PSR78
Public Safety Repeater
USER MANUAL
Version 0.1

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

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' Repeater Operation and Management System
BTS	Base Transceiver Station
CDMA	Code Division Multiple Access
CFE	Compact Front End
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
IF	Intermediate Frequency
LNA	Low Noise Amplifier
LTE	Long Term Evolution
MS	Mobile Station
PLL	Phased Locked Loop
PS	Power Supply
RF	Radio Frequency
SQE	Signal Quality Estimate
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

Released version: 0.1

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	Description	Date
0.1	Sun Kim	Initial Release	March 16, 2011

TABLE OF CONTENTS

1. PSR78 Repeater

1.1 Introduction

The PSR78 is an over-the-air repeater system that operates in both the 700 and 800 MHz public safety frequencies.

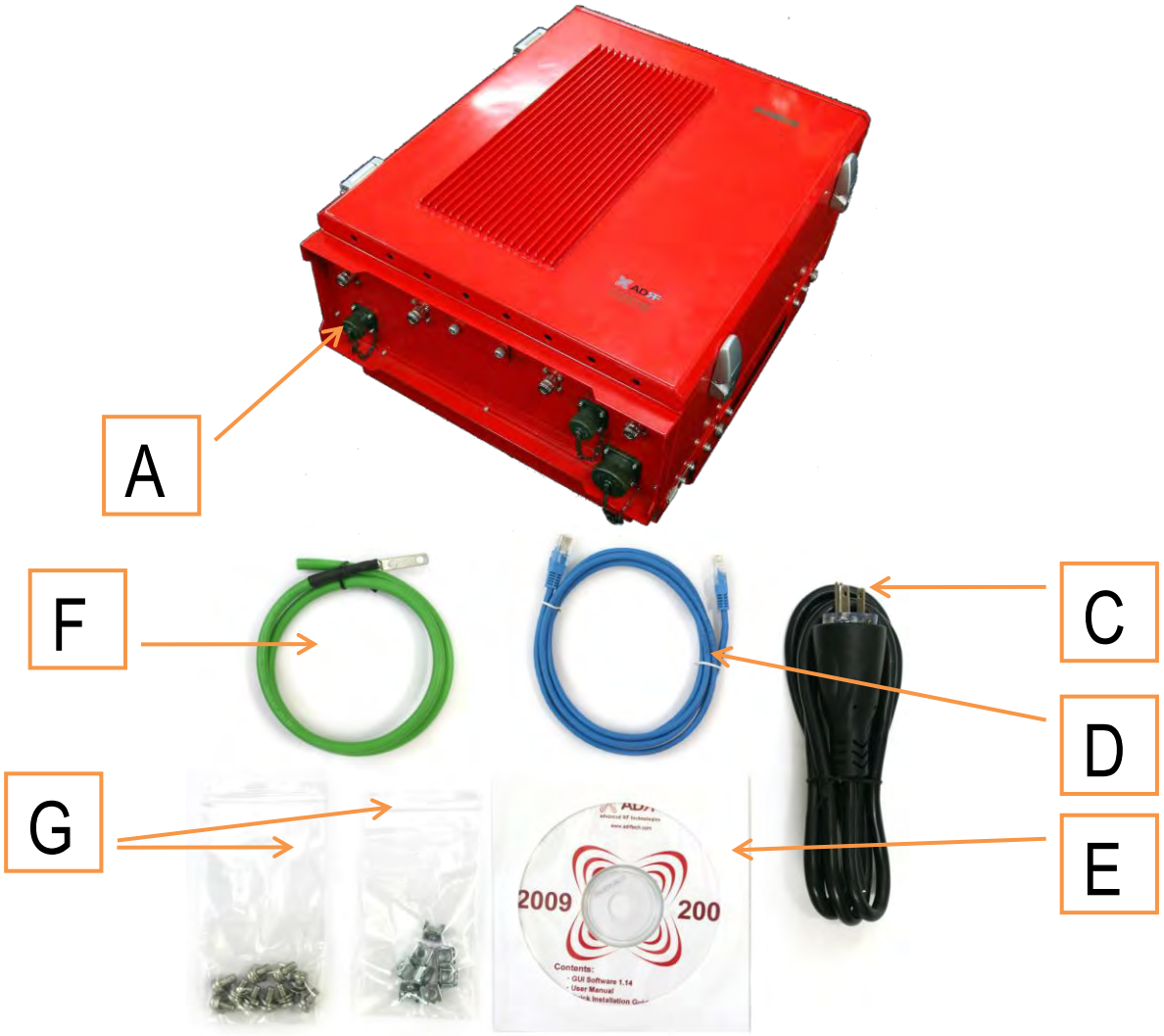
1.1.1 Highlights

- Supports up to 2 frequency bands simultaneously
    - Covers the entire 700 MHz Public Safety Frequencies (12 MHz)
    - Covers the entire 800 MHz Public Safety Frequencies (18 MHz)
- Composite Output Power of 30 dBm
- 30 dB AGC Range @ 0.5 dB Step
- Adjustable AGC Output Power Level
- Adjustable ALC Level
- Band Selectable via Web-GUI
- Can Support up to 6 total Non-Contiguous Bands
- External Alarming capabilities via dry contact AAI alarms
- Digital filtering
- Incremental Automatic Shutdown/Resumption Time: PSR78 gradually increases the time span between automatic shutdown and resumption before it permanently shuts itself down
- Versatility and Usability: PSR78 gives total control to the user. Most of the control parameters, e.g., gain, output power, alarm threshold, etc. can be changed using the Web-GUI so that the user can adjust the system perfectly to the given RF environment
- Web-GUI connectivity via DHCP
- Supports DHCP; No 3rd party GUI software required
- Automated installation

1.1.2 Parts List

Label	Quantity	Description
A	1	PSR78 Repeater
C	1	AC Power Cable
D	1	Ethernet Cable (Crossover)
E	1	Documentation CD**
F	1	Ground Cable
G	8	Rack Mount Bolt/Nut

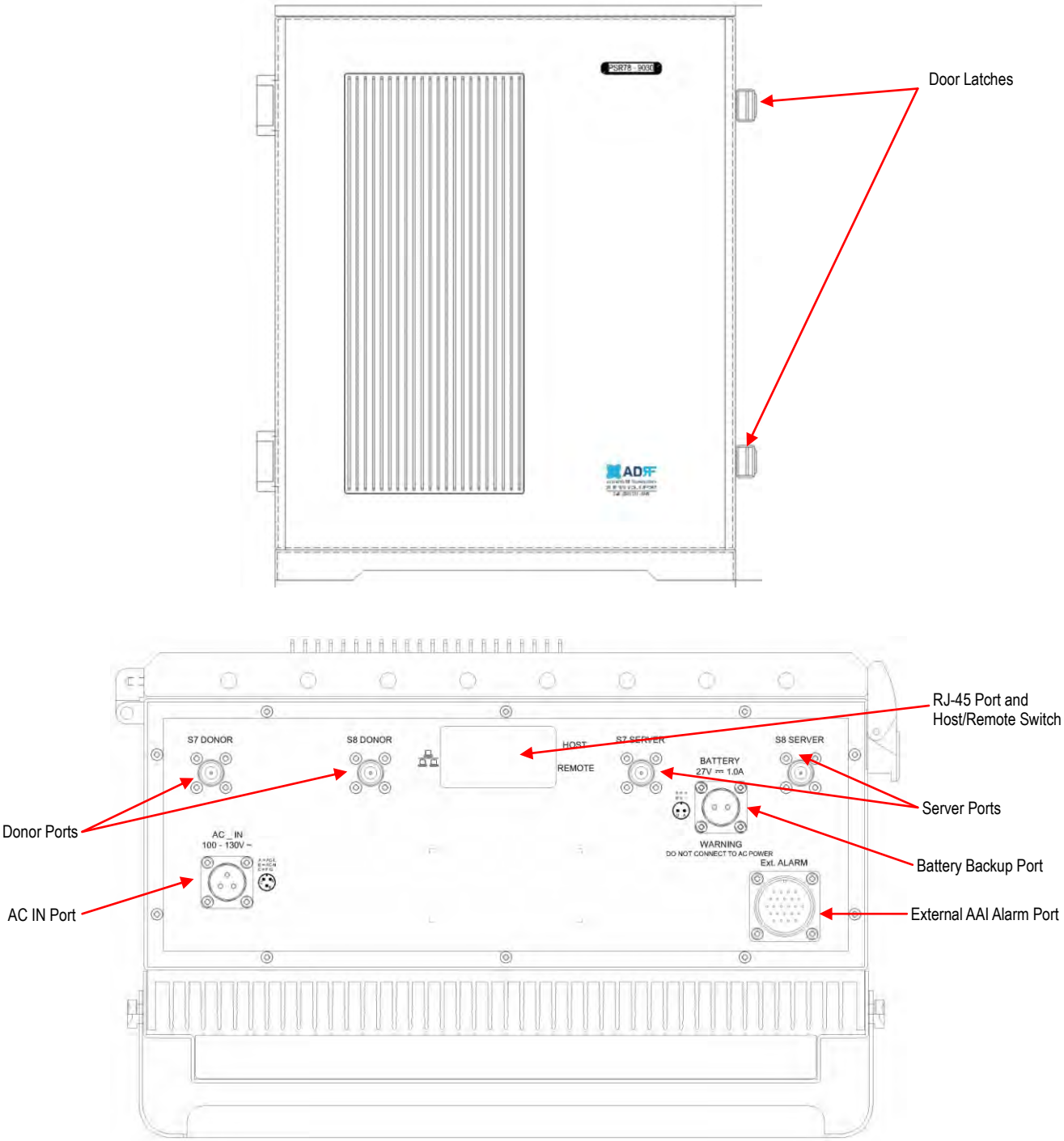
Table 1 – Parts List



*** CD includes: User Manual, Quick-Start Guide, and Troubleshooting Guide*

Figure A – PSR78 Repeater Parts List

1.1.3 Repeater Quick View



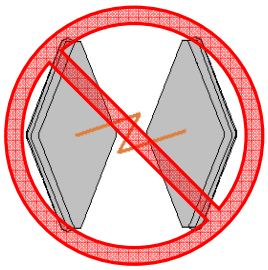
2. Warnings and Hazards

WARNING! ELECTRIC SHOCK

Opening the PSR78 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 Axiom 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 Axiom 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.

CAUTION

Double Pole/Neutral Fusing.

3. PSR78 Overview

3.1 Switches & Fault Indicators

3.1.1 LEDs

The PSR78 has 3 LED's located on inside of the repeater.

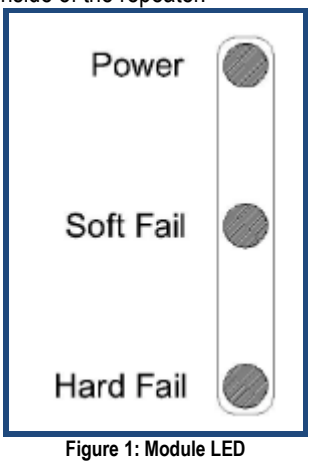


Figure 1: Module LED

PSR78		Specifications
Power	Solid Green	Module power is ON
	OFF	Module is powered OFF
Soft Fail	Solid Yellow	Soft Fail alarm exist in the system
	OFF	No Soft Fail alarm are present in the system
Hard Fail	Solid Red	Hard Fail alarm exist in the system
	OFF	No Hard Fail alarms are present in the system

3.1.2 Message Board Alarms and Notification

Parameters	Remark
AC fail	Power supply out of range
DC fail	Power supply out of range
Communication failure	Internal Communication failure
RMF	Field replaceable module failure
RESET	Reset alarm
Heartbeat	Heartbeat
OSC	Oscillation detected
UL RSSI fail	Power at coverage port too high
UL PLL fail	UL Synthesizer failure
H/W fail	Hardware failure
S/W fail	Software failure
UL Emission fail	UL Out-of-band emissions out of spec
DL RSSI fail	Donor Power too high/low
ISO fail	Low isolation
DL PLL fail	DL Synthesizer failure
DL Spur fail	DL Spurious emissions out of spec
Interfere	Interferer power exceeded

3.2 Switches and Ports

3.2.1 AC In Port

The AC In Port is designed to work with the power cable that is included with the system.

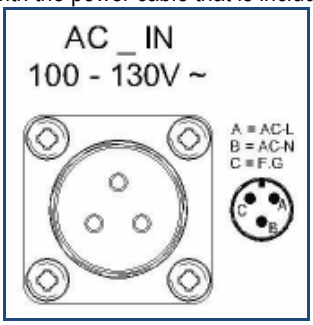


Figure 2: AC In Port

3.2.2 Battery Port

The PSR78 can be connected to an ADRF-BBU (ADRF Battery Backup) to provide power during a power failure. If an ADRF-BBU is utilized, connect the ADRF-BBU to the PSR78 via the external battery port as shown in Figure 4.

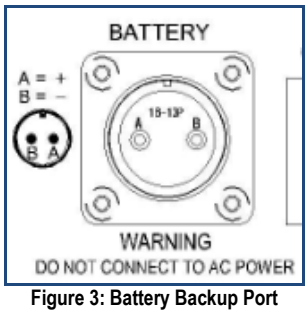


Figure 3: Battery Backup Port

(WARNING: The circuit switch on the ADRF-BBU must be set to OFF before connecting the ADRF-BBU to the PSR78 to prevent damage to the repeater 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.

3.2.3 Power Switch

The power switch is located on the inside of the repeater. Open the 2 latches on the side of the repeater to open the top cover. Once opened, the power switch is located on the bottom left of the power supply.

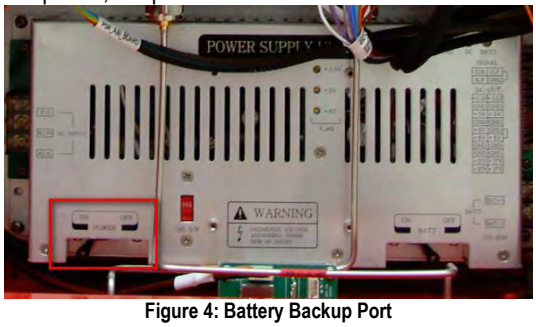


Figure 4: Battery Backup Port

3.2.3 Ethernet Port and Host/Remote Switch

The Ethernet Port and Host/Remote switch are located underneath the waterproof cover. Loosen the hand-screws and remove the cover to expose the Host/Remote switch and the Ethernet port to gain access to the system. Once the system is configured, it is recommended replace the cover and tighten the screws back into place.

Ethernet Port

The Ethernet port can be used to communicate directly with the PSR78 using a RJ-45 crossover cable or can also be used to connect the PSR78 to an external modem box.

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 adjusting by logging into the repeater in HOST mode and configuring the settings under the Modem Box Setting section on the Install Page (section 4.4). Once the settings are set, flipping the switch to the REMOTE position will reboot the repeater with the new alternate settings. *Please note that when the repeater is set to the REMOTE position DHCP is disabled and the repeater will not automatically assign an IP address to any device that connects directly to the repeater.*

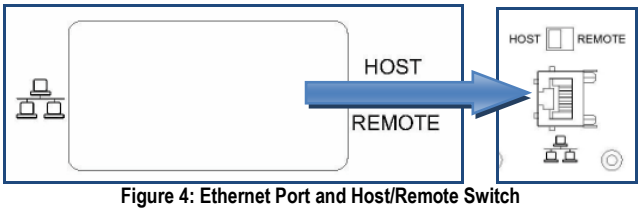


Figure 4: Ethernet Port and Host/Remote Switch

3.2.4 RF Ports

The donor and server antennas connect directly to the PSR78 using the ports listed below:

- S7 DONOR- 700 MHz Donor Antenna
- S8 DONOR- 800 MHz Donor Antenna
- S7 SERVER- 700 MHz Server Antenna
- S8 SERVER- 800 MHz Server Antennas

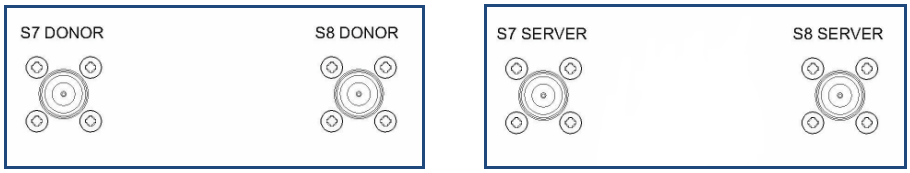


Figure 5: PSR78 RF Ports

3.2.5 Ext. ALARM Port

The PSR78 uses the open collector method. The Ext. Alarm port allows the PSR78 to send out dry contact AAI alarms to an alarming panel. The PSR78 can receive a voltage up to +24V on the "+" line.

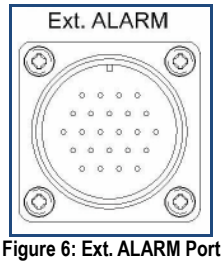


Figure 6: Ext. ALARM Port

3.5 Installation

3.5.1 Wall Mount Procedure

The wall-mounting bracket has six mounting holes which are used to mount the bracket to the wall. The wall bracket must be securely attached to the wall in order to support the weight of the PSR78. After mounting the bracket to the wall, the PSR78 is placed on the mounting bracket using the four guard screws attached to the PSR78.

The following steps should be followed while mounting the repeater:

① Take the PSR78 out of the box.
② Using the six anchor bolts, mount the bracket on the wall.
③ Make sure the bracket is securely mounted.
④ Slightly tilt the top portion of the repeater and mount the repeater onto the wall as shown in figure 4 in the illustrations below. Hook the upper 2 guard screws first and then slide/push in the lower 2 guard screws into place.
⑤ Make sure the PSR78 is securely placed onto the wall bracket.
⑥ Fasten the 8 bracket screws back properly on both sides.
⑦ Verify that the repeater is secure and properly grounded.

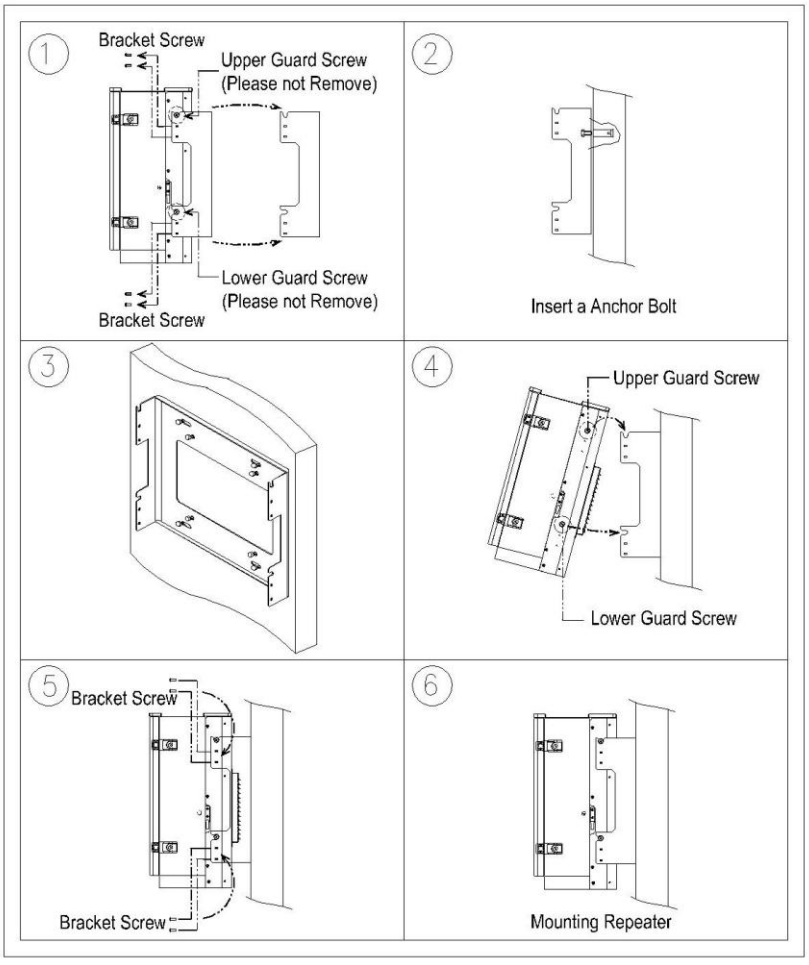


Figure 7: Wall Mount Instructions

3.5.3 Grounding

Install the ground cable which is included in the package on the side of the repeater as show in the figure below.

Figure 8: Wall Mount Instructions

3.5.4 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.

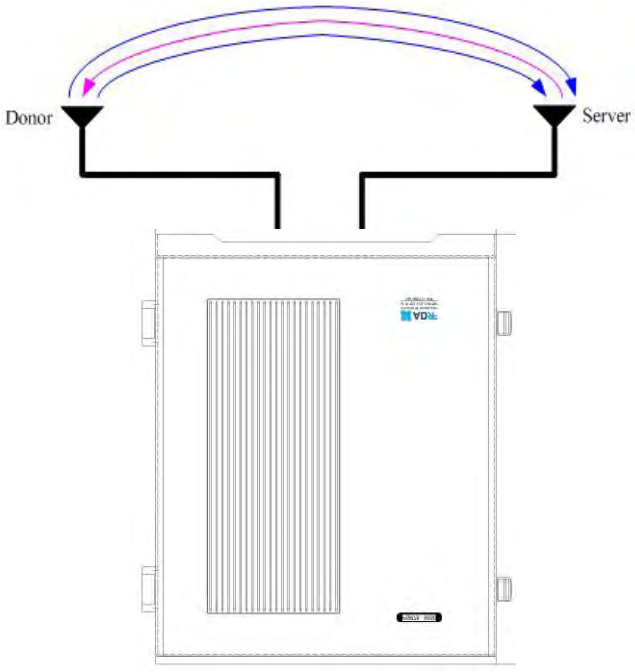


Figure 9: RF Repeater Oscillation

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, if the gain of the repeater is 50 dB, then an isolation of 63 ~ 65 dB or greater is required. In the same manner, because the PSR78 has a maximum gain of 90 dB, it requires an isolation of at least 103 ~ 105 dB.

3.5.5 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.

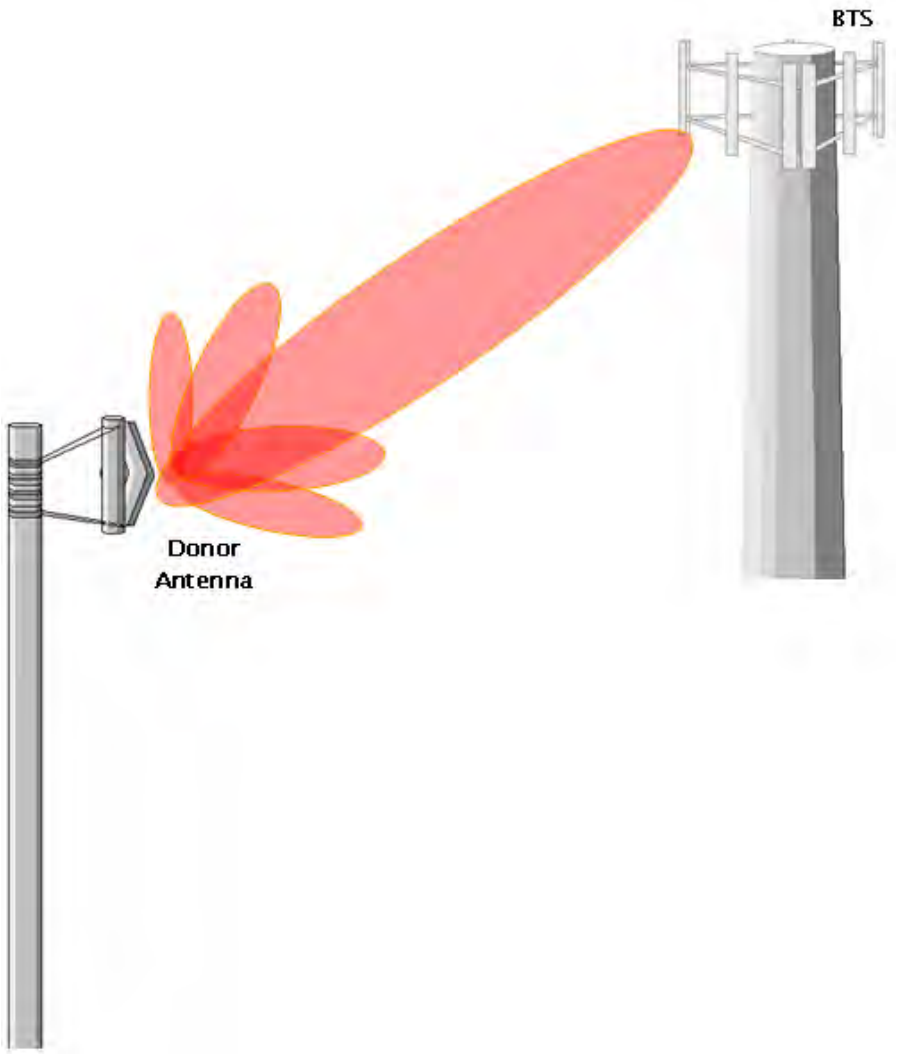


Figure 10 - Direct Line of Sight to the BTS

4. PSR78 Web-GUI Setup

The Web-GUI allows the user to communicate with the repeater either locally or remotely. To connect to the repeater locally, you will need a laptop with an Ethernet port and a RJ-45 crossover cable. To connect to the repeater remotely, you will need to have an active internet connection and the repeater must have either an internal modem or an Omnibox (ADRF Modem Box) connected to the repeater.

4.1 Repeater/PC Connection Using Web-GUI

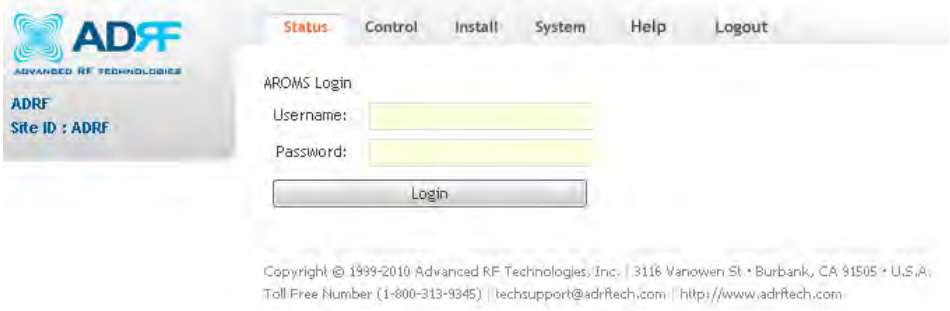
A. Verify that your Local Area Connection is set to Obtain an IP address automatically under the Internet Protocol (TCP/IP) properties
   - If you are connecting to the unit remotely, then skip steps A and B.

B. Connect the RJ-45 crossover cable between the laptop's Ethernet port and the repeater's Ethernet port

C. Launch an Internet Browser

D. 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

E. The following login screen will appear:

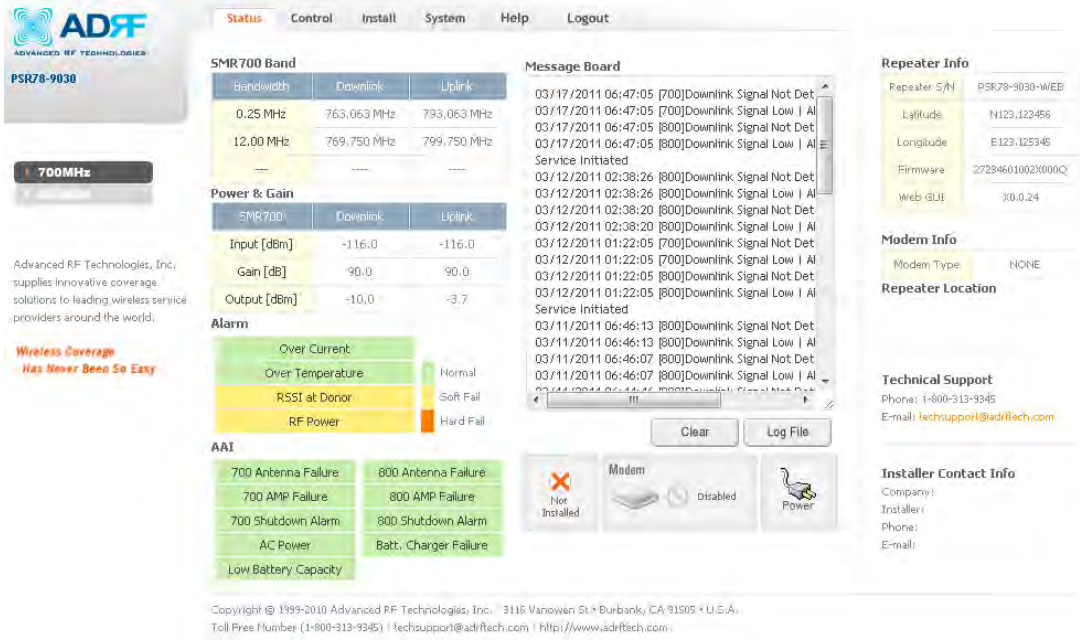


If you are not the Administrator, please type in your assigned username & password which you should have received from the Administrator.

The default username and password for the General User is adrf & adrf, respectively.

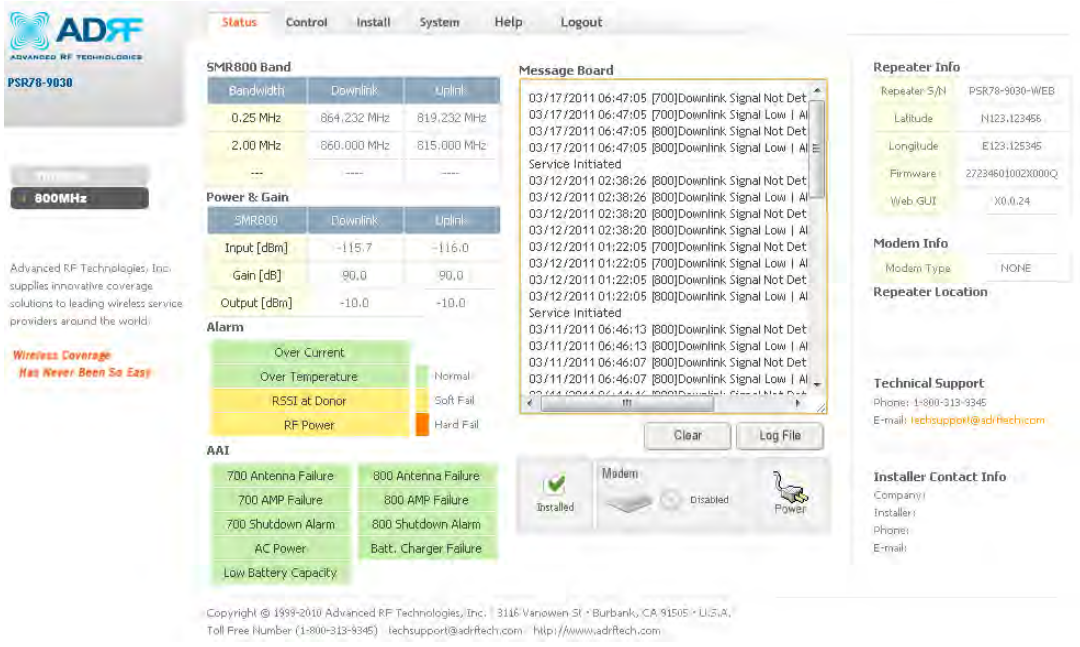
4.2 Status Tab

4.2.1 Status- 700 MHz



Status- 700 MHz

4.2.2 Status- 800 MHz



4.2.3 Side Navigation Bar

The side navigation bar located on the left hand side of the Web-GUI allows the user to switch between the two technolgies supported by the system.

4.2.4 SMR700 Band / SMR800 Band

SMR700 Band

Bandwidth	Downlink	Uplink
0.25 MHz	763.063 MHz	793.063 MHz
12.00 MHz	769.750 MHz	799.750 MHz
---	----	----

SMR800 Band

Bandwidth	Downlink	Uplink
0.25 MHz	864.232 MHz	819.232 MHz
2.00 MHz	860.000 MHz	815.000 MHz
---	----	----

The band column displays the bandwidth that has been selected. The downlink column displays the center frequency of the selected band. The uplink column displays the center frequency of the selected band.

4.2.5 Power & Gain

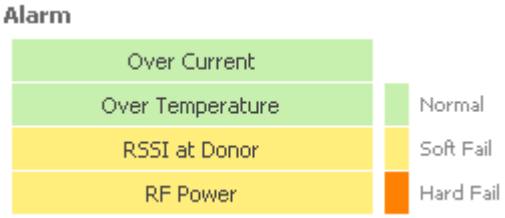
This section displays the Input, Gain, and Output for both downlink and uplink.

Power & Gain

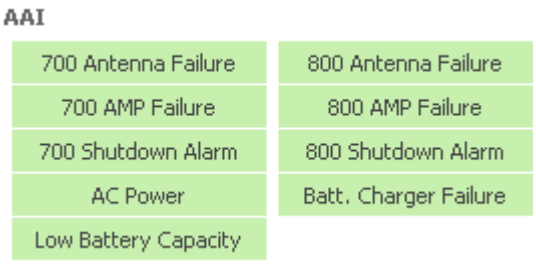
SMR800	Downlink	Uplink
Input [dBm]	-115.7	-116.0
Gain [dB]	90.0	90.0
Output [dBm]	-10.0	-10.0

4.2.6 Alarm

This section displays the four (4) alarms statuses with three possible status conditions (Normal, Soft Fail or Hard Fail).



4.2.7 AAI

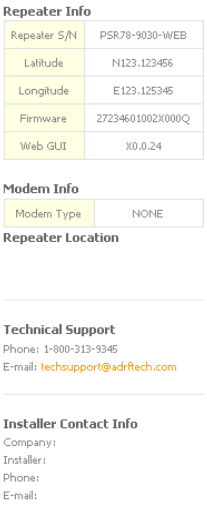


4.2.8 Message Board

Displays the recent system events for both the 700MHz and 800MHz sides.

- **Clear**: Clears the content that is currently being displayed on the Message Board
- **Log File**: Downloads the system Log File (events and alarms) to your computer

4.2.9 Repeater Info / Modem Info / Technical Support / Installer Contact Info



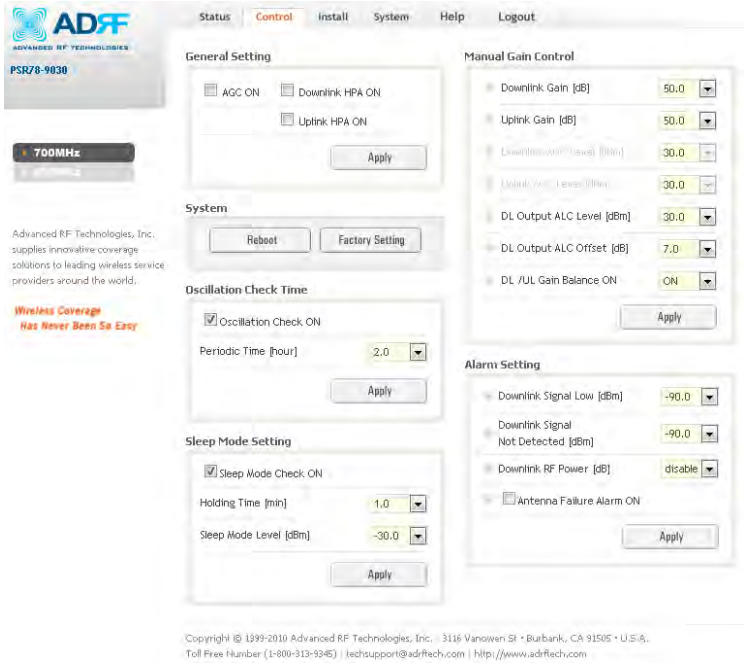
- *Repeater Info*- Displays the serial number, latitude, longitude, and firmware version of the repeater
- *Modem Info*- If an internal modem is present, the modem information appears in this section
- *Technical Support*- Displays ADRF's Technical Support contact information
- *Installer Contact Info*- Displays the contact information of the installer

4.2.10 Install, Modem, and Power Status

- **Installation**: Displays whether or not the installation routine has been run (Not Installed or Installed)
- **Modem**: Displays the status of the modem
  - Disabled- No internal modem is present
  - Not Connected- Internal modem is detected, but no connection to the network has been established
  - Connected- Internal modem is detected and a connection to the network has been established
- **Power**: Displays the power source that is currently being used

4.3 Control Tab

4.3.1 Control



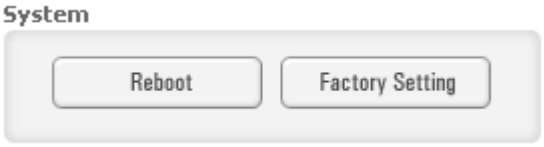
Control- 700 MHz / 800 MHz

4.3.2 General Setting

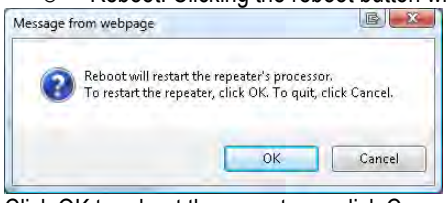
- **AGC ON**: Enables or disables AGC (Automatic Gain Control)
- **Downlink HPA ON**: Enables or disables the DL HPA
- **Uplink HPA ON**: Enables or disabled the UL HPA

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

4.3.3 System

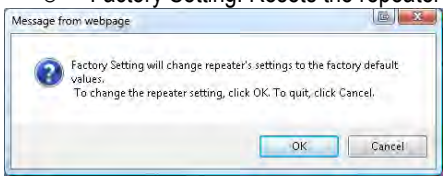


- Reboot: Clicking the reboot button will have the following popup show up:



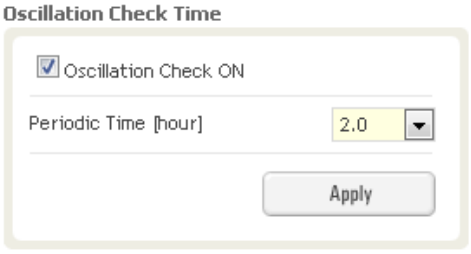
Click OK to reboot the repeater or click Cancel to exit out

- Factory Setting: Resets the repeater to the original factory settings



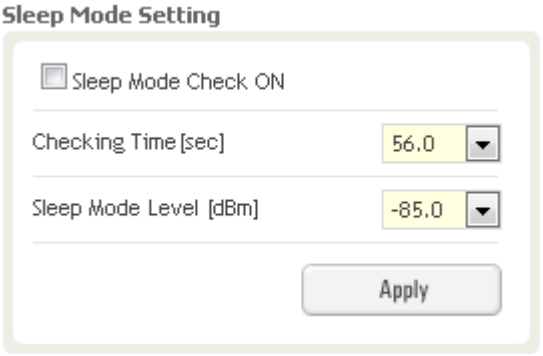
4.3.4 Oscillation Check Time

This section allows the user to enable or disable the oscillation check feature and also specify the time interval at which the repeater checks for oscillation.

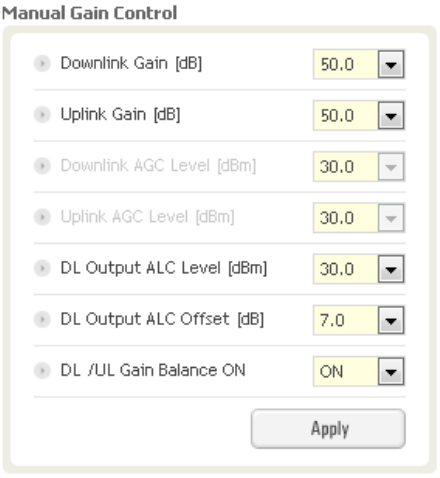


4.3.5 Sleep Mode Setting

Sleep mode function is designed to power off the UL HPA when there is no UL traffic. To enable Sleep Mode, click on the check box next to "Sleep Mode Check ON" and click on the Apply button. The user can specify the Idle time and the Sleep Mode Level from this page. If the signal drops below the Sleep Mode Level for the specified amount of Idle time, then the UL HPA will shut off.

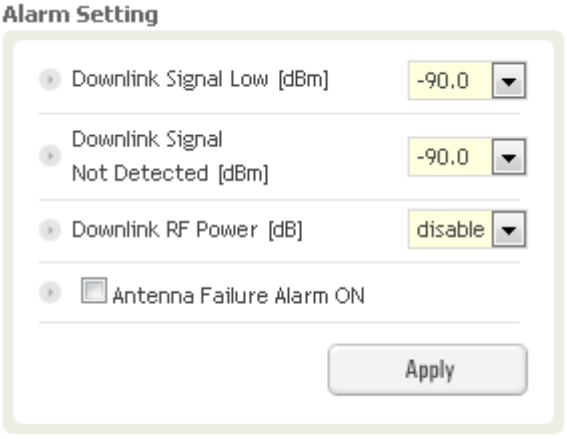


4.3.6 Manual Gain Control



- **Downlink Gain**: Allows the DL gain to be adjusted manually when AGC is OFF
- **Uplink Gain**: Allows the UL gain to be adjusted manually when AGC is OFF
- **Downlink AGC Level**: Allows the user to set the DL gain when AGC is enabled
- **Uplink AGC Level**: Allows the user to set the UL gain when AGC is enabled
- **DL Output ALC Level**:
- **DL Output ALC Offset**:
- **DL /UL Gain Balance ON**:

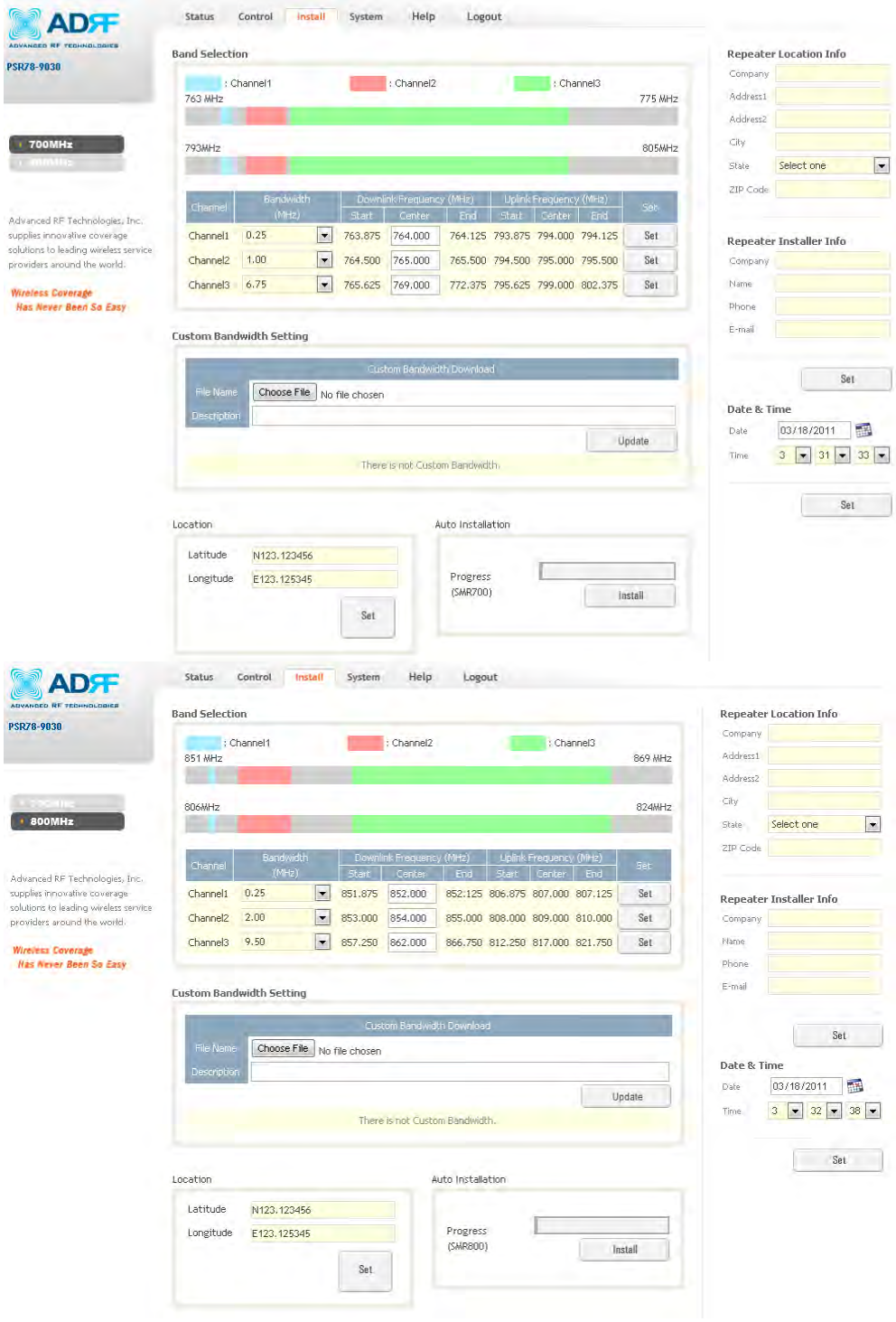
4.3.7 Alarm Setting



- **Downlink RSSI**: Allows the user to specify the how weak the signal can be before triggering a "RSSI at Donor" soft-fail alarm
- **Downlink RF Power**: Allows the user to set a maximum deviation value for the downlink RF power
  - For example, if the input signal is -50 dBm and the gain is set to 60 dB, the expected output power should be 10 dBm. If the Downlink RF Power alarm value is set to 6dB, then if the output power is below 4 dBm, then this will trigger a soft-fail alarm

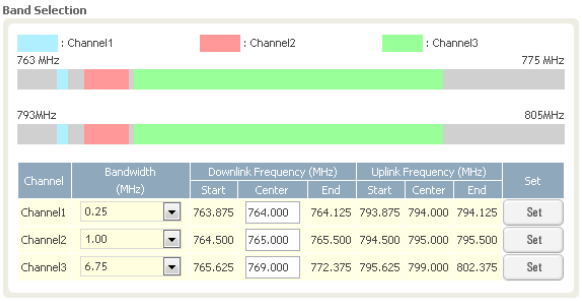
4.4 Install Tab

4.4.1 Install- 700MHz / 800 MHz



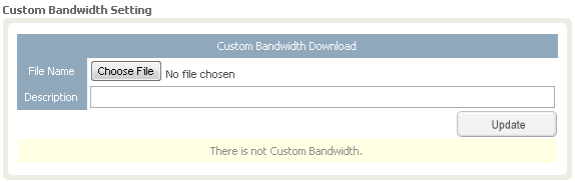
4.4.1.1 Bandwidth Selection

This section allows the user to specify the desired bandwidths and frequencies ranges to be amplified. First select the desired bandwidth from the dropdown menu in the Bandwidth column. Next, input the center frequencies of the desired frequencies and click the Set button. Once the Set button is pressed, desired frequencies will be highlighted in the frequency table.



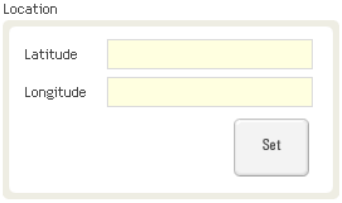
4.4.1.2 Custom Bandwidth Setting

This section allows the user to download custom filter bandwidth. The PSR78 supports bandwidths selections in 250 KHz steps. If there are any special applications that require custom bandwidth, please contact our Sales department.



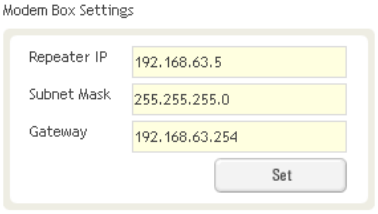
4.4.1.3 Location

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



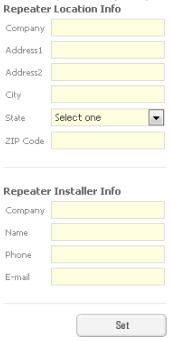
4.4.1.4 Modem Box Settings:

This section allows the user to specify an alternative Repeater IP, Subnet Mask, and Gateway settings. These settings are enabled when the Host/Remote switch is set to the Remote position. When the Host/Remote switch is changed, the repeater will reboot and will result in a temporary loss in coverage.



4.4.1.5 Repeater Location Info / Repeater Installer Info

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



4.4.1.5 Date & Time

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

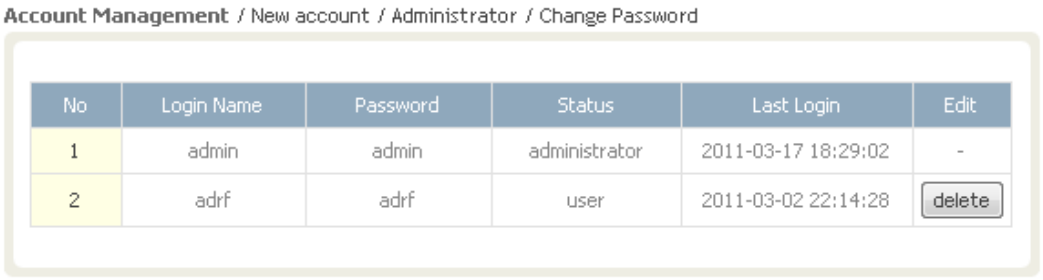
4.5 System

The System tab allows the user to perform firmware updates, add/remove user accounts, and change the login credentials of the Administrator.

4.5.1 System: Account

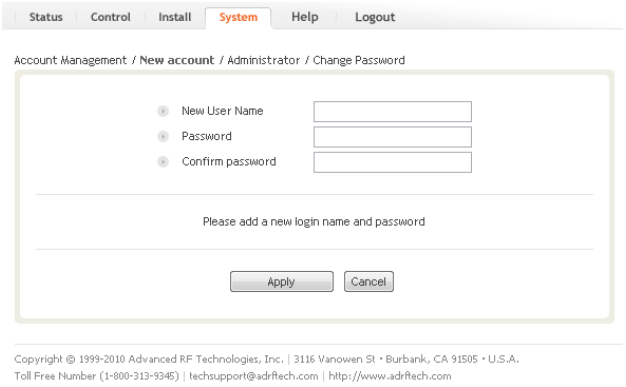
4.5.1.1 System: Account Management

The Account Management section will allow the Administrator to delete any user 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 account click on the Account Management link and under the Delete column, click on the delete button.



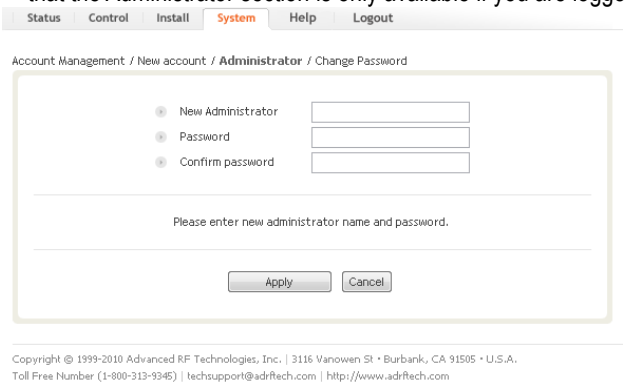
4.5.1.2 System: New Account

The New account section allows the Administrator to create a new user 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 account click on the New account link and fill in the fields highlighted in yellow as shown below.



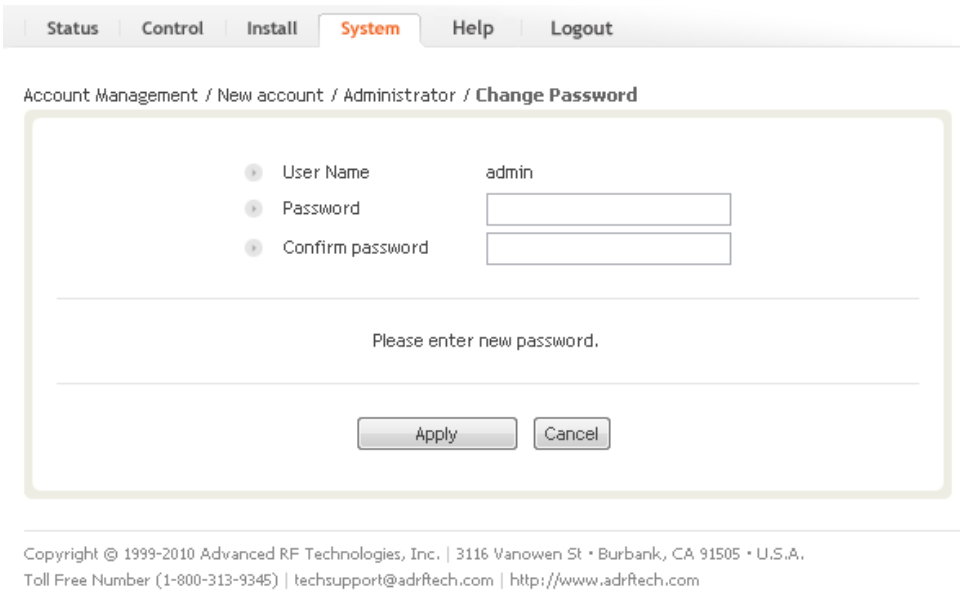
4.5.1.3 System: Administrator

The Administrator section allows the Administrator to create additional Administrator accounts. Please note that the Administrator section is only available if you are logged into the system as the Administrator.



4.5.1.4 System: Change Password

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



4.5.2 System: User Log

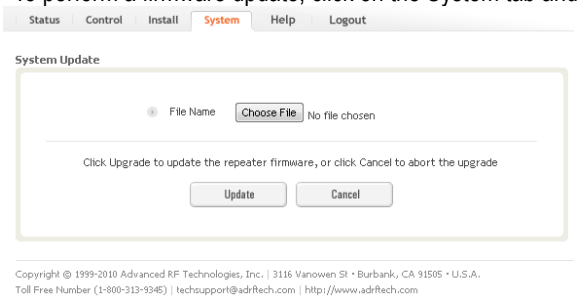
This section displays all the system activities that have taken place in the repeater along with the account associated with that event.

User Log

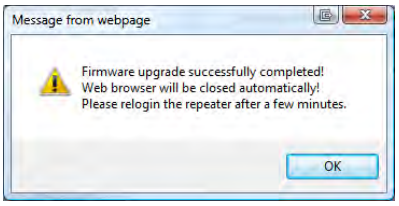
Number	Date	Username	Log Message
1	02/18/2011 17:59:22	admin	Downlink RF Power [dB]Level Set 6.0
2	02/18/2011 17:59:22	admin	Downlink Signal Not Detected Level Set -90
3	02/18/2011 17:59:22	admin	Downlink Signal Low Level Set -89
4	02/18/2011 17:58:59	admin	Downlink RF Power [dB]Level Set 9.0
5	02/18/2011 17:58:59	admin	Downlink Signal Not Detected Level Set -90
6	02/18/2011 17:58:59	admin	Downlink Signal Low Level Set -89
7	02/18/2011 17:58:57	admin	Downlink RF Power [dB]Level Set -1.0
8	02/18/2011 17:58:57	admin	Downlink Signal Not Detected Level Set -90
9	02/18/2011 17:58:57	admin	Downlink Signal Low Level Set -89

4.5.3 System: Update

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



- Click on the Choose File… button and locate the firmware file
- Click on the Upload button to perform the firmware update
- Once the firmware update is complete, the following popup message will appear:



4.6 Help

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

4.7 Logout

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

5. Maintenance Guide for PSR78 Repeater

5.1 Periodic Inspection Checklist

a) Check for loose connections between the repeater and antennas. If connections are loose, make sure that all connections are tightly fastened properly.
b) Cables and connectors are in good condition.
c) Ensure that the repeater brackets are in good. condition and that the repeater is securely fastened

5.2 Preventive Measures for Optimal Operation

5.2.1 Recommendations

- Perform the *Periodic Inspection Checklist* quarterly or semi-annually.

5.2.2 Precautions

- Do not operate the repeater with the antennas in extremely close proximity to one another as this may cause damage to the repeater.
- Do not change the 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 is necessary.

6. Warranty and Repair Policy

6.1 General Warranty

The PSR78 carries a Standard Warranty period of two (2) years unless indicated otherwise on the package or in the acknowledgment of the purchase order.

6.2 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.

6.3 Limitation of Damages

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

6.4 No Consequential Damages

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

6.5 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.

6.6 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@adrftech.com.

7. Specifications

7.1 Electrical Specifications

Parameters		Specifications	Remark
Frequency	SMR700 UL	793 ~ 805MHz (BW: 12MHz)	
	SMR700 DL	763 ~ 775 MHz (BW: 12MHz)	
	SMR800 DL	851 ~ 869 MHz (BW: 18MHz)	
	SMR800 UL	806 ~ 824 MHz (BW: 18MHz)	
Port		2Donor, 2Server	
Composite Output Power		+36 dBm	700 + 800 MHz
Gain Ripple	DL / UL	≤±1.5 dB p-p	700 + 800 MHz
Gain (DL / UL)	Maximum	90 dB	
	Range	30 dB	
	Step	0.5 dB	
	Tolerance	≤1 dB	
Input	SMR700 UL	-60 ~ -30dBm	
	SMR700 DL	-60 ~ -30dBm	
	SMR800 DL	-60 ~ -30dBm	
	SMR800 UL	-60 ~ -30dBm	
Channel Type		Public Safety Multiple Channel	
Modulation Type		iDEN	
Roll Offs	DL / UL	≥65 dBc	@ 0.5 MHz outside pass band
Adjustable Band Edge	SMR700 DL/UL	Resolution: 250kHz (Filter Download function.)	250 kHz steps Size.
	SMR800 DL/UL		
OIP3	DL / UL	≥ 50 dB	@ Gain 90 dB/60 dB
IMD	DL / UL	≥ 40 dBc @ +30dBm total. Max Output Power @ 2Tone/1MHz	At least FCC Rule (-13dBm)
VSWR	DL / UL	≤ 1.5: 1	
RF Spurious Emission	DL / UL	≤ -13 dBm	
Noise Figure	UL	≤ 5 dB @max gain	(UL-Only)
Delay	DL / UL	≤ 8 us@ Standard Product.	Special Request It will be increase.
Impedance		50 Ohms	

7.2 Mechanical Specifications

Parameters	Specifications	Remark
Dimension	17.9 X 22.5 X 12.3 inches	Mount bracket excluded
Weight	< 92 lbs	Mount bracket excluded
RF Ports	N-type (F)	Donor & Server Antenna Ports
Local Interface	RJ45 (DHCP)	
Cooling	12V FAN	2EA
IP Class	NEMA 4	Outdoor Type
Mounting Type	Wall Mounting	
Color	Red	

7.3 Power Specifications

Parameters	Specifications	Comments
AC Power	120 AC	
AC Frequency	45 ~ 65 Hz	
AC Supply Protection	Fuse	
DC Power Option	-40 ~ -60 V / +20 ~ 30 V	
Power Consumption	≤ 250 W	
Ground	External Threaded Stud	

7.4 Environment Specifications

Parameters	Specifications	Remark
Operating Temperature	-10 ~ +50 C°	Ambient
Relative Humidity	5 ~ 95 %, non-condensing	

7.5 Alarm Specification

No	Parameters	Specifications	Display
1	Synthesizer Lock	PLL Fail	Web GUI
2	RF Power Alarm	Internal Amp Fail	Web GUI
3	DSP Fail	DSP Alarm	Web GUI
4	700 Antenna Malfunction	VSWR Alarm	Web GUI Dry Contact
5	800 Antenna Malfunction	VSWR Alarm	Web GUI Dry Contact
6	700 Signal Booster Failure	Synthesizer Lock, DSP Fail.	Web GUI Dry Contact
7	800 Signal Booster Failure	Synthesizer Lock, DSP Fail.	Web GUI Dry Contact
8	700 Shut Down alarm	Hard Fail Alarm	Web GUI Dry Contact
9	800 Shut Down alarm	Hard Fail Alarm	Web GUI Dry Contact
10	Power Supply supervisory Alarm	Loss of normal AC Power	Web GUI Dry Contact
11		Failure of battery charger.	Web GUI Dry Contact
12		Low Battery Capacity	Web GUI Dry Contact

Appendix A: Mechanical Drawing

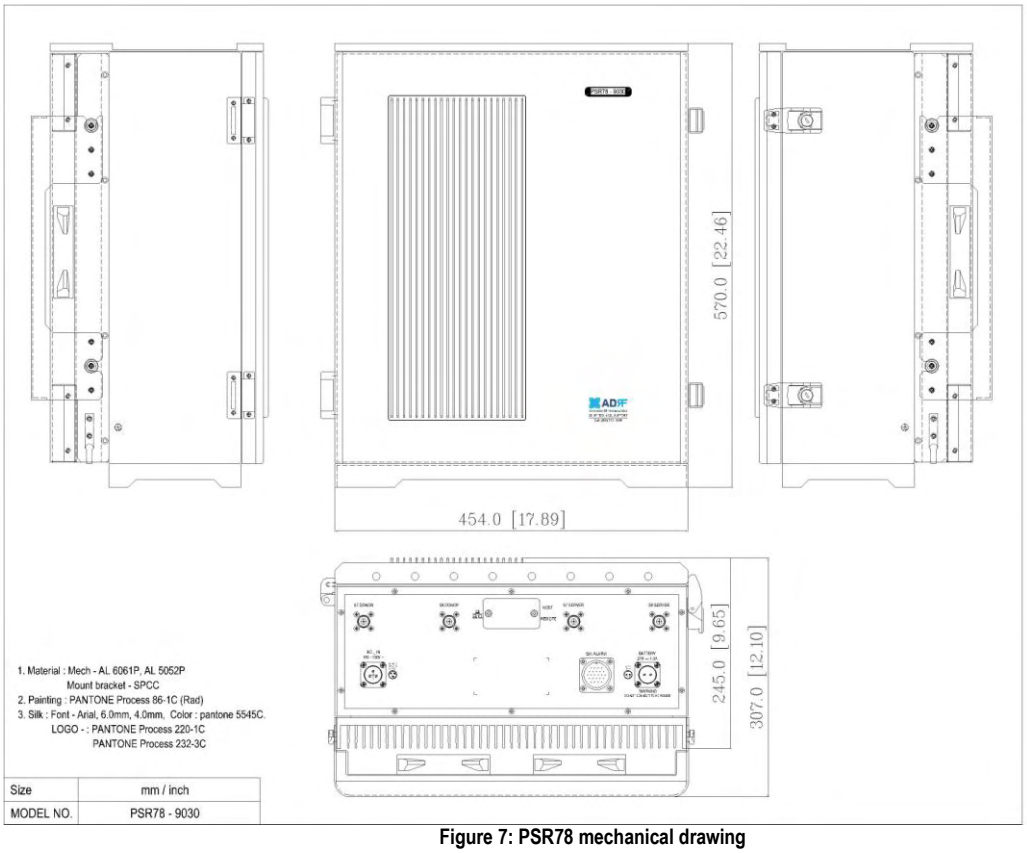


Figure 7: PSR78 mechanical drawing

Appendix B: Shutdown Retry Logic

The function of the built-in shutdown routine is to protect the repeater from any further damage from a hard-fail that the system may be experiencing.

Within 5 seconds of a hard-fail alarm being detected, the repeater will start the shutdown routine. The repeater will shut down by powering of the HPAs (high-powered amplifiers) for 30 seconds.

After 30 seconds have elapsed, the repeater will power on the HPAs and check to see if the hard-fail alarm still exist. If the hard-fail alarm still exists, then the repeater will shut down for 1 minute (double the time of the previous shutdown time).

After 1 minute has elapsed, the repeater will power on the HPAs and check to see if the hard-fail alarm still exist. If the hard-fail alarm still exists, then the repeater will shut down for 2 minutes (double the time of the previous shutdown time).

The shutdown routine will repeat itself a total of 10 times. If the hard-fail alarm still exists after the 10th retry, then the repeater will turn on its HPAs permanently until a reset is performed.