

## Installing a 12-Fiber Ribbon Fan-out

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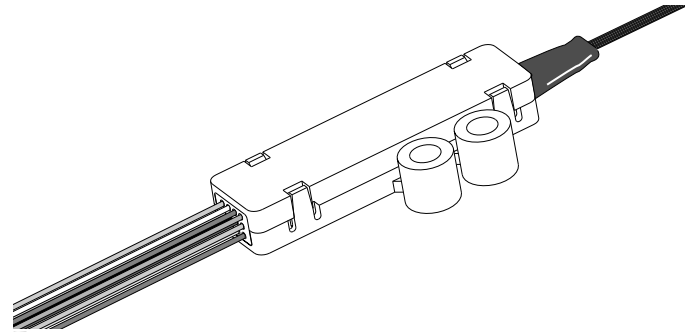


Figure 1

### 1. General

**1.1** This procedure describes the Corning Cable Systems 12-fiber ("12 f") Ribbon Fan-out used on Corning Cable Systems 12-fiber ribbon cable, AT&T Accu-Ribbon cable, and single-ribbon stubs (Figure 1). The 12-f Ribbon Fan-out branches the fibers in a ribbon cable into individual fibers protected by color-coded, 900 µm protective tubing. The fibers can then be connectorized per hardware interface requirements.

**1.2** One 12 f Ribbon Fan-out is required for each ribbon at the cable end of the ribbon cable being connectorized.

**1.3** This issue includes updated corporate information.

### 2. Precautions

#### 2.1 General Precautions

**IMPORTANT:** Please read and understand this procedure completely before starting a fan-out assembly.



#### Safety Glasses

**WARNING:** Corning Cable Systems strongly recommends that you wear safety glasses to protect your eyes from accidental injury when handling chemicals and cutting fiber. Pieces of glass fiber are very sharp and can damage the cornea of the eye easily.



#### Safety Gloves

**WARNING:** Corning Cable Systems strongly recommends that you wear safety gloves to protect your hands from chemicals and accidental injury when handling sharp-bladed tools.

#### 2.2 Cable Handling Precautions

#### 2.3 Chemical Precautions



**CAUTION:** Fiber optic cable is sensitive to excessive pulling, bending, and crushing forces. Consult the cable specification sheet for the cable you are installing. **Do not bend cable more sharply than the minimum recommended bend radius. Do not apply more pulling force to the cable than specified. Do not crush the cable or allow it to kink.** Doing so may cause damage that can alter the transmission characteristics of the cable — the cable may have to be replaced.



#### d'Gel® Cleaning Wipes

**WARNING:** Contains hydrocarbons. If ingested, **DO NOT INDUCE VOMITING.** Call a physician immediately. **DISPOSE OF PROPERLY. KEEP OUT OF THE REACH OF CHILDREN.**



#### Isopropyl Alcohol

**DANGER:** Flammable. Flashpoint 59 degrees F. Can cause irritations to the eyes on contact. In case of eye contact, flush eyes immediately with water for at least 15 minutes. Inhaling fumes may induce mild narcosis. In case of ingestion, consult a physician. Use with adequate ventilation.



#### Epoxy Adhesives

**WARNING:** Uncured epoxy adhesives consisting of resin and hardener components may cause dermatitis, skin sensitization or other allergic responses. Prevent all contact with the skin and eyes. If contact occurs, flush immediately with water for at least 15 minutes (get prompt medical attention for eyes). Keep away from heat and open flame.

**KEEP OUT OF REACH FROM CHILDREN.**

Avoid prolonged inhalation of vapors and use adequate ventilation. Immediately clean up any spills that may occur.

### 3. Tools and Materials

3.1 The following tools and materials are required to complete this procedure:

- Seam ripper
- Scissors
- Side cutters
- Isopropyl alcohol
- Strapping tape
- Lint free tissues
- d'Gel cleaning wipes
- Heat gun
- 1/4-inch OD spiral wrap
- Loctite® 411 epoxy
- Clean rags
- Permanent marker
- Table vise
- Wire markers (number tags)
- Masking tape
- Razor blade
- 35-inch (87.5 cm) long x 1/2 inch (1.25 cm) OD PVC pipe with watertight cap on one end (for use with AT&T cable)

### 4. Carton Contents

4.1 Each 12 f Ribbon Fan-out kit contains the following (Figure 2):

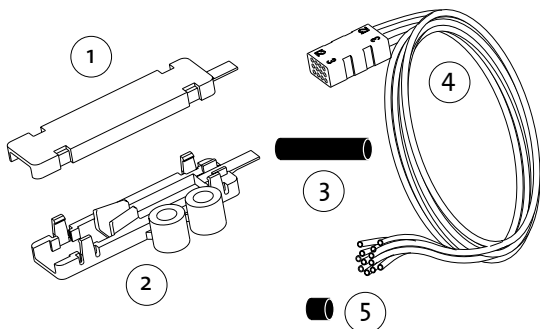


Figure 2

- 1) 12 f Ribbon Fan-out, Top (1)
- 2) 12 f Ribbon Fan-out, Bottom (1)
- 3) 3/16-in. OD x 0.625-in. long TAT-125, heat shrink (1)
- 4) 12 f 900 μm assembly (1)
- 5) 3/16-inch OD x 0.25-inch long heat shrink (1)

### 5. Cable Preparation

5.1 Remove the cable sheath, fiberglass strands and inner cable core tube in accordance with the cable vendor's instructions to the lengths shown in Figure 3.

Use care when removing the inner core tube to avoid nicking the ribboned fibers.

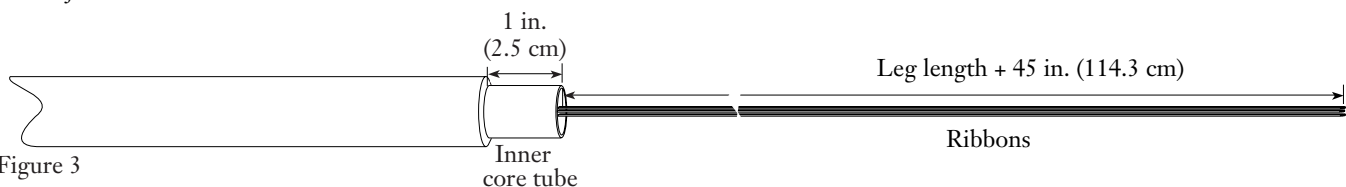


Figure 3

5.2 Measure 35 in (87.5 cm) from the cable sheath. Mark this length with the permanent marker.

5.3 Install a piece of 1/4-in. OD spiral wrap, 8-in. long, over the ribboned fibers and work it back to the inner core tube. Insert the spiral wrap 1-inch (2.5 cm) into the inner core tube (Figure 4). To make sliding the spiral wrap over the ribbons easy, make sure the ribbons are lying flat on each other.

Use care during this step to maintain the order and integrity of the ribbons.

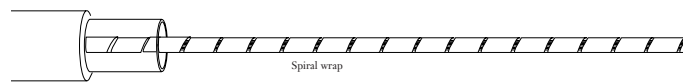


Figure 4

5.4 Slide a 3/16-in. OD x 0.625-inch long piece heat shrink over each ribbon. Work the heat shrink back to the spiral wrap to temporarily store it out of the way (Figure 5).

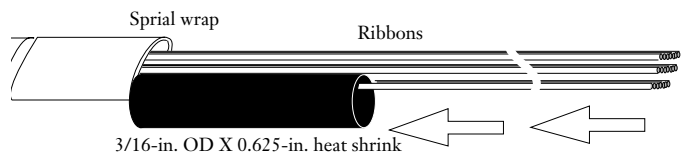


Figure 5

5.5 Install a 3/16-in. OD x 0.25-inch long piece of heat shrink over each ribbon as follows:

- a) Slide the heat shrink back to the mark made in step 5.2. Be sure to position the heat shrink on the ribbon-end side of the mark as shown in Figure 6.
- b) Use a heat gun to shrink this small piece of heat shrink in place.
- c) While the heat shrink is still warm, use your finger to flatten the heat shrink on the ribbon.

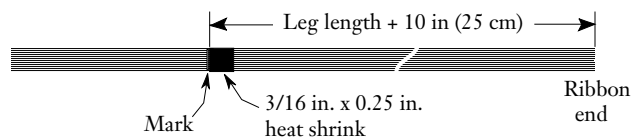


Figure 6

Proceed to Step 6.1 if you are installing the 12-f fan-out on Corning Cable Systems 12-fiber ribbon cable or step 6.11 for AT&T ribbon cable.

## 6. Fiber Preparation

### Corning Cable Systems 12-Fiber Ribbons

**6.1** Secure the cable end down to a work surface using strapping tape.

**6.2** Starting with the first ribbon, tape it down so that the heat shrink at the 35-inch mark is positioned at the work surface edge (Figure 7).

**Note:** Corning Cable Systems ribbon is marked approximately every 6 inches on one side of the ribbon with a number and color. The number and color identify the ribbon to its relative position in the cable, i.e.; the first ribbon in the cable is “1 BL”, the second is “2 OR”, etc.

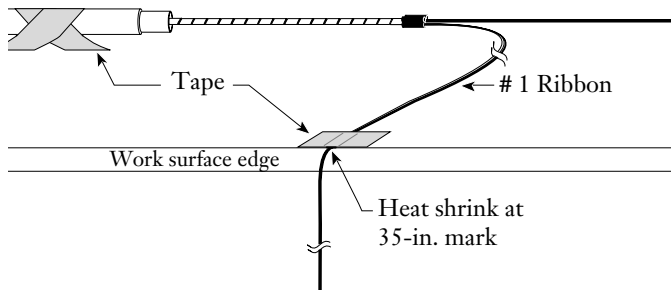


Figure 7

**6.3** At the ribbon end, use a razor blade to shave off 0.25 in. (6 mm) of the bond material on one side of the ribbon (Figure 8).

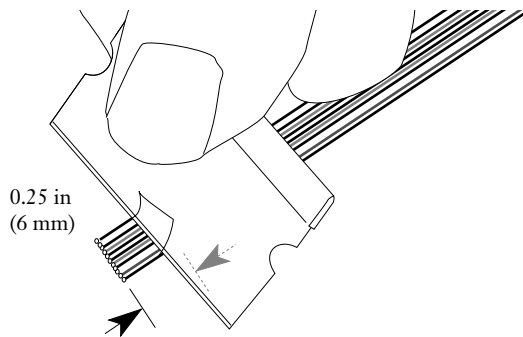


Figure 8

**6.4** Use a seam ripper to separate the fibers where you removed the bond material in step 6.3. Work the seam ripper back into the ribbon the fibers about 1 inch (2.5 cm) (Figure 9).

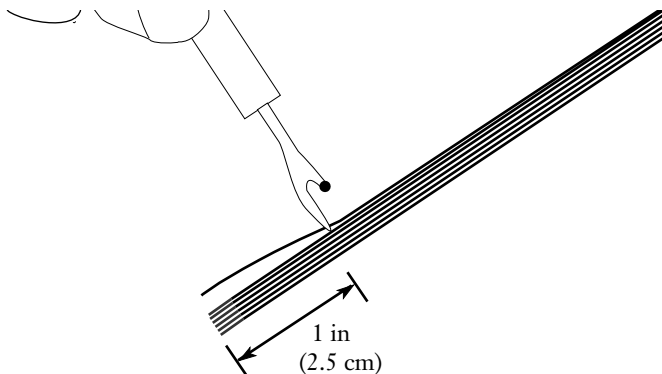


Figure 9

**6.5** Once you have separated all the fibers, peel each fiber back to the heat shrink installed in step 5.5.

**6.6** Starting just below the heat-shrink, use a d'Gel wipe to thoroughly remove the acrylate matrix which groups the fibers together (Figure 10). Wipe all of the fibers simultaneously. Do NOT wipe above the heat-shrink on the ribbon.

**Note:** Do not be in a hurry—25- to 30 wipes with moderate pressure will be required to remove the matrix. If the fiber color comes off, you are applying too much pressure.

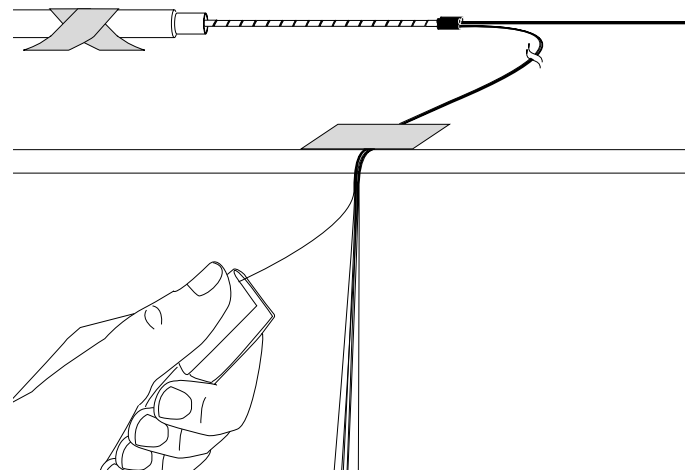


Figure 10

**6.7** Run a dry finger on each fiber to check for any residue left on the fiber. If residue is detected, repeat step 6.6.

**Note:** It is critical in this step to ensure all of the bond residue from the ribbon structure is removed. Any residue left on the fiber will obstruct threading operations into the 900 mm assembly pieces.

**6.8** Dry the fibers with a clean, lint-free tissue.

**6.9** Remove the strapping tape holding the ribbon down to the work surface edge.

**6.10** Repeat steps 6.2 through 6.9 for the remaining ribbons in the cable.

Proceed to step 7.1

## Fiber Preparation

### AT&T Accu-Ribbon

**6.11** Secure the cable end down to a work surface using strapping tape.

**6.12** Starting with the first ribbon, tape it down so that the heat shrink at the mark is positioned at the work surface edge (Figure 11).

**Note:** AT&T ribbon is marked approximately every 6 inches on one side of the ribbon with a number and color. The number and color identify the ribbon to its relative position in the cable, i.e.; the first ribbon in the cable is "1 BL", the second is "2 OR", etc..

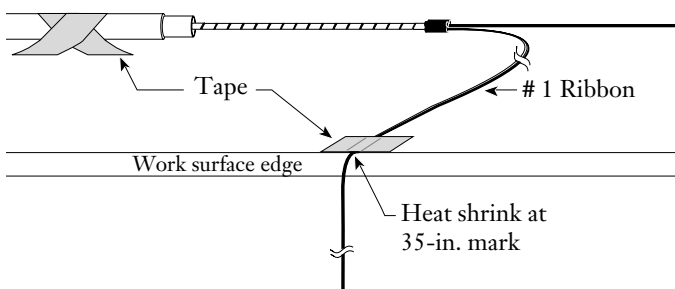


Figure 11

**6.13** At the ribbon end, use a razor blade to shave off 0.25 in. (6 mm) of the bond material on one side of the ribbon (Figure 12).

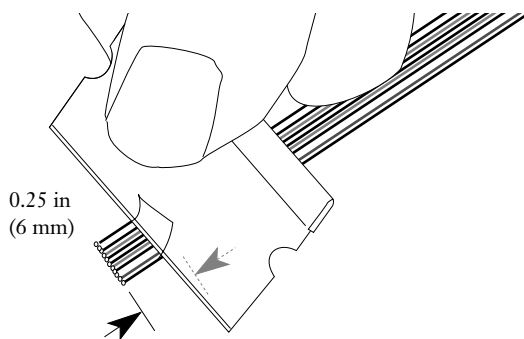


Figure 12

**6.14** Use a seam ripper to separate the fibers where you removed the bond material in step 6.13. Work the seam ripper back into the ribbon the fibers about 1 inch (2.5 cm) (Figure 13).

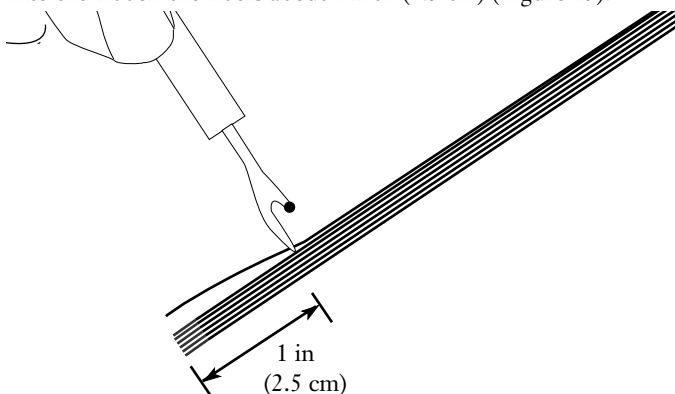


Figure 13

**6.15** Once you have separated all the fibers, peel each fiber back to the heat shrink installed in step 5.5.

**6.16** Untape the ribbon from the work surface.

**6.17** Secure the 35-inch long capped pipe to the work surface, open end up. Fill the pipe with alcohol.

**6.18** Dip the separated fibers from the first ribbon into the alcohol-filled tube (see Figure 14). *Do not submerge the heat-shrink covered area in the alcohol.*

**6.19** Soak the fibers for five minutes and then remove them from the pipe. Tape the ribbon back down to the work surface just as you did in step 6.12.

**6.20** Insert the fibers from the next ribbon into the alcohol (Figure 14). During this group of fibers' 5-minute soak, proceed to step 6.21 to work with the first set of fibers.

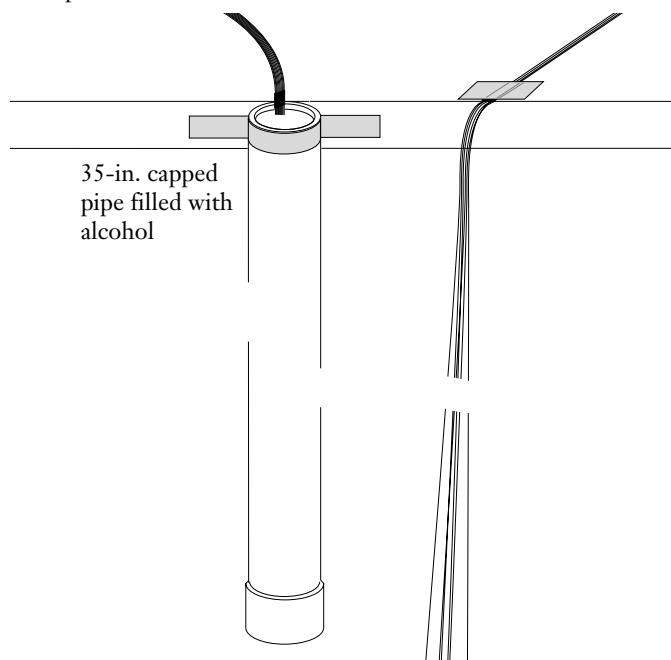


Figure 14

**6.21** Use an alcohol-soaked lint free tissue to thoroughly clean the acrylate residue from each fiber (Figure 15).

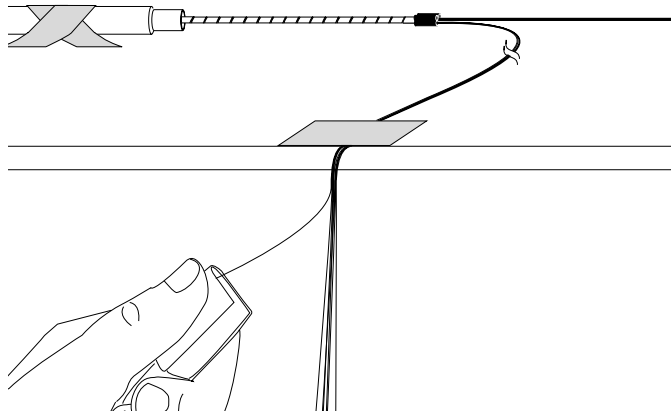


Figure 15

6.22 Run a dry finger on each fiber to check for any residue left on the fiber. If residue is detected, repeat step 6.21.

**Note:** It is critical in this step to ensure all of the bond residue from the ribbon structure is removed. Any residue left on the fiber will obstruct threading operations into the 900 μm assembly pieces.

6.23 Remove the strapping tape holding the ribbon down to the work surface edge.

6.24 Repeat steps 6.12 through 6.23 for the remaining ribbons in the cable.

## 7. Threading the Fibers

7.1 Starting with the first ribbon, tape it down with strapping tape so that the heat shrink mark is at the table's edge.

7.2 Approximately 2 inches (5 cm) off to either side of the ribbon, use strapping tape to tape the plastic section of the 900 μm assembly to the table's edge as shown in Figure 16.

**Note:** The plastic section 900 μm assembly has color-coded legs and corresponding numbers on its plastic housing. The number 1, or blue tube should be on the right front corner of the assembly.

7.3 Starting at one side of the 900 μm unit, carefully thread the #1 fiber (blue) into the blue 900 μm tube end (Figure 16).

If you have difficulty in feeding the fiber into the tube end, withdraw the fiber and reclean it to remove any matrix remnants.

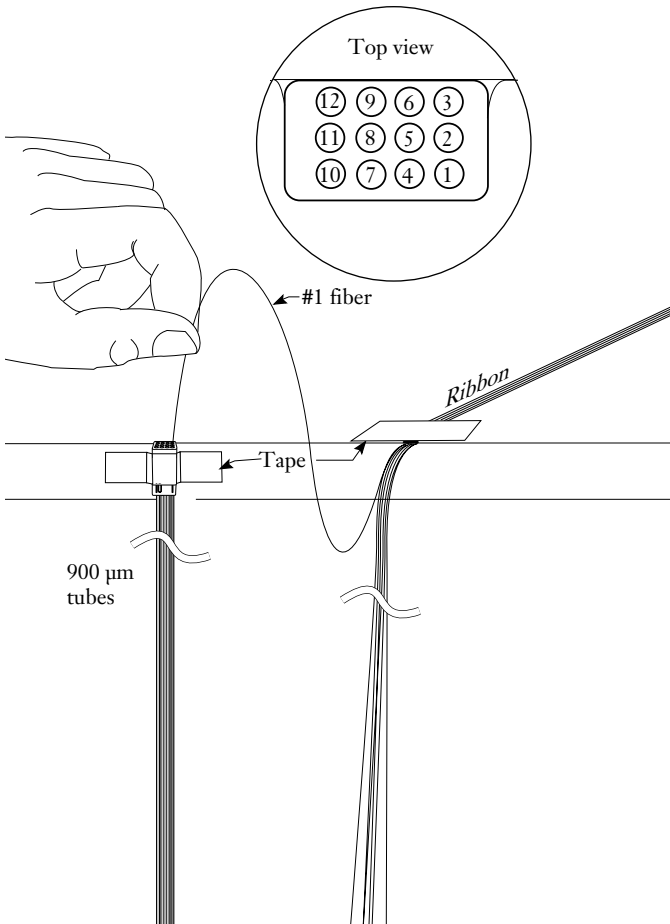


Figure 16

7.4 Repeat step 7.3 for the remaining fibers in sequential fiber order (i.e., blue, orange, green, brown, etc.). Work the threading process across the 900 μm tube assembly in the proper order (see Figure 16)

Do not let any of the fibers cross each other during this threading operation.

- |           |            |
|-----------|------------|
| 1) Blue   | 7) Red     |
| 2) Orange | 8) Black   |
| 3) Green  | 9) Yellow  |
| 4) Brown  | 10) Violet |
| 5) Slate  | 11) Rose   |
| 6) White  | 12) Aqua   |

7.5 Push all twelve fibers as a group until they protrude from the other ends of the tubes. Carefully pull the protruding fibers out of the tube ends to take up the excess fiber length at the table edge. Leave a small fiber loop at the table edge to prevent fiber breakage during the remaining threading operations (Figure 17).

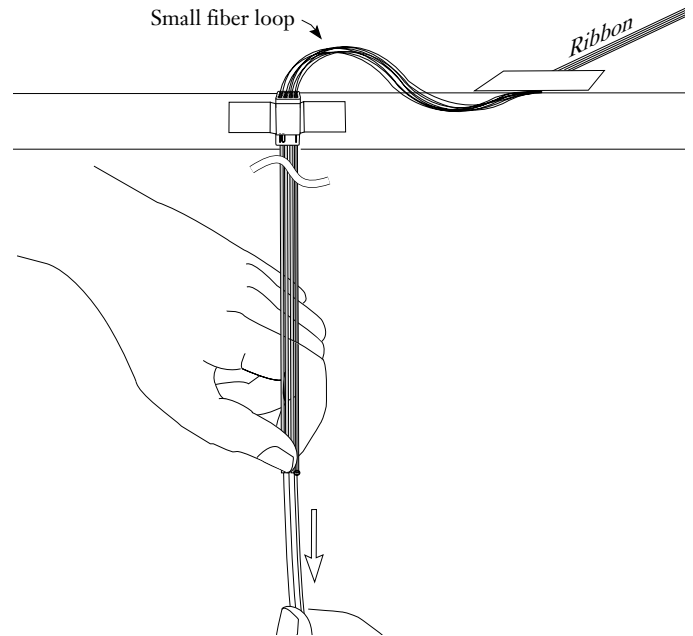


Figure 17

7.6 Untape the 900 μm assembly from the table edge. Carefully slide the assembly (while gently pulling the bare fibers protruding from the tube ends) to within 0.75 in. (19 mm) of the heat shrink on the ribbon (Figure 18).

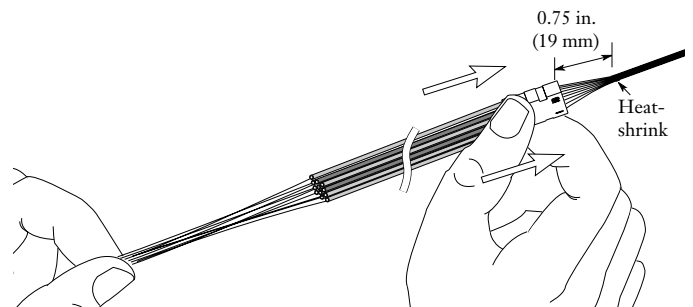


Figure 18

7.7 Untape the ribbon from the work surface.

## 8. Installation of the 12 f Fan-out

**8.1** With the printed side of the ribbon facing up, ensure the ribbon-to-900  $\mu\text{m}$  tube transition of the fan-out is as straight as possible (Figure 19).

**Note:** To ensure proper orientation of the fan-out to the ribbon, always insert the ribbon with its printed side facing up in the bottom fan-out body.

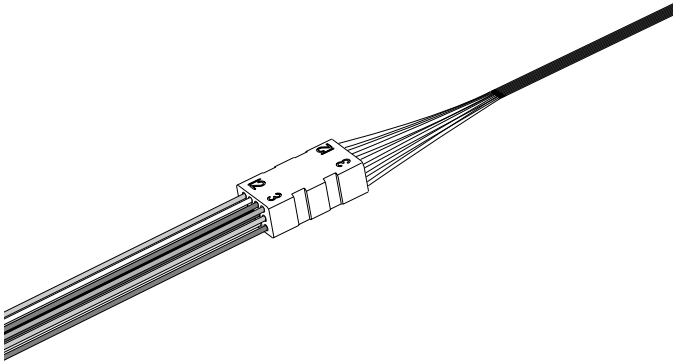


Figure 19

**8.3** Carefully position the the 900  $\mu\text{m}$  sub-assembly into the bottom section of a fan-out body (Figure 20).

Make sure that the heat-shrink on the end of the ribbon is positioned inside the fan-out body as shown in Figure 21.

Apply a small drop of Loctite 411 adhesive on the ribbon as shown in Figures 20 and 21.

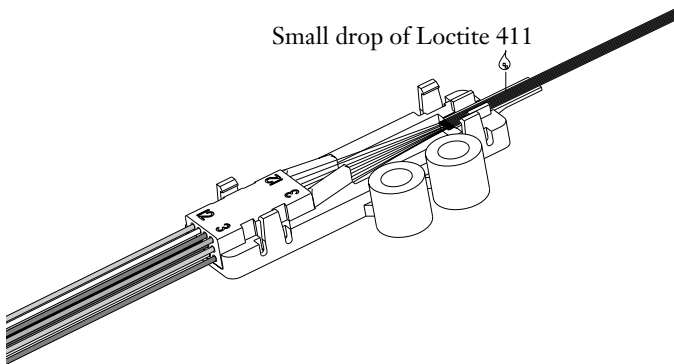


Figure 20

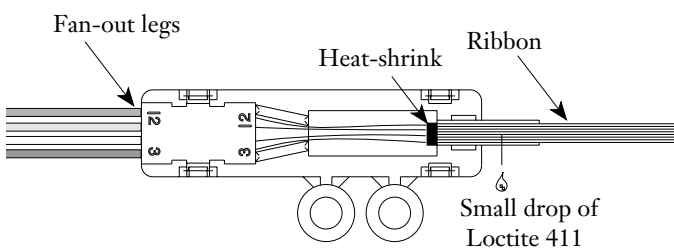


Figure 21

**8.4** Align the top fan-out body with the bottom section and snap the assembly together.

**8.5** To complete the installation:

- Work the 0.625-in. long, 3/16-in OD heat shrink down the ribbon to the back of the fan-out body (Figure 22 a).
- Slide the heat shrink over the rear tabs on the fan-out body. (Figure 22b)
- Use the heat gun to shrink the tubing in place (Figure 22 c).

**Note:** The heat shrink will shorten in length when heat is applied and start to back off the tabs. After the heat shrink is melted down, slide the piece back up the tab until it butts with the backside of the fan-out. Use your fingers to flatten the heat shrink section that is in contact with the ribbon.

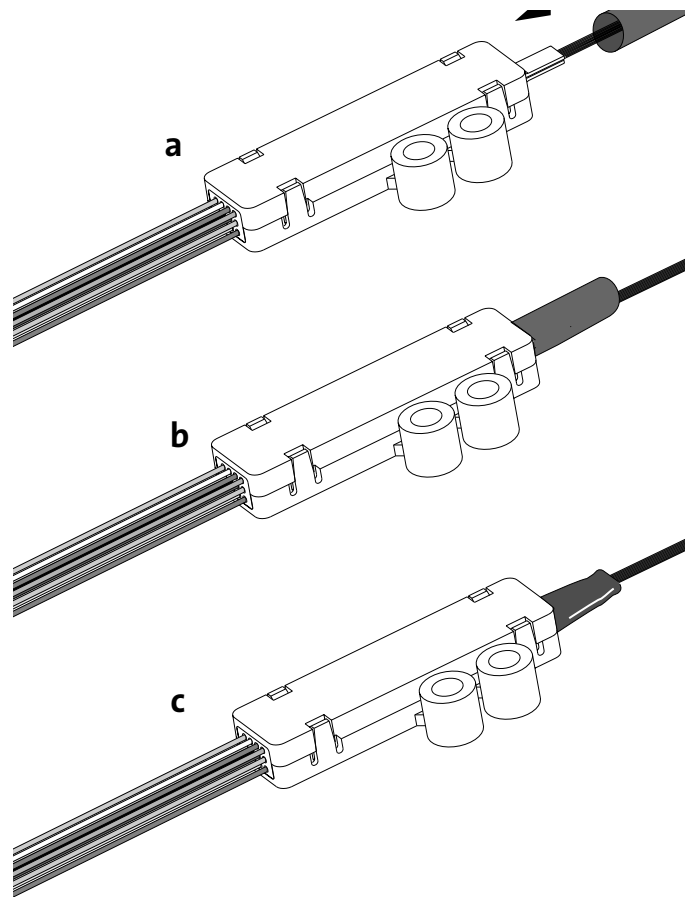


Figure 22

**8.6** Repeat steps 7.1 through 8.5 for the remaining ribbons.

**Note:** Corning Cable Systems recommends working with the ribbons in sequential order to maintain installation organization.

8.7 To aid in the identification and maintenance of the fan-out assemblies, use numbered wire markers to individually identify each fan-out with respect to its ribbon number (Figure 23).

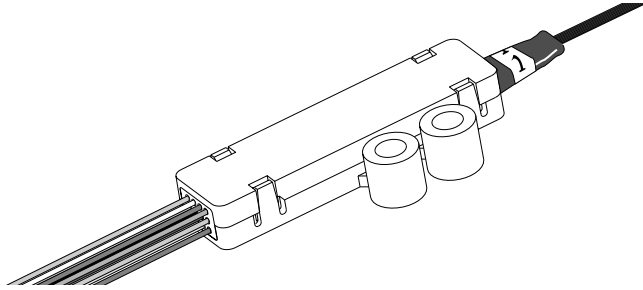


Figure 23

## 9. Fiber Termination

9.1 Trim the excess fiber lengths to a length of 0.75 inches (1.9) from the end of the 900  $\mu$ m tubing.

9.2 Terminate each fiber, working one fan-out assembly at a time, following the instructions provided with the connectors.

9.3 Test the connectors in accordance with standard test procedures or any recommended test procedures supplied by the connector vendor.

## 10. Installing a Fan-Out on a Single-Ribbon Stub

10.1 Some hardware may contain “single-ribbon stubs”, i.e. a 12-fiber ribbon protected by rectangular fan-out tubing. The 12-f fan-out is suitable for installation on these stubs.

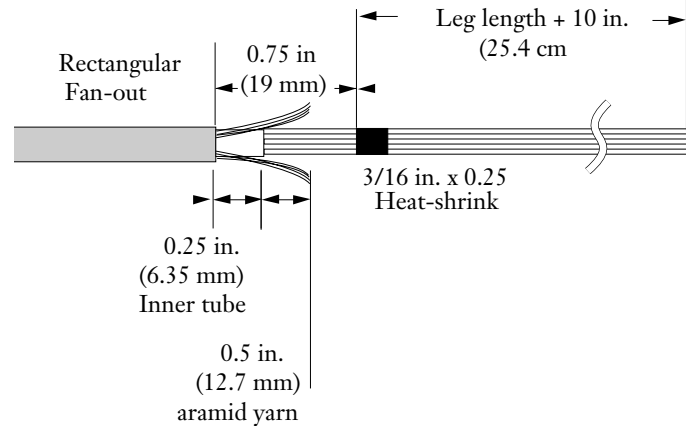
10.2 Slide the 3/16 x 0.625 in. heat shrink down the rectangular tubing until it is out of the way.



**Caution:** Whenever possible, prepare the rectangular fan-out tubing before the ribbon fiber is inserted into it. If you are installing a 12-fiber fan-out on rectangular tubing which contains a ribbon, use extreme caution in trimming the fan-out tubing's outer jacket and inner tube to length.

10.3 Prepare the rectangular fan-out tubing to the lengths shown in Figure 24.

10.4 Apply the 3/16 x 0.25 in. heat shrink to the ribbon 0.75 in (19 mm) from the end of the inner tube (Figure 24). Figure 24



10.5 Separate the ribbon into individual fibers according to the appropriate steps in Section 6, *Fiber Preparation*.

10.6 Assemble the fan-out according to section 7, *Threading the Fibers* and steps 8.1- 8.4. The end of the inner tube should butt against the ribbon tabs on the fan-out body.

10.7 Apply a small amount of Loctite 411 epoxy on the ribbon tabs. Place the aramid yarn from the fan-out tubing over the ribbon the tabs (Figure 25)

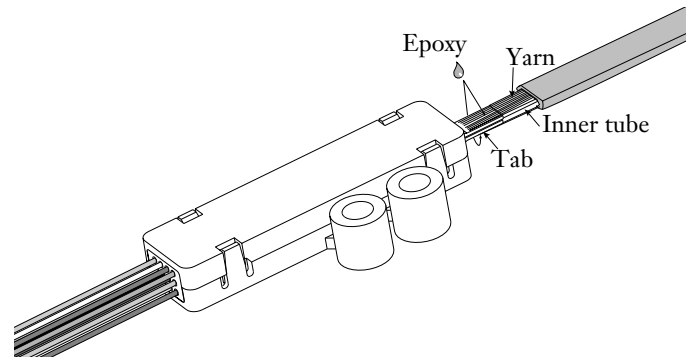


Figure 25

10.9 Complete the installation according to steps 8.5 - 8.7 and Section 9.

Special Note:  
Fiber Optic  
Training  
Program



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