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ADC OmniReach™ Advanced Termination System (ATS) Methods and Procedures

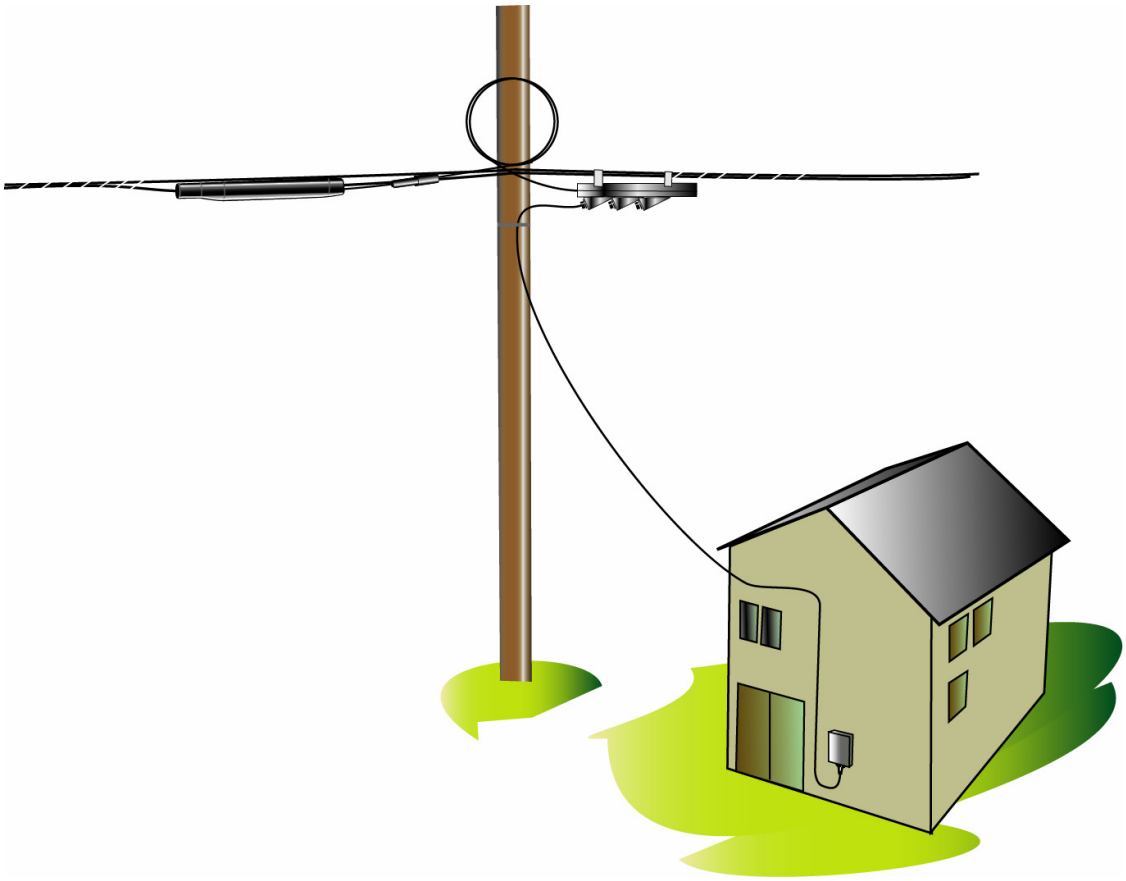

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TABLE OF CONTENTS

TABLE OF CONTENTS

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ABOUT THIS MANUAL

This publication provides installation information for the ADC OmniReach Advanced Termination System (ATS) release 1.0, used in Fiber-To-The-Premises applications.

The instructions in this manual are to be carried out by trained personnel only.

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.

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⚠ **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.*

LIST OF ACRONYMS AND ABBREVIATIONS

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

ATS	Advanced Termination System
CO	Central Office
FDH	Fiber Distribution Hub
FTTP	Fiber-To-The-Premises
MFC	Multifiber Connector
MST	Multiport Service Terminal
OSP	Outside Plant
OTDR	Optical Time Domain Reflectometer
PAM	Pole Alignment Marker
SAM	Slack Alignment Marker
TAP	Tethered Access Point

1 INTRODUCTION

The ADC OmniReach Advanced Termination System (ATS) is a distribution cable product for use in aerial applications. The cable ships from the factory with connectorized tethers having 4, 6, 8 or 12 fiber capabilities. Non-connectorized tethers are also available. Tethers are pre-terminated into the cable length at locations and configurations designated by an Outside Plant Engineer. ATS cable placement follows standard fiber placement methods and primarily serves as an alternative to traditional terminal splicing activity.

The ADC ATS solution provides a cost effective and efficient alternative to constructing FTTP distribution networks. The system includes OSP distribution cables (loose-tube or self-support) with Tethered Access Points (TAPs) spliced in at the factory according to the customer's engineering specifications. The TAP points are configured to align with pole locations. ADC TAP points are provided with either single or dual tethers and are protected in a rugged over mold enclosure. See Figure 1 and Figure 2.

TAP tethers are equipped with hardened Multifiber Connector (MFC) jacks at the end of the tethers. The TAP MFC connector jacks are sized with 4, 6, 8 or 12 fiber ports per connector. The TAP MFC allows Multiport Terminals to be initially deferred. Multiport Terminals are available with mating MFC plugs allowing the Terminals to be rapidly installed during service turn-up.

ADC ATS cable assemblies are designed and qualified for installation in aerial (Figure 3) Release 1.0 applications. TAP access points are available with either one or two tethers for up to 24 fibers per access point. Loop back plugs may be ordered and installed on the ATS cable assembly in the factory allowing rapid field testing. TAP access points with field splicing to the tethers are also available.

ADC ATS Cable Assemblies and ATS Terminals are constructed in a controlled factory environment and are supplied fully tested thus ensuring the quality and reliability of the overall installation.

Figure 1. ATS Single Tether - Aerial Loose-Tube

Figure 2. ATS Dual Tether - Aerial Loose-Tube

Figure 3. ATS Dual Tether - Aerial Self Support

1.1 Placement Considerations

1.1.1 Aerial Tree Trimming

A clear and unobstructed path is recommended for the placement of ATS.

1.1.2 Reel Loading

ATS cables are loaded onto reels with the Central Office (CO) ends on the outside of the reels as shown in Figure 4.

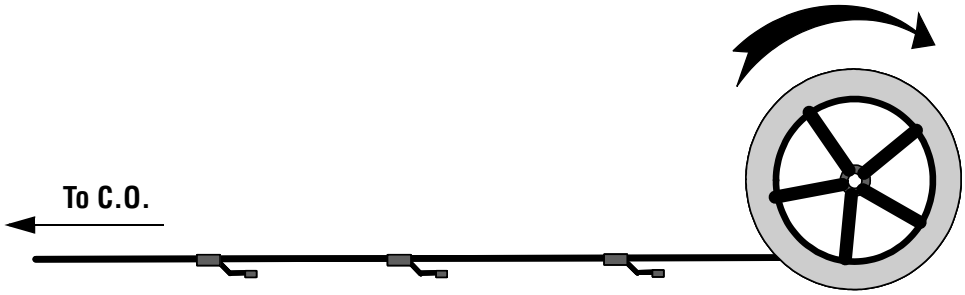


Figure 4. Central Office Side Comes off Reel First

1.1.3 Tether Management

Each ATS TAP includes one or two tethers. The tethers are connectorized or non-connectorized. The tether is taped to the cable to protect and manage the tether during the reel loading and cable placement. For aerial placements, the taped tether requires the line or splice technician to remove the tape to align/place the cable (Figure 5).

Figure 5. Aerial Tether

1.1.4 TAP Positioning

When dressed out and supported, the TAP should be 6 ft., (72 in.) off the pole, and the MFC should be one foot (12 in.) off the pole to the CO side of the pole, unless designed for another distance based on the engineering drawing. See Figure 6.

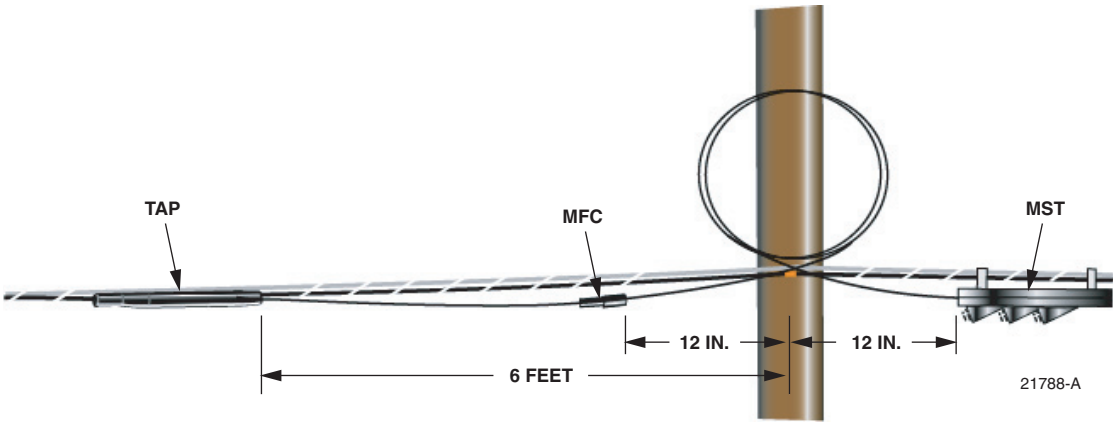


Figure 6. TAP and MFC Positions

1.2 PAM Marker

An orange pole alignment marker (PAM) marks the center line measurement from one pole to the next. It is placed by the factory according to the measurement specification provided by the engineer. PAM markers are shown in Figure 7.

Figure 7. PAM (orange) and SAM (yellow) Markers

As the cable is placed from pole to pole, each PAM should be watched by the line force for negative or cumulative drift in relation to the poles. As drifting grows in either direction, a maximum tolerance of approximately 4 feet is an indication that corrective action be considered. Examples of corrective action are introducing slack coils if the drift is in the direction of placement (PAM is positioned after the pole; long), or taking advantage of engineered slack coils if the drift is against the direction of placement (PAM is positioned before the pole; short).

1.2.1 Identifying and Correcting Drift

In cable placement situations where span sections of the cables are too long, the placement crew can recognize PAM drift and make a determination as to when and where to take corrective action. After the Zero Marker is attached at the first pole each subsequent span placement results in a shifting PAM away from the CO. The line technician must be able to recognize the need to take corrective action early in the placement process. When sufficient drift occurs, a slack coil can be introduced, bringing the alignment back to zero at that point.

Note: Correcting drift aligns the distribution cable and access points after the slack loop is made. Access points before the slack loop are not affected. It is important to make corrections while drift is still within acceptable tolerances, and before the drift is unacceptable.

1.3 SAM Marker

Yellow slack alignment markers (SAMs) mark the beginning and ending points of engineering designed slack lengths. One of the SAMs is always located next to a PAM, indicating the start of a slack loop. If no slack adjustments are required, a slack loop is made and the two yellow SAM markers align with each other. If an adjustment needs to be made in either direction, make a slack loop and align the SAM furthest from the PAM at the pole where the PAM would be located, before continuing the placement to the next pole/hand-hole.

1.4 ADC Reel Options

Three reel sizes are available (See Figure 8).

- 15-inch reel - up to 3000 feet; fit up to three reels on an arbor
- 22-inch reel - 3000 to 4500 feet; fit up to two reels on an arbor
- 36-inch reel - 4500 to 7000 feet; fit one reel on an arbor

Reel return policy, ADC recycles reels and will arrange to pick up bulk quantities.

15-in. Reel
Up to 3000 ft.

22-in. Reel
3000 to 4500 ft.

36-in. Reel
4500 to 7000 ft.

Figure 8. ATS Reels

Typical S/N barcode found on each on reel is shown in Figure 9:

Figure 9. Reel ID Label

2 PLACEMENT

ADC ATS cable placement follows standard fiber placement methods.

Installers must be aware of the pull-load limits for the cables:

- Minimum bend radius is 20 x cable OD (Dynamic) or 10 x cable OD (Static)
- Distribution cable - 600lb
- Access point tether - 100lb

The ADC ATS cables are capable of several placement methods:

- lash to pre-existing cable or dedicated messenger - single pass
- lash to pre-existing cable or dedicated messenger - two-pass
- self-supporting
- underground - direct-buried
- underground - conduit

As described earlier, slack loops are built into distribution cables where measurements are not precise. Slack loops make it possible to adjust for measurement discrepancies.

1. CAREFULLY remove shipping wrap from spool
2. Check the CO side label for correct cable ID, etc. See Figure 10 for a sample label.

Figure 10. CO Side Label

2.1 Single-Pass Placement

Single-pass placement method involves hanging and lashing the distribution cable to a pre-existing cable or a dedicated messenger in one pass. The reel is typically loaded onto an arbor on the rear of a truck. The technician starts at the CO end of the run, feeds out the specified amount of slack, aligns the first PAM, and then progresses towards the other end of the run. When a TAP over mold is reached, the lashing machine is lifted past the over mold and tether and strand are secured before continuing. See Figure 11.

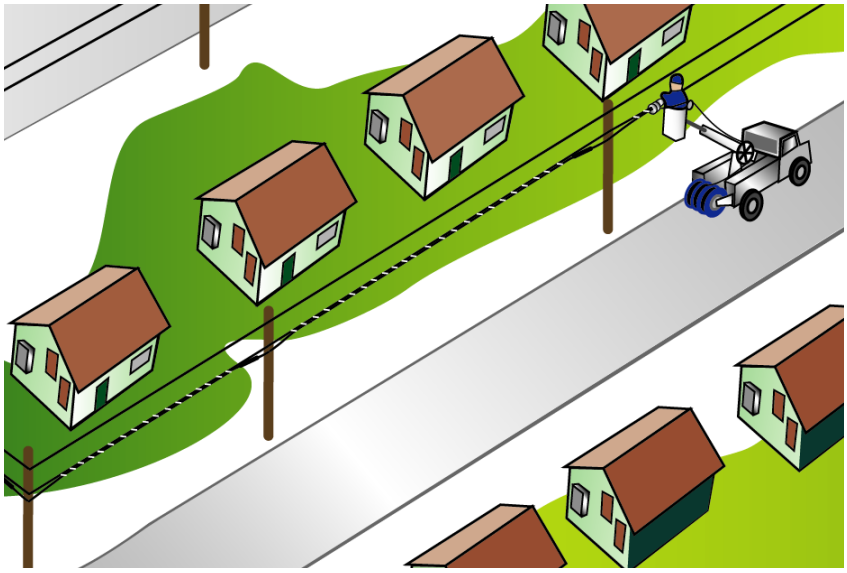


Figure 11. Single Pass - Hang and Lash - Pull Beginning to End

2.2 Two-Pass Placement

Two-pass placement method involves hanging and lashing the distribution cable to a pre-existing cable or a dedicated messenger in two passes. The reel is typically loaded onto a trailer that is placed at the field side end of the run. The technician pulls off the CO end of the cable, starts hanging the cable on blocks, and then progresses towards the CO end of the run. See Figure 12. Once the complete cable is hung, the technician returns to the field side end of the cable and begins the lashing operation, removing the blocks as he progresses. See Figure 13. When a TAP over mold is reached, the lashing machine is lifted past the over mold and tether and strand are secured before continuing.

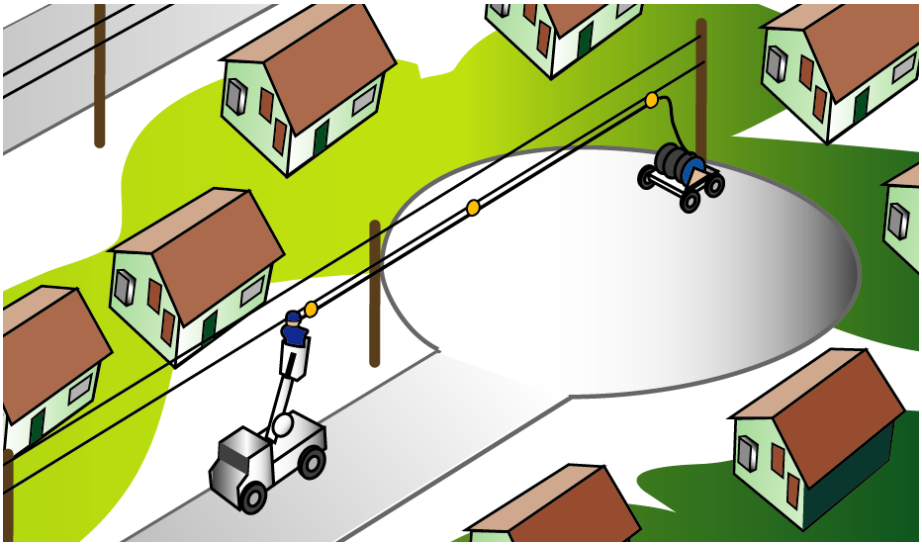


Figure 12. First Pass - Hang on Blocking, Pull End to Beginning

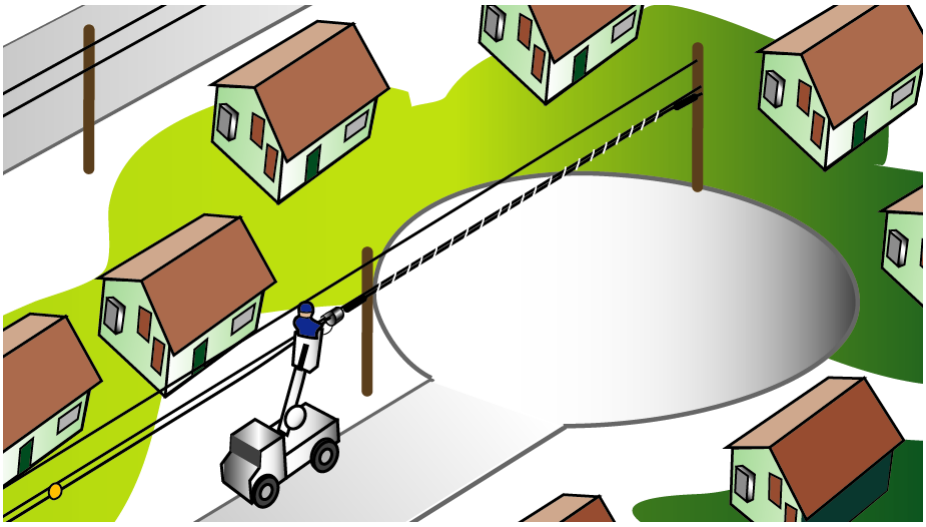


Figure 13. Second Pass - Lash, Remove Blocking

2.3 Self-Supporting Cable Placement

This method involves hanging the distribution cable in one pass. The reel is typically loaded onto an arbor on the rear of a truck. The technician starts at the Central Office (CO) end of the run, feeds out the specified amount of slack, aligns the first PAM, and then progresses towards the other end of the run. See Figure 14.

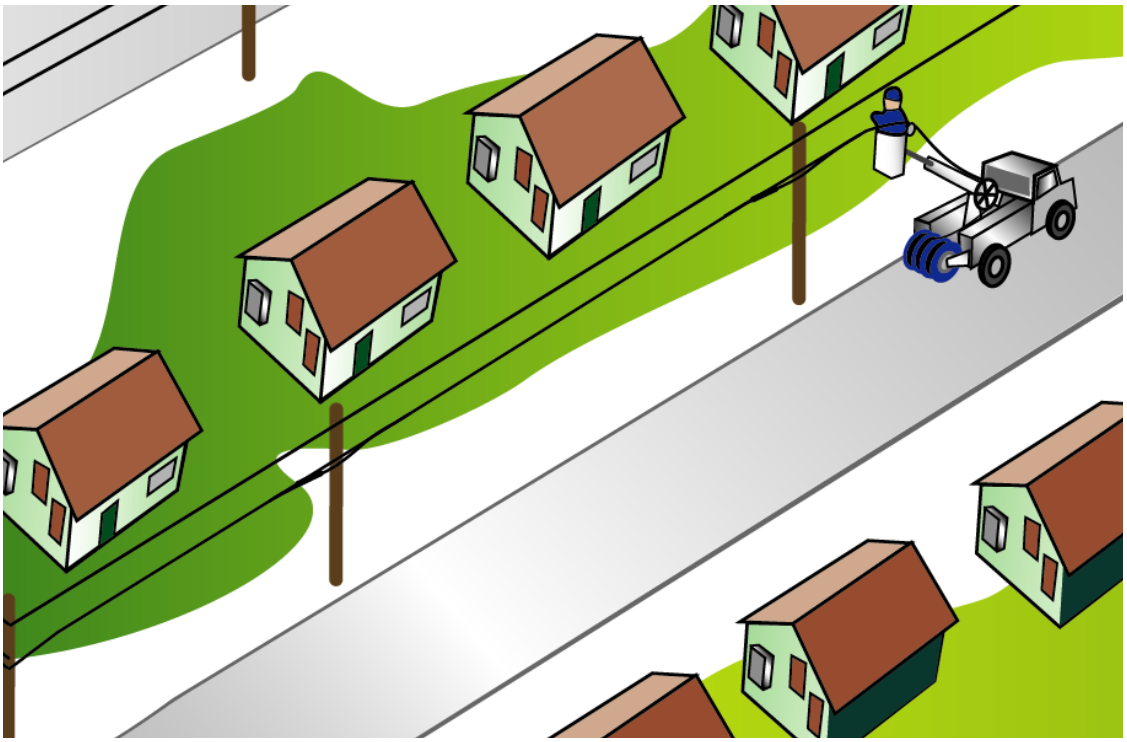


Figure 14. Cable Placement - Pull Beginning to End

2.4 Tether Handling

The tethers are connectorized or non-connectorized. Tethers are taped to the cable to protect and manage the tether during reel loading and cable placement. For aerial placements, the taped tether requires the line or splice technician to remove the tape to align/place the terminal. For underground placements, a tether release mechanism is built into the tether attachment to assist in pulling the tether into the hand-hole or pedestal.

2.5 Testing

A Loop Back plug (Figure 15) is placed in the TAP MFC jack which is furthest from the splice end of the distribution cable. Loop back plugs are also available factory installed into any other MFC jacks of specific tethers. Field technicians can then use a light source or OTDR to check fiber continuity or signal characteristics of the fibers connected through the loop back plug.

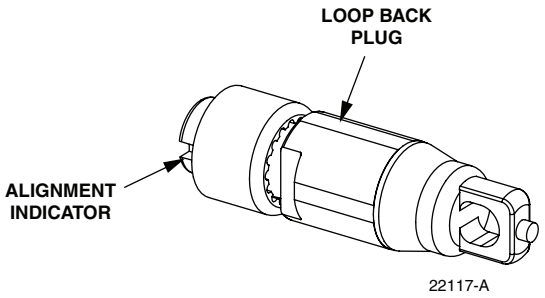


Figure 15. Loop Back Plug

Testing may be accomplished after the ATS cable is placed and prior to splicing to the main distribution cable. The technician would rely on the cable build plan shipped with cable which identifies the tether number, tube colors, and fiber colors for each MFC termination or un-connectorized tether.

Testing can also be accomplished from the Fiber Distribution Hub (FDH) after splicing the ATS cable to the main distribution cable. In this instance, the technician needs the cable build plan shipped with the ATS cable as well as the FDH F2 splice/connection details to resolve each fiber's connector number on the termination panel.

When connecting a light source or OTDR, the loop back plug at each MFC connects fibers as shown in Figure 16.

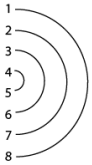
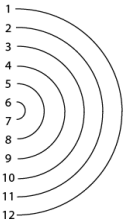
4-fiber connector	fiber 1 ⇔ fiber 4 fiber 2 ⇔ fiber 3	
6-fiber connector	fiber 1 ⇔ fiber 6 fiber 2 ⇔ fiber 5 fiber 3 ⇔ fiber 4	
8-fiber connector	fiber 1 ⇔ fiber 8 fiber 2 ⇔ fiber 7 fiber 3 ⇔ fiber 6 fiber 4 ⇔ fiber 5	
12-fiber connector	fiber 1 ⇔ fiber 12 fiber 2 ⇔ fiber 11 fiber 3 ⇔ fiber 10 fiber 4 ⇔ fiber 9 fiber 5 ⇔ fiber 8 fiber 6 ⇔ fiber 7	

Figure 16. Loop Back Plug Connections

The loop back plug serves as a dust cap and can remain in place until making a terminal connection, or may be replaced with a standard MFC jack dust cap.

3 TERMINALS

The ADC ATS Multiport Service Terminal (MST) incorporates the OptiTap™ hardened connector technology and is equipped with MFC plugs for rapid connection to the MFC on the ATS cable assembly. The terminals are available with 10-feet and longer MFC tethers. The terminal connector ports are clearly marked with port numbers for quick drop cable connections. ADC ATS Multiport Service Terminals are designed for both aerial and below ground applications. ADC ATS Multiport Service Terminals are shown in Figure 17.

- Available with 4, 6, 8, and 12 ports
- Terminal tether terminated with MFC plug
- Packaged with universal mounting bracket
- Default tether length is 10 feet (available up to 2000 feet)

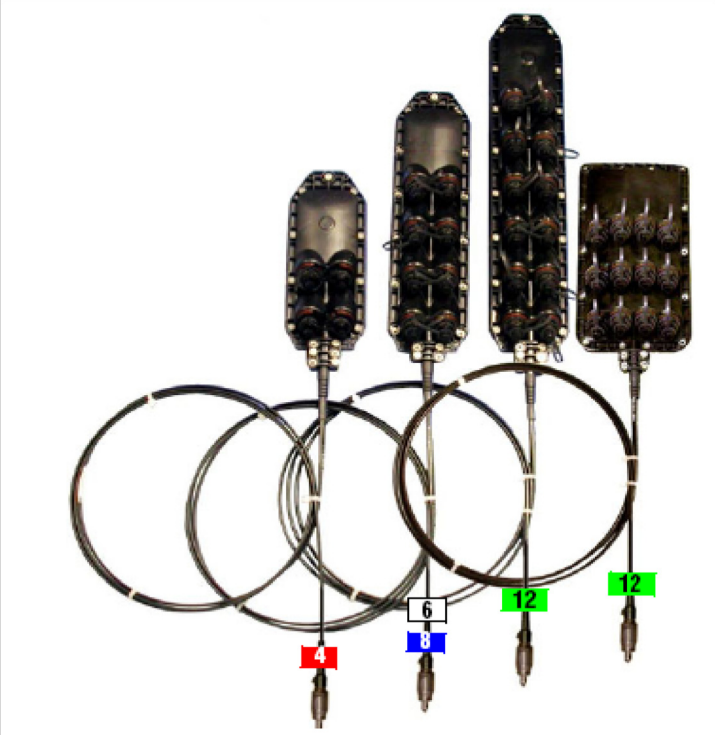


Figure 17. ADC Multiport Service Terminals

When using the universal mounting bracket, the ADC MST is capable of being easily mounted for many applications. Mounting options are shown in Figure 18.

- Aerial Strand
- Hand-hole

- Pedestal
- Pole

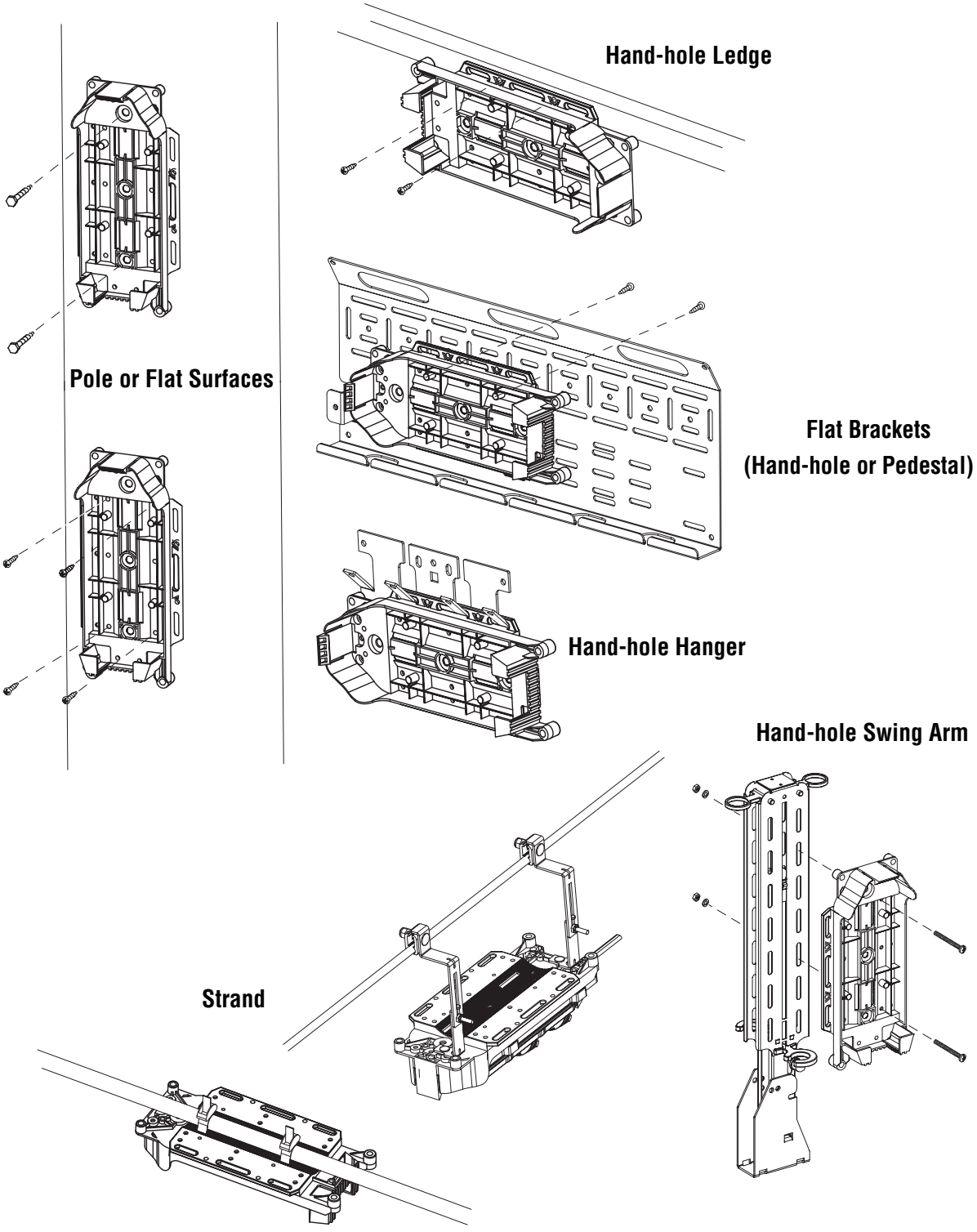


Figure 18. MST Universal Mounting Options

3.1 Terminal Connections

3.1.1 MFC Connectors

Tethers on both the distribution cable access point and the MST use color-coded tape to identify the number of fibers in the connector/tether. The tape is located near the MFC boot (connectorized tethers) or near the end of the tether (non-connectorized tethers). There is also a label on the access point tethers used for pole identicalness, distribution cable number, and tether number. See Figure 19.

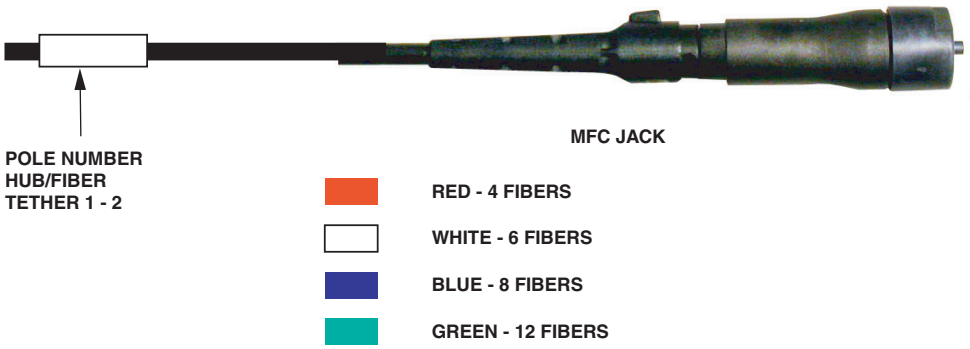


Figure 19. Tether Color Coding

The MFC connectors are keyed and must be aligned to mate correctly. Alignment indicators are on the bodies of both the jack and the plug. See Figure 20 for correct mating alignment.

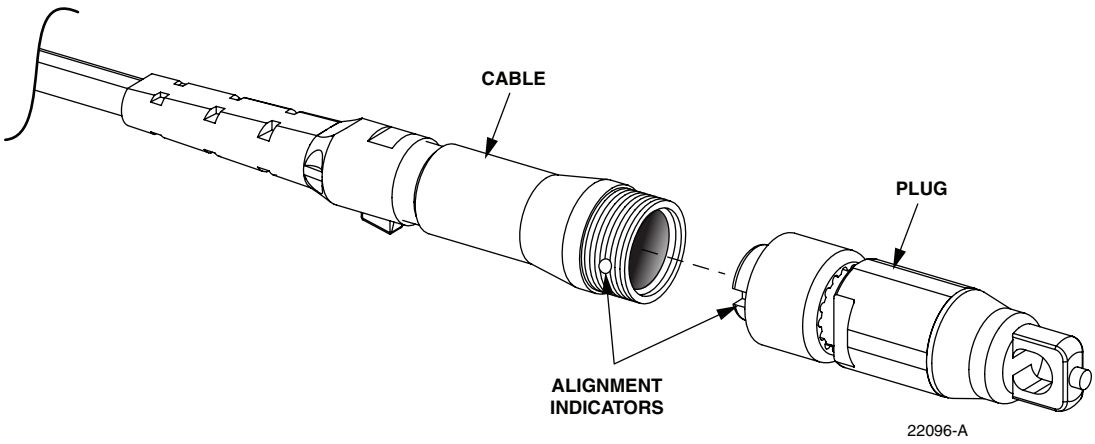


Figure 20. MFC Alignment

To mate the MFC connectors:

1. Find the alignment indicators on both MFC connectors.
2. With the indicators aligned, push the plug into the jack until it seats.
3. Thread the plug's coupling nut onto the jack until is fully seated.

3.1.2 Splicing

For access point tethers that are splice-only (non-connectorized), use standard local practices to attach a terminal.

4 CONNECTOR CLEANING

Note: If loss is high, then follow the cleaning procedure. ADC recommends that the craft follow local standard cleaning procedure when cleaning connectors and adapters.

Note: Alternate cleaning procedures are available from ADC for use in especially dirty environments.

1. ADC recommends dry cleaning first with a tool such as the US Conec MT connector cleaning tool (p/n 8247). Follow the cleaning instructions included with the tool.
2. If dry cleaning does not produce the desired results, use a small amount of solvent on one or more Chemtronics® Coventry™ 2.5mm fiber optic swabs. A non isopropyl alcohol (IPA) solvent is recommended (such as Chemtronics PX wash). Using the swabs, remove contaminants/dirt from the ferrule endface.

Note: Always use a new swab for each connector.

3. If there is a need to moisten a connector end face, it must be blown dry with clean compressed air, then dry clean the connector as detailed in Step 1.

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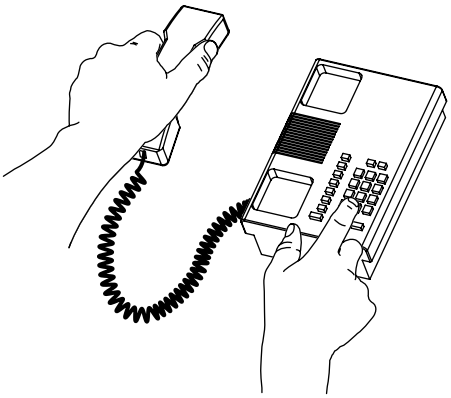

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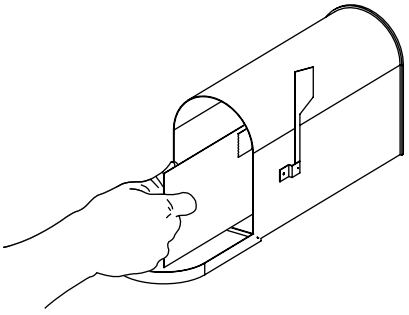

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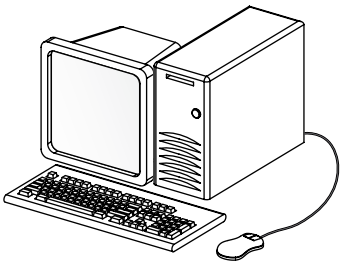

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