



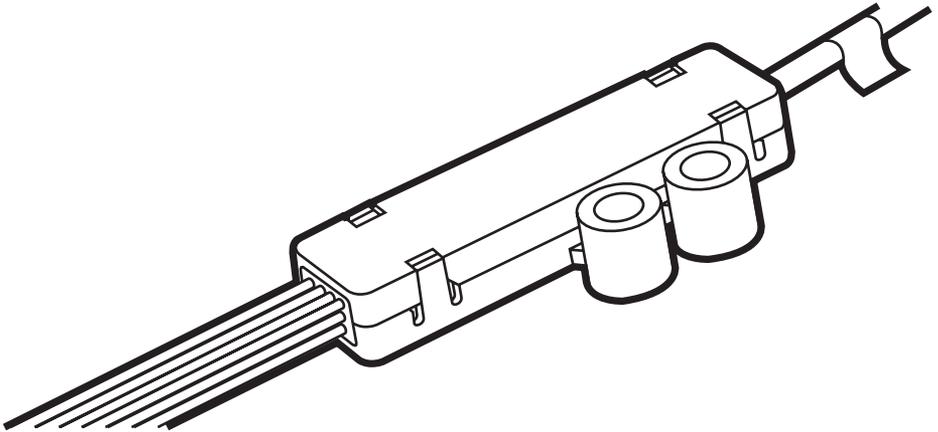
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## 6-Fiber Buffer Tube Fanout Kit 12-Fiber Buffer Tube Fanout Kit



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## TRADEMARKS USED IN THIS MANUAL

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# 1. Specifications

**Buffer Tube Diameter**—6-Fiber Buffer Tube Fanout: 2.4-mm buffer tubes;  
12-Fiber Buffer Tube Fanout: 3.0-mm buffer tubes

**Protective Tube Diameter**—900  $\mu\text{m}$

**Temperature**—32 to 158°F (0 to 70°C)

## 2. Introduction

### 2.1 Description

Because individual fiber optic cable strands have an extremely small diameter, to terminate the cable you must first enclose each strand in protective tubing. Once the cable is enclosed, you can then add fiber optic connectors, such as SC, to each enclosed cable.

The Buffer Tube Fanout Kits are specifically designed to terminate 6- and 12-fiber buffer tubes. Perfect for users who want to field-install connectors, the kits provide a compact, easy-to-install fanout solution. No additional hardware or space other than that required for terminating tight-buffered cables is required. With these kits, you don't even need epoxy!

The Kits feature a 900- $\mu\text{m}$  fanout assembly that is color-coded to match the fiber color scheme. The fanout assembly is available with 6- or 12-fiber units in lengths of 25 or 36 inches (63.5 or 91.4 cm). These different lengths give you the flexibility you need for a variety of hardware options.

You can install the 6-Fiber Buffer Tube Fanout on 2.4-mm buffer tubes or the 12-Fiber Buffer Tube Fanout on 3.0-mm buffer tubes for indoor applications. The Buffer Tube Fanouts branch the fibers from a buffer tube into individual fibers protected by 900- $\mu\text{m}$  PVDF protective tubing. You can then install connectors on the fiber according to your hardware interface requirements.

One Buffer Tube Fanout is required for each 6- or 12-Fiber Buffer Tube. Please read the installation instructions in **Chapter 3** before assembling the Buffer Tube Fanout.

### 2.2 Precautions

#### WARNING

Wear safety gloves to protect your hands from chemicals and accidental injury when handling sharp-bladed tools.

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.

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

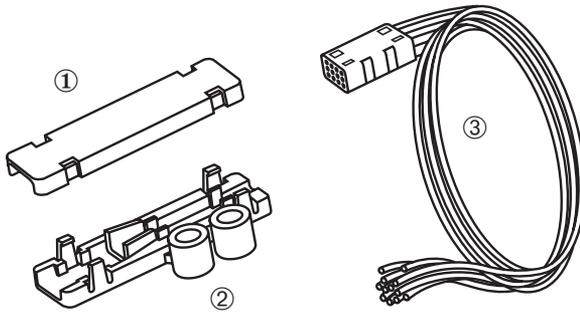
#### CAUTION

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 or buffer tubes more sharply than their minimum recommended bend radius. Do not apply more pulling force to the cable than specified. Do not crush the cable or buffer tubes or allow them to kink. Doing so may cause damage that can alter the transmission characteristics of the cable—the cable may have to be replaced.

### 2.3 What the Package Includes

Check to make sure your package includes the following items (refer to **Figure 2-1**). If anything is missing or damaged, please contact Black Box at 724-746-5500.

- ① Buffer Tube Fanout top
- ② Buffer Tube Fanout bottom
- ③ 6-ft. (1.8-m) or 12-ft. (3.6-m) 900- $\mu$ m color-coded assembly, 25 in. (63.5 cm) or 36 in. (91.4 cm) long



**Figure 2-1. Package Contents.**

## **2.4 What You Need to Supply**

You'll need the following items:

- Electrical tape
- Lint-free tissues
- Clean rags
- Permanent marker
- Wire markers
- Buffer tube stripper
- Buffer tube clamps
- d'Gel cable cleaner (liquid or wipes)
- Pliers

## 3. Installation

### 3.1 Preparing the Cable

#### **CAUTION**

**Read the cable manufacturer's sheath-removal instructions. Some cable-stripping procedures may call for a slightly longer length at the end of the cable to allow for cable core (buffer tube) damage caused when accessing rip cords, etc. Be sure to add such length (typically 6 to 10 inches) to the strip length in Step 2, below.**

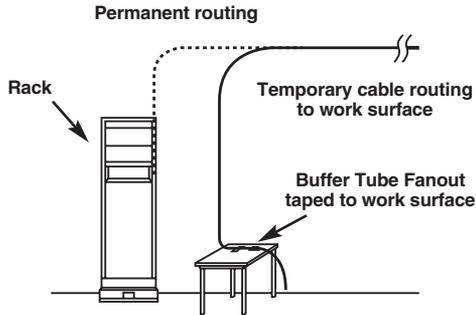
You can assemble a Buffer Tube Fanout any time after you've removed the cable sheath and cleaned the buffer tubes.

Installation factors such as the length of cable slack available, the location of terminating hardware, and the question of storing buffer tube slack as opposed to cable slack, can dictate when and where you choose to mount the cable end and assemble the Buffer Tube Fanout.

**Figures 3-1 and 3-2** illustrate two typical installation options.

#### *Option 1 (Refer to Figure 3-1)*

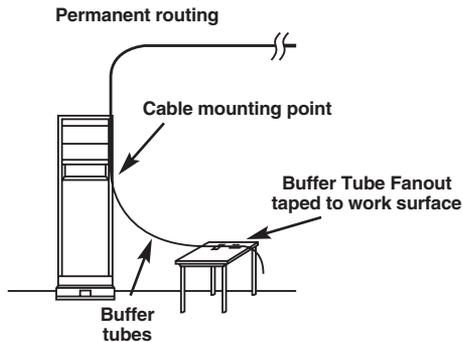
1. Prepare the cable end.
2. Route the cable end to a work surface.
3. Assemble the Buffer Tube Fanout.
4. Mount the cable on the hardware, and route the Buffer Tube Fanout and tubes inside the hardware.
5. Install the Buffer Tube Fanout in the hardware.



**Figure 3-1. Option 1.**

*Option 2*

1. Prepare the cable end.
2. Mount the cable on the hardware.
3. Route the buffer tubes to a work surface.
4. Assemble the Buffer Tube Fanout.
5. Route Buffer Tube Fanout and tubes inside the hardware.
6. Install the Buffer Tube Fanout in the hardware.



**Figure 3-2. Option 2.**

## 6- OR 12-BUFFER TUBE FANOUT KIT

Determine the total strip length requirement for your installation. This length will be:

- The buffer tube length(s) required to route the tubes from the cable sheath attachment point to the planned location of the Buffer Tube Fanout body.

plus

- either 35 inches (for the 25-inch fiber assembly) or 46 inches (for the 36-inch fiber assembly)

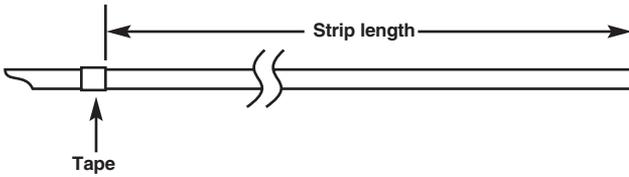
plus

- (optional) any additional length called for in the cable stripping procedure as a safety factor

plus

- (optional) the distance from the cable mounting point to a work surface if you are performing an Option 2 installation.

Mark this strip length from the end of the cable by wrapping the spot with a piece of tape (see **Figure 3-3**).



**Figure 3-3. Cable Strip Length.**

Strip the cable according to the cable manufacturer's instructions for removing the sheath. Determine the cable central member and strength member yarn lengths needed to secure the cable from the instructions provided with the hardware.

If you are working with a grease or gel-filled water-blocked cable, use a d'Gel wipe (or a tissue soaked with d'Gel liquid) to remove any flooding compound from the buffer tubes.

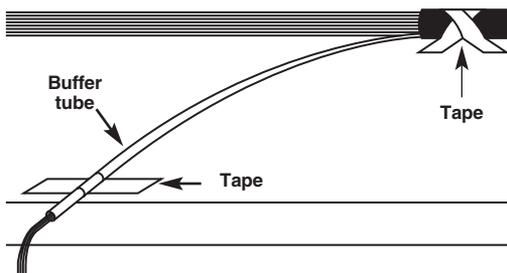
Depending on the kit you're using, measure 35 inches (88.9 cm) or 46 inches (116.8 cm) of buffer tube from the end of the tubes. Use a permanent marker to mark each tube at that spot.

### **CAUTION**

**To minimize the chance of breaking a fiber, follow the remaining steps in this procedure one buffer tube at a time.**

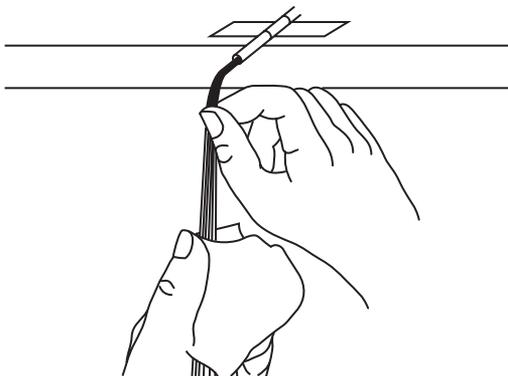
### 3.2 Preparing the Buffer Tube

1. Tape the cable end to a work surface so that the marks on the buffer tubes can reach the work surface edge (see **Figure 3-4**).
2. Select the first buffer tube. Use a buffer stripping tool to remove the buffer tube back to the mark made in permanent marker.
3. Tape down the buffer tube that will receive the Buffer Tube Fanout. Make sure 1 to 2 inches of tube overhang the work surface edge (see **Figure 3-4**).



**Figure 3-4. Taping the Buffer Tube Fanout.**

4. Wipe the filling compound from the exposed fibers with a d'Gel wipe (see **Figure 3-5**). Use a clean, lint-free tissue to thoroughly dry each fiber.



**Figure 3-5. Cleaning the Filling Compound from the Exposed Fibers.**

5. Run a dry finger along each fiber to check for any filling compound residue. If residue is present on the fiber, repeat step 4.

**IMPORTANT**

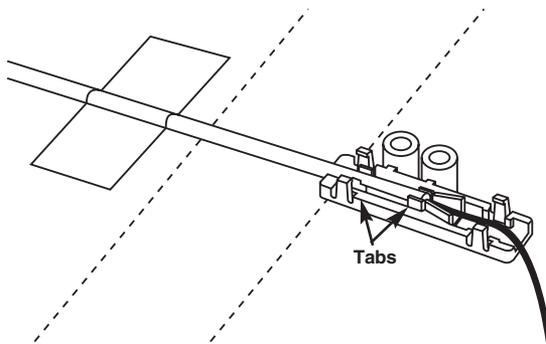
Make sure that the fibers are clean and dry. Any residue left on the fiber will obstruct threading operations into the 900- $\mu\text{m}$  assembly pieces.

- Place the crimp tabs of the bottom piece of the Buffer Tube Fanout on the end of the buffer tube. Press the tab with pliers to secure the Buffer Tube Fanout bottom to the end of the tube (see **Figure 3-6**).

**CAUTION**

Be careful not to crush the tube. Crimp only until the tube begins to deform. Spaces between the ends of the crimp tabs are normal for most applications.

Check the crimp for effectiveness by pulling on and twisting the tube. The tube should not move when pulling gently on it.



**Figure 3-6. Securing the Buffer Tube Fanout Bottom to the End of the Tube.**

**3.3 Threading the Fibers**

- Approximately 2 inches (5 cm) off to either side of the tube and Buffer Tube Fanout bottom, use strapping tape to secure the plastic section of the 900- $\mu\text{m}$  assembly to the table's edge as shown in **Figure 3-7**.

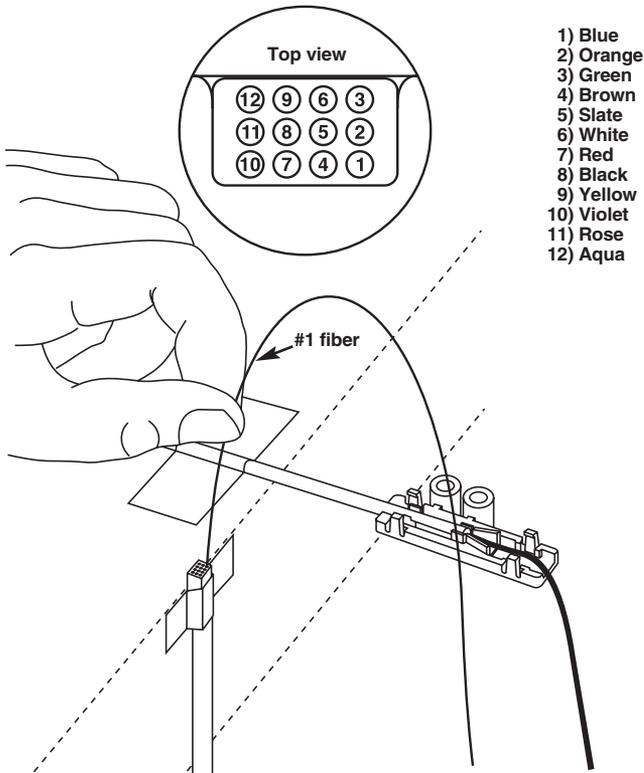
**NOTE**

The plastic section 900- $\mu\text{m}$  assembly has color-coded legs and corresponding numbers on its plastic housing. The number 1, or blue tube should be on the front bottom right corner of the assembly.

- Separate and untangle the number 1 (blue) fiber back to the point where it exits the buffer tube.

## 6- OR 12-BUFFER TUBE FANOUT KIT

- Carefully thread about three inches of the first fiber into the #1 slot of the 900- $\mu$ m tube (see **Figure 3-7**).



**Figure 3-7. Threading the Fiber.**

- Repeat steps 2 and 3 for the remaining fibers in sequential fiber order (orange, green, brown, etc.). Work the threading process across the 900- $\mu$ m tube assembly in the proper order.

### NOTE

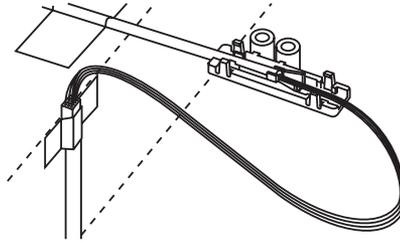
**Do not let any of the fibers cross each other during this threading operation.**

- After all of the fibers have been inserted into the 900- $\mu$ m tubes, gently push the fibers into the tubes as a group until the fiber ends protrude from the ends of the tubes.

- Carefully pull the fibers out of the tube ends to take up most of the excess length between the Buffer Tube Fanout body and the 900- $\mu\text{m}$  assembly.

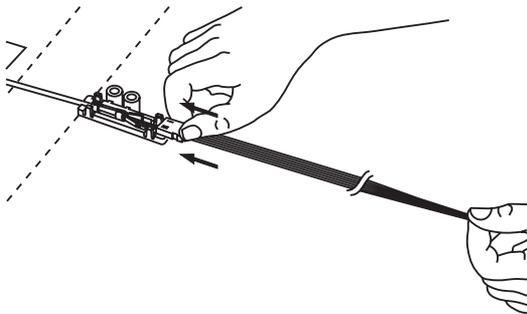
### NOTE

Leave a small fiber loop between the Buffer Tube Fanout body and the 900- $\mu\text{m}$  assembly to prevent fiber breakage during later steps in this procedure (see Figure 3-8).



**Figure 3-8. Leaving a Loop to Prevent Fiber Breakage.**

- Untape the 900- $\mu\text{m}$  assembly from the table edge. Carefully slide the assembly while gently pulling the bare fibers protruding from the 900- $\mu\text{m}$  tube ends until the assembly is above the fanout body (see Figure 3-9).



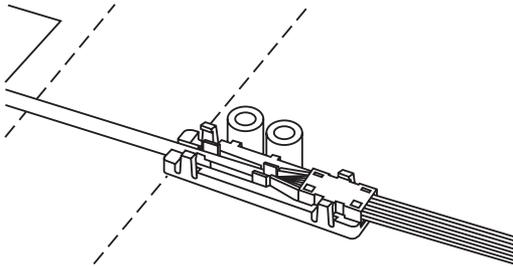
**Figure 3-9. Pulling the Assembly.**

At times the fibers will twist as a group when sliding the 900- $\mu\text{m}$  assembly toward the buffer tube. Rotate the 900- $\mu\text{m}$  assembly opposite the direction of twist until the fibers straighten out. Severe twists left in the fibers could exhibit long term micro-bending effects on the fiber performance and add loss.

### NOTE

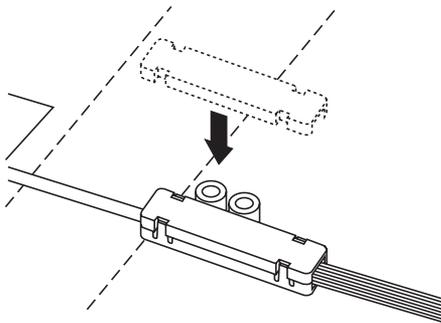
Because buffer tubes are semi-rigid, they require careful handling to compensate for their “memory” and “springy” nature. Buffer tubes will tend to quickly return to their original position after handling. Whenever you use tape to anchor the tubes down, use care to control the tubes when removing the tape.

8. Lower the insert section into the Buffer Tube Fanout body and press it into place (see **Figure 3-10**).



**Figure 3-10. Pressing the Insert Section into Place.**

9. Align the top of the Buffer Tube Fanout body with the bottom and press them together until the top snaps into place (see **Figure 3-11**).



**Figure 3-11. Pressing the Bottom and Top Together.**

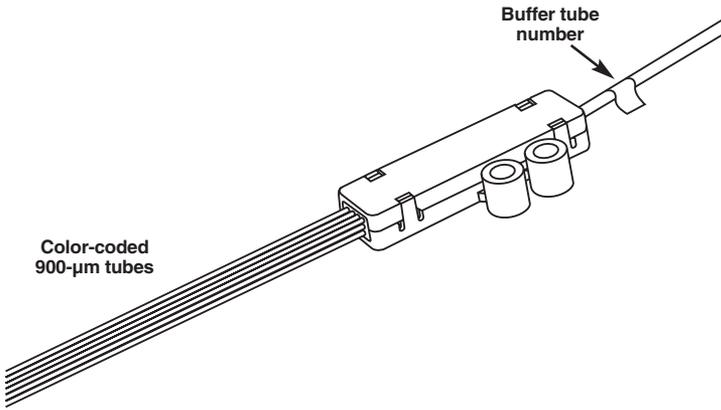
10. Remove the tape from the buffer tube.
11. Separate another buffer tube and assemble the next Buffer Tube Fanout by repeating steps 2 through 10.

**NOTE**

We recommend working with the tubes in sequential order to maintain installation organization.

**3.4 Marking the Buffer Tube Fanout**

To aid in the identification and maintenance of the fanout assemblies, use numbered wire markers. These markers can individually identify each Buffer Tube Fanout with respect to its buffer tube number if the buffer tubes are not easily distinguished (see **Figure 3-12**).



**Figure 3-12. Marking the Buffer Tube Fanout.**

**3.5 Fiber Termination**

1. Trim the excess fiber lengths to a length of 2 inches (5.1 cm) from the end of the 900- $\mu$ m tubing.
2. Terminate each fiber, working one Buffer Tube Fanout assembly at a time, following the instructions provided with the connectors.
3. Test the connectors in accordance with standard test procedures or any recommended test procedures supplied by the connector vendor.

### 3.6 Installing the Buffer Tube Fanout into Hardware

1. You can either bolt or tape the Buffer Tube Fanout into pieces of hardware. Refer to the instructions provided with the hardware you're using to determine the best method.
2. To route the Buffer Tube Fanout assembly into the hardware:
  - a. Hold the Buffer Tube Fanout body while grasping the buffer tube just outside the assembly.
  - b. Carefully guide the Buffer Tube Fanout assembly into place, taking care to prevent the buffer tube from kinking at the entrance to the Buffer Tube Fanout body.