FiberLeap™

Installation and Operation Manual Access Unit Model AU2006

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FiberLeap™

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FCC, Safety and Service Information

FCC Licensing

FiberLeap operates as an unlicensed device under FCC Rules, Part 15, Low Power Communication Device Transmitter.

FCC Part 15 Rules Compliance

This Device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation.

The FiberLeap Access unit has no user accessible controls and may not be modified or altered in any way. Changes or modifications to the equipment could void the user's warranty.

FCC RF Exposure Compliance

The Federal Communications Commission (FCC), with its action in General Docket 93-62, November 7, 1997, has adopted a safety standard for human exposure to Radio Frequency (RF) electromagnetic energy emitted by FCC regulated equipment. Telaxis subscribes to the same safety standard for the use of its products. Proper operation of this equipment will result in user exposure far below the Occupational Safety and Health Act (OSHA) and Federal Communications Commission limits.

FCC ID# P57-AU2006

Safety Notice

This unit has been tested for RF emission levels and found not to exceed the FCC RF exposure requirements for occupational and general public exposure. Even though the RF levels external to the unit are not hazardous to humans, Telaxis believes it is prudent to minimize all exposure to RF emissions and therefore recommends the installation be such that the RF beam emitted by the antenna be positioned over the heads of any personnel working in the vicinity.

WARNING DO NOT position FiberLeap Access Unit LOS (Line of Site) in such a manner that the antenna beam is directed towards areas where maintenance personnel might be working while the unit is operating.

Service Precautions

Failure to follow these installation instructions could damage the equipment and/or improper operation may result.

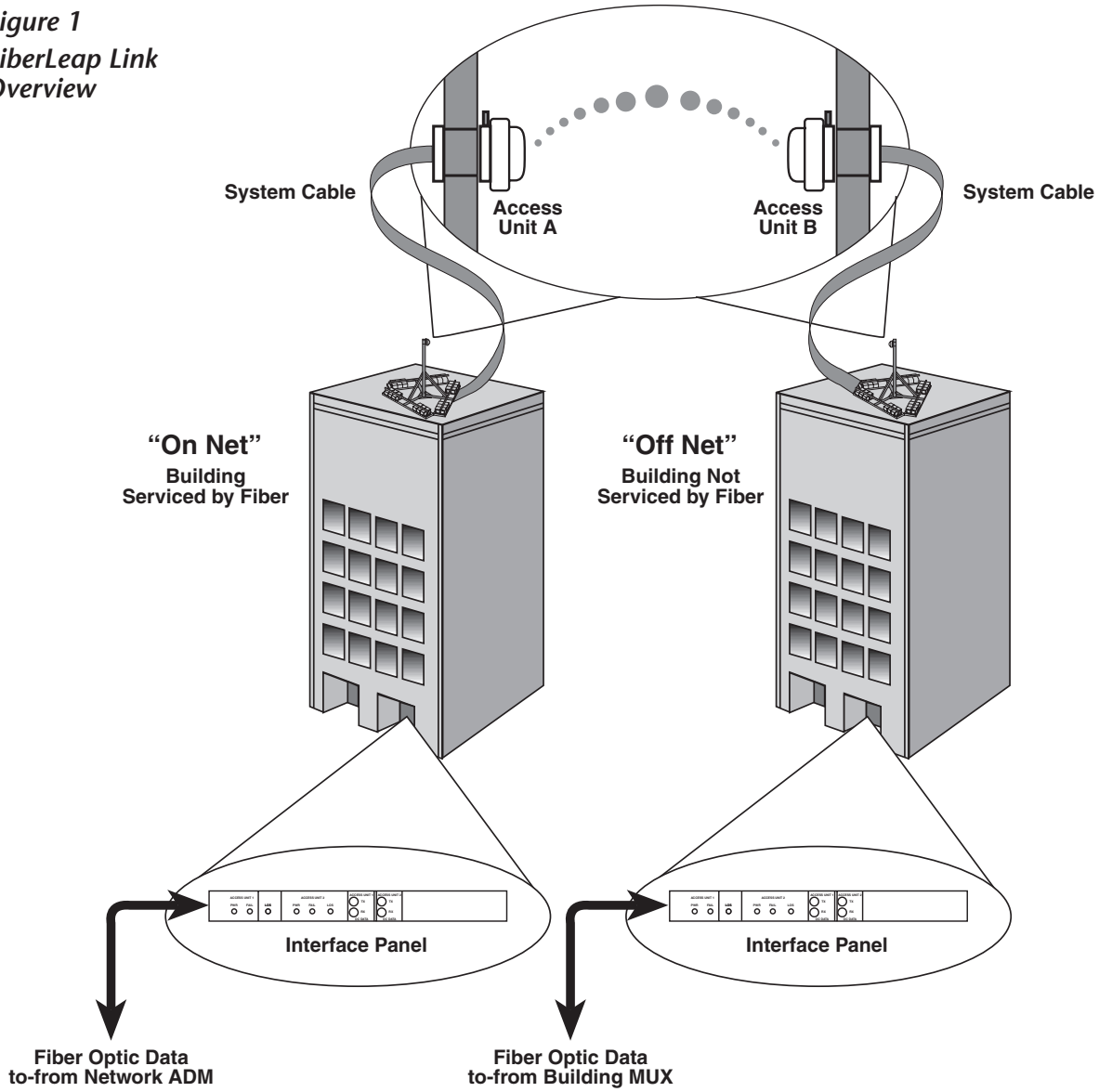
- FiberLeap is designed and sold for installation and maintenance by trained, qualified professionals.
- For service, the unit must be returned to Telaxis CUSTOMER ASSISTANCE CENTER.

1 Overview

Application

The FiberLeap™ product is designed to extend the reach of fiber optic networks through wireless connections where installation barriers and high cost make installing additional fiber connections less desirable. Telaxis has developed this product to enable direct fiber optic connection and transmission of fiber optic signals over a wireless link without the use of conventional modems. These fiber extension links function, and can be managed and serviced, as if they were a length of fiber optic cable.

Figure 1
FiberLeap Link Overview



Hardware Description

A FiberLeap fiber extension link consists of:

- FiberLeap Access units (2) with Mast Mounting Assembly Kit
- FiberLeap Interface Panels (2)
- FiberLeap System Cables (2)

The two Access Units are mounted within direct visual LOS (Line-of-Site) of each other. Each of the two Access Units is connected to an Interface Panel (located indoors), by means of a System Cable. The Interface Panels connect to the fiber optic network (see Figure 1).

About this Manual

This Installation and Operation Manual provides instructions on how to install the Access Unit on one end of the Link, which is then repeated for the second end of the link. **This installation procedure assumes that the necessary rooftop mast for mounting the Access Unit, the System Cable and the FiberLeap Interface Panel have already been installed.**

2 Inspection and Unpacking

Inspect the shipment packaging and contents for any obvious damage due to shipment. If any damage is evident, you should immediately file a claim with the transporter.

The Packing List itemizes each component shipped. Verify each part and the indicated quantity. If any parts are missing, immediately contact:

FiberLeap Customer Assistance Center (CAC)
www.fiberleap.com
1-413-665-8551 x350
email: CS@fiberleap.com

Parts Identification

FiberLeap Access Unit

1 ..... FiberLeap Access Unit, Model AU2006
1 ..... FiberLeap Installation and Operation Manual (AU2006)
3 ..... Flat Hd Bolt, M10 x 35
1 ..... 5 mm Allen Key
1 ..... Locktite™ Thread Locking Compound

Mast Mounting Assembly Kit

1 ..... Mount Kit
4 ..... Hex Nut, M10
4 ..... Lockwasher, M10
4 ..... Washer, Flat, M10
1 ..... Mast Mount Installation Instructions

3 Getting Started

Before initiating the actual installation of the Access Unit, certain other activties should already have been accomplished. These include:

1. A Site Enginering Study – This study would have been initiated by a site survey to determine all the physical and environmental constraints of the installation. The engineering study ensures that the performance of the data link can be met and specifies the details of the installation, i.e. the location of the Interface Panel, the mount/mast for the Access Unit and its location, identification of the power source, length of the System Cable, length of the wireless link, far end Access Unit location, etc.
2. Installation of the Rooftop Mast for the Access Unit – A suitable mast, 2.5 to 4.0" O.D., of sufficient height to meet the Access Unit mounting height requirement specified in the engineering study must have been installed. This mast must be braced or ballasted to survive high winds and grounded to the rooftop lightning protection system in accordance with NEC or local regulations.
3. Installation of the System Cable – This installation must have been completed in conformance with building requirements and governing codes by trained and licensed installers.

Getting Started (cont.)

4. Installation of the Interface Panel – The Interface Panel should be either rack or wall mounted in a suitable location in the Equipment Room to allow easy connection to the ADM and the dc power source.
5. Review of Installation Details – The installer should review the engineering study to assure an understanding of all the installation requirements. This includes the Access Unit type (A or B), mounting height, LOS (Line-Of-Site) direction to the far end of the link, antenna polarization (Horizontal or Vertical) and ADM data source identification.

Tools Required

Hardware Installation, Cable Connections and LOS Alignment

- Open end wrench, 17mm
- 5mm Allen key (supplied with Access Unit)
- Crimping Tool (Ground lug attachment to ground wire)
- Multimeter for dc voltage measurement and continuity checks.
- BNC-to-test lead adapter
- BER Tester or other OC-3/OC-12 SONET data source/analyzer

4 Installation

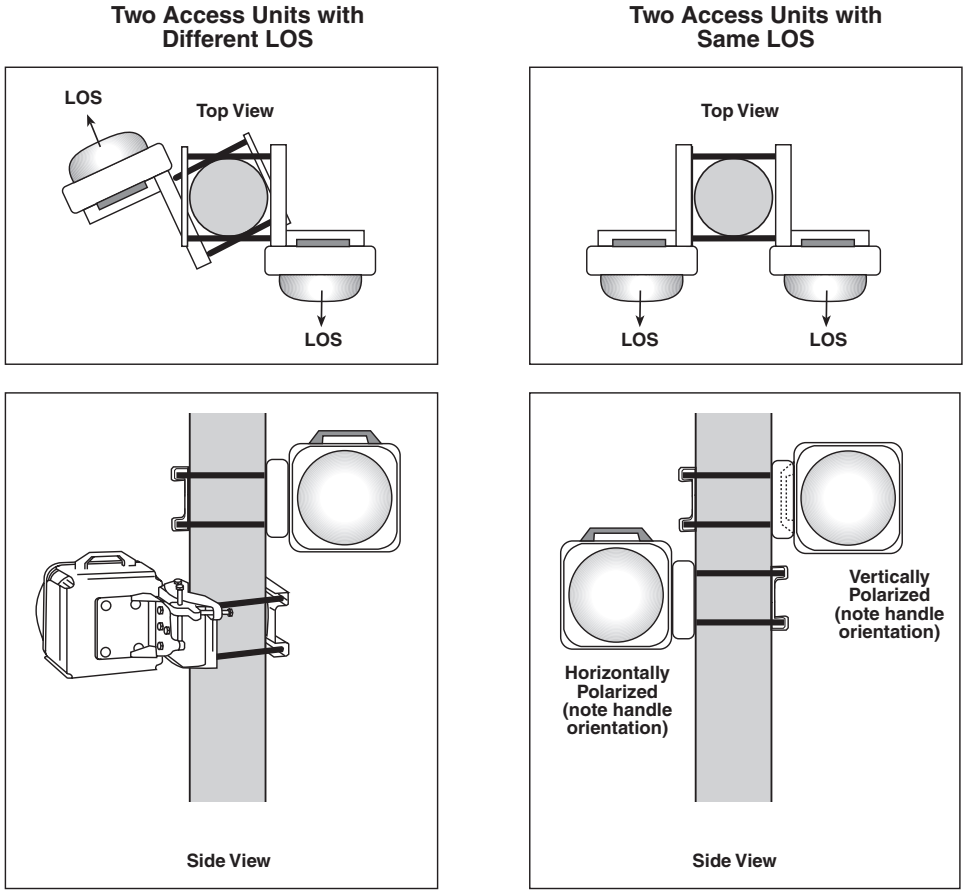
1 Attach Mount Assembly to Mast

The site engineering study specifies the physical requirements for mounting the Access Unit and the installer must refer to that document to determine the predetermined parameters for properly installing the Mount Assembly and Access Unit:

- height above the roof deck
- direction of the LOS (visual sight line link far end)
- Access Unit type at each link end (A or B)
- Access Unit polarization (handle orientation)

Note: An installation involving two Access Units (links) on the same mast and pointing in different directions usually requires both Access Units positioned for horizontal polarization (Access Unit handles oriented horizontally). An installation involving two Access Units (links) on the same mast and pointing the same direction, i.e. at the same link far end, requires one Access Unit positioned for horizontal polarization (Access Unit handle oriented horizontaly) and the second Access Unit positioned for vertical polarization (Access Unit handle oriented vertically). See Figure 2.

Figure 2
Multiple Access Units with Different and Same LOS



1 Attach Mount Assembly to Mast (cont.)

- The Mount Assembly is mounted on the same side of the mast intended for the Access Unit. (Figure 3).

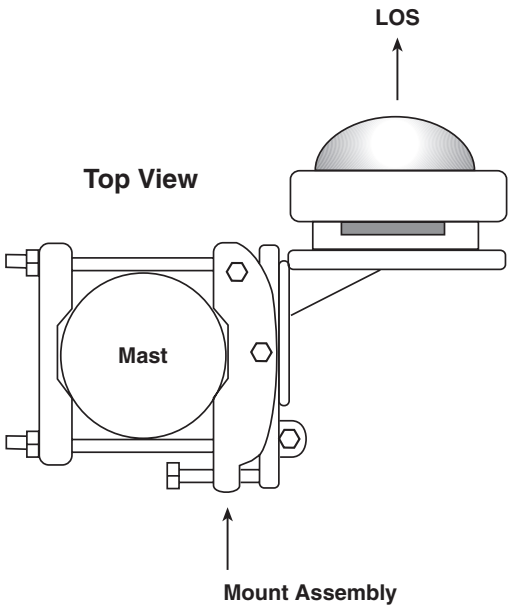


Figure 3
Mount Assembly for Orientation LOS

CAUTION: When working on a roof or on a ladder, mast or staging, use extreme care. Observe all facility and OSHA (or other applicable regulatory agency) required safety precautions.

1 Attach Mount Assembly to Mast (cont.)

Install the Mount Assembly on the mast, at the height specified in the site engineering analysis (Figure 4).

Use the 4 Hex Nuts, 4 Lock Washers and 4 Flat Washers to secure the Mount Assembly to the Mast as shown below (Figure 5).

Figure 4
Mount/Access Unit Height Above Roof

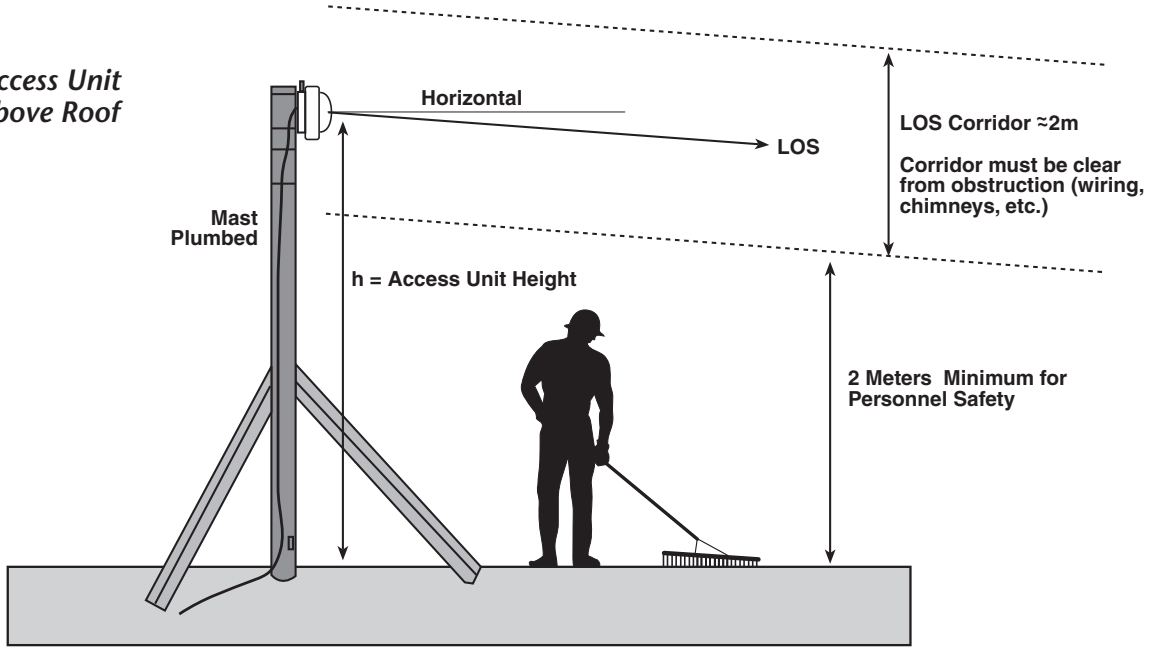
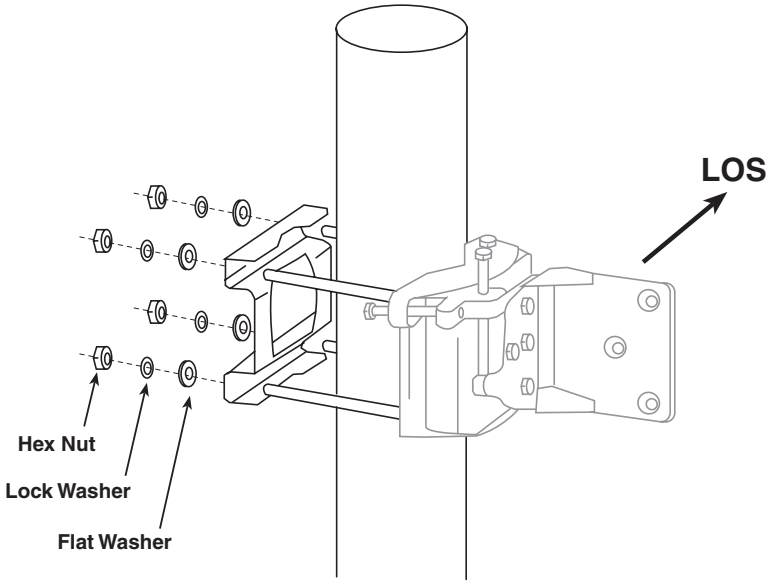


Figure 5
FiberLeap Mounting Hardware



Torque mast mounting nuts to 22Nm (16.2 lb-ft)

2 Attach FiberLeap Access Unit to Mount/Mast

CAUTION: Handle Access Unit carefully to prevent damage.

- **Carry the unit by the handle provided**
- **Avoid impact or shock to the unit, especially to the antenna radome**
- **When handling/moving the unit, always have protective caps on conectors (2)**

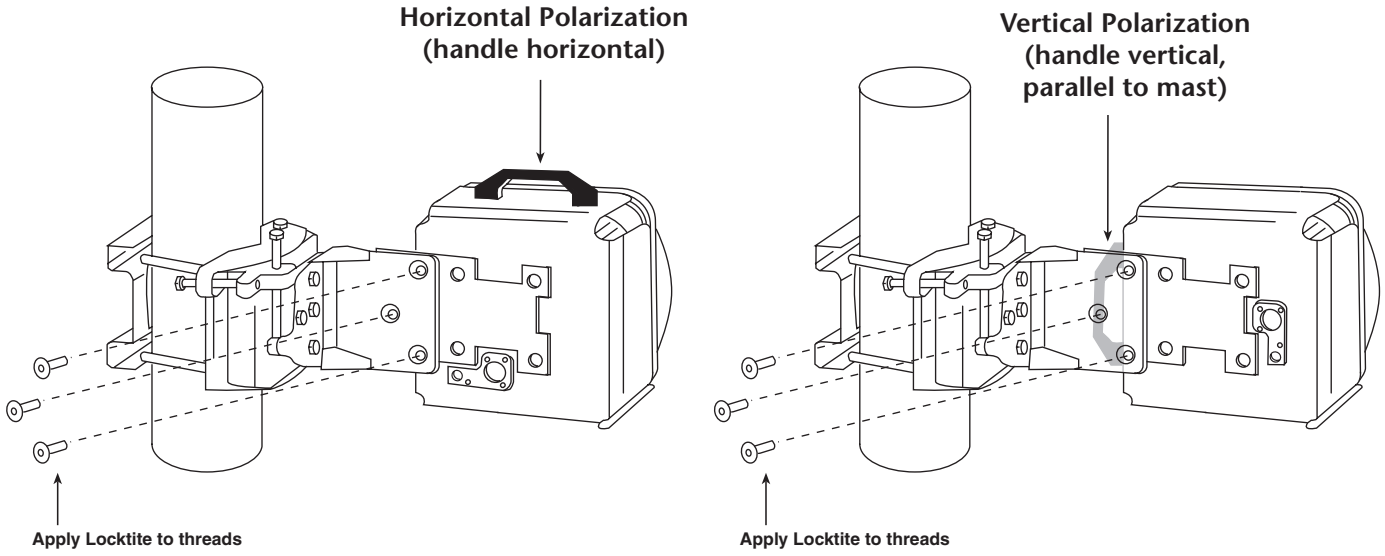
1. Position the Access Unit to the Mount, orienting the Access Unit for Horizontal (handle horizontal) or Vertical polarization (or handle vertical), as specified in the System Engineering Analysis.

IMPORTANT:

- Polarization of the **near end** and **far end** Access Units must be the same. The System Engineering Analysis designates Horizontal or Veritcal polarization.
- Each link is comprised of two Access Units, one type A and one type B, as designated by the last digit of its model number (example AU2006-**A** is type A). Install the type A and type B Access Units in the near end or far end, as specified in the System Engineering Analysis.

2. Attach using 3 M10 x 35 Flat Head bolts thru the 3 holes provided in the Mount. Apply Locktite™ to threads of bolts. Use the 5mm Allen key provided to torque bolts to 22 N-m (16.2 lb-ft).

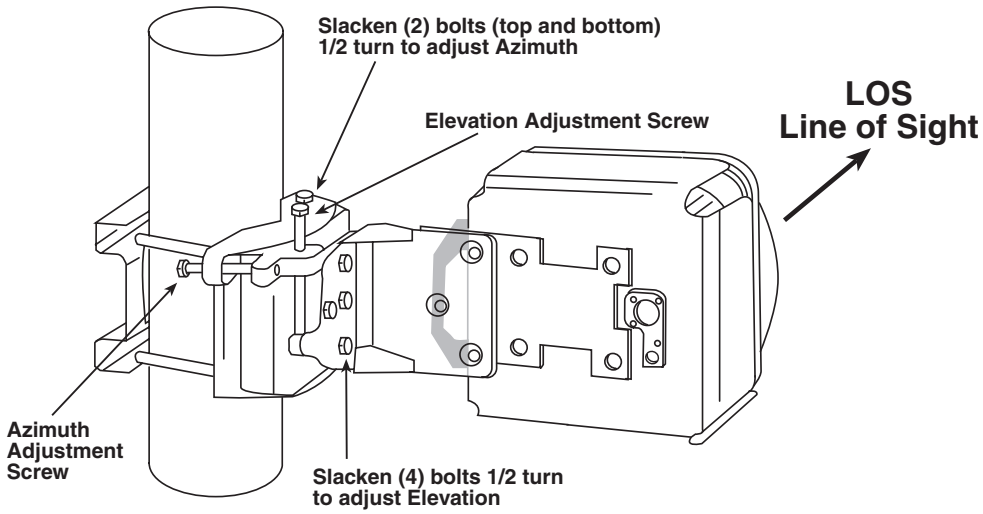
Figure 6
Access Unit and Mast Mounting



2 Attach FiberLeap Access Unit to Mount/Mast (cont.)

3. Sighting along the edge of the Access Unit toward the far end of the link, adjust the Azimuth and Elevation Adjustment Screws so the near end Access Unit LOS points at the far end Access Unit.

Figure 7
Adjustment of Azimuth and Elevation



3 Make Cable Connection to FiberLeap Access Unit

1. Ensure that the Access Unit power switch on the Interface Panel (rear) is OFF.
2. **Route an AWG 6 ground wire and System Cable up the mast** and dress appropriately approximately every 18”using cable ties such that the wiring is close to the mast and an adequate service loop remains to connect to the Access Unit.
3. Crimp 1 M10 x (.39 inch I.D.) Ring Terminal on the AWG 6 ground wire using the appropriate crimping tool and setting.
4. Attach the ground wire to the Access Unit using the M10 x 10mm Hex Hd Bolt, M10 Lock Washer and M10 Flat Washer thru the Ring Terminal. Torque to 22 N-m (16.2 lb-ft).
5. Remove the protective caps on the Access Unit main connector and the System cable connector and connect the System cable to the Access Unit.
6. Mate the two protective caps.

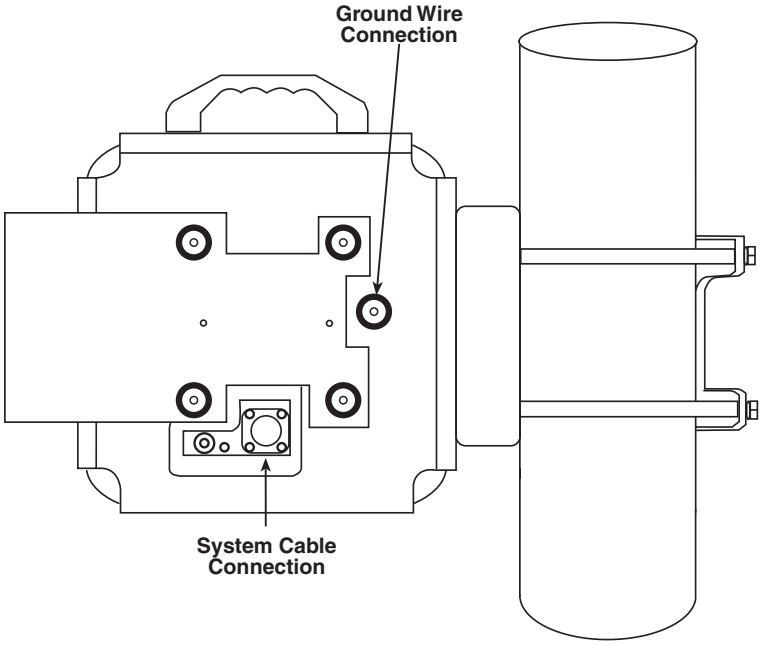
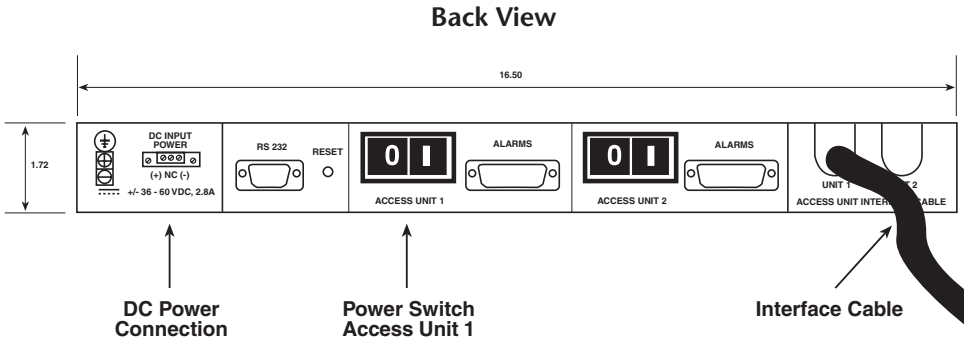


Figure 8
FiberLeap Access Unit Back View with Sun Shield

4 Power-Up FiberLeap

1. Verify that the System Cable is connected to the Interface Panel.
2. Verify the connection of the Interface Panel to the power source. Observe proper polarity of the dc power connections (red = +, black = -).
3. Enable the power source to the Interface Panel.
4. Verify the power source voltage is between 36-60 Vdc using a voltmeter at the dc input power terminals on the Interface Panel.
5. Turn ON Access Unit power at the Interface Panel. Green LED should illuminate to indicate power is available and enabled. The Yellow and Red LEDs should initially be OFF, but may illuminate after 10-60 seconds.

Figure 9
Interface Panel Connections

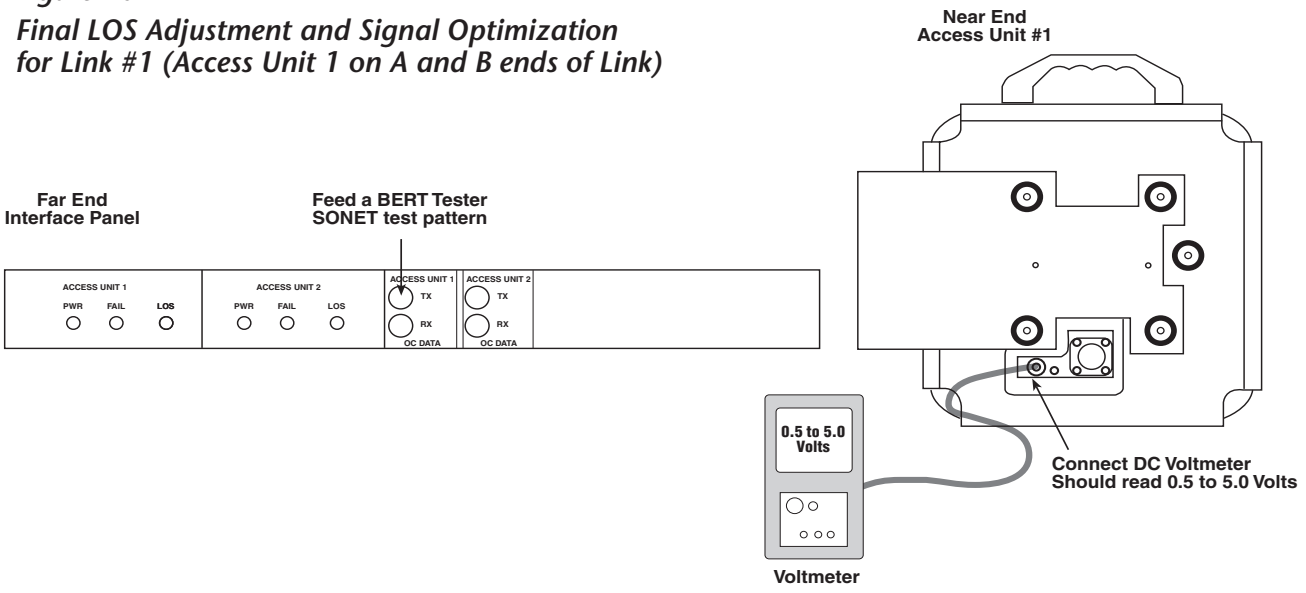


5 Make Final LOS Adjustment to FiberLeap Access Unit

The purpose of this step is to adjust the LOS (Line of Sight) of the Access Unit to maximize the signal level. During this step, the second FiberLeap Access Unit at the far end of the link must also be installed and powered ON. A continuous TX data signal must also be present at the far end link. For purposes of Final LOS alignment and signal optimization, a BERT (Bit Error Rate Tester) or an ADM with BERT capability may be used to feed a SONET test pattern into the OC DATA, TX input connector of the FiberLeap Interface Panel at the far end. Refer to Figure 7 unless otherwise noted.

1. **Connect a dc voltmeter to the BNC connector on the rear of the Access Unit** using a BNC-to-test lead adapter. The voltmeter should read a dc voltage of between 0.5 to 5.0 volts (see Figure 10).
2. **Slacken the 2 azimuth clamp bolts on the Mount 1/2 turn.** Using the Azimuth Adjustment Bolt, adjust the azimuth LOS until the reading on the voltmeter is at a maximum. It is advised that, in order to ensure the true maximum, you should adjust through the maximum (peak voltage) until the voltage clearly begins to drop and then adjust back until the maximum is attained again (see Figure 11).
3. **Tighten the 2 Azimuth clamp bolts on the Mount while observing the voltmeter** reading to ensure the azimuth alignment does not change while tightening. Tighten bolts to 22 N-m (16.2 lb-ft).
4. **Slacken the 4 Elevation clamp bolts on the Mount 1/2 turn. Using the Elevation Adjustment Bolt, adjust the elevation LOS until the reading on the voltmeter is at a maximum**. It is advised that, in order to ensure the true maximum, you should adjust through the maximum until the voltage clearly begins to drop and then adjust back until the maximum is attained again.
5. **Tighten the 4 Elevation clamp bolts on the Mount** while observing the voltmeter reading to ensure the elevation alignment does not change. Tighten Nuts to 22 N-m (16.2 lb-ft).
6. **Repeat steps 1 through 5** (above) to guarantee optimum alignment for maximum signal strength.

Figure 10
Final LOS Adjustment and Signal Optimization for Link #1 (Access Unit 1 on A and B ends of Link)



5 Make Final LOS Adjustment to FiberLeap Access Unit (cont.)

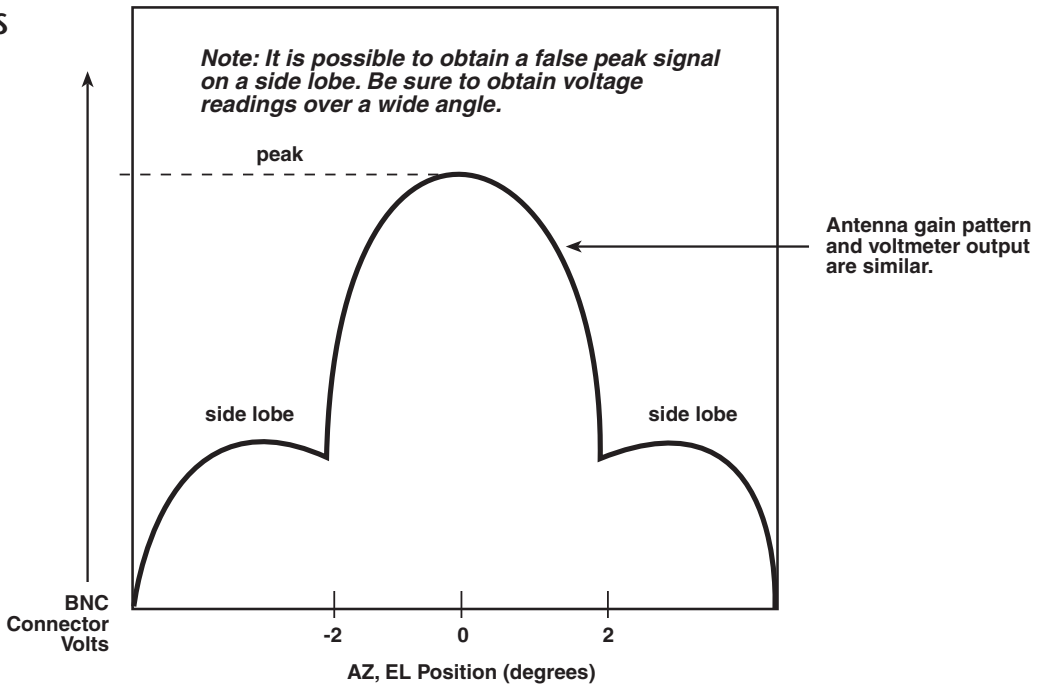


Figure 11
Peak Signal

6 Test the Link

Prior to placing link in service for network traffic, the link should be tested for BER using standard procedures for fiber optic cables.

The Installation Record (see page 17) and Warranty Registration should be completed with pertinent installation information.

5 Operation

Operation of a FiberLeap link is quite simple. There are no user controls or adjustments possible except for the ON/OFF switches on the Interface Panels at each end of the link, and aiming the LOS (alignment) of the Access Units. Once turned ON, the units are fully operational.

If SONET data is being supplied by the network to the OC TX connector at the Interface Panel, the Access Unit will transmit that data to the link far end Access Unit. Absence of a valid SONET signal will mute the transmitter.

In the event of network alarms, refer to the FiberLeap Troubleshooting Guide.

Please note that any attempt to open or modify a FiberLeap Access Unit will void the warranty.

6 Inspection and Maintenance

Routine Inspection of the FiberLeap Access Unit and exterior portions of the Cables should be performed at least once per year to check for loose hardware, damage, corrosion or other disturbance to the installed hardware. Any damage, corrosion or conditions not conforming to the original installation should be corrected immediately.

Replacement of an Access Unit, Interface Panel or Cable, or any realignment of either of the two FiberLeap Access Units requires a retest for BER (see pages 14-15).

FiberLeap™

Installation Record and Warranty Registration

Please completely fill out and return a copy of this form to Telaxis (mail, fax, or email at the addresses listed on the right).

Telaxis Communications
Customer Assistance Center
20 Industrial Drive East
South Deerfield, MA 01373-0109 USA
Phone (413) 665-8551 x350 • Fax (413) 665-7090
Email: customerassistance@tlxs.com

Purchasing/Leasing Company Information

Customer/Company _____

Address _____

Address _____

City/Town _____ State _____ Zip _____

Company Contact Name _____

Title _____ Phone _____

Fax _____ Email _____

Purchase Order No. _____ Date _____

Installation Information

Application (OC-3, OC-12, GigE, Etc.) _____

Company Link Indentifier Number _____

Installation Address _____

Address _____

City/Town _____ State _____ Zip _____

Installer Name/Company _____

Access Unit

Model Number _____ State _____

Interface Panel

Model Number _____ State _____

System Cable

Model Number _____ State _____

Installation Parameters

LOS Alignment Voltmeter Reading, Maximum _____ Volts

Link Distance, Approximate _____ Meters Feet (circle one)

BER Test

Technician Company/Name _____

Test Date _____ Pass Fail (circle one)

Payload/Test Pattern _____

Bit Error Rate Achieved _____

Test Duration _____ Days Hours (circle one)