COMMSCOPE®

Installation Procedures for Pre-Radiused Keyed Behind-The-Wall (BTW) and Jumper LC Fiber Optic Connectors

Epoxy and EZ Method for Multimode and Singlemode,

Pre-Radius Simplex and Duplex Jumper Connectors

Used on Simplex and Duplex 0.9mm and 1.6mm Jumper Cords

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Notice

Every effort has been made to ensure that the information in this document is complete and accurate at the time of printing. However, information is subject to change.

Acknowledgments

Developed by **CommScope Inc.**

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1   General

1.1   LC Jumper Connectors

The S**TSTIMAX**® **LC** Fiber Optic Simplex and Duplex Jumper Connectors can be used to terminate simplex and duplex 1.6mm jumper cords. It is intended for use in Central Offices, Local Area Networks (LANs), and in patch cords for Premises Distribution Systems. The connector can also be used in computer backplane connections, computer peripheral interconnections, device terminations, and other applications where quality, small size, high-density, low-loss, and a low-cost infrastructure are required.
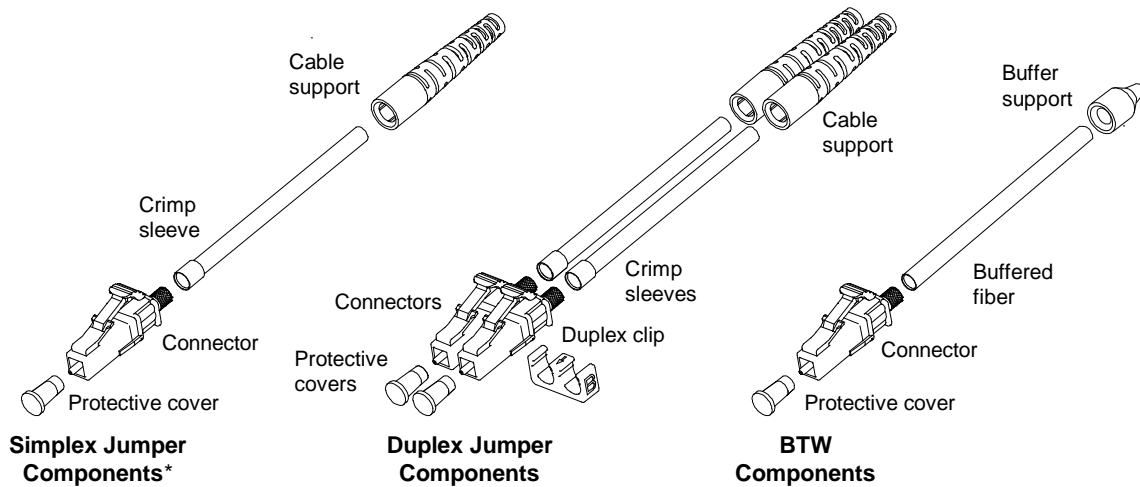
Note: In addition to the simplex and duplex LC jumper connectors for 1.6mm jumper cords, a Behind-The-Wall (BTW) connector is offered for 0.9mm buffered fiber. Installation of the BTW connector is included in this document. The BTW connector can be used to terminate Outside Plant (OSP) cables as well as building cables.

When installed on typical fiber, the following performance should be obtained:

Multimode

- Insertion loss (avg.) = <0.5 dB
- Return loss ≥ 20 dB

Single Mode

Insertion loss (avg.) = <0.5 dB
Return loss ≥ 40 dB

1.2 Epoxy Consumables

Table A.

Kit Type	Kit Number	Material ID	Kit Includes
Multimode	KIT-C-UNIV-M-100	760066720	Universal polishing kit, multimode, 100 connectors
Single-mode	KIT-C-UNIV-S-100	760066738	Universal polishing kit, single-mode, 100 connectors
Direct termination of OSP cables	KIT-090-BO	9700110/00	Fiber breakout kit, outside plant cable
Breakout Kit	6 FIBER BREAKOUT KIT	760018820	6 Fiber breakout kit, loose tube
Breakout Kit	12 FIBER BREAKOUT KIT	760018838	6 Fiber breakout kit, loose tube

Note: Kits **do not** contain connectors, isopropyl alcohol, or non-ozone depleting canned air.

1.3 Tool and Upgrade Kits for Epoxy Method

Table B.

Kit Type	Kit Number	Material ID	Kit Includes
Epoxy Tool Kit	1032B5	700006026	Tools for BTW, LC, SC, ST, Oven (110 volt)

Note: In addition to the tool kit, the following upgrade kit is required.

Jumper LC Upgrade Kit	D-182959 Kit	700005853	Tools for LC Jumper terminations, used in conjunction with 1032B kits.

1.4 EZ Consumables Kits for LC Connectors

Table C.

Kit Type	Kit Number	Material ID	Kit Includes
Multimode	KIT-C-UNIV-M-100	760066720	Universal polishing kit, multimode, 100 connectors
Single-mode	KIT-C-UNIV-S-100	760066738	Universal polishing kit, single-mode, 100 connectors

Note: Kits **do not** contain connectors, isopropyl alcohol, or non-ozone depleting canned air.

1.5 Tool Kit Required for EZ Method

Table D.

Kit Type	Kit Number	Material ID	Kit Includes
EZ Tool Kit	1032H	700005838	Tool kit to mount SC, ST, and LC connectors using anaerobic adhesives on 900 µm buffered fiber

1.6 Ordering Information

To order LC connectors and kits, refer to Section 11, *Ordering Information*.

2   How to Contact Us

- To find out more about **CommScope**® products, visit us on the web at www.commscope.com/

- For technical assistance:

  - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or **PartnerPRO**™ Network Partner.

  - Within the United States, report any missing/damaged parts or any other issues to **CommScope** Customer Claims at 1-866-539-2795 or email to claims@commscope.com. Outside the United States, contact your local account representative or **PartnerPRO** Network Partner.

3   Safety Precautions

- Safety glasses should be worn at all times while performing the installation procedures.

- Avoid skin contact with the epoxy.

- Place combustibles away from the curing oven when it is in operation. After the oven has reached its operating temperature, the oven ports and heat tube assemblies are extremely hot at 266°F (130°C). Allow the oven and heat tube assemblies to cool before handling or storing.

- Optical fibers may emit radiation if the far end is connected to a working laser or Light-Emitting Diode (LED). Never view the fiber end of a cable or plug with the naked eye or any optical instrument until absolute verification is established that the fiber is disconnected from any laser or LED source.

4   Oven Preparation

4.1   Set Up Curing Oven

1. Place oven on a level surface and away from combustibles.

2. Connect the power cord to a power source (120V 60Hz AC for the 200A oven and 220V 50Hz AC for the 200A1 international oven).

3. Locate the six heat tube assemblies supplied with the Upgrade Kit.

4. Insert the heat tube assemblies into the heater ports.

   Be certain that the metal portion of each heat tube assembly is fully inserted into the heater ports.

5. Push the **ON/OFF** switch to the **ON** position (lamp in switch illuminates).

   Note: A READY lamp will illuminate when the oven reaches its operating temperature of 266°F (130°C).

⚠ CAUTION:

After the oven reaches its operating temperature, the metal portion of the heat tube assembly will be extremely **HOT** at 266°F (130°C). Allow the oven and heat tube assemblies to cool before handling and storing.
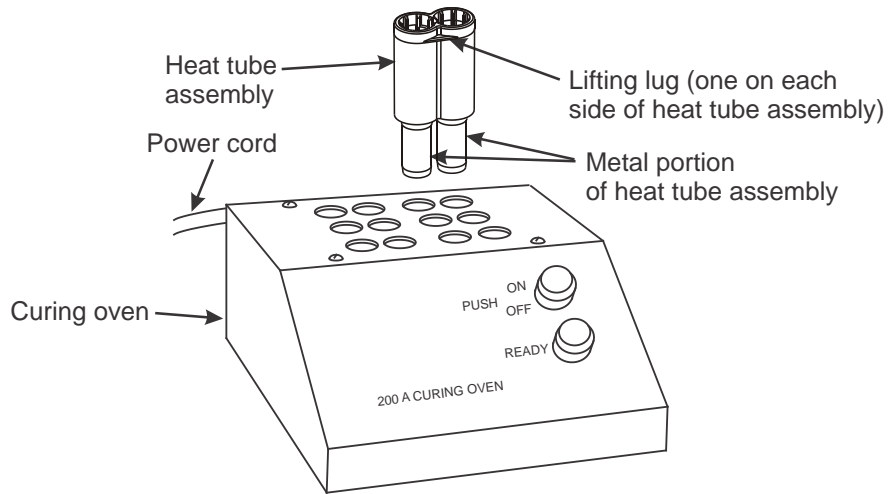
5 Fiber Preparation, 0.9mm Buffered Fiber (BTW) Connector

1. Remove cable sheath and outer jacket.

   ⚠ **CAUTION:** Be careful not to cut into fibers while removing cable sheath and outer jacket.

   Note: Use a standard sheath removal tool. Also, be certain to expose enough buffered fiber to:

   - Allow access to the curing oven and other connector preparation functions.
   - Prevent stress on fibers during connector preparation.
   - Provide adequate fiber length for placement in associated equipment cabinet.

   Typical working length for buffered fibers is 24 to 36 inches (0.6 to 0.9 meters).

2. Install buffer support boot by slipping the small end of boot onto the buffered fiber.
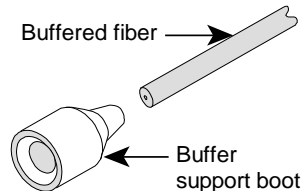
3. Measure and mark the buffered fiber 7/16 to 1/2 inch (11 to 13mm) from the end by using the scale or template provided in the tool kit.
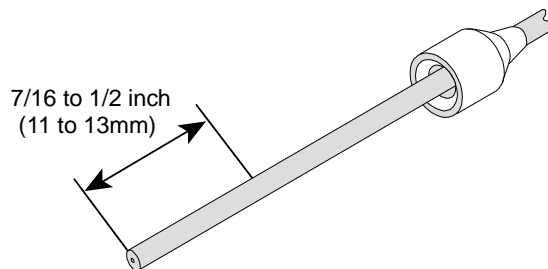
4. Locate 1026A Heat-Strip Tool provided in the 1032B5 Tool Kit.

   Note: Refer to 1026A Heat-Strip Tool operating instructions for setup.

5. Strip 7/16 to 1/2 inch (11 to 13mm) of the buffered fiber.

6. Clean stripped fiber by saturating a wipe with isopropyl alcohol (>91% 2-propanol + water) and wiping the fiber from the edge of the buffer toward the end of the fiber.

   Note: If residue remains on the fiber, use a clean wipe saturated with isopropyl alcohol to wipe the fiber again.

7. Place prepared buffer into the grooves of the 971A-2 holder block, provided in Tool Kit, to avoid breaking or contamination of the fiber.

1026A heat-strip tool

Buffer

Align mark on buffer with heat-strip blades

Partial view of a 971A-2 holder block

Prepared fiber in a 1.6mm groove

Buffer support boot
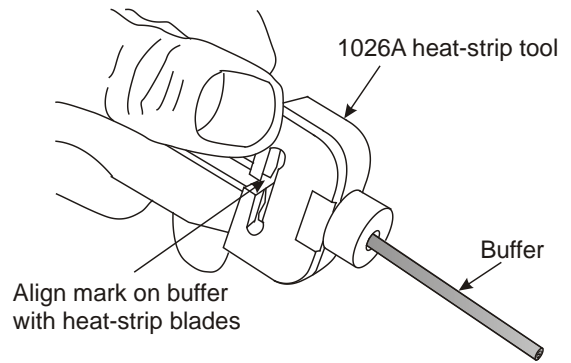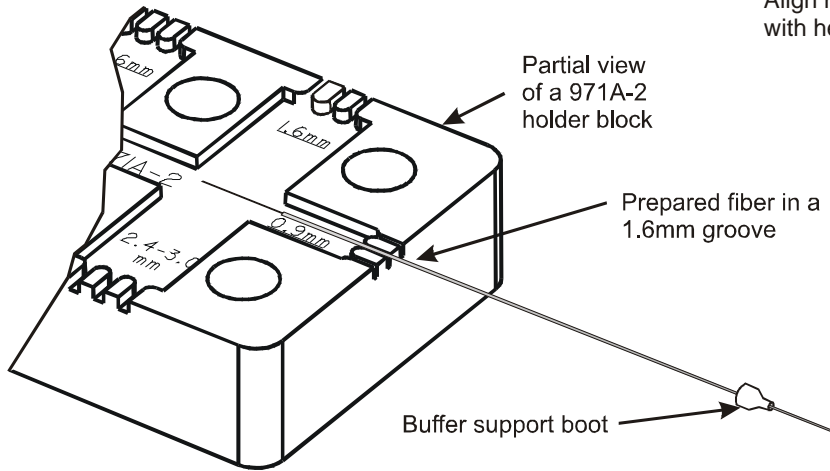
6 Cord Preparation – Jumper Connectors

6.1 Assemble Connector Components

6.1.1 Simplex Applications on a Simplex Cord

1. Thread a cable support onto the simplex cord, narrow end first.
2. Thread a crimp sleeve onto the cord. The metal end of the crimp sleeve should be oriented toward the end of the cord.
3. Repeat Steps 1 and 2 for the other end of the cord.

Narrow end of cable support

Cable support

Metal end of crimp sleeve

Crimp sleeve
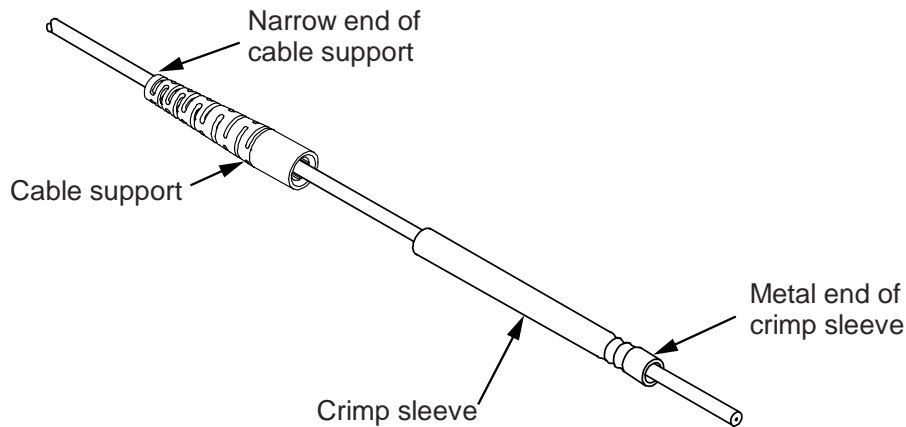
6.1.2   Duplex Applications on a Duplex Cord

1. Split the jacket on the duplex cord into two separate cords at least 9 inches (230mm) from the end.

2. Determine the buffer color of each cord by looking at the end of the cordage. The duplex cord should have a blue buffer and an orange buffer.

3. Thread a cable support onto each cord, narrow end first.

4. Place a yellow crimp sleeve on the cord with the blue buffer and a white crimp sleeve on the cord with the orange buffer. The metal end of the crimp sleeves should be oriented toward the end of the cord.

5. Repeat items 1 through 4 for the other end of the cord.
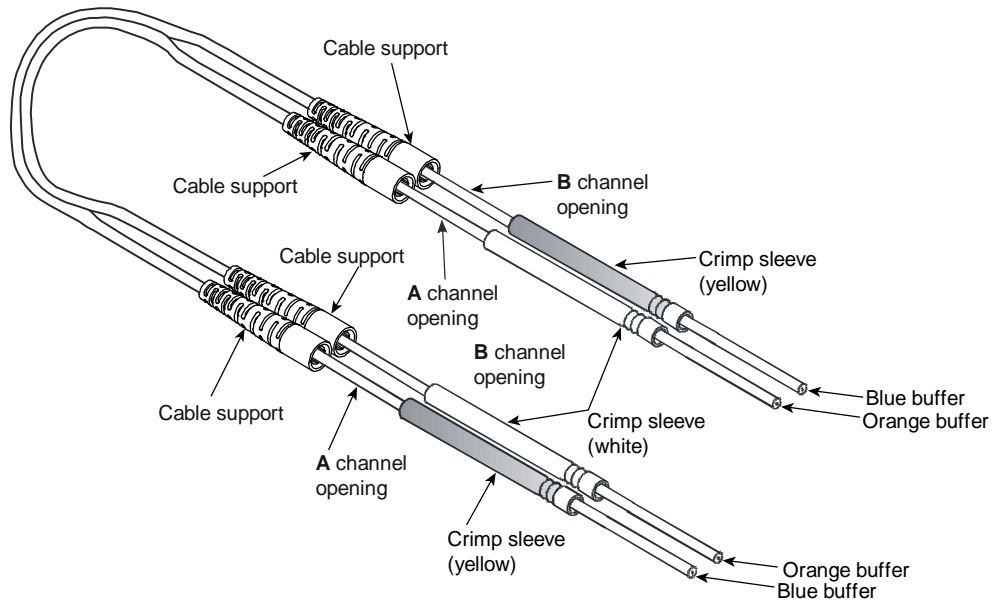
6.2   Remove Outer Jacket and Trim Strengthening Yarn

1. Locate the template provided in the Upgrade Kit.

   Measure and mark outer jacket at 1.125 inches (29mm) and at 1.375 inches (35mm) from the end.
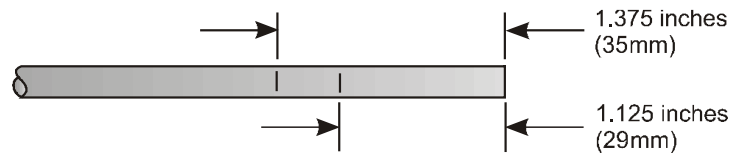
2. Use the 700A stripping tool, provided in Tool Kit, to remove outer jacket at the 1.125 inches (29mm) mark.
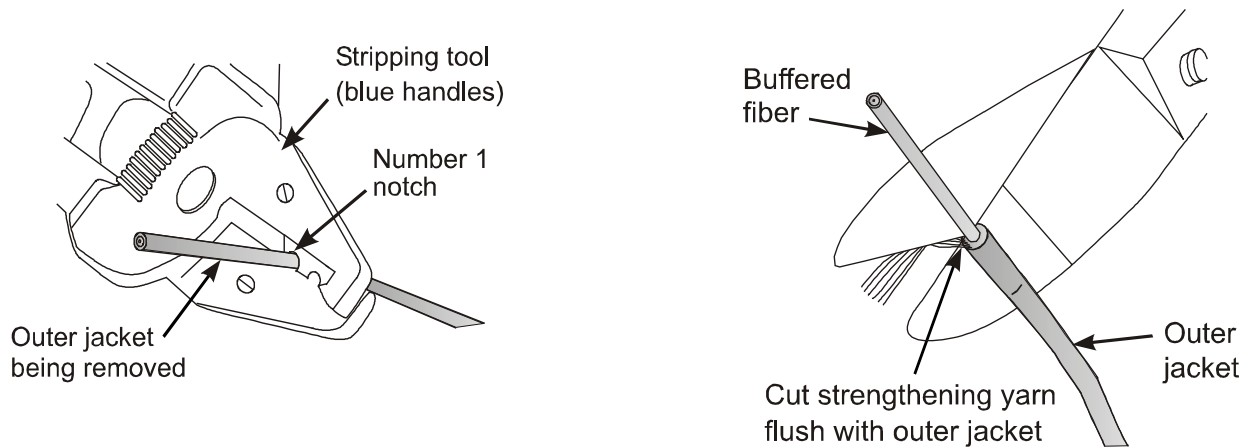
3. Lightly twist the strengthening yarn into one bundle and use scissors to cut yarn flush with the end of the outer jacket.
4. Use the 700A stripping tool to remove outer jacket at the 1.375 inches (35mm) mark. This will expose 0.25 inch (6mm) of yarn.
5. Flare the shortened strengthening yarn evenly around the cable. The brush from the 1026A stripper tool can be used.
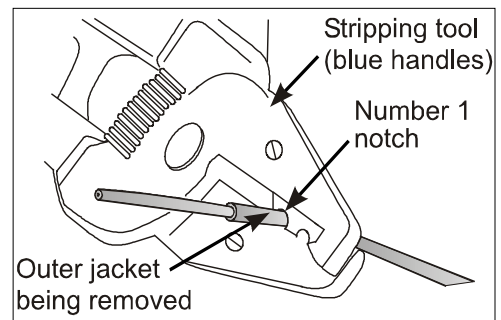
6.3   Remove Buffer and Fiber Coating

Refer to 1026A Heat-Strip Tool operating instructions for heat-strip tool setup.

1. Locate the 1026A Heat-Strip Tool provided in the Tool Kit.
2. Locate the gold LC stripper guide tube provided in the Upgrade Kit.
3. Install the heat-strip tube into the heat-strip tool making sure the heat-strip tube is fully inserted into the heat-strip tool.
4. Insert buffered fiber into the guide tube until the jacket and strengthening yarn hit the appropriate stop inside the guide tube.

Note: Do not force the cord into the guide tube. If the buffer does not go through the guide tube easily, trim 0.0315 inch (0.8mm) from end of buffer. The end of the buffer occasionally becomes flattened when the cord is initially cut. The buffered fiber should protrude approximately 0.55 inch (14mm) into the guide tube.

⚠ CAUTION:

Proper stripping lengths and procedures are required for best connector pull-proof performance.

5. Close the handles of the heat-strip tool and wait 6 to 10 seconds for the softening of the buffer to occur.

6. Wrap the cord around your index finger and pull the fiber from the tool with one smooth and straight motion.

Note: Wrapping the cord around your index finger may prevent the buffered fiber from slipping out of the jacket during the stripping operation.
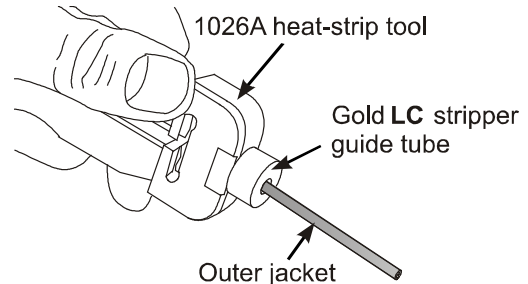
⚠ CAUTION:

The buffer must not be allowed to move within the cord while stripping. Do not strip additional buffer length if buffer pulls from cordage. Buffer will normally push back into cord during connector plug assembly.

1026A heat-strip tool

Gold **LC** stripper guide tube

Outer jacket

0.55 inch (14mm)

0.25 inch (6mm)
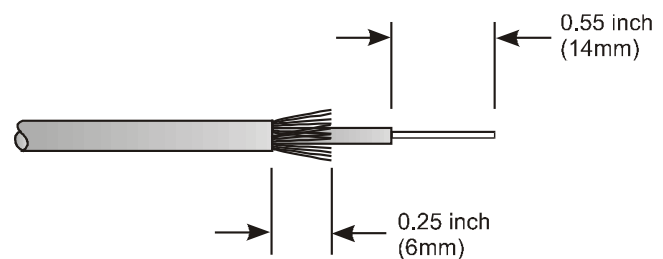
6.4 Clean Stripped Fiber

1. Saturate a wipe with isopropyl alcohol (>91% 2-propanol + water).

2. Start at the coating end and wipe toward the fiber end.

3. Place the prepared cord into the grooves of the 971A-2 holder block to avoid breaking or contamination of the fiber (holder blocks are provided in the Upgrade Kit).

Note: If residue remains on the fiber, use a clean wipe saturated with isopropyl alcohol to wipe the fiber again.

Prepared fiber in a 1.6mm groove

Partial view of a 971A-2 holder block
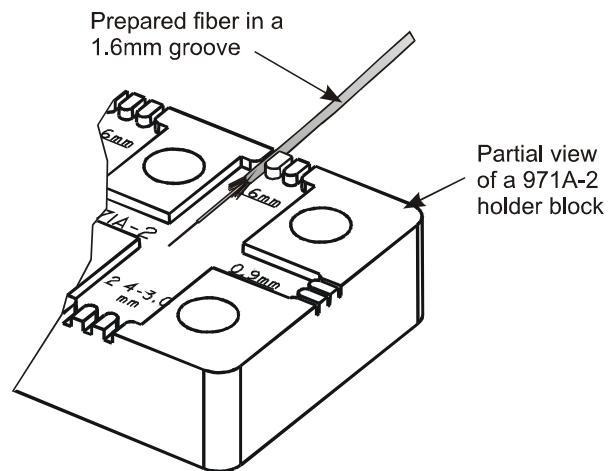
7 Epoxy Preparation or Adhesive Preparation

There are two methods of bonding the fiber into the connector using either epoxy or adhesive preparation. Refer to *7.1*, *Epoxy Preparation* or *7.2*, *Adhesive Preparation* in this section.

7.1 Epoxy Preparation

The epoxy can be ordered separately using the catalog number FOT-KIT-CON-EPX. The epoxy comes in a two-part package. A divider separates the resin from the hardener. The divider must be removed to allow the epoxy to be mixed. The epoxy is then loaded into a syringe.

⚠ **CAUTION:**   Avoid contact of epoxy with skin.

1. Remove the divider between the resin and the hardener.

2. Mix the epoxy using the divider.

    Note: The epoxy must be thoroughly mixed until both parts are blended into a smooth uniform color.

3. Obtain a syringe from the *Multimode LC Consumables Kit*.

4. Place the syringe tip on the syringe and twist to lock in place.

5. Remove the plunger from the syringe.
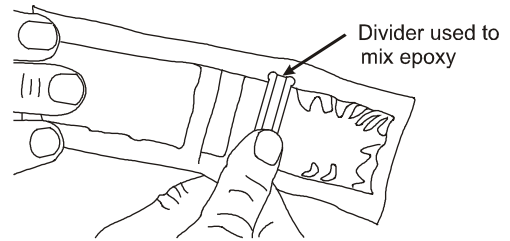
6. Fold the epoxy package in half and cut off one of the package corners.

7. Squeeze the mixed epoxy into the syringe.

8. Replace the plunger into the syringe.

9. Remove air pockets from the syringe by holding the syringe tip upward and ejecting epoxy until the air pockets are removed.

    Note: A 3/4-inch (19mm) length of epoxy will be enough for about 50 connectors.
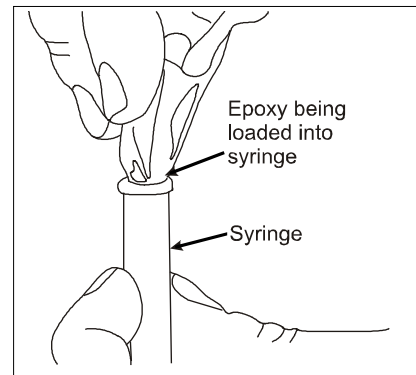
7.2   Adhesive Preparation

⚠ **CAUTION:**   Avoid contact of primer with skin.

Note: Refer to Table E for recommended adhesive temperatures.

Table E: Recommended Usage Temperatures for Adhesive

Condition	Temperature
Storage	-5°C to 30°C (23°F to 86°F)
Installation	0°C to 38°C (32°F to 100°F)
Operating	-40°C to 75°C (-40°F to 167°F)

1. Shake the bottle of adhesive vigorously.

2. Remove the cap from the bottle.

    Note: If bottle has not been opened, use a straight pin to make a hole in the tip of nozzle.

3. Remove plunger from syringe and twist a syringe tip onto the end of syringe.

4. Squeeze bottle to squirt adhesive into syringe.

5. Place plunger into syringe and expel air from syringe.

    Note: Alternately, simply twist a syringe tip onto the nozzle of the adhesive bottle, making sure it fits snugly.

7.2.1 Prepare Primer

⚠️ **CAUTION:**   Avoid contact of primer with skin.

1. Place the 1-inch long (25mm) syringe tip onto the syringe and twist to lock in place.
2. Shake the bottle of primer vigorously.
3. Remove plunger from syringe.
4. Squeeze primer bottle to squirt adhesive into syringe.
5. Place plunger into syringe to expel excess air.

Note: Alternatively, simply twist a syringe tip onto the nozzle of the primer bottle, making sure it fits snugly.

Note: Once the installation procedure has been completed, any extra primer in the syringe may be placed back into the original bottle; however, the syringe tip should be thrown away to avoid getting adhesive, which may be on the tip, mixed in with the primer.

8 Connector Installation for BTW (0.9mm Buffered Fiber) and LC (1.6 Jacketed Fiber)

Connectors are provided in packages which must be ordered by product codes (See **Section 11.1** for BTW and LC connector product codes). Each connector is fitted with a white dust cap to protect the connector tip from damage and contamination. During the connector installation process a holder is used to protect the fiber protruding from the connector tip and to aid in the handling of the small connectors.

8.1 EZ Terminations

Complete the following sections first.

8.1.1   Apply Primer to the Connector Tip

1. Locate connector and connector holder with extension.
2. Remove the white dust cap from tip of connector.
3. Place two texwipes on the work table, one on top of the other, and place a drop of primer on the texwipes.
4. Wipe the tip of the ferrule through the drop of primer on the texwipes, one time.
5. Snap connector into the connector holder.
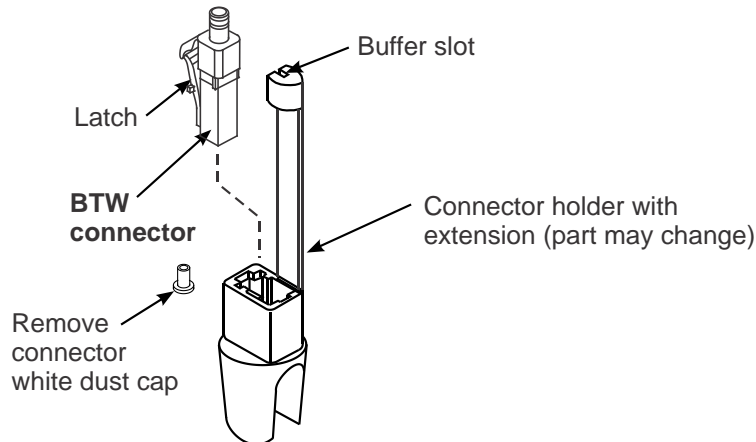
8.1.2 Apply Primer to Buffer

⚠ **CAUTION:** **DO NOT** get primer on the fiber or the holder block.

1. Remove the prepared buffer fiber from the holder block.

2. Carefully place one drop of primer onto buffer, just back from where the buffer was stripped (do not put primer on the bare fiber).

3. Replace prepared buffered fiber in holder block.

Place one drop of primer here

Remove prepared buffer fiber from holder block
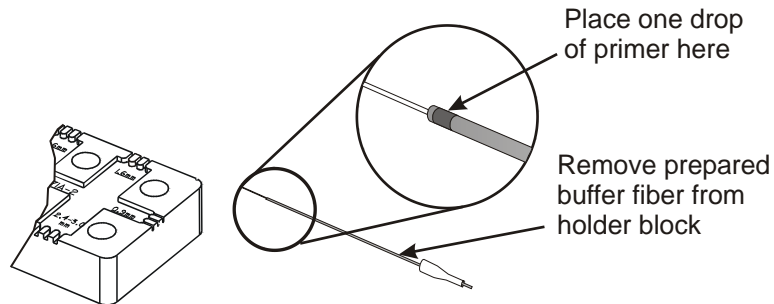
8.2 Prepare the Connector

The following instructions are included for preparing a BTW connector (**Section 8.2.1**) and an LC connector (**Section 8.2.2**).

8.2.1 Prepare BTW Connector (0.9 mm Buffered Fiber)

1. Locate the connector to be installed and remove the white dust cap.
2. Hold the connector towards the light and check to make sure the hole and the tip are clear.
3. If necessary, clear the hole using the music wire (furnished).
4. Locate a connector holder with extension.
5. Snap connector into the holder.

Trigger
Latch
BTW connector
Remove connector white dust cap
Buffer slot
Connector holder with extension

0.9 mm Buffered Fiber

Trigger
Latch
Keyed LC connector
Connector holder

1.6mm jacketed fiber
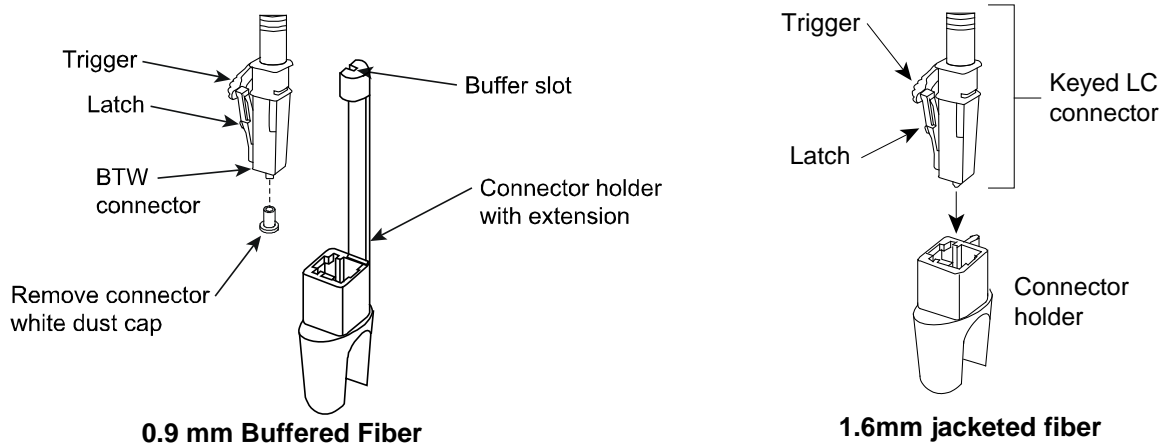
8.2.2 Prepare LC Connector (1.6 mm Jacketed Fiber)

1. Locate the connector to be installed and remove the white dust cap.
2. Locate a connector holder from the upgrade kit and snap the connector into the holder.

8.3   Apply Epoxy/Adhesive

Epoxy is injected into two areas of the connector: (1) inside of the ferrule and (2) at the back of the ferrule. The syringe is first used to inject epoxy into the ferrule. This epoxy bonds the stripped fiber to the ferrule. Before removing the syringe from the connector, epoxy must next be deposited at the back of the ferrule. This epoxy bonds the buffer at the back of the ferrule.

DO NOT apply an excessive amount of epoxy to either the ferrule or at the back of the ferrule.
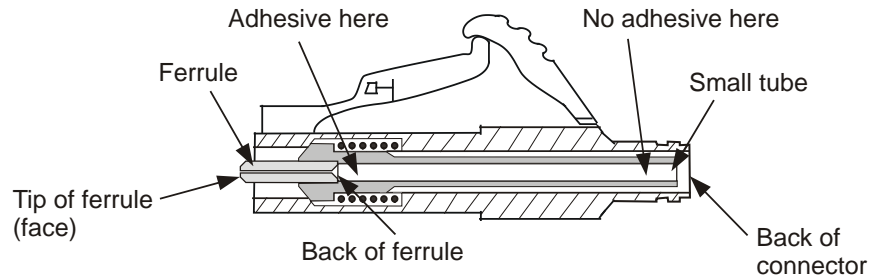
Note: Simplex connector shown.

1.   Visually locate the small tube inside the back of the connector.
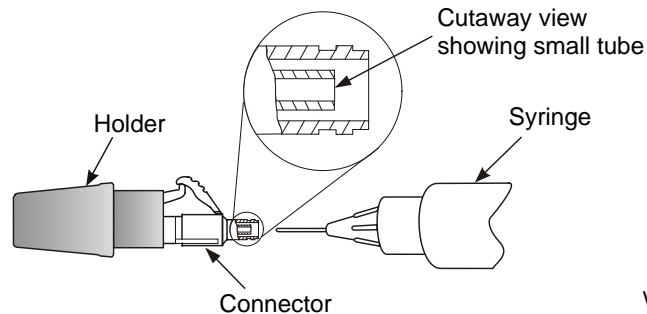
2.   Carefully insert the tip of the syringe into the small tube until it bottoms.

⚠ CAUTION:

In the following step, do not apply excess epoxy to the connector tip of the ferrule. The adhesive is a low viscosity fluid and if applied in excess will flow to the chamfer and sidewalls. Excess adhesive on the ferrule chamfer and sidewalls should be removed with the edge of a wipe.

3.   Inject epoxy into the ferrule by slowly pressing the syringe plunger until the epoxy adhesive exits the connector tip (face of the ferrule).

4.   Deposit epoxy at the back of the ferrule by pulling the tip of the syringe back slightly and momentarily injecting a small amount of epoxy at the back of the ferrule.

⚠ CAUTION:

When removing syringe from the connector in the following step, do not allow epoxy on syringe tip to contaminate the small tube or the back of the connector.

5.   Release pressure on plunger, wait a moment, and then remove the syringe from the connector.

8.4 Insert Fiber

8.4.1 Buffered Fiber (0.9mm)

Insert Fiber Into Connector

1. Remove prepared fiber from holder block.
2. Insert the exposed fiber into the small tube inside the connector and carefully feel for the opening in the ferrule.

   Note: Rotating the fiber or the connector assembly may help to locate the opening.

   ⚠️ **CAUTION:** Only perform the following step once.

3. When the fiber is seated, pull it back slightly and watch for fiber movement at the tip of the ferrule to make sure the fiber is not broken.
4. Reposition the fiber back into the connector.
5. Ensure the buffer support boot is pushed well away from the holder extension slot and back onto buffered fiber.
6. Push buffer in slot at end of holder extension.

Cure Adhesive and Attach Buffer Support Boot

1. Allow adhesive to cure for 1 minute.

   Note: Excessive adhesive on the ferrule will not cure and must be cleaned off after polishing.

2. Remove the connector from connector holder.

   ⚠️ **CAUTION:** In the following item, exercise care not to break the exposed fiber.

3. Use the edge of a wipe to clean any uncured adhesive from around the fiber where it protrudes from the ferrule tip.
4. Push the cable support boot onto the connector.

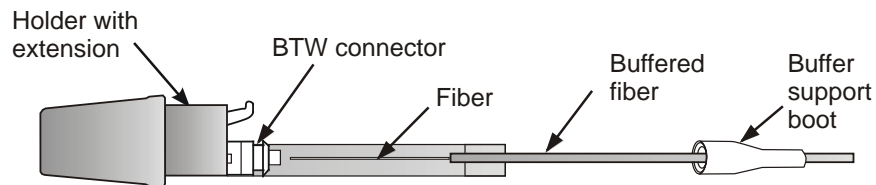   **Note:** Exercise care not to break the exposed fiber.

8.4.2 Cordage (1.6mm)

1. Remove prepared fiber from holder block.
2. Insert the exposed fiber into the small tube inside the connector and carefully feel for the opening in the ferrule.

   Note: Rotating the fiber or the connector assembly may help to locate the opening.

⚠️ **CAUTION:** Only perform the following step once.

3. When the fiber is seated, pull it back slightly and watch for fiber movement at the tip of the connector to make sure the fiber is not broken.

4. Reposition the fiber back into the connector.
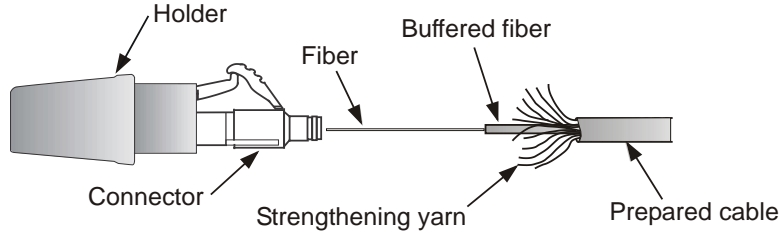
8.5 Install Crimp Sleeve

1. Slip the cable crimp sleeve assembly over the back of the connector while capturing the strengthening yarn.
2. Using the 1510LC crimping tool, place the square edge of the connector against one edge of the crimp jaw with the crimp sleeve assembly lying through the crimp jaws.

⚠️ **CAUTION:**

CRIMP ONLY ONCE. More than one crimp will weaken the connector.

3. Apply pressure until crimping tool completely closes and automatically opens.
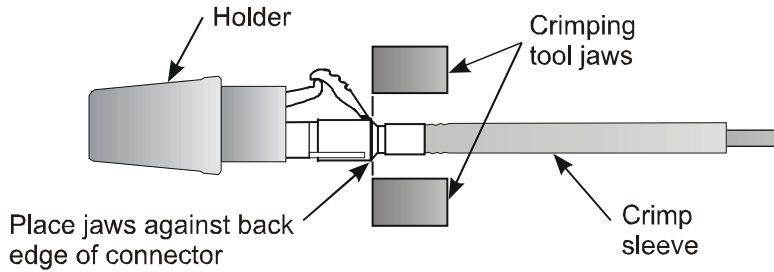
Simplex or Duplex Jumper Connector

4. Store crimped connector vertically in the holder block until up to 12 simplex or 6 duplex connectors have been crimped.
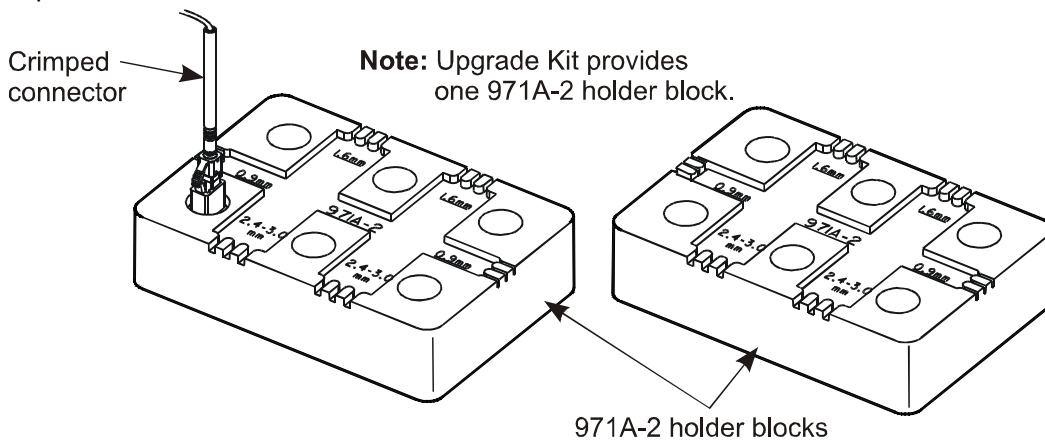
8.6 EZ Adhesive Terminations

Place connector assembly into the holder block. This will prevent the adhesive from flowing to the ferrule chamfer and sidewall surfaces. Allow the adhesive to cure for 1 minute, and proceed to **Step 8.8**.

Note: Excess adhesive on the ferrule will not cure and must be cleaned off after polishing.

8.6.1 Cure Connector Assemblies – Heat Cure Epoxy Terminations

1. When the desired number of connectors has been prepared, place the holder block next to the preheated oven.
2. Place the crimped connector assemblies into the heat pipes.
3. Ensure that the connector assemblies are sitting at the bottom of the heat pipes.
4. Remove the assemblies from the heat pipes after they have cured for 10 minutes.

8.7 Cool Connector Assemblies

1. Place cured assemblies back into the holder block to cool.

   - For simplex connectors: Push the cable supports onto the connector. The cable support is properly installed when the cable support contacts the back of the connector. **Do NOT twist or forcibly push the cable support onto the connector.** Twisting or forcibly pushing the cable support onto the connector may damage the fiber.

   - **For duplex connectors:** Allow the connector holder assemblies to completely cool in the holder blocks. **Do NOT** install the cable support at this time.

8.8 Score the Fiber

1. Remove the connector from the connector holder.
2. Obtain the 975A cleaving/scoring tool from the Tool Kit.

   Note: In the following step, score the fiber as close to the ferrule as possible while at the same time being careful not to break the fiber.

3. Place the cleaving/scoring tool against the ferrule and exposed fiber.
4. Using one stroke of the cleaving/scoring tool, gently score the exposed fiber.
5. Remove the exposed fiber by gently pulling straight away from the cable.

   Note: If fiber did not readily pull off, score fiber again on opposite side and gently pull fiber.

6. Dispose of the fiber scraps in a safe manner.

   Note: The adhesive surface on a piece of tape is a convenient place to hold fiber piece until disposal.
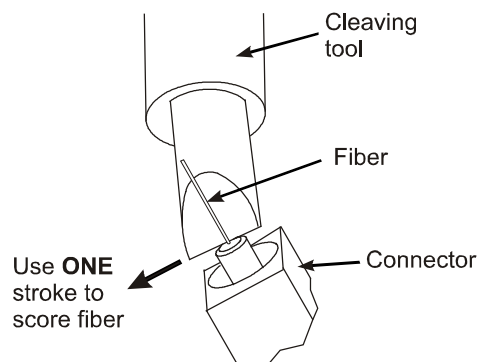
8.9 Polish Connector End–Multimode and Singlemode

⚠️ **WARNING:** These procedures are not intended for use on flat-tipped LC Connectors (MFC-LCU-16, MFC-LCU-09, MDC-LCU-16, SFC-LCU-16, and SFC-LCU-09).

⚠️ **CAUTION:** Contaminants on polishing materials can cause scratches on the end face of the fiber/ferrule. Throughout the entire polishing process, keep work area and all polishing materials clean. Clean polishing papers between each step using a wipe moistened with alcohol.

⚠️ **CAUTION:** Uncured adhesive on ferrule cylindrical surface can cause problems during mating/demating of connectors. Clean all ferrule surfaces using a wipe moistened with alcohol.

Note: Table F (multimode) and Table G (singlemode) provide quick overviews for polishing.

Note: Cut one sheet of type H polishing paper (green, mylar-backed) into four pieces.

8.9.1 Step 1. Remove Fiber Stub

1. In one hand, hold one of the cut pieces of type H polishing paper (green, dull side facing the connector).

2. In the other hand, hold the connector in the polishing tool.

    Note: When performing the following step, support the polishing tool with the fingers on back side of paper. Be careful not to break the fiber stub.

    Note: Use the keyed 2 polishing tool for polishing keyed 2 connectors (MID 760205195).

3. Air polish using light figure-8 motions about 1 inch (25mm) in diameter; carefully polish off fiber stub. Gently begin light figure-8 strokes to allow polishing paper to polish down the fiber stub without snagging or breaking the stub. Polish approximately 20 strokes.

Position tool during polishing so it is supported by fingers on back side of paper

Type H (green) polishing paper
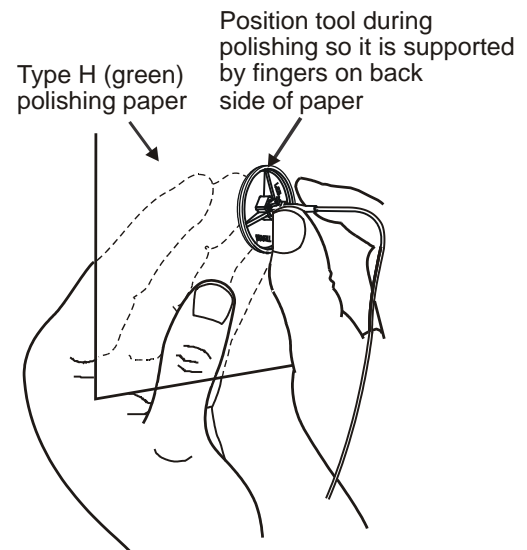
8.9.2 Step 2. Remove Excess Adhesive

1. Use canned air to clean the back and front of one sheet of type H polishing paper (green). Each sheet of polishing paper is cut to fit squarely on the polishing plate.

2. Saturate a wipe with isopropyl alcohol (>91% 2-propanol + water).

3. Obtain a glass plate and a polishing tool from the tool kit.

4. Clean the connector ferrule, glass plate, and polishing tool with the saturated wipe between polishing steps.

5. Use canned air to blow dry the connector ferule, glass plate, and the polishing tool.

6. Insert the LC connector into the polishing tool.

7. Place one sheet of type H (6"x 6") polishing paper (green), dull side up, over the plate.

8. Gently place the polishing tool and connector onto the polishing paper.

Note: In the following step, you should **not** feel any drag between the fiber and the paper. Start with light pressure and use figure-8 strokes that are approximately 2 inches (51mm) high and 1 inch (25mm) wide. The figure-8 strokes must be well rounded to ensure complete removal of the adhesive from the end of the ferrule.

9. Polish **MM** and **SM Connectors**:

- **MM Connectors** – Gently polish the connector for 12-15 large figure-8 strokes to remove all epoxy/adhesive from the ferrule end face. For a more uniform polish, rotate the connector and puck 90 degrees every ten strokes.
- **SM Connectors** – Using firm pressure, polish the connector with 8-10 large figure-8 strokes to remove all epoxy/adhesive from the ferrule end face.

⚠️ **DANGER:** *Optical fibers may emit radiation if the far end is connected with a working laser or light-emitting diode (LED). Never view the fiber end of a cable or plug with the naked eye or any optical instrument until absolute verification is established that the fiber is disconnected from any laser or LED source.*

10. Using a 7X magnifier or LC microscope, check the tip of the ferrule. No excess adhesive should surround the fiber, ferrule chamfer, and cylindrical surfaces.

    Note: If excess adhesive is found, continue to use type H polishing paper (green) to remove the excess. Inspect after every 5 polishing strokes.

    Note: To be certain that the ferrule is free of any uncured adhesive, clean the connector tip, chamfer, and cylindrical surfaces with a moistened wipe.

    Note: This concludes the polishing procedure for multimode connectors. **Section 8.9.3** is to be performed on singlemode connectors only.

Type H polishing paper (green) with dull side up
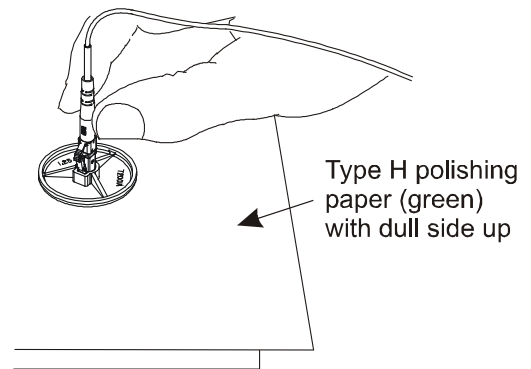
8.9.3 Step 3. Singlemode — Improve Return Loss

1. Place one sheet of type E (white) polishing paper over the type H paper (green), dull side up.
2. Remove the connector from the polishing tool.
3. Place a small amount of distilled water on the type E paper and distribute the water over the polishing area using several figure-8 strokes with the empty polishing tool.
4. Place the connector back into the LC polishing tool.
5. Polish the connector using 6-8 well-rounded, figure-8 strokes.

    Note: To be certain that the ferrule is free of any uncured adhesive, clean the connector tip, chamfer, and cylindrical surfaces with a moistened wipe.

    Note: This concludes the polishing procedure for singlemode connectors.

Table F. Overview—Polishing Multimode

Step	Polishing Materials	No. of Figure-8 Strokes	Notes
1	Type H (green, mylar backed)	20, then as required	Air polish **with polishing tool** to remove fiber stub.
2	1 sheet (green) type H over polishing plate	12-15, then as required	Dry polish to remove cured adhesive.
Repair polish, only if needed	2 sheets type F (yellow) over Type H (green) polishing paper	10 strokes, then as required to remove flaw (25 strokes max)	Wet type F paper with distilled water.

Table G. Overview—Polishing Singlemode

Step	Polishing Materials	No. of Figure-8 Strokes	Notes
1	Type H (green, mylar backed)	20, then as required	Air polish **with polishing tool** to remove fiber stub.
2	1 sheet (green) type H over polishing plate	8-10, then as required	Dry polish to remove cured adhesive.
3	1 sheet (white) type E over H polishing paper on plate	6	Wet type E paper with distilled water for final polish.
Repair polish, only if needed	2 sheets type F (yellow) over Type H (green) polishing paper	10 strokes, then as required to remove flaw (25 strokes max)	Wet type F paper with distilled water. After flaw is removed, repeat Step 3.

8.10   Repair Polishing (Only If Needed)

1., Place two sheets of type F paper (yellow), one on top of the other, over Type H polishing paper, dull side up, placed on the glass plate.

2. Wet the polishing surface with distilled water. Distribute the water over the polishing area using several figure-8 strokes with an empty polishing tool.

3. Install the connector into the polishing tool.

4. Using firm pressure, polish the connector using 10 well-rounded figure-8 strokes, to attempt to remove the flaw. If the flaw is not removed, continue to polish, but do not exceed 25 repair strokes total, to avoid over polishing the ferrule. If an unacceptable flaw is still present after 25 strokes, the connector should be replaced/reterminated.

    Note: This concludes the repair procedure for multimode fibers.

    Note: To be certain that the ferrule is free of any uncured adhesive, clean the connector tip, chamfer, and cylindrical surfaces with a moistened wipe.

5. For singlemode fibers only, repeat **Section 8.9.3**.

8.11   Polishing Hints

Note: The following photos (next page) depict polished end faces viewed using an interferometer to display end face contours. This information is provided as a reference.

Example 1. Round Figure-8 Strokes

Uniform Dome (Good)
Circular Interferometric Pattern

2" (51 mm)
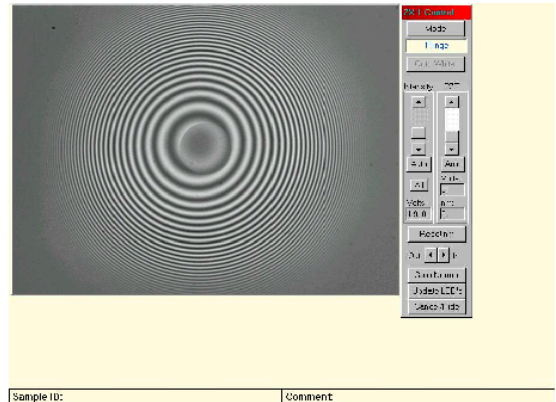
Example 2. Narrow Figure-8 Strokes

Irregular Dome (Undesirable)
Elliptical Interferometric Pattern
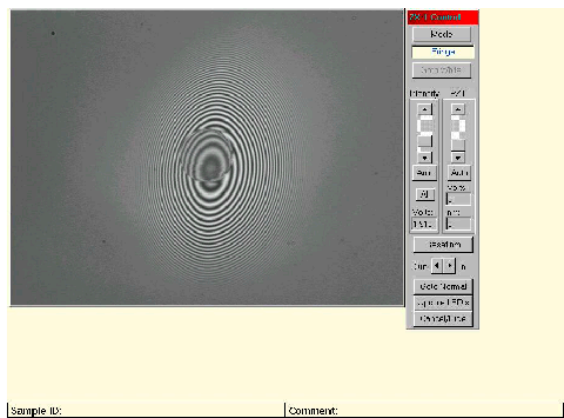
Example 3. Under-polished Flat Endface LC (This should not occur if using pre-radius LC connectors)

Irregular Dome (Undesirable)
Ferrule end face still flat near fiber

Flat area
(straight lines)
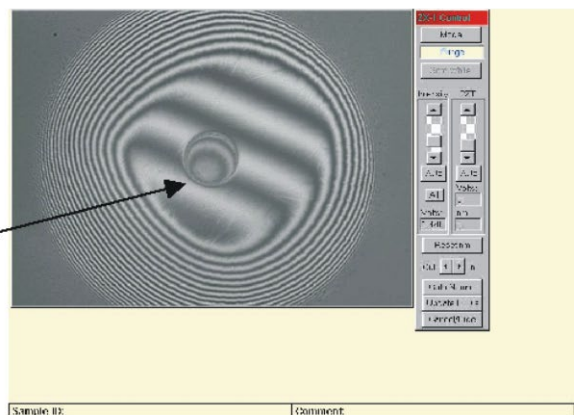
8.12   Final Assembly

8.12.1   Simplex Connectors

1. Ensure that connector has been polished and the end finish is acceptable.

2. Cover the end of the connector with the white dust cap supplied with the connector.

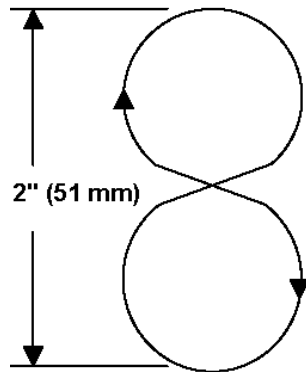   **Note:** To be certain that the ferrule is free of any uncured adhesive, clean the connector tip, chamfer, and sidewalls with a moistened wipe.

8.12.2   Duplex Connectors with Replaceable Duplex Clip

1. Ensure that each connector has been polished and the end finish is acceptable.

2. Ensure that the cords are not twisted.

3. Attach cable supports if not already attached.

   **Note:** Attach each cable support by pushing forward. **Do NOT twist and push.** Twisting and pushing may damage the fiber. When properly seated, the cable support should positively contact the back of the connector.
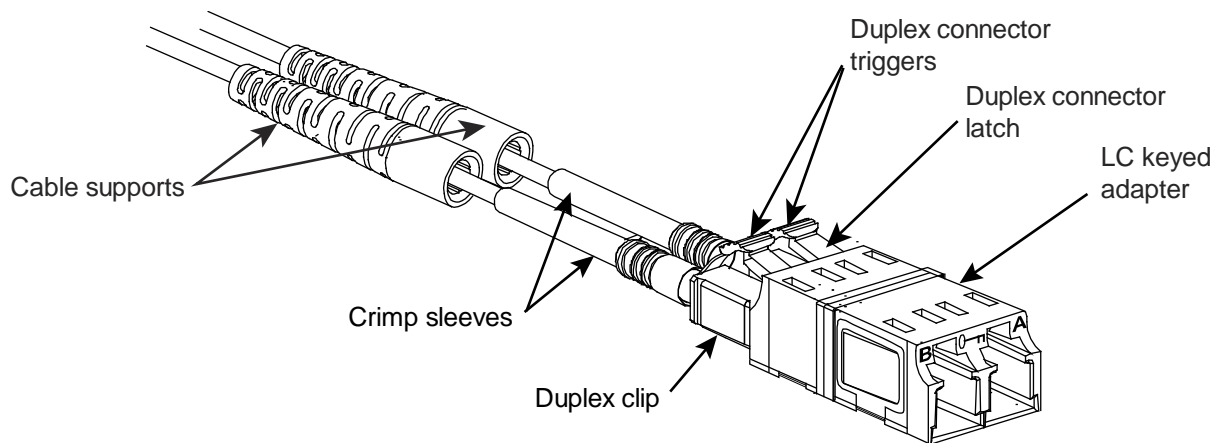
4. Locate the **B** channel opening on one of the duplex clips.

5. At the first end of duplex cord, snap connector with the yellow crimp sleeve (shown on drawing in section 6.1.2) into the **B** channel opening on the duplex clip.

6. Locate the **A** channel opening on the duplex clip.

7. Snap connector with the white crimp sleeve into the **A** channel opening.

8. Locate the **A** channel opening on the second duplex clip.

9. On the opposite end of duplex cord, snap connector with the yellow crimp sleeve (shown on drawing in section 6.1.2) into the **A** channel opening on the duplex clip.

10. Locate the **B** channel opening on the duplex clip.

11. Snap connector with the white crimp sleeve into the **B** channel opening.

9 Fiber Inspection

9.1   Fiber Inspection

⚠ DANGER:

Optical fibers may emit radiation if the far end is connected with a working laser or light-emitting diode (LED). Never view the fiber end of a cable or plug with the naked eye or any optical instrument until absolute verification is established that the fiber is disconnected from any laser or LED source.

Note: The fiber end face should be clean and contaminant free.

1. Dampen a wipe with isopropyl alcohol (>91% 2-propanol + water).
2. Clean the tip and sides of the ferrule with the dampened wipe, followed by a dry wipe.
3. Blow the ferrule dry with canned air.
4. Locate the LC microscope supplied in the Upgrade Kit.
5. Insert the ferrule end of the connector into the microscope adapter (center hole).

⚠ DANGER:

A high-intensity light may be used at distant end of fiber to illuminate fiber core.

6. Open the microscope barrels to illuminate the connector tip and use the side wheel to focus.

End Face Inspection-Multimode Connectors

Acceptable Polish   Restricted Area

62.5 microns (fiber core)   125 microns (fiber outside diameter)

Unacceptable Polishes

Crack Through Core   Crack Pointing Toward Core   Chip in Restricted Area and Core   Edge Crack With Loose Chip
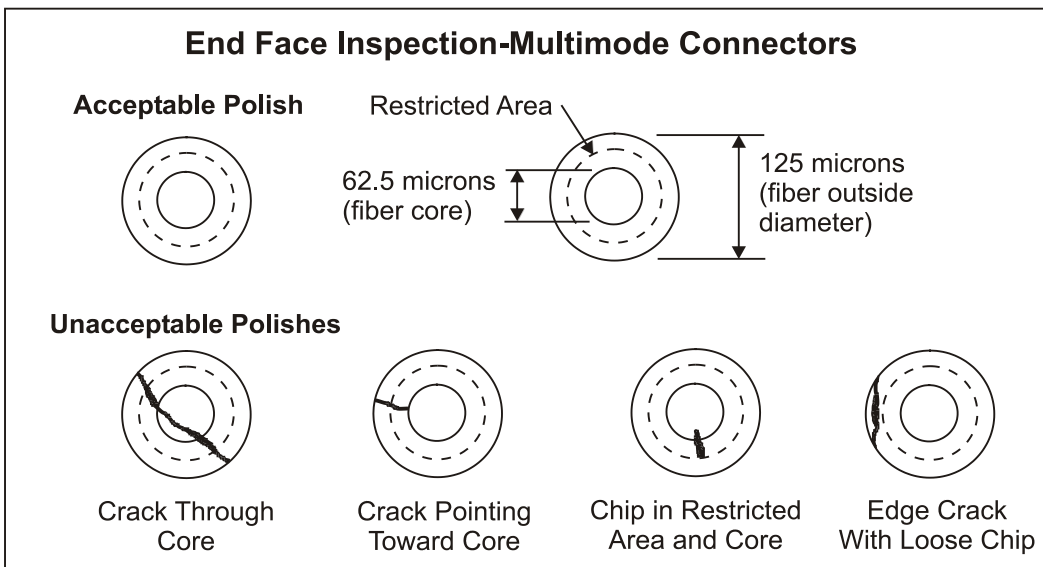
10 Cleaning Instructions

10.1   LC Connector

⚠️ **CAUTION:**

The adhesive used in this process is a low viscosity fluid and can migrate to the ferrule sidewalls if not cleaned. Functionality and signal performance will be affected if the connector tip is not thoroughly cleaned.

1. Dampen a wipe with isopropyl alcohol (>91% 2-propanol + water).

2. Clean the end of the ferrule with the dampened wipe.

3. Blow the ferrule dry with canned air.

10.2 Adapter

⚠️ **WARNING:**

Do not try to clean adapter with a standard pipe cleaner. The inner diameter of an LC sleeve is too small. If a connector is mounted in the adapter, do not try to clean the adapter with LC adapter brush or canned air.

1. If access to the adapter is only available from one side, bulkhead cleaning sticks or 1.25mm in-adapter swaps can be used.

2. If access is available from both sides of the adapter, clean the adapter with the LC adapter brush moistened with alcohol followed by canned air. The brush can be cleaned with alcohol and canned air.

10.3   Mount Adapter

⚠️ **CAUTION:**   The adapter should never be installed from the front of a panel or outlet.

1. Locate the panel or outlet where the adapter is to be mounted.

2. Install the adapter **from the front** of the panel or outlet and mount the adapter horizontally with position markings of **B** and **A** up to achieve correct polarity and position of the signal within the panel.

    Note: The position markings (**B** and **A**) are for transmit-to-receive polarity guidance.

Install LC keyed adapter from front

Mount LC keyed adapter horizontally
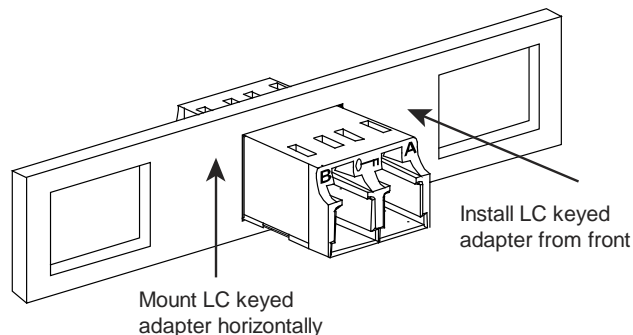
3. Adapter and connector are color coded to mate with each other. For example, red color coded LC adapters will mate only to red color coded LC connectors.

    Note: For testing purposes a universal black color coded adapter and connector is available, and will mate with any other color coded keyed adapter or connector.

11 Ordering Information

11.1 Ordering Information for Keyed LC BTW and Jumper Connectors
Table H.

Material ID	Part Number	Description
760102541	MFC-LCR-09-KBL	Pre-radiused BTW keyed LC connector, 0.9mm fiber, multimode, blue
various*	MFC-LCR-09-KXX	Pre-radiused BTW keyed LC connector, 0.9mm fiber, multimode, XX
760102327	MFC-LCR-16-LC KBL	Pre-radiused keyed LC connector, 1.6mm fiber, simplex multimode, blue
various	MFC-LCR-16-LC KXX	Pre-radiused keyed LC connector, 1.6mm fiber, simplex multimode, XX
760102434	MDC-LCR-16-KBL	Pre-radiused keyed LC connector, 1.6mm fiber, duplex multimode, blue
various	MDC-LCR-16-KXX	Pre-radiused keyed LC connector, 1.6mm fiber, duplex multimode, XX
760102897	SFC-LCR-09-KBL	TeraSPEED® BTW keyed LC connector, 0.9 mm fiber, single-mode, blue
various	SFC-LCR-09-KXX	TeraSPEED® BTW keyed LC connector, 0.9 mm fiber, single-mode, XX
760102657	SFC-LCR-16-KBL	TeraSPEED® Pre-radiused keyed LC connector, 1.6mm fiber, simplex single-mode, blue
various	SFC-LCR-16-KXX	TeraSPEED® Pre-radiused keyed LC connector, 1.6mm fiber, simplex single-mode, XX
760102764	SDC-LCR-16-KBL	TeraSPEED® Pre-radiused keyed LC connector, 1.6mm fiber, duplex single-mode, blue
various	SDC-LCR-16-KXX	TeraSPEED® Pre-radiused keyed LC connector, 1.6mm fiber, duplex single-mode, XX

Note: where XX= BL (Blue), GR (Green), RD (Red), YL (Yellow), AQ (Aqua), BR (Brown), SL (Slate), VI (Violet), RO (Rose), OR (Orange), BK (Black)

*Note: Contact your local account representative for ordering numbers for connector color variations.

11.2 Ordering Information for Adapters
Table I.

Material ID	Part Number	Description
760057190	KFA-LC02-KBL	Keyed LC duplex adapter, single pack, blue
various	KFA-LC02-KXX	Keyed LC duplex adapter, single pack, XX

Note 1: For testing purposes, a universal black color-coded adapter and connector is available, and will mate with any other color coded keyed adapter or connector.

Note 2: where XX= BL (Blue), GR (Green), RD (Red), YL (Yellow), AQ (Aqua), BR (Brown), SL (Slate), VI (Violet), RO (Rose), OR (Orange), BK (Black)

11.3 Ordering Information for Epoxy Kits

11.3.1 1032B5 Tool Kit
Table J.

Kit Qty	Description	Kit Qty	Description
1	1510B Crimping Tool	1	Glass Plate
1	300B Microscope	1	Stripping tool (R4366)
1	1510A Polishing Tool	1	Instruction Manual
12	600B Connector Holders	15	Micro Clips (1043A)
1	700A Stripping Tool	1	200A Curing Oven
1	1026A Heat Strip Tool	12	SC Curing Fixtures
2	971A-1 Holder Blocks	2	Modified SM/MM SC Grips
1	975A Cleaving Tool	1	Rubber Polishing Pad
1	Scissors	1	1039B Cut-Length Template with Scale
1	Alcohol Bottle	1	Instructions – Epoxy and EZ Methods

11.3.2   1032H Mini Tool Kit

Table K.

Kit Qty	Description
1	Microscope
2	1510A ST/SC Polishing Tool
12	600B ST Connector Holders
1	Stripping Tool
1	975A Cleaving/Scoring Tool
1	Scissors
1	Glass Plate
1	Ringing Tool (R-4366)
15	Micro Clips (1043A)
12	SC Connector Holders
1	Rubber Polishing Pad
1	1039B ST/SC Cut-Length Template
1	Magnifier
2	T2000A Polishing Tool
1	LC Microscope Adapter
12	LC Connector Holders
1	LC Polishing Pad Template

11.3.3   D-182959 Kit Upgrade Kit for LC Jumper Connectors

Table L.

Kit Qty	Description
1	T2001A Polishing Tool
1	LC Microscope
12	LC Connector Holders
1	LC Polishing Pad Template
1	Assembly Instructions for LC Fiber Optic BTW Connectors – Epoxy and EZ Methods – Singlemode and Multimode Versions

11.3.4   KIT-C-UNIV-S-100, Universal Polishing Kit, Singlemode
Table M.

Kit Qty		Description
2	Packages	Wipes
1	Vial	Music Wire
15	Syringes	Syringes
25	Tips	Dispensing tips
25	Sheets	Type H Polishing Paper (Green), 6"x6" (150x150mm)
25	Sheets	Type E Polishing Paper (White), 6"x6" (150x150mm)

Note: Kit contains enough supplies to field-assemble 100 singlemode LC connectors using heat cured epoxy.

11.3.5 KIT-C-UNIV-M-100, Universal Polishing Kit, Multimode

Kit contains enough supplies to install 100 multimode LC fiber optic connectors using heat cured epoxy. The kit is the same as the KIT-C-UNIV-S-100 Kit except no type E polishing paper is provided.

11.4 Epoxy

The approved epoxies for use with the **SYSTIMAX®** epoxy field installations can be obtained from the following distributors:

Product:

EPO-TEK* 353ND

USA

Epoxy Technology, Inc.

14 Fortune Drive
Billerica, MA 01821
Tel. 978-667-3805
Web: www.epotek.com

Asia, (Japan)
Daizo Corporation

Tel. 03-3279-6011
Fax 03-3279-6010

Europe, (France)

Techni Industries, France
Tel. 33 1 60 94 01 30
Fax 33 1 60 54 98 95

Product:

Tra-Bond F123MV**

USA

Tra-Con, Inc.

45 Wiggans Avenue
Bedford, MA 01730
Tel. 781-275-6363

Asia, (Singapore)
Tra-Con Singapore

Tel. 65-6299-3071

11.5 Obtain Locally

- Distilled water
- Isopropyl alcohol (>91% 2-propanol + water)
- Canned air (non-ozone depleting)

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*EPO-TEK is a registered trademark of Epoxy Technology, Incorporated
** Tra-Bond is a registered trademark of Tra-Con, Incorporated