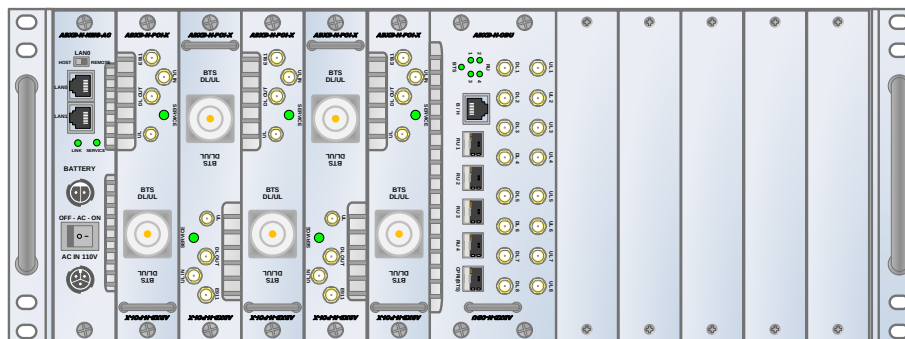


ADXD-LPR User Manual

Version 0.1



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Terms and Abbreviations

The following is a list of abbreviations and terms used throughout this document.

Abbreviation/Term	Definition
AGC	Automatic Gain Control
ALC	Automatic Level Control
AROMS	ADRF' Repeater Operation and Management System
BCU	Band Combiner Unit
BTS	Base Transceiver Station
CDMA	Code Division Multiple Access
CHC	Channel combiner
CW	Continuous Wave (un-modulated signal)
DAS	Distributed Antenna System
DL	Downlink
Downlink	The path covered from the Base Transceiver Station (BTS) to the subscribers' service area via the repeater
HE	Head End
HPA	High Power Amplifier
HW	Hardware
IF	Intermediate Frequency
LNA	Low Noise Amplifier
LPR	Low Power Remote Unit
LTE	Long Term Evolution
MPR	Medium Power Remote Unit
MS	Mobile Station
NMS	Network Management System
ODU	Optic Donor Unit which is located in ADXD-HE.
OEU	Optic Expansion Unit
ORU	Optic Remote Unit which is located in ADXD-MPR.
PLL	Phased Locked Loop
POI	Point Of Interface
PSU	Power Supply Unit
RF	Radio Frequency
RU	Remote Unit which is composed of ORU and RMs of plural bands
RM	Remote Module which is assigned per band
SW	Software
UL	Uplink
Uplink	The path covered from the subscribers' service area to the Base Transceiver Station (BTS) via the repeater
VSWR	Voltage Standing Wave Ratio

1. INTRODUCTION

Currently the ADXD supports 600MHz, 700 MHz (Lower A, Lower B, Lower C and Upper C), SMR800/Cellular, PCS, AWS, WCS, BRS, CBRS band

1.1 Highlights

- Modular Structure (HE)
 - Supports multi bands service in one body
 - Supports up to 12 slot available for POI, ODU, etc.
- 33dBm of downlink composite output power
- Requires only single strand of fiber per remote unit
- Supports SNMP v1, v2, v3 (get, set & traps)
- Web-based GUI Interface; No 3rd party GUI software required
- Web-GUI connectivity via DHCP in host mode
- Versatility and Usability: ADXD gives total control to the user. Control parameters such as gain, output power, and alarm threshold can be changed using Web-GUI interface allowing the user to fine tune the system to the given RF environment.

1.2 ADXD LPR Quick View

1.2.1 HE Quick View

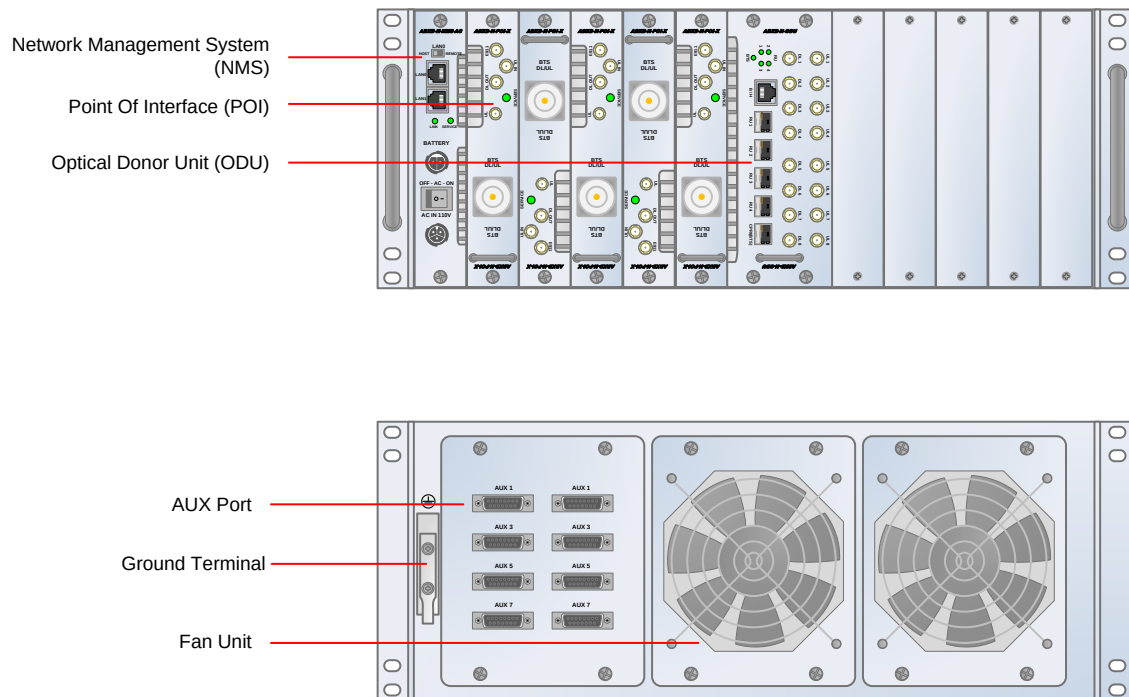


Figure 2-1 ADXD HE Quick View (Front and Rear)

1.2.2 LPR Quick View

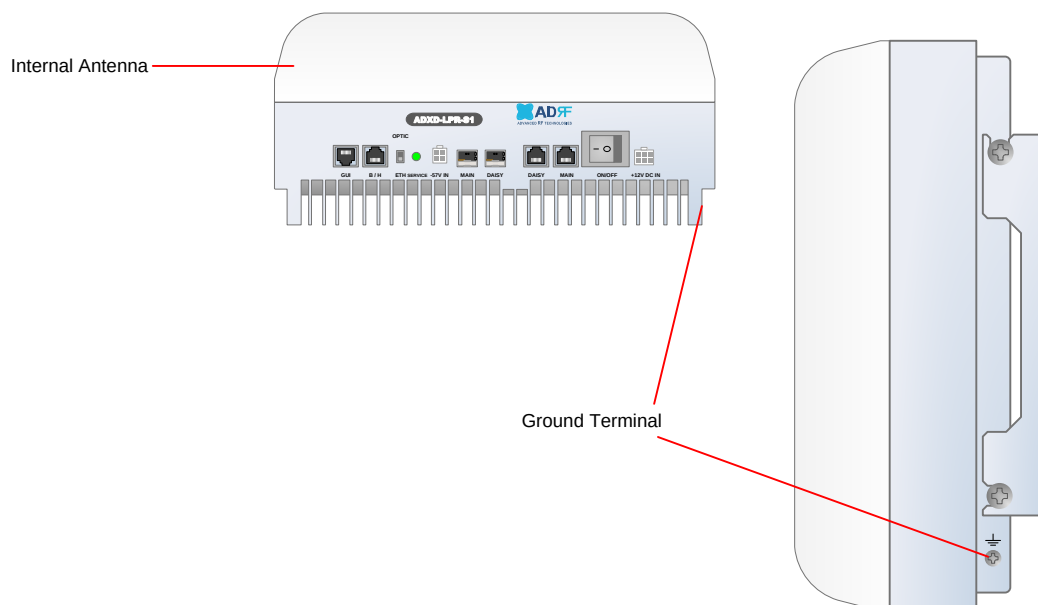


Figure 2-2 ADXD LPR Quick View (Front and Side)

1.2.3 LPR HUB Quick View

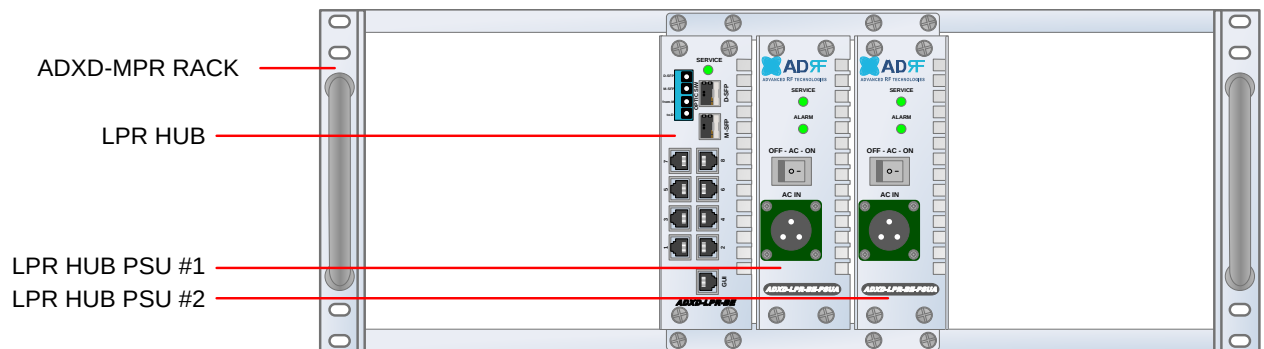


Figure 2-3 ADXD LPR HUB Quick View

1.3 Warnings and Hazards



WARNING! ELECTRIC SHOCK

Opening the ADXD-LPR could result in electric shock and may cause severe injury.



WARNING! EXPOSURE TO RF

FCC RF Radiation Exposure Statement:
This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

RF EXPOSURE & ANTENNA PLACEMENT Guidelines

Actual separation distance is determined upon gain of antenna used.

Please maintain a minimum safe distance of at least 20 cm while operating near the donor and the server antennas.

FCC Part 15.21

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

WARRANTY

Opening or tampering the ADXD DAS will void all warranties.

Lithium Battery: CAUTION. RISK OF EXPLOSION IF BATTERY IS REPLACED BY INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO INSTRUCTIONS.

Ethernet Instructions: This equipment is for indoor use only. All cabling should be limited to inside the building.

FCC Part 15 Class A

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

FCC Part 20

WARNING. THIS is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.

Laser Safety

Fiber optic ports of the ADXD LPR emit invisible laser radiation at the 1270, 1330nm wavelength window.

To avoid eye injury never look directly into the optical ports, patch cords or optical cables. Do not stare into beam or view directly with optical instruments. Always assume optical output is on.

Only technicians familiar with fiber optic safety practices and procedures should perform optical fiber connections and disconnections of the ADXD DAS and the associated cables.

The ADXD DAS complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No.50 (July26. 2001)@IEC 60825-1, Amendment2 (Jan. 2001).

Care of Fiber Optic Connectors

Do not remove the protective covers on the fiber optic connectors until a connection is ready to be made. Do not leave connectors uncovered when not connected.

The tip of the fiber optic connectors should not come into contact with any object or dust.

Refer to the cleaning procedure for information on the cleaning of the fiber tip.

Use of unauthorized antennas, cables, and/or coupling devices not conforming with ERP/EIRP and/or indoor-only restrictions is prohibited.

Home/ personal use are prohibited

Only 50 ohm rated antennas, cables and passive equipment shall be used with this remote. Any equipment attached to this device not meeting this standard may cause degradation and unwanted signals in the bi-directional system. All components connected to this device must operate in the frequency range of this device.

Only 50 ohm rated antennas, cables and passive components operating from 0.6 - 3 GHz shall be used with this device.

RSS-GEN, Sec. 7.1.2– (transmitters)

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada.

Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

RF Radiation Exposure

This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. RF exposure will be addressed at time of installation and the use of higher gain antennas require larger separation distances.

L'antenne (ou les antennes) doit être installée de façon à maintenir à tout instant une distance minimum de au moins 20 cm entre la source de radiation (l'antenne) et toute personne physique. Cet appareil ne doit pas être installé ou utilisé en conjonction avec une autre antenne ou émetteur.

2. BLOCK DIAGRAM

2.1 ADXD LPR Block Diagram

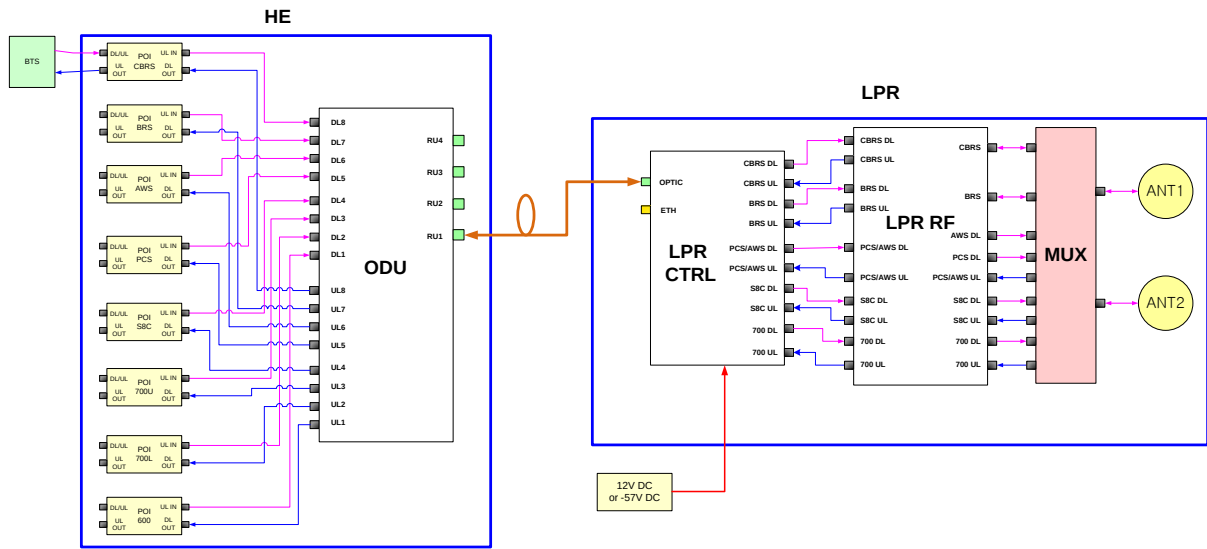


Figure 2-1 ADXD LPR Block Diagram (Optic link)

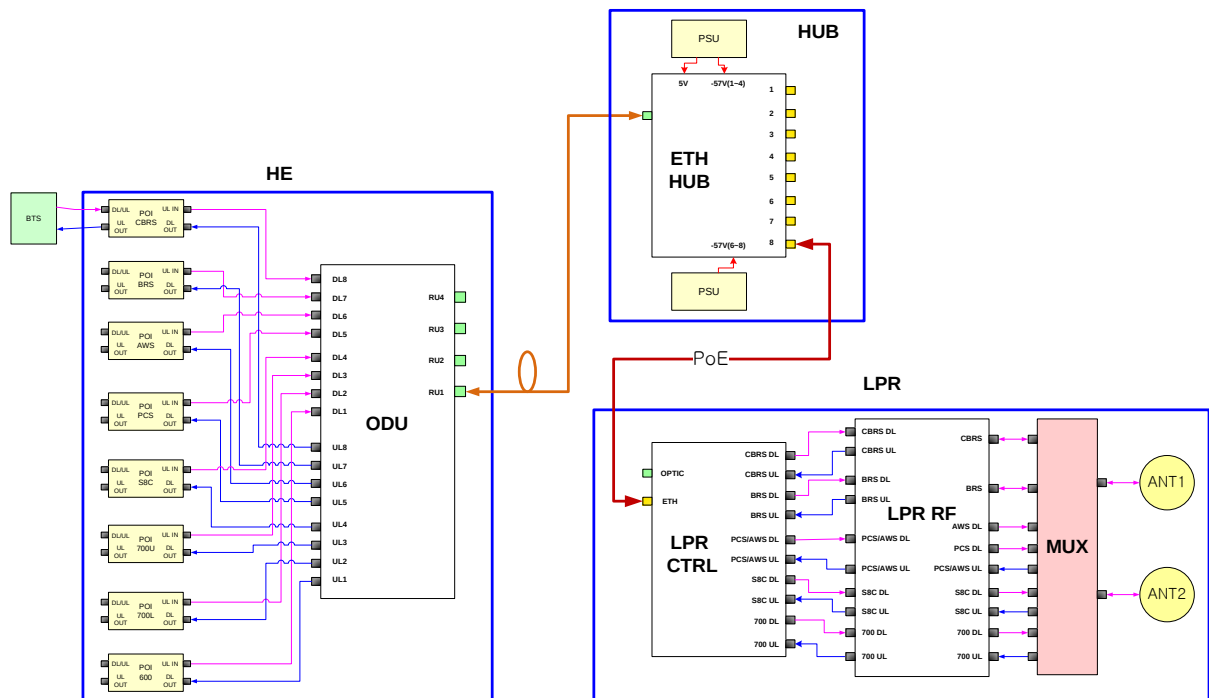


Figure 2-2 ADXD LPR Block Diagram (Ethernet link)

Note : In actual deployment, you can choose Optic link or Ethernet one, furthermore not only Optic link nor Ethernet one but also via Optic and Ethernet complex links are possible.

The topologies link for an FCC & IC regulations assessment is the Optic link (Figure 2-1).

For the PoE Ethernet link to LPR (Figure 2-2), Ethernet HUB must be needed. Ethernet link does not affect RF characteristics.

2.2 ADXD LPR Scalability

Table 2-1 ADXD LPR Scalability

Unit		Scalability	Remarks
Supported band		700F, Cellular, SMR800, PCS, AWS, BRS, CBRS	
HE	POI	No limitation in 12 slots except NMS	
	NMS	No limitation through NMS daisy chain link (1 per one HE 19" Rack)	
	ODU	No limitation in 12 slots except NMS In case of Aux, No limit in 8 Aux ports	
LPR	Optic Link	No limitation through Optic daisy chain link (1 daisy chain per one LPR)	
	HUB	8 LPR per HUB through PoE link	

3. ADXD LPR OVERVIEW

3.1 Head End

The head end unit always has to be connected to the Base Station using a direct cabled connection. This system has not been approved for use with a wireless connection via server antenna to the base station.

- Specifications
 - Size: 19.0 x 19.7 x 7inches (482 x 500 x 178 mm)
 - Weight: 71.5lbs @8 POIs, ODU and NMS
 - Power Input: 110/220VAC, -48VDC(optional)

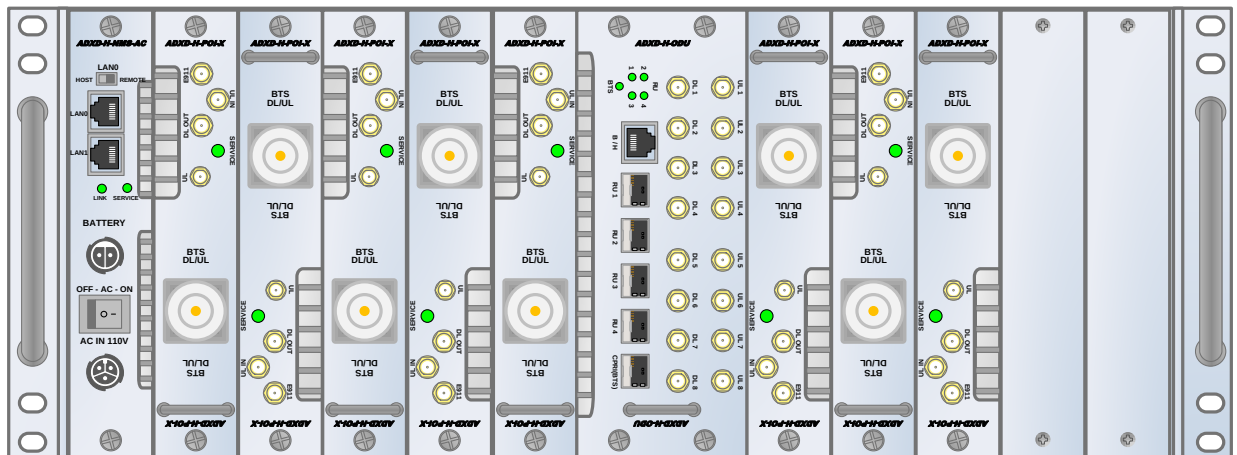


Figure 3-1 Head End Front View

3.1.1 NMS (Network Management System)

- Functions and features
 - Supports SNMP v1, v2, and v3 (get, set & trap) and web-based GUI Interface.
 - Monitors alarms and status
 - Provides control interfaces with all subordinate modules
 - Provides overall DAS structure via the auto tree update function
 - ADXD-H-NMS-AC is for AC type
 - ADXD-H-NMS-DC is for DC type
 - HE's battery backup option is available only in ADXD-H-NMS-AC
- Spec
 - Size: 19.0 x 12.1 x 1.7inches
 - Weight: 3.5lbs

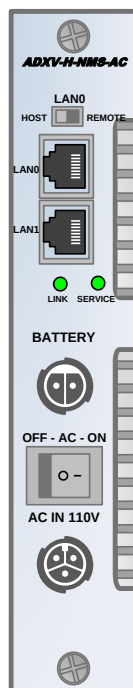


Figure 3-2 ADXD-H-NMS-AC Front View

3.1.1.1 LEDs

NMS has LEDs on the front panel as shown in Figure 3-3.

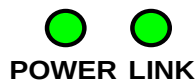


Figure 3-3 NMS LED

Table 3-1 NMS LED Specifications

ADXD DAS-NMS		Specifications
POWER	Solid Green	NMS power is ON
	OFF	NMS power is OFF
LINK	Solid Red	HE Link Fail alarm exists in the system
	Solid Green	No HE Link Fail alarms are present in the system

3.1.1.2 Ethernet Port

The Ethernet port can be used to communicate directly with the ADXD DAS using a RJ-45 crossover cable or can also be used to connect the ADXD DAS to an external modem box.

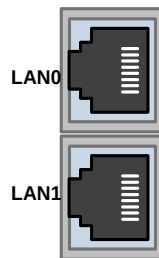


Figure 3-4 Ethernet Port

3.1.1.3 Host/Remote Switch

The Host/Remote Switch allows the user to switch the default Repeater IP, Subnet Mask, and Gateway of the repeater to an alternative setup. These settings can be adjusted by logging into the ADXD DAS in HOST mode and configuring the settings under the Modem Box Setting section under the Install Page of NMS.

Once the settings are set, flipping the switch to the REMOTE position will reboot NMS module with the new alternate settings. *Please note that when the NMS is set to the REMOTE position, DHCP is disabled and the NMS will not automatically assign an IP address to any device that connects directly to the NMS.*

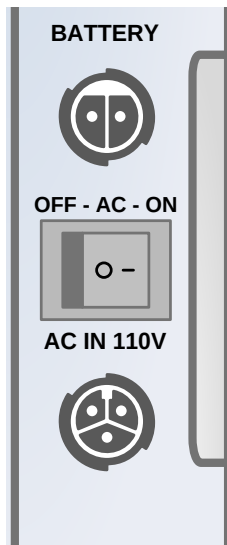


Figure 3-5 Host/Remote Switch

- Host IP: 192.168.63.1 (Fixed IP, unable to modify this IP address)
- Remote IP: 192.168.63.5 (Default IP, but can be modified in Host mode)

3.1.1.4 Power Connection

- For AC type(AC 110V)
ADXD-H-NMS-AC has two push-lock connectors for battery backup and AC power connection on the front panel.
You should verify voltage and should turn on the power after power connection necessarily



3.1.1.5 POI (ADXD-H-POI-x)



Figure 3-6 POI front View

- Functions and features
 - Provide RF interface with BTS
 - Each POI has independent gain control and filtering
 - Modular type and hot swappable
 - Supports duplex port and simplex RX port
 - Easily support additional frequency bands by adding a POI
 - Reduces complexity and overall equipment size
- Specifications
 - Size: 1.3 x 17.0 x 6.86 (in)
 - Weight: 6.2 lbs

3.1.2 POIL (ADXD-H-POIL-x)

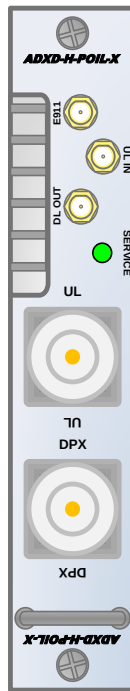


Figure 3-7 POIL front View

- Functions and features
 - Provide RF interface with BTS
 - Each POIL has independent gain control and filtering
 - Modular type and hot swappable
 - Supports duplex port and simplex RX port
 - Easily support additional frequency bands by adding a POIL
 - Reduces complexity and overall equipment size
- Specifications
 - Size: 1.3 x 17.0 x 6.86 (in)
 - Weight: 5.0 lbs

3.1.2.1 LED

POI has LEDs on the front panel as shown in Figure 3-8.



Figure 3-8 POI LED

Table 3-2 POI LED Specifications

POI		Specifications
Power	Solid Green	POI power is ON and POI/POIL is normal status
	Solid Red	POI power is ON and POI/POIL is hard fail alarm status
	Solid Yellow	POI power is ON and POI/POIL is soft fail alarm status

3.1.2.2 RF Ports

BTS DL/UL, DL OUT, UL IN, E911 Ports (refer to Figure 3-6) are located at the front of the POI

Table 3-3 POI RF port

RF Port	Function
BTS DL/UL	BTS Interface, DL duplexer Input, UL duplexer output
DL OUT	DL output
UL IN	UL input
UL OUT	UL output not passing through duplexer
E911	E911 RF interface

3.1.3 Optic Distribution Unit (ODU, ADXD-H-ODU)

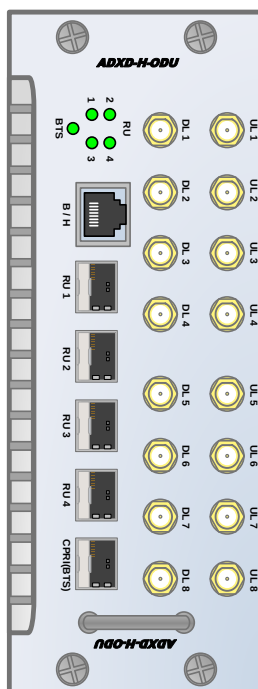


Figure 3-9 ADXD-H-ODU Front view

- Functions & Features
 - Converts signal from RF to digital optic and transports signals up to a maximum of 20Km.
 - One ADXD-H-ODU supports up to 8 bands
 - Has 4 SFP+ ports for RU connections.
- Spec
 - Size: 2.62 x 17.0 x 6.86 (in)
 - Weight: 5.6lbs

3.1.3.1 LED

The ADXD-H-ODU has the following LEDs on the front panel as shown in Figure 3-10.



Figure 3-10 ADXD-H-ODU LED

Table 3-4 ODU LED Specifications

ADXD DAS-Module		Specifications
RU 1 to RU 4	Solid Yellow	RU Link Fail alarm exists
	Solid Green	RU Link is normal

3.1.3.2 RF Ports

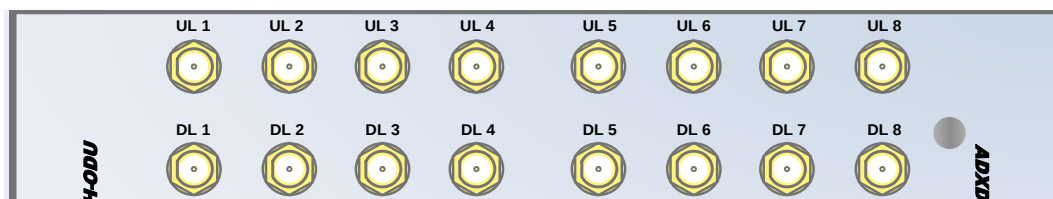


Figure 3-11 ODU RF Ports

3.1.3.2.1 DL / UL

The downlink signal received from specific POI's DL OUT port is transferred to the specific DL port at ODU. The specific UL port connects to specific POI's UL IN port.

3.1.3.3 Optic Ports



Figure 3-12 ODU Optic Ports

The ADXD-H-ODU has 4 SFP+ ports and can support up to 4 RUs.

3.2 LPR (Low Power RU)

- Specifications
 - Size: 11.43 x 5.52 x 14.78 in (290 x 140 x 375 mm)
 - Weight: 24.3 lbs (11.0 Kg)
 - Power Input: -12 or -48VDC (In case of Optic link), PoE(In case of Ethernet link)

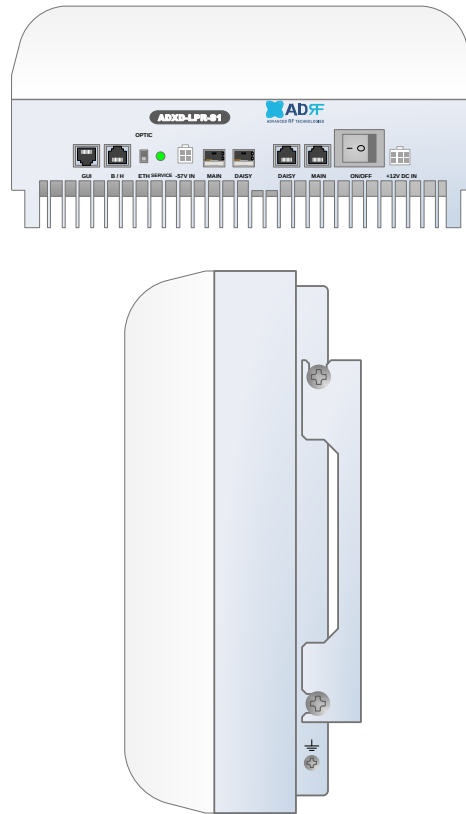


Figure 3-13 ADXD-LPR Bottom and Side View

3.2.1.1 LPR Connection

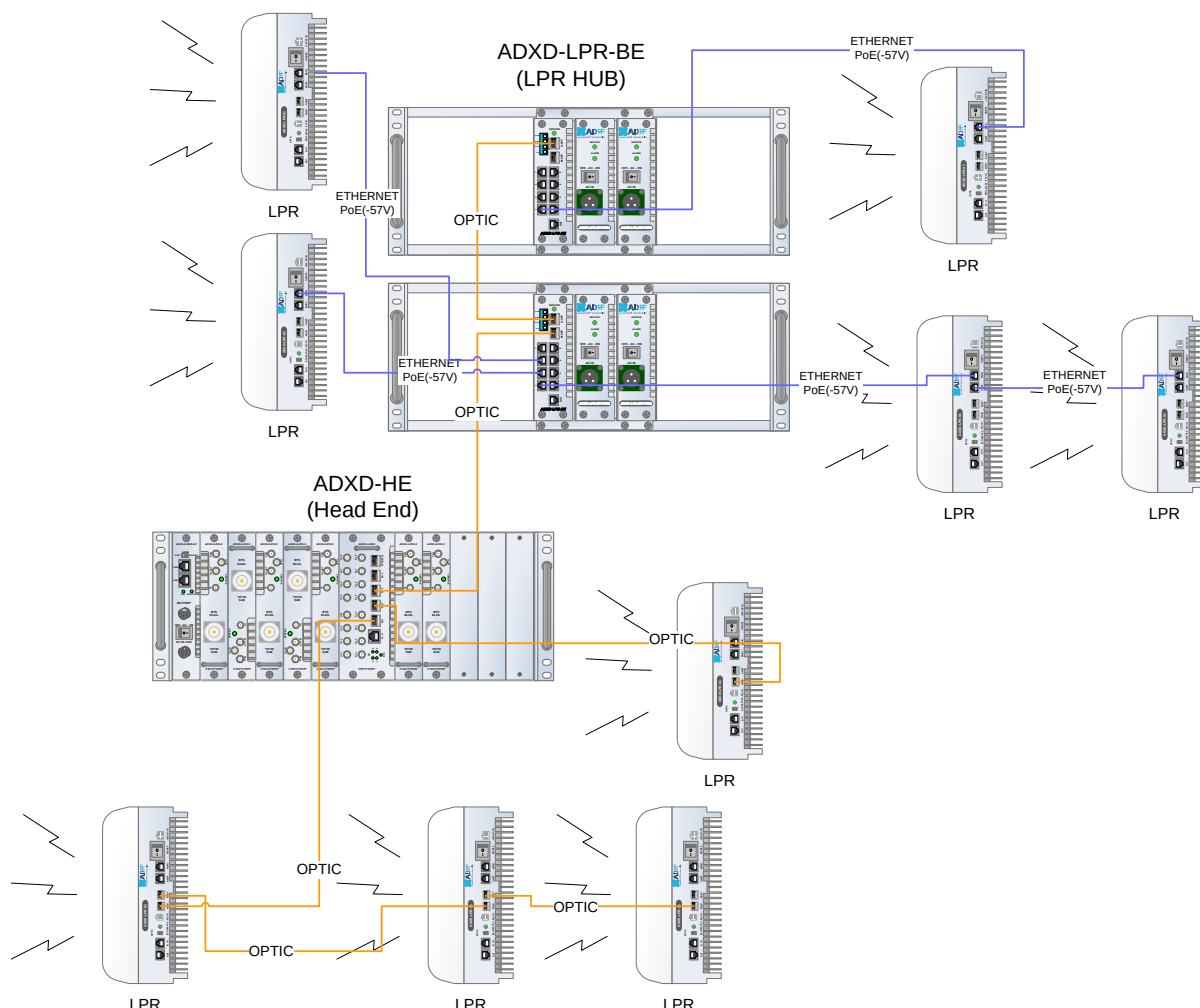


Figure 3-14 LPR Connection Diagram

3.2.1.2 Ports and Switches

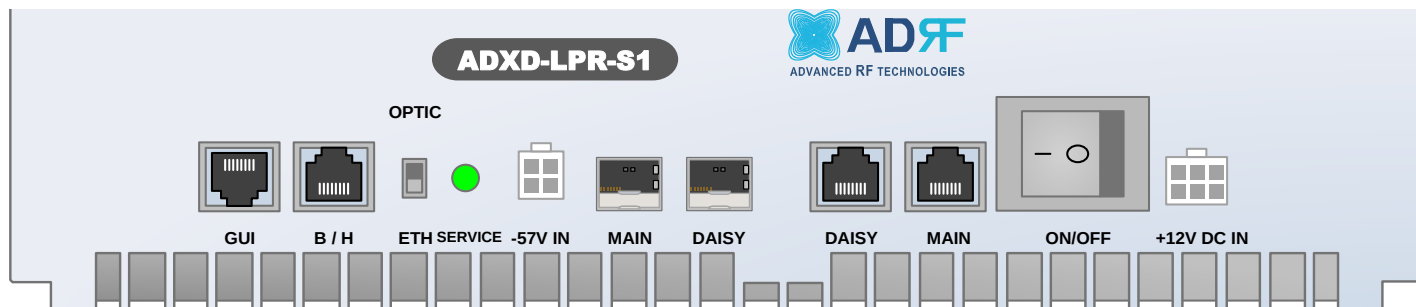


Figure 3-15 LPR Ports and Switches

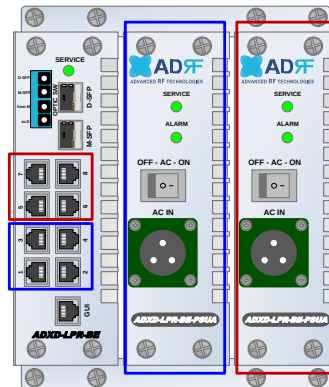
- GUI: This port for GUI
- B/H: This port for Ethernet Backhaul
- OPTIC/ETH selection switch: Selection for Optic or Ethernet HUB link

- -57V IN and +12V DC: In case of Optic link, you should use one of those power types.
- MAIN (Main SFP): Optic port connects to HE- ODU
- DAISY (Daisy SFP): Optic port connects to another LPR for daisy chain
- MAIN(Main Ethernet): Ethernet port connects to LPR HUB
- DAISY(Daisy Ethernet): Ethernet port connects to another LPR for daisy chain
- ON/OFF switch: Power Switch
- RF Port: There is no exposed RF port due to Internal Antenna

3.2.1.3 LED (Service)

LED color	Status
Green	Normal
Yellow	Soft fail
Red	Hard fail

3.3 LPR HUB



- Power Input: 110VAC
- Chassis: 5.83 x 14.34 x 6.86 in (148 x 364 x 174 mm)
- Ethernet Hub: 1.9 x 13.44 x 5.91 in (48 x 341 x 150 mm)
- Hub PSU: 1.9 x 13.44 x 5.91 in (48 x 341 x 150 mm)

LPR HUB has 8 Ethernet ports to link to LPRs via PoE and is connected to HE ODU via optic cable. Left PSU is for #1 to #4 port PoE power distribution and right one is for #5 to #8 port.

4. MOUNTING METHOD

4.1 Head End

4.1.1 Rack Mount

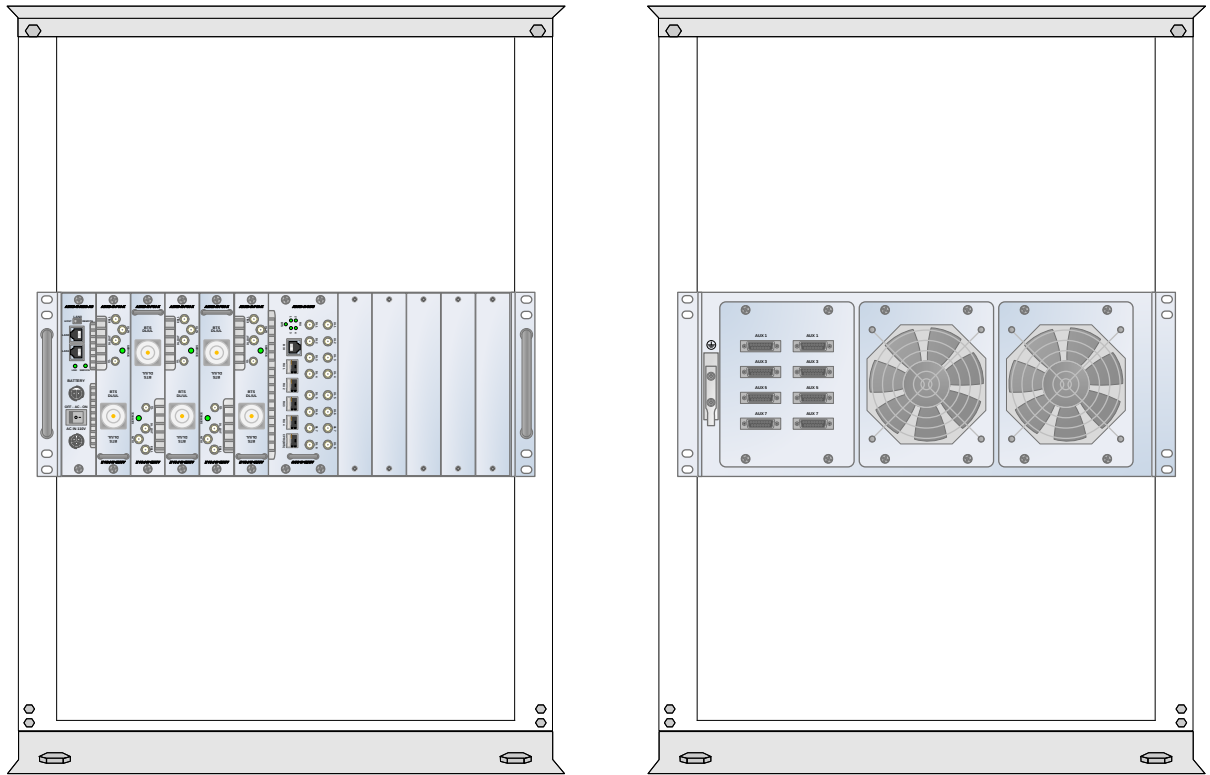


Figure 4-1 HE Rack Mount (Front & Rear view)

4.2 LPR

4.2.1 Wall Mount

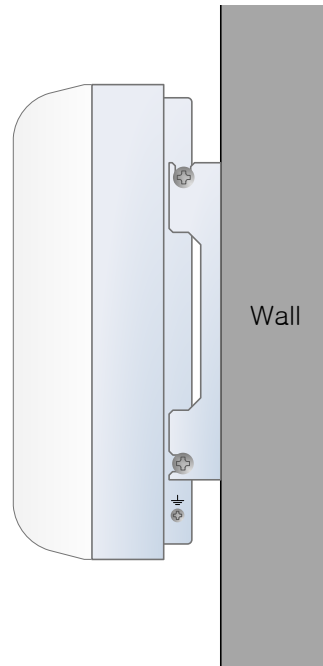


Figure 4-2 LPR Wall Mount

5. INSTALLATION

5.1 Pre-Installation Inspection

Please follow these procedures before installing ADXD equipment:

- Verify the number of packages received against the packing list.
- Check all packages for external damage; report any external damage to the shipping carrier. If there is damage, a shipping agent should be present before you unpack and inspect the contents because damage caused during transit is the responsibility of the shipping agent.
- Open and check each package against the packing list. If any items are missing, contact ADRF customer service.
- If damage is discovered at the time of installation, contact the shipping agent.
- Verify the AC voltage with DVM (Volt meter) is 110VAC or 220VAC. Incorrect AC voltage can damage the ADXD HE equipment.
- This power of this system shall be supplied through wiring installed in a normal building. If powered directly from the mains distribution system, it shall be used additional protection, such as overvoltage protection device.
- Over voltage category(OVC) & Pollution degree(PD)

Over voltage category (OVC)	OVC II
Pollution degree (PD)	PD2

5.2 ADXD LPR Installation Procedure

5.2.1 HE Installation Procedure



CAUTION: ADXD DAS HE should be installed inside building only.

5.2.1.1 Installing a ADXD DAS HE in a rack

The ADXD HE chassis mounts in a standard 19" (483mm) equipment rack. Allow clearance of 3" (76mm) at the front and rear, and 2" (51mm) on both sides for air circulation. No top or bottom clearance is required.

- Consideration:
 - Eight mounting holes are located on 4 corners of ADXD HE to attach it to the 19" rack. The ADXD HE must be securely attached to a rack that can support the weight of the ADX.
- Mount procedure
 - The following steps should be followed while mounting the ADXD HE
 - > Verify that the HE and Mounting holes are in good condition
 - > Set the ADXD DAS HE against the 19" rack and secure the unit with screws
 - > Verify that ADXD HE is securely attached
 - > Connect the GND cable
 - > Connect the RF cable
 - > Connect the Power
 - > Connect the Optic cable

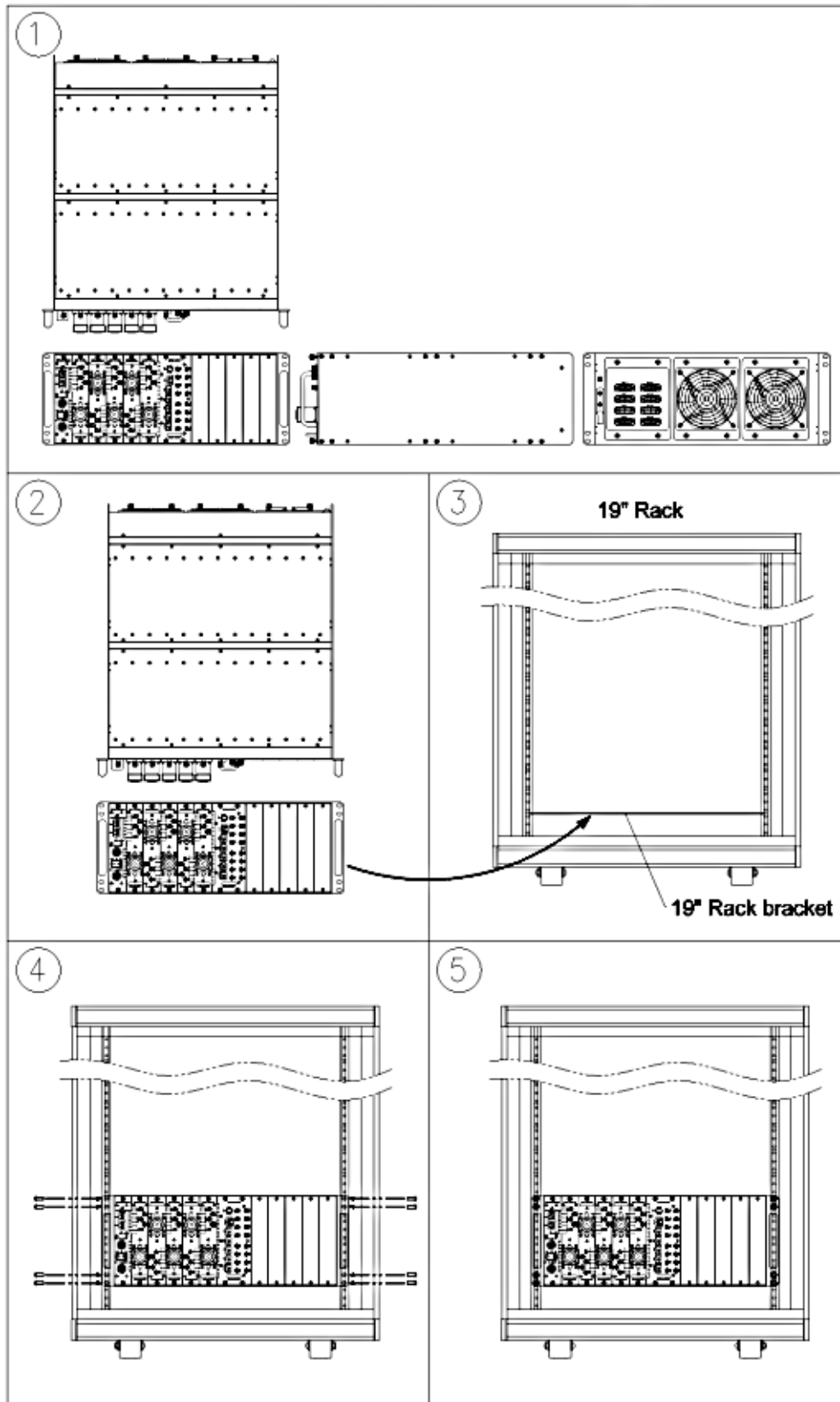


Figure 5-1 HE Installation Procedure

5.2.2 LPR Installation Procedure (Wall mount)

- Procedure
 - The following steps should be followed while mounting the ADXD-LPR
 - > > Verify that the ADXD-LPR and mounting hole are in good condition
 - > > Place the ADXD-LPR mounting template up against the wall and mark of mount holes
 - > > Mount the ADXD-LPR to wall use the four mounting holes on the wall mount bracket
 - > > Connect the GND cable
 - > > Connect the Power cable in case of Optic link

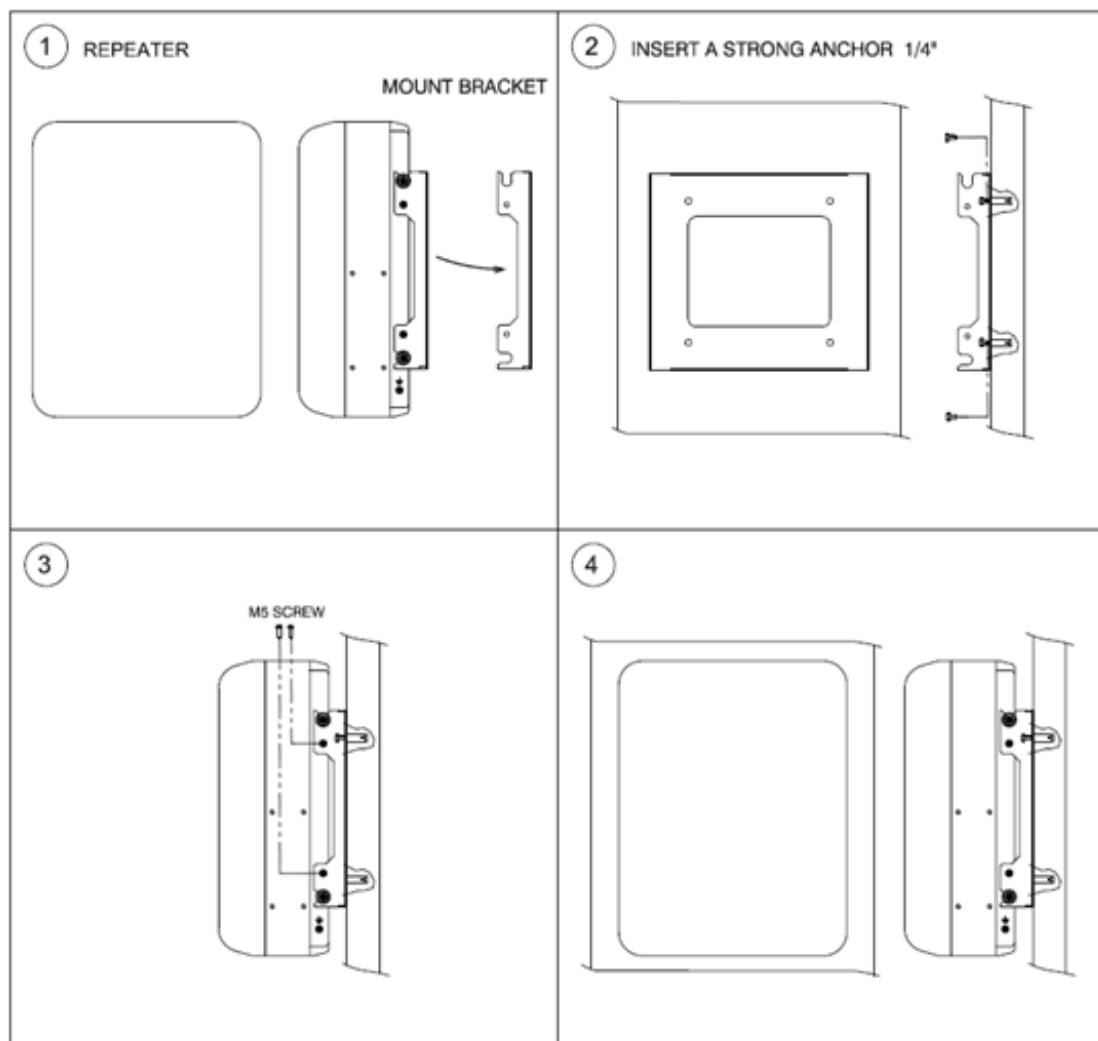


Figure 5-2 LPR Installation Procedure

5.2.3 RF coaxial cable and antenna connection

- > The coaxial cables are connected to the antenna ports of LPRs. Before connection, check the VSWR value of coaxial cable whether it is within specification using Sitemaster..
- > At this time, check if the Return loss or VSWR is proper
- > The part of antenna connection fasten to port not to be loosed and not to be injected the dusty and insects
- > The antenna connected to LPR is only serviced in in-building

5.3 Grounding

A ground cable is included in the box. The grounding terminals are located at the rear of the ADXD HE and LPR. The grounding cable should be properly connected before powering on the equipment.

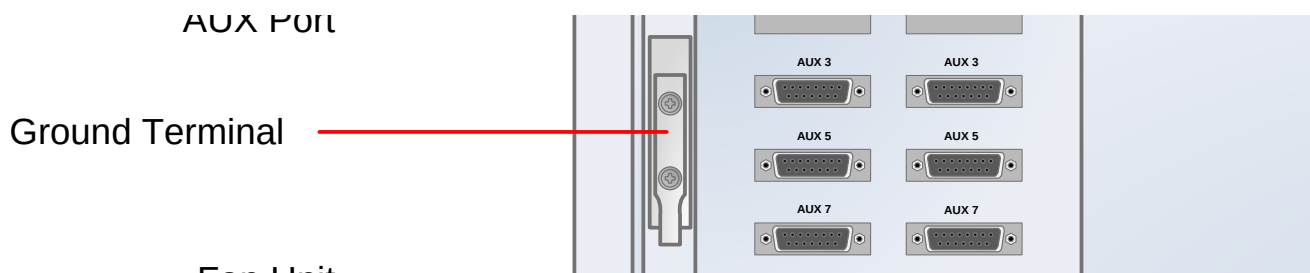


Figure 5-3 HE Ground Cable Connection, Protective Earthing Conductor (HE chassis rear side)

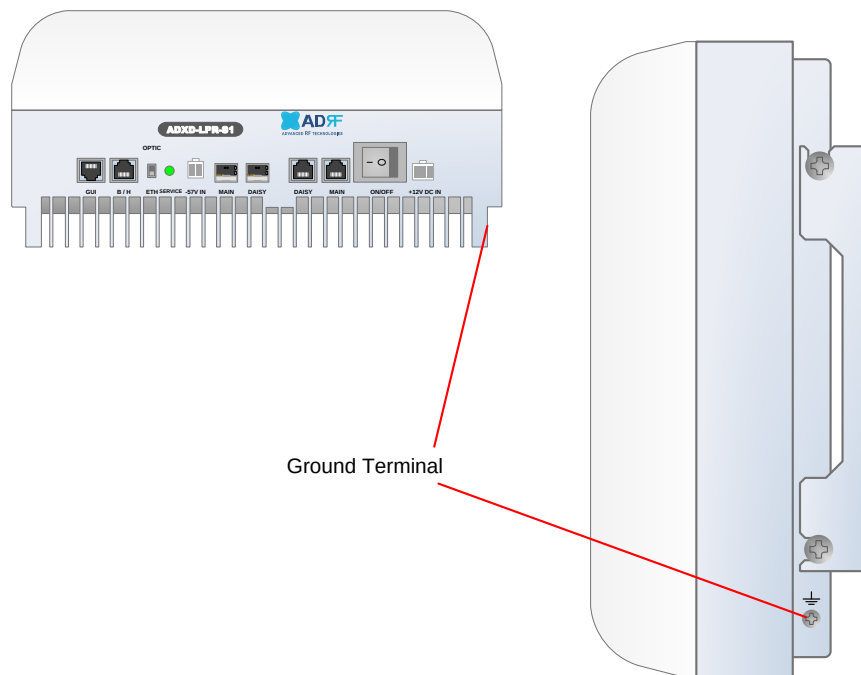


Figure 5-4 LPR Ground Cable Connection, Protective Earthing Conductor (LPR left/right side)

Round terminals located on the side of a 1.25mm²(16AWG) or more wires Using permanently connected to earth(Protective earthing conductor).

5.4 Optic Port Cleaning

- We recommend cleaning the optic connectors using the proper optical cleaning tools in a dry environment as needed.
- When optic connector are not in use, the port should be covered with a protective dust cap.

6. WEB-GUI

6.1 Web-GUI Setup

The Web-GUI allows the user to communicate with the DAS system either locally or remotely. To connect to the DAS system locally, you will need a laptop with an Ethernet port and a RJ-45 crossover cable. To connect to the DAS system remotely, you will need to have an active internet connection and the ADXD system must have an external modem box connected to the ADX.

6.1.1 DAS system/PC Connection Using Web-GUI

- Verify that your Local Area Connection is set to Obtain an IP address automatically under the Internet Protocol (TCP/IP) properties
 - If you are connecting to the unit remotely (use of a modem), then skip this and next step.
- Connect the RJ-45 crossover cable between the laptop's Ethernet port and the repeater's Ethernet port
- Launch an Internet Browser
- Type the following IP address into the address bar of Microsoft Internet Explorer: <http://192.168.63.1>
 - If you are connecting to the unit remotely, then type the IP address of the modem to connect to the unit
- The following login screen will appear:

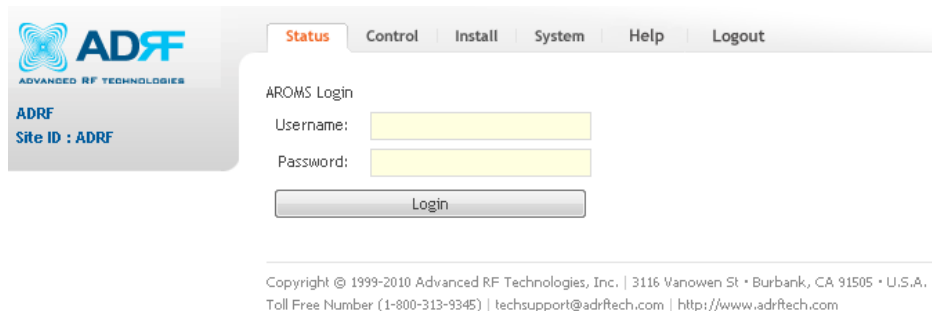


Figure 6-1 Login screen

If you are not the Administrator, please type in your assigned username & password which you should have received from the Administrator.

Table 6-1 Account Information for Login

Account type	Show items	Control Items	Default ID	Default Password
Administrator	all Items	all items	admin	admin
User	restricted items	restricted items	adrf	adrf
Guest	restricted items	read-only	guest	guest

6.2 Administrator/User Mode

6.2.1 Common

6.2.1.1 Navigation Tree

The navigation tree located on the left hand side of the Web-GUI allows the user to switch between the various modules that are connected to the system.

Table 6-2 Navigation tree

Parameters	Description
	Expands the entire navigation tree
	Collapses the entire navigation tree
	The module has the expandable subordinate modules
	The branch is currently expanded
	The module has soft fail alarm
	The module has hard fail alarm
	The module has no alarms (normal)
	The selected module will have orange colored text

6.2.1.2 Power Status

Display the power source that is currently being used.

Table 6-3 Power Supply Status

Input Power Status	Display Image
AC	
Battery	

6.2.1.3 Commissioning Status

Display whether or not the module has successfully been commissioned.

Table 6-4 Commissioning ICON

Status	Display Image
Commissioned	
Not-Commissioned	

6.2.1.4 Information

ADRF Remote Operation & Management System

Information

Serial Number	SN_NMS
Latitude	N777.777777
Longitude	E777.777777
Firmware	13000F01002X
Web GUI	X0.0.35

Location

ADRF
3116 Vanowen St.
burbank CA 91505

Description

nms_desc.

Technical Support

Phone: 1-800-313-9345
E-mail: techsupport@adrftech.com

Installer Contact Info

Company: ADRF
Installer: Installer
Phone: 800-313-9345
E-mail: techsupport@adrftech.com

Figure 6-2 ADXD LPR General Information

- Information: Displays the serial number, latitude/longitude, firmware version of selected module, and Web GUI version of the NMS.
- Location: Displays the address where the ADXD DAS is installed.
- Description: Displays the description of selected module. The description of each module can be edited from the Install tab. It is recommended to use the location of the module as the description. This description information can be seen when hovering over the device tree in order to easily identify each component.
- Technical Support: Displays ADRF's Technical Support contact information.
- Installer Contact Info: Displays the contact information of the installer.

6.2.2 Status Tab

6.2.2.1 Status – NMS

The NMS Status page provides an overall view of how the system is performing. From the NMS Status page, the user can see what modules are connected to ADXD DAS. In addition, the user can see if any alarms are present in the system and also the commissioning status of each module.

6.2.2.1.1 System Summary

The Summary section provides the user with the number of components physically connected, the number of soft/hard/link fails present in the system, and also the number of commissioned and non-commissioned components.

Table 6-5 System Summary Description

Parameters	Description
Connected	Display the number of modules physically connected to ADXD DAS
Soft Fail	Display the number of soft fail present on each module
Hard Fail	Display the number of hard fail present on each module
Link Fail	Display the number of link fail present on each module
Not Commissioned	Display the number of non-commissioned or commission failed module
Commissioned	Display the number of successfully commissioned module

6.2.2.1.2

6.2.2.1.3 HE Alarm Status

Display the alarm status of each HE component.

6.2.2.1.4 HE Commissioning Status

Display commissioning status of each HE component.

6.2.2.1.5 Alarm

Displays alarm status of the NMS. If an alarm is present in the system, the color of the system alarm tab will change according to the type of failure.

Alarm

System	
Fan Alarm #1	Over Temperature
Fan Alarm #2	Under Temperature
Fan Alarm #3	
AC Fail	DC Fail
Battery Fail	Battery Not Installed
Battery Low	Battery Not Charge

 Normal	 Soft Fail	 Hard Fail	 Link Fail
--	---	--	---

6.2.2.2 Status – POI

6.2.2.2.1 Frequency

Frequency

poiTESTBANDNAME	Downlink	Uplink
PCS	1930.0 ~ 1995.0 (1962.5)	1850.0 ~ 1915.0 (1882.5)

Display the band frequency status of the connected POI

6.2.2.2.2 Power & Attenuation

Power & Atten (POI)

---	Downlink	Uplink
Input	--.-	--.-
Gain[dB]	-2.0	14.0
Atten[dB]	11.0	11.0
Output[dBm]	--.-	--.-

Displays the detected Input, Gain, Attenuation and Output values of the connected POI

6.2.2.3 Status – ODU

6.2.2.3.1 Alarm

Displays alarm status of the ODU. If an alarm is present in the system, the color of the system alarm tab will change according to the type of failure.

6.2.2.3.2 Frequency Plan

Frequency Plan

Port Setting	Carrier	DL Frequency	UL Frequency
700L SISO None	#1	1953.12 ~ 1971.88 (1962.50)	1923.12 ~ 1941.88 (1932.50)
	#2	1956.88 ~ 1968.12 (1962.50)	1926.88 ~ 1938.12 (1932.50)
	#3	1958.12 ~ 1966.88 (1962.50)	1928.12 ~ 1936.88 (1932.50)
	#4	1952.50 ~ 1972.50 (1962.50)	1922.50 ~ 1942.50 (1932.50)
700L SISO None	#5	1954.12 ~ 1972.88 (1963.50)	1924.12 ~ 1942.88 (1933.50)
	#6	1959.12 ~ 1967.88 (1963.50)	1929.12 ~ 1937.88 (1933.50)
	#7	1956.62 ~ 1970.38 (1963.50)	1926.62 ~ 1940.38 (1933.50)
	#8	1961.00 ~ 1966.00 (1963.50)	1931.00 ~ 1936.00 (1933.50)

Displays information about ports, carriers, and frequencies set by ODU by band

6.2.2.4 Status – LPR

6.2.2.4.1 RM Selection

RM #1 700F	RM#2 S8C	RM#3 PCS	RM#4 AWS	RM#5 BT/CBRS
------------	----------	----------	----------	--------------

Display the selected RM. This section allows the user to specify the selection.

6.2.2.4.2 Frequency

6.2.2.4.3 Power & Attenuation

Power & Atten (#1-700F)

---	Downlink	Uplink
Input	25.0	-40.0
Gain[dB]	--.-	--.-
Atten[dB]	--.-	--.-
Output[dBm]	-4.0	-50.0

Displays the detected Input, Gain, Attenuation and Output values of the connected RM.

6.2.2.4.4 frequency

Frequency (#1-700F)

-	Downlink			Uplink		
	Start	Center	End	Start	Center	End

Displays information about ports, carriers, and frequencies status.

6.2.2.4.5 Alarm

Alarm

Common Alarm		RM Alarm					
Over Temperature	Optic Fail #1	DL OverPower	1	2	3	4	5
Under Temperature	Optic Fail #2	UL Input Overload	1	2	3	4	5
PLL Lock Fail		DL Low Output	1	2	3	4	5
System Halt		Out Of Sync	-	-	-	-	5
		System Halt	1	2	3	4	5

Displays the alarm status of the LPR. If an alarm is present in the system, the color of the alarm tab will change according to the type of failure.

6.2.3 Control/Install Tab

6.2.3.1 Control/Install – NMS

6.2.3.1.1 SNMP

Figure 6-3 SNMP

In the SNMP section, you can configure SNMP Trap operation, Trap Interval, and Trap Manager. The Manager IP field is where the user enters the IP address of the NOC system used to monitor SNMP traps. You can also configure other settings for the Trap.

6.2.3.1.2 Location

This section allows the user to input the latitude and the longitude of the repeater.

Figure 6-4 Location Setting (Install – NMS)

- Select N or S from the dropdown menu for Latitude
- Select E or W from the dropdown menu for Longitude
- Input the first 3 numbers of the latitude/longitude in the text area after the “+” and before the “.”
- Input the last 6 numbers of the latitude/longitude in the text area after the “.”

6.2.3.1.3 Remote Ethernet Setting

In this section, you can specify alternate IP, subnet mask, and gateway settings. This setting is enabled after the host / remote switch is set to the remote location and the static setting (Use the following IP Address) is set. the LAN1 setting is also used to configure the daisy chain system.

Figure 6-5 Remote Ethernet Settings

6.2.3.1.4 Information

The Information section allows you to specify the Site ID and Description. the Site-ID is the code that is used to identify a particular module.

Figure 6-6 Information

6.2.3.1.5 Location Info / Installer Info

This section allows the user to specify the address of the repeater and also the information of the installer.

Figure 6-7 Location Info / Installer Info

6.2.3.1.6 Date & Time

This section allows the user to specify the current date and time.

Date & Time

Date: 12/09/2011

Time: 17 0 32

Set

Figure 6-8 Date & Time Setting

6.2.3.1.7 Alarm Test

Alarm Test

OFF

Apply

This is the system alarm test item. It can be set to Off to end the test or set to Soft / Hard / Normal.

6.2.3.2 Control/Install – POI

6.2.3.2.1 Status

Status

Path	Input	Gain	Atten	Output
Downlink	---	-2.0	11.0	---
Uplink	---	14.0	11.0	---

Uptime : 63 days 11:13:34

Displays the detected Input, Gain, Attenuation and Output values

6.2.3.2.2 Manual Commissioning

Manual Commissioning

Commissioning Status	Progress	Commissioning Date
Commissioned		03/18/2019 15:16:50

Downlink Input Commissioning Level [dBm] 10.0

Uplink output commissioning level [dBm] -26.0

Band Commissioning

Apply

Set up the Commission manually.

6.2.3.2.3 General Setting

General Setting

☒ DL On

DL Atten [dB] 11.0

DL Output ALC Level [dBm] -3.0

DL Output ALC Offset [dB] 7.0

DL Release Time [sec] 1.0

☒ UL On

UL Atten [dB] 11.0

UL Output ALC Level [dBm] -15.0

UL Output ALC Offset [dB] 5.0

UL Release Time [sec] 1.0

DL/UL Atten Balance Off

Apply

6.2.3.2.4 Alarm Setting

Alarm Setting ?

DL Signal Low [dBm]	-5.0 ▼
DL Signal Not Detected [dBm]	-10.0 ▼
UL Over Power Level [dBm]	0.0 ▼
UL Over Power Duration [Sec]	4.0 ▼

Apply

Set alarm options.

6.2.3.2.5 Information

Information ?

Description	att
Band Name	poiTESTBANDNAME

Apply

Set description and Band Name of product.

6.2.3.2.6 SISO/MIMO ID

SISO/MIMO ID ?

☒ SISO
 ☐ MIMO - 1
 ☐ MIMO - 2

Apply

Set SISO, MIMO options

6.2.3.2.7 Filter Type

Filter Type ?

☒ Duplex
 ☐ Simplex

Apply

Set Filter Type options

6.2.3.3 Control/Install – ODU

6.2.3.3.1 Port Setting

Note: For this project (ADXD-LPR), only SISO is covered.

Port Setting ?

Occupied Resource		80		Remaining Resource		40	
number	Band	Sector	MIMO	Description	Occupied Carrier		
Port #1	700L	None	SISO	T_PORT1	4		
Port #2	700L	None	SISO	T_PORT2	4		
Port #3	700L	None	SISO	T_PORT3	4		
Port #4	700L	None	SISO	T_PORT4	4		
Port #5	700U	None	SISO	T_PORT5	0		
Port #6	700U	None	SISO	T_PORT6	4		
Port #7	700U	None	SISO	T_PORT7	4		
Port #8	700U	None	SISO	T_PORT8	4		

Apply

Set Band, Sector, Mimo, Description for each port.

6.2.3.3.2 Frequency Plan Setting

Frequency Plan Setting ?

Occupied Carrier		28		Remaining Carrier		4	
Port #1	Port #2	Port #3	Port #4	Port #5	Port #6	Port #7	Port #8
Band	700L			Frequency Range	728.00 ~ 746.00		
Sector	None			MIMO	SISO		
Carrier #1	Center Frequency			Band Width			
	1962.5			CDMA-18.75 MHz			
	Downlink			Uplink			
	Start	Center	End	Start	Center	End	
	1953.1	1962.5	1971.9	1923.1	1932.5	1941.9	
Carrier #2	Center Frequency			Band Width			
	1962.5			CDMA-11.25 MHz			
	Downlink			Uplink			
	Start	Center	End	Start	Center	End	
	1956.9	1962.5	1968.1	1926.9	1932.5	1938.1	
Carrier #3	Center Frequency			Band Width			
	1962.5			CDMA-8.75 MHz			
	Downlink			Uplink			
	Start	Center	End	Start	Center	End	
	1958.1	1962.5	1966.9	1928.1	1932.5	1936.9	
Carrier #4	Center Frequency			Band Width			
	1962.5			CDMA-20.00 MHz			
	Downlink			Uplink			
	Start	Center	End	Start	Center	End	
	1952.5	1962.5	1972.5	1922.5	1932.5	1942.5	

Apply

Set frequency and bandwidth for each carrier for each port you set.

6.2.3.3.3 Information

Information ?

Description

Apply

Set description of product.

6.2.3.4 Control/Install – LRP

6.2.3.4.1 RM Selection

RM #1 700F	RM#2 S8C	RM#3 PCS	RM#4 AWS	RM#5 BT/CBRS
------------	----------	----------	----------	--------------

Display the selected RM. This section allows the user to specify the selection.

6.2.3.4.2 Information

Information ?

Band Name

Set band name of RM.

6.2.3.4.3 Frequency Setting

Frequency Setting (#2-S8C) ?

Port Select Mode	☐ Auto ☒ Manual	Port Select	T_PORT1
Sector	None	MIMO	SISO

Carrier No.	Downlink			Uplink		
	Start	Center	End	Start	Center	End
Enable	-	-	-	-	-	-
Enable	-	-	-	-	-	-
Enable	-	-	-	-	-	-
Enable	-	-	-	-	-	-

Set Port, Sector, MIMO and Carrier.

6.2.3.4.4 Status

Status (#2-S8C) ?

Path	Input	Gain	Atten	Output
Downlink	--.-	--.-	--.-	--.-
Uplink	--.-	--.-	--.-	--.-

Uptime : 0 days 00:13:18

Display the detected level of Input, Gain, Atten and Output level.

6.2.3.4.5 Manual Commissioning

Manual Commissioning (#2-S8C) ?

Commissioning Status	Progress	Commissioning Date
-		-

DL Output Level [dBm] 15.5 ▼

Apply

Set up the Commission manually.

6.2.3.4.6 General Setting

General Setting (#2-S8C) ?

☐ DL On	☐ UL On
DL Atten [dB] 19.5 ▼	UL Atten [dB] 20.0 ▼
DL Output ALC Level [dBm] 18.0 ▼	UL Output ALC Level [dBm] -12.0 ▼
DL Output ALC Offset [dB] 0.0 ▼	UL Output ALC Offset [dB] 0.0 ▼
DL Release Time [sec] 1.0 ▼	UL Release Time [sec] 1.0 ▼
	DL/UL Atten Balance On ▼

Apply

Control and manage general settings.

6.2.3.4.7 Alarm Setting

Alarm Setting (#2-S8C) ?

Downlink Overpower [dBm] 18.0 ▼

Downlink Low Output [dBm] 8.0 ▼

Apply

Set alarm options.

6.2.3.4.8 System

System ?

Reboot Factory Settings

Execute device reboot or set controls to factory settings.

6.2.3.4.9 Information

Information ?

Description Description

Apply

Set description of product.

6.2.4 Tools

6.2.4.1 Inventory (NMS, ODU)

Inventory

Filter Model Commissioning Status SISO/MIMO ID
 not-selected not-selected not-selected Apply Filter

Model Name	Serial Number	Description	Commissioning Status	Group	Ungroup	SISO / MIMO ID
☐ [0]H-NMS-AC	SW_TEST_NMS_SN (SW_TEST_SHELF_SN)	a	-	-	-	-
☐ [5]H-ODU	ODU_SN	b	-	-	-	-
☐ [1-1]R-ORU		c	-	-	-	-
☐ [1]R-337F			Not Commissioned	-	-	SISO

Sort RMs Sort NMSs Apply

Use the Inventory function for connected products in the system.

6.2.4.2 Commissioning (NMS)

Commissioning

Filter Model Commissioning Status SISO/MIMO ID
 not-selected not-selected not-selected Apply Filter

Model Name	Description	Commissioning Status	Current / Commissioning			SISO / MIMO ID
			Input Level (dBm)	Input Ratio (%)	Output Level (dBm)	
☐ [0]H-NMS-AC	a	-	-	-	-	-
☐ [5]H-ODU	b	-	-	-	-	-
☐ [1-1]R-ORU	c	-	-	-	-	-
☐ [1]R-337F		Not Commissioned	---	---/ 10.0 Atten (8.0)		SISO

Stop All Apply

Use the Commissioning function for the connected products of the system.

6.2.4.3 History (NMS, ODU, ORU, RM, LPR)

History

History Log Save

Management

- history_20190321_104704.csv
- history_20190320_020658.csv
- history_20061204_165121.csv

Download Delete

current 3 exist.

History Graph

LD Power (dBo) PD Power (dBo)

Atten DL (dB)

Marker

Maker	Level
Peak	---
Marker 1	---
Marker 2	---
Marker 3	---

Apply

For each item, check the recorded data of the previous values.

6.2.5 System

The System tab allows the user to perform firmware updates, upload closeout packages, view any changes to the system, backup existing configuration, and add/remove user accounts, and change the login credentials of the Administrator.

6.2.5.1 Account

6.2.5.1.1 Account Management (Admin Only)

The Account Management section allows the Administrator to delete any user/guest account. Please note that the Account Management section is only available if you are logged into the system as the Administrator. To delete a user/guest account click on the Account Management link and under the Delete column, click on the delete button.

Account Management / New account / Change Password

No	Login Name	Password	Status	Last Login	Edit
1	admin	admin	administrator	2012-02-28 18:37:53	-
2	adrf	adrf	user	2012-02-28 00:47:55	delete
3	guest	guest	guest	1970-01-01 00:00:00	delete

Figure 6-9 Account Management

6.2.5.1.2 New Account (Admin Only)

The New account section allows the Administrator to create a new user/guest account. Please note that the new account section is only available if you are logged into the system as the Administrator. To create a new user/guest account click on the new account link and fill in the fields highlighted in yellow as shown below.

Account | Logs | Update | System Information | Backup/Restore | Network Service | SNMP

Account Management / New account / Change Password

① User Name

② User Group

③ Password

④ Confirm password

Figure 6-10 New Account

6.2.5.2 Logs

6.2.5.2.1 Event Log

This section displays system events that have taken place. The Event Log displays who has made the changes, the time and date of when the event took place, and what changes were made to the system. The System Log tracks the following events:

- System Initiation
- Alarm Set
- Alarm Clear

6.2.5.2.1 User Log

This section tracks user activity within the system. The User Log displays who has made the changes, the time and date of when the event took place, and what changes were made to the system. The User Log tracks the following items:

- Log in / Log out activity
- Changes to gain/attenuation/output values
- System event generated by user(firmware update, backup/resote, create/delete account)
- DAS Navigation Tree Lock/Unlock
- Description change
- Repeater/installer information change
- Setting date/time

Seq.	Date / Time	Source	Description	Username	Log Message
2	2012-02-16 / 08:31:29	NMS	-----	adrf	Logged-In
1	2012-02-16 / 08:29:38	NMS	-----	admin	Logged-In

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Figure 6-11 User Log

6.2.5.3 Updates

- To perform a firmware update, click on the System: Update tab and the following screen will show up.

Description	Current	Available	Progress	Comment
☐ [0]H-NMS-AC	a	7X00C0	-	-
☐ [1]H-CHASSIS	a	F.0.07	F.0.06	-
☐ [5]H-ODU	b	7X00D1	7X00CC	-
☐ [5]H-ODU[FPGA]	b	FPGA_O	20190326B	-
☐ [1-1]R-ORU	c	7X00DE	7X00DC	-
☐ [1-1]R-ORU[FPGA]	c	FPGA_F	-	Update N/A
☐ [1]R-337F	F.0.01	1.0.12	-	-
☐ [11]H-CHC-88-DL	3.0.01	-	-	Update N/A

Figure 6-12 System update

- Click on the 'Browse' button and locate the firmware file then click the 'Upload' button.
- Click on the 'Update' button to perform the firmware update.
- Click on the 'Download' button to perform the firmware update file download.
- Click on the 'Delete' button to perform the firmware update file delete.

- Check the child items that require updates and click the 'Update' button.
- Once the firmware update is complete, the following message will appear.

```
File Size = 1149078///1149055
File upload OK.
Now copying files and reboot. Do not close this page.
Updated... Web
Updated... Universal Extra files

Updated ...

Rebooting now ...

Turn off this terminal.
And connect GUI after 30 seconds ...

*****
***** End Download *****
*****
```

Figure 6-13 Message after System update is complete

6.2.5.4 System Information

History

Complete System Information report can be obtained by clicking the Download button.

Download Current Information

Management systeminfo_20190424_131149.csv

Download Delete

current 19 exist.

It verifies the information of all devices connected to the system, and manages downloading and deletion of information at present time.

6.2.5.5 Backup/Restore

Settings Files

Current Setting Save Save

Setting File Upload Choose File No file chosen Upload

Current Selected File

Management backup_20200113_151411.xml backup_20200121_130834.xml

Select Download Delete

Check the available boxes below to select the ADXD units to be restore. Click the EXECUTE button at the bottom of this section to begin the setting restore process.

Unit list	Progress	Status
☐ [0]H-NHS-AC		---
☐ [6]H-ODU		---
☐ [1-1]LP8-8E		---
☐ [3-1]LP8-51		---
☐ [2-1]R-ORU		---
☐ [1]R-336		---
☐ [2]R-337P		---
☐ [7]H-BCC		---
☐ [9]H-AA0-32-PIN		---
☐ [12]H-PQI-7U		---

Execute Stop

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You can backup, save, download, and manage the system information of the current point of view and restore each individual device using the backup file if necessary.

6.2.5.6 Network Service

6.2.5.6.1 SFTP Service

SFTP Service ?

☐ Enabled
 ☒ Disabled

New Password

Confirm

Account Name : adrftech

Apply

Turn SFTP Service function on and off. The account name is adrftech and the password can be changed..

6.2.5.6.2 Web Service Type

Web Service Type ?

☒ HTTP
 ☐ HTTPS

Apply

Change the Web GUI Service Type to HTTP / HTTPS.

6.2.5.7 SNMP

SNMP V1 / V2

ADD SNMP

Version	Permission	Community	Command
v2c ▼	read/write ▼		add

Active SNMP

Version	Permission	Community	Command
v1	read/write	public	delete
v2c	read/write	public	delete

SNMP V3

ADD SNMP

User ID	Permission	Auth Algorithm / Password	Privacy Algorithm	Command
	read/write ▼	MD5 ▼	None ▼	add

Active SNMP

User ID	Permission	Auth Algorithm / Password	Privacy Algorithm	Command
---------	------------	---------------------------	-------------------	---------

SNMP Monitoring

SNMP V1 / V2

Enabled	Version	Permission	Community	Command
☐	v1 ▼	read only ▼		set

SNMP V3

Enabled	User ID	Permission	Auth Algorithm / Password	Privacy Algorithm	Command
☐		read only ▼	MD5 ▼	None ▼	set

Manage and add SNMP options.

6.2.6 Help

MY ADRF LOGIN

Register for a MyADRF account
 Register to find out the latest product updates, take online certification training, download technical documents, software & firmware, design tools, and service documents. To request quotes, contact sales@adrftech.com.

Username Email Address

First Name Last Name

Company Name Phone Number

Password Confirm Password

Login to MyADRF

Username

Password

[Forgot Password?](#) **LOGIN**

Figure 6-14 Help

If an internet connection is available, clicking on the Help Tab will redirect the user to our Technical Support page.

6.2.7 Logout

Clicking the Logout button will log the current user off the system.

6.3 Guest Mode

When logging into the system as a guest, the guest will only have read-only privileges and will not be able to make any changes to the system.

7. SYSTEM-WIDE SPECIFICATIONS

- 700L, 700U, S8C

Parameters		700L	700U	S8C	Comment
Frequency	Downlink	728-746MHz	746-757MHz	862-894MHz	
	Uplink	698-716MHz	776-787MHz	817-849MHz	
Max BW		18MHz	11MHz	32MHz	
Channel Selection		3	1	4	
Maximum Composite Output EIRP(DL)		26dBm	26dBm	26dBm	

- PCS, AWS, BRS/CBRS

Parameters		PCS	AWS	BRS	CBRS	Comment
Frequency	Downlink	1930-1995MHz	2110-2155MHz	2496-2690MHz (196MHz)	3550-3700MHz (150MHz)	
	Uplink	1850-1915MHz	1710-1755MHz			
Max BW		65MHz	45MHz	80MHz(4G) +80MHz(5G)	80MHz(4G) +80MHz(5G)	
Channel Selection		4	4	4(4G), 1(5G)	4(4G), 1(5G)	
Maximum Composite Output EIRP(DL)		28dBm	28dBm	27dBm @60MHz BW or less BW	23dBm @60MHz BW or less BW	

Maximum Composite UL Output Power(@H-POI)		-35dBm	
VSWR		≤ 1.8:1	
Roll-off		45dBc@1MHz Passband edge	
Optic		10Gbps LC Receptacle Bi-Directional SFP+ Transceiver	
Delay Equalization		0 to 100us	
EVM		3.5%	
Frequency stability		± 0.05 ppm	
Spurious		Meet FCC Rules, 3GPP TS 36.104	
Dimension (WXDXH)	Head End Chassis	19.0 x 19.7 x 7.0 in (482 x 500 x 178 mm)	
	H-POI	1.3 x 17.0 x 6.86 in (33 x 432 x 174 mm)	
	H-POI	1.3 x 17.0 x 6.86 in (33 x 432 x 174 mm)	
	H-ODU	2.62 x 17.0 x 6.86 in (66.4 x 432 x 174 mm)	
	HUB	Chassis: 5.83 x 14.34 x 6.86 in (148 x 364 x 174 mm) Ethernet Hub: 1.9 x 13.44 x 5.91 in (48 x 341 x 150 mm) Hub PSU: 1.9 x 13.44 x 5.91 in (48 x 341 x 150 mm)	
	LPR	11.43 in x 5.52 in x 14.78 inches (290 x 140 x 375 mm)	
Weight	Head End Chassis	16.3 lbs (7.4 kg)	
	H-POI	6.2 lbs (2.8 kg)	
	H-POI	5.5 lbs (2.5 kg)	
	H-ODU	5.6 lbs (2.6 kg)	
	HUB	Hub Chassis: 3.5 lbs (1.6 kg) Ethernet Hub: 3.0 lbs (1.4 kg) Hub PSU: 4.0 lbs (1.8 kg)	

	LPR	24.3lbs (11.0kg)	
Operating Temperature		14~122°F (-10~50°C)	
Operating Humidity		5~95% RH (Non-condensing)	
Power Supply	Head-End	110/220V, 50-60Hz with battery backup function, -48V DC (optional)	
	HUB	110/220V, 50-60Hz, -48V DC (optional)	
	LPR	Opt1: PoE (via HUB), Opt2: Remote Power Supply (-57V DC), Opt3: Local Power Supply (+12V DC)	
Network Management System		Ethernet(RJ45)	
RF Connector	POI	7/16 DIN(Female)	
	POIL	4.3-10(Female)	
	LPR	No External RF Connector (Internal Antenna)	

8. MECHANICAL DRAWINGS

8.1 HE

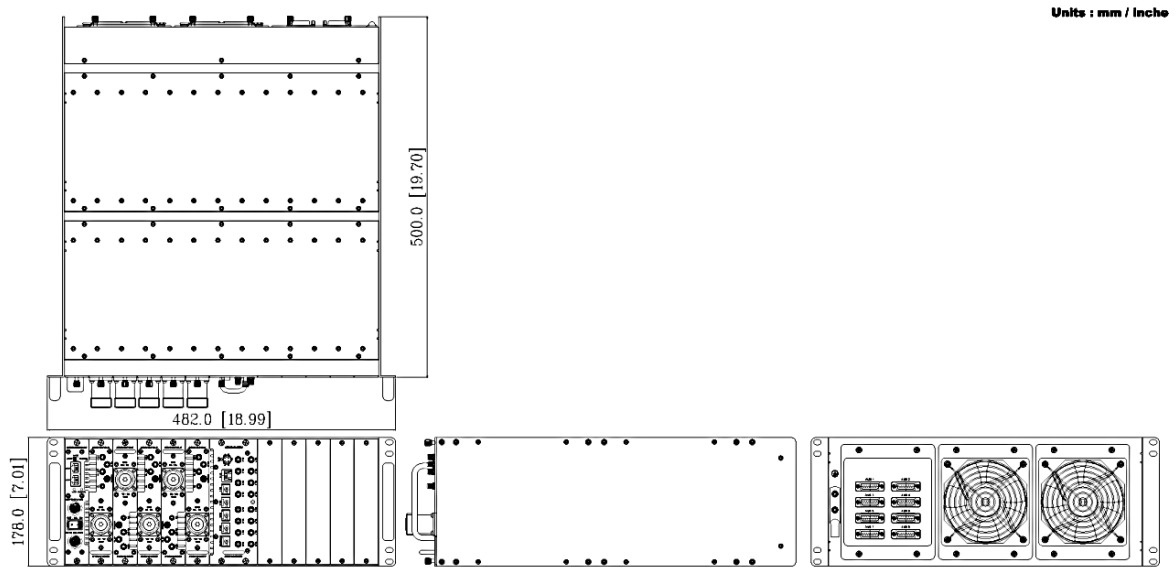


Figure 8-1 HE Drawing

8.2 LPR

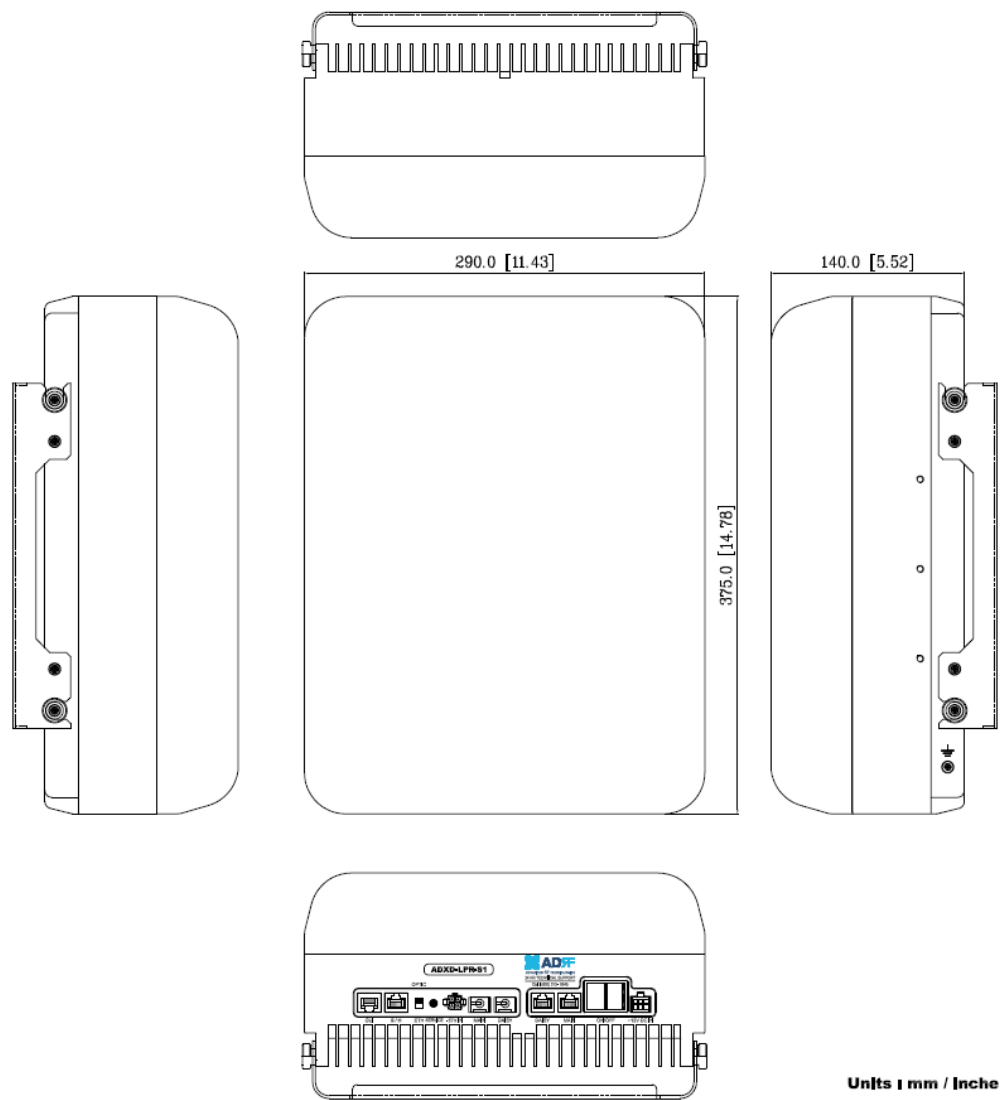


Figure 8-2 LPR Drawing