Epoch-III-P8024/8030/8037NM
USER MANUAL

Version 1.6

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Glossary

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's Repeater Operation and Management System
BTS	Base Transceiver Station
CDMA	Code Division Multiple Access
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
HPA	High Power Amplifier
HW	Hardware
iDEN	Integrated Digital Enhanced Network
IF	Intermediate Frequency
LNA	Low Noise Amplifier
MS	Mobile Station
PLL	Phased Locked Loop
PS	Power Supply
RF	Radio Frequency
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

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Revision History

Version	Author	Description	Date
1.0	Peter Son		March 15, 2007
1.1	B.C. Kim		March 22, 2007
1.2	Julie Song		April 2, 2007
1.3	Namchul Lee	Update for Epoch-III-P8037NM	July 16, 2007
1.4	Namchul Lee	Update for UL approval	October 17, 2007
1.5	Julie Song	Update for external modem box	November 18, 2007
1.6	Namchul Lee	Update for FCC	March 31, 2008

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1. Epoch-III-P8024/8030/8037NM

1.1 Introduction

Epoch-III-P8024/8030/8037NM is a CDMA 1900 MHz RF repeater which enhances in-building wireless coverage in the most effective and cost efficient way. For its intelligent design and versatility, the Epoch-III-P8024/8030/ 8037NM is the ideal choice for wireless coverage problems indoors. Epoch-III-P8024/8030/8037NM can be used as a stand-alone repeater with passive antennas connected to it or it can also be used as a feeder repeater to a DAS (Distributed Antenna System).

1.1.1 Highlights

- Covers the 65 MHz PCS band including G band
- Supports up to three (3) non-contiguous band combinations
- Supports up to six (6) different instantaneous bandwidths;
  5, 10, 15, 20, 25 and 30 MHz
- 24/30/37 dBm composite output power
- 80 dB gain
- 40 dB AGC Range @ 0.5 dB Step [Epoch-III-P8024NM]
- 30 dB AGC Range @ 0.5 dB Step [Epoch-III-P8030/8037NM]
- Sharp out-of-band rejection; 50 dBc @ 1 MHz Sub-band edge
- Automated installation
- Web GUI via DHCP
- Remote Monitoring Capability using External Modem Box (MBOX-DET1)

1.1.2 Parts List

Table 1 – Parts List

Label	Qty	Description
A	1	PCS Repeater
B	1	AC Power Cable
C	1	Ethernet Cable (cross over)
D	1	Ground Cable
E	6	Anchor Bolts
F	1	CD**

Figure 1 – Epoch-III-P8024/8030/8037NM Repeater Parts List

** CD includes: (1) Epoch-III-P8024/8030/8037NM User Manual & (2) Epoch-III-P8024/8030/8037NM Quick Start Guide

1.1.3 Repeater Quick View

Power LED
(Page12)

Soft Fail LED
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Hard Fail LED
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DC power port for
external modem box

Upper Guard Screw
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Bracket Screw
(Page15)

Lower Guard Screw
(Page15)

Ground Hole
(Page16)
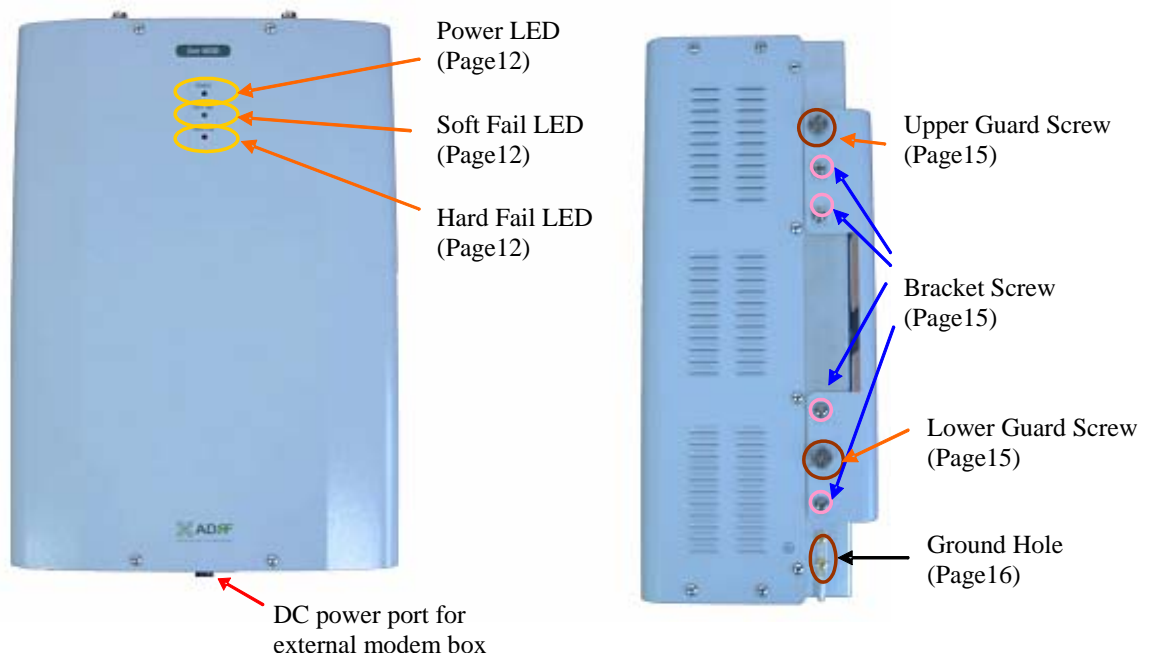
Figure 2 – Epoch-III-P8024/8030/8037NM Front & Side Views

Donor Antenna Port
(Page17)

Server Antenna Port
(Page17)

DC power port for
external modem box

AC power switch (page13)

Anchor Bolt
Hole (page15)

Wall Mounting
Bracket (page15)

Mode Selection
Switch (page13)

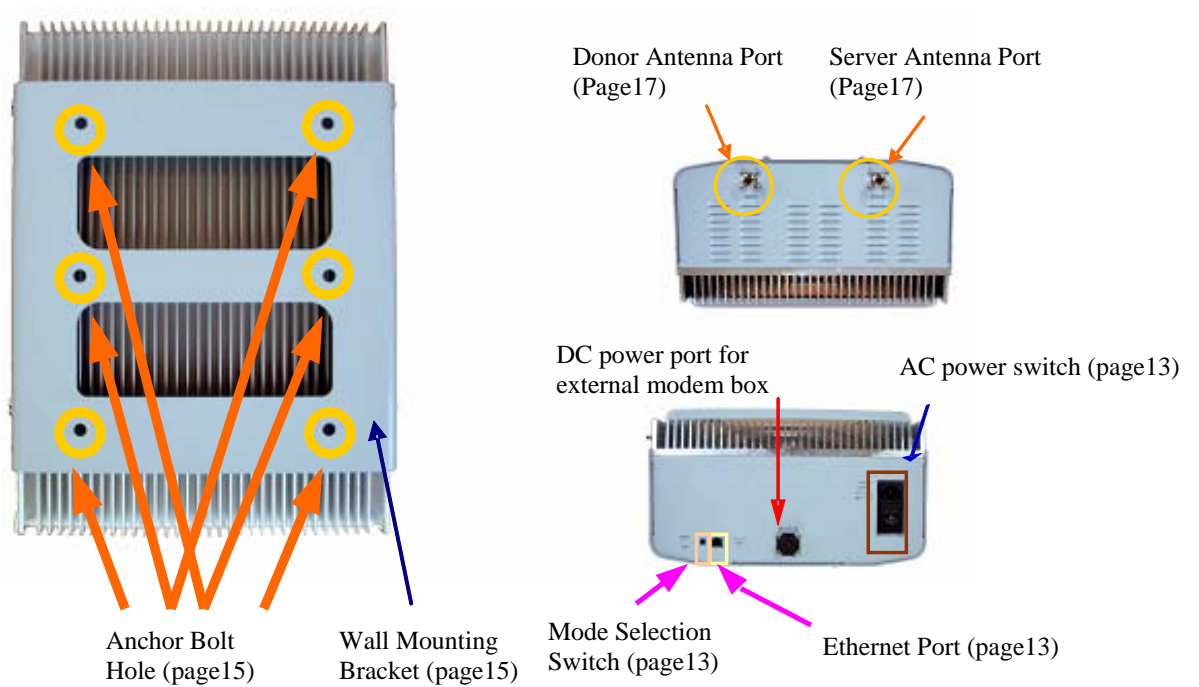Ethernet Port (page13)

Figure 3 – Epoch-III-P8024/8030/8037NM Back, Bottom, & Top Views

1.2 Warnings and Hazards

WARNING! ELECTRIC SHOCK

Opening the Epoch–III–P8024/8030/8037NM could result in electric shock and may cause severe injury.

WARNING! EXPOSURE TO RF

Working with the repeater 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.
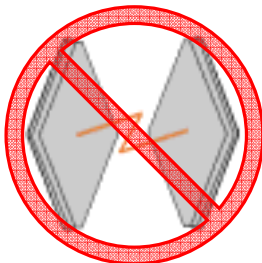
WARNING! DAMAGE TO REPEATER

Operating the Epoch–III–P8024/8030/8037NM with antennas in very close proximity facing each other could lead to severe damage to the repeater.

RF EXPOSURE & ANTENNA PLACEMENT Guidelines

Actual separation distance is determined upon gain of antenna used.
Please maintain a minimum safe distance of at least 50 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 Epoch–III–P8024/8030/8037NM 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 his own expense.

2. Epoch-III-P8024/8030/8037NM Overview

2.1 Operation Modes

2.1.1. Local Web GUI
Host Mode

This mode should be selected only if an Epoch-III-P8024/8030/8037NM is used alone without being connected to any other device functioning as a host.

Simply connect one end of the ethernet cable on the repeater monitor port and the other end on the PC's LAN port. After doing so, launch the Microsoft Internet Browser (Internet Explorer) and the Local Web GUI will be launched through typing the IP address (**http://192.168.63.1/home.asp**)

2.1.2. Remote Web GUI
Remote Mode

This mode should be selected if an external modem box (MBOX-DET1) is being installed along with the Epoch-III-P8024/8030/8037NM for monitoring purposes. In this case, the Epoch-III-P8024/8030/8037NM works as a remote unit sending its information to the collocated external modem box.
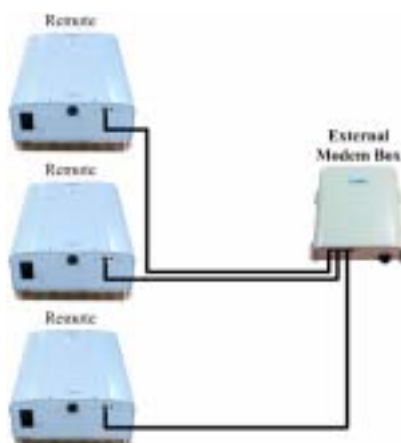
Note: ADRF's Web GUI has not been developed for Microsoft Internet Explorer and other web browsers (e.g. Netscape, FireFox, Mozilla, etc.) may not be compatible. ADRF's Web GUI has not been tested with Microsoft Internet Explorer versions higher than 6.0.

2.2 Switches & Indicators

2.2.1   LEDs

Epoch-III-P8024/8030/8037NM has three LEDs on the front panel of the repeater as shown below in Figure 4.

Figure 4 – Epoch-III-P8024/8030/8037NM Repeater LED View

POWER

If the LED is lit GREEN, it indicates that there is AC power to the repeater.

SOFT FAIL

If the LED is lit YELLOW, it indicates that there is a soft fail alarm in the system. The detailed alarm information can be viewed via the local web GUI. In the event of a soft fail alarm, the repeater will still function, but the alarm needs to be addressed promptly.

HARD FAIL

If the LED is lit RED, it indicates that there is a hard fail alarm in the system. The detailed alarm information can be viewed via the local web GUI. In the event of a hard fail alarm, the repeater will not function and immediate attention is required.

2.2.2 AC Power Switch & DC Power Port for External Modem Box

The AC Power on/off switch is located on the bottom of repeater (Figure 5). The switch should be powered on after the repeater has been installed properly.

The DC Power Port can be used to provide power to the optional External Modem Box (Figure 5).

Figure 5 – AC Power Switch & DC Power Port

2.2.3 Mode Selection Switch and Ethernet Port

The Ethernet port and the Mode Selection Switch for DHCP are located on bottom of the repeater as shown below in Figure 6. The mode selection switch has two modes: Host Mode & Remote Mode.

Figure 6 – Ethernet Port & Mode Selection Switch

2.3   Installation

2.3.1   Tools

No special tools or equipments are needed to install the Epoch-III-P8024/8030/8037NM.

2.3.2   Procedure

Six mounting holes are located on the wall-mounting bracket to attach it to the wall. The wall bracket must be securely attached to sufficiently carry the weight of the Epoch-III-P8024/8030/8037NM, which is bolted to the wall bracket through the four aligned mounting holes.

The following steps should be followed while mounting the repeater:

Installation Procedure

Take the Epoch-III-P8024/8030/8037NM out of the box
Using the six anchor bolts, mount the bracket on the wall
Make sure the bracket is securely mounted
Slightly tilt the repeater and mount the repeater onto the wall as shown in the picture. Hook the upper 2 guard screws first and then slide/push in the lower 2 guard screws into the place.
Make sure the Epoch-III-P8024/8030/8037NM is securely placed onto the wall bracket
Fasten the 8 bracket screws back properly
Inspect that everything is secure

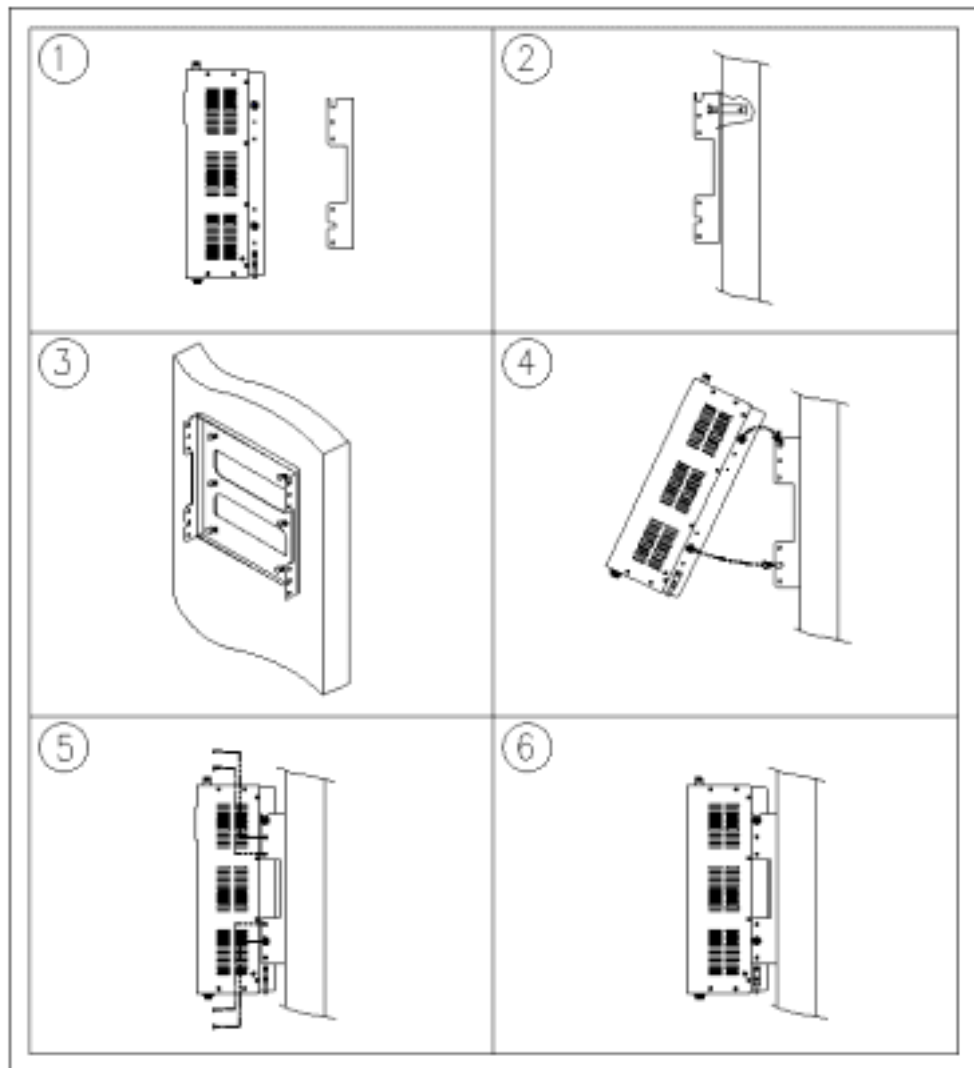** Rack Mount option is also available. Please contact ADRF for additional information.*

Figure 7 – Repeater Mounting Instructions

2.3.3 Grounding

A ground cable is included in the packaging and should be properly connected to the repeater as shown below.

Figure 8 – Ground Cable Connection

2.3.4   Antenna Separation/Isolation

Separation between the antennas is necessary to prevent oscillation. Oscillation occurs when the signal entering the system continually reenters, due to the lack of separation between the donor and server antennas. In other words, the signal is being fed back into the system. This creates a constant amplification of the same signal. As a result, the noise level rises above the signal level.
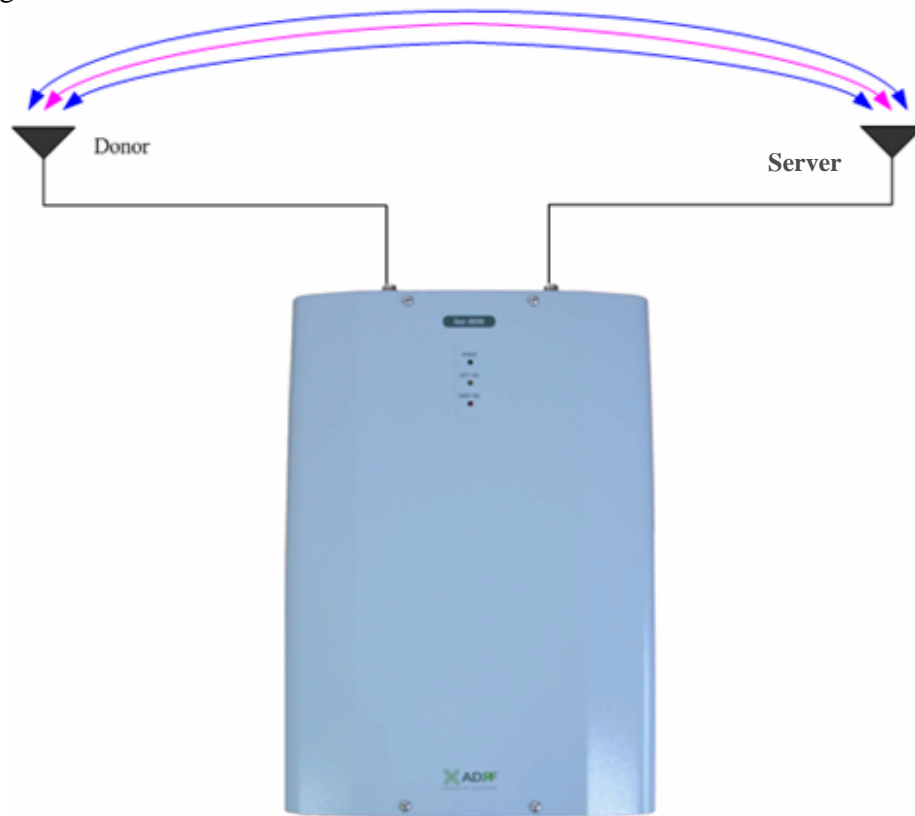

Figure 9 - RF Repeater Oscillation

To prevent feedback, the donor and server antennas must be separated by an appropriate distance to provide sufficient isolation. Isolation is attained by separating antennas a sufficient distance so that the output of one antenna does not reach the input of the other.   This distance is dependent on the gain of the repeater.

A sufficient isolation value is 13 ~ 15 dB greater than the maximum gain of the repeater. For example, since the Epoch-III-P8030NM has a maximum gain of 80 dB, it requires an isolation of at least 93 ~ 95 dB.

2.3.5 Line of Sight

The donor antenna which points towards the base station typically has a narrow beam antenna pattern. As a result, a slight deviation away from the direction of the BTS can lead to less than optimum results. In addition, obstacles between the repeater and the BTS may impair the repeater from obtaining any BTS signal. As a result, the repeater cannot transmit signal to the coverage area. Therefore, a direct line of sight to the BTS for the donor antenna is vital to the function of a repeater. For the same reason, placing the server antenna in direct line of sight of the coverage area is also necessary.
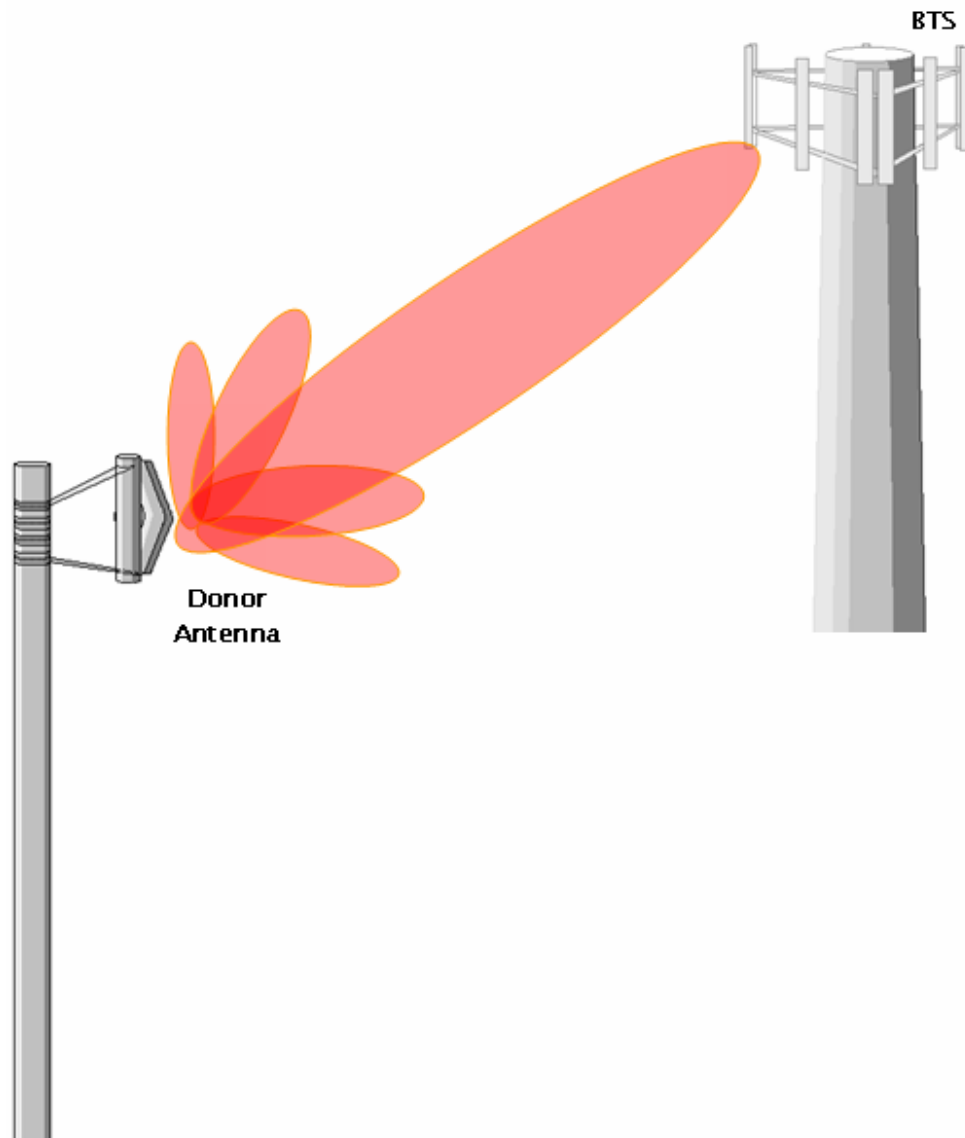

Figure 10 - Direct Line of Sight to the BTS

3. Epoch-III-P8024/8030/8037NM AROMS Setup

3.1 Repeater/PC Connection Using AROMS

i) Wait until the Power LED is lit in green. Connect the LAN cable between the laptop's Ethernet port and the repeater's Ethernet port.

Note: Under Local Area Connection in Network Settings, make sure to select **Obtain an IP address automatically** under Internet Protocol (TCP/IP) properties.
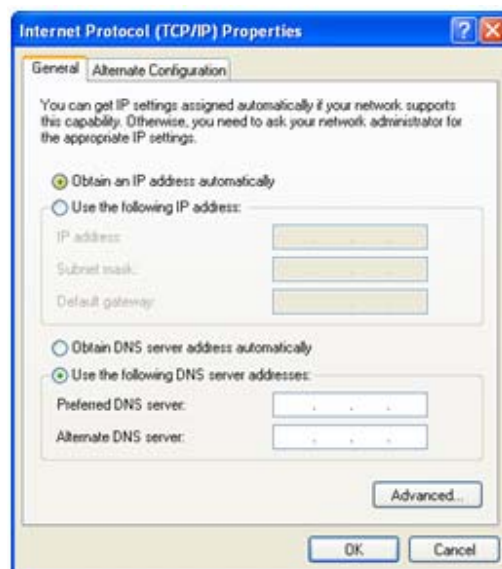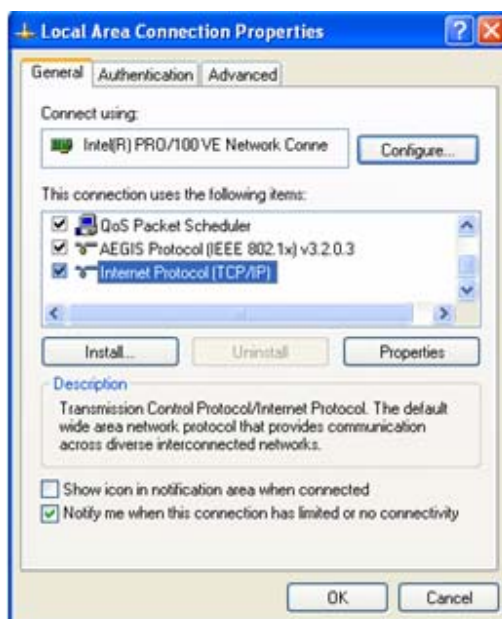
ii)   Launch MS Internet Explorer (Version 6.0)

Note: ADRF's Web GUI has not been tested for compatibility with any other web browsers (e.g. Netscape, FireFox, Mozilla, etc.).

iii) Please type the following IP address into the address bar of MS Internet Explorer:

   http://192.168.63.1/home.asp

iv) The following login screen will appear:

If you are not the Super-User, please type in your assigned username & password which you should have received from the Super-User.
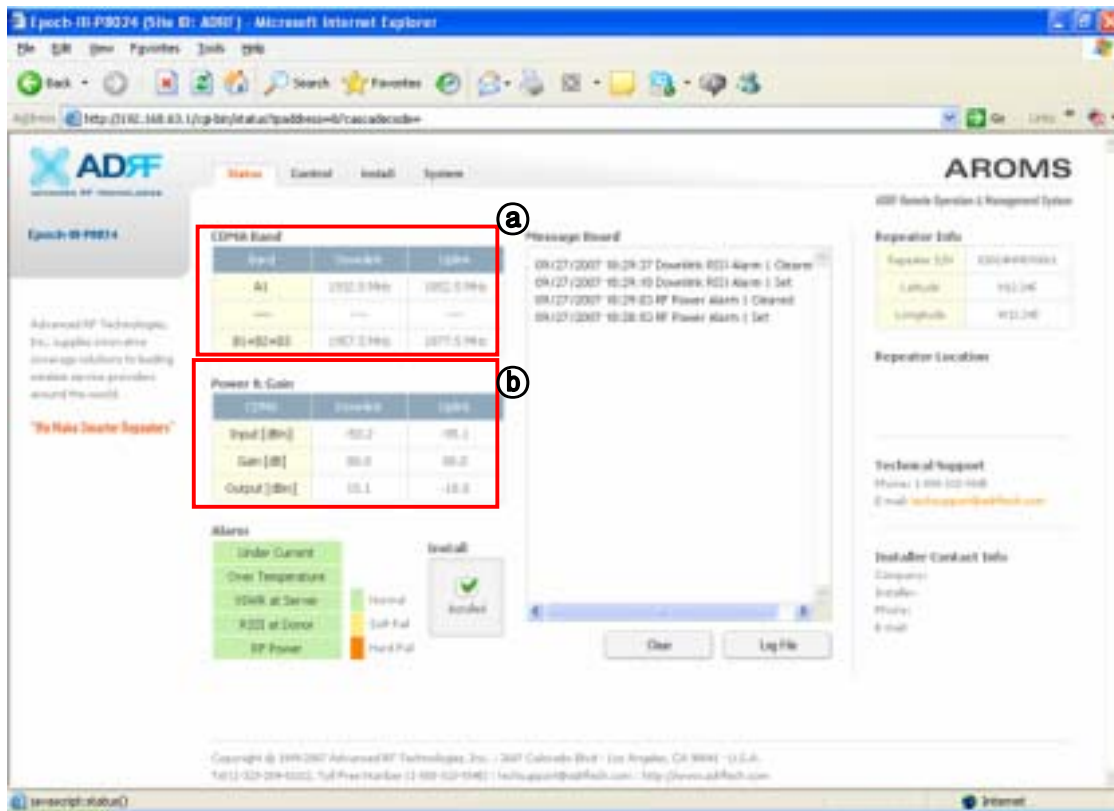
The default username and password for the General User is adrf & adrf, respectively.

If the username & password is typed in incorrectly, the following screen will appear:

3.2 Repeater Status

If you click on Status tab, the following window will appear:

In this window, the user can view the following:
(To change any parameters, e.g., PCS Sub-Bands, Instantaneous Band Width, Gain Settings, AGC Level, etc., you must go to the **Install** or the **Control** window.)

- CDMA Band: Will display the center frequencies of the 1900 MHz spectrums on the downlink and uplink respectively.

Ⓐ

CDMA Band		
Band	DownLink	UpLink
A1	1932.5 MHz	1852.5 MHz
-----	-----	-----
-----	-----	-----

- Power & Gain: Will display the repeater input, gain and output power on the downlink and uplink.

ⓑ

| Power & Gain		
CDMA	DownLink	UpLink
Input [dBm]	-41.0	-97.0
Gain [dB]	65.5	65.5
Output [dBm]	23.8	-10.0

- **Alarm**: Will display five alarms with three different status conditions (Normal, Soft Fail or Hard Fail).
- **Message Board**: Will show up to recent 20 log messages (Alarms & Heartbeats).
- **Installation**: Will display repeater's installation status (Not Installed or Installed).
- **Repeater Info**: Will display repeater's serial number, and location information (latitude and longitude coordinates).
- **Repeater Location**: Will display the address where the repeater is installed
- **Technical Support**: Will display ADRF's technical support contact information.
- **Installer Contact Info**: Will display the installer's name, phone and e-mail address.

Note: Once successfully logged in, the repeater model name and the site/cascade ID will be displayed on the top of all the windows.

Parameters		Range	Step Size
DL/UL Output Power	Epoch-III-P8024NM	-10 ~ 24 dBm	0.1 dB
	Epoch-III-P8030NM	-10 ~ 30 dBm	
	Epoch-III-P8037NM	-10 ~ 37 dBm	
DL/UL Input Power	Epoch-III-P8024NM	-12 ~ -97 dBm	0.1 dB
	Epoch-III-P8030NM	-12 ~ -100 dBm	
	Epoch-III-P8037NM	-12 ~ -100 dBm	
Gain	Epoch-III-P8024NM	40 ~ 80 dB	0.5 dB
	Epoch-III-P8030NM	50 ~ 80 dB	0.5 dB
	Epoch-III-P8037NM	50 ~ 80 dB	0.5 dB

3.3 Repeater Control

If you click on **Control** tab, the following window will appear:
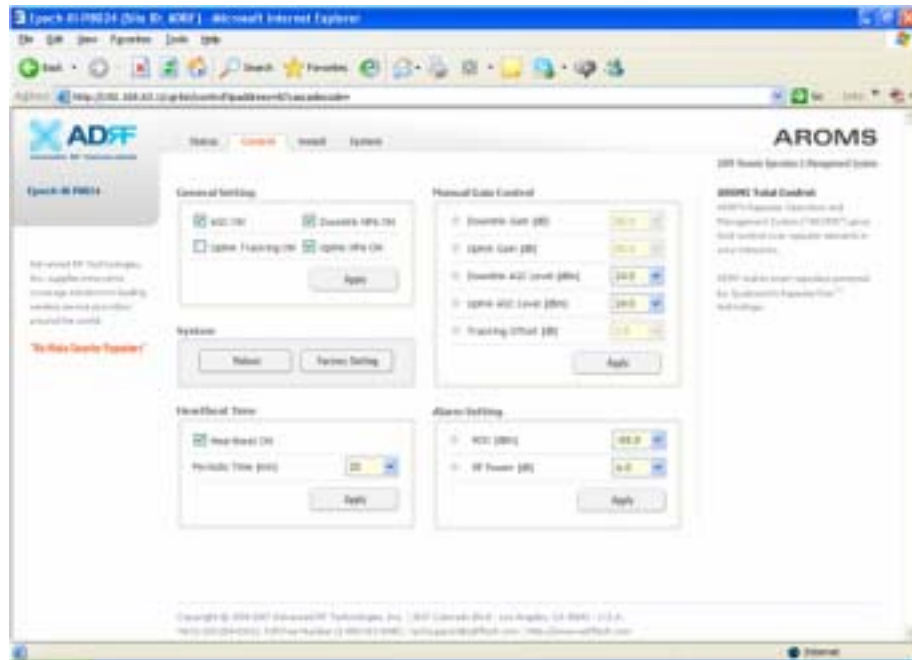
In this window, the user can adjust the following parameters:

General Setting
- Automatic Gain Control (Default mode is Off)
- Downlink HPA on/off (Default mode is On)
- Uplink HPA on/off (Default mode is On)
- Uplink Tracking Mode on/off (Default mode is Off)

Manual Gain Control
➔ - Downlink Gain Control (40 to 80 dB @ 0.5 dB step)
  Epoch-III-P8024NM: 40 to 80 dB @ 0.5 dB step, default value: 40 dB
  Epoch-III-P8030/8037NM: 50 to 80 dB @ 0.5 dB step, default value: 50 dB

➔ - Uplink Gain Control (40 to 80 dB @ 0.5 dB step)
  Epoch-III-P8024NM: 40 to 80 dB @ 0.5 dB step, default value: 40 dB
  Epoch-III-P8030/8037NM: 50 to 80 dB @ 0.5 dB step, default value: 50 dB

➔ - Downlink AGC Level
    Epoch-III-P8024NM: 0 to 24 dBm @ 0.5 dB step, default value: 24 dBm
    Epoch-III-P8030NM: 0 to 30 dBm @ 0.5 dB step, default value: 30 dBm
    Epoch-III-P8037NM: 0 to 37 dBm @ 0.5 dB step, default value: 37 dBm

➔ - Uplink AGC Level
Epoch-III-P8024NM: 0 to 24 dBm @ 0.5 dB step, default value: 24 dBm
Epoch-III-P8030NM: 0 to 30 dBm @ 0.5 dB step, default value: 30 dBm
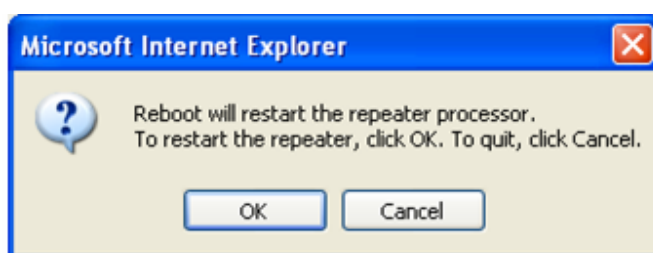Epoch-III-P8037NM: 0 to 37 dBm @ 0.5 dB step, default value: 37 dBm

➔ - Uplink Tracking Offset (0 to 10 dB @ 0.5 dB step, default value: 3 dB)

System
- If you click the **Reboot** button, the following message box will appear:
When the system reboots, the latest settings will be saved.
Please wait approximately 30 seconds to 1 minute for the system to reboot.

- If you click the **Factory Setting** button, the following message box will appear:
Factory setting will erase the saved settings by the user and change all the
parameters to the factory default settings.
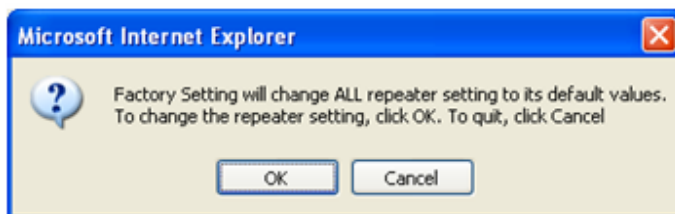
Heartbeat Time
- Heartbeat on and off (Default mode is On)
- Heartbeat periodic time (Range: 1 to 59 min @ 1 min step,
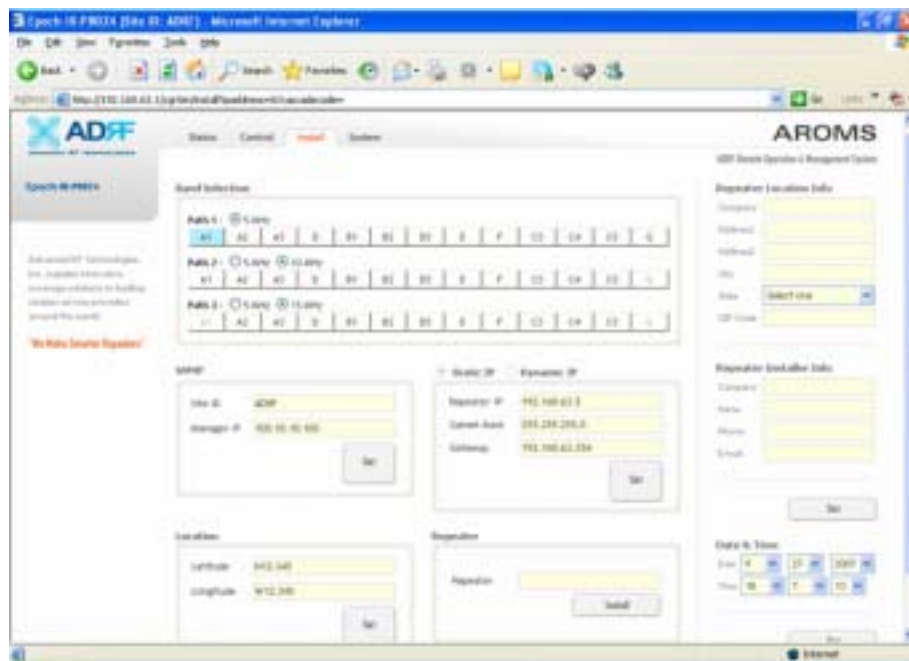default period is 20 min)

Alarm Setting
- RSSI Alarm at Donor (-100 ~ -50 dBm @ 0.5 dB step, default value: -85 dBm)
- RF Power Alarm (2 ~ 10 dB @ 0.5 dB step, default value: 6 dB)

3.4 Repeater Install

If you click on the **Install** tab, the following window will appear:

Band Selection

Simply click on the desired operating bandwidth.

The Epoch-III-P8024/8030/8037NM has three independent RF paths: Path 1, Path 2, and Path 3. Path 1 supports 5 MHz bandwidth. Path 2 supports 5 or 10 MHz bandwidths. Path 3 supports 5 or 15 MHz bandwidths.
One can use only one Path (single band: Path 1, Path 2 or Path 3), any of the two Paths (Two contiguous or non-contiguous sub-bands: Path 1 and Path 2, Path 2 and Path 3, Path 1 and Path 3), or all three Paths (Three contiguous or non-contiguous sub-bands: Path1, Path 2 and Path 3).   Therefore, the instantaneous bandwidth that the Epoch-III-P8024/8030/8037NM supports is 5, 10, 15, 20, 25 or 30 MHz.

The following Band Selection shows that A1 (5 MHz) is selected in Path 1, A3+D (10 MHz) is selected in Path 2, and the entire B band (15 MHz) is selected in Path 3.

SNMP
Type in the assigned Site/Cascade ID and Manager IP Address.
Default Site ID is ADRF.
Default Manager IP address 100.10.10.100

Repeater
Click the Install button to automatically setup the repeater.
It may take up to 3 minutes to complete the process. You will see a gradual
progress bar display. After the process is completed, a pop-up window will
display "*Installation Successfully Completed*" message.

Click on Status tab, the Installation box now changes from "Not Installed" to
"Installed."

If the Epoch-III-P8024/8030/8037NM detects a problem during the installation
process, it will show a prompt message, e.g., "Modem is not detected." Please
follow the instructions and address the problem to finish the installation process.
If the problem persists, please contact our technical support.

Repeater Location
Please type in the physical address where the repeater is installed.

Repeater Installer Info
Please type in the installer's name, phone number and e-mail address for technical
support.

Repeater Static IP: Will display the Repeater's Static IP Address, Subnet Mask,
and Gateway. This information is necessary when using the Repeater in
conjunction with the External Modem Box. Default values are:
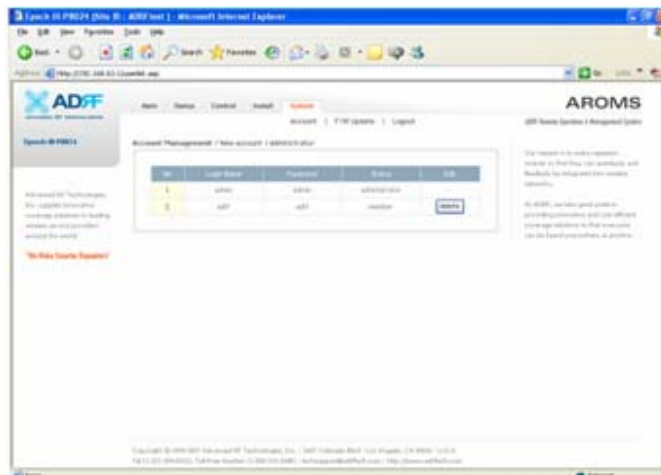 **Repeater IP**: 192.168.63.5
  Subnet Mask: 255.255.255.0
  Gateway: 192.168.63.254

Date and Time: Sets the date and time for the internal clock (required for Log
Messages)

3.5 Repeater System

If you click on the **System** tab, the following window will appear:

Note: If you are the Super-User, you will see account management section under the System Window. If you are a general user, you will not be able to see the account management portion.

Only the Super-User can add, delete and modify a user. The following window illustrates how a new user can be added by simply clicking on New Account.
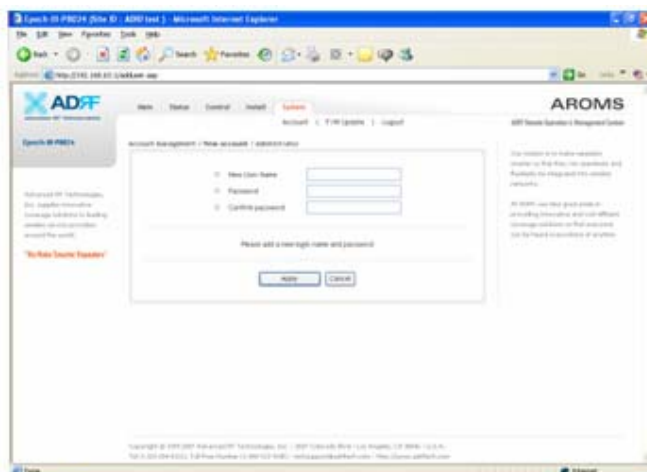
The following window illustrates how the administrator can be changed by simply clicking on Administrator.
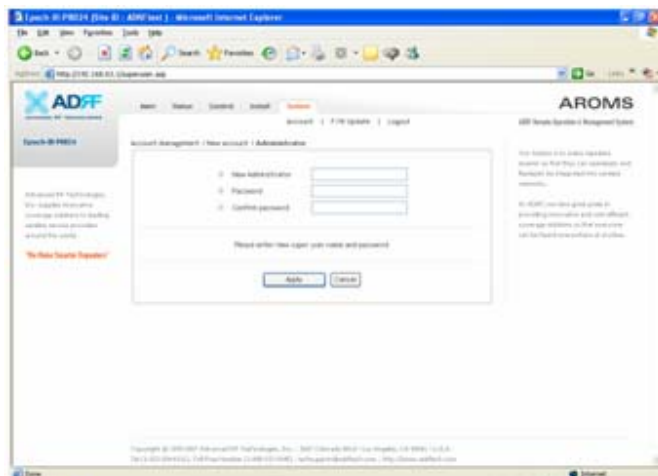
Firmware Upgrade

If you click on Firmware Upgrade, the following window will appear. You can browse through your PC and locate the firmware file. Once it's selected, simply click on Update and it'll upload the latest firmware automatically and close the session. You will need to re-login again.
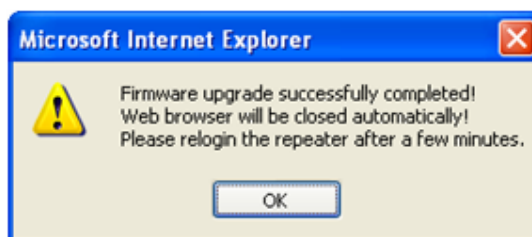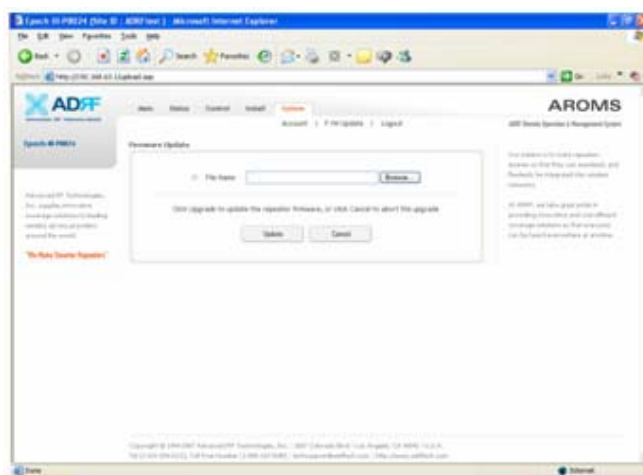
4. Maintenance Guide for Epoch-III-P8024/8030/8037NM

4.1 Periodic Inspection Checklist

4.1.1 Check for loose connections to the repeater and antennas. If connections are loose, make sure that all connections are tightly fastened properly.

4.1.2 Check that cables and connectors are in good condition.

4.1.3 Ensure that the repeater brackets are in good condition and that the repeater is securely fastened.

4.2 Preventive Measures for Optimal Operation

4.2.1 Recommendations

1.1.3.1   Perform the *Periodic Inspection Checklist* quarterly or semiannually.

4.2.2 Precautions

- Do not operate the repeater with the antennas in extremely close proximity as this may cause damage to the repeater.

- Do not change parameters unless instructed to do so by an authorized supervisor.

- Do not move the repeater unless instructed to do so by an authorized supervisor.

- Do not detach any cables to the repeater unless repair of respective components are necessary.

5. Warranty and Repair Policy

5.1 General Warranty

The Epoch-III-P8024/8030/8037NM carries a Standard Warranty period of five (5) years unless indicated otherwise on the package or in the acknowledgment of the purchase order.

5.2 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.

5.3 Limitation of Damages

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

5.4 No Consequential Damages

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

5.5 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.

5.6 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 (323) 254-8131 or send an email to techsupport@adrftech.com.

Appendix A: Specifications

A.1 Electrical Specifications

Parameters		Specifications		Comments
Frequency Range	Downlink	1930~1995 MHz		
	Uplink	1850~1915 MHz		
Frequency Error		≤ ± 0.05 ppm		
Band Selection		5/10 MHz + 5/15 MHz + 5 MHz		
Gain Flatness	Full band	≤ ±1.25 dB		
	Each band	≤ ±1.25 dB		
Gain	Maximum	80 dB		
	Step	0.5 dB		
	Range	P8024NM	40 dB	
		P8030NM/P8037NM	30 dB	
	Tolerance	≤ ±0.5 dB		
Composite Output Power (UL/DL)	P8024NM	+24 dBm		
	P8030NM	+30 dBm		
	P8037NM	+37 dBm		
AGC Error		≤ ±0.5 dB		
Inband Spurious emissions		≥ 45 dBc/30 kHz @ fo ± 885 KHz		
		≥ 50 dBc/30 kHz @ fo ± 1.98 MHz		
		≤ -13 dBm/1 MHz @ fo ± 2.25 MHz		
Outband Spurious emissions		≤ -13 dBm/1 kHz; 9 kHz < f < 150 kHz		
		≤ -13 dBm/10 kHz; 150 kHz < f < 30 MHz		
		≤ -13 dBm/100 kHz; 30 MHz < f < 1 GHz		
		≤ -13 dBm /1 MHz; 1 GHz < f < 5 GHz		
Roll offs		> 50 dBc @1 MHz outside passband		
Noise Figure (Uplink)	P8024NM	≤ 5.0 dB @ max gain		
	P8030NM	≤ 5.0 dB @ max gain		
	P8037NM	≤ 5.0 dB @ max gain		
Delay		≤ 5 us		
VSWR		≤ 1.5:1		
Coupling for Modem		15 ± 2 dB		

A.2 Mechanical Specifications

Parameters		Specifications	Comments
Dimension	Epoch-III-P8024NM	11.98 x 18.52 x 7.33 inches	Bracket excluded
	Epoch-III-P8030NM	13.55 x 18.52 x 8.00 inches	
	Epoch-III-P8037NM	16.71 x 22.06 x 7.96 inches	
Weight	Epoch-III-P8024NM	40.82 lbs	Bracket excluded
	Epoch-III-P8030NM	44.00 lbs	
	Epoch-III-P8037NM	62.83 lbs	
RF Ports		N-Type (F)	Donor & Server Antenna Ports
Local Interface		RJ45 (DHCP)	
Cooling		Air Convection	
IP Class		IP 20	Indoor Type
Mounting Type		Wall Mounting	19" Rack Mounting Option Available

A.3 Environmental Specifications

| Parameters	Specifications	Comments
Operating Temperature	-10 ~ +50 ℃	Ambient
Relative Humidity	5 ~ 95 %, (Non-Condensing)	
Dust	Industrial Dust Per Telcordia GR63 Core	

A.4 Power Specifications

Parameters		Specifications	Comments
AC Power		100 ~ 130 AC	
AC Frequency		50 ~ 60 Hz	
AC Supply Protection		Fuse	
DC Power Option		-40 ~ -60 V / +20 ~ 30 V	
Power Consumption	Epoch-III-P8024NM	≤ 95 W	
	Epoch-III-P8030NM	≤ 150 W	
	Epoch-III-P8037NM	≤ 250 W	
Ground		External Threaded Stud	

A.5 Other Specifications

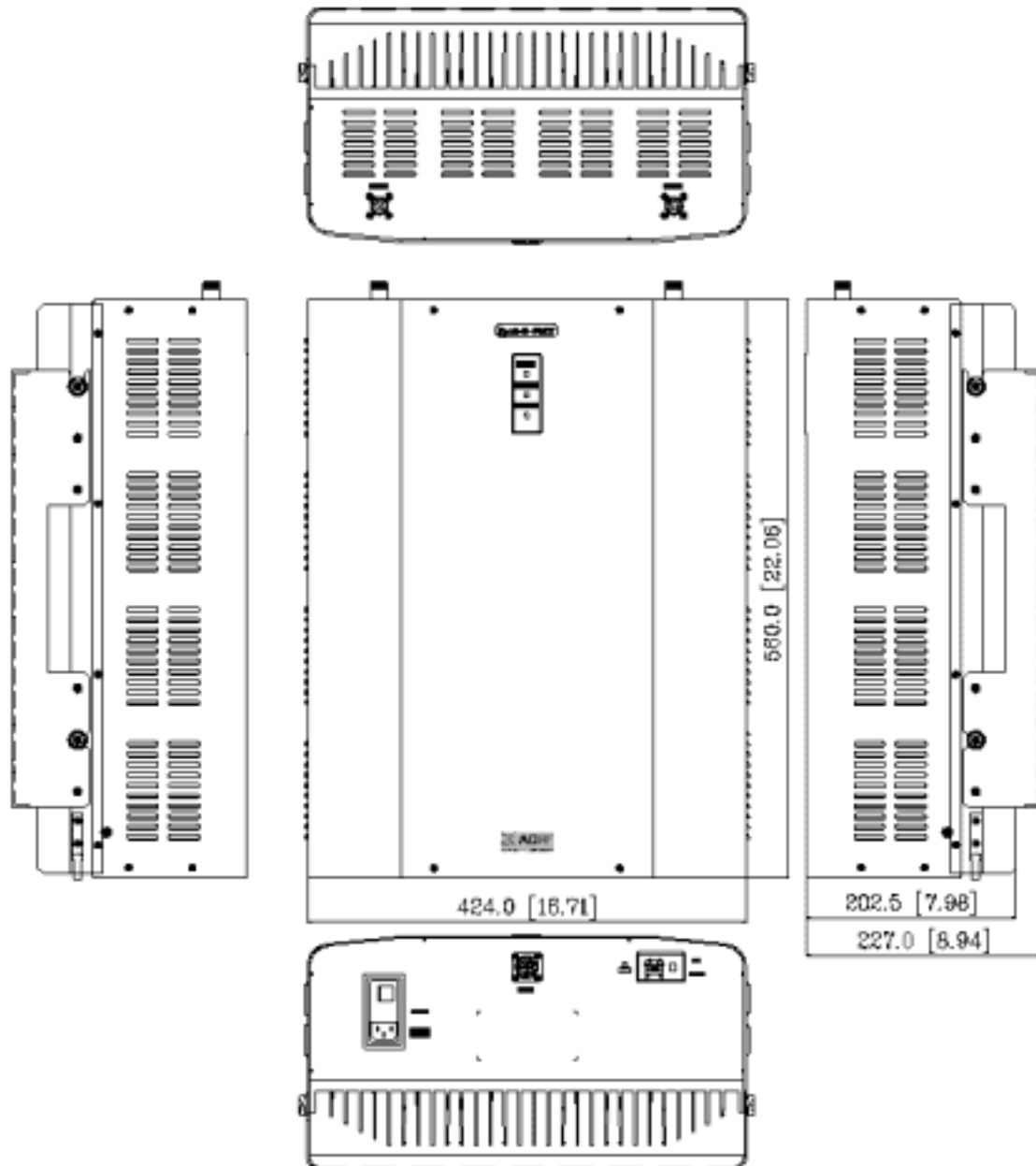| Parameters	Specifications	Comments
MTBF	> 100,000 Hours	
Certificates	UL 60950, FCC Part 15, 24	
Warranty	5 Years	

Appendix B: Mechanical Drawing
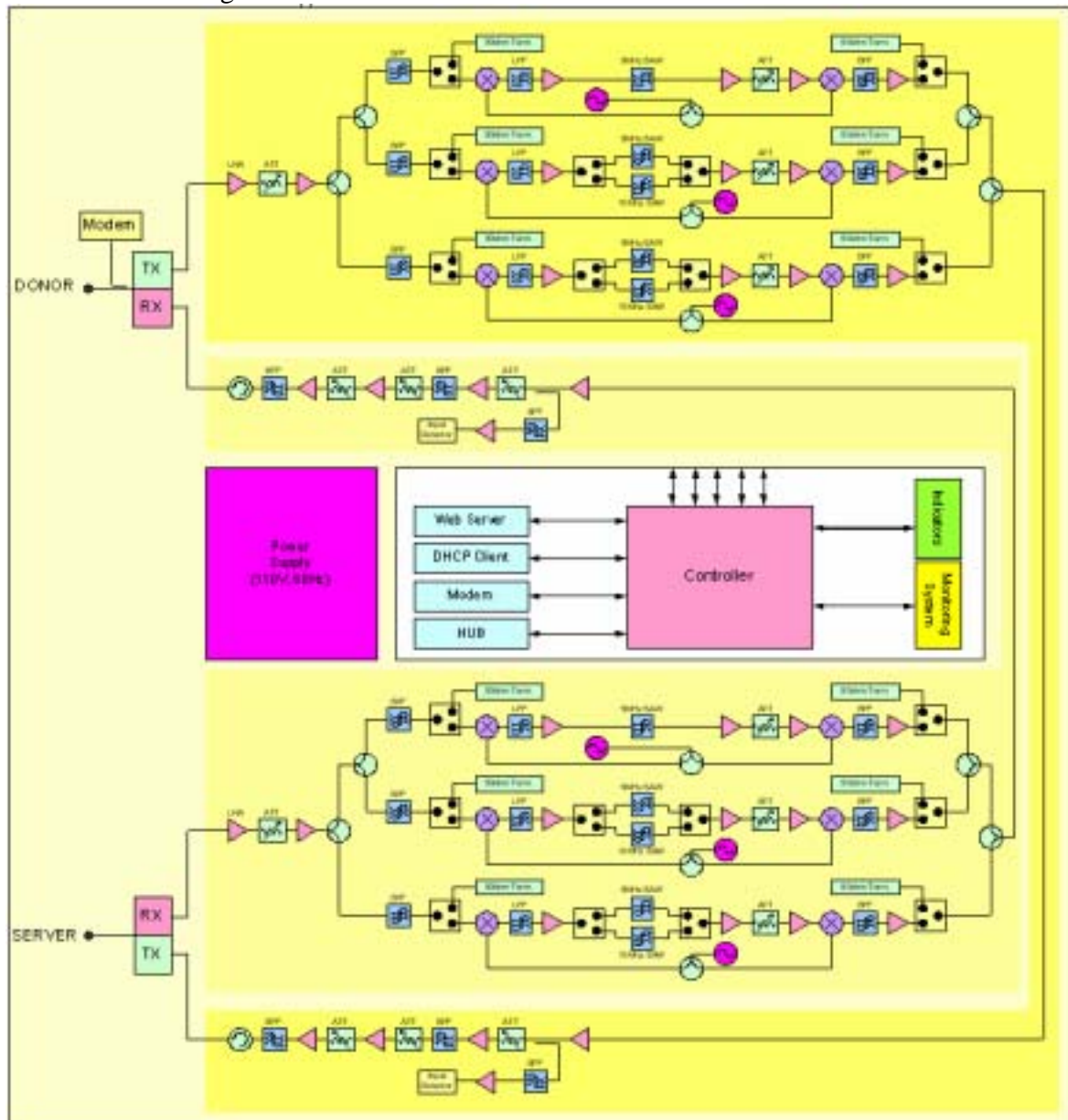
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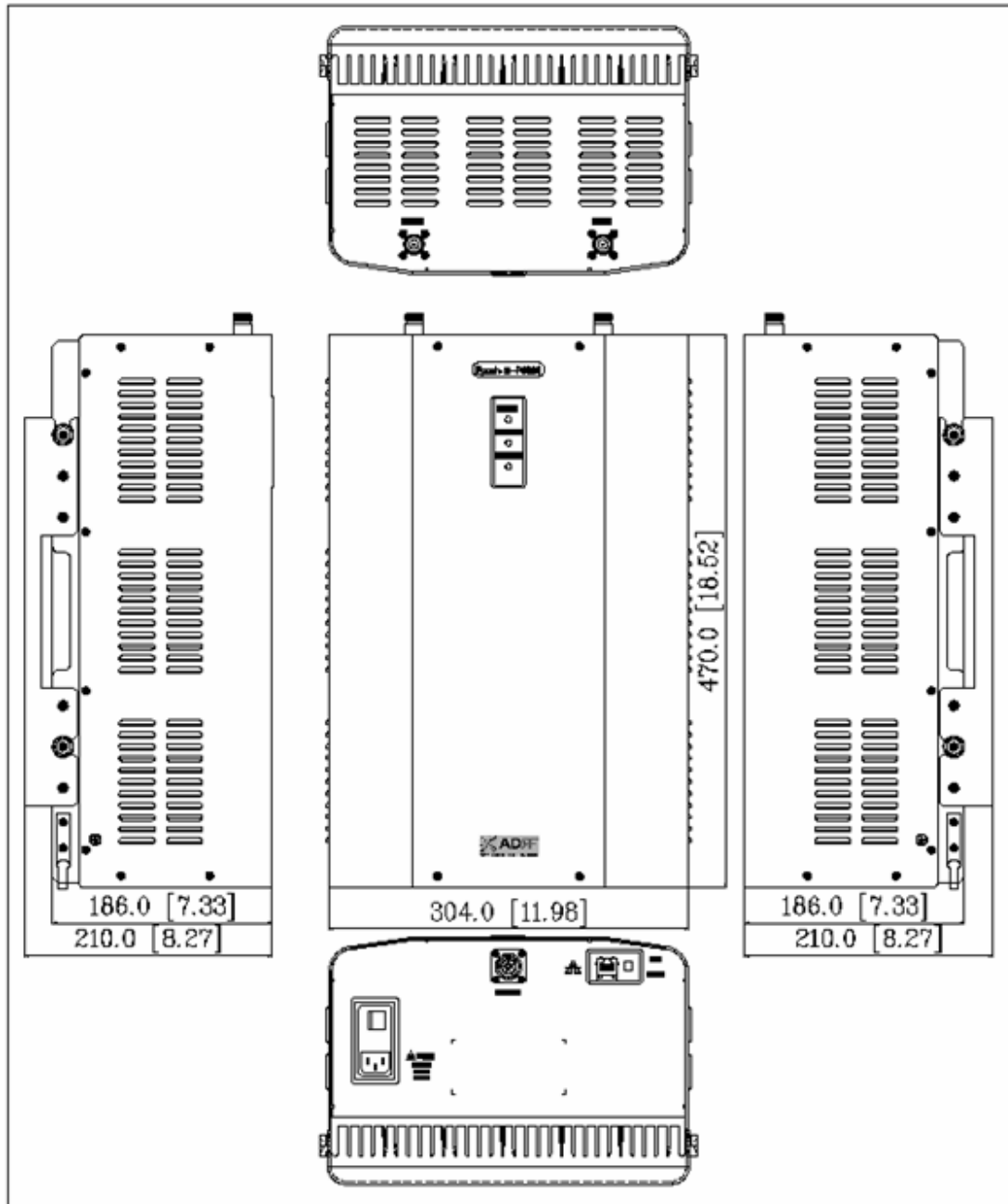
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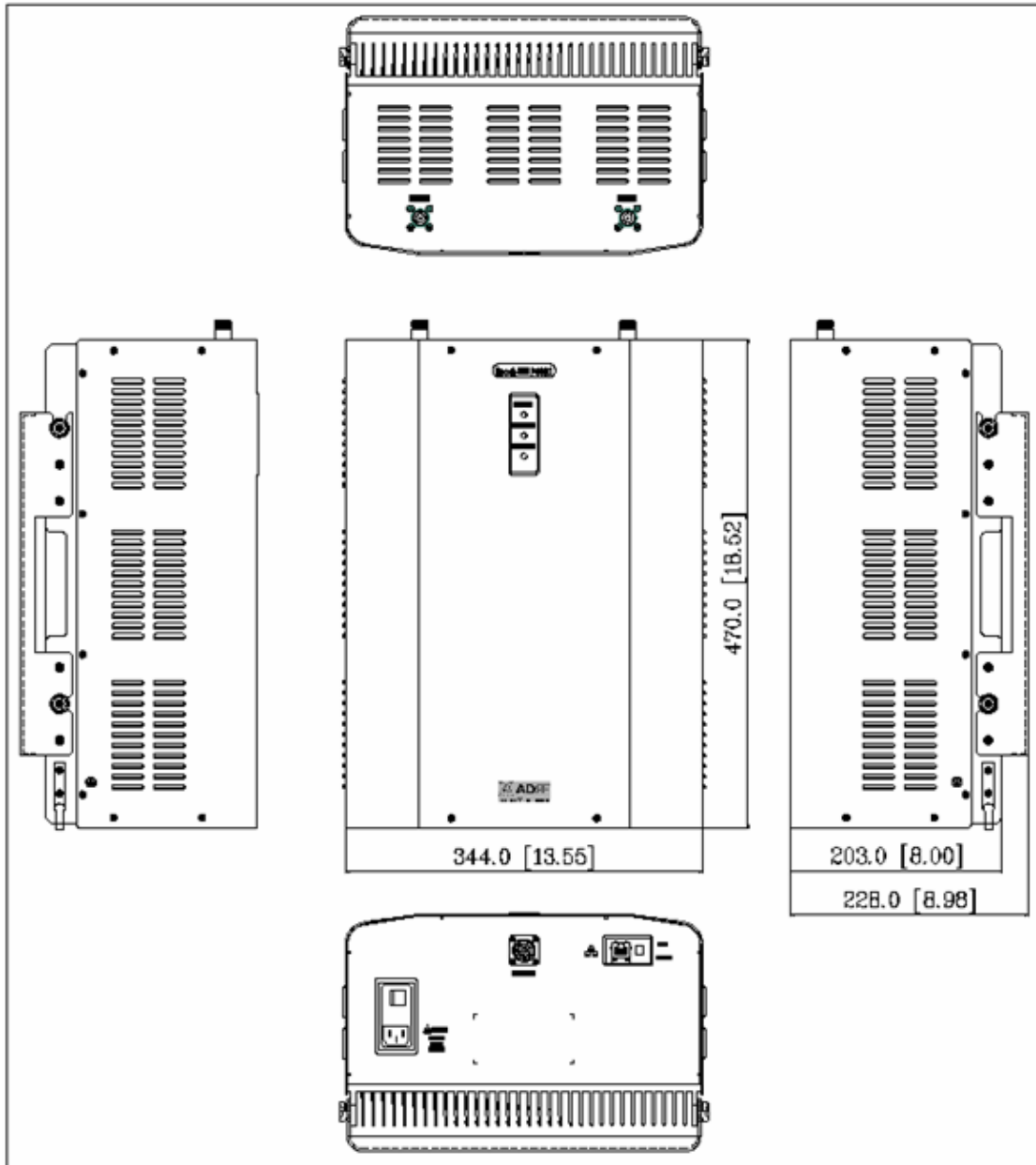
Epoch-III-P8037NM
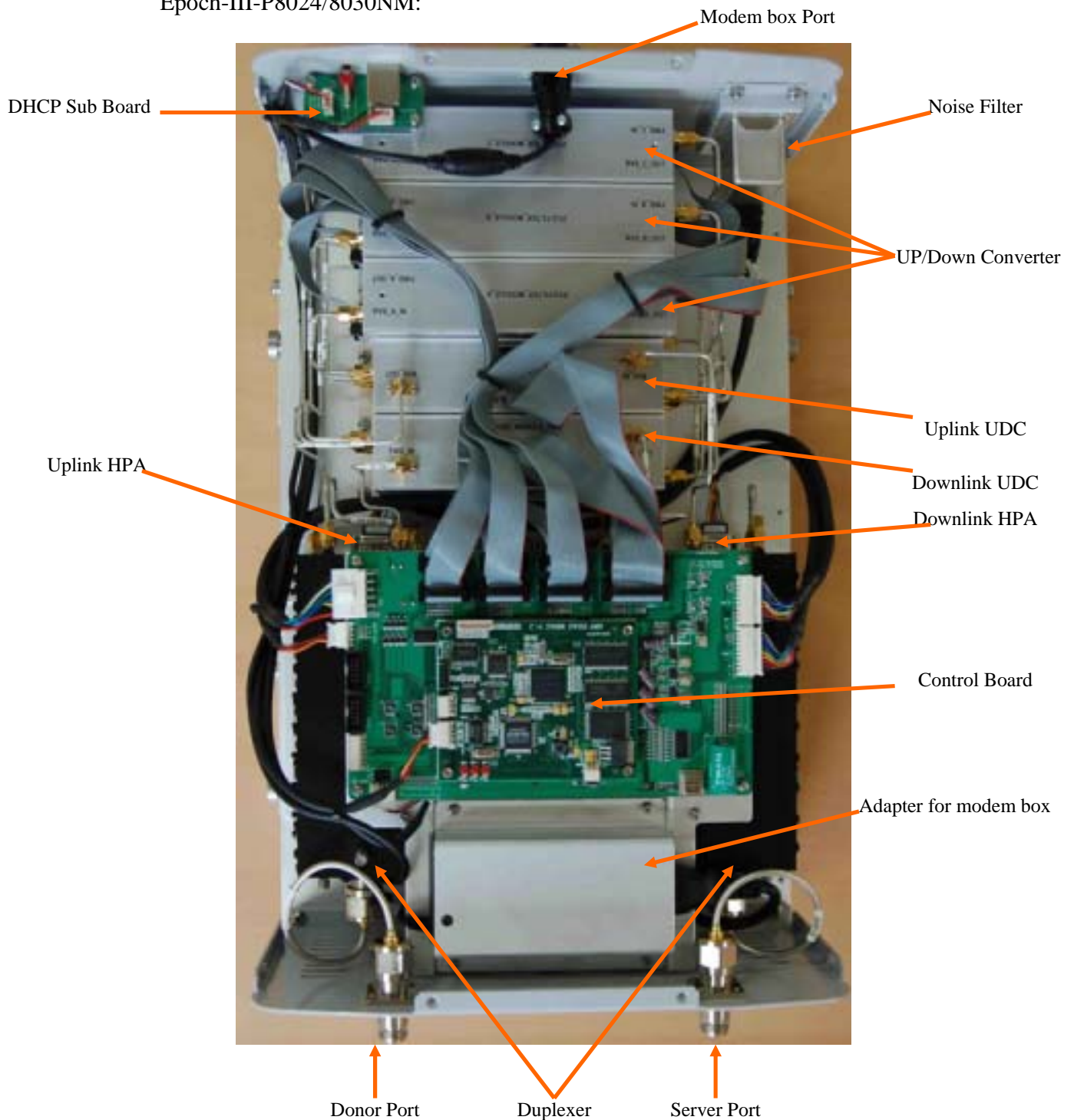
Appendix C: Epoch-III-P8024/8030/8037NM Overview

C.1 Block Diagram

Epoch-III-P8024/8030/8037NM Repeater Block Diagram

C.2 Components

Epoch-III-P8024/8030NM:
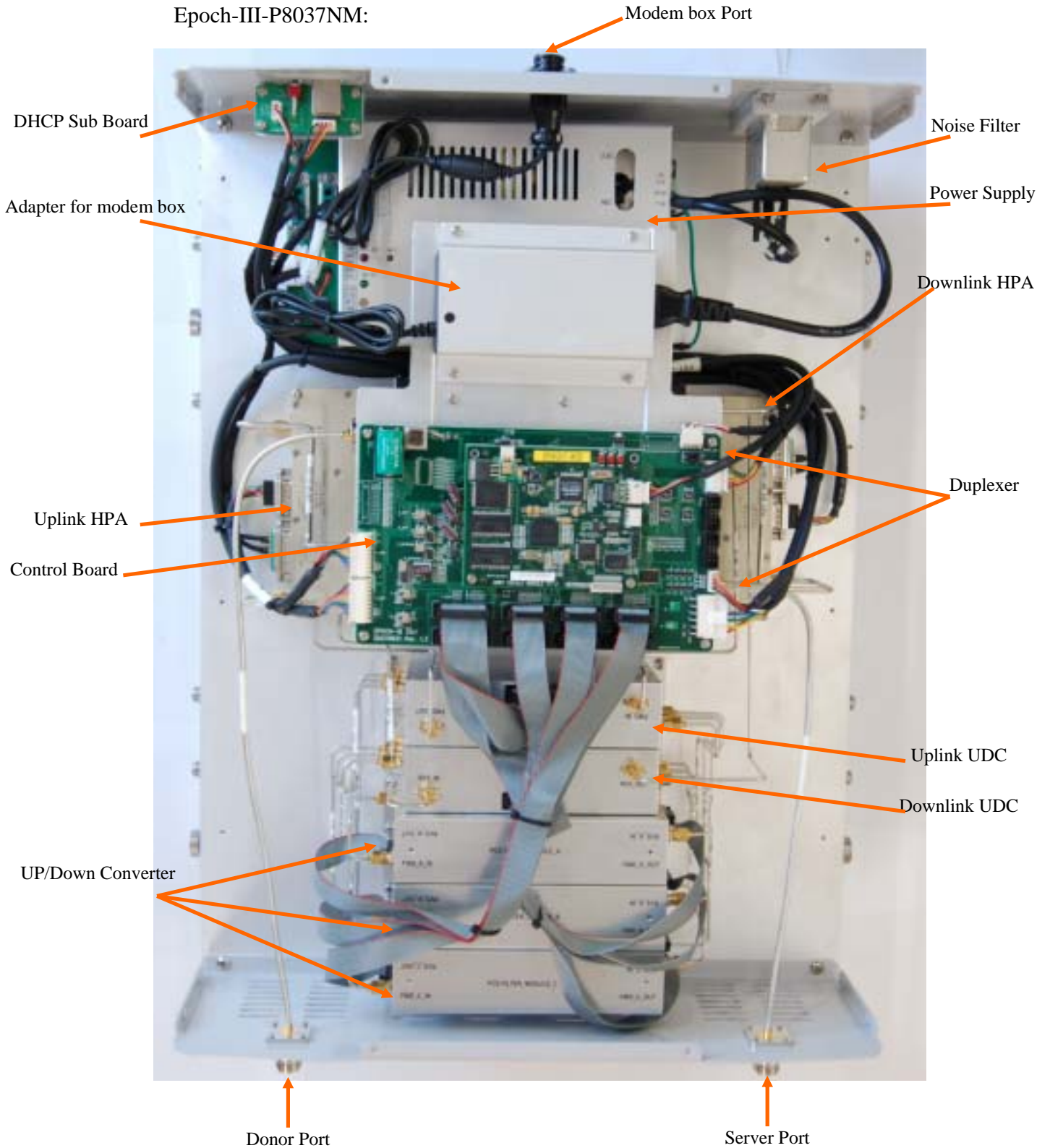

Modem box Port

DHCP Sub Board

Noise Filter

UP/Down Converter

Uplink UDC

Uplink HPA

Downlink UDC

Downlink HPA

Control Board

Adapter for modem box

Donor Port   Duplexer   Server Port

Epoch-III-P8024/8030NM Internal Components

Epoch-III-P8037NM:

Modem box Port

DHCP Sub Board

Noise Filter

Power Supply

Adapter for modem box

Downlink HPA

Duplexer

Uplink HPA

Control Board

Uplink UDC

Downlink UDC

UP/Down Converter

Donor Port

Server Port

Epoch-III-P8037NM Internal Components

Power Supply

It provides DC power to each module within the repeater.

Controller

It is responsible for monitoring the status of each module and controls the parameters. Also it interfaces with PC through Ethernet port.

Down Converter Module

The downlink RF signal that enters through the cavity filter is converted to IF frequency, which is later converted back to RF frequency through SAW filtering.

Up Converter Module

The uplink RF signal that enters through the cavity filter is converted to IF frequency, which is later converted back to RF frequency through SAW filtering.

Duplexer

It consists of two BPFs (band-pass filters): PCS TX (1930 ~ 1995 MHz) & RX (1850 ~ 1915 MHz)

HPA

It receives the output signal from the Up/Down converter module and amplifies the signal to the repeater's rated maximum power level.

Modem Box Adapter

Adapter for modem box