SDR Modular Repeater User Manual

Version 0.9

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Revision History

Version	Author	Descriptions	Date
0.1	Sun Kim	Initial Release	January 18, 2011
0.2	Sun Kim	Revised max gain levels for SMR module	May 10, 2011
0.3	Sun Kim	Revised Band Selection section on the Install Page	July 15, 2011
0.4	Sun Kim	Update illustrations and changes to specifications; added Closeout Package, User Log, and Backup sections	July 19, 2011
0.5	Sun Kim	Added frequency table information	September 13, 2011
0.6	Sun Kim	Updated SDR front view illustration that shows the removal of modem module	September 23, 2011
0.7	Sun Kim	Added 700 MHz, Cellular, and AWS	December 1, 2011
0.8	cck	Added SDR-33-BTF	November 14, 2019
0.9	cck	Added SDR-33-700F/C/P	June 05,2020

Change List

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Terms and Abbreviations

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

Abbreviation/Term	Definition
AGC	Automatic Gain Control
ALC	Automatic Level Control
AROMS	ADRF' Repeater Operation and Management System
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

1. INTRODUCTION

Up to four technologies in one body: SDR is an over-the-air repeater system that can incorporate up to four (4) technologies in one body. Current supported technologies are 3 bands (Low700MHz, Upper 700, Cellular 800 and PCS 1900).

1.1 Highlights

- Supports up to 4 frequency bands simultaneously
  - Available modules include:
    - 700 MHz Covers any combination of Lower and Upper
    - Cellular 800 covers the 25 MHz band
    - PCS- Covers 65 MHz
      - 3 independent RF PCS channels, each channel supports 1.25 to 18.75 MHz bandwidth
- Composite Output Power of 33 dBm
- 30 dB AGC Range @ 0.5 dB Step for SMR
- 40 dB AGC Range @ 0.5dB Step for Low700MHz, Upper 700, Cellular 800 and PCS 1900
- Adjustable AGC Output Power Level
- Adjustable ALC Level
- Band Selectable via Web-GUI
- Supports Network Management Monitoring System via SNMP
- Digital filtering
- Incremental Automatic Shutdown/Resumption Time: SDR gradually increases the time span between automatic shutdown and resumption before it permanently shuts itself down
- Versatility and Usability: SDR 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
- Adjustable center frequencies by 1KHz step

1.2 Parts List

Table 1-1 Parts List

Label	Quantity	Description
SDR-NMS		
A	1	SDR Network Management System (NMS)
B	1	AC Power Cable
C	1	Ethernet Cable (Crossover)
D	1	NMS Power Cable
E	6	Anchor Bolt
F	1	Ground Cable
G	1	Documentation CD**
SDR-Modules		
J	Up to 4*	Optional SDR Modules*
K	Up to 4*	Module Data Cable
SDR-CHC		
L	1	SDR-CHC
M	6 or 8	RF Jumper Cables
N	1	50 Ohm Terminator (placed on Server Wifi port)
O	1	Chassis Mounting Kit

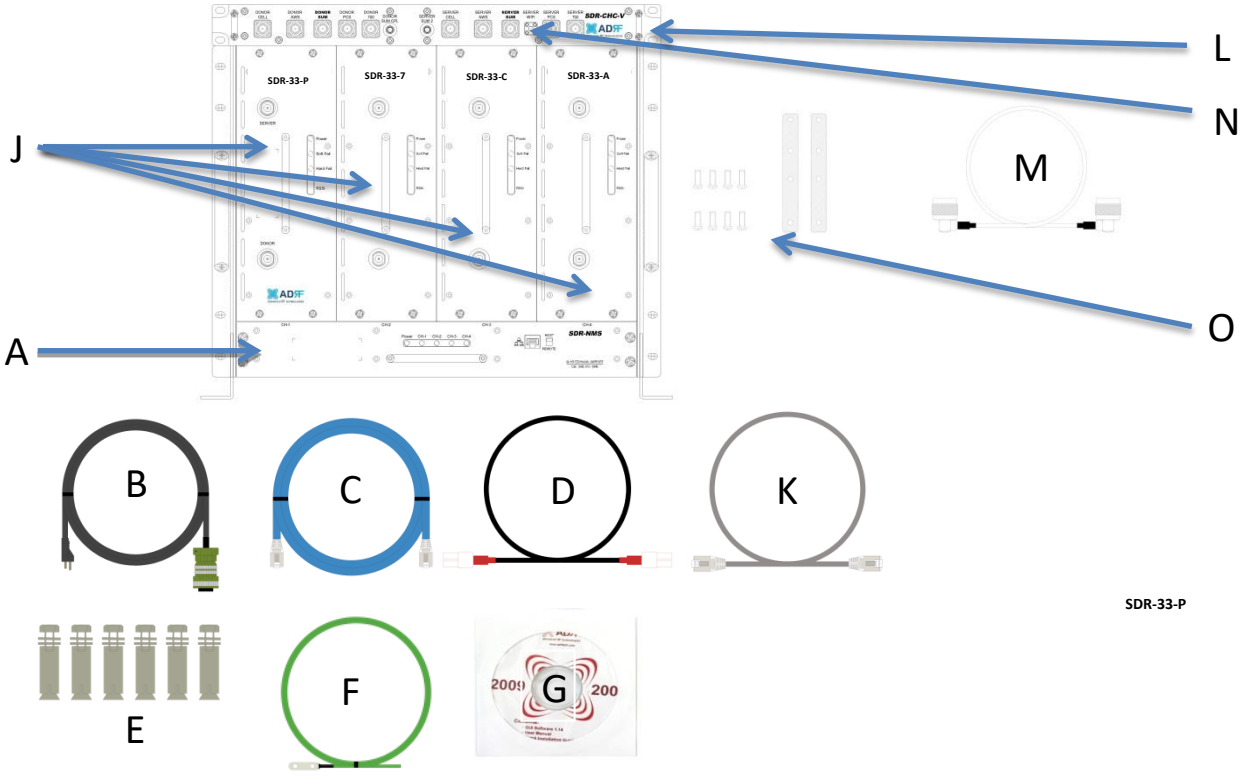


Figure 1 SDR Repeater Parts List

**** At least 1 module must be present in order to use SDR***
***** CD includes: User Manual, Quick-Start Guide, and Troubleshooting Guide***

1.3 Repeater Quick View

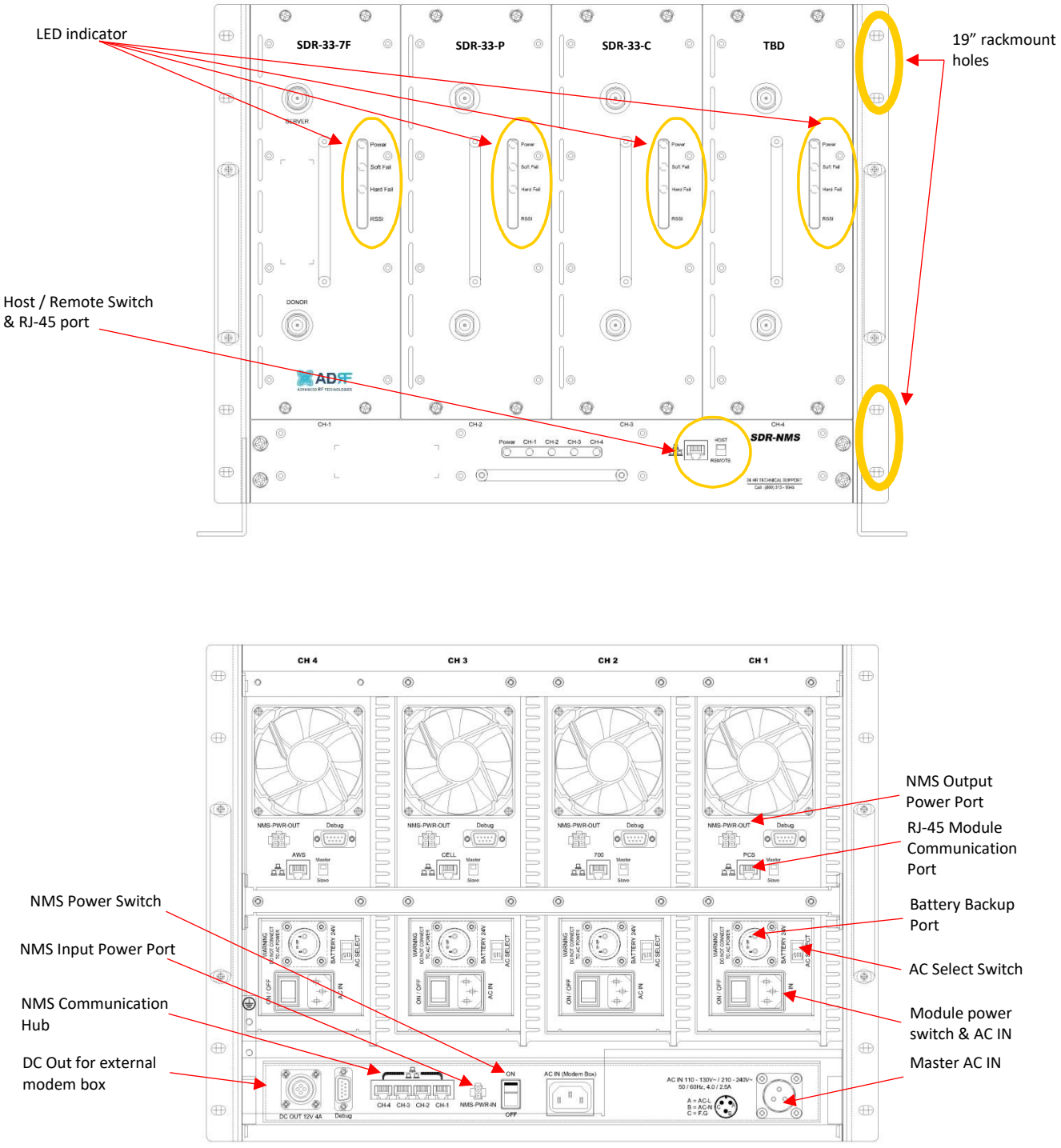


Figure 2 Repeater Quick View

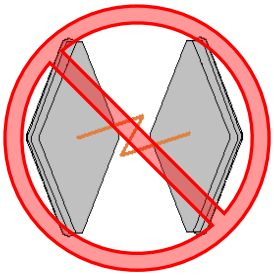
1.4 Warnings and Hazards

WARNING! ELECTRIC SHOCK

Opening the SDR 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 SDR 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 370 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 SDR 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.

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.

Preclude indications that Home/ personal use are prohibited.
Use of unauthorized antennas, cables, and/or coupling devices not conforming with ERP/EIRP is prohibited.

Part 15.21

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

WARNING: This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISED licensee. You MUST have an ISED LICENCE or the express consent of an ISED licensee to operate this device.

RSS-GEN, Sec. 7.1.2 – (transmitters)
Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionneravec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention desautres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotroperayonnée quivalente (p.i.r.e.) ne dépassepas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

RSS-GEN, Sec. 7.1.2 – (detachable antennas)
This radio transmitter (identify the device by certification number, or model number if Category II)has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste,ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

RF Radiation Exposure
This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 370 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. RF exposure will be addressed at time of installation and the use of higher gain antennas require larger separation distances.

L'antenne (ou les antennes) doit être installée de façon à maintenir à tout instant une distance minimum de au moins 370 cm entre la source de radiation (l'antenne) et toute personne physique. Cet appareil ne doit pas être installé ou utilisé en conjonction avec une autre antenne ou émetteur.

2. OVERVIEW FOR EACH MODULE

2.1 NMS

2.1.1 LEDs

SDR has LEDs on the front of the NMS as shown below in Figure 3.

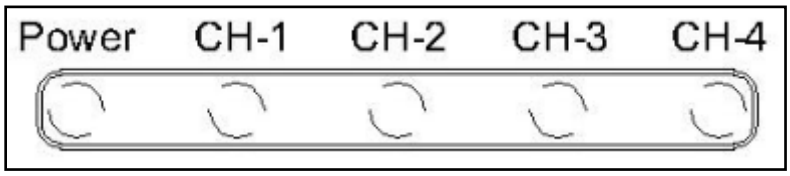


Figure 3 NMS LED

Table 2-1 NMS LED Specifications

SDR-NMS		Specifications
Power	Solid Green	NMS power is ON
	OFF	NMS is powered OFF
CH-1, CH-2, CH-3, CH-4	Solid Green	Module has communication with NMS
	Solid Red	Module has a communication failure with NMS
	OFF	Module is powered OFF

2.1.2 Ethernet Port and Host/Remote Switch

2.1.2.1 Ethernet Port

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

2.1.2.2 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 repeater in HOST mode and configuring the settings under the Modem Box Setting section on the Install Page (section 5.4.1.3).

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.*

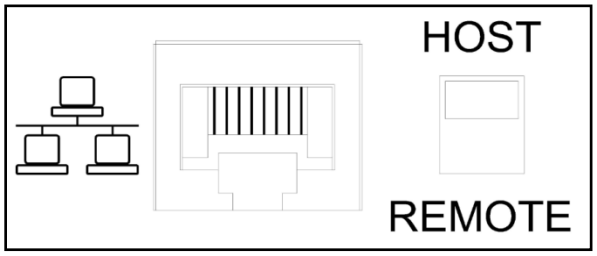


Figure 4 Ethernet Port and Host/Remote Switch

- 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)

2.1.3 DC Power Port & Debug Port.

- DC Power Port- The DC Power Port can be used to provide power to the optional External Modem Box (ADRF OmniBox, SymBox)
- Debug Port- The debug port is used for ADRF testing purposes only.

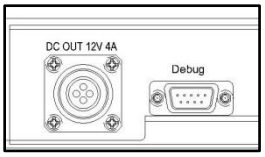


Figure 5 Debug Port

2.1.4 Communication Port & NMS Power Port

- Communication Port- These RJ-45 ports are used to connect the SDR-NMS to the SDR modules using the included RJ-45 cables.

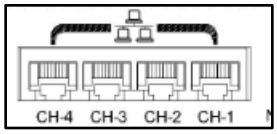


Figure 6 Communication Port

Note: Each module must be plugged into the corresponding port number on the SDR-NMS in order for the NMS to properly detect the modules.

2.1.5 NMS Power Port & Power Outlet for Channel Card

- NMS-PWN-IN (NMS power input)- The NRS-PWN-IN port is used to power the SDR-NMS. The 2-pin cable connects to the any one of NMS-PWR-OUT ports on the SDR modules. The NMS power can be used to power on/off the SDR-NMS.
- Power for RF Module- Connect the AC power cables to the SDR modules

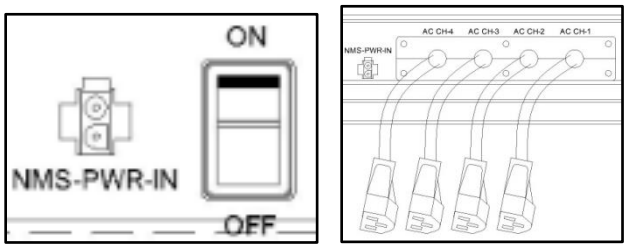


Figure 7 NMS Power Port & Power Outlet for Channel Card

2.1.6 Master AC outlet

Connect the Master AC In from the chassis to an AC Outlet.

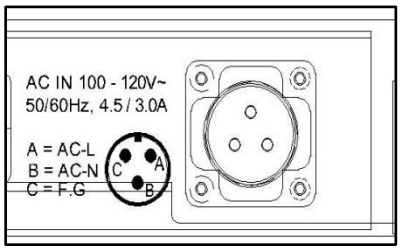


Figure 8 Main AC Outlet

- The socket-outlet shall be installed near the equipment and shall be easily accessible.
- This power of this system shall be supplied through wiring installed in a normal building.
- If powered directly from the mains distribution system, it shall be used additional protection, such as overvoltage protection device.

2.2 RF Module

2.2.1 LEDs

SDR has LEDs on the front of the RF module as shown below in Figure 9.

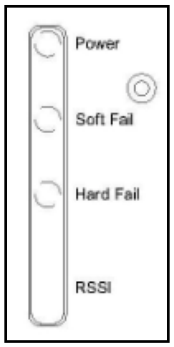


Figure 9 RF Module LED

Table 2-2 RF Module LED Specifications

SDR-Module		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
RSSI	Input < -85dBm	Zero (0) bar On
	Input < -75dBm	One (1) bar On
	Input < -65dBm	Two (2) bars On
	Input < -55dBm	Three (3) bars On
	Input < -45dBm	Four (4) bars On
	Input >= -45dBm	Five (5) bars On

2.2.2 RF Ports

Donor and server antennas can be connected directly to the modules or the optional SDR-CHC (channel combiner) can be used to split or combine signals.

Figure 10 RF port

2.2.3 Power Switch

The AC Power on/off switch is located at the back of each individual module. Each module must be powered on separated. The switch should be powered on after the repeater has been installed properly.

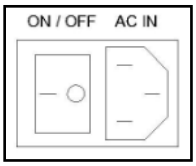


Figure 11 SDR Repeater Power Switch View

2.2.4 Back Up Battery Port

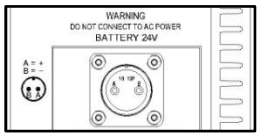


Figure 12 Battery Backup Port

The SDR module 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 SDR via the external battery port as shown in Figure 4.

(WARNING: The circuit switch on the ADRF-BBU must be set to OFF before connecting the ADRF-BBU to the SDR 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.

2.2.5 Communication Port & Mode Select Switch

- Communication Port- This port is used to communicate with the SDR-NMS. Connect the RJ-45 data cables that are included with the SDR modules to the NMS communication port.
- Master/Slave switch- The Master/Slave switch must be set to the slave position when the SDR modules are connected to a SDR-NMS. The Master/Save switch should only be set to the Master when troubleshooting the repeater with ADRF Technical Support.

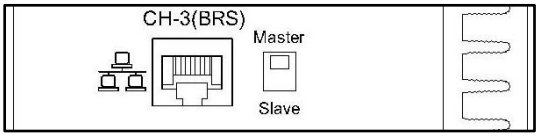


Figure 13 Master/Slave Switch

2.2.6 AC Select Switch

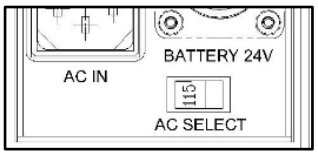


Figure 14 AC Select Switch

- The AC select switch will let the user switch between 115V and 230V.

2.2.7 Communication Port & Mode Select Switch

- NMS-PWR-OUT- This port is used to power the SDR-NMS. If multiple modules are being used in a system, the SDR-NMS only requires power from only 1 module. This port will connect to the NMS-PWN-IN on the SDR-NMS.
- Debug Port- The debug port is used for ADRF testing purposes only.

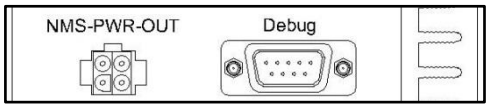


Figure 15 NMS Power Port & Debug Port

2.3 Channel Combiner (SDR-CHC)

2.3.1 RF Ports

An optional channel combiner can be mounted directly above the SDR. There are 2 versions of the SDR-CHC. The SDR-CHC-V supports Cellular, AWS, PCS, and 700MHz. The SDR-CHC-S supports PCS, BRS, and SMR. The donor portion of the SDR-CHC can be used to split up a combine donor signal. The server portion of the SDR-CHC can be used to combine the server signals into the Server Sum port. Please contact sales@adrftech.com if you are interested in purchasing the SDR-CHC.

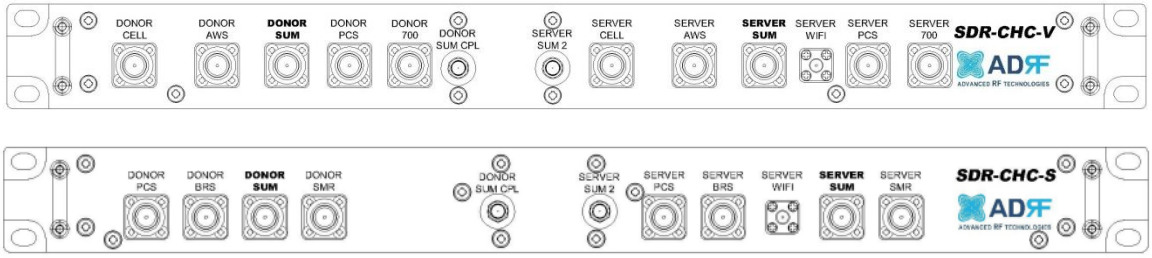


Figure 16 Channel Combiner RF ports

- Port Name Description
  - Donor PCS: Connects to the SDR PCS donor port
  - Donor Cell: Connects to the SDR Cell donor port
  - Donor AWS: Connects to the SDR AWS donor port
  - Donor 700: Connected to the SDR 700 MHz donor port
  - Donor BRS: Connects to the SDR BRS donor port
  - Donor Sum: Connects to the combined donor line
  - Donor SMR: Connects to the SDR SMR donor port
  - Donor Sum CPL: Expansion donor port with 18 dB ±3 coupling value [Connects to an external modem box]
  - Server Sum 2: Expansion server port with 20 dB coupling value
  - Server PCS: Connects to the SDR PCS server port
  - Server Cell: Connects to the SDR Cell server port
  - Server AWS: Connects to the SDR AWS server port
  - Server 700: Connects to the 700 MHz server port
  - Server BRS: Connects to the BRSPCS server port
  - Server WiFi: Input port for Wifi AP
  - Server Sum: Connects to the server antennas
  - Server SMR: Connects to the SDR SMR server port

3. ALARMS

3.1 Message Board Alarms and Notification

Table 3-1 Message Board Alarms and Notification

Parameters	Remark
AC Fail	Power supply is not operating within specs
DC Fail	Power supply is not operating within specs
Fan Fail	System has detected an issue with the fan
Temperature	Module is above the normal operating temperature
Current	Power supply is not operating within specs
System Halt	System is in a shutdown state due to a hard fail alarm
DSP Fault	System has detected an issue with the internal DSP chip
Link Fail	Communication error between the module and NMS
BRS Out of Sync	Unable to perform TDD sync
OSC	Oscillation detected
DL Signal not detected	DL signal is below the specified level
DL Signal Low	DL signal is below the specified level
Input Overload	Incoming in-band DL or UL signal is too strong
Out of band Overload	Incoming out-band DL or UL signal is too strong
Synthesizer Lock Fail	Issue with internal PLL
DL RF Power	Input + gain does not match the output level (above delta of 6 dB)
Overpower	Output level is above the max output levels
VSWR	Power is being reflected back to the repeater
Heartbeat	Heartbeat
Reboot	Reboot
Factory setting	Factory setting

3.2 Alarms

Table 3-2 Alarms Threshold

Parameters	Remark
AC Fail	Power supply is not operating within specs. (4 seconds)
DC Fail	Power supply is not operating within specs. (4 seconds)
Fan Fail	System has detected an issue with the fan. (4 seconds)
Temperature	Module is above the normal operating temperature. (4 seconds) Over Temperature [Soft: 80~87 C, Hard: Above 87 C]
Current	Power supply is not operating within specs. (4 Second) Over Current [Hard: Above 10A]
System Halt	System is in a shutdown state due to a hard fail alarm. (10 times)
DSP Fault	System has detected an issue with the internal DSP chip. (Cannot communication with DSP)
Link Fail	Communication error between the module and NMS. (5 mins)
BRS Out of Sync	Unable to perform TDD sync (10 seconds)
OSC	Oscillation detected. Alarm is only present when one-time oscillation check is performed (4 seconds)
DL Signal not detected	DL signal is below the specified level. (default: -85dBm)
DL Signal Low	DL signal is below the specified level. (default: -90dBm)
Input Overload	Input signal is above the threshold. (Soft: -17dBm, Hard: -15dBm)
Out of band Overload	Out of band signal is above the threshold. (Soft: -17dBm, Hard: -15dBm)
Synthesizer Lock Fail	Issue with internal PLL
DL RF Power	Input + gain does not match the output level (default delta of 6 dB)
Overpower	Output level is above the max output levels (Soft: ALC or AGC + 1~2dB, Hard: ALC or AGC + >2dB)
VSWR	Power is being reflected back to the repeater. Threshold = output power - 8dB. For example, if the repeater is outputting 24dBm, then if the system detects 16dBm of return power, then the VSWR will be triggered.

4. INSTALLATION

4.1 Installation Procedures

4.1.1 Wall Mount Procedure

- Verify that the SDR and mounting hole are in good condition
- Remove all SDR modules from the system
- Place the SDR chassis up against the wall so that that module's RF ports face the ceiling
- Mount the SDR chassis to wall use the six (6) mounting hold on the wall mount bracket
- Install the SDR modules into the chassis and secure the module by tightening the four (4) hand screws
- Connect the power and data cables at the bottom on the SDR
- Connect the GND cable
- Connect the Antenna cable
- Connect the Power cable

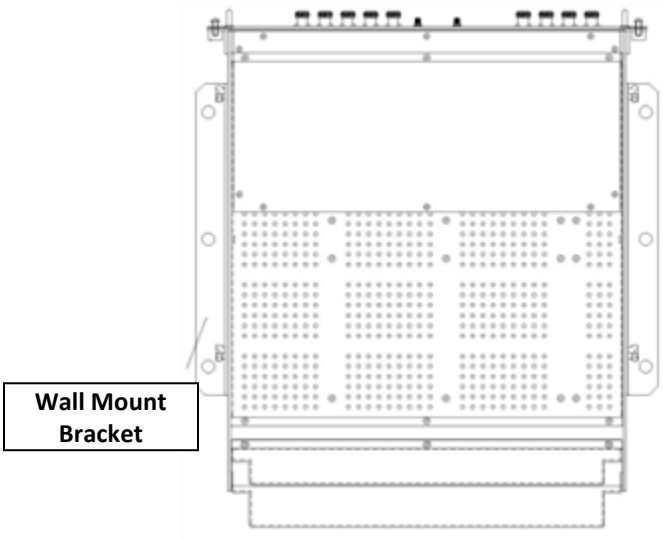


Figure 17 SDR Wall Mount

4.1.2 Rack Mount Procedure

- Verify that the SDR and mounting hole are in good condition
- Remove all SDR modules from the system
- Remove all SDR wall mount bracket from the system
- Install the SDR chassis into the 19” rack mount system
- Screw the SDR chassis into the 19” rack mount system using the eight (8) mounting holes
- Install the SDR modules into the chassis and secure the module by tightening the four (4) hand screws
- Connect the power and data cables at the back of the SDR
- Connect the GND cable
- Connect the Antenna cable
- Connect the Power cable

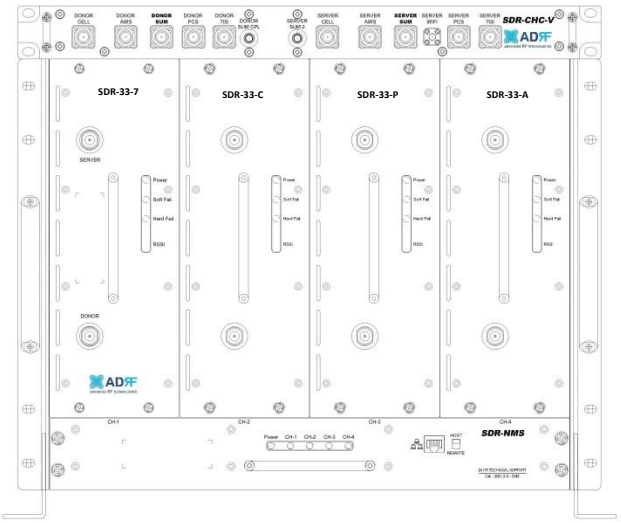


Figure 18 SDR Rack Mount

4.1.3 SDR CHC Mount Procedure

The SDR-CHC ships with a chassis mounting kit. The SDR-CHC can be directly mounted to the chassis using the chassis mounting kit. This kit is only needed when wall-mounting the SDR.

Figure 19 SDR CHC Mount Bracket Kit

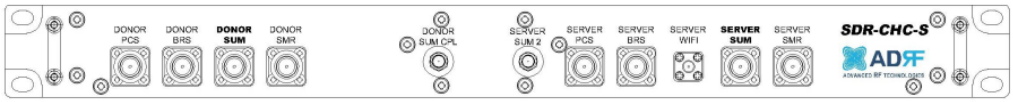


Figure 20 SDR CHC Front View

The SDR-CHC is to be placed on top the chassis. The mounting brackets should be installed in the position shown below in grey. Secure the mounting brackets in place with the screws.

-

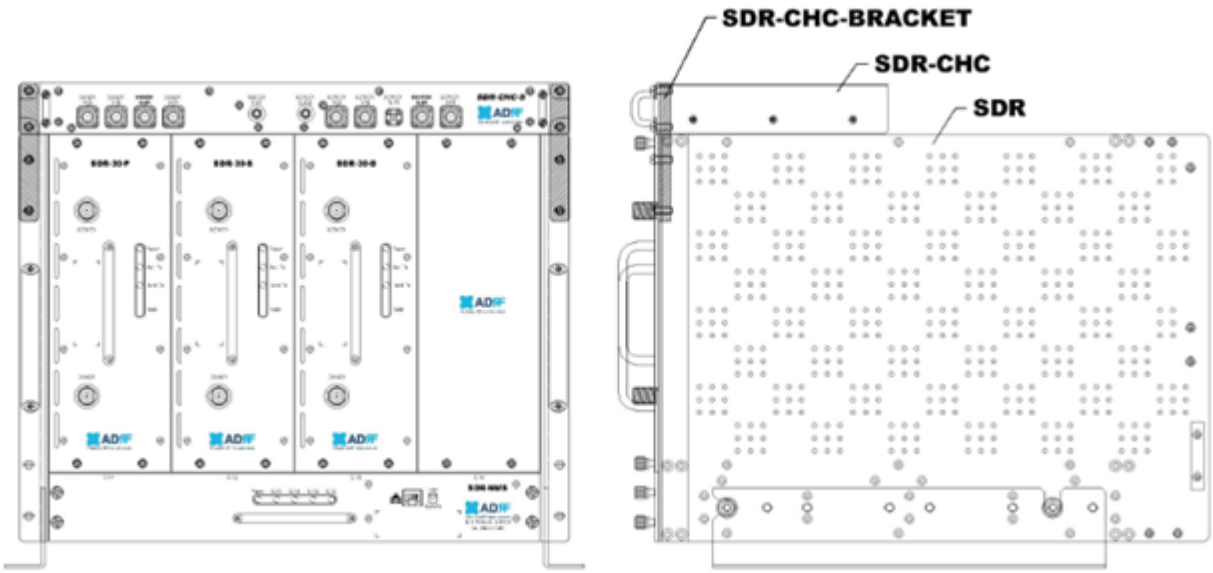


Figure 21 SDR CHC Assembly

4.2 Grounding

Install the ground cable that is included in the package at the back of the repeater as show in the figure below.

Figure 22 Ground Cable Connection

- Round terminals located on the side of a 0.75 mm2 (18 AWG) or more wires Using permanently connected to earth.

4.3 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.

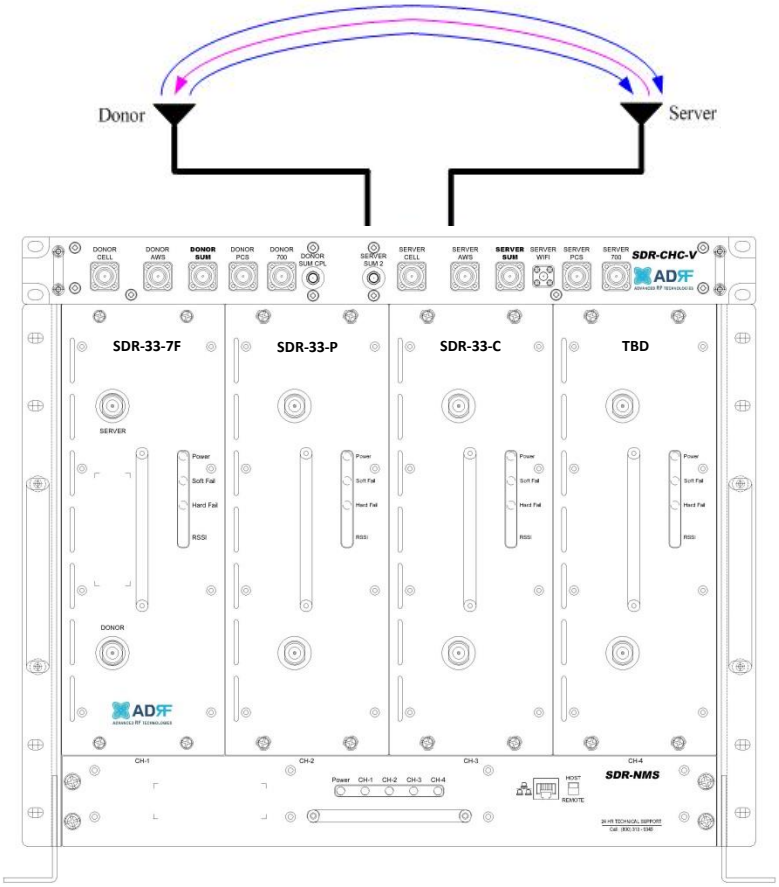


Figure 23 RF Repeater Oscillation

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 SDR has a maximum gain of 90 dB in case of SDR-24, it requires an isolation of at least 103 ~ 105 dB.

4.4 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.

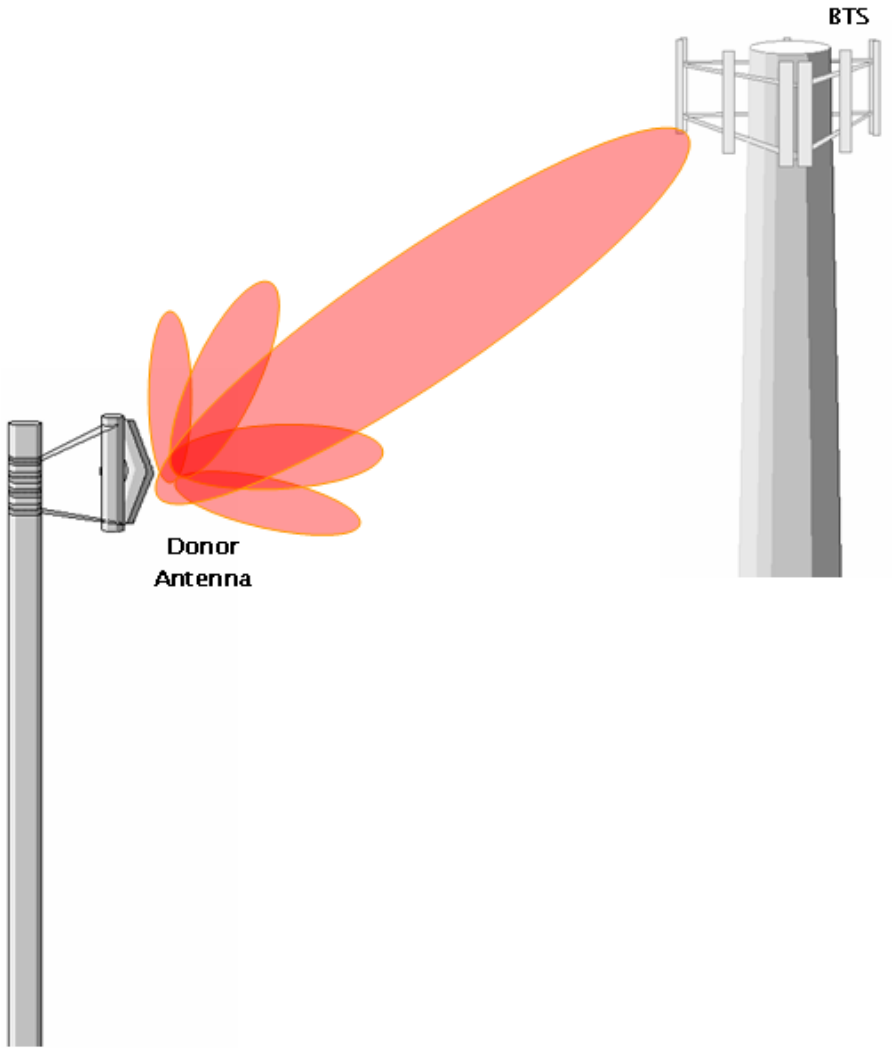


Figure 24 Direct Line of Sight to the BTS

5. SDR 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.

5.1 Repeater/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 steps A and B.
- 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:

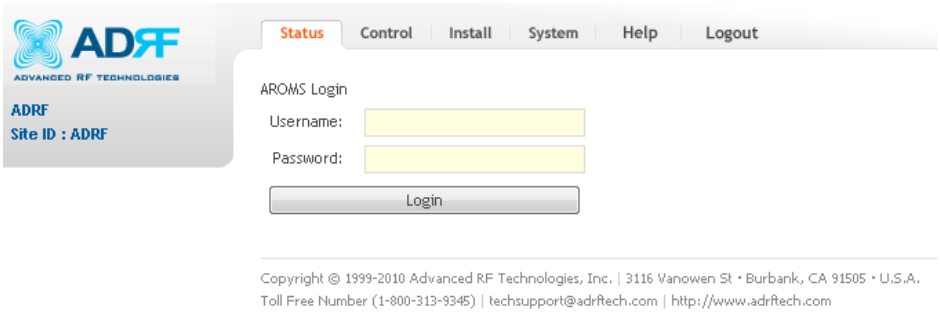


Figure 25 Login screen

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.
The default Administrator login is admin & admin, respectively.

5.2 Status Tab

5.2.1 Status- NMS

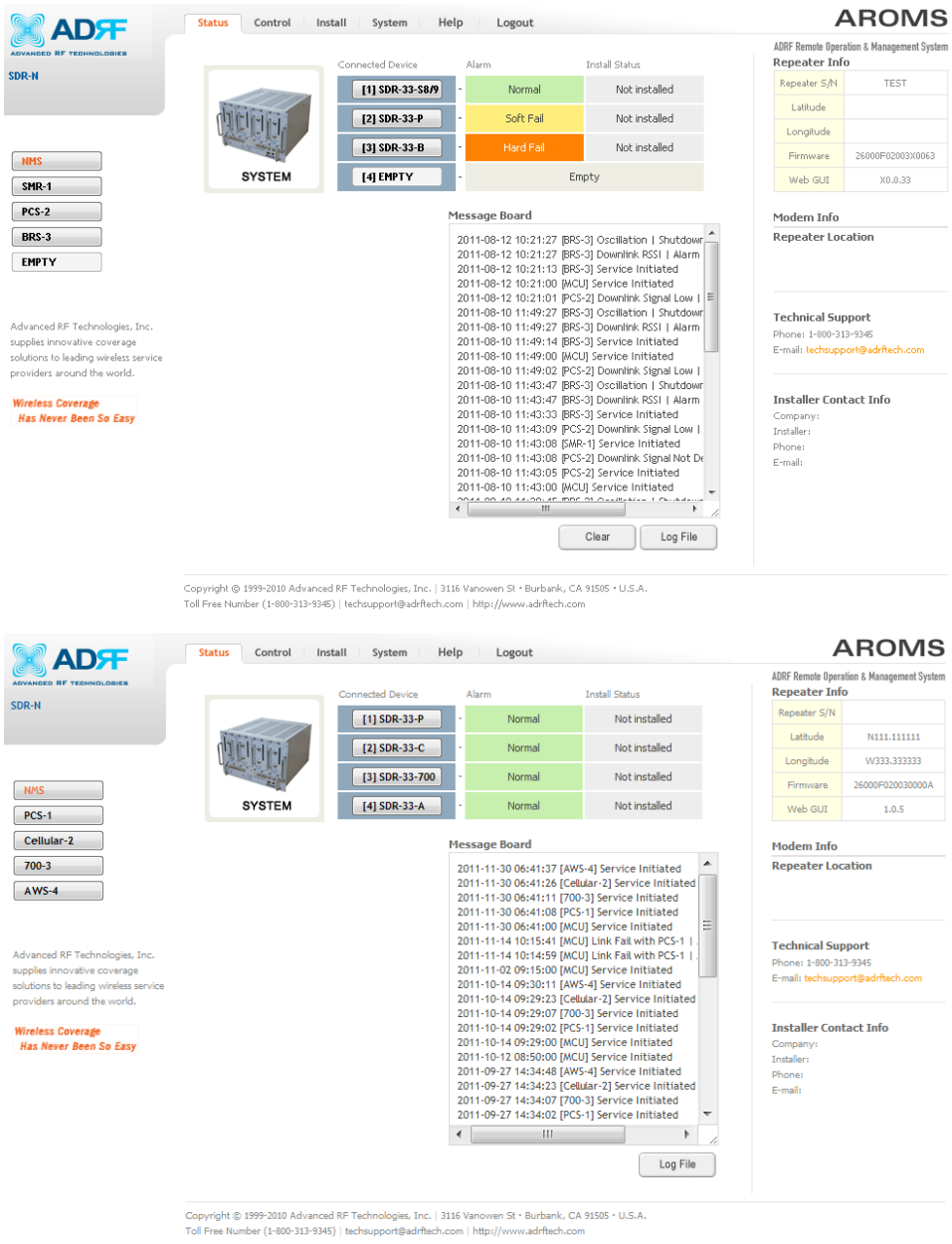


Figure 26 Status - NMS

The NMS Status page provides an overview of how the system is performing. From the NMS Status page, the user can see if there are any alarms present on any of the modules.

5.2.1.1 Navigation Bar

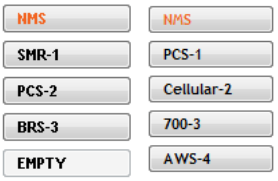


Figure 27 Navigation Bar

The navigation bar 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.

5.2.1.2 System Summary

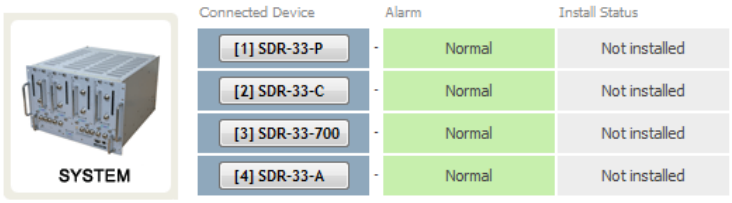


Figure 28 System Summary

The system summary provides a snapshot of how the system is currently performing.

- **Connected Device**- Displays what modules are connected to the SDR-NMS. Clicking on the buttons in the column will take you to the Status page of that module.
- **Alarm**- Displays the current alarm status of the individual modules
- **Install Status**- Displays the installation status of the module

5.2.1.3 Message Board

Displays the system events of all connected modules.

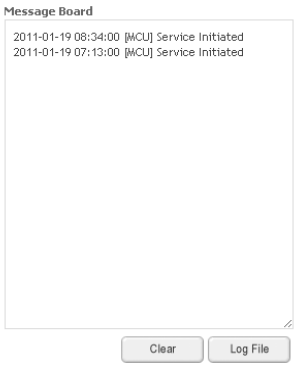


Figure 29 Message Board

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

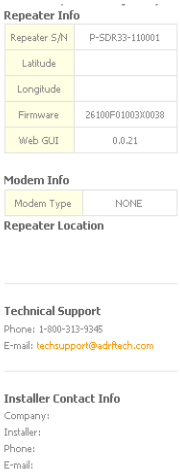


Figure 30 Repeater Info / Modem Info / Technical Support / Installer Contact Info

- 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

5.2.2 Status- SMR, PCS, BRS, Cellular, 700 MHz, AWS

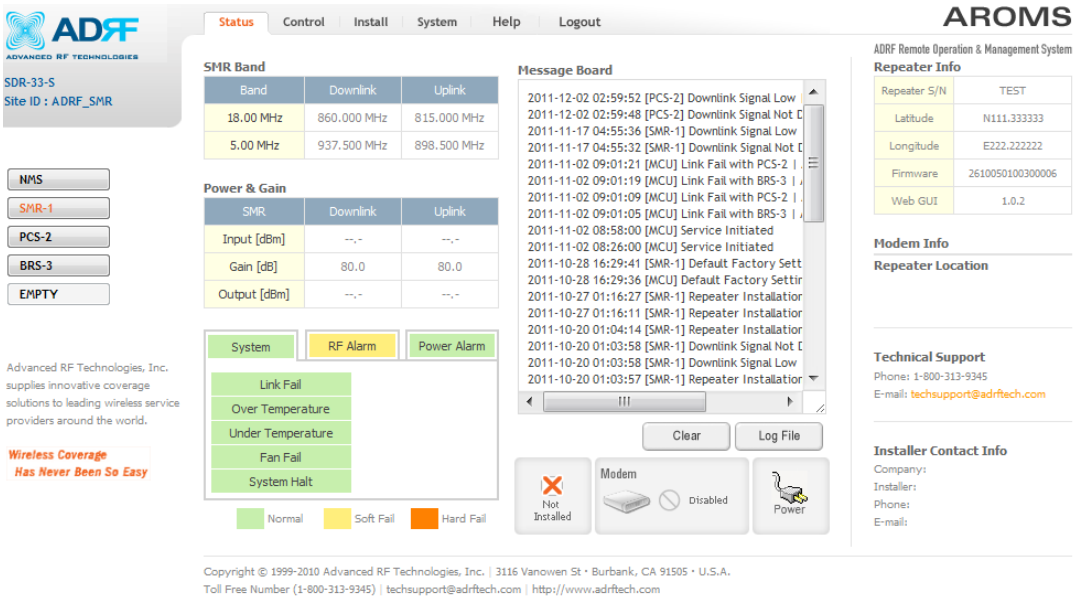


Figure 31 Status - SMR

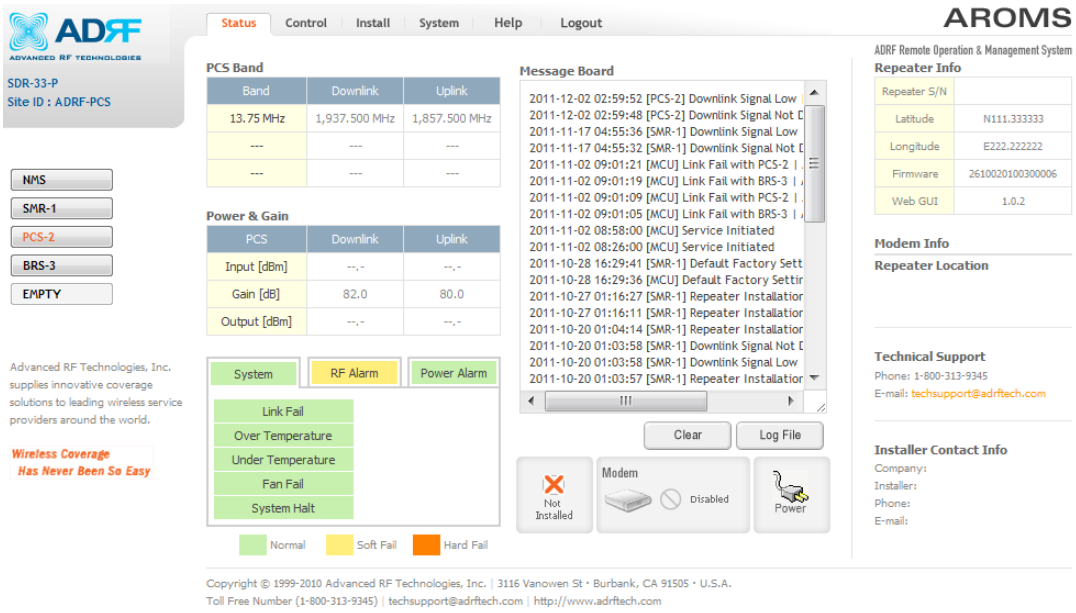


Figure 32 Status - PCS

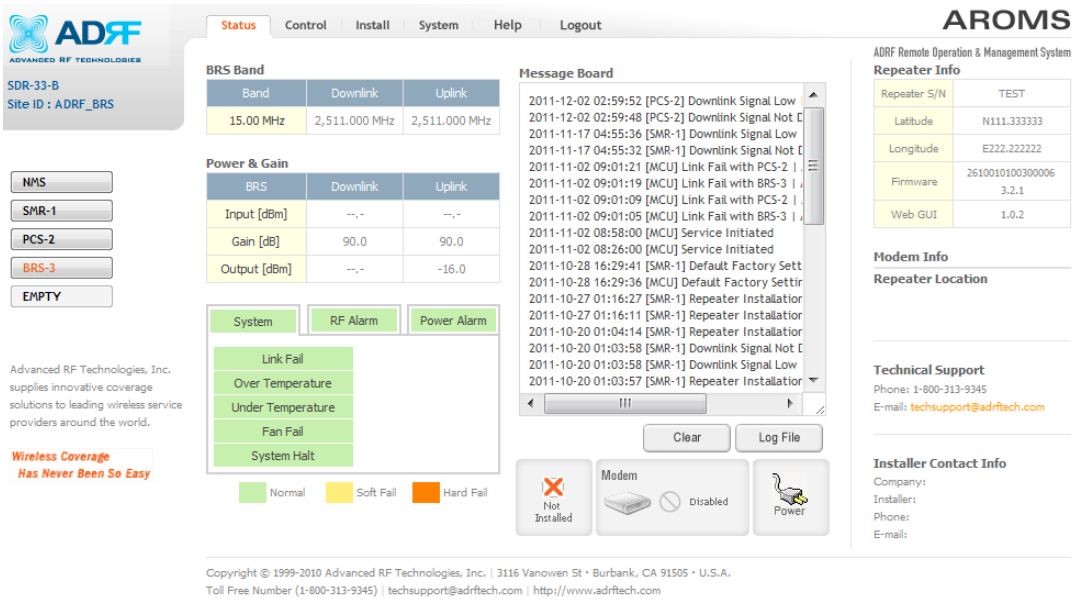


Figure 33 Status- BRS

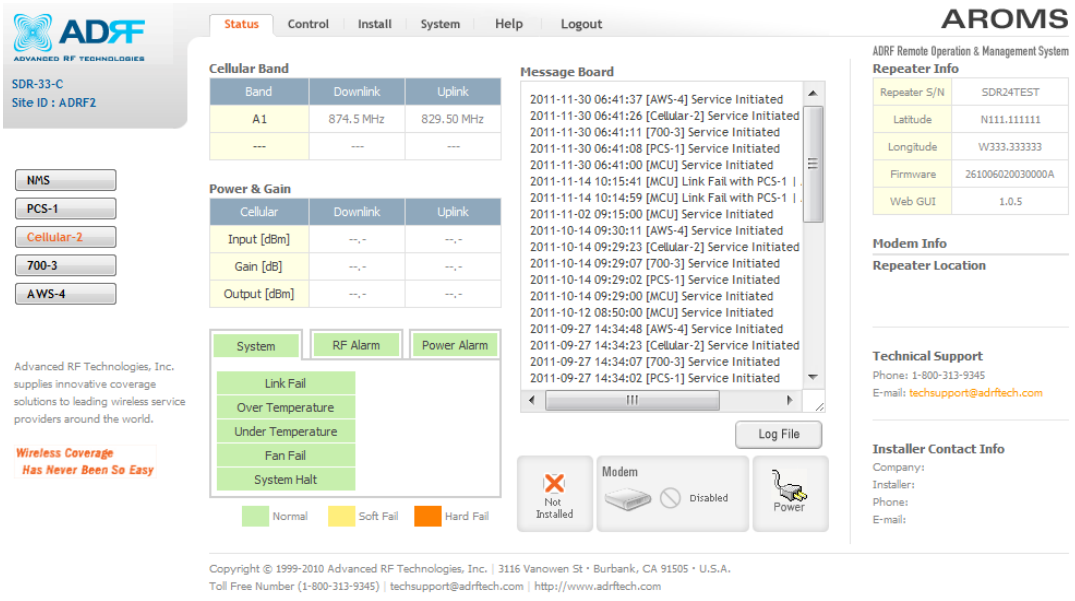


Figure 34 Status- Cellular

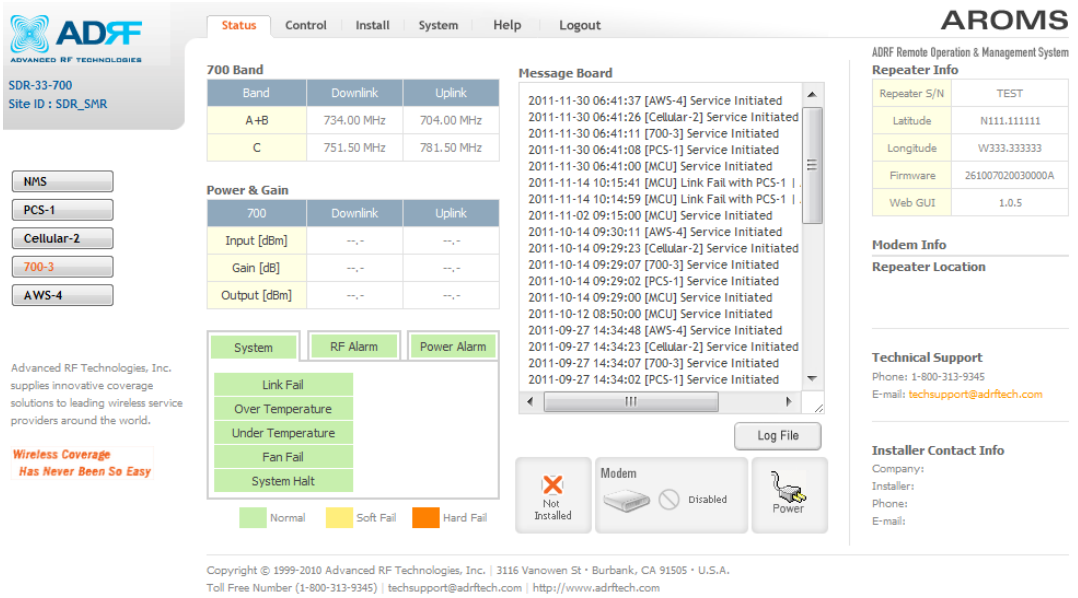


Figure 35 Status- 700 MHz

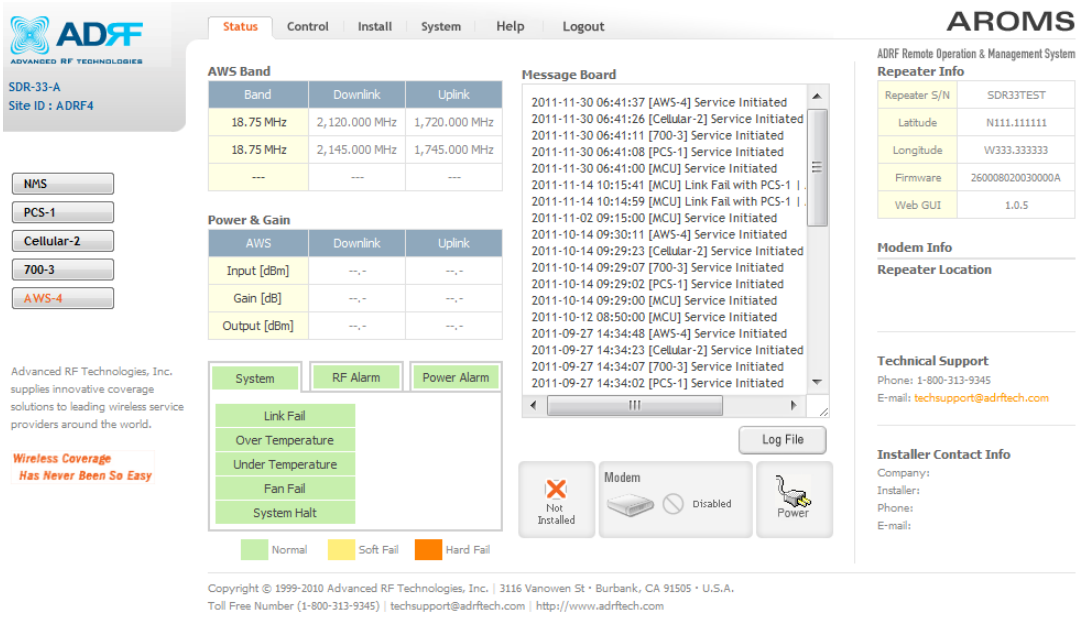
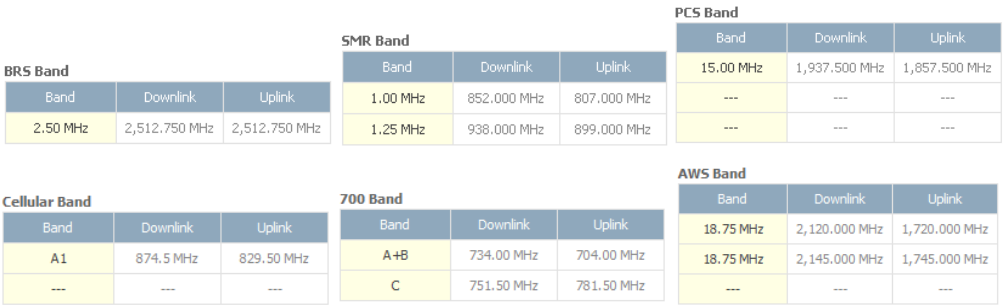


Figure 36 Status- AWS

5.2.2.1 **Band**

This section displays the spectrum and technology that is being used. The band column displays the bandwidth or band 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.



BRS Band

Band	Downlink	Uplink
2.50 MHz	2,512.750 MHz	2,512.750 MHz

SMR Band

Band	Downlink	Uplink
1.00 MHz	852.000 MHz	807.000 MHz
1.25 MHz	938.000 MHz	899.000 MHz

PCS Band

Band	Downlink	Uplink
15.00 MHz	1,937.500 MHz	1,857.500 MHz
---	---	---
---	---	---

Cellular Band

Band	Downlink	Uplink
A1	874.5 MHz	829.50 MHz
---	---	---

700 Band

Band	Downlink	Uplink
A+B	734.00 MHz	704.00 MHz
C	751.50 MHz	781.50 MHz

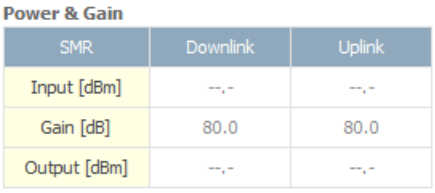
AWS Band

Band	Downlink	Uplink
18.75 MHz	2,120.000 MHz	1,720.000 MHz
18.75 MHz	2,145.000 MHz	1,745.000 MHz
---	---	---

Figure 37 Band Display

5.2.2.2 **Power & Gain**

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



Power & Gain

SMR	Downlink	Uplink
Input [dBm]	--.-	--.-
Gain [dB]	80.0	80.0
Output [dBm]	--.-	--.-

Figure 38 Power & Gain Display

- Input [dBm] – Displays the incoming Downlink/Uplink signal level. The system will display "--.-" when the input level is < -90 dBm.
- Gain [dB] – Displays the amount of gain that is currently be used.
- Output [dB] – Diplays the Downlink/Uplink output power levels. The system will display "--.-" when the input level is < -10 dBm.

5.2.2.3 Alarm

This section displays the alarm status for System alarms, RF alarms, and Power alarms. If an alarm is present in the system, then the color of the alarm tab will change according to the type of failure.

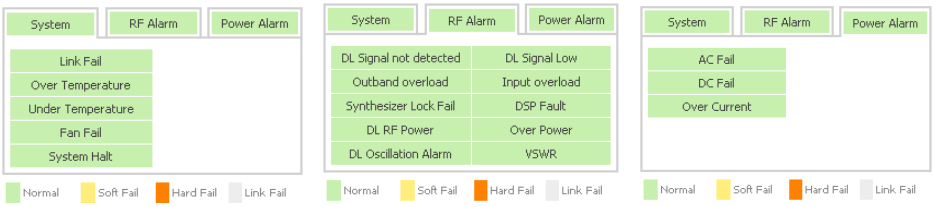


Figure 39 Alarm Display

5.2.2.4 Message Board

Displays the 20 most recent events.

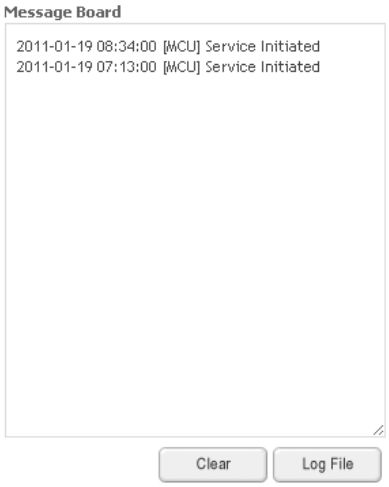


Figure 40 Message Board

- **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

5.2.2.5 Install, Modem, and Power Status

Figure 41 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

5.2.2.6 Repeater Info / Modem Info / Repeater Location / Technical Support / Installer Contact Info

Figure 42 Repeater Info / Modem Info / Repeater Location / Technical Support / Installer Contact Info

- **Repeater Info**: Displays the serial number, latitude, longitude, firmware version, Web-GUI version
- **Modem Info**: Displays the internal modem information (ESN, MDN, IP)
- **Repeater Location**: Displays the address where the repeater is installed
- **Technical Support**: Displays ADRF's Technical Support contact information
- **Installer Contact Info**: Displays 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 (except for the Main Window).

5.3 Control Tab

5.3.1 Control- NMS

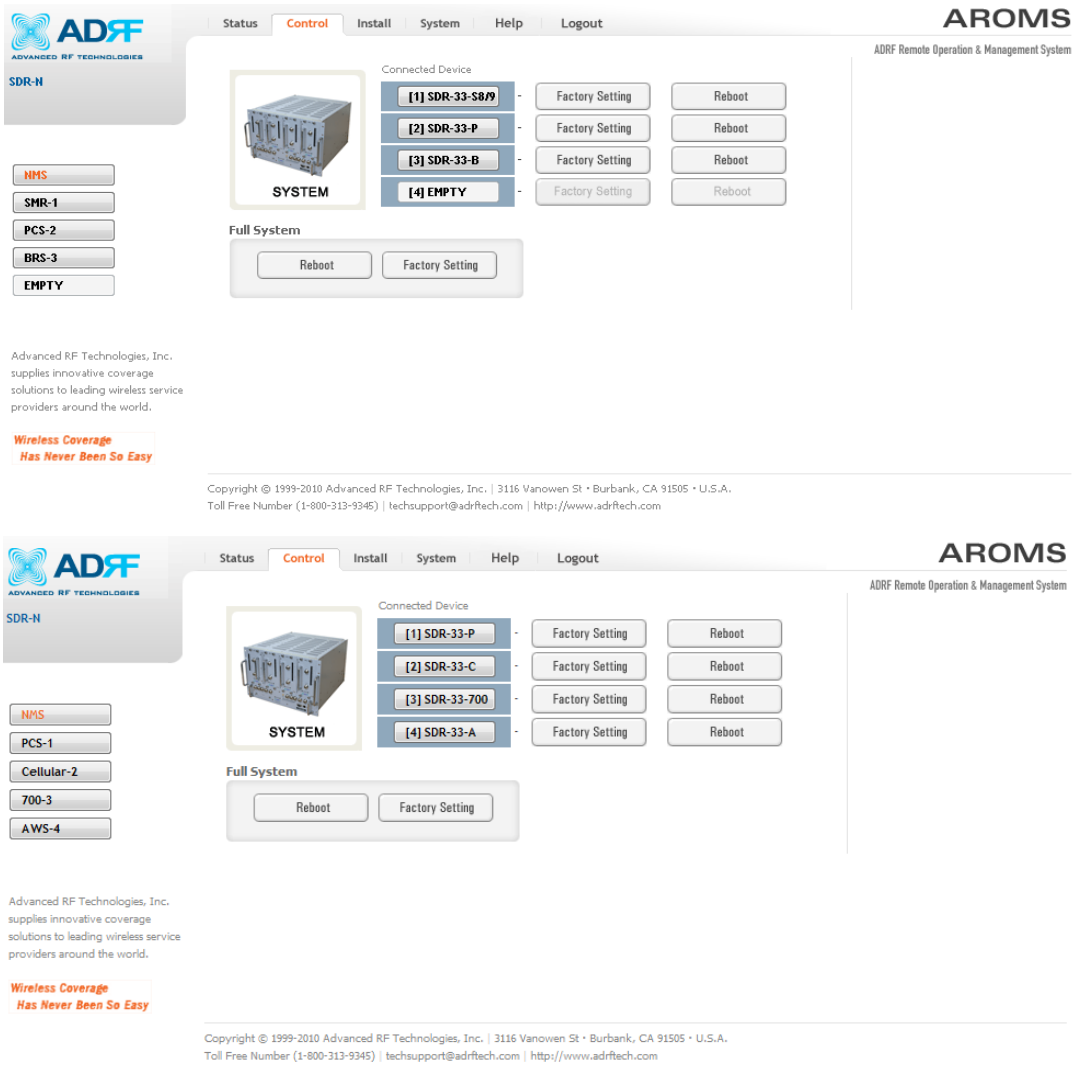


Figure 43 Control- NMS

5.3.1.1 Control Summary

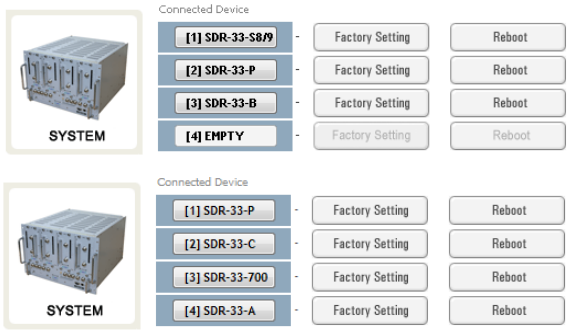


Figure 44 Control Summary

This section allows the user to perform factory settings and reboot one module at a time.

5.3.1.2 **Full System**

Figure 45 Full System

This section allows the user to perform a full system reboot or full system factory settings.

5.3.2 Control- SMR, PCS, BRS, Cellular, 700, AWS

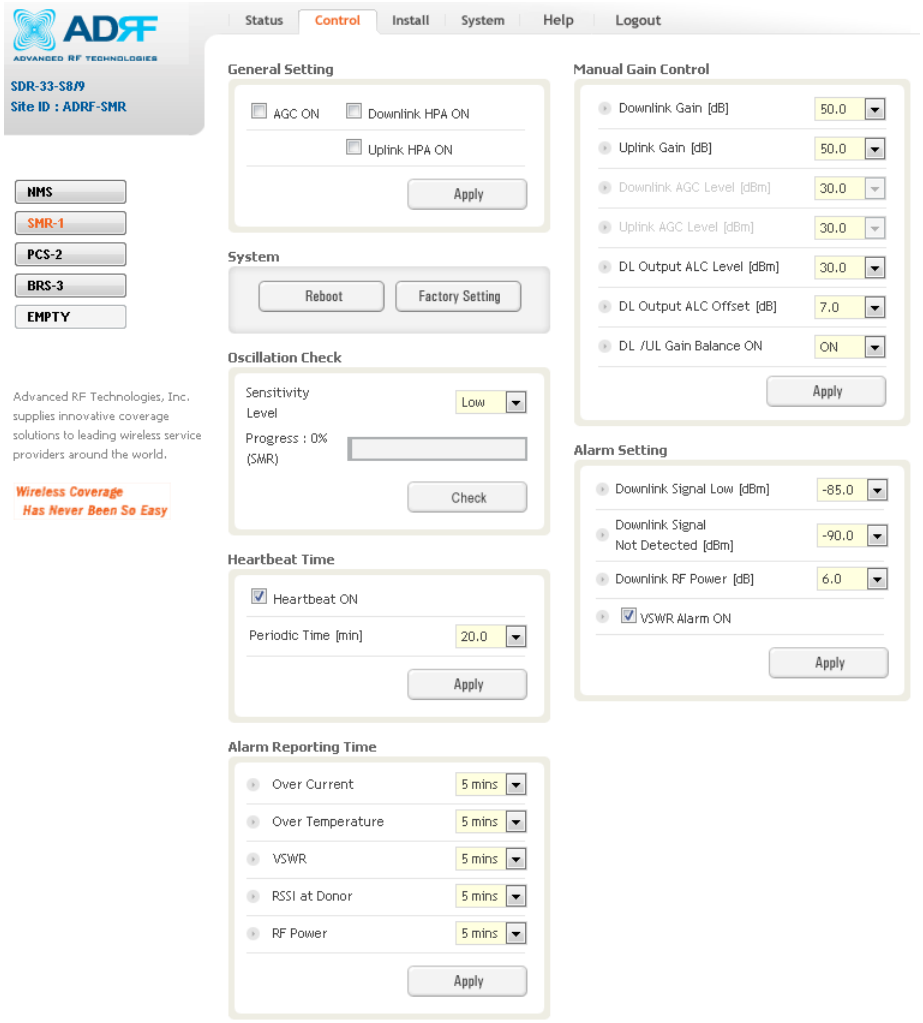


Figure 46 Control- SMR, PCS, BRS, Cellular, 700, AWS

5.3.2.1 General Setting

Figure 47 General Setting

- **AGC ON**: Enables or disables AGC (Automatic Gain Control)
- **Downlink HPA ON**: Enables or disables the DL HPA (High Power Amplifier)
- **Uplink HPA ON**: Enables or disabled the UL HPA (High Power Amplifier)
  To enable any of the settings, click on the checkbox and click the Apply button.

5.3.2.2 System

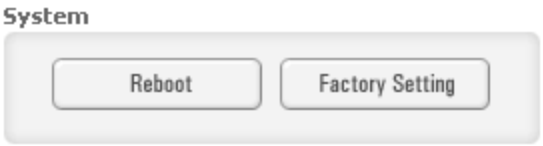


Figure 48 System Command

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

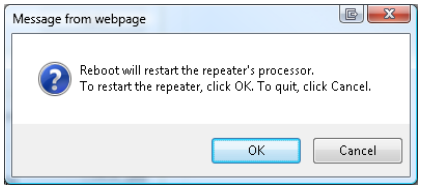


Figure 49 Pop-up message when Reboot button is pressed

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

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

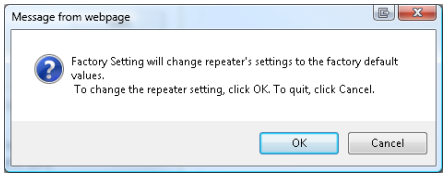


Figure 50 Pop-up message when Factory Setting button is pressed

5.3.2.3 Heartbeat Time

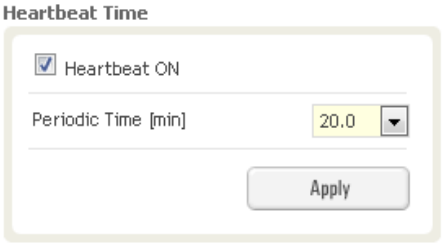


Figure 51 Heartbeat Setting

- Allows the user to enable or disable heartbeats from being sent out and also specify the time interval.

5.3.2.4 Alarm Reporting Time

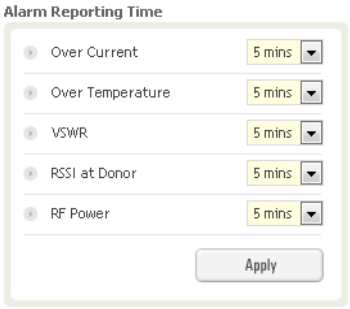


Figure 52 Alarm Reporting Time Setting

This section allows the user to specify the reporting time of the following alarms; Over Current, Over Temperature, VSWR, RSSI at Donor, and RF Power. If the alarm is set to 5 mins, then the system will send out a SNMP trap only if the alarm is continually present for a 5 minute period. If the alarm clears within this 5 minute period, then the SNMP trap will not be sent out. When the alarm reporting time is set to 0 min, the SNMP trap will be set out immediately once the alarm is triggered. The alarm should be set to 0 min, only when testing the monitoring function. Otherwise, all alarms should be set to 5 mins for normal operation.

5.3.2.5 Manual Gain Control

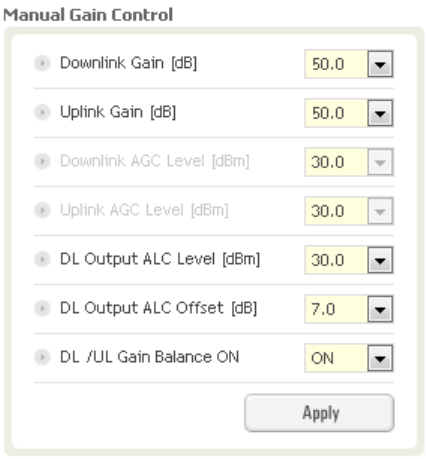


Figure 53 Main Gain Control Setting

- **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 output power level when AGC is enabled
- The system will automatically adjust the gain levels to output the specified AGC level
- **Uplink AGC Level**: Allows the user to set the UL output power level when AGC is enabled
- The system will automatically adjust the gain levels to output the specified AGC level
- **DL Output ALC Level**: Allows the user to set the Max output level when AGC is OFF
- **DL Output ALC Offset**: The delta value at which the BDA will increase/decrease the gain levels to compensate for the decrease/increase in signal level
- **DL /UL Gain Balance ON**: When enabled, the system will keep the delta value between the Downlink and Uplink gain levels

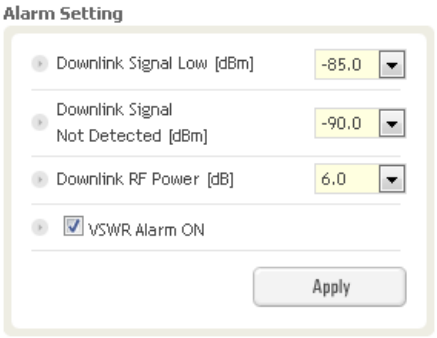


Figure 54 Alarm Threshold Setting

- **Downlink Signal Low**: Allows the user to specify how low the signal can be before triggering a "Downlink Signal Low" soft-fail alarm
- **Downlink Signal Not Detected**: Allows the user to specify how low the signal can be before triggering a "Downlink Signal Not Detected" 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
- **VSWR Alarm ON**: Allows the user to enable/disable the VSWR alarm check

5.4 Install Tab

5.4.1 Install- NMS

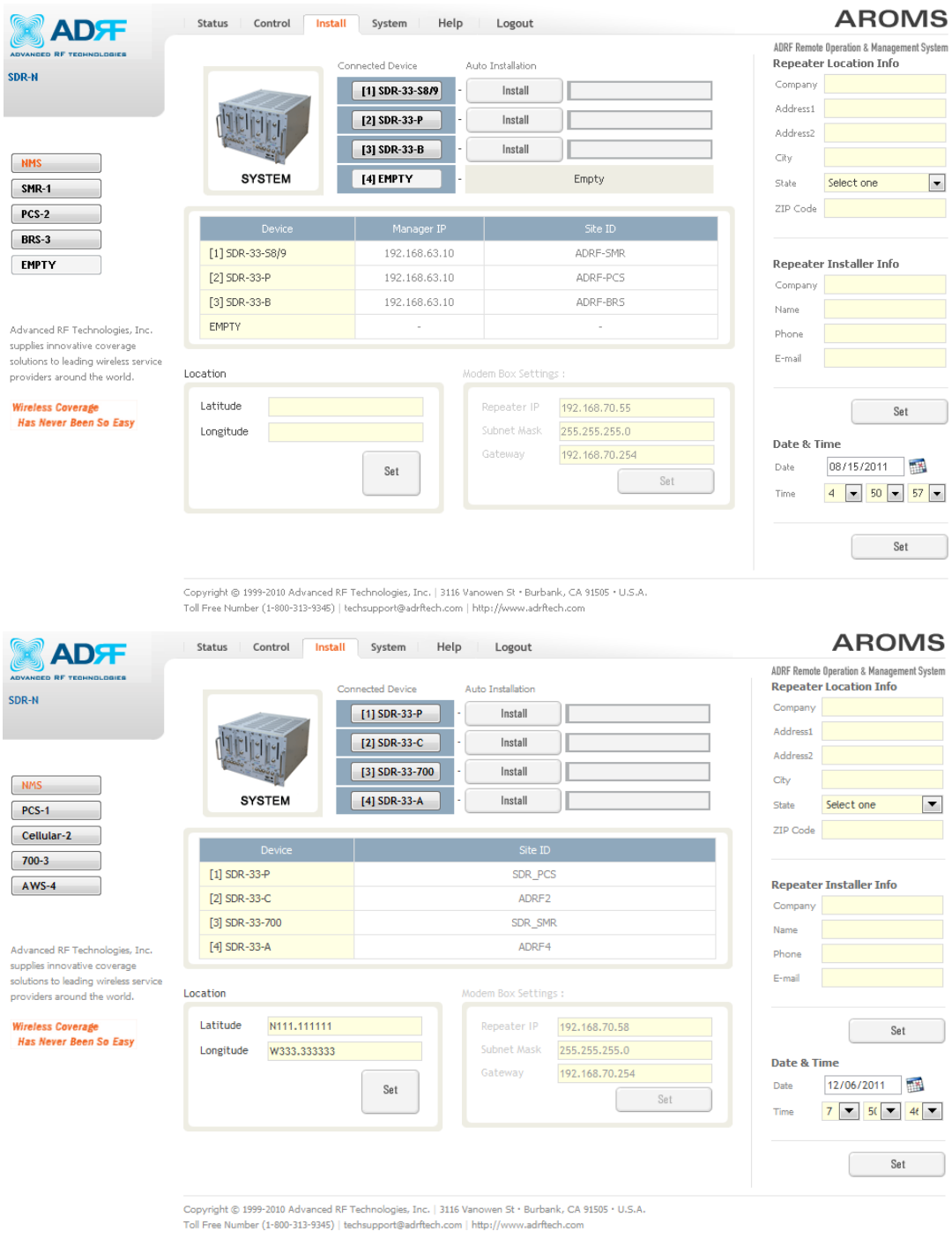


Figure 55 Install – NMS

5.4.1.1 Install Summary

The auto installation routine can be run from this page by clicking on the Install button under the Auto Installation column. This section also displays the Manager IP and Site ID for all the connected SDR modules.

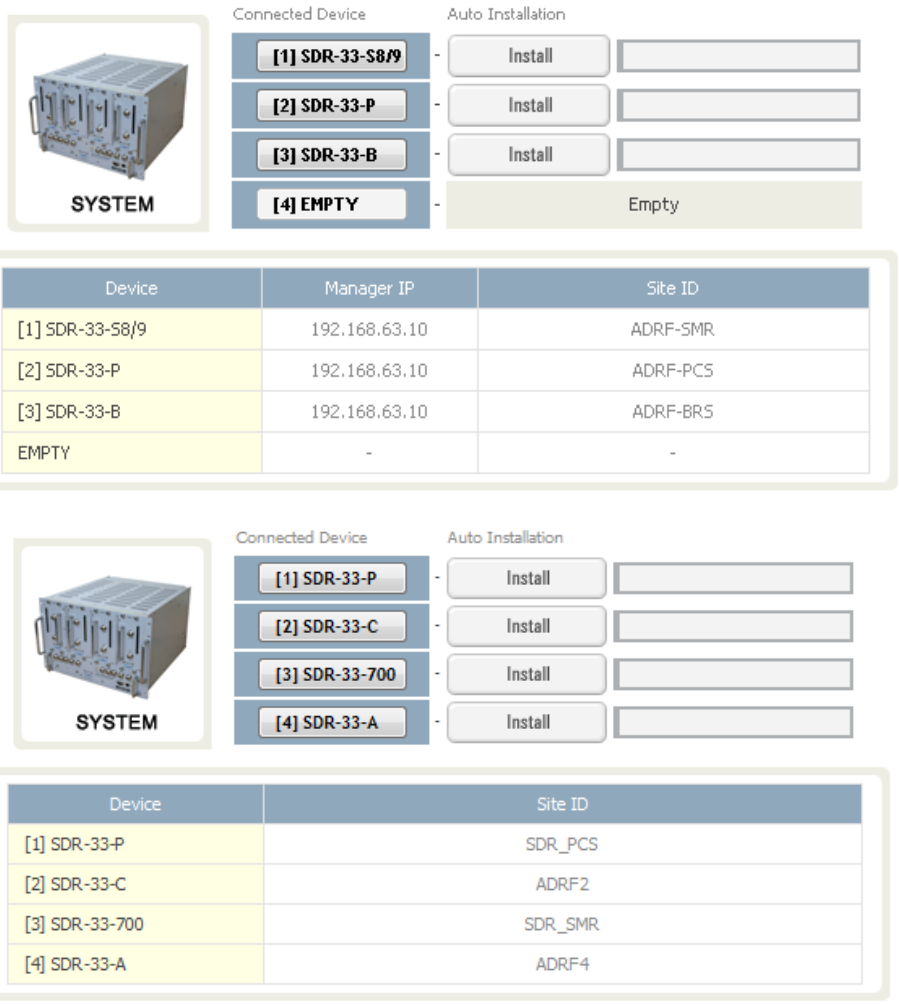


Figure 56 Install Summary

5.4.1.2 Location

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

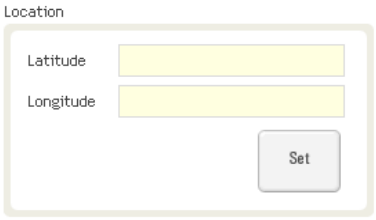


Figure 57 Location Setting

5.4.1.3 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.

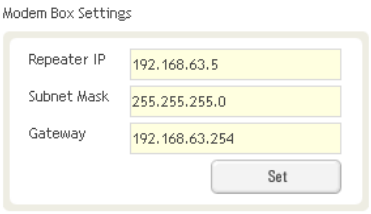


Figure 58 Modem Box Setting

5.4.1.4 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.

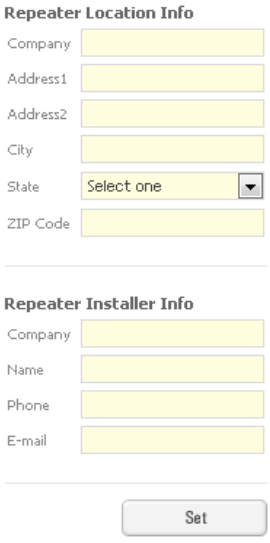


Figure 59 Repeater Location Info / Repeater Installer Info

5.4.1.5 Date & Time

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

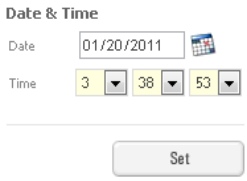


Figure 60 Date & Time Setting

5.4.2 Install- SMR

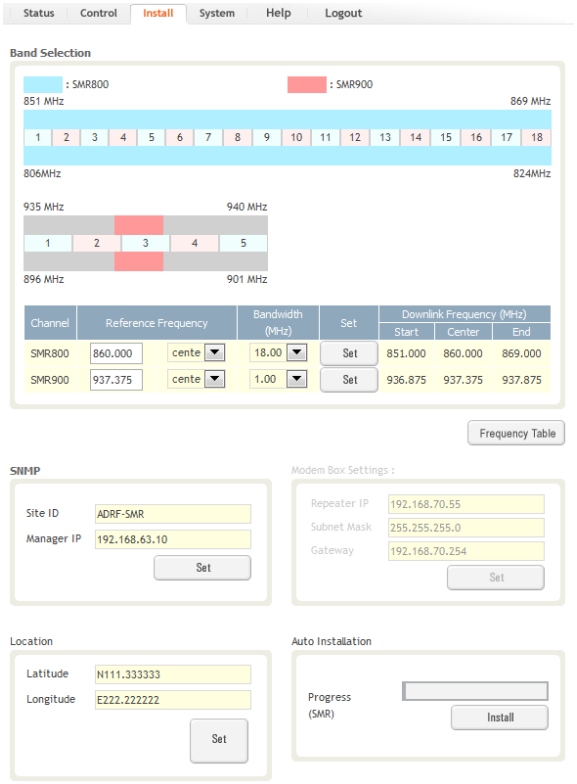


Figure 61 Install - SMR

The SMR Install page allows the user specify the desired frequncies by inputting the Reference Frequency and Bandwidth. The SMR module supports 1 channel on the SMR800 and 1 channel on the SMR900. SMR800 bandwidth selections range from 1.25 to 18 MHz and SMR900 bandwidth selections range from 1.25 to 5 MHz. The Web-GUI requires you to select the exact pass-bands that you will be using and exclude the guard bands when making your band selections.

5.4.2.1 Install- SMR Band Selection

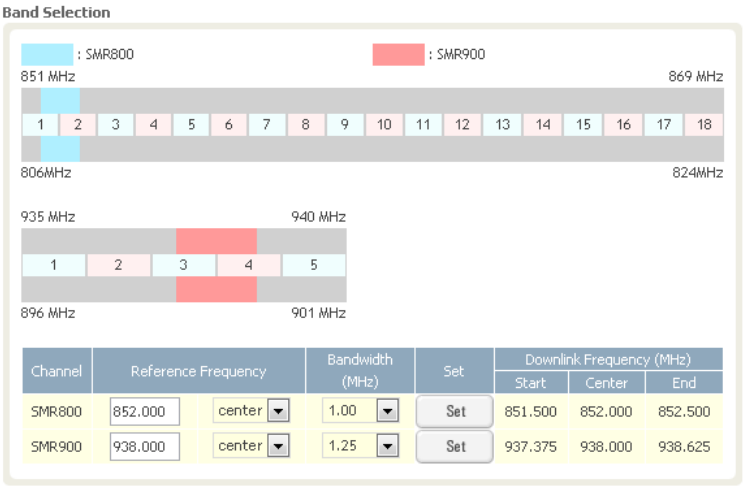


Figure 62 Install- SMR Band Selection

To specify a frequency, input a DL reference frequency and select either start, center, or stop from the dropdown menu. Select the desired bandwidth from the dropdown menu under the Bandwidth column and then click Set.

- Start Frequency

If a start frequency is specifed, then this will be the beginning frequency of the band selection. Adding the bandwidth value that is selected from the Bandwidth column will give you the end frequency of your band selection.

- Center Frequency

Once a center frequncy is specified and a bandwidth is selected, the system will split the bandwidth value in half and then add this to the center frequency to obtain your end frequency and also subtract this value to obtain your start frequency.

- Stop Frequency

If a stop frequency is specified, then this will be the ending frequency of the band selection. Subtracting the bandwidth value that is selected from the Bandwidth column will give you the start frequency of your band selection.

5.4.2.2 Install- Frequency Table

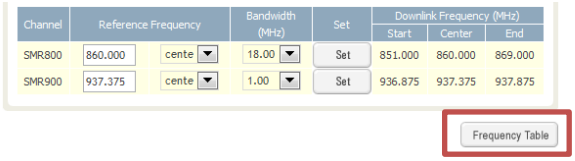


Figure 63 Install- Frequency Setting

By clicking on the Frequency Table button, the following screen will appear. You can use the frequency table as a reference to set the desired bands. Clicking on the Back button will take you back to the previous page.

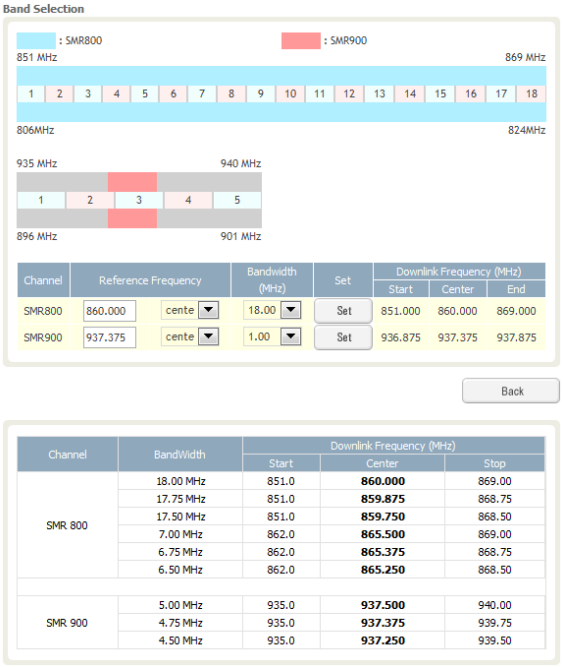


Figure 64 Install- Frequency Table

5.4.2.3 Install- SNMP

Figure 65 Install - SNMP

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.

5.4.2.4 Install- Auto Installation

Figure 66 Install – Auto Installation

The Auto Installation routine can be run by clicking on the Install button. The Auto Installation routine runs basic system checks to ensure proper functionality.

5.4.3 Install- PCS

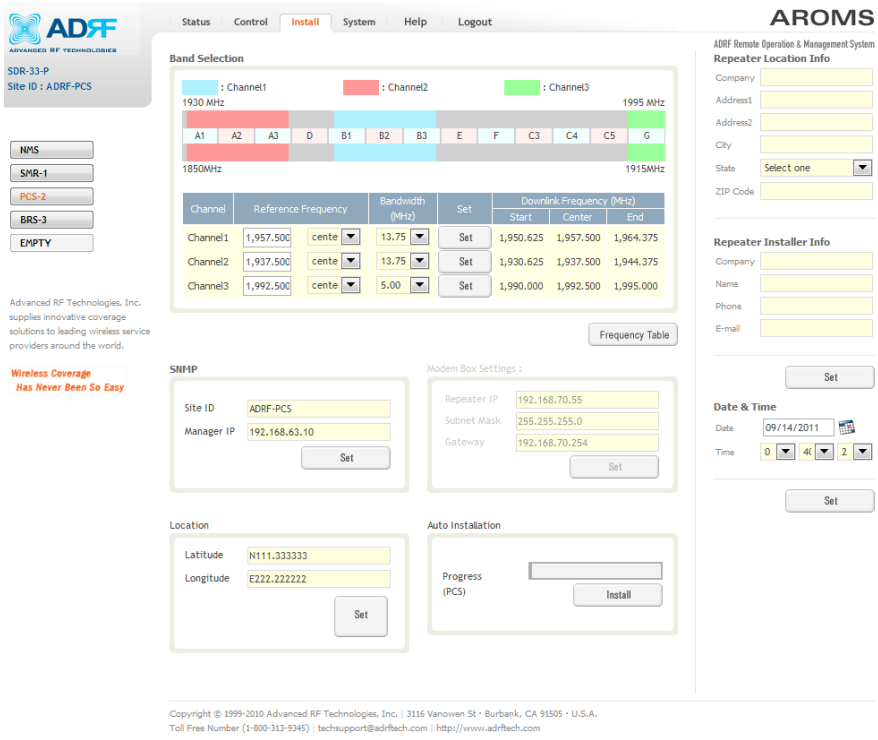


Figure 67 Install - PCS

The PCS Install page allows the user specify the desired frequncies by inputting the Reference Frequency and Bandwidth. The PCS module supports up to 3 non-contiguous bands. Bandwidth selection ranges from 1.25 to 18.75 MHz. The Web-GUI requires you to select the exact pass-bands that you will be using and exclude the guard bands when making your band selections.

5.4.3.1 Install- PCS Band Selection

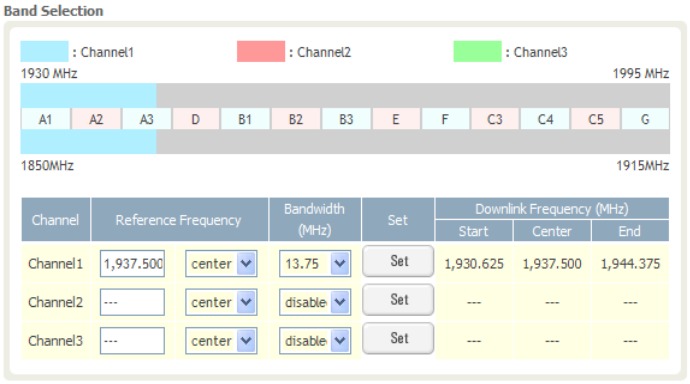


Figure 68 Install- PCS Band Selection

To specify a frequency, input a DL reference frequency and select either start, center, or stop from the dropdown menu. Select the desired bandwidth from the dropdown menu under the Bandwidth column and then click Set.

- Start Frequency

  If a start frequency is specifed, then this will be the beginning frequency of the band selection. Adding the bandwidth value that is selected from the Bandwidth column will give you the end frequency of your band selection.

- Center Frequency

  Once a center frequncy is specified and a bandwidth is selected, the system will split the bandwidth value in half and then add this to the center frequency to obtain your end frequency and also subtract this value to obtain your start frequency.

- Stop Frequency

  If a stop frequency is specified, then this will be the ending frequency of the band selection. Subtracting the bandwidth value that is selected from the Bandwidth column will give you the start frequency of your band selection.

5.4.3.2 Install- Frequency Table

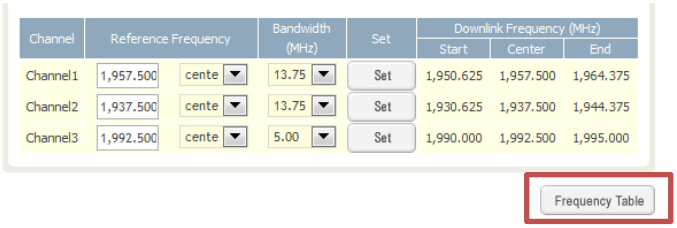
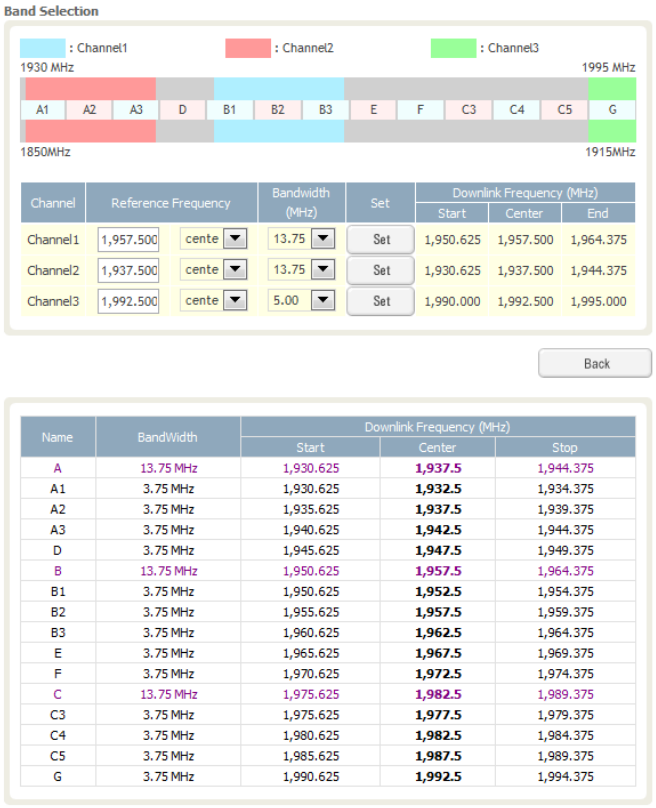


Figure 69 Install – Frequency Setting

By clicking on the Frequency Table button, the following screen will appear. You can use the frequency table as a reference to set the desired bands. Clicking on the Back button will take you back to the previous page.



Name	BandWidth	Downlink Frequency (MHz)		
		Start	Center	Stop
A	13.75 MHz	1,930.625	**1,937.5**	1,944.375
A1	3.75 MHz	1,930.625	**1,932.5**	1,934.375
A2	3.75 MHz	1,935.625	**1,937.5**	1,939.375
A3	3.75 MHz	1,940.625	**1,942.5**	1,944.375
D	3.75 MHz	1,945.625	**1,947.5**	1,949.375
B	13.75 MHz	1,950.625	**1,957.5**	1,964.375
B1	3.75 MHz	1,950.625	**1,952.5**	1,954.375
B2	3.75 MHz	1,955.625	**1,957.5**	1,959.375
B3	3.75 MHz	1,960.625	**1,962.5**	1,964.375
E	3.75 MHz	1,965.625	**1,967.5**	1,969.375
F	3.75 MHz	1,970.625	**1,972.5**	1,974.375
C	13.75 MHz	1,975.625	**1,982.5**	1,989.375
C3	3.75 MHz	1,975.625	**1,977.5**	1,979.375
C4	3.75 MHz	1,980.625	**1,982.5**	1,984.375
C5	3.75 MHz	1,985.625	**1,987.5**	1,989.375
G	3.75 MHz	1,990.625	**1,992.5**	1,994.375

Figure 70 Install- Frequency Table

5.4.3.3 Install- SNMP

Figure 71 Install - SNMP

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.

5.4.3.4 Install- Auto Installation

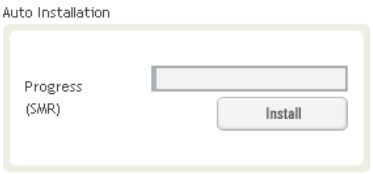


Figure 72 Install – Auto Installation

The Auto Installation routine can be run by clicking on the Install button. The Auto Installation routine runs basic system checks to ensure proper functionality.

5.4.4 Install- BRS

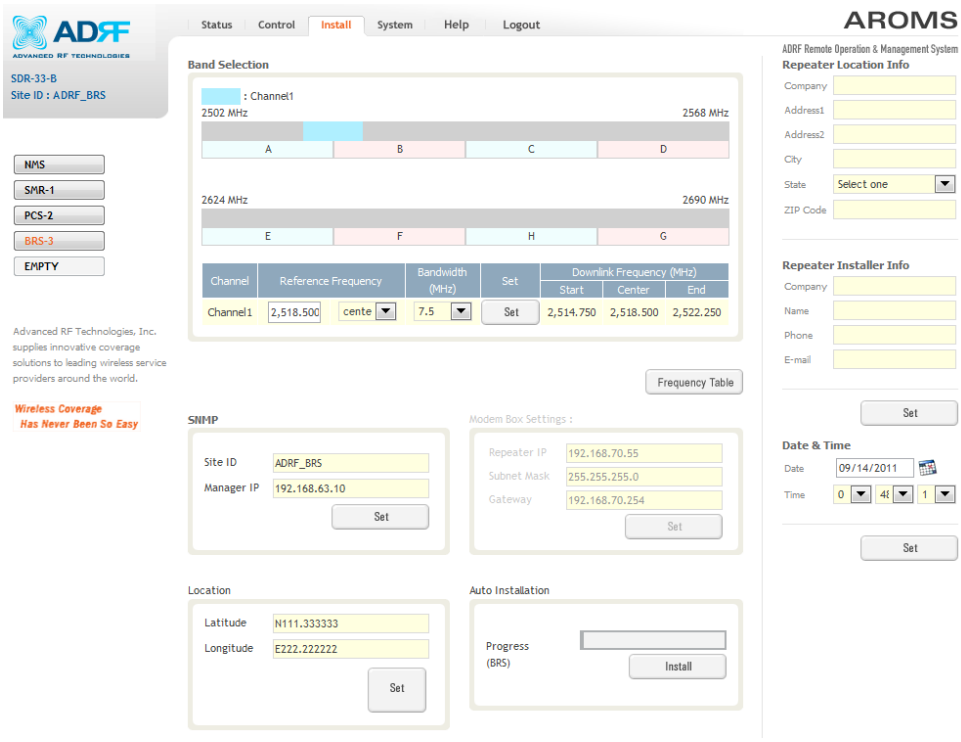


Figure 73 Install - BRS

The BRS Install page allows the user to specify the desired frequncies by inputting the Reference Frequency and Bandwidth. The BRS module supports 1 contiguous bands. Bandwidth selection ranges from 2.5 to 30 MHz. The Web-GUI requires you to select the exact pass-bands that you will be using and exclude the guard bands when making your band selections.

5.4.4.1 Install- BRS Band Selection

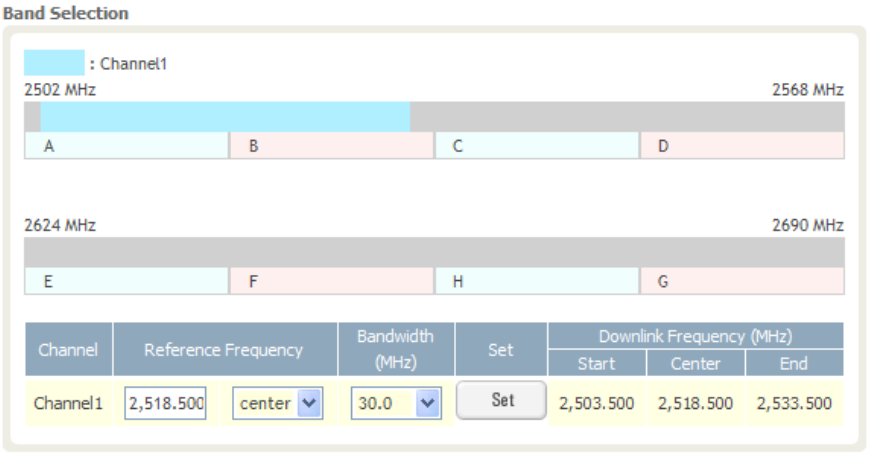


Figure 74 Install- BRS Band Selection

To specify a frequency, input a DL reference frequency and select either start, center, or stop from the dropdown menu. Select the desired bandwidth from the dropdown menu under the Bandwidth column and then click Set.

- Start Frequency

If a start frequency is specifed, then this will be the beginning frequency of the band selection. Adding the bandwidth value that is selected from the Bandwidth column will give you the end frequency of your band selection.

- Center Frequency:

Once a center frequncy is specified and a bandwidth is selected, the system will split the bandwidth value in half and then add this to the center frequency to obtain your end frequency and also subtract this value to obtain your start frequency.

- Stop Frequency:

If a stop frequency is specified, then this will be the ending frequency of the band selection. Subtracting the bandwidth value that is selected from the Bandwidth column will give you the start frequency of your band selection.

5.4.4.2 Install- Frequency Table

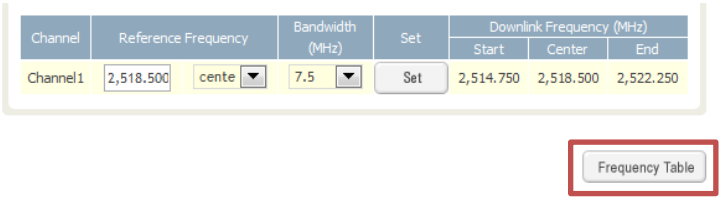
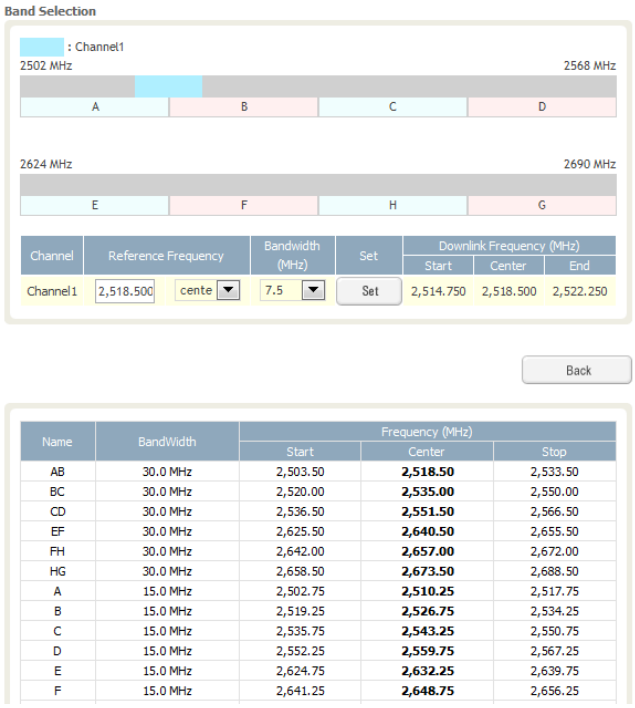


Figure 75 Install- Frequency Setting

By clicking on the Frequency Table button, the following screen will appear. You can use the frequency table as a reference to set the desired bands. Clicking on the Back button will take you back to the previous page.



Name	BandWidth	Frequency (MHz)		
		Start	Center	Stop
AB	30.0 MHz	2,503.50	**2,518.50**	2,533.50
BC	30.0 MHz	2,520.00	**2,535.00**	2,550.00
CD	30.0 MHz	2,536.50	**2,551.50**	2,566.50
EF	30.0 MHz	2,625.50	**2,640.50**	2,655.50
FH	30.0 MHz	2,642.00	**2,657.00**	2,672.00
HG	30.0 MHz	2,658.50	**2,673.50**	2,688.50
A	15.0 MHz	2,502.75	**2,510.25**	2,517.75
B	15.0 MHz	2,519.25	**2,526.75**	2,534.25
C	15.0 MHz	2,535.75	**2,543.25**	2,550.75
D	15.0 MHz	2,552.25	**2,559.75**	2,567.25
E	15.0 MHz	2,624.75	**2,632.25**	2,639.75
F	15.0 MHz	2,641.25	**2,648.75**	2,656.25

Figure 76 Install- Frequency Table

5.4.4.3 Install- SNMP

Figure 77 Install- SNMP

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.

5.4.4.4 Install- Auto Installation

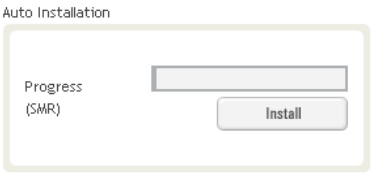


Figure 78 Install- Auto Installation

The Auto Installation routine can be run by clicking on the Install button. The Auto Installation routine runs basic system checks for propery functionaility.

5.4.5 Install- BTF

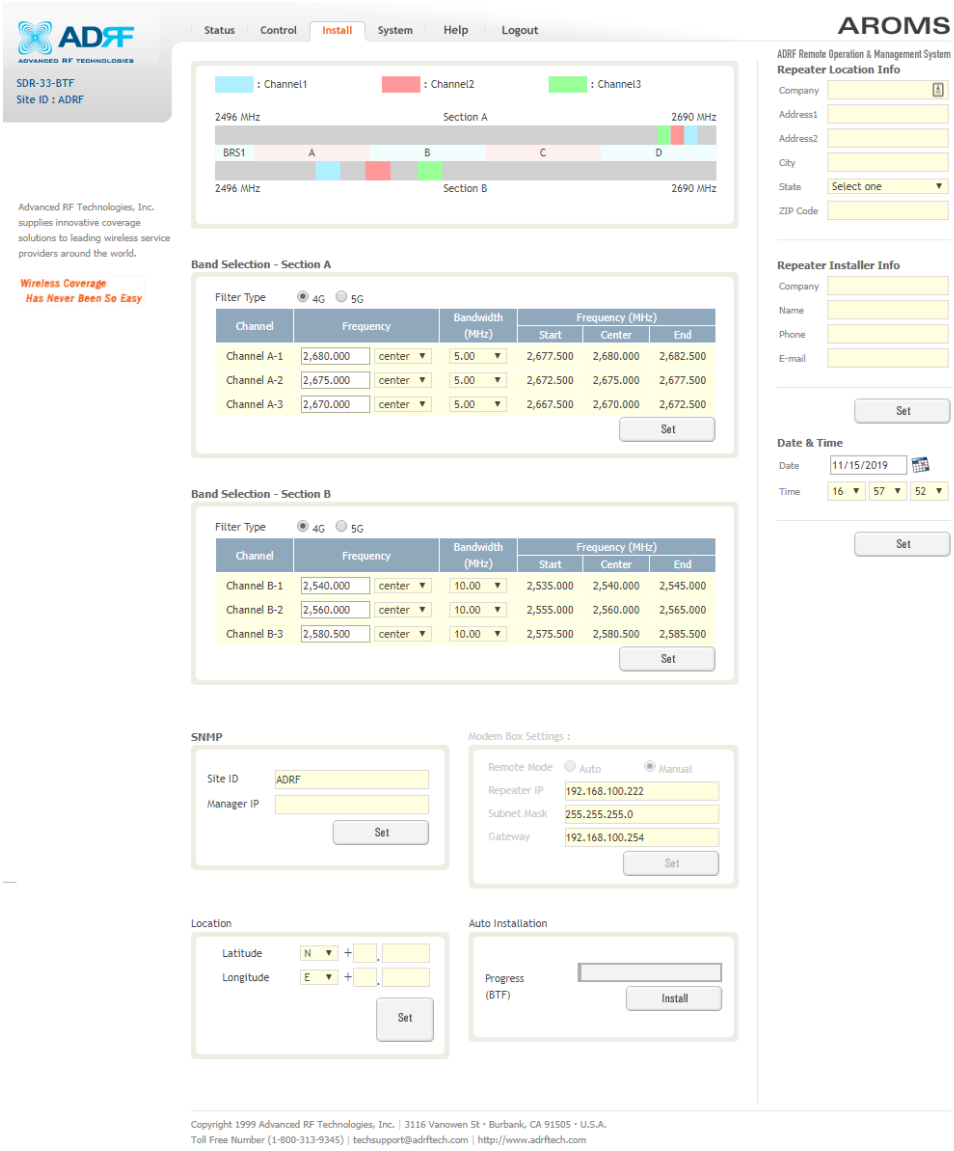


Figure 79 Install - BTF

The BTF Install page allows the user to specify the desired frequncies by inputting the Reference Frequency and Bandwidth. The BTF has 2 modules. The each BTF module supports each 3 non-contiguous bands in 4G, 1 contiguous band in 5G. Bandwidth selection ranges from 5 to 60 MHz in 4G, 20 to 100 MHz in 5G . The Web-GUI requires you to select the exact pass-bands that you will be using and exclude the guard bands when making your band selections.

5.4.5.1 **Install- BTF Band Selection**

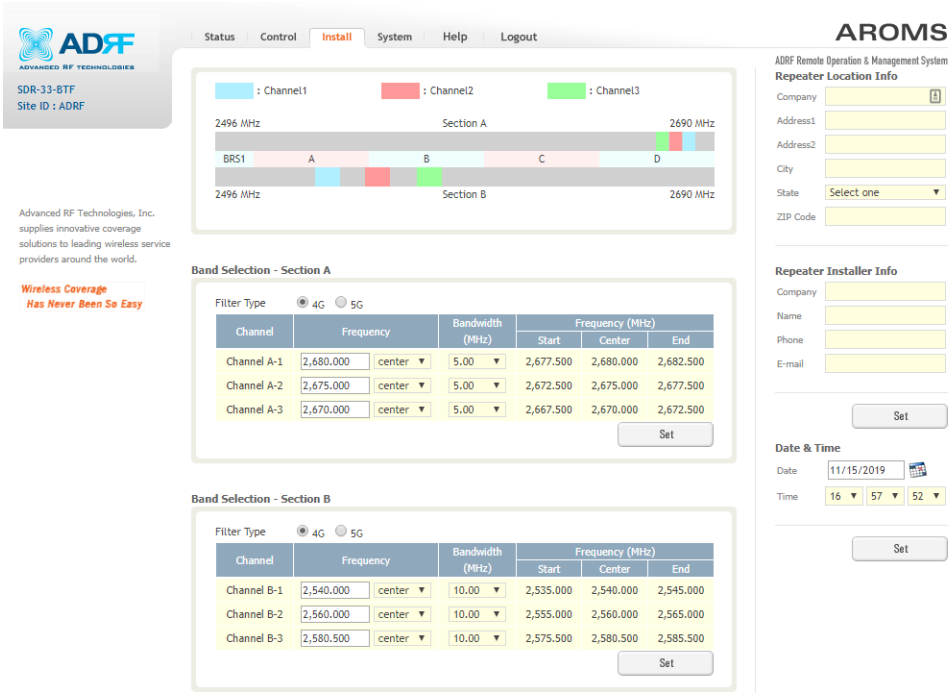


Figure 80 Install- BTF Band Selection

To specify a frequency, input a DL reference frequency and select either start, center, or stop from the dropdown menu. Select the desired bandwidth from the dropdown menu under the Bandwidth column and then click Set.

- Start Frequency

If a start frequency is specifed, then this will be the beginning frequency of the band selection. Adding the bandwidth value that is selected from the Bandwidth column will give you the end frequency of your band selection.

- Center Frequency:

Once a center frequncy is specified and a bandwidth is selected, the system will split the bandwidth value in half and then add this to the center frequency to obtain your end frequency and also subtract this value to obtain your start frequency.

- Stop Frequency:

If a stop frequency is specified, then this will be the ending frequency of the band selection. Subtracting the bandwidth value that is selected from the Bandwidth column will give you the start frequency of your band selection.

5.4.5.2 Install- SNMP

Figure 81 Install- SNMP

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.

5.4.5.3 Install- Auto Installation

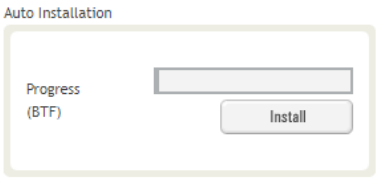


Figure 82 Install- Auto Installation

The Auto Installation routine can be run by clicking on the Install button. The Auto Installation routine runs basic system checks for propery functionaility.

5.4.6 Install- Cellular

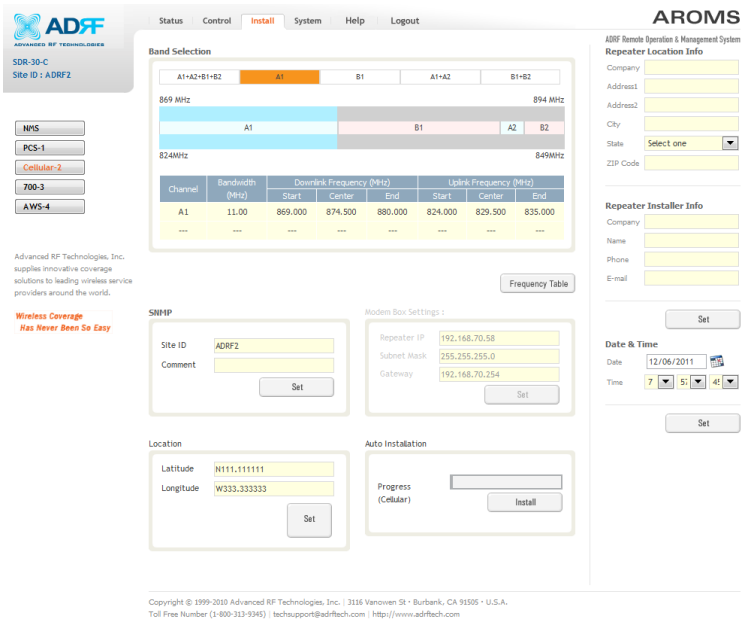
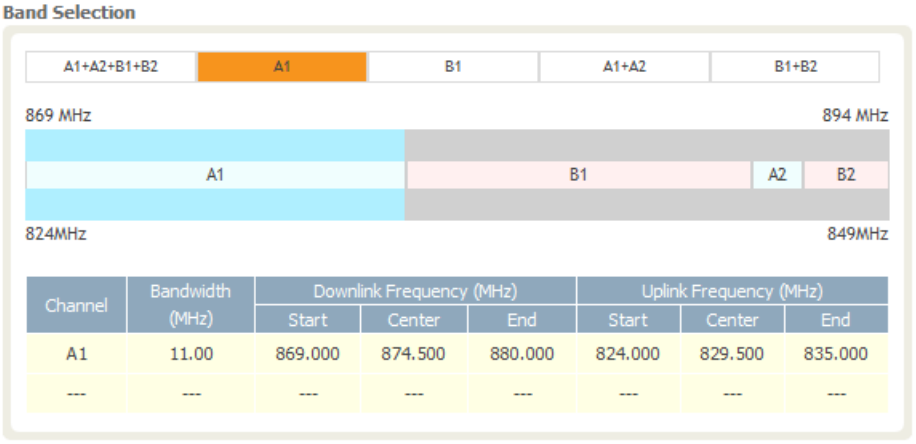


Figure 83 Install - Cellular

The Cellular Install page allows the user specify the desired frequncies by clicking on the preset Cellular band. Preset choices include A1+A2+B1+B2, A1, B1, A1+A2, and B1+B2.

5.4.6.1 Install- Cellular Band Selection



Channel	Bandwidth (MHz)	Downlink Frequency (MHz)			Uplink Frequency (MHz)		
		Start	Center	End	Start	Center	End
A1	11.00	869.000	874.500	880.000	824.000	829.500	835.000
---	---	---	---	---	---	---	---

Figure 84 Install- Cellular Band Selection

The selected preset bands will be highlighted in orange.

5.4.6.2 Install- Frequency Table

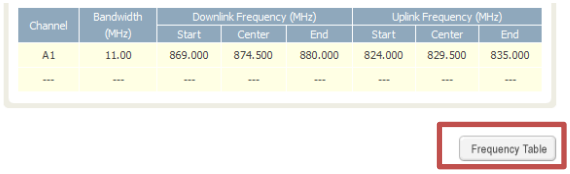


Figure 85 Install- Frequency Setting

By clicking on the Frequency Table button, the following screen will appear. You can use the frequency table as a reference to set the desired bands. Clicking on the Back button will take you back to the previous page.

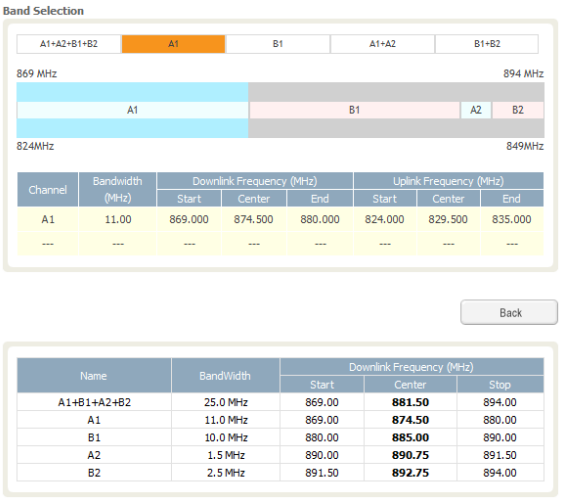


Figure 86 Install- Frequency Table

5.4.6.3 Install- SNMP

Figure 87 Install - SNMP

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.

5.4.6.4 Install- Auto Installation

Figure 88 Install – Auto Installation

The Auto Installation routine can be run by clicking on the Install button. The Auto Installation routine runs basic system checks to ensure proper functionality.

5.4.7 Install- 700 MHz

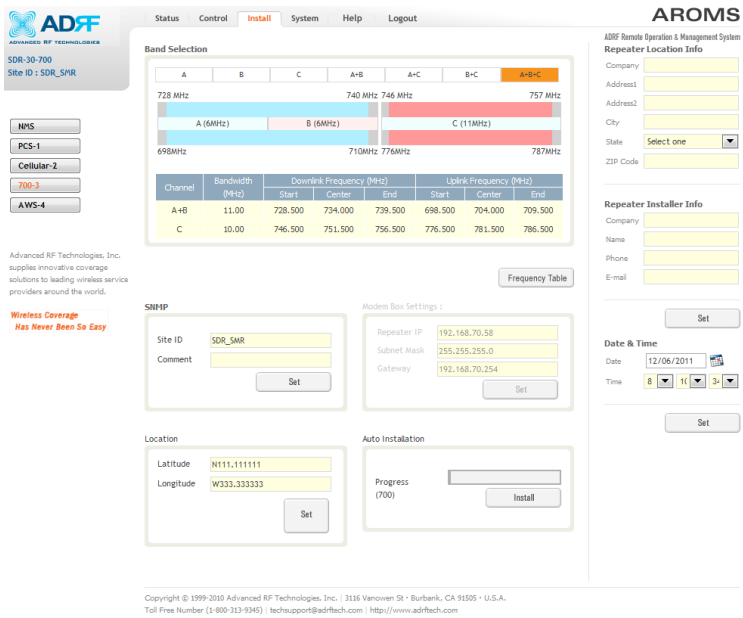
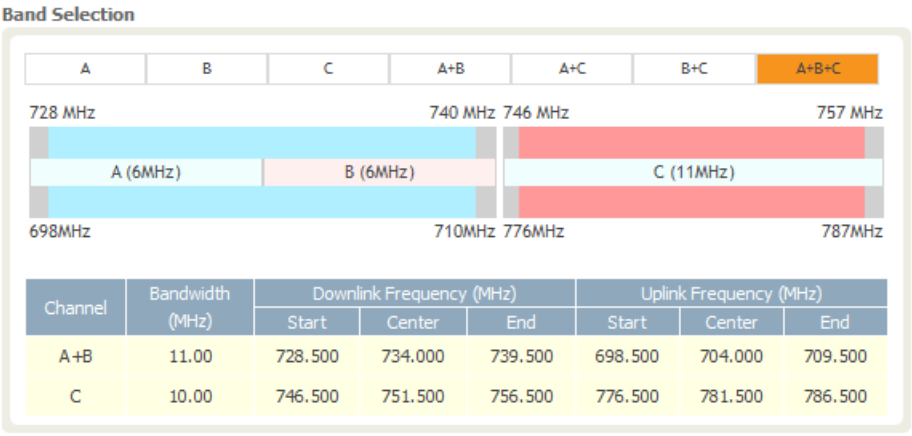


Figure 89 Install – 700 MHz

The 700 MHz Install page allows the user specify the desired frequncies by clicking on the preset 700 MHz band. Available choices include any combination of Lower A, Lower B, and Upper C.

5.4.7.1 Install- 700 MHz Band Selection



Channel	Bandwidth (MHz)	Downlink Frequency (MHz)			Uplink Frequency (MHz)		
		Start	Center	End	Start	Center	End
A+B	11.00	728.500	734.000	739.500	698.500	704.000	709.500
C	10.00	746.500	751.500	756.500	776.500	781.500	786.500

Figure 90 Install- Cellular Band Selection

The selected preset bands will be highlighted in orange.

5.4.7.2 Install- Frequency Table

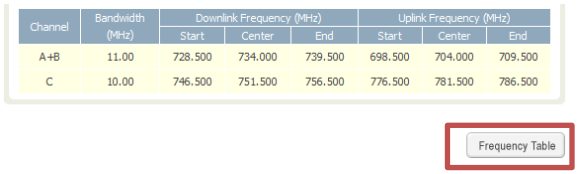


Figure 91 Install- Frequency Setting

By clicking on the Frequency Table button, the following screen will appear. You can use the frequency table as a reference to set the desired bands. Clicking on the Back button will take you back to the previous page.

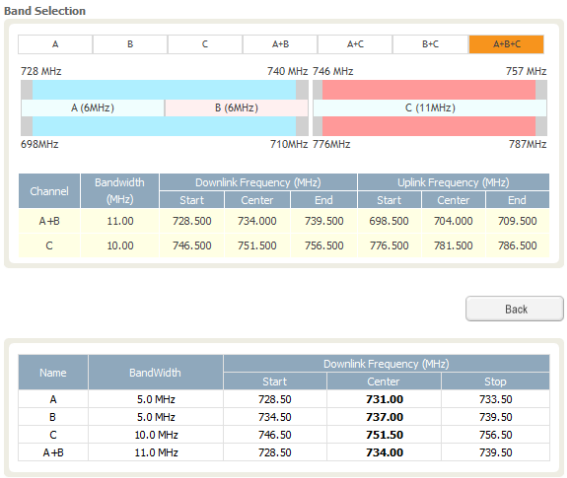


Figure 92 Install- Frequency Table

5.4.7.3 Install- SNMP

Figure 93 Install - SNMP

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.

5.4.7.4 Install- Auto Installation

Figure 94 Install – Auto Installation

The Auto Installation routine can be run by clicking on the Install button. The Auto Installation routine runs basic system checks to ensure proper functionality.

5.4.8 Install- AWS

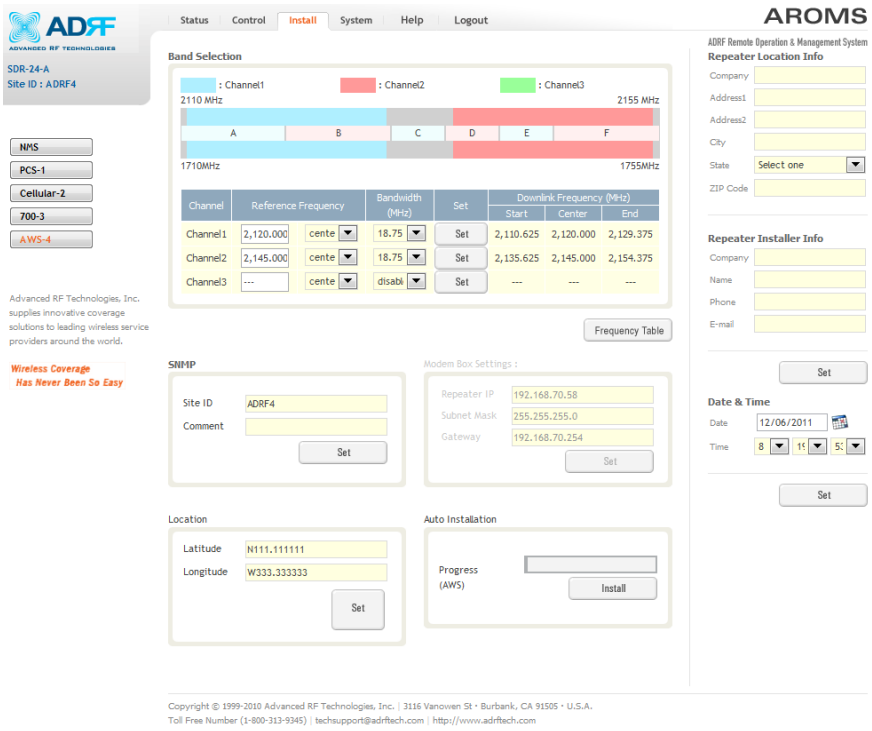


Figure 95 Install - AWS

The AWS Install page allows the user specify the desired frequncies by inputting the Reference Frequency and Bandwidth. The AWS module supports up to 3 non-contiguous bands. Bandwidth selection ranges from 1.25 to 18.75 MHz. The Web-GUI requires you to select the exact pass-bands that you will be using and exclude the guard bands when making your band selections.

5.4.8.1 Install- AWS Band Selection

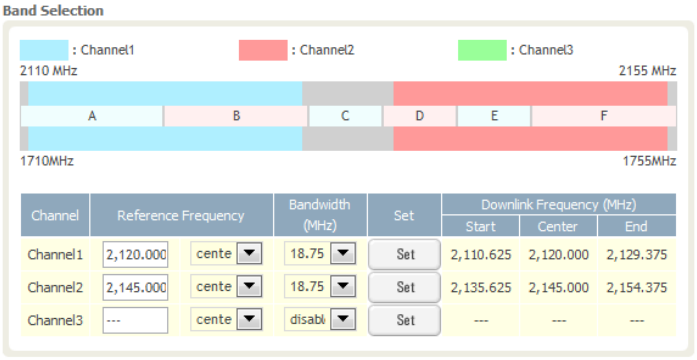


Figure 96 Install- AWS Band Selection

To specify a frequency, input a DL reference frequency and select either start, center, or stop from the dropdown menu. Select the desired bandwidth from the dropdown menu under the Bandwidth column and then click Set.

- Start Frequency

  If a start frequency is specifed, then this will be the beginning frequency of the band selection. Adding the bandwidth value that is selected from the Bandwidth column will give you the end frequency of your band selection.
- Center Frequency

  Once a center frequncy is specified and a bandwidth is selected, the system will split the bandwidth value in half and then add this to the center frequency to obtain your end frequency and also subtract this value to obtain your start frequency.
- Stop Frequency

  If a stop frequency is specified, then this will be the ending frequency of the band selection. Subtracting the bandwidth value that is selected from the Bandwidth column will give you the start frequency of your band selection.

5.4.8.2 Install- Frequency Table

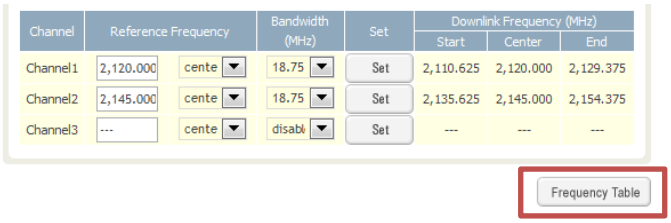


Figure 97 Install – Frequency Setting

By clicking on the Frequency Table button, the following screen will appear. You can use the frequency table as a reference to set the desired bands. Clicking on the Back button will take you back to the previous page.

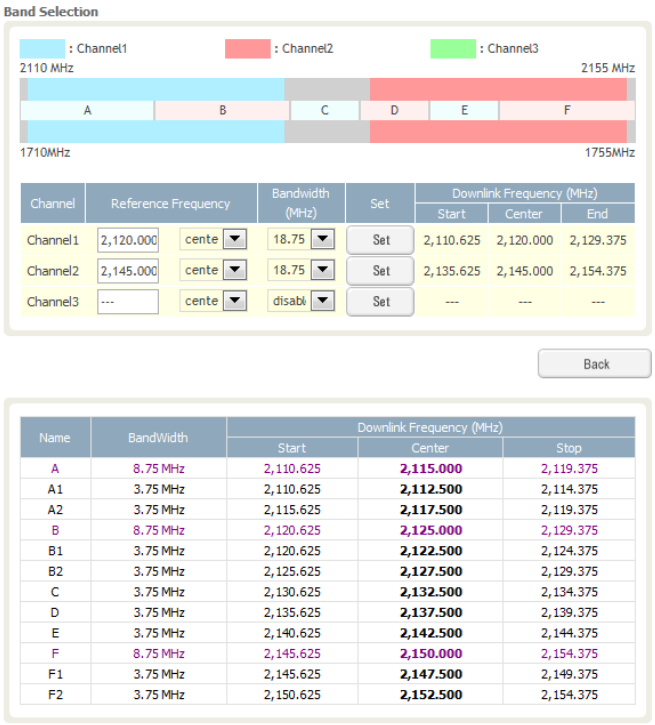


Figure 98 Install- Frequency Table

5.4.8.3 Install- SNMP

Figure 99 Install - SNMP

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.

5.4.8.4 **Install- Auto Installation**

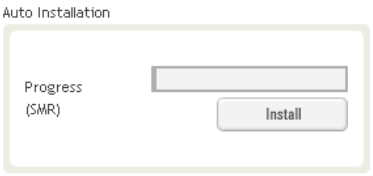


Figure 100 Install – Auto Installation

The Auto Installation routine can be run by clicking on the Install button. The Auto Installation routine runs basic system checks to ensure proper functionality.

5.5 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.

5.5.1 System- Account

5.5.1.1 System: Account- Account Management

The Account Management section allows 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.

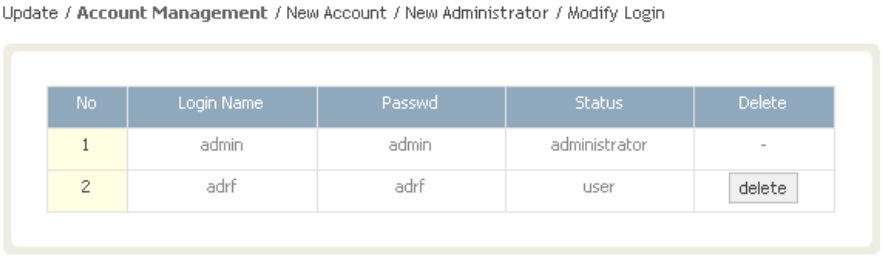


Figure 101 System: Account- Account Management

5.5.1.2 System: Account- 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.

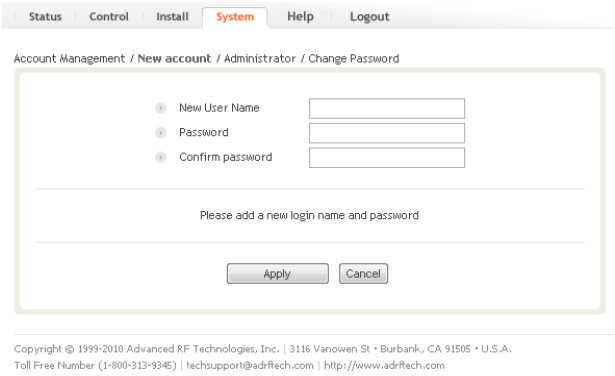


Figure 102 System: Account- New Account

5.5.1.3 System: Account- 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.

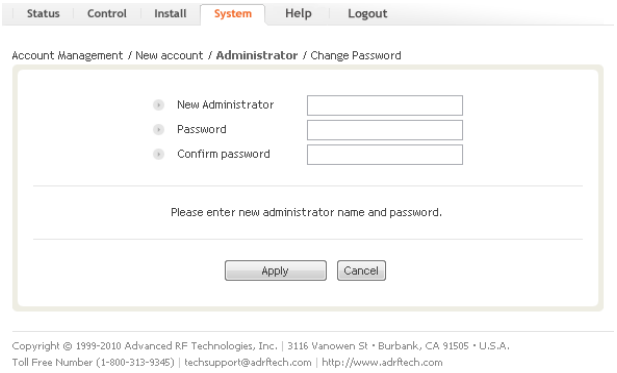


Figure 103 System: Account- Administrator

5.5.1.4 System: Account- Change Password

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

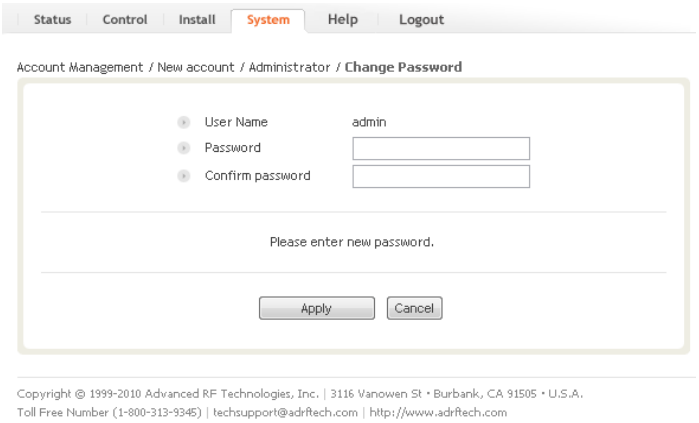


Figure 104 System: Account- Change Password

5.5.2 System- Closeout Package

The closeout package section will allow the user to upload documents to the module. 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.

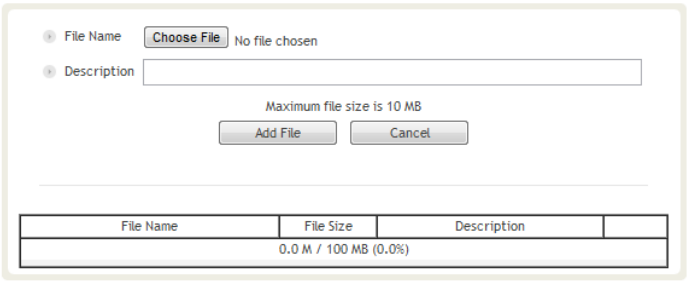


Figure 105 System- Closeout Package

To upload documents to the module, click on the "Choose File" or "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.

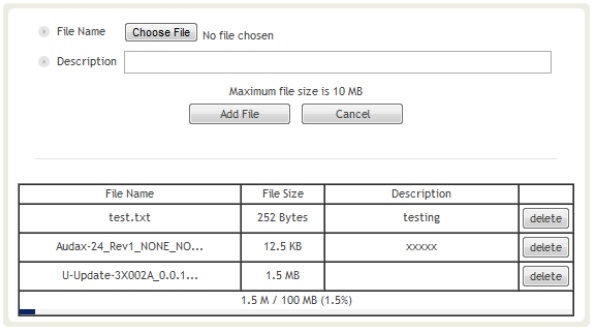


Figure 106 System- Closeout Package after the file upload

5.5.3 System- User Log

This section displays system events that have taken place. 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.

User Log

Number	Date	Username	Log Message
1	07/19/2011 20:43:17	admin	Logged-In
2	07/19/2011 19:34:09	admin	Logged-In
3	08/18/2011 13:31:08	adrf	[SMR-1] System Time Change to 7/19/2011 7:19:52
4	08/18/2011 13:21:42	adrf	Logged-In
5	08/18/2011 05:11:57	adrf	Logged-In
6	08/18/2011 01:45:25	admin	[SMR-1] Change Longitude to E222.222222
7	08/18/2011 01:45:25	admin	[SMR-1] Change Latitude to N111.111111
8	08/18/2011 01:43:59	admin	[SMR-1] UL HPA Set On
9	08/18/2011 01:43:59	admin	[SMR-1] DL HPA Set On
10	08/18/2011 01:43:59	admin	[SMR-1] AGC Set On
11	08/18/2011 00:12:06	admin	Logged-In

Figure 107 System – User Log

5.5.4 System: Update

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

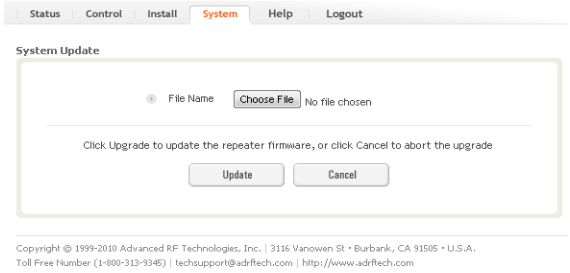


Figure 108 System update

- 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:

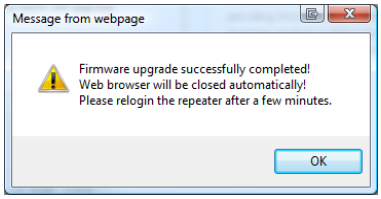


Figure 109 Pop-up message after System update is complete

5.5.5 System- Backup

The backup section allows the user to save the settings of the module. To perform the backup, click on the Backup button and you will be prompted to save the backup file. To restore the settings to the system, perform an update using this file.

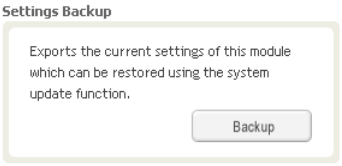


Figure 110 System backup

5.6 Help

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

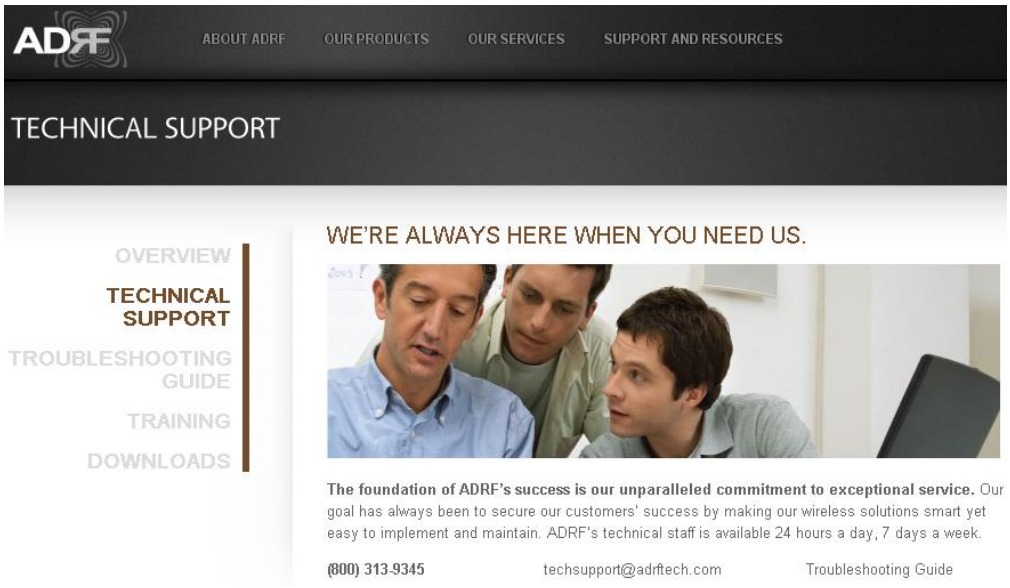


Figure 111 Help

5.7 Logout

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

6. MAINTENANCE GUIDE FOR SDR REPEATER

6.1 Periodic Inspection Checklist

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

6.2 Preventive Measures for Optimal Operation

6.2.1 Recommendations

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

6.2.2 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.

7. WARRANTY AND REPAIR POLICY

7.1 General Warranty

The SDR 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@adrftech.com.

8. SPECIFICATIONS

8.1 Electrical Specifications

Parameters		Specifications		
		SDR-33-700F	SDR-33-C	SDR-33-P
Frequency Range	DL	728~746 MHz 746~757 MHz	869~894 MHz	1930~1995 MHz
	UL	698~716 MHz 776~787 MHz	824~849 MHz	1850~1915 MHz
Frequency Error		**≤ ±0.05ppm**		
Band Selection		LTE_10MHz	LTE_10MHz	1.25MHz Step Max 18.75 MHz LTE_10 & 20MHz
Gain Flatness	Full band	≤ ±1.5dB		
	Each band	≤ ±1.5dB		
Gain	Maximum	95B		
	Step	0.5dB		
	Range	40dB		
	Tolerance	≤ ±1.0dB		
Composite Output power		33dBm (SDR-33)		
Delay		**6us**		
Roll offs		1MHz@ 50dBc		
Noise Figure(Uplink Only)		6dB@ Max Gain		
VSWR (Input Only)		1.5:1		

8.2 Mechanical Specifications

Table 8-1 Mechanical Specifications

Parameters		Specifications	Remarks
Size	Module	18.2 x 11.6 x 4.2 in	
	NMS	17 x 16.7 x 2.3 in	
	Chassis	19 x 19.1 x 14 in	
Weight	Module	23 lbs	
	NMS	7 lbs	
	Chassis	26 lbs	
Connector Type	Input / Output	N Female	
	Sum Port		
	Ethernet	RJ45 Female	
	Frame ground	M5 Screw	
Mount type		Wall mount or 19” rack mount	
Security		Physical Cabinet	

8.3 Power Specifications

Table 8-2 Power Specifications

Parameters	Specifications	Remarks
AC Power	110~130V AC / 210~240V AC	AC Select

8.4 Environment Specifications

Table 8-3 Environment Specifications

Parameters	Specifications	Remarks
Operating Temperature	+14 ~ +122°F	
	-10 ~ +50°C	
Relative Humidity	+5 ~ +90%	
Industrial dust	Telcordia GR63-core	

8.5 Warranty & Certificates

Table 8-4 Warranty & Certificates

Parameters	Specifications	Remarks
MTBF	> 100,000 hours	
Certificates	UL 60950	
	FCC CFR47 part 22, 24, 27	
	FCC CFR47 part 15	

APPENDIX A: MECHANICAL DRAWING

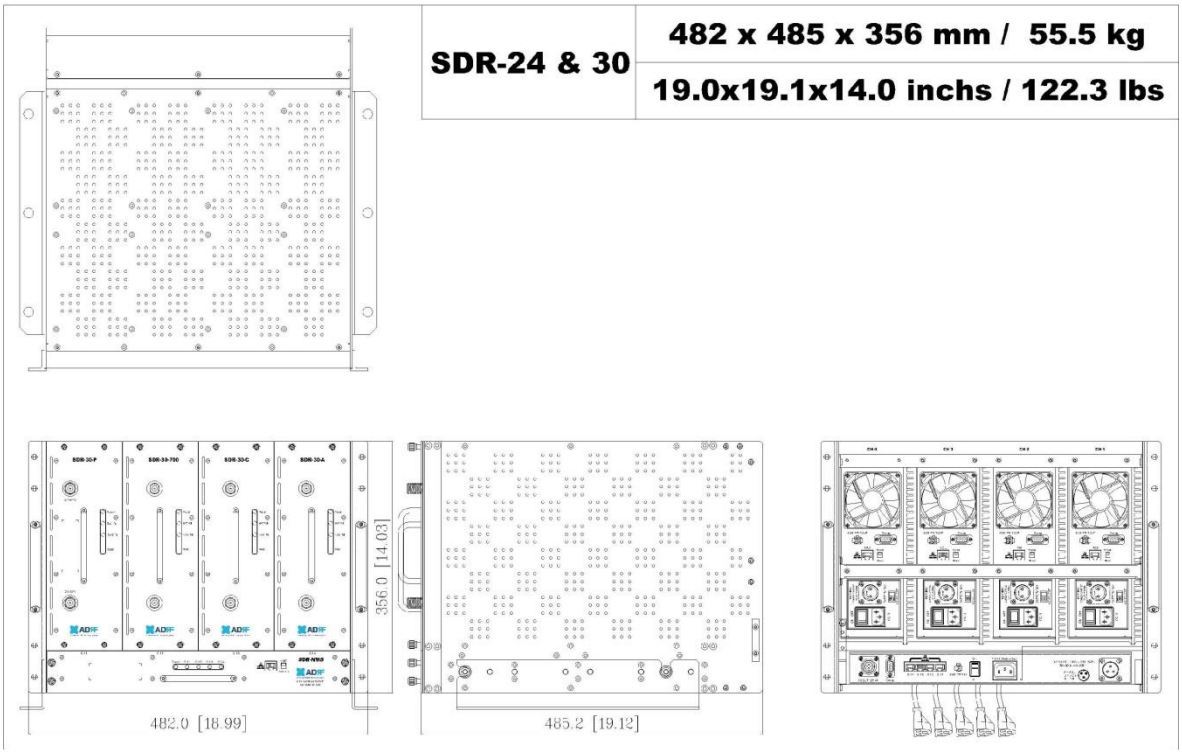


Figure 112 SDR Mechanical Drawing

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 10^{th} retry, then the repeater will turn off its HPAs permanently until a reset is performed or factory set is executed.

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