

**ML MM Terminus Kit 1828199-1**  
(For Loose and Tight Cable Structure)

**MT MM Terminus Kit 1828200-1**  
(For Ultra Tight Cable Structure)

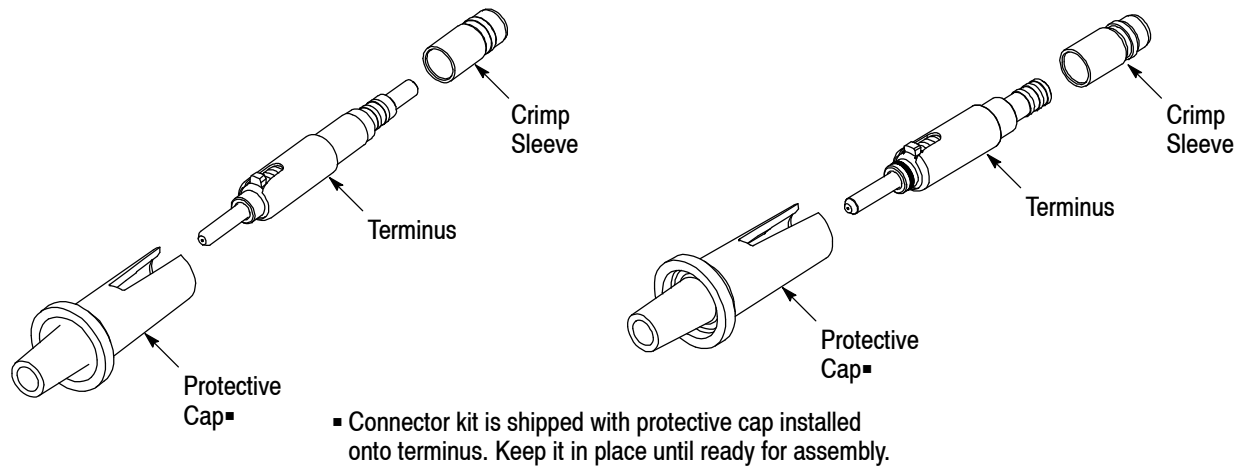


Figure 1

## 1. INTRODUCTION

This instruction sheet covers the application of ARINC 801-compliant fiber optic connector terminus kits 1828199-1 and 1828200-1 (shown in Figure 1) to multimode fiber optic cable with a ceramic size of 128  $\mu\text{m}$  and having the cable structure described in Figure 2.

**NOTE**



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

Read these instructions thoroughly before starting assembly.

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

## 2. DESCRIPTION

Each connector terminus kit consists of a terminus, crimp sleeve, and protective cap. See Figure 1.

## 3. ASSEMBLY PROCEDURE

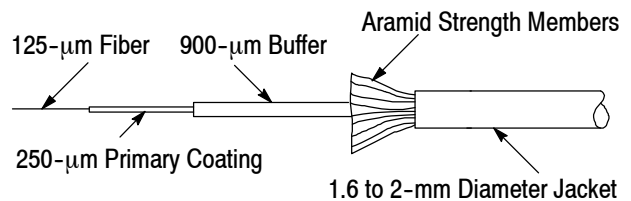
### 3.1. Required Tools and Consumables

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

#### A. Tools

- safety goggles (for eye protection)
- ruler with metric and US customary units

### Cable Structure



#### Loose (ML)

Movement is possible between the buffer and the jacket.  
Movement is possible between the fiber and buffer.

#### Tight (ML)

Movement is possible between the buffer and the jacket.  
Movement is not possible between the fiber and buffer.

#### Ultra Tight (MT)

Movement is not possible between the buffer and the jacket.  
Movement is not possible between the fiber and buffer.

Figure 2

- aramid shears
- fiber jacket stripper 1278531-1
- miller strip tool 1754708-1
- epoxy dish 502282-2
- ferrule resin injector 1918509-1
- PRO-CRIMPER\* III hand tool frame assembly 58532-1 (408-4020)
- ARINC 801-compliant die set 1828889-1
- heat cure oven 502130-1
- curing oven block 1918510-1
- fiber optic sapphire scribe tool 504064-1 (408-4293)
- lc polishing bushing 1754074-1
- polishing pad 501523-1
- polishing plate 501197-1
- 200× microscope 1754767-1
- 1.25-mm microscope adapter 1754765-1

**NOTE** All tools listed are included in ARINC 801-compliant termination kit 1828644-2.

**B. Consumables**

- alcohol fiber wipe packet 501857-2
- lint-free cloth or tissue
- isopropyl alcohol

**NOTE** The following consumables are included in ARINC 801-compliant termination kit 1828644-2.

- epoxy 504035-1 or EPO-TEK 353ND epoxy

**NOTE** For characteristics, safety and reactivity data, and handling instructions for the epoxy, refer to material safety data sheet (MSDS) 125-6353.

- resin injector tip 1918509-2
- 5-µm polishing film 228433-8
- 9-µm polishing film 1374484-1
- fine diamond polishing film 503887-1
- .3-µm polishing film 228433-5

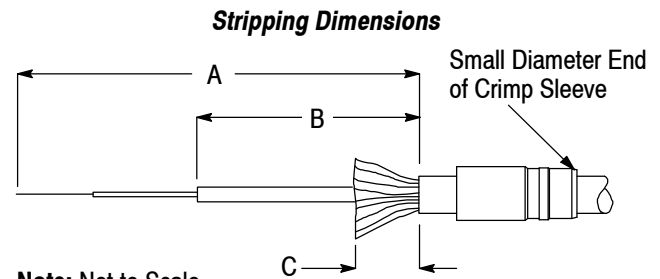
EPO-TEK is a trademark.

**3.2. Cable Preparation**

**DANGER** To avoid personal injury, ALWAYS wear eye protection when working with optical fiber. 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.

**DANGER** 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 crimp sleeve (small diameter end first) onto the cable.
2. Using the ruler, aramid shears, jacket stripper, and strip tool, strip the cable to the dimensions given in Figure 3.



Note: Not to Scale

CONNECTOR TERMINUS	DIMENSION		
	A	B	C
ML	27-30 [1.06-1.18]	15-16 [.59-.63]	2.5-3.5 [.10-.14]
MT	25-28 [.98-1.10]	13-14 [.51-.55]	

Figure 3

3. Using the alcohol pad or lint-free cloth dampened with isopropyl alcohol, clean the glass cladding to remove any coating residue.

**CAUTION** NEVER clean the buffer or fibers with a dry cloth.

**3.3. Prepare and Apply Epoxy**

**A. Prepare the Epoxy and Injector**

1. Remove the separating clip from the bag of epoxy. Mix the epoxy inside the bag thoroughly for 2 minutes.

**NOTE** When mixed properly, the epoxy will have a uniform, translucent, amber color.

2. Cut the epoxy bag diagonally at one corner, and squeeze the mixed epoxy into the epoxy dish.
3. Make sure the ferrule resin injector (syringe) counter is set to position 0.26 (equivalent to 2.6  $\mu$ l). If it is not, turn the knob until it is.
4. Obtain a new piston and capillary, and press the injector push-button until it stops.

**NOTE** *Use a new piston and capillary for each new batch of epoxy.*

5. Firmly insert the piston into the injector mandrel until it stops, then release the injector push-button.
6. Thread the capillary over the piston and lock it onto the injector.

**B. Apply the Epoxy**

1. Depress the injector push-button, and introduce the end of the capillary into the epoxy dish containing the epoxy.
2. *Gently* release the injector push-button to lift the epoxy.

**NOTE** *If air bubbles are lifted, leave the capillary in the epoxy, push out half of the amount lifted, then pump it again until the piston is fully extended.*

3. Clean the capillary, and remove the drop of epoxy.
4. Position the capillary on the ferrule.
5. *Gently* press the injector push-button to inject the epoxy inside the ferrule. Inject all of the epoxy.
6. With the injector push-button depressed, remove the capillary from the ferrule. Then release the push-button.

**3.4. Terminate the Connector**

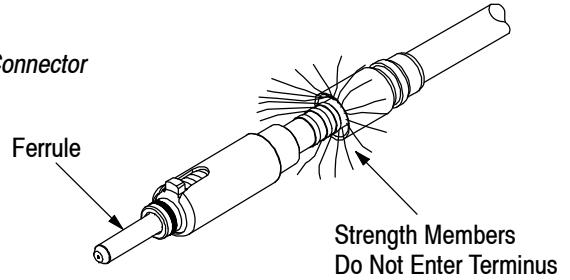
1. Remove the protective cover from the terminus. Retain the protective cover.
2. Carefully insert the fiber into the back of the terminus until the buffer bottoms on the base of the ferrule. **DO NOT** allow the cable strength members to enter the terminus. See Figure 4, Detail A.

For the ML connector, the back portion of the terminus should slide under the cable jacket.

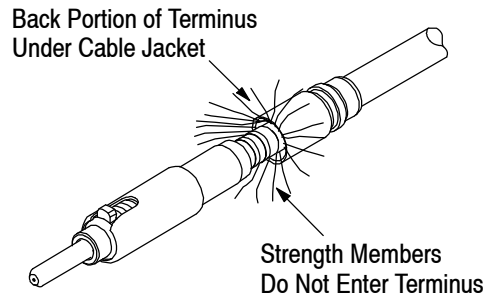
3. Uniformly distribute the cable strength members around the back of the terminus. See Figure 4, Detail B.
4. Slide the crimp sleeve over the cable strength members until the end of the crimp sleeve bottoms against the terminus. See Figure 4, Detail C.

**Detail A**

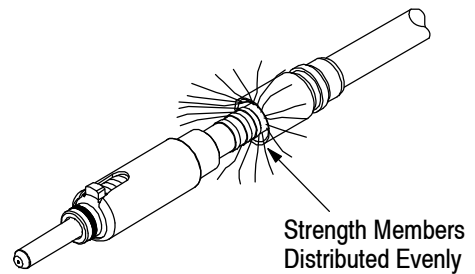
*MT Connector*



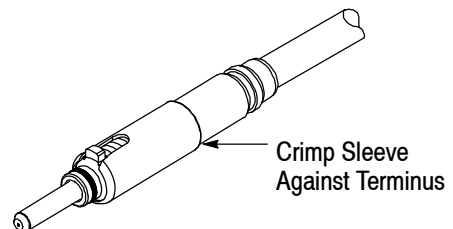
*ML Connector*



**Detail B**



**Detail C**



*Figure 4*

5. Using the ferrule resin injector, apply a drop of epoxy to the back part of the terminus. See Figure 5, Detail A.
6. Place the end of the crimp sleeve into the die assembly of the hand tool. Align the back of the terminus with the edge of the die. See Figure 5, Detail B.
7. Hold the terminus in place, and actuate the tool. The cable strength members should be retained.
8. Remove the assembly from the tool, and inspect the crimp sleeve for a straight and even crimp.

### 3.5. Cure the Epoxy

1. Remove any excess epoxy from the assembly.



*Excess epoxy will be difficult to remove after curing.*

2. Place the connector assembly onto the curing oven block; then, place the curing oven block in the heat cure oven according to the instructions included with the oven. Cure the epoxy between 115°C and 120°C [239°F and 257°F] for a minimum of 15 minutes.



*To avoid damage to the assembly, DO NOT expose assembly to excessive temperatures.*

3. 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.*

### 3.6. Cleave the Fiber

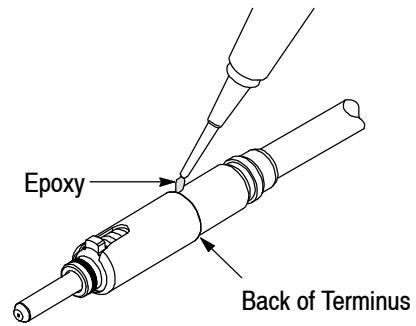


*To avoid personal injury, ALWAYS wear eye protection when working with optical fiber.*

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

1. Firmly support the assembly, and place the blade of the scribe tool directly above the epoxy. DO NOT allow the blade to make contact with the epoxy. See Figure 6.

**Detail A**



**Detail B**

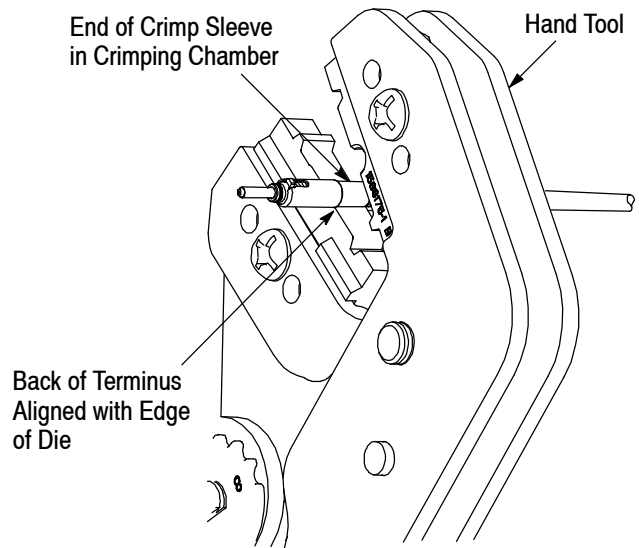


Figure 5

After Scoring, Pull Fiber Straight Away

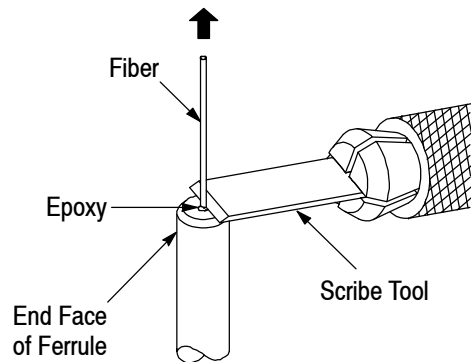


Figure 6



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

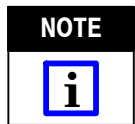
2. Lightly draw the beveled edge of the blade across the fiber parallel to the tip of the ferrule. After scoring the fiber, pull it straight away from the ferrule. The fiber should shear cleanly at the scribed point.

### 3.7. 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:

1. Using a small piece of the 5- $\mu\text{m}$  (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 and until the fiber stops leaving a trace on the film.



*For optimum results, keep the polishing films clean.*

2. Install the terminus onto the polishing bushing.
3. Place the polishing pad on the polishing plate. Place the 9- $\mu\text{m}$  polishing film on the polishing pad.



*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 terminus, 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). See Figure 7. 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- $\mu\text{m}$  polishing film from the polishing pad, and place the fine diamond (green or lavender) polishing film on the polishing pad.
7. 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 6 figure-8 patterns.
8. Inspect the fiber according to Paragraph 3.8. 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- $\mu\text{m}$  polishing film and then use the fine diamond polishing film to remove small peripheral chips.

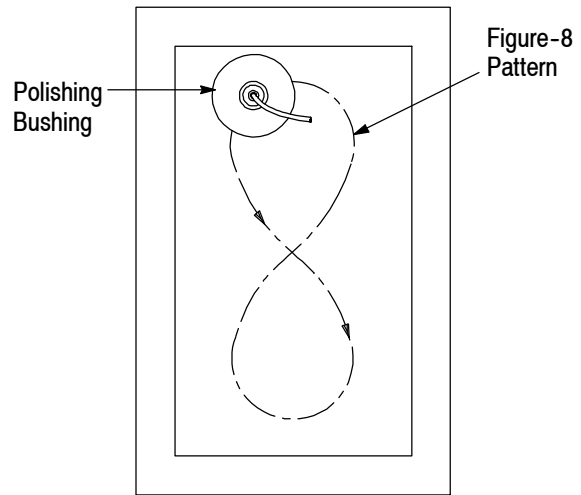


Figure 7

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

10. Remove the fine diamond polishing film from the polishing pad, and place the .3- $\mu\text{m}$  (white) polishing film on the polishing pad.

11. Holding the polishing bushing and terminus, 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). Make 3 figure-8 patterns.


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

### 3.8. Clean the Ferrule




*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 of the terminus using the alcohol pad or isopropyl-alcohol dampened lint-free cloth. Then wipe around the ferrule using a dry lint-free cloth.
2. Place the dry lint-free cloth on a smooth, flat surface. Holding the terminus perpendicular, wipe the ferrule endface across the cloth.
3. Blow compressed air across the endface of the ferrule.
4. Using the microscope (with the 1.25-mm adapter), examine the endface of the ferrule for debris according to Section 4. If debris is present, repeat Steps 1 through 3.

**NOTE**  This is the final step prior to connector connection. **DO NOT** wipe the ferrule or allow it to touch anything before connecting the connector.

**4. INSPECTION**

- Using the microscope (with the 1.25-mm adapter), inspect the ferrule and fiber according to the following criteria (refer to Figure 8):
  - Make sure that any epoxy is removed from the ferrule

**NOTE**  Use a sharp blade to remove epoxy from the chamfered edge of the ferrule. **DO NOT** allow the blade to touch the fiber.

- Dirt may be mistaken for small pits; if dirt is evident on the ferrule or fiber, clean with the alcohol pad or isopropyl-alcohol dampened lint-free cloth, then dry
- Fine polishing lines are acceptable
- Small peripheral chips (at the outer rim) on the fiber are acceptable
- Large chips in the center of the fiber and dark scratches are unacceptable, and the fiber must be re-terminated

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

**5. REPLACEMENT AND REPAIR**

The kit components are not repairable. Replace any damaged components. **DO NOT** re-use terminated connectors by removing the cable.

**6. REVISION SUMMARY**

Revisions to this instruction sheet include:

- Changed name of connector terminus kit, die set, and termination kit

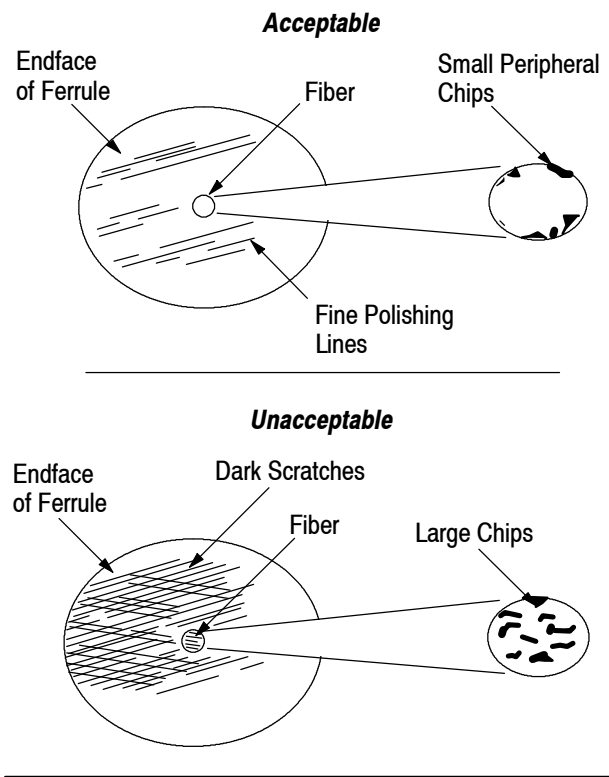


Figure 8