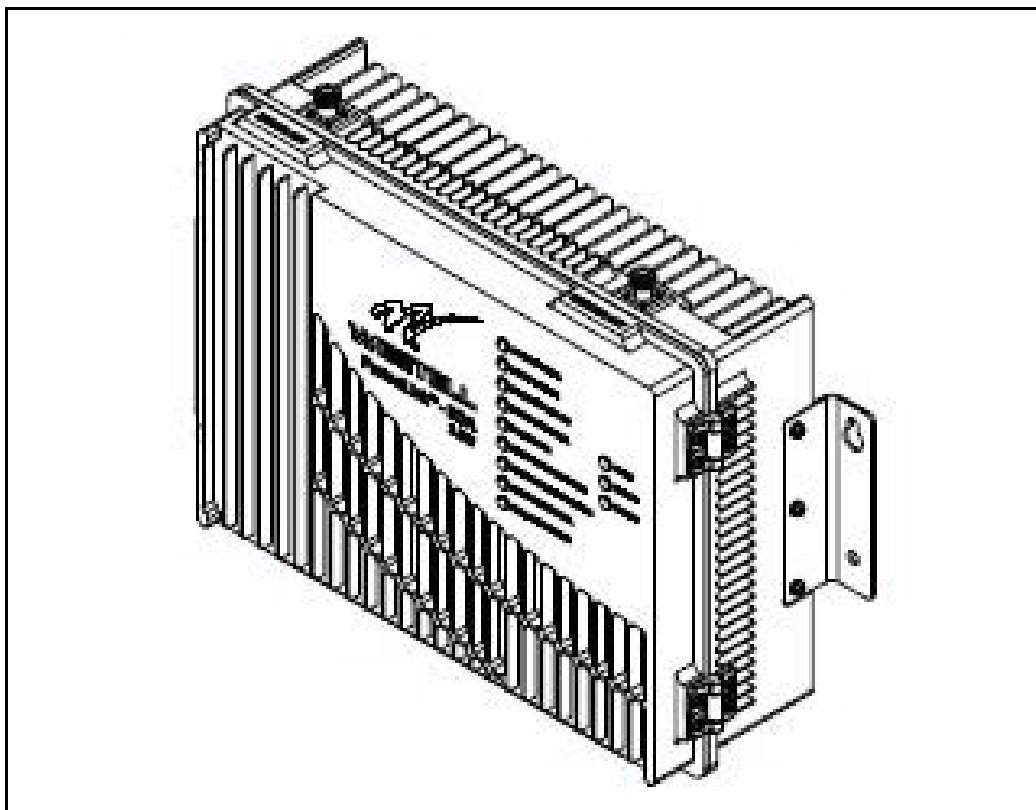# ProtectLink CS45-734-834-A0
Public Safety Bi-directional Amplifier
Installation and Users Guide

Rev A -- April 2025

INSTALLATION & USER GUIDE

WESTELL.COM

© Westell Technologies

030-102049 Rev A

COPYRIGHT AND DISCLAIMER INFO

Copyright © 2025 by Westell Technologies, Inc. All information and statements contained herein are accurate to the best of Westell Technologies' knowledge. Westell makes no warranty with respect thereto, including without limitation any results that may be obtained from the products described herein or the infringement by such products of any property rights of any persons. Use or application of such information or statements is at the users' sole risk, without any liability on the part of Westell. Nothing herein shall be construed as license or recommendation for use, which infringes upon any property rights or any person. Product material and specifications are subject to change without notice. Westell standard terms of sale and the specific terms of any particular sale apply.

WESTELL TECHNOLOGIES, Inc.

Corporate Offices
750 North Commons Drive
Aurora, IL 60504 USA

In-Building Wireless Division
750 North Commons Drive
Aurora, IL 60504 USA

Toll Free: (800) 375-8677 International: +1 (630) 375-4950 Fax: +1 (630) 375-4931

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, AND OTHER INVOLVED PARTIES			
This product incorporates field-programmable software. In order for the product to comply with the requirements in the Standard for In-building 2-Way Emergency Radio Communication Enhancement Systems, UL 2524 certain programming features or options must be limited to specific values or not used as all as indicated below.			
Program, feature, or option	**Permitted in UL 2524? (Y/N)**	**Possible settings**	**Settings permitted in UL 2524**
ALARM TEST screen DISABLE AUDIBLE HORN opton	N	DISABLE and ENABLE	ENABLE

Product Registration Form

Westell recommends retaining a permanent record of your purchase with the following product information and proof of purchase. Refer to .

MODEL NUMBER   SERIAL NUMBER   PURCHASE DATE

POINT OF SALE COMPANY

DRAFT D4-16 – AUTHORIZED USE ONLY

Table of Contents

Preface

This preface includes the following information about this ProtectLink Public Safety Bi-directional Amplifier System Installation and Users Guide.

Guide to this Preface

Document Purpose, Scope, Audience, and References

Document Conventions

Customer Assistance

Document Purpose, Scope, Audience, and References

Purpose

This manual contains information and procedures for the operation of Westell's ProtectLink PublicSafety Bi-Directional Amplifier and any third-party DAS system.

Changes that occur after the publishing date may be incorporated by a complete manual revision or as additions.

Scope

Reference this manual when there is a need to add enhanced signal capability to a new or existing system, to monitor a system, to make maintenance adjustments, or to address alarms.

Audience

This manual is intended for installers and users who are familiar with similar types of equipment.

References

- UL 2524 Firmware 3.2
- FCC Part 90
- FCC Part 20 SMR bands

Document Conventions

The table below lists the conventions used throughout this document.

Table Preface 1:   Document Conventions

Convention	Meaning
⚡ **DANGER!**	Description of an imminent hazard that, if not avoided, may result in severe personal injury or death. Before you work on equipment, be aware of the hazards involved with electrical and RF circuitry and be familiar with standard practices for preventing accidents.
⚡ **WARNING!**	Warning messages describe an imminent hazard that, if not avoided, may result in severe personal injury or serious equipment damage.
⚠ **CAUTION:**	Description of conditions or practices that could cause damage to equipment or property. Communicates information that is crucial to preventing loss of data or damage to hardware or software, and actions that could result in equipment failure.
Important:	Important messages contain must-have information essential to the completion of a task, unrelated to a hazard.
Note:	Note messages emphasize or supplement important points of the main text. Notes provide beneficial information unrelated to hazards.
Tip:	Tip messages provide information that assists users in operating equipment more effectively.
Menus and Menu Commands	This style indicates menu and menu commands. A right arrow (>) separates the menus from the submenus or menu commands. The right arrow also indicates the order in which you should click the menus, submenus, and menu commands.
Dialog Boxes, Tabs, Fields, Check Boxes, Command Buttons	This bold style indicates GUI features, dialog boxes, tabs, fields, check boxes, and command buttons.
KEYS	Uppercase body text indicates keys on a keyboard, such as the TAB or ENTER keys. Keys used in combination are connected with a plus symbol (+).

WESTELL.COM

WESTELL

1-800-377-8766

DRAFT D4-16 – AUTHORIZED USE ONLY

Table Preface 1: Document Conventions (Continued)

Bold text indicates an action or provides emphasis	**Labels**	Designates physical components on Westell products such as jumpers, switches, and cable connectors.
	Click	Instructs the user to press the primary (typically left) mouse button while the pointer is over the specified location.
	Right-click	Instructs the user to press the secondary (typically right) mouse button while the pointer is over the specified location.
	Double-click	Instructs the user to press the primary (typically left) mouse button twice, rapidly, while the pointer is over the specified location.
	Select	Instructs the user to perform a selection on the screen by clicking an active object.
	Enter	Instructs the user to type text using the keyboard

Customer Assistance

Pre-Sales Support

Westell offers pre-sales technical support from 9 a.m. to 5 p.m. Eastern time, Monday-Friday. Representatives are standing by to assist with customer account information and product ordering and answer questions regarding Westell products and solutions.

Phone number: 800-377-8766, option 1

Before you call or email

Before you contact Westell for assistance, please have the following information available:

- The versions of hardware and software you are currently running
- What happened and what you were doing when the problem occurred
- How you tried to solve the problem

Email Technical Support

Email support is available. Send email to:

support@westell.com

Telephone Technical Support

Telephone technical support is available to Westell customers or partners who have not been able to resolve their technical issue by using our online services.

Phone numbers: 800-377-8766, option 2 then option 3

Normal Business Hours: 8:30 a.m. to 6 p.m. Eastern time Monday through Friday

Product Documentation

You can also access and view the most current versions of Westell product documentation on our website at

http://www.westell.com

WESTELL
1-800-377-8766

DRAFT D4-16 – AUTHORIZED USE ONLY

General Information

This chapter provides general information about your Westell ProtectLink Public Safety Bi-directional Amplifier.

Guide to this Chapter

CHAPTER 1

1.1 Document Purpose and Intended Users

The purpose of this document is to provide a step-by-step procedure to help experienced technicians or engineers install and commission an in-building Passive Wireless Distributed Antenna System (DAS) using Westell's ProtectLink Public Safety Bi-directional Amplifier. Follow the instructions in this guide to minimize risks associated with modifying a live system and preclude service interruptions. This document assumes the technician or engineer understands the basic principles and functionality involved with an RF Signal Booster and in-building wireless systems. This guide has been written to address the practical concerns of the installer.

Note: In this and other sections, the ProtectLink Public Safety Bi-Directional Amplifier is also referred to as the ProtectLink, the BDA, or the Signal Booster.

1.2 Product Application

Use this guide when installing a Westell ProtectLink Public Safety Bi-Directional Amplifier and/or DAS system, or when replacing any of the components.

1.3 Product Registration Information

Westell recommends retaining a permanent record of your purchase with product information and proof of purchase. Complete the Product Registration Form inside the front cover page of this document.

The ProtectLink model and serial numbers are on the Westell labels on the right side of the enclosure (see Figure 1-1 on page 1-8). Record these numbers on the Product Registration Form. Retain this information, along with proof of purchase, to serve as a permanent record of your purchase.

DRAFT D4-16 – AUTHORIZED USE ONLY

WESTELL

1-800-377-8766

1.4 Safety Guidelines

The general safety information in this guideline applies to both operations and service personnel. Specific warnings and cautions are located in the applicable manual sections, but may not appear in this summary. Failure to comply with these precautions or specific warnings elsewhere in the manual violates safety standards of design, manufacture, and intended use of equipment. Westell assumes no liability for the customer's failure to comply with these requirements:

⚠️

CAUTION: Grounding

This Signal Booster is designed to operate at 12VDC, 11.7A maximum power, and must always be operated with the ground wire properly connected. The ground wire must be at least 14 AWG and must be connected to the building ground.

⚠️

CAUTION: Explosive atmospheres

To avoid explosion or fire, do not operate this product in the presence of flammable gases or fumes.

⚡

WARNING: Lightning danger

Do not install or adjust this unit during an electrical storm.

No user-serviceable parts are inside the unit. Hazardous voltages are present when the cover is removed. Removing the internal protective covers will void your warranty. If you suspect a malfunction with this product, call your dealer or Westell's technical support line at 1-800-377-8766.

⚠️

CAUTION: Turn the Signal Booster power off when connecting or disconnecting cables or replacing fuses.

External Ethernet Port

⚡

WARNING: The RJ45 Ethernet port on the external surface of the enclosure is for maintenance use only. This port cannot be used as a permanent connector.

Remote Annunciator Location

The remote annunciator unit is for installation in

- a locked room such as a fire control room

WESTELL
1-800-377-8766

DRAFT D4-16 – AUTHORIZED USE ONLY

- a locked enclosure, or
- an equivalent enclosure that requires a tool to open.

UL2524 Alarm Silencing Limit

Permanent alarm silencing via the web interface is not permitted for installations requiring full compliance with UL 2524. Refer to the NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, AND OTHER INVOLVED PARTIES inside the front cover.
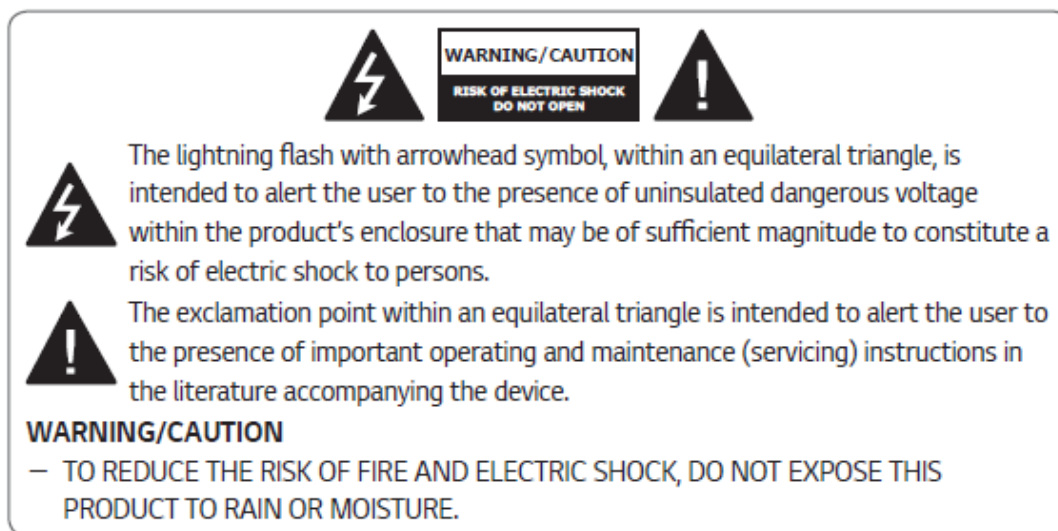
Battery Safety

CAUTION: Do not wear conductive jewelry or use conductive tools while cleaning and working near battery terminals.

Field Wiring

Important: Field wiring is not to exceed 30 meters.

1-800-377-8766

1.5 Important Antenna Safety Information

Antennas used for the purpose of radiating signals indoors are limited to a maximum gain of 3 dBi. Each antenna must be positioned to observe minimum separation requirements from all users and bystanders.

The following guidelines must be used when considering separation distances:

- Indoor antennas must be placed so that under normal conditions, personnel cannot come within 28 cm (~1 foot) of any inside antenna. Adhering to this minimum separation will ensure that the employee or bystander cannot exceed RF exposures beyond the maximum permissible limit as defined by FCC Regulations section 1.1310 Limits for general population/uncontrolled exposure.

- Outdoor antenna must be positioned so that under normal conditions, personnel cannot approach closer than 70 cm (~2 feet 4 inches). If a directional antenna having a maximum gain of 11 dBi is used, precautions should be taken to prevent personnel from routinely passing through the main radiation beam at a distance closer than specified.

RSS-102 RF Exposure

The antenna (or antennas) must be installed in such a way as to maintain at all times a minimum distance of at least 28 cm (~11") between the source of the radiation (the antenna) and any person. This device must not be installed or used in conjunction with any other antenna or transmitter.

WESTELL

1-800-377-8766

1.6 FCC Part 90 Signal Boosters Warnings

Class B Device Warning

⚠️

WARNING: THIS IS A 90.219 CLASS A AND CLASS B DEVICE

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. When commissioned with filters wider than 75 kHz you must register class B signal boosters (as defined in 47 CFR 90.219) online at https://signalboosters.fcc.gov/signal-boosters/. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation. FCC Warning Labels

FCC Contact Information

Federal Communications Commission

445 12th Street SW

Washington, DC 20554

Phone: 1-888-225-5322

TTY: 1-888-835-5322

Fax: 1-866-418-0232

FCC Labels

Refer to .

FCC Part 15 -- Radio and Television Interference

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

WESTELL

1-800-377-8766

DRAFT D4-16 – AUTHORIZED USE ONLY

To maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and television reception.

If shielded cables were used when testing your product, you must add this paragraph to the manual statement.

Maximum Uplink ERP Warning

FCC maximum allowed uplink power per channel is 37dBm ERP. If using a donor antenna system with greater than 3dB of gain (donor antenna gain minus donor coax loss) the installer must reduce the maximum RF output power of the uplink signal to no more than 37dBm ERP at the donor antenna. Exceeding 37dBm ERP is a violation of FCC regulations and can result in significant penalties.

1.7 Product Labels

FCC and Product Label Placement

Figure 1-1 is a right side view of the ProtectLink Public Safety Bi-Directional Amplifier showing placement of NFPA and other Regulatory and Product labels.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

WESTELL

1-800-377-8766

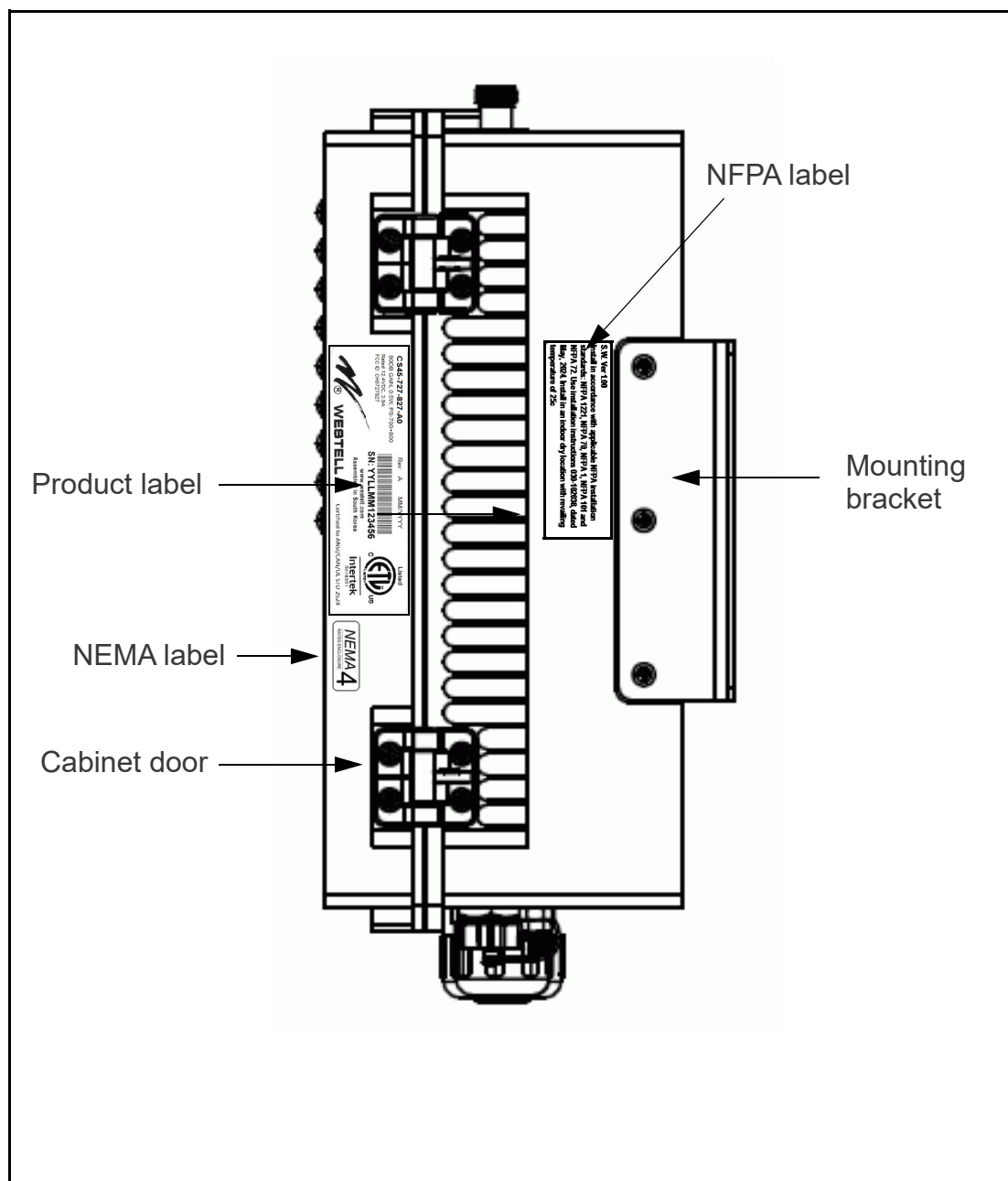Figure 1-1   FCC and Product labels on right (hinge) side of ProtectLink Public Safety Bi-Directional Amplifier

DRAFT D4-16 – AUTHORIZED USE ONLY

D959-2197-002
FCC Warning Label
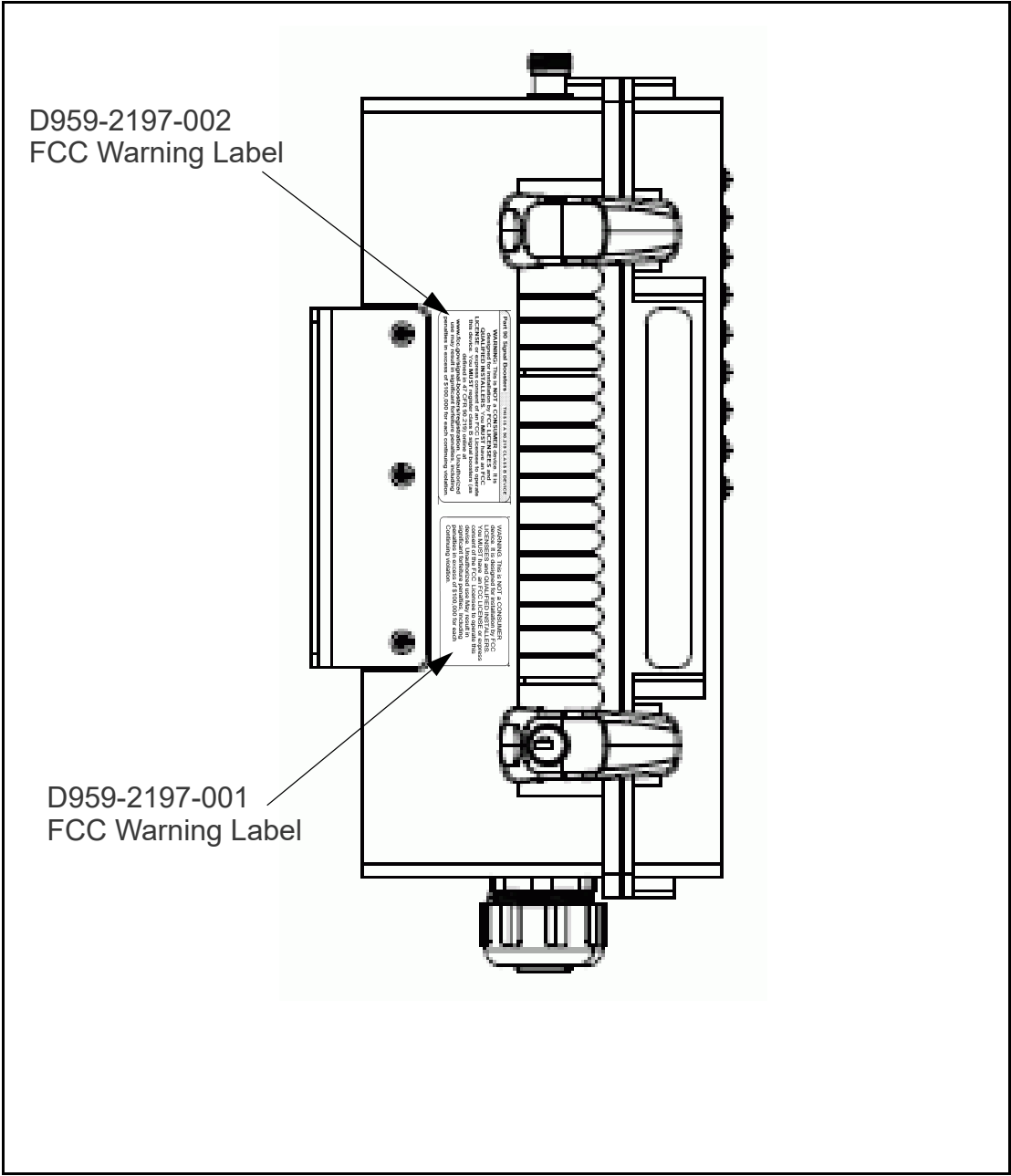
D959-2197-001
FCC Warning Label

Figure 1-2   FCC warning labels on left side of CS45-727-827-A0

FCC Warning Labels

In accordance with FCC requirements, the labels shown in Figure 1-3 below are affixed to the ProtectLink Public Safety Bi-Directional Amplifier, as shown in Figure 1-2 on page 1-9.
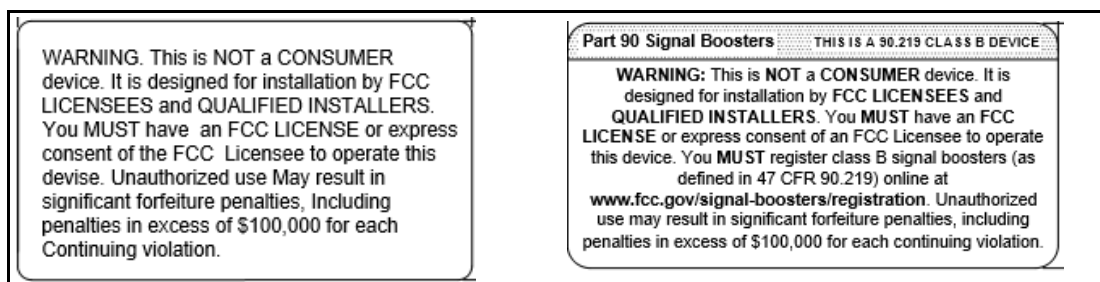

Figure 1-3   FCC Warning labels on signal booster

Product Labels

ProtectLink Bi-Directional Amplifier Product Label

A product label similar to that shown in Figure 1-4 below is affixed to the CS45-734-834-A0 BDA as shown in Figure 1-1 on page 1-8.

Figure 1-4   CS45-734-834-A0 BDA product label

This label includes the BDA's electrical rating (12.9VDC, 11.7A). Other information on this and similar CS45-727-827-A0 product labels is described in Table 1-1:

Table 1-1   BDA Product Label information

Item #	Description
1	Model number
2	Product description
3	Product revision number
4	Date of manufacture (MM/YYYY)
5	Product Serial Number
6	Bar Code for Product Serial Number
7	ETL Control Number

NFPA Label

A National Fire Protection Association label similar to that shown in below is affixed to the right side of the cabinet next to the product label on the door.
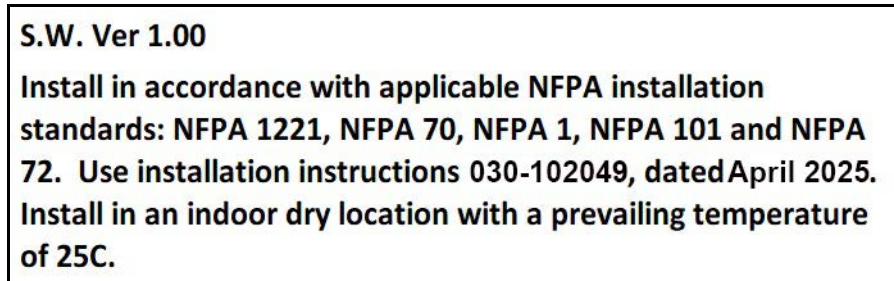
S.W. Ver 1.00

Install in accordance with applicable NFPA installation standards: NFPA 1221, NFPA 70, NFPA 1, NFPA 101 and NFPA 72. Use installation instructions 030-102049, dated April 2025. Install in an indoor dry location with a prevailing temperature of 25C.

Figure 1-5   NFPA label

NEMA Label

The NEMA label, similar to that at right, is on the right side of the CS45-727-827-A0 signal booster to the right of the product label, as shown in Figure 1-1 on page 1-8.

GUI Code Label

Installation and User's Guide QR Code Link Label

Labels affixed to the inside of the cabinet door provide GUI port login credentials and a QR code to access this Installation and User Guide online.

CS19-BBU-005 Battery Cabinet

The CS19-BBU-005 Battery Cabinet product label is shown in Figure 1-6 on page 1-11.

Figure 1-6   CS19-BBU-005 Battery Cabinet Product Label

This label includes the battery cabinet's electrical rating (120VAC, 60 Hz, 1A) and other details listed in Table 1-1 on page 10.

Remote Annunciator

A product label similar to that shown in <u>Figure 1-7</u> below is affixed to the CS45-734-834-A0 Public Safety Bi-directional Amplifier remote annunciator as shown in <u>Figure 1-1 on page 1-8</u>.

Figure 1-7   BDA Remote Annunciator product label

This label includes the remote annunciator's electrical rating (28VDC, 25mA) and other details listed in <u>Table 1-1 on page 10</u>.

Product Overview

This chapter provides an overview of your Westell CS45-734-834-A0 Public Safety Bi-directional Amplifier.

Guide to this Chapter

CHAPTER 2

DRAFT D4-16 – AUTHORIZED USE ONLY
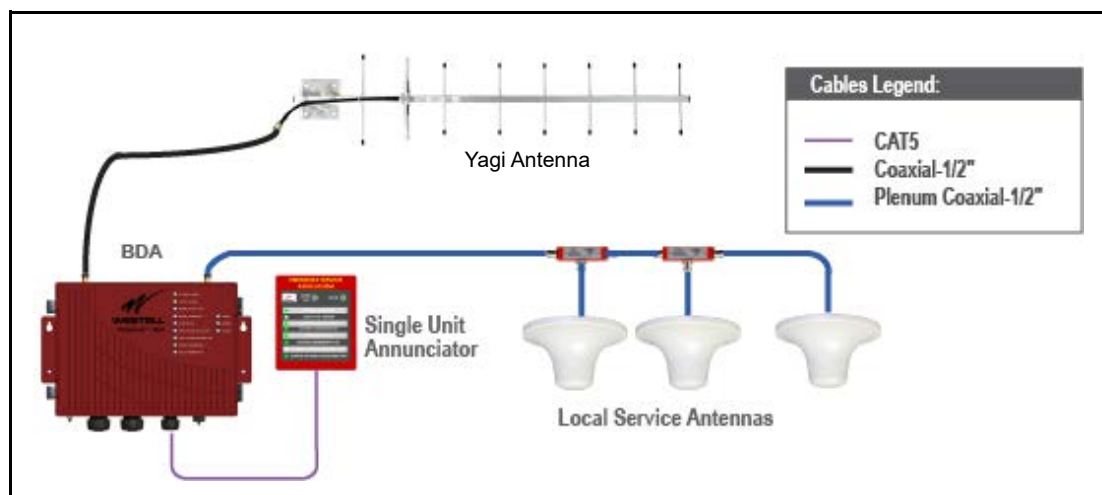
2.1 Product Information

Figure 2-1   CS45 Series System layout

The ProtectLink Public Safety Bi-Directional Amplifier was developed for use in enclosed structures where signals from local public safety towers to operate mobile units are poor or unavailable. Adequate signal strength must be available outside the structure as a prerequisite to achieving in-building coverage. The device is connected to an external antenna, normally located on a roof, and to one or more internal antennas placed strategically throughout the area where wireless service is desired.

Figure 2-1 above illustrates a possible configuration of a ProtectLink Public Safety Bi-directional Amplifier serving a building complex. The BDA at left is linked to the external donor antenna, an Annunciator, and three local service antennas serving the buildings. Westell CS19-BBC-005 Battery Cabinets (not shown above) can be installed to supply battery backup power to the BDA.

The external antenna is typically directional, such as a Yagi or Panel antenna. Internal antennas are typically omnidirectional, although various other types may be used, depending on the coverage application. The Signal Booster amplifies both the uplink (mobile to base) and downlink (base to mobile) signals, thus facilitating communications to and from the intended wireless infrastructure.

The downlink and uplink paths support maximum gains of up to 90 dB and 80 dB, respectively. Gain can be adjusted in 1 dB steps, from 60 to 90 dB DL and from 50 to 80 dB UL.

The ProtectLink BDA has two RJ45 Ethernet ports, an external port labeled GUI for local configuration and an internal port labeled Network for the persistent network connection.There are also LED indicators on the front panel of the enclosure to indicate power and status alarms. Refer to Front Panel Status Indicators on page 3-8.

2.2 Product Features

Features of the CS45-734-834-A0 Public Safety Bi-directional Amplifier include:

- Control using a web browser and accessed by connecting a laptop or desktop computer to the 8P8C/RJ45 Connector labeled 'GUI' on the bottom panel of the ProtectLink.
- Automatic gain control
- Intelligent Oscillation Management
- Overdrive protection
- Under/over voltage protection
- Fault protection
- Low power consumption
- Operates on 12VDC (generated by 120VAC-powered BBU)
- Built-in battery backup and alarming
- SNMP
- Web based GUI
- Built-in Annunciator data connection
- Dry contacts for Fire Alarm Control Panel connections
- NEMA4 conduit glands
- Max 64 filters shared in blocks of 8 per band for Class A/B operation
- Adjustable gain / attenuation control per each channel
- Uplink squelch function per each channel
- Digital modulation
- Dual status donor antenna monitoring
- Mandatory isolation test prior to commissioning
- Internal Emergency Transmit Disable (ETD) connection
- P25 Phase II FAST AGC Level control
- FAST SQUELCH control

WESTELL
1-800-377-8766

2.3 Included Accessories

Table 2-1 contains the items that are shipped with the ProtectLink Public Safety Signal Booster.

Table 2-1   Included Accessories

Quantity	Description
4	Hex head wood screws and split washers
2	BDA Cabinet Keys
2	3/4" Cordgrips
1	1/2" Cordgrip
1	6' Ethernet Cable

2.4 Optional Accessories

A complete line of accessories is available from Westell. Check with your Westell distributor for any additional items needed. Some products that are suitable for most in-building needs are listed in Table 2-2.
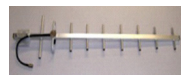
Table 2-2   Optional Accessories
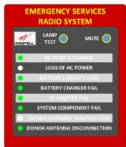
SKU	Model #	Description	
Antennas			
CS03-019-429	ANT-O/698-2.7K/N(F) OMNI ECON	Omnidirectional Antenna, Quad Band (700-960, 1710-2700 MHz) w/ plenum attached, white ECON	
CS03-011-429	ClearLink-O/698-2.7K/N	Omnidirectional Antenna, -153 PIM, Quad Band (700-960, 1710-2700, MHz) w/ plenum attached	
CS03-021-833/N	ANT-O/600-4000-THINRND/N(F)	Omnidirectional Antenna, Round Ultra Slim, -153 PIM (600-4000)	
CS03-012-389	ClearLink-D/698-2.7K/N	Directional Antenna, -153 PIM, Multiband (698-960 & 1710-2700 MHz)	
CS03-003-430	CSI-AY/746-896/11	Yagi, 11 dB, Public Safety 700/800 (746-896 MHz)	
CS03-777-999		High Gain Hurricane Rated Panel Antenna (698-940 MHz 30° 15dBi)	
Power Tappers			
CS05-494-114	PT3/340-2.7K/N	3dB Power Tapper, Public Safety grade, 200W, N connectors (340-2700 MHz)	
CS05-478-114	PT5/340-2.7K/N	5dB Power Tapper, Public Safety grade, 200W, N connectors (340-2700 MHz)	
CS05-479-114	PT6/340-2.7K/N	6dB Power Tapper, Public Safety grade, 200W, N connectors (340-2700 MHz)	
CS05-480-114	PT7/340-2.7K/N	7dB Power Tapper, Public Safety grade, 200W, N connectors (340-2700 MHz)	
CS05-481-114	PT8/340-2.7K/N	8dB Power Tapper, Public Safety grade, 200W, N connectors (340-2700 MHz)	

WESTELL
1-800-377-8766

Table 2-2   Optional Accessories

SKU	Model #	Description	
CS05-482-114	PT10/340-2.7K/N	10dB Power Tapper, Public Safety grade, 200W, N connectors (340-2700 MHz)	
CS05-483-114	PT13/340-2.7K/N	13dB Power Tapper, Public Safety grade, 200W, N connectors (340-2700 MHz)	
CS05-484-114	PT15/340-2.7K/N	15dB Power Tapper, Public Safety grade, 200W, N connectors (340-2700 MHz)	
CS05-485-114	PT20/340-2.7K/N	20dB Power Tapper, Public Safety grade, 200W, N connectors (340-2700 MHz)	
CS05-486-114	PT30/340-2.7K/N	30dB Power Tapper, Public Safety grade, 200W, N connectors (340-2700 MHz)	
Directional Couplers			
CS05-488-429	DC5/340-2.7K/N	5dB Directional Coupler, Public Safety grade, 300W, N connectors (340-2700 MHz)	
CS05-489-429	DC6/340-2.7K/N	6dB Directional Coupler, Public Safety grade, 300W, N connectors (340-2700 MHz)	
CS05-490-429	DC10/340-2.7K/N	10dB Directional Coupler, Public Safety grade, 300W, N connectors (340-2700 MHz)	
CS05-491-429	DC15/340-2.7K/N	15dB Directional Coupler, Public Safety grade, 300W, N connectors (340-2700 MHz)	
CS05-492-429	DC20/340-2.7K/N	20dB Directional Coupler, Public Safety grade, 300W, N connectors (340-2700 MHz)	
CS05-493-429	DC30/340-2.7K/N	30dB Directional Coupler, Public Safety grade, 300W, N connectors (340-2700 MHz)	
Power Dividers			
CS04-472-429	SPD2/340-2.7K/N	2-Way Power Divider, Public Safety grade, 300W, N connectors	
CS04-473-429	SPD3/340-2.7K/N	3-Way Power Divider, Public Safety grade, 300W, N connectors	
CS04-474-429	SPD4/340-2.7K/N	4-Way Power Divider, Public Safety grade, 300W, N connectors	
Remote Annunciator			
CS40-ANNUNC	CS40-ANNUNC	Remote Annunciator panel for single ProtectLink Series BDA or individual remote units	

Specifications and Product Appearance

This chapter provides the Westell CS45-734-834-A0 ProtectLink Public Safety Bi-directional Amplifier specifications.

Guide to this Chapter

CHAPTER 3

3.1 RF Specifications

Table 3-1   RF Specifications

Item	Parameter	Description	Unit	Notes
1	700 DL Freq. Band	769-776	MHz	
2	700 UL Freq. Band	799-806		
3	800 DL Freq. Band	851-869		
4	800 UL Freq. Band	806-824		
5	Number of DL Class A Filters per Band	Up to 64		
6	Number of UL Class A Filters per Band	Up to 64		
7	Class A Channelized Filter BW	12.5, 75	kHz	Default 75 kHz with minimum group delay
8	Class A Filter Rejections		dB typical	Δ**f** – is rejection from BAND EDGE
	60 typical			Δf tolerance +/- 5kHz
9	Class A System Group Delay for each filter		uS	TOTAL DL group delay between DONOR and SERVICE ports.
	12.5 kHz	$\leq$60		
	75 kHz	$\leq$15		P25 phase 1 & 2 compliant
11.2	Class B Channelized Filter BW	150	KHz	
11.4	Class B Filter Rejections			Δ**f** – is rejection from BAND EDGE
	60 typical		dB	Δf tolerance +/- 20kHz
11.6	Class B Group Delay for each filter		uS	
	150 KHz	<15		
12	System Gain DL	90	dB	
13	System Gain UL	80	dB	
14	UL and DL System Gain Adjustment	30	dB	1 dB steps
15	UL and DL Gain Adjustment per Channel	30		1 dB steps - Attenuation adjustment

1-800-377-8766

3.2 Power Specifications

CS45-734-834-A0 Power Specifications

Table 3-2 lists power specifications for the CS45-734-834-A0 ProtectLink Public Safety Bi-Directional Amplifier.

Table 3-2   Power Specifications

Parameter	Specification
	BDA as single system
Battery Charger Output	14.4 VDC Max.
DC Input Range	12.9 VDC (rated nominal), (11 - 14.4 operational)
DC Power Consumption (dual band)	12.9 VDC (Nominal), 11.7A (max.), 9.5A (typical)
DC Power Consumption (single band)	12.9VDC (Nominal), 9.5A (max.), 8.1A (typical)
Max. AH battery capacity (two batteries)	145AH
Max. battery standby operating time with two 100AH batteries	12 hours (UL 2524 operation)
Max. battery standby operating time with two 145AH batteries	24 hours (UL 2524 operation)
Max. battery standby operating time with two 100AH batteries (dual band)	19.4 hours (NFPA operation)
Max. battery standby operating time with two 145AH batteries (dual band)	42.1 hours (NFPA operation)

CS19-BBU-005 Battery Cabinet Power Specifications

Table 3-3 lists power specifications for the CS19-BBU-005 battery cabinet.

Table 3-3   CS19-BBU-005 Power Specifications

Parameter	Specification
Main Power Input Voltage	120VAC, 60 Hz, 2.8A
AC Power Consumption (Full RF load, no battery charging, 1.3A @ 108VAC)	140 W Max
AC Power Consumption (Full RF load, no battery charging, 1.2A @ 120VAC	144 W Max
AC Power Consumption (Full RF load, no battery charging, 1.0A @ 134VAC	134 W Max
AC Power Consumption (Full RF load, 7A max charge setting, 2.3A @ 108VAC = 248 W)	248 W Max
AC Power Consumption (Full RF load, 7A max charge setting, 2.1A @ 120VAC = 252 W)	252 W Max
AC Power Consumption (Full RF load, 7A max charge setting, 1.9A @ 134VAC = 254 W)	254 W Max

WESTELL
1-800-377-8766

3.3 Mechanical Specifications

CS45-727-827-A0 Public Safety Bi-Directional Amplifier

Table 3-4 lists mechanical specifications for the CS45-734-834-A0 Public Safety Bi-Directional Amplifier.

Table 3-4   Mechanical Specifications -- BDA

Parameter	Specification	Notes
Size	16.54" (420 mm) W x 12.6" (320 mm) H x 5.47" (139 mm) D (cabinet only) 18.74" (476.1 mm) W x 12.98" (329.82 mm) H x 6.26" (159 mm) D (cabinet plus mounting flanges and protruding connectors)	
Weight (approx.)	25.6 lbs. (11.61 kg)	
Connectors	Donor/Coverage Antenna Ports:	N female
	DC (Battery) Power In (3/4" conduit fitting)	
	Alarm Relay (3/4" conduit fitting)	
	Annunciator (1/2" conduit fitting)	
	RJ-45 Ethernet-1 (10/100 Base-T)	GUI Interface
	Frame Ground	One-Lug Ground
Mounting Type	Wall Mount with 4 holes	2 holes in each side
Enclosure Lock	Key lock	One-key lock
Heat Dissipation	Natural Convection	
Finish	Red paint	RAL3001 Signal RED

CS19-BBU-005 Battery Cabinet

Table 3-5 lists mechanical specifications for the CS19-BBU-005 battery cabinet.

Table 3-5   Mechanical Specifications -- CS19-BBU-005

Parameter	Specification	Notes
Size	28.25" (717.5 mm) W x 18.38" (466.8 mm) H x 15.07" (382.7 mm) D (cabinet only) 28.25"(717.5 mm) W x 22.25" (565.2 mm) H x 16.02" (407 mm) D (cabinet plus mounting flanges and protruding connectors and vents)	All dimensions are for the factory-conjoined battery box and charger enclosure. Opening the battery cabinet door adds up to 8.5" to the overall width.
Weight		
Connectors	Refer to Figure 4-10 on page 4-20 for battery cabinet connector details	

1-800-377-8766

3.4 Environmental Specifications

lists environmental specifications for the CS45-727-827-A0 Public Safety Bi-directional Amplifier components.

Table 3-6   Environmental Specifications

Parameter	Specification	Notes
Operating Temperature	-30°C ~ +50°C (ambient)	-22°F ~ +122°F
Storage Temperature	-40°C ~ +60°C (ambient)	-40°F to +140°F
Operating Humidity	5% ~ 95%	
Environmental	IP-65, NEMA 4 Compliance	Battery Charger Enclosure
Environmental	NEMA 3R Compliance	Battery Enclosure

WESTELL

1-800-377-8766

3.5 Trouble Status

Table 3-7   Trouble Status

Alarm State	Severity	Relay Alarm / Remote Annunciation	GUI / SNMP Alarm	Description
Loss of AC power, Operating on Battery	Warning	LOSS OF AC POWER	LOSS OF AC POWER	AC Power lost and BDA is operating on battery power
Donor Antenna Disconnected	Critical	DONOR ANTENNA DISCONNECT	DONOR ANTENNA DISCONNECT	No RF input on donor port - Donor antenna disconnection suspected
Donor Antenna Malfunction	Warning	DONOR/SOURCE MALFUNCTION	DONOR ANTENNA MALFUNCTION	RF input at donor port below threshold - Antenna alignment change suspected
Uncorrectable Oscillation Detected	Critical	SYSTEM COMPONENT FAIL	SYSTEM COMPONENT FAIL	Uncorrectable oscillation detected that a reduction in gain could not resolve, causing RF shutdown
		RF EMITTER FAIL	OSCILLATION RF SHUTDOWN	
Oscillation Detected	Warning	SYSTEM COMPONENT FAIL	OSCILLATION REDUCED GAIN	Oscillation detected - BDA operating at reduced gain
Over Temperature	Critical	SYSTEM COMPONENT FAIL	HIGH TEMPERATURE DETECTED	BDA internal temperature over threshold, will result in HPA shutdown
		RF EMITTER FAIL		
UL/DL Amplifier Failure	Critical	RF EMITTER FAIL	DL 700 HPA FAIL	Uplink and/or downlink amplifier has been shut down
			DL 800 HPA FAIL	
			UL HPA FAIL	
Loss of Annunciator Communications	Warning	SYSTEM COMPONENT FAIL	REMOTE ANNUNCIATOR LOSS OF COMMUNICATIONS	BDA lost communications with the remote annunciator
Battery Capacity Low	Warning	BATTERY CAPACITY LOW	BATTERY CAPACITY LOW	Battery capacity under 30%
Battery Charger Failure	Critical	BATTERY CHARGER FAIL	BATTERY CHARGER FAIL	Failure of battery charger in BDA
Door Open	Warning	NONE	DOOR OPEN	Front panel door is open
Emergency Transmit Disable Enabled	Warning	RF EMITTER FAIL	USER INITIATED EMERGENCY TRANSMIT DISABLE	Emergency transmit disable (ETD) button (hardware or web interface) has been enabled

WESTELL®

1-800-377-8766

3.6 Product Appearance

CS45-727-827-A0 Public Safety Bi-Directional Amplifier

Figure 3-1 shows the external configuration of your ProtectLink.

Figure 3-1   External configuration of the Public Safety Signal Booster

1-800-377-8766

Figure 3-2 shows connectors and other features inside an open BDA cabinet.
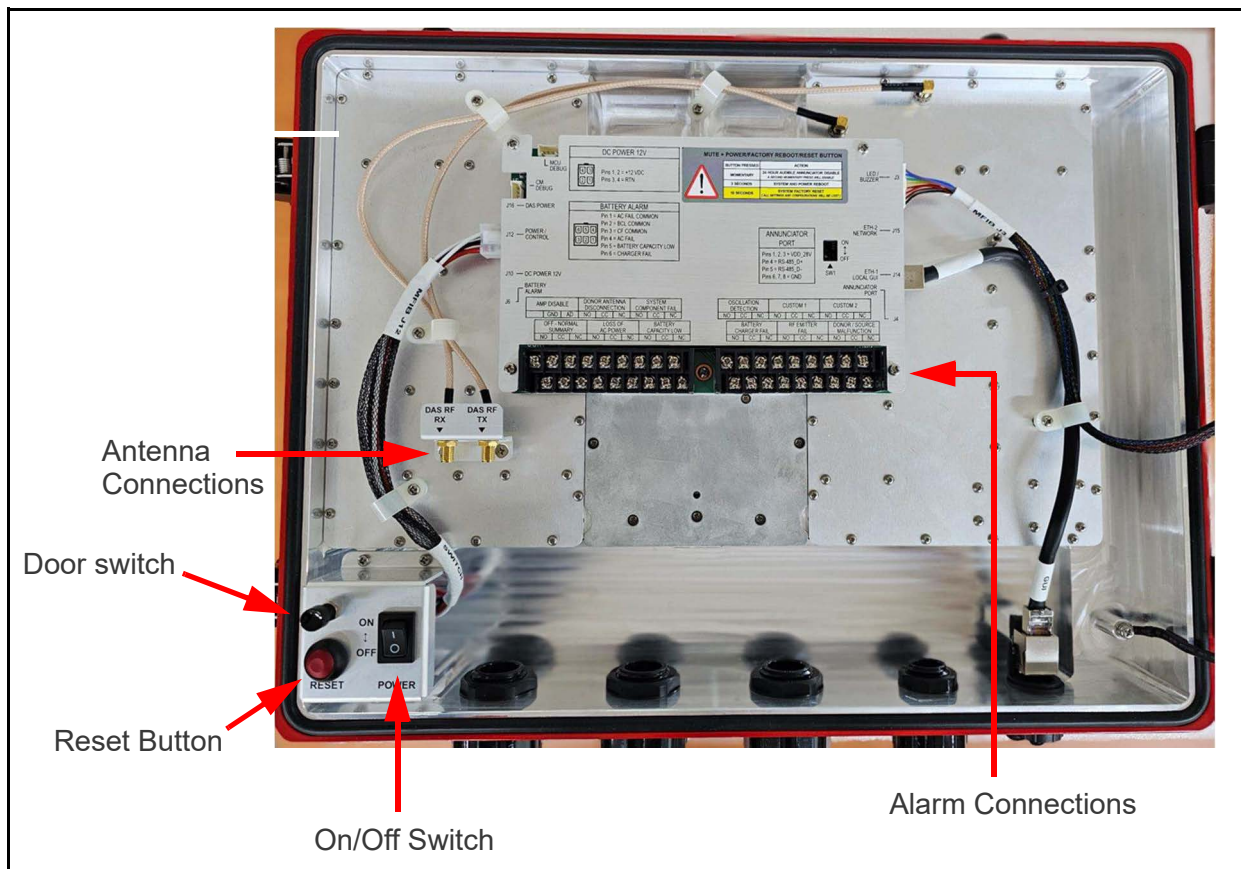
Figure 3-2   Features inside the open ProtectLink cabinet

Front Panel Status Indicators

On the front panel of the BDA are 12 LED indicators shown at left. The AC POWER - NORMAL indicator will glow green when unit is powered on. The SYSTEM indicator will glow green for normal operation (Normal Standby), yellow for non-critical trouble alarms, and red for critical trouble alarms.

1-800-377-8766

Figure 3-3 also shows the bottom view of the Public Safety Signal Booster.
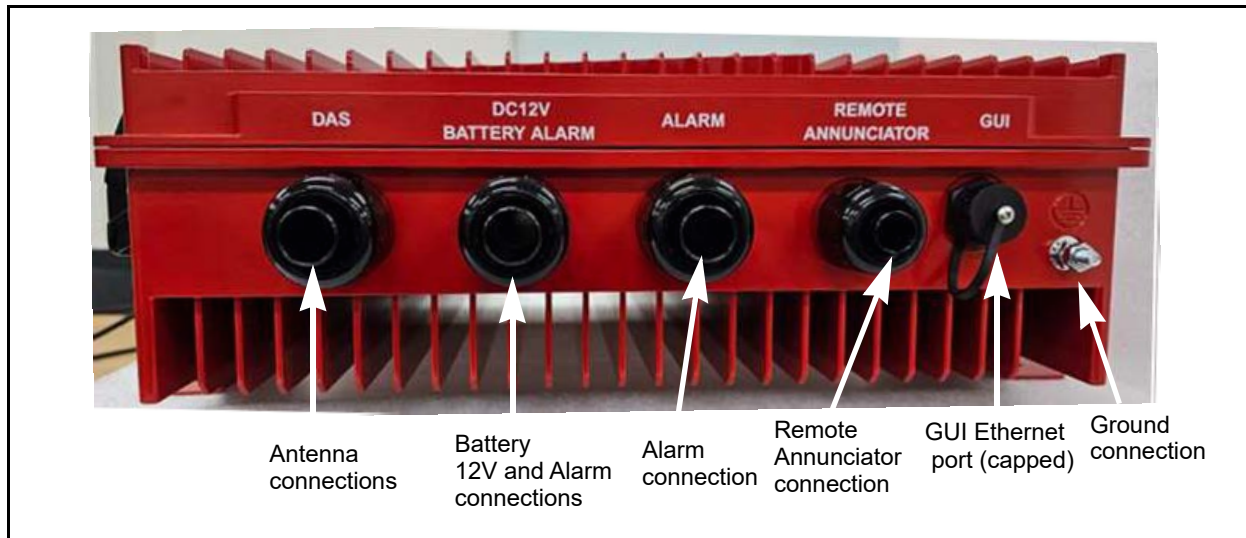

Figure 3-3   Bottom views of the Public Safety Bi-directional Amplifier

Bottom Panel Feedthroughs and Connectors

On the bottom of the ProtectLink (see Figure 3-3) are all the connections and cable feedthroughs, each labeled clearly. Watertight conduit fittings or hole plugs come preinstalled. The accessory kit provided includes additional conduit fittings and watertight cordgrips if the installer wishes to use a different style of feedthrough. See 4.5 Determining cable entry selection on page 4-8 for additional information.

Label Placement

Label placement on the Public Safety Bi-directional Amplifier is shown in Figure 1-1 on page 1-8.

DRAFT D4-16 – AUTHORIZED USE ONLY

1-800-377-8766

Installation Guidelines

This chapter provides installation guidelines for your Westell CS45-727-827-A0 Public Safety Bi-directional Amplifier and DAS System.

Guide to this Chapter

CHAPTER 4

WESTELL

4.1 Important Installation Guidelines

The CS45-734-834-A0 Public Safety Bi-directional Amplifier and CS19-BBU-005 battery cabinet are designed for indoor use only in Restricted Access locations.

The ProtectLink BDA must be installed in a vertical orientation (e.g. feedthroughs on the bottom of the unit).

Inadequate isolation between the outside and inside antennas may reduce the maximum available gain. Careful consideration of the layout and placement of the system is needed to minimize this possibility and to minimize the amount of signal leaking from the building.

Do not disassemble the Signal Booster or any other components of the system.

Important: Remote annunciator units are for installation in:

- a locked room such as a fire control room,
- a locked enclosure, or
- an equivalent enclosure that requires a tool to open.

DANGER: Refer to 1.4 Safety Guidelines on page 1-3 for proper antenna selection and installation. To avoid serious injury, death and/or damage to the Signal Booster, do not install donor or server antennas near overhead power lines or high power components. Allow enough distance so that falling antennas would not come in contact with those components.

DANGER: Electric shock may occur if the Signal Booster or battery cabinet are installed in close proximity to water.

WARNING: **Amplifier or handset damage may occur if a handset is connected directly to the Signal Booster or to the coax that leads to the Signal Booster.**

WARNING: **The Signal Booster must be connected to ground for protection.**

WARNING: **We recommend that installers do not wear jewelry or metal accessories when installing this Signal Booster or battery cabinet.**

WARNING: **Do not place cables or tools that may damage the Signal Booster or other system components in close proximity to any of the components.**

WARNING: **Check the installation site for hazardous conditions such as water-covered floors or badly worn or damaged cables prior to installation.**

WARNING: **Lifespan and performance of the Signal Booster and battery cabinet may be reduced if the unit is operating outside its nominal temperature range.**

CAUTION: When the Signal Booster is in operation, RF fields in close proximity to the donor or service antennas may exceed FCC limits for human exposure.

CAUTION: Turn power to the Signal Booster off when connecting or disconnecting cables.

CAUTION: Be careful as there is a very high voltage inside the Signal Booster. Keys are required to open these components, but the keys must be kept by the administrator who manages the product.

WESTELL
1-800-377-8766

4.2 Designing a System and Preparing For Installation

Before starting installation work, it is important to assess the physical facility which the BDA will serve, and then design a system which will provide the desired level of service. Westell Sales Engineers can assist with this process. Such a design is shown in 2.1 Product Information on page 2-2.

Start the design process by familiarizing yourself with all important installation and safety guidelines in section 4.1 Important Installation Guidelines on page 4-2. Then undertake these steps:

- Determine the installation location and placement of the system's central components:

    - The BDA and, as applicable, the Battery Cabinet. See Placement of the BDA on page 4-9 and 4.10 Connecting 12V Battery Power on page 4-17.

    - The external antenna. See 4.3 Donor Antenna Installation Guidelines on page 4-6.

    - The Remote Annunciator connected to the BDA. See 4.11 Connecting Remote Annunciators on page 4-24.

- If internal antennas shall be connected directly to the BDA, determine each antenna's installation location. See 4.4 Indoor Antenna Installation Guidelines on page 4-7.

- Determine the installation location and placement of a Battery Cabinet providing backup battery power (optional).

- With the information assembled while making the above determinations, make sure the correct product components, cables, connectors, and accessories are procured prior to the start of installation work. Refer as needed to 2.3 Included Accessories on page 2-4 and 2.4 Optional Accessories on page 2-5.

WESTELL

1-800-377-8766

Installation Tools and Equipment

Make sure all necessary tools and equipment are assembled prior to starting installation of the CS45-734-834-A0 Public Safety Bi-directional Amplifier and CS19-BBU-005 battery cabinet.

- Drill and drill bits
- Wrenches, socket wrenches, torque wrench, and sockets fitting bracket and BBU cover bolts, fasteners, and battery terminals
- Level
- Small slotted screwdriver (for alarm connections)
- Wire stripper
- Pliers
- Knife to cut flexible rubber conduit
- 1/2" and/or 3/4" flexible conduit (depending on installation design)
- Spectrum analyzer
- Signal generator
- Cable sweep tester
- Laptop computer with Ethernet connection
- Westell CS45-734-834-A0 BDA wall mounting template (p/n 030-000448) (optional)
- Westell CS19-BBU-005 battery cabinet wall mounting template (p/n 030-000448) (optional)

Contact Westell to obtain the above templates. Refer to Telephone Technical Support.

4.3 Donor Antenna Installation Guidelines

- Accurately determine the azimuth to the donor site. Obtain the donor site information and approval from the service provider/carrier.

- Ensure that the radiation path to the donor site is unobstructed.

- Mount the donor antenna at or toward the edge of the roof, in the direction of the donor site. Avoid having the RF signal from the donor pass above the location(s) of the service antennas. Normally, the service antennas are installed behind and below the donor antenna, as viewed from above. This approach helps avoid interference and feedback to and from the service antennas.

- Normally, mounting the donor antenna higher will allow a less obstructed path to the donor site. However, in high traffic metro areas, avoid mounting the donor antenna higher than necessary, as the quality of the donor signal may become less stable and it is more likely to encounter adjacent filter interference.

- When possible, shield the rear of a donor antenna by locating it so that any HVAC units and/or penthouse structures are behind the antenna, relative to the donor cell site location.

1-800-377-8766

4.4 Indoor Antenna Installation Guidelines

- Use omnidirectional antennas (see section 2.4. Optional Accessories) indoors and locate them centrally with respect to the intended coverage area to minimize signal leakage to the outside. Only use directional antennas indoors in special cases when higher gain and directionality would be helpful and RF exposure limits will not be exceeded.

- To avoid Signal Booster uplink overload and gain limiting, mount the indoor antennas away from areas where mobile subscribers frequently use their radios, fire alarm control rooms, or dispatch areas.

Note: If the signal level from antenna at the UL service port is >-12dBm, add external attenuation to avoid shutdown alarm.

- To determine the quantity and locations of indoor antennas, measure Received Signal Strength Indication (RSSI) to determine areas of weak signals. These are the approximate areas where indoor antennas may be needed.

- Be aware that the signal from an indoor antenna, in most cases, can be expected to penetrate approximately two standard sheet rock walls to reach users. If the signal must travel through more than two walls, or if the walls are made of materials other than sheet rock, it may be necessary to split the available signal and add more antennas.

WESTELL

1-800-377-8766

4.5 Determining cable entry selection

Prior to mounting the ProtectLink BDA, you'll need to determine what type of cable entries will be used for each component.

Provided with each ProtectLink are both watertight conduit fittings and NEMA4 rated cordgrips (cordgrips for AC power only). For a cleaner installation, conduit is preferred, and those fittings come preinstalled on the BDA. UL2524 Installations require the use of the conduit fittings. If you wish to use the cordgrips for any cable feed-throughs, change out those fittings prior to mounting on the wall.

The Alarm Relay and Accessory feed-throughs (shown in Figure 3-3 on page 3-9) utilize non-metallic flexible 3/4" conduit. AC, DC and Annunciator feed-throughs use 1/2" non-metallic flexible conduit. Westell's CS19-BBU-005 battery cabinet is supplied with conduit fittings, so at a minimum you may wish to keep the DC cable as conduit.

Figure 2-1 on page 2-2 includes a legend showing the types of cables needed to connect the system components during installation.

1-800-377-8766

4.6 Mounting and Grounding the ProtectLink BDA

Follow the instructions in this section to wall mount the ProtectLink.

Placement of the BDA

All cabinets must be placed to accommodate all required connections and clearances (for e.g. cabinet doors).

Battery Cabinets

A Battery Backup Unit needs to be installed in proximity to the BDA. Below is a Westell BDA installed above a Westell CS19-BBU-005 Public Safety Battery Backup Unit, along with an iso view of the battery backup unit with the cover removed. Refer to for battery backup unit installation details.

CS19-BBU-005 front panel installation

W 28" 711.2 mm

H 21.25" 539.8 mm (Between mounting holes)

D 16.02" 407 mm

CS19-BBU-005 mounting dimensions
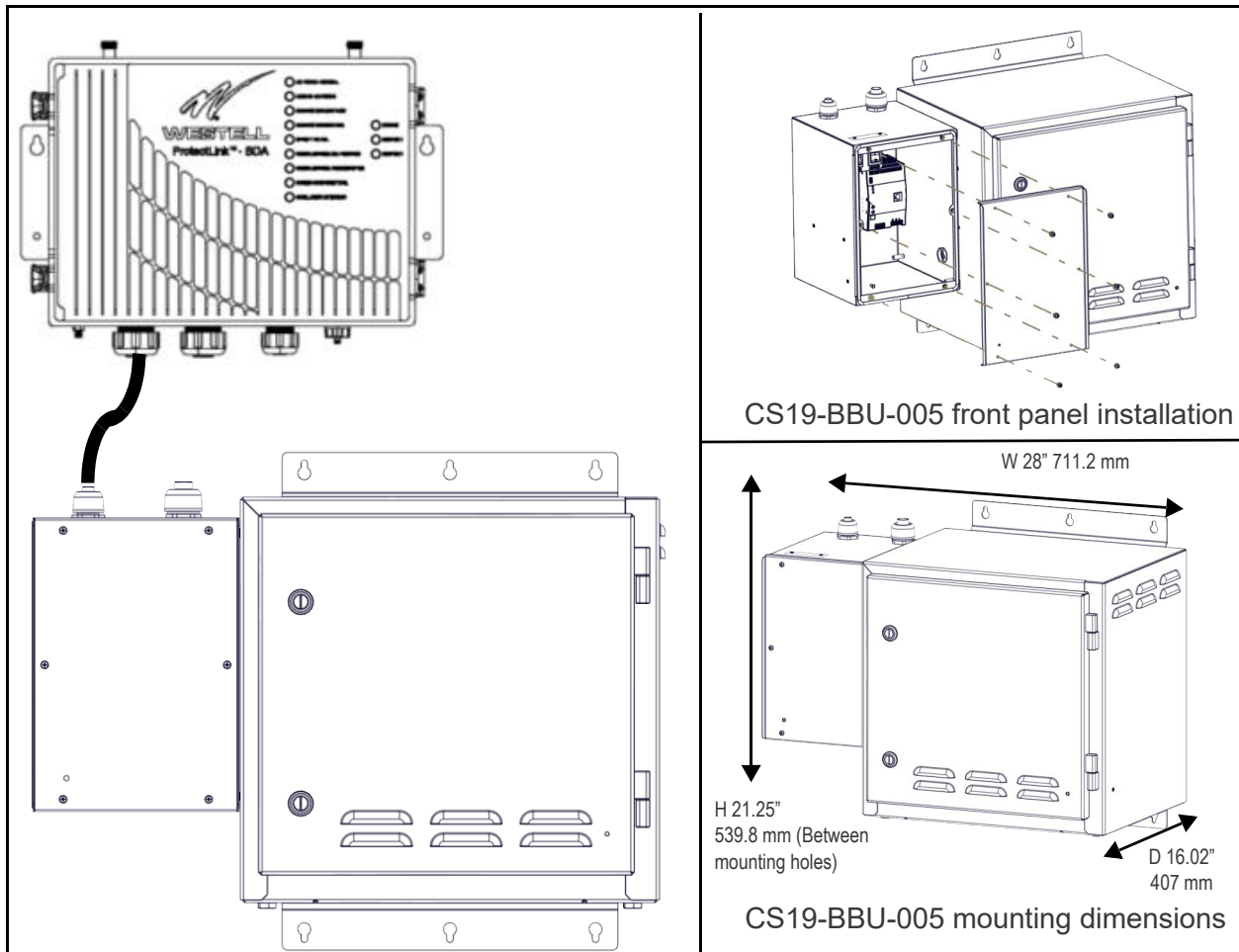
Figure 4-1   Signal booster installed above a Westell CS19-BBU-005 battery backup unit, left, and backup unit details, right

1-800-377-8766

⚠

WARNING: Failure to use the Westell CS19-BBU-005 battery backup unit with the CS45-734-834-A0 bi-directional amplifier will violate UL2524 compliance and void your product warranty.
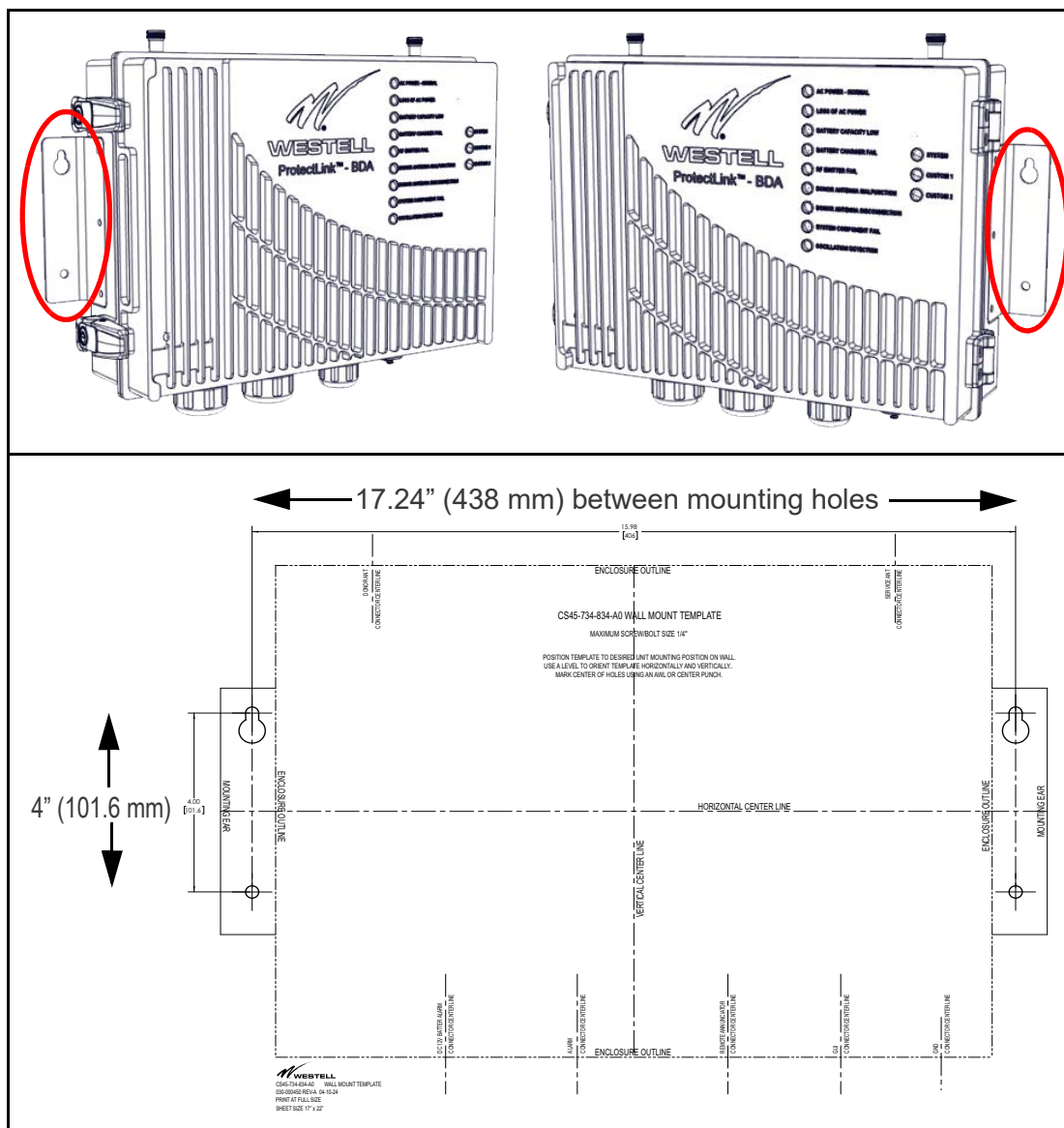
Figure 4-2   Signal Booster Mounting brackets (top, circled in red) and printable wall mounting template

Mounting and Grounding the ProtectLink

1. Using the ProtectLink or a full size printout of Westell document 030-000450 NG-BDA-TEMPLATE as a template, mark the four (4) locations for the wall anchoring system screws (two per mounting bracket). See Figure 4-2.

2. Move the BDA and drill the mounting holes at the marks in the wall.

3. Install a wall anchor (8mm x100mm) in each of the four (4) drilled holes.

4. Install the top four (4) screws into the anchors, leaving enough room to slide the screws into the oblong recesses in the tops of the unit's top mounting bracket openings.

5. Lift and hang the cabinet on the top two (2) screws, and finish fastening the top screws.

6. Install the bottom two (2) screws through the bracket openings into the anchors, fastening the cabinet to the wall.

7. Ground the BDA as described in Grounding Public Safety Bi-directional Amplifier Components.

Grounding Public Safety Bi-directional Amplifier Components

The CS45-734-834-A0 BDA must always be operated with the ground wire properly connected. Use a single-lug frame ground connector and at least 14 AWG wire to connect the ground terminal on the bottom of each cabinet to the building ground.

The cabinet ground connection is shown in Figure 3-3 on page 3-9.

DRAFT D4-16 – AUTHORIZED USE ONLY

1-800-377-8766

4.7 Connecting BDA and Antennas

Once the BDA is mounted and grounded, the antenna and annunciator connections can be completed.

1. **Install and connect the Donor Antenna.** Install the Donor Antenna following the 4.3 Donor Antenna Installation Guidelines on page 4-6 and the antenna manufacturer's installation instructions. Connect the antenna to the DONOR ANT port on the top left of the BDA cabinet with a watertight coaxial cable and fitting.

2. **Install and connect Service Antennas.** If Service Antennas will be connected directly to the BDA, install and connect them at this point. Follow the 4.4 Indoor Antenna Installation Guidelines on page 4-7. Connect each Service Antenna using watertight 1/2" Plenum Coaxial cable and couplers and/or power tappers shown in Table 2-2 on page 2-5. Connect the cable to the SERVICE ANT coaxial port on the top right of the BDA.

Verifying the Physical System Setup

- Check all cables for shorts and opens. Verify that there are no cables with loose or poor connections. RF leakage could cause oscillation to occur under some conditions.

- If the rooftop antenna (donor antenna) is directional, check it for proper alignment along the calculated compass heading. Typically, the directional antenna would be aimed at the same site that your handset uses, but that may not always be the case.

1-800-377-8766

4.8 Connecting the Emergency Transmit Disable Button

The AMP DISABLE connections on the left alarm terminal block allow for a remote Emergency Transmit Disable (ETD) switch to disable all RF functions of the ProtectLink. See Figure 4-3 below.
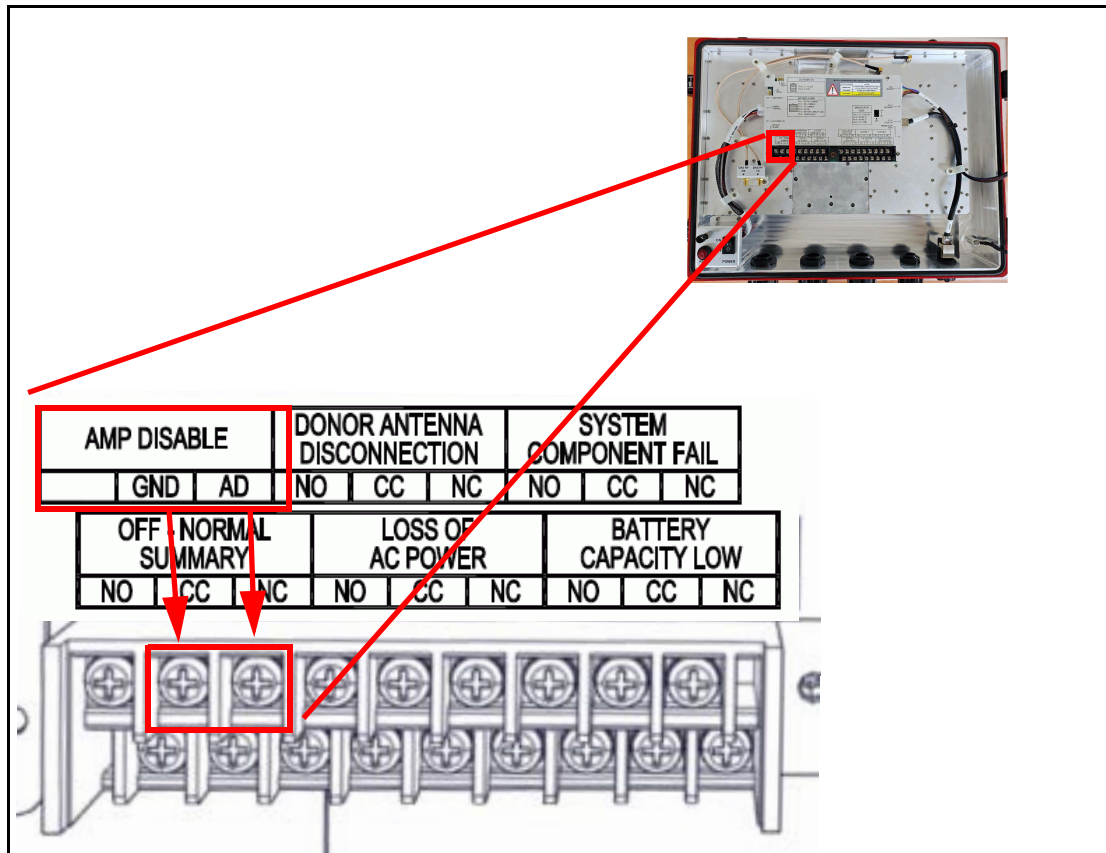
Figure 4-3   Emergency Transmit Disable connections

Use a mushroom type ETD button available from electrical suppliers. The button may be a Single Pole Single Throw (SPST) type switch that is normally open and upon pressing closes the contacts. A 2 wire circuit between the ETD switch and the AMP DISABLE terminals will need to be provided by the installer.

WESTELL
1-800-377-8766

4.9 Connecting to the Fire Alarm Control Panel

Use an industry standard multi-conductor alarm cable between 22 and 14 gauge to connect the CS45 Series Signal Booster to an external Fire Alarm Control Panel.

1. Strip the outer serial cable insulation back to expose the inner conductors, as shown in Figure 4-4.

2. Strip back the insulation on the ends of each conductor. (Tin wires as needed.)
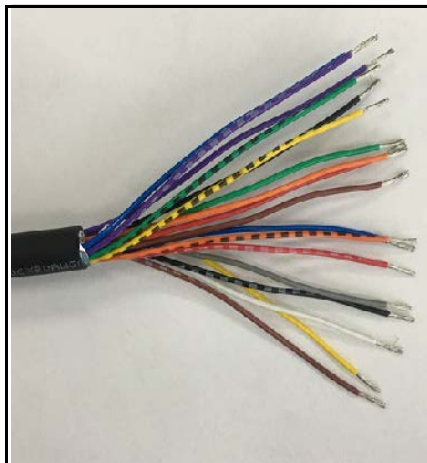
Figure 4-4   Stripped alarm wire

3. If using the provided conduit fittings, feed alarm cable through the watertight conduit and terminate in an electrical junction box. If using the provided watertight cordgrips, remove the conduit fitting from the bottom of the BDA chassis and replace with the suitably sized cordgrip fitting.
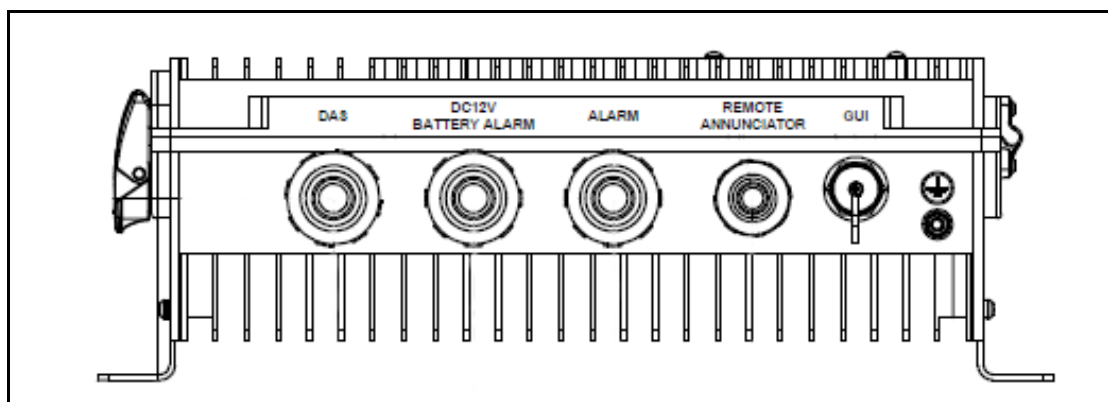
Figure 4-5   Conduit fittings on bottom of CS45 Series BDA

4. Route the cable wire pairs through the ALARM port to the BDA Fire Alarm Control Panel terminals shown in Figure 4-6 using the connection information in Table 4-1. As shown in Figure 4-6, the top row labels identify the corresponding top row terminals, and the bottom row labels identify the corresponding bottom row terminals. Be sure to fasten the connector screws securely.
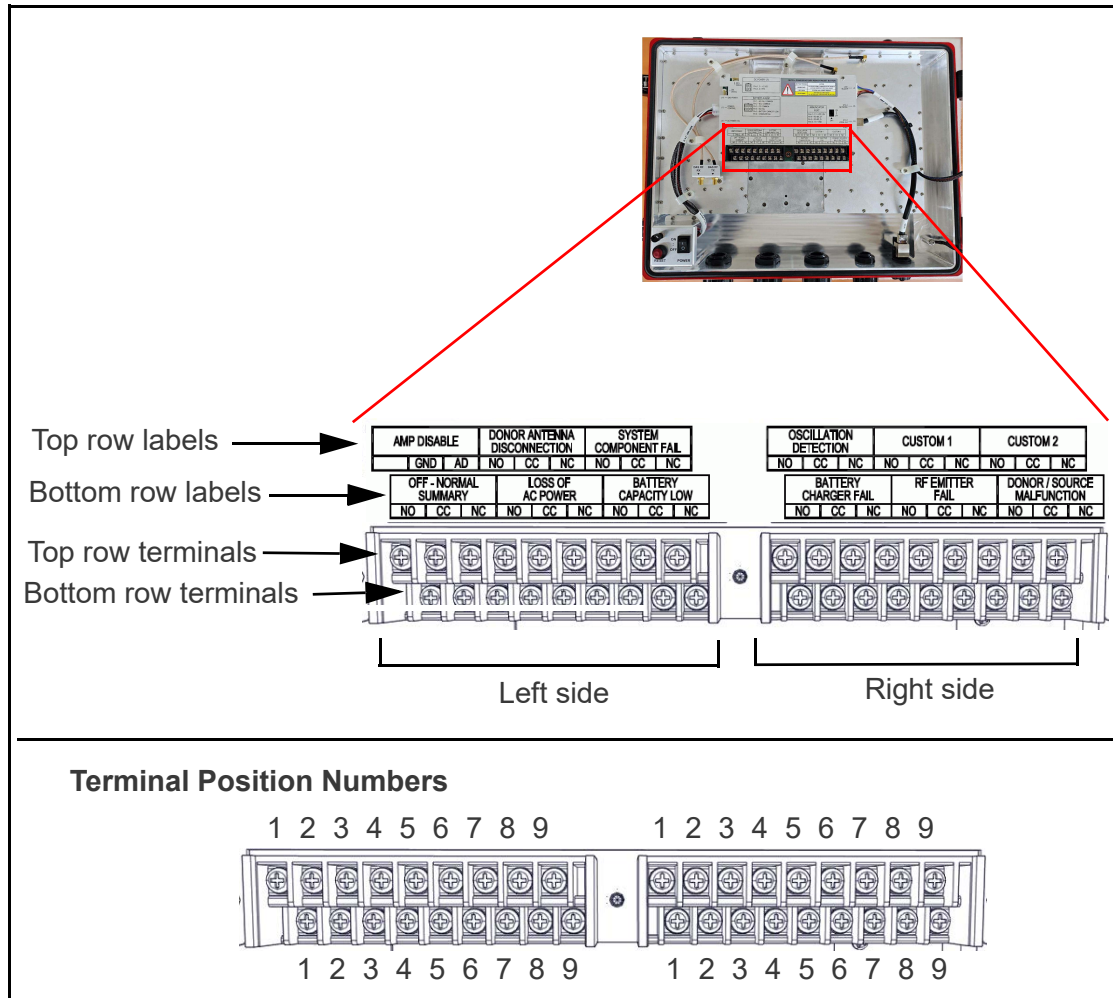
Figure 4-6   CS45 Series BDA Fire Alarm Control Panel terminals

5. Connect the stripped end of the cable to the Fire Alarm Control Panel. Refer to Table 4-1 below for connection information.

Table 4-1   Alarm Connections

Alarm *(See Table 5-3 on page 5-13 for additional information)*	Terminal position		
	NO	CC	NC
Top row, left side			
AMP DISABLE		2	3
DONOR ANTENNA DISCONNECTION	4	5	6
SYSTEM COMPONENT FAIL	7	8	9
Top row, right side			
OSCILLATION DETECTION	1	2	3
CUSTOM 1	4	5	6
CUSTOM 2	7	8	9
Bottom row, left side			
OFF-NORMAL SUMMARY	1	2	3
LOSS OF AC POWER	4	5	6
BATTERY CAPACITY LOW	7	8	9
Bottom row, right side			
BATTERY CHARGER FAIL	1	2	3
RF EMITTER FAIL	4	5	6
DONOR/ SOURCE MALFUNCTION	7	8	9

1-800-377-8766

4.10 Connecting 12V Battery Power

Using Westell CS19-BBU-005 Public Safety Battery Cabinet

Westell's CS19-BBU-005 Public Safety Battery Cabinet (shown below and in Battery Cabinets on page 4-9) is designed to provide 12V battery power to the BDA.

Figure 4-7   CS19-BBU-005 battery cabinet without battery installed

Follow these installation instructions.

1. As discussed in Placement of the BDA on page 4-9, determine the Battery Cabinet location in proximity to the BDA. Make sure spacing between cabinets is adequate for all connections and clearances. Ensure there is sufficient room and unobstructed access to the front panel, and the cabinet height accommodates battery handling and installation. Westell offers printable wall mounting template shown in Figure 4-8 to assist installers mounting the CS19-BBU-005 battery cabinet.

1-800-377-8766

PLACEHOLDER for image of new mounting template (if applicable)

Figure 4-8   Wall mounting template for CS19-BBU-005 battery cabinet

2. Inspect the battery cabinet for damages. Immediately report any damage to the transportation company and to Westell. See the Westell contact information in Customer Assistance on page Preface-v.

3. Mount the battery cabinet on a concrete wall, stud wall, or wall with 3/4" plywood backing board. See Figure 4-9 below, and follow these steps:

A. Using the top mounting bracket as a template, mark the three top mounting hole locations. If the wall is backed by studs, locate the holes so as many bolts as possible are aligned to enter studs.

B. Install the top and bottom mounting brackets on the back of the cabinet.

C. Drill appropriately sized pilot top mounting holes (slightly smaller than the shank width and depth of the mounting bolt, screw, or anchors intended for the hole) at the top mounting marks. Do not drill the holes too large.

D. (Optional) If anchors are being used, install the anchors in the three top mounting holes.

E. Partially install the three top mounting bolts or screws with washers until about 1/2" remains.

F. Carefully lift the cabinet to the mounting height. Do not place the cabinet on an unstable cart, stand, table, or any surface where it might fall and cause serious damage. Hang the cabinet from the partially installed top mounting bolts.
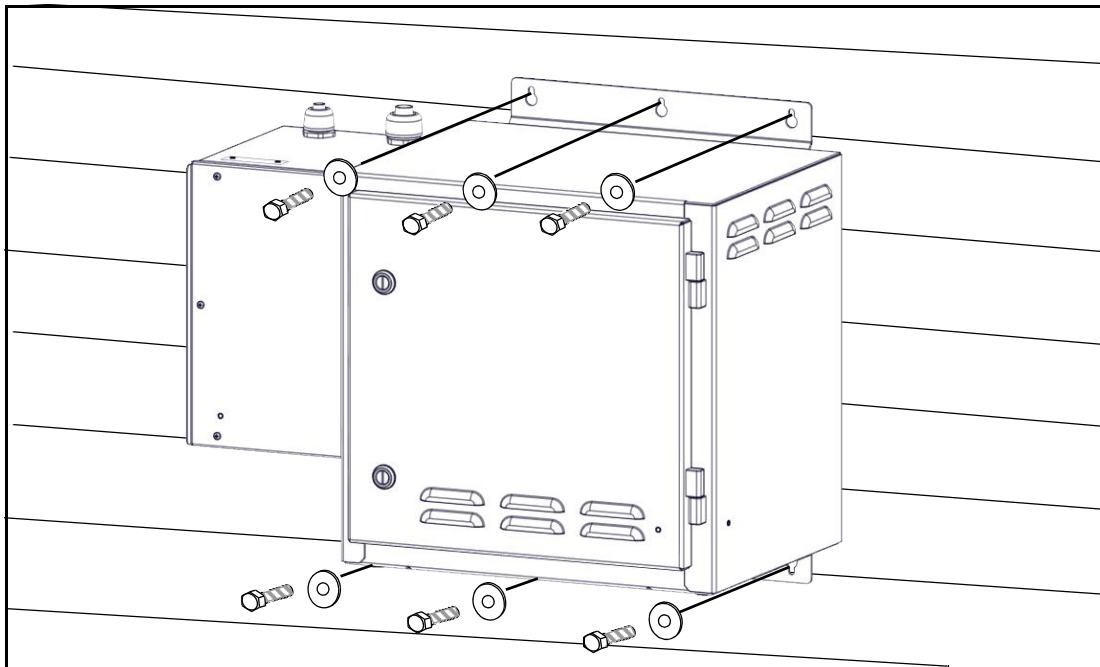
Figure 4-9   Wall mounting the CS19-BBU-005 battery cabinet

G. Verify that the cabinet is level, then finish driving the top mounting bolts until they are snug and the cabinet is flush and tight against the wall. Manually test the bolt tightness to verify that the bolts will support the cabinet weight. Correct any level or mounting bolt imperfections.

H. Mark the bottom mounting hole locations through the bottom mounting bracket holes. Drill the holes, install the bottom mounting bolts, and verify their snugness the same as the top bolts.

Refer to the CS19-BBU-005 battery cabinet wiring and connection details shown in as you complete the remaining installation steps.

1-800-377-8766
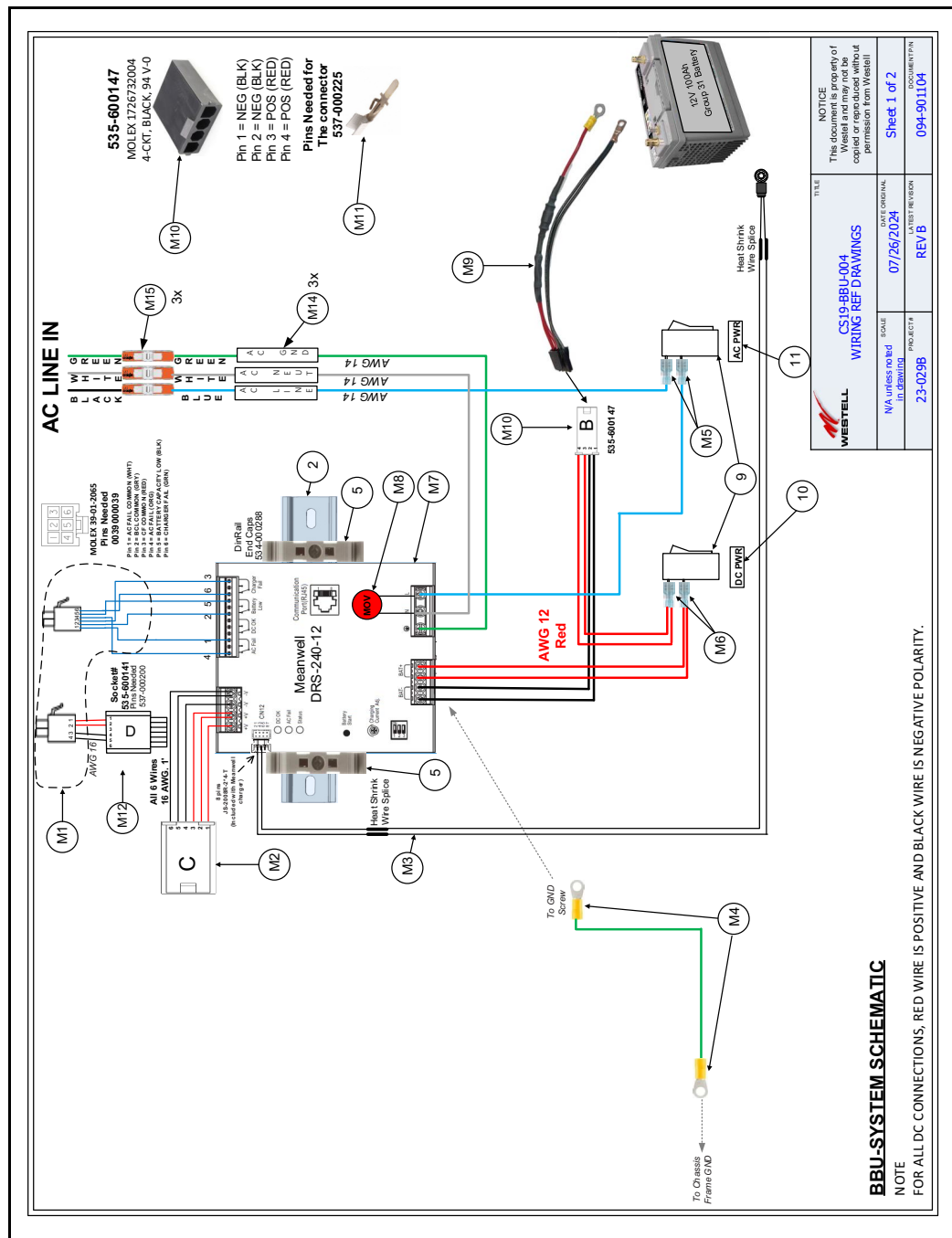
Figure 4-10   CS19-BBU-005 Battery Cabinet Wiring Reference Drawing

4. Extend the 10-foot cable spooled inside the BBU cabinet into the BDA via 3/4"
    conduit and the DC 12V BATTERY ALARM cable port.

5. Connect the 4-pin Molex connector on the battery cable to the BDA's four-pin DC POWER 12V connector. Connect the six-pin Molex connector to the BDA BATTERY ALARM terminals. See Figure 4-11 and use the connector information in Table 4-2 below.
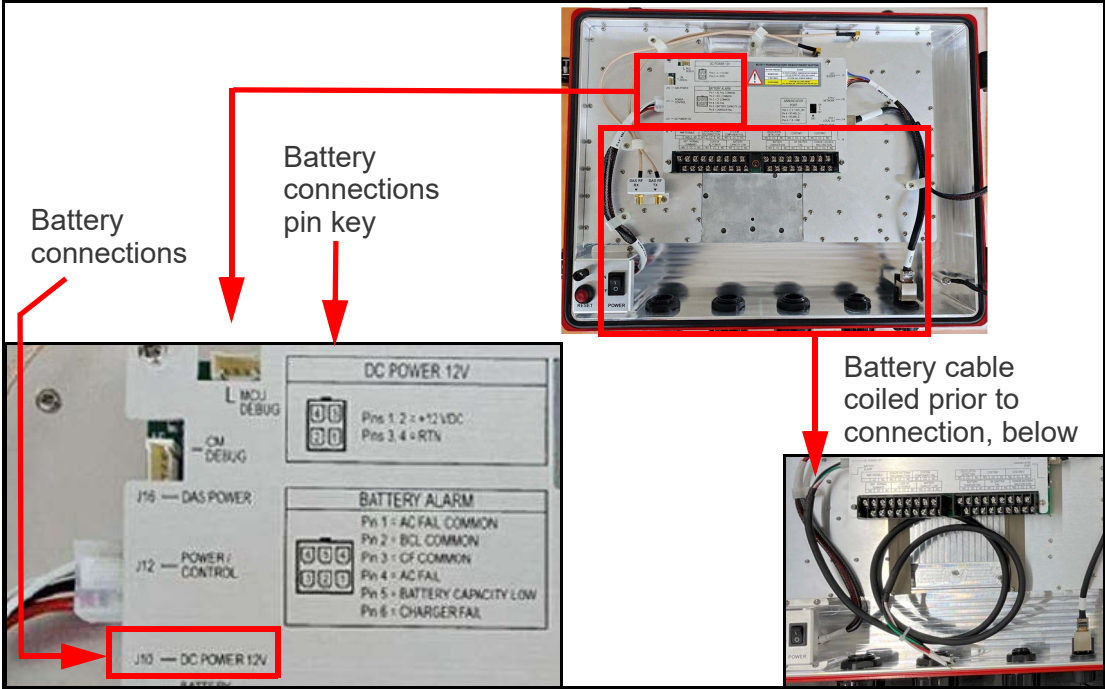
Figure 4-11   Battery cable connections to signal booster

Table 4-2   12V Power and Battery Alarm Pins

Connector	Pin #s	Description
	DC POWER 12V	
4 3 / 2 1	1, 2	+12 VDC
	3, 4	RTN
	BATTERY ALARM	
6 5 4 / 3 2 1	1	AC FAIL COMMON
	2	BATTERY CAPACITY LOW COMMON
	3	CHARGER FAIL COMMON
	4	AC FAIL
	5	BATTERY CAPACITY LOW
	6	CHARGER FAIL

6. **Connect AC Power:** Make sure the AC power source is disconnected or turned off. Route 12 AWG 3-wire AC power lines into the BBU cabinet via the 1/2" conduit fitting. Connect the AC wires to the corresponding black (line), white

(neutral), and green (protective earth ground) wires already installed on the battery charger and AC power switch. Open the hasp on the free end of each Wago connector, insert the stripped wire end, and close the hasp to secure the wire.

7. Carefully set a 12V battery in the right side of the BBU cabinet. Recommended batteries are listed in <u>Table 4-3</u> below.

8. To provide temperature compensated battery charging, the temperature probe must be attached to the negative post of the battery.

9. Four wires (two red, two black) connect to two ring lugs which attach to the positive (red wires) and negative (black wires) battery terminals. Connect the four-pin Molex connector on the other end of the wires to the corresponding connector attached to the charger/power supply.

10. When all connections have been completed, put the access cover back on the BBU charger/wiring chamber and torque the cover screws to 20 lbf-in.

Using Other Battery Solutions

⚠️

WARNING: **Use of other battery solutions is not recommended and may void your warranty and FCC and UL certification.**

Battery Specifications

<u>Table 4-3</u> lists key specifications for the sealed, maintenance-free lead-acid batteries Westell recommends to provide backup power to the ProtectLink.

Table 4-3   Battery Specifications

Battery Model	Qty	Nominal Capacity, 10HR rate	Dimensions
NP Power NPD12V-100AH	2	100 Ah	12.99" L x 6.73" W x 8.46" H
Zeus PC12-145-DC	2	145 AH	13.39" L x 6.81" W x 11.34" H

When powering the BDA, the two 145 Ah, 12VDC batteries will provide 24 hours of backup time including 20% derate factor, with the system fully configured for maximum RF power. (290AH / 9.5A(avg.)) x 0.80 = 24.4 hours).

When powering the BDA, a 55 Ah, 12VDC battery will provide in excess of 12 hours of backup time including 20% derate factor for aging, with the system fully configured for maximum RF power. (200AH / 9.5A(avg.)) x 0.80 = 16.8 hours).

1-800-377-8766

Other Battery Maintenance Considerations

⚠️

CAUTION: Do not wear conductive jewelry or use conductive tools while cleaning and working near battery terminals.

- Batteries should be marked with their installation date upon installation.

- The recommended batteries require no maintenance, but should be inspected in accordance with an NFPA 72 maintenance schedule for signs of damage including leakage, cracks, corrosion, or bloating.

- Batteries should be replaced on a schedule in accordance with local and state codes.

Page 4-23

WESTELL

1-800-377-8766

4.11 Connecting Remote Annunciators

Important: Remote annunciators must be installed in a secure location such as:

⚙ a locked room such as a fire control room

⚙ a locked enclosure

⚙ an equivalent enclosure that requires a tool to open

The Remote Annunciator connects to the BDA with a standard Ethernet cable housed in conduit meeting specified standards.

Westell offers the CS40-ANNUNC,which provides the status of the BDA to which it is connected.

CS40-ANNUNC
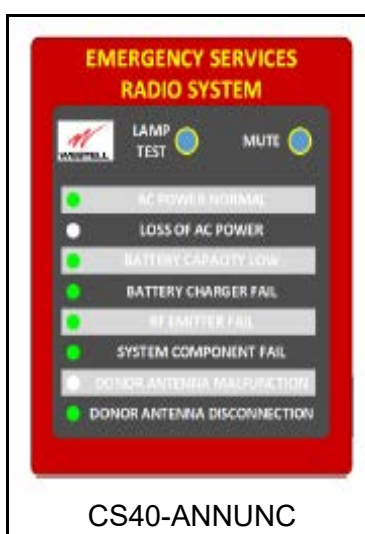
Figure 4-11   Remote Annunciator displays

Follow these steps for each Remote Annunciator installation:

1. Install the annunciator base on a standard wall-mounted electrical junction box at the desired visible location. Use a 2-gang box for CS40-ANNUNC.

2. Install standard straight Ethernet cable in conduit between the annunciator and the BDA. Use the connection information in Table 4-4.

Table 4-4   Annunciator Port Pins

Pin #s	Description	Notes
1, 2, 3	+28VDC	+28VDC will use 12 VDC
4	RS485 D+	
5	RS485-D-	
6, 7, 8	GND	

DRAFT D4-16 – AUTHORIZED USE ONLY

3. To install the annunciator, remove the 2 screws located on each side of the annunciator to loosen the mounting bracket. Mount the bracket to the front of the 2-gang electrical box.

4. Install the Ethernet cable through the bottom conduit fitting labeled REMOTE ANNUNCIATOR to the ANNUNCIATOR PORT connector inside the BDA and the port on the back of the annunciator (see Figure 4-12). Remove factory installed plugs from these RJ45 ports as necessary.

5. Place the annunciator on the mounting bracket and affix to the mounting bracket with the 2 screws removed in step 3.
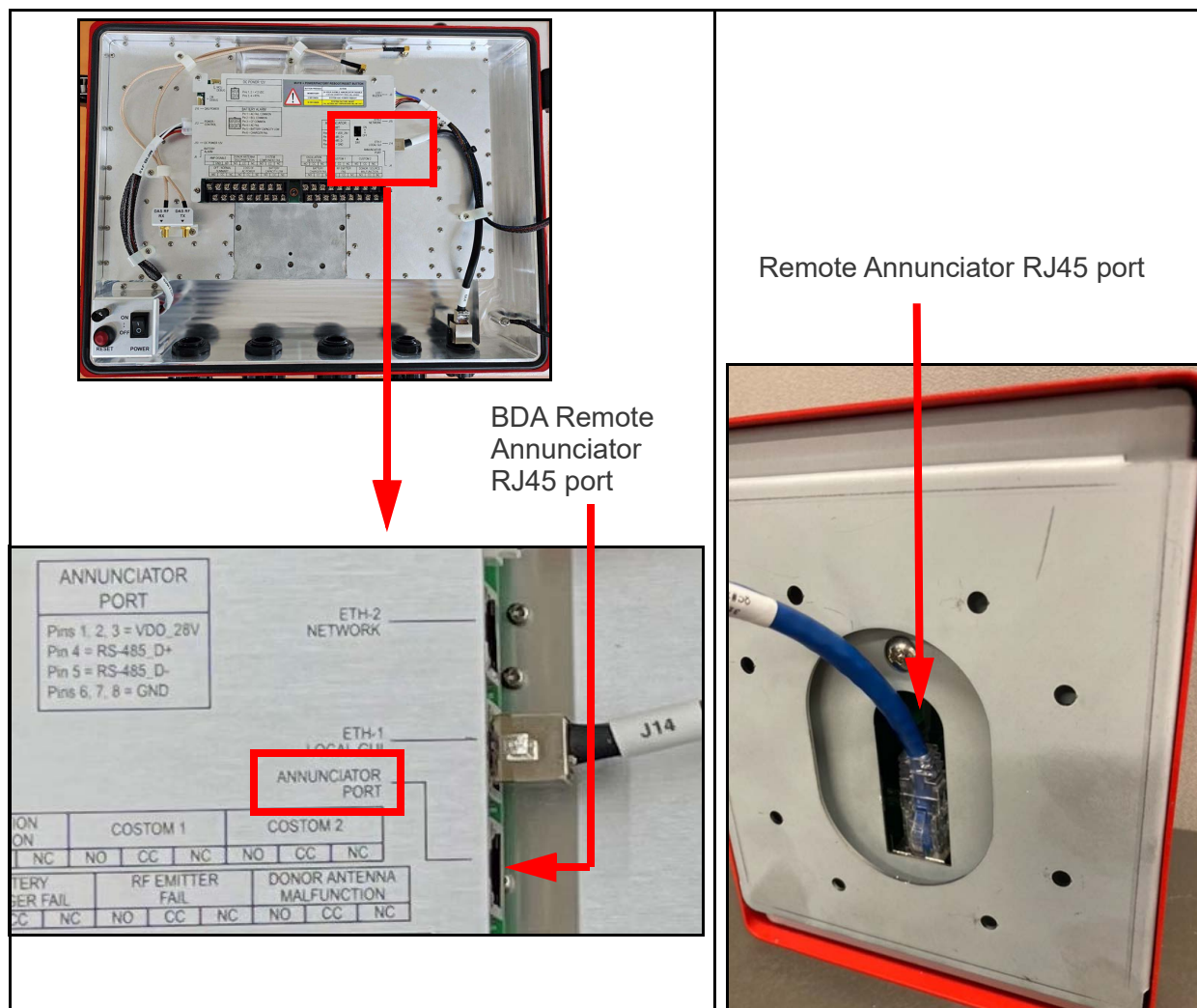
Figure 4-12   Connections to the Remote Annunciator

WESTELL
1-800-377-8766

4.12 Powering Up the BDA

Before power is applied to the newly installed BDA, make sure that:

- All preceding installation steps are complete.
- All debris, tools, and installation materials have been removed safely away from system components.
- All connections have passed informal field inspection.
- All reasonable steps have been taken to ensure that the components are properly grounded and connected and can be powered up safely.

Follow these steps to power up the BDA:

1. Connect battery power to the BDA.

2. Connect AC power to the CS19-BBU-005 battery cabinet.

3. Turn on both the DC PWR and AC PWR switches in the battery cabinet, and then turn on the POWER switch in the BDA cabinet. The Power LED indicator will glow green when the BDA is powered on.

4. Reinstall the front panel on the battery cabinet and close the BDA front cover.

1-800-377-8766

DRAFT D4-16 – AUTHORIZED USE ONLY

4.13 Controlling the Public Safety Bi-directional Amplifier

Controlling and monitoring the Signal Booster requires that a properly configured computer with a web browser is connected via an Ethernet cable, such as the one shown in Figure 4-13.

During installation or maintenance, the Network Interface port of a computer can temporarily be connected to the external GUI port on the bottom of the Signal Booster. The external port is factory-connected to the ETH-1 LOCAL GUI port inside the BDA.

Figure 4-13   Ethernet Cable
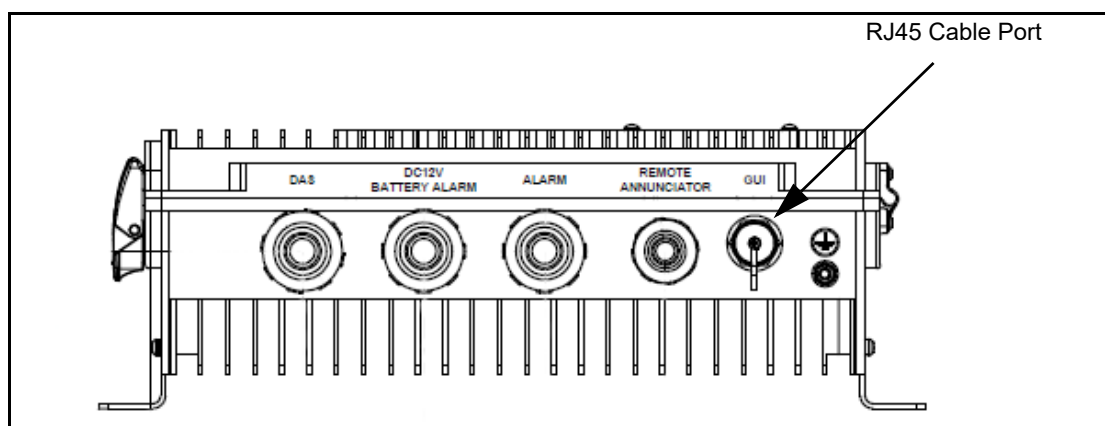
Figure 4-14   GUI port for Ethernet connection

⚠️

WARNING: **The RJ45 Ethernet port on the external surface of the enclosure is for maintenance use only. This port cannot be used as a permanent connector.**

WESTELL
1-800-377-8766

1-800-377-8766

System Operation

This chapter covers your Westell ProtectLink Public Safety Bi-directional Amplifier's key system operating features.

Guide to this Chapter

CHAPTER 5

5.1 Controls Inside the ProtectLink

Within the ProtectLink on the control board are two user accessible controls, the ON/OFF power switch and a reset button. These and other interior features are shown in Figure 5-1 below.
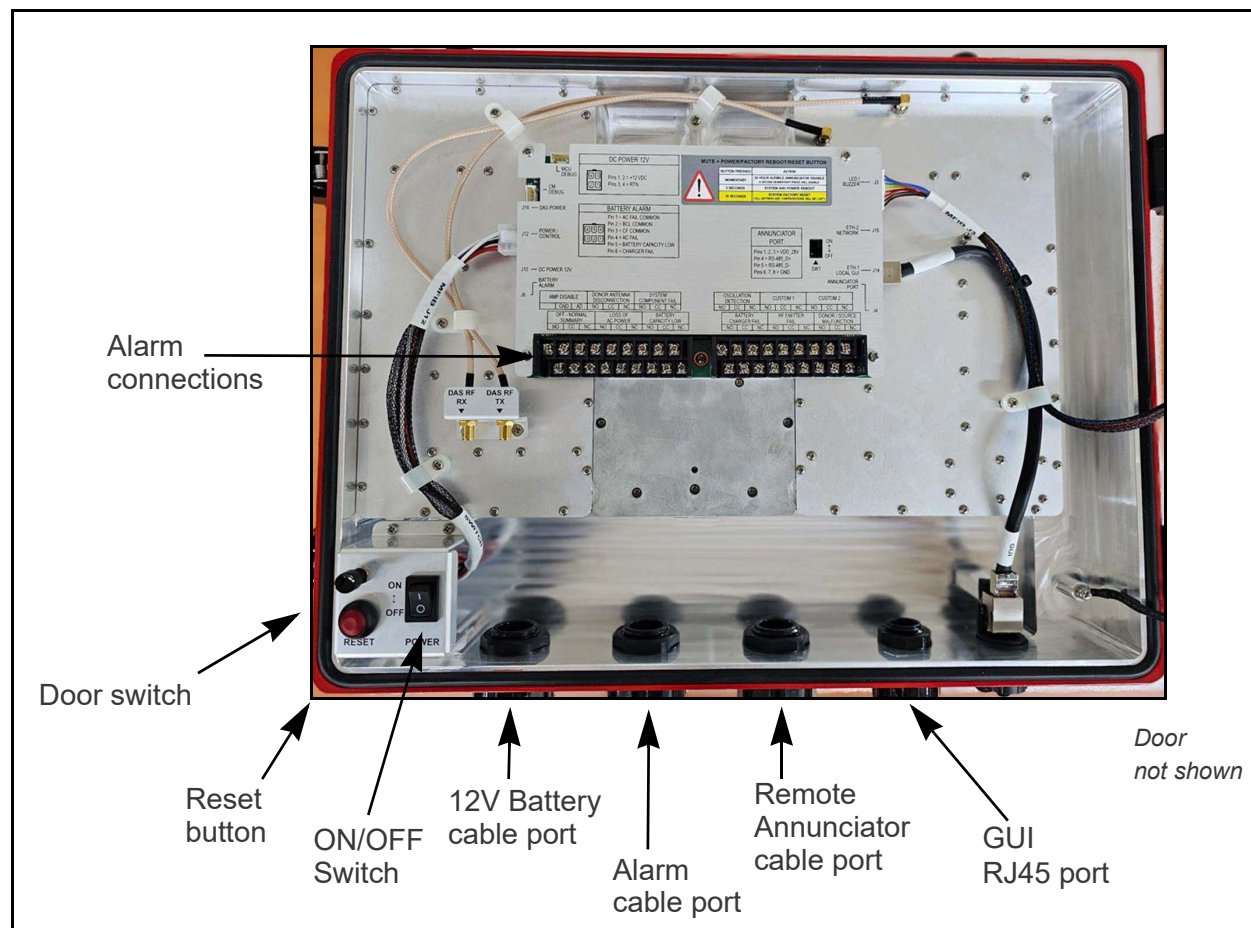
Figure 5-1   ProtectLink interior features

ON/OFF Switch

The red ON/OFF switch mounted at bottom left connects and disconnects the 12V power source to the ProtectLink.

Reset Button

The reset button mounted at bottom left has 3 distinct functions:

- A momentary press will temporarily disable the audible annunciator in the BDA and on the remote annunciator if one is installed. After 24 hours, the audible alarms will be re-enabled.
- A press lasting 3-8 seconds will reboot the BDA. All settings will remain. This is similar to powering the unit off and then back on.
- A press of 10 or more seconds will reset the BDA to factory defaults. This is a way to wipe the BDA of all configured settings and start over.

1-800-377-8766

5.2 Accessing the ProtectLink GUI

Access the ProtectLink using web browser software on your computer through a LAN connection. A Google Chrome browser optimizes the GUI without formatting issues that can be noticeable with other browsers. The BDA ships with the IP address **192.168.1.150** on the **GUI** port.

To connect directly to the BDA from a laptop or PC with a CAT-5E cable or over a LAN, make sure the computer's NIC card setting is DCHP client (this is often the default setting) so the computer will automatically get an IP or configure a static IP. Follow these steps:

1. Open your computer's Control Panel or Settings and navigate to All Control Panel Items and then to Network Connections (or Network and Sharing Center).

2. Choose an appropriate Local area connection. For example:

Properties windows will appear to make network connection settings as shown in below.
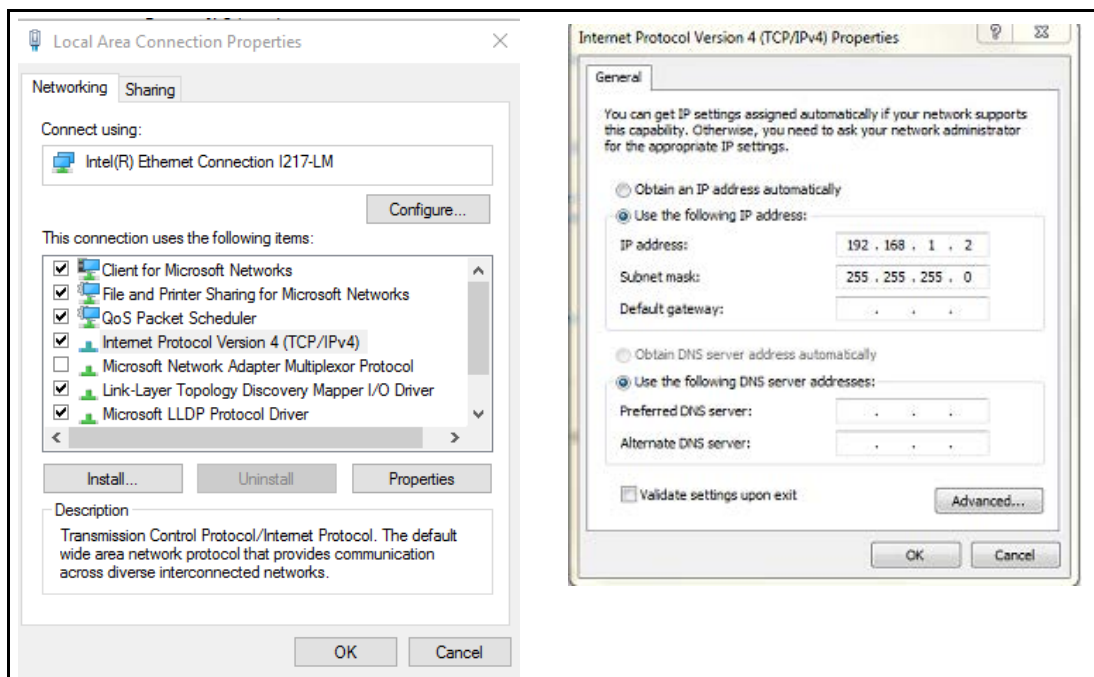
Figure 5-2   Network Connection Set-up

DRAFT D4-16 – AUTHORIZED USE ONLY

3. Select **Use the following IP address** and enter IP address 192.168.1.x, where "x" is any number from 2 to 254, inclusive, other than 150 (*for example: 192.168.1.2*).

4. Ensure that the subnet mask is set to 255.255.255.0

    Note: Refer questions about these settings to your IT department.

Once the above LAN settings are configured, open a browser (Westell recommends Chrome) and enter the signal booster's default IP address. The Sign In screen appears as shown in Figure 5-3 below.
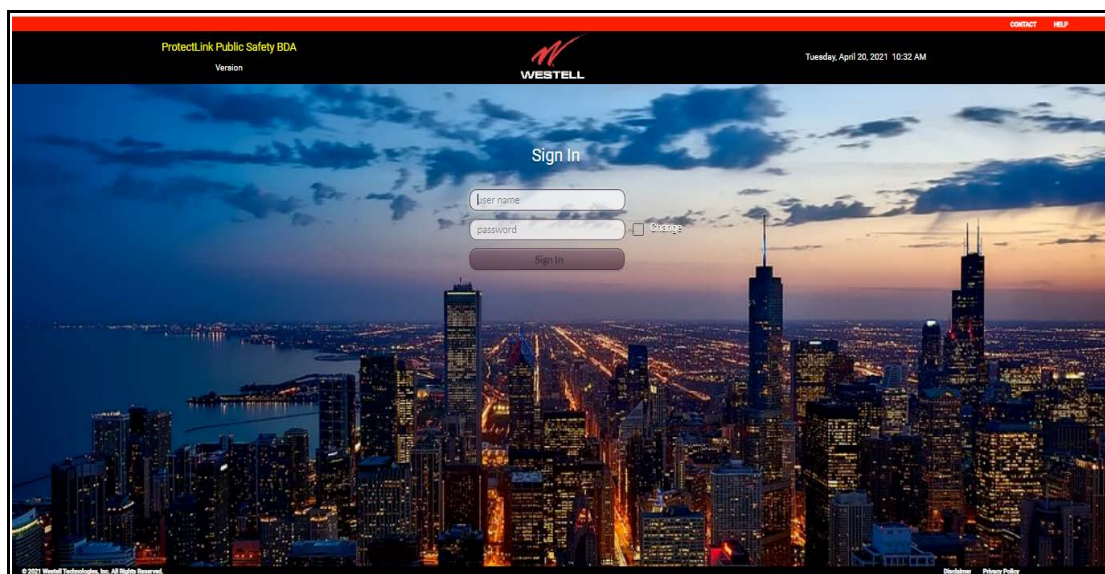
Figure 5-3   Sign In screen

Sign in the first time with the default user name **admin** and default password **admin**. The System Status screen will appear as shown in Figure 5-5.

GUI Appearance Options

The ProtectLink graphic user interface in Figure 5-3 above shows the default screen appearance. At the left side of the top ribbon (see at right) is a menu enabling the user to switch to a plain light or dark screen background as shown in Figure 5-4.

1-800-377-8766
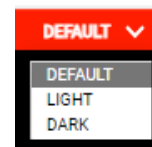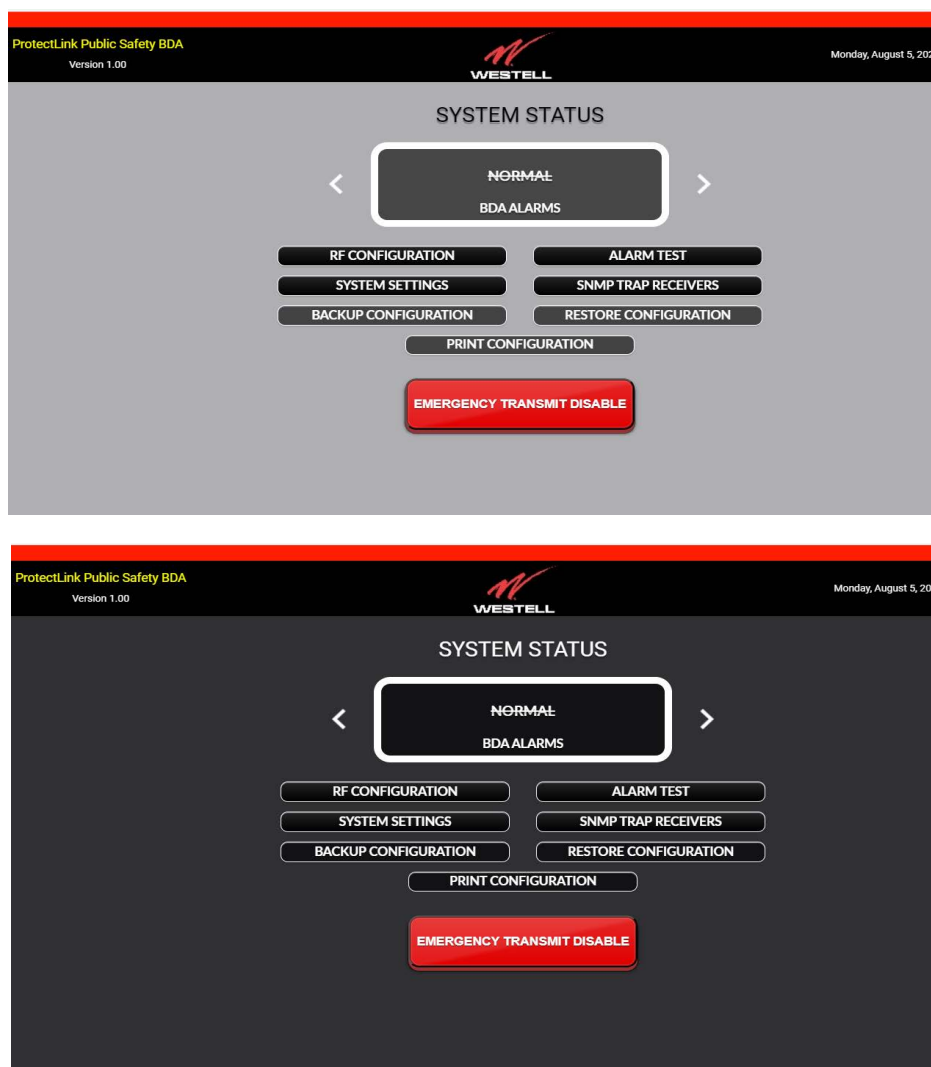
Figure 5-4   Light GUI screen background, top, and dark background, bottom

Idle Timeouts and Lost Connections

- If the GUI is left inactive for 30 minutes (no keystrokes or mouse activity), the user automatically will be signed out and the Sign In screen will reappear.

- If the network connection is lost for 5 minutes, an alert will appear, the user automatically will be signed out, and the Sign In screen will reappear.

1-800-377-8766

Changing passwords

Users can change their passwords while signed out of the ProtectLink GUI by checking the **Change** checkbox to the right of the **Password** field. As shown at right, new fields appear to enter and confirm a new password.

1-800-377-8766
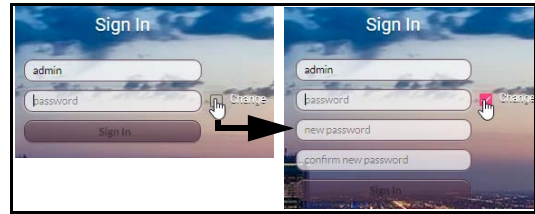
5.3 Web GUI System Status Display

When you sign in, the System Status window (also called the Main Menu) is displayed as shown in Figure 5-5 below. Key features numbered in Figure 5-5 are described in Table 5-1. Current Alarms are color coded as described in Table 5-2 on page 5-11.
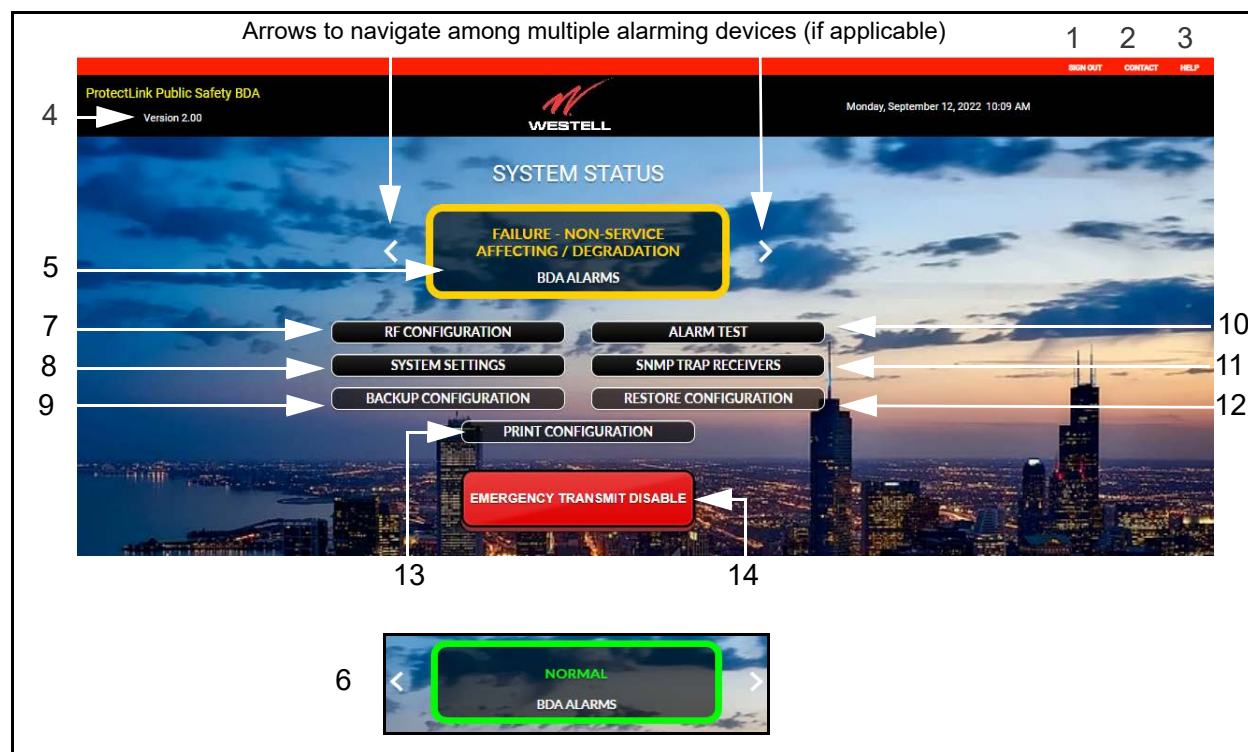
Figure 5-5   Public Safety Bi-directional Amplifier System Status Screen

Tip: Use the zoom control on your internet browser to enlarge or reduce this and other Web GUI displays on your screen as needed.

Table 5-1   System Status page features

Feature	Description
1	Sign out button. Click to sign out.
2	Contact button. See CONTACT and HELP Links.
3	Help button. See CONTACT and HELP Links.
4	Software version number

Table 5-1   System Status page features

Feature	Description
5	Device Status indicator and Alarm Page button. Cycles through color-coded alarm and status displays for the BDA. Arrows navigate among displays. Click to open Alarm Page for the device(s) currently displayed. See 5.4 Alarms Pages on page 5-11.
6	Device Status indicator with BDA display
7	RF Configuration. Click to open RF Configuration settings page. See 5.5 RF Configuration on page 5-19.
8	System Settings. Click to open the System Setting page. See 5.6 System Settings Page on page 5-25.
9	Backup Configuration. Click to open the Backup Configuration popup window to save configuration settings. See Backup Configuration on page 5-29.
10	Alarm Tests button. Click to test any or all alarms. See 5.9 Alarm Tests on page 5-33.
11	SNMP Trap Receivers button. Click to add, edit, or delete SNMP Trap Receivers. See 5.8 SNMP Trap Receivers on page 5-30.
12	Restore Configuration button. Click to open the Restore Configuration popup to select and restore a previous configuration. See Restore Configuration on page 5-29.
13	Print Configuration button. Click to open the Print Configuration popup to export all current configuration and measured values using HTML or CSV format. See Print Configuration on page 5-29.
14	Emergency Transmit Disable button. Click to turn off power to the BDA HPAs. See EMERGENCY TRANSMIT DISABLE Button on page 5-10.

CONTACT and HELP Links

CONTACT and **HELP** links are at the top right of the screen header. As shown in Figure 5-6 below, click either of these links to open a popup with a QR code. The user can then scan or click the QR code to open a new browser tab with **Westell contact information or the online user guide.**

DRAFT D4-16 – AUTHORIZED USE ONLY
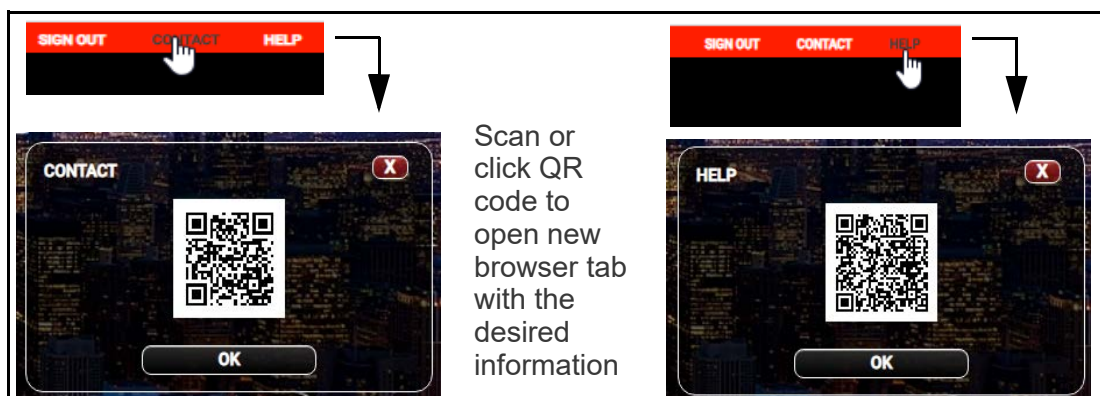
Figure 5-6   **CONTACT** and **HELP** popups with QR codes

EMERGENCY TRANSMIT DISABLE Button

A prominent red **EMERGENCY TRANSMIT DISABLE** (ETD) button is at center bottom of the System Status screen. This cuts power to the HPAs on the BDA, the same as pushing a physical button connected to the ETD terminals inside the BDA. When the user clicks the EDT button, the popup at right appears; click **APPLY** to cut the power.
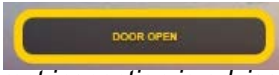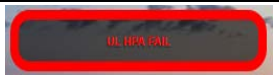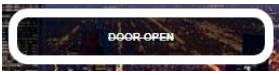
1-800-377-8766
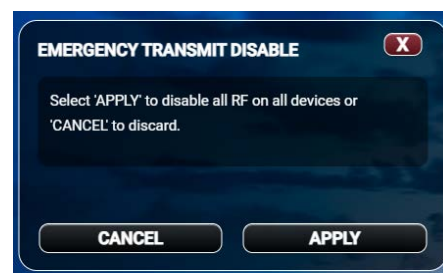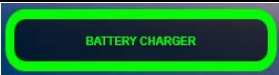
5.4 Alarms Pages

The BDA has its own Alarms Page. This section describes Alarm Color Codes, alarm button behavior, and the Alarms Page.

Alarm Color Codes

As shown in Table 5-2, the color outlining each alarm indicator reflects current alarm severity or masking.These same color codes appear on the Device Status indicator on the System Status page.

Table 5-2   Alarm Indicator Colors

Color	Alarm Severity	
Green	Normal	BATTERY CHARGER
Yellow	System Degradation Alarm *(Service is possible, but a prompt inspection is advisable)*	DOOR OPEN
Red	Critical Alarm	UL NPA FAIL
White	Alarm is masked	DOOR OPEN

Alarm Button Tools and Behavior

Click an alarm indicator once to display a popup revealing a more detailed alarm description and/or indicators for multiple alarm sources, as shown in Figure 5-7.When a click opens several alarm sources, the popup includes a vertical navigation bar.
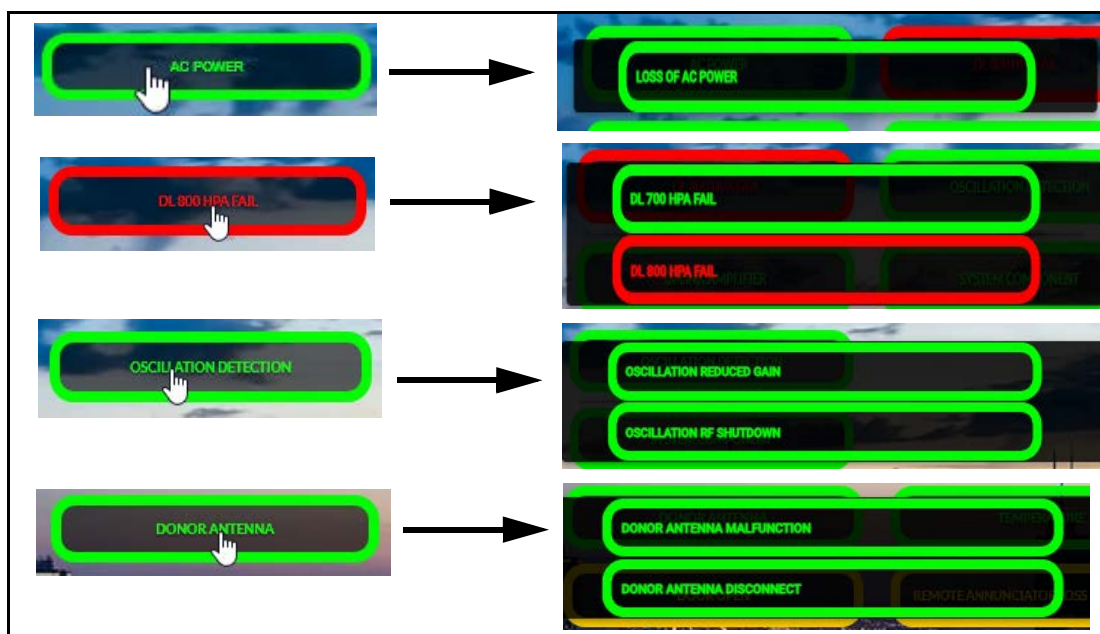
Figure 5-7   Popups revealing more alarm detail and/or multiple alarm sources

Either double-click an alarm indicator shown in Figure 5-7 or click a popup indicator as shown in Figure 5-7 to reveal that alarm source's **Mask**, **Delay**, and **Frequency** settings appear as shown in Figure 5-8 below. The second click reveals the settings. See Editing Alarms on page 5-14 for how to change these settings.

Figure 5-8   Second click reveals alarm settings

Click once anywhere else on any Alarms page to close a popup display.

Once the user has opened an alarm's popup display with the alarm settings and then closed it, a single click will reopen it until the user navigates away from that page.

WESTELL

1-800-377-8766

Alarms Page Features

The BDA Alarm Page is shown in Figure 5-9 below.

Figure 5-9   BDA Alarms Page

Details about each alarm indicator appears in Table 5-3.

Table 5-3   Alarm Indicators

Alarm Display	Description
AC POWER	Loss of AC Power
DOWNLINK AMPLIFIER	Downlink 700 MHz high power amplifier shutdown
	Downlink 800 MHz high power amplifier shutdown
OSCILLATION DETECTION	Oscillation Reduced Gain
	Oscillation RF Shutdown
BATTERY CAPACITY	Low battery capacity at 70% reduction
UPLINK AMPLIFIER	Uplink high power amplifier shutdown
SYSTEM COMPONENT	Unspecified system component failure not identified by another alarm
BATTERY CHARGER	Battery Disconnection or Battery Not Charging status

WESTELL
1-800-377-8766

<div align="center">Table 5-3   Alarm Indicators</div>

Alarm Display	Description
DONOR ANTENNA	Donor Antenna Malfunction
	Donor antenna disconnect (no malfunction)
TEMPERATURE	Temperature is outside the set temperature range
EMERGENCY TRANSMIT DISABLE	Emergency Transmit Disable has been activated externally
DOOR OPEN	Door status check
REMOTE ANNUNCIATOR COMMUNICATION	Annunciator loss of communication

Editing Alarms

Click the **EDIT ALARMS** button to on any Alarms page to change the configurations of any alarm. The **ALARM CONFIGURATION** popup will appear as shown at right. This popup must be active to edit any of the alarm configuration settings.

Tip: Click and drag this and similar popups anywhere on the screen as needed.
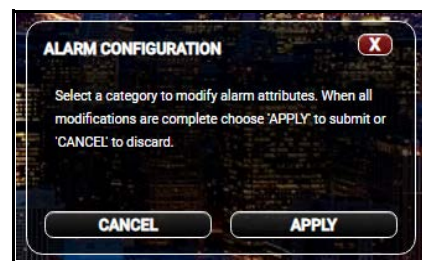
As shown in Figure 5-10 below, the user can now configure the **Mask** checkbox and slide controls to set the **Alarm Delay** and **Frequency** of SNMP traps sent.

1. User double-clicks alarm indicator

2. Indicator expands to reveal Mask checkbox and Delay and Frequency slide controls

3. User adjusts settings as desired
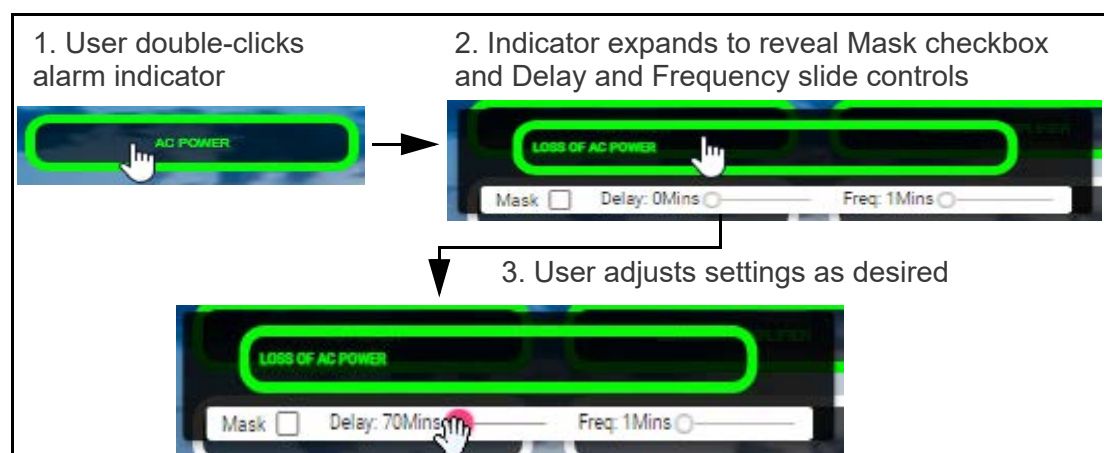
<div align="center">Figure 5-10   Accessing alarm configuration tools</div>

DRAFT D4-16 – AUTHORIZED USE ONLY

To edit an alarm, follow these steps:

1. Click the **EDIT ALARMS** button to open the **ALARM CONFIGURATION** popup.

2. Double-click on the first alarm you want to edit. Activate the tools to adjust settings as shown in Figure 5-10.

3. To mask (disable) the alarm, check the **Mask** checkbox. The alarm will not activate audible or visual annunciators while masked.

⚠️

CAUTION: Permanent alarm silencing via the web interface is not permitted for installations requiring full compliance to UL 2524.

4. To set a time delay before an alarm is reported, adjust the **Delay** setting to the desired delay (minutes).

5. To set the frequency with which the alarm will send SNMP traps, adjust the **Freq.** setting (minutes).

6. Select the next alarm to be edited and repeat the above steps. Repeat this for every alarm to be edited.

7. When edits are complete, click the **APPLY** button in the **ALARM CONFIGURATION** popup. The popup will close with the configured alarm settings in effect.

Masking All Alarms

The user can mask all alarms on any Alarms page by clicking the **MASK ALL ALARMS** button. The **MASK ALL CONFIGURATION** display will appear, as shown at right. Click **MASK** to mask all alarms, or **UNMASK** to unmask all alarms; the BDA Alarms page will update accordingly. Figure 5-11 below shows all BDA alarms masked.

WESTELL

1-800-377-8766

DRAFT D4-16 – AUTHORIZED USE ONLY
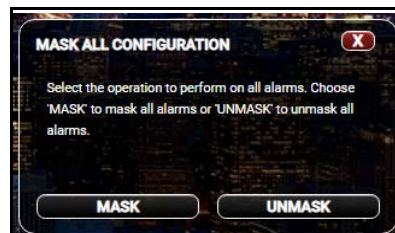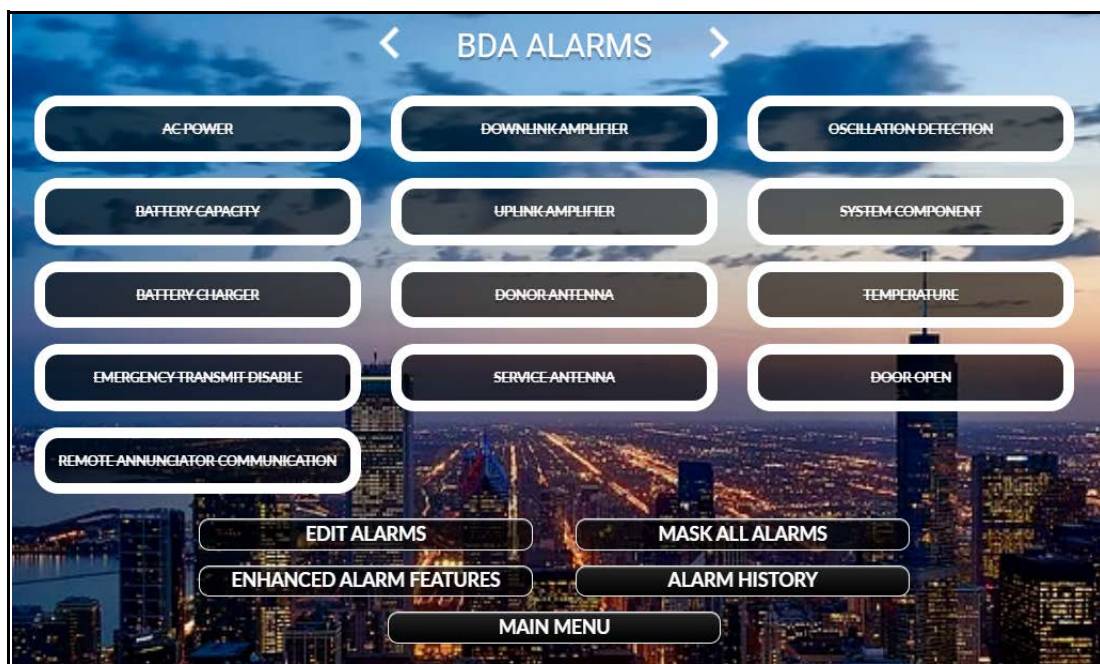
Figure 5-11   BDA Alarms page with all alarms masked

Notes: Any alarms masked with the **MASK ALL ALARMS** function can be unmasked individually as needed by using the **EDIT ALARMS** configuration.

!   The **MASK ALL ALARMS** and **UNMASK ALL ALARMS** functions apply to all alarms regardless of whether individual alarms are masked or unmasked.

WESTELL

1-800-377-8766

Alarm History Page

The **Alarm History** button at the bottom of the Alarms page opens the **Alarm History** page, shown in Figure 5-12.
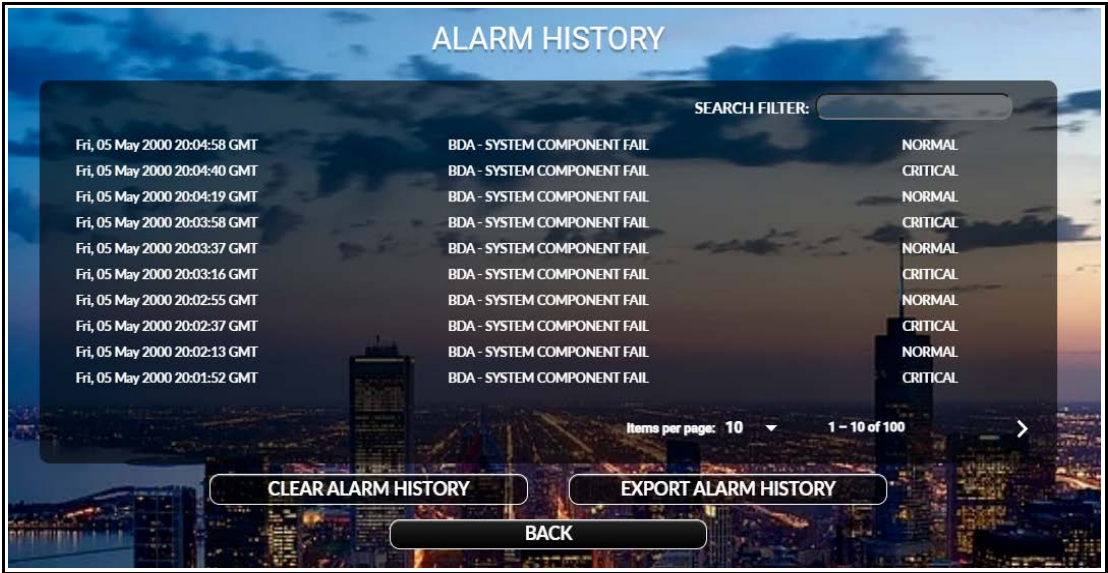
Figure 5-12   Alarm History page

Each time an alarm changes severity, the Alarm History page logs the date and time, the alarm, and the event severity. The most recent alarms appear at the top of the display. Buttons at lower right let the user set the number of rows displayed per page and scroll through multiple pages.

Click the **CLEAR ALARM HISTORY** button to empty the alarm log.

Click the **EXPORT ALARM HISTORY** button beneath the log to download an Excel spreadsheet with the current alarm log. The spreadsheet name includes the date it was downloaded (e.g. "Alarm History03-03-2021").

Click the **BACK** button at the bottom of the page to return to the BDA Alarms page.

Enhanced Alarm Features

Click the **ENHANCED ALARM FEATURES** button to open the dialog listing the enhanced features. As shown in Figure 5-13, when the user hovers over the name of an enhanced feature, a brief tooltip description appears. Each enhanced feature has toggle buttons to select ENABLE or DISABLE, and the user clicks the APPLY button to apply the selection.

WESTELL
1-800-377-8766

Refer to Appendix 3: Enhanced Alarm Features for additional details about the Enhanced Alarm Features.

Hover cursor over feature name

Alarm description appears
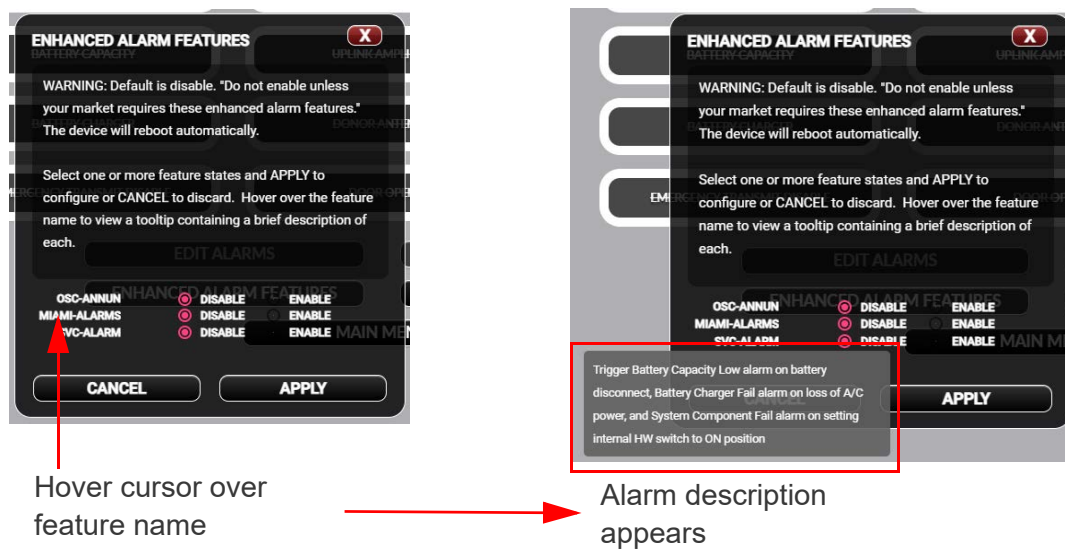
Figure 5-13   Enhanced Alarm Features dialog showing toggle buttons and tooltip

Returning to Main Menu

To return to the System Status page from the BDA Alarms page, click the **MAIN MENU** button at the bottom of the page.

1-800-377-8766

DRAFT D4-16 – AUTHORIZED USE ONLY

5.5 RF Configuration

The RF Configuration page allows the installer to configure all RF settings in the BDA. Clicking the **RF CONFIGURATION** button on the System Status page opens the RF Configuration window. Figure 5-14 below shows the BDA RF Configuration page.

Features of the Band Settings are detailed in Band Settings on page 5-21. Features of the Filter Settings are detailed in Filter Settings on page 5-22.

Figure 5-14   BDA RF Configuration window
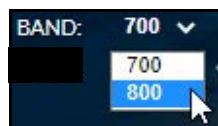
 Prior to editing amplifier or filter settings, the user may select between viewing the 700 or 800 band by clicking on the **BAND** control at upper left. This control is disabled when the page is in edit mode.

Isolation Test

Prior to editing any filters, the installer must first run an isolation test to verify there is adequate isolation between the donor and service antennas. To initiate an isolation test, click the **ISOLATION TEST** button at upper right (see Figure 5-15). A dialog will open showing progress and, within a few seconds, a message that the test succeeded and the maximum safe gain level. Do not exceed this gain level when commissioning the BDA without first making adjustments to the donor or service antenna system to increase the isolation. The most recent isolation test value appears to the right of the **ISOLATION TEST** button.

1-800-377-8766

Click **ISOLATION TEST**
Dialog opens
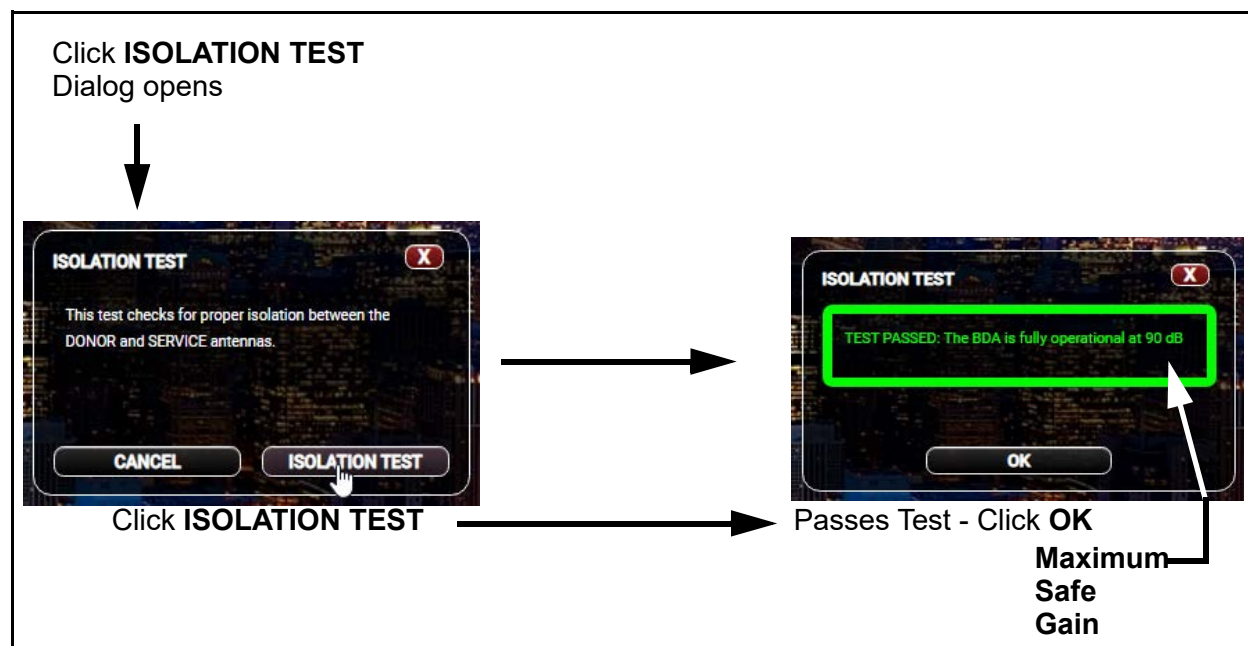
Figure 5-15   Conducting an isolation test

Click OK to close the **ISOLATION TEST** dialog.

Click **ISOLATION TEST** at any time to retest the isolation.

Editing RF Configuration

When the user clicks the **EDIT RF CONFIGURATION** button at bottom, the **RF CONFIGURATION** popup appears as shown at right and the settings open for editing as shown in below.

1-800-377-8766
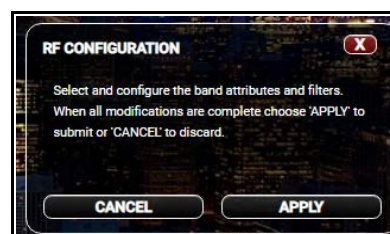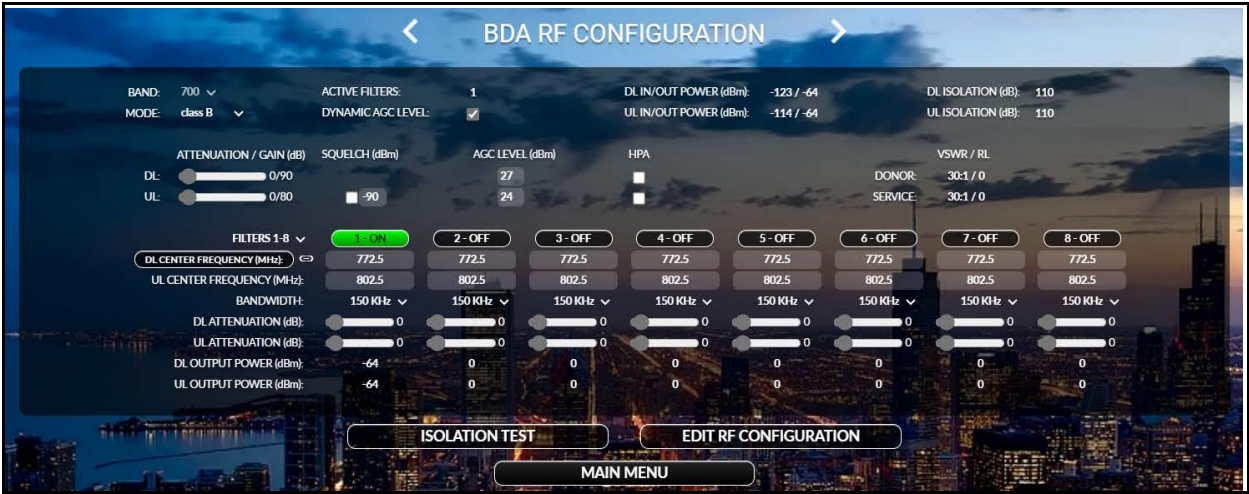
Figure 5-16   RF Configuration page open for editing

Band Settings

Two rows of band settings are displayed in the upper part of the RF Configuration page, as shown in Figure 5-17 and detailed in Table 5-4.

Figure 5-17   Band Displays and Settings on RF Configuration Page

Tip: Once a slider (such as those used to adjust GAIN settings above) is selected, the user can fine-tune the adjustment with the left and right arrow keys on the keyboard.

Table 5-4   RF Configuration Page band display and settings features
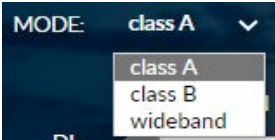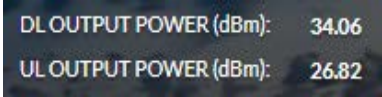
Feature Image	Description
	Mode -- Select class A (class A models only), class B, or wideband.

1-800-377-8766

Table 5-4   RF Configuration Page band display and settings features

Feature Image	Description
ACTIVE FILTERS: 2	# Filters -- Displays number of filters that are turned on
DL OUTPUT POWER (dBm): 34.06 UL OUTPUT POWER (dBm): 26.82	Output Power -- Displays DL and UL output power in dBm
ISOLATION TEST	Refer to Isolation Test on page 5-19.
ATTENUATION / GAIN (dB) DL: 0/90 UL: 7/73	Gain - Drag the slide controls to set DL and UL Gain. Max Gain: 90 dB DL, 80 dB UL.
SQUELCH (dBm) ✓ -80	Squelch - Displays UL Squelch setting. Click in the value field to edit the setting. Check the checkbox to activate Squelch. Squelch range is from -90 dBm to -60 dBm.
AGC LEVEL (dBm) 27 24	AGC LEVEL - Displays the maximum RF power output of the DL (top) and UL amplifiers. Adjustable from +27 dBm to -3 dBm on the downlink and +24 to -6 dB on the uplink. Click in a value field to edit the value.
HPA ✓ ✓	HPA - Displays DL (top) and UL HPA checkboxes. Uncheck the box to deactivate the high powered amplifiers.

Filter Settings

The Filter settings are below the band settings, as shown in Figure 5-18. Band settings opened for editing appear in Figure 5-19. See Table 5-5 on page 5-23 for feature details.
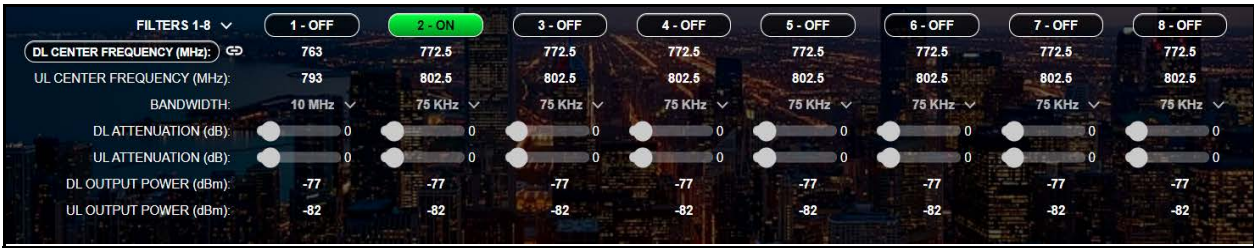
Figure 5-18   Filter settings display on RF Configuration page.

To edit filter settings, click the **EDIT RF CONFIGURATION** button at the bottom of the page to open the **RF CONFIGURATION** popup, shown at right. The filter settings open for editing as shown in Figure 5-19. When editing is complete, click **APPLY**.

Figure 5-19   Filter settings open for editing
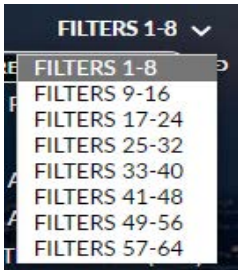
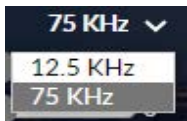Table 5-5   RF Configuration page filter settings
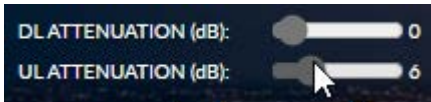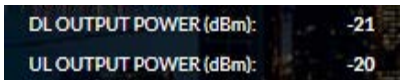
Feature	Description
	Filter range selector - Click to select: ● In 700 or 800 band class A or class B mode (pictured at left), filters 1-8, 9-16, 17-24, 25-32, 33-40, 41-48, 49-56, or 57-64.
	Filter enable button - In edit mode, click to toggle ON / OFF. Displays green when on, black when off.

Table 5-5   RF Configuration page filter settings

Feature	Description
	DL and UL Center Frequencies (MHz) - In edit mode, click to edit values. When entering either the DL or UL frequency, the opposite frequency will automatically be entered with the appropriate offset.
	Filter Bandwidth - In edit mode, select between available bandwidths. Available bandwidths vary by band, class, and/or filter. **Note:** The narrower the filter, the greater the group delay and possible impact on P25 digital transmissions.
	DL and UL Attenuation - In edit mode, click and drag slide tool to set value (dB). This attenuation applies to this filter only, and typically is used to balance incoming RF signals.
	DL and UL Output Power - Displays RF output power (dBm) for individual filters.

5.6 System Settings Page

The System Settings page allows the installer to add the company name and contact information, set network IP addresses, set system time, load firmware upgrades, load product upgrade keys, and reset to factory defaults. This page also displays product model number, product description, serial number, uptime timer, and firmware version.

Click the **SYSTEM SETTINGS** button on the System Status page to open the **SYSTEM SETTINGS** page, shown in Figure 5-20 below.

Figure 5-20   System Settings page

To edit settings, click the **EDIT SYSTEM SETTINGS** button at the bottom of the page. As shown in Figure 5-21 on page 5-26, the EDIT SYSTEM SETTINGS dialog appears and editable **SITE INFORMATION** fields are highlighted. **NMS CONNECTION** static mode IP settings will appear open for editing when the user changes the **MODE** from DHCP to static.
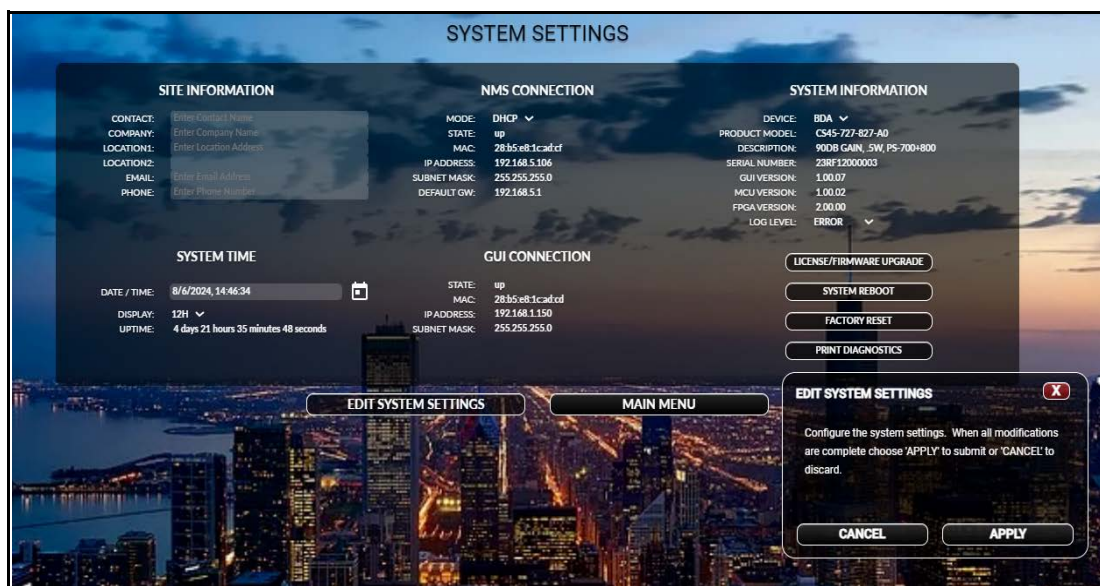
1-800-377-8766

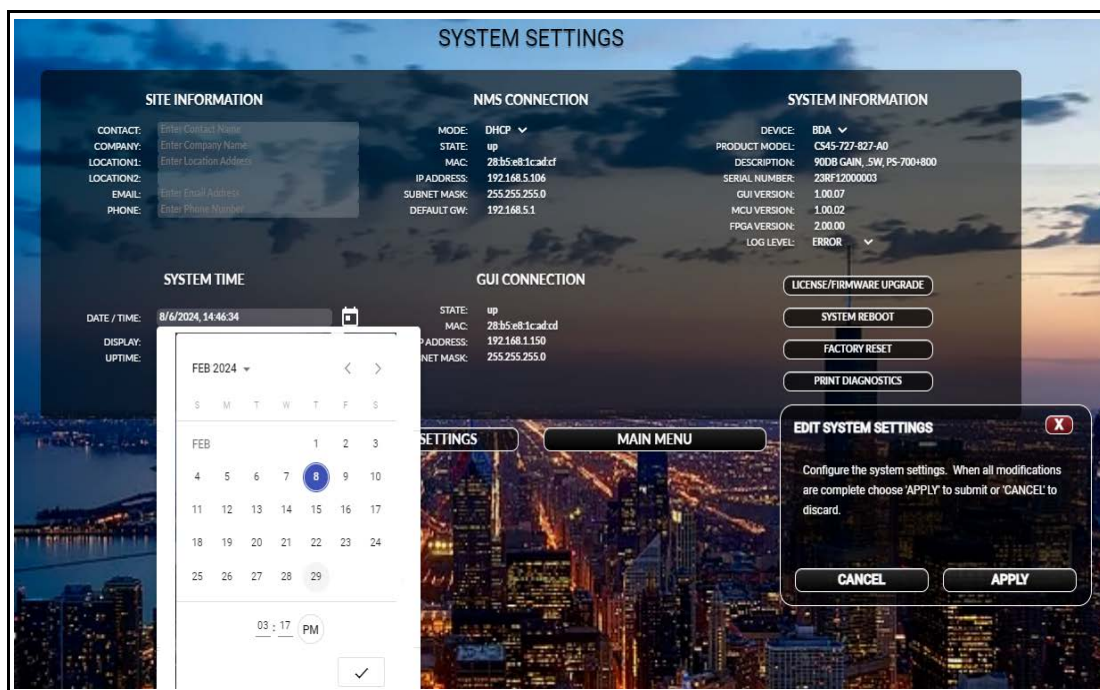Figure 5-21   System Settings page opened for editing

Figure 5-22   Date picker popup for setting date and time
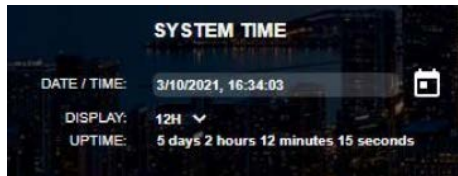
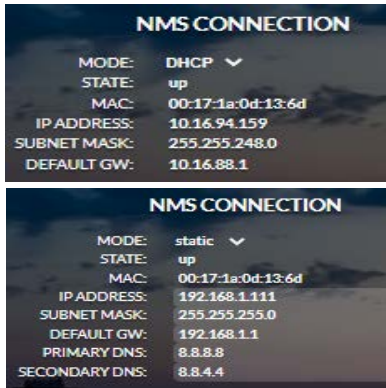Table 5-6 System Settings Page features
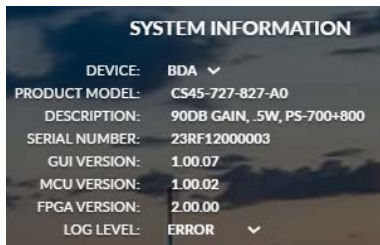
Feature	Description
SITE INFORMATION CONTACT: Westell Manager COMPANY: Westell Technologies LOCATION1: 750 North Commons Drive LOCATION2: Aurora, IL EMAIL: admin@westell.com PHONE: 123-123-1234	Site Information fields - In edit mode, click in each row to add or edit: • the site **CONTACT** (person or position), • **COMPANY** • **LOCATION1** (street address • **LOCATION2 (**City, State) • **EMAIL** (Contact's email address) • **PHONE** (Contact's phone number)
SYSTEM TIME DATE / TIME: 3/10/2021, 16:34:03 DISPLAY: 12H ∨ UPTIME: 5 days 2 hours 12 minutes 15 seconds	System Time fields - • **DATE/TIME** - Displays M (or MM) /DD/YYYY, HH:MM:SS with the HH in 24-hour format. To edit, either type directly in the DATE/TIME display or click the calendar icon to open the date picker popup as shown in . Add minutes and seconds in place of 00:00 to advance the clock by a specified period. The clock display stops while in edit mode. • **DISPLAY** - This sets the format of the time display at upper right. In edit mode, select 12H (12 hour) or 24H (24 hour) using dropdown tool. • **UPTIME** - Displays cumulative system uptime.
NMS CONNECTION MODE: DHCP ∨ STATE: up MAC: 00:17:1a:0d:13:6d IP ADDRESS: 10.16.94.159 SUBNET MASK: 255.255.248.0 DEFAULT GW: 10.16.88.1 **NMS CONNECTION** MODE: static ∨ STATE: up MAC: 00:17:1a:0d:13:6d IP ADDRESS: 192.168.1.111 SUBNET MASK: 255.255.255.0 DEFAULT GW: 192.168.1.1 PRIMARY DNS: 8.8.8.8 SECONDARY DNS: 8.8.4.4	NMS Connection fields - • **MODE**: In edit mode, use dropdown tool to select **DCHP** or **static**. This selection determines the other fields displayed, as shown at left. Only static mode settings are editable. • **STATE**: Displays connection state (up or down). • **MAC**: The signal booster's MAC address. • **IP ADDRESS**: NMS connection IP address • **SUBNET MASK**: NMS connection subnet mask • **DEFAULT GW**: Default gateway IP address • **PRIMARY DNS**: Optional IP address for domain name service. Consult your IT department. • **SECONDARY DNS**: See above.

WESTELL
1-800-377-8766

Table 5-6 System Settings Page features

Feature	Description
GUI CONNECTION STATE: up MAC: 00:17:1a:0d:13:6c IP ADDRESS: 192.168.1.150 SUBNET MASK: 255.255.255.0	GUI Connection fields - ● **STATE** - up or down ● **MAC** - The signal booster's MAC address ● **IP ADDRESS** - Static IP address of GUI port, preset to 192.168.1.150. ● **SUBNET MASK** - GUI connection subnet mask
SYSTEM INFORMATION DEVICE: BDA ⌄ PRODUCT MODEL: CS45-727-827-A0 DESCRIPTION: 90DB GAIN, .5W, PS-700+800 SERIAL NUMBER: 23RF12000003 GUI VERSION: 1.00.07 MCU VERSION: 1.00.02 FPGA VERSION: 2.00.00 LOG LEVEL: ERROR ⌄	System Information fields for BDA - ● **PRODUCT MODEL** ● **DESCRIPTION** ● **SERIAL NUMBER** ● **GUI VERSION** ● **MCU VERSION** ● **FPGA VERSION** ● **LOG LEVEL**
LICENSE/FIRMWARE UPGRADE	License and Firmware Upgrade button- See 6.1 Upgrading the System Software on page 6-2.
SYSTEM REBOOT	System Reboot button - See Rebooting the System on page 6-3.
FACTORY RESET	Factory Reset button - See Factory Reset on page 6-3.
PRINT DIAGNOSTICS	Print Diagnostics button

Click the **MAIN MENU** button at the bottom of the page to return to the System Status page.

5.7 Backup, Restore, and Print Configuration Tools

Backup configuration is used to either create a backup copy of the ProtectLink being installed or to create a template for additional BDAs to be easily programmed. It will create a file on your computer that includes all the RF and system settings with the exception of site information and network connection, which will remain at their default values.

As shown in Figure 5-5 on page 5-8, System Status page features include the **BACKUP CONFIGURATION**, **RESTORE CONFIGURATION**, and **PRINT CONFIGURATION** buttons
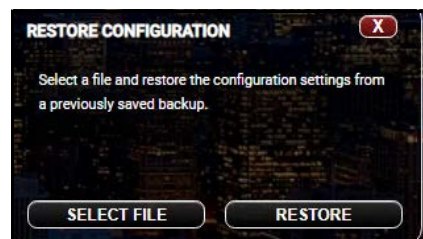
Backup Configuration

To save the current signal booster configurations as the backup configuration, click the **BACKUP CONFIGURATION** button. The **BACKUP CONFIGURATION** popup shown at right appears, with the note explaining that this will save all configuration settings excluding network connection and site information data. Click **SAVE.**
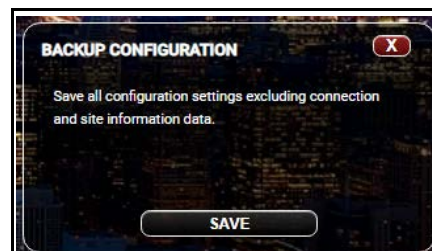

Restore Configuration

To restore a previous configuration, click the **RESTORE CONFIGURATION** button. The **RESTORE CONFIGURATION** popup shown at right appears. Click **SELECT FILE**, then navigate to the file with the desired configuration and select it. Then click **RESTORE**.

Print Configuration

To export a report with all current configuration data and measured values, click **PRINT CONFIGURATION**. The **PRINT CONFIGURATION** popup shown at right appears. Click one of the buttons to select your desired report format. The HTML report is formatted for print when opened in a web browser.

1-800-377-8766
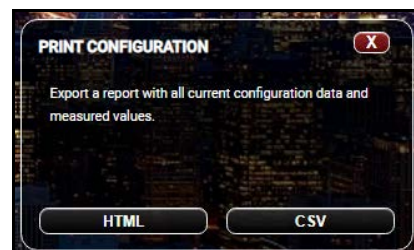
5.8 SNMP Trap Receivers

As shown in Figure 5-5 on page 5-8, System Status page features include the **SNMP TRAP RECEIVERS** button. Click that button to open the **SNMP TRAP RECEIVERS** page pictured in Figure 5-23 below.

Figure 5-23   SNMP Trap Receivers page

Click the [+] button at upper right to add a new SNMP trap receiver. The **ADD SNMP TRAP RECEIVER** popup shown in Figure 5-24 appears. Add the trap IP address in the **HOST** field and the community in the **COMMUNITY** field, then click **ADD**. The display refreshes showing the new trap as shown in Figure 5-24. The new trap is turned ON upon creation.

1-800-377-8766
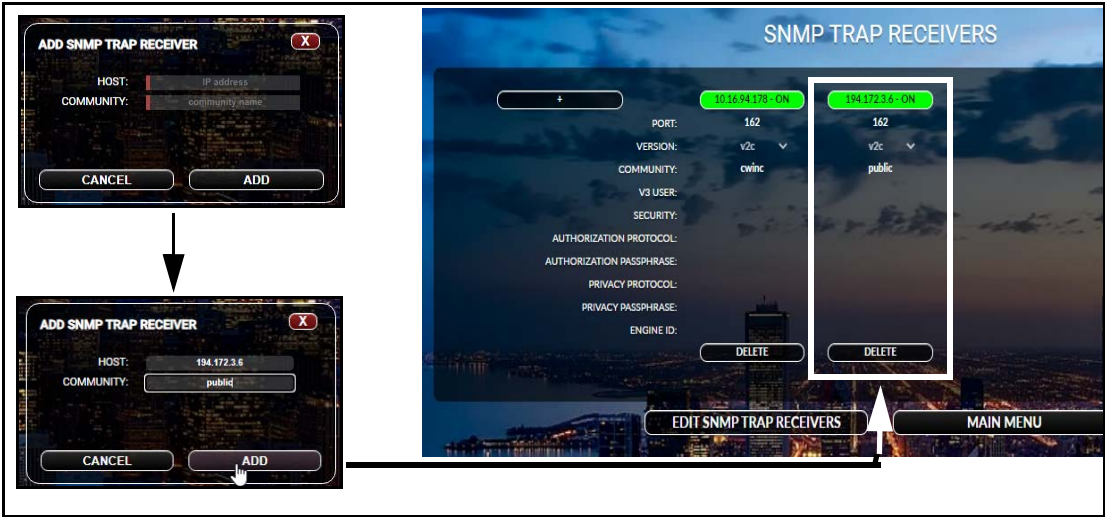
DRAFT D4-16 – AUTHORIZED USE ONLY

Figure 5-24   Adding new SNMP trap receiver

To delete an SNMP trap receiver, click the **DELETE** button below the trap display. The **DELETE SNMP TRAP RECEIVER** popup window appears as shown at right. Click **DELETE** to confirm the deletion. The **SNMP TRAP RECEIVERS** page refreshes and the just-deleted receiver is no longer shown.

Click the **EDIT SNMP TRAP RECEIVERS** button at the bottom of the page to open the page for editing. Highlights will appear over editable fields, and the **SNMP TRAP RECEIVERS** popup will appear as shown in below.

Figure 5-25   SNMP Trap Receivers page opened for editing

With the page open for editing, the user can:

1-800-377-8766

- Click the top button to toggle the receiver ON-OFF or OFF-ON. The button appears green when the unit is on and turns dark gray when off. The button also says whether the receiver is on or off.
- Edit the Port number
- Edit the **VERSION** using the drop-down menu. Version v2c is used by default. If the user changes the version to v3, additional fields open for configuration.

The user must click **APPLY** in the SNMP TRAP RECEIVERS popup for the changes to be applied. When the user clicks APPLY, the page refreshes and the changes are applied.

1-800-377-8766

5.9 Alarm Tests

Click the **ALARM TEST** button on the System Status page to open the ALARM TEST page shown in <u>Figure 5-26</u> below.
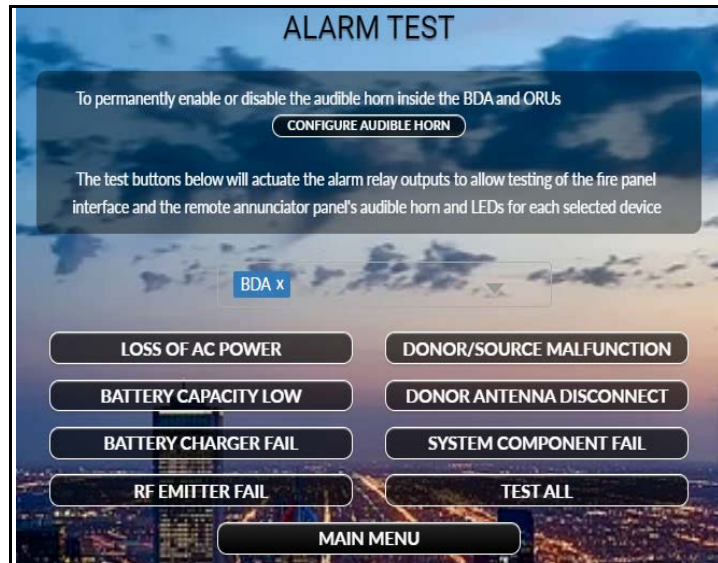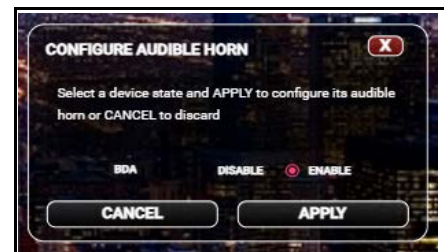

Figure 5-26   Alarm Test window

To disable or enable the audible horn inside the BDA, click the **CONFIGURE AUDIBLE HORN** button. The **CONFIGURE AUDIBLE HORN** dialog opens as shown at right, with a toggle button to DISABLE or ENABLE the BDA horn. Disabling the horn will silence the audible alarm.Click **APPLY** to activate the configuration.

⚠
CAUTION: Permanent alarm silencing via the web interface is not permitted for installations requiring full compliance to UL 2524.

Click any individual alarm button to test that alarm. The alarm relay will activate and the remote annunciator audio alarm will sound unless disabled, and that alarm's LED should illuminate on the annunciator. A popup similar to that at right will appear with a timer showing when the test will end. The user can click the **END TEST** button to halt the test at any time.
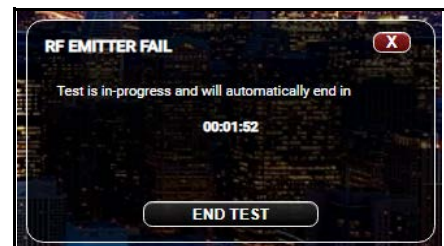
Click the **TEST ALL** button to test all of the alarms in sequence. The test will proceed through all alarms one at a time at 5 second intervals.

1-800-377-8766

System Software Upgrade

This chapter provides software upgrade information for your Westell CS45-734-834-A0 Public Safety Bi-directional Amplifier and DAS system.

Guide to this Chapter

**CHAPTER 6**

6.1 Upgrading the System Software

Follow the instructions in this section to upgrade to a newer version of system software.

1. On the System Settings page ([Figure 5-20 on page 5-25](#)), click the **LICENSE/FIRMWARE UPGRADE** button.

2. The **LICENSE/FIRMWARE UPGRADE** popup shown at right appears. Click **SELECT FILE**. A file explorer window will open.

3. Select the file provided by Westell for the desired system firmware and/or software license upgrade. Click **Open**. The **LICENSE/FIRMWARE UPGRADE** popup refreshes showing the name of the selected file.

4. Click the **UPGRADE** button. The upgrade will commence. A series of color-coded status messages such as those at right will appear as the upgrade proceeds, saying "SYSTEM UPGRADE has started status is uploading," then "SYSTEM UPGRADE is in-progress, you will be redirected automatically," and finally "SYSTEM UPGRADE has succeeded status is idle" appearing in green. If the upgrade fails, "SYSTEM UPGRADE has failed status is idle" appears in red.

   Note: The time necessary for an upgrade varies from less than one minute to up to 30 minutes, depending on the system firmware and/or software license upgrade(s) being undertaken. Upgrades to the FPGA software require 20 minutes or more. The yellow "status is pending" message remains throughout the installation of uploaded software.
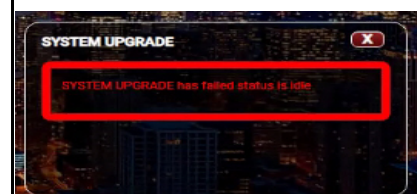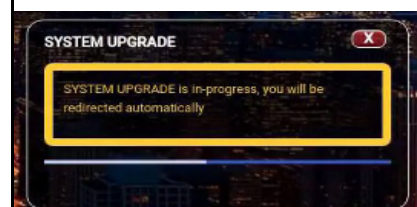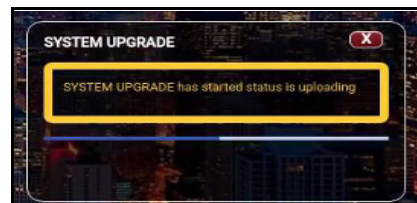
5. When the message "SYSTEM UPGRADE has succeeded status is idle" appears in green as shown at right, click **OK**.

6. You will be logged out of the BDA. Log back in. The upgrade is complete.

1-800-377-8766
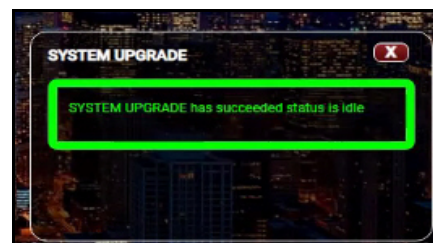
6.2 System Reboot and Factory Reset

Rebooting the System

Click the **SYSTEM REBOOT** button to undertake a system reboot. The **SYSTEM REBOOT** popup will appear as shown at right. If the system includes multiple devices which can be rebooted, the user must select the desired device with the selection menu. Click **SYSTEM REBOOT** to proceed with the reboot.

When the BDA is rebooted, service will be disrupted during the reboot, but all configurations and alarm history will be preserved.

Factory Reset

Click the **FACTORY RESET** button to reset the system to factory defaults. The FACTORY RESET popup will appear as shown at right. Click FACTORY RESET to undertake the reset.

⚠️ **CAUTION:** BDA service will be disrupted when a factory reset is undertaken, and all configuration and alarm history will be lost.

1-800-377-8766

Important Product Information

This appendix includes important information about your CS45-734-834-A0 Public Safety Bi-directional Amplifier.

Guide to this Appendix

A.1 Important Product Information

A.1.1 Registration Number

Your ProtectLink Registration Number is located on a label on the right side of the cabinet, as shown in Figure 1-1 on page 1-8. See 1.3 Product Registration Information on page 1-2.

A.1.2 NRTL

This product is NRTL listed.

1-800-377-8766

Acronyms and Abbreviations

This chapter provides information on acronyms and abbreviations used in this document.

Guide to this Appendix

APPENDIX B

B.1 Acronyms and Abbreviations

Table B-1 below defines acronyms and abbreviations that appear in this document.

Table B-1   Acronyms and Abbreviations

Acronym or Abbreviation	Definition
AC	Alternating Current
AGC	Automatic Gain Control
BDA	Bi-Directional Amplifier
COM	Communications
dB	Decibels
dBi	Decibels relative to isotropic
dBm	The power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW)
DC	Direct Current
DL	Downlink
FCC	(U.S.) Federal Communications Commission
HPA	High-powered Amplifier
IP	Internet Protocol
KHz	Kilohertz
LAN	Local Area Network
LED	Light Emitting Diode
MHz	Megahertz
NMS	Network Management System
OSC	Oscillation
RF	Radio Frequency
RS232C	Serial Communications Standard
UL	Uplink
VAC	Volts Alternating Current (AC Voltage)
VSWR	Voltage Standing Wave Ratio

DRAFT D4-16 – AUTHORIZED USE ONLY

Enhanced Alarm Features

This chapter provides information on Enhanced Alarm Features available with the ProtectLink CS45-734-834-A0 Public Safety Bi-directional Amplifier. Refer to <u>Enhanced Alarm Features on page 5-17</u> for additional information.

Guide to this Appendix

APPENDIX C

C.1 Enhanced Alarm Features

The sections below provide details about Enhanced Alarm Features available with the ProtectLink CS45-734-834-A0 Public Safety Bi-directional Amplifier, configurable from the Alarm GUI screen.

OSC-ANNUN

- Maps an Oscillation Reduced Gain alarm to cause a Remote Annunciator's RF Emitter Fail LED to blink.

MIAMI-ALARMS

- Triggers Battery Capacity Low alarm when the battery is disconnected.
- Triggers Battery Charger Fail alarm when AC power is lost.
- Triggers System Component Fail alarm when the internal HW switch is set to ON position.

SVC-ALARM

- Triggers Service Antenna Disconnect alarm when the service port VSWR threshold limit is exceeded, causing the Remote Annunciator's System Component Fail LED to blink.

1-800-377-8766