Bi-Directional Amplifier System (BDA)-Channelized Digital Class A and Class B

General

NOTIFIER offers all of the following components required for the design and installation of the Emergency Radio Communication Enhancement Systems (ERCES):

- signal boosters/ Bi-Directional Amplifiers (BDA)
- Distributed Antenna Systems (DAS) antennas
- design services and training
- coaxial cable
- connectors and lightning arrestors
- batteries and battery enclosures
- donor antennas
- power dividers and hybrid couplers

Signal Boosters/Bi-Directional Amplifiers (BDA)

NOTIFIER Channelized Digital Class A and Class B BDAs are high gain, high power channel selective (Class A) or band-selective (Class B) signal boosters/bi- directional amplifiers that can be designed and customized to meet all public safety frequency band ranges in ERCES applications. It is intended to provide reliable two-way radio signal coverage inside buildings, tunnels and other structures. The state-of-the-art DSP-based filter design combined with our industry leading band-pass duplexer filters deliver a reliable performance in even the most challenging RF environments. The product delivers high RF power with 5W rated amplifiers while maintaining the industry leading power efficiency and reliability.

The state-of-the-art design delivers superior reliability and excellent performance in a small, lightweight, and economical package. The all-inclusive design includes

- NFPA, IFC and UL® compliant supervisory interfaces
- AC power supply
- Battery Charger and Dedicated Annunciator Panel
- NOTIFIER Channel and Band Selective, DSP Programmable Class A, Class B BDAs and power supplies

The DSP Programmable Class A, Class B BDAs and power supplies are designed to meet and exceed the published UL2524 2nd Edition standard requirements (UL2524 2nd Edition listing pending) for In-building 2-Way Emergency Radio Communication Enhancement Systems, NFPA and IBC/IFC standards compliance-making it the best choice for public safety and other mission critical applications.

FEATURES AND BENFITS

- ***Support for public safety frequency bands, various Channel and Band Selective, DSP Programmable models available for the following:***
  - Class A, UHF (406.1 - 512MHz): NF-BDA400-D5-1A
  - Class B, UHF (406.1 - 512MHz): NF-BDA400-D5-1B
  - Class A, 800MHz: NF-BDA800-D5-1A
  - Class B, 800MHz: NF-BDA800-D5-1B
  - Class A, 700MHz and 800MHz Dual Band:NF-BDA7800-D5-2A
  - Class B, 700MHz and 800MHz Dual Band:NF-BDA7800-D5-2B
- ***Lower Total Cost of Ownership***
  - High Power 5W (37dBm) Amplifiers with 10W (40dBm) Combined Downlink Power on 700/800 MHz Dual band models
  - High Gain: (92dB Typ.)
  - 32-Channel Capacity (64 Channels with 700/800 MHz Dual band model)
  - Ability to connect to NOTIFIER's SLC loop for monitoring of the BDA at the FACP
- ***Excellent RF Performance***
  - Channel Selective Class A Filters (12.5 or 25KHz)
  - Band Selective Class B (500KHz, 250KHz, 150KHz, 25KHz or 12.5KHz)
  - Low Processing Delay (12usec.) Filter Options
  - High Selectivity Filter Options

BDA

  - State-of-the-art DSP FPGA Digital Filter Design with programmable frequencies, selectivity and delay
- ***High Reliability***
  - Low Noise Figure
  - Uplink Noise Squelch: Completely eliminates uplink noise from the BDA by shutting off uplink amplifier while it is idle achieving no transmissions from within the building and eliminating risk of interrupting public safety radio network
  - Oscillation Suppression Function built-in prevents amplifier feedback and oscillations
  - 3-year warranty (excluding battery)
- ***NFPA, IFC Code Compliance***
  - Supervisory Interfaces, NFPA-Compliant: Ability to connect to NOTIFIER's SLC loop for monitoring of the BDA at the FACP.
  - Includes a supervised, dedicated annunciator panel
  - Built-In Control Panel with Status Indications and Trouble Logs
  - High Efficiency Power Supply with an option of 12-48Hr Battery Backup
  - NEMA-4 Rated Enclosures, Watertight Design
- ***High Efficiency Power Supply with a Choice of 12- 48Hr Battery Backup***
  - PSU unit includes Power Supply, Charger, Battery Backup and Supervision
  - High Efficiency (>90%)
  - Fully Supervised
  - Redundant AC Power Supplies
  - Smart Battery Charger with Battery Supervision
  - Built-in Control Panel with LED Status Indication

Electrical Specifications

Table 1 lists the electrical specifications for each Notifier BDA models.

Specification	NF-BDA400-D5-1A	NF-BDA400-D5-1B	NF-BDA800-D5-1A	NF-BDA800-D5-1B	NF-BDA7800-D5-2A	NF-BDA7800-D5-2B
Frequency Range (MHz)	DL: 406.1-512 UL: 402-512	DL: 406.1-512 UL: 402-512	DL: 851-862 UL: 806-817	DL: 851-862 UL: 806-817	UL1: 799-805 UL2: 806-817 DL1: 769-775 DL2: 851-862	UL1: 799-805 UL2: 806-817 DL1: 769-775 DL2: 851-862
FCC ID	2AHPSB400M3A	2AHPSB400M3B	2AHPSB800M3A	2AHPSB800M3B	2AHVPSB7800M3A	2AHVPSB7800M3B
Amplifier Composite RF Output Power dBm (W), Max.*1	DL: 37dBm (5W) UL: 37dBm (5W)	DL: 37dBm (5W) UL: 37dBm (5W)	DL: 37dBm (5W) UL: 37dBm (5W)	DL: 37dBm (5W) UL: 37dBm (5W)	DL: 40dBm (10W) Combined 700+800MHz UL: 37dBm (5W)	DL:40dBm (10W) Combined 700+800MHz UL: 37dBm (5W)
Duplexer Insertion Loss dB (typ.)	2.5–6 dB	2.5–6 dB	<2.5dB	<2.5dB	<2.1dB	<2.1dB
Gain and Power Ripple within the rated Passband dB (typ.)	<3dB	<3dB	<3dB	<3dB	<3dB	<3dB
Selectable Channel Bandwidth for Each Channel (kHz)	12.5, 25	12.5, 25, 150, 250, 500	12.5, 25	12.5, 25, 150, 250, 500	12.5, 25	12.5, 25, 150, 250, 500
Channel Filter Capacity (Downlink + Uplink)	32 + 32	32 + 32	32 + 32	32 + 32	64 + 64	64 + 64
Selectable Channel Filter Latency / Group Delay Per Channel (µsec.)	12, 20, 48	12, 20, 48	12, 20, 48	12, 20, 48	12, 20, 48	12, 20, 48
Maximum System Gain (typ.) dB	92	92	92	92	92	92
Gain Adjustment Attenuation Range in 1dB Steps (dB)	0-35	0-35	0-35	0-35	0-35	0-35
Power Adjustment Range 1dB Steps(dB)	0-15	0-15	0-15	0-15	0-15	0-15
Intermodulation (IM3)	<-15dBm	<-15dBm	<-15dBm	<-15dBm	<-15dBm	<-15dBm
Amplifier Noise Figure	<4dB	<4dB	<4dB	<4dB	<4dB	<4dB
Maximum RF Power Input for Rated IM3	-20dBm	-20dBm	-20dBm	-20dBm	-20dBm	-20dBm
Absolute Maximum Input Power	0dBm	0dBm	0dBm	0dBm	0dBm	0dBm
Impedance W	50	50	50	50	50	50
RF Connector Type	N-Female	N-Female	N-Female	N-Female	N-Female	N-Female
Supply Voltage VDC	28.5V DC	28.5V DC	28.5V DC	28.5V DC	28.5V DC	28.5V DC
Power Consumption Under Maximum Load	<90W	<90W	<90W	<90W	<150W	<150W
Warning: These devices are NOT CONSUMER devices. The devices 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.						
Note: Changes or modifications not expressly approved by the Manufacturer, responsible for compliance, could void the user's authority to operate the equipment.						

Table 1 BDA Electrical Specifications

Mechanical and Environmental Specifications

Table 2 lists the mechanical and environmental specifications for each Notifier BDA model.

Specification	NF-BDA400-D5-1A	NF-BDA400-D5-1B	NF-BDA800-D5-1A	NF-BDA800-D5-1B	NF-BDA7800-D5-2A	NF-BDA7800-D5-2B
Enclosure Environmental Rating	NEMA-4 (Type-4)	NEMA-4 (Type-4)	NEMA-4 (Type-4)	NEMA-4 (Type-4)	NEMA-4 Type-4)	NEMA-4 (Type-4)
Dimensions (WxDxH)	23.23"x8.32"x24"	23.23"x8.32"x24"	23.23"x8.32"x24"	23.23"x8.32" x24"	23.23"x8.32" x25.4"	23.23"x8.32"x25.4"
Weight (With Duplexers) Typ. (lbs)	<59	<59	<59	<59	<59	<59
Enclosure Color	Red (RAL3000)	Red (RAL3000)	Red (RAL3000)	Red (RAL3000)	Red (RAL3000)	Red (RAL3000)
Operating Temperature °F (°C)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)
Recommended Operating Environment Temperature °F (°C)	-14 to +86 (-10 to +30)	-14 to +86 (-10 to +30)	-14 to +86 (-10 to +30)	-14 to +86 (-10 to +30)	-14 to +86 (-10 to +30)	-14 to +86 (-10 to +30)

Table 2 Mechanical and Environmental Specifications

PSU (BDA-EPSU-300A-ASSY) Technical Specifications:

Table 3 lists the PSU Technical Specifications.

Specifications	Settings
AC In	100 – 250V / 50-60Hz / 3A @ 120V
DC Out	28.5V / 7A Continuous Duty
Charging Current	5.5A
Supervisory Functions	AC, Battery Capacity, Battery V, Charging Current, Load Presence, Temp, MCU PSU Diagnostic, V out, I out
Protection	DC Out and Charger Electronic Current Limiting + ATC Mini Fuse. AC Input Fuse
Operating Temperature	-22 to +140 °F (-30 to +60 °C)
Enclosure Environmental Rating	NEMA-4 (Type-4, Waterproof UL Listed)
Enclosure Dimensions	24"W x 10"D x 24"H
Weight with PSU, without batteries	51 lbs.

Table 3 PSU Technical Specifications

PSU Connections:

Table 4 lists the PSU Connections.

Component	Connections
Enclosure Connections	Requires NEMA-4 Waterproof Conduit
AC Power Connection	Built-In Duplex Power Outlet Included
DC Connection	Wire Terminal Included (10-14AWG Wire)
Battery Connection	Fuse and Wire Harness Included
Supervisory	CAT-5 Jumper to BDA

Table 4 PSU Connections

Batteries and Battery Enclosure

- NEMA-4, UL Type-4 Listed Battery Enclosure
- 12V / 75Ah battery, minimum two are required for each BDA

Donor Antennas

- Installed on the Roof of the building.
- Pointing to the public safety radio repeater site, line of sight not required.
- High gain, high directivity Yagi Antennas for various frequency bands.

DAS Antennas

- Installed in-building based on the design to achieve coverage.
- Fiberglass and Low Profile antennas for various frequency bands.

Coaxial Cable

- Plenum Rated, ½" diameter with low insertion loss.
- Red cable color to differentiate for Public Safety BDA use.

Connectors and Lighting Arrestors

- Various types of connectors, cable jumpers for ½" cable.
- Coaxial surge protector, UL listed.
- Cable jumper and Antenna Sensor / EOL termination for Donor Antenna.

Power Dividers and Hybrid Couplers

- 2/3/4-way power dividers for various frequency bands.
- Directional couplers for various dB and Frequency bands.

Services

- Services for BDA iBwave System Design, Drawings, BOM.
- Services for BDA Training

Figure 1 illustrates the setup for a typical BDA System Riser.

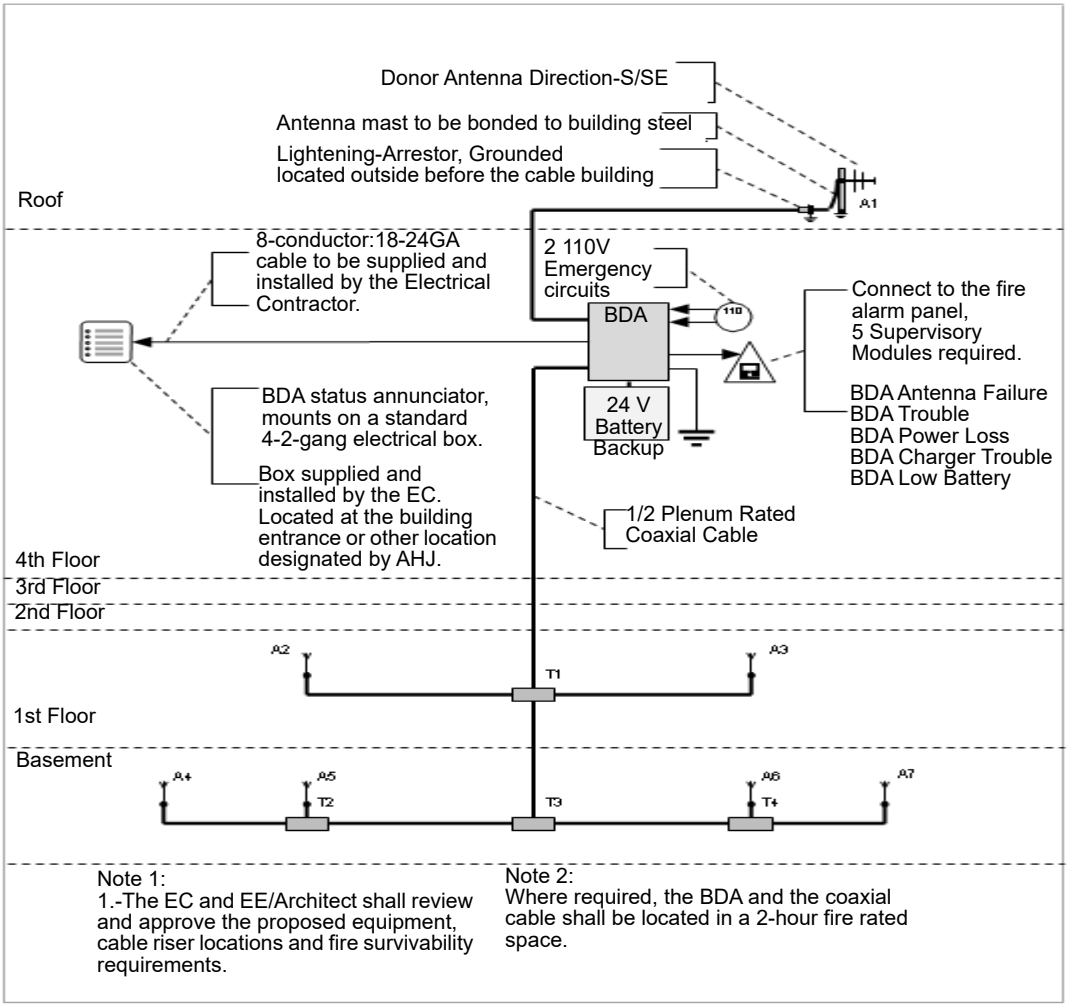

Figure 1 Typical BDA System Riser Diagram

Product Line Information

Signal Boosters / Bi-Directional Amplifiers (BDA)

NF-BDA400-D5-1A: Class A, UHF Digital BDA, 406.1-512MHz, 5W, Notifier

NF-BDA400-D5-1B: Class B, UHF Digital BDA, 406.1-512MHz, 5W, Notifier

NF-BDA800-D5-1A: Class A, 800MHz Digital BDA, 5W, Notifier

NF-BDA800-D5-1B: Class B, 800MHz Digital BDA, 5W, Notifier

NF-BDA7800-D5-2A: Class A, 700MHz & 800MHz Dual Band Digital BDA, 5W, Notifier

NF-BDA7800-D5-2B: Class B, 700MHz & 800MHz Dual Band Digital BDA, 52, Notifier

Batteries and Battery Enclosure

BDA-EPSU-300A-ASSY: Battery backup/external power supply for BDA, Type-4 certified enclosure.

BDA-EPSU-300A: External power supply only for BDA, excludes enclosure.

BDA-ENCL-15UL4: Battery Backup Enclosure assembly only, excludes power supply.

BDA-BB-75-10: Battery, 12V/75Ah each. (minimum two are required for each BDA/signal booster).

Cable, Connectors, and Lightning Arrestors

BDA-CABLE-10A-250: 250 ft. Cable, Red Jacket, Imprinted, 1/2" Corrugated Alum Plenum Air Dielectric, 50 Ohm Coaxial.

BDA-CABLE-10A-500: 500 ft. Cable-Black Jacket, Imprinted, 1/4" Corrugated Copper Foam Dielectric, 50 Ohm Coaxial.

BDA-CABLE-15A-250: 250 ft. Cable - Black Jacket, Imprinted, 1/4" Corrugated Copper Foam Dielectric, 50 Ohm Coaxial.

BDA-CABLE-15A-500: 500 ft. Cable - Black Jacket, Imprinted, 1/4" Corrugated Copper Foam Dielectric, 50 Ohm Coaxial.

BDA-NMC-10: N-Male Connector for 1/2" cable.

BDA-NFC-11: N-Female Connector for 1/2" cable.

BDA-NMC-40A: N-Male connector for 1/4" Cable.

BDA-NFC-41A: N-Female connector for 1/4" Cable.

BDA-EOL-10: Antenna Sensor / End of the line termination.

BDA-JMPRG-10: Coaxial Cable Jumper NM-NM RG58, 18" long.

BDA-JMPRG-11: Coaxial Cable Jumper NM-NM RG58, 37" long.

BDA-LA-P8AX-6G: Coaxial surge protector, UL listed.

BDA-JMPRG-12: Coaxial Cable Jumper NM-NM 1/4" Superflex, Outdoor UV, 48" long

BDA-JMPPL-19: Coaxial Cable Jumper NM-NM Plenum, UL Listed Red Cable, 10" long

Product Line Information (Continued)

Cable, Connectors, and Lightning Arrestors (*Continued*)

BDA-JMPPL-20: Coaxial Cable Jumper NM-NM Plenum, UL Listed Red Cable, 18" long
BDA-JMPPL-21: Coaxial Cable Jumper NM-NM Plenum, UL Listed Red Cable, 37" long
BDA-ADP-RA-1: Right Angle N Male to N Female Adapter.
BDA-GKCK-10: Coaxial Cable Grounding Kit.

Power Dividers and Hybrid Couplers

BDA-PD2-4588-1: 2-way power divider/combiner, 450-880MHz, 50W, Wilkinson type.
BDA-PD3-4588-1: 3-way power divider/combiner, 450-880MHz, 50W, Wilkinson type.
BDA-PD4-4588-1: 4-way power divider/combiner, 450-880MHz, 50W, Wilkinson type.
BDA-PD2-1552-1: 2-way power divider/combiner,150-520MHz, 50W, Wilkinson type.
BDA-PD3-1552-1: 3-way power divider/combiner,150-520MHz, 50W, Wilkinson type.
BDA-PD4-1552-1: 4-way power divider/combiner,150-520MHz, 50W, Wilkinson type.
BDA-DC6-3588-1: Directional Coupler 6dB, 350-880MHz
BDA-DC10-3588-1: Directional Coupler 10dB, 350-880MHz
BDA-DC15-3588-1: Directional Coupler 15dB, 350-880MHz
BDA-DC20-3588-1: Directional Coupler 20dB, 350-880MHz

DAS Antennas

BDA-FA-450470-1: DAS Antenna, Fiberglass 450-470MHz
BDA-FA-465490-1: DAS Antenna, Fiberglass 470-490MHz
BDA-FA-700-1: DAS Antenna, Fiberglass 763-805MHz
BDA-FA-800-1: DAS Antenna, Fiberglass 806-869MHz
BDA-FA-7800-1: DAS Antenna, Fiberglass 763-869MHz
BDA-FA-7800-2: DAS Antenna, Fiberglass 763-869MHz
BDA-LPA-4502700-1: DAS Antenna, Low Profile, Ultra Broadband, 450-2700MHz
BDA-LPA-7800-1: DAS Antenna, Low Profile 763-869MHz
BDA-DP-7800-2: DAS Antenna, Directional Panel 763-869MHz
BDA-DP-400-2: DAS Antenna, Directional Panel UHF

Donor Antennas

BDA-DA-450470-1: Donor Antenna, Yagi Directional, 450-470MHz
BDA-DA-465490-1: Donor Antenna, Yagi Directional, 470-490MHz
BDA-DA-800-1: Donor Antenna, Yagi Directional, 806-869MHz
BDA-DA-700-1: Donor Antenna, Yagi Directional, 763-805MHz
BDA-DA-7800-1: Donor Antenna, Yagi Directional, 763-869MHz
BDA-DA-LP582700-1: Donor Antenna, Log-Periodic Directional Broadband 580-2700MHz, High FB Ratio

Services

BDA-SVC-10: BDA iBwave System Design, Drawings, BOM (Unit Ea.)
BDA-TRAINING-1DAY: BDA Training, 1 DAY Unit

Building with Insufficient Public Radio Coverage - Non-compliant to Code

Figure 2 Diagram of a Building without the BDA

Building with Sufficient Public Radio Coverage - Code Compliant

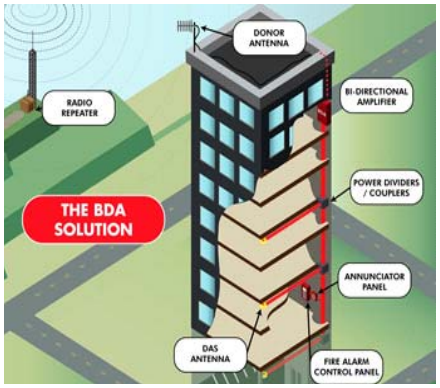

Figure 3 Diagram of a Building with the BDA

AGENCY LISTINGS AND APPROVALS

These listings and approvals apply to the modules specified in this document. In some cases, certain modules or applications may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- NFPA 72 Compliance
- NFPA 1221 Compliance
- IFC Compliance
- FCC Title 47 Part 90
- FCC Title 47 Part 15b

ISO 9001 CERTIFIED
ENGINEERING & MANUFACTURING QUALITY SYSTEMS

Country of Origin: USA

NOTIFIER
12 Clintonville Road
Northford, CT 06472
203.484.7161
www.notifier.com

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