COMMSCOPE®

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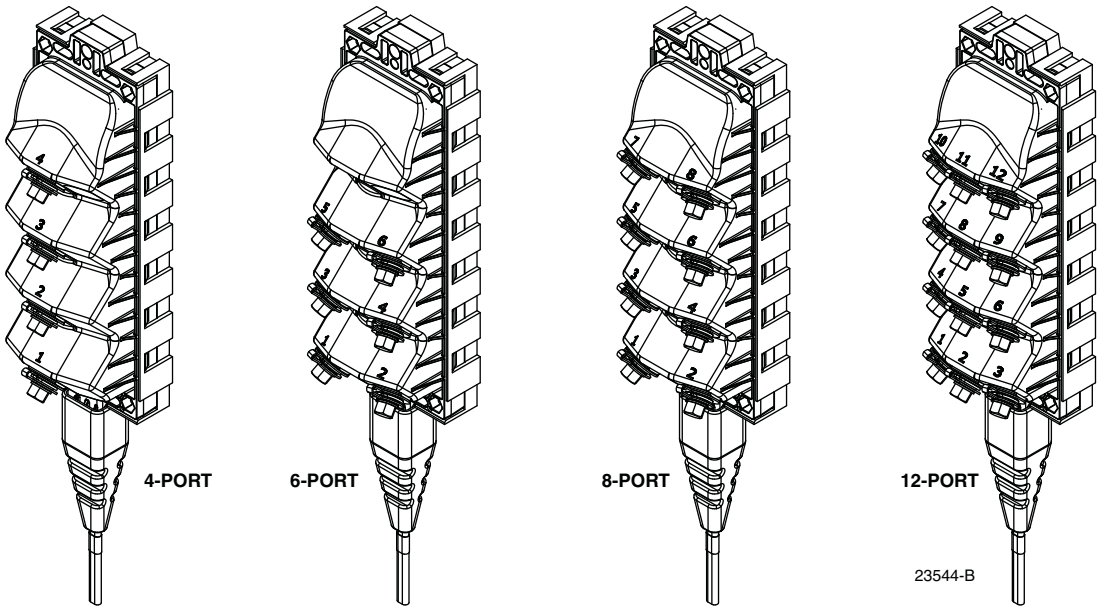
OmniReach® DLX™ Mini Multi-Port Service Terminal

User Manual



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REVISION HISTORY

ISSUE	DATE	REASON FOR CHANGE
1	10/2009	Original release
2	5/2010	Update dust cap installation and MST maintenance procedure
3	11/2010	General revisions
4	March 2017	Reformatted for CommScope.

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PRODUCT PATENTS

http://www.commscope.com/ProductPatent/ProductPatent.aspx

TECHNICAL SUPPORT AND PRODUCT INFORMATION

http://www.commscope.com/SupportCenter

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ABOUT THIS MANUAL

This publication provides user information for the OmniReach DLX Mini Multiport Service Terminal (MST) which includes the models designated MST-04D, MST-06D, MST-08D and MST-12D. The topics covered include a basic description of the MST; installation and mounting guidelines; and procedures for using and maintaining the hardened connectors and adapters.

RELATED PUBLICATIONS

Listed below are related manuals and their publication numbers. Copies of these publications can be ordered by contacting the CommScoope Technical Assistance Center (refer to Section 7 on Page 20).

Title	ADCP Number
CommScope OmniReach® DLX™ Connector and Adapter Cleaning Instructions	**96-163**
Universal Mounting Bracket Strand-Mount Installation Instructions	**96-124**

ADMONISHMENTS

Important safety admonishments are used throughout this manual to warn of possible hazards to persons or equipment. An admonishment identifies a possible hazard and then explains what may happen if the hazard is not avoided. The admonishments — in the form of Dangers, Warnings, and Cautions — must be followed at all times. These warnings are flagged by use of the triangular alert icon (seen below) and are listed in descending order of severity of injury or damage and likelihood of occurrence.

⚠ **Danger:** *Danger is used to indicate the presence of a hazard that **will** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*

⚠ **Warning:** *Warning is used to indicate the presence of a hazard that **can** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*

⚠ **Caution:** *Caution is used to indicate the presence of a hazard that **will** or **can** cause minor personal injury or property damage if the hazard is not avoided.*

GENERAL SAFETY PRECAUTIONS

⚠ **Warning:** *Wet conditions increase the potential for receiving an electrical shock when installing or using electrically-powered equipment. To prevent electrical shock, never install or use electrical equipment in a wet location or during a lightning storm.*

⚠ **Caution:** *Fiber optic cables may be damaged if bent or curved to a radius that is less than the recommended minimum bend radius. Always observe the recommended bend radius limit when installing fiber optic cables and patch cords.*

Danger: *Exposure to laser radiation can seriously damage the retina of the eye. Do not look into the ends of any optical fiber. Do not assume the laser power is turned-off or that the fiber is disconnected at the other end.*

Warning: *Contact with underground cables or pipes, especially electric power cables and gas service lines, could interrupt local utility service and cause serious personal injury and extensive property damage. Before digging, check with all local utilities for the presence of buried cables or pipes.*

STANDARDS CERTIFICATION

Telcordia: This equipment is designed to be compliant with the applicable sections of GR-771-CORE.

LIST OF ACRONYMS AND ABBREVIATIONS

The acronyms and abbreviations used in this manual are detailed in the following list:

ATS	Advanced Termination System
AWG	American Wire Gauge
C	Centigrade
DLX	Dual Locking Connector
F	Fahrenheit
FDH	Fiber Distribution Hub
FTTP	Fiber To The Premises
MFC	Multi-Fiber Connector
MST	Multiport Service Terminal
OSP	Outside Plant
RMA	Return Material Authorization
UMB	Universal Mounting Bracket

1 DESCRIPTION AND APPLICATION

This section provides a description of the OmniReach DLX Mini Multiport Service Terminal (MST) plus basic product application information.

1.1 Multiport Service Terminal

The OmniReach Multiport Service Terminal (MST) is an environmentally-sealed, Outside Plant (OSP) fiber optic terminal that provides a point for connecting subscriber drop cables to the network. Designed for Fiber To The Premises (FTTP) applications, the MST consists of a two-piece plastic housing equipped with multiple optical ports. An attached optical cable assembly is connected internally to the optical ports. The DLX-MST may be ordered with four, six, eight, or twelve fiber ports. All port configurations use the same style housing. Figure 1 shows the various types of MST's that are available.

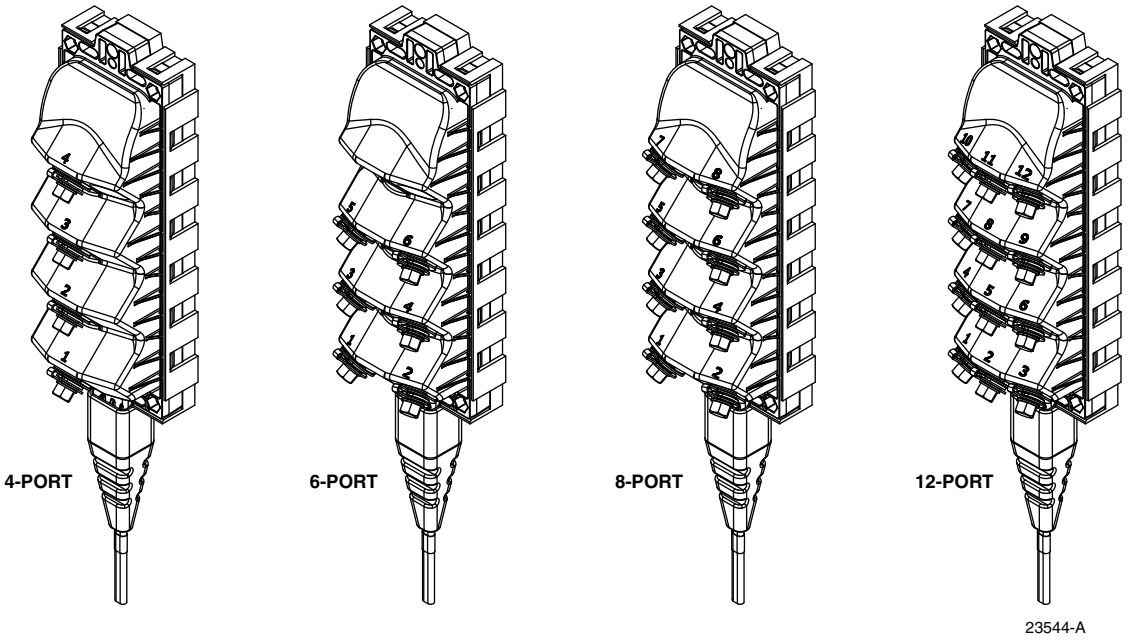

Figure 1. Typical Mulitport Service Terminals

The MST uses CommScope DLX adapters for the optical ports. A DLX adapter consists of a standard SC adapter that is enclosed within a protective housing. The housing provides sealed environmental protection for the adapter. The opening to each optical port is sealed with a threaded dust cap that prevents the entry of dirt and moisture. A standard 216B security tool (accessory) can be used to remove the dust cap. The MST optical ports accept subscriber drop cables that are terminated with DLX hardened connectors from CommScope.

Within the MST enclosure, the MST optical cable assembly is connected internally to the optical ports. The cable assembly exits the MST enclosure through a sealed opening located at the bottom of the enclosure. The DLX MST may be ordered with a flat dielectric cable (toneable or non-toneable). Depending on the option ordered, the cable end may be stubbed for splicing or terminated with a hardened multi-fiber connector (MFC).

The length of the MST cable may range from 50 to 2,000 feet (15.2 to 609.6 meters). When the cable is over 300 feet in length, the cable is coiled on a spool and the MST enclosure is secured to the top of the spool. The cable may be unreeled from the spool using a roller reel with a vertical arbor. Normally, the cable is spooled so that the free end of the cable must be unwound first. As an ordering option, the cable may also be reverse spooled so that the MST end of the cable must be unwound first. The specifications for the MST are provided in Table 1.

Table 1. Multiport Service Terminal Specifications

PARAMETER	SPECIFICATION
Dimensions (LxWxD) – See Figure 2 MST-4, MST-6, MST-8, MST-12	Note: Includes optional universal mounting bracket 11.739 x 5.13 x 3.52 Inches (29.8 x 13.0 x 8.9 cm)
Weight (without cable) MST-04D MST-06D MST-08D MST-12D	Note: Includes optional universal mounting bracket 1.93 lbs (0.88 kg) 1.98 lbs (0.9 kg) 2.08 lbs (0.94 kg) 2.18 lbs (0.99 kg)
Number of optical ports MST-04D, MST-06D, MST-08D, MST-12D	4, 6, 8, 12
Optical port connector	APC/SC hardened connector
Cable lengths (all versions)	50, 100, 200, 250, 500, 750, 1000, 1250, 1500, 1750, and 2000 feet (additional lengths available)
Cable types	Flat drop cable with dielectric strength members (with or without toneable tracer).
Environmental	Designed to GR-771-CORE
Temperature	–40º F (± 3.6º) to 150º F (± 3.6º) –40ºC (± 2º) to 65º C (± 2º)
Humidity	0% to uncontrolled
Water Resistance	NEMA 6 (10-foot water head for 7 days without leakage)
Flammability	UL94-V0
Color	Black

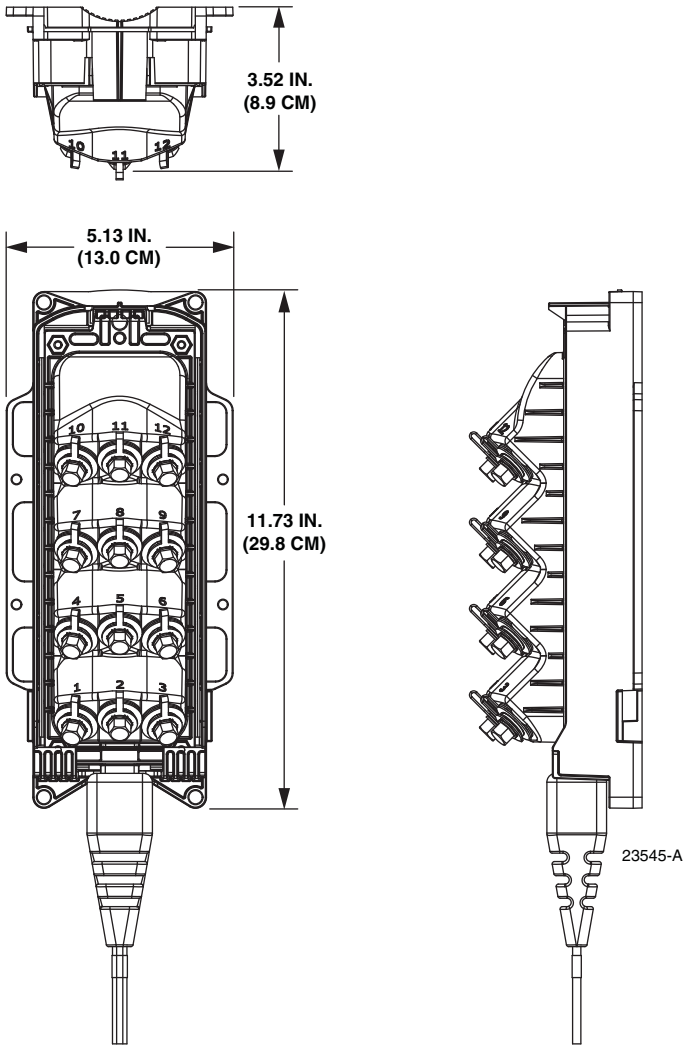

Figure 2. Multiport Service Terminal Dimensions (shown with UMB Installed)

1.2 MST Application

In a typical FTTP network, the MST is installed between the Fiber Distribution Hub (FDH) and the subscribers as shown in Figure 3. Network feeder cables transport the optical signals from the signal source to the FDH. At the FDH, optical splitters are used to divide the optical signals for distribution to the subscribers. Distribution cables transport the optical signals to the MST's which are located at points that allow service to be provided to several subscribers. Drop cables transport the optical signals from each MST to the individual subscribers.

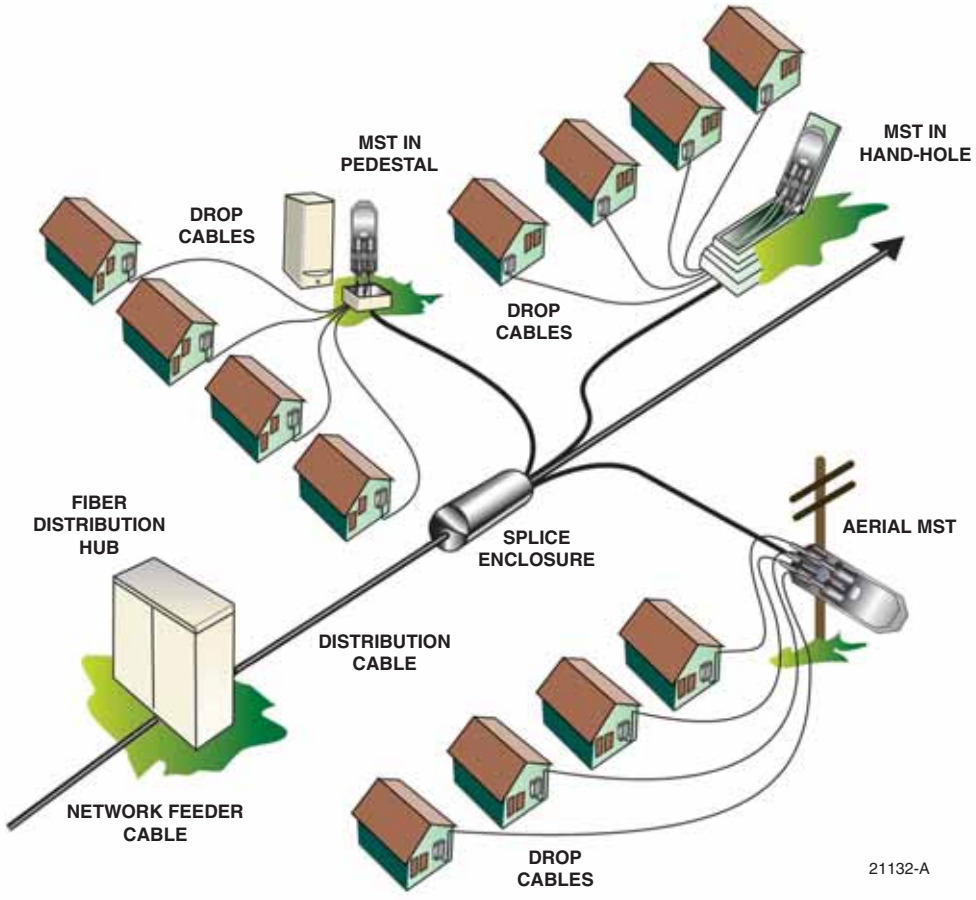

Figure 3. Typical FTTH Network

The MST is designed for outdoor applications and can be installed in a hand-hole or pedestal; mounted on a utility pole or over-head cable. A universal mounting bracket (UMB) is shipped with the MST. The MST meets the environmental criteria specified in the referenced specifications and can withstand direct exposure to extreme temperatures and humidity, is resistant to water penetration during flood conditions or heavy rains, and is also chemical and corrosion resistant.

2 BEFORE STARTING THE APPLICATION

This section provides general installation considerations, lists the tools and materials required for MST installation, and provides unpacking and inspection procedures.

2.1 Installation Overview

Installation of the MST enclosure involves the following main tasks:

Mounting MST – The MST must be mounted on or within a suitable support base or enclosure. The UMB allows the MST to be mounted in a variety of applications including the following:

- **Hand-Hole** (below ground) – Secure to mounting system provided with hand-hole.
- **Pole-Mount** (aerial) – Secure UMB directly to pole.
- **Strand-Mount** (aerial) – Secure UMB to strand. Requires a strand-mount bracket kit which must be ordered separately (MST-ACC-M02).
- **Pedestal** (at final grade) – Secure to mounting system provided with pedestal.

MFC Cable Installation – MST cables terminated with an MFC must be routed to the Advanced Termination System (ATS) distribution cable for connection.

Stub Cable Installation and Splicing – MST stub cables must be routed to a separate splice enclosure (not provided) and spliced to the system distribution cable. Refer to Section 3 for general cable pulling guidelines and cable installation recommendations.

Drop Cable Installation – A fiber drop cable connects MST to the subscriber. Follow local practice for pulling and installing drop cables. Refer to the instructions provided with the mounting system for drop cable entry and routing.

Drop Cable Connection – Service is enabled by connecting the drop cable connectors to the subscriber distribution ports on the MST enclosure. Refer to Section 5 for instructions.

2.2 Tools and Materials Required for Installation

The following basic tools, auxiliary equipment, and materials are required for MST installation:

- Vertical roller reel (if the MST is mounted on a cable spool)
- 216B key tool (used to open optical port dust cap)
- Hardened connector/adapter cleaning kit (FHD-ACC-CLNKIT1)
- Utility knife
- Cable pulling equipment
- Splicing equipment (MST with stub cable)
- Appropriate fasteners to mount the UMB and tools to install the fasteners
- Note: If using an enclosure such as a hand-hole or pedestal, refer to the instructions provided with the enclosure for any additional tools or equipment required

2.3 Unpacking and Inspection

This section provides instructions for opening the shipping boxes, verifying that all parts have been received, and verifying that no shipping damage has occurred.

Use the following procedure to unpack and inspect the MST and all accessories:

1. Open the shipping carton(s) and carefully inspect the MST and the attached cable.
2. If there are damages, contact CommScope (see Section 7) for an RMA (Return Material Authorization) and to reorder if replacement is required.

3 GENERAL INSTALLATION INFORMATION

This section provides general installation information for all versions of the MST.

3.1 Cable Handling Recommendations

Each MST is equipped with a optical cable. Depending on the length of the cable and the number of ports on the MST enclosure, the MST cable may be coiled up and placed in box or it may be coiled on a spool.

Coiled Cable Handling: If the MST is placed in a box with other MST's, carefully remove the packaging material to expose the cable coil and the MST as shown in Figure 4. Leave the MST on top and in the center of the coil. If the MST was ordered with the **standard** spooling option, locate the **free** end of the cable and then carefully uncoil the cable from around the MST. If the MST was ordered with the **reverse** spooling option, carefully uncoil the cable starting with the **MST** end of the cable.

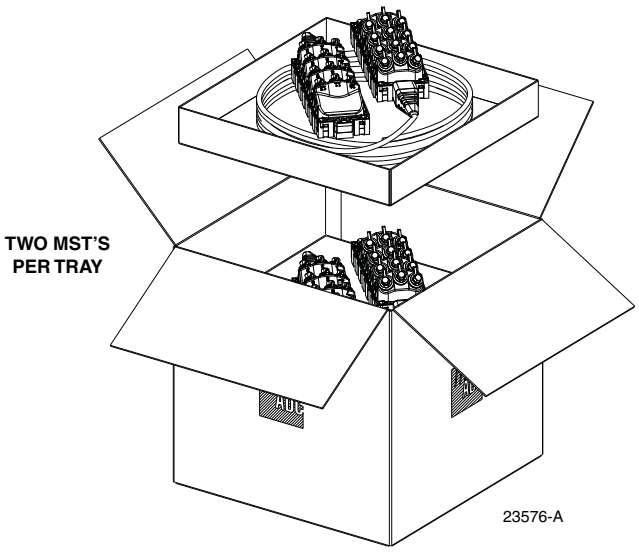

Figure 4. Typical MST Cable Coiled and MST Placed in a Box

Spooled Cable Handling: If the MST cable is coiled on a spool, remove the spool from the box as shown in Figure 5. Leave the MST on top of the spool and place the spool on a vertical arbor. If the MST was ordered with the **standard** spooling option, locate the **free** end of the cable. Carefully pull the cable away from the spool allowing the spool assembly to rotate about the vertical arbor. If the MST was ordered with the **reverse** spooling option, carefully unspool the cable starting with the **MST** end of the cable.

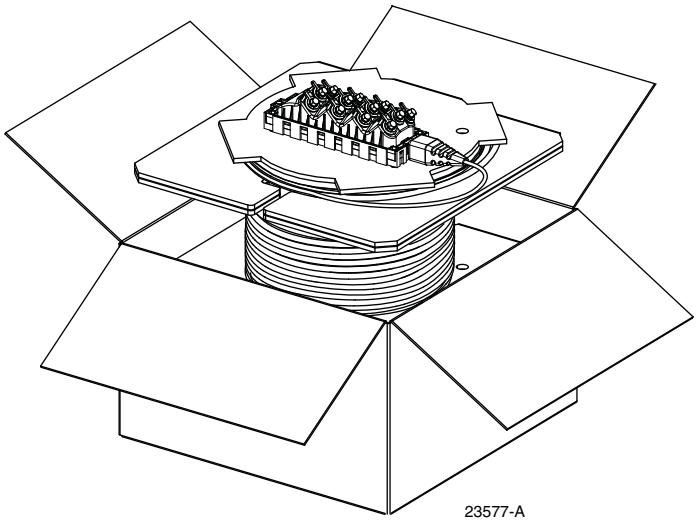

Figure 5. Typical Distribution Cable on a Spool

MST Cable Bend Radius Limits: Take care to observe the recommended minimum bend radius limits for the distribution cable. Always maintain a minimum bend radius of 6 inches during installation and 4 inches when installed.

Pulling the MST Cable: When pulling the MST cable into place, do not exceed a pulling force of 25 pounds on the optical cable.

Caution: *Do not pull the MST using the attached distribution cable as the pulling cable. Internal damage to the MST may result.*

3.2 Fiber and Port Configuration

Depending on the option ordered, the MST is equipped with four, six, eight, or twelve optical ports. The number of each port is molded into the MST enclosure. The fibers in the distribution cable are color-coded to correspond to the optical ports. Table 2 lists the port number and the color of the associated optical fiber for the various versions of the MST.

Table 2. Typical Distribution Cable Color Code

PORT	FIBER COLOR	PORT	FIBER COLOR	PORT	FIBER COLOR
1	Blue	5	Slate	9	Yellow
2	Orange	6	White	10	Violet

Table 2. Typical Distribution Cable Color Code, continued

PORT	FIBER COLOR	PORT	FIBER COLOR	PORT	FIBER COLOR
3	Green	7	Red	11	Rose
4	Brown	8	Black	12	Aqua

4 MOUNTING THE MULTIPORT SERVICE TERMINAL

The following sections describe the MST mounting options and provide the installation procedures for the MST.

4.1 MST Mounting Options

The MST can be mounted in any outside plant environment using anyone of several standard OSP enclosures. However, the MST does not require any type of OSP enclosure and may be mounted in the open from a pole or strand. The following describes the various mounting options for the MST:

- **Hand-Hole Mounting** (below ground) – A hand-hole enclosure (examples shown in Figure 6) is an OSP below-ground mounting system that may be used for any MST or other similar products. When installed, the top of the hand-hole enclosure is flush with the top of the ground. Hand-hole enclosures consist of a base unit and a top cover. The base unit mounts in the ground. Cables and conduit enter the base unit from the bottom.

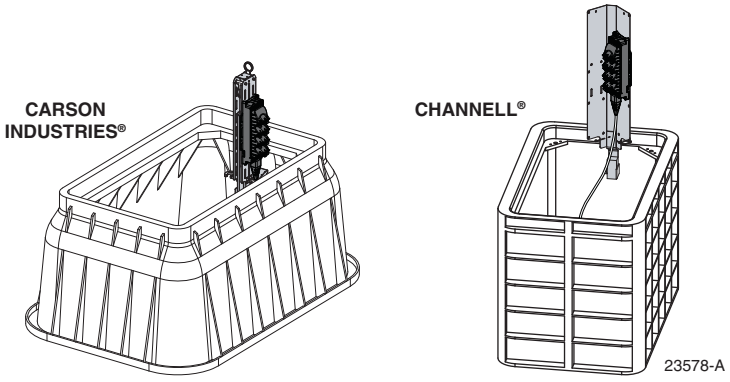

Figure 6. Typical Hand-Hole Mounting

- **Pedestal Mounting** (at final grade) – Pedestal enclosures (examples shown in Figure 7) may be used for mounting the MST at ground level. Pedestal enclosures consist of a base assembly and a top cover. The base assembly mounts partly in the ground. Cables and conduit enter the base assembly from the bottom.

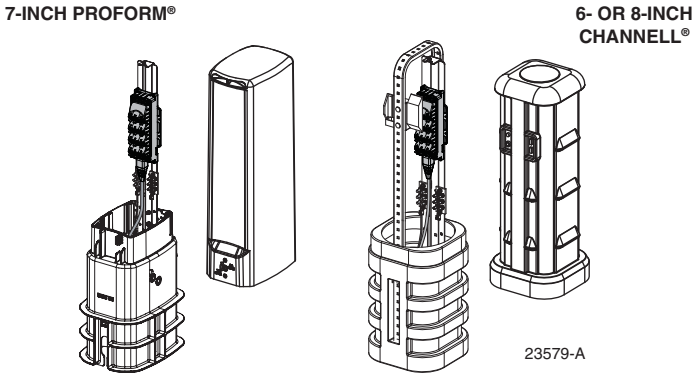

Figure 7. Typical Pedestal Mounting

- **Pole-Mounting** (aerial) – The MST may be mounted on a utility pole as shown in Figure 8. The UMB may be attached to the pole with lag screws or construction screws. Other than the fasteners, no additional parts are required for pole mounting.

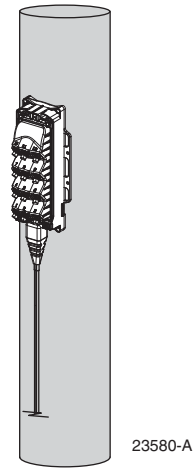

Figure 8. Typical Pole-Mount Installation

- **Strand-Mounting** (aerial) – A strand-mount bracket kit (MST-ACC-M02) is available for aerial mounting the MST from an overhead strand as shown in Figure 9. The brackets mount on the UMB and are then clamped to the strand. The MST snaps into the UMB.

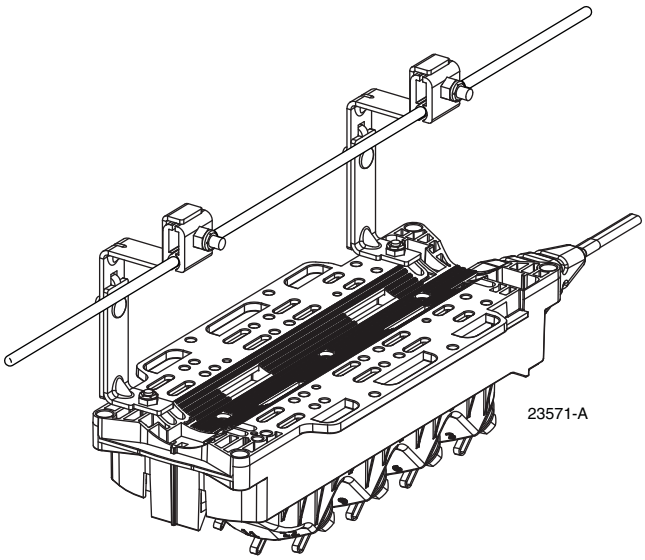

Figure 9. Typical Strand-Mount Installation

4.2 Installing the UMB and MST

The Universal Mounting Bracket (UMB) supplied with the MST and is used for mounting the MST. The UMB may be attached to various mounting surfaces using a variety of fasteners as shown in Figure 10. Multiple holes and slots are provided in the UMB to accommodate different fasteners including screws, nails, and cable ties. Secure the UMB to the selected mounting surface using whatever fastening method is applicable.

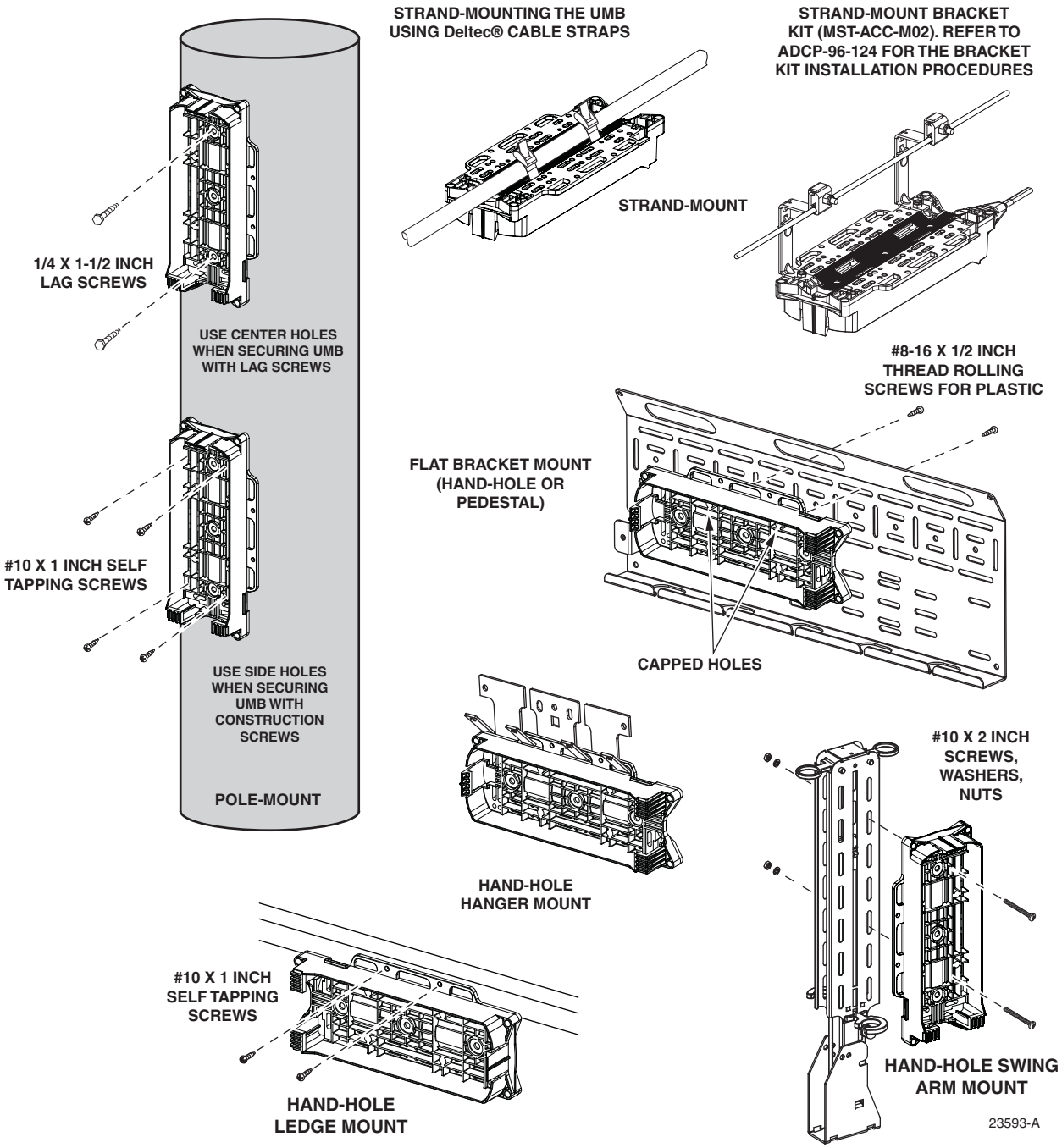

Figure 10. Typical Installation of a Universal Mounting Bracket (UMB)

After the UMB is mounted, install the MST in the UMB as shown in Figure 11. Insert the cable end of the MST into the UMB first and then push the front of the MST into the UMB until the latch snaps closed.

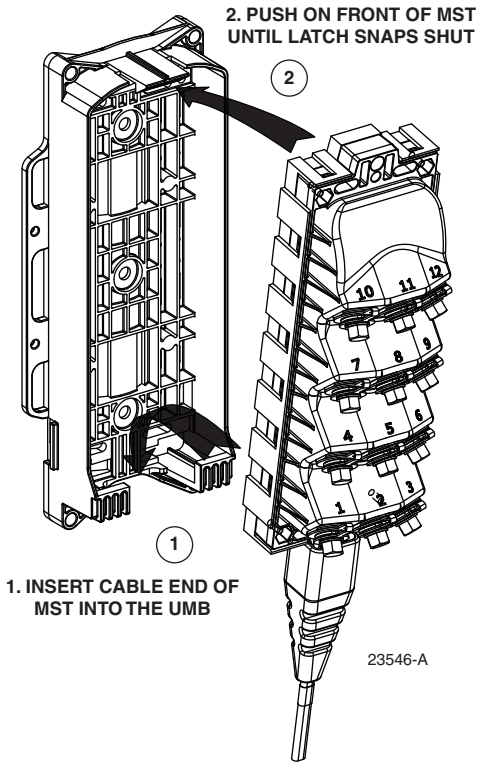

Figure 11. Installing the MST in the Universal Mounting Bracket

If the MST will be supported from a strand, secure the MST to the UMB with hardware provided as shown in Figure 12.

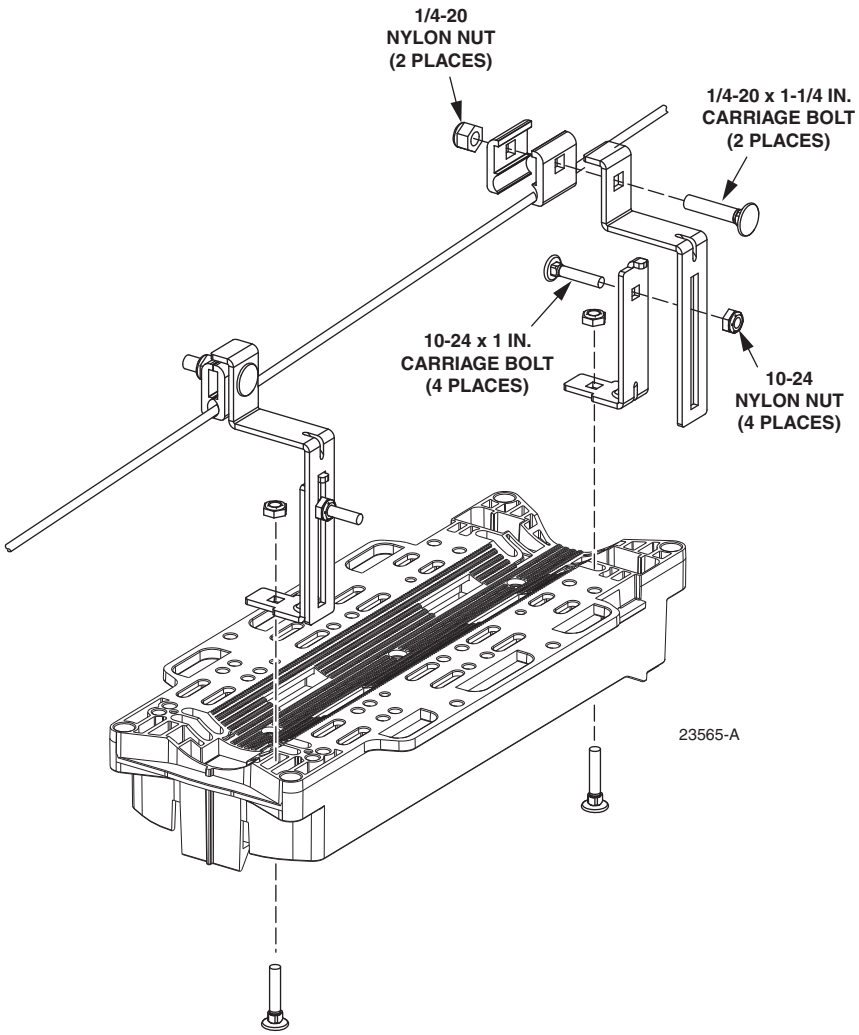

Figure 12. Securing Strand-Mounted MST

5 USING COMMSCOPE DLX HARDENED CONNECTORS AND ADAPTERS

CommScope DLX hardened connectors and adapters provide sealed environmental protection for the subscriber drop cable connector, SC connector, and adapter mounted within the MST optical port. The following sections provide a description of the connector and adapter components and provide instructions for connecting or disconnecting the drop cable to/from the optical ports.

5.1 Connector Components

The basic components of the drop cable connector are shown in Figure 13. The connector coupling nut threads onto the dust cap. The O-ring on the connector body provide a water tight seal when the dust cap is in place. A pulling eye is provided in the end of the dust cap for pulling the drop cable. Do not exceed a pulling force of 100 lbs.

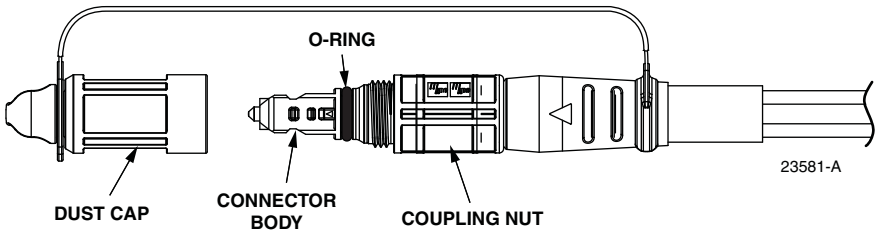

Figure 13. Drop Cable Connector Components

The basic components of a typical MST optical port hardened adapter are shown in Figure 14. The dust cap threads into the adapter housing. An O-ring on the dust cap provides a water tight seal when the dust cap is in place. The 216B key tool is required to remove the dust cap.

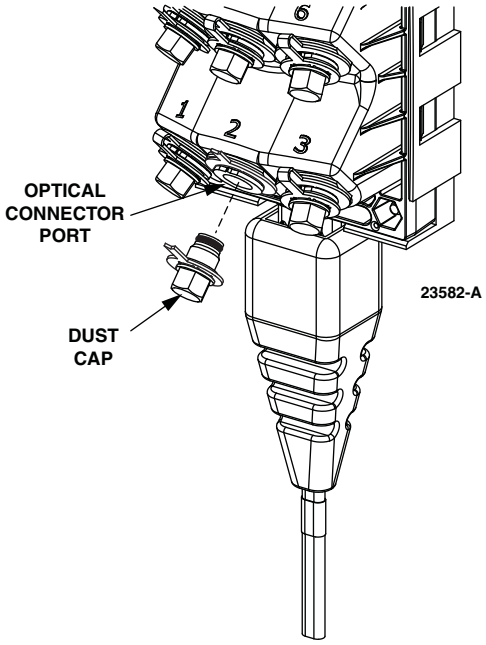

Figure 14. Typical Optical Port Adapter Components

5.2 Connecting Drop Cable to MST Optical Port

⚠ **Danger:** *Exposure to laser radiation can seriously damage the retina of the eye. Do not look into the ends of any optical fiber. Do not assume the laser power is turned-off or that the fiber is disconnected at the other end.*

Use the following procedure to connect a drop cable to an optical port on the MST enclosure:

1. Before removing the connector dust cap, clean any debris from around the drop cable connector housing, preferably using compressed air, to minimize contaminants from being introduced onto the ferrule.

2. Unscrew the coupling nut from the drop cable connector dust cap (see Figure 13).
3. Before removing the optical port dust cap, clean any debris from around the MST optical ports, preferably using compressed air, to minimize contaminants from being introduced into the optical port. Use the 216B key tool (accessory) to unscrew the dust cap (see Figure 14) from the MST optical port.
4. Clean both the optical port adapter and the drop cable connector (requires accessory kit FHD-ACC-CLNKIT1) as specified in ADCP-96-163.
5. Align the drop cable connector with the optical port as shown in Figure 15. The protrusions on the drop cable connector should line up with the arrow on the optical port.

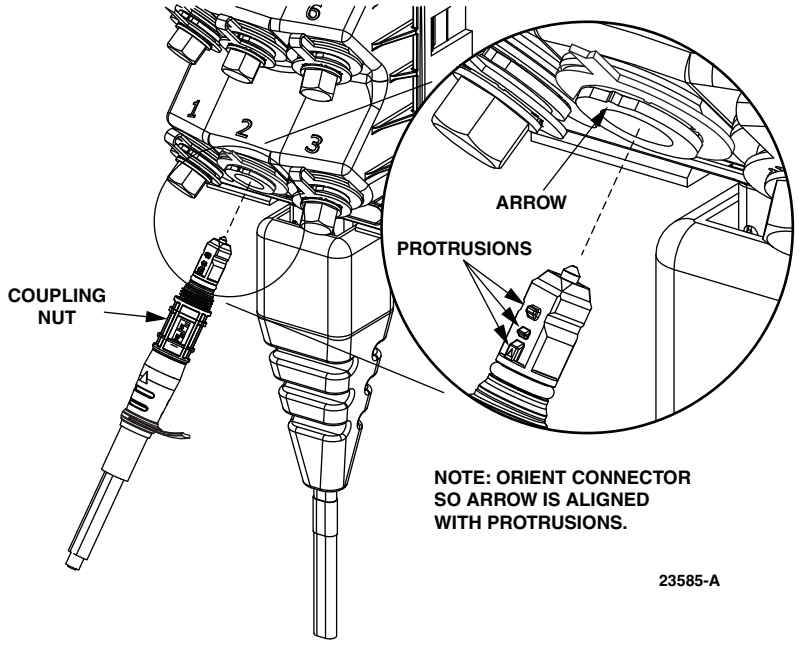

Figure 15. Typical Connection of a Drop Cable To MST Optical Port

6. Insert the drop cable connector into the optical port until it slides freely into place and latches.
7. Thread the drop cable connector coupling nut into the optical port and tighten coupling nut until finger tight.
8. Thread the optical port dust cap into the drop cable dust cap as shown in Figure 16 and then tighten both dust caps finger tight. This ensures that both dust caps will stay clean when not in use.

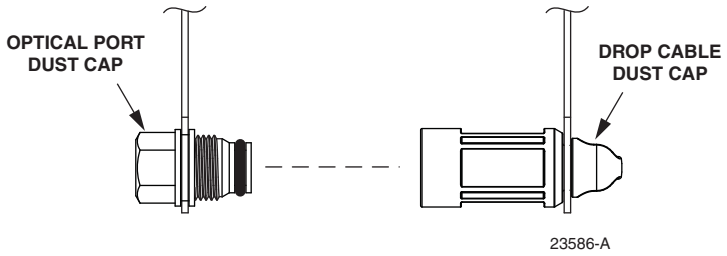

Figure 16. Dust Caps

5.3 Disconnecting Drop Cable From MST Optical Port

Danger: *Exposure to laser radiation can seriously damage the retina of the eye. Do not look into the ends of any optical fiber. Do not assume the laser power is turned-off or that the fiber is disconnected at the other end.*

Use the following procedure to disconnect a drop cable from an optical port on the MST enclosure:

1. Before removing the connector dust cap, clean any debris from around the dust cap, preferably using compressed air, to minimize contaminants from being introduced onto the ferrule. Unscrew the optical port dust cap from the drop cable dust cap (see Figure 16).
2. Before removing the drop cable connector, clean any debris from around the connector housing and MST optical port, preferably using compressed air to minimize contaminants from being introduce onto the connector ferrule or into the optical port.
3. Unscrew the drop cable connector coupling nut and remove from the optical port (see Figure 15).
4. Grasp the connector and pull it straight out of the adapter. 5 Lbs. of force or less is required to extract the connector.
5. Thread the optical port dust cap into the optical port and tighten until finger tight (see Figure 14).
6. Thread the drop cable connector coupling nut into the drop cable dust cap and tighten until finger tight (see Figure 13).

6 MAINTENANCE PROCEDURES

Maintenance for the MST enclosure is limited to cleaning the hardened adapters as needed to maintain optimal performance.

Caution: *Clean the connector body and adapter before disconnecting a drop from the adapter port or removing the adapter port dust cap to minimize contaminants from being introduced into the terminal adaptor port and onto it's connector end face.*

6.1 Drop Cable Connector Cleaning Procedure

Cleaning kit (FHD-ACC-CLNKIT1) and key tool (216B) are required for this procedure. Use the following procedure to clean the drop cable connector:

1. Clean the connector body, preferably using compressed air, to minimize contaminants introduced to the ferrule. When cleaning always follow your local operating practices.
2. Unscrew the drop cable connector coupling nut from the drop cable dust cap.
3. Examine the end of the drop cable connector, note the position of the protrusions on the connector, see Figure 17.

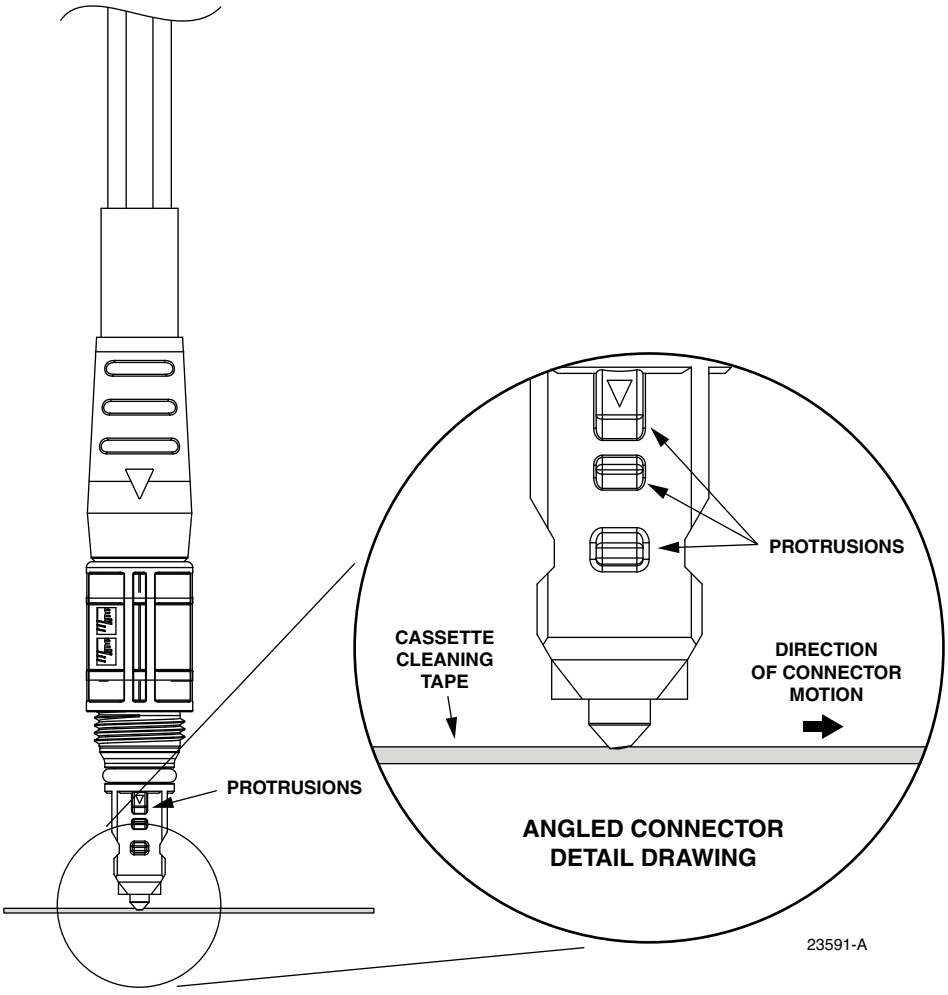

Figure 17. Typical Angled Connector End-Face Detail

4. Locate the cleaning tape cassette that is provided with the cleaning kit.
5. Open the tape shutter by squeezing the lever on the underside of the cassette and then keep the shutter open by continuing to squeeze the lever.

6. Hold connector facing you with the protrusions perpendicular to the length of the cleaning cassette, tilt the connector to the right (no more than 8-degrees) this places the connector in the correct position for cleaning, see Figure 18.

Note: The drop cable connector uses angled SC type connectors. Make sure the connector end-face is pointing in the correct direction before starting the cleaning motion.

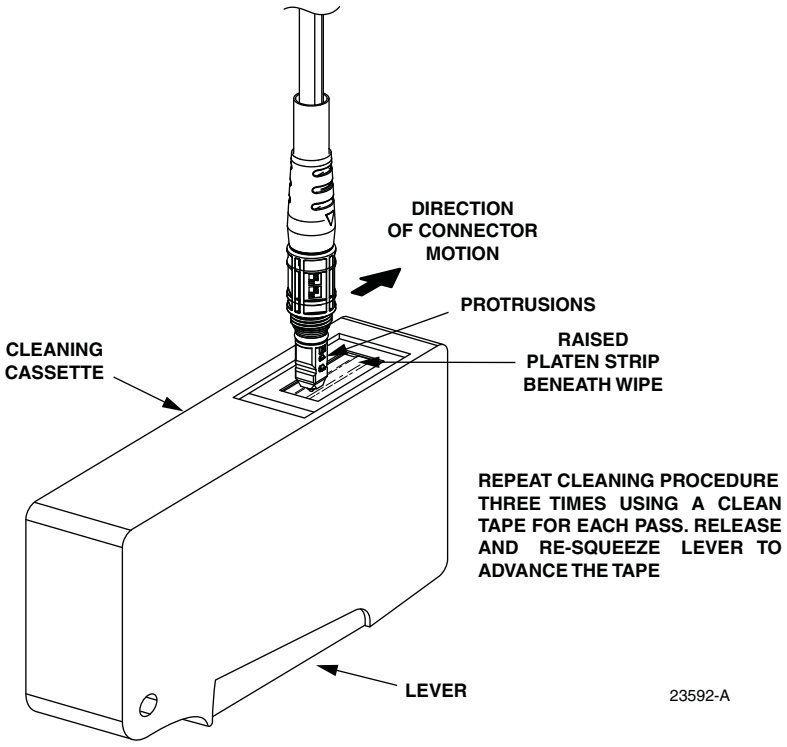

Figure 18. Cleaning Drop Cable Connector

7. With **light pressure**, slide the connector end-face once across the tape in the direction shown using a smooth linear motion. Do not press too hard and do not repeat the cleaning motion with the same tape.
8. Release the lever on the underside of the cassette to close the tape shutter.
9. Repeat Step 4 through Step 7 until the connector has been cleaned three times.
10. When the connector is clean, reinstall into optical port.

6.2 MST Adapter/Connector Cleaning Procedure

Cleaning kit (FHD-ACC-CLNKIT1) is required for this procedure. Use the following procedure to clean the MST optical port adapters and the internal connectors:

1. Clean any debris from around the MST optical ports preferably using compressed air, to minimize contaminants introduced into the optical port. When cleaning always follow your local operating practices.
2. Using a 216B key tool, unthread the optical port dust cap from the optical port adapter.
3. Locate the dry swabs that are provided with the connector/adapter cleaning kit.
4. Insert a dry swab into the adapter as shown in Figure 19.

Note: Do not apply alcohol to the swab or the adapter.

5. While applying **light pressure** against the connector end-face, rotate the dry swab 360º three times.
6. Dispose of the dry swab after use.
7. When connector end-face and adapter are clean, install the drop cable connector or dust cap into the optical port.

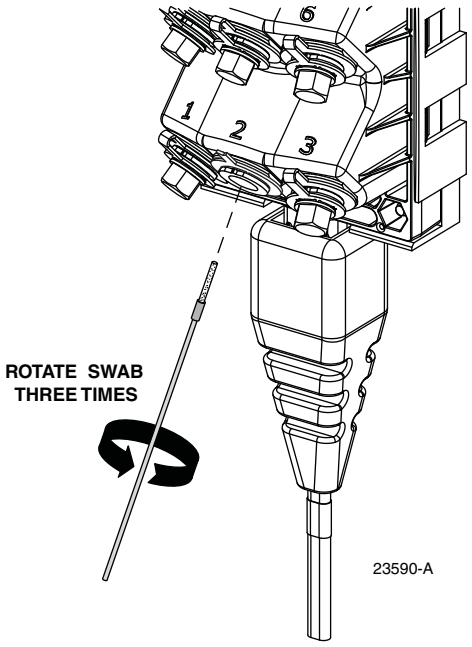

Figure 19. Typical Cleaning of an Optical Port Connector and Adapter

7 CUSTOMER INFORMATION AND ASSISTANCE

- To find out more about CommScope® products,go to www.commscope.com/
- For technical assistance, customer service, or to report any missing/damaged parts, go to http://www.commscope.com/SupportCenter