



**CS40-734834-00D-A0 2.5W Public Safety  
Signal Booster**

**Users Guide**

**PRODUCT MANUAL**



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## Preface

This Preface includes the following:

- Purpose
- Scope
- Audience
- Document Organization
- References
- Document Conventions
- Safety Notices
- Technical Support
- Acronyms and Abbreviations
- Copyright and Trademark Acknowledgements

## Purpose

This manual contains information and procedures for the operation of the Westell CS40-734834-00D-A0 Public Safety Signal Booster.

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, make maintenance adjustments, or address alarms.

## Audience

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

## Document Organization

This manual includes the following chapters:

- **Chapter 1: General Information** – Outlines the document purpose and intended users, application, product registration, safety guidelines, disclaimer and FCC Part 90, FCC Warning Labels.
- **Chapter 2: Product Overview** – Provides product information, describes product features and lists accessories.
- **Chapter 3: Product Specification** – Provides tables containing RF, power, mechanical and environmental specifications. Also provides information about GUI items, alarm status and alarm relay.



- **Chapter 4: Product Appearance** – Provides physical specifications, photographs and information about the external and internal Signal Booster configuration.
- **Chapter 5: Installation Guidelines** – Lists guidelines for installing the Signal Booster and antennas.
- **Chapter 6: Software Installation** – Outlines the steps required to install the software.
- **Chapter 7: System Operation** – Describes product operation, including how to open the communication port and describes the functions in the Status and Control pages.
- **Appendix A: Important Product Information** – Provides the product registration number and internal power supply information.
- **Appendix B: Acronyms and Abbreviations** – A table of acronyms and abbreviations and definitions for each.

## References

- FCC Part 90

## Document Conventions

Table P-1 lists the conventions used throughout this document.

Table P-1: Document Conventions

Convention	Description
<b>DANGER!</b>	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.
<b>WARNING!</b>	Description of an imminent hazard that, if not avoided, may result in personal injury or serious equipment damage.
<b>CAUTION</b>	Description of a conditions or practice 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.
<b>IMPORTANT</b>	Additional important information that the user must be aware of, but is not related to a hazard.
<b>NOTE</b>	Additional information that is beneficial for the user to know, but is not related to a hazard.
<b>Bold</b>	Bold text indicates an action or provides emphasis.
<b>Click</b>	Instructs the user to press the primary (typically left) mouse button while the pointer is over the specified location.
<b>Right-click</b>	Instructs the user to press the secondary (typically right) mouse button while the pointer is over the specified location.
<b>Double-click</b>	Instructs the user to press the primary (typically left) mouse button twice, rapidly, while the pointer is over the specified location.
<b>Select</b>	Instructs the user to perform a selection on the screen by clicking an active object.
<b>Enter</b>	Instructs the user to type text using the keyboard.
<b>&gt;</b>	Indicates a level in a menu. For example, <b>Start&gt;Programs</b> prompts the user to click on Start, then locate and click Programs under the Start menu.

## Safety Notices

This general safety information applies to both operating and service personnel. Specific warnings and cautions are located in other parts of this manual where they apply and may not appear in this summary. Failure to comply with these precautions or specific warnings elsewhere in the manual violates the safety standards of design, manufacture, and intended use of equipment.

Westell assumes no liability for the customer's or user's failure to comply with these requirements:

- **Explosive atmospheres** - To avoid explosion or fire, do not operate this product in the presence of flammable gases or fumes.
- **Lightning danger** - Do not install or make adjustments to this unit during an electrical storm.

## WARNING!

Changes and Modifications not expressly approved by Westell can void your authority to operate this equipment under Federal Communications Commission's rules.

## Technical Support


If you suspect a malfunction with this product or have a technical question, call your dealer or the Westell Support Line at: (603) 626-6677, Toll Free (USA) 1-800-377-8766, press option 2, and then option 3. Westell Support can also be reached via email at [Support@westell.com](mailto:Support@westell.com).

## Acronyms and Abbreviations

Refer to Appendix B for definitions of the acronyms and abbreviations used in this manual.

## Copyright and Trademark Acknowledgements

The following products are referred to in this manual:

-  **WESTELL** is a registered trademark of Westell Technologies, Inc.

## 1 General Information

### 1.1 Document Purpose and Intended Users

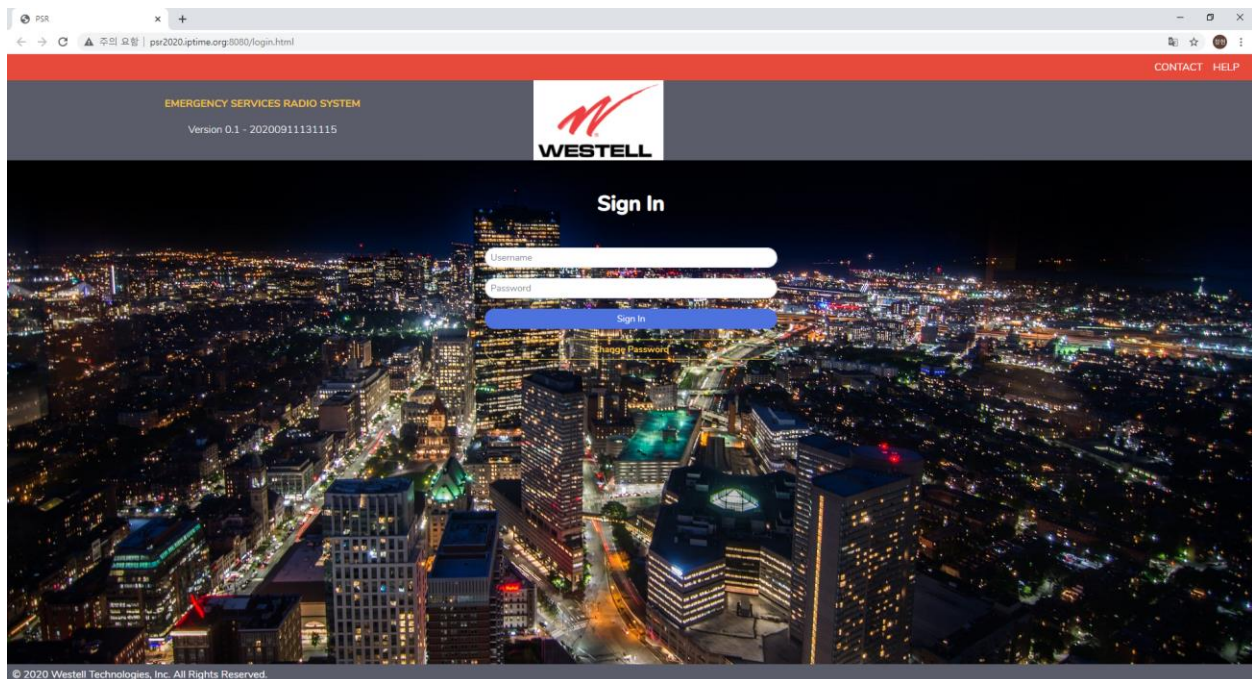
The purpose of this document is to provide a step-by-step procedure to help experienced technicians or engineers install and commission an in-building Passive Wireless Distributed Antenna System (DAS) using Westell's **CS40-734834-00D-A0** 2.5W Public Safety Signal Booster. Follow the instructions in 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.

### 1.2 Application

Use this guide whenever there is a need to add enhanced signal capability to an existing system or when a Signal Booster is included in a new installation.

### 1.3 Product Registration Information

Username and Password are provided by Westell. After signing in, you can modify and check information in SYSTEM SETTING.



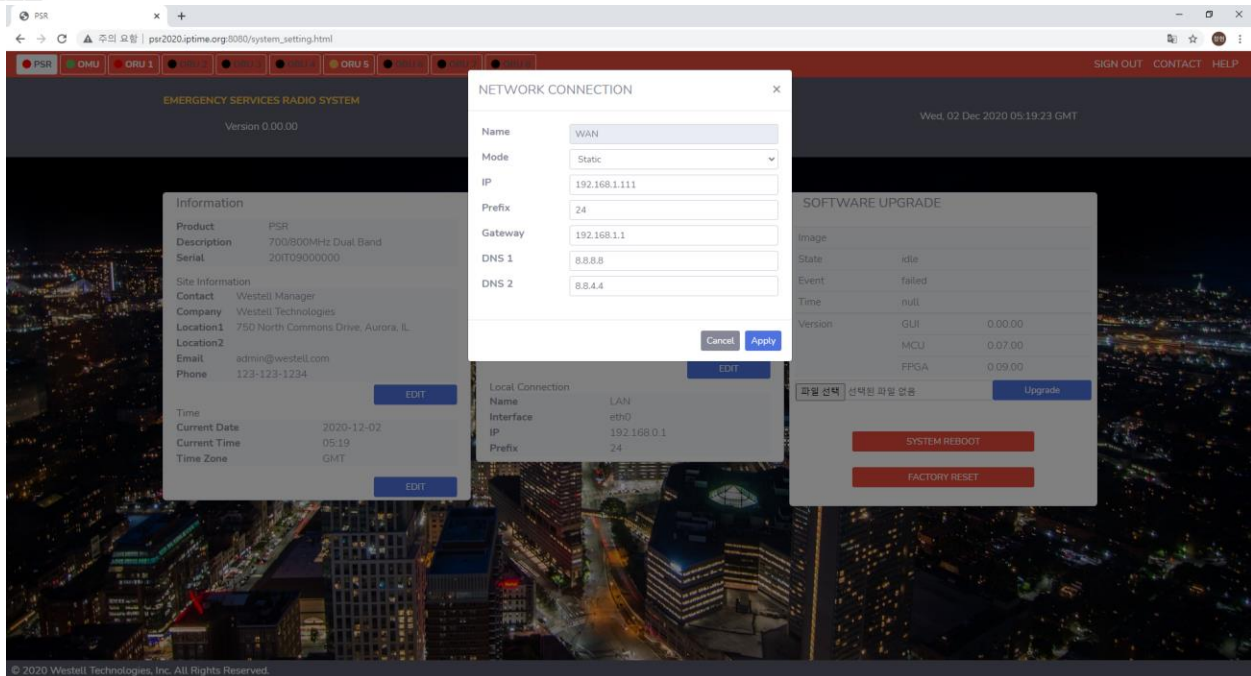


Figure 1-1: Product Registration

## 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:

**Grounding:** This Signal Booster is designed to operate at 100-240V~, 50/60Hz, 2A power and must always be operated with the ground wire properly connected. The ground wire must be at least 16 AWG and must be connected to the building ground.


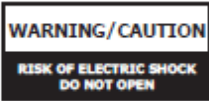

**Explosive atmospheres:** To avoid explosion or fire, do not operate this product in the presence of flammable gases or fumes.


**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. Opening the chassis will void your warranty. If you suspect a malfunction with this product, call your dealer or Westell's technical support line at 1.877.844.4274.

## CAUTION

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



 The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

 The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the device.

**WARNING/CAUTION**

— TO REDUCE THE RISK OF FIRE AND ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.



## 1.5 Important 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 20 cm (~8 in) 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 120 cm (~4 ft.). A directional antenna having a maximum gain of 3.75 dBi is used, and precautions should be taken to prevent personnel from routinely passing through the main radiation beam at a distance closer than specified.

## 1.6 FCC Part 90 Signal Boosters

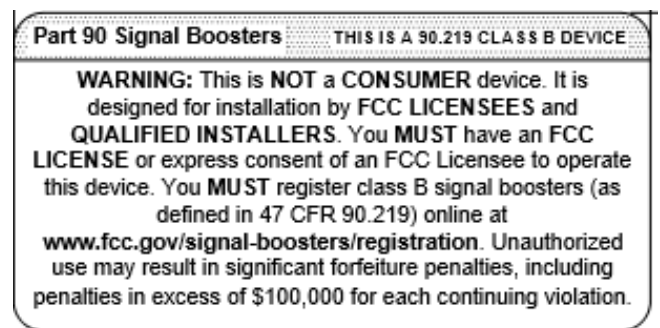
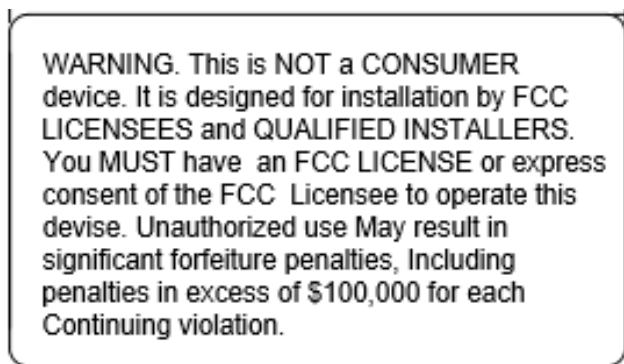
### WARNING!

THIS IS A 90.219 CLASS B DEVICE

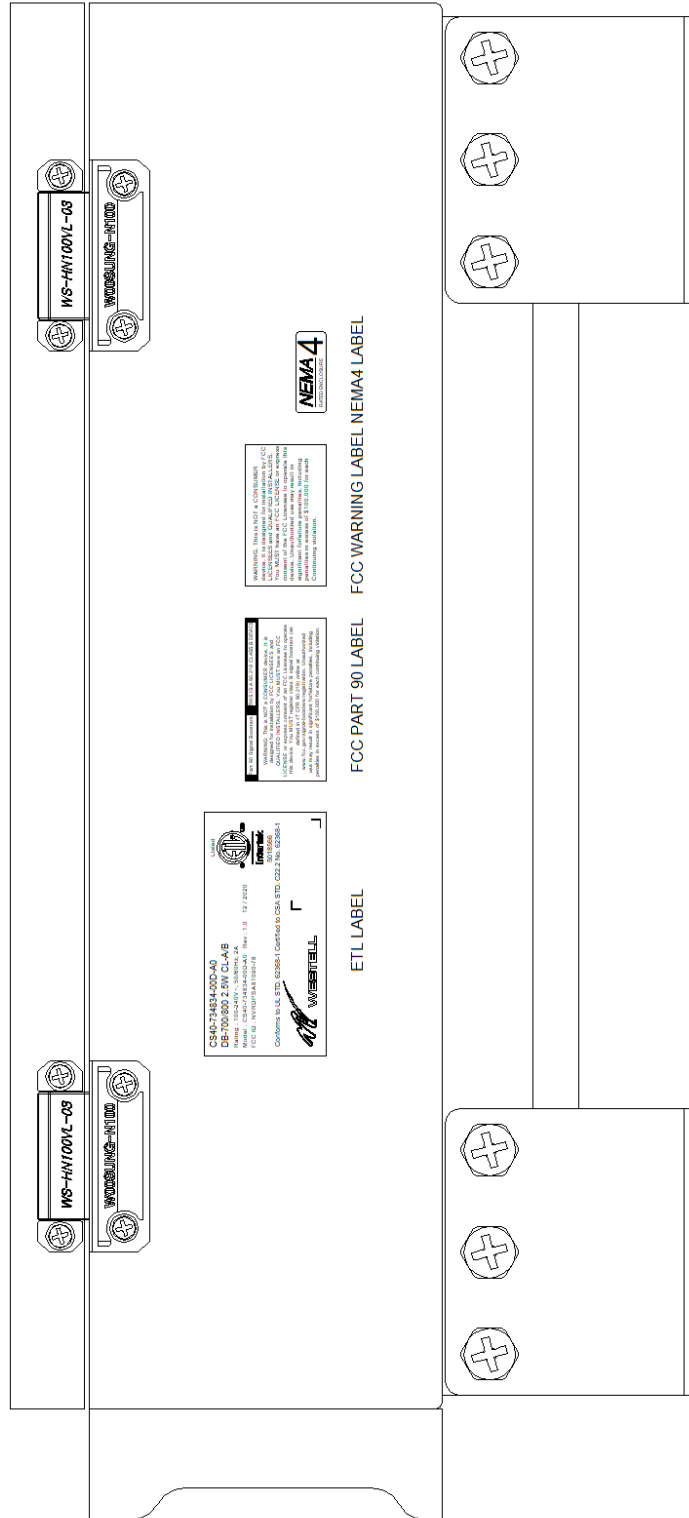
**This is not a consumer device.** It is designed for installation by FCC licensees and qualified installers. You must have an FCC license or express consent of an FCC License to operate this device. You must register class B signal boosters (as defined in 47 CFR 90.219) online at [www.fcc.gov/signal-boosters/registration](http://www.fcc.gov/signal-boosters/registration). Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.

### FCC Warning Labels

The following labels will appear on the CS40-734834-00D-A0 Signal Booster in accordance with the FCC:



### FCC Label Placement on the CS40-734834-00D-A0:



Right-Side View



## ■ FCC Part 15 Class A

**Note:**

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

### FCC Part 15 Class A

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



## 1.7 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



## 2 Product Overview

### 2.1 Product Information

The CS40-734834-00D-A0 Signal Booster was developed for use in enclosed structures where signals from local public safety towers to operate mobile units is 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.

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.

With a maximum total of 90 dB nominal gain the downlink and 80 dB nominal gain the uplink, gain can be adjusted over a range from 60(50) dB to 90(80) dB in 1 dB steps.

The Signal Booster is controlled using a computer connected to the RJ45 Female Network Connector labeled 'GUI'. There are also LED indicators to indicate alarm status, OSC and power. Refer to Figure 4-1.

The key features of this product are seamless interface to the 700/800 5W Composite DAS Ready Dual Band Class A/B Public Safety Repeater (PSR), Modular Optical Master Unit (OMU) supporting 8 (eight) remote locations, local service area coverage at shared OMU and PSR location 5W composite output power (2.5W each band), 32 UL Class A filters, mirrored operation and control through a common GUI with the PSR. The product will also support Class B operation with filters selectable wider than 75kHz. The product will be UL2524 compliant and certified.

## 2.2 Product Features

- Easy installation
- Light and small
- Control using a Windows-based Graphical User Interface (GUI) and accessed by connecting a laptop or desktop computer to the 8P8C/RJ45 Female Network Connector labeled 'GUI'
- User gain control
- Automatic level control
- Automatic shutdown function
- Oscillation protection
- Overdrive protection
- Under/over voltage protection
- Fault protection
- Alarm notification
- SNMP
- Persistent status and error information
- Battery Back-up Input

### 2.3 Included Accessories

Table 2-1 contains the items that are shipped with the CS40-734834-00D-A0 Public Safety Signal Booster.











Table 2-1: Included Accessories

Quantity	Description
1	AC Power 3 Wire Up to 16 AWG, Length : 6 ft
1	Ethernet cable, Length : 2 M
1	USB Drive containing the User Manual and Software
9	Drywall Anchors
1	2M External Alarm Cable Whip - UL 2464 AWG20 <b>20C</b>
2	Cabinet Keys

## 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

Donor Antenna			
CSI-AY/746-896/11	Yagi, 11 dB, Public Safety 700/800 (746-896 MHz)		
Clearlink-APD/698-940/-153/15/4310f	Panel Donor Antenna, Low-Band, 698-960, High Isolation		
Server/Coverage Antenna			
ClearLink-O/698-2.7K/N	CS03-011-429		
ClearLink-D/698-2.7K/N	CS03-012-389		
Hybrid Coupler			
	4.3-10 Type Connector	N-Type Connector	
3 dB	ClearLink-HC3/340-2.7K/N	ClearLink-HC3/340-2.7K/4310	
Power Tapper (Non-PIM Rated)			
	4.3-10 Type Connector	N-Type Connector	
6 dB	ClearLink-PT6/340-2.7K/4310	ClearLink-PT6/340-2.7K/N	
7 dB	ClearLink-PT7/340-2.7K/4310	ClearLink-PT7/340-2.7K/N	
8 dB	ClearLink-PT8/340-2.7K/4310	ClearLink-PT8/340-2.7K/N	
10 dB	ClearLink-PT10/340-2.7K/4310	ClearLink-PT10/340-2.7K/N	
13 dB	ClearLink-PT13/340-2.7K/4310	ClearLink-PT13/340-2.7K/N	
15 dB	ClearLink-PT15/340-2.7K/4310	ClearLink-PT15/340-2.7K/N	
20 dB	ClearLink-PT20/340-2.7K/4310	ClearLink-PT20/340-2.7K/N	
30 dB	ClearLink-PT30/340-2.7K/4310	ClearLink-PT30/340-2.7K/N	
Directional Coupler (Non-PIM Rated)			
	4.3-10 Type Connector	N-Type Connector	
5 dB	ClearLink-DC5/340-2.7K/4310	ClearLink-DC5/340-2.7K/N	
6 dB	ClearLink-DC6/340-2.7K/4310	ClearLink-DC6/340-2.7K/N	
10 dB	ClearLink-DC10/340-2.7K/4310	ClearLink-DC10/340-2.7K/N	
15 dB	ClearLink-DC15/340-2.7K/4310	ClearLink-DC15/340-2.7K/N	
20 dB	ClearLink-DC20/340-2.7K/4310	ClearLink-DC20/340-2.7K/N	
30 dB	ClearLink-DC30/340-2.7K/4310	ClearLink-DC30/340-2.7K/N	
Power Divider (Non-PIM Rated)			
	4.3-10 Type Connector	N-Type Connector	
2:1	CLEARLINK-SPD2/340-2.7K/4310	ClearLink-SPD2/340-2.7K/N	
3:1	ClearLink-SPD3/340-2.7K/4310	ClearLink-SPD3/340-2.7K/N	
4:1	ClearLink-SPD4/340-2.7K/4310	ClearLink-SPD4/340-2.7K/N	
Adapter			
4.3-10 (M) to N (F)	CS48-132-633		
Battery Back-up			
12 Hour Battery Back-up	PS-BBU-01		

### 3 Product Specification

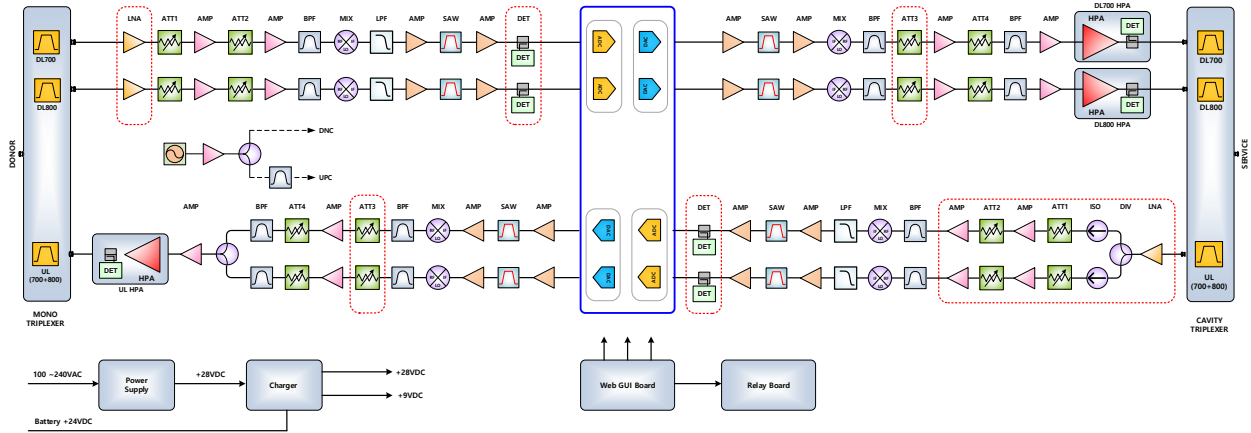
#### 3.1 RF Specifications

Table 3-1: RF Specifications

ITEM	PARAMETER	DESCRIPTION	UNIT	NOTES
1	700 DL Freq. Band	758-776	MHz	
2	700 UL Freq. Band	788-806	MHz	
3	700 FirstNet DL Freq. Band	758-768	MHz	
4	700 FirstNet UL Freq. Band	788-798	MHz	
5	800 DL Freq. Band	851-869	MHz	
6	800 UL Freq. Band	806-824	MHz	
7	Number of DL Class A Filters per Band	32		PLUS FirstNet for 700 band
8	Number of UL Class A Filters per Band	32		PLUS FirstNet for 700 band
9	Class A Channelized Filter BW	12.5, 25, 50, 75, 100, 150	kHz	Default 75 kHz with minimum group delay, 100kHz and 150kHz considered Class B
10	Class A Filter Rejections		dB	f – is rejection from BAND EDGE f tolerance +/- 5kHz
	12.5 kHz @ f >30kHz	>60		
	25 kHz @ f >50kHz	>60		
	50 kHz @ f >105kHz	>60		
	75 kHz @ f >210kHz	>60		
	100 kHz @ f >210kHz	>60		
	150 kHz @ f >210kHz	>60		
11	Class A System Group Delay for each filter		uS	TOTAL DL group delay between DONOR and SERVICE ports.
	12.5kHz	<60		Will not meet P25 phase 1 or 2 requirements
	25 kHz	<36		Will not meet P25 phase 1 or 2 requirements
	50 kHz	<25		P25 phase 2 compliant
	75kHz	<15		P25 phase 1&2 compliant
	100 kHz	<15		P25 phase 1&2 compliant
	150 kHz	<15		P25 phase 1&2 compliant
12	Number of DL Class B Filters per Band	4		PLUS FirstNet for 700
13	Number of UL Class B Filters per Band	4		PLUS FirstNet for 700
13.2	Class B Channelized Filter BW	0.250, 0.500, 1.0, 2.0, 3.0, 6.0, 7.0, 10	MHz	
13.4	Class B Filter Rejections			f – is rejection from BAND EDGE

	0.250MHz @ f >210kHz	>60	dB	f tolerance +/- 20kHz
	0.500MHz @ f >500kHz	>60		
	1.0MHz @ f >500kHz	>60		
	2.0MHz @ f >750kHz	>60		
	3.0MHz @ f >750kHz	>60		
	6.0MHz @ f >1MHz	>60		
	7.0MHz @ f >1MHz	>60		
	10MHz @ f >1MHz	>60		
	FirstNet @ f >1MHz	>60		
13.6	Class B Group Delay for each filter		uS	TOTAL DL group delay between DONOR and SERVICE ports.
	0.250MHz	<15		
	0.500MHz	<8		
	1.0MHz	<6		
	2.0MHz	<6		
	3.0MHz	<6		
	6.0MHz	<6		
	7.0MHz	<6		
	10MHz	<6		
FirstNet	<6			
16	System Gain DL	90	dB	
17	System Gain UL	80	dB	
18	UL and DL Composite Gain Adjustment	30	dB	1 dB steps
18.5	UL and DL Gain Adjustment per Channel (Filter)	30	dB	1 dB steps – Attenuation adjustment
19	Gain Accuracy	+/-1	dB	
20	AGC Range	60	dB	Consists of 30dB available from composite gain control and 30 dB available from individual channel gain control





### 3.2 Power Specification

Table 3-2: Power Specifications

Parameter	Specification	Note
Main Power Input Voltage	100-240V~ 50/60 Hz	AC Power
Battery (ACM-31 type)	Max. 2.7 A	Battery full Charging within 48hours
	22.5 VDC to 27 VDC	Battery Voltage
Power Consumption	100-240V~, 50/60 Hz.	< 2.0 A Max.

### 3.3 Mechanical Specification

Table 3-3: Mechanical Specifications

Parameter	Specification	Note
Size	14.9 x 18.7 x 5.3 in	L x H x D
Connectors	Donor/Coverage Antenna Ports: 4.3-10 (f)	Matting Male Connector Torque 3.7 ft.-lbs.
	AC Power In (8402 Gland Connector)	Open Wire Terminal (Pig tail)
	DC (Battery) Power In (8402 Gland Connector)	Open Wire Terminal (Pig tail)
	Accessory (8404 Gland Connector)	DAS OMU Interface
	Alarm Relay (8404 Gland Connector)	Alarm Relay Interface
	Annunciator (8402 Gland Connector)	Remote Annunciator Interface
	RJ-45 Ethernet-1 (10/100 Base-T)	GUI Interface
Mounting Type	Wall-Mount with 8 holes	Two-Lug Ground 4 holes in each side
Enclosure Lock	Key Lock	Two-Key Lock
Heat Dissipation	Natural Convection	
Finish	Red color Paint	RAL3001 Signal RED

### 3.4 Environmental Specification

Table 3-4: Environmental Specifications

Parameter	Specification	Note
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-67, NEMA 4 Compliance	

### 3.5 GUI Items

Table 3-5: GUI Items

Parameter	Specification	Note
UL/DL Output Readings	UL : 5dBm to 30dBm DL : 5dBm to 36dBm	Reads and displays the UL/DL output power
Alarm Readout Displays	Loss of AC Power - Battery Depleted Donor Antenna Fail1 Oscillation Detection1 Temperature Fail UL/DL Amplifier Fail Donor Antenna Fail2 Oscillation Detection2 Loss of Ra/DRA COMMS Battery Charger Fail Door Open Emergency Power Off	Displays alarm status
UL/DL Shutdown Setting	UL : 30dBm DL : 36dBm	Use to set the peak power (shutdown level)
UL/DL Gain Setting / Attenuation	UL : 50dB to 80dB Gain DL : 60dB to 90dB Gain 0dB to 30dB Attenuation.	Used to set the UL/DL system gain.
System Display	Manufacturer, Repeater Type, Repeater S/N, S/W Version, Temperature	Displays the repeater name and information.
Location Display	Company, Address, City, State, Contact	Displays the repeater location information.
Control Send	All Control Page Settings	Used to save settings in the Control page.
Isolation	Isolation Value, Isolation Max Gain Display	

Refer to **Section 6 System Operation** for more information about the GUI.

### 3.6 Alarm Status

Table 3-6 Alarm Status

<i>PSR Alarm State</i>	<i>PSR Action</i>	<i>GUI/SNMP Alarm</i>	<i>Description</i>
Loss of AC Power - Battery Depleted	NA - System dead	NA - System dead	NA - System dead
Donor Antenna Disconnect	None	Donor Antenna Disconnect	Donor Antenna Disconnect
Oscillation RF Shutdown	RF shutdown	System component	Uncorrectable Oscillation detected, RF shutdown
		Oscillation detection	
Temperature fail	None	Temperature	High temperature alarm
UL/DL Amplifier fail <i>UL and DL separate alarms</i>	RF shutdown	UL HPA fail	UL/DL Amplifier fail <i>UL and DL separate alarms</i>
		DL 700 HPA fail	
		DL 800 HPA fail	
Donor Antenna Malfunction	None	Donor Antenna Malfunction	Donor Antenna Malfunction
Oscillation Reduced Gain	Reduce Gain	Oscillation Reduced Gain	Oscillation detected - Gain Reduced
Loss of RA/DRA COMMS	None	Remote Annunciator loss of Communication	Annunciator Communication Lost
Battery capacity low	None	Battery capacity	Battery capacity low
Battery charger fail	None	Battery charger fail	Battery charger fail
Door open	None	Door open	Door open
Emergency power off	RF shutdown	User initiated Emergency power off	User initiated Emergency power off
Loss of AC Power Battery working	None	Loss of AC Power	Loss of AC Power

### 3.7 Alarm Relay

Table 3-7 Alarm Relay

<i>PSR Alarm State</i>	<i>PSR Action</i>	<i>PSR Relay/Annunciator Alarm</i>	<i>Description</i>
Loss of AC Power - Battery Depleted	NA - System dead	NA - System dead	NA - System dead
Donor Antenna Disconnect	v	Donor Antenna Disconnect	Donor Antenna Disconnect
Oscillation RF Shutdown	RF shutdown	System component fail	Uncorrectable Oscillation detected, RF shutdown
		RF Emitter fail	
Temperature fail	None	System component fail	High temperature alarm
UL/DL Amplifier fail <i>UL and DL separate alarms</i>	RF shutdown	RF Emitter fail	UL/DL Amplifier fail <i>UL and DL separate alarms</i>
Donor Antenna Malfunction	None	Donor Antenna Malfunction	Donor Antenna Malfunction
Oscillation Reduced Gain	Reduce Gain	System component fail	Oscillation detected - Gain Reduced
Loss of RA/DRA COMMS	None	System component fail	Annunciator Communication Lost
Battery capacity low	None	Battery capacity low	Battery capacity low
Battery charger fail	None	Battery charger fail	Battery charger fail
Door open	None	None	Door open
Emergency power off	RF shutdown	RF Emitter fail	User initiated Emergency power off
Loss of AC Power Battery working	None	Loss of AC Power	Loss of AC Power

## NOTE

Either method in Table 3-7 would trigger the following alarms: AC Power Fail, Battery Capacity Low, Battery Charger Fail, RF Emitter Fail, Donor Antenna Malfunction/Disconnection and System Component Fail.

- **ALARM 1 : EMERGENCY POWER OFF (Pin 1,2)**
- **ALARM 2 : AC POWER NORMAL (Pin 3,4,5)**
- **ALARM 3 : LOSS AC POWER (Pin 6,7,8)**
- **ALARM 4 : BATTERY CAPACITY LOW (Pin 9,10,11)**
- **ALARM 5 : BATTERY CHARGER FAIL (Pin 12,13,14)**
- **ALARM 6 : RF EMITTER FAIL (Pin 15,16,17)**
- **ALARM 7 : DONOR ANTENNA MALFUNCTION (Pin 18,19,20)**
- **ALARM 8 : DONOR ANTENNA DISCONNECT (Pin 21,22,23)**
- **ALARM 9 : SYSTEM COMPONENT FAIL (Pin 24,25,26)**

## 4 Product Appearance

### 4.1 External Configuration

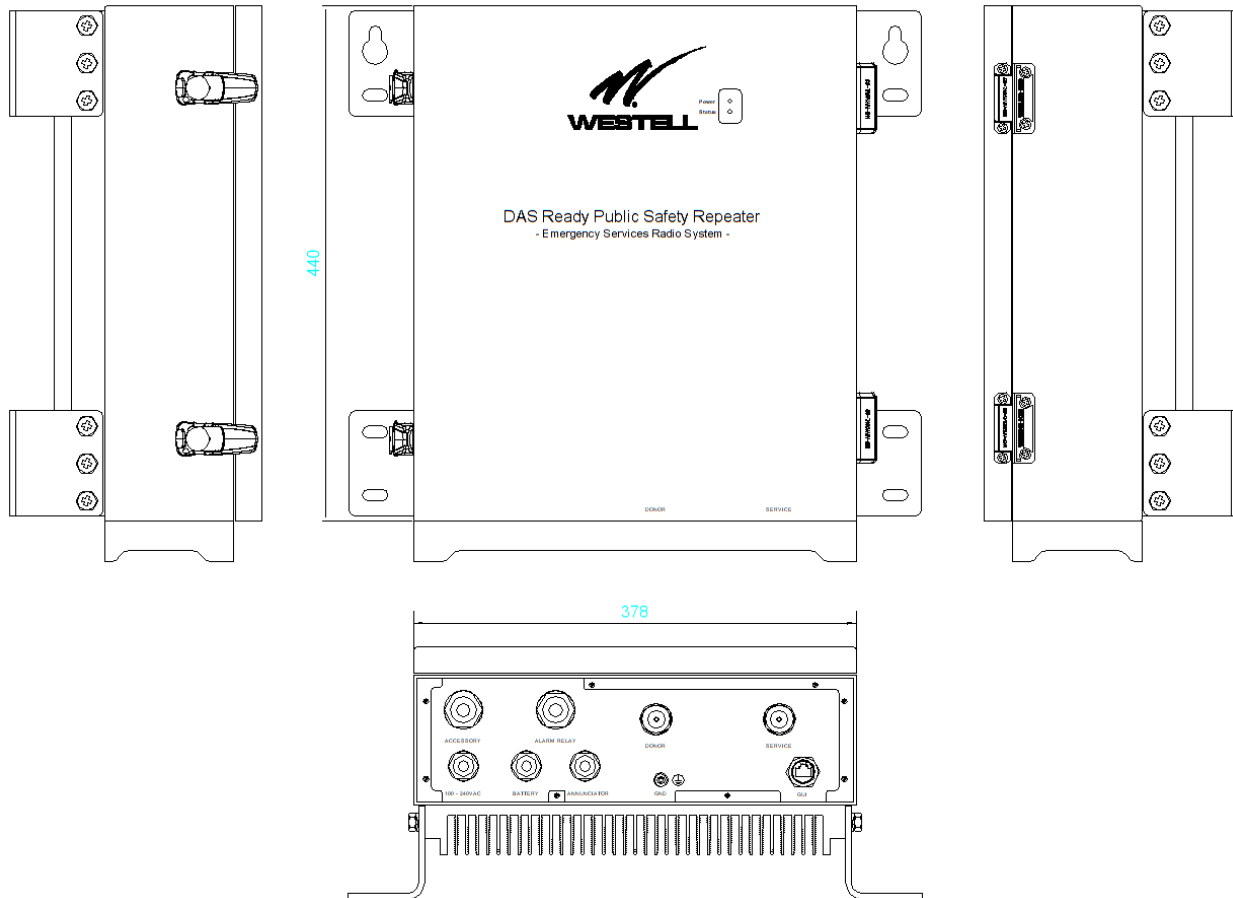


Figure 4-1: External Product Configuration

## 5 Installation Guidelines

### 5.1 Important Installation Guidelines

- The CS40-734834-00D-A0 Signal Booster is designed for indoor use only.
- The CS40-734834-00D-A0 Signal Booster must be installed in a vertical orientation (i.e. Connectors on the bottom of the unit).
- Inadequate isolation between the outside and inside antennas may cause regenerative feedback in the system.
  - This feedback can cause the amplifier to emit a continuous signal at maximum amplitude, and, in some cases, interfere with normal operation of the donor site. Careful consideration of the layout and placement of the system is imperative to minimize this possibility and to minimize the amount of signal leaking from the building.
- Do not disassemble the Signal Booster.

### **DANGER!**

- Refer to the 1.3 Safety Guidelines section 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.
- Electric shock may occur if the Signal Booster is 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.
- The CS40-734834-00D-A0 Signal Booster must be connected to ground for protection.
- We recommend that installers do not wear jewelry or metal accessories when installing this Signal Booster.
- Do not place cables or tools that may damage the Signal Booster in close proximity to it.
- Check the installation site for hazardous conditions such as water-covered floors or badly worn or damaged cables prior to installation.
- Lifespan and performance of the Signal Booster may be reduced if the unit is operating outside its nominal temperature range.

## CAUTION

- **Close proximity to the donor or server antennas with the Signal Booster in operation may expose users or installers to RF fields that exceed FCC limits for human exposure.**
- **Turn power to the Signal Booster off when connecting or disconnecting cables.**



- **Be careful as there is a very high voltage inside Signal Booster. Key is required to open Signal Booster, but the key must be kept by the administrator who manages the product.**

### 5.2 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 channel 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.



### 5.3 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 phones / radios, such as desks 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) using DM Tool software 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.

## 5.4 Mounting the Signal Booster

Follow the instructions in this section to mount the Signal Booster on a wall.

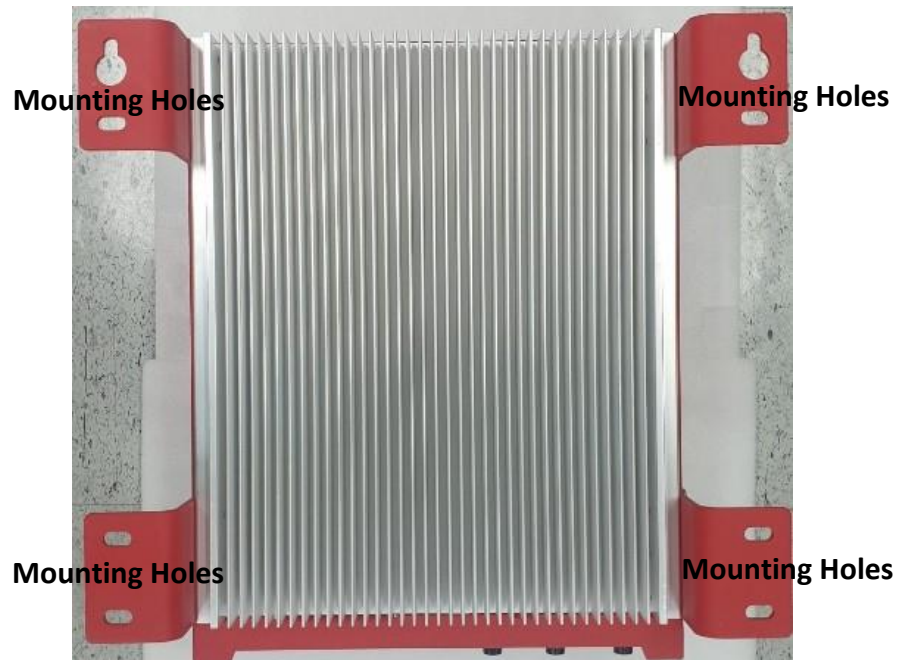


Figure 5-1: Signal Booster Mounting

1. Using the CS40-734834-00D-A0 as a template, mark the four (8) locations for the wall anchoring system screws.
2. Move the CS40-734834-00D-A0 unit and drill the mounting holes at the marks in the wall.

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



3. Install the top two (4) screws into the anchors, leaving enough room to slide the screws into the oblong holes of the top of the unit's mounting positions.
4. Once the Unit is hung on the top two (4) screws finish fastening the top screws.
5. Install the bottom two (4) screws into the anchors, fastening the Unit to the wall.

## 5.5 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.
- If cables and alignment are acceptable, and a problem persists, use a spectrum analyzer to examine the signal environment in which the unit is operating. The existence of strong adjacent channel signals within the frequency band(s) can cause the AGC to reduce the amplifier's gain or cause alarms. In some cases, additional filtering or attenuation may be required to reject these unwanted signals. In some instances, the donor antenna can be reoriented horizontally to place the interference source in an antenna pattern null.

## 5.6 Controlling the Signal Booster

Control and monitoring the Signal Booster requires that a properly configured computer with Westell CS40-734834-00D-A0 control software installed is connected via an Ethernet cable, such as the one shown in Figure 5-2A. Connect the Ethernet cable from the Network Interface port of a computer to the GUI port on the bottom end panel of the Signal Booster.



Figure 5-2A: Ethernet Cable

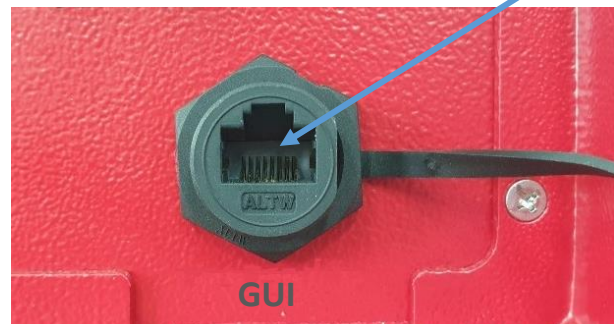


Figure 5-2B: Ethernet Connectors

### 5.7 Connecting to the Alarm Relay Panel

Use the provided Alarm Relay Serial Cable to connect the Public Safety Signal Booster to the alarm relay panel. If the provided cable is not long enough for your system, you will need to build one.

1. Strip the outer serial cable insulation back to expose the inner conductors, Figure 5-3.
2. Strip back the insulation on the ends of each conductor. (Tin wires as needed.)

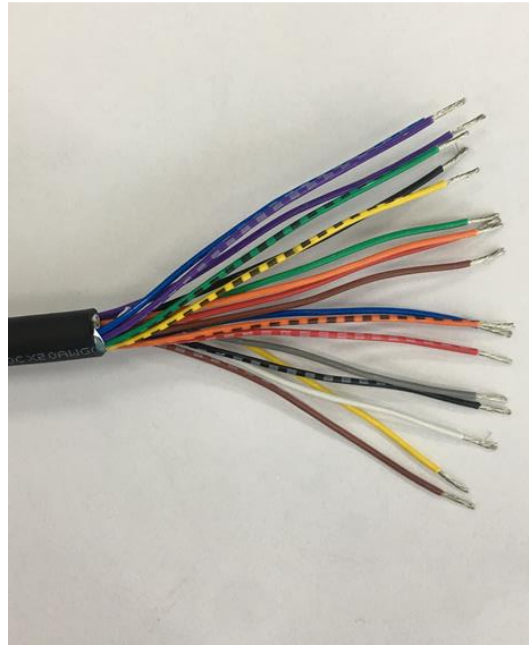


Figure 5-3: Stripped Alarm Wire

3. Remove HFC 8404 Gland Connector and feed alarm cable through fitting.



Figure 5-4: Alarm Relay 20-wire Gland Connector HFC 8404

4. Connect the HFC 8404 Gland connector at the serial cable to the Alarm Relay connector on the PSR, Figure 5-5. Be sure to fasten the connector screws securely.

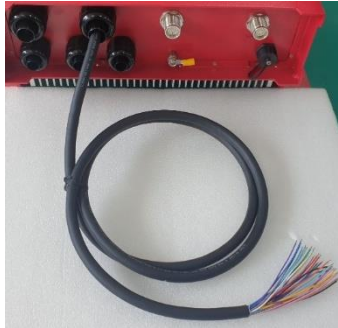


Figure 5-5: Alarm Relay Cable Connected to Repeater

1. Connect the stripped end of the serial cable to the alarm relay panel. Refer to Table 5-1 for connection information.

Table 5-1: Alarm Relay Connections

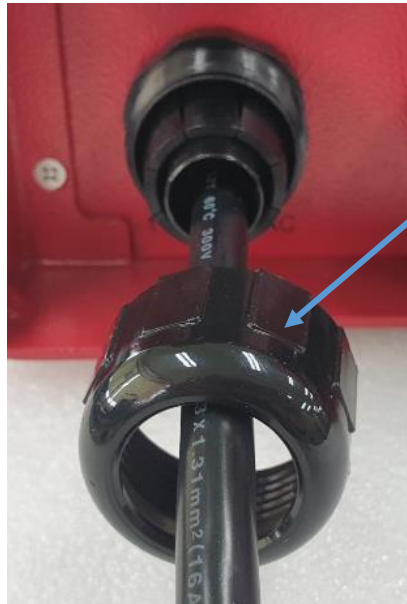
Alarm#	Description		Alarm Information	Relay Status
	IN	OUT		
Alarm1	1	2	EMERGENCY POWER OFF	

Alarm#	Description			Alarm Information	Relay Status
	NC	NO	CC		
Alarm2	3	4	5	AC POWER NORMAL	Normal → NC+CC Alarm → NO+CC
Alarm3	6	7	8	LOSS AC POWER	
Alarm4	9	10	11	BATTERY CAPACITY LOW	
Alarm5	12	13	14	BATTERY CHARGER FAIL	
Alarm6	15	16	17	RF EMITTER FAIL	
Alarm7	18	19	20	DONOR ANTENNA MALFUNCTION	
Alarm8	21	22	23	DONOR ANTENNA DISCONNECT	
Alarm9	24	25	26	SYSTEM COMPONENT FAIL	

## 5.8 Connecting the Power Cable

Use the provided AC Power Cable to connect the Public Safety Signal Booster to an AC power source.

1. Remove the HFC 8402 Gland Connector Molded from the AC 100~240V power connector on the Signal Booster, Figure 5-6.



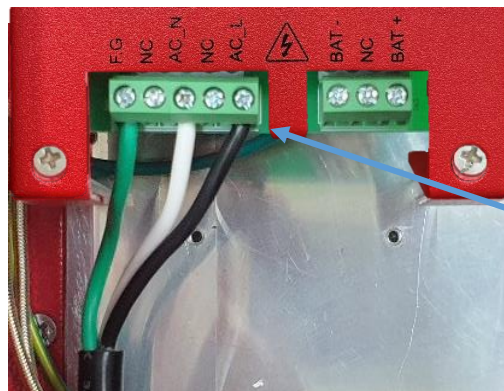
Remove  
HFC 8402 Gland  
Connector Molded

Figure 5-6: Remove the Power Connector Cap

2. Connect the power cable to the AC 100~240V power connector on the Signal Booster, Figure 5-7.

### NOTE

The Signal Booster connector and the cable connector are keyed as shown in Figure 5-7.



Connection  
F.G, AC\_N, AC\_L  
Alarm Relay Board

Figure 5-7: Connection AC Power Cable

3. Screw the connector on securely.





**Screw the  
connector on  
securely**

Figure 5-8: Power Cable Connected to Repeater

4. When the Signal Booster is properly set up and ready to have power applied, plug the other end into the Cabinet 100~240 VAC.



Figure 5-9: Power Cable Connected to Signal Booster



### 5.9 Connecting the Battery Back-up Cable

Use the provided DC Power Cable to connect the Public Safety Signal Booster to a 24-30VDC Battery Back-up / power source. (Pin A, White = positive, Pin B, Black = Negative)



Figure 5-10: Battery Cable Connected to Signal Booster

**Warning: Do NOT use DC Power Supply instead of Battery**

### 5.10 BBU Specification

Battery Model	Pulse Cranking Amps	CCA rating at -18°C (0°F)	Capacity – 20HR rate
NSB-AGM31	2150 A	1150 A	103 Ah
Internal resistance	Short Circuit Current	Q'ty Batteries of BBU	Reserve Capacity
2.2 mΩ @25°C	5000 A	2	220 min

## 6 System Operation

### 6.1 Operating the Program

Access the Public Safety Signal Booster through a LAN connection. The Signal Booster ships with the IP address **192.168.0.1** on the **GUI** port.

To connect directly to the Signal Booster from a laptop or PC with a crossover CAT-5E cable or over a LAN, change the TCP/IP settings on your computer to enable a connection to a host that has a static IP.

**PC Set-up:** Open Control Panel → Network Connections → Local area connection

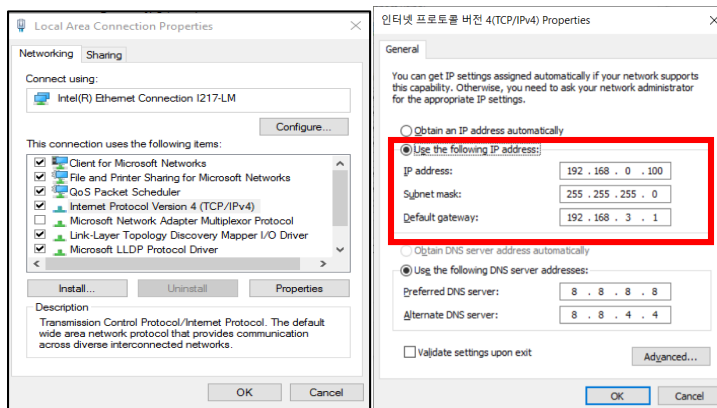
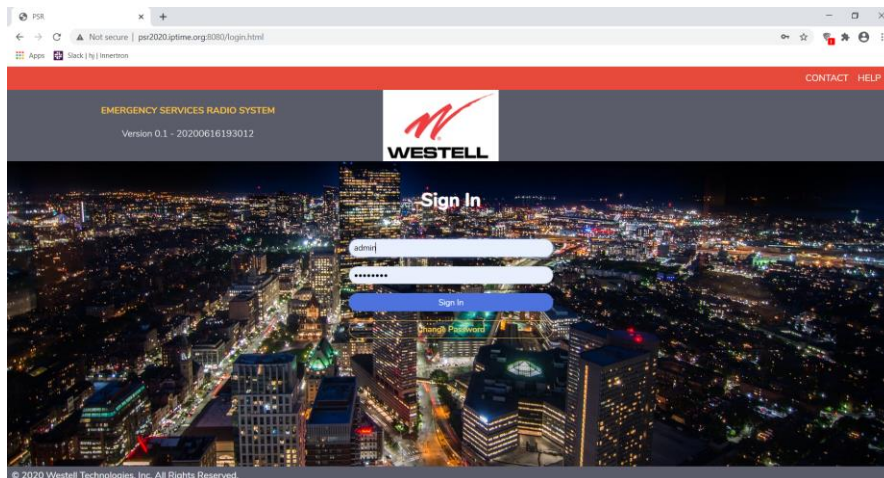


Figure 6-1: Network Connection Set-up

- 1) Select **Use the following IP Address** and enter the IP address **192.168.1.x**, where 'x' is any number from 2 to 254, inclusive, other than 150
- 2) Ensure that the subnet mask is set to 255.255.255.0
- 3) Web Browser: Chrome/Internet explorer



Username: admin  
Password: Password

Figure 6-2: Web GUI Log in

## 6.2 Web GUI System Status

When you log-in, the System Status window is displayed, and the four menus in which the sections are described are activated. The top menu displays Alarm, and if you click it, you can check the entire alarm



Figure 6-3: Web GUI System Status

Item	Description
①	Alarm Page (Check the alarm status)
②	RF Configuration (Setting the RF mode)
③	Configuration Export (Exporting information from equipment)
④	Annunciator Test (Alarm and LED test)
⑤	System Setting (Check your system settings and download F/W)

## 6.3 Alarm Page



Figure 6-3: Alarm Configuration

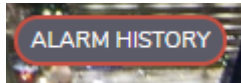
Item #	Section
Loss Of AC Power	Fail of AC Power
Battery Capacity Low	Low Battery capacity at 70% reduction
Battery Charger Fail	Battery Disconnection or Battery No charging status
DL 700 HPA Fail	Downlink 700MHz HPA Upper/Lower Current Limit
DL 800 HPA Fail	Downlink 800MHz HPA Upper/Lower Current Limit
UL HPA Fail	Uplink HPA Upper/Lower Current Limit
High Temperature Detected	Out of the set temperature range Checked
Donor Antenna Disconnect	Donor ANT Disconnection Checked
Donor Antenna Malfunction	Donor ANT VSWR Check Fail/ Donor ANT Malfunction
Oscillation Reduced Gain	Gain adjustment when oscillation occurs
Oscillation RF Shutdown	Output off when oscillation is not resolved
System Component Fail	System Component Fail Alarm
Door Open	Door status check
User Initiated Emergency Power Off	System off when an Emergency occurs
Remote Annunciator Loss Of Communication Loss	Annunciator connection check

**Alarm Monitoring**

Not User-Configurable/ Alarm Test and Alarm Informational Only.

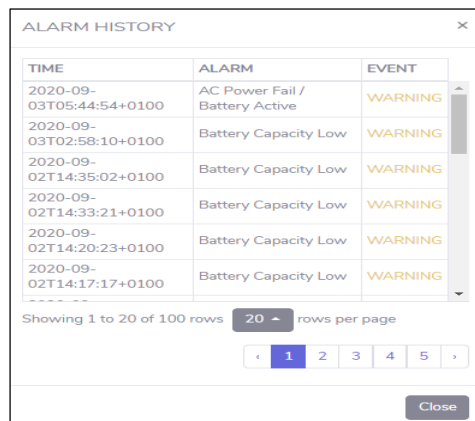
( GREEN = Normal; Yellow = Alarm )

**Alarm History**



Click the Alarm History Button

check the history of alarm occurrence by time and details



### 6.4 RF Configuration

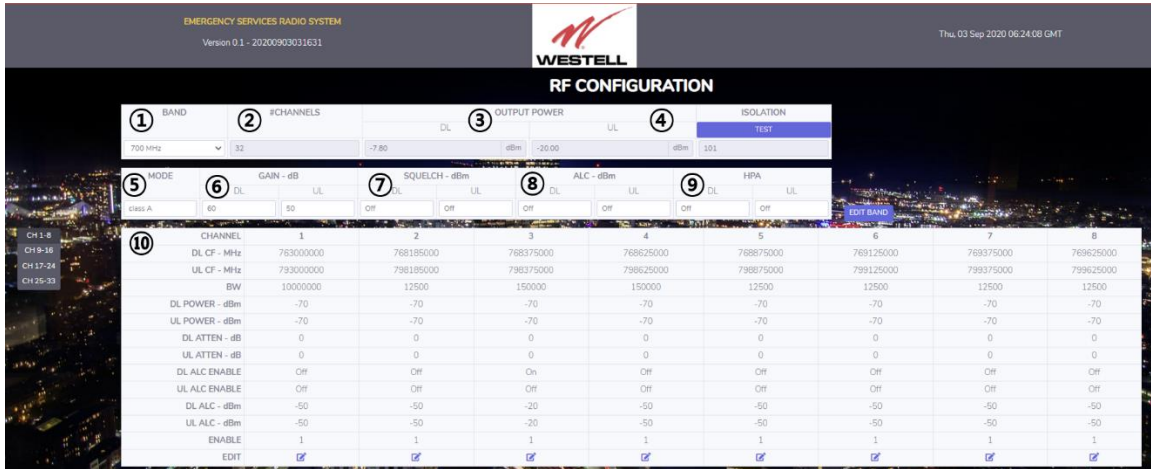
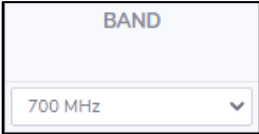
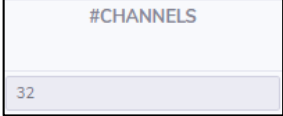
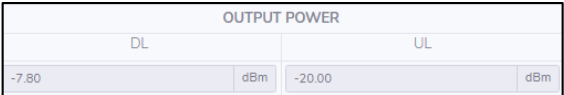

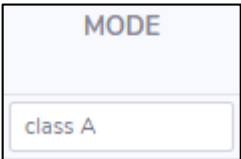
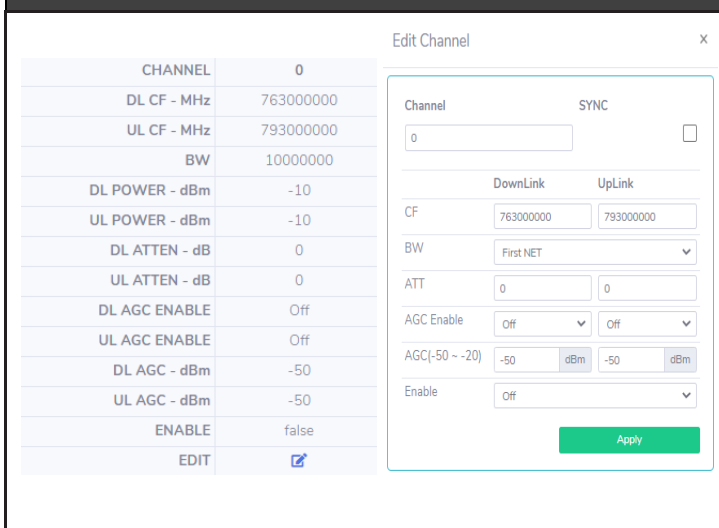


Figure 6-4: RF Configuration

Item 1	Section
	<b>Band</b> 700MHz, 800MHz Band Selection Menu
	<b>Channels</b> 32Ch. Selection Menu
	<b>Output Power</b> UL DL output power of selected band is monitored
	<b>Isolation</b> Antenna isolation measurement
	<b>Mode</b> Class A,B Selection Menu If Class A,B is set, the selectable channels are displayed differently.



Item 1	Section						
Item 6	Section						
<table border="1"> <thead> <tr> <th colspan="2">GAIN - dB</th> </tr> <tr> <th>DL</th> <th>UL</th> </tr> </thead> <tbody> <tr> <td>60</td> <td>50</td> </tr> </tbody> </table>	GAIN - dB		DL	UL	60	50	<p><b>Gain</b></p> <p>DL, UL Gain setting DL Max Gain: 90dB UL Max Gain: 80dB</p>
GAIN - dB							
DL	UL						
60	50						
Item 7	Section						
<table border="1"> <thead> <tr> <th colspan="2">SQUELCH - dBm</th> </tr> <tr> <th>DL</th> <th>UL</th> </tr> </thead> <tbody> <tr> <td>Off</td> <td>Off</td> </tr> </tbody> </table>	SQUELCH - dBm		DL	UL	Off	Off	<p><b>Squelch</b></p> <p>Displays DL, UL Automatic Level Control Level setting value</p>
SQUELCH - dBm							
DL	UL						
Off	Off						
Item 8	Section						
<table border="1"> <thead> <tr> <th colspan="2">ALC - dBm</th> </tr> <tr> <th>DL</th> <th>UL</th> </tr> </thead> <tbody> <tr> <td>Off</td> <td>Off</td> </tr> </tbody> </table>	ALC - dBm		DL	UL	Off	Off	<p><b>ALC</b></p> <p>Displays DL, UL Automatic Level Control Level setting value</p>
ALC - dBm							
DL	UL						
Off	Off						
Item 9	Section						
<table border="1"> <thead> <tr> <th colspan="2">HPA</th> </tr> <tr> <th>DL</th> <th>UL</th> </tr> </thead> <tbody> <tr> <td>Off</td> <td>Off</td> </tr> </tbody> </table>	HPA		DL	UL	Off	Off	<p><b>HPA</b></p> <p>Sets DL, UL HPA On/Off</p>
HPA							
DL	UL						
Off	Off						
Item 10	Section						
	<p><b>Channel Selection</b></p> <p>Setting the center frequency of the filter Setting the Band Width(BW) of the filter Filter output power monitoring Attenuator control Sets ALC On/Off Sets ACL Level setting value Sets Filter On/Off</p> <p><b>EDIT</b></p> <p>Settings can be made through Edit. Clicking the Edit button shows the items that can be set. <b>Class A can operate a total of 32Ch</b> <b>Class B can operate a total of 4Ch</b></p>						

## 6.5 Annunciator Test

This test will actuate:

- 1) the audible annunciator for each alarm in the repeater enclosure
- 2) the audible and visible annunciator for each alarm in the remote annunciator panel
- 3) Test All: Enable alarm testing via the software GUI

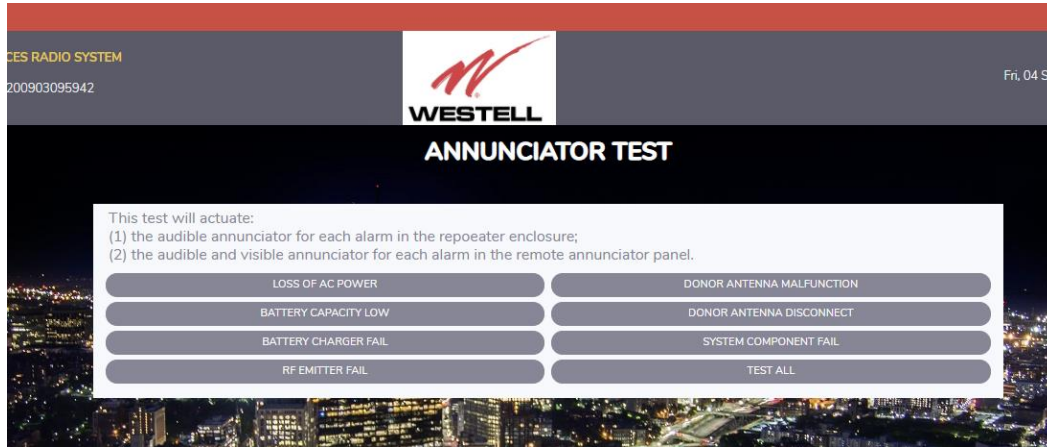


Figure 6-5: Annunciator Test

## 7 System Software Upgrade

### 7.1 Upgrading the System Software

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

- 1) Click the “System Setting” button on the System Status to display the Control page.
- 2) System Upgrade progress window, Figure 7-1, displays.

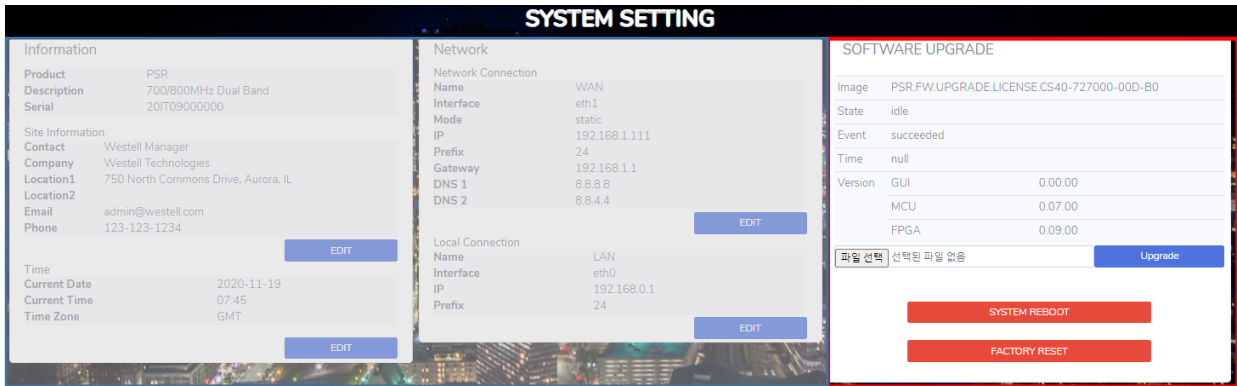


Figure 7-1: System Firmware Upgrade Progress

- 3) Navigate to Integrated SW Upgrade folder

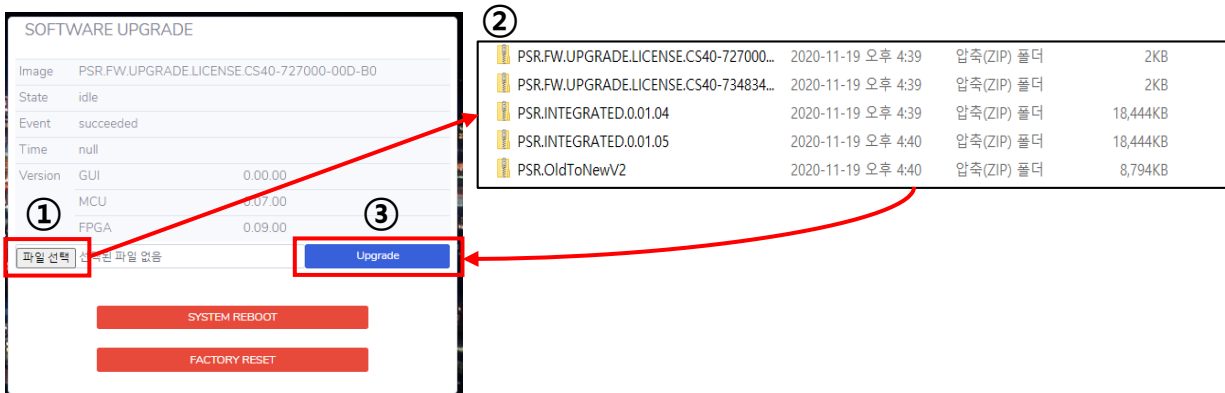


Figure 7-2: Window File Open Tab

- 4) Select the File **PDT.INTEGRATED.0.XX.XX.zip** and press. Never extract the compressed file. Select the zip file as it is
- 5) Click **UPGRADE** in the System file upload dialog window, system upgrade begins, as indicated by the progress bar in the system upgrade window.
  - The firmware upgrade takes about 30 minutes.
- 6) Check the version after completing the upgrade



### 7.3 Network (WAN) Setting

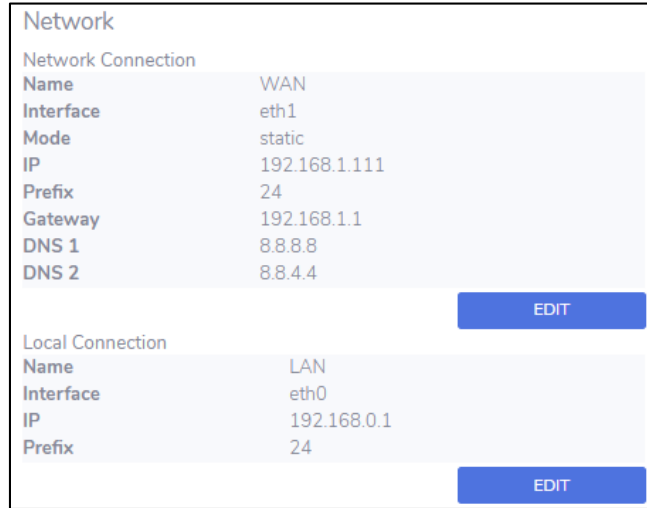
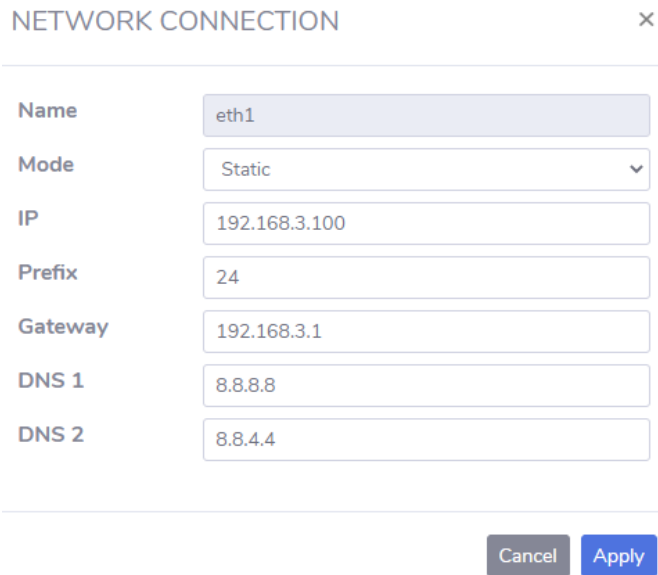


Figure 7-3: Network Display

- 1) Select "SYSTEM SETTING" button
- 2) Select "Network" section "EDIT" button
- 3) Fill network setting value(Prefix 24 is same subnet mask 255.255.255.0)



- IPsetting
  - IP Address: 192.168.0.100
  - Subnet Mask: 255.255.255.0
  - Gate way: 192.168.3.1
  - DNS Server: Auto

Figure 7-4: IP Settings

- 4) You can access PSR control page anywhere.

## Appendix A Important Product Information

### A.1 Registration Number

FCC - NVRDPSA81090-78

### A.2 ETL

This product is ETL Listed. #5018566

### A.3 Configuration LIST

Part Number	Band	Bands	Class	Description
CS40-734834-00D-A0	700 / 800	Dual	A/B	DB-700/800 2.5W CL-A/B
CS40-734000-00D-A0	700	Single	A/B	SB-700 2.5W CL-A/B
CS40-000834-00D-A0	800	Single	A/B	SB-800 2.5W CL-A/B
CS40-730830-00D-A0	700 / 800	Dual	A/B	DB-700/800 1W CL-A/B
CS40-730000-00D-A0	700	Single	A/B	SB-700 1W CL-A/B
CS40-000830-00D-A0	800	Single	A/B	SB-800 1W CL-A/B
CS40-727827-00D-A0	700 / 800	Dual	A/B	DB-700/800 .5W CL-A/B
CS40-727000-00D-A0	700	Single	A/B	SB-700 .5W CL-A/B
CS40-000827-00D-A0	800	Single	A/B	SB-800 .5W CL-A/B
CS40-734834-00D-B0	700 / 800	Dual	B	DB-700/800 2.5W CL-B
CS40-734000-00D-B0	700	Single	B	SB-700 2.5W CL-B
CS40-000834-00D-B0	800	Single	B	SB-800 2.5W CL-B
CS40-730830-00D-B0	700 / 800	Dual	B	DB-700/800 1W CL-B
CS40-730000-00D-B0	700	Single	B	SB-700 1W CL-B
CS40-000830-00D-B0	800	Single	B	SB-800 1W CL-B
CS40-727827-00D-B0	700 / 800	Dual	B	DB-700/800 .5W CL-B
CS40-727000-00D-B0	700	Single	B	SB-700 .5W CL-B
CS40-000827-00D-B0	800	Single	B	SB-800 .5W CL-B

### A.4 Accessory

CS40-DASANNUNCIATOR	DAS Master Annunciator
CS40-ANNUNCIATOR	BDA / DAS Remote Annunciator

## Appendix B Acronyms and Abbreviations

Table B-1 contains the acronyms and abbreviations used in this manual, along with a definition for each one.

Table B-1: Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AC	Alternating Current
AGC	Automatic Gain Control
COM	Communications
dB	Decibels
dBc	Decibels relative to the carrier
dB <sub>i</sub>	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	Federal Communications Commission
HPA	High-Powered Amplifier
IF SAW	Intermediate Frequency Surface Acoustic Wave
IP	Internet Protocol
LAN	Local Area Network
LED	Light Emitting Diode
MHz	Megahertz
NMS	Network Management System
OSC	Oscillator
PLL LD	Phase-locked loop with lock detection
RF	Radio Frequency
RS-232C	Serial Communication Standard
UL	Uplink
UPS	Uninterruptable Power Supply
VAC	Volts Alternating Current (AC Voltage)
VSWR	Voltage Standing Wave Ratio

## **Appendix C UL2524 Installation Guidelines**

### UL2524 Installations

#### AC Input Connector

- 1/2" Liquid Tight Conduit Fitting - Heyco 8402
- 1/2" Cordgrip - Heyco M6108

#### DC Input/Output Connector

- 1/2" non-metallic Conduit fitting - Heyco 8402
- 1/2" Cordgrip - Heyco M6108

#### Accessory Connector

- 3/4" non-metallic Conduit fitting - Heyco 8404
- 3/4" Hole Plug - Heyco 3835

#### Alarm Relay Connector

- 3/4" non-metallic Conduit fitting - Heyco 8404
- 3/4" Cordgrip - Heyco M6110

#### Annunciator Connector

- 1/2" non-metallic Conduit fitting - Heyco 8402
- 1/2" Hole Plug - Heyco 3833



**For FCC Korea**

**Regarding NVRDPSA81090-78**

This letter serves to describe the model differences between FCC ID: NVRDSPA81090-78 models marketed under the Westell Part Numbers as identified in this letter.

**All the configurations have exactly the same HW as the base model.**

All eighteen Westell defined configurations use the same exact Hardware Assembly (Internal Part Number: 080-300897), Firmware and Software. There no Hardware, Software, Firmware differences between the eighteen defined configurations.

**All the functional difference is controlled by SW**

The information provided in the configuration spreadsheet details the Software differences between the eighteen Westell defined configurations. The eighteen Westell defined configurations are achieved by applying a Software key that is installed that allows certain software features to be turned on and off as well as it can limit the settings of certain features resulting in the eighteen defined Westell Configurations. The functionality of these Westell model numbers is in accordance with FCC KDB 178919 D01 Permissive Change Policy V06, Section V, Part C

Westell Part Number	S.W. Config Key	Software Configurations	Band	Bands	Filters	Description
CS40-734834-00D-A0	1	700 Band Features Enabled 800 Band Features Enabled Class-A Filter Features Enabled Class-B Filter Features Enabled Allow DL Output PWR set to 34dbm and below Allow UL Output PWR set to 30dbm and below	700 / 800	Dual	A & B	DB-700/800 2.5W CL-A/B
CS40-734000-00D-A0	2	700 Band Features Enabled 800 Band Features Disabled Class-A Filter Features Enabled Class-B Filter Features Enabled Allow DL Output PWR set to 34dbm and below Allow UL Output PWR set to 30dbm and below	700	Single	A & B	SB-700 2.5W CL-A/B



<b>CS40-000834-00D-A0</b>	3	700 Band Features Disabled 800 Band Features Enabled Class-A Filter Features Enabled Class-B Filter Features Enabled Allow DL Output PWR set to 34dbm and below Allow UL Output PWR set to 30dbm and below	800	Single	A & B	SB-800 2.5W CL-A/B
<b>CS40-730830-00D-A0</b>	4	700 Band Features Enabled 800 Band Features Enabled Class-A Filter Features Enabled Class-B Filter Features Enabled Allow DL Output PWR set to 30dbm and below Allow UL Output PWR set to 30dbm and below	700 / 800	Dual	A & B	DB-700/800 1W CL-A/B
<b>CS40-730000-00D-A0</b>	5	700 Band Features Enabled 800 Band Features Disabled Class-A Filter Features Enabled Class-B Filter Features Enabled Allow DL Output PWR set to 30dbm and below Allow UL Output PWR set to 30dbm and below	700	Single	A & B	SB-700 1W CL-A/B
<b>CS40-000830-00D-A0</b>	6	700 Band Features Disabled 800 Band Features Enabled Class-A Filter Features Enabled Class-B Filter Features Enabled Allow DL Output PWR set to 30dbm and below Allow UL Output PWR set to 30dbm and below	800	Single	A & B	SB-800 1W CL-A/B
<b>CS40-727827-00D-A0</b>	7	700 Band Features Enabled 800 Band Features Enabled Class-A Filter Features Enabled Class-B Filter Features Enabled Allow DL Output PWR set to 27dbm and below Allow UL Output PWR set to 30dbm and below	700 / 800	Dual	A & B	DB-700/800 .5W CL-A/B
<b>CS40-727000-00D-A0</b>	8	700 Band Features Enabled 800 Band Features Disabled Class-A Filter Features Enabled Class-B Filter Features Enabled Allow DL Output PWR set to 27dbm and below Allow UL Output PWR set to 30dbm and below	700	Single	A & B	SB-700 .5W CL-A/B





<b>CS40-000827-00D-A0</b>	9	700 Band Features Disabled 800 Band Features Enabled Class-A Filter Features Enabled Class-B Filter Features Enabled Allow DL Output PWR set to 27dbm and below Allow UL Output PWR set to 30dbm and below	800	Single	A & B	SB-800 .5W CL-A/B
<b>CS40-734834-00D-B0</b>	10	700 Band Features Enabled 800 Band Features Enabled Class-A Filter Features Disabled Class-B Filter Features Enabled Allow DL Output PWR set to 34dbm and below Allow UL Output PWR set to 30dbm and below	700 / 800	Dual	B Only	DB-700/800 2.5W CL-B
<b>CS40-734000-00D-B0</b>	11	700 Band Features Enabled 800 Band Features Disabled Class-A Filter Features Disabled Class-B Filter Features Enabled Allow DL Output PWR set to 34dbm and below Allow UL Output PWR set to 30dbm and below	700	Single	B Only	SB-700 2.5W CL-B
<b>CS40-000834-00D-B0</b>	12	700 Band Features Disabled 800 Band Features Enabled Class-A Filter Features Disabled Class-B Filter Features Enabled Allow DL Output PWR set to 34dbm and below Allow UL Output PWR set to 30dbm and below	800	Single	B Only	SB-800 2.5W CL-B
<b>CS40-730830-00D-B0</b>	13	700 Band Features Enabled 800 Band Features Enabled Class-A Filter Features Disabled Class-B Filter Features Enabled Allow DL Output PWR set to 30dbm and below Allow UL Output PWR set to 30dbm and below	700 / 800	Dual	B Only	DB-700/800 1W CL-B
<b>CS40-730000-00D-B0</b>	14	700 Band Features Enabled 800 Band Features Disabled Class-A Filter Features Disabled Class-B Filter Features Enabled Allow DL Output PWR set to 30dbm and below Allow UL Output PWR set to 30dbm and below	700	Single	B Only	SB-700 1W CL-B



<b>CS40-000830-00D-B0</b>	15	700 Band Features Disabled 800 Band Features Enabled Class-A Filter Features Disabled Class-B Filter Features Enabled Allow DL Output PWR set to 30dbm and below Allow UL Output PWR set to 30dbm and below	800	Single	B Only	SB-800 1W CL-B
<b>CS40-727827-00D-B0</b>	16	700 Band Features Enabled 800 Band Features Enabled Class-A Filter Features Disabled Class-B Filter Features Enabled Allow DL Output PWR set to 27dbm and below Allow UL Output PWR set to 30dbm and below	700 / 800	Dual	B Only	DB-700/800 .5W CL-B
<b>CS40-727000-00D-B0</b>	17	700 Band Features Enabled 800 Band Features Disabled Class-A Filter Features Disabled Class-B Filter Features Enabled Allow DL Output PWR set to 27dbm and below Allow UL Output PWR set to 30dbm and below	700	Single	B Only	SB-700 .5W CL-B
<b>CS40-000827-00D-B0</b>	18	700 Band Features Disabled 800 Band Features Enabled Class-A Filter Features Disabled Class-B Filter Features Enabled Allow DL Output PWR set to 27dbm and below Allow UL Output PWR set to 30dbm and below	800	Single	B Only	SB-800 .5W CL-B



## FCC compliance information

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.