrink assembly, and a boot.

Each duplex jumper connector kit consists of a duplex clip, two connector subassemblies, two protective covers, two crimp eyelet/heat shrink assemblies, and two bend-limiting boots.

3. ASSEMBLY PROCEDURE

3.1. Required Tools and Consumables

The following tools and consumables are required for assembling the connector kit (related instruction sheets are in parenthesis).



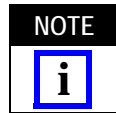
Kits are provided with a protective cover installed onto the connector subassembly. Keep the cover in place until ready for installation.

A. Tools

- Miller Strip Tool 1754708-1
- Aramid Shears 1278637-1
- Cable Preparation Template 1588756-1 for GEN I Connector Kits ■ ‡
- Cable Preparation Template 1828843-1 for GEN II Connector Kits
- LC Jumper Fiber Protector 1457630-2 ■
- Fiber Optic Sapphire Scribe Tool 504064-1 (408-4293)
- LC/SC/FC Die Set 1588175-1 ■ ‡
- PRO-CRIMPER* III Hand Tool Frame Assembly 1976850-1 (408-10242)
- Heat Cure Oven 502134-1 (120V) or 502134-2 (240V) (408-9460)
- Oven Block Assembly 1457628-1 ■
- (If using epoxy,) Epoxy Mixer 501202-1
- Fiber Optic Inspection Microscope (200) 1754767-1
- Polishing Bushing 1754074-1 ■ ‡
- Polishing Plate 501197-1
- Polishing Pad 501523-1
- 1.25-mm Universal Microscope Adapter 1754765-1 ■ ‡

B. Consumables

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



Refer to Material Safety Data Sheet (MSDS) 125-6353 for characteristics, reactivity data, and handling of the epoxy.

- If using epoxy, Epoxy Applicator Kit 501473-3
- alcohol pads or isopropyl alcohol and lint-free cloths
- 9-mm Polishing Film 1374484-1 ■ ‡
- mm Polishing Film 228433-8
- Fine Diamond Polishing Film 503887-1 ■ ‡
- 0.3-mm Polishing Film 228433-5

3.2. Selection of Epoxy or Anaerobic Adhesive

Choose the 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 three minutes.

3.3. Preparation of Cable



To avoid personal injury, ALWAYS wear eye protection when working with optical fibers. NEVER look into the end of terminated or unterminated fibers. Laser radiation is invisible but can damage eye tissue. Never eat, drink, or smoke when working with fibers. This could lead to ingestion of glass particles.



BE VERY CAREFUL to dispose of fiber ends properly. The fibers create slivers that can easily puncture the skin and cause irritation.

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. Refer to Figure 2.

■ Included in LC Termination Kit 1754462-1 (for use with epoxy or anaerobic adhesive).

‡ Included in LC Termination Kit 1754603-1 (for use with anaerobic adhesive).

These kits are used to expand Professional Installer's Kit 501258-[] to allow termination of the LC connector.

† EPO-TEK and LOCTITE may be trademarks of their respective owners.

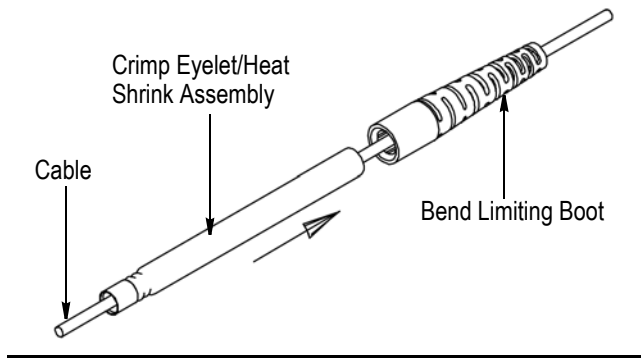


Figure 2

2. Refer to Figure 3 to determine if you're using the shorter GEN I or the longer GEN II Tight-Jacketed LC Connector.

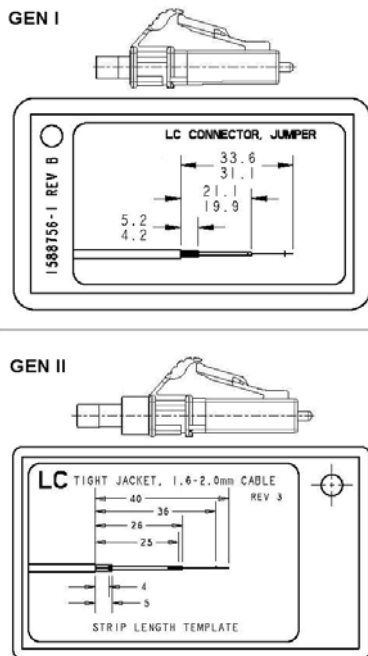


Figure 3

3. Using the combination strip tool and aramid shears, strip the cable according to the dimensions shown in Figure 3.

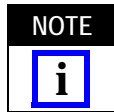
4. Clean the glass cladding using the alcohol pad or lint-free cloth dampened with alcohol to remove any coating residue.



CAUTION NEVER clean buffer or fiber with a dry cloth.

5. If using the anaerobic adhesive, dip the fiber and buffer into the activator, or apply to the buffer and

fiber with a brush. Allow 30 seconds for the activator to dry.

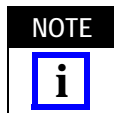


For optimum results, the activator must be applied properly and allowed to dry.

3.4. Prepare and Apply the Epoxy or Anaerobic Adhesive

A. Preparation of Epoxy

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



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

2. Using the epoxy applicator kit, install the needle tip onto the epoxy applicator. Make sure that the tip is secure. Remove the plunger.

3. 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.

4. Using the alcohol pad or alcohol-dampened lint-free cloth, clean the tip of the applicator needle.

B. Preparation of Anaerobic Adhesive

1. Install the needles onto the two applicators, making sure they are secure.

2. Remove the plunger from one of the applicators, and load the adhesive into the back of the plunger. Re-install the plunger.

3. 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-.169 oz]) of activator into the applicator.

C. Application of Epoxy or Anaerobic Adhesive

1. If using the epoxy, remove the protective cover from the connector subassembly, and attach the cure protector as shown in Figure 4.

2. Hold the connector subassembly in an upright position. Insert the needle tip into the rear body and support tube until the needle tip touches the bottom of the ferrule. See Figure 5.

**Installing the Fiber Protector
(For Use with Epoxy Only)**

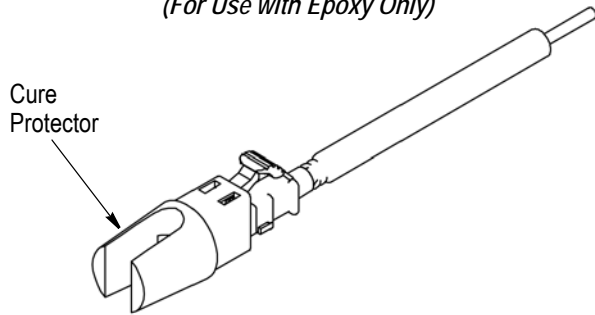


Figure 4

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.

Applying Epoxy or Anaerobic Adhesive

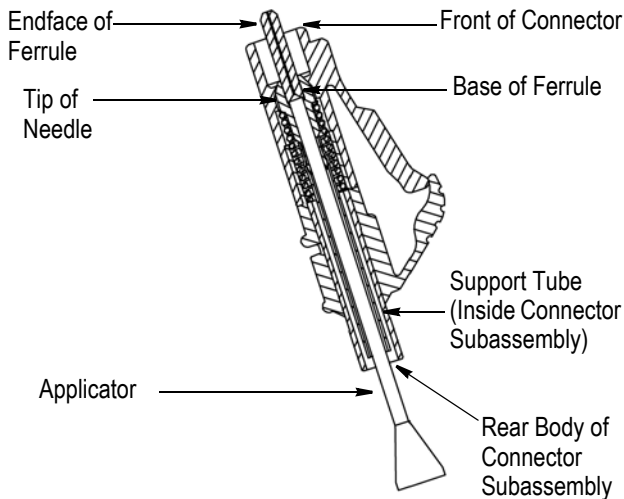


Figure 5

4. Retract the applicator slightly (approximately 1.0 [.04]). Hold for one second, then withdraw the applicator needle quickly without injecting more adhesive or epoxy into the connector subassembly.



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

3.5. Termination

1. Carefully insert the fiber into the rear body 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 [.25] from the ferrule endface.



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 6, Detail A.



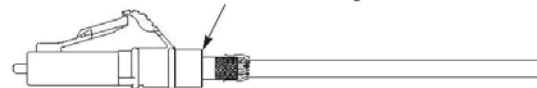
If using the GEN II connector, ensure that the aramid strength members do not contact the housing, otherwise excess aramid can be caught under the bend-limiting boot. See Figure 6, Detail B.

Detail A



Detail B

Caution
On Gen II Connector, trim strength members to prevent contact with this housing



Detail C

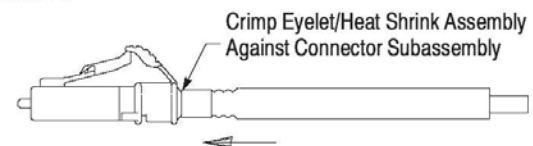


Figure 6

3. Slide the crimp eyelet/heat shrink assembly forward over the cable strength members until the crimp eyelet end bottoms against the connector.

4. Place the crimp eyelet end of the crimp eyelet/heat shrink assembly into the crimping chamber of the die assembly. Align the back of the connector with the edge of the die as shown in Figure 7.

5. Hold the connector subassembly in place and actuate the tool handle. This operation retains the strength members.

6. Remove the assembly from the hand tool and inspect it for a straight and even crimp.

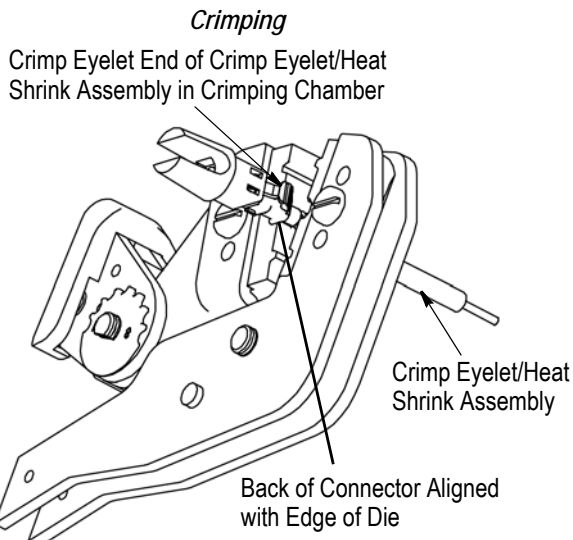


Figure 7

3.6. Cure the Epoxy or Anaerobic Adhesive

A. Epoxy



Excess epoxy must be removed 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. Refer to Figure 8. Cure the epoxy between 115° and 120°C [239° and 257°F] for a minimum of 15 minutes.

This step will also shrink the crimp eyelet/heat shrink assembly.

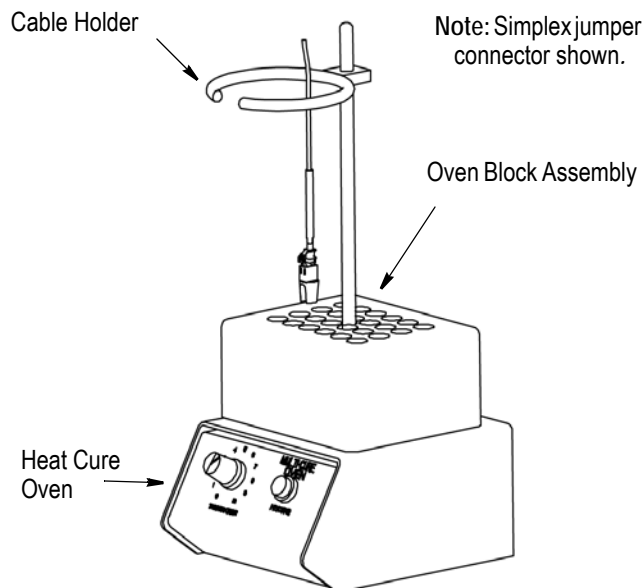


Figure 8



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.

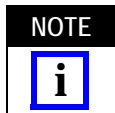


To avoid damage to the assembly, allow the assembly to cool.

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.



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 overheat.



Overheating can cause the fiber bending, breakage, or high insertion loss.

3.7. Cleave the Fiber



ALWAYS wear safety glasses when working with optical fibers. BE VERY CAREFUL to dispose of fiber ends properly. The fibers create slivers that easily puncture the skin and cause irritation.

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 adhesive. DO NOT allow the blade to make contact with the epoxy or adhesive. Refer to Figure 9.



Allowing the blade to touch the epoxy or 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.

Cleaving the Fiber

After Scoring Fiber, Pull Fiber Straight Away

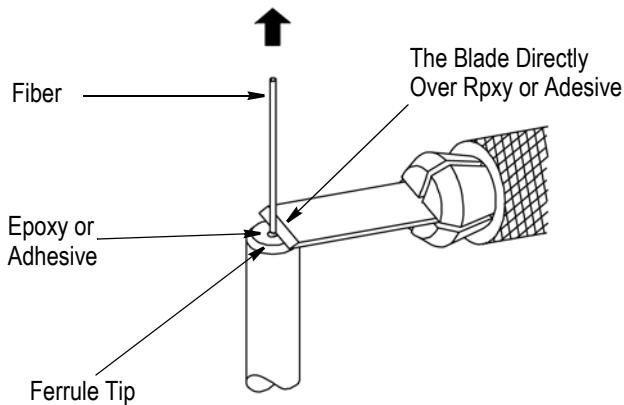


Figure 9

3.8. Install the Boot

Slide the boot over the cable until it is against the rear body of the connector subassembly. See Figure 10.

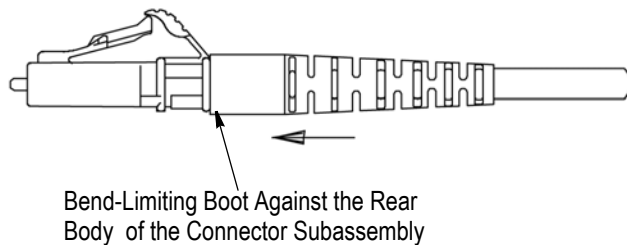


Figure 10

3.9. Polish the 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:

NOTE For optimum results, keep the polishing films clean.



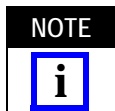
1. Level the fiber. Using a small piece of the 5-mm (light grey) polishing film, lightly polish the endface of the ferrule in a small circular motion to remove the fiber stub down to the level of the epoxy or adhesive and until the fiber stops leaving a trace on the film.

2. Install the connector subassembly onto the polishing bushing.
3. Place the polishing pad on the polishing plate. Place the 9-mm 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.

4. Holding the polishing bushing and connector subassembly, place the polishing bushing on the film. Using light pressure on the ferrule, polish in an elongated figure-8 pattern (approximately 50.8 [2.0] 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-mm polishing film from the polishing pad, and place the fine diamond (green or lavender) 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 [2.0] long). Make six figure-8 patterns.
7. Inspect the fiber according to Paragraph 3.10. 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-mm polishing film, then use the fine diamond polishing film to remove small peripheral chips.



NOTE MAKE SURE to clean the endface of the ferrule and the polishing bushing between film changes.

8. Clean the endface of the ferrule and the polishing bushing with the alcohol pad or alcohol-dampened lint-free cloth.
9. Remove the fine diamond polishing film from the polishing pad, and replace it with the 0.3-mm (white) 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 [2.0] long) according to the following:
 - for multimode connectors, make three figure-8 patterns
 - for singlemode connectors, make 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.

3.10. Inspect the Fiber



Before inspecting the fiber, DISCONNECT the fiber from the power signal source. NEVER inspect or look into the end of a fiber when optical power is applied to the fiber. The infrared light used, although it cannot be seen, can cause injury to the eyes.

1. Using the fiber optic inspection microscope kit, inspect the endface of the ferrule and fiber according to the following criteria (refer to Figure 11):

- Make sure that all adhesive or epoxy is removed from the ferrule. Use a sharp blade to remove adhesive or epoxy 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.

Inspecting the Fiber

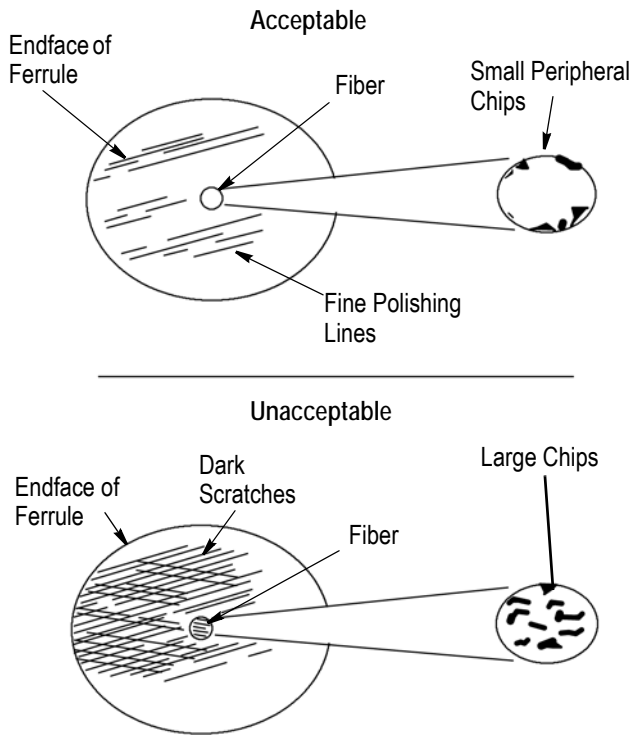
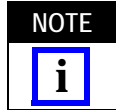


Figure 11

2. If not installing the connector immediately, install the protective cover onto connector subassembly to prevent contamination to the endface of the ferrule.

3.11. Install Connectors onto Duplex Clip

1. Identify Channel A of the connector and locate Cavity A on the duplex clip.

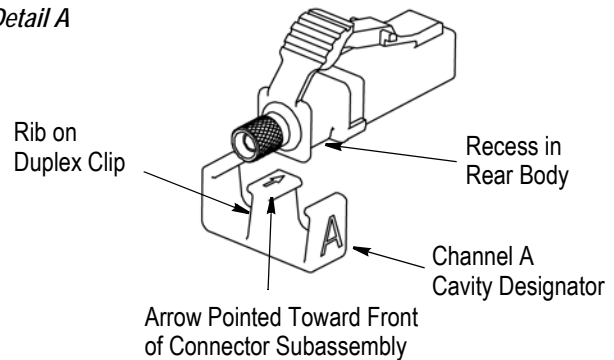


To determine the polarity of a patchcord, light one fiber path. One of the two connectors should be illuminated. Designate the lit channel as Channel A and the other channel as Channel B.

2. Center the rear body of the connector subassembly between the cavity of the duplex clip as shown in Figure 12, Detail A, and using a biasing force, insert the connector into the cavity. Correct placement is denoted by an audible "click."

Installing Connectors onto Duplex Clip

Detail A



Detail B

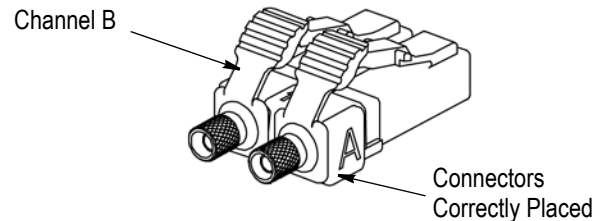
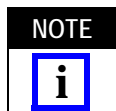


Figure 12




For correct installation, the rib on the duplex clip must align with the recess in the rear body of the connector subassembly. In addition, the arrow on the duplex clip that should point toward the front of the connector subassembly. Refer to Figure 12, Detail A.

3. Identify Channel B of the connector, locate Position B on the duplex clip, and repeat Step 2..

3.12. Removing Connector from Duplex Clip

If necessary (for example, to inspect, to insert into a photo-detector adapter, or to correct a polarity error), remove the duplex clip according to the following:

NOTE  *Removing the connector from the duplex clip according to the following should prevent damage to the duplex clip and allow for re-use.*

Hold either a connector (the one 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. Refer to Figure 13.

Removing Connector from Duplex Clip

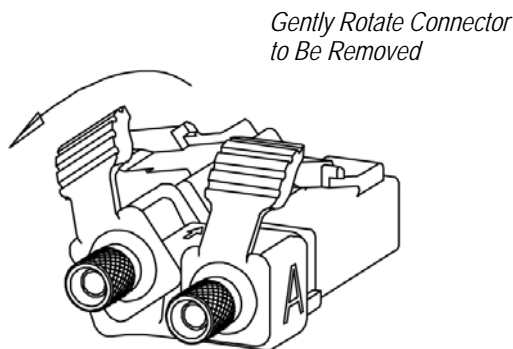




Figure 13

4. CLEANING PROCEDURE

4.1. 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.*


1. 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.
2. 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.
3. Blow compressed air across the endface of the ferrule.
4. 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 5.2.

4.2. Receptacle

1. Blow compressed air through the receptacle.

NOTE  *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 4.1. If attenuation is still too high, repeat the cleaning procedure (Paragraph 4.1 and Paragraph 4.2).

5. 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

6. REVISION SUMMARY

Revisions to this instruction sheet include:

- Changed Figure 3:
- Changed Figure 8 :
- Removed non-RoHS numbers:
- Added Generation II (GEN II) Part Numbers:
- Updated format to current corporate requirements'