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Tel-Link
Point-To-Multipoint

Remote Terminal Installation & Maintenance Manual

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Tel-Link Point-To-Multipoint
Remote Terminal Installation & Maintenance Manual
Revision Page

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Tel-Link Point-To-Multipoint
Remote Terminal Installation & Maintenance Manual

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1.0 General Information

Before installing and operating a Tel-Link Point to Multipoint (PMP) System, P-COM recommends installation personnel read this section in its entirety. Once accomplished, the user can proceed directly to the section or subsection of interest.

This manual provides the installation procedures and guidelines for installing hardware associated with a PMP System. This manual is intended for personnel who are responsible for installing and testing the PMP system. The user should keep this manual next to the system at all times.

P-COM highly recommends the user utilize the P-COM PMP Installation Procedure Checklist located in Appendix A to ensure the correct procedures are followed. For further assistance, contact the P-COM Technical Assistance Center (TAC) at 1-877-674-3600.

1.1 Manual Organization

This manual is part of a set of PMP manuals that focus on specific aspects of the PMP system. The set of manuals consist of the following:

- M68330 - Tel-Link PMP System Description Manual
- M68331 - Tel-Link PMP Local Site Manager Users Manual
- M68332 - Tel-Link PMP Network Management System Users Manual
- M68333 - Tel-Link PMP Sector Terminal Installation & Maintenance Manual
- M68334 - Tel-Link PMP Remote Terminal Installation & Maintenance Manual

The Manual is divided into 11 sections providing specific information needed to install and test the PMP System. The sections are:

Section 1: General Information - Contains discussions on the use of this manual, summary of the manual, special notations, and general safety reminders.

Section 2: Remote Terminal Overview - Provides a description of the PMP equipment.

Section 3: Tools and Test Equipment Required - Provides lists of tools and equipment necessary to perform the installation.

Section 4: Site Preparation - Contains information on how to prepare the installation site.

Section 5: Equipment Unpacking and Inspection - Provides instructions on how to unpack and inspect the PMP Equipment

Section 6: Remote Terminal Outdoor Unit Installation - Provides instructions on how to install the Outdoor Unit.

Section 7: Remote Terminal Indoor Unit Equipment Physical Installation - Provides instructions on how to install the Indoor Unit.

Section 8: Remote Terminal Wiring and Cabling Installation - Provides instructions on how to wire and cable the Remote Terminal.

Section 9: Remote Terminal Initial Power Application - Provides instructions on how to initially apply power to the Remote Terminal.

Section 10: Initial Terminal Configuration and Testing - Provides instructions on how to configure and test the Remote Terminal.

Section 11: Technical Support - Provides instructions on how to contact the Technical Assistance Center.

1.2 FCC Requirements Summary

The Remote Terminal complies with Federal Communications Commission (FCC) Parts 2 and 101 Regulations.

- **FCC ID for Remote Terminal:** L5X-PMP-04-000

Operators must be familiar with the requirements of the FCC Parts 2 and 101 Regulations prior to operating any link using the equipment. For installations outside the United States, contact local authorities for applicable regulations.

1.3 Requesting Changes

P-COM welcomes any suggestions for improving this manual. A Reader Comments Form is provided at the end of this manual for recording comments and suggestions for improvement.

1.4 Special Notations

This manual uses four levels of special notation to alert you to important information concerning your safety, proper equipment handling, or useful tips for easier operation. These notations are shown below in descending order of importance

DANGER!	Indicates that personal injury can result if you do not comply with the given instruction. A DANGER! statement will describe the potential hazard, its possible consequences, and the steps you must take to avoid personal injury.

WARNING!	Indicates that serious damage to the equipment can result if you do not comply with the given instruction. A WARNING! statement will describe the potential hazard, its possible consequences, and the steps you must take to avoid serious equipment damage.

CAUTION!	Indicates that equipment damage and/or process failure can result if there is a failure to comply with the given instruction. A CAUTION! statement will describe the potential hazard, its possible consequences, and the steps that must be taken to avoid equipment damage and/or process failure.

NOTE:	Provides supplementary information to emphasize a point or procedure, or gives a tip for easier operation.

1.5 General Safety Reminders

To prevent possible personal injury or equipment damage, always observe the following rules:

- Installation and operations personnel should be familiar with the safety requirements before attempting installation or operation of the equipment covered by this manual. Failure to follow the requirements could result in death or injury to personnel and/or damage to the equipment.
- Always examine the general area for any potential hazards (such as wet floors or overhead wires) before beginning installation.
- Observe all DANGER! notations. Dangerously high voltages are present within this equipment when in operation. Lethal line voltages may be present unless the power has been disconnected.
- Always remove any jewelry or other personal items that may conduct electricity before beginning installation.
- Keep away from live circuits. Whenever feasible in verifying circuits, check by continuity and resistance methods with all power off, rather than directly checking voltages.
- Observe grounding precautions. Verify the unit under test or being installed and all measurement equipment are properly grounded.

- Do not test alone. Testing or adjusting the equipment should only be carried out in the presence of a person qualified to render aid.
- Use proper lifting techniques when lifting the equipment to prevent injury.
- It is the responsibility of the installer and the user to ensure that the public is not exposed to excessive RF levels. Such information must be posted near the antenna in the form of caution or warning notes and signs.

1.6 P-COM PMP Terminology

For the ease of the reader, a Glossary is provided at the end of the manual defining terminology used in P-COM Tel-Link PMP Manuals.

2.0 Remote Terminal Overview

2.1 Introduction

The Remote Terminal provides the interface between network services and the customer premise. The Remote Terminal is available with various interfaces for customer premise interconnect and communicates with a Sector Terminal. The Remote Terminal consists of the following components:

- Remote ATM Indoor Unit (IDU) containing a Modem and a Remote ATM Controller (RAC) with four UTP-5 ports
- One or more Asynchronous Transfer Mode (ATM) Service Modules
- Outdoor Unit (ODU)
- Antenna and Mounting hardware
- An IFL consisting of a single coaxial cable connecting the IDU to the ODU

2.2 Remote ATM Indoor Unit (IDU)

The IDU is located inside the customer's facility at a remote site and is connected to an ODU via a coaxial cable. The IDU is capable of implementing two types of software selectable uplinks: FDMA or TDMA. The IDU is comprised of the following components:

- 1 rack unit (1U) Remote ATM IDU chassis
- AC or DC Power Supply
- A Modem that provides the physical layer wireless communication link between the Remote Terminal and Sector Terminal
- Remote ATM Controller (RAC)
- Optional ATM Bandwith Manager Daughter Card

The 1U Remote ATM IDU Chassis measures 5 cm (H) x 45 cm (W) x 43 cm (D) (1.75” x 17.5” x17.5”). This chassis can be desktop or rack mounted (refer to Figure 2-1 and Figure 2-2).

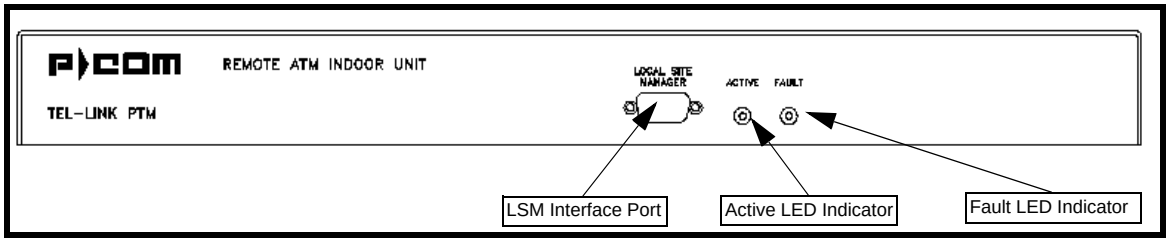

Figure 2-1 - 1U Remote ATM IDU Chassis (Front View)

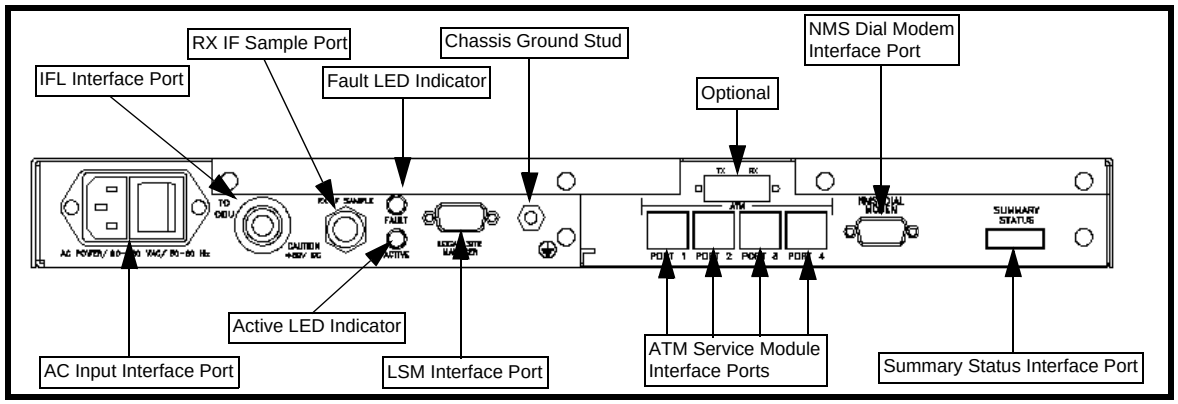

Figure 2-2 - 1U Remote ATM IDU Chassis (Rear View)

Power supply options are AC (90V to 260V) or DC (±19V to ±56V). An optional external battery Uninterruptible Power Supply (UPS) can provide up to 4 or 8 hours of operation in the presence of a primary power failure.

2.3 Asynchronous Transfer Mode (ATM) Service Modules (ASM)

The Remote Terminal provides the interface to network services at the customer premise. The Remote IDU has four (4) UTP-5 ATM Interface Ports and can be connected to ASMs that can provide the following interfaces for customer interconnect:

- T1 Circuit Emulation Services (CES)
- E1 Circuit Emulation Services (CES)
- T1 Frame Relay
- E1 Frame Relay
- Ethernet 10BaseT

These ASMs provides the ATM conversion necessary to provide connectivity for a broad range of user equipment and operates with no service affecting interdependicies. Figure 2-3 illustrates the ASMs available.

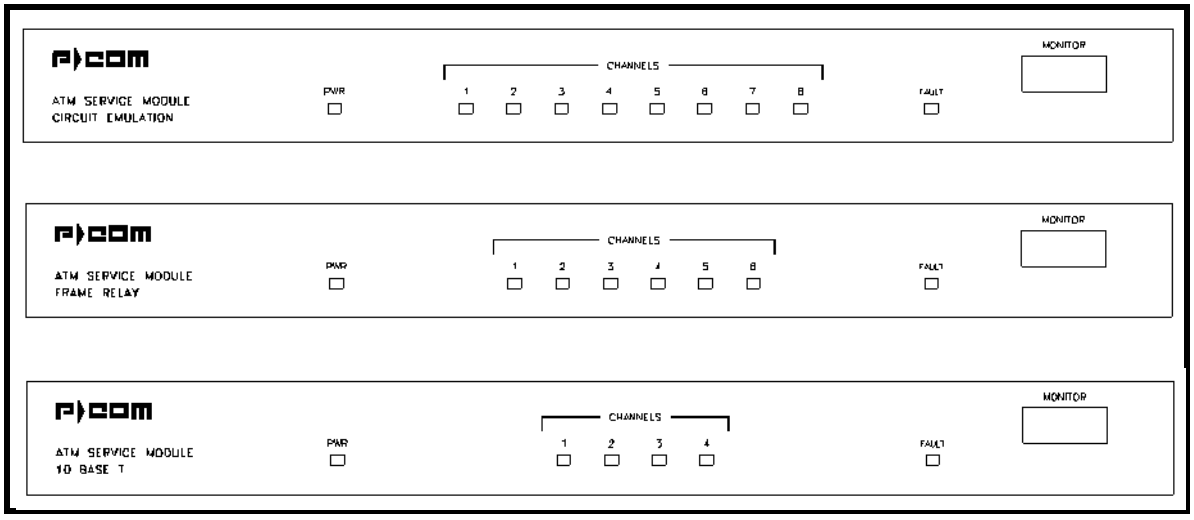

Figure 2-3 - Front Panel Overlays for ATM Service Modules

2.4 Remote Outdoor Unit (ODU)

Figure 2-4 illustrates a typical RF/Antenna configuration for the ODU. The packaging includes the following components:

- ODU Enclosure
- RF Electronics
- ODU Controller Card responsible for controlling and monitoring ODU functions and for interfacing with the IDU

The ODU is frequency agile so that the same ODU can typically be used throughout the entire allocated frequency band. Subsequently, this reduces sparing levels.

The ODU meets all National Electrical Code requirements pertaining to lightning and power transients and meets or exceeds FCC and ETSI regulations pertaining to conducted and radiated Electromagnetic Emissions.

The ODU is sealed against the environment and is capable of functioning in ambient temperatures ranging from -40°C to +60°C, with up to 100% relative humidity. The ODU can survive steady state winds of 40 m/s with gusts to 55 m/s (89 mph/123 mph).

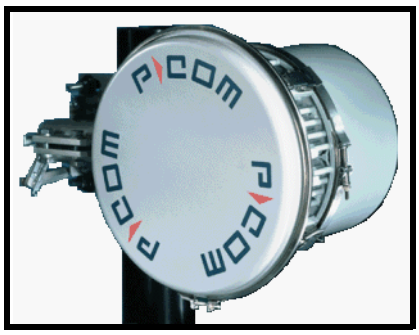

Figure 2-4 - Remote Terminal Outdoor Unit with 30 cm Parabolic Antenna

2.5 Antenna

The Antenna is typically a 30-cm parabolic and can be directly mounted to an 8.85 cm - 11.385 cm (3.5” - 4.5”) pipe. The mount will typically support a minimum of ±25 degrees of elevation and 360 degrees of azimuth adjustment. The packaging includes the following components:

- Reflector
- Feed
- Radome
- Mount

2.6 IF Cable Run

A single coaxial cable is used to connect the ODU to the Remote ATM IDU. The cable carries transmit IF signal, receive IF signal, telemetry, 10 MHz reference signal and DC power between the IDU and ODU. The IDU and ODU contain "N" type female connectors for interconnection of the coaxial cable.

Double screened LMR-400 coaxial cable is recommended to provide good EMC performance and possess the following characteristics as shown in Table 2-1:

Table 2-1 - LMR-400 Performance Characteristics

Property	LMR-400	
Shielding	> 90 dB	
Impedance	50 Ohms	
Velocity	85%	
Capacitance	2.39 pF/ft	
Center Conductor	0.109” (0.28 cm)	
Attenuation (25°)	30 MHz	0.70 dB/100 ft
	220 MHz	1.80 dB/100 ft
	450 MHz	2.7 dB/100 ft
	900 MHz	3.90 dB/100 ft
Phase Stability	+/- 10 ppm/deg C	
DC Resistance	1.39 Ohms/1000 ft	
Bend Radius	1” (2.54 cm)	
Temperature Range	-40°F to 185°F (-40°C to 85°C)	
Maximum Length	1000 Feet (300 meters)	
IF Connector	Type N Male	

Table 2-2 shows the signals carried between the Remote IDU and Remote ODU on the coaxial IFL cable:

Table 2-2 - IFL Signals

IFL Signal	Frequency	Variation
IDU Transmit	205 MHz	±5 MHz
IDU Receive	490 MHz	±5 MHz
Telemetry	800 KHz	30 KHz
Reference Signal	10 MHz (Phase Locked to Hub Reference)	10 ppm (Unlocked)
IFL Power	**Voltage**	**Variation**
ODU Power	+39 VDC	+40 to +57 VDC (±10%)
IFL Connector	**Termination 1**	**Termination 2**
Type N Male	IDU	ODU

3.0 Tools and Test Equipment

Table 3-1 and Table 3-2 are the recommended list of tools and test equipment necessary for the following activities:

- **Site Survey**
- **Installation**
- **Commissioning**

NOTE: This is a typical Installers tool kit. On some installations additional tools may be necessary.

Table 3-1 - Recommended Tools and Equipment (Site Survey)

DESCRIPTION	QNTY	BRAND	PART NO.
Area Map	1	NA	NA
Binoculars	1	NA	NA
Camera (Digital Preferred)	1	NA	NA
Compass	1	NA	NA
Computer, Laptop (Pentium) (with Link Budget Software)	1	NA	NA
Flag or Red Towel (to identify site from a distance	2	NA	NA
Flashlight	1	NA	NA
Global Positioning System Receiver	1	NA	NA
Multimeter, Handheld	1	Klein	44100
Radio, 2-Way or Cell Phone	2	NA	NA
Safety Belt	2	NA	NA
System Configuration Document	1	NA	NA
Site Survey Checklist	1	NA	NA
Wood Stick	1	Desco	517F

.

Table 3-2 - Recommended Tools and Equipment (Installation/Commissioning)

DESCRIPTION	QNTY	BRAND	PART NO.
AC Circuit Tester	1	Ideal	6-035
Antenna Alignment Tool	1	P-COM	28055-1
Anti-Statitc Material Kit	1	Charleswater	16430
Binoculars	1	NA	NA
Bit Error Rate Test Set, (with correct UIM interface module)	1	FireBerd Portable	6000A
Cable Cutter	1	Klein	63050
Compass	1	NA	NA
Computer, Laptop (Pentium) (with Link Budget Software)	1	NA	NA
Crimp Tool, Die Set (RG-58, 59)	1	IDEAL	30-581
Crimp Tool Die Set, (LMR-400, RG-8)	1	RF Industries	RFA-4005-02
Crimp Tool	1	RF Industries	RFA-4005-020
Crimp Tool, (RJ-45)	1	IDEAL	30-559
Crimp Tool, (Solderless Connectors)	1	NA	NA
Diagonal Cutters, Flush Cut	1	NA	NA
Flashlight	1	NA	NA
Global Positioning System Receiver	1	NA	NA
Inclinometer	1	NA	NA
Knife, Utility	1	NA	NA
Multimeter, Handheld	1	Klein	44100
Pliers, Needle Nose 4” Insulated	1	NA	NA
Pliers, Slip Joint 6” Insulated	1	NA	NA
Rachet, 3/8” Drive	1	NA	NA
Radio, 2-Way or Cell Phone	2	NA	NA
RF Connector (Type N Male)	AR	RF Industries	RFN-1006-31
Rope, Nylon 100 Ft	2	NA	NA
Safety Belt	2	NA	NA
Safety Glasses	2	NA	NA
Screwdriver, #1 Phillips	1	NA	NA
Screwdriver, #2 Phillips	1	NA	NA
Screwdriver, #2 Phillips Stubby	1	NA	NA

Table 3-2 - Recommended Tools and Equipment (Installation/Commissioning)

DESCRIPTION	QNTY	BRAND	PART NO.
Screwdriver, 1/4 x 1” Slotted	1	NA	NA
Screwdriver, 1/4 x 4” Slotted	1	NA	NA
Screwdriver, 1/8 x 2” Slotted	1	NA	NA
Screwdriver, 1/8 x 8” Slotted	1	NA	NA
Screwdriver, 3/16 x 3” Slotted	1	NA	NA
Socket Set (Deep well) 3/8-3/4 (3/8 drive)	1	NA	NA
Solder	1	Weller	SP23
Soldering Iron, 25 watt	1	NA	NA
Tape Measure (25 ft)	1	NA	NA
Tie Wraps, Black	AR	NA	NA
Weather Proof Tape	AR	NA	NA
Wire Brush	1	NA	NA
Wire Stripper, 10-18 AWG	1	IDEAL	45-120
Wire Wrap Tool, 24 & 26 Gauge, Manual	1	NA	NA
Wire Wrap Tool, 24 & 26 Gauge, Power	1	NA	NA
Wood Stick	1	Desco	517F
Wrench, 8” Adjustable	1	NA	NA
Wrench, Combination ASE 1/4 - 3/4 Set	1	NA	NA

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4.0 Site Preparation

Prior to beginning physical installation of the Tel-Link PMP equipment, the Site preparation work should be complete. Site preparation includes but is not limited to the following:

- Completed Site Survey Checklist (P-COM highly recommends the use and completion of the Site Survey Checklist located in Appendix B)
- System Configuration Document Specification

The criteria below should be evaluated prior to designating Remote to Sector terminal RF paths with the use of Site Surveys and Link Budgets:

- An unobstructed line-of-sight
- Be within range (distance separation) with respect to the modulation type used
- Be within the antenna beamwidth

NOTE: P-COM highly recommends a blower or fan be used with an enclosed rack containing three or more IDUs.

The IDU is designed to be installed in a 19-inch equipment rack or enclosed cabinet in a location that is:

- Dry, clean and well ventilated
- Easily accessible
- Within 655 feet (with CAT-5 cable) of subsequent T1 equipment
- Within 1000 feet of the ODU when using LMR-400 or equivalent Coaxial cable
- Compliant with all environmental specifications

4.1 ODU/Antenna Installation Preparation

Verify the location selected has the following characteristics:

- Space on pole is adequate for mounting the antenna and ODU.
- Verify the pole for the ODU/Antenna assembly is installed in the location identified on the Site Survey Checklist.
- Verify the pole has been securely installed and is grounded per local code.

4.2 IDU Installation Preparation

Verify the location selected has the following characteristics:

- Identify IDU mounting location as specified in a completed Site Survey Checklist.
- Verify the required rack (if used) is installed, secured to the floor, and ready to accept the IDU.
- Sufficient space is provided for the installation of the ASM.

4.3 Power Preparation

Verify the location selected has the following characteristics:

- Verify the correct power source has been provided within close proximity to the IDU location.
- Verify the power source is controlled through an appropriately sized circuit breaker or fuse.

4.4 IFL Installation Preparation

NOTE: Maximum cable length of 1000 ft (300 meters) between the Hub IF Combiner and ODU.

P-COM recommends the IFL should be Times-Microwave LMR-400 coaxial cable.

- Verify the IFL between the ODU and IDU location is present.
- Verify a sufficient length of IFL is present at both ends to provide a service loop prior to being terminated to the equipment.
- Terminate each end of the IFL with a Type-N male connector per manufacturers instructions.
- Apply liquid electrical sealant to ensure a waterproof seal between the cable and connector.

5.0 Equipment Receiving, Unpacking and Inspection

5.1 Introduction

This procedure provides information for unpacking and inspecting the PMP equipment prior to physical installation.

5.2 Receiving and Unpacking the Equipment

At a minimum, check for the following:

STEP 1. Check the outside of the shipping crates for visible signs of damage. Crushed corners or tears in cardboard may indicate rough handling which may result in hidden damage to equipment.

STEP 2. Inventory shipping crates and other packages received in the shipment. Verify that all items listed on the Electronic Goods Descriptive Inventory or applicable shipping document were received. Identify all missing items on the inventory sheet.

STEP 3. Record any noted damage to the outside of the packaging material on the carrier's Bill of Lading and have the transportation company initial the sheet. All notations should indicate location and condition.

Example: 1" x 2" scratch on left front (LF) metal panel; not LF panel scratched. Another example would be 4" x 6" dent in center panel (not dent in panel).

WARNING! The warranty will be violated if you do not take anti-static precautions when unpacking or assembling the PMP boards in the PMP shelf. Circuit modules can be damaged by electrostatic discharge. Ensure that an approved anti-static wrist strap is connected between the wrist of the person and an electrical ground before handling any of the circuit modules.

STEP 4. Carefully open the equipment packaging.

5.3 Inspecting the Equipment

STEP 1. For each of the PMP subsystems received, verify the equipment received matches the shipping list by Part Number and Serial Number. Report any discrepancies immediately using the field return procedure outlined in Section 11 of this manual. The Tel-Link PMP system may be ordered in different configurations. Table 5-1 shows the Part Number for all system parts. In addition, the quantities of boards for redundant and non-redundant configurations are identified. The Equipment Parts List may contain more than the users specific requirements.

CAUTION! Tampering with seals will void the warranty.

Table 5-1 - PMP Remote Terminal Equipment Parts List

REMOTE INDOOR UNIT (IDU)		
Description	**Part Number**	**Quantity**
1 RU Remote IDU	28000-1,-2,-3 or -4	1
ATM Service Modules		
Description	**Part Number**	**Quantity**
ATM Service Modules	Interface Dependent	1
REMOTE OUTDOOR UNIT (ODU)		
Description	**Part Number**	**Quantity**
Remote ODU	Frequency Dependent	1
30 cm Parabolic Antenna	Frequency Dependent	1
60 cm Parabolic Antenna	Freqeuncy Dependent	1

STEP 2. After unpacking the equipment, visually inspect the equipment for damage and ensure that:

- All components mounted on the individual boards are secure.
- The circuit boards are not cracked.
- There are no loose leads.
- The shelf unit has not been dented or damaged in any way.

STEP 3. Dispose of as much packing material as possible. P-COM suggests that the user retain at least one of each box with all packing materials. In the unlikely event that it is necessary to return a unit, the user will possess the required packing material for safe shipment of the unit.

STEP 4. Make claims for any damages incurred during shipment to the transportation company involved in accordance with company procedures.

6.0 Remote ODU Installation

6.1 Introduction

This procedure provides instruction for installing a P-COM Tel-Link Point to Multipoint Remote ODU/ Antenna assembly.

6.2 Tools Required

Multiple vendors of antenna and mounting assemblies may be used to operate with the ODU. A listing of tools necessary to install an antenna/mounting assembly, can be found in Vendor's Antenna Installation Manual.

6.3 Materials Required

- Antenna/mounting assembly. This assembly typically includes all hardware needed to install the antenna to the mount, and the mount to a pole.
- Outdoor Unit (ODU)

6.4 Step by Step Remote ODU/Antenna Installation Procedure

WARNING! Failure to follow installation procedures may result in damage to the ODU/Antenna and render the radio unusable. Read through the entire procedure before attempting installation. If there are any questions, please contact P-COM Technical Assistance Center (TAC) at 1 (877) 674-3600.

STEP 1. Install the mounting bracket on the pole so that the flat face of the Antenna Mounting Bracket is in line with the direction of the sector signal using the four pole interface bolts (refer to Figure 6-1).

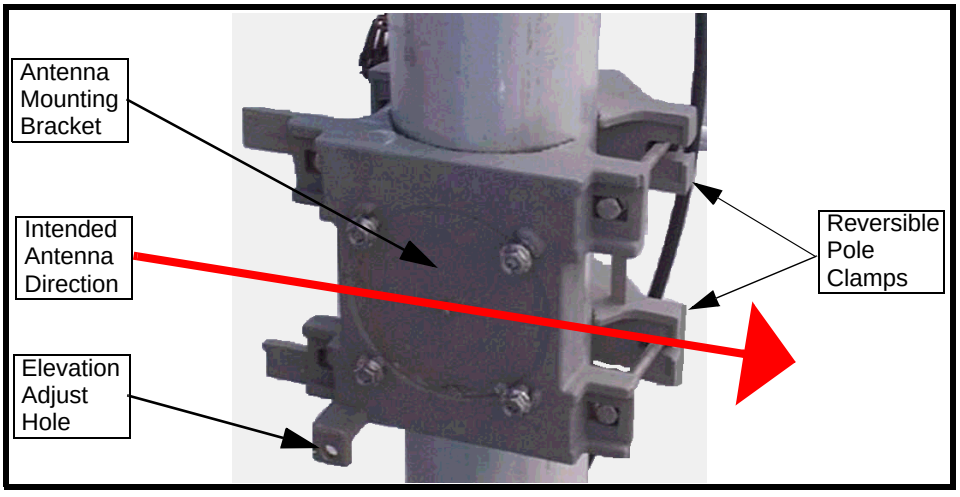

Figure 6-1 - Antenna Mounting Bracket

STEP 2. Feed the pole interface bolts through the pole clamps on the back side of the pole and secure with the pole clamp nuts. These pole clamps may be reversed to accomodate smaller diameter poles.

STEP 3. Attach the Collar Assembly beneath the Antenna Mounting Bracket as in Step 2. Ensure the Azimuth Adjust Hole is positioned on the tops ide f the collar assemby and between the Antenna Mounting Bracket and pole clam assembly. This will be used later for final azimuth adjustment (refer to Figure 6-2)

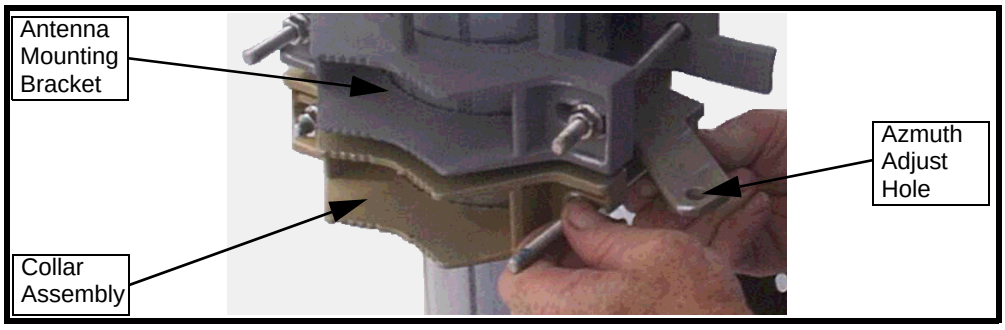

Figure 6-2 - Collar Assembly

NOTE: The plastic protective cover remains in place until the ODU is attached to the back side of the Antenna.

STEP 4. Attach the Antenna to the Antenna Mounting Bracket using the four “Bracket Locknut Cutouts” allowing the positioning of the Antenna over the bracket locking nuts, then rotate the Antenna up or down for course eleation adjust (refer to Figure 6-3).

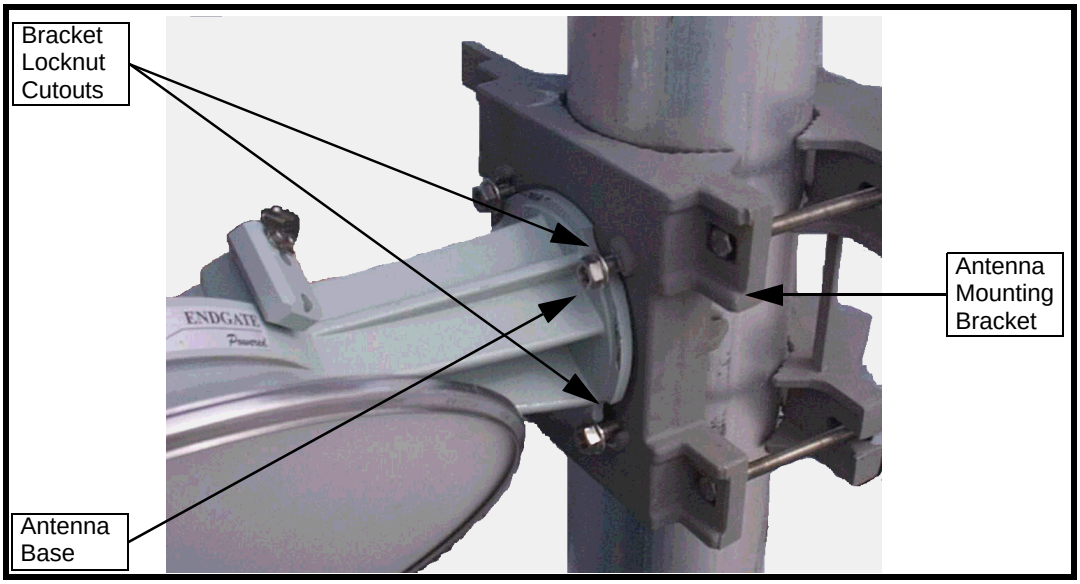

Figure 6-3 - Attaching Antenna to Antenna Mounting Bracket

STEP 5. Attach and secure the Elevation Adjustmen Rod and Adjuster Clamp to the back side of the Antenna Base and Elevation Adjust Hole. The clevis pin a the base of the adjusting bolt seats into the elevation adjust hole at the base fo the mounting bracket (refer to Figure 6-4). No cotter pin is required for the clevis.

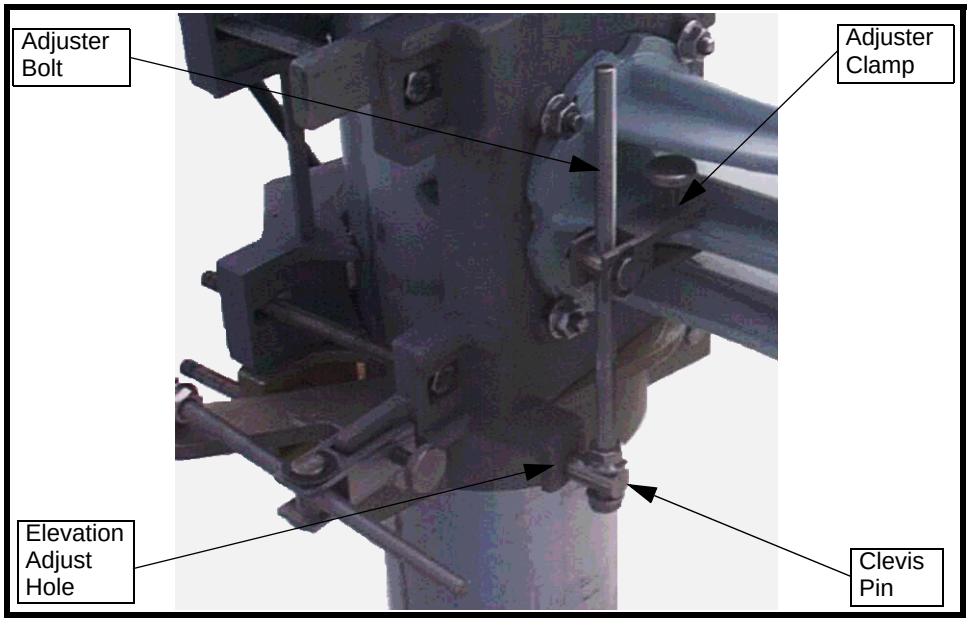

Figure 6-4 - Elevation Adjustment Rod

STEP 6. Rotate the Elevation Adjustment Rod and position the Antenna so its elevation is coarsely aligned with the Sector Antenna. Secure the Antenna with the bracket locking nuts.

STEP 7. Attach and secure the Azimuth Adjustment Rod and Adjuster Clamp to the base of the mounting bracket and the Azimuth Adjust Hole on the Collar Assembly. The clevis pin on the adjusting bolt seats into the azimuth adjust hole on the top side of the Collar Assembly (refer to Figure 6-5). No cotter pin is required for the clevis.

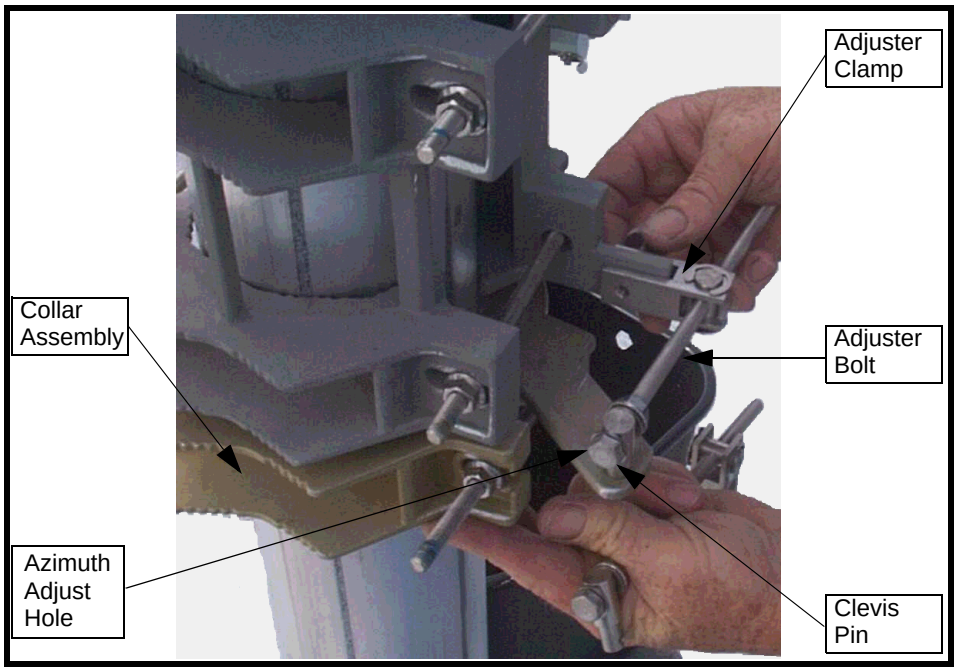

Figure 6-5 - Azimuth Adjustment Rod

STEP 8. The final assembly will look similar to the picture beow. Both azimuth and elevation may be adjusted from the back side of the antenna with this configuration (refer to Figure 6-6).

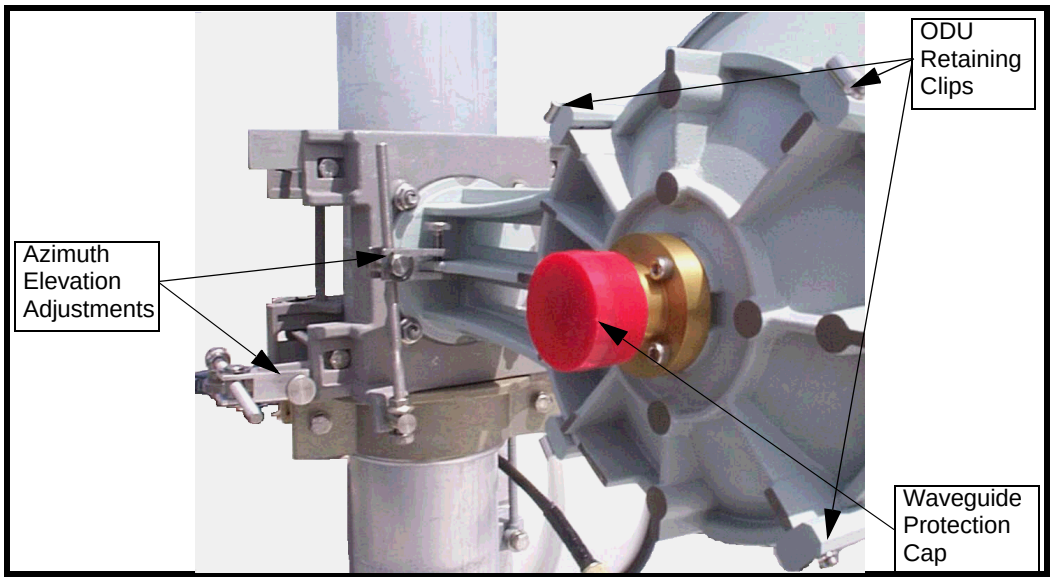

Figure 6-6 - Final Assembly

STEP 9. Attach the ODU to the back side of the Antenna Assembly by mating the antenna waveguide to the ODU orifice, ensuring the IFL Port is in the lower right hand position. This will place the ODU in a vertical transmit polarity. Snap into place using the retaining clips (refer to Figure 6-7). Final polarization will occur during commissioning.

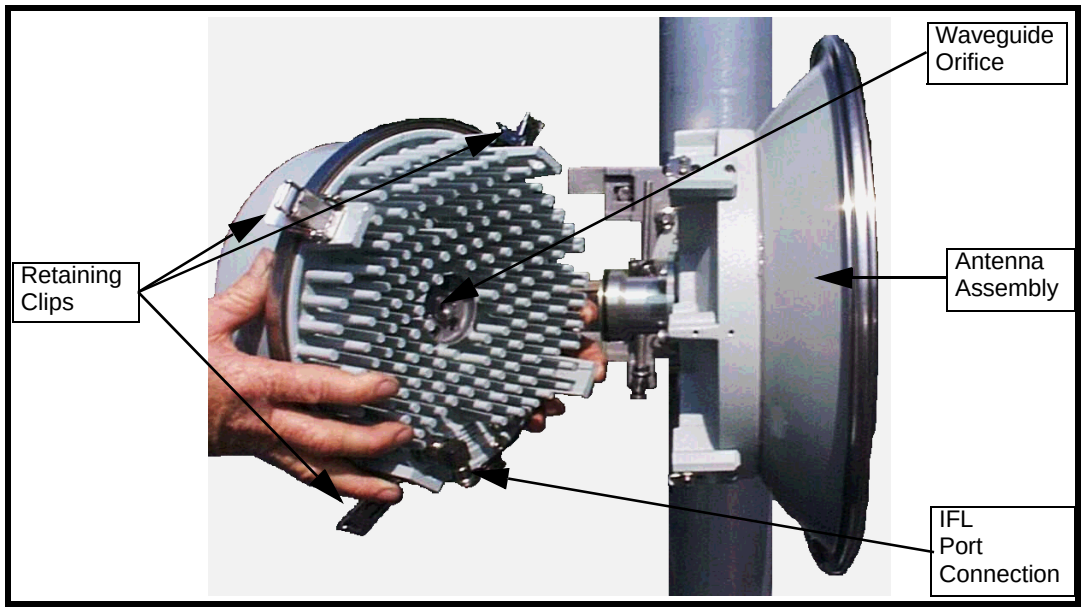

Figure 6-7 - Attaching ODU to Antenna Assembly

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7.0 Remote ATM IDU & ASM Rack Installation

7.1 Introduction

This procedure provides instructions for installing the IDU chassis and the ASMs in a standard 19 inch common equipment rack or cabinet. A typical installation for installing both the IDU and ASM in a rack is shown in Figure 7-1.

7.2 Remote ATM IDU Rack Installation

7.2.1 Tools Required

Refer to Table 3-2 in Section 3.0 for applicable tools.

7.2.2 Materials Required

- Four (4) cage nuts per IDU. (May not be required, consult rack manufacturer's documentation.)
- Four (4) cage nuts per ATM Service Module. (May not be required, consult rack manufacturer's documentation.)
- Four (4) equipment mounting screws with washers per ATM Service Module. (Consult rack manufacturer's documentation for required size.)

7.2.3 Remote ATM IDU Rack Installation Procedure

NOTE: P-COM highly recommends that a blower or fan be used with an enclosed rack containing three or more IDU's

STEP 1. Install Cage nuts on the rack if necessary

STEP 2. Install the IDU using screws in the four mounting holes.

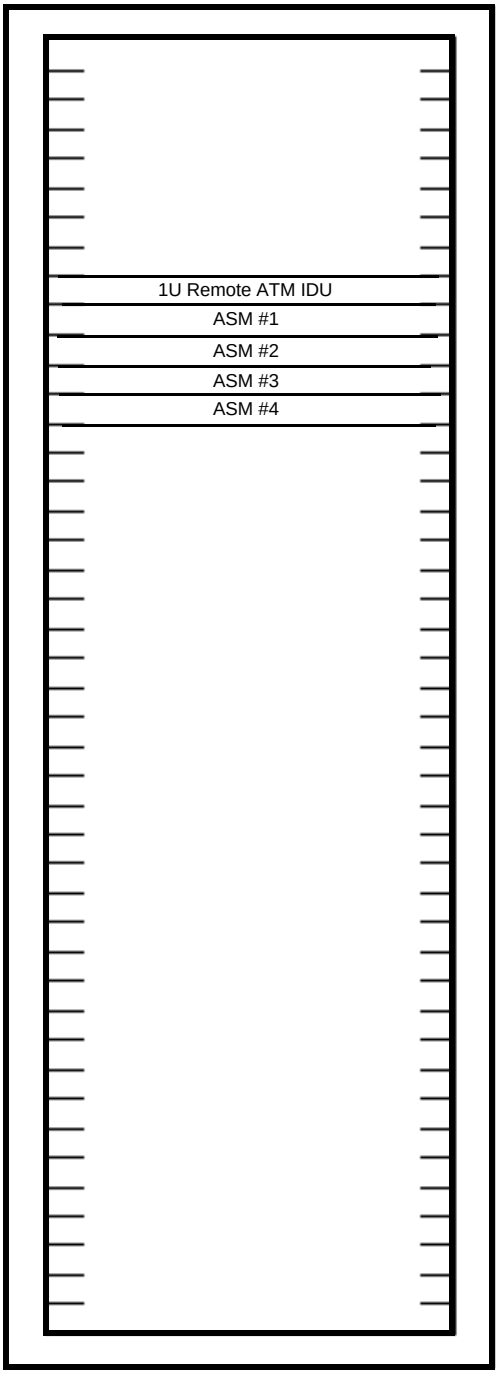

Figure 7-1 - Rack Elevation of a Remote ATM IDU and ASMs

7.3 ASM Rack Installation

7.3.1 Tools Required

Refer to Table 3-2 in Section 3.0 for applicable tools.

7.3.2 Materials Required

- Four (4) cage nuts. (May not be required, consult rack manufacturer's documentation.)
- Four (4) equipment mounting screws with washers. (Consult rack manufacturer's documentation for required size.)

7.3.3 ASM Rack Installation Procedure

STEP 1. Install Cage nuts on the rack if necessary

STEP 2. Install the IDU using screws in the four mounting holes.

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8.0 Remote Terminal Wire and Cabling Installation

8.1 Introduction

This procedure provides instructions for wiring and cabling for the Remote Terminal. The following shelf wiring is required for full system operations:

- Power Supply Cabling
- Grounding
- IFL Cabling interconnect
- Interface Cabling to ASMs

8.2 Ground, Power and Signal Wiring

8.2.1 Tools Required

Refer to Table 3-2 in Section 3.0 for applicable tools.

8.2.2 Material Required

- IFL cable (LMR-400 recommended)
- 90° Type-N Adapter
- RF connectors (Type-N)
- Weatherproofing sealant
- Outside Grounding Wire IAW local code
- 12 AWG Green Stranded Wire
- 12 AWG Compression Ring Lugs
- Power Cord (as applicable)
- Interface Cabling to ASMs

8.2.3 Grounding

NOTE: Ensure the indoor equipment rack is grounded per applicable local code.

STEP 1. Ground the IDU chassis using the chassis ground stud on the rear of the chassis (refer to Figure 8-1). Ground the IDU chassis by installing compression type lug and connecting the lug to the rack frame vertical channel, or local grounding bar, by using 12 AWG (or larger) copper wire. Remove any paint or oxidation from the surface of the equipment.

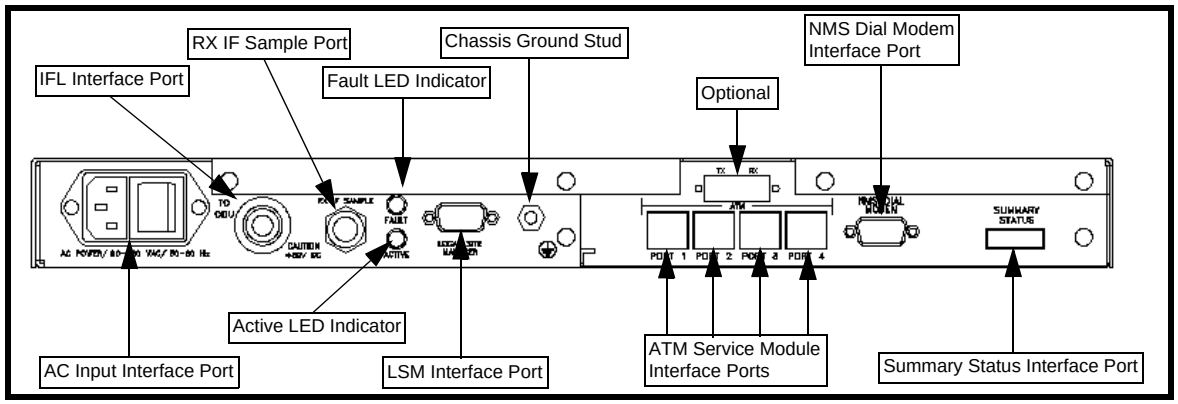

Figure 8-1 - One Rack Unit Remote IDU AC Input (Rear View)

STEP 2. Ground the ASM chassis using the ground stud on the rear of the chassis (refer to Figure 8-2). Ground the ASM chassis by installing compression type lug and connecting the lug to the rack frame vertical channel, or local grounding bar, by using 12 AWG (or larger) copper wire. Remove any paint or oxidation from the surface of the equipment.

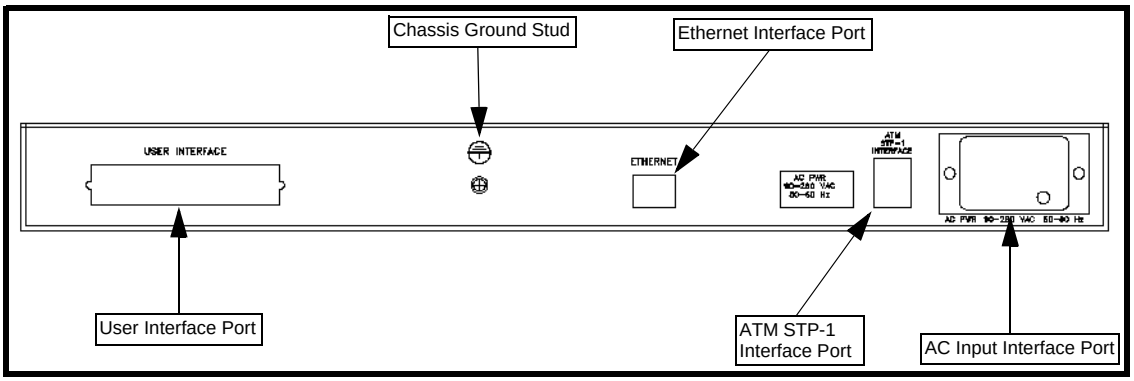

Figure 8-2 - ASM AC Input (Rear View)

STEP 3. Attach and secure grounding cable, in accordance with local code, from building ground to the antenna assembly pole structure for proper ODU grounding.

8.2.4 AC Power Supply

DANGER! Before connecting the AC cord to the IDU, ensure that the power switch is turned off

For AC operations, a standard computer AC power cable rated for 10 Amp capacity is supplied with each Remote ATM IDU chassis and ASMs. The AC receptacle is found on the rear of the Remote ATM IDU chassis and ASMs (refer to Figure 8-1 and Figure 8-2). One power cable is supplied with the Remote ATM IDU and each ASM.

8.2.5 DC Power Supply

DANGER! Before connecting the DC cable to the IDU, ensure that the protection fuse is removed to prevent the application of power at this time.

For DC operations, 16 AWG, 2-conductor cable is supplied. The cables for carrying DC power to the Remote ATM IDU and ASM should be routed to a DC distribution panel preferably installed in the same rack. The DC distribution panel should provide individual fuse protection to each chassis (refer to Figure 8-3 and Figure 8-4). The DC receptacle is found on the rear of the IDU and ASM. The DC power to the Remote ATM IDU and ASMs should be protected with a 5.0 Amp fuse.

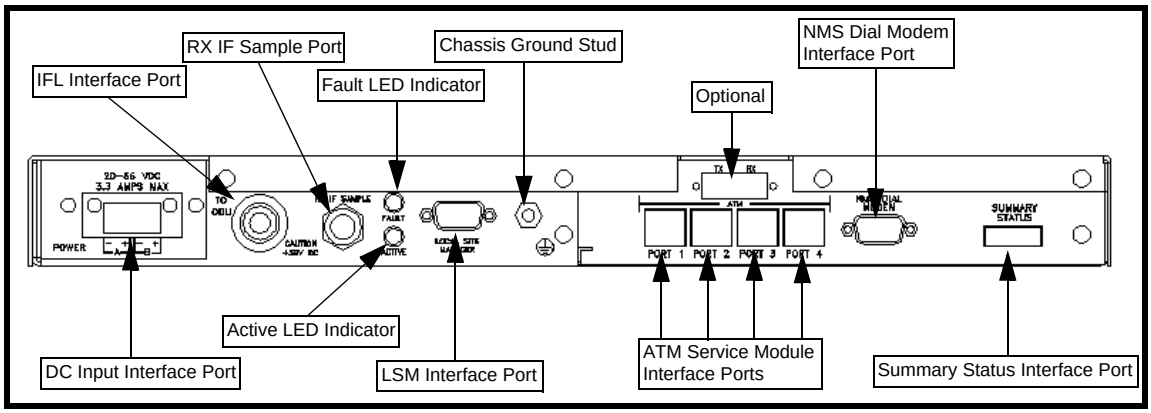

Figure 8-3 - Remote IDU DC Input (Rear View)

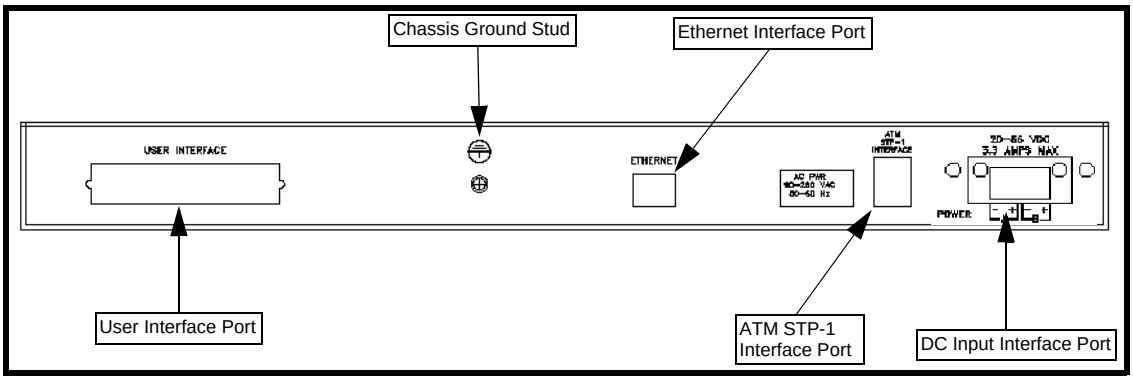

Figure 8-4 - ATM Service Module DC Input (Rear View)

8.2.6 ASM to IDU Wiring

The ATM Service Module is connected to the IDU via a UTP-5 cable with RJ-45 connectors. The length of the cable should be sufficient to allow a small service loop near each end but should not exceed 20 feet (6 meters) in length. Connect one end of the cable to the ATM STP-1 Interface Port of the ASM. Connect the other end of the cable to the appropriate ATM Service Module Interface Port of the IDU (refer to Figure 8-5).

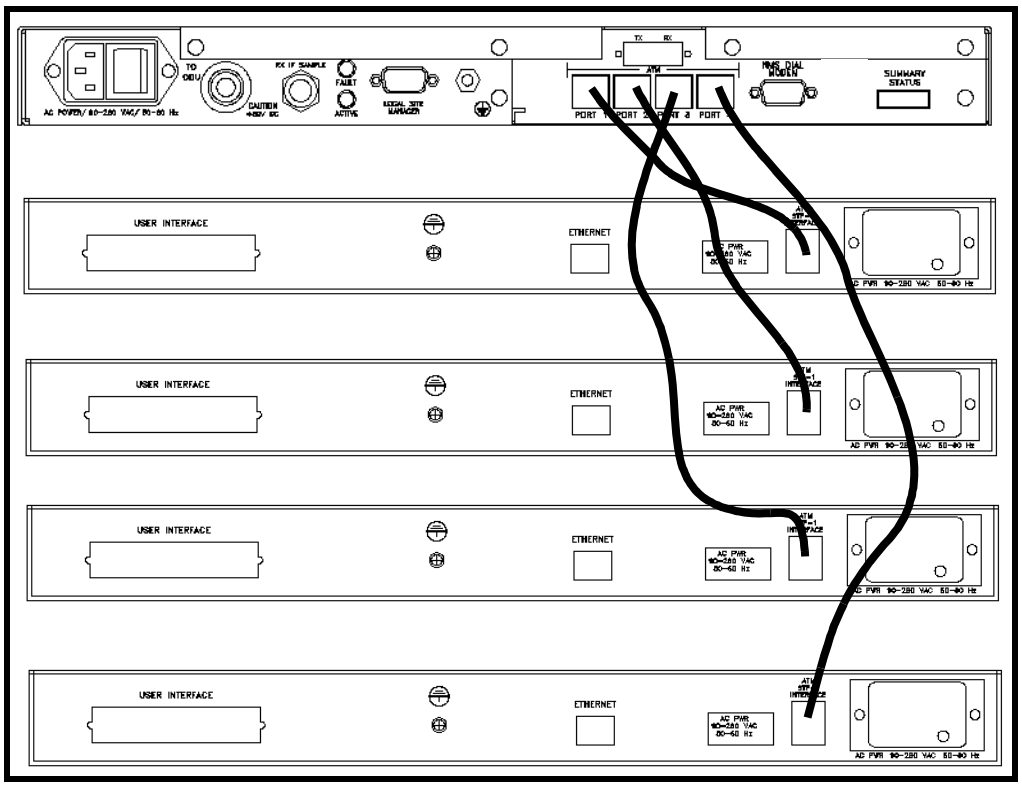

Figure 8-5 - ASM to Remote ATM IDU Wiring

8.2.7 IF Cabling

WARNING! Do not plug the IDU into the AC outlet or DC power source until the cable to the ODU is connected. If power is on, a DC voltage (44VDC) will be present on the N connector of the IDU and could be shorted when installing the coaxial cable to the ODU.

Sufficient length of cable should be used to allow routing along the side of the rack, and a service loop. Connect the Type-N male connector on the IF coaxial cable to the IF Interface Port of the IDU (refer to Figure 8-1 and Figure 8-3).

STEP 1. Terminate IFL Cable ends with Type-N Male RF connectors

STEP 2. Ensure a 90° Type-N Adapter is securely attached to the ODU Type-N female port

STEP 3. Connect the IFL cable to the 90° Type-N Adapter of the ODU and apply Weatherproofing sealant

8.3 IDU to LSM Cabling

8.3.1 Tools Required

Refer to Table 3-2 in Section 3.0 for applicable tools.

8.3.2 Material Required

- Serial, straight-through, computer cable with DB-9 male/female connectors, 15-25 ft in length

8.3.3 NMS Cabling

STEP 1. Connect LSM to the Local Site Manager Interface Port located in the front of all IDU chassis (refer to Figure 8-1 and Figure 8-3).

STEP 2. Refer to the LSM Manual for operations.

STEP 3. Connect ATM Interface Port cables to customer supplied equipment, e.g., router, terminal server, etc. (refer to Figure 8-2 and Figure 8-4).

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9.0 Remote Terminal Initial Power Application

9.1 AC Power Application

STEP 1. Ensure the AC power switch of the Remote ATM IDU and ASMs are in the OFF position.

STEP 2. Plug the AC cord for the Remote ATM IDU and ASMs into the AC source.

STEP 3. Place the AC power switch on the Remote ATM IDU and ASMs in the ON position.

STEP 4. Verify power is applied to the chassis by viewing the LEDs on the front panel.

STEP 5. If the LEDs on the boards do not illuminate, remove the AC connector from the appropriate equipment and verify wiring and AC voltage.

9.2 DC Power Application

STEP 1. Ensure the DC connectors to the Remote ATM IDU and ASMs are not connected.

STEP 2. Verify the appropriately sized fuses are installed IAW procedures in section 8.3.

STEP 3. Plug in the DC connector into the DC Power Port of the Remote ATM IDU and ASMs.

STEP 4. Verify power is applied to the chassis by viewing the LEDs on the front panel.

STEP 5. If the LEDs on the boards do not illuminate, remove the DC connector from the appropriate equipment and verify wiring and voltage polarity.

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10.0 Initial Terminal Configuration and Testing

Proper functioning of this command and response exchange verifies that the IDU's Local Site Manager (LSM) agent and other critical software components are present and operational. Refer to the Tel-Link PMP Local Site Manager Users Manual M68331 for detailed information on LSM operations. From the PC, the installer can use the Get and Set commands to communicate with the LSM agent in the IDU to program and interrogate the IDU configuration. Completion of the configuration will ensure items are properly loaded.

10.1 Terminal Configuration

STEP 1. After applying power to the Remote IDU and ASMs, allow the unit to warm up for five minutes.

STEP 2. Verify that the Remote IDU and ASMs have completed their self-test processes and the LEDs on the front of each card are in an operational state. (Refer to Table 10-1).

Table 10-1 - Board LED Indications

BOARD	LED COLOR	INDICATION	DESCRIPTION
Remote IDU	Green (Active)	Blinking	OK
		Off or Solid On	Fault
	Red (Fault)	Solid on or Blinking	Fault
		Off	OK
ATM Service Module	Green (Port)	Solid On	Active and Configured
		Off	Not Configured
	Red (Port)	Solid On	Inactive and Configured
		Off	Not Configured
	Red (Fault)	Solid On	Fault
		Off	OK
	Green (Power)	Solid On	OK
		Off	Off

STEP 3. Connect the LSM to the IDU LSM Interface Port. Connection is via a straight through cable with Male/Female DB-9 connections. The LSM should be running the P-COM WaveView software (refer to Figure 10-1).

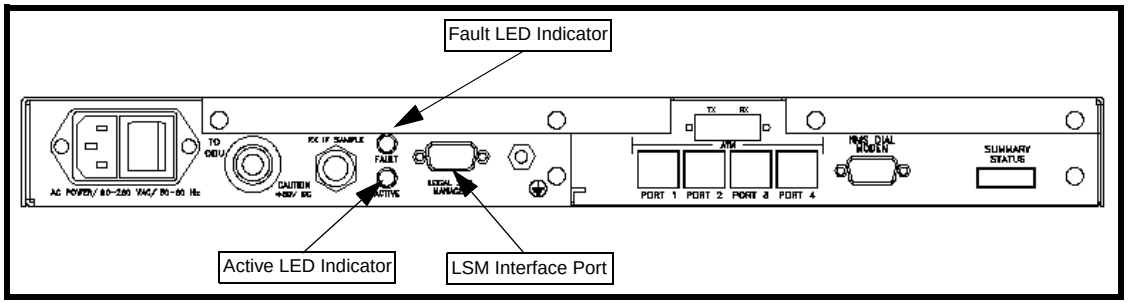

Figure 10-1 - LSM Interface Port

STEP 4. Verify appropriate software is loaded in the Remote ATM IDU and in accordance with the System Configuration Document.

STEP 5. Verify the transmitter is disabled.

- **Remote ATM IDU** Set the **rac_Commissioning_Complete** register to **No**.

STEP 6. Load (**Get** and **Set**) appropriate registers in the IDU. Refer to the System Configuration Document for appropriate frequencies, data rates, modulation schemes, etc. The icon to the left of each of the configuration item's name should have a green plus symbol to indicate successful loading of each configuration parameter.

10.2 Antenna Alignment

STEP 1. Enable the transmitter

- Set the **rac_Commissioning_Complete** register to **No**.

STEP 2. Connect the LSM to the Remote IDU controller card and set **odu_Antenna_Align_Enable** to **Enable**.

STEP 3. Connect the Antenna Alignment Unit (AAU) to the Remote Terminal ODU auxiliary port and prepare to align.

STEP 4. Loosen the appropriate bolts to allow the fine adjustment tuning of the antenna.

STEP 5. Azimuth and elevation adjustments should be made and confirmed with both visual and electronic alignment with AAU of the Sector antenna. With correct course alignment, the demodulator will lock up to the sector transmit signal.

STEP 6. The person aligning the antenna at the remote site should now contact the person located at the Remote IDU and confirm the remote site Demodulator has locked up to the Sector Terminal. If it has not, course antenna alignment is incorrect and repeat steps 4 and 5.

STEP 7. The person located at the Remote IDU should connect the LSM to the IDU and display the Demod table of the Remote Site Controller window. Locate and observe the **dem_Meas_Signal_Quality** register value.

STEP 8. Secure the Remote antenna assembly to prevent movement of azimuth and elevation settings when the maximum reading has bee obtained.

STEP 9. WIth the LSM still connected to the Remote IDU, set the **odu_TxLevCtrlEn** register to **Power_Ramp**. This will enable automatic gain control of the Remote ODU.

STEP 10. Set **rac_Commissioning_Complete** register to **Yes**.

10.3 Terminal Commissioning

10.3.1 LED Functionality

The following steps will verify the functionality of the LEDs on the Remote IDU:

STEP 1. Verify the LEDs are in the following state:

SECTOR BOARDS	GREEN LEDs	RED LEDs
Sector ATM Controller	Blinking	Off
Modulator	Blinking	Off
ODU Mux	Blinking	Off
Demodulator	Blinking	Off

REMOTE BOARD	GREEN LEDs	RED LEDs
Remote IDU	Blinking	Off

STEP 2. Remove the IF Cable to the Remote IDU and verify the following LED state occurred:

BOARD	GREEN LEDs	RED LEDs
Remote IDU	Blinking	Blinking

STEP 3. Reconnect the IF Cable to the Remote IDU and verify the following LED state occurred:

BOARD	GREEN LEDs	RED LEDs
Remote IDU	Blinking	Off

10.3.2 Power-up Restoration

The following steps will ensure the PMP equipment will restore back to an operational state with the interruption of power:

STEP 1. Connect an ATM Test Set to the ASM. Place an ATM Port of the Remote IDU into a loopback mode and the ATM Test Set will generate ATM packets.

STEP 2. Allow the system to stabilize into an operational state and turn the power off to the Remote IDU. The ATM Test Set should be displaying bit/packet errors.

STEP 3. Reapply power to the Remote IDU. After approximately one minute, the bit/packet errors displayed on the ATM Test Set should halt.

10.3.3 Network Monitoring

The following steps will demonstrate messaging between a Sector and Remote Terminal:

STEP 1. Allow the system to stabilize into an operational state.

STEP 2. From the Sector Terminal using the LSM with the proper Site ID selected, initiate a **Get All** command on the Remote Controller Section. The Remote Controller Chassis Window should refresh with configuration parameters.

STEP 3. initiate a **Get All** command on the ODU Section. The ODU Chassis Window should refresh with configuration parameters.

10.3.4 Over The Air System Integration

The following procedures will demonstrate the over-the-air system integration of the PMP equipment will not significantly degrade bit error rate performance.

10.3.4.1T1-CES ASM

STEP 1. Provision a CBR connection with the appropriate VPI/VCI for 1.544 mbps CAS between the T1-CES ASM and the ATM switch.

STEP 2. Generate traffic of the CBR (1.544 Mbps) from the Remote Terminal to a test set connected to the ATM Switch.

STEP 3. Verify the equipment can handle the traffic with no lost cells and conduct a Bit Error Rate Test for 15 minutes. The BER test set should display a performance of zero bit errors (BER performance <1E-9).

10.3.4.2T1-Frame Relay ASM

STEP 1. Provision a CBR connection with the appropriate VPI/VCI for 1.544 mbps CAS between the T1-Frame Relay ASM and the ATM switch.

STEP 2. Connect the Frame Relay test set #1 to Port 1 of the Frame Relay ASM.

STEP 3. Connect the Frame Relay test set #2 to a T1/FR port on the ATM switch.

STEP 4. Configure the Remote Terminal ATM port under test for internal loopback.

STEP 5. Configure each Frame Relay test set to generate “keep alive” messages at a rate of 2 per minute.

STEP 6. Reset the test set and allow the test to run for 30 minutes.

STEP 7. Record the following performance parameters.

- FCS Errors
- LMI Time-outs
- LIM Errors
- LMI Messages
- PVC Status

10.3.4.310 BaseT ASM

STEP 1. Provision the 10 BaseT ASM with the appropriate VPI/VCI and IP address.

STEP 2. Configure the PC with LAN Analyzer software loaded with the appropriate IP address.

STEP 3. Generate Ethernet Packets (pings) from the PC to Destination IP. All pings should have a response with a mean response time of <10 ms.

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11.0 Technical Support

11.1 Warranty

P-COM warrants PMP products to be free from defects in materials and workmanship for a period of twelve (12) months from the date of shipment from the factory. Extended warranty options are available.

11.2 Return Process

The boards of the PMP product requiring service may be sent to P-COM Florida at any time whether the unit is under warranty or not. There is a charge for repairs after the twelve-month warranty period.

A product requiring service should be returned with a Return Material Authorization (RMA), a detailed description of the problem and proof of purchase date if the twelve-month warranty has not expired. The product should be returned in its original shipping carton to ensure that in-transit damage does not occur.

The following process is used whenever returning equipment to P-COM:

STEP 1. Contact P-COM TAC at the telephone number below to obtain an RMA number and return shipping address:

P-COM Technical Assistance Center

Phone Number:1-877-674-3600

FAX Number:1-407-674-3700

Hours of Operation

8:00 AM to 5:00 PM Eastern Time (standard or daylight savings)

NOTE: All equipment received without an RMA will be returned to the sender.

STEP 2. Pack the equipment in the original shipping containers, if possible. If original shipping containers have been discarded, pack the failed unit so as to protect it from shipping damage.

STEP 3. Obtain insurance from the shipper that will cover the entire value of the equipment being returned.

STEP 4. Send the equipment (pre-paid shipping) to the address received from the Technical Assistance Center.

STEP 5. P-COM will notify the sender, upon receipt of the equipment, of an estimated time to repair and for return shipping instructions. An estimate of the repair cost will be given for all non-warranty repairs

All repairs covered under warranty will be completed at no cost and the return shipping (surface) will be paid for by P-COM. Repairs not covered by the warranty will be performed at current P-COM labor rates and material costs and billed to the customer. In addition, shipping will be billed for non-warranty repairs.

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APPENDIX A: PMP Installation Procedure Checklist

PMP INSTALLATION PROCEDURE CHECKLIST

Technician(s) Name:		Date:	

INTRODUCTION

This Installation Procedure Checklist is provided to ensure correct installation procedures of P-COM PMP equipment. The Checklist is to be completed for each site installed and the installer is to check-off each step as completed. The installer will sign and date the Checklist and forward it to the P-COM Technical Assistance Center (TAC) when the installation is completed.

Site Name:				
Site Designation:				
	Sector Terminal	☐	Remote Terminal	☐

FORMS:

- ☐ Verify possession of completed Site Survey Form for the designated site.
- ☐ Verify possession of System Configuration Document for the designated site.
- ☐ Verify possession of Commissioning Test Form for the designated site.

INVENTORY: The shipping list contains all equipment ordered by the customer for the total number of Sector and Remote Terminals.

- ☐ Verify possession of completed Site Survey Form for the designated site.
- ☐ Verify possession of System Configuration Document for the designated site.

NOTE: Any visible damage should be reported immediately to the customer and to P-COM TAC at: 1-(877) 674-3600

INTERFACILITY LINK (IFL) INSTALLATION SEQUENCE

IFL INSTALLATION PREPARATION: The IFL should be Times-Microwave LMR-400 coaxial cable, or equivalent, unless otherwise stated in the P-COM Site Survey Form

- ☐ Verify presence of an appropriate IFL between ODU and IDU locations.
- ☐ Verify sufficient length (4 ft) of IFL exists at both ends to provide a service loop prior to being terminated to the equipment.
- ☐ Terminate each end of the IFL with Type-N male connectors.

PMP INSTALLATION PROCEDURE CHECKLIST

Technician(s) Name:		Date:	

OUTDOOR UNIT (ODU) INSTALLATION SEQUENCE

ODU/ANTENNA INSTALLATION PREPARATION:

- ☐ Verify the pole used to mount the ODU/Antenna assembly is installed at the location identified in the SIte Survey Form.
- ☐ Verify the pole is securely mounted and connected to earth ground in accordance with local code.

ODU/ANTENNA INSTALLATION:

- ☐ Install the ODU/Antenna assembly in accordance with the P-COM Installation and Maintenance Manual.
- ☐ Sector ODU/Antenna: Course align the antenna in the direction for operation as specified in the P-COM System Configuration Document.
- ☐ Remote ODU/Antenna: Align the antenna in the general direction of the designated Sector Terminal. Fine-tuning will be performed during the “Initial Power-up and Test Sequence.”

ODU INTERCONNECT:

- ☐ Sector Terminal: Connect the IFL cable between the appropriate ODU and Basic IDU Chassis.
- ☐ Remote Terminal: Connect the IFL cable between the ODU RF POrt (Type-N Connector and Remote IDU.

INDOOR UNIT (IDU) INSTALLATION SEQUENCE

IDU INSTALLATION PREPARATION: Each Site should be identified, In the P-COM Site Survey Form, if the IDU is to be rack mounted or placed on a tabletop.

- ☐ Verify presence of IDU chassis and all cards intended to populate the IDU.
- ☐ Verify presence of customer’s interface demarcation
- ☐ Verify required rack/table is installed, secured to the floor, and ready to accept the IDU.
- ☐ Verify correct power source has bee provided within close proximity to the location where the IDU is to be installed and is controlled through an appropriate sized circuit breaker or fuse
- ☐ Verify power to the IDU is in the Off position (AC) or disconnected (DC).

PMP INSTALLATION PROCEDURE CHECKLIST

Technician(s) Name:		Date:	

IDU INSTALLATION:

- ☐ Properly install the IDU in accordance with P-COM Installation & Maintenance Manual.

IDU INTERCONNECT:

- ☐ Sector Terminal: Connect the IFL cable to the RF Port of the IDU.
- ☐ Remote Terminal: Connect the IFL cable to the RF Port of the IDU.
- ☐ Sector and Remote Terminals: Connect the power leads/cords to the IDU Input Power Port. Terminate the power leads/cord to the appropriate AC or DC power source. Two power leads/cable may be terminated for a Sector IDU with optional redundant power supplies.
- ☐ Sector and Remote IDUs: Connect a ground wire from the chassis to a local earth ground.

CUSTOMER PREMISE EQUIP-MENT (CPE) PREPARATION:

- ☐ Verify CPE has been installed within close proximity to the IDU equipment.
- ☐ Verify sufficient length of CPE cable is present to provide a service loop prior to being terminated to the equipment.
- ☐ Sector and Remote Terminals: After completion of the Commissioning Test Plan connect the CPE cable to the appropriate port on the USer Interface Module (UIM) or Network Interface Card (NIC).

ODU POWER SUPPIY

The ODU Power Supply should be installed at least 1 RU above each Sector bank of IDUs to prevent air flow restriction.

- ☐ Properly install the ODU Power Supply in accordance with P-COM Installation & Maintenance Manual.

PMP INSTALLATION PROCEDURE CHECKLIST

Technician(s) Name:		Date:	

ODU POWER SUPPLY:

- ☐ Connect the ODU Power Supply to the Basic Chassis IDU in accordance with the P-COM Sector Terminal Installation & Maintenance Manual.
- ☐ Connect a ground wire from the ODU Power Supply to a local earth ground.
- ☐ Connect the power cord/leads to the Input Power Port. Terminate the power cord/leads to the appropriate AC or DC Power Source.

INITIAL POWER-ON AND TEST SEQUENCE

- ☐ Turn the circuit breaker assigned to the IDU to the ON position when prepared to apply power to the IDU.

SECTOR TERMINAL:

- ☐ Apply power to the Sector IDU and IF Combiner. Allow the terminal to warm up for 5 minutes.
- ☐ Verify each card has completed its self-test process and the LEDs are in an operational condition. Interpretation of LED conditions may be found in Table 11-1, Board LED Indications of the P-COM Installation Manual.
- ☐ Connect the LSM to the Controller card via DB-9 cable.
- ☐ Verify appropriate software in the IDU
- ☐ Load (Set/Get) appropriate registers in the IDU
- ☐ Verify configuration loaded successfully.
- ☐ Verify transmitter is disabled. The **sc_Commissioning_Complete** register should indicate “No”.
- ☐ Perform Terminal (Local Testing) in accordance with P-COM PMP Installation Manual.
- ☐ Enable the transmitter. Set the **sc_Commissioning_Complete** register to “Yes”.
- ☐ Verify proper transmit level.

PMP INSTALLATION PROCEDURE CHECKLIST

Technician(s) Name:		Date:	

REMOTE TERMINAL:

- ☐ Apply power to the Remote IDU. Allow the terminal to warm up for 5 minutes.
- ☐ Verify each card has completed its self-test process and the LEDs are in an operational condition. for the 7 RU Interpretation of LED conditions may be found in Table 11-1, Board LED Indications of the P-COM Installation Manual.
- ☐ Connect the LSM to the Controller card via DB-9 cable.
- ☐ Verify appropriate software in the IDU
- ☐ Load (Set/Get) appropriate registers in the IDU
- ☐ Verify configuration loaded successfully.
- ☐ Verify transmitter is disabled. The **rc_Commissioning_Complete** register should indicate “No”.
- ☐ Perform Terminal (Local Testing) in accordance with P-COM PMP Installation Manual.
- ☐ Align the Remote Terminal antenna. Connect a AAU to the test port of the ODU. Adjust the antenna in elevation, then in azimuth to obtain a peak voltage measurement. Align antenna for a peak reading on the AAU. Tighten down all mounting bolts.
- ☐ Verify proper receive level is registered at the IDU.
- ☐ Enable the transmitter. Set the **rc_Commissioning_Complete** register to “Yes”.
- ☐ Perform BER tests on the Remote Terminal for all T1 ports for a minimum of 30 minutes.

INSTALLATION COMPLETED

This concludes the P-COM PMP equipment installation sequence. Sing and date in the spaces provided below and proceed to the P-COM PMP Commissioning Test Plan.

Completion Number:	
Date:	
Signature:	

APPENDIX B: Site Survey Checklist

SITE SURVEY CHECKLIST

Engineer:		**Date:**	
Customer		**Address:**	
Contact Names:			
Telephone Numbers:			

SITE CHARACTERISTICS

Prior to site installation planning visit, complete line-of-sight, transmission engineering and preliminary frequency coordination work to establish viability of path selected.

Site Name:					
Site Designation:					
	Sector Terminal		Remote Terminal		
Coordinates:	GPS EPE		**Degrees**	**Minutes**	**Seconds**
		Latitude:			
		Longitude:			
Ground Elevation AMSL (Above Mean Sea level)					
Distance Between Hub and Remote Terminals (kilometers)					
Azimuth (True) From Sector:					
Hub/Sector:			Remote:		
Transmit Frequency (High/Low Band; Polarization)					
Transit:			Receive:		
Available Conduit:					

SITE SURVEY CHECKLIST

Customer		**Date:**	
Site Name:			

OUTDOOR EQUIPMENT

Roof Access (Describe):	

Site Access

	Yes	No		Yes	No
Roof Access Door			Ladder Req		
Permit Req			Access Keys Req		
Roof Penetration			Wall Penetration		
Special Tools Req			On-SIte Escort Req		

If Yes, What Special Tools:	If Yes, Who is Needed as the Escort:

Sketch/photos of Equipment and Site (on pages 5 and 6) - Include Site Layout (Topographical Map and Building Blueprints if available), Location of Antenna/ODU, and briefly explain how the Antenna/ODU will be installed below:

Tripod:	
Wall Mount	
Parapet:	
Tower:	
Other:	
Pole Diameter:	

Show details in sketch of proposed mounting and hardware (pole) location. Show relationship to coaxial cable access and building ground. Show lightning rod ground connect point if applicable.

Terrain Considerations:	
Obstructions:	
Other Considerations:	

SITE SURVEY CHECKLIST

Customer		**Date:**	
Site Name:			

INTERFACILITY POWER AVAILABILITY

Available Power (Voltage and Current

NOTE: Do not mount radio equipment in the proximity of machinery that can either generate larege electromagnetic fields or large voltage spikes as they cycle On/Off (i.e. air conditioners, elevator motores, etc.)

	Yes	No		Yes	No
AC Power On Roof:			AC Power At Rack:		

Identify Location and Distance to Available AC Power:	
Distance Between ODU and IDU:	

NOTE: Maximum distance of LMR-400 Cable is 1000 Feet.

	Yes	No
Has Cable Been Ordered?		

IFL Cable Supplied By: P-COM ☐ Customer ☐

Distance Between IDU and Customer Premise:	

Sketch/Photos Of Equipment - Cable Run from ODU to IDU

	Yes	No
Show Access Points (i.e. Floors) (Sketch) (Space available on Pages 5 and 6)		
IFL Exists in-place:		
Is Plenum Rated Cable Required:		

Length:		Type:	

	Yes	No
Is Pull Rope Installed in Conduit		
Is New Pull Rope Required:		

SITE SURVEY CHECKLIST

Customer		**Date:**	
Site Name:			

INDOOR EQUIPMENT

What Type of Terminating Equipment Will Be Used (Customer Premise Equipment)

Check Site For:

	Yes	No		Yes	No
Phone Jack:			AC/DC Power:		
Fuse Panel:			Battery Back-up		

Number of IDUs Required:				
IDU Mounting	Rack Mounted		Tabletop Mounted	
Rack/Table Supplied By	P-COM		Customer	

	Yes	No
Rack or Table Ordered:		
Limitations on Rack or Table Floor Space:		
Temperature/Humidity Controlled Room		
Air Flow Restrictions:		
Fans Needed:		
Other Rack Installation Considerations:		

TOOLS REQUIRED

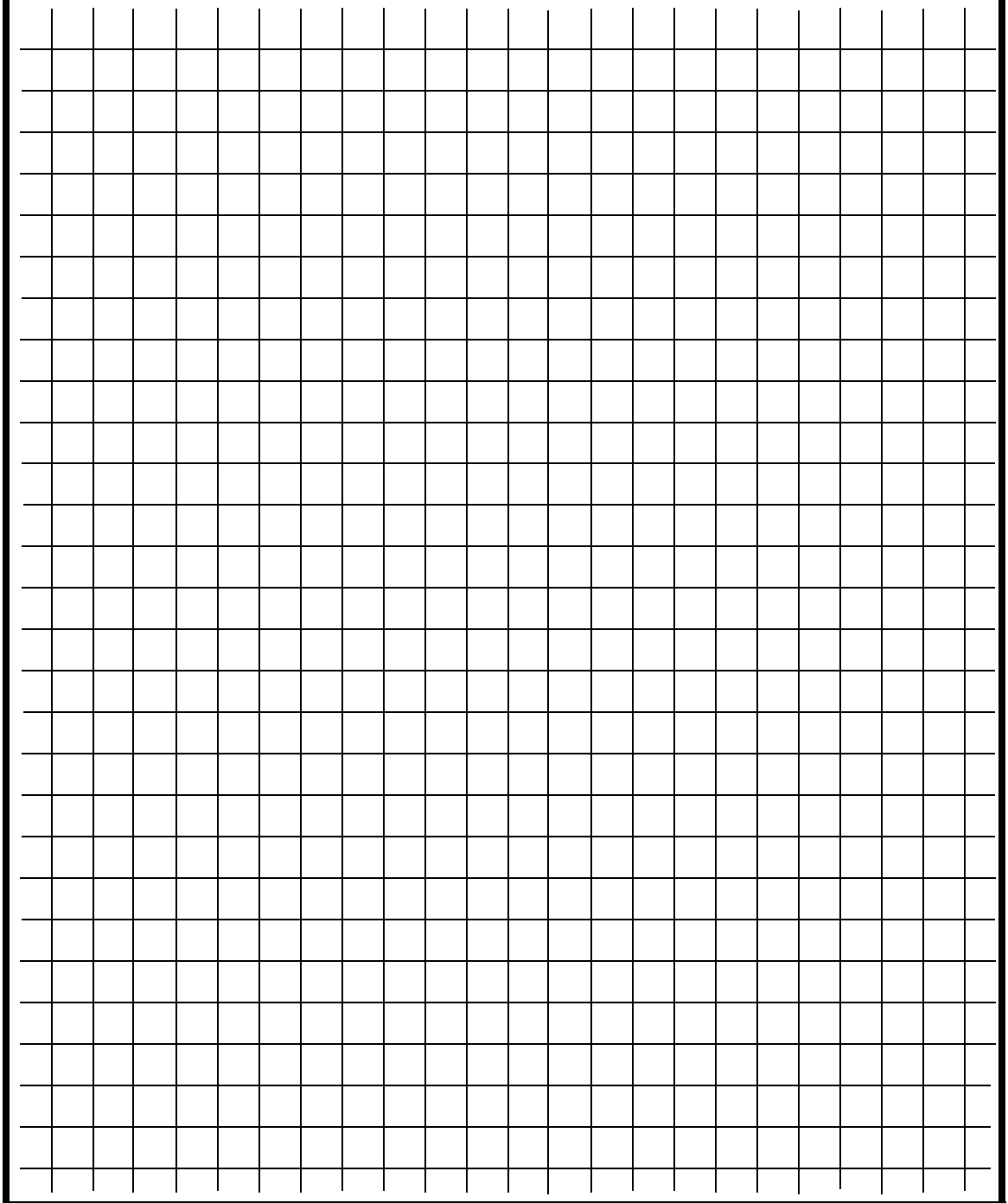
	Yes	No		Yes	No
Binoculars			Camera		
Cellular Phone (2 each)			Compass		
Flashlight/Strobe			GPS Receiver:		
Tape Measure					

Other Equipment:	

SITE SURVEY CHECKLIST

Customer		Date:	
Site Name:			

SKETCH OF EQUIPMENT AND SITE



SITE SURVEY CHECKLIST

Customer		Date:	
Site Name:			

SKETCH OF EQUIPMENT AND SITE

Glossary

NAME	DESCRIPTION
AAL	ATM Adaption Layer - A collection of standardized protocols providing services to higher layers by adapting user traffic to a cell format.
AAU	Antenna Alignment Unit
Active Window	The window whose Title Bar is highlighted. Active windows lie in front of all windows that intersect them in three dimensional space
AGC	Automatic Gain Control
AIS	Alarm Indicator Status - One of the Operations and Maintenance function types used for fault management.
AMI	Alternate Mark Inversion - A type of bipolar line signaling used by DS-1 and DS-3 interfaces.
ANSI	American National Standards Institute. A US technology standards organization.
AMSL	Above Mean Sea Level
ASIC	Application Specific Integrated Circuit
ASM	ATM Service Module
ATM	Asynchronous Transfer Mode - A broadband switching and multiplexing, connection-oriented, high-performance and cost effective integrated technology.
B8ZS	Bipolar with Eight Zero Substitution - A line code substituting 8 zeros with Bipolar Violations for bit synchronization purposes.
Base Station	The center of a cell where Sector Terminal(s) are installed.
BER	Bit Error Rate - A measure of the rate of bit errors in a digital system.
BNC	Bayonet Nut Connector
BOD	Bandwidth-On-Demand - A technique allocating more bandwidth to users requiring it and reduces bandwidth to users that do not.
BPV	Bipolar Violation - DS-1 and DS-3 line fault alarms.
BRI	Basic Rate Interface - A ISDN service specification that provides two 64-Kbps B-channels and one 16-Kbps D-channel.
Calibration File	A file used by the LSM to calibrate a particular model of ODU
CAS	Channel Associated Signaling
CBR	Constant Bit Rate - One of five service classes for the ATM layer. This service type allows a user to define a specific cell delay, cell delay variation, and reserve a specific constant fixed bandwidth on the network.

NAME	DESCRIPTION
CCITT	Consultative Committee on International Telegraphy and Telephony.
CCS	Common Associated Signaling
CHAMP	Connector
Chassis Number	An integer value that uniquely identifies a chassis
Chassis Parameter	A value that may be read and/or written from/to a board that exists within a chassis. Examples of chassis parameters include odu_Temperature for the ODU, or sc_Tx_Frequency in the Sector Controller
Chassis Window	The window that displays information about the individual boards making up a chassis. The operator interacts with this window to control and monitor chassis parameters.
CLAV	Cell Available
Client Area	The area of a window excluding the title bar and bounded by the window frame. The client area is used to display the document visually to the operator.
Closing a Window	Expanding a window down to its maximum size. Maximizing a window under Windows 95 is performed by clicking on the maximize button on the Title Bar
Configuration Files	Files that contain the labels, desired values, sampling intervals, and sampling active states for chassis parameters. These files are displayed graphically within Chassis Windows.
Configuration Section	A section of a Configuration File containing parameters for a given board that do not exist within any configuration tables.
Configuration Table	A table of parameters lying within a configuration section,
Continuous Get	The process of automatically performing Gets on chassis parameters at selected intervals
CPE	Customer Premise Equipment - Customer provided equipment that connects to the interface port(s) of the IDU.
CRC	Cyclic Redundancy Check - A process used to check the integrity of a block of data.
Current Value	The current setting of a chassis parameter. Used in conjunction with a Get operation
DBPSK	Differential Bi-Phase Shift Keyed
Debug Port	The serial port used by the LSM to monitor and debug a PMP System.
Definition Files	Files that contain the VID number, PID number, sample rate and sampling active settings, as well as enumerated values for chassis parameters. These files are displayed graphically with Chassis Windows

NAME	DESCRIPTION
Desired Value	The value that the operator wishes to change a chassis parameter to. Used in conjunction with a Set operation
Desired Value	The value one wishes to change a chassis parameter to. Used in conjunction with a Set operation.
Desktop	The backdrop against which applications run in the Windows 95 environment. It is in reality the parent window of all windows present with Windows 95.
Detailed Help	Detailed information about an object, available by clicking on the arrow/question mark button in the Toolbar and then clicking on the object.
DFM	Drive Fault Monitor
Dialog Box	A window consisting of controls with which an operator interacts. Dialog boxes come in two flavors: modal dialog boxes, which require that the operator terminate the dialog box before other window objects present in the application may be accessed, and modeless dialog boxes, which allow the operator to interact with other window objects at any time while the dialog box exists.
DLL	Dynamic Link Library - Libraries of code shared by applications
DLL Libraries	Libraries of code shared by applications
Down Link	The RF communications path from a Base Station to the Remote Terminal
DQPSK	Differential Quandrature-Phase Shift Keyed
DSP	Digital Signal Processor
DSX	DS-n customer premise equipment
EIA	Electronics Industry Association
EIRP	Effective Isotropic Radiated Power
EMC	Electromagnetically Coupled
EPLD	Electronically Programmable Logic Device
Error Code	An integer value indicating success/failure at performing a Set/Get operation.
Error Message	A message received from the PMP System via the LSM Port that gives information on an error that was detected within the PMP System. Error messages may be displayed via the Error Message Window.
ESF	Extended Super Frame Format - Combination of 24 T1 frames.
ETSI	European Telecommunications Standards Institute - European equivalent of ANSI.

NAME	DESCRIPTION
Explorer	Short for Windows 95 Explorer, the application that comes bundled with Windows 95 allowing the manipulation of drives, directories and files.
EXZ	Excessive Zero Events - Used by DS-3 interface.
FCC	Federal Communications Commission - A US regulatory commission.
FDDI	Fiber Distributed Data Interface - ANSI standard for implementing high-speed (100-Mbps) LAN over fiber.
FDMA	Frequency Decision Multiple Access - A technique that allows multiple users access to bandwidth by subdividing into multiple channels.
FEC	Forward Error Correction - An error correction technique allowing the receiver to correct some errors in the received signal.
FERF	Fare End Receive Failure
FPGA	Field Programmable Gate Array
FSK	Field Shift Keyed
FWA	Fixed Wireless Access
Get Operation	The process of obtaining the current value of a chassis parameter
GUI	Graphical User Interface
HDB3	High Density Bipolar Order 3
HDLC	High-level Data Link Control - A synchronous bit-oriented protocol for serial data.
Hex Records	Records collectively making up a hex **.rec** file, the file format used for software updates. Motorola defines the standard for the records used by the LSM for software updates.
IDU	Indoor Unit - PMP chassis, including cards populating the chassis, located inside a building.
IF	Intermediate Frequency
IFL	Interfacility Link - A communications link between the IDU and ODU
Incoming Packets	Packets of data received by the Local Site Manager via a serial port
ISDN	Integrated Services Digital Network - Digital service for voice, data, and video.
ISP	Internet Service Provider
Keyboard Accelerator	A keystroke sequence that emulates the selection of a menu item
Keystroke Sequence	A group of keys on the keyboard simultaneously depressed

NAME	DESCRIPTION
Label	A name uniquely identifying a chassis parameter
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LIU	Line Interface unit
LMCS	Local Multi-Point Communications Services
LMDS	Local Multi-Point Distribution System
LNA	Low Noise Amplifier
Logs	Status information reports accumulated over time. Examples include incoming packets logs, or error message logs.
LOS	Loss of Signal
LSM	Local Site Manager -Laptop or desktop PC based software tool used to monitor, control and configure the PMP System.
LSM Installer	The software application that installs the LSM and all subordinate files
LSM Port	The serial port used by the LSM to communicate with a PMP System
LSM Uninstaller	The software application that uninstalls the LSM and all subordinate files
Main Window	The window that contains the menu bar and toolbar, serving as the parent of all windows and dialog boxes. Closing the Main Window terminates the LSM
Maximizing a Window	Expanding a window to its maximum size. Maximizing a window under Windows 95 is performed by clicking on the maximize button in the title bar.
MC	Modem Controller
MCF	Motorola Cold-Fire Processor
Menu Bar	A list of individual menus. Present at the top of the Main Window
Menu Item	An individual item that resides within a menu which may be selected by the operator
MIB	Management Information Base - Database containing information regarding network management and performance.
Minimizing a Window	Shrinking a window down to a single title bar. Minimizing a window under Windows 95 is performed by clicking on the minimize button on the Title Bar
Mouse Cursor	The cursor that displays the current position of the mouse

NAME	DESCRIPTION
NCO	Numerical Control Oscillator
NMA	Network Management Agent
NMS	Network Management System
NOC	Network Operations Center
ODU	Outdoor Unit - PMP communications equipment located outside a building connected to an antenna.
OMT	Othogonal Mode Transducer
Operator	The person who is interacting with the Local Site Manager
OTA	Over the Air
Outgoing Packets	Packets of data transmitted via the LSM Port to the PMP System.
PA	Power Amplifier
PCB	Printed Circuit Board
PD	Pattern Detect
PID	Process ID - A number uniquely identifying a process with a board.
PMP	Point-to-Multipoint
PMP System	The combination of hardware and embedded software that make up the P-COM Point-to-Multipoint System
Popup Menu	A menu that comes into existence when a Windows Object is selected by the operator while the right mouse button is pressed. Popup Menus serve as a convenient means of querying/changing the settings for a given Window Object
POST	Power Up Self Test
PSN	Public Switched Network
PTN	Public Telephone Network
QAM	Quadrature Amplitude Modulation - A high bandwidth efficiency modulation technique
QPSK	Quadrature Phase Shift Keyed - Digital modulation technique.
Quick Help	A brief summary of a chassis parameter, available by double clicking on the chassis parameter in the label column of a Chassis Window.
RAC	Remote ATM Controller - ATM controller card used in the Remote Terminal IDU to manage and control the traffic a the Remote site.
RAM	Random Access Memory
RCS	Redundancy Control Switch

NAME	DESCRIPTION
Remote IDU	Remote Terminal Indoor Unit chassis located at the remote location
Remote ODU	Remote Terminal Outdoor Unit located at the remote location, connected to a directional antenna pointed towards the Sector Terminal.
Remote Terminal	Consists of a Remote IDU, Remote ODU and Interfacility Link
Restoring a Window	Resizing a window to its previous size. Restoring a window under Windows 95 is performed by clicking on the restore button in the title bar.
RF	Radio Frequency
RMA	Return Material Authorization
ROM	Read Only Memory
RSSI	Receive Signal Strength Indicator
RU	Rack Unit
Rx	Receive Signal
SAC	Sector ATM Controller - ATM controller card used at the Base Station/ Sector Terminal IDU to manage and control the traffic at the sector.
Sample Interval	The rate at a Continuous Get is performed on a chassis parameter
Sampling Active	Whether or not Continuous Gets will be performed on a chassis parameter
SAW	Surface Acoustic Wave
SCC	Serial Communication Controller
Scroll Bars	Bars present at the bottom and/or right edge of a Window enabling the operator to scroll the data upwards or downwards, thus observing information that lies beyond that capable of being displayed in the window
SDH	Synchronous Digital Hierarchy - A hierarchy for very high-speed digital transmissions over optical fiber links
Sector	A geographic area radiating out from a Base Station. Typically referred to as the area covered by a Sector Antenna
Sector IDU	Sector Terminal Indoor Unit chassis located at the Base Station
Sector ODU	Sector Terminal Outdoor Unit chassis located at the Base Station location, connected to an antenna providing coverage over a sector.
Sector Terminal	Consists of one or more Sector IDUs connected to a common, or redundant, set of Hub IF Combiners and Sector ODU/Antenna assemblies

NAME	DESCRIPTION
Selection	Highlighting an item for an action via the process of single clicking on the item. Holding down the Shift Key while selecting items allows contiguous selections. Holding down the Ctrl Key while selecting items allows noncontagious selections.
Set Operation	The process of changing the current value of a chassis parameter
Settings	Options for customizing the Local Site Manager to an operator's preferences. Available from the Setup Dialog Box
SF	Super Frame Format
Shortcut	A Windows 95 Object that points to an application or data file. Double clicking on a shortcut to an application executes the application. Double clicking on a data file executes the application tied to the data file
Site Diagnostic Report	A report produced listing detailed information about the current status of all chassis making up the system
Slot Number	A value that uniquely identifies a board within a chassis
SNMP	Simple Network Management Protocol - Protocol for exchanging network management information.
SNR	Signal-to-Noise Ration - A measurement of the strength of the RF signal when compared to the background noise level.
Software Updating	The process of updating code for a board that resides within a chassis
Splitter Bar	A vertical bar separating panes of a window. The splitter bar may be dragged to resize the panes of a window.
Start Menu	A menu containing applications (or shortcuts to applications) that are to be executed whenever Windows 95 boots
Status Bar	An area which enables the displaying of detailed information about the current menu item that is selected, or about the current status of an operation. Present at the bottom of the Main Window
STM	Synchronous Transfer Mode
STP	Shielded Twisted Pair
STS	Synchronous Transport Signal
System Menu	The menu accessible by clicking on the icon that resides at the far left corner of the title bar of a window. The System Menu contains a list of operations commonly performed on windows.
TAC	Technical Assistance Center
Task Bar	The bar that runs along the bottom of the Windows 95 User Interface
TDM	Time Division Multiplex

NAME	DESCRIPTION
TDMA	Time Division Multiple Access - A technique allowing multiple users access to a single channel through time sharing.
Title Bar	The bar that runs along the top of Windows. The title bar contains the name of the document (or some means of identifying its purpose), as well as the close box, minimize box, and maximize box.
Toolbar	A list of buttons serving as an equivalent to the selection of menu items that reside within the Menu Bar. Present immediately below the Menu Bar of the Main Window
Tooltip	A small popup window appearing whenever the mouse cursor hovers over an object for a given amount of time. Tooltips are most often used to supply concise help for Toolbar buttons.
Tx	Transmit Signal
UNI	User Network Interface - Interface between the Remote Terminal and the ATM network. The ATM forum has defined two contexts in which the UNI appears: Public UNI, connecting ATM equipment within a private network, either hosting or switching with public network provider networks. Private UNI, used exclusively to connect hosts to switches where both are managed by the same administrative entity.
Uplink	The RF Communications path from the Remote Terminals to the Base Station
VID	Variable ID - A number uniquely identifying a parameter.
VOM	Volt-Ohm-Meter
Whitespace	Tabs or spaces. This term originates from the Unix world
Windows Object	An object presented to the operator through the Windows 95 user Interface. Window objects encompass such thins as icons, menus, and windows
WLL	Wireless Local Loop
VBR-nt	Variable Bit Rate-non real time - One of five service classes for the ATM layer.

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Reader Comment Form

We welcome your comments and suggestions for improving our manuals. Please record your suggestions below and FAX the completed form with your comments to (407) 674-3797.

NOTE: This form is for documentation comments only. Problems with hardware or software should be reported separately to the Technical Assistance Center at 1-(877)-674-3600.

1. Did you find any omissions or inaccuracies in the manual? If so, please specify the page and the problem. (It may help to include a marked up copy of the page along with this form.)

_____
_____

2. Did you find this manual understandable, usable, and well organized? Please make suggestions for improvement.

_____
_____

3. Is there sufficient documentation on the associated hardware or software required for your use of the Point to Multipoint System, as described in this manual? If not, specify the type of information you feel is missing.

_____
_____

4. Please indicate the type of user/reader that you most nearly represent:

_____System programmer/System Manager **_____Maintenance Technician**

_____Process Engineer **_____Other_____**

5. Please indicate the way(s) in which you use this manual:

_____Instructional Tool **_____Other_____**

_____Reference Tool

Name _____ **Title** _____

Company_____ **Division**_____

Address_____ **City** _____

Telephone_____ **State, Zip/Country** _____

Date_____