



ADX DAS User Manual



3116 West Vanowen St.
Burbank, CA 91505
Tel: 818-840-8131
Fax: 818-840-8138

www.adrftech.com



Information in this document is subject to change without notice.

*Advanced RF Technologies, Inc. 1996-2013.
All rights reserved.*

- Please send comments to:

E-Mail: info@adrftech.com

Phone: (818) 840-8131
(800) 313-9345

Fax: (818) 840-8138

- Address:

Advanced RF Technologies, Inc.
Attention: Technical Publications Department
3116 Vanowen St.
Burbank, CA 91505
USA
www.adrftech.com



Revision History

Version	Author	Descriptions	Date

Change List

Version	Change list	Contents

Table of Contents

1.	Introduction	14
1.1	Highlights	14
1.2	ADX DAS Quick View	15
1.2.1	HE Quick View	15
1.2.2	RU Quick View	16
1.3	Warnings and Hazards	17
2.	Block Diagram	19
2.1	ADX DAS Block Diagram	20
2.2	ADX DAS Topology	21
2.3	SISO Configuration	22
2.4	ADX-DAS Scalability	23
3.	ADX Overview	24
3.1	Head End	24
3.1.1	NMS (Network Management System)	25
3.1.1.1	LEDs	25
3.1.1.2	Ethernet Port	26
3.1.1.3	Host/Remote Switch	26
3.1.1.4	HE View/RU View Switch	26
3.1.2	RFU (ADX-H-RFU-x)	27
3.1.2.1	LEDs	28
3.1.2.2	RF Ports	28
3.1.2.3	Communication Port	28
3.1.3	Channel Combiner (ADX-H-CHC)	28
3.1.3.1	RF ports	29
3.1.3.2	RF ports	29
3.1.4	Optic Distribution Unit (ADX-H-ODU + ADX-RACK-ODU)	29
3.1.4.1	LEDs	30
3.1.4.2	RF Ports	30
3.2	Remote Unit	31
3.2.1	ADX-R-x3xM (Master RU)	32
3.2.1.1	LEDs	32
3.2.1.2	RF Ports	33
3.2.1.3	Optic Port	34
3.2.1.4	Power On/Off Switch & DC IN Port	34
3.2.1.5	PSU Alarm Port	34
3.2.1.6	GUI Port	34
3.2.1.7	RS-485 Port	34

3.2.1.8	ADDR.....	35
3.2.2	ADX-R-xxS/ADX-R-BTxxS/ADX-R-VU25S (Slave RU)	36
3.2.2.1	LEDs	36
3.2.2.2	RF Ports.....	37
3.2.2.3	Power On/Off Switch & DC IN Port.....	38
3.2.2.4	RS-485 Port	38
3.2.3	RU Power Supply Options.....	38
3.2.3.1	ADX-R-ADP (RU Power Adapter).....	38
3.2.3.2	ADX-R-PSU (RU Power Supply Unit).....	38
4.	Cable Connection	40
4.1	Head End Connection Diagrams	41
4.1.1	Front/Rear Head End Connection View with Optional BCU unit.....	41
4.1.2	Rear Head End Connection View with (4) OPT-8 units	42
4.2	Remote Unit Connection Diagrams	43
4.3	Remote Unit w/ 4-Way Combiner (ADX-R-4WS)	44
5.	Mounting method.....	45
5.1	Head End.....	45
5.1.1	Rack Mount	45
5.1.2	Wall Mount.....	46
5.2	Remote Unit.....	47
5.2.1	Rack Mount	47
5.2.2	Wall Mount.....	48
5.2.2.1	Remote Unit using RU Chassis (ADX-R-CHA-30)	48
5.2.2.2	Individual Remote Module	48
6.	Installation	49
6.1	Pre-Installation Inspection.....	49
6.2	ADX DAS Installation Procedure	49
6.2.1	HE Installation Procedure	49
6.2.1.1	Installing a ADX DAS HE in a rack.....	49
6.2.1.2	Wall mounting the ADX DAS HE.....	51
6.2.2	RU Installation Procedure.....	53
6.2.2.1	Installing a ADX DAS RU in a rack.....	53
6.2.2.2	Wall mounting the ADX DAS RU	55
6.2.2.3	Wall mounting an ADX Remote Module.....	57
6.2.3	ADX-H-OEU Installation Procedure	58
6.2.3.1	Installing a ADX-H-OEU in a Rack	58
6.2.3.2	Wall mounting the ADX-H-OEU	60
6.3	Grounding	61
6.4	Optic Port Cleaning	62

7.	Warranty and Repair Policy	63
7.1	General Warranty	63
7.2	Limitations of Warranty	63
7.3	Limitation of Damages	63
7.4	No Consequential Damages	63
7.5	Additional Limitation on Warranty	63
7.6	Return Material Authorization (RMA)	63
8.	Web-GUI	64
8.1	Web-GUI Setup	64
8.1.1	DAS system/PC Connection Using Web-GUI	64
8.2	Administrator/User Mode	65
8.2.1	Common	65
8.2.1.1	Navigation tree Lock/Unlock	65
8.2.1.2	Navigation Tree	65
8.2.1.3	Power Status	66
8.2.1.4	Commissioning Status	66
8.2.1.5	Information	66
8.2.2	Status Tab	67
8.2.2.1	Status – NMS	67
8.2.2.2	Status – BCU	70
8.2.2.3	Status – RFU	72
8.2.2.4	Status – OPT	74
8.2.2.5	Status – RU Hub	77
8.2.2.6	Status – Remote module	78
8.2.3	Control Tab	81
8.2.3.1	Control – NMS	81
8.2.3.2	Control – BCU	82
8.2.3.3	Control – RFU	83
8.2.3.4	Control – OPT	87
8.2.3.5	Control – RH Hub	88
8.2.3.6	Control – Remote Module (Master or Slave RU)	89
8.2.4	Install Tab	92
8.2.4.1	Install – NMS	92
8.2.4.2	Install – RFU	95
8.2.4.3	Install – OPT	96
8.2.4.4	Install – RU Hub	97
8.2.4.5	Install – Remote Module (Master or Slave RU)	98
8.2.5	System	100
8.2.5.1	System: Account	100



8.2.5.2	System: Logs	101
8.2.5.3	System: Update.....	102
8.2.5.4	System: System Information.....	102
8.2.5.5	System: Backup/Restore.....	105
8.2.5.6	System: SNMP.....	106
8.2.5.7	System: Closeout Package	107
8.2.6	Help	108
8.2.7	Logout.....	108
8.3	Guest Mode	108
9.	System Specification	109
9.1	Specification for PS78, SMR.....	109
9.2	Specification for VU, BT	110
9.3	FCC Certification	111
10.	Antenna Specifications	111
10.1	Omni Antenna.....	111
11.	Mechanical Drawing	112

Figures

Figure 1-1	ADX DAS HE Quick View	15
Figure 1-2	ADX DAS RU Quick View	16
Figure 2-1	ADX DAS Block Diagram	20
Figure 2-2	ADX DAS Topology	21
Figure 2-3	ADX DAS SISO Configuration	22
Figure 3-1	Head End Front View	24
Figure 3-2	ADX-H-NMS Front View	25
Figure 3-3	NMS LED	25
Figure 3-4	Ethernet Port	26
Figure 3-5	Host/Remote Switch	26
Figure 3-6	HE View/RU View Switch	26
Figure 3-7	RFU Front & Rear View (excluding BT and VU)	27
Figure 3-8	RFU Front & Rear View for BT	27
Figure 3-9	RFU Front & Rear View for VU	27
Figure 3-10	RFU LED	28
Figure 3-11	Communication Port (RFU)	28
Figure 3-12	ADX-H-CHC Front & Rear View	29
Figure 3-13	ADX-RACK-ODU + ADX-H-ODU-4/1 Front & Rear View	30
Figure 3-14	ADX-H-OPT-8 LED	30
Figure 3-15	OPT RF Ports	30
Figure 3-16	RU Front View	31
Figure 3-17	RU Rear View	31
Figure 3-18	Master RU Front & Rear View(excluding BT)	32
Figure 3-19	Master RU Front & Rear View only for BT	32
Figure 3-20	Master RU LED	32
Figure 3-21	RF Ports (Master RU)	33
Figure 3-22	Ports at the back panel (Master RU)	34
Figure 3-23	Correct RS-485 connection between Master RU and Slave RU or between Slave RUs	35
Figure 3-24	Wrong RS-485 connection between Master RU and Slave RU or between Slave RUs	35
Figure 3-25	Do NOT connect RS-485 ports of Remote Module to network equipment port	35
Figure 3-26	Slave RU Front & Rear View (excluding BT and VU)	36
Figure 3-27	Slave RU Front & Rear View (BT)	36
Figure 3-28	Slave RU Front & Rear View (excluding VU)	36
Figure 3-29	Slave RU LED	37
Figure 3-30	RF Ports (Slave RU)	37
Figure 3-31	Ports at the rear panel (Slave RU)	37
Figure 3-32	RU PSU Front & Rear View	38
Figure 3-33	RU PSU LED	39
Figure 3-34	RU PSU Power Switch View	39
Figure 3-35	Battery Backup Port & Battery Backup Switch	40
Figure 3-36	DC Output Port (RU PSU)	40
Figure 3-37	PSU Alarm Port (RU PSU)	40
Figure 4-1	HE Cable connection (1 OPT-8 +1 BCU)	41
Figure 4-2	HE Cable connection (4 OPTs)	42
Figure 4-3	RU Cable connection (4 Remote Module + RU PSU)	43
Figure 4-4	Slave RU Expansion using ADX-R-4WS	44
Figure 5-1	HE Rack Mount (Front & Rear view)	45
Figure 5-2	HE Wall Mount (Top View)	46
Figure 5-3	RU Rack Mount (Front view)	47
Figure 5-4	19" Shelf type - RU Wall Mount (Top view)	48



Figure 5-5	Remote Module Wall Mount (Top view)	48
Figure 6-1	ADX HE 19" Rack Mount Instructions	50
Figure 6-2	ADX HE Wall Mount Instructions	51
Figure 6-3	Wall Mount Instructions for ADX-HE added 1U Unit	52
Figure 6-4	ADX-RU 19" Rack Mount Instructions	54
Figure 6-5	ADX-RU Wall Mount Instructions	55
Figure 6-6	Wall Mount Instructions for ADX-RU added 1.5U Unit	56
Figure 6-7	Remote Module Wall Mount Instructions	57
Figure 6-8	ADX-H-OEU Rack Mount Instructions	59
Figure 6-9	ADX-H-OEU Wall Mount Instructions	60
Figure 6-10	Ground Cable Connection (HE rear side)	61
Figure 6-11	Ground Cable Connection (RU rear side)	61
Figure 6-12	Optic Connector Cleaning (left) and Optic Port Cleaning (right)	62
Figure 6-13	SC/APC Optic Connector Dust Cap	62
Figure 8-1	Login screen	64
Figure 8-2	Navigation tree Lock/Unlock	65
Figure 8-3	Navigation tree	65
Figure 8-4	ADX DAS General Information	66
Figure 8-5	Status - NMS	67
Figure 8-6	System Summary	67
Figure 8-7	System scan time, HE view/RU view	68
Figure 8-8	HE alarm status	68
Figure 8-9	HE Commissioning status	69
Figure 8-10	Status – BCU	70
Figure 8-11	Status – BCU Band	70
Figure 8-12	Status – BCU Power & Atten	70
Figure 8-13	Status – BCU Power Ratio	71
Figure 8-14	Status – BCU Alarm	71
Figure 8-15	Status – RFU	72
Figure 8-16	Status – RFU Band	72
Figure 8-17	Power & Gain Display (Admin)	72
Figure 8-18	Power & Gain Display (User)	73
Figure 8-19	Status - OPT	74
Figure 8-20	Summary (Status – OPT)	74
Figure 8-21	RF Status (Status – OPT)	75
Figure 8-22	Optic Status (Status – OPT)	75
Figure 8-23	Optic Attenuation (Status – OPT)	76
Figure 8-24	Optic Path Status (Status – OPT)	76
Figure 8-25	Status - RU Hub	77
Figure 8-26	RU Alarm Status (Status - RU Hub)	77
Figure 8-27	RU Commissioning Status (Status - RU Hub)	77
Figure 8-28	Status – Remote Module	78
Figure 8-29	PCS Band Information (Status – Remote Module)	79
Figure 8-30	Power & Gain (Admin)	79
Figure 8-31	Power & Gain (User)	79
Figure 8-32	Optic Power (Status – Master RU only)	80
Figure 8-33	Control - NMS	81
Figure 8-34	Heartbeat (Control – NMS)	81
Figure 8-35	HE System Reboot & Factory Setting (Control – NMS)	81
Figure 8-36	NMS System Reboot & Factory Setting (Control – NMS)	81
Figure 8-37	Control – BCU	82
Figure 8-38	Control – BCU Manual ATT Control	82
Figure 8-39	Control – BCU Reboot/Factory Setting	83

Figure 8-40	Control – BCU Alarm Setting.....	83
Figure 8-41	Control - RFU	83
Figure 8-42	General Setting (Control – RFU) (Admin).....	84
Figure 8-43	General Setting (Control – RFU) (User).....	84
Figure 8-44	Reboot & Factory Setting (Control – RFU).....	84
Figure 8-45	UL Noise Detection (Control – RFU)	84
Figure 8-46	UL Noise Detection - PCS band.....	85
Figure 8-47	Manual Attenuator Control Setting (Control – RFU)	85
Figure 8-48	Alarm Threshold Setting (Control – RFU)	86
Figure 8-49	Control – OPT.....	87
Figure 8-50	Optic Attenuation – OPT.....	87
Figure 8-51	Reboot & factory Setting (Control – OPT)	88
Figure 8-52	Control – RU Hub	88
Figure 8-53	Reboot & Factory Setting (Control – RU Hub)	88
Figure 8-54	Control – Remote Module	89
Figure 8-55	General Setting (Control - RU)	89
Figure 8-56	Reboot & factory Setting (Control - RU)	90
Figure 8-57	Optic Setting (Control - RU)	90
Figure 8-58	Manual Atten Control (Control - RU).....	90
Figure 8-59	Alarm Setting (Control - RU)	91
Figure 8-60	Install - NMS	92
Figure 8-61	HE Commissioning Status (Install – NMS).....	92
Figure 8-62	SNMP (Install – NMS).....	93
Figure 8-63	Location Setting (Install – NMS)	93
Figure 8-64	External Modem Box Setting (Install – NMS)	93
Figure 8-65	Description (Install – NMS).....	94
Figure 8-66	SNMP Agent False Alarm Test (Install – NMS).....	94
Figure 8-67	Location Info / Installer Info (Install – NMS).....	94
Figure 8-68	Date & Time Setting (Install – NMS)	95
Figure 8-69	Install - RFU.....	95
Figure 8-70	RFU Commissioning (Install – RFU).....	96
Figure 8-71	Description (Install – RFU)	96
Figure 8-72	Install – OPT.....	96
Figure 8-73	Optic control (Control – OPT)	97
Figure 8-74	Description (Install – OPT)	97
Figure 8-75	Install-RU Hub.....	98
Figure 8-76	RU Commissioning Status (Install-RU Hub)	98
Figure 8-77	Description (Install-RU Hub)	98
Figure 8-78	Install-Remote Module	99
Figure 8-79	RU Output Commissioning (Install-RU)	99
Figure 8-80	Description (Install-Remote Module)	100
Figure 8-81	Account Management	100
Figure 8-82	New Account	100
Figure 8-83	Change Password.....	101
Figure 8-84	Event Log	101
Figure 8-85	User Log	102
Figure 8-86	System update	102
Figure 8-87	System Information	103
Figure 8-88	System Notification	103
Figure 8-89	Bill of material	104
Figure 8-90	Setting Backup (Before)	105
Figure 8-91	Setting Backup (After).....	105
Figure 8-92	Setting Restore	106



Figure 8-93	SNMP V1/V2	106
Figure 8-94	SNMP V3	107
Figure 8-95	System- Closeout Package	107
Figure 8-96	System- Closeout Package after the file upload	107
Figure 8-97	Help.....	108
Figure 11-1	HE Drawing	112
Figure 11-2	RFU Drawing for SMR/PS.....	113
Figure 11-3	RFU Drawing for VU	114
Figure 11-4	RFU Drawing for BT.....	115
Figure 11-5	Master RU Drawing for PS	115
Figure 11-6	Master RU Drawing for BT	116
Figure 11-7	Slave RU Drawing for SMR.....	117
Figure 11-8	Slave RU Drawing for VU	118
Figure 11-9	RU Rack Shelf Drawing.....	119

Tables

Table 2-1	ADX-DAS Scalability	23
Table 3-1	NMS LED Specifications	25
Table 3-2	RFU LED Specifications	28
Table 3-3	OPT LED Specifications	30
Table 3-4	Master RU LED Specifications	32
Table 3-5	Slave RU LED Specifications	37
Table 3-6	RU PSU LED Specifications	39
Table 8-1	Account Information for Login	64
Table 8-2	Navigation tree	65
Table 8-3	Power Supply Status	66
Table 8-4	Commissioning ICON	66
Table 8-5	System Summary Description	68
Table 8-6	Description for HE Commissioning status	69
Table 8-7	Description for NMS alarm	69
Table 8-8	RFU Alarm Status	73
Table 8-9	Summary Description	75
Table 8-10	Description for optic path status	76
Table 8-11	Description for RU Commissioning status	78
Table 8-12	Alarm Status (Status - RU Hub)	78
Table 8-13	Operating Status (Status – Remote Module)	80
Table 8-14	Description for General Setting	84
Table 8-15	Description for Main Gain Control Setting (Control – RFU)	85
Table 8-16	Description for Alarm Threshold Setting (Control – RFU)	86
Table 8-17	Description for Optic Attenuation (Control – OPT)	88
Table 8-18	Description for General Setting (Control - RU)	89
Table 8-19	Description for Optic Setting (Control - RU)	90
Table 8-20	Description for Manual Atten Control (Control - RU)	91
Table 8-21	Description for HE Commissioning Status (Install – NMS)	92
Table 8-22	Description for Optic control (Control – OPT)	97
Table 8-23	Description for RU Commissioning status	98

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
LTE	Long Term Evolution
MS	Mobile Station
NMS	Network Management System
ODU	Optic Donor Unit which is located in OPT. A OPT has two ODUs.
OEU	Optic Expansion Unit
OPT	Optic Unit
PLL	Phased Locked Loop
PSU	Power Supply Unit
RF	Radio Frequency
RFU	RF Channel Unit
RU	Remote Unit which is composed of master RU and multiple slaves RU
SQE	Signal Quality Estimate
Remote Module	generic term for master RU and slave RU
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

Up to (8) frequency bands in one body: Currently the ADX supports 700 MHz (Lower A, Lower B, Lower C, and Upper C), 700MHz Public Safety w/ Upper D support, Cellular, PCS, SMR800/SMR900, and AWS bands.

1.1 Highlights

- Modular Structure
 - Supports multi bands service (700MHz, 700MHz PS, Cell, PCS, AWS, SMR800/SMR900 etc.) in one body
 - Supports up to 8 RF units
- Supports optional combining/balancing of multiple carriers' signals via BCU (Band Combiner Unit)
- Supports up to a maximum of 32 SISO Remote Units
- 30dBm of downlink composite output power
 - 33dBm available for PCS and AWS
- Requires only single strand of fiber per remote unit
- Operates with up to 5dBo optical loss (Single mode)
- 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: ADX 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.
- Uplink noise measurement routine
- Support RU View mode, refer to section 3.1.1.4
- Incremental Automatic Shutdown/Resume Time: ADX gradually increases the time span between automatic shutdown and resume period before it permanently shuts itself down
- Support ALC function to prevent ADX DAS from input overload or output overpower

1.2 ADX DAS Quick View

1.2.1 HE Quick View

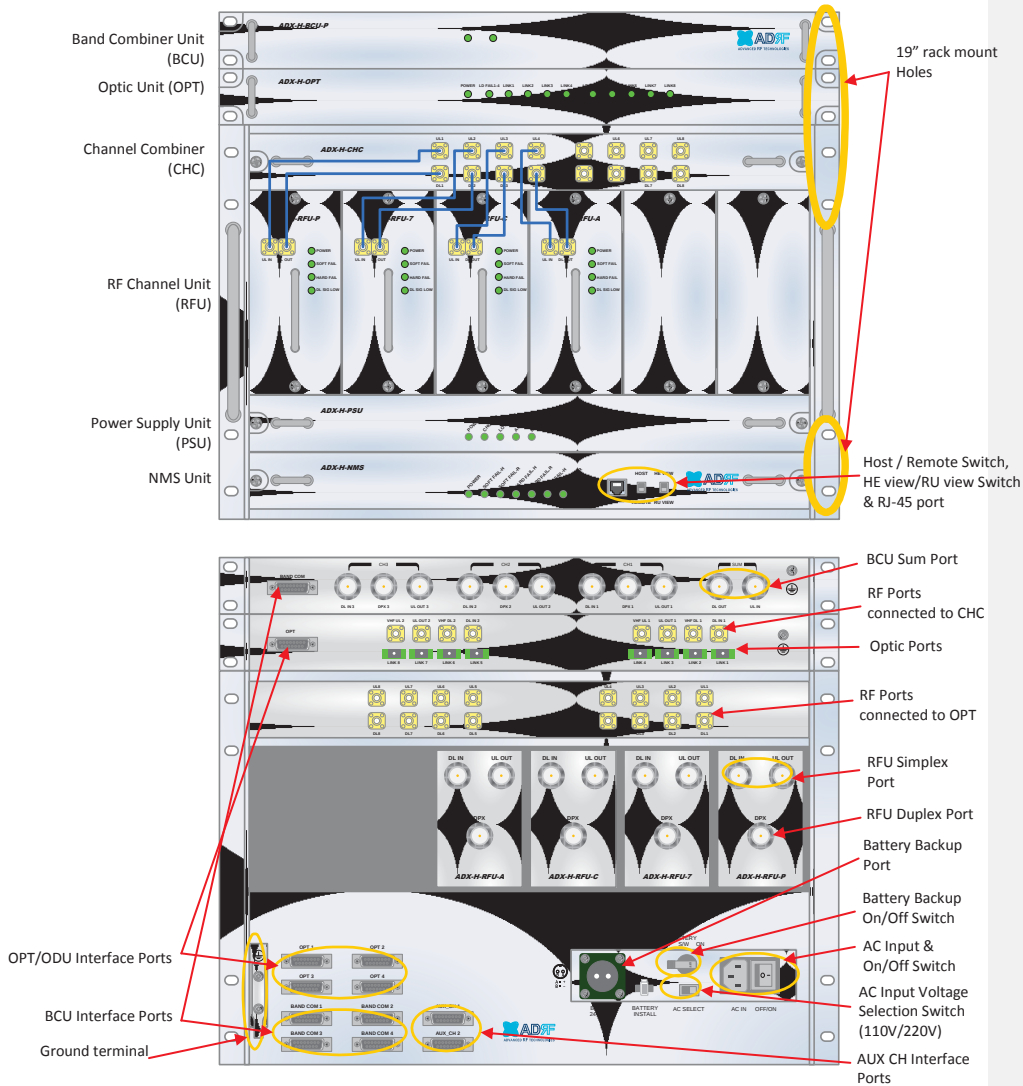


Figure 1-1 ADX DAS HE Quick View

1.2.2 RU Quick View

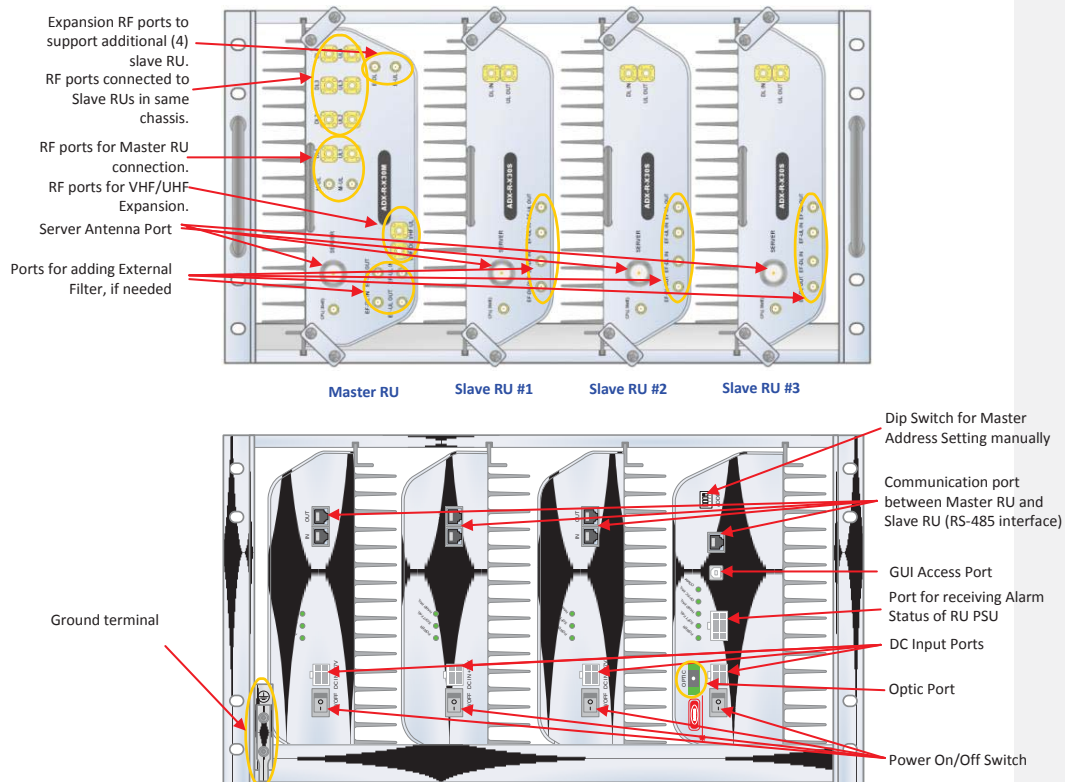


Figure 1-2 ADX DAS RU Quick View

1.3 Warnings and Hazards



WARNING! ELECTRIC SHOCK

Opening the ADX DAS could result in electric shock and may cause severe injury.



WARNING! EXPOSURE TO RF

Working with the ADX DAS while in operation, may expose the technician to RF electromagnetic fields that exceed FCC rules for human exposure. Visit the FCC website at www.fcc.gov/oet/rfsafety to learn more about the effects of exposure to RF electromagnetic fields.

RF EXPOSURE & ANTENNA PLACEMENT Guidelines

Actual separation distance is determined upon gain of antenna used.

Please maintain a minimum safe distance of at least 30 cm while operating near the donor and the server antennas. Also, the donor antenna needs to be mounted outdoors on a permanent structure.

WARRANTY

Opening or tampering the ADX 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.

FCC Part 90 Class B

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. You **MUST** register Class B signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.

메모 [Y1]: 추가
15/02/03

메모 [Y2]: 추가
15/02/03

Laser Safety

Fiber optic ports of the ADX DAS emit invisible laser radiation at the 1310, 1550nm 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 ADX DAS and the associated cables.

The ADX 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.

2. BLOCK DIAGRAM

2.1 ADX DAS Block Diagram

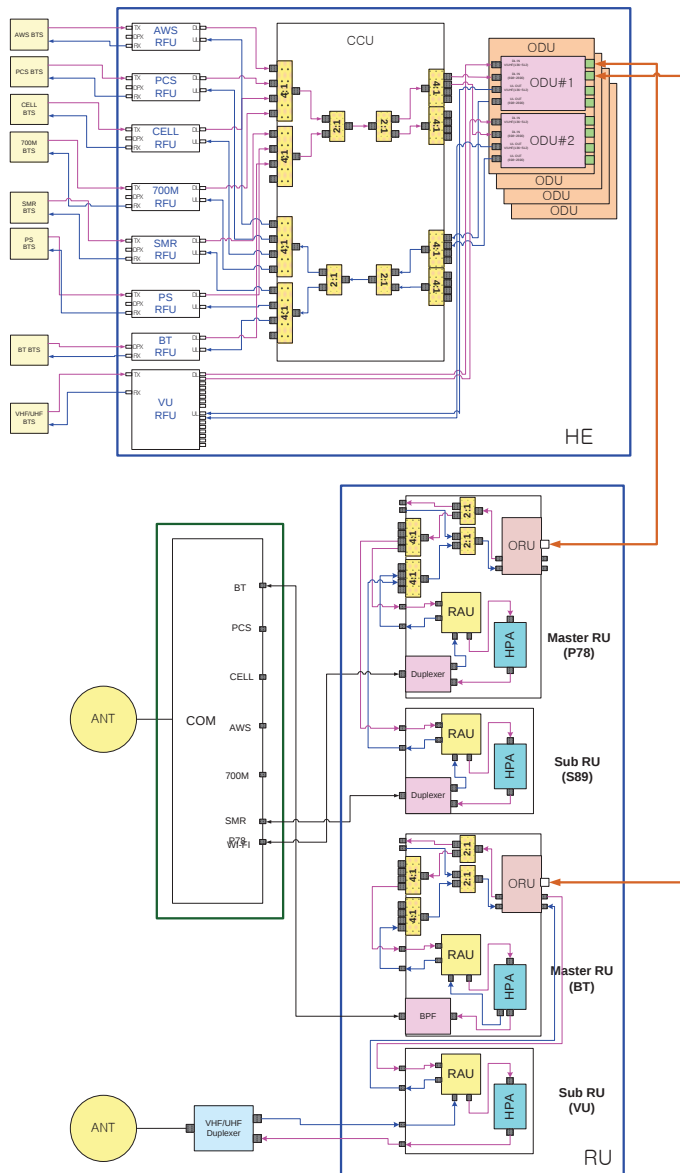


Figure 2-1 ADX DAS Block Diagram

2.2 ADX DAS Topology

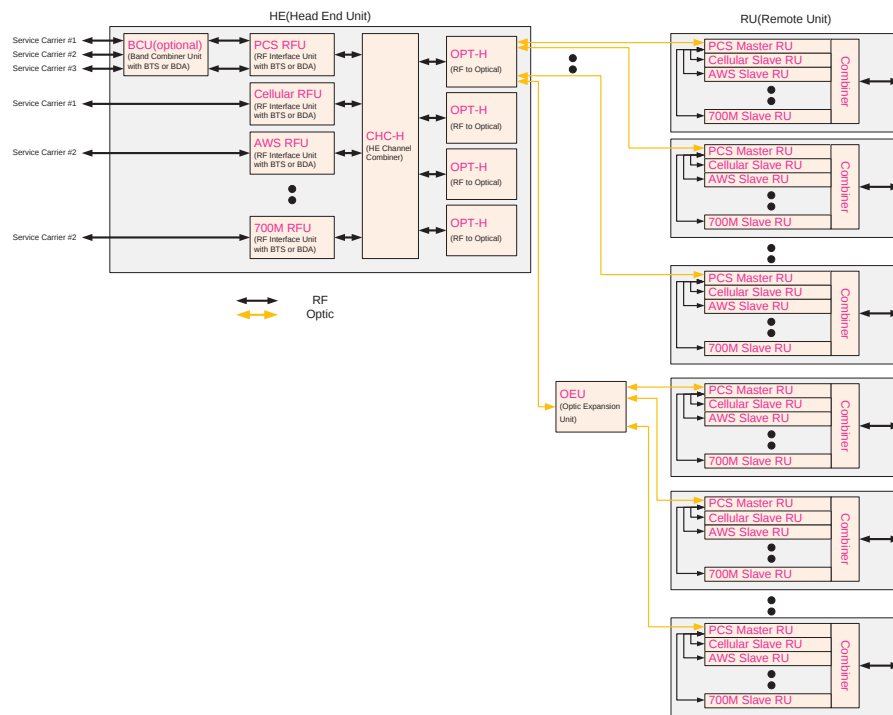


Figure 2-2 ADX DAS Topology

2.3 SISO Configuration

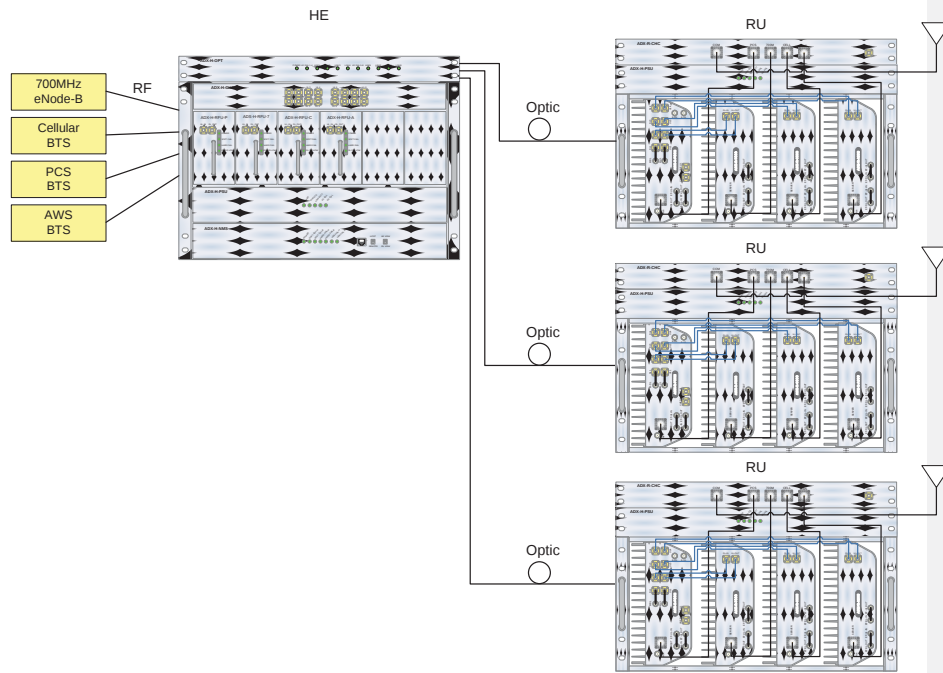


Figure 2-3 ADX DAS SISO Configuration

2.4 ADX-DAS Scalability

Table 2-1 ADX-DAS Scalability

Unit		Scalability	Remarks
Supported band		700MHz, Cellular, AWS 1W/2W, PCS 1W/2W, SMR800/900, PS700, VHF, UHF, BRS	700MHz includes Lower A, Lower B, Lower C, and Upper C
HE	RFU	Up to 8	up to 6: card type 7 th & 8 th RFU: 19" rack type
	NMS	1	
	Channel Combiner	1	
	Optic Unit	Up to 4	
	Band Combiner Unit	Up to 4	To support multiple carriers
	Power Supply Unit (AC or DC)	1	Capable of supplying power to 8 RFUs, 4 BCUs, 4 OPTs and NMS.
RU	RU	Up to 60	
	OEU	Up to 4	
	PSU	Adaptor type	1 per remote module
		19" rack mount (AC or DC)	1 Capable of supplying power to 8 Remote Modules

3. ADX OVERVIEW

3.1 Head End

The head end unit must always 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.

Head end components include:

- ADX-H-NMS (Network Management System)
- ADX-H-CHC (Head End Channel Combiner)
- ADX-H-PSU (Head End Power Supply)
- Up to [4] ADX-H-BCU (Band Combiner Unit)
- Up to [8] ADX-H-RFU-x (RF Unit)
- Up to [4] ADX-H-OPT (Optical Unit)

- Specifications

- Size: 19.0 x 14.6 x 12.2 inches (482 x 370 x 311 mm)
- Weight: 83.7 lbs (38.0 Kg)@4 RFU, CHC-H, PSU and NMS
- Power Consumption: 52W@4 RFU, 1 OPT and NMS, 28W@1 RFU, 1 OPT and NMS
- Power Input: 110VAC or -48VDC(optional)
- Supports the ADRF-BBU for external battery backup solution

메모 [Y3]: 추가
15/02/03

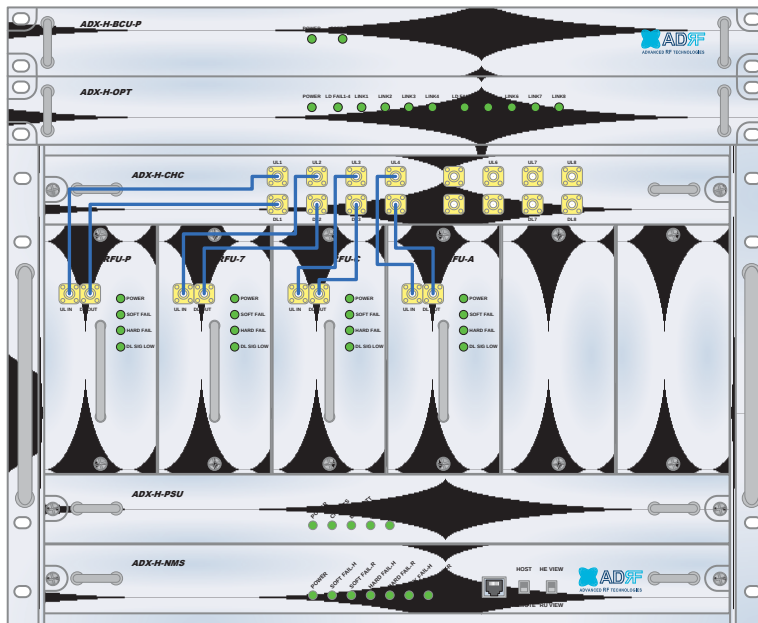


Figure 3-1 Head End Front View

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
- Spec
 - Size: 19.0 x 12.1 x 1.7 inches
 - Weight: 5.5 lbs



Figure 3-2 ADX-H-NMS 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

ADX DAS-NMS		Specifications
Power	Solid Green	NMS power is ON
	OFF	NMS power is OFF
SOFT FAIL-H	Solid Yellow	HE Soft Fail alarm exists in the system
	Solid Green	No HE Soft Fail alarms are present in the system
SOFT FAIL-R	Solid Yellow	RU Soft Fail alarm exists in the system
	Solid Green	No RU Soft Fail alarms are present in the system
HARD FAIL-H	Solid Red	HE Hard Fail alarm exists in the system
	Solid Green	No HE Hard Fail alarms are present in the system
HARD FAIL-R	Solid Red	RU Hard Fail alarm exists in the system
	Solid Green	No RU Hard Fail alarms are present in the system
LINK FAIL-H	Solid Yellow	HE Link Fail alarm exists in the system
	Solid Green	No HE Link Fail alarms are present in the system
LINK FAIL-R	Solid Yellow	RU Link Fail alarm exists in the system
	Solid Green	No RU 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 ADX DAS using a RJ-45 crossover cable or can also be used to connect the ADX 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 ADX 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.*

HOST



REMOTE

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 HE View/RU View Switch

The HE View/RU View Switch allows the user to disable the periodic monitoring performed by the NMS. In the HE view mode, the NMS monitors the status of all subordinate units connected to NMS but when switched to RU view the NMS does not monitor the subordinate units. RU View mode will allow the user to go to a RU and monitor/control the HE. If the NMS is set to the HE View mode and tries to connect to a RU to monitor the HE, data collisions between the NMS and RU may prevent the user from properly monitoring or configuring the HE when at the RU.

HE VIEW



RU VIEW

Figure 3-6 HE View/RU View Switch

3.1.2 RFU (ADX-H-RFU-x)



Figure 3-7 RFU Front & Rear View (excluding BT and VU)



Figure 3-8 RFU Front & Rear View for BT



Figure 3-9 RFU Front & Rear View for VU

- Functions and features
 - Provide RF interface with BTS
 - Each RFU has independent gain control and filtering
 - Modular type and hot swappable
 - Supports duplex port or simplex TX & RX ports
 - Easily support additional frequency bands by adding a single RFU
 - Reduces complexity and overall equipment size
- Specifications
 - Size: 12.8 x 6.2 x 2.8 inches
 - Weight: 7.3 lbs

3.1.2.1 LEDs

RFU has LEDs on the front panel as shown in Figure 3-10.



Figure 3-10 RFU LED

Table 3-2 RFU LED Specifications

ADX DAS-Module		Specifications
Power	Solid Green	Module power is ON.
	OFF	Module power is OFF.
Soft Fail	Solid Yellow	Soft Fail alarm exists in the RFU.
	Solid Green	No Soft Fail alarms are present in the RFU.
Hard Fail	Solid Red	Hard Fail alarm exists in the RFU.
	Solid Green	No Hard Fail alarms are present in the RFU.
DL SIG LOW	Solid Yellow	When DL input signal level is lower than the defined threshold level. (default threshold value: -5dBm)
	Solid Green	When DL input signal level is upper than the defined threshold level.

3.1.2.2 RF Ports

3.1.2.2.1 DL IN/UL OUT & DPX ports

DL IN/UL OUT & DPX Ports (refer to Figure 3-7) are located at the back of RFU and can be connected directly to the BTS. The RFU can support incoming signal strength from 0 to 25dBm(in case of BT and VU, -15~37dBm).

BT RFU does not have DL IN port because of TDD(Time division duplex) system.

VU RFU does not have DPX port because there is externally optional Duplexer customized by user requirement for VHF/UHF system.

3.1.2.2.2 DL OUT/UL IN

DL OUT/UL IN Ports (refer to Figure 3-7) are located at the front of the RFU and connect directly to the HE Channel Combiner (ADX-H-CHC).

3.1.2.3 Communication Port

The ADX-H-NMS monitors and controls the RFU via this port. DC Power is also provided to the RFU via this port.



Figure 3-11 Communication Port (RFU)

3.1.3 Channel Combiner (ADX-H-CHC)





Figure 3-12 ADX-H-CHC Front & Rear View

- Functions & Features
 - Combines DL signals received from each RFU and feeds the combined signals to the ADX-H-OPT
 - Combines UL signals received from each RU and feeds the combined signal to the ADX-H-RFU
 - Supports up to 8 RFUs and (4) ADX-H-OPT-8 or (4)ADX-H-OPT-4
 - Channel Combiner is not connected to VU RFU because VU RFU internally includes 8way combiner for connection to 8 ODU's VHF ports
- Specifications
 - Size: 16.9 x 12.9 x 1.7 inches
 - Weight: 11.0 lbs

3.1.3.1 RF ports

3.1.3.1.1 RF ports at the front panel (DL 1 to DL 8, UL 1 to UL 8)

DL 1(to DL 8) & UL 1(to UL 8) RF ports are connected to DL OUT/UL IN Ports at the front panel of RFU.

- Receive the downlink signal from each RFU
- Split the uplink signal received from OPT to each RFU

3.1.3.1.2 RF ports at the back panel (DL 1 to DL 8, UL 1 to UL 8)

DL 1(to DL 8) & UL 1(to UL 8) RF ports are connected to DL IN/UL OUT Ports at the back panel of OPT.

- Transfer the combined downlink signals to OPT
- Receive the uplink signal from OPT

3.1.3.2 RF ports

3.1.3.2.1 RF ports at the front panel(DL 1 to DL 8, UL 1 to UL 8)

DL 1(to DL 8) & UL 1(to UL 8) RF ports are connected to DL OUT/UL IN Ports at the front panel of RFU.

- Receive the downlink signal from each RFU
- Split the uplink signal received from OPT to each RFU

3.1.3.2.2 RF ports at the back panel(DL 1 to DL 8, UL 1 to UL 8)

DL 1(to DL 8) & UL 1(to UL 8) RF ports are connected to DL IN/UL OUT Ports at the back panel of OPT.

- Transfer the combined downlink signals to OPT
- Receive the uplink signal from OPT

3.1.4 Optic Distribution Unit (ADX-H-ODU + ADX-RACK-ODU)



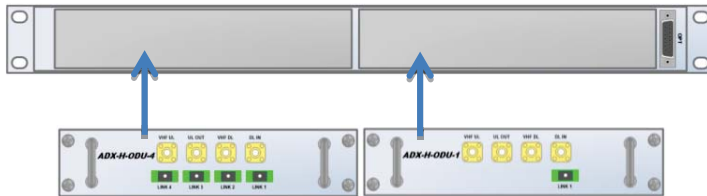


Figure 3-13 ADX-RACK-ODU + ADX-H-ODU-4/1 Front & Rear View

- Functions & Features
 - Converts signal from RF to optic and transports signals to Master RU
 - ADX-RACK-ODU can support up to (2) ADX-H-ODU units
 - ADX-H-ODU-4 can supports up to (4) Master RUs with up to 5 dBo loss (including optical connection loss)
 - ADX-H-ODU-1 can supports (1) Master RU with up to 10dBo loss (including optical connection loss)
 - Minimizes the number of optic fiber cable need by transporting multi band signals over a single strand of fiber using WDM technology.
 - VHF DL and VHF UL ports for VHF/UHF band transmission
- Spec
 - ADX-RACK-ODU
 - o Size: 19.0 x 12.9 x 1.7 inches (482 x 327 x 44 mm)
 - o Weight: 4.2 lbs
 - ADX-ODU-1/4
 - o Size: 7.96 x 7.17 x 1.64 inches (202 x 182 x 41.5 mm)
 - o Weight: 3.2 lbs

3.1.4.1 LEDs

The ADX-H-OPT-8 has the following LEDs on the front panel as shown in Figure 3-14. The ADX-H-OPT-4 has the same LEDs except for LD FAIL 5-8, LINK 5, LINK 6, LINK 7, AND LINK 8.



Figure 3-14 ADX-H-OPT-8 LED

Table 3-3 OPT LED Specifications

ADX DAS-Module		Specifications
Power	Solid Green	Module power is ON
	OFF	Module power is OFF
LD FAIL 1-4/ LD FAIL 5-8	OFF	ODU is not installed
	Solid Yellow	LD Fail alarm exists in the ODU
	Solid Green	No LD Fail alarm is present in the ODU
LINK1 to LINK8	Solid Yellow	PD Fail alarm exists
	Solid Green	No PD Fail alarm is present

3.1.4.2 RF Ports

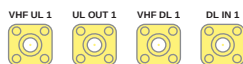


Figure 3-15 OPT RF Ports

3.1.4.2.1 DL IN/UL OUT



The combined downlink signal received from ADX-H-CHC is transferred to the DL IN 1(or 2) at the back of OPT. The UL OUT port connects any of the ports on back of the ADX-H-CHC labeled UL 1 ~8.

3.1.4.2.2 VHF DL/VHF UL

VHF DL/UHF UL ports are used to support Public Safety in the VHF & UHF frequency bands. VHF/UHF signals for Public Safety bypass the ADX-H-CHC and connect directly to the VHF DL/UHF UL ports of the ADX-H-OPT.

3.2 Remote Unit

The remote unit is composed of a (1) Master RU and up to (7) Slave RU's (ADX-R-4WS is required when connecting more than 3 Slave RU's). A power source, either the ADX-R-ADP-30 (supports [1] Master/Slave RU) or the ADX-R-PSU-30 (supports up to [8] Master/Slave RU) is required.

- Specifications
 - Size: 19.0 x 12.9 x 10.5 inches
 - Weight: 61.0 lbs
 - Power Input: 110VAC or -48VDC (optional)

Figure 3-16 RU Front View

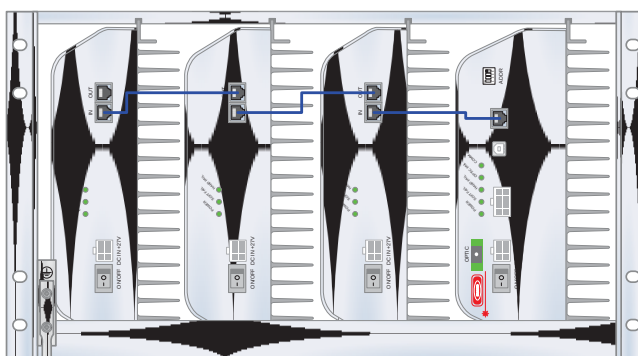


Figure 3-17 RU Rear View

3.2.1 ADX-R-x3xM (Master RU)

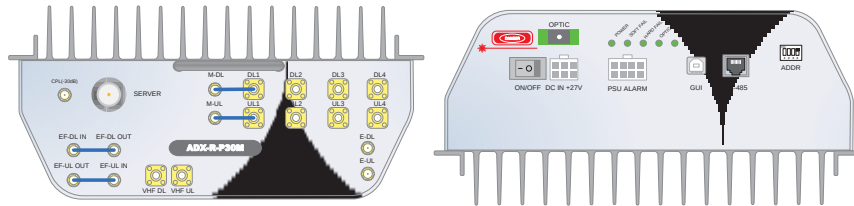


Figure 3-18 Master RU Front & Rear View(excluding BT)

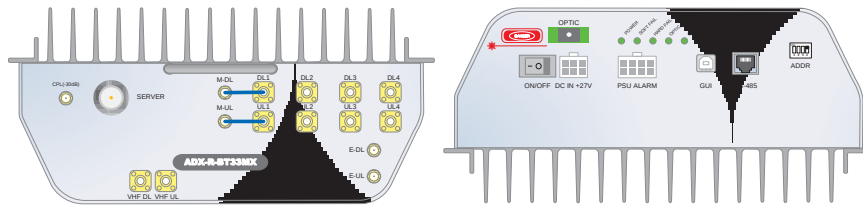


Figure 3-19 Master RU Front & Rear View only for BT

- Functions & Features
 - Converts DL optic signal to a RF signal
 - Converts UL RF signal to an optic signal
 - Splits the converted RF signals and which provide RF to Slave RU's
 - Transmits DL signal and receives UL signal through server antenna
 - Supports up to 7 slave RUs
 - Individually wall-mountable or 19" rack-mountable (requires ADX-R-CHA)
 - Supports external filters via DL and UL pass-through ports
- Specifications
 - Size: 11.8 x 9.8 x 4.5 inches
 - Weight: 13.2 lbs

3.2.1.1 LEDs

Master RU's have the following LEDs on the front panel as shown in Figure 3-20.



Figure 3-20 Master RU LED

Table 3-4 Master RU LED Specifications

ADX DAS-Module		Specifications
Power	Solid Green	Module power is ON
	OFF	Module power is OFF

Soft Fail	Solid Yellow	Soft Fail alarm exists in the Master RU
	Solid Green	No Soft Fail alarms are present in the Master RU
Hard Fail	Solid Red	Hard Fail alarm exists in the Master RU
	Solid Green	No Hard Fail alarms are present in the Master RU
Optic Fail	Solid Yellow	Optic Fail alarm exists in the Master RU
	Solid Green	No Optic Fail alarm is present in the Master RU
COMM	Solid Yellow	COMM Fail alarm exists in the Master RU
	Solid Green	No COMM Fail alarm is present in the Master RU

3.2.1.2 RF Ports

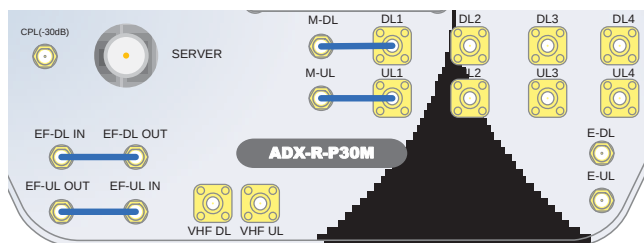


Figure 3-21 RF Ports (Master RU)

3.2.1.2.1 M-DL/M-UL, DL1 to DL4 & UL1 to UL4

- M-DL/M-UL ports
 - Master RU units will come with the M-DL and M-UL ports pre-connected to the DL1 and UL1 ports.
- DL2 to DL4 & UL2 to UL4 ports
 - Slave RU's connect to the DL2 ~DL4 and UL2~UL4 ports.

3.2.1.2.2 E-DL/E-UL

- The E-DL/E-UL ports connect to the ADX-R-4WS (4-way splitter)
- The ADX-R-4WS will provide an additional (4) DL and UL ports to connect up to (4) additional Slave RU's
- ADX-R-4WS divides the output of E-DL port to extended slave RUs and combines/transfers UL signal received from extended slave RUs to E-UL port.

3.2.1.2.3 VHF DL/VHF UL

- Connects to the ADX-R-V25S (VHF Slave RU) for public safety service in the VHF/UHF bands

3.2.1.2.4 SERVER & CPL

- Server Port
 - Connects directly to a server antenna or the ADX-R-CHC (remote channel combiner)
- CPL Port
 - 30dB coupling port off of the server port

3.2.1.2.5 EF-DL IN/EF-DL OUT & EF-UL IN/EF-UL OUT

- Connects to an external DL/UL filter
- DL external filter can be used to reduce DL out-band emissions
- UL external filter can be used to reduce out-band frequencies
- BT RU does not have external filter ports because there are no issues for external filtering

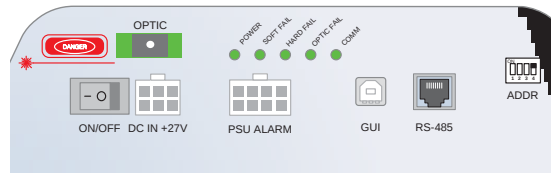


Figure 3-22 Ports at the back panel (Master RU)

3.2.1.3 Optic Port

- Connects to ADX-H-OPT-8, ADX-H-OPT-4, or ADX-R-OEU via optic line

3.2.1.4 Power On/Off Switch & DC IN Port

- Power On/Off switch
 - Master RU Power On/Off switch
- DC IN Port
 - Connects to DC output port of AC/DC adapter (ADX-R-ADP-30) or RU PSU (ADX-R-PSU-30)

3.2.1.5 PSU Alarm Port

- Connects to the ADX-R-PSU-30
- The ADX-H-NMS and the Master RU can monitor the status of the ADX-H-PSU-30 via this port

3.2.1.6 GUI Port

- Connects to a laptop via USB cable
- Monitor/control the RU and the HE connected to the RU using User GUI, which is a Windows based program. ADRF 32-bit or 64-bit drivers will also be required to access the RU using the User GUI.

3.2.1.7 RS-485 Port

- Slave RU should be connected to master RU in a daisy chain structure using RS-485 line to monitor and control slave RUs.
- The RS-485 cable connected to master RU should be connected to RS-485 IN port of slave RU. When a slave RU is connected to another slave RU, then the RS-485 cable should be connected from the RS-485 OUT port to the RS-485 IN of the 2nd Slave RU. (Figure 3-23)
- If RS-485 port connections between Remote Modules are not correct, master RU will not be able to recognize all subordinate slave RUs. (Figure 3-24)
- **WARNING! The RS-485 ports should NEVER be connected to the Ethernet port of laptop or Ethernet Network Equipment. Doing so may cause serious damage to the Remote Modules or network equipments. (Figure 3-25)**

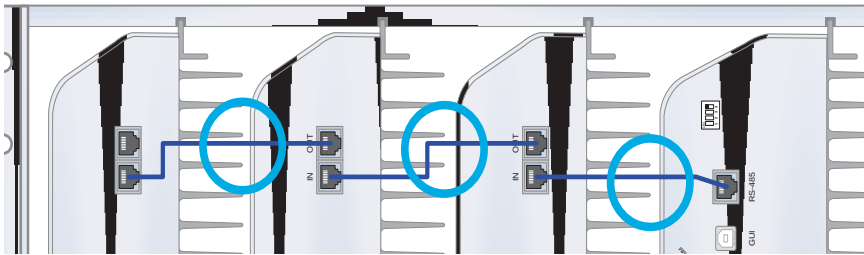


Figure 3-23 Correct RS-485 connection between Master RU and Slave RU or between Slave RUs

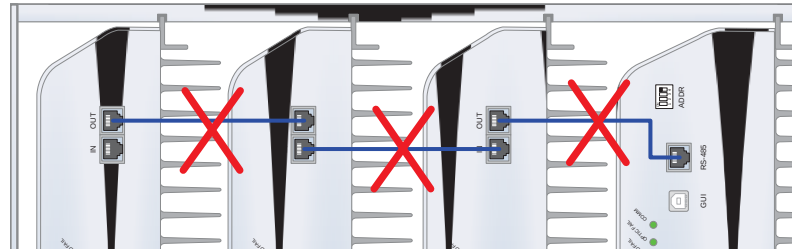
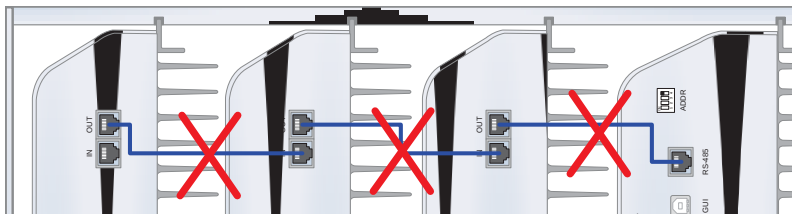


Figure 3-24 Wrong RS-485 connection between Master RU and Slave RU or between Slave RUs

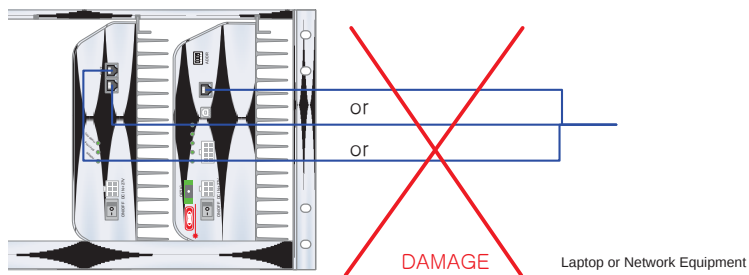


Figure 3-25 Do NOT connect RS-485 ports of Remote Module to network equipment port

3.2.1.8 ADDR

- The ID of master RU can be set manually using ADDR switch. This switch should only be used if instructed by ADRF Technical Support.

3.2.2 ADX-R-xxxS/ADX-R-BTxxS/ADX-R-VU25S (Slave RU)

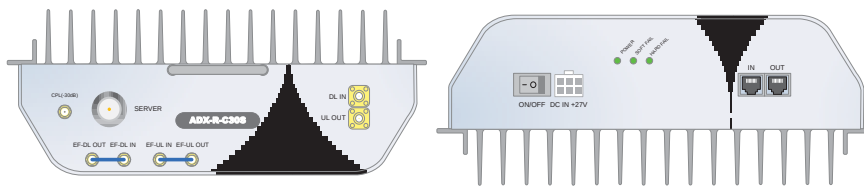


Figure 3-26 Slave RU Front & Rear View (excluding BT and VU)

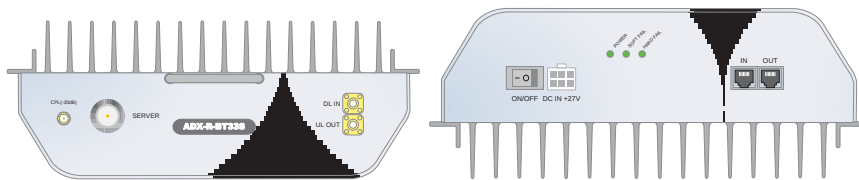


Figure 3-27 Slave RU Front & Rear View (BT)

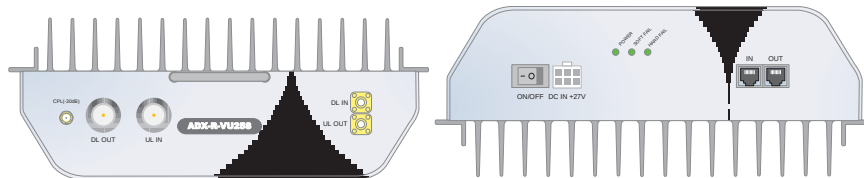


Figure 3-28 Slave RU Front & Rear View (excluding VU)

- Functions & Features
 - Transmits DL signal and receives UL signal through server antenna port
 - Individually wall-mountable or 19" rack-mountable (requires ADX-R-CHA)
 - Supports external filters via DL and UL pass-through ports
- Specification
 - Size: 11.8 x 9.8 x 3.7 inches (300 x 249.6 x 94.5 mm)
 - Weight: 11.7 lbs (5.3 kg)

3.2.2.1 LEDs

ADX-R-x30S has the following LEDs on the front of the Slave RU as shown below in Figure 3-29.



Figure 3-29 Slave RU LED

Table 3-5 Slave RU LED Specifications

ADX DAS-Module		Specifications
Power	Solid Green	Module power is ON
	OFF	Module power is OFF
Soft Fail	Solid Yellow	Soft Fail alarm exists in the Slave RU
	Solid Green	No Soft Fail alarms are present in the Slave RU
Hard Fail	Solid Red	Hard Fail alarm exists in the Slave RU
	Solid Green	No Hard Fail alarms are present in the Slave RU

3.2.2.2 RF Ports



Figure 3-30 RF Ports (Slave RU)

3.2.2.2.1 DL IN & UL OUT

- Connects to one of the available DL 2 to 4/UL 2 to 4 ports of the Master RU
- DL IN port receives the divided DL output from the Master RU
- UL OUT port transfers the UL output of slave RU to the Master RU

3.2.2.2.2 SERVER & CPL

- Server Port
 - Connects directly to a server antenna or the ADX-R-CHC (remote channel combiner)
- CPL Port
 - 30dB coupling port off of the server port

3.2.2.2.3 EF-DL IN/EF-DL OUT & EF-UL IN/EF-UL OUT

- Connect to an external DL/UL filter
- DL external filter can be used to reduce out-band emissions
- UL external filter can be used to reduce uplink out-band signals
- BT and VU RU do not have external filter ports because there are no issues for external filtering



Figure 3-31 Ports at the rear panel (Slave RU)

3.2.2.3 Power On/Off Switch & DC IN Port

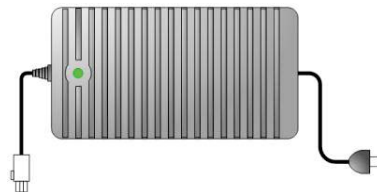
- Power On/Off switch
 - Slave RU Power On/Off switch
- DC IN Port
 - Connected to DC output port of AC/DC adaptor (ADX-R-ADP-30) or RU PSU (ADX-R-PSU-30)

3.2.2.4 RS-485 Port

- Slave RU should be connected to master RU in a daisy chain structure using RS-485 line to monitor and control slave RUs.
- The RS-485 cable connected to master RU should be connected to RS-485 IN port of slave RU. When a slave RU is connected to another slave RU, then the RS-485 cable should be connected from the RS-485 OUT port to the RS-485 IN of the 2nd Slave RU. (Figure 3-23)
- If RS-485 port connections between Remote Modules are not correct, master RU will not be able to recognize all subordinate slave RUs. (Figure 3-24)
- **WARNING! The RS-485 ports should NEVER be connected to the Ethernet port of laptop or Ethernet Network Equipment. Doing so may cause serious damage to the Remote Modules or network equipments. (Figure 3-25)**

3.2.3 RU Power Supply Options

3.2.3.1 ADX-R-ADP (RU Power Adapter)



The ADX-R-ADP-30 is capable of powering 1 remote module (Master or Slave RU).

3.2.3.2 ADX-R-PSU (RU Power Supply Unit)

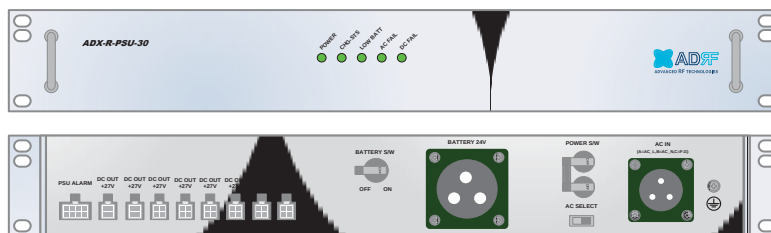


Figure 3-32 RU PSU Front & Rear View

- Functions & Features
 - Provides power to 8 remote modules (Master or Slave RU)
 - Supports ADRF-BBU Battery Backup
- Spec

- Size: 19.0 x 12.0 x 2.6 inches (482 x 304x 66 mm)
- Weight: 9.9lbs (4.5 kg)
- Power Input: 110V or 220VAC, selectable by switch

3.2.3.2.1 LEDs

ADX DAS has the following LEDs on the front of the RU PSU as shown below in Figure 3-33.



Figure 3-33 RU PSU LED

Table 3-6 RU PSU LED Specifications

ADX DAS-Module		Specifications
Power	Solid Green	Module power is ON
	OFF	Module power is OFF
CHG STS	Solid Yellow	No AC power detected and ADRF-BBU is being used
	Blinking Green	ADRF-BBU is being charged
	Solid Green	Completely Charged
	OFF	Battery is not connected
LOW BATT	Solid Yellow	Low Battery alarm exist in the PSU
	Solid Green	No Low Battery alarm is present in the PSU
AC FAIL	Solid Yellow	AC Fail alarm exist in the PSU
	Solid Green	No AC Fail alarm is present in the PSU
DC FAIL	Solid Yellow	DC Fail alarm exist in the RFU
	Solid Green	No DC Fail alarms is present in the PSU

3.2.3.2.2 AC Input On/Off Switch, AC Input Port and AC Input Selection Switch

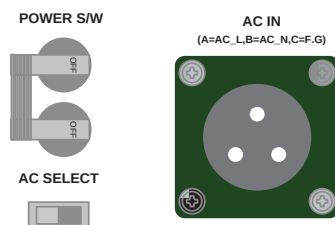


Figure 3-34 RU PSU Power Switch View

The AC Power on/off switch is located at the rear of the ADX-R-PSU-30. The ADX-R-PSU-30 can be operated at the 110V AC or 220V AC. The AC Input Voltage should be properly set by the user.

3.2.3.2.3 Battery Backup Port and Battery Backup Switch

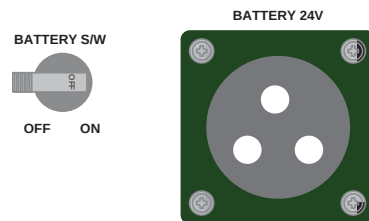


Figure 3-35 Battery Backup Port & Battery Backup Switch

When the Battery S/W is set to the ON position, the power supply charges the optional ADRF-BBU (External Backup Battery) (Figure 3-35).

The RU PSU can be connected to an ADRF-BBU (ADRF Battery Backup Unit) to provide power during a power failure. If an ADRF-BBU is utilized, connect the ADRF-BBU to the RU PSU via the external battery backup port as shown in Figure 3-35.

(WARNING: The circuit switch on the ADRF-BBU must be set to OFF before connecting the ADRF-BBU to the HE PSU to prevent damage to the HE PSU or the ADRF-BBU and personal injury.)

Note: Please contact ADRF Technical Support for assistance if you are unfamiliar with the installation procedure of our battery box.

The procedure for connecting RU PSU to BBU

- BATT S/W OFF
- Connect BBU to RU PSU Battery port using RU battery cable
- BATT S/W ON

3.2.3.2.4 DC Output Port



Figure 3-36 DC Output Port (RU PSU)

- (8) DC output ports are available to connect up to 8 remote modules (Master or Slave RU's)

3.2.3.2.5 PSU Alarm Port



Figure 3-37 PSU Alarm Port (RU PSU)

- Connects to the Master RU to monitor the status of the ADX-R-PSU-30
- The ADX-H-NMS & Master RU monitor the status of the ADX-R-PSU-30 via this port

4. CABLE CONNECTION

4.1 Head End Connection Diagrams

4.1.1 Front/Rear Head End Connection View with Optional BCU unit

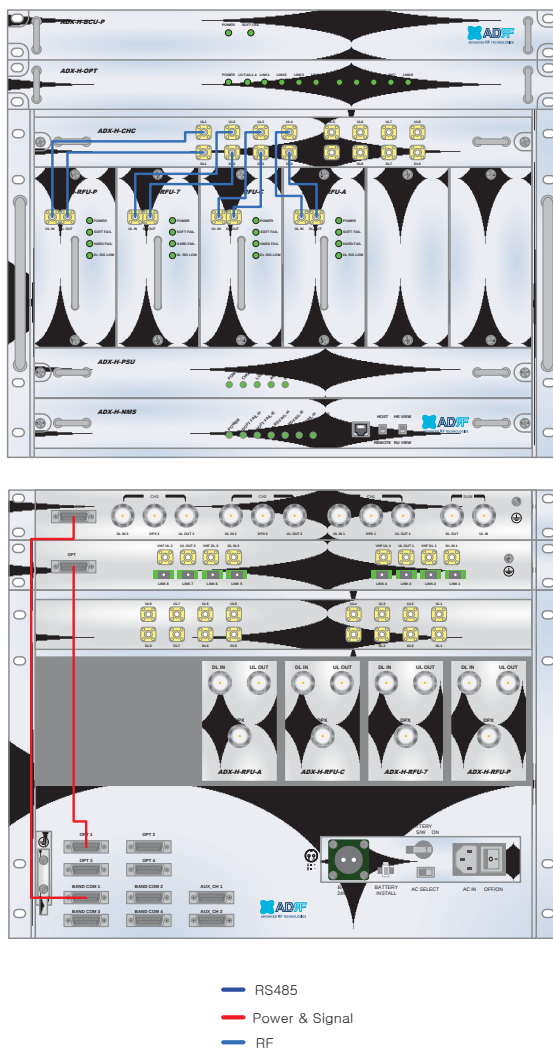


Figure 4-1 HE Cable connection (1 OPT-8 +1 BCU)

4.1.2 Rear Head End Connection View with (4) OPT-8 units

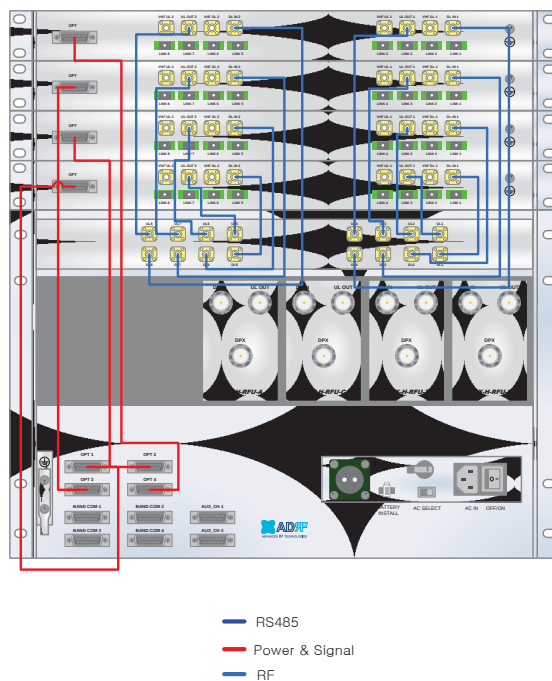


Figure 4-2 HE Cable connection (4 OPTs)

4.2 Remote Unit Connection Diagrams

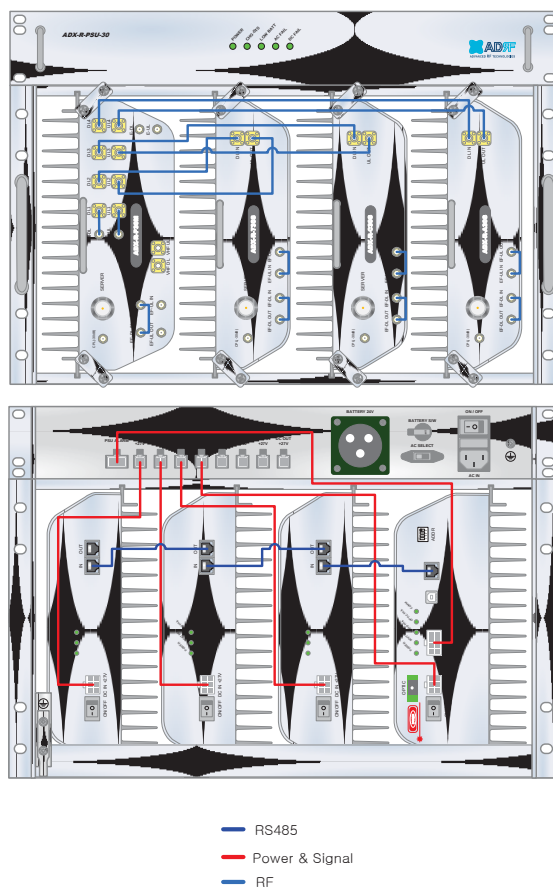


Figure 4-3 RU Cable connection (4 Remote Module + RU PSU)



4.3 Remote Unit w/ 4-Way Combiner (ADX-R-4WS)

Figure 4-4 Slave RU Expansion using ADX-R-4WS



5. MOUNTING METHOD

5.1 Head End

5.1.1 Rack Mount

Figure 5-1 HE Rack Mount (Front & Rear view)

- Expandable up to 4 OPTs, 4 BCUs and 2 AUX CHs

5.1.2 Wall Mount

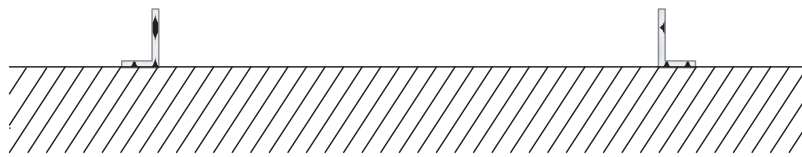


Figure 5-2 HE Wall Mount (Top View)

- Expandable up to 3 units (OPT, BCU) or max 3U (132mm)
 - OPT or BCU will be stacked up above basic 19" HE chassis which includes NMS, RFU, PSU and CHC



5.2 Remote Unit

5.2.1 Rack Mount

Figure 5-3 RU Rack Mount (Front view)

5.2.2 Wall Mount

5.2.2.1 Remote Unit using RU Chassis (ADX-R-CHA-30)

Wall mount brackets attached to the individual remote modules must be removed before sliding the remote modules into the RU Chassis.

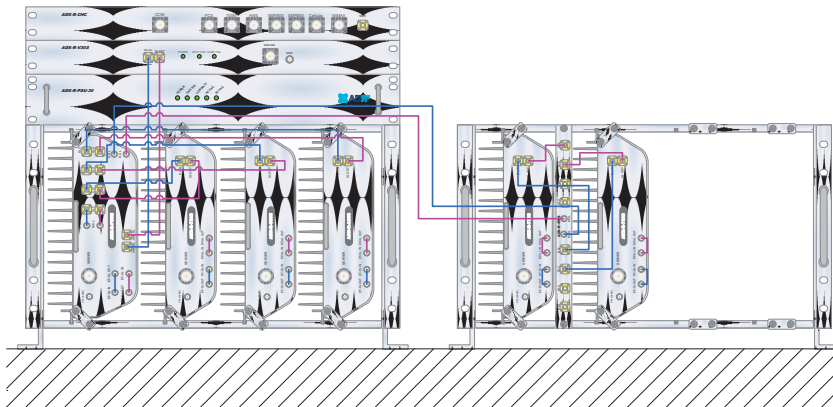


Figure 5-4 19" Shelf type - RU Wall Mount (Top view)

5.2.2.2 Individual Remote Module

Remote modules can be mounted using the attached mounting bracket that ships with the unit.

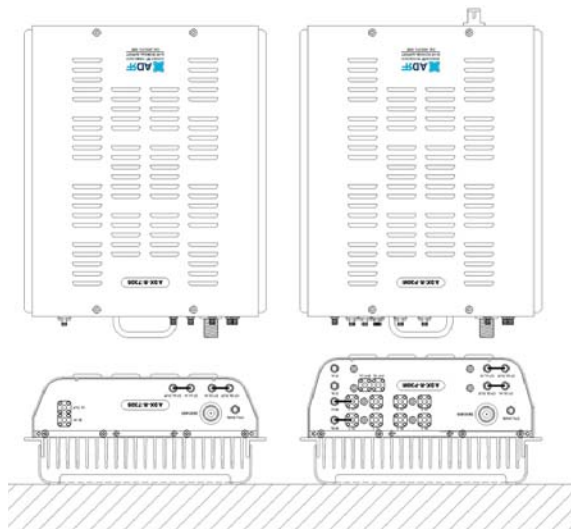


Figure 5-5 Remote Module Wall Mount (Top view)

6. INSTALLATION

6.1 Pre-Installation Inspection

Please follow these procedures before installing ADX 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), then select the either 110V or 220V AC using the selection switch located at the rear of HE and RU PSU. The ADX ships with the AC selection switch set to the 110V position. Incorrect AC selection can damage the ADX equipment.

6.2 ADX DAS Installation Procedure

6.2.1 HE Installation Procedure



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

6.2.1.1 Installing a ADX DAS HE in a rack

The ADX 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 ADX HE to attach it to the 19" rack. The ADX 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 ADX HE
 - > Detach the wall mount bracket assembled located at the base of the ADX-HE chassis
 - > Verify that the HE and Mounting holes are in good condition
 - > Set the ADX DAS HE against the 19" rack and secure the unit with screws
 - > Verify that ADX HE is securely attached
 - > Connect the GND cable
 - > Connect the RF cable
 - > Connect the Power
 - > Connect the Optic cable

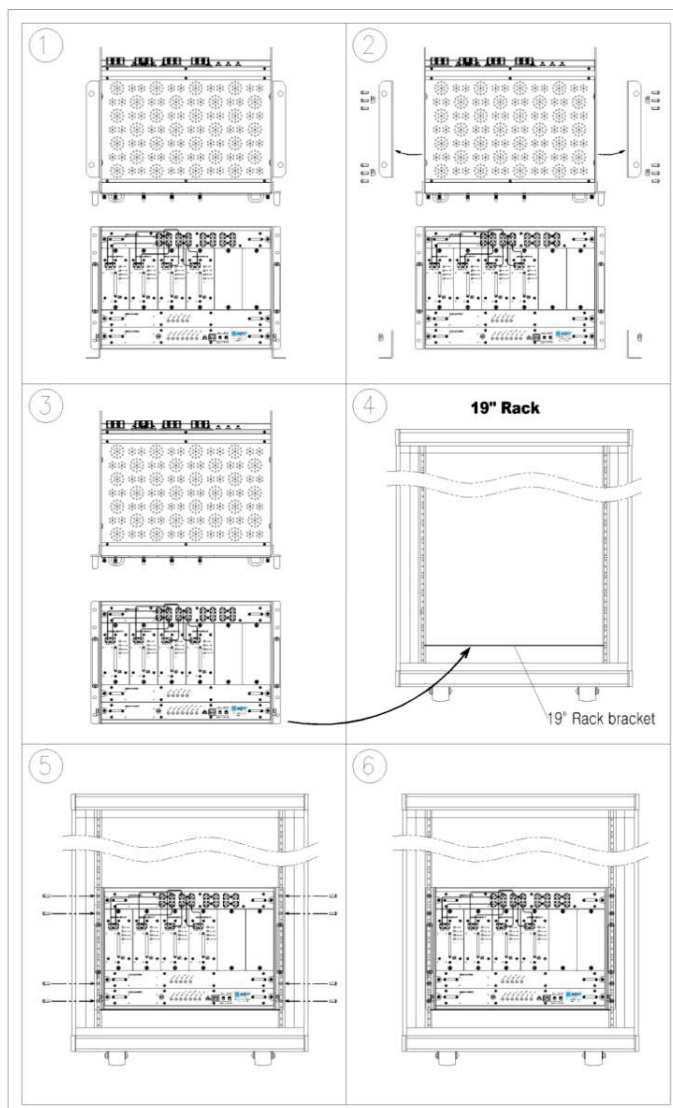


Figure 6-1 ADX HE 19" Rack Mount Instructions

6.2.1.2 Wall mounting the ADX DAS HE

If the ADX HE chassis is being mounted to a wall, then allow clearance of at least 17" (430mm) on the top (front side of HE) and 2" (51mm) on the bottom (rear side of HE) and 2" (51mm) on both sides and front for air circulation.

- Mount procedure
 - The following steps should be followed when wall mounting the ADX HE
 - > Verify that the HE and Mounting hole are in good condition
 - > Place the ADX HE against the wall and mark of the mounting holes
 - > Drill holes(4holes, 18Φmm, 50mm depth) in the installation surface and insert the anchor bolts
 - > Bolt the ADX HE to the wall
 - > Make sure the ADX HE is securely attached
 - > Connect the GND cable
 - > Connect the RF cable
 - > Connect the Power
 - > Connect the Optic cable

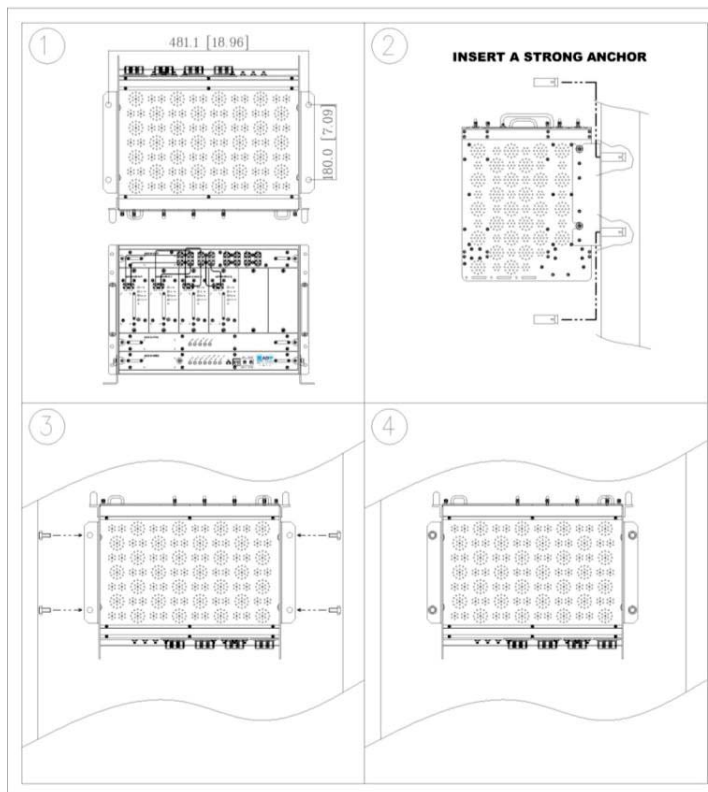


Figure 6-2 ADX HE Wall Mount Instructions

6.2.1.2.1 Installing added rack type modules into basic HE chassis

Additional modules such as the ADX-H-OPT and ADX-H-BCU can be mounted to the Chassis (ADX-H-CHA) using the included mounting brackets that come with the add-on modules.

- A maximum of up to 3 add-on modules (OPT, BCU) can be mounted to the chassis
 - OPT or BCU will be stacked up above basic 19" HE chassis which includes NMS, RFU, PSU and CHC

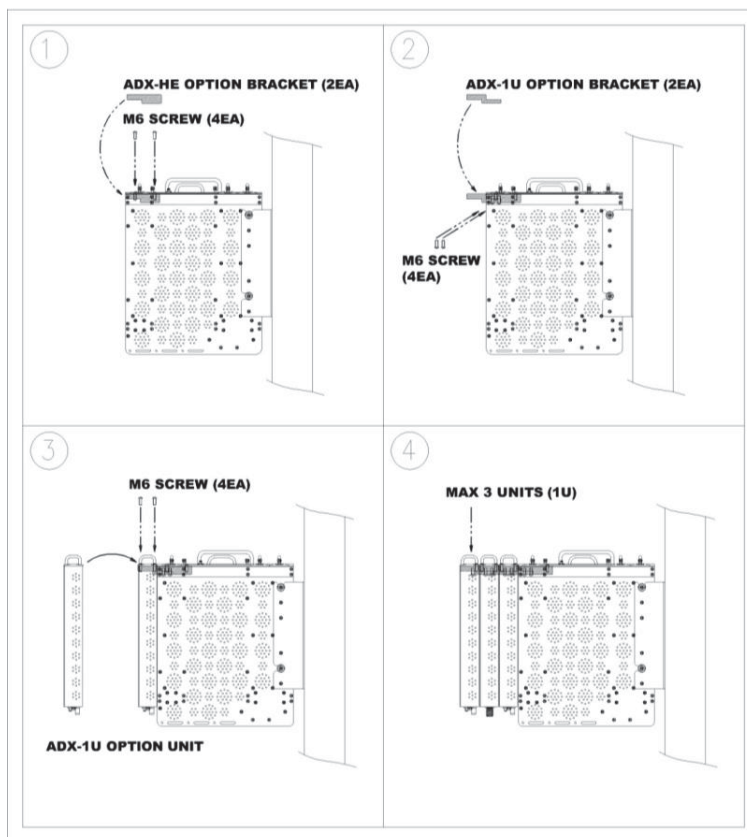


Figure 6-3 Wall Mount Instructions for ADX-HE added 1U Unit

6.2.2 RU Installation Procedure



CAUTION: ADX DAS RU should be installed inside building only.

6.2.2.1 Installing a ADX DAS RU in a rack

If the ADX RU chassis is being wall mounted then allow clearance of 3" (76mm) front and rear, and 2" (51mm) on both sides for air circulation. No top or bottom clearance is required.

When ADX DAS RU mounts in a standard 19" equipment rack, rack or wall type fan is needed for heat dissipation. The rack type fan (ADX-R-FAN) must have at least 1.75" of clearance.

- Consideration:
 - Eight mounting holes are located on 4 corners of ADX RU to attach it to the 19" rack. The ADX RU must be securely attached to support the weight of the ADX-RU units.
- Mount procedure
 - The following steps should be followed while mounting the ADX-RU units
 - > Detach the wall mount bracket located at the base of the ADX-RU chassis
 - > Verify that the RU and Mounting hole are in good condition
 - > Screw the ADX DAS RU to the 19" rack
 - > Make sure the ADX RU is securely attached
 - > Connect the GND cable
 - > Connect the RF cable
 - > Connect the Power
 - > Connect the Optic cable

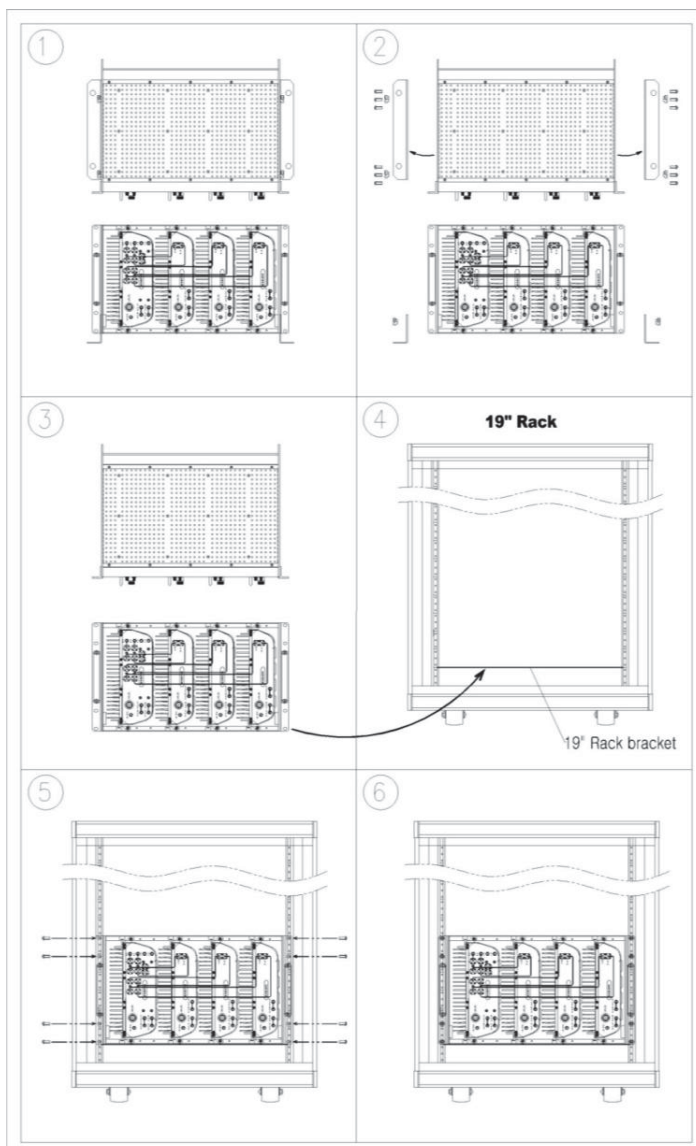


Figure 6-4 ADX-RU 19" Rack Mount Instructions

6.2.2.2 Wall mounting the ADX DAS RU

If the ADX RU chassis is being mounted to a wall, then allow clearance of at least 16" (406mm) on the top (front side of RU), 2" (51mm) on the bottom (rear side of RU) and 2" (51mm) on both sides and front for air circulation.

- Mount procedure
 - The following steps should be followed while mounting the ADX RU
 - > Verify that the RU and Mounting hole are in good condition
 - > Place the RU chassis up against the wall and mark off the mounting holes
 - > Drill holes(4holes, 18Φmm, 50mm depth) in the installation surface and insert the anchor bolts
 - > Bolt the RU chassis to the wall
 - > Install the individual Sub-RU inside of the chassis
 - > Make sure the RU chassis is securely attached
 - > Connect the RF cable
 - > Connect the Antenna cable
 - > Connect the Power
 - > Connect the Optic cable

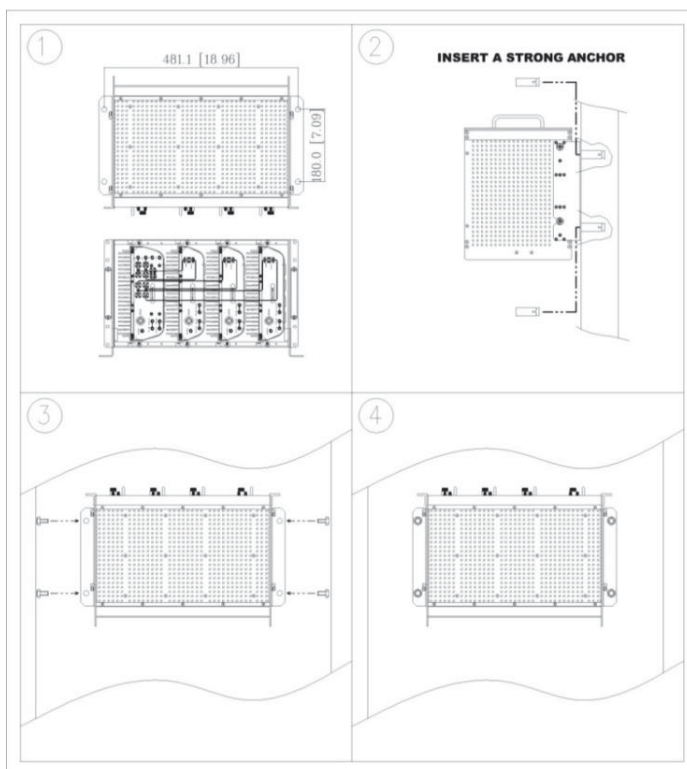


Figure 6-5 ADX-RU Wall Mount Instructions

6.2.2.2.1 Installing added rack type modules into basic HE chassis

Additional modules such as the ADX-R-CHC (channel combiner) and ADX-R-PSU (power supply unit) can be mounted to the Chassis (ADX-R-CHA) using the included mounting brackets that come with the add-on modules.

- A maximum of up to 2 addon modules (ADX-R-CHC and ADX-R-PSU) can be mounted to the chassis.
 - ADX-R-PSU or ADX-R-CHC will be stacked up above basic 19" RU chassis which holds the Master/Slave RU units.

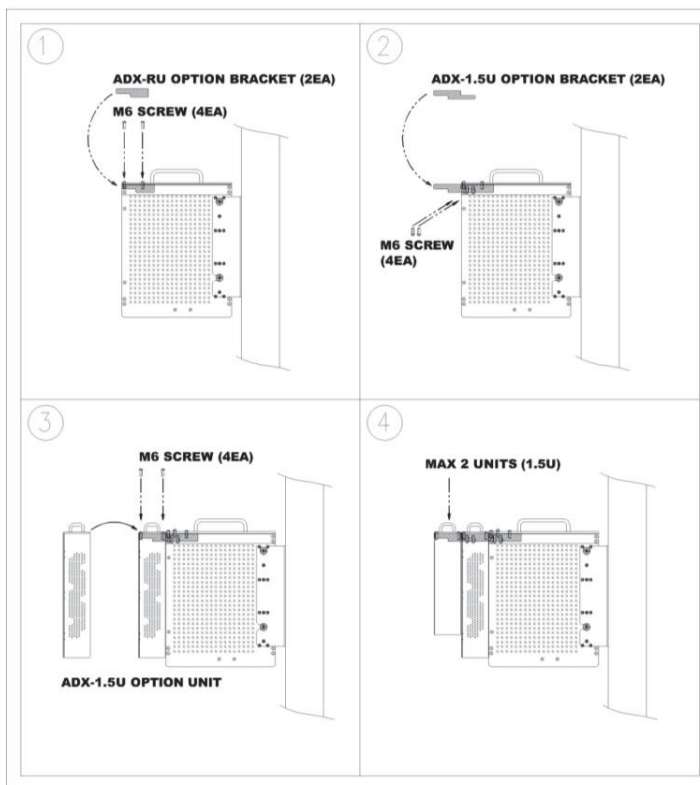


Figure 6-6 Wall Mount Instructions for ADX-RU added 1.5U Unit

6.2.2.3 Wall mounting an ADX Remote Module

- Mount procedure
 - The following steps should be followed while mounting the Remote Module
 - > Verify that the RU and Mounting hole are in good condition
 - > Separate the wall mount bracket from the Sub-RU
 - > Placed the wall mount bracket against the wall and mark off the mounting holes
 - > Drill holes(4holes, 6Φmm) in the installation surface then insert the enclosed anchor bolts
 - > Bolt the mounting bracket to the wall
 - > Install the Sub-RU to the mounting bracket
 - > Fasten the Sub-RU to the mounting bracket using the included screws
 - > Verify that the Remote Module is securely attached
 - > Connect the Antenna cable
 - > Connect the Power
 - > Connect the Optic cable (if applicable)

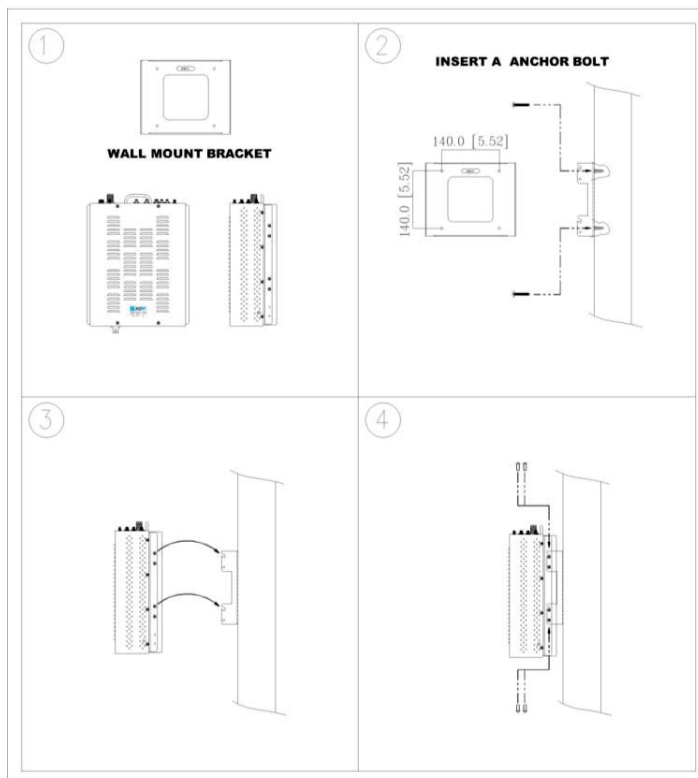


Figure 6-7 Remote Module Wall Mount Instructions

6.2.3 ADX-H-OEU Installation Procedure



CAUTION: ADX-H-OEU should be installed inside building only.

6.2.3.1 Installing a ADX-H-OEU in a Rack

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

- Consideration:
 - Four mounting holes are located on 4 corners of ADX-H-OEU to attach it to the 19" rack. The ADX-H-OEU must be securely attached to support the weight of the unit.
- Mount procedure
 - The following steps should be followed while mounting the ADX-H-OEU
 - > Detach the wall mount brackets located at the base of the ADX-H-OEU
 - > Verify that the OEU and mounting hole are in good condition
 - > Screw the ADX-H-OEU to the 19" rack
 - > Make sure the ADX-H-OEU is securely attached
 - > Connect the GND cable
 - > Connect the RF cable
 - > Connect the Power
 - > Connect the Optic cable

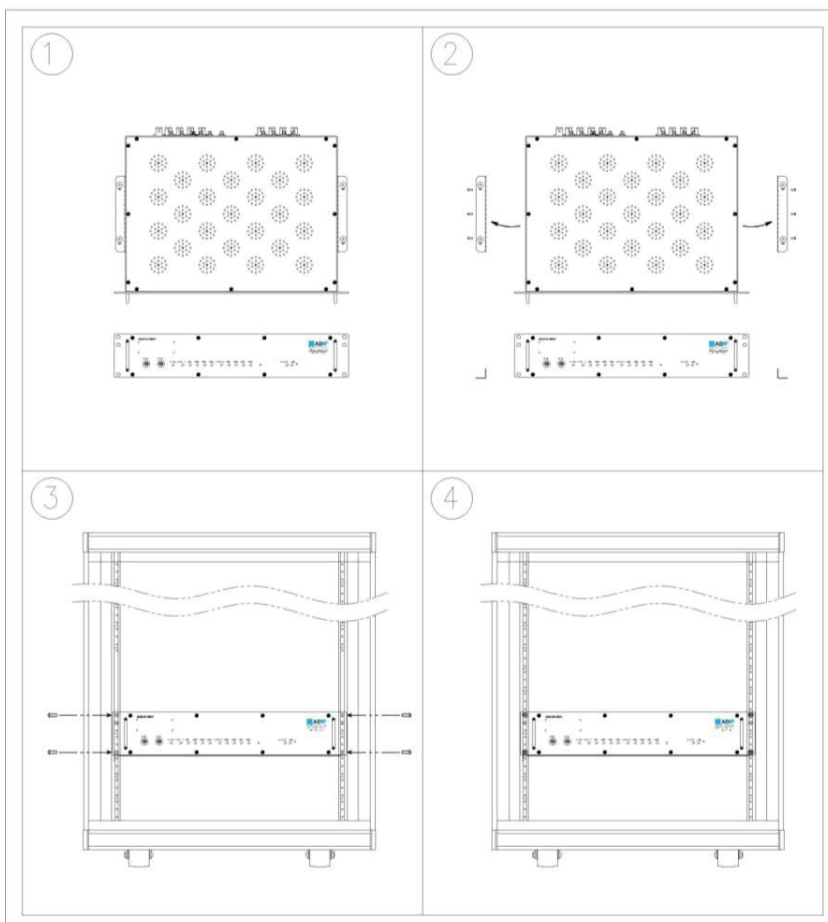


Figure 6-8 ADX-H-OEU Rack Mount Instructions

6.2.3.2 Wall mounting the ADX-H-OEU

- Mount procedure
 - The following steps should be followed while mounting the ADX-H-OEU
 -
 - > Verify that the OEU and Mounting hole are in good condition
 - > Drill holes(4holes, 6Φmm) in the installation surface then insert the enclosed anchor bolts
 - > Set the ADX-H-OEU against the wall
 - > Make sure the OEU is securely attached
 - > Connect the RF cable
 - > Connect the Antenna cable
 - > Connect the Power
 - > Connect the Optic cable

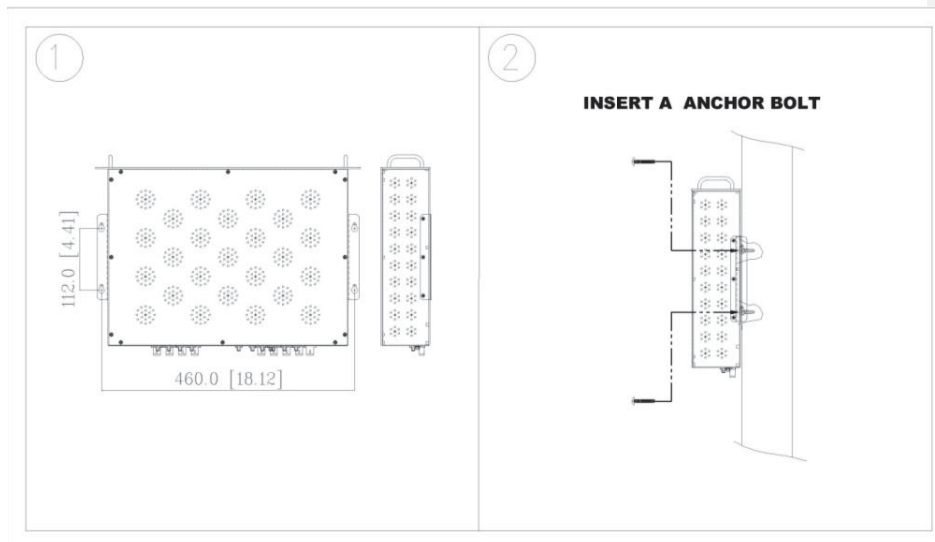


Figure 6-9 ADX-H-OEU Wall Mount Instructions

6.3 Grounding

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

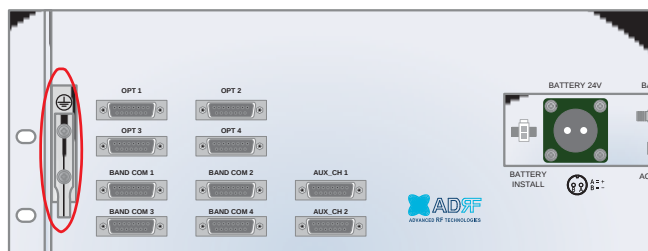


Figure 6-10 Ground Cable Connection (HE rear side)

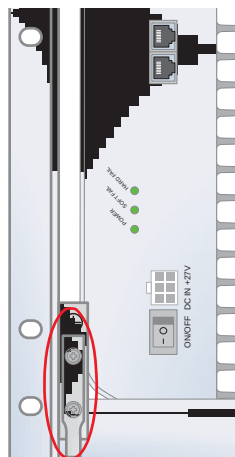


Figure 6-11 Ground Cable Connection (RU rear side)

6.4 Optic Port Cleaning

- We recommend cleaning optic connector using a dry optical cleaning swab or tissue in a dry environment as needed. We recommend cleaning the optic connectors only if the expected optic loss is higher than the loss reported in the Web-GUI by 1.5dB. (Figure 6-12)
- When optic connector are not in use, the port should be covered with a protective dust cap. (Figure 6-13)

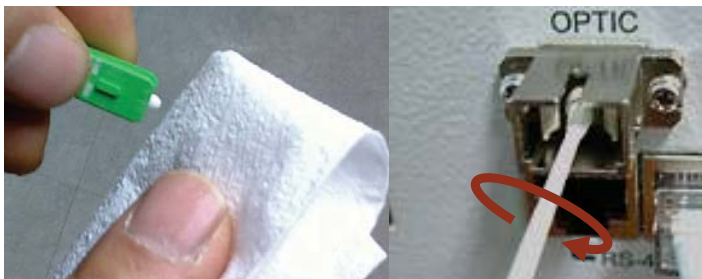


Figure 6-12 Optic Connector Cleaning (left) and Optic Port Cleaning (right)



Figure 6-13 SC/APC Optic Connector Dust Cap



7. WARRANTY AND REPAIR POLICY

7.1 General Warranty

The ADRF carries a Standard Warranty period of two (2) years unless indicated otherwise on the package or in the acknowledgment of the purchase order.

7.2 Limitations of Warranty

Your exclusive remedy for any defective product is limited to the repair or replacement of the defective product. Advanced RF Technologies, Inc. may elect which remedy or combination of remedies to provide in its sole discretion. Advanced RF Technologies, Inc. shall have a reasonable time after determining that a defective product exists to repair or replace the problem unit. Advanced RF Technologies, Inc. warranty applies to repaired or replaced products for the balance of the applicable period of the original warranty or ninety days from the date of shipment of a repaired or replaced product, whichever is longer.

7.3 Limitation of Damages

The liability for any defective product shall in no event exceed the purchase price for the defective product.

7.4 No Consequential Damages

Advanced RF Technologies, Inc. has no liability for general, consequential, incidental or special damages.

7.5 Additional Limitation on Warranty

Advanced RF Technologies, Inc. standard warranty does not cover products which have been received improperly packaged, altered, or physically damaged. For example, broken warranty seal, labels exhibiting tampering, physically abused enclosure, broken pins on connectors, any modifications made without Advanced RF Technologies, Inc. authorization, will void all warranty.

7.6 Return Material Authorization (RMA)

No product may be returned directly to Advanced RF Technologies, Inc. without first getting an approval from Advanced RF Technologies, Inc. If it is determined that the product may be defective, you will be given an RMA number and instructions in how to return the product. An unauthorized return, i.e., one for which an RMA number has not been issued, will be returned to you at your expense. Authorized returns are to be shipped to the address on the RMA in an approved shipping container. You will be given our courier information. It is suggested that the original box and packaging materials should be kept if an occasion arises where a defective product needs to be shipped back to Advanced RF Technologies, Inc. To request an RMA, please call (800) 313-9345 or send an email to techsupport@adrfttech.com.

8. WEB-GUI

8.1 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 ADX system must have an external modem box connected to the ADX.

8.1.1 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 8-1 Login screen

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

Table 8-1 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

8.2 Administrator/User Mode

8.2.1 Common

8.2.1.1 Navigation tree Lock/Unlock

When the system is “Locked”, a green lock icon will appear above the navigation tree. When the system is locked, new devices cannot be added. Any devices added to the system when the system is “Locked” will not be detected by the NMS. After a system has been commissioned properly, the system should be left in the “Locked” position. To unlock the system, click on the “Unlock System” button to the right of the icon.

When the system is “Unlocked”, an orange icon will appear above the navigation tree. When the system is unlocked, new devices added to the system will be automatically detected. Once the new hardware appears in the system tree, then the system can be locked. To lock the system, click on the “Lock System” button to the right of the icon.



Figure 8-2 Navigation tree Lock/Unlock

8.2.1.2 Navigation Tree

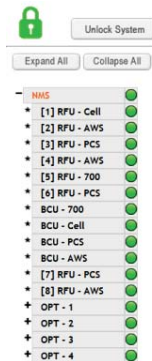


Figure 8-3 Navigation tree

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 8-2 Navigation tree

Parameters	Description
Expand All	Expands the entire navigation tree
Collapse All	Collapses the entire navigation tree
+	The module has the expandable subordinate modules
-	The branch is currently expanded
Orange circle	The module has soft fail alarm
Red circle	The module has hard fail alarm
Green circle	The module has no alarms (normal)
NMS	The selected module will have orange colored text

8.2.1.3 Power Status

Display the power source that is currently being used.

Table 8-3 Power Supply Status

Input Power Status	Display Image
AC	
Battery	

8.2.1.4 Commissioning Status

Display whether or not the module has successfully been commissioned.

Table 8-4 Commissioning ICON

Status	Display Image
Commissioned	
Not-Commissioned	

8.2.1.5 Information

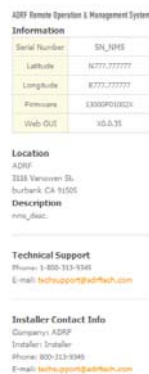


Figure 8-4 ADX DAS General Information

- 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 ADX 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.

8.2.2 Status Tab

8.2.2.1 Status – NMS

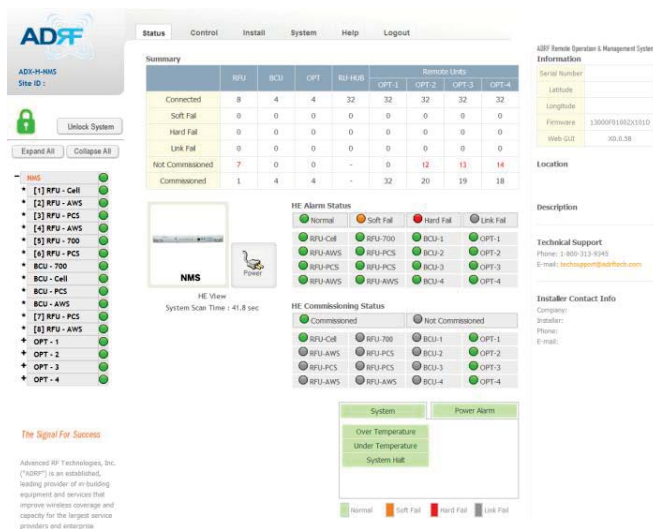


Figure 8-5 Status - NMS

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 ADX DAS. In addition, the user can see if any alarms are present in the system and also the commissioning status of each module.

8.2.2.1.1 System Summary

Summary								
	RFU	BCU	OPT	RU-HUB	Remote Units			
					OPT-1	OPT-2	OPT-3	OPT-4
Connected	8	4	4	32	32	32	32	32
Soft Fail	0	0	0	0	0	0	0	0
Hard Fail	0	0	0	0	0	0	0	0
Link Fail	0	0	0	0	0	0	0	0
Not Commissioned	7	0	0	-	0	12	13	14
Commissioned	1	4	4	-	32	20	19	18

Figure 8-6 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 componnets.

Table 8-5 System Summary Description

Parameters	Description
Connected	Display the number of modules physically connected to ADX 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

8.2.2.1.2 HE View / RU View, System Scan Time

- HE View/RU View
 - Displays whether the NMS is set to HE view or RU view.
 - Refer to section 3.1.1.4
- System Scan Time
 - Displays the time it takes to scan and update the information of all the modules that are on the navigation tree. This time will increase as more components are added to the system.
 - When Navigation Tree is unlocked, the user should wait at least the “System Scan Time” for the system to detect newly added hardware.



Figure 8-7 System scan time, HE view/RU view

8.2.2.1.3 HE Alarm Status

Display the alarm status of each HE component.

HE Alarm Status

Normal	Soft Fail	Hard Fail	Link Fail
RFU-Cell	RFU-700	BCU-1	OPT-1
RFU-AWS	RFU-PCS	BCU-2	OPT-2
RFU-PCS	RFU-PCS	BCU-3	OPT-3
RFU-AWS	RFU-AWS	BCU-4	OPT-4

Figure 8-8 HE alarm status

8.2.2.1.4 HE Commissioning Status

Display commissioning status of each HE component.

HE Commissioning Status

 Commissioned	 Not Commissioned
 RFU-Cell	 RFU-700
 RFU-AWS	 RFU-PCS
 RFU-PCS	 RFU-PCS
 RFU-AWS	 RFU-AWS

Figure 8-9 HE Commissioning status

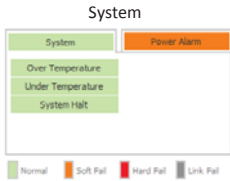
Table 8-6 Description for HE Commissioning status

Status	Display	Description
Installed Status	Physically Installed	RFU-PCS
	Physically Not-Installed	RFU-CHS
Commissioning Status	Success	
	Failed or not commissioned	

8.2.2.1.5 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.

Table 8-7 Description for NMS alarm

Alarm	Severity	Description
	Over Temperature	Hard Fail / Soft Fail
	Under Temperature	Soft Fail
	System Halt	Hard Fail
		HE system halt
	AC Fail	Soft Fail
	DC Fail	Soft Fail
	Over Current	Hard Fail
	Battery Low	Soft Fail

8.2.2.2 Status – BCU

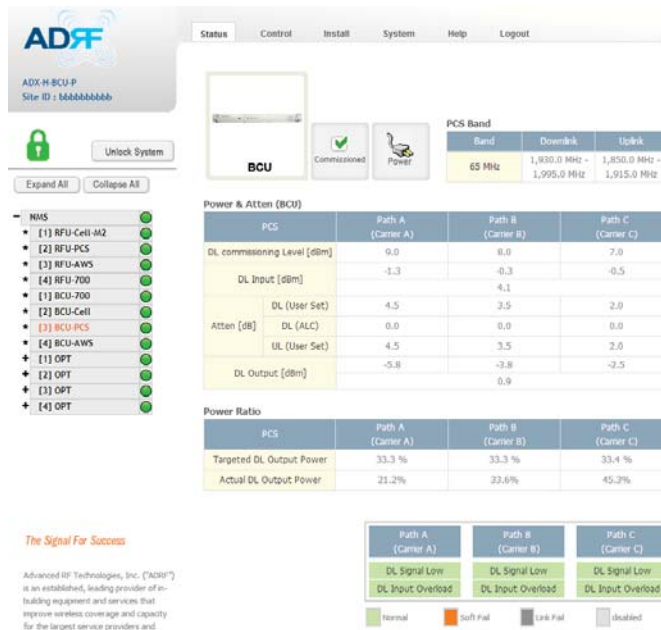


Figure 8-10 Status – BCU

8.2.2.2.1 Band

Displays the bandwidth and the frequency ranges for DL and UL of the BCU module.

PCS Band		
Band	Downlink	Uplink
65 MHz	1,930.0 MHz - 1,995.0 MHz	1,850.0 MHz - 1,915.0 MHz

Figure 8-11 Status – BCU Band

8.2.2.2.2 Power & Atten

Power & Atten (BCU)				
PCS	Path A (Carrier A)	Path B (Carrier B)	Path C (Carrier C)	
DL commissioning Level [dBm]	9.0	8.0	7.0	
DL Input [dBm]	-1.3	-0.3	-0.5	
		4.1		
DL (User Set)	4.5	3.5	2.0	
Atten [dB]	0.0	0.0	0.0	
DL (ALC)	4.5	3.5	2.0	
UL (User Set)	-5.8	-3.8	-2.5	
DL Output [dBm]		0.9		

Figure 8-12 Status – BCU Power & Atten

- **DL Commissioning Level:** Displays the commissioning level for each individual RF path. If unit has not been commissioned, "Not Commissioned" will be displayed.
- **DL Input:** Displays the currently incoming signal strength of each RF path along with the composite DL input power of all 3 RF paths.
- **Atten:** Displays the attenuation values that the system is currently using which is defined by the power ratios specified by the user.
- **DL Output:** Displays the output value for each RF path along with the composite DL output power of all 3 RF paths. The DL Output level for each RF path will not exceed 5dBm and the composite output power will not exceed 10 dBm.

8.2.2.2.3 Power Ratio

Power Ratio			
PCS	Path A (Carrier A)	Path B (Carrier B)	Path C (Carrier C)
Targeted DL Output Power	33.3 %	33.3 %	33.4 %
Actual DL Output Power	21.2%	33.6%	45.3%

Figure 8-13 Status – BCU Power Ratio

- **Targeted DL Output Power:** Displays desired power ratios specified by the user. If unit has not been commissioned, "Not Commissioned" will be displayed.
- **Actual DL Output Power:** Displays the currently power ratios that the system is using. These values will fluctuate based on the amount of traffic that is in the system.

8.2.2.2.4 Alarm

Displays the current alarm status of each individual RF path. Parameters for both DL Signal Low and DL Input Overload can be specified from the Control tab.

Path A (Carrier A)	Path B (Carrier B)	Path C (Carrier C)
DL Signal Low DL Input Overload	DL Signal Low DL Input Overload	DL Signal Low DL Input Overload
Normal	CatB Fail	Link Fail
		disabled

Figure 8-14 Status – BCU Alarm

8.2.2.3 Status – RFU

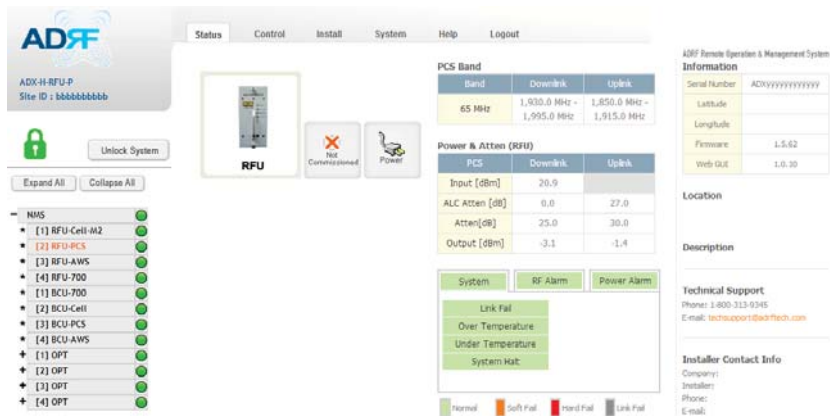


Figure 8-15 Status – RFU

8.2.2.3.1 Band

Displays the bandwidth and the frequency ranges for DL and UL of the RFU module.

Band	Downlink	Uplink
65 MHz	1,930.0 MHz - 1,995.0 MHz	1,850.0 MHz - 1,915.0 MHz

Figure 8-16 Status – RFU Band

8.2.2.3.2 Power & Gain (Admin/User)

- Admin Mode- Displays the Downlink Input/output, Downlink/Uplink Attenuation, and Uplink Output.
- User Mode- Displays the Downlink Input, Downlink/Uplink Attenuation, and Uplink Output.

Cell	Downlink	Uplink
Input [dBm]	9.9	
ALC Atten [dB]	0.0	0.0
Atten[dB]	10.0	10.0
Output [dBm]	-4.1	-22.4

Figure 8-17 Power & Gain Display (Admin)

Power & Gain (RFU)

Cell	Downlink	Uplink
Input [dBm]	--,-	
Atten[dB]	25.0	35.0
Output [dBm]		--,-

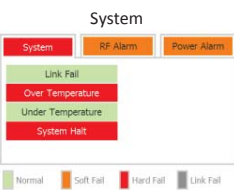
Figure 8-18 Power & Gain Display (User)

- Input [dBm]: Displays the Downlink RF input level which comes from the ADX-H-BCU, BTS. This value should be between 0 to 25 dBm.
- ALC Atten [dB]: The amount of attenuation that is being used by the system when ALC is active.
- Atten [dB]: The amount of attenuation that has been set manually by the user.
- Output [dBm]: The downlink/uplink output power of the RFU and NOT the output power of the RU.

8.2.2.3.3 Alarm

Displays System, RF, and Power Alarms. If an alarm is present in the system, then the color of the tab will change according to the type of failure.

Table 8-8 RFU Alarm Status

Alarm	Severity	Description
	Link Fail	Soft Fail
	Over Temperature	Hard Fail / Soft Fail
	Under Temperature	Soft Fail
	System Halt	Hard Fail
	DL Signal not detected	Soft Fail
	DL Signal Low	Soft Fail
	Input Overload	Hard Fail / Soft Fail
	Overpower	Hard Fail / Soft Fail
	AC Fail	Soft Fail
	DC Fail	Soft Fail
	Over Current	Hard Fail
	Battery Low	Soft Fail

8.2.2.4 Status – OPT

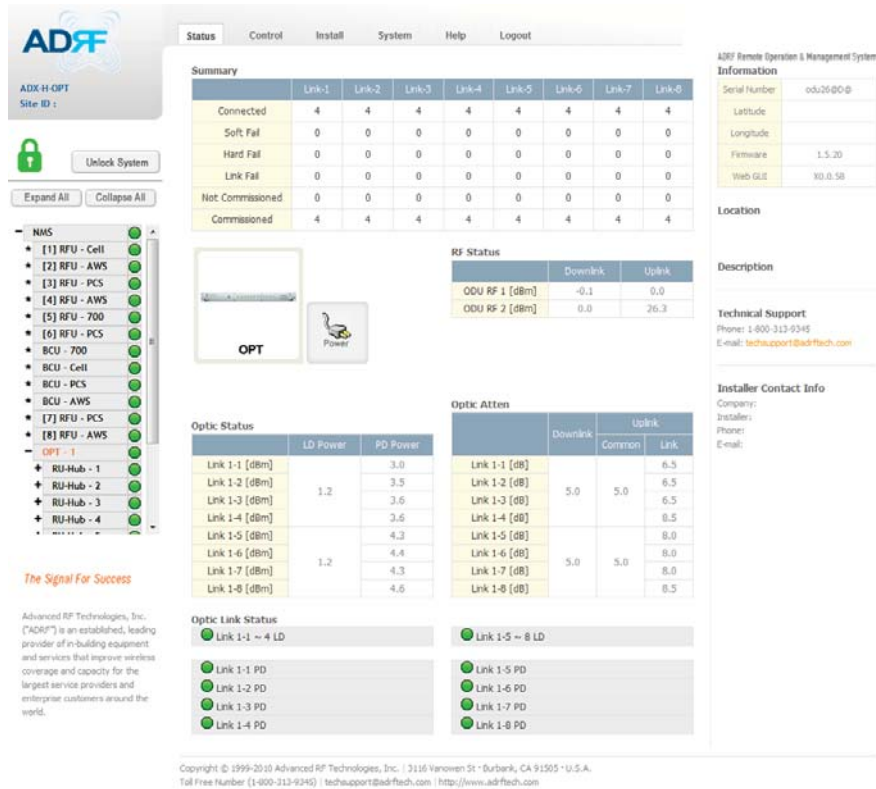


Figure 8-19 Status - OPT

8.2.2.4.1 Summary

The Summary section displays the number of remote modules that are physically connected, the number of soft/hard/link fail alarms, and the number of Remote Module that have been commissioned and the number of Remote Module that need to be commissioned.

Summary	Link-1	Link-2	Link-3	Link-4	Link-5	Link-6	Link-7	Link-8
Connected	4	4	4	4	4	4	4	4
Soft Fail	0	0	0	0	0	0	0	0
Hard Fail	0	0	0	0	0	0	0	0
Link Fail	0	0	0	0	0	0	0	0
Not Commissioned	0	0	0	0	0	0	0	0
Commissioned	4	4	4	4	4	4	4	4

Figure 8-20 Summary (Status – OPT)

Table 8-9 Summary Description

Parameters	Description
Connected	Displays the number of Remote Module's connected to the ADX-H-OPT.
Soft Fail	Displays the total number of soft fail present.
Hard Fail	Displays the number of hard fail present on each module.
Link Fail	Displays the number of link fail present on each module.
Not Commissioned	Displays the number of non-commissioned or commission failed module.
Commissioned	Display the number of successfully commissioned module

8.2.2.4.2 RF Status

Displays the DL input power and the UL output power for each ODU.
An OPT is composed of 2 ODUs.

RF Status

	Downlink	Uplink
ODU RF 1 [dBm]	-0.1	0.0
ODU RF 2 [dBm]	0.0	26.3

Figure 8-21 RF Status (Status – OPT)

8.2.2.4.3 Optic Status

Display LD Power and PD Power for each optic path. LD Power is the power that is being sent to the RU and PD Power is the power that is being received from the RU.

Optic Status

	LD Power	PD Power
Link 1-1 [dBm]	1.2	3.0
Link 1-2 [dBm]		3.5
Link 1-3 [dBm]		3.6
Link 1-4 [dBm]		3.6
Link 1-5 [dBm]	1.2	4.3
Link 1-6 [dBm]		4.4
Link 1-7 [dBm]		4.3
Link 1-8 [dBm]		4.6

Figure 8-22 Optic Status (Status – OPT)

8.2.2.4.4 Optic Atten (Admin Only)

The ADX-H-OPT has 3 types of attenuators.

- Downlink Common Attenuator- Displays the common attenuation level on the DL path.
- Uplink Common Attenuator- Displays the common attenuation level on the UL path.
- Uplink Optic Attenuator- Displays the amount of attenuation used at each optical link.

Optic Atten			
	Downlink	Uplink	
		Common	Link
Link 1-1 [dB]	5.0	5.0	6.5
Link 1-2 [dB]			6.5
Link 1-3 [dB]			6.5
Link 1-4 [dB]			8.5
Link 1-5 [dB]	5.0	5.0	8.0
Link 1-6 [dB]			8.0
Link 1-7 [dB]			8.0
Link 1-8 [dB]			8.5

Figure 8-23 Optic Attenuation (Status – OPT)

8.2.2.4.5 Optic Path Status

Displays the optic status for each optic path

Optic Link Status	
● Link 1-1 ~ 4 LD	● Link 1-5 ~ 8 LD
● Link 1-1 PD	● Link 1-5 PD
● Link 1-2 PD	● Link 1-6 PD
● Link 1-3 PD	● Link 1-7 PD
● Link 1-4 PD	● Link 1-8 PD

Figure 8-24 Optic Path Status (Status – OPT)

Table 8-10 Description for optic path status

Status	Display	Description
LD Status	●	Green, optic signal being sent to Master RU is > -5dBm
	●	Orange, optic signal being sent to Master RU is < -5dBm
	●	Gray, no connection between OPT and Master RU
PD Status	●	Green, optic signal being received from Master RU is > -10dBm
	●	Orange, optic signal being received from Master RU is < -10dBm
	●	Gray, no connection between OPT and Master RU



8.2.2.5 Status – RU Hub

RU-Hub is not separate module but is integrated into the master RU. The picture of RU Hub displayed on web based GUI is same as the picture of master RU.

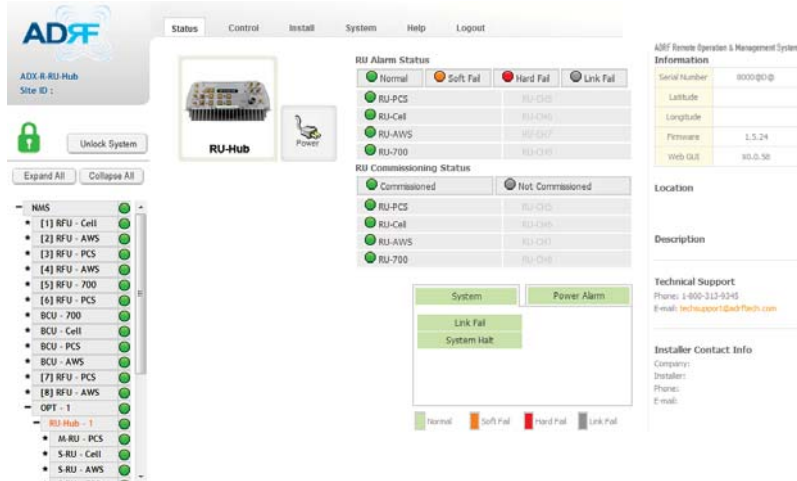


Figure 8-25 Status - RU Hub

8.2.2.5.1 RU Alarm Status

The RU Hub can support up to 8 remote modules. The RU alarm status displays the alarm status of each remote module.

RU Alarm Status	
☒ Normal	☐ Soft Fail
☐ Hard Fail	☐ Link Fail
☒ RU-PCS	RU-CH5
☒ RU-Cell	RU-CH6
☒ RU-AWS	RU-CH7
☒ RU-700	RU-CH8

Figure 8-26 RU Alarm Status (Status - RU Hub)

8.2.2.5.2 RU Commissioning Status

Display the Commissioning status of each Remote Module.

RU Commissioning Status	
☒ Commissioned	☐ Not Commissioned
☒ RU-PCS	RU-CH5
☒ RU-Cell	RU-CH6
☒ RU-AWS	RU-CH7
☒ RU-700	RU-CH8

Figure 8-27 RU Commissioning Status (Status - RU Hub)

Table 8-11 Description for RU Commissioning status

Status	Display	Description
Installed Status	Installed	RU-PCS Text is black
	Not-Installed	RU-CH7 Text is gray
Commissioning Status	Success	Green
	Fail or not yet	Gray

8.2.2.5.3 Alarm

Table 8-12 Alarm Status (Status - RU Hub)

Alarm	Severity	Description
System 	Link Fail	Soft Fail Present when a module cannot communicate with the NMS
	System Halt	Hard Fail System will go into a "System Halt" state when a hard fail alarm does not clear after 10 checks. System Halt can only be cleared with a power cycle, reboot, or factory settings.
Power Alarm 	AC Fail	Soft Fail AC power is not within parameters.
	DC Fail	Soft Fail DC power is not within parameters.
	Over Current	Hard Fail Total current of RU is higher than the threshold level for over current alarm
	Battery Low	Soft Fail Voltage of battery connected to RU PSU is lower than the defined threshold

8.2.2.6 Status – Remote module



Figure 8-28 Status – Remote Module

8.2.2.6.1 Band

Display the spectrum that is being used. The band column displays the bandwidth that has been used. The downlink column displays the center frequency of the used downlink band. The uplink column displays the center frequency of the used uplink band.

PCS Band		
Band	Downlink	Uplink
65 MHz	1962.5 MHz	1882.5 MHz

Figure 8-29 PCS Band Information (Status – Remote Module)

8.2.2.6.2 Power & Gain (Admin/User)

Display the Downlink output, Downlink/Uplink Attenuation, and Uplink Input/output.

Power & Gain		
PCS	Downlink	Uplink
Input [dBm]		-50.8
ALC Atten [dB]	0.0	0.0
Atten [dB]	6.5	0.0
[M]Output [dBm]	-16.1	-17.8
[H]Output [dBm]	16.8	

Figure 8-30 Power & Gain (Admin)

Power & Gain		
PCS	Downlink	Uplink
Input [dBm]		--,-
Atten [dB]	9.0	7.5
Output [dBm]	25.6	

Figure 8-31 Power & Gain (User)

- Admin
 - Input [dBm]: Displays the RF input level for Uplink only for the Remote Module.
 - ALC Atten [dB]: The amount of attenuation used when ALC is activate.
 - Atten [dB]: The amount of attenuation manually set by the user.
 - [M]Output [dBm]: Output power of RF transceiver (1st stage amplification).
 - [H]Output [dBm]: Output power of downlink HPA (2nd stage amplification).
- User
 - Input [dBm]: Displays the RF input level for Uplink only for the Remote Module.
 - Atten [dB]: The amount of attenuation manually set by the user.
 - Output [dBm]: Displays the total composite output power.

8.2.2.6.3 Optic Power (Master-RU Only)

Display the LD Power and PD Power of optic module inside the Master RU.

Optic Power		
---	PD Power	LD Power
Power	0.3	6.9

Figure 8-32 Optic Power (Status – Master RU only)

8.2.2.6.4 Operating Status

Table 8-13 Operating Status (Status – Remote Module)

Alarm	Severity	Description
System System RF Alarm Power Alarm Link Fail Over Temperature Under Temperature System Halt ORU LD Fail ORU PD Fail Normal Soft Fail Hard Fail Link Fail	Link Fail	Soft Fail No communication with NMS.
	Over Temperature	Hard Fail / Soft Fail Temperature is higher than the threshold level for over temperature alarm.
	Under Temperature	Soft Fail Temperature is lower than the threshold level for under temperature alarm.
	System Halt	Hard Fail System halt on either the Master RU or Slave RU. System halt occurs when a hard fail alarm fails to clear after 10 checks.
	ORU LD Fail	Soft Fail LD Fail present in the Master RU's optic unit.
	ORU PD Fail	Soft Fail PD Fail present in the Master RU's optic unit.
	Input Overload	Hard Fail Uplink input signal is higher than the defined threshold.
	Over Power	Hard Fail / Soft Fail Downlink output signal is higher than the defined threshold by user.
RF Alarm System RF Alarm Power Alarm Input overload Over Power VSWR Normal Soft Fail Hard Fail Link Fail	VSWR	Soft Fail Triggered when power is being reflected back to the system, typically due to a loose connector.
	AC Fail	Soft Fail AC power is not operating within parameters.
	DC Fail	Soft Fail DC power is not operating within parameters.
Power Alarm System RF Alarm Power Alarm AC Fail DC Fail Over Current Battery Low Normal Soft Fail Hard Fail Link Fail	Over Current	Hard Fail Total current of RU is higher than the threshold level for over current alarm.
	Battery Low	Soft Fail Voltage of battery connected to HE PSU is lower than the defined threshold.

8.2.3 Control Tab

8.2.3.1 Control – NMS

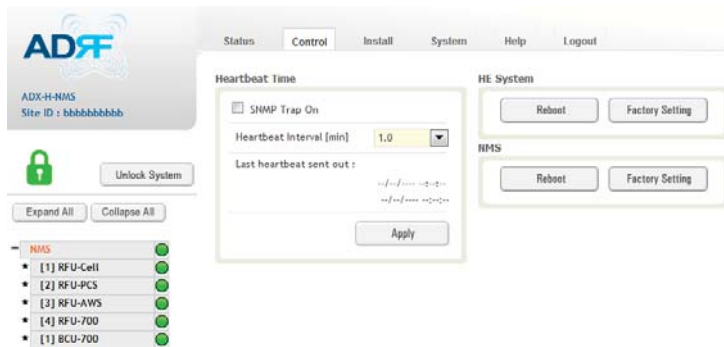


Figure 8-33 Control - NMS

8.2.3.1.1 Heartbeat Time

Allows the user to enable or disable SNMP traps from being sent out and also specify the Heartbeat interval. Time and date stamps of the last 2 heartbeats will be displayed in the “Last heartbeat sent out” section.

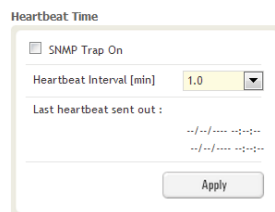


Figure 8-34 Heartbeat (Control – NMS)

8.2.3.1.2 HE System

Allows the user to perform a HE system reboot or HE full system factory settings

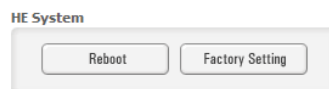


Figure 8-35 HE System Reboot & Factory Setting (Control – NMS)

8.2.3.1.3 NMS System

Allows the user to perform a NMS Unit reboot or NMS factory settings

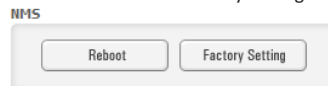


Figure 8-36 NMS System Reboot & Factory Setting (Control – NMS)

8.2.3.2 Control – BCU

ADRF THE SIGNAL FOR SUCCESS

ADX-H-BCU-P
Site ID : bbbbbb

Unlock System

Expand All Collapse All

NMS

- [1] RFU-Cell-A2
- [2] RFU-PCS
- [3] RFU-AWS
- [4] RFU-700
- [1] BCU-700
- [2] BCU-Cell
- [3] BCU-PCS
- [4] BCU-AWS
- [1] OPT
- [2] OPT
- [3] OPT
- [4] OPT

Manual ATT Control

	PATH A (Carrier A)	PATH B (Carrier B)	PATH C (Carrier C)
Downlink [dB]	30.0	30.0	30.0
Uplink [dB]	30.0	30.0	30.0
DL Output ALC Level [dBm]	5.0	5.0	5.0
	9.8		

Apply

BCU

Reboot Factory Setting

Alarm Setting

- Downlink Input Overload [dBm] 25.0
- Downlink Signal Low [dBm] -5.0
- ☒ Downlink Input Overload Alarm On
- ☒ [PATH - A] Downlink Signal Low Alarm On
- ☒ [PATH - B] Downlink Signal Low Alarm On
- ☒ [PATH - C] Downlink Signal Low Alarm On

Apply

Figure 8-37 Control – BCU

8.2.3.2.1 Manual ATT Control

Manual ATT Control

	PATH A (Carrier A)	PATH B (Carrier B)	PATH C (Carrier C)
Downlink [dB]	30.0	30.0	30.0
Uplink [dB]	30.0	30.0	30.0
DL Output ALC Level [dBm]	5.0	5.0	5.0
	9.8		

Apply

Figure 8-38 Control – BCU Manual ATT Control

- Downlink:** Allows the user to manually adjust the DL attenuation levels for each RF path. Adjusting these settings is not recommended since it will change the power ratios set by the user.
- Uplink:** Allows the user to manually adjust the UL attenuation levels for each RF path. Adjusting these settings is not recommended, unless additional attenuation is needed on the UL path.
- DL Output ALC Level:** Allows the user to manually set the DL Output ALC Levels for each RF path. Adjusting these settings is not recommended since it will change the power ratios set by the user. These settings are automatically set by the system during the BCU commissioning process. This section also displays the composite DL Output ALC Level which is the value that can be used to commission the RFU.

8.2.3.2.2 Reboot / Factory Setting

Allows the user reboot or restore factory settings of the BCU.



Figure 8-39 Control – BCU Reboot/Factory Setting

8.2.3.2.3 Alarm Setting

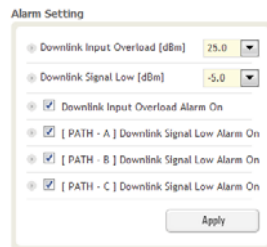


Figure 8-40 Control – BCU Alarm Setting

- **Downlink Input Overload:** Allows the user to specify the level at which the DL Input Overload alarm is triggered. Values range from 0 dBm to +25 dBm.
- **Downlink Signal Low:** Allows the user to specify the level at which the DL Signal Low alarm is triggered. Values range from -10 dBm to +20 dBm.
- **Downlink Input Overload Alarm On:** Allows to user to enable or disable the Input Overload Alarm
- **[Path – A/B/C] Downlink Signal Low Alarm On:** Allows the user to enable or disable the DL Signal Low alarm for each RF path.

8.2.3.3 Control – RFU

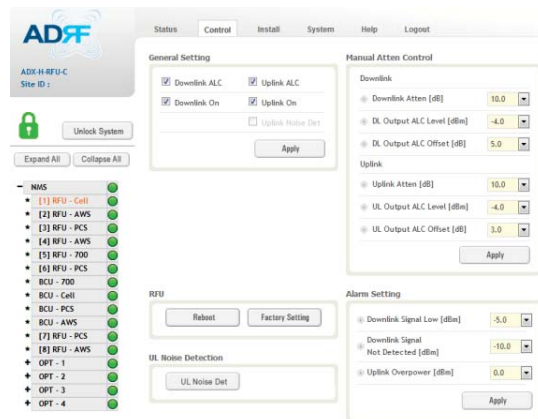


Figure 8-41 Control - RFU

8.2.3.3.1 General Setting

To enable any of the settings, click on the checkbox and click the Apply button.

Figure 8-42 General Setting (Control – RFU) (Admin)

Figure 8-43 General Setting (Control – RFU) (User)

Table 8-14 Description for General Setting

Name	Description	Available Accounts
Downlink ALC	Enables or disables Downlink ALC	Administrator
Uplink ALC	Enables or disables Uplink ALC	Administrator
Downlink ON	Enables or disables the RFU Downlink path	Administrator, User
Uplink ON	Enables or disables the RFU Uplink path	Administrator, User
Uplink Noise Det	Displays if the module is turned on or off due to the UL Noise Detection Routine	Administrator

8.2.3.3.2 Reboot / Factory Setting

Allows the user reboot or restore factory settings of the RFU.

Figure 8-44 Reboot & Factory Setting (Control – RFU)

8.2.3.3.3 Uplink Noise Detection (Admin Only)

Figure 8-45 UL Noise Detection (Control – RFU)

The “UL Noise Det” button will take you to the UL Noise Detection page which will allow you to run the UL Noise Detection routine.

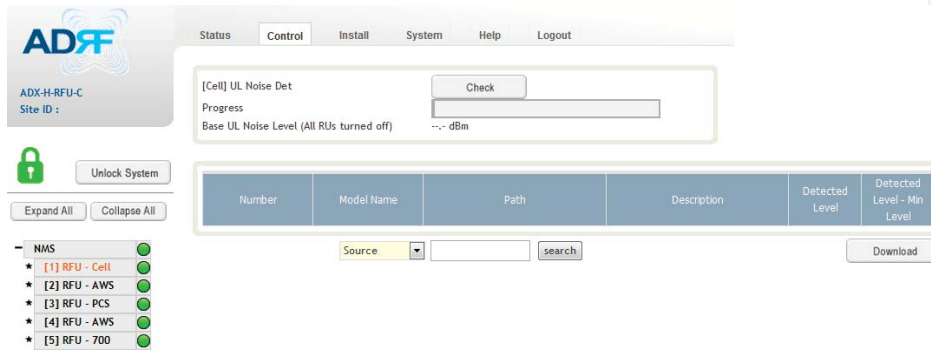


Figure 8-46 UL Noise Detection - PCS band

The Auto UL noise measurement routine can be run by clicking on the Check button. After all UL noise measurement have been taken, the levels for each UL path will be displayed and along with the difference between minimum detect level and measured detect level.

The user will be able to see which path is generating the elevated UL noise level based on the measured detect level and difference value.

To navigate back to the RFU control page, click on the Control tab again.

8.2.3.3.4 Manual Atten Control

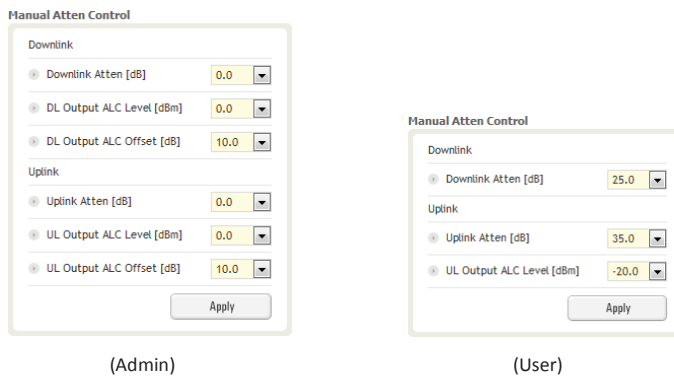


Figure 8-47 Manual Attenuator Control Setting (Control – RFU)

Table 8-15 Description for Main Gain Control Setting (Control – RFU)

Name	Description	Range	Step	Available Accounts
Downlink Atten	Downlink Attenuator to be adjusted manually	0 ~ 25dB	0.5dB	Administrator, User
Uplink Atten	Uplink Attenuator to be adjusted manually	0 ~ 35dB	0.5dB	Administrator, User
DL Output ALC Level	To set the Max output ALC level	-10 ~ 0dBm	0.5dBm	Administrator
UL Output ALC Level	To set the Max output ALC level	-20 ~ 0dBm	0.5dBm	Administrator, User

DL Output ALC Offset	To set the Max output ALC Offset	-10 ~ 0dBm	0.5dBm	Administrator
UL Output ALC Offset	To set the Max output ALC Offset	-20 ~ 0dBm	0.5dBm	Administrator

8.2.3.3.5 Alarm Setting

Alarm Setting

☒ Downlink Signal Low [dBm] -5.0

☒ Downlink Signal Not Detected [dBm] -10.0

☒ Uplink Overpower [dBm] 0.0

Figure 8-48 Alarm Threshold Setting (Control – RFU)

Table 8-16 Description for Alarm Threshold Setting (Control – RFU)

Name	Description	Range	Default threshold
Downlink Signal Low	Allows the user to specify the minimum incoming DL input signal level before triggering a “Downlink Signal Low” soft-fail alarm.	-10 ~ 20dBm	-5dBm
Downlink Signal Not Detected	Allows the user to specify the minimum incoming DL input signal level before triggering a “Downlink Signal Not Detected” soft-fail alarm.	-10 ~ 20dBm	-10dBm
Uplink Over Power	Allows the user to specify the how strong the output signal of uplink can be before triggering an “Uplink Over Power” Hard Fail alarm.	-20 ~ 0dBm	0dBm

8.2.3.4 Control – OPT

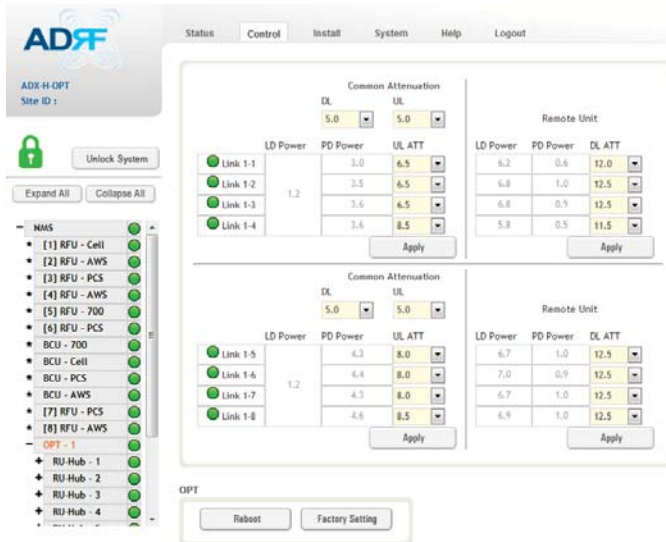


Figure 8-49 Control – OPT

8.2.3.4.1 Optic Attenuation (Admin Only)



Figure 8-50 Optic Attenuation – OPT

Table 8-17 Description for Optic Attenuation (Control – OPT)

Name	Description	Range	Default threshold
DL/UL common ATT	Allows the user to control overall optic DL/UL path gain.	0 ~ 30dB	5dB
DL ATT	Used to compensate DL optic loss.	0 ~ 13dB	13dB
UL ATT	Used to compensate UL optic loss.	0 ~ 13dB	13dB

8.2.3.4.2 Reboot/Factory Setting

Allows the user to perform OPT reboot or OPT factory settings.

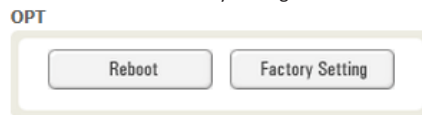


Figure 8-51 Reboot & factory Setting (Control – OPT)

8.2.3.5 Control – RH Hub

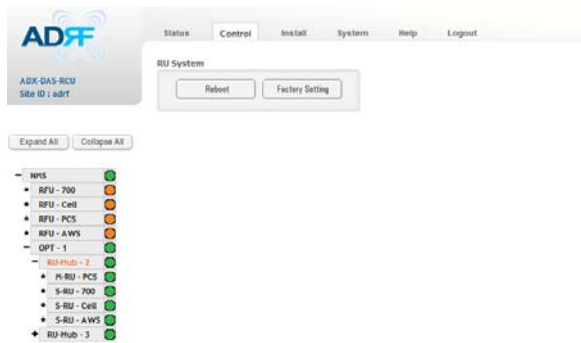


Figure 8-52 Control – RU Hub

8.2.3.5.1 Reboot/Factory Setting

Allows the user to perform RU Hub reboot or RU Hub factory settings



Figure 8-53 Reboot & Factory Setting (Control – RU Hub)

8.2.3.6 Control – Remote Module (Master or Slave RU)

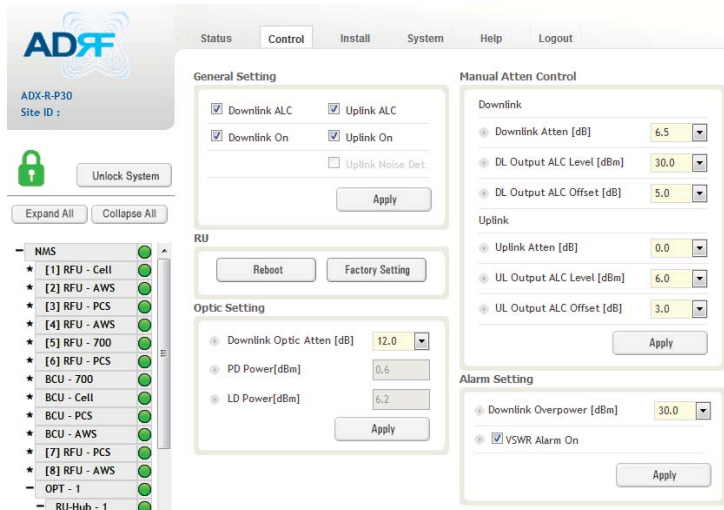


Figure 8-54 Control – Remote Module

8.2.3.6.1 General Setting (Admin/User)

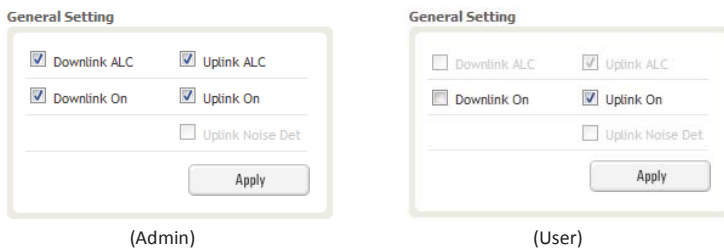


Figure 8-55 General Setting (Control - RU)

Table 8-18 Description for General Setting (Control - RU)

Name	Description	Available Accounts
Downlink ALC	This setting allows you to enable or disable the downlink ALC function. When ALC is enabled, the downlink output power will not exceed the Downlink Output Level specified in the Manual Atten Control section.	Administrator
Downlink On	This setting allows you to enable or disable the Downlink path.	Administrator, User
Uplink ALC	This setting allows you to enable or disable the uplink ALC function. When ALC is enabled, the Uplink output power will not exceed the Uplink Output Level specified in the Manual Atten Control section.	Administrator
Uplink On	This setting allows you to enable or disable the Uplink path.	Administrator, User

8.2.3.6.2 Reboot/Factory Setting

Allows the user to Reboot or restore Factory Settings on the remote module.

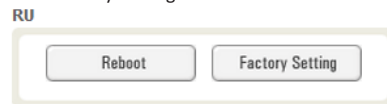


Figure 8-56 Reboot & factory Setting (Control - RU)

8.2.3.6.3 Optic Setting (Only Master RU) (Admin Only)

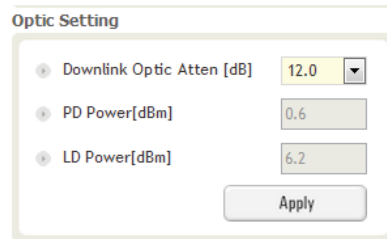


Figure 8-57 Optic Setting (Control - RU)

Table 8-19 Description for Optic Setting (Control - RU)

Name	Description	Range	Step	Available Accounts
Downlink Optic Atten	RF attenuator to compensate the optic loss of downlink	0~ 13.0 dB	0.5 dB	Administrator
PD Power	Incoming power level from the OPT			Administrator
LD Power	Outgoing power level to the OPT			Administrator

8.2.3.6.4 Manual Attenuator Control

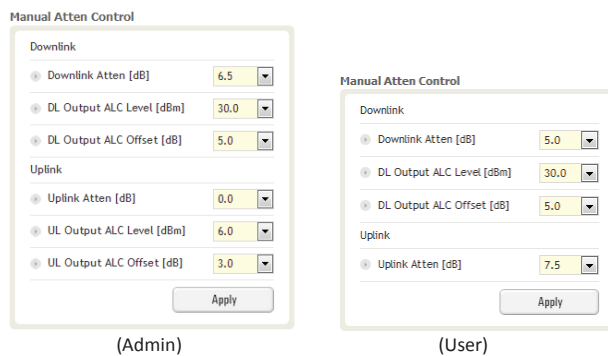


Figure 8-58 Manual Atten Control (Control - RU)

Table 8-20 Description for Manual Atten Control (Control - RU)

Name	Description	Range	Default threshold	Available Accounts
Downlink Atten	Allows the user to specify how much attenuation to use.	0 ~ 30dB	30dB	Administrator, User
Uplink Atten	Allows the user to specify how much attenuation to use.	0 ~ 25dB	25dB	Administrator, User
DL Output ALC Level	The remote module will prevent the downlink output power from exceeding the specified value.	5 ~ 30dB	30dBm	Administrator, User
UL Output ALC Level	The system will prevent the output power to exceed the specified value.	0 ~ 10dBm	5 or 6dBm	Administrator
DL Output ALC Offset	When the incoming signal level increases, the system will not adjust the gain levels until it reaches the ALC Offset Level.	0 ~ 10dB	5dB	Administrator, User
UL Output ALC Offset	When the incoming signal level increases, the system will not adjust the gain levels until it reaches the ALC Offset Level.	0 ~ 10dB	3dB	Administrator

8.2.3.6.5 Alarm Setting

Alarm Setting

Downlink Overpower [dBm] ▼

☒ VSWR Alarm On

Figure 8-59 Alarm Setting (Control - RU)

- DL Over Power Limit: The overpower alarm threshold can be adjusted from 5~30dBm. +2dB from the DL overpower limit will trigger a soft fail and >2dB will trigger a hard fail alarm
- VSWR Alarm ON : Enable or disables the VSWR Alarm.

8.2.4 Install Tab

8.2.4.1 Install – NMS

ADR Remote Operation & Management System

HE Commissioning Status

☒ Commissioned ☐ Not Commissioned

☒ RFU-Cell	☐ RFU-700	☐ BCU-1	☒ OPT-1
☐ RFU-AWS	☐ RFU-PCS	☐ BCU-2	☒ OPT-2
☐ RFU-PCS	☐ RFU-PCS	☐ BCU-3	☒ OPT-3
☐ RFU-AWS	☐ RFU-AWS	☐ BCU-4	☒ OPT-4

SNMP

Site ID:
 Manager IP: 0.0.0.0

External Modem Box Settings

Repeater IP: 192.168.63.5
 Subnet Mask: 255.255.255.0
 Gateway: 192.168.63.254

Location

Latitude: N
 Longitude: E

Description

Description:

SNMP Agent False Alarm Test

Progress:

Location Info

Company:
 Address1:
 Address2:
 City:
 State:
 ZIP Code:

Installer Info

Company:
 Name:
 Phone:
 E-mail:

Date & Time

Date: 01/30/2000
 Time: 15:19:13

Figure 8-60 Install - NMS

8.2.4.1.1 HE Commissioning Status

HE Commissioning Status

☒ Commissioned	☐ Not Commissioned		
☐ RFU-PCS	RFU CH5	☐ BCU-1	☐ OPT-1
☐ RFU-Cell	RFU CH6	BCU 2	OPT 2
RFU CH3	RFU CH7	BCU 3	OPT 3
RFU CH4	RFU CH8	BCU 4	OPT 4

Figure 8-61 HE Commissioning Status (Install – NMS)

Table 8-21 Description for HE Commissioning Status (Install – NMS)

Status	Display	Description
Installed Status	Physically Installed	RFU-PCS Text is black
	Physically Not-Installed	RFU CH5 Text is gray
Commissioning Status	Success	☒ Green
	Fail or not commissioned	☐ Gray

8.2.4.1.2 SNMP



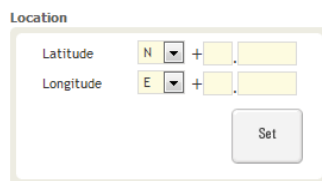
The figure shows a configuration window titled "SNMP". It contains two text input fields: "Site ID" with the value "adrf" and "Manager IP" with the value "0.0.0.0". Below these fields is a "Set" button.

Figure 8-62 SNMP (Install – NMS)

The SNMP section allows you to specify the Site ID and Manager IP. The Site-ID is the code that is used to identify a particular module. The Manager IP field is where the user inputs the IP address of the NOC system that is being used to monitor the SNMP traps.

8.2.4.1.3 Location

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



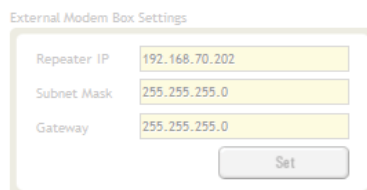
The figure shows a configuration window titled "Location". It contains two rows of input fields. The "Latitude" row has a dropdown menu with "N" selected, followed by a "+" sign and a text input field. The "Longitude" row has a dropdown menu with "E" selected, followed by a "+" sign and a text input field. Below these fields is a "Set" button.

Figure 8-63 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 "."

8.2.4.1.4 External Modem Box Settings

This section allows the user to specify an alternative IP, Subnet Mask, and Gateway settings. These settings are enabled when the Host/Remote switch is set to the Remote position.



The figure shows a configuration window titled "External Modem Box Settings". It contains three text input fields: "Repeater IP" with the value "192.168.70.202", "Subnet Mask" with the value "255.255.255.0", and "Gateway" with the value "255.255.255.0". Below these fields is a "Set" button.

Figure 8-64 External Modem Box Setting (Install – NMS)

8.2.4.1.5 Description



This section allows the user to save the description of NMS.

Description

Description

Figure 8-65 Description (Install – NMS)

8.2.4.1.6 SNMP Agent False Alarm Test

This section allows the user to generate both soft and hard fail alarms. After alarms are generated, the NOC can poll the ADX to see if alarms are present. All alarms generated during this test are false alarms.

SNMP Agent False Alarm Test

Progress

Figure 8-66 SNMP Agent False Alarm Test (Install – NMS)

8.2.4.1.7 Location Info / Installer Info

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

ADRF Remote Operation & Management System

Location Info

Company

Address1

Address2

City

State ▼

ZIP Code

Installer Info

Company

Name

Phone

E-mail

Figure 8-67 Location Info / Installer Info (Install – NMS)

8.2.4.1.8 Date & Time

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

Date & Time

Date: 12/09/2011

Time: 17:00:32

Set

Figure 8-68 Date & Time Setting (Install – NMS)

8.2.4.2 Install – RFU

ADRF THE SIGNAL FOR SUCCESS

ADX-H-RFU-C
Site ID : hhhhhhhhh

Unlock System

Expand All Collapse All

NMS

- [1] RFU-Cell
- [2] RFU-PCS
- [3] RFU-AWS
- [4] RFU-700
- [1] BCU-700
- [2] BCU-Cell
- [3] BCU-PCS
- [4] BCU-AWS
- [1] OPT
- [2] OPT

HE Input Commissioning - Cell

Current DL Input Level [dBm]: 7.9

DL Input Commissioning Level [dBm]: 8.0

Commissioning Progress:

Previous DL Commissioning Level [dBm]: 8.0

Last Commissioning Date: 09/28/2012

Last Commissioning Time: 05:42:57

Apply

Description: RFU-cell

SISO/MIMO Assignment: SISO MIMO - 1 MIMO - 2

Set Apply

Figure 8-69 Install - RFU

8.2.4.2.1 RFU Commissioning

This section allows the user to perform RFU commission. To perform RFU commissioning, select a DL Input Commissioning Level from the dropdown menu and click Apply. The commissioning progress is displayed on the Commissioning Progress bar. Any errors, warnings, and messages will appear via a popup window. Please refer to the ADX Installation Guide to determine the proper RFU commissioning levels.

Figure 8-70 RFU Commissioning (Install – RFU)

8.2.4.2.2 Description

This section allows the user to set the description of RFU.

Figure 8-71 Description (Install – RFU)

8.2.4.3 Install – OPT

Figure 8-72 Install – OPT

8.2.4.3.1 Optic Commissioning

This section will allow the user to perform any optic compensation if it is necessary. The Commissioning button will turn orange if optic compensation is needed.

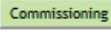
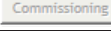
Optic Commissioning

Common Attenuation				Remote Unit			
DL		UL		DL		UL	
5.0		5.0		6.2		0.4	
LD Power	PD Power	UL ATT		LD Power	PD Power	DL ATT	
Commissioning	Link 1-1	3.0	6.5	6.2	0.4	12.0	
Commissioning	Link 1-2	3.5	6.5	6.8	1.0	12.5	
Commissioning	Link 1-3	3.6	6.5	6.8	0.9	12.5	
Commissioning	Link 1-4	3.6	8.5	5.8	0.5	11.5	
Apply				Apply			

Common Attenuation				Remote Unit			
DL		UL		DL		UL	
5.0		5.0		6.7		1.0	
LD Power	PD Power	UL ATT		LD Power	PD Power	DL ATT	
Commissioning	Link 1-5	4.3	8.0	6.7	1.0	12.5	
Commissioning	Link 1-6	4.4	8.0	7.0	0.9	12.5	
Commissioning	Link 1-7	4.3	8.0	6.7	1.0	12.5	
Commissioning	Link 1-8	4.6	8.5	6.9	1.0	12.5	
Apply				Apply			

Figure 8-73 Optic control (Control – OPT)

Table 8-22 Description for Optic control (Control – OPT)

Display & Control	Description
	Optic loss is less than 5dBo
	Optic loss is more than 5dBo
	Not connected to a RU
	No optic loss compensation is needed.
	Optic loss compensation is needed.
	Not connected to a RU

8.2.4.3.2 Description

This section allows the user to save the description of OPT.

Description

Description

OPT

Set

Figure 8-74 Description (Install – OPT)

8.2.4.4 Install – RU Hub

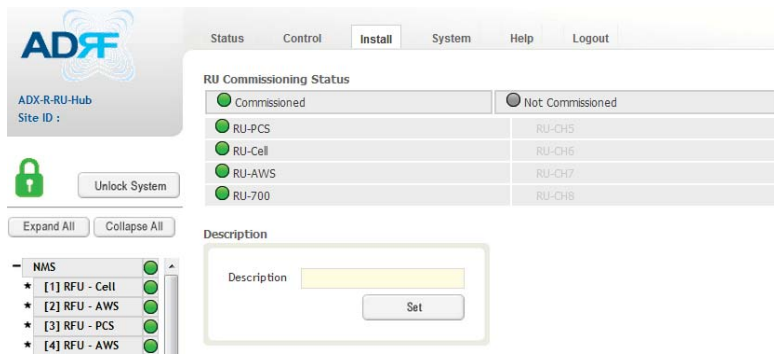


Figure 8-75 Install-RU Hub

8.2.4.4.1 RU Commissioning Status

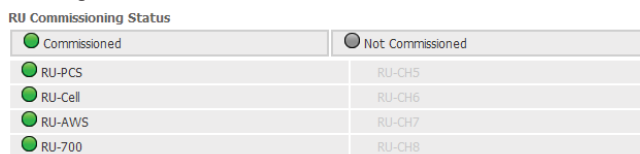


Figure 8-76 RU Commissioning Status (Install-RU Hub)

Table 8-23 Description for RU Commissioning status

Status	Display	Description
Installed Status	Physically Installed	RU-PCS Text is black
	Physically Not-Installed	RU-CH7 Text is gray
Commissioning Status	Success	Green
	Fail or not commissioned	Gray

8.2.4.4.2 Description

This section allows the user to save the description of RU Hub.

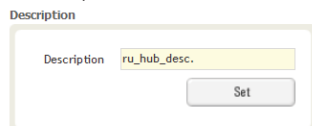


Figure 8-77 Description (Install-RU Hub)

8.2.4.5 Install – Remote Module (Master or Slave RU)

ADRF THE SIGNAL FOR SUCCESS

ADX-R-P30
Site ID : bbbbbb

Unlock System

Expand All Collapse All

NMS

- [1] RFU-Cell-A2
- [2] RFU-PCS
- [3] RFU-AWS
- [4] RFU-700
- [1] BCU-700
- [2] BCU-Cell
- [3] BCU-PCS
- [4] BCU-AWS
- [1] OPT
- [1] RU-Hub

RU Commissioning - PCS

Current DL Output Level [dBm] 16.8

DL Output Commissioning Level [dBm] 5.0

Commissioning Progress

Previous DL Commissioning Level [dBm] 0.0

Last Commissioning Date 00/00/0000

Last Commissioning Time 00:00:00

Apply

Description

Description

Set

SISO/MIMO Assignment

SISO MIMO - 1 MIMO - 2

Apply

Figure 8-78 Install-Remote Module

8.2.4.5.1 RU Output Commissioning

This section allows the user to perform RU commission. To perform RU commission, select a DL Output Commissioning Level from the dropdown menu and then click Apply. The commissioning progress is displayed on the Commissioning Progress bar. Any errors, warnings, and messages will appear via a popup window.

RU Commissioning - PCS

Current DL Output Level [dBm] 16.9

DL Output Commissioning Level [dBm] 5.0

Commissioning Progress

Previous DL Commissioning Level [dBm] 5.0

Last Commissioning Date 01/15/2000

Last Commissioning Time 00:41:52

Apply

Figure 8-79 RU Output Commissioning (Install-RU)

8.2.4.5.2 Description

This section allows the user to save the description of remote module.

Description

Description

Figure 8-80 Description (Install-Remote Module)

8.2.5 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.

8.2.5.1 System: Account

8.2.5.1.1 System: Account - 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 8-81 Account Management

8.2.5.1.2 System: Account - 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 | SNMP | Closeout Package

Account Management / New account / Change Password

user

Figure 8-82 New Account

8.2.5.1.3 System: Account - Change Password

The Change Password section allows the current user who is logged into the system to change their login credentials.

Account Management / New account / Change Password

User Name

admin

Password

Confirm password

Apply

Cancel

Figure 8-83 Change Password

8.2.5.2 System: Logs

8.2.5.2.1 System: Logs - 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



ADRF
ADRF-H-MMS
Site ID : ADRF_HQ

Status Control Install System Help Logout

ADRF Remote Operation & Management System

Event Log / User Log

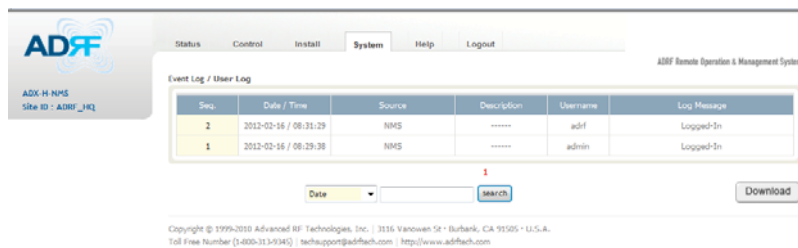
Seq.	Date / Time	Source	Description	Event	Severity Level
1970	2012-02-16 / 08:27:09	OPT-3	12387	PD Path 8 Fail Alarm Set	minor
1969	2012-02-16 / 08:27:09	OPT-3	12387	PD Path 7 Fail Alarm Set	minor
1968	2012-02-16 / 08:27:08	OPT-3	12387	PD Path 6 Fail Alarm Set	minor
1967	2012-02-16 / 08:27:08	OPT-3	12387	PD Path 5 Fail Alarm Set	minor
1966	2012-02-16 / 08:27:08	OPT-3	12387	PD Path 4 Fail Alarm Set	minor
1965	2012-02-16 / 08:27:07	OPT-3	12387	PD Path 3 Fail Alarm Set	minor
1964	2012-02-16 / 08:27:07	OPT-3	12387	PD Path 2 Fail Alarm Set	minor
1963	2012-02-16 / 08:27:07	OPT-3	12387	PD Path 1 Fail Alarm Set	minor
1962	2012-02-16 / 08:27:06	OPT-2		PD Path 8 Fail Alarm Set	minor
1961	2012-02-16 / 08:27:06	OPT-2		PD Path 7 Fail Alarm Set	minor
1960	2012-02-16 / 08:27:06	OPT-2		PD Path 6 Fail Alarm Set	minor
1959	2012-02-16 / 08:27:05	OPT-2		PD Path 5 Fail Alarm Set	minor
1958	2012-02-16 / 08:27:05	OPT-2		PD Path 4 Fail Alarm Set	minor
1957	2012-02-16 / 08:27:05	OPT-2		PD Path 3 Fail Alarm Set	minor
1956	2012-02-16 / 08:27:04	OPT-2		PD Path 2 Fail Alarm Set	minor
1955	2012-02-16 / 08:27:04	OPT-2		PD Path 1 Fail Alarm Set	minor
1954	2012-02-16 / 08:27:04	OPT-1	ADRF_HQ_H-ODU	PD Path 8 Fail Alarm Set	minor
1953	2012-02-16 / 08:27:03	OPT-1	ADRF_HQ_H-ODU	PD Path 7 Fail Alarm Set	minor
1952	2012-02-16 / 08:27:03	OPT-1	ADRF_HQ_H-ODU	PD Path 6 Fail Alarm Set	minor
1951	2012-02-16 / 08:27:03	OPT-1	ADRF_HQ_H-ODU	PD Path 5 Fail Alarm Set	minor

Figure 8-84 Event Log

8.2.5.2.2 System: Logs - 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



The screenshot shows the ADRF Remote Operation & Management System interface. The 'System' tab is selected. Below the navigation bar, there is a section titled 'Event Log / User Log'. It contains a table with the following data:

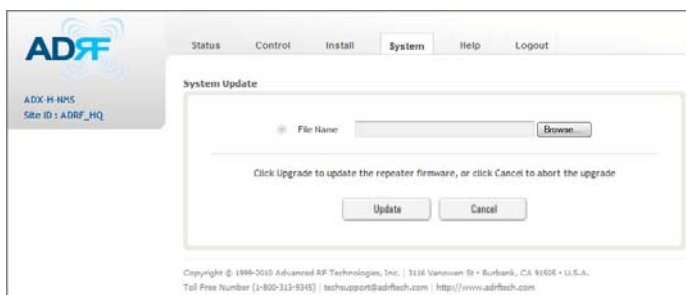
Seq	Date / Time	Source	Description	Username	Log Message
2	2012-02-16 / 08:31:29	NMS	-----	adrf	Logged-In
1	2012-02-16 / 08:29:38	NMS	-----	admin	Logged-In

Below the table, there is a 'Date' dropdown menu, a 'search' button, and a 'Download' button. At the bottom, there is a copyright notice: Copyright © 1999-2010 Advanced RF Technologies, Inc. | 3136 Vanowen St • Burbank, CA 91505 • U.S.A. Toll Free Number (1-800-313-9345) | techsupport@adrftech.com | http://www.adrftech.com

Figure 8-85 User Log

8.2.5.3 System: Update

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



The screenshot shows the ADRF Remote Operation & Management System interface. The 'System' tab is selected. Below the navigation bar, there is a section titled 'System Update'. It contains a 'File Name' input field with a 'Browse...' button next to it. Below the input field, there is a message: 'Click Upgrade to update the repeater firmware, or click Cancel to abort the upgrade'. At the bottom, there are 'Update' and 'Cancel' buttons. At the bottom, there is a copyright notice: Copyright © 1999-2010 Advanced RF Technologies, Inc. | 3136 Vanowen St • Burbank, CA 91505 • U.S.A. Toll Free Number (1-800-313-9345) | techsupport@adrftech.com | http://www.adrftech.com

Figure 8-86 System update

- Click on the 'Browse' button and locate the firmware file.
- Click on the Update button to perform the firmware update.

8.2.5.4 System: System Information

8.2.5.4.1 System: System Information

ADRF Remote Operation & Management System

System Information Check Check

System Information	
Name	Status
Web GUI Version	X0.0.58
External Modem Box Setting	192.168.63.5 / 255.255.255.0 / 192.168.63.254
Time	01/30/2000 15:52:58

System Notification

[OPT-1 / RU-Hub-3 / S-RU-PCS] Multiple (PCS) remote units have been detected.
 [OPT-2 / RU-Hub-2 / S-RU-PCS] Multiple (PCS) remote units have been detected.
 [OPT-2 / RU-Hub-2 / S-RU-PCS] Multiple (PCS) remote units have been detected.

BOM

Seq.	Model Name	Source	Serial Number	Firmware Version	Description	Alarm Status	Commissioned	Module Status (Ok / Err)
140	ADX-CELL-S-30R	OPT-4 / RU-Hub-8 / S-RU-Cell		1.5.63		Normal	---	On / On
139	ADX-AWS-S-30R	OPT-4 / RU-Hub-8 / S-RU-AWS		1.5.63		Normal	---	On / On
138	ADX-PCS-S-30R	OPT-4 / RU-Hub-8 / S-RU-PCS		1.5.63		Normal	---	On / On
137	ADX-700-M-30R	OPT-4 / RU-Hub-8 / M-RU-700		1.5.63		Normal	---	On / On
136	ADX-CELL-S-30R	OPT-4 / RU-Hub-7 / S-RU-Cell		1.5.63		Normal	---	On / On
135	ADX-PCS-S-30R	OPT-4 / RU-Hub-7 / S-RU-PCS		1.5.63		Normal	---	On / On
134	ADX-AWS-S-30R	OPT-4 / RU-Hub-7 / S-RU-AWS		1.5.63		Normal	---	On / On

- System Information Check

The System Information Check button will check the ADX configuration and report possible discrepancies.

System Information Check Check

- System Information

This section displays the general system information of the ADX DAS.

System Information	
Name	Status
Web GUI Version	X0.0.49
External Modem Box Setting	192.168.63.44 / 255.255.255.0 / 192.168.63.254
Time	02/16/2012 09:07:35

Figure 8-87 System Information

- System Notification

This section is displayed only when the following conditions are present:

- When multiple remote modules with same frequency band exist in a RU.
- When the remote module does not match with the RFU being used.

System Notification

[OPT-1 / RU-Hub-3 / S-RU-PCS] Multiple (PCS) remote units have been detected.
 [OPT-2 / RU-Hub-2 / S-RU-PCS] Multiple (PCS) remote units have been detected.
 [OPT-2 / RU-Hub-2 / S-RU-PCS] Multiple (PCS) remote units have been detected.

Figure 8-88 System Notification

- BOM

BOM displays all parts that are connected to the ADX-H-NMS.
The BOM can be downloaded as a CSV file by clicking the 'Download' button at the bottom right.

Seq.	Model Name	Serial Number	Firmware Version	Description	Alarm Status	Commissioned	Module Status (OK / UL)
16	ADX-AWS-S-30R		1.5.5D	3rd chassis(bottom)	Normal	---	On / Off
15	ADX-AWS-S-30R		1.5.5D	2nd chassis(top)	Normal	---	Off / Off
14	ADX-700-S-30R		1.5.5D	~~~~~	Normal	---	Off / On
13	ADX-CELL-S-30R		1.5.5D	abcde	Normal	---	Off / Off
12	ADX-AWS-S-30R		1.5.5D	1st chassis	Normal	---	On / On
11	ADX-700-S-30R		1.5.5D	s-nu-700	Normal	---	On / On
10	ADX-CELL-S-30R		1.5.5D	~~~~~	Normal	---	On / On
9	ADX-PCS-M-30R		1.5.5D	~~~~~	Normal	---	On / On
8	ADX-H-OPT		1.5.1C	12387	Normal	---	-- / --
7	ADX-H-OPT		1.5.1C		Normal	---	-- / --
6	ADX-H-OPT		1.5.1C	ADRF_HQ_H-ODU	Normal	---	-- / --
5	ADX-H-RFU-A		1.5.52	ADRF_HQ_H-A	Normal	Not Commissioned	Off / Off
4	ADX-H-RFU-C		1.5.52	ADRF_HQ_H-C	Normal	Not Commissioned	On / On
3	ADX-H-RFU-7		1.5.52	ADRF_HQ_H-7	Normal	Not Commissioned	On / On
2	ADX-H-RFU-P		1.5.52	ADRF_HQ_H-P	Soft Fail	Commissioned	On / On
1	ADX-H-NMS	13000F01002X1017		---	Normal	---	-- / --

Model Name

Search

Download

Figure 8-89 Bill of material

8.2.5.5 System: Backup/Restore

Settings Backup

Click the Backup button to generate a backup file.

Backup

Settings Restore

File Name

Choose File

no file chosen

☒ NMS

☒ [1]RFU - Cell

☒ [2]RFU - 700

☒ [3]RFU - AWS

☒ [4]RFU - PCS

☒ Unknown - 5

☒ Unknown - 6

☒ Unknown - 11

☒ Unknown - 12

☒ OPT - 1

☒ Rf-Hub - 6

☒ M-RJ - PCS

☒ S-RJ - Cell

☒ S-RJ - 700

☒ S-RJ - AWS

msba

HUB011A0005

s-m-700

Click Restore to restore the system-setting

Restore

- Settings Backup

Clicking the Backup will create a temporary backup file stored inside of the ADX. Once the file is created, it will need to be downloaded to a computer. A download button will appear after the backup file has been created. If the ADX is power cycled or rebooted, then the temporary backup file will be lost. We recommend downloading the backup file immediately after it has been created. Click on the Download button to download the backup file.

Settings Backup

Exports the current settings of this system which can be restored using the system restore function.

Backup

Figure 8-90 Setting Backup (Before)

Settings Backup

Click the Backup button to generate a backup file.

Backup

Download

Figure 8-91 Setting Backup (After)

- Setting Restore

Restore function can be used to restore the saved settings from the backup file. Once the backup file is loaded, the tree in the figure below will appear. Check the boxes of the modules that you would like to restore and then click the “Restore” button at the bottom on this section.

We recommend creating a new backup file if adding or removing modules from the ADX. Discrepancies between the backup file and the existing tree could cause restore errors.

Settings Restore

File Name

☒ NMS

- ☒ [1]RFU - PCS ADRF_HQ_H-
- ☒ [2]RFU - 700 ADRF_HQ_H-
- ☒ [3]RFU - Cell ADRF_HQ_H-
- ☒ [4]RFU - AWS ADRF_HQ_H-
- ☒ OPT - 1 ADRF_HQ_H-OD

☒ RU-Hub - 1

- ☒ M-RU - PCS
- ☒ S-RU - Cell
- ☒ S-RU - 700 s-ru-70
- ☒ S-RU - AWS 1st chassis
- ☒ S-RU - Cell abcd
- ☒ S-RU - 700
- ☒ S-RU - AWS 2nd chassis(top)
- ☒ S-RU - AWS 3rd chassis(bottom)

☒ OPT - 2

☒ OPT - 3 1238

Click Restore to restore the system-setting

Figure 8-92 Setting Restore

8.2.5.6 System: SNMP

- SNMP V1/V2

This section allows you to add community strings for SNMP v1 and v2.

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

Figure 8-93 SNMP V1/V2

- SNMP V3

This section allows the user to add accounts for SNMP v3.

The interface for adding an SNMP V3 account. It features two main sections: 'ADD SNMP' and 'Active SNMP'.

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
---------	------------	---------------------------	-------------------	---------

Figure 8-94 SNMP V3

8.2.5.7 System: Closeout Package

The closeout package section will allow the user to upload documents to the ADX-H-NMS. The maximum file size for each upload is limited to 10 MB. The total amount of space available for uploading document is 100 MB. Please do not use this section as the primary storage location of your documents. Documents may become unavailable if the system goes down.

The interface for uploading a file to the System: Closeout Package. It includes a 'File Name' field with a 'Browse...' button, a 'Description' field, and a table showing the upload progress.

Maximum file size is 10 MB

File Name	File Size	Description
0.0 M / 100 MB (0.0%)		

Figure 8-95 System- Closeout Package

To upload documents to the module, click on the "Browse" button and locate the file that you would like to upload, then enter in a Description of the file being uploaded. Afterwards, click on the "Add File" button to upload the file. Below is what you will see after the file upload. To delete the file, click on the delete button located in the last column.

The interface after a file upload. It shows the 'File Name' field with 'Test.txt', the 'File Size' as '100 Bytes', and the 'Description' as 'Test'. A 'delete' button is now visible in the last column of the table.

Maximum file size is 10 MB

File Name	File Size	Description	
Test.txt	100 Bytes	Test	delete
0.0 M / 100 MB (0.0%)			

Figure 8-96 System- Closeout Package after the file upload



8.2.6 Help

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



Figure 8-97 Help

8.2.7 Logout

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

8.3 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.

9. SYSTEM SPECIFICATION

9.1 Specification for PS78, SMR

Parameters		PS78		SMR	
Frequency	Downlink	P7	763-775MHz	S8	851-869MHz
		S8	851-869MHz	S9	935-940MHz
	Uplink	P7	793-805MHz	S8	806-824MHz
		S8	806-824MHz	S9	896-901MHz
Input Power Range		0~+25dBm			
Gain	Downlink	5~30dB, 0.5dB step, ATT range: 0~25dB			
	Uplink	-5~30dB, 0.5dB step, ATT range: 0~35dB			
Maximum Output Power ¹	Downlink at RU	30dBm±2dB			
	Uplink at HE	-15dBm±2dB			
Noise Figure		< 10dB@maximum gain			
VSWR		< 1:1.5			
Optical Loss		0~5dBo			
System Delay		< 2us			
Spurious		Meet FCC rules, 3GPP TS 36.104, 3GPP2 C.S0010-C			
Nominal Band/BW for Industry Canada	Downlink	P7	A~B MHz/bw MHz	S8	C~D MHz
		S8	E~F MHz	S9	G~H MHz
	Uplink	P7	I~J MHz	S8	K~L MHz
		S8	M~N MHz	S9	O~P MHz
Dimension (WDXH)	Head-End Shelf	19.0 x 14.6 x 12.2 inches (482 x 370 x 311 mm)			
	Remote-Unit Shelf	19.0 x 12.9 x 10.5 inches (482 x 328.2 x 266.5 mm)			
	Master RU	11.8 x 9.8 x 4.5 inches (300 x 249.6 x 114.5 mm)			
	Slave RU	11.8 x 9.8 x 3.7 inches (300 x 249.6 x 94.5 mm)			
Weight	Head-End Shelf	83.7 lbs (38.0 Kg) @4 RFU, CHC-H, PSU and NMS			
	Remote-Unit Shelf	61.0 lbs (27.7 kg) @ 1 master RU, 3 Slave RU			
	Master RU	13.2 lbs (6.0 kg)			
	Slave RU	11.7 lbs (5.3 kg)			
Operating Temperature		14-122°F(-10-50°C)			
Operating Humidity		5~90%RH			
Power Input		110/220V, 50-60Hz, 24V or -48V DC(optional)			
Power consumption	Head-End	52W@4 RFU, 1 OPT and NMS			
		28W@1 RFU, 1 OPT and NMS			

메모 [Y4]: 실제로 측정하셔서
기입요청합니다.
15/02/03

¹ The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5 dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device

	Remote-Unit	60W	53W
Network Management System		Ethernet(RJ45)	
RF connector	Head-End	N-type(Female)	
	Remote-Unit	N-type(Female)	
Input/output Impedance		50Ω	

9.2 Specification for VU, BT

Parameters		VU		BT	TBD
Frequency	Downlink	VHF	136-174MHz	2496-2690MHz (BRS TDD)	
		UHF	396-512MHz		
	Uplink	VHF	136-174MHz	2496-2690MHz (BRS TDD)	
		UHF	396-512MHz		
Input Power Range		-15~+37dBm			
Gain	Downlink	-12~40dB, 0.5dB step, ATT range: 0~52dB		0~52dB, 0.5dB step, ATT range: 0~52dB	
	Uplink	-15~20dB, 0.5dB step, ATT range: 0~35dB		-5~30dB, 0.5dB step, ATT range: 0~35dB	
Maximum Output Power ²	Downlink at RU	25dBm±2dB		37dBm±2dB	
	Uplink at HE	-15dBm±2dB		-15dBm±2dB	
Noise Figure		< 10dB@maximum gain			
VSWR		< 1:1.5			
Optical Loss		0~5dBo			
System Delay		< 2us			
Spurious		Meet FCC rules, 3GPP TS 36.104, 3GPP2 C.S0010-C			
Nominal Band/BW for Industry Canada	Downlink	VHF	A~B MHz /bw MHz	NA	
		UHF	E~F MHz		
	Uplink	VHF	C~D MHz	NA	
		UHF	G~H MHz		
Dimension (WXDXH)	Master RU	11.8 x 9.8 x 4.5 inches (300 x 249.6 x 114.5 mm)			
	Slave RU	11.8 x 9.8 x 3.7 inches (300 x 249.6 x 94.5 mm)			
Weight	Master RU	13.2 lbs (6.0 kg)			
	Slave RU	11.7 lbs (5.3 kg)			
Operating Temperature		14-122°F(-10-50°C)			
Operating Humidity		5~90%RH			
Power Input		110/220V, 50-60Hz, 24V or -48V DC(optional)			
Power consumptio	Head-End	52W@4 RFU, 1 OPT and NMS			
		28W@1 RFU, 1 OPT and NMS			

² The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5 dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device

메모 [Y5]: 실제로 측정하셔서
기입요청합니다.
15/02/03



n	Remote-Unit	32W	87W	
Network Management System		Ethernet(RJ45)		
RF connector	Head-End	N-type(Female)		
	Remote-Unit	N-type(Female)		
Input/output Impedance		50Ω		

9.3 FCC Certification

Item	FCC Certification
ADX-R-SMR	Part 20, Part 90
ADX-R-78P	Part 90
ADX-R-BT	Part 20

메모 [Y6]: FCC part 명기
15/02/03

10. ANTENNA SPECIFICATIONS

10.1 Omni Antenna

Frequency	698-960MHz	1710-2690MHz
Polarization	Vertical	
Gain	2dBi	3dBi
VSWR	<1.7:1	<1.5:1
Impedance	50Ω	
Power Rating	50W	

메모 [Y7]: 안테나 규격 추가
15/02/03

Note.

Please note that integrators, end-users or installers should not use the antenna with more gain than 3dBi to meet the RF exposure requirement.

11. MECHANICAL DRAWING

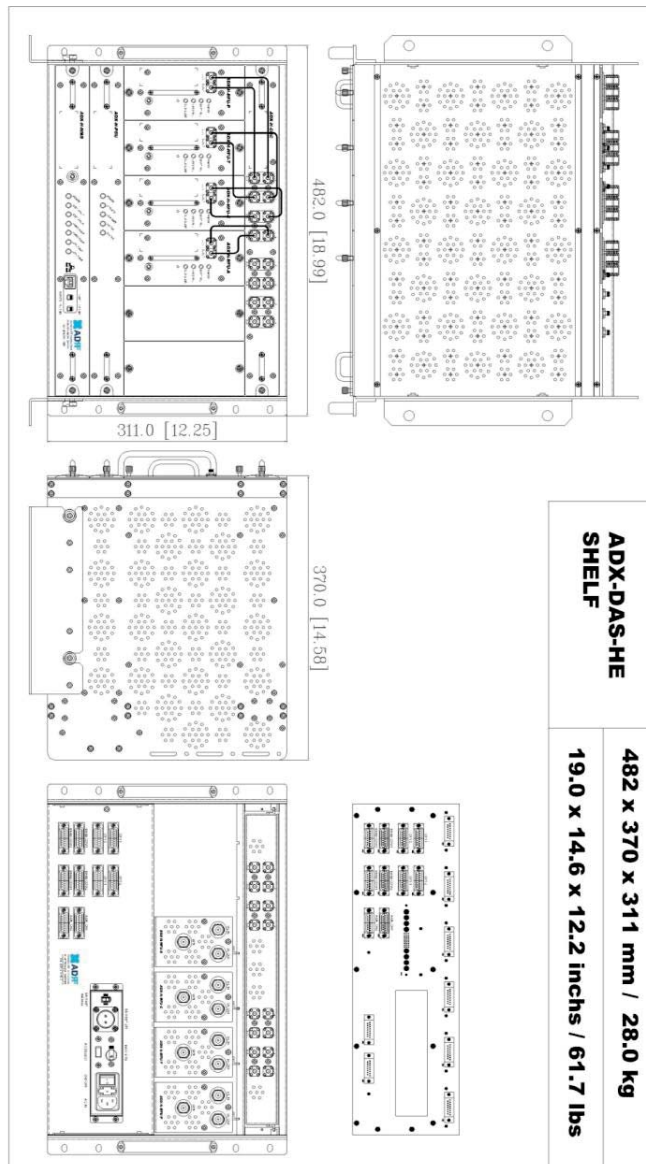


Figure 11-1 HE Drawing

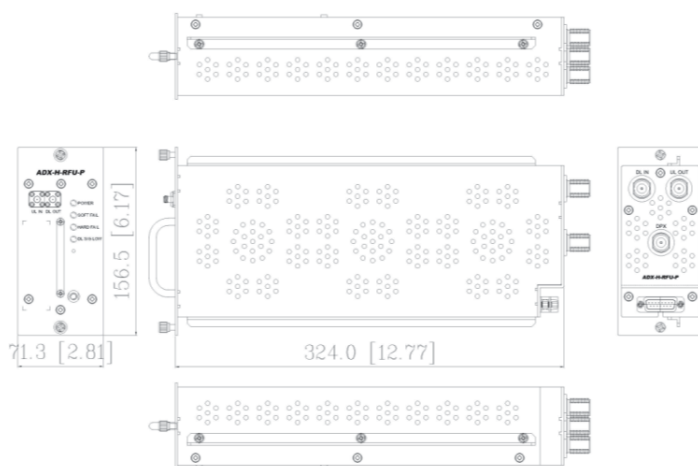


Figure 11-2 RFU Drawing for SMR/PS

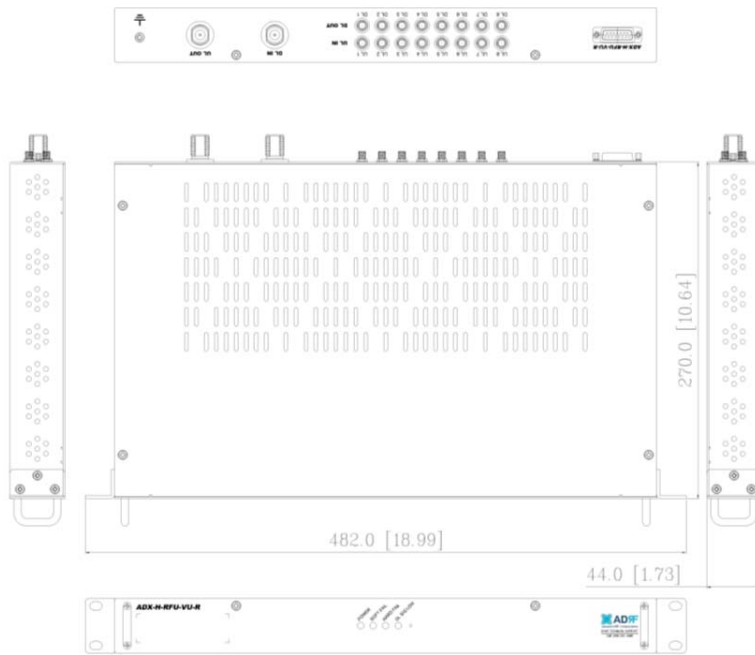


Figure 11-3 RFU Drawing for VU

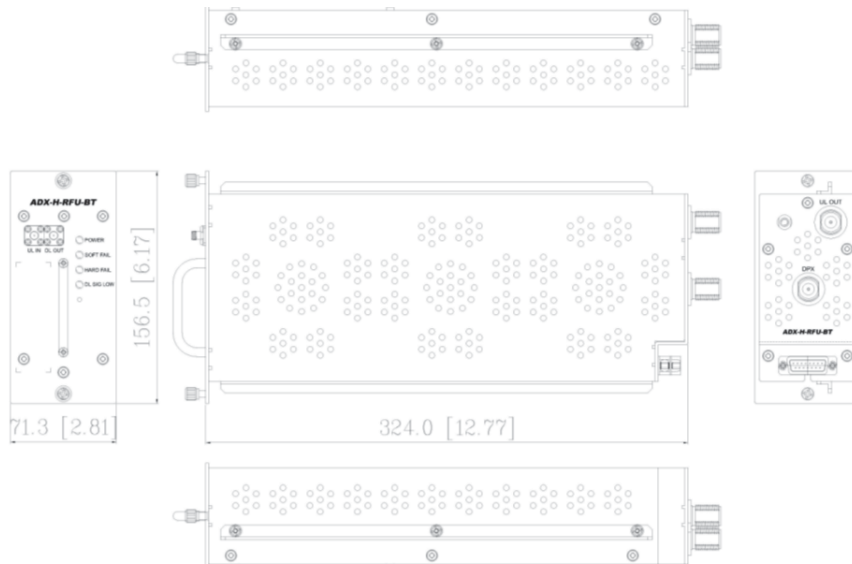


Figure 11-4 RFU Drawing for BT

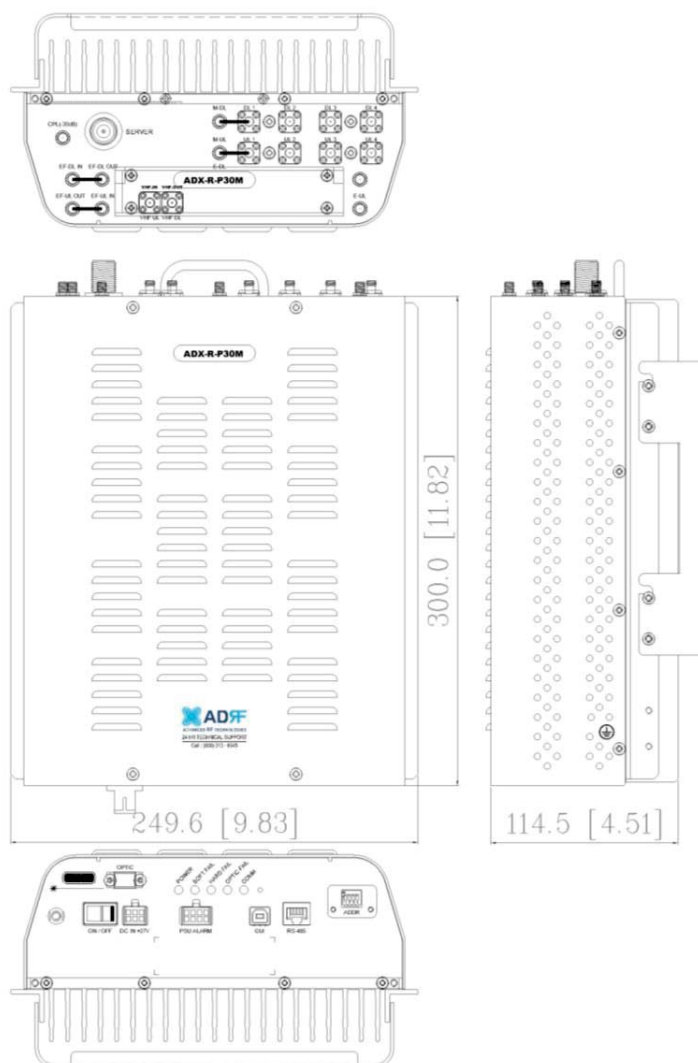


Figure 11-5 Master RU Drawing for PS

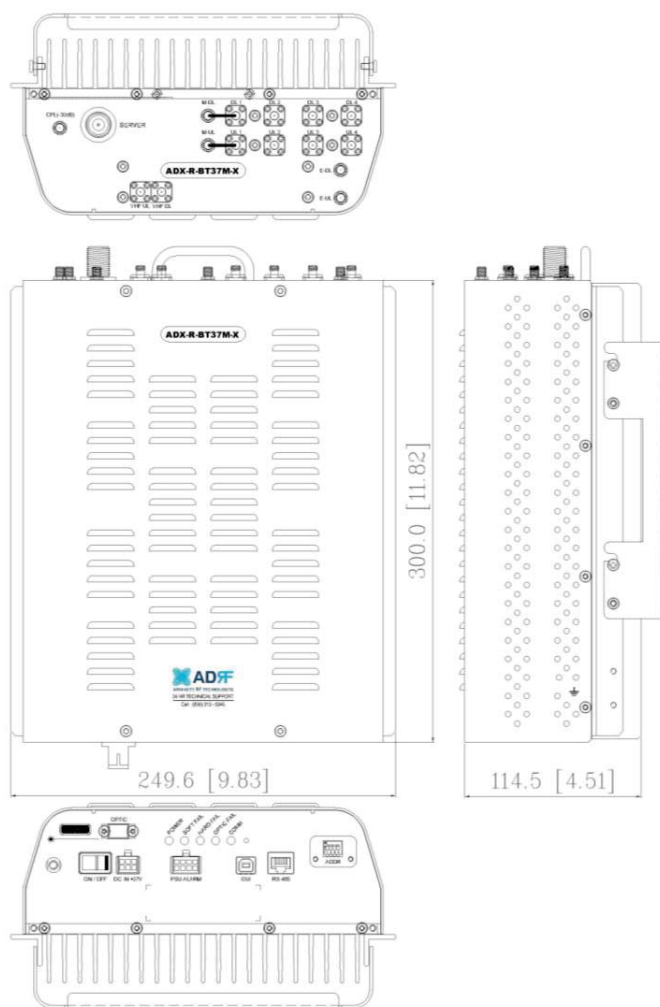


Figure 11-6 Master RU Drawing for BT

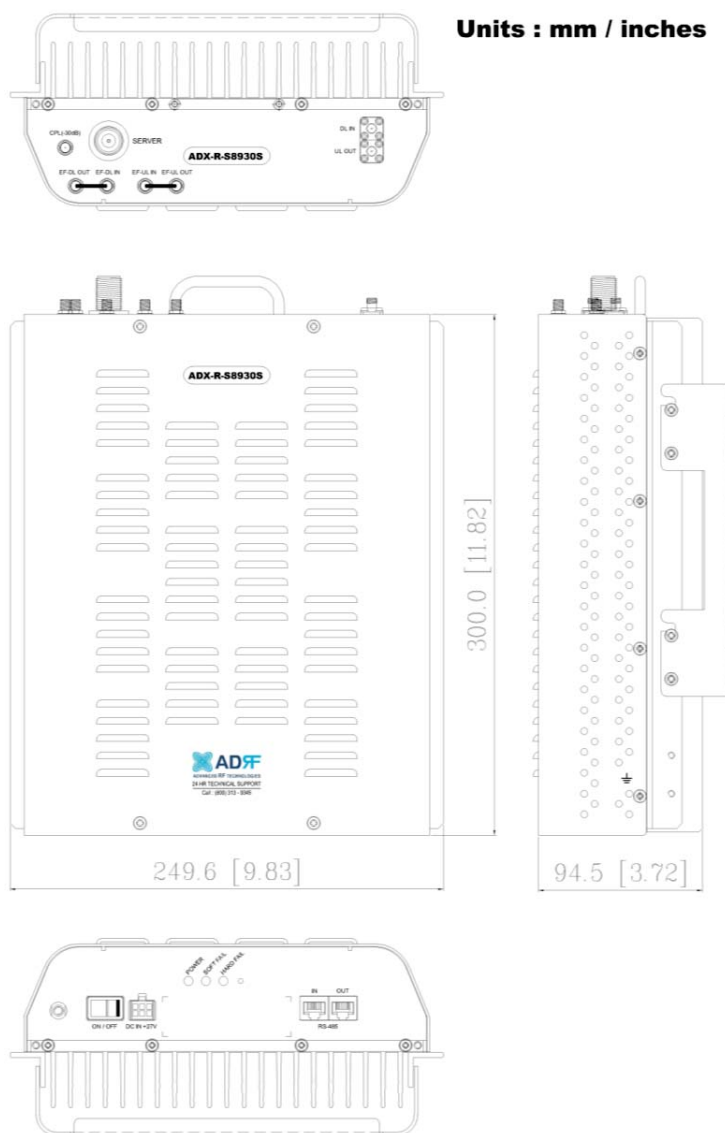


Figure 11-7 Slave RU Drawing for SMR

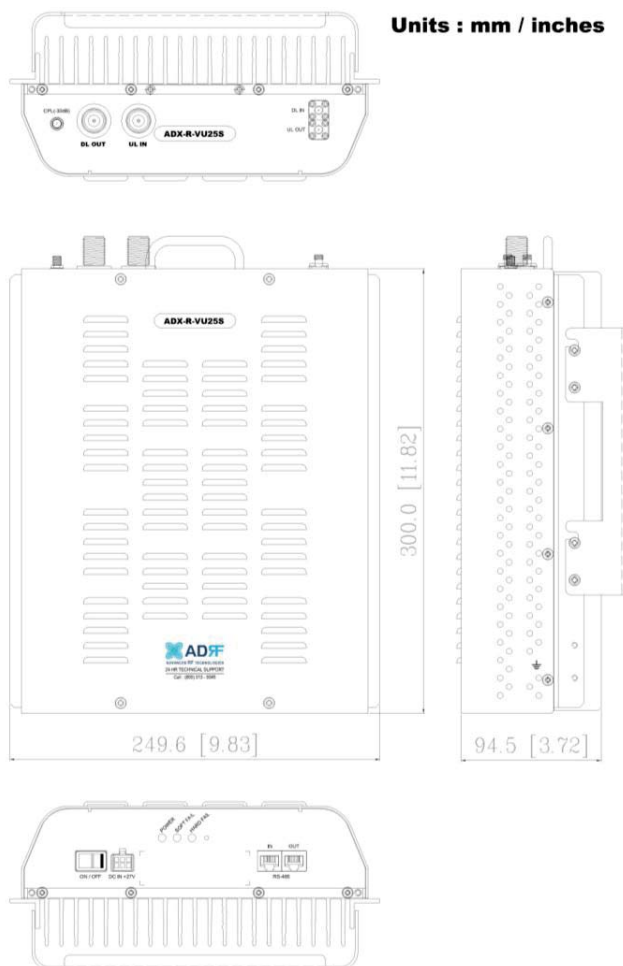


Figure 11-8 Slave RU Drawing for VU

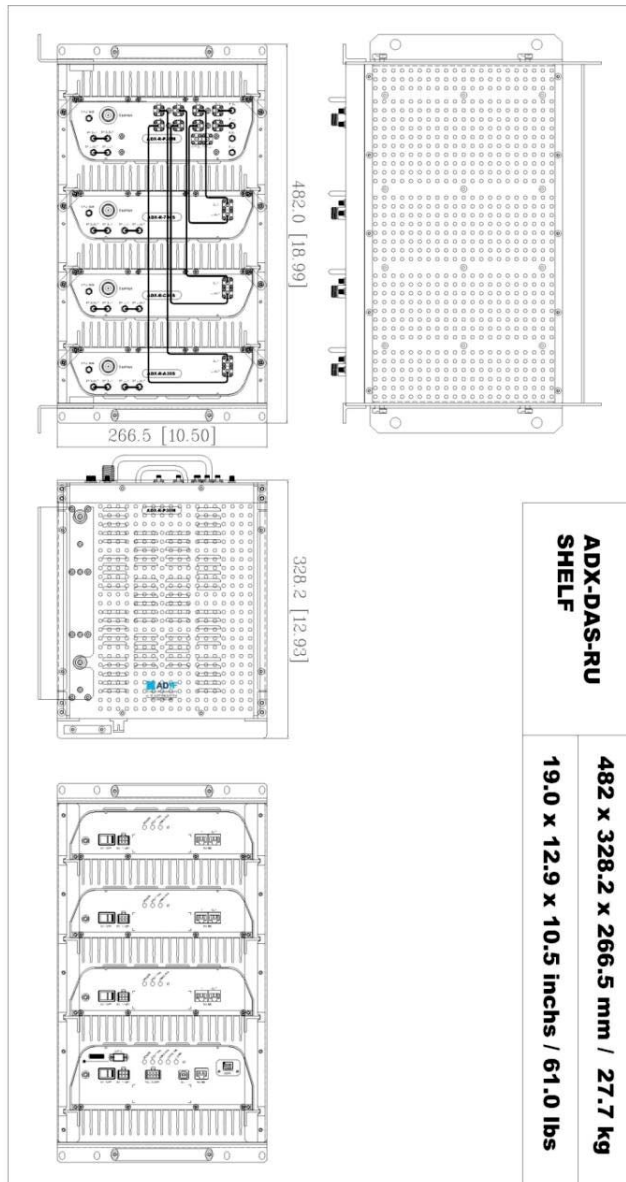


Figure 11-9 RU Rack Shelf Drawing