NOTIFIER®
by Honeywell

Emergency Radio Communications Enhancement Systems (ERCES)

NF-BDA150-1B, NF-BDA400-1B, NF-BDA400-2B, NF-BDA700-1B, NF-BDA800-1B, NF-DEMOBDA800-1B, NF-BDA7800-2B Class B Signal Boosters

Instruction Manual

Document LS10212-001NF-E Rev: A
06/06/2018 ECN: 18-0255

Installation Precautions

Adherence to the following will aid in problem-free installation with long-term reliability:

WARNING - Several different sources of power can be connected to the panel. Disconnect all sources of power before servicing. Control unit and associated equipment may be damaged by removing and/or inserting cards, modules, or interconnecting cables while the unit is energized. Do not attempt to install, service, or operate this unit until manuals are read and understood.

CAUTION - System Re-acceptance Test after Software Changes: To ensure proper system operation, this product must be tested in accordance with NFPA 72 after any programming operation or change in site-specific software. Re-acceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring. All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested.

It is recommended that this system and its peripherals be installed in an environment with a prevailing ambient temperature of 25º C/77º F.

Verify that wire sizes are adequate for the device loop and the maximum long-line resistance is not exceeded per the documentation provided by the device manufacturer. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning induced transients. Although no system is completely immune from lightning transients and interference, proper grounding will reduce susceptibility. Overhead or outside aerial wiring is not recommended, due to an increased susceptibility to nearby lightning strikes. Consult with the Technical Services Department if any problems are anticipated or encountered.

Disconnect AC power and batteries prior to removing or inserting circuit boards. Failure to do so can damage circuits.

Remove all electronic assemblies prior to any drilling, filing, reaming, or punching of the enclosure. When possible, make all cable entries from the sides or rear. Before making modifications, verify that they will not interfere with battery, transformer, or printed circuit board location.

Do not tighten screw terminals more than 9 in-lbs. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

This system contains static-sensitive components. Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Use static suppressive packaging to protect electronic assemblies removed from the unit.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the control panel and associated equipment. FACP operation and reliability depend upon proper installation.

FCC Warning

Part 90 Signal Boosters **These are 90.219 Class B Devices**

150 ERCES FCC ID: 2AHVPSB150M2A
400 ERCES FCC ID: 2AHVPSB400M2A
700 ERCES FCC ID: 2AHVPSB700M2A
800 ERCES FCC ID: 2AHVPSB800M2A
7800 ERCES FCC ID: 2AHVPSB7800M2A

WARNING: These are **NOT CONSUMER** devices. They are designed for installation by **FCC LICENSEES** and **QUALIFIED INSTALLERS**. You **MUST** have an **FCC LICENSE** or express consent of an FCC Licensee to operate this device. You **MUST** register Class B signal boosters (as defined in 47 CFR 90.219) online at **www.fcc.gov/signal-boosters/registration.**

Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause interference to radio communications. It has been tested and found to comply with the limits for class A computing devices pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when devices are operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his or her own expense.

Canadian Requirements

This digital apparatus does not exceed the Class A limits for radiation noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

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Section 1: Safety and Standards

Before use, review this manual and insure that all conditions meet the equipment specifications and site requirements. Safe operation may be impaired if this equipment is not used as intended. Honeywell International, Inc. assumes no liability for the customer's failure to comply with these precautions.

This manual contains cautions and warnings to alert the reader as follows:

CAUTION: SUMMARY IN BOLD
INFORMATION ABOUT PROCEDURES THAT COULD CAUSE PROGRAMMING ERRORS, RUNTIME ERRORS, OR EQUIPMENT DAMAGE.

WARNING: SUMMARY IN BOLD
INDICATES INFORMATION ABOUT PROCEDURES THAT COULD CAUSE IRREVERSIBLE DAMAGE, IRREVERSIBLE LOSS OF PROGRAMMING DATA OR PERSONAL INJURY.

1.1 Safety Instructions

The NF-BDA150-1B, NF-BDA400-1B, NF-BDA400-2B, NF-BDA700-1B, NF-BDA800-1B, and NF-BDA7800-2B Class B Signal Boosters are not consumer devices. They are intended and designed for installation by qualified installers.

Danger - Electrical Shock Hazard

Any high voltage and electrical ground connections must be done by a qualified electrician. To prevent electrical shock when installing or modifying the system power wiring, disconnect the wiring at the power source before working with uninsulated wires or terminals. Prior to powering up the unit, please make sure that electrical ground is connected to both the ground DIN-Rail terminals and to the enclosure grounding bolt located on the underside of the enclosure. AC Power and RF Connections should be installed with all standards as defined in NFPA 1221. This includes grounding and electrical bonding together of all equipment enclosures and grounding of the primary antenna cable and the installation of proper surge suppression (lightning arrestor) equipment at the entrance to the building or the equipment room.

Danger - Battery

Risk of explosion or fire if battery is replaced with incorrect type. Do not use faulty or degraded batteries. Follow all installation instructions and safety precautions specified in this manual. Replacement fuses and batteries must be the same type and must have identical values to the original ones. Do not short the battery terminals or other power supply lines. Do not leave loose pieces of wire or other conductive material inside the battery or signal booster enclosures. Do not block the battery enclosure vents.

1.2 Federal Communications Commission

The NF-BDA150-1B, NF-BDA400-1B, NF-BDA400-2B, NF-BDA700-1B, NF-BDA800-1B, and NF-BDA7800-2B Class B Signal Boosters shall be serviced by Notifier certified and qualified personnel only. Unauthorized alternations, modifications and settings changes may cause harmful interference and result in non-compliance with FCC rules.

Unauthorized Changes to Equipment

Changes or Modifications not expressly approved by the manufacturer responsible for compliance could void the user’s authority to operate the equipment

FCC RF Exposure Limits

This unit complies with FCC RF exposure limits for an uncontrolled environment. To comply with FCC RF exposure limit requirements antennas must be operated at a minimum distance of 77.25cm or 2.53’ between the radiator and any person’s body. This assumes 5W ERP (=8.2W EIRP) with 20% power margin.

- 90.219 (d) Class B broadband signal boosters are permitted to be used only in confined or indoor areas such as buildings, tunnels, underground areas, etc., or in remote areas, i.e., areas where there is little or no risk of interference to other users.
- 90.219 (e) The licensee is given authority to operate signal boosters without separate authorization from the Commission. Certificated equipment must be employed and the licensee must ensure that all applicable rule requirements are met. (f) Licensees employing either Class A narrowband or Class B broadband signal boosters as defined in §90.7 are responsible for correcting any harmful interference that the equipment may cause to other systems. Normal co-channel transmissions will not be considered as harmful interference. Licensees will be required to resolve interference problems pursuant to §90.173(b).

ERP POWER LIMIT

FCC regulations limit signal booster ERP (Effective Radiated Power) to 5W. Effective radiated power is calculated as follows: 1.59W - (CABLE LOSSES) – (CONNECTOR AND SPLITTER LOSSES) - (ANY OTHER SYSTEM LOSSES) + (ANTENNA GAIN), *where the 1.59W figure is the maximum output power of the signal booster @ 32dBm.*

NOTE: If a high gain antennas are used, such as a directional Yagi antenna, reduce the maximum output power of the signal booster so that the ERP (Effective Radiated Power) does not exceed the 5W limit.

1.3 Other Standards and Documents

■ This Two Way Radio Communication Enhancement System complies with the following standards:

- NFPA 72 Two Way Radio Communications Enhancement Systems
- NFPA 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.

■ This Two Way Radio Communication Enhancement System also complies with:

- UL 2524 In-Building 2-way Emergency Radio Communication Systems

■ The installer should be familiar with the following documents and standards:

- NFPA 70 National Electric Code
- NFPA 72 Inspection, Testing and Maintenance for Fire Alarm Systems.

Underwriters Laboratories (UL)

- UL 50 Enclosures for Electrical Equipment
- UL 50E Enclosures for Electrical Equipment, Environmental Considerations
- UL 864 Standard for control Units for Fire Protective Signaling Systems
- UL1481 Power Supplies for Fire Protective Signaling Systems
- UL 2524 In-Building 2-way Emergency Radio Communication Systems

Other

- FCC Title 47 Part 15b Radio Frequency Devices - Unintentional Radiators
- FCC Title 47 Part 90 Private Land Mobile Radio Services
- IFC 2018 International Fire Code
- NEC Article 300 Wiring Methods
- NEC Article 760 Fire Protective Signaling Systems
- NEMA 250 Enclosures for Electrical Equipment
- Applicable Local and State Building Codes
- Requirements of the Local Authority Having Jurisdiction

1.4 Related Documents

The table below provides a list of documents referenced in this manual, as well as documents for selected other compatible devices.

Compatible Conventional Devices (Non-addressable)	**Document Number**
Device Compatibility Document	15378
Fire Alarm Control Panel (FACP) and Main Power Supply Installation	**Document Number**
NFS2-3030 Installation, Programming and Operations Manuals	52544, 52545, 52546
NFS2-640/E Installation, Operations, and Programming Manuals	52741, 52742, 52743
NFS-320/E/C Installation, Operations, and Programming Manuals NFS-320C Canadian Applications Addendum	52745, 52746, 52747, 52745CDN
SLC Wiring Manual	51253
XP10-M Ten Input Monitor Module Installation Document	I56-1803
Dedicated Annunciator Installation Document	LS10212-000GE-E
Battery Enclosure Installation Document	LS10212-001GE-E
Seismic Kit (BDA-SBR-10-UL3R) Product Installation Document	LS10212-002GE-E

Table 1.1 Related Documents

Section 2: Overview

The Emergency Radio Communications Enhancement System (ERCES) consists of Class B signal boosters. The NF-BDA150-1B, NF-BDA400-1B, NF-BDA400-2B, NF-BDA700-1B, NF-BDA800-1B, and NF-BDA7800-2B are high gain, high power, class B signal boosters. The signal booster is a bi-directional amplifier (BDA) that operates in the public safety bands. It is intended for enhancing two-way radio signal coverage in buildings, tunnels, and other confined areas.

The NF-BDA150-1B has a 150-174MHz single VHF sub-band.

The NF-BDA400-1B has a 450-520MHz single UHF sub-band.

The NF-BDA400-2B has a 450-520MHz dual UHF sub-band.

The NF-BDA700-1B has a full 700 MHz FirstNet Public Safety Band coverage.

The NF-BDA800-1B has a full 800 MHz Public Safety Band coverage.

The NF-BDA7800-2B has a dual band with full 700 MHz FirstNet and 800 MHz Public Safety Band coverage.

2.1 Features

The BDA is specifically designed for public safety and other mission-critical applications. The NFPA-compliant version of the signal booster includes:

- Built-in dual power supply system with a backup battery charging and monitoring system.
- Two sets of monitoring connections (fire panel and annunciator) for status monitoring of the BDA operation
- System monitoring for antenna systems, battery capacity, power supply, AC status, temperature, RF module status, etc.
- Removable SD memory card for logging event history as a simple text file.
- Two separate circuit breakers for easy power hookup and for the increased reliability.
- Conveniently mounted RF modules located on the main panel for easy access and serviceability.
- Self Attenuating Oscillation Prevention feature prevents signal interference by automatically reducing gain if the signal conditions change and cause signal oscillation.

The unit is factory-set for specific frequencies and bandwidths. Other than gain and power settings, it does not require any additional field tuning or programming.

2.2 Hardware Layout

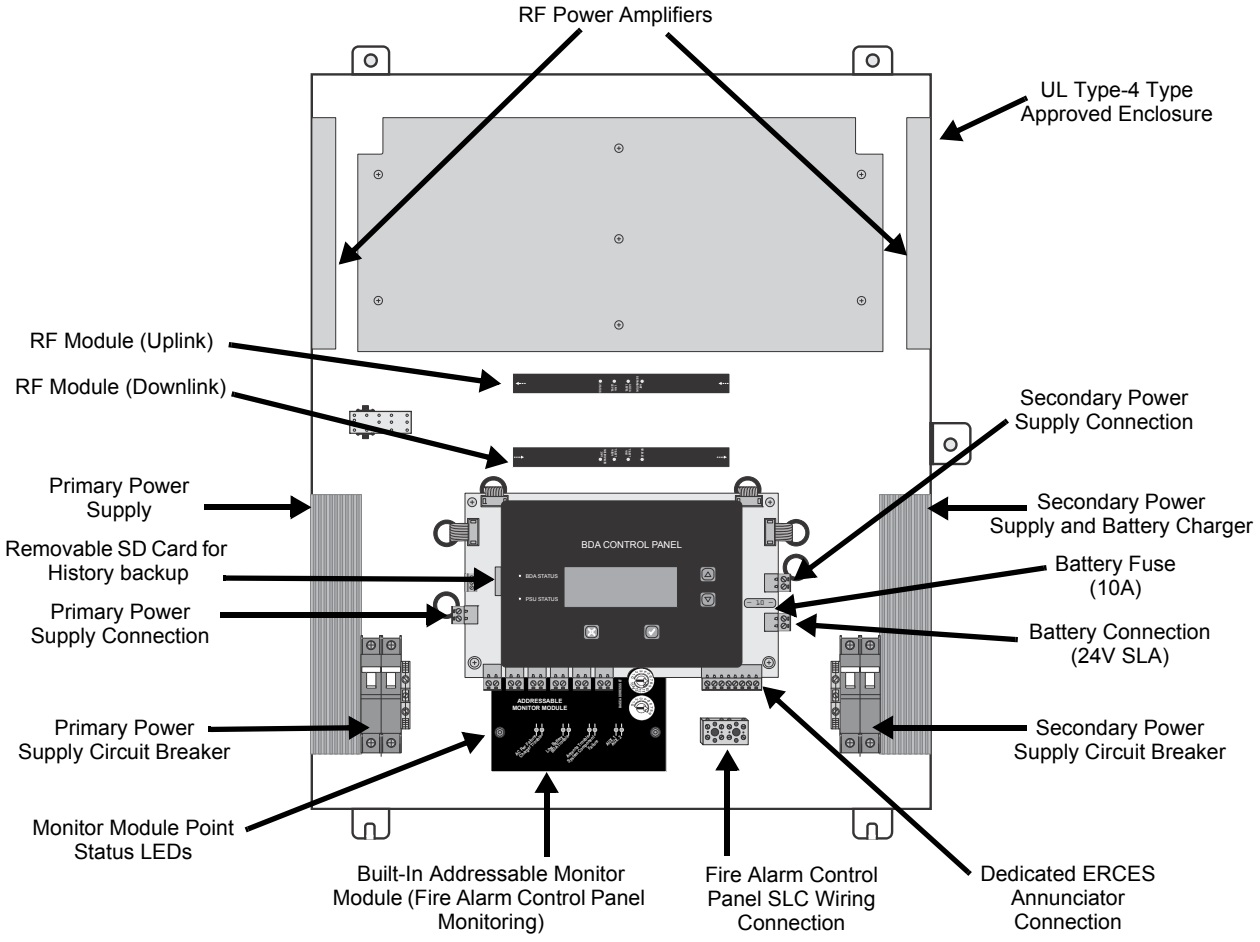


Figure 2.1 Hardware Layout for the NF-BDA150-1B, NF-BDA400-1B,NF-BDA400-2B, NF-BDA700-1B, and NF-BDA800-1B

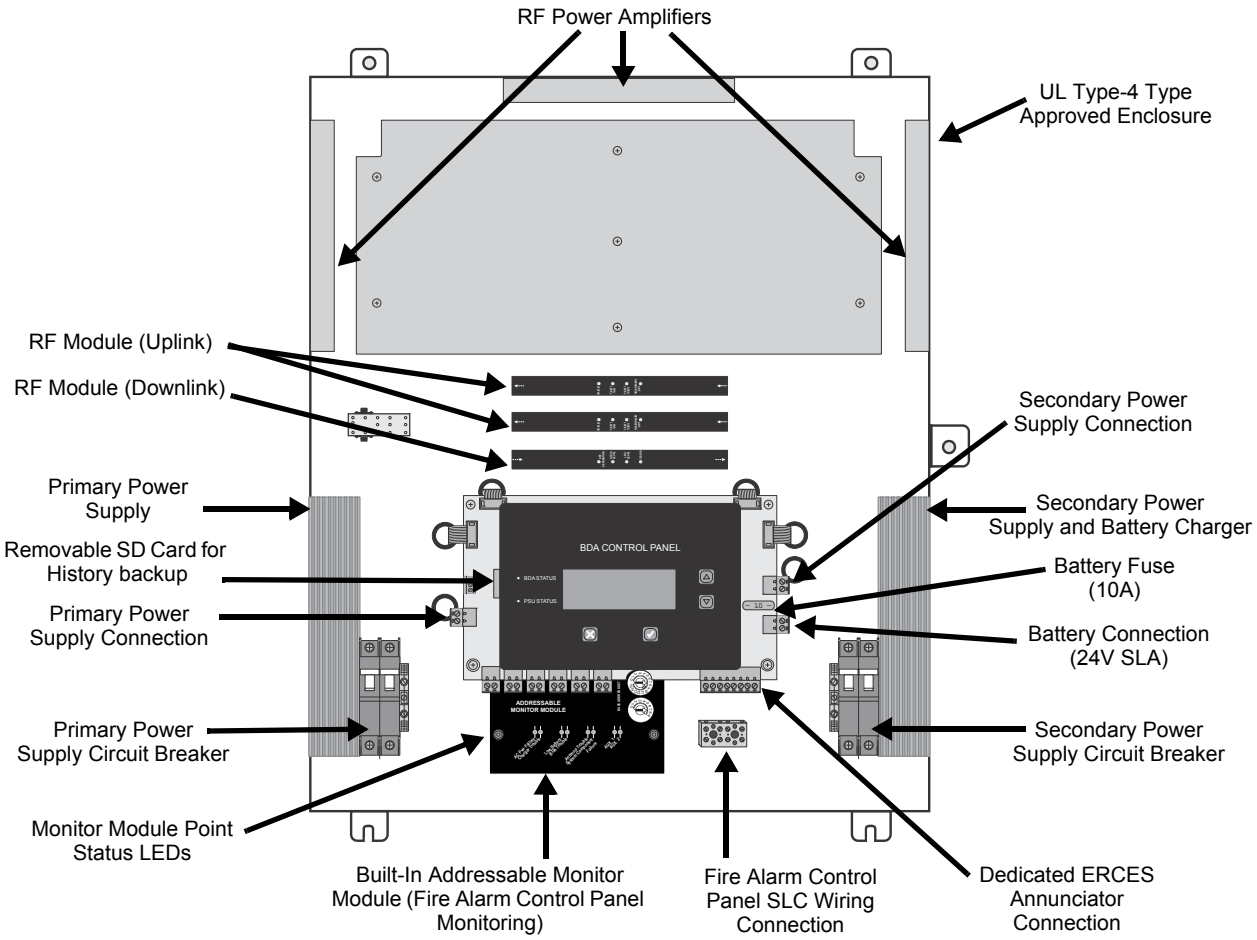


Figure 2.2 Hardware Layout for the NF-BDA7800-2B

2.3 LED Indicators

The Red "Signal" LEDs on both modules indicate that the ALC (Automatic Level Control) circuit has been activated – i.e. input signal is high enough where amplifier needs to reduce the gain to limit the output power to 30dBm max (28dBm max for the NF-BDA7800-2B).

The "Status" LEDs indicates status of the module. A Green LED light indicates that the unit is powered up and no faults have been detected. A Red Status LED light indicates a problem with the module, such as over/under voltage, over/under temperature, over/under current draw or another module fault. All off-normal conditions are signaled to the central monitoring unit which then displays the off-normal condition on the LCD. The off-normal condition is logged with the current time stamp to the SD card and activates the BDA fault condition outputs.

2.3.1 Electrical Specifications

Frequency Range

NF-BDA150-1B	150MHz - 174MHz
NF-BDA400-1B NF-BDA400-2B	450MHz - 512MHz
NF-BDA700-1B	Uplink: 793-805MHz Downlink: 763-775MHz
NF-BDA800-1B	Uplink: 806-815MHz Downlink: 851-860MHz
NF-BDA7800-2B	Uplink: 793-815MHz Downlink: 851-860MHz and 763-775MHz

Maximum Composite Output Power

NF-BDA150-1B	30dBm
NF-BDA400-1B NF-BDA400-2B	32dBm
NF-BDA700-1B	30dBm
NF-BDA800-1B	30dBm
NF-BDA7800-2B	28dBm

Power Limiter Adjustment (1dB increments)

NF-BDA150-1B	30dBm to 16dBm
NF-BDA400-1B NF-BDA400-2B	32dBm to 18dBm
NF-BDA700-1B	30dBm to 16dBm
NF-BDA800-1B	30dBm to 16dBm
NF-BDA7800-2B	28dBm to 14dBm

Noise Figure

NF-BDA150-1B	<6.5dB typ. 8dB max.
NF-BDA400-1B NF-BDA400-2B	<6.5dB typ. 8dB max
NF-BDA700-1B	<6.5dB typ. 8dB max
NF-BDA800-1B	<6.5dB typ. 8dB max
NF-BDA7800-2B	<6.0dB typ. 7dB max

Common Electrical Specifications

Maximum Gain (adjustable)	92dB (Typ)
Gain Adjustment, 1 dB steps	50dB to 92dB = 42dB total adjustment range
Impedance	50 Ohm
Maximum RF Signal Input Level for FCC spurious limits compliance	-20dBm
Maximum Signal Propagation Delay	9µs
Absolute Maximum Input RF Signal Level	0dBM continuous, +10dBm peak
Condition Monitoring	Six (6) Form A relays for each of the following off-normal conditions: AC Power Status, Charger Status, Low Battery Capacity, Low Battery Voltage, BDA Trouble, Antenna Trouble, and Aux Alarm. Second relay contact set provided for a LED annunciator panel.Each relay is rated 30VDC @ 2A.
Dedicated Annunciator	6 output channels rated @ 25mA per circuit Maximum wire resistance = 180 ohms
Event Logging	Standard SD Card up to 16GB or Mini SD with an adapter. Real-time clock time stamp included.
AC Power Supply	Two independent power supplies with 110-240VAC/2.1A, 50/60Hz each
Power Supply Efficiency	91% (Typ)
DC Power Supply	Requires two (2) 75Ah 12V AGM Sealed L.A. batteries in series for Secondary power
Fuses	Fast Acting, ATC or ATO, 10A, 32VDC
Maximum Current Draw	2.5A @24VDC
Run Time with standard 2x75Ah 60% de-rated Battery Backup	24 Hours under full load
Battery Charging with the Built-in Charger*	Charging Current Limited to 5A max.
Recommended Ambient Temperature	-4°F to +77° F (-20°C to +25°C)

* Only use approved lead-acid batters. Contact Customer Service for list of approved batteries.

CAUTION: VOIDING THE WARRANTY
OPERATING THE DEVICE OUTSIDE THE RECOMMENDED AMBIENT TEMPERATURE RANGE MAY VOID THE WARRANTY.

2.3.2 Mechanical Specifications

Dimensions	UL Type-4 Enclosure: 20.55”Wx24”Hx8.32”D
Total Width Including Heatsinks	23.23”
Total Height Including Mounting Tabs	26.22”
Signal Booster Enclosure Type	UL Type-4, Sealed Enclosure, Aluminum with Powder-Coat.
Weight - Standard enclosure, single sub band configuration, NFPA-Compliant version with two power supplies	<59lbs
RF Connectors	N-Female
Backup Battery Enclosure, Order separately*	UL Type-3R 23”Wx13”Hx8.3”D, contains two 12V/75Ah Sealed Lead-Acid Batteries†
Battery Enclosure Color	Red, includes louvered vents on both sides
Connections	Four 1/2” trade size cutouts provided for conduit or strain relief fittings for power, battery backup and communication wiring. For unused cutouts, use UL Type-4 rated 1/2 conduit hub plugs.

* Additional battery backup configurations are available. Call Customer Service for information.
† An inline 10A fuse is required on the positive battery terminal.

2.3.3 Wiring Specifications

Terminations	Wiring Size
Battery Connection	12 - 16 AWG
Dedicated Annunciator Wiring	18 - 24 AWG (solid wire) 20 - 22 AWG (stranded wire)
Primary Power Wiring	10 - 14 AWG
Ground Wiring	8 - 14 AWG

Table 2.1

Section 3: Installation and Maintenance

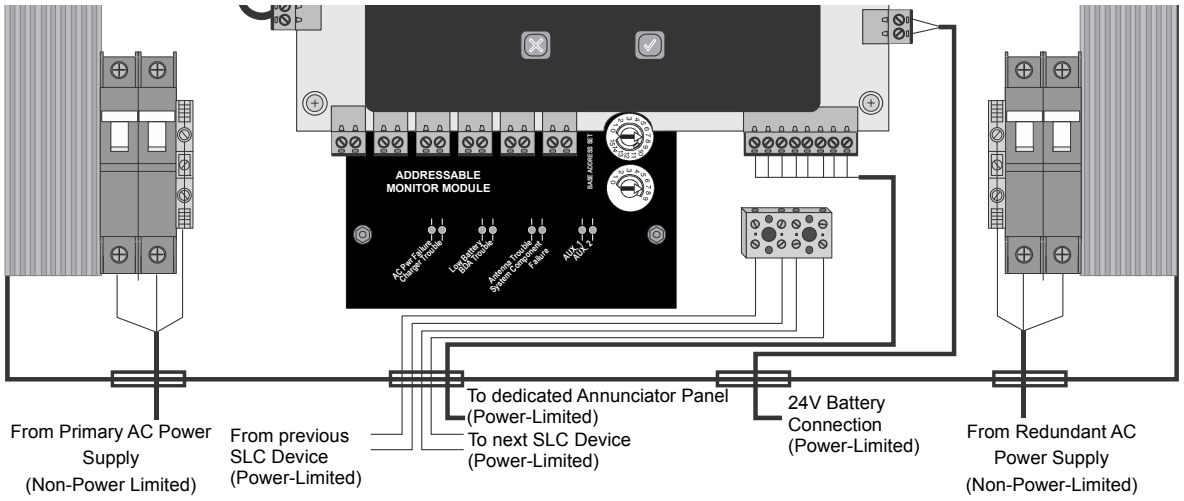
3.1 Hardware Installation

Perform the following steps to install the Emergency Radio Communications Enhancement System. During the wiring process, ensure the separation of circuits as indicated in Figure 3.1.

1. **Secure the signal booster to a solid, vertical surface** such as an interior wall. The signal booster enclosure has two mounting tabs on top and two on the bottom. For optimal airflow, it is best to maintain at least 1" of spacing between the back of the enclosure and the wall. This is best accomplished by mounting the enclosure on a grounded strut channel (i.e. Unistrut, Kindorf etc.).

NOTE: Make sure that there is sufficient clearance around the signal booster enclosure to ensure unobstructed airflow.

WARNING: LIVE WIRE TERMINALS ON THE CIRCUIT BREAKERS!



NOTE: Spacing between Non-Power Limited and Power-Limited wiring must be 1/4 inch or more.

2. **Connect the AC Power** - The enclosure has 4 ½" trade size cutouts: two for power, one for battery backup and one for communication circuits. Diameter of the cutouts is 7/8" to allow for easy installation of ½" trade size conduit fittings rated for UL Type-4 type approved applications. The two power supplies have two separate circuit breakers so that either a one shared circuit or two separate circuits can be connected for backup and redundancy in mission-critical applications. Each one of the two dual circuit breakers has the Line, Neutral and Ground connections. Please make sure that the green ground terminal is connected to the ground wire and that is it secured to the DIN-rail. The DIN rail is the ground path for the enclosure.

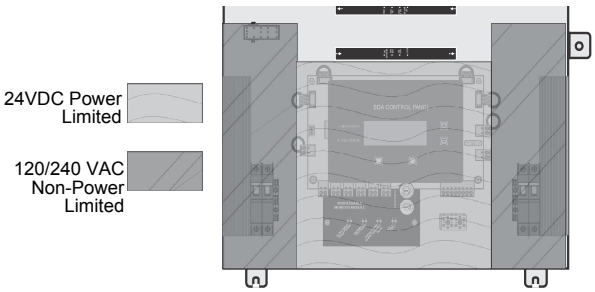


Figure 3.1 Separation of Circuits

WARNING: DANGER ELECTRICAL SHOCK HAZARD

ANY HIGH VOLTAGE AND ELECTRICAL GROUND CONNECTIONS MUST BE DONE BY A QUALIFIED ELECTRICIAN. TO PREVENT ELECTRICAL SHOCK WHEN INSTALLING OR MODIFYING THE SYSTEM POWER WIRING, DISCONNECT THE WIRING AT THE POWER SOURCE BEFORE WORKING WITH UNINSULATED WIRES OR TERMINALS. PRIOR TO POWERING UP THE UNIT, PLEASE MAKE SURE THAT ELECTRICAL GROUND IS CONNECTED TO BOTH THE DIN-RAIL TERMINALS INSIDE THE ENCLOSURE AND TO THE ENCLOSURE GROUNDING BOLT LOCATED ON THE UNDERSIDE OF THE ENCLOSURE. AC POWER AND RF CONNECTIONS SHOULD BE INSTALLED WITH ALL STANDARD INSTALLATION PRACTICES FOR LIGHTNING PROTECTION. THIS INCLUDES GROUNDING AND ELECTRICAL BONDING TOGETHER OF ALL EQUIPMENT ENCLOSURES AND GROUNDING OF THE PRIMARY ANTENNA CABLE AND THE INSTALLATION OF PROPER SURGE SUPPRESSION (LIGHTNING ARRESTOR) EQUIPMENT AT THE ENTRANCE TO THE BUILDING OR THE EQUIPMENT ROOM.

3. **Connect the Battery Backup** – The battery enclosure (P/N BDA-BENCL-10) is designed to be installed directly below the signal booster. Use the provided wire harness to connect batteries to the battery power terminal on the PMU circuit board. Leave the battery fuse out for now. *Only use the supplied or approved batteries.*
   Refer to document LS10212-001GE-E for additional information on installing the backup batteries.
   Refer to document LS10213-002GE-E for information on Seismic installations.
4. **Connect the Antenna system** – Underside of the signal booster enclosure has two N-Type connectors - the DAS system connector on the right side and the connector for donor antenna on the left side, as labeled. 50 Ohm coaxial cable jumpers for both DAS (distributed antenna system) and for the donor antenna must have solid outside conductor (such as ¼" - ½" Superflex, Heliax, etc.).

Coaxial cables with braided outside conductor may have excessive "signal leakage" that can cause feedback and oscillation of the signal booster, especially when high gain settings are used. Ensure that both DAS and donor antenna systems are tested before they are connected to the signal booster. Bad antenna connections, antenna line breakages etc. can cause poor performance and RF intermod interference.

5. **Power up the signal booster.** Insert the battery backup fuse.
6. **Set the signal booster gain for both uplink and downlink chains** – The signal booster ships from the factory with gain set to minimum. Gain can be increased as needed using the control panel menu (Fig. 3.2, 3.3 and 3.4). System gain needs to be set for both the downlink and the uplink amplifiers.
7. **Connect the dedicated Monitoring Annunciator panel**. (Refer to Figure 3.2). The Booster Monitoring Annunciator is direct wired to the BDA and is mounted in a standard 2-gang electrical box. Refer to document LS10212-000GE-E for additional information.

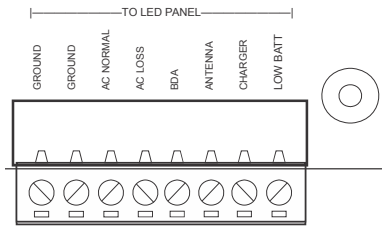


Figure 3.2 Annunciator Wiring Connection

8. **Connect the SLC wiring** to the Fire Alarm Control Panel (Refer to Figure 3.3) and set the Monitor Module base address on the rotary dials of the module. Use the rotary code switches to set the address of the first module between 01 and 150 (Refer to Figure 3.4).The module will occupy a total of eight consecutive SLC point addresses starting from the base number. Refer to Section 4.2 on page 17 for Fire Alarm Panel Programming information.

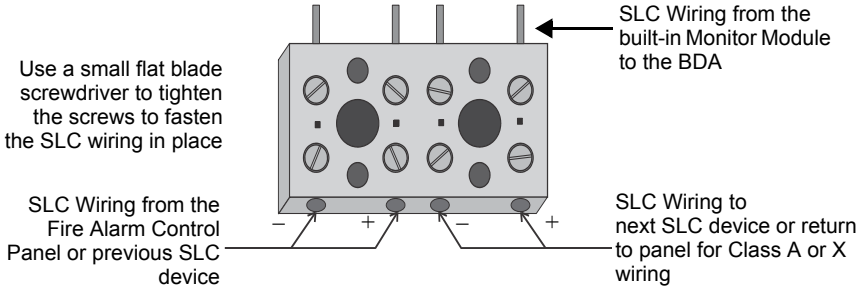


Figure 3.3 SLC Wiring Connection

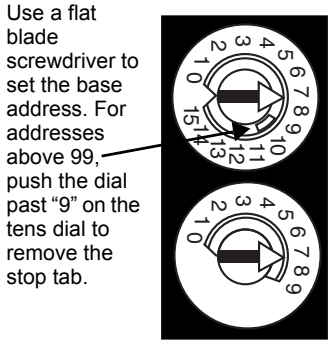


Figure 3.4 Rotary Code Switches

3.2 Testing and Maintenance

Once fully installed and operational, the BDA is required to be tested and a survey report is to be performed to ensure that all required areas have appropriate signal coverage. Coverage strength is to meet NFPA, IFC, and AHJ (Authority Having Jurisdiction) requirements.

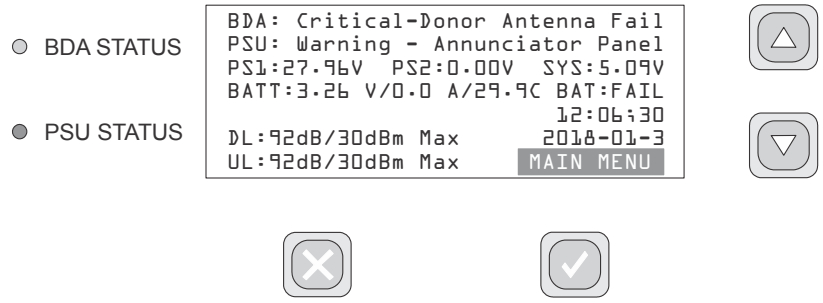
- A minimum of 20 signal test points per floor is standard. Signal readings are taken by measuring the signal levels of incoming transmissions from an AHJ radio system.
- Once preliminary testing has been completed, testing and inspection is to be performed by the AHJ.
- The BDA should be tested and inspected annually, with a full building survey performed a minimum of once every 5 years to ensure proper signal coverage.
- Batteries should be replaced every three (3) years.

Section 4: Programming

4.1 ERECS Programming - Gain, Power, and Uplink Squelch Adjustment

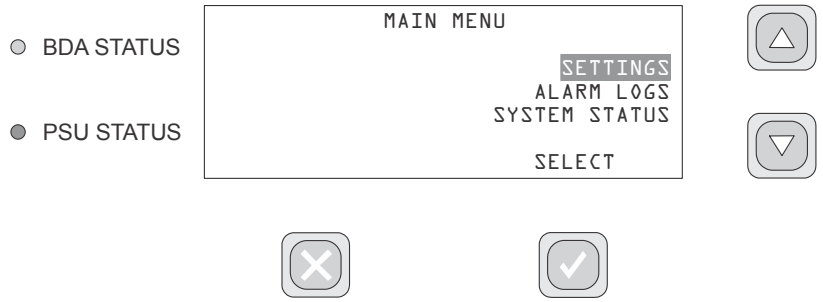
Setting the gain and power limits

The signal booster ships from the factory with the output power set to minimum. Gain can be increased as needed using the control panel menu (Figures 4.1, 4.2, and 4.3 below). Power limit needs to be set for both the uplink and the downlink amplifiers.



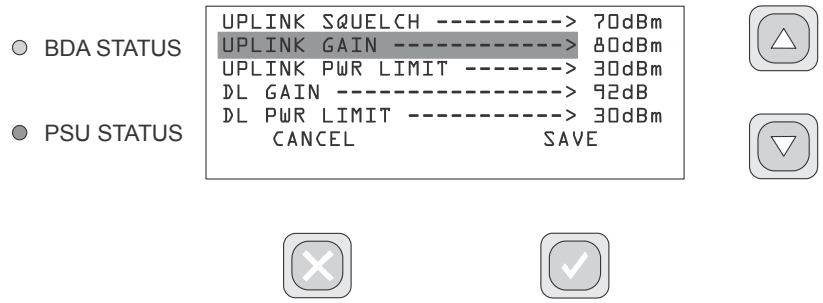
1. Use the arrows and selection buttons to select the MAIN MENU option from the System Status screen.

Figure 4.1 System Status



2. Use the arrows and selection buttons to select the SETTINGS option from the MAIN MENU screen.

Figure 4.2 Main Menu



3. Use the arrows and selection buttons to adjust the uplink and downlink gain and power limit.

4. Select the SAVE option to save the changes made or CANCEL to return to the MAIN MENU screen without saving.

Figure 4.3 Settings Menu

4.2 Fire Alarm Control Panel Programming - Point Programming

The NF-BDA150-1B, NF-BDA400-1B, NF-BDA400-2B, NF-BDA700-1B, NF-BDA800-1B, and NF-BDA7800-2B have a built-in monitor module for fire panel monitoring applications. The Module requires eight consecutive SLC address points, starting with the base address that is set during installation (Refer to Section 3.1 on page 14 for installation information and setting the base address). Each address of the monitor module corresponds with a condition of the BDA.

The first five (5) SLC address points are required to be programmed as a Supervisory type code, the sixth SLC address point is required to be programmed with a Trouble monitoring type code, and the seventh and eighth SLC addresses are reserved for future use. Refer to the table below for additional information:

Module Address	Monitoring Condition	Description
Base	AC Power Loss	Primary AC power loss on the BDA will illuminate the LED associated with this point and transmit the supervisory condition to the Fire Alarm Control Panel.
Base + 1	Charger trouble	A trouble condition on the BDA battery charger will illuminate the LED associated with this point and transmit the supervisory condition to the Fire Alarm Control Panel.
Base + 2	Low Battery	A low battery condition on the BDA will illuminate the LED associated with this point and transmit the supervisory condition to the Fire Alarm Control Panel.
Base + 3	BDA trouble	A trouble condition on the BDA will illuminate the LED associated with this point and transmit the supervisory condition to the Fire Alarm Control Panel.
Base + 4	Antenna trouble	A trouble on a donor antenna or the DAS will illuminate the LED associated with this point and transmit the supervisory condition to the Fire Alarm Control Panel
Base + 5	AUX Alarm	An off-normal condition on the AUX device will illuminate the LED associated with this point and transmit the trouble condition to the Fire Alarm Control Panel
Base + 6	No Connection - Reserved for Future Use	
Base + 7	No Connection - Reserved for Future Use	

Section 5: System Planning and Deployment

Design the Distributed Antenna System (D.A.S) – Design the D.A.S for optimal signal coverage of the building or other confined area. The D.A.S. system can be designed by using a combination of radiating cable, non-radiating cable, antennas, signal taps, splitters or hybrid couplers. To prevent feedback oscillations, a solid outer conductor, non-radiating cable must be used to connect the booster to the D.A.S. and donor antenna systems.

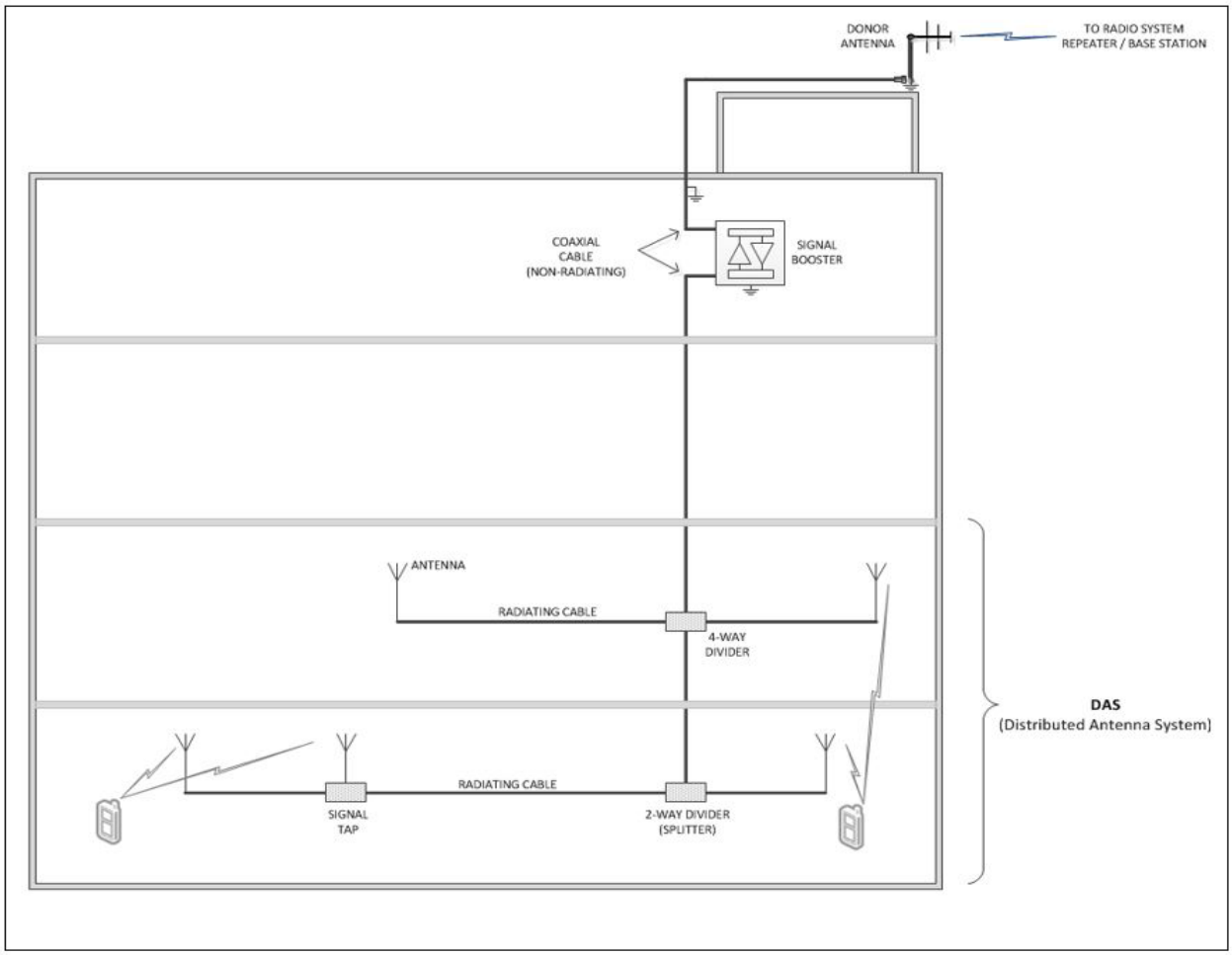


Figure 5.1 Typical BDA System

CAUTION: HIGH GAIN ANTENNAS
IF HIGH GAIN ANTENNAS ARE USED, IT IS IMPORTANT TO LIMIT THE OUTPUT POWER OF THE SIGNAL BOOSTER SO THAT THE MAXIMUM ERP DOES NOT EXCEED THE 5W LIMIT.

Locate the Donor Antenna – The Donor antenna should be a high-gain, directional type antenna and should be aimed at the nearest radio system repeater site. Location of the antenna should be chosen so that it provides highest possible signal isolation from the D.A.S. system.

NOTE: It is important to limit the output power of the signal booster so that the maximum ERP does not exceed the 5W limit.

Measure the D.A.S. to Donor Antenna Signal Isolation – Probably the most important step in design and deployment of an in-building signal booster system is to ensure that there is a sufficient signal isolation between the donor antenna and the D.A.S. system. Just like the feedback that occurs when the microphone and speaker get too close together on a public address system, a signal booster can start to oscillate when the gain of the system is higher than the isolation of the antenna system. The oscillations can cause continuous in-band interference to other users that are in the range of the signal booster. To prevent the feedback oscillation from happening it is important to ensure that the amount of antenna isolation is at least 15dB higher than the signal booster gain. Antenna isolation is measured by generating a test signal into the D.A.S. system and measuring the level of the signal received off the donor antenna using a spectrum analyzer or other device capable of accurately measuring RF signal levels. If a directional hybrid couplers are used in the D.A.S. system then the same test should be performed in other direction by generating the test signal into donor antenna and measuring the received signal level from the D.A.S. system. Once the signal separation is measured, deduct 15dB from the figure and the result is the maximum amount of gain that is allowed.

Example:

Test Signal Level generated into the D.A.S. system: 0dBm

Measured Test Signal Level at the Donor Antenna: -70dBm

Signal Isolation = 0dBm – 70dBm = 70dB

Maximum Booster Gain Allowed: 70dB -15 = 55dB

Follow the Good Engineering Practices and be a Good RF Neighbor - Good engineering practice must be used in regard to the signal booster's noise radiation. Accordingly, the gain of the signal booster should be set so that the ERP of the output noise from the signal booster should not exceed the level of -43 dBm in 10 kHz measurement bandwidth. In the event that the noise level measured exceeds that value, the signal booster gain should be decreased accordingly. Also, please note that in general, the ERP of noise on a spectrum more than 1 MHz outside of the pass band should not exceed -70 dBm in a 10 kHz measurement bandwidth.

Set the Booster Gain using the procedure described on page 10 to the value as determined by following the step 3 and 4. System gain can be further reduced if required by specific site conditions or factors.

Set the Booster Power Limit to the desired value using the procedure described on page 10.

Power up the Booster and Test the Coverage. Class B broadband signal boosters are permitted to be used only in confined or indoor areas such as buildings, tunnels, underground areas, etc., or in remote areas, i.e., areas where there is little or no risk of interference to other users.

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