Comba

CriticalPoint™ Public Safety

V3 ANNUNCIATOR PANEL

USER MANUAL

APV3-BDA / APV3-DAS
QE: 1-0-3

Comba Telecom Limited

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0.2 REVISION HISTORY

Rev. No.	ENU	Release Date	Author	Details Of Change
1	1-0-0	09/01/2024	MD	First Release
2	1-0-1	11/01/2024	MD	Updated sections 0.5, 0.8, 0.11, 2.12, 4.2 – 4.5
3	1-0-2	01/09/2026	MD	Updated to include V2 BBU Support & DAS Mirror Mode
4	1-0-3	01/21/2026	MD	Updated V3 AP Troubleshooting section

0.3 ABOUT THIS MANUAL

This user manual describes the pre-planning, installation, commissioning, operation, and maintenance procedures for the Comba CriticalPoint™ V3 Public Safety Annunciator Panels. A complete overview of the hardware and software is provided. The hardware and software mentioned throughout this manual are under continuous development to provide improvements and/or new features. As a result, there may be minor differences between the information found in this manual and the actual design of the hardware and software received by the operator. Any specifications, weights, dimensions, or other statements mentioned in this manual are subject to change without notice.

The information contained herein is the responsibility of and is approved by the following, to whom all enquiries should be directed:

0.4 DOCUMENTATION FEEDBACK

Comba prides itself in providing our clients with the best customer experience possible. Your feedback can help keep our documentation current and accurate. If you have any comments or suggestions about the content found within this user manual, please feel free to contact us.

Please include the following information when submitting your comments:

- Product Model Number and Version Number
- User Manual Name and Version Number
- Topic Title or Subject
- Page Number
- Brief description of the content you believe should be improved, corrected, or is missing.
- Your recommendation for how to correct or improve the document.

Please send your email messages to the following:

techsupport@combausa.com

Please note this email is for both technical support and documentation feedback.

0.5 TECHNICAL SUPPORT

Comba provides direct access to our technical support team 12 hours a day (Mon-Fri) from 9:00am (EST) to 6:00pm (PST). Technical support is provided for free for the entire time the product is covered by the equipment warranty, on condition that the user/operator has a valid certificate of training completion issued by Comba for the product in question. Unauthorized individuals should not be servicing the equipment and will not be assisted over the phone due to liability issues. See section 0.12 for details on who is authorized to operate the equipment.

For technical support please contact us at the telephone number or email address below or submit a ticket for support through the website.

Tel: (408) 526 0180 Ext. 3
techsupport@combausa.com
https://combausa.com/technical-support-request-form/

0.6 RETURN MATERIAL AUTHORIZATION (RMA)

If you need to request an RMA, please call the technical support line mentioned in section 0.5 or complete the RMA form on our website and a Comba representative will contact you shortly.

https://combausa.com/rma-request-form/

0.7 WARRANTY

The standard product warranty is 3 years or as otherwise agreed under a special contract with Comba. The warranty period commences upon date of shipment from Comba Telecom.

0.8 UNAUTHORIZED CHANGES TO EQUIPMENT

Any changes or modifications to the equipment not expressly approved by Comba Telecom (who are responsible for compliance) could void the user's authority to operate the equipment. Furthermore, unauthorized changes or modifications could void the device warranty. If you have any questions regarding what modifications can be made to specific equipment, please contact the technical support line mentioned in section 0.5.

0.9 GLOSSARY OF TERMS

Abbreviation	Definition
AGC	Automatic Gain Control
AHJ	Authority Having Jurisdiction
ALC	Automatic Level Control
AP	Annunciator Panel
ATT	Attenuator
BATT	Battery
BBU	Battery Backup Unit
BDA	Bi-Directional Amplifier
BTS	Base Transceiver Station
CH	Channel
CSA	Cross Sectional Area
dB	Decibel
dBm	Decibels relative to one milliwatt
DL	Downlink
DT	Donor Terminal (Base/Donor Port)
DPX	Duplexer
ERCES	Emergency Responder Communication Enhancement System
ERRCS	Emergency Responder Radio Communication System
FCC	Federal Communications Commission
FOU	Fiber Optic Unit
FPGA	Field-Programmable Gate Array (Digital Signal Processor)
FS	Frequency Selection
GND	Ground
GUI	Graphical User Interface
Hz	Hertz
ID	Identification
IF	Intermediate Frequency
LNA	Low Noise Amplifier
LOS	Line-of-Sight
MCU	Main Control Unit
MHz	Megahertz
MPX	Multiplexer
MT	Mobile Terminal (Service/Mobile Port)
MTBF	Mean Time Between Failures
MU	Master Unit
NF	Noise Figure
OMC	Operation & Maintenance Center
OMT	Operation & Maintenance Terminal
OP	Optical Port

PA	Power Amplifier
PE	Protective Earth
PLL	Phase Locked Loop
PS	Public Safety
PSU	Power Supply Unit
RF	Radio Frequency
RFU	Radio Frequency Unit
RMA	Return Material Authorization
RU	Remote Unit
RX	Receive
SMA	Sub-Miniature A Connector
TX	Transmit
UL	Uplink
VAC	Volts Alternating Current
VDC	Volts Direct Current
VSWR	Voltage Standing Wave Ratio
W	Watts

0.10 SAFETY NOTICES AND ADMONISHMENTS

This document contains safety notices in accordance with appropriate standards. In the interests of conformity with the territory standards for the country concerned, the equivalent territorial admonishments are also shown.

Installation, adjustment, maintenance, and/or repair of the equipment must only be conducted by trained/certified personnel! At all times, personnel must comply with any safety notices and instructions! Before installing, modifying, or replacing any of the equipment, the user manual should be read and understood in its entirety.

Specific hazards are indicated by symbol labels on or near the affected parts of the equipment. The labels conform to international standards, are triangular, and are colored black on a yellow background. An informative text label may accompany the symbol label.


General Warning


High Voltage


Non-ionizing Radiation Hazard


Electric Hazard


Laser Hazard

Hazard labeling is supplemented by safety notices in the applicable sections of this manual. These notices contain additional information on the nature of the hazard and may also specify precautions.

Example:


Non-ionizing Radiation Hazard

For compliance with the general population RF exposure limits, each individual antenna used for this transmitter must be installed to provide a separation distance during normal operation and must not be co-located with any other antenna for meeting RF exposure requirements.

Warning Notices:

These draw the attention of personnel to hazards that may cause death or injury to the operator or others. Examples of use are cases of high voltage, laser emission, toxic substances, point of hot temperature, etc.

Example:


Electric Hazard

WARNING. Electric Shock may occur if the signal booster is installed near water.

Alerts:

These draw the attention of personnel to hazards that may cause damage to the equipment.

Examples:


General Warning

ALERT! Disconnection of either of the RF ports (unloaded) may cause damage to the equipment when power and equipment is active.

Caution Notices:

These may also be used in the handbook to draw attention to matters that do not constitute a risk of causing damage to the equipment, but where there is a possibility of seriously impairing its performance, e.g., by mishandling or gross maladjustment. Warnings and Cautions within the main text may not incorporate labels and may be in shortened form.

Example:

WARNING. This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. The PS BDA can be configured as Class A or Class B Signal Booster. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties of more than $100,000 for each continuing violation.

Note: The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could revoke the user's authority to operate the equipment.

CAUTION! Use only authorized and approved antennas, cables and/or coupling devices! The use of unapproved antennas, cables or coupling devices could cause damage and may be a violation of FCC regulations. The use of unapproved antennas, cables and/or coupling devices is illegal under FCC regulations and may subject the user to a fine.

CAUTION! Ambient temperature range for equipment use: -33 to 55 degrees Celsius.

CAUTION! This equipment is not suitable for use in locations where children are likely to be present.

CAUTION! The product shall have a connection of the equipment protective earthing conductor to the installation protective earthing conductor (for example, by means of a power cord connected to a socket-outlet with earthing connection).

CAUTION! When the plug on the power supply cord is used as the disconnect device, the socket-outlet shall be easily accessible.

0.11 AUTHORIZED EQUIPMENT OPERATORS

Signal Boosters/Zone Enhancers (Also referred to BDAs or Fiber Fed BDAs) are not consumer devices. They are industrial devices which may only be operated and maintained by authorized individuals and qualified installers.

1. **Operators of the equipment MUST have taken and passed Comba Telecom's certification training for RF101 and the V3 BDA/DAS/BBU product line.**
2. **Operators of the equipment MUST have a valid FCC General Radio Operator License (GROL) if operating the device in the USA.**
3. **Operators of the equipment MUST have NICET Level 3 Certification IB-PSC; or they MUST have NICET Level 2 Certification IB-PSC and be supervised by someone who has NICET Level 3 IB-PSC if operating the device in the USA.**
4. **Installers of the equipment MUST have NICET Level 2 Certification IB-PSC or higher; or they MUST have NICET Level 1 Certification IB-PSC and be supervised by someone with NICET Level 2 Certification IB-PSC or higher while operating the device in the USA.**
5. **Non-Licensee Operators MUST receive express written consent to operate the Signal Booster/Zone Enhancer from the FCC/ISED License Holder BEFORE installing and operating the device.**

The equipment must be installed and operated in accordance with any license required by the radio authorities in the country of concern. In most cases, it is a criminal offense if one fails to obtain a license to install and operate the equipment. It is the operator's responsibility to ensure that any required licenses are obtained, that systems are installed and commissioned in accordance with their terms, and that no changes can be made later that would disobey them.

Comba reserves the right to seize sales to a client and/or report the violation to the proper authorities should we determine if a client is allowing unauthorized individuals to operate the equipment. Comba will not be held responsible for unauthorized use of our devices.

End of Section

1 GENERAL PRODUCT INFORMATION

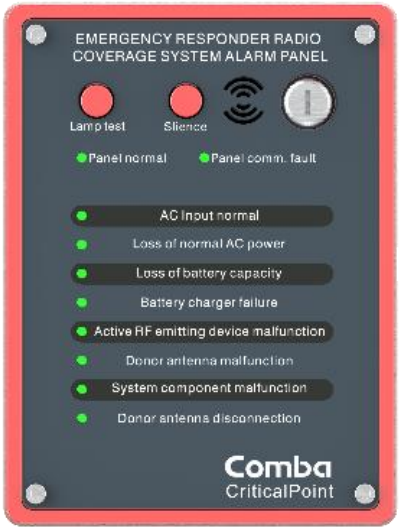


Figure 1: V3 Annunciator Panel for BDA

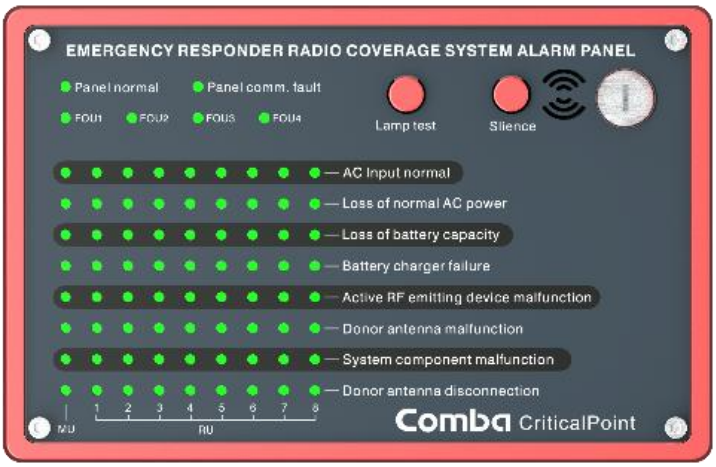


Figure 2: V3 Annunciator Panel for Fiber DAS

The CriticalPoint™ V3 Annunciator Panel (AP) is a system designed to provide audible and visual annunciation of ERRCS/ERCES alarms per the latest IFC, NFPA, and UL codes and standards. The devices are specifically designed to provide status indication for all Comba V3 BDA, BBU and Fiber DAS products. Furthermore, the annunciator panels can only be used together and managed by Comba V3 BDA, BBU and Fiber DAS products. The annunciator panel will display the status of the whole system it is connected to, including system Amplifiers (BDA, Master Unit, or Remote Unit), Fiber Optic Expansion Units (FOUs) and Battery Backup Units (BBUs).

The V3 AP is available in two different models. The model **APV3-BDA** is designed to be used with a stand-alone V3 BDA/BBU system or where a summarization of Fiber DAS Remote BDA/BBU alarms is permitted. Each APV3-BDA can handle system alarms for (1) BDA, (1) MU, or (1) RU and its associated BBU. Up to (4) APV3-BDA can be connected in cascade from each BDA, MU, or RU if multiple annunciators are required to be located throughout the building in different locations.

The model **APV3-DAS** is designed to be used with the V3 Fiber DAS configuration when individual annunciation of device alarms is required (Individual alarm LEDs for each Master Unit, Fiber Optic Unit, Remote Units, and BBUs). Each APV3-DAS can handle independent system alarms for (1) MU+BBU, (1) FOU, and (8) RU+BBU. Up to (4) APV3-DAS can be connected in cascade from a BDA/MU to support a system consisting of (1) MU, (4) FOUs, (32) RUs, and (33) BBUs. Also, the APV3-DAS can be used in “mirror” mode in systems that contain only (1) FOU and up to (8) RUs. In “mirror” mode, the cascaded annunciators provide identical alarms as the first APV3-DAS, mirroring the same alarms at a different location.

Each AP model is provided with multiple front alarm plate options for the user to choose from to meet their local alarm requirements. The alarm plate options provided with the annunciators have a similar layout to those provided with the V3 BDA/MU and RU devices and mirror the same alarm configuration. The V3 annunciator models are used for audible and visual annunciation of alarms only. They DO NOT provide any Dry-Contact Alarm Outputs to feed a fire alarm system. The V3 annunciators allow for flush mounting to a wall, or mounting to a Gang box, which is further explained in the following sections of this manual. A “Silence” and a “Lamp Test” button are included on the exterior of the device. The provided key must be used to silence alarms or test the lamps/LEDs. The device uses RJ45 connectors for ease of installation using cat 5/6 cable. The BDA/MU/RU devices are now provided with an RJ45 adapter cable to be used to connect between the BDA/MU/RU AP power and communication terminals and a standard RJ45 ethernet cable.

1.1 V3 AP SYSTEM STANDARDS COMPLIANCE

- Complies with IFC / NFPA / UL2524
- UL 2524 Standard 2nd Edition Certified – SGS Certificate:
  - APV3-BDA: **SGSNA/24/GZ/00199**
  - APV3-DAS: **SGSNA/24/GZ/00200**
- IP30 enclosure

1.2 V3 AP MAIN FEATURES

Figure 3: APV3-BDA - Isometric View

Figure 4: APV3-DAS - Isometric View

- **APV3-BDA** - Dedicated External Annunciator Panel for Comba Public Safety V3 BDA, MU, or RU.
- **APV3-DAS** - Dedicated External Annunciator Panel for Comba Public Safety V3 Fiber DAS displaying individual alarms for each MU, FOU, and RU. Connects to BDA/MU only.
- Swappable front alarm plates to meet various alarm standards (matches plates on V3 BDA/MU/RU)
- Supports visual and audible alarm annunciation only.
- Supports Lamp Testing and Alarm Muting via external key switch and buttons.
- Operates on +12~+42.4VDC; powered from Comba V3 BDA/MU/RU or by a local AC/DC adaptor.
- Supports long distances (up to 2000ft using 24AWG cable)
- Lightweight and small footprint. Easy to install and commission.
- **UL2524 2nd Edition Listing with SGS, Nationally Recognized Testing Laboratory (NRTL) approved by OSHA for the UL2524 Standard Certified - SGS Certificate No.: DSS_SGSNA_24_GZ_00199 (BDA Version) / DSS_SGSNA_24_GZ_00200 (DAS Version)**
- Cascade up to (4) APs for stand-alone V3 BDA/MU/RU applications
- Cascade up to (4) APs for V3 Fiber DAS displaying independent alarms for entire system of devices.
- **APV3-BDA** is now supported by V2 BBU with FW version **V8802 or newer**.

1.3 V3 AP SPECIFICATIONS

Specifications

Annunciator Panel BDA Version		
NFPA/IFC/UL2524 Alarm Indicators		8 Alarms, synchronized with BDA V3/DAS V3
Other Alarm Indicators		Panel Normal / Comm Alarm
Max. Number of AP supported by V3 platform		4
DAS Support (For individual alarms from RUs)		N/A
Dimensions, H x W x D	In(mm)	5.75 x 4.33 x 1.81 (146 x 110 x 46)
Weight BDA	lb(kg)	0.9 (0.41)
Power Consumption	W	0.6
Annunciator Panel DAS Version		
NFPA/IFC/UL2524 Alarm Indicators		8 Alarms, synchronized with BDA/DAS, 1 MU and 8 RU supported per panel
Other Alarm Indicators		Panel Normal / Comm Alarm / FOU 1 ~ 4 Alarm
Max. Number of AP supported by V3 platform		4
DAS Support (For individual alarms from RUs)		Up to Master Unit and 32 Remote Units alarm annunciation from 4 cascaded APs
Dimensions, H x W x D	In(mm)	7.20 x 4.65 x 1.42 (183 x 118 x 36)
Weight DAS	lb(kg)	1.2 (0.54)
Power Consumption	W	2
Common Specifications		
Audio Annunciation / Buzzer Muting		Available
Lamp Test		Available
Limited Access for Operation (Alarm Muting)		Key Operated
Dry Contact Input		N/A
Dry Contact Output		N/A
Common Mechanical and Electrical Specifications		
DC Input	VDC	+12 ~ +42.4
Mounting		4” x 4” Junction Box / Wall
Max Cable Distance	Feet	2000 (24ga wire)
Connection with BDA/DAS		DC + RS485 (1x Cat. 5 Cable provided for quick connection)
IP / NEMA / Environment Class		IP30
Operating Temperature and Humidity	°F/°C	-27.4 ~ +131 (-33 ~ +55)

Part Numbers

Part Number	Description
APV3-BDA	Annunciator Panel V3 for BDA V3 or individual DAS Remote Units V3, UL 2524 Standard Certified
APV3-DAS	Annunciator Panel V3 for DAS V3, Individual Alarm Annunciation for entire system, UL 2524 Standard Certified
APV3-BDA-3804MX	Flushing Mounting Kit for APV3-BDA
APV3-DAS-3804MX	Flushing Mounting Kit for APV3-DAS

1.4 V3 AP SYSTEM DIAGRAM – STANDARD V3 BDA/BBU WITH APV3-BDA

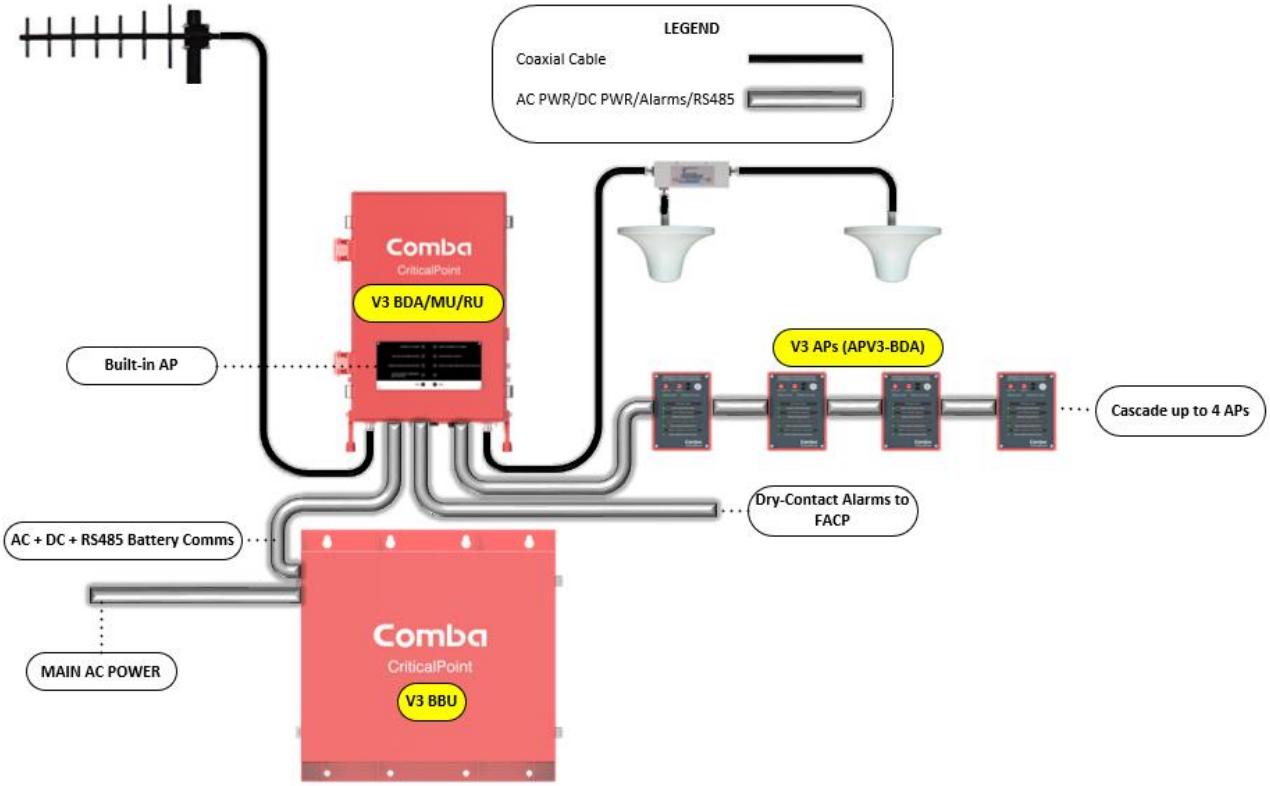


Figure 5: APV3-BDA - System Diagram - Standard V3 BDA/BBU with APV3-BDA

The APV3-BDA Annunciator Panel(s) are powered by DC voltage and receive Power and RS-485 alarm communications directly from the V3 BDA/MU/RU device. System status and alarm conditions configured within the BDA/BBU are displayed on the annunciator panel, and an audible buzzer is activated whenever an alarm condition occurs. A maximum of four (4) annunciator panels may be daisy-chained from a single BDA, with a cumulative cable length of up to 2,000 feet to the furthest panel, using 24-AWG cabling. Category 5 or Category 6 Ethernet cable terminated with RJ-45 connectors is recommended for interconnection between the BDA and annunciator panels. Each APV3-BDA is supplied with an adapter cable that consolidates the BDA annunciator panel terminal outputs into an RJ-45 interface. The APV3-BDA annunciator panel is equipped with a factory-installed RJ-45 connector, eliminating the need for an adapter at the panel end. Audible alarms may be muted by engaging the key switch and pressing the **Silence** button. A lamp test function is available by engaging the key switch and pressing the **Lamp Test** button.

1.5 V3 AP SYSTEM DIAGRAM – V3 FIBER DAS WITH APV3-BDA

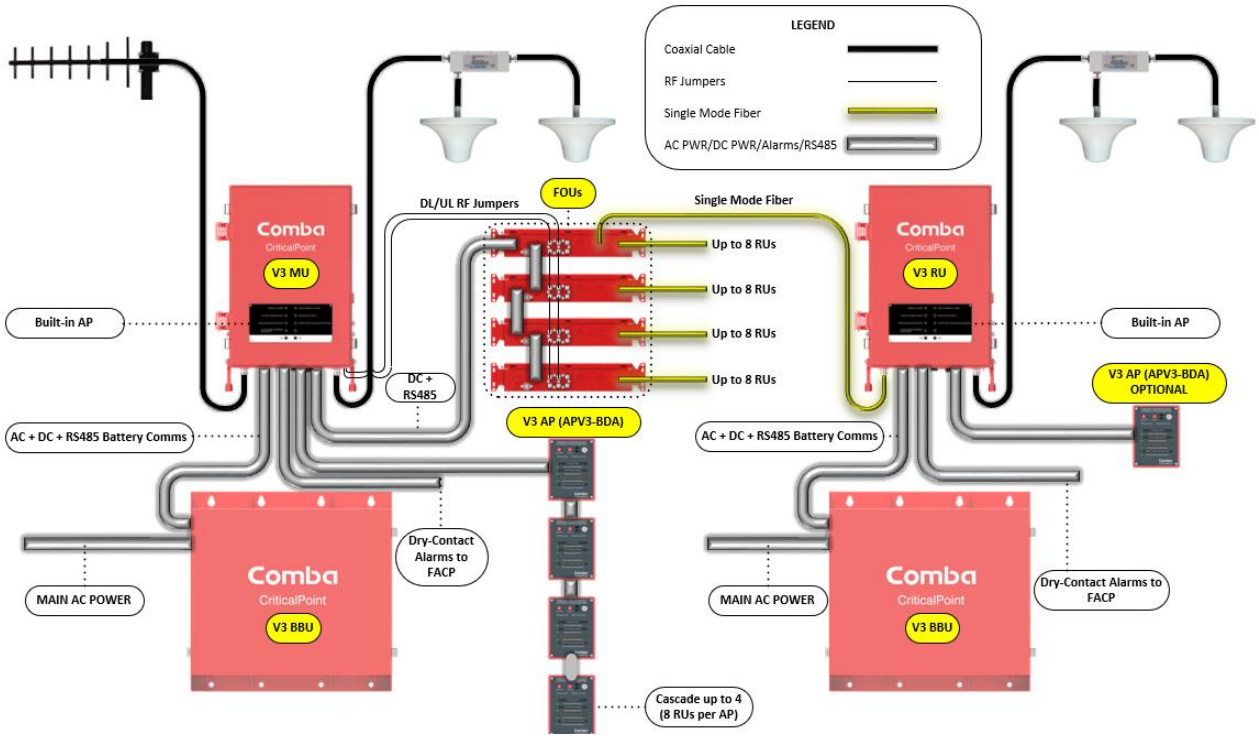


Figure 6: APV3-BDA - System Diagram - V3 Fiber DAS with APV3-BDA

The APV3-BDA Annunciator Panel(s) may also be deployed within a fiber DAS architecture, provided that applicable code requirements permit the consolidation of Remote Unit and Remote BBU alarms at the Master Unit (MU) or head-end location. The APV3-BDA annunciator panels receive DC Power and RS-485 alarm communications directly from the V3 MU/RU device. System status and alarm conditions configured within the BDA/BBU are displayed on the annunciator panel, and an audible buzzer is activated when an alarm condition occurs. A maximum of four (4) annunciator panels may be daisy-chained from the MU/RU, with a total cable length of up to 2,000 feet to the furthest panel, using 24-AWG cabling. Category 5 or Category 6 Ethernet cable terminated with RJ-45 connectors is recommended for interconnection between the MU/RU and annunciator panels. The APV3-BDA devices are supplied with an adapter cable that consolidates the BDA annunciator panel terminal outputs into an RJ-45 interface. The APV3-BDA annunciator panel includes a factory-installed RJ-45 connector, eliminating the need for an adapter at the panel end. Audible alarms may be silenced by engaging the key switch and pressing the **Silence** button. A lamp test may be performed by engaging the key switch and pressing the **Lamp Test** button.

1.6 V3 AP SYSTEM DIAGRAM – V3 FIBER DAS WITH APV3-DAS

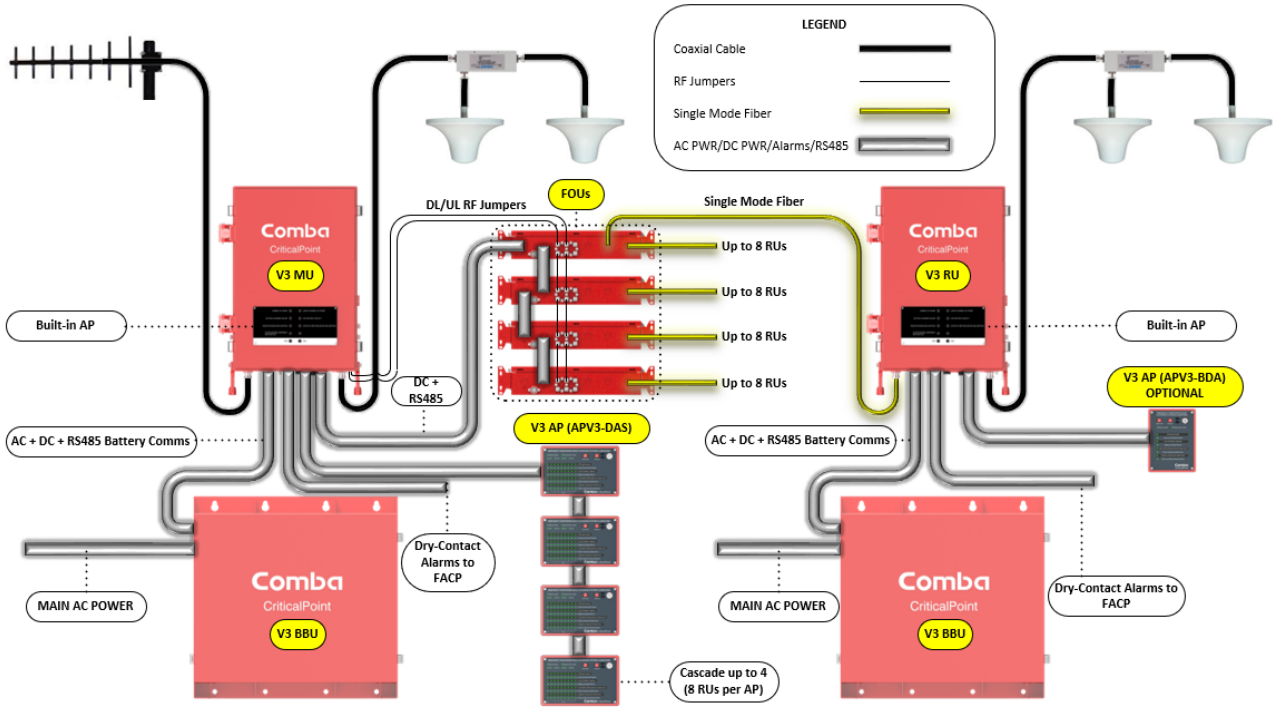


Figure 7: APV3-DAS - System Diagram - V3 Fiber DAS with APV3-DAS

The APV3-DAS Annunciator Panel(s) are powered by DC voltage and receive Power and RS-485 alarm communications directly from the V3 BDA/MU device. System status and alarm conditions configured within the MU, FOU, and RU devices are displayed on the annunciator panel, and an audible buzzer is activated whenever an alarm condition occurs. A maximum of four (4) annunciator panels may be daisy-chained from the Master Unit (MU), with a cumulative cable distance of up to 2,000 feet to the furthest panel, using 24-AWG cabling. Each APV3-DAS annunciator panel supports independent alarm indication for one (1) BDA/MU, one (1) Fiber Optic Unit (FOU), and up to eight (8) Remote Units (RUs). Additional APV3-DAS panels may be cascaded to expand monitoring capability to a maximum of four (4) FOUs and thirty-two (32) RUs. Category 5 or Category 6 Ethernet cable terminated with RJ-45 connectors is recommended for interconnection between the MU/RU devices and the annunciator panels. The APV3-DAS devices are supplied with an adapter cable that consolidates the BDA/MU annunciator panel terminal outputs into an RJ-45 interface. Each APV3-DAS annunciator panel is equipped with a factory-installed RJ-45 connector, eliminating the need for an adapter at the panel end. Audible alarms may be muted by engaging the key switch and pressing the **Silence** button. A lamp test function may be initiated by engaging the key switch and pressing the **Lamp Test** button. Where independent alarm indication for each remote unit is not required, the APV3-BDA annunciator panel may be used to provide a summarized view of system alarms. In addition, an APV3-BDA annunciator panel may be installed at an individual remote unit to provide localized status and alarm indication. This configuration is particularly beneficial when remote units are installed in separate buildings with dedicated Fire Alarm Control Panels.

Alternatively, the APV3-DAS annunciator panel may be configured to operate in **Mirror Mode**. This mode is supported only on systems utilizing one (1) FOU and up to eight (8) remote units. In Mirror Mode, each APV3-DAS annunciator panel displays identical alarm and status indications for the BDA/MU, the FOU, and all connected remote units. For systems exceeding eight (8) remote units, Mirror Mode operation is not supported. Refer to section 1.9 for more details.

1.7 V3 AP SYSTEM DIAGRAM – CASCADING A V1 AP TO FEED FACP

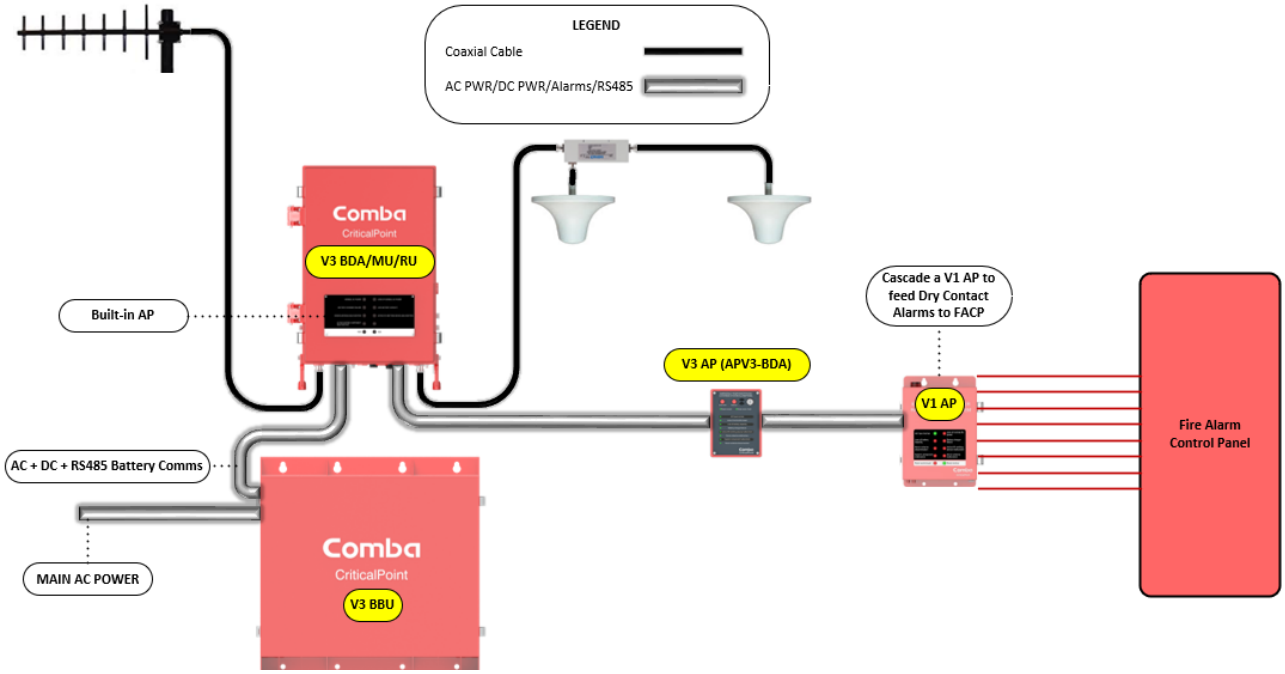


Figure 8: APV3-BDA - System Diagram - Cascading a V1 AP to Feed FACP

If desired, a V1 annunciator panel may be connected in a daisy-chain configuration with an APV3-BDA to provide up to eight (8) dry-contact alarm outputs for interfacing with a Fire Alarm Control Panel.

1.8 V3 AP SYSTEM DIAGRAM – V3 FIBER DAS WITH V1 AP FEEDING FACP

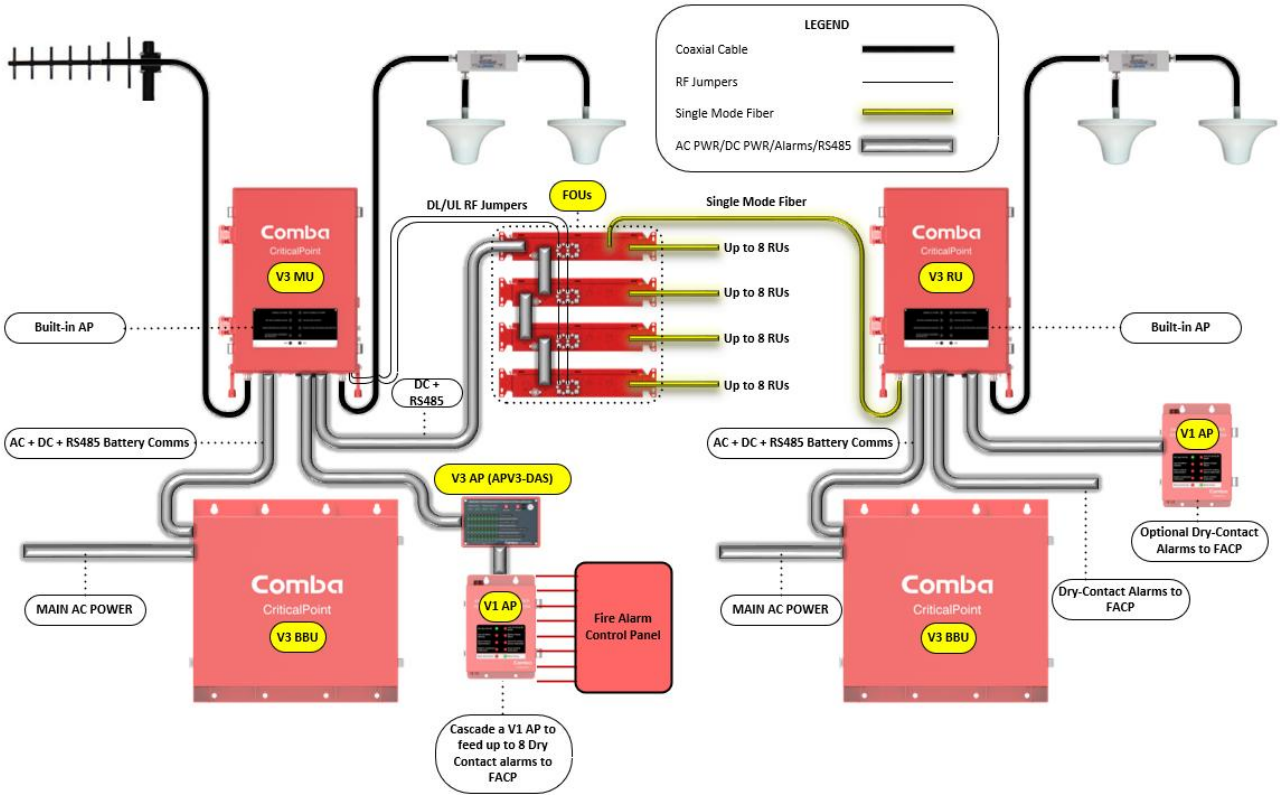


Figure 9: APV3-DAS - System Diagram - Cascading a V1 AP to Feed FACP

A V1 annunciator panel may be connected in a daisy-chain configuration with an APV3-DAS to provide up to eight (8) dry-contact alarm outputs for interfacing with a Fire Alarm Control Panel. When a V1 annunciator panel is used in this configuration, only one (1) APV3-DAS may be installed upstream of the V1 panel, which limits system status and alarm indication to a maximum of eight (8) remote units. In addition, a V1 annunciator panel may be installed at an individual Remote Unit (RU) to provide dry-contact alarm outputs to a local Fire Alarm Control Panel dedicated to that specific RU.

1.9 V3 AP SYSTEM DIAGRAM – V3 FIBER DAS APV3-DAS MIRROR MODE

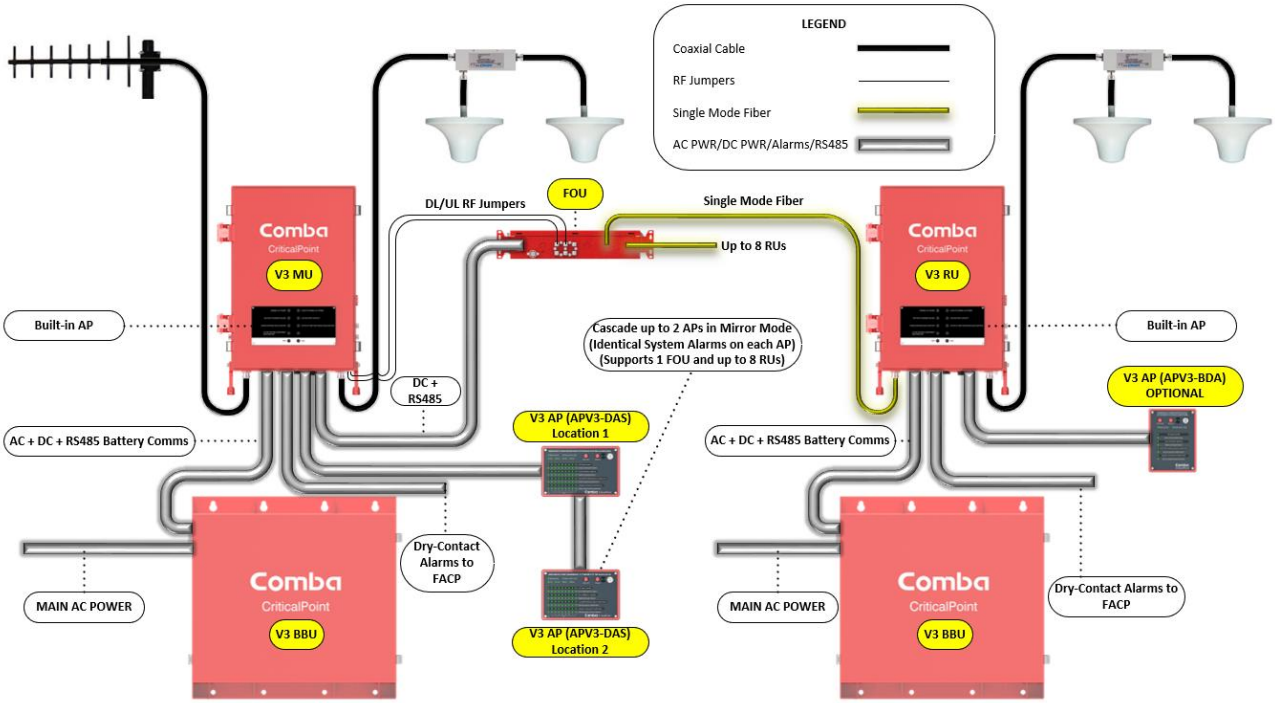


Figure 10: APV3-DAS - System Diagram - V3 Fiber DAS APV3-DAS Mirror Mode Configuration

The APV3-DAS annunciator panel(s) may also be deployed in a **Mirror Mode**. This configuration is commonly used when two (2) APs are required to provide the same alarms at different locations in a building. In this arrangement, two (2) APV3-DAS annunciator panels are daisy-chained to display identical system alarms for systems of up to one (1) FOU and eight (8) RUs. System status and alarm conditions configured within the V3 BDA/MU are displayed on the annunciator panels, and an audible buzzer is activated upon detection of an alarm condition. A maximum of two (2) APV3-DAS annunciator panels in Mirror Mode may be daisy-chained from the V3 BDA/MU, with a cumulative cable length of up to 2,000 feet to the furthest panel, using 24-AWG cabling. Category 5 or Category 6 Ethernet cable is recommended for interconnection between the V3 BDAMU and the annunciator panels The APV3-DAS devices are supplied with an adapter cable that consolidates the BDA/MU annunciator panel terminal outputs into an RJ-45 interface. Each APV3-DAS annunciator panel is equipped with a factory-installed RJ-45 connector, eliminating the need for an adapter at the panel end. Audible alarms may be muted by engaging the key switch and pressing the **Silence** button. A lamp test function may be initiated by engaging the key switch and pressing the **Lamp Test** button. Refer to the Installation section of this user manual for instructions on how to cascade/daisy-chain V3 APs. See the Commissioning section of this user manual for instructions on configuring and commissioning the APV3-DAS annunciator panels in **Mirror Mode**.

1.10 V3 AP SYSTEM DIAGRAM – V2 BBU WITH APV3-BDA

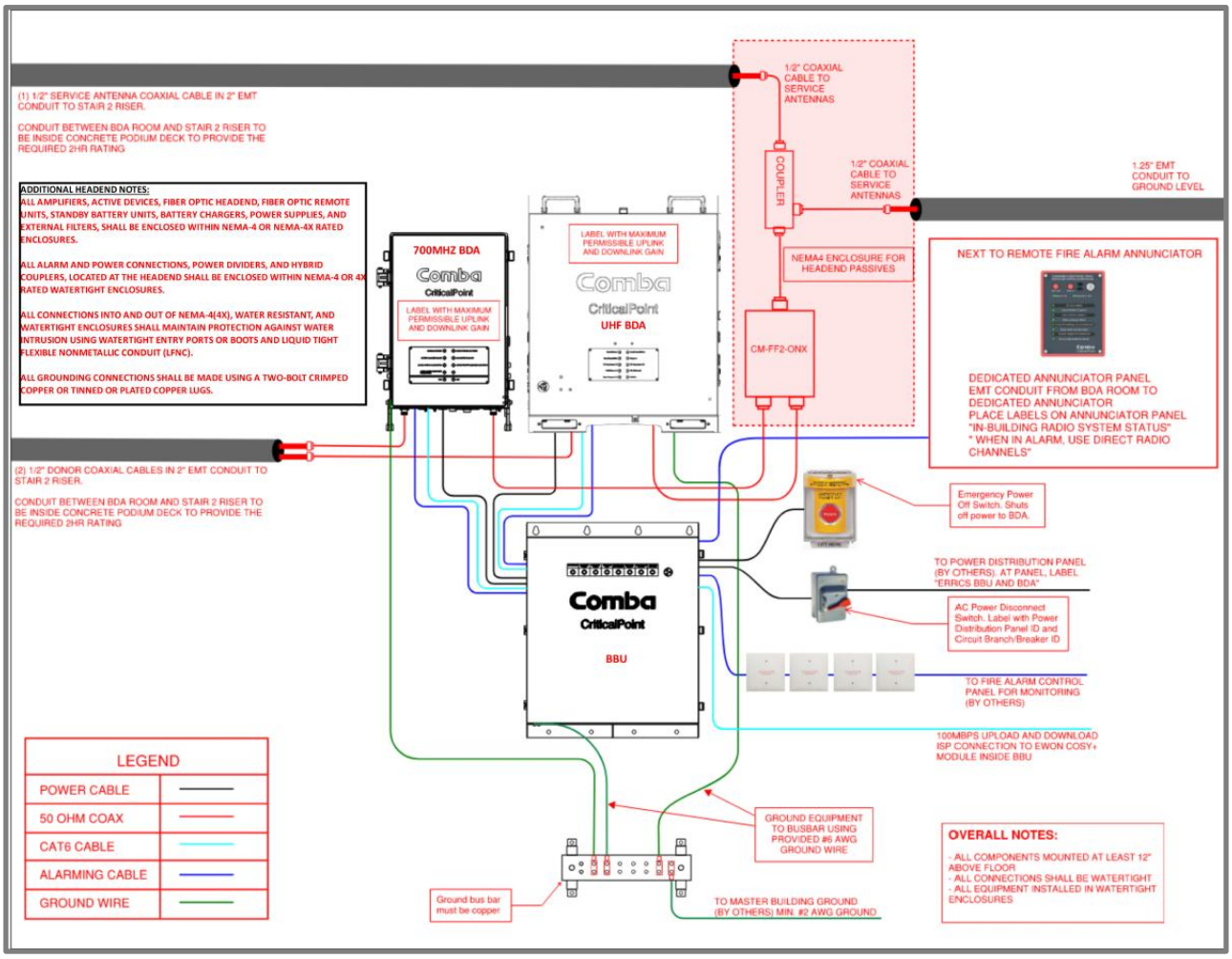


Figure 11: APV3-BDA - System Diagram - V2 BBU in Multiband V3 BDA Configuration with APV3-BDA

The APV3-BDA annunciator panel(s) may also be deployed in conjunction with a Comba V2 BBU. This configuration is commonly used when two (2) V3 BDAs are powered from a single V2 BBU. In this arrangement, the APV3-BDA annunciator panels receive DC power and RS-485 alarm communications directly from the V2 BBU. System status and alarm conditions configured within the V3 BDAs and V2 BBU are summarized and displayed on the annunciator panel, and an audible buzzer is activated upon detection of an alarm condition. A maximum of four (4) APV3-BDA annunciator panels may be daisy-chained from the V2 BBU, with a cumulative cable length of up to 2,000 feet to the furthest panel, using 24-AWG cabling. Category 5 or Category 6 Ethernet cable is recommended for interconnection between the V2 BBU and the annunciator panels. The V2 BBU provides screw-terminal outputs for APV3-BDA power and RS-485 alarm communications only. The installer must terminate the APV3-BDA cabling directly to these terminals in accordance with the T568B wiring standard. Refer to the Installation and Commissioning sections for instructions on wiring and commissioning the APV3-BDA annunciator panels for a V2 BBU.

Note: **APV3-BDA** is only supported by V2 BBU with FW version **V8802 or newer**.

1.11 V3 AP CABINET DIMENSIONS

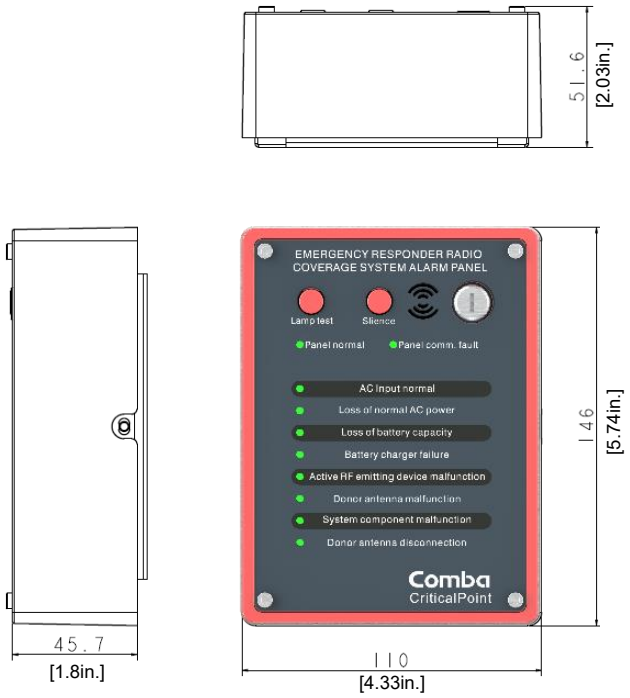


Figure 12: APV3-BDA - Dimensions

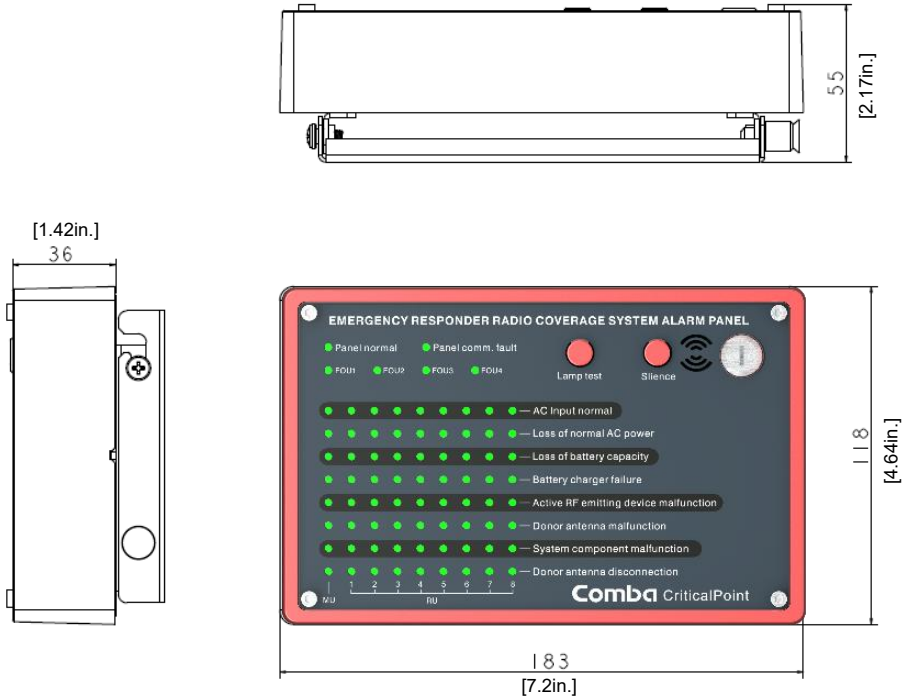


Figure 13: APV3-DAS - Dimensions

1.12 V3 AP STANDARD MOUNTING BRACKET DIMENSIONS

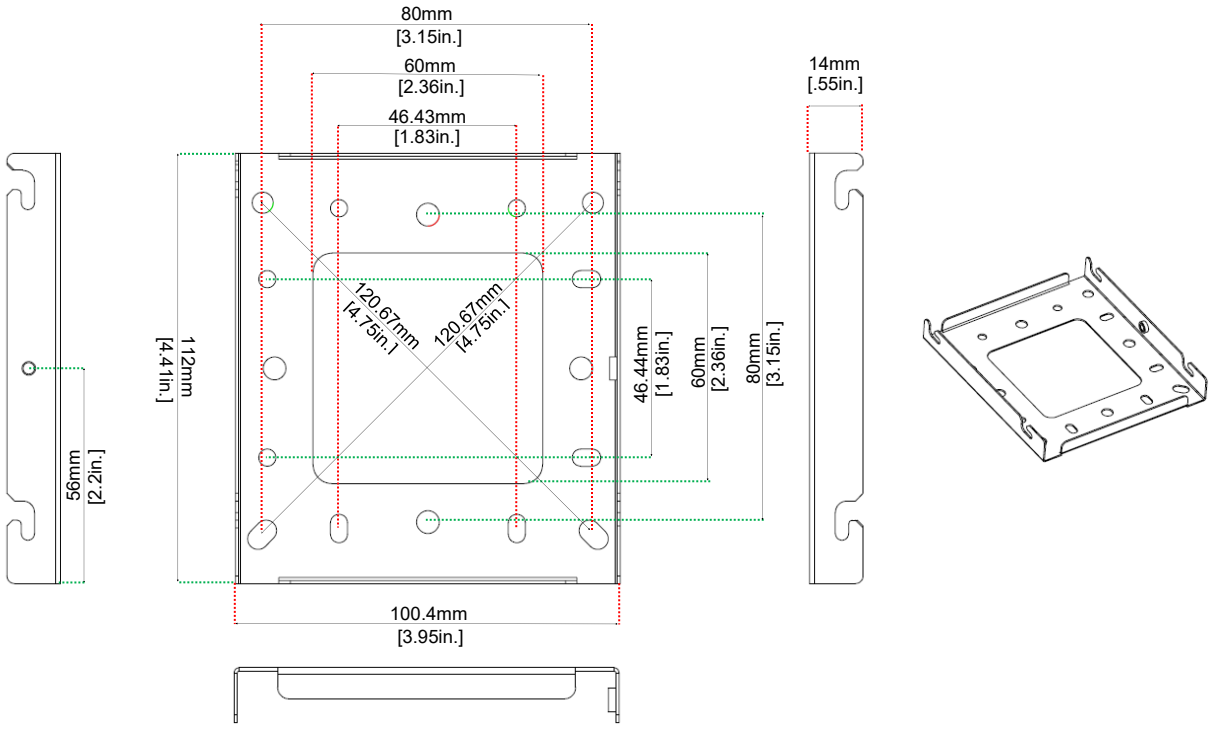


Figure 14: APV3-BDA - Standard Mounting Bracket Dimensions

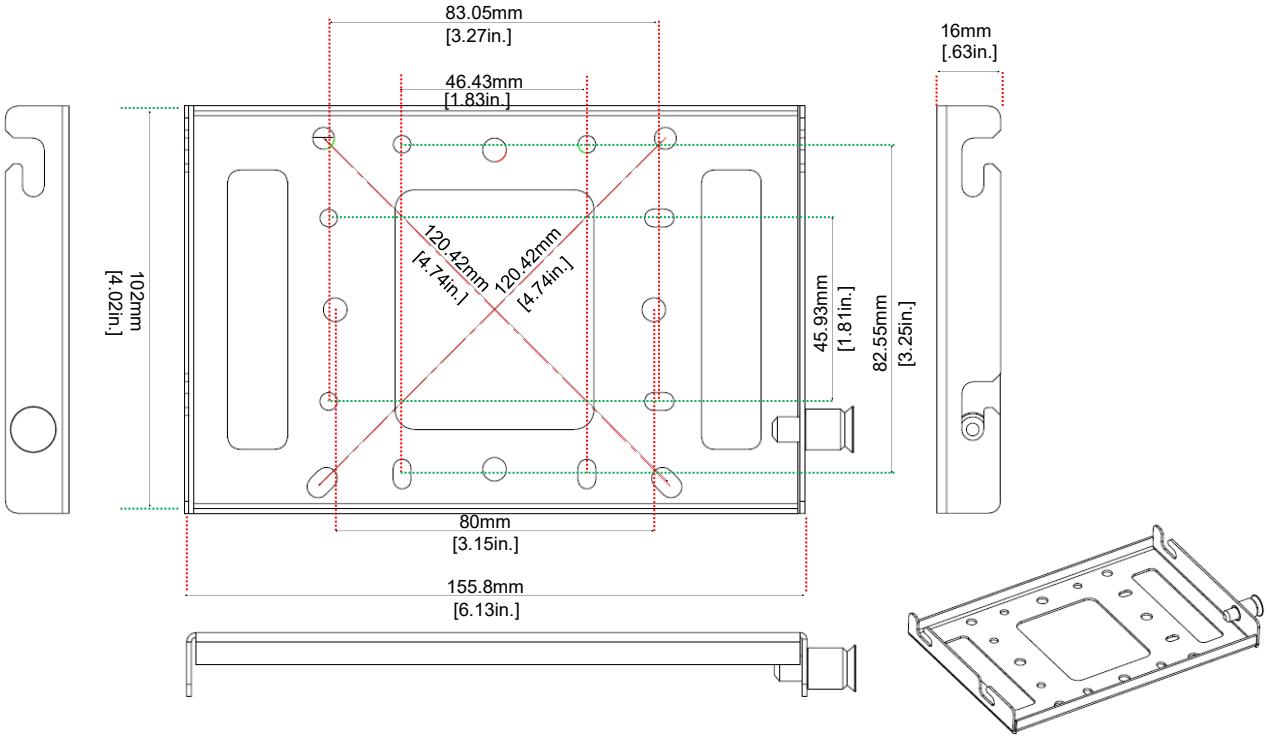


Figure 15: APV3-DAS - Standard Mounting Bracket Dimensions

1.13 V3 AP FLUSH MOUNTING BRACKET DIMENSIONS

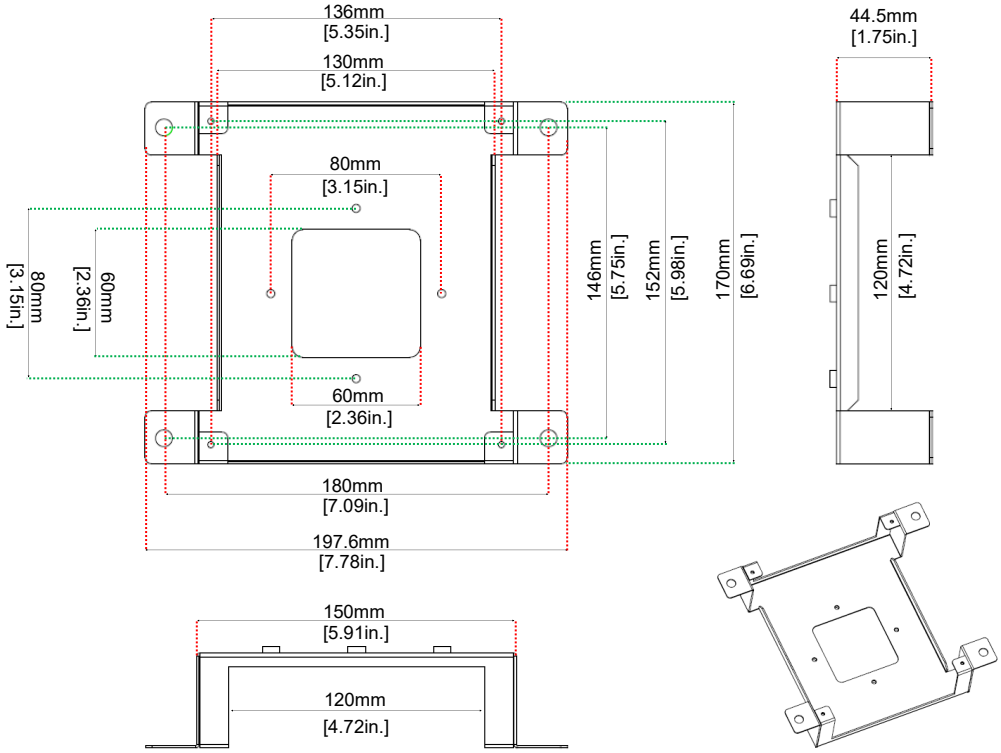


Figure 16: APV3-BDA - Flush Mount Bracket Dimensions

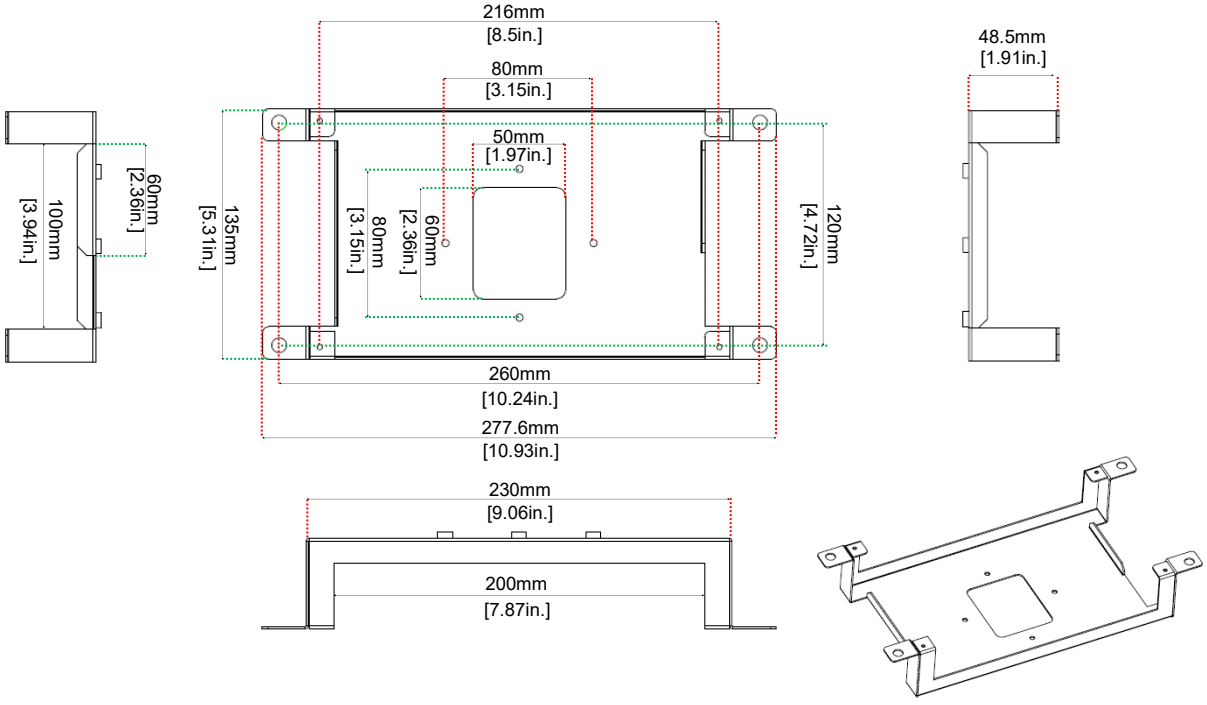


Figure 17: APV3-DAS - Flush Mount Bracket Dimensions

1.14 V3 AP FLUSH MOUNTING FRONT PLATE DIMENSIONS

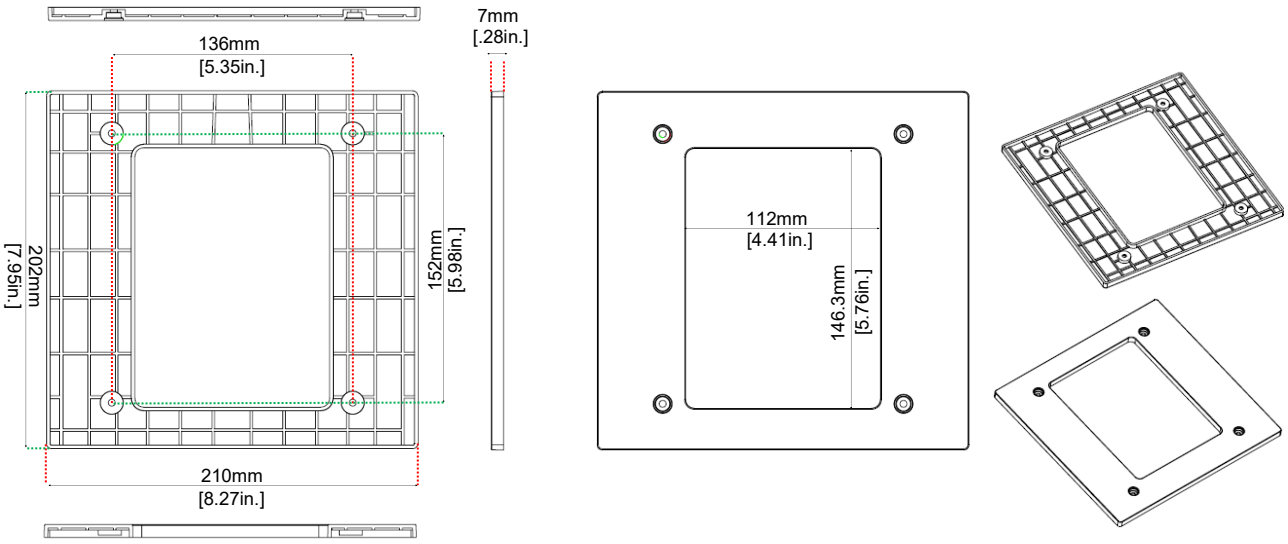


Figure 18: APV3-BDA - Flush Mount Front Plate Dimensions

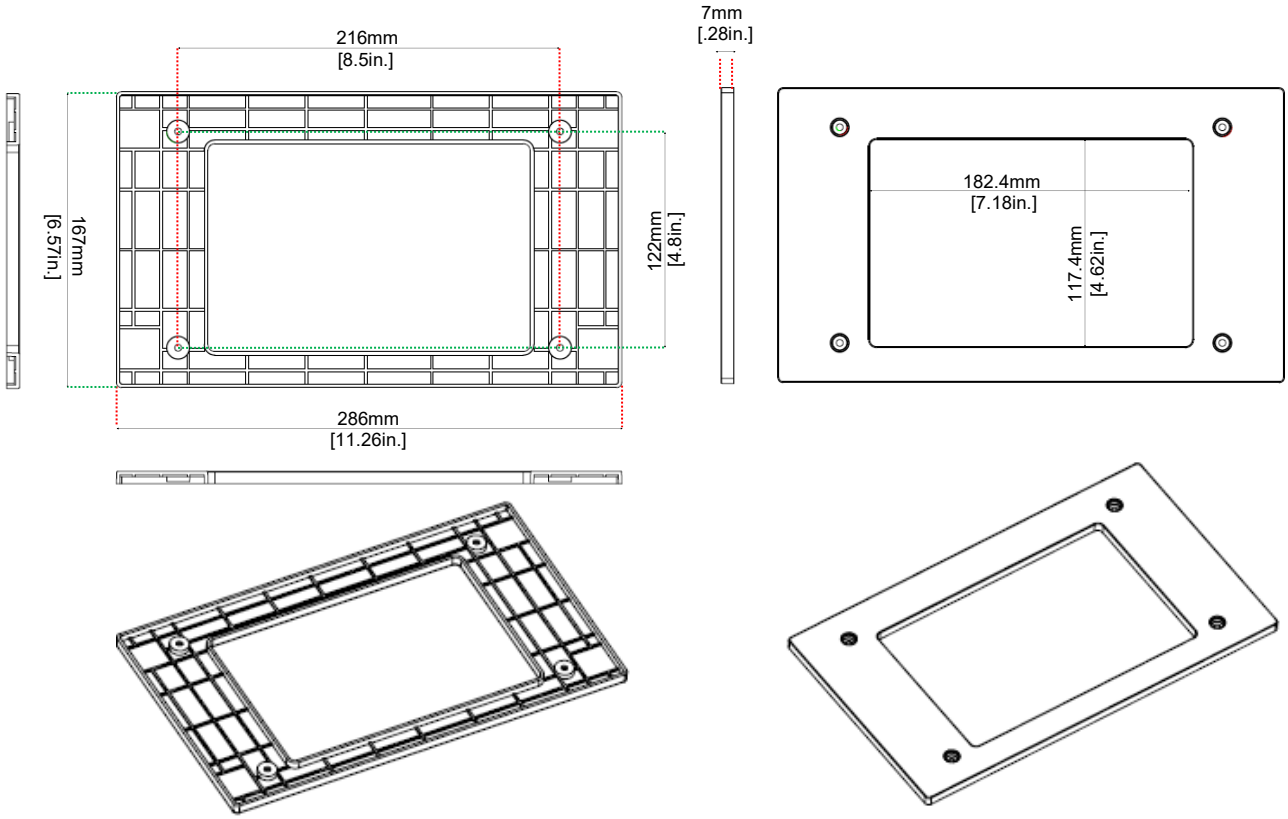


Figure 19: APV3-DAS - Flush Mount Front Plate Dimensions

1.15 V3 AP INTERNAL ADDRESS DIPSWITCH LOCATION

Each V3 annunciator panel is addressable and includes a four-position DIP switch used to configure addressing when multiple annunciators are connected in either a daisy-chain or parallel arrangement to a single BDA, MU, or RU device. All V3 annunciator panels are factory-configured with a default address of **1**. When a single annunciator panel is used, the factory default address may be retained. When multiple annunciator panels are installed, each panel must be assigned a unique address to ensure proper RS-485 alarm communication among all connected devices. To change the address, remove the rear cover of the annunciator panel to access the DIP switch and set the desired address as shown in Figure 20. Additional configuration and installation details are provided in the Installation section of this manual.

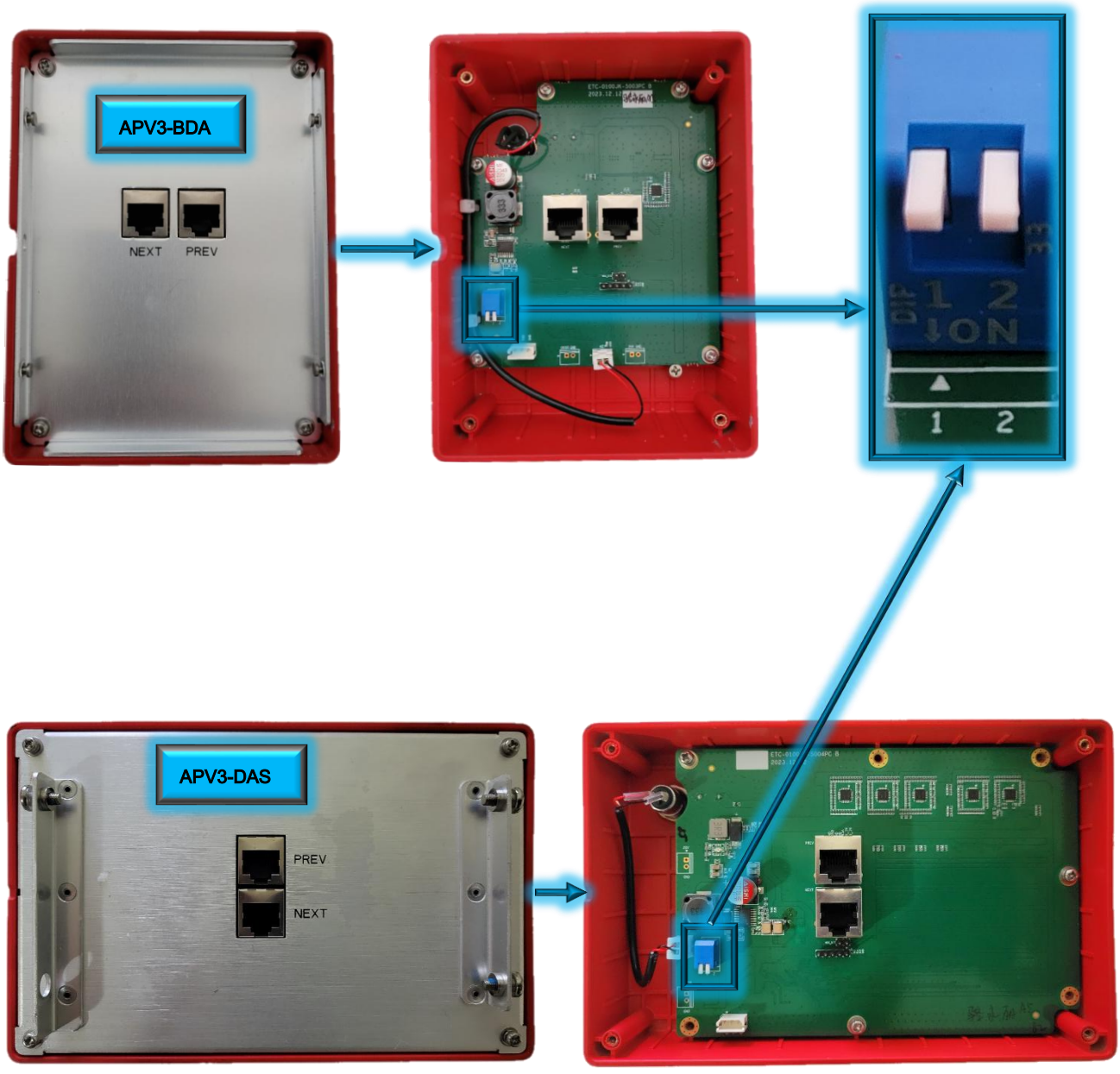


Figure 20: V3 AP - Internal View and Addressable DIP Switch Location

1.16 V3 AP CABINET CONNECTIONS

Refer to Figures 21 and 22 and Table 1 below.

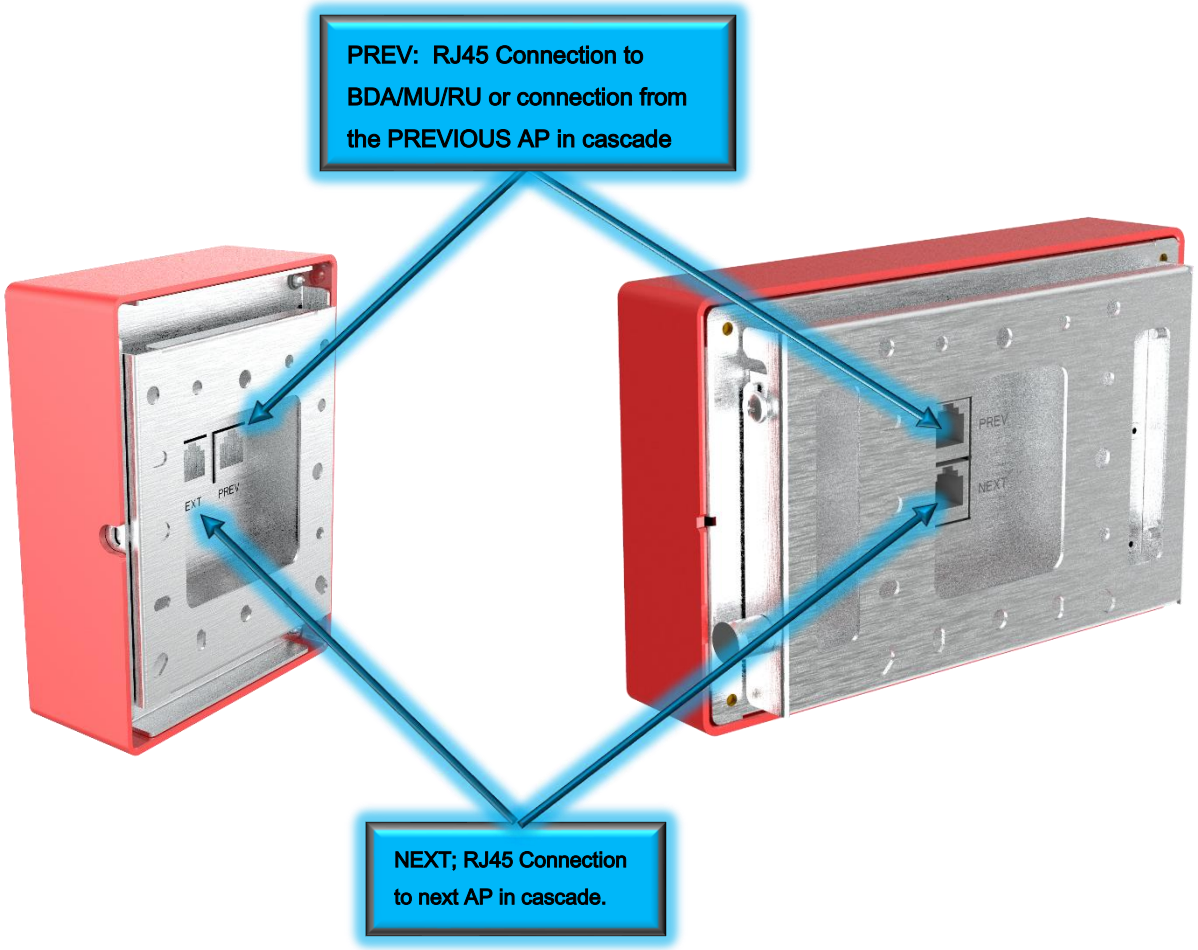


Figure 21: APV3-BDA - Cabinet Connections

Figure 22: APV3-DAS - Cabinet Connections

Table 1: V3 AP - Cabinet Connections

Identifier	Descriptions
PREV	RJ45 Connector; Connection for BDA/MU/RU when the AP is standalone or 1st in cascade. Connection to previous AP if the AP is cascaded from another AP.
NEXT	RJ45 Connector; Connection to next AP in cascade PREV port. If not cascading APs, this port is unused.

End of Section

2 INSTALLATION

2.1 WARNINGS, ALERTS AND CAUTIONS

Safety to personnel
Before installing, modifying, or replacing any of the equipment, the user manual should be read and understood in its entirety. The user needs to supply the appropriate AC or DC power to the equipment. Incorrect power connections can damage the equipment and may cause injury to the user.

Be aware that in certain conditions the devices can become very warm and can cause minor injuries if handled without the appropriate Personal Protective Equipment (PPE) such as gloves.

Radio Frequency Energies
There may be situations, particularly for workplace environments near high-powered RF sources, where recommended limits for safe exposure of human beings to RF energy could be exceeded. In such cases, restrictive measures or actions may be necessary to ensure the safe use of RF energy.

High Voltage
The equipment has been designed and constructed to prevent, as far as reasonably practicable danger. Any work activity on or near equipment involving installation, operation or maintenance must be, as far as reasonable, free from danger. Where there is a risk of damage to electrical systems involving adverse weather, extreme temperatures, wet, corrosive, or dirty conditions, flammable or explosive atmospheres, the system must be suitably installed to prevent danger.

Protective Earthing
Equipment provided for the purpose of protecting individuals from electrical risk must be suitable for the purpose and properly maintained and used.

Handling Precautions
This covers a range of activities including lifting, lowering, pushing, pulling, carrying, moving, holding, or restraining an object, animal, or person from the equipment. It also covers activities that require the use of force or effort, such as pulling a lever, or operating power tools. Where some of the above-mentioned activities are required, the equipment must be handled with care to avoid being damaged.

Electrostatic Discharge (ESD)
Observe standard precautions for handling ESD-sensitive devices. Assume that all solid-state electronic devices are ESD-sensitive. Ensure the use of a grounded wrist strap or equivalent while working with ESD-sensitive devices. Transport, store, and handle ESD-sensitive devices in static-safe environments.

2.2 SITE PLANNING CONSIDERATIONS

Site Considerations
This device is not designed for outdoor use. Temporary protection should be taken when the equipment enclosure is opened for installation or maintenance in any harsh environment. The equipment must not be opened for installation or maintenance outdoors in harsh weather (e.g. gale, storm rainfall, extreme temperatures, and high humidity).

Installation Location
The mounting surface shall be capable of supporting the weight of the equipment. To avoid electromagnetic interference, a proper mounting location must be selected to minimize interference from electromagnetic sources such as large electrical equipment.

Environmental
Humidity has an adverse effect on the reliability of the equipment. It is recommended to install the equipment in locations having stable temperatures and unrestricted airflow. The installation location for the product should be well ventilated. The equipment has been designed to operate at the temperature range and humidity level as stated in the product specifications in the datasheet. Direct sunlight exposure to the equipment should be avoided. Provide additional shelter if necessary.

Power Supply
The power supply unit (PSU) provides power to all modules within the equipment. It is recommended that the PSU be operated on a dedicated circuit breaker or fused circuit.

Grounding Requirement
Verify that the equipment has been well grounded. This includes antennas and all cables connected to the system. Ensure lightning protection for the antennas is properly grounded.

Cable Routing
Depending on equipment configuration, a variety of types of cables may be required. Where applicable, ensure cables are properly routed and secured so that they are not damaged.

Manual Handling
During transportation and installation, take necessary handling precautions to avoid potential physical injury to the installation personnel and the equipment.

2.3 INSTALLATION CHECKLIST

- Working space available for installation and maintenance for each mounting arrangement. Ensure unrestricted airflow.
- Ensure earth ground point is within reach of the ground wire.
- Ensure a power source is within reach of the device and the power source has sufficient capacity.
- Do not locate the equipment near large transformers or motors that may cause electromagnetic interference.
- Ensure equipment will be operated within the stated environment (see datasheet)
- Observe handling of all cables to prevent damage.
- Ensure the required tools are on hand to perform the installation work.

2.4 GOODS INWARD INSPECTION

- Verify the number of packages received against the packing list.
- Check all packages for external damage; report any external damage to the shipping courier. If there is damage, a shipping agent should be present before unpacking and inspecting the contents because damage during transit is the responsibility of the agent.
- Open and check each package against the device packing list. If any items are missing, contact Comba technical support.
- Do not remove items from anti-static packing until it is ready for installation. If damage is discovered at the time of installation, contact the shipping agent.

See Appendix C for an example device packing list.

2.5 TOOLS

See Appendix A for a full list of the recommended tools required for installation and routine maintenance.

2.6 EQUIPMENT GROUNDING

The Ground Connection should be the first wire connection made to any device after it has been successfully mounted and secured. Please ensure all equipment has been properly grounded before making wire connections to the annunciator panels. The V3 AP itself does not require a ground.

The BDA/MU/FOU/RU cabinets must be grounded securely by connecting a copper wire (CSA 16mm^2) to the grounding terminal connection of the equipment, and the other end to a protective ground (i.e., building earth point). An internationally acceptable color code of the ground connection wire is green/yellow.

Such a ground connection implements the “Protective Ground Connection” and must be connected to the equipment at the designated ground point. In general, do not connect the main power supply before establishing an adequate ground (earth) connection.

Construct the ground wire and use appropriate crimp connectors where necessary. Locate and connect the equipment grounding terminal to a protective ground (i.e., building earth point).

Note: Follow local jurisdiction codes.

2.7 V3 AP MOUNTING BRACKET PREPARATION/REMOVAL

The BDA/MU and RU devices come from the factory with the mounting bracket attached to the panel enclosure. Prior to installation, you may have to remove the mounting bracket from the panel enclosure. For APV3-BDA, remove the Hex screw on the right side of the device using the provided hex tool and push down on the bracket for it to detach. Retain the Hex screw to be used for final installation. For APV3-DAS, pull on the spring-loaded pin lock and pull down on the bracket for it to detach. Refer to Figure 23 below.

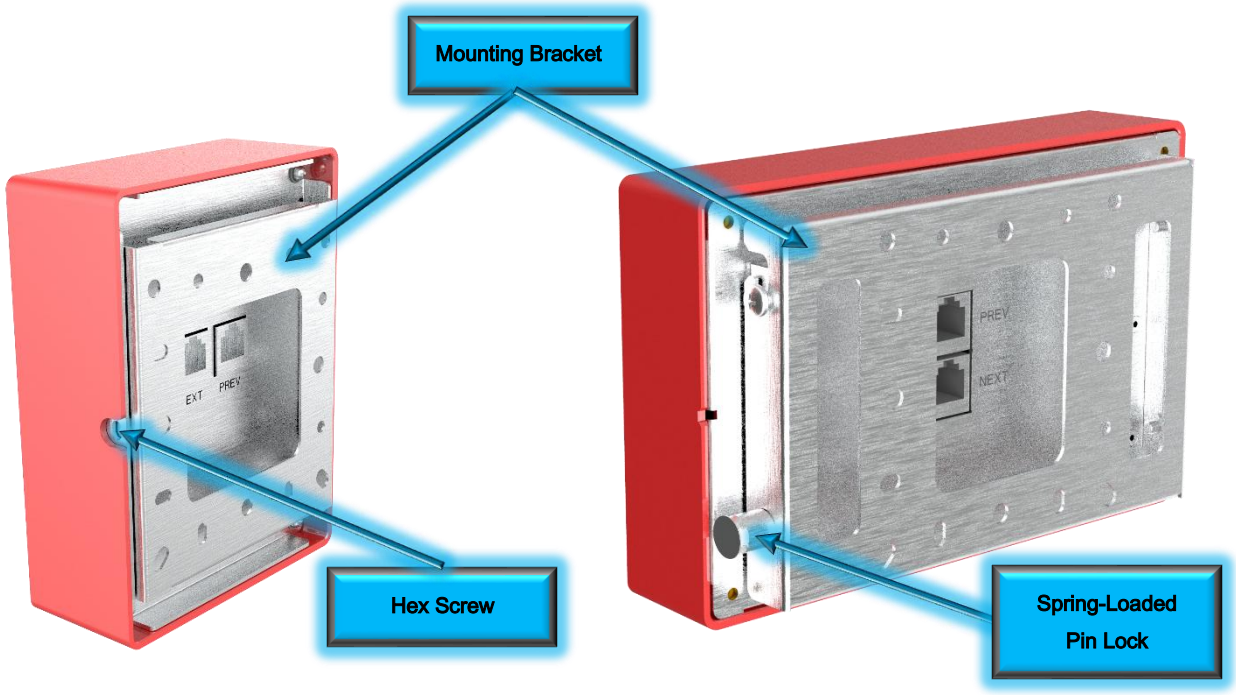


Figure 23: V3 AP - Mounting Bracket Overview

2.8 V3 AP ADDRESS SETTING WHEN USING MULTIPLE AP'S

When multiple APs are connected in cascade from a BDA, MU, or RU device, each panel must be uniquely addressed to ensure proper RS-485 communication with the host equipment. Addressing is accomplished using a four-position DIP switch located on the APs internal printed circuit board. When a single AP is connected, the address is set to **1**, which is also the factory default. When APs are connected in a cascaded configuration, each AP must be assigned an address corresponding to its position in the chain. The first AP is addressed as **1**, with subsequent APs incremented sequentially, up to a maximum of four (4) APs in cascade. For APV3-DAS systems, FOU1 through FOU4 indicators are directly associated with the AP address. For example, when both applicable DIP switches are set to the ON position, the AP address is **4**, and the **FOU4** indicator will illuminate, indicating that the AP is displaying alarms associated with remote units connected to **FOU4**. Refer to Figure 24 and Table 2 for additional configuration details.

Use the below instructions to change the address of a V3 AP **BEFORE** installing:

- Lay the V3 AP down on its face. Remove the mounting bracket if it is attached.
- Remove the (4) Philips head screws holding the backplate in place. Remove the backplate.
- Change the address on the DIP switch accordingly. Refer to Table 2 for guidance.
- Reinstall the backplate.

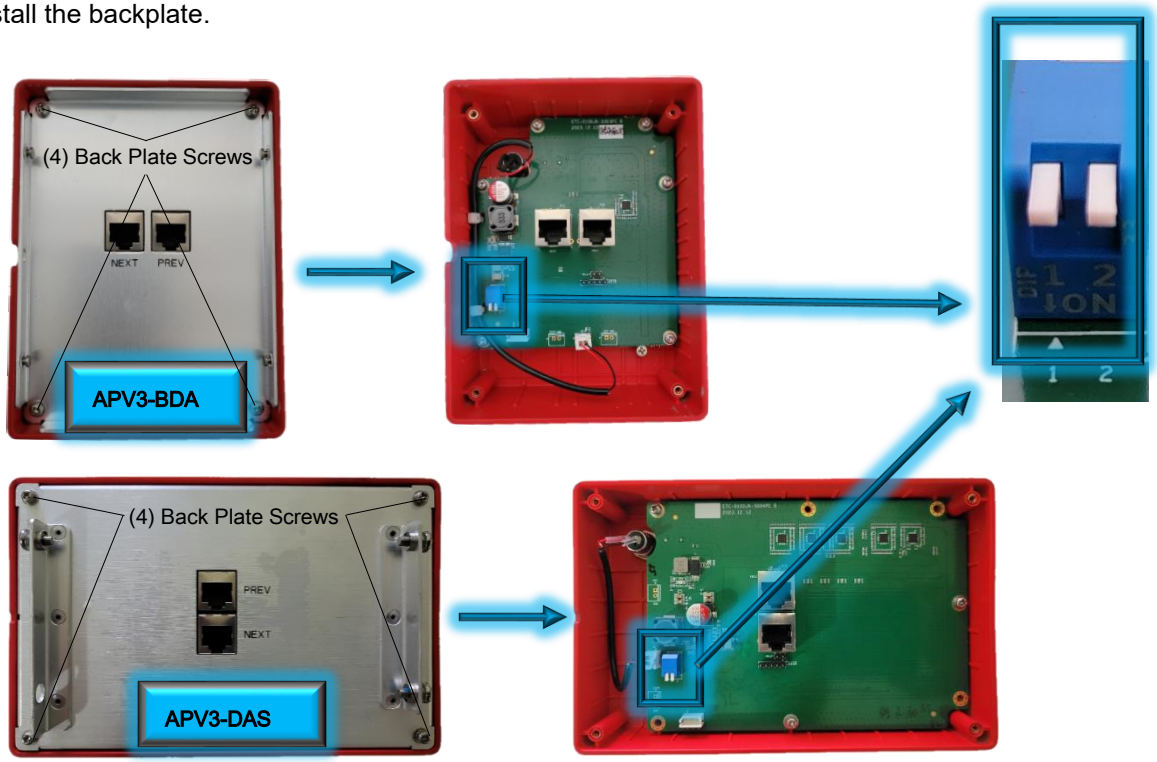


Figure 24: V3 AP - Address Switch Setting

Table 2: V3 AP - Address Switch Setting

Switch Pin 1	Switch Pin 2	Address of Alarm panel
OFF	OFF	1 (Default)
ON	OFF	2
OFF	ON	3
ON	ON	4

2.9 V3 AP MOUNTING TO GANG BOX

Follow the below instructions to mount the V3 AP to a 2-gang junction box. Reference Figures 25 and/or 26.

- Install the AP mounting bracket on the 2-gang junction box using the installation holes and corresponding (4) screws according to the specific junction box. Screws are not included.
- Run the ethernet RJ45 cable through the center of the mounting bracket and connect to the AP device.
- Align and hang the AP on the mounting bracket. For APV3-BDA, secure the AP to the bracket using the provided Hex screw. For APV3-DAS, secure the AP to the bracket using the provided spring pin lock.

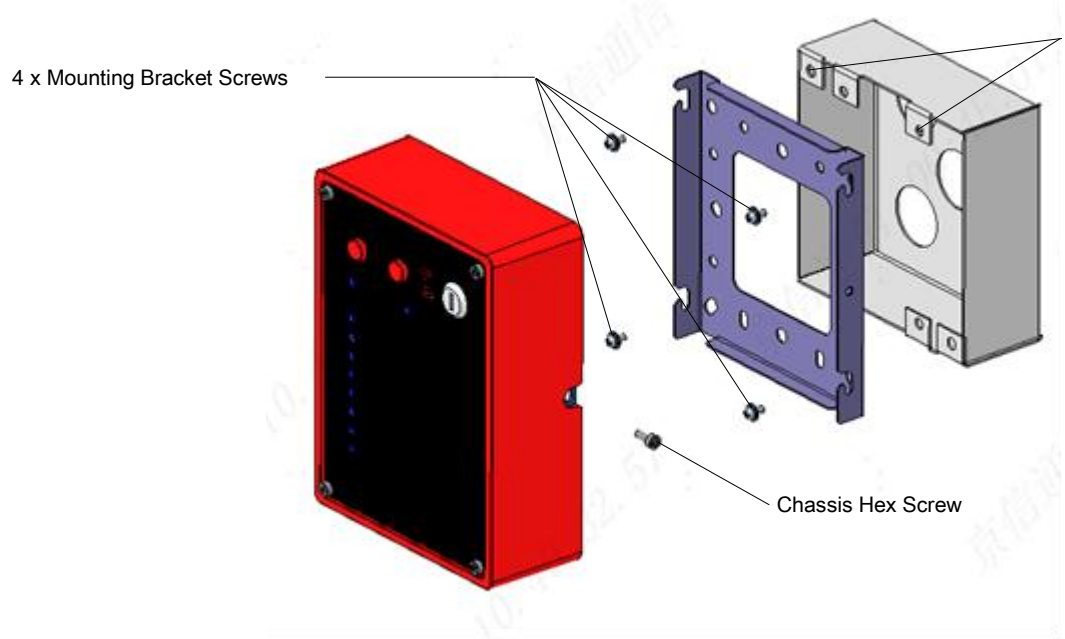


Figure 25: APV3-BDA - Mounting - Gang Box

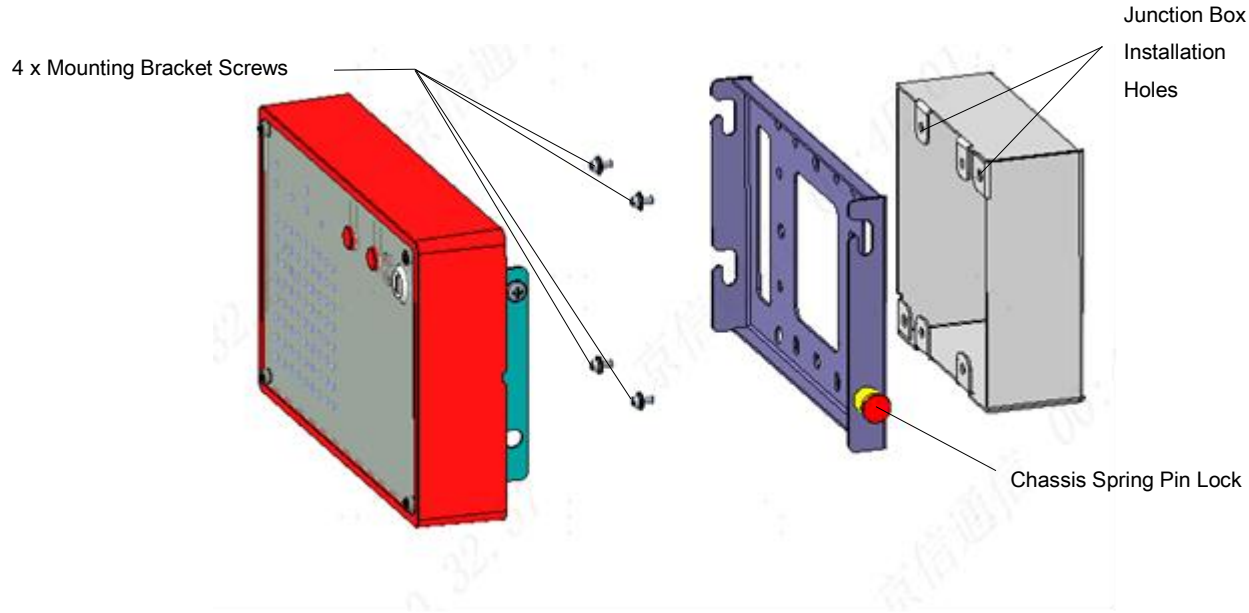


Figure 26: APV3-DAS - Mounting - Gang Box

2.10 V3 AP FLUSH MOUNTING

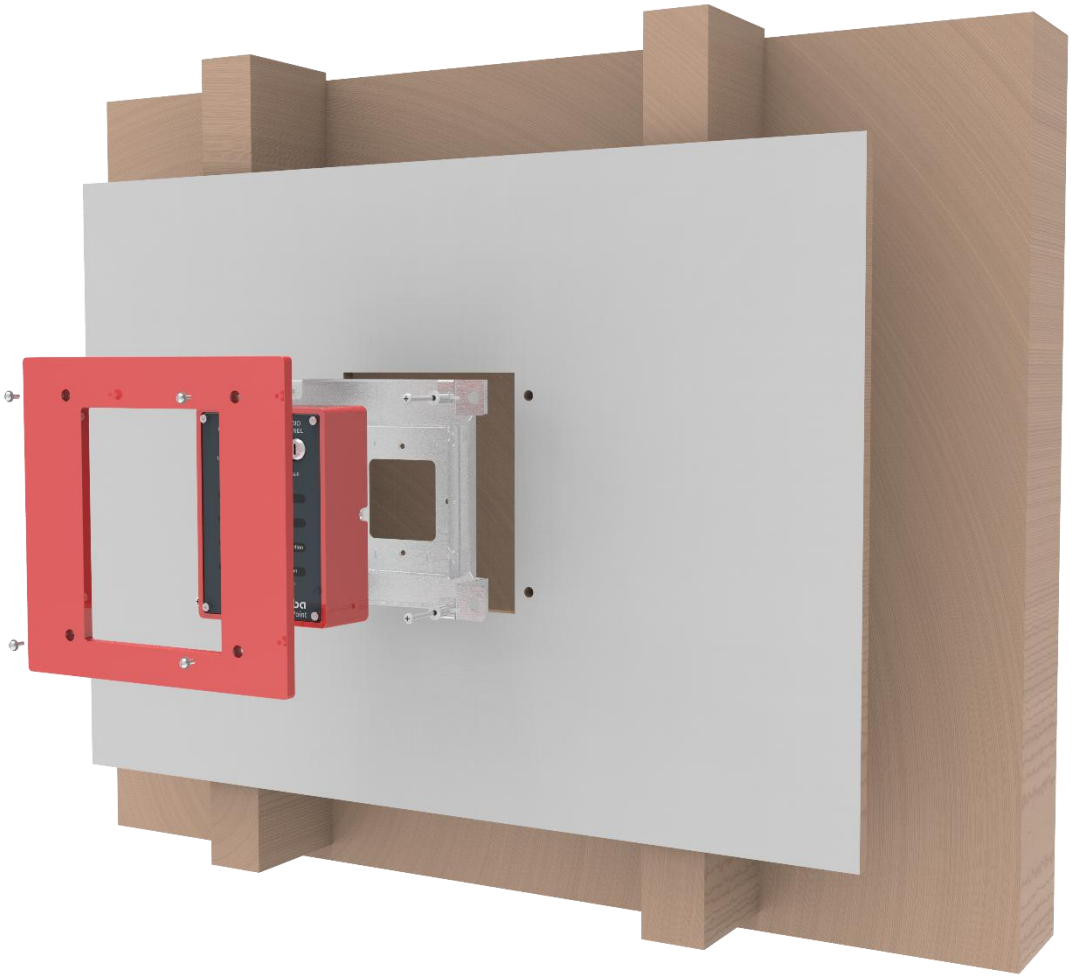


Figure 27: APV3-BDA - Flush Mounting to Wall

Follow the below instructions, Figures 28 through 31, to flush mount the APV3-BDA:

- Remove the APV3-BDA Flush Mount Kit from the box and place it on a flat surface with red face plate facing up.
- Remove the (4) Philips head screws holding the faceplate to the mounting bracket. Do not discard screws as these will be used to reinstall the face plate. Remove the face plate.
- Remove the (4) screws that are attached to the mounting bracket from the factory. These screws will be used in the next step to attach the APV3-BDA standard mounting bracket to the flush mount bracket. See Figure 28 below.

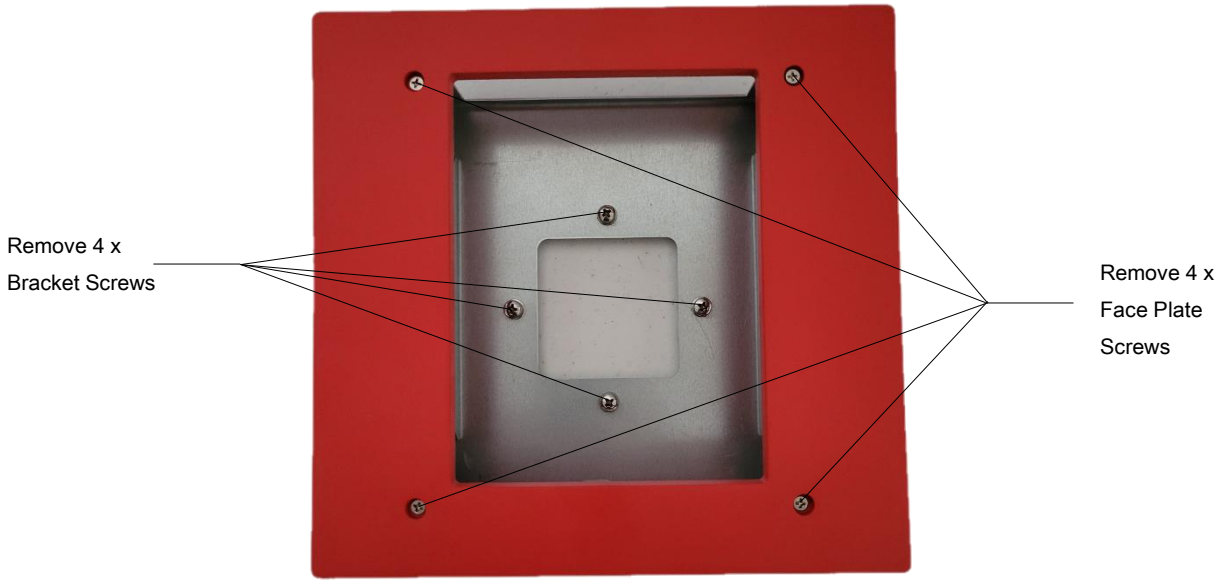


Figure 28: APV3-BDA - Flush Mount Kit Face Plate and Bracket Screw Removal

- Install the APV3-BDA standard mounting bracket into the flush mount bracket using the (4) screws removed in the previous step. Ensure the standard mounting bracket is installed with the HEX Screw hole on the right side. See Figure 29 below.

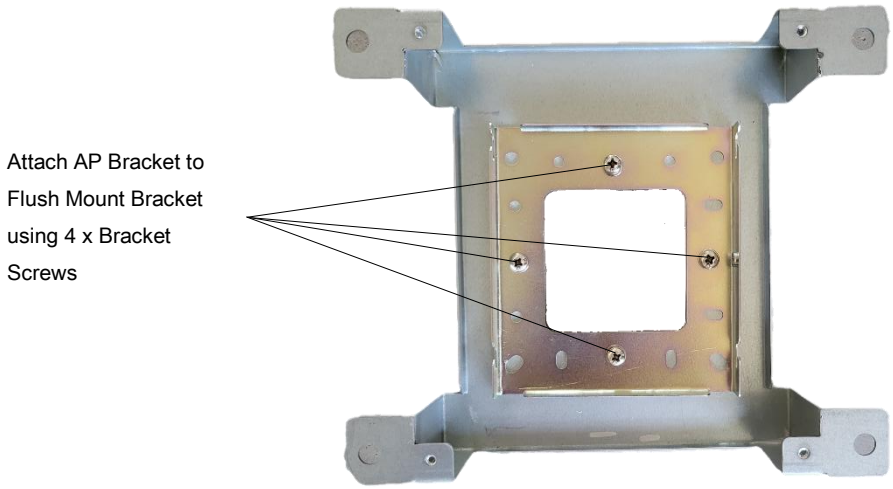


Figure 29: APV3-BDA - Mounting Standard Mounting Bracket to Flush Mount Bracket

- Align and hang the APV3-BDA cabinet onto the flush mounting bracket. Note, the Hex Screw that was removed earlier to release the standard mounting bracket from the AP is not used when flush mounting the APV3-BDA. You can simply hang the device onto the flush mount assembly. Refer to Figure 30 below.

Figure 30: APV3-BDA - Mounting APV3-BDA into Flush Mount Bracket

- Using the AP flush mounting bracket as a template, hold the bracket against the wall in the planned installation location. Using a pencil, trace the sides of the bracket to mark the rectangular location on the wall that needs to be cut out. Using a saw, cut out the rectangular section of drywall and remove.
- Push the AP mounting bracket into the rectangular area of removed drywall, so it fits flush and tight into the wall. If the rectangular area is too small to push the bracket into position, you may need to use sandpaper or another tool to slightly enlarge the rectangular opening.
- Once the AP and Flush Mount Bracket are in position, use a pencil to mark the location of the 4 holes that will need to be drilled to secure the flush mount bracket to the wall. After hole locations are marked, remove the AP and flush mount bracket from the wall.
- Drill four holes into the drywall using the previously marked locations. Install wall anchors as necessary.
- Connect the RJ45 ethernet cable to the V3 AP “PREV” port through the flush mount bracket.
- Push AP and flush mount bracket into the wall location.
- Use (4) screws to attach the flush mounting bracket to the wall. Screws and anchors are not provided.
- Install the flush mount front plate using the (4) provided screws.

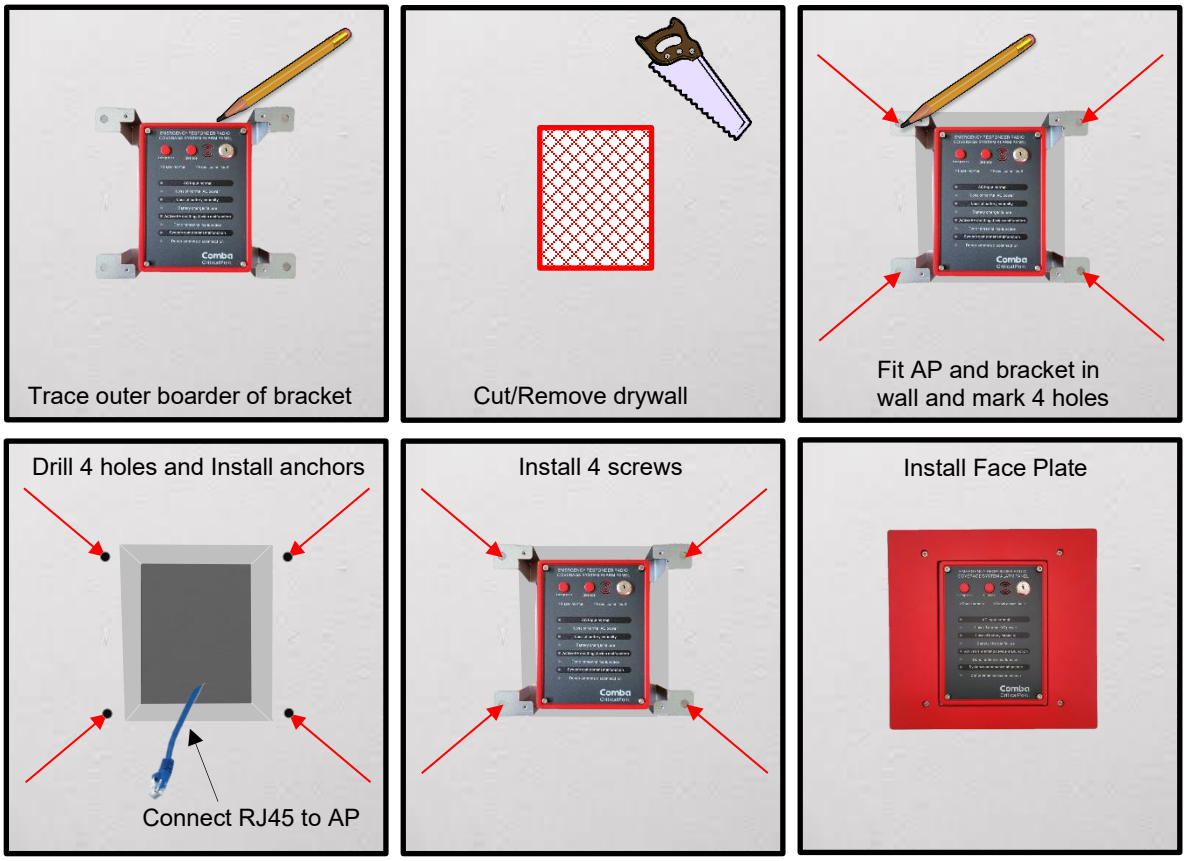


Figure 31: APV3-BDA - Installing Flush Mount Bracket, APV3-BDA, and Face Plate into a Wall

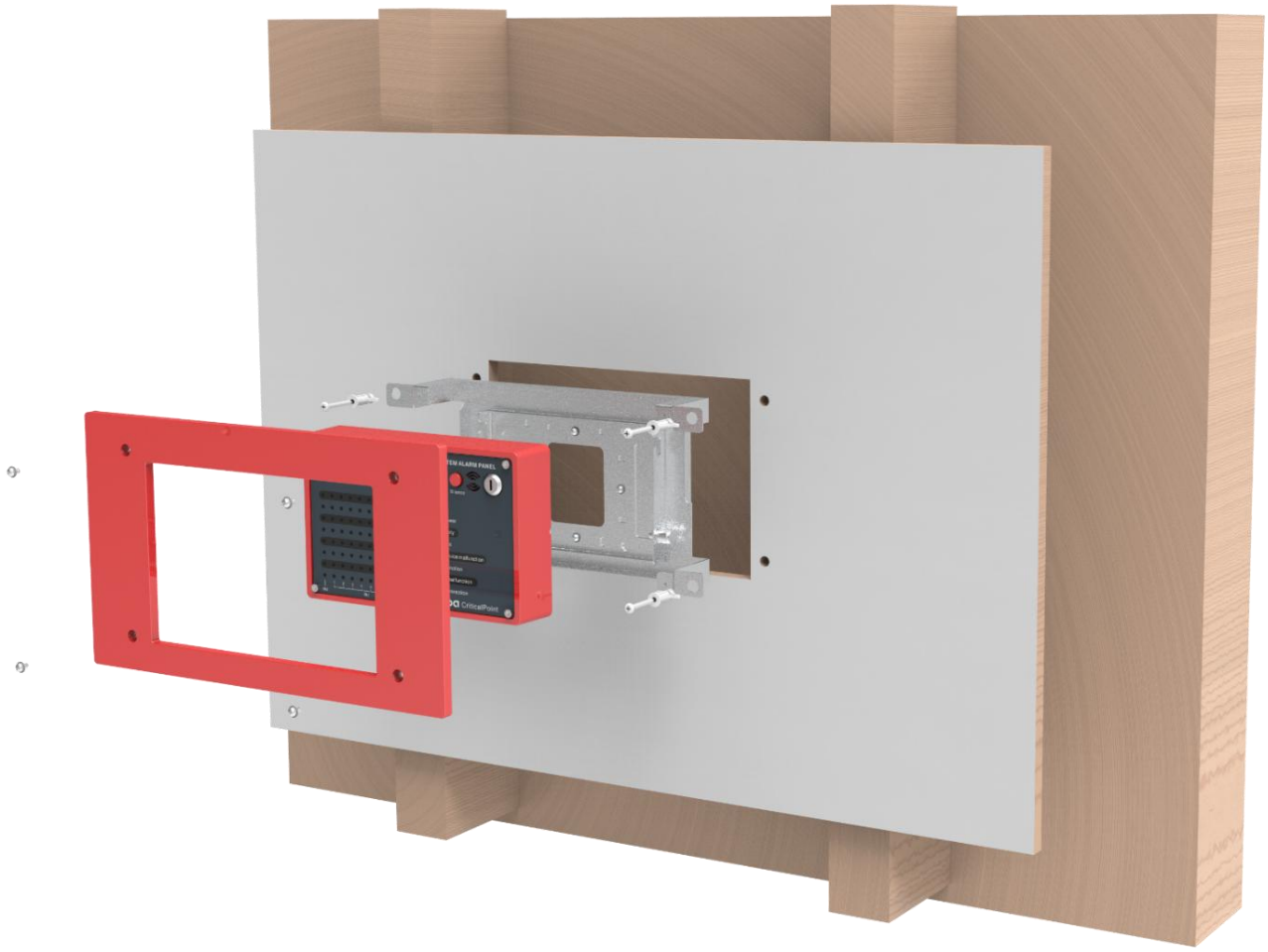


Figure 32: APV3-DAS - Flush Mounting to Wall

Follow the instructions below, and see Figures 33 through 36, to flush mount the APV3-DAS:

- Remove the APV3-DAS Flush Mount Kit from the box and place it on a flat surface with red face plate facing up.
- Remove the (4) Philips head screws holding the faceplate to the mounting bracket. Do not discard screws as these will be used to reinstall the face plate. Remove the face plate.
- Remove the (4) screws that are attached to the mounting bracket from the factory. These screws will be used in the next step to attach the APV3-DAS standard mounting bracket to the flush mount bracket. See Figure 33 below.

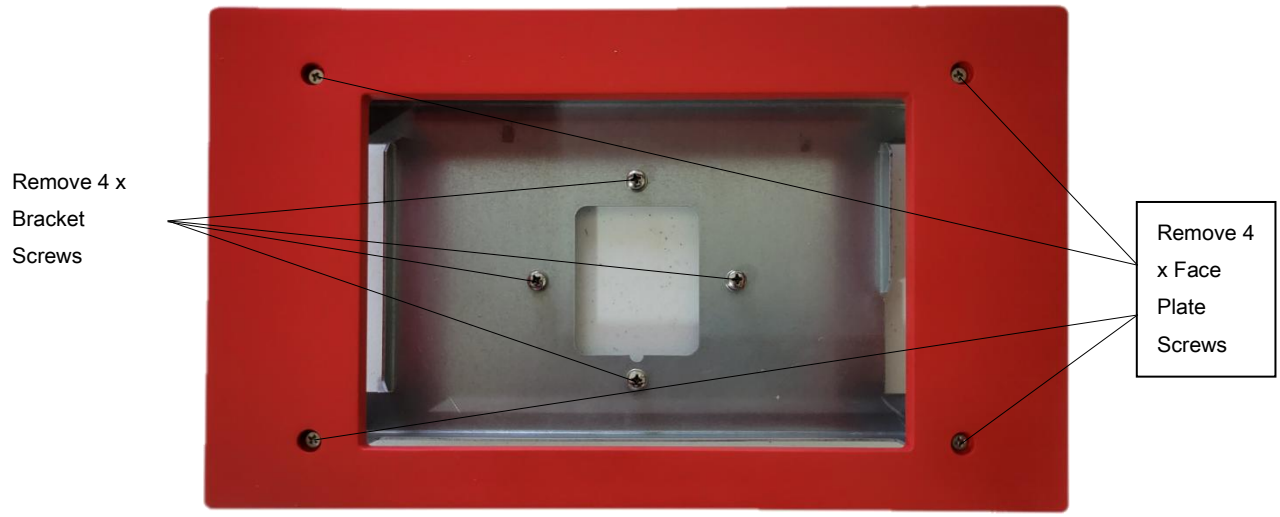


Figure 33: APV3-DAS - Flush Mount Kit Face Plate and Bracket Screw Removal

- Install the APV3-DAS standard mounting bracket into the flush mount bracket using the (4) screws removed in the previous step. Ensure the standard mounting bracket is installed with the Spring-loaded Pin Lock on the right side. See Figure 34 below.

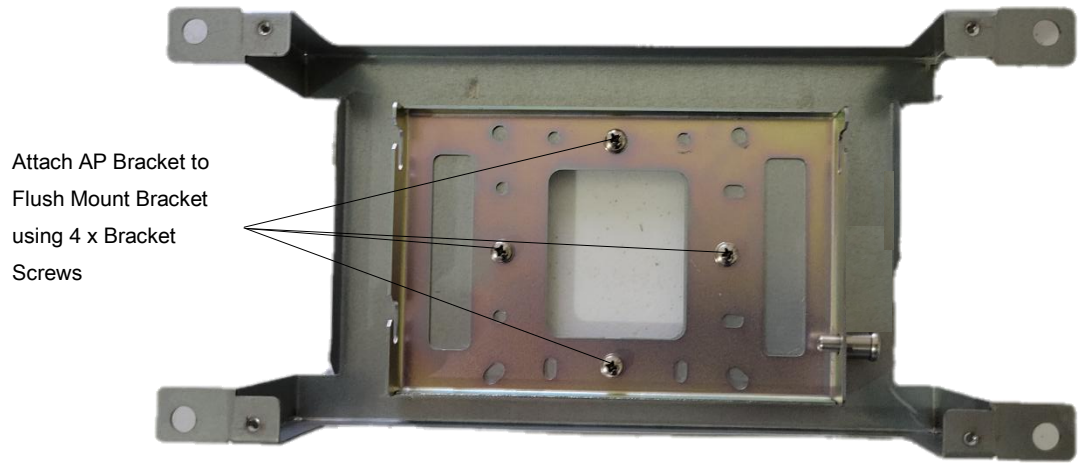


Figure 34: APV3-DAS - Mounting Standard Mounting Bracket to Flush Mount Bracket

- Align and hang the APV3-DAS cabinet onto the flush mounting bracket. You must pull out the spring-loaded pin lock, hang the AP cabinet, then release the pin lock.

Figure 35: APV3-DAS - Mounting APV3-DAS into Flush Mount Bracket

- Using the AP flush mounting bracket as a template, hold the bracket against the wall in the planned installation location. Using a pencil, trace the sides of the bracket to mark the rectangular location on the wall that needs to be cut out. Using a saw, cut out the rectangular section of drywall and remove.
- Push the AP mounting bracket into the rectangular area of removed drywall, so it fits flush and tight into the wall. If the rectangular area is too small to push the bracket into position, you may need to use sandpaper or another tool to slightly enlarge the rectangular opening.
- Once the AP and Flush Mount Bracket are in position, use a pencil to mark the location of the 4 holes that will need to be drilled to secure the flush mount bracket to the wall. After hole locations are marked, remove the AP and flush mount bracket from the wall.
- Drill four holes into the drywall using the previously marked locations. Install wall anchors as necessary.
- Connect the RJ45 ethernet cable to the AP “PREV” port through the flush mount bracket.
- Push AP and flush mount bracket into the wall location.
- Use (4) screws to attach the flush mounting bracket to the wall. Screws and anchors are not provided.
- Install the flush mount front plate using the (4) provided screws.

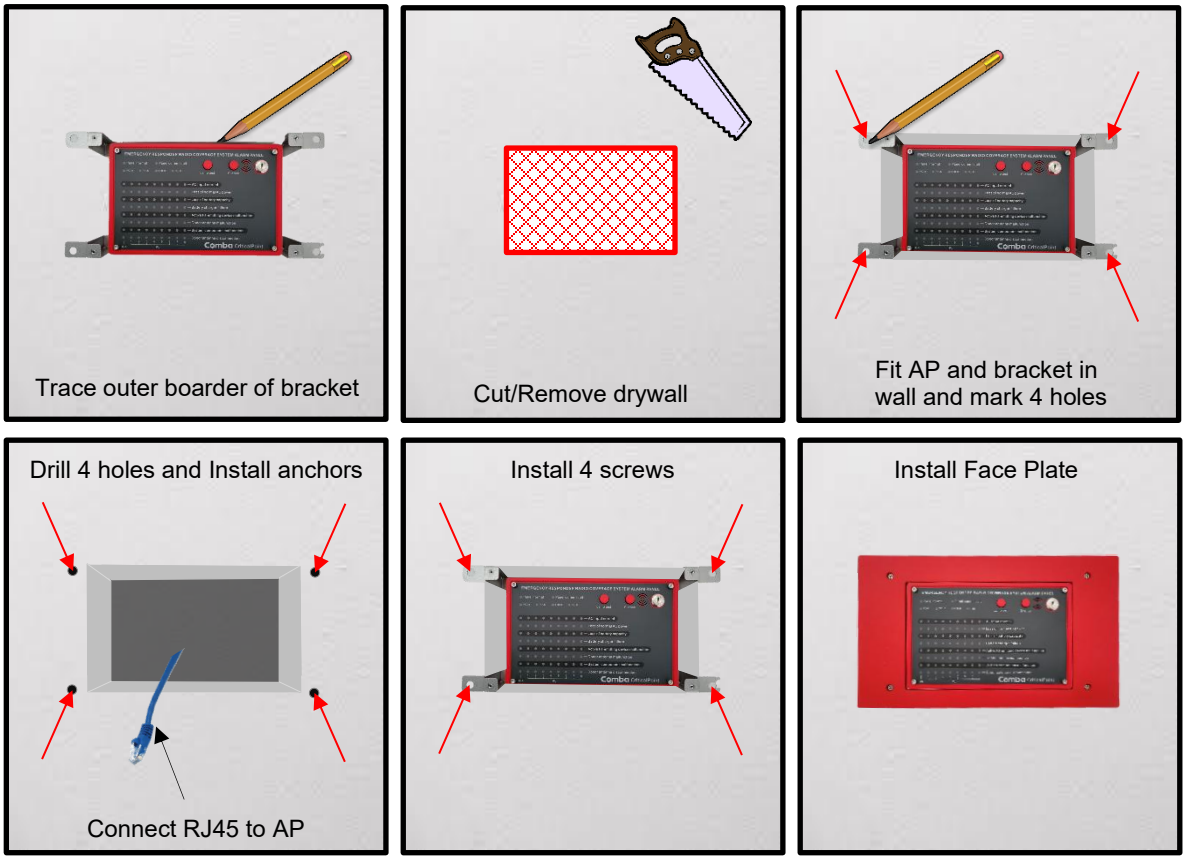


Figure 36: APV3-BDA - Installing Flush Mount Bracket, APV3-BDA, and Face Plate into a Wall

Figure 37: APV3-BDA and APV3-DAS Flush Mounted to Wall

2.11 V3 AP SYSTEM WIRING – STANDARD CONFIGURATION

Power and communication cabling for the V3 annunciator panel is not supplied with the equipment and must be furnished by the installer. The BDA, MU, or RU interfaces with the V3 annunciator panel using a T568B-terminated RJ-45 network cable. An adapter cable is provided with the AP to consolidate the BDA/MU/RU power and communication outputs into a single RJ-45 female connector. This configuration allows a single Category 5 or Category 6 cable, terminated with RJ-45 connectors, to be installed between the BDA/MU/RU and the V3 annunciator panel. The adapter cable is factory pre-terminated with Phoenix connectors to facilitate quick and efficient installation. Refer to Figures 38 and 39 for wiring details.

ALERT: DO NOT use an ethernet crossover cable to connect between the BDA/MU/RU and V3 AP devices. The crossover cable DOES NOT support the power and RS-485 sequence and WILL cause damage to the devices.

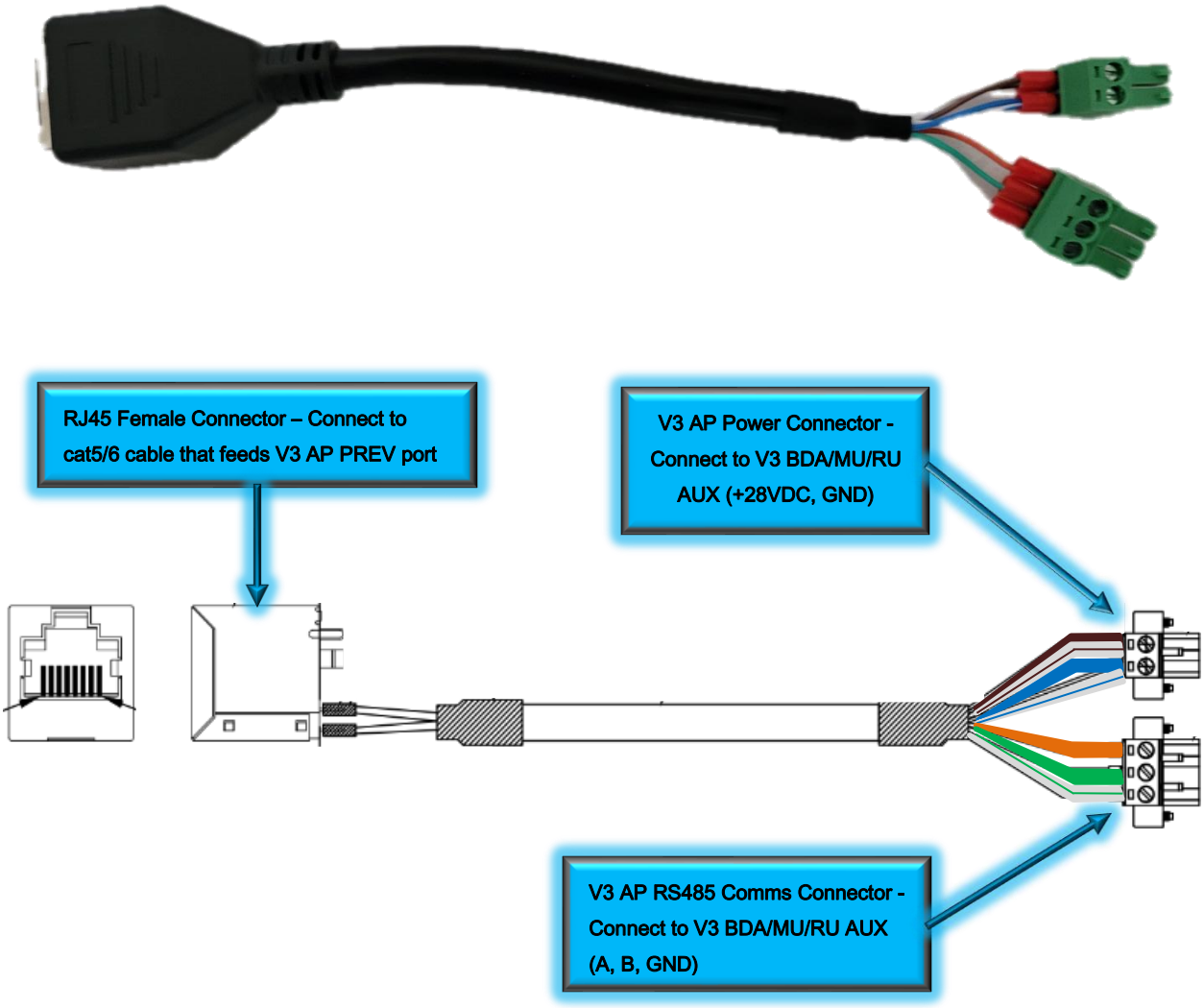


Figure 38: V3 BDA/MU/RU - RJ45 Adapter for V3 APs

Follow the instructions below, and see Figure 39 below, to connect a V3 AP to the V3 BDA/MU or RU:

- Power down the V3 BDA/MU or RU system.
- Connect the RJ45 adapter to the BDA/MU/RU as shown in Figure 39 below.
- Connect RJ45 ethernet cable between the RJ45 adapter and the V3 AP “PREV” port.
- To cascade additional APs, connect RJ45 cat5/6 cable between previous AP1 “NEXT” port and AP2 “PREV” port.

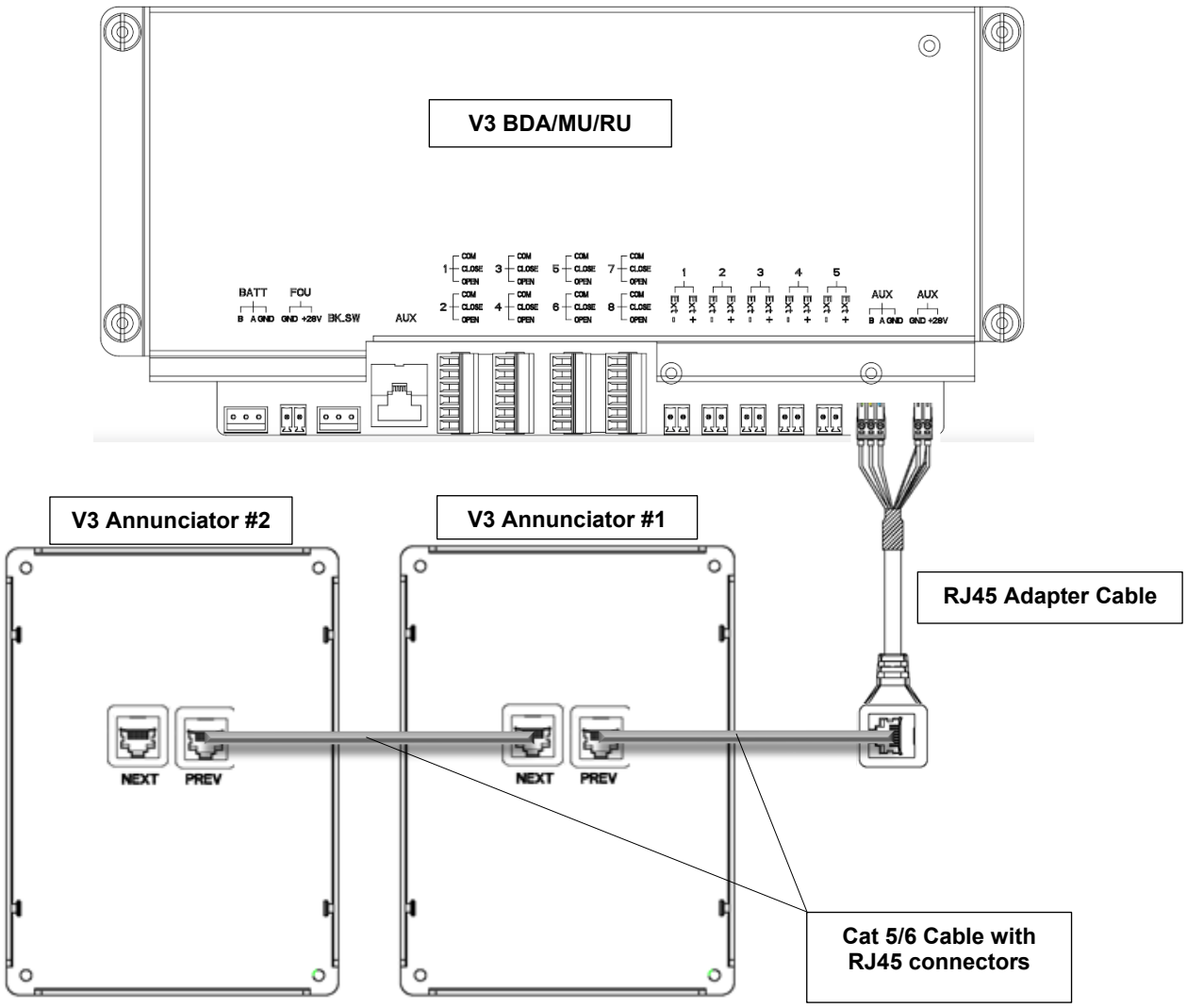


Figure 39: V3 BDA/MU/RU Wiring Connection to V3 AP

General Warning

Caution: You must follow your local code requirements for guidance on cable installation. See local codes for additional guidance on installing cabling inside of conduit as well as free wiring cable. Please ensure the correct liquid tight connector or cable gland is used.

2.12 V3 AP SYSTEM WIRING – CASCADING AP'S

Refer to the instructions and Figures 40 and 41 below for guidance on cascading additional annunciator panels from the initially installed panel.

- Ensure all APs have been addressed accordingly. Refer to section 2.8
- Power down the V3 BDA/MU or RU.
- Connect one end of an RJ45 cat 5/6 cable to first AP "NEXT" port.
- Connect the opposite end of the RJ45 cat5/6 cable to second AP "PREV" port.
- Follow the same concept to cascade up to four (4) total APs.

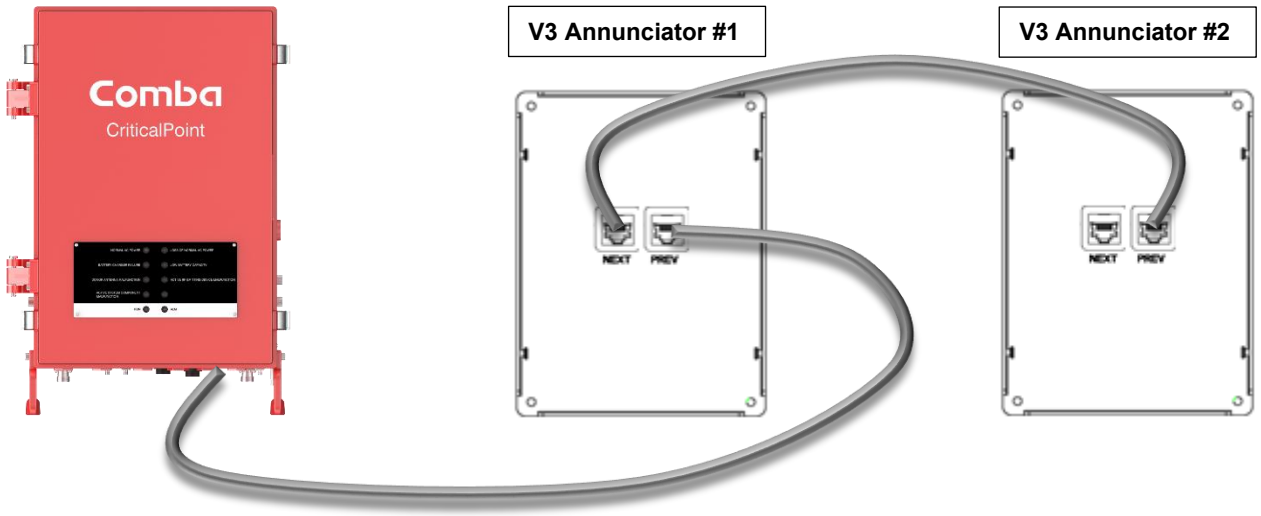


Figure 40: Cascading Multiple APV3-BDA

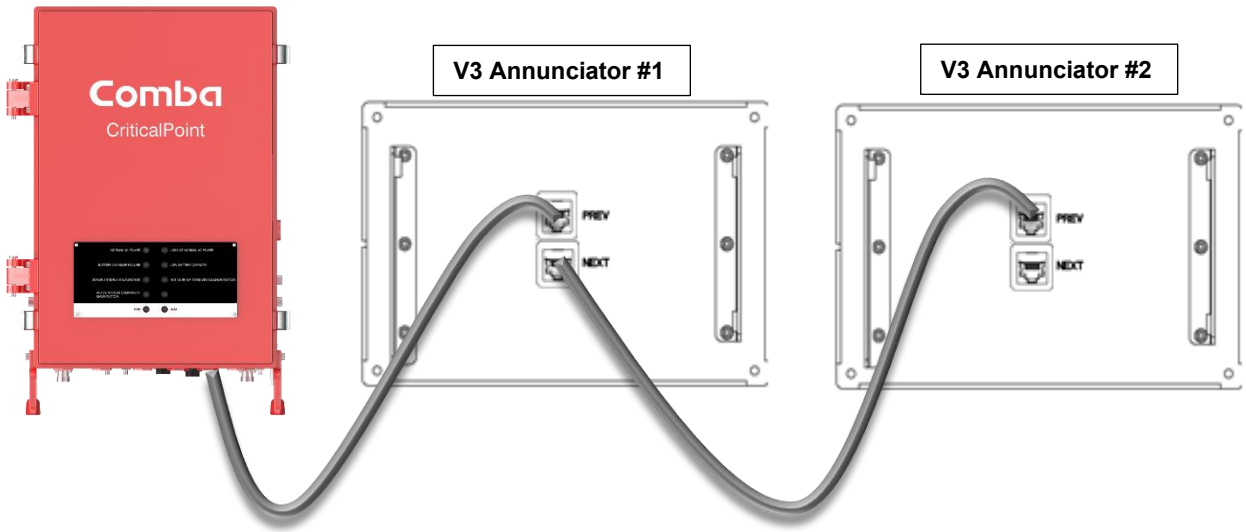


Figure 41: Cascading Multiple APV3-DAS

2.13 V3 AP SYSTEM WIRING – BARE WIRE CONNECTION TO BDA/MU/RU

In certain installations, a technician may elect not to use the RJ-45 Ethernet adapter and instead terminate the Category 5/6 conductors directly at the BDA, MU, or RU. In these cases, all terminations must follow the T568B wiring standard. Refer to Figure 42 for details on the required T568B pinout and corresponding connections to the BDA/MU/RU equipment.

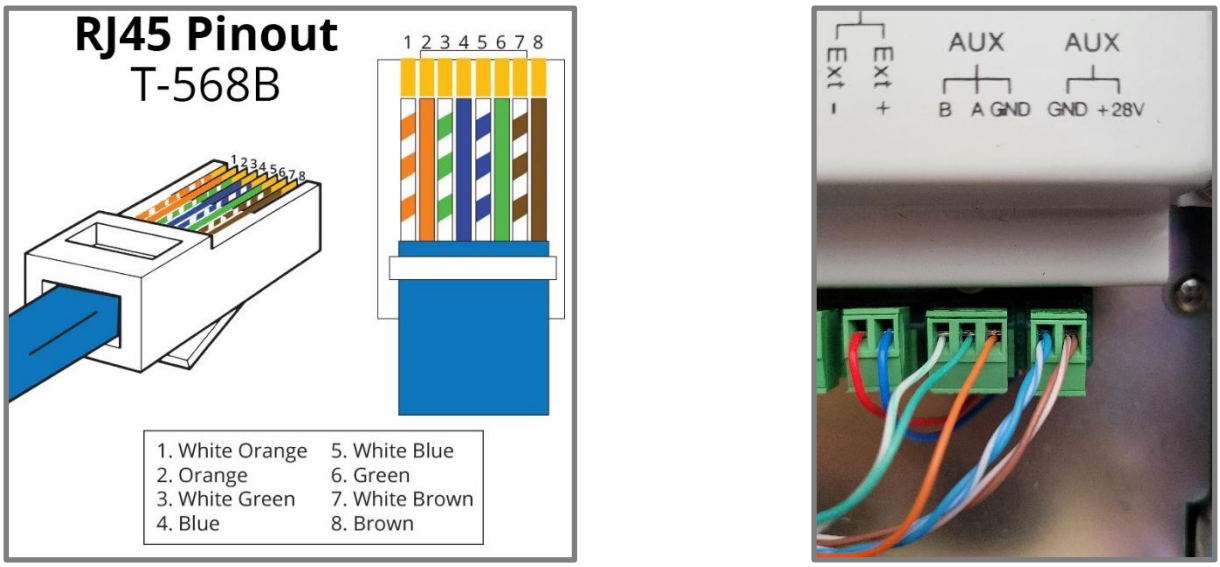


Figure 42: V3 AP - RJ45 T568B Connector Pinout for Bare Wire Connection to BDA/MU/RU

Refer to the instructions below for connecting the V3 annunciator panel to a BDA, MU, or RU using unterminated Category 5/6 Ethernet conductors:

- Power down the V3 BDA/MU or RU system.
- Connect one end of the cat 5/6 cable terminated with RJ45 to the “PREV” port of the AP.
- Connect the other end of the cat 5/6 cable with bare wires to BDA/MU/RU as follows:
    - White/Orange – NOT USED
    - Orange – Connect to AUX RS485 GND
    - White/Green – Connect to AUX RS485 B
    - Green – Connect to AUX RS485 A
    - White/Blue – Connect to AUX GND
    - Blue – Connect to AUX GND
    - White/Brown – Connect to AUX +28VDC
    - Brown – Connect to AUX +28VDC

- To cascade additional APs, connect RJ45 cat5/6 cable between previous AP “NEXT” port and the next AP “PREV” port. **Connections between annunciator panels must be made using RJ45 connectors.**

2.14 V3 AP SYSTEM WIRING – APV3-BDA WITH V2 BBU

The APV3-BDA may also be deployed in conjunction with a Comba V2 BBU. This configuration is commonly used when two (2) V3 BDAs are powered from a single V2 BBU. In this arrangement, the APV3-BDA receives DC power and RS-485 alarm communications directly from the V2 BBU. System status and alarm conditions configured within the V2 BBU are displayed on the AP, and an audible buzzer is activated upon detection of an alarm condition. A maximum of four (4) APV3-BDA may be daisy-chained from the V2 BBU, with a cumulative cable length of up to 2,000 feet to the furthest panel, using 24-AWG cabling. Category 5 or Category 6 Ethernet cable is recommended for interconnection between the V2 BBU and the APs. The V2 BBU provides screw-terminal outputs for APV3-BDA power and RS-485 alarm communications only. The installer must terminate the APV3-BDA cabling directly to these terminals in accordance with the T568B wiring standard. Refer to the instructions below and Figures 43-45 for wiring details. Refer to the Commissioning section for instructions on commissioning the APV3-BDA annunciator panels from the V2 BBU user GUI.

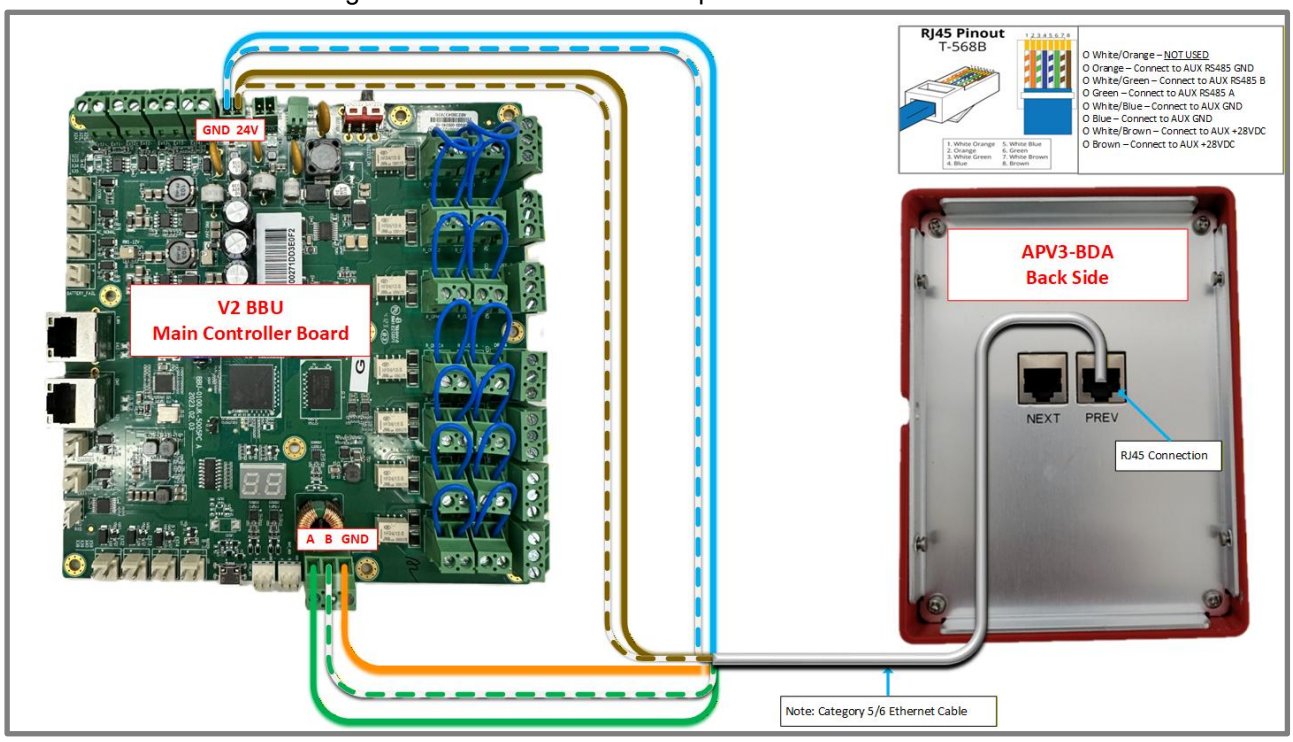


Figure 43: APV3-BDA - Wiring Diagram - V2 BBU + APV3-BDA

Refer to the instructions below for connecting the V3 annunciator panel to a V2 BBU using unterminated Category 5/6 Ethernet conductors:

- Power down the V2 BBU System.
- Connect one end of the cat 5/6 cable terminated with RJ45 to the “PREV” port of the AP.
- Connect the other end of the cat 5/6 cable with bare wires to the V2 BBU as follows:
  - White/Orange – NOT USED
  - Orange – Connect to AUX RS485 GND
  - White/Green – Connect to AUX RS485 B
  - Green – Connect to AUX RS485 A
  - White/Blue – Connect to AUX GND (12, 24, or 48 VDC AUX GND Ports options)
  - Blue – Connect to AUX GND (12, 24, or 48 VDC AUX GND Ports options)
  - White/Brown – Connect to AUX +12, 24, or 48VDC (+12, 24, or 48 VDC AUX Ports options)
  - Brown – Connect to AUX +12, 24, or 48VDC (+12, 24, or 48 VDC AUX Ports options)

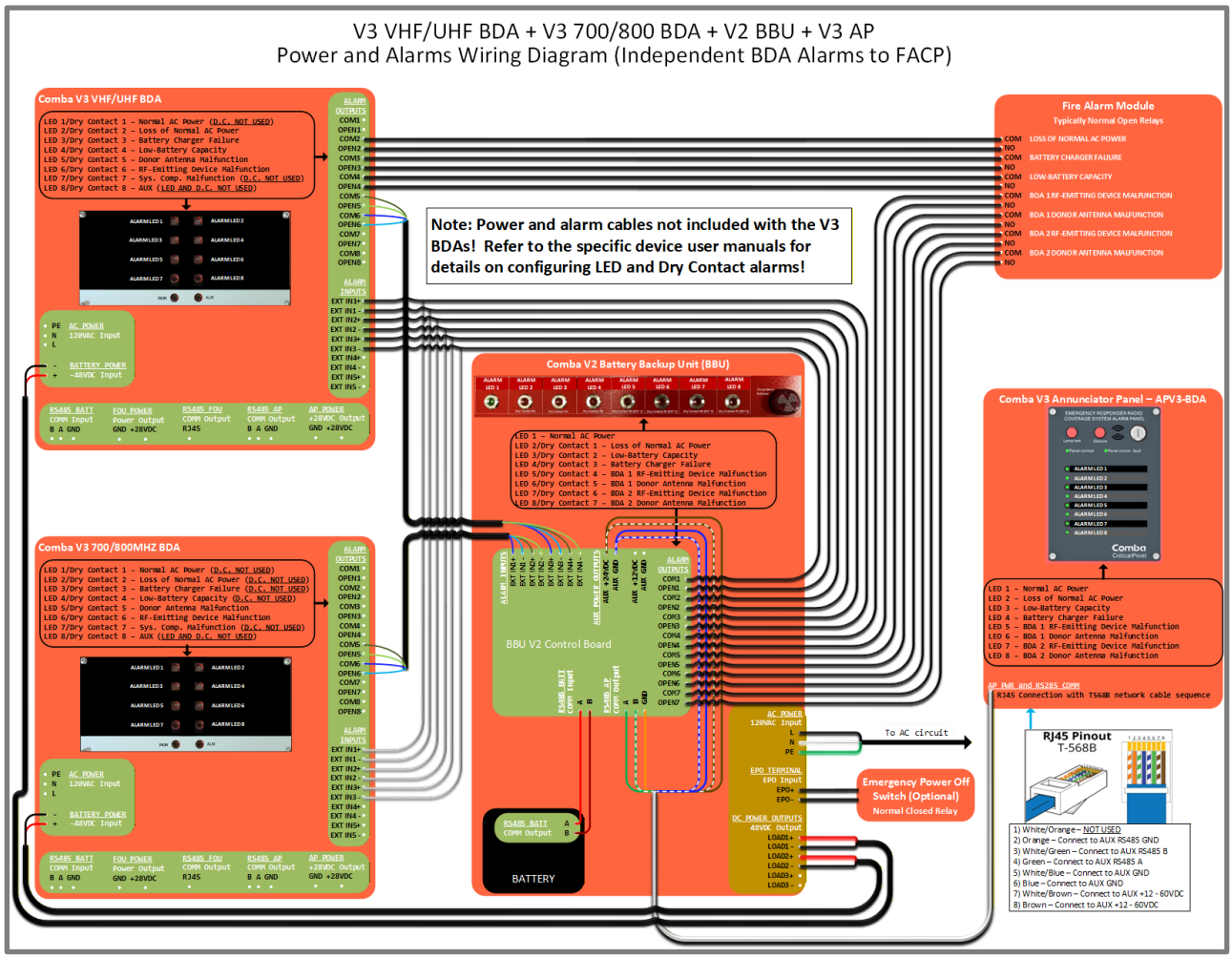


Figure 44: APV3-BDA - Wiring Diagram - V2 BBU + (2) V3 BDA + V3 AP

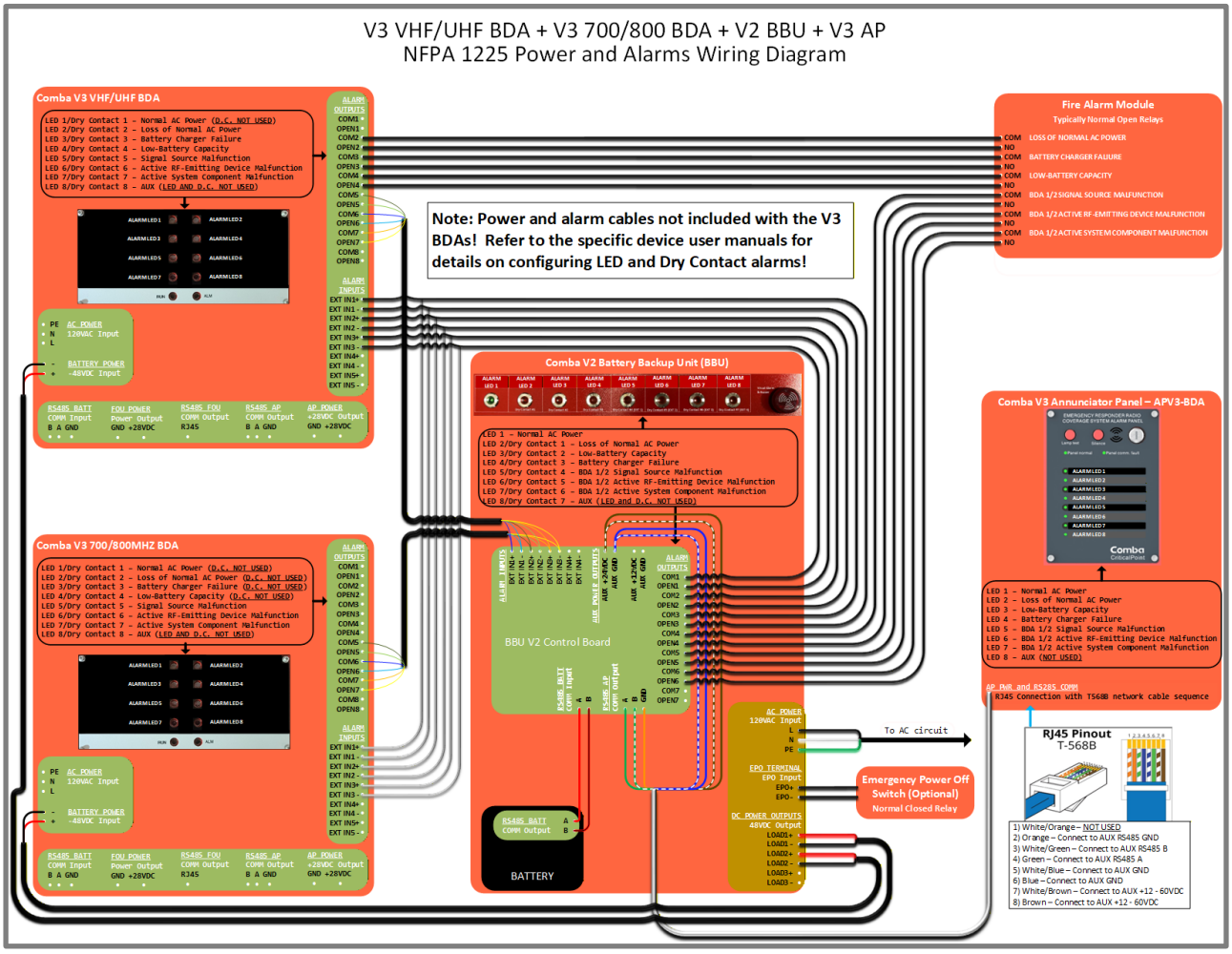


Figure 45: APV3-BDA - Wiring Diagram - V2 BBU + (2) V3 BDA + V3 AP - NFPA1225

2.15 V3 AP SYSTEM WIRING – CASCADING V1 AP FROM APV3-BDA

The APV3-BDA supports daisy-chaining of a Comba Version 1 Annunciator Panel (V1 AP). This configuration enables a single APV3-BDA to be installed at a location requiring local LED indication and audible (buzzer) notification, while a V1 AP may be daisy-chained from the APV3-BDA and installed within the room housing the Fire Alarm Control Panel (FACP) interface. The V1 AP provides eight (8) dry-contact alarm outputs, seven (7) of which are configurable, allowing delivery of IFC- and NFPA-required alarm signals to the fire alarm system. The commissioning process is the same when cascading a V3 AP or a V1 AP. Refer to the commissioning sections for more details. Refer to Figure 46 below for detailed wiring information.

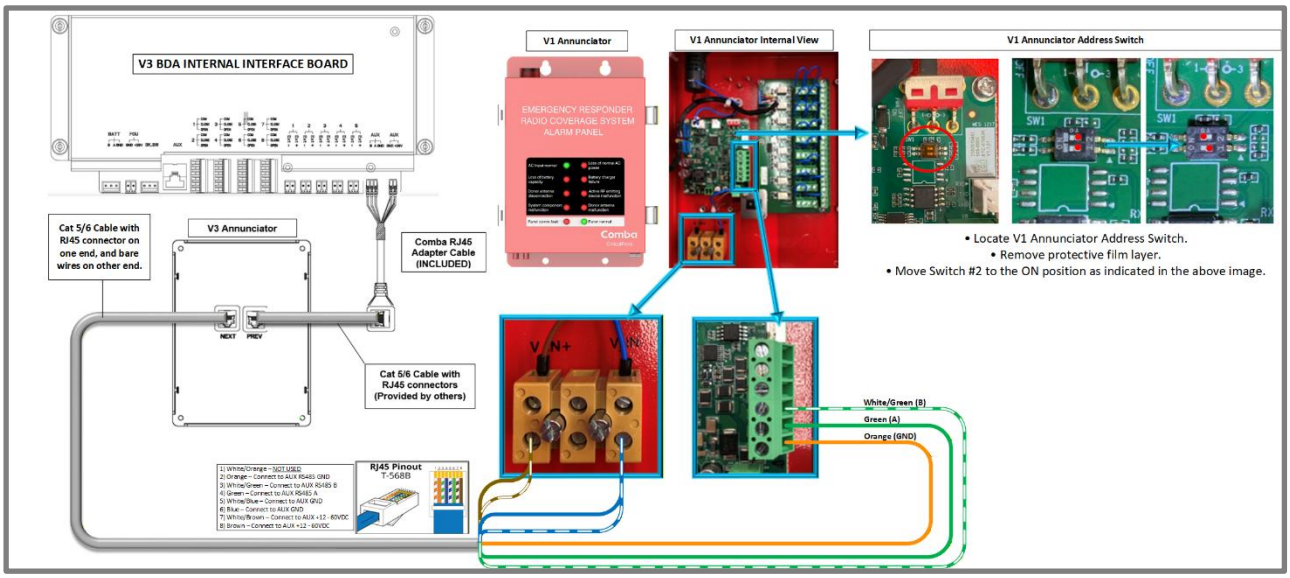


Figure 46: APV3-BDA – Wiring Diagram – Cascading a V1 AP from APV3-BDA

2.16 V3 BDA/MU/RU ANNUNCIATOR FRONT PLATE INSTALLATION

The V3 APs come from the factory with four different alarm plate options for the front of the device. This allows the user to choose the front panel plate that matches the authority's code requirements. The UL2524 2nd Revision Oct 2018 Alarm plate is installed in the factory.

To replace the factory installed plate:

- As shown in Figure 47 and 48 below, remove the 4 HEX screws holding the factory installed plate in place. This hardware will be reused. Do not discard!
- Position the desired plate such that all 4 cabinet screw holes are aligned with the holes in the new plate.
- Secure the plate using the 4 screws.

Figure 47: APV3-BDA - Front Alarm Plate Installation

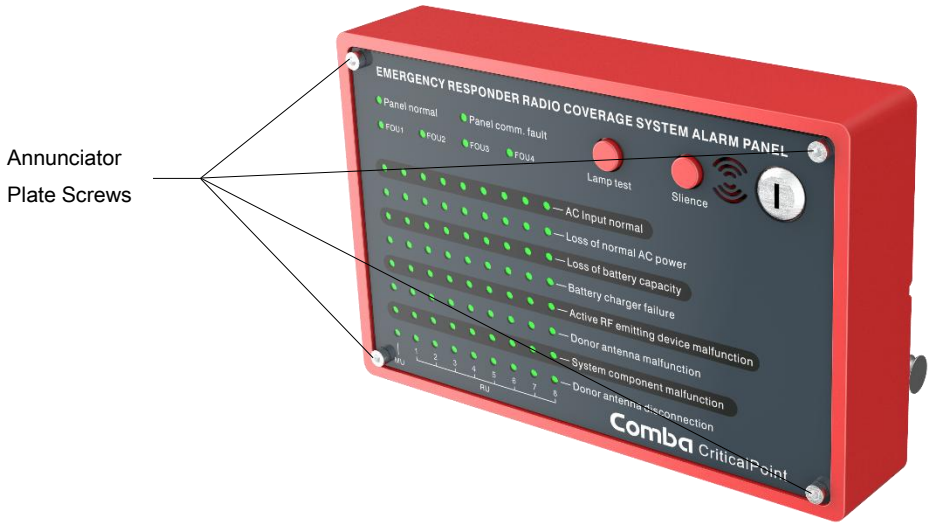
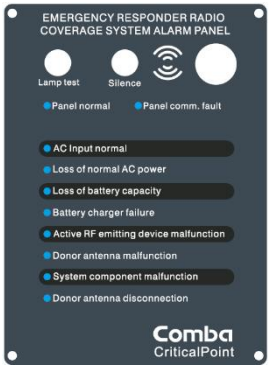
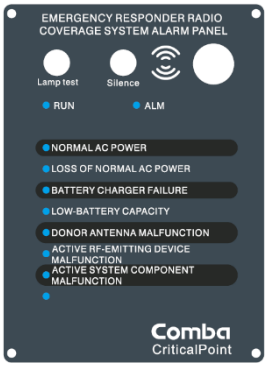
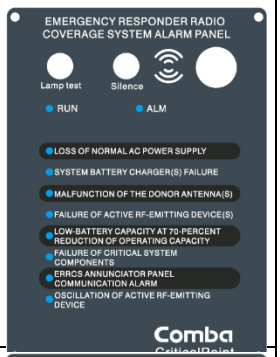
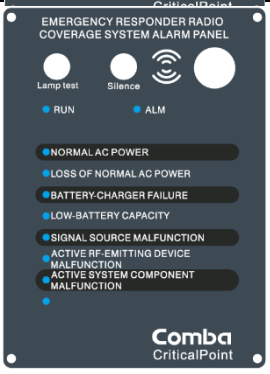


Figure 48: APV3-DAS - Front Alarm Plate Installation

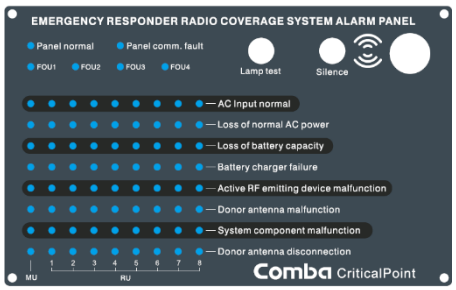
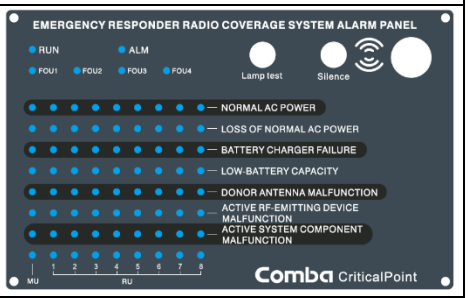
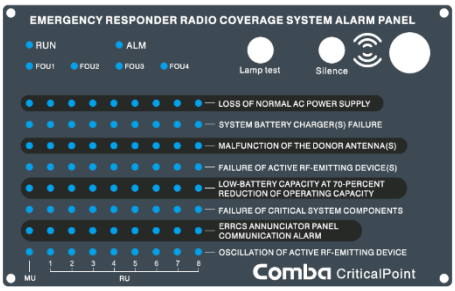
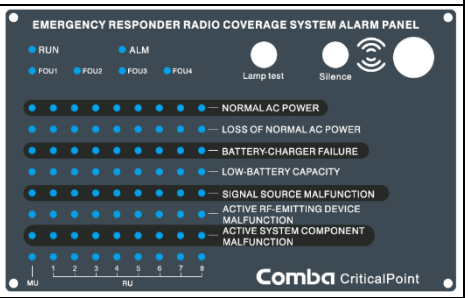
See Table 3 below for details about the APV3-BDA front plate options and alarm configurations.

Table 3: APV3-BDA - Front Alarm Plate Options

Alarm Configuration	Annunciator Alarm LEDs
UL2524 2nd Rev Oct 2018 (Default)	1. AC Input Normal 2. Loss of Normal AC Power 3. Loss of Battery Capacity 4. Battery Charger Failure 5. Active RF Emitting Device Malfunction 6. Donor Antenna Malfunction 7. System Component Malfunction 8. Donor Antenna Disconnection 9. Panel Normal 10. Panel Comm. Fault 
NFPA1221 2019	1. Normal AC Power 2. Loss of Normal AC Power 3. Battery Charger Failure 4. Low-Battery Capacity 5. Donor Antenna Malfunction 6. Active RF-Emitting Device Malfunction 7. Active System Component Malfunction 8. RUN 9. ALM 
IFC510 2021	1. Loss of Normal AC Power Supply 2. System Battery Charger(s) Failure 3. Malfunction of the Donor Antenna(s) 4. Failure of Active RF-Emitting Device(s) 5. Low-Battery Capacity at 70% Reduction of Operating Capacity 6. Failure of Critical System Components 7. ERRCS Annunciator Panel Communication Alarm 8. Oscillation of Active RF-Emitting Device 9. RUN 10. ALM 
NFPA1225 2022	1. Normal AC Power 2. Loss of Normal AC Power 3. Battery-Charger Failure 4. Low-Battery Capacity 5. Signal Source Malfunction 6. Active RF-Emitting Device Malfunction 7. Active System Component Failure 8. RUN 9. ALM 

See Table 4 below for details about the APV3-DAS front plate options and alarm configurations.

Table 4: APV3-DAS - Front Alarm Plate Options

Alarm Configuration	Annunciator Alarm LEDs
UL2524 2nd Rev Oct 2018	1. AC Input Normal 2. Loss of Normal AC Power 3. Loss of Battery Capacity 4. Battery Charger Failure 5. Active RF Emitting Device Malfunction 6. Donor Antenna Malfunction 7. System Component Malfunction 8. Donor Antenna Disconnection 9. Panel Normal 10. Panel Comm. Fault 11. FOU Status Alarm 
NFPA1221 2019 (Default)	1. Normal AC Power 2. Loss of Normal AC Power 3. Battery Charger Failure 4. Low-Battery Capacity 5. Donor Antenna Malfunction 6. Active RF-Emitting Device Malfunction 7. Active System Component Malfunction 8. RUN 9. ALM 10. FOU Status Alarm 
IFC510 2021	1. Loss of Normal AC Power Supply 2. System Battery Charger(s) Failure 3. Malfunction of the Donor Antenna(s) 4. Failure of Active RF-Emitting Device(s) 5. Low-Battery Capacity at 70% Reduction of Operating Capacity 6. Failure of Critical System Components 7. ERRCS Annunciator Panel Communication Alarm 8. Oscillation of Active RF-Emitting Device 9. RUN 10. ALM 11. FOU Status Alarm 
NFPA1225 2022	1. Normal AC Power 2. Loss of Normal AC Power 3. Battery-Charger Failure 4. Low-Battery Capacity 5. Signal Source Malfunction 6. Active RF-Emitting Device Malfunction 7. Active System Component Failure 8. RUN 9. ALM 10. FOU Status Alarm 

End of Section

3 COMMISSIONING

3.1 PRE-COMMISSIONING TASKS

See Comba V3 BDA/BBU/DAS User Manual for instructions to follow to ensure system pre-commissioning tasks are complete before powering on the system.

3.2 V3 BDA/MU/RU/BBU POWER ON/POWER OFF

See Comba V3 BDA/BBU/DAS User Manual for instructions to follow to properly power ON/OFF the V3 system.

3.3 WEB GUI LOGIN AND USER MANAGEMENT

The PS BDA can be monitored and controlled via the WEB GUI; use the following instructions to login to the GUI for system parameter setting and commissioning.

BDA/MU or RU Login

- Set the computer IP address to 192.168.8.xxx (except 101) / 255.255.255.0. (e.g. 192.168.8.100)
- Connect the computer to the **OMT Port** on the device using a regular Ethernet RJ45 Cable.
- Use the default device IP address of **http://192.168.8.101** in the browser to login to the device. Enter full address with the <http://> all the time. Some browsers will default to use <https> and not be able to access the device if just typing 192.168.8.101.
- Use username **admin** and password **admin** for general web operation.
- There is an additional LAN port located on the BDA/MU only. The LAN port can be used for local access but more commonly used for remote access after being configured to connect to an external Modem / Router / Switch or a Gateway, etc...
  The LAN port IP can be configured in WEB –> Management –> Network.
  The LAN port default IP address is 192.168.0.101 / 255.255.255.0, and the Gateway is 192.168.0.1.

  Note: If the device is configured for remote connection using the LAN port, all the firmware upgrades for the BDA/MU, FOU, and RUs can be completed remotely through the BDA/MU without the need to send anyone to the site.

3.4 WEB GUI INTRODUCTION

See Comba V3 BDA/BBU/DAS User Manual for complete overview of the V3 web GUI operation.

3.5 COMMISSIONING PROCEDURE – APV3-BDA AND APV3-DAS

Perform the following procedures to commission the V3 AP. The process is the same for BDA, MU, or RU.

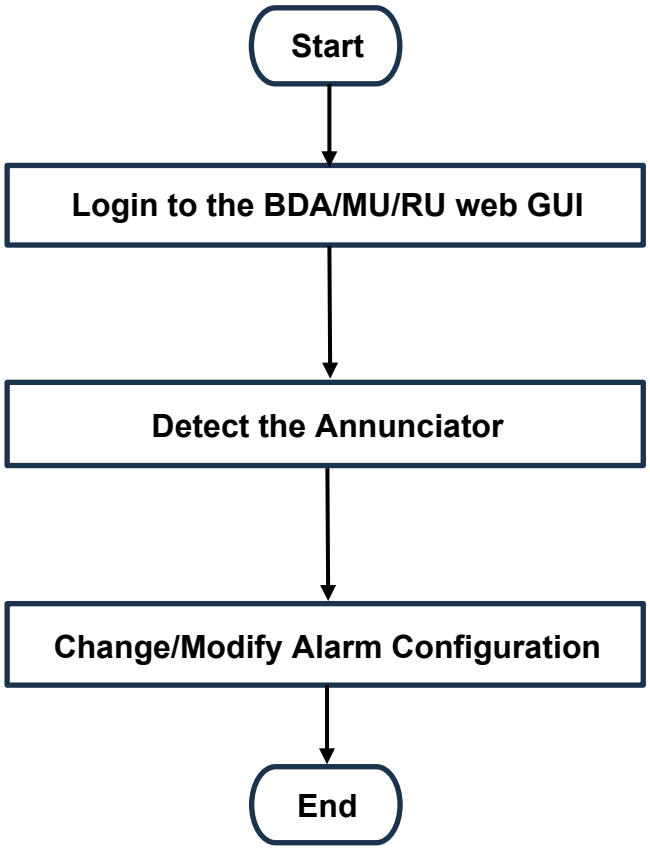


Figure 49: Commissioning Procedure - APV3-BDA and APV3-DAS

Follow the instructions below to commission the V3 AP(s):

- Ensure all installation and wiring is complete.
- Ensure APs have been addressed accordingly. See section 2.8 for more details
- Login to the BDA/MU/RU web GUI.
- For BDA mode, see Figure 50 below, navigate to Device -> Overview -> External Annunciator Panel. For MU mode, see Figure 51 below, navigate to Home -> MU -> AP. For RU, Navigate through the MU to Home -> RU -> AP.
- Click “detect” to start the detection process. Wait a few minutes for the AP(s) to be detected. After the AP(s) are detected, their system details will display in the GUI.
- If desired, modify alarm parameters in the “actions” column. Default settings are recommended.
- If required, change the alarm configuration to match the front panel alarm plate. See section 4 Alarms, Troubleshooting, and Maintenance for further details.

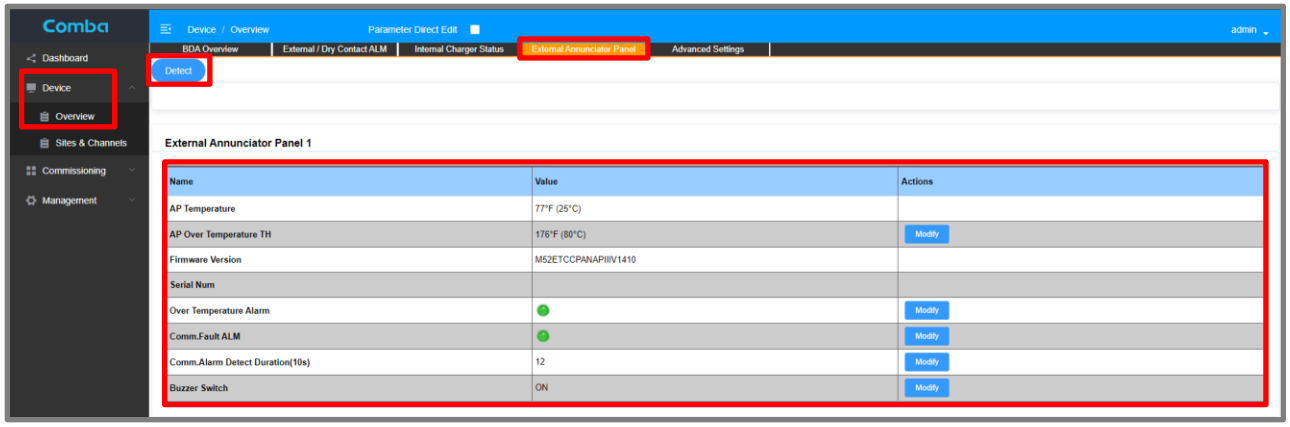


Figure 50: Commisioning V3 AP in BDA mode

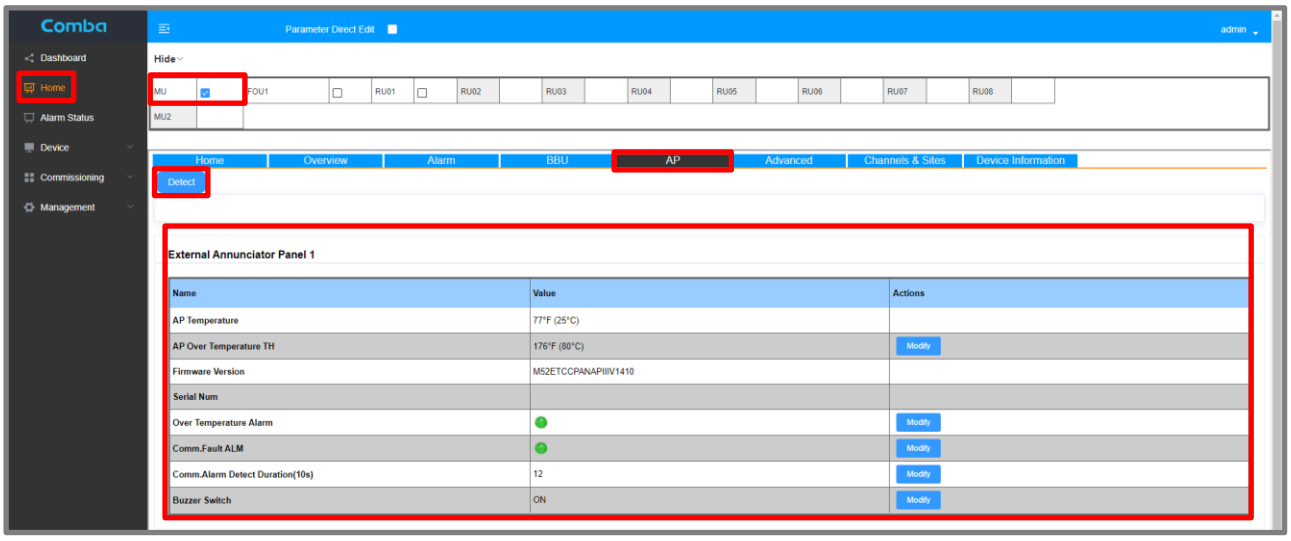


Figure 51: Commissioning V3 AP in DAS Mode

3.6 V3 AP – WEB GUI SETTINGS

See Figure 52 and Table 5 below for an explanation of AP web GUI parameters and settings

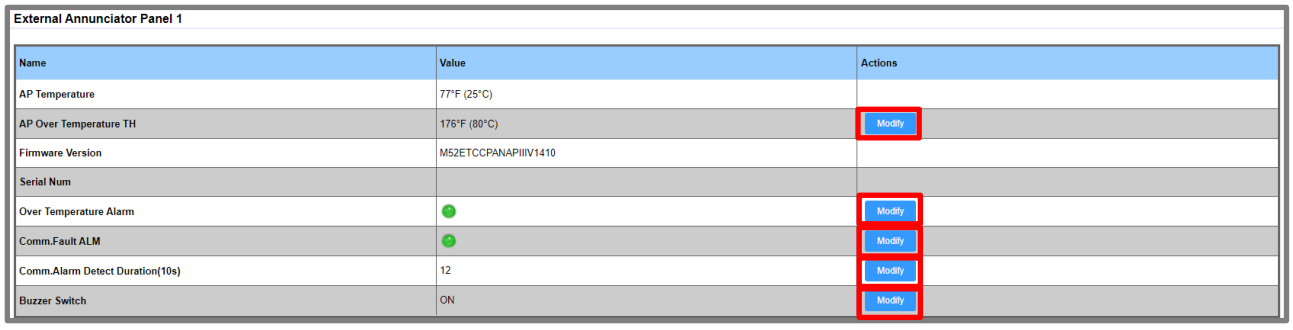


Figure 52: V3 AP - Web GUI Settings

Table 5: V3 AP - Web GUI Settings

Parameter name	Description
AP Temperature	Current device temperature
AP Over Temperature Threshold	Device will alarm if above this temperature threshold. Modify if desired. Default setting recommended.
Firmware Version	Current Firmware Version loaded on the device
Serial Number	Device Serial Number
Overtemperature Alarm	Disable/Enable Overtemperature Alarm. Modify if desired. Default setting recommended.
Communication Fault Alarm	Disable/Enable Communication Fault Alarm. Modify if desired. Default setting recommended.
Communication Alarm Detection Duration(10s)	Allowable time without communication before Communication Fault Alarm. Set in Multiples of 10 seconds. The default setting is 12. 12 x 10 seconds = 120 seconds or 2 minutes
Buzzer Switch	Enable/Disable Buzzer. Modify if desired. Default setting recommended.

3.7 COMMISSIONING PROCEDURE – APV3-DAS MIRROR MODE

Perform the following procedures to commission two (2) APV3-DAS in **Mirror Mode**. In **Mirror Mode**, two (2) APV3-DAS can be cascaded/daisy-chained to show identical system alarms for systems containing up to one (1) FOU and eight (8) RUs. The process only applies to a BDA/MU in a fiber DAS configuration.

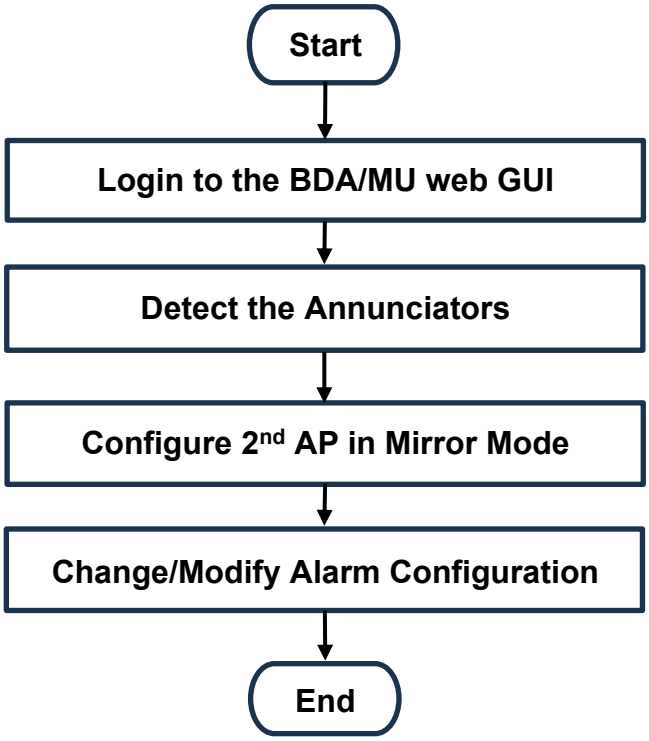
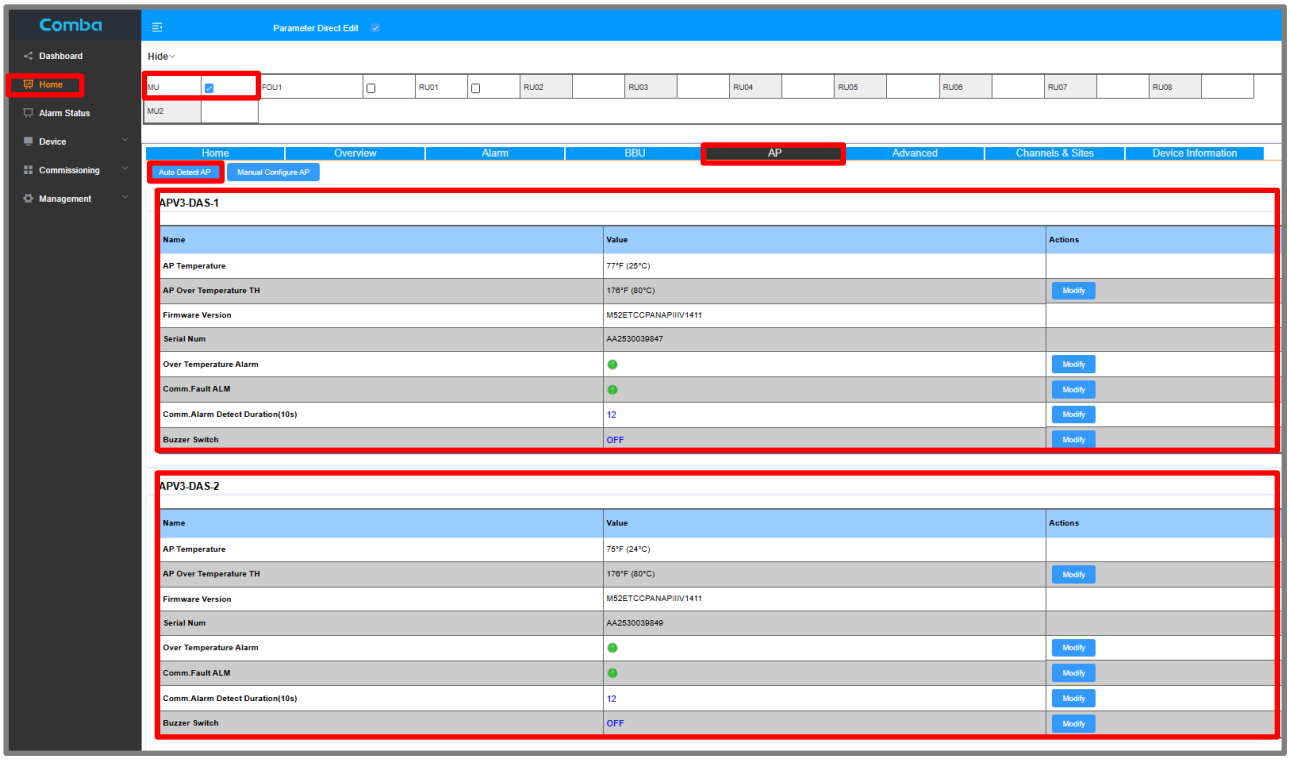


Figure 53: Commissioning Procedure - APV3-DAS Mirror Mode

Follow the instructions below to commission two (2) APV3-DAS in Mirror Mode:

- Ensure all installation and wiring is complete.
- Ensure APs have been addressed accordingly. The first APs address should be the default address of **1** and the second AP should be addressed **2**. See section 2.8 for more details
- Login to the BDA/MU web GUI.
- Navigate to Home -> MU -> AP.
- Click “detect” to start the detection process. Wait a few minutes for the AP(s) to be detected. After the AP(s) are detected, their system details will display in the GUI.
- Go to the 2nd AP location. Insert the APV3-DAS KEY into the key switch and turn 90 degrees clockwise. Hold the “Silence” button down for 5-10 seconds, until the APV3-DAS shows activity on the FOU1 status indicator LED. Remove the APV3-DAS KEY by turning counterclockwise 90 degrees.
- If desired, modify alarm parameters in the “actions” column. Default settings are recommended.
- If required, change the alarm configuration to match the front panel alarm plate. See section 4 Alarms, Troubleshooting, and Maintenance for further details.

See Figure 54 below.



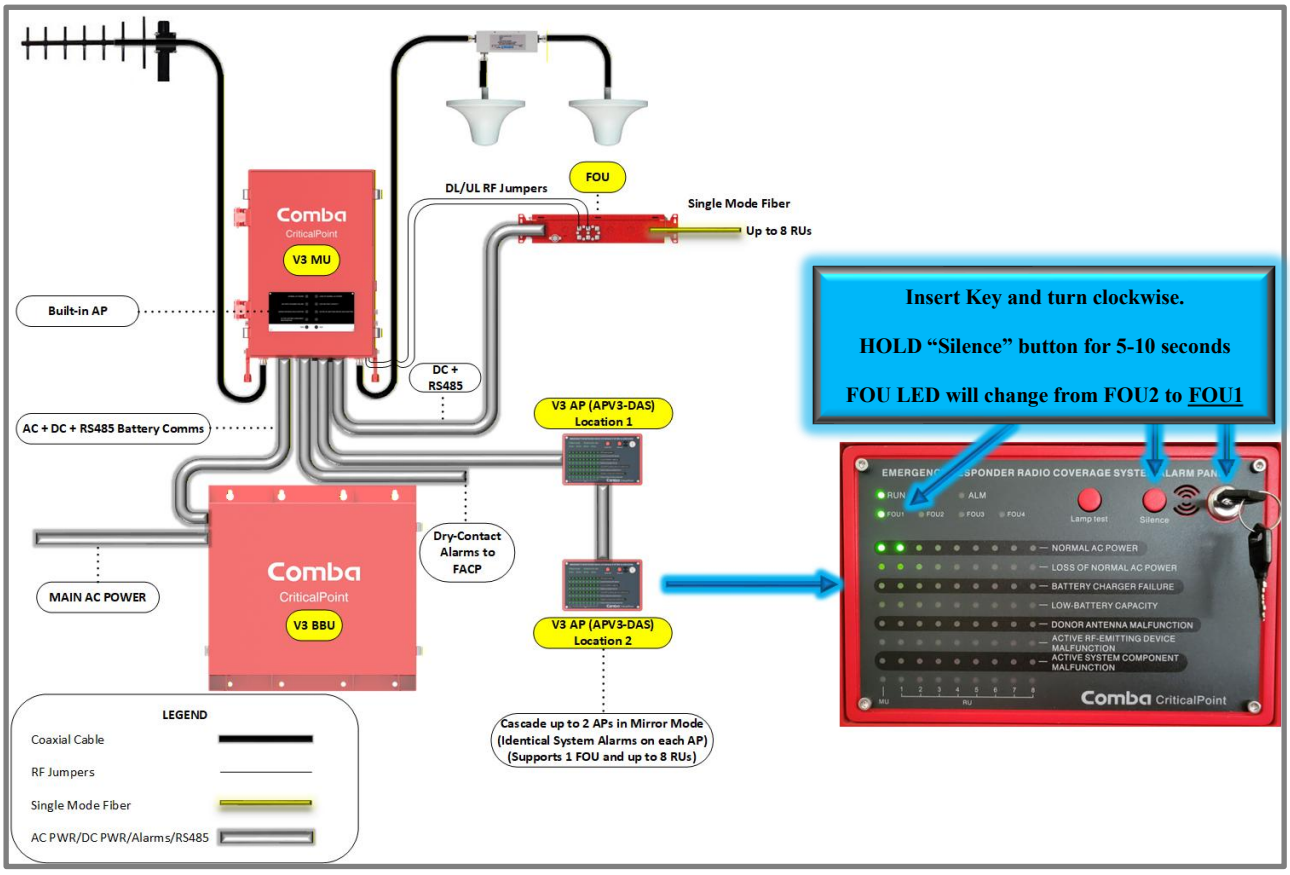


Figure 54: Commissioning APV3-DAS in Mirror Mode

3.8 COMMISSIONING PROCEDURE – APV3-BDA WITH V2 BBU

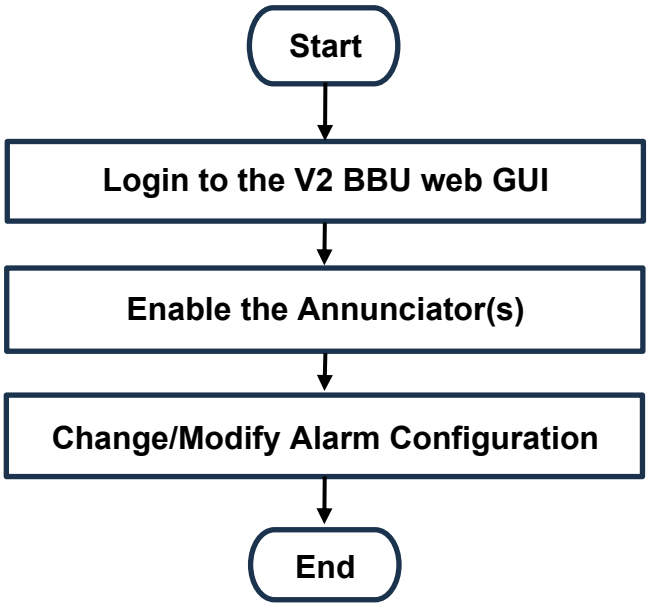


Figure 55: Commissioning Procedure - APV3-BDA with V2 BBU

Follow the instructions below to commission the V3 AP(s) connected to a V2 BBU:

- Ensure all installation and wiring is complete.
- Ensure APs have been addressed accordingly. See section 2.8 for more details
- Login to the V2 BBU web GUI. Refer to V2 BBU User Manual for login information.
- Navigate to the <Settings> page. Locate the “APV3 Panel NO.” parameter in the settings table.
- Click the drop down in this row to configure the number of APV3-BDA that are connected. Up to 4 APV3-BDA can be cascaded/daisy-chained from the V2 BBU.
  Example: If only using one (1) APV3-BDA, choose **1** from the drop down.
- Ensure the checkbox is checked in the “APV3 Panel NO.” row and click “Modify” to apply the changes. Then click “Refresh”. It takes approximately 1-3 minutes for the APV3-BDA(s) to be detected.
- Once the APV3-BDA(s) have been detected, the status and configuration details can be found by navigating to the <Panel> page of the GUI.
- Device Information can be viewed from the <Dev Info> tab. Alarm configuration and thresholds can be configured in the <Alarm Setting> tab.
- If desired, modify alarm parameters in the “Config Value” column. Default settings are recommended.
- If required, change the alarm configuration to match the front panel alarm plate. See section 4 Alarms, Troubleshooting, and Maintenance and the V2 BBU User Manual for further details.

See Figure 56 Below.

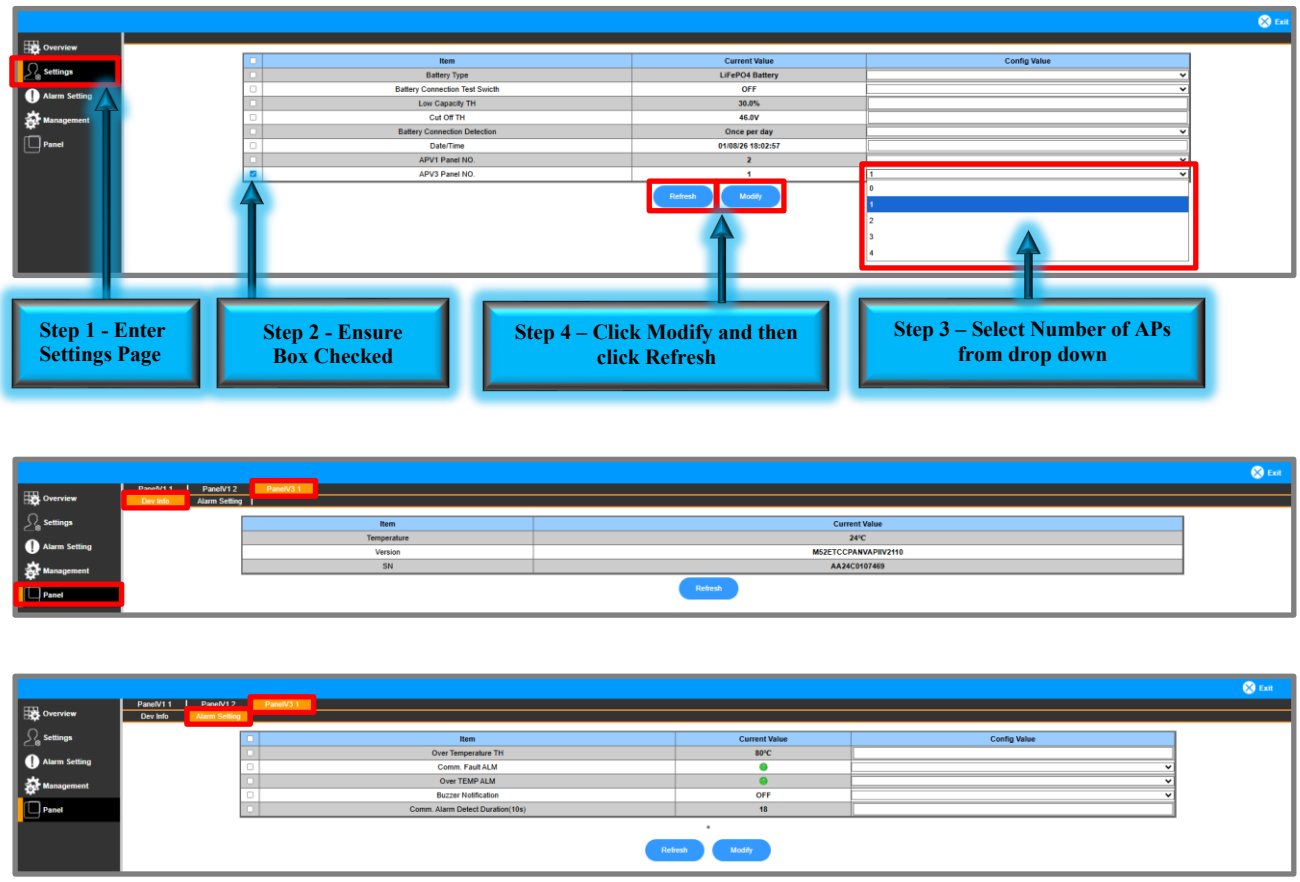


Figure 56: Commissioning APV3-BDA from V2 BBU

End of Section

4 ALARMS, TROUBLESHOOTING, AND MAINTENANCE

4.1 V3 AP ANNUNCIATOR LED INDICATORS, SILENCE AND LAMP TEST

The LED indicators help the user to check the equipment alarm status quickly and easily. See Figures 57 and 58 and Table 6 below for a detailed explanation of their operation.

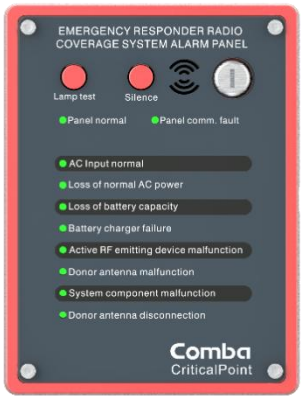


Figure 57: APV3-BDA - LED Alarm Indicators

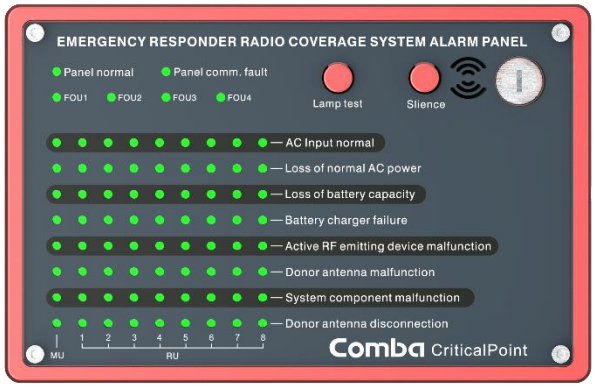


Figure 58: APV3-DAS - LED Alarm Indicators

Table 6: V3 AP - Default LED Indicators for UL2524 2018 2nd Revision

Identifier	Color	Indication
AC Input normal	Green/Red	When AC input is ok, GREEN. RED if in alarm.
Loss of normal AC power	Red	When AC input is not present, ON
Loss of battery capacity	Red	When battery voltage is lower than the threshold, ON
Battery charger failure	Red	When AC/DC module detects fault, ON
Active RF emitting device malfunction	Red	When the Public safety product generates Booster failure alarm event, ON
Donor antenna disconnection	Red	When the Public safety product generates Donor Antenna Disconnection alarm, ON
System component malfunction	Red	When the Public safety product generates System Component alarm, ON
Donor antenna malfunction	Red	When the Public safety product generates Donor Antenna malfunction alarm, ON
Panel Comm. Fault	Red	When the communication between Alarm panel and BBU unit is abnormal, ON
Panel Normal	Green	When Alarm panel works normally, ON
FOU1~FOU4	Green	Indicates that the alarm display panel displays alarms for a specific FOU. When FOU detected, ON *For APV3-DAS only
Lamp Test	N/A	Insert Key and rotate 90 degrees clockwise. Hold the Lamp Test button to perform a lamp self-check on LEDs.
Silence	N/A	Insert Key and rotate 90 degrees clockwise. Press the Silence button to silence the buzzer.

There are multiple alarm presets in the BDA/MU/RU web GUI provided so the user can quickly configure alarms for their jurisdiction's code requirements. The AP's are provided with matching front panel alarm plates based on the BDA/MU/RU presets. Furthermore, the user can define their own set of custom alarms for each Dry Contact Output. As previously shown, the UL2524 2018 is the default preset from the factory. Figures 59 and 60, and Table 7, indicate the general relationship between dry contact settings and LED alarm annunciation.

Figure 59: APV3-BDA - LED and Dry Contact Alarm Correlation

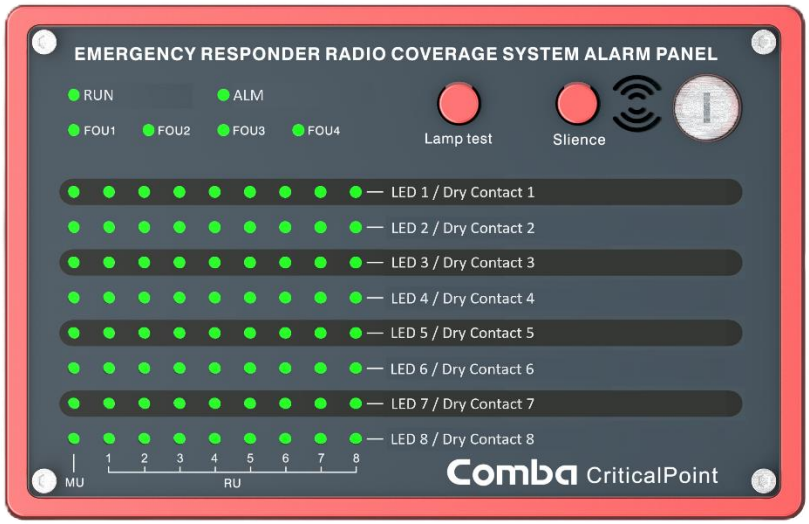


Figure 60: APV3-DAS - LED and Dry Contact Alarm Correlation

Table 7: V3 AP - LED Indicators – General Overview

Identifier	Color	Indication
LED 1 / Dry Contact 1	Green/Red	Green=Normal; Red=Alarm (AC Power Alarm)
LED 2 / Dry Contact 2	Red	Alarm indicator. ON = alarm; OFF = no alarm.
LED 3 / Dry Contact 3	Red	Alarm indicator. ON = alarm; OFF = no alarm.
LED 4 / Dry Contact 4	Red	Alarm indicator. ON = alarm; OFF = no alarm.
LED 5 / Dry Contact 5	Red	Alarm indicator. ON = alarm; OFF = no alarm.
LED 6 / Dry Contact 6	Red	Alarm indicator. ON = alarm; OFF = no alarm.
LED 7 / Dry Contact 7	Red	Alarm indicator. ON = alarm; OFF = no alarm.
LED 8 / Dry Contact 8	Red	Alarm indicator. ON = alarm; OFF = no alarm.
RUN	Red	Operation indicator. Flashes every second to indicate normal operation. 1. OFF: MCU cannot be powered up 2. Solid RED: Software is not ready / cannot boot up 3. Solid Green: Software is running normally
ALM	Red	Alarm indicator. ON = alarm; OFF = no alarm. 1. OFF: No Alarm 2. Solid Red: Dry Contact 1-8 active 3. Red (1 blink, pause): Any other alarms besides Dry Contact configured alarms.
FOU1~FOU4	Green	Indicates that the alarm display panel displays alarms for a specific FOU. *For APV3-DAS only
Lamp Test	N/A	Insert Key and rotate 90 degrees clockwise. Hold the Lamp Test button to perform a lamp self-check.
Silence	N/A	Insert Key and rotate 90 degrees clockwise. Press the Silence button to silence the buzzer.

4.2 ALARM STATUS INDICATORS IN THE WEB GUI

There are several sections of the user GUI that contain alarm status indicators and/or alarm configuration parameters. See Tables 8 and 9 and Figure 61 below which describe where the alarm status indicators and configuration parameters can be found in the V3 BDA/MU/RU devices

Table 8: V3 BDA/MU/RU - Web GUI Alarm Status Indicators

Parameter name/location	Description
Dashboard	View of all dry contact alarm status. View of all current system alarms.
Device – Overview– BDA Overview	General device alarm status. 700MH/800MHz band specific alarm status
Device – Overview– External/Dry Contact ALM	External Alarms and Dry Contact Alarms
Device – Overview– Internal Charger Status	Power Supply and Battery Charger status and alarms.
Device – Overview – External Annunciator Panel	Comba External Annunciator Panel status and alarms.
Device – Overview – Advanced Settings	Settings for Oscillation Alarm and Antenna Disconnection Alarm.

Table 9: V3 Fiber DAS – Web GUI Alarm Configuration and Status

Parameter name	Description
Home page	View of all dry contact alarm status. View of all current system alarms.
Home – Device Checkbox - Overview	General device alarm status. 700MH/800MHz band specific alarm status
Home – Device Checkbox – Alarm	External Alarms and Dry Contact Alarms
Home – Device Checkbox – BBU	Power Supply and Battery Charger status and alarms.
Home – Device Checkbox – AP	Comba External Annunciator Panel status and alarms.
Home – Device Checkbox – Advanced	Settings for Oscillation Alarm and Antenna Disconnection Alarm.

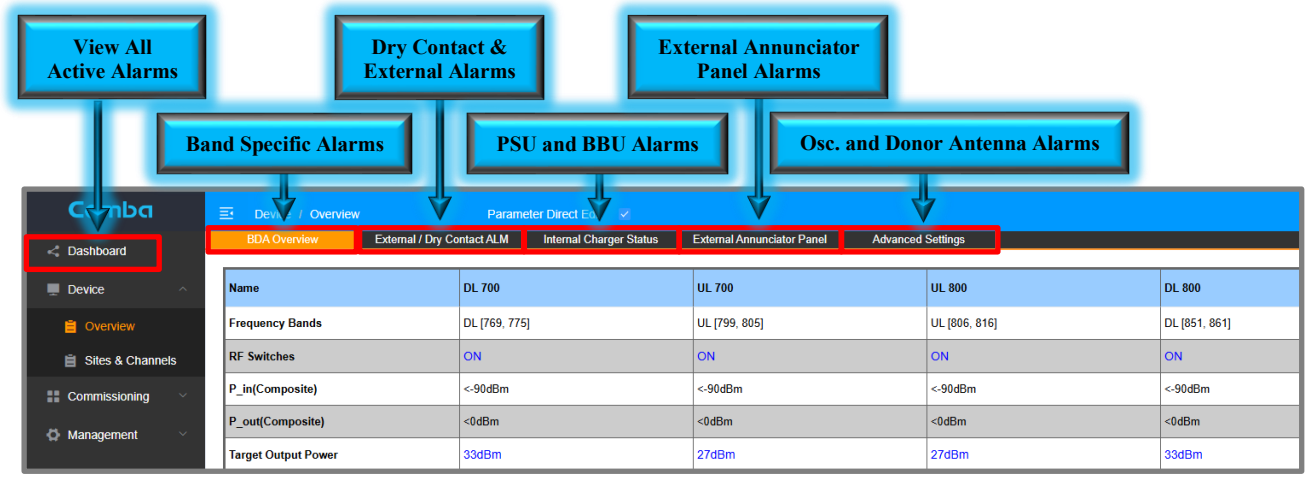


Figure 61: V3 BDA/MU/RU – Web GUI Alarm Configuration and Status

Table 10 contains a complete list of all internal device alarms. Each of these individual alarms can be configured to trigger one of the 8 Dry Contact outputs and Associated AP LEDs. By default, the V3 BDA/MU/RU devices will use the NFPA 1221 2019 alarm configuration, and the internal alarms are already configured for that standard. The user can choose one of the standard presets, or they can use a custom user defined configuration and configure which internal system alarms are mapped to each Dry Contact Output relay.

Table 10: V3 BDA/MU/RU - Complete List of Device Alarms

Summary Alarm	Dry Contact Alarm	Individual System Alarms	Related Bands / Modules / Devices
Yes	Configurable	DL P_in Low Alarm	DL 700MHz, DL 800MHz
Yes	Configurable	DL P_out Low Alarm	DL 700MHz, DL 800MHz
Yes	Configurable	DL P_in Over Alarm	DL 700MHz, DL 800MHz
Yes	Configurable	DL P_out Over Alarm	DL 700MHz, DL 800MHz
Yes	Configurable	LNA Alarm	DL 700MHz, DL 800MHz, UL 700/800MHz
Yes	Configurable	PA Alarm	DL 700MHz, DL 800MHz, UL 700/800MHz
Yes	Configurable	PA Shutdown Alarm	DL 700MHz, DL 800MHz, UL 700/800MHz
Yes	Configurable	VSWR Alarm	DL 700MHz, DL 800MHz
Yes	Configurable	Oscillation Shutdown Alarm	700MHz, 800MHz, hidden when the feature is OFF
Yes	Configurable	Oscillation Gain Reduction Alarm	700MHz, 800MHz, hidden when the feature is OFF
Yes	Configurable	Digital Clock Lock Alarm	Device
Yes	Configurable	PLL Alarm	Device
Yes	Configurable	DT ANT Disconnection Alarm	Device
Yes	Configurable	Over Temperature Alarm	Device
Yes	Configurable	External Alarms 1-4	Device
Yes	Configurable	External Alarm 5	Device / Preconfigured as Door Open Alarm
Yes	Configurable	Loss Of Normal AC Power	BBU, hidden when not using BBU V3
Yes	Configurable	Battery Low Alarm	BBU, hidden when not using BBU V3
Yes	Configurable	Charger Fault Alarm	BBU, hidden when not using BBU V3
Yes	Configurable	Battery Over-Discharge Alarm	BBU, hidden when not using BBU V3
Yes	Configurable	Battery Over Temperature Alarm	BBU, hidden when not using BBU V3
Yes	Configurable	Battery Connection Fail Alarm	BBU, hidden when not using BBU V3
Yes	Configurable	Battery Comm. Fault Alarm	BBU, hidden when not using BBU V3
Yes	Configurable	Charger Comm. Fault Alarm	BBU, hidden when not using BBU V3
Yes	Configurable	System Dry ALM 1	RU Dry Contact 1 Alarm
Yes	Configurable	System Dry ALM 2	RU Dry Contact 2 Alarm

Yes	Configurable	System Dry ALM 3	RU Dry Contact 3 Alarm
Yes	Configurable	System Dry ALM 4	RU Dry Contact 4 Alarm
Yes	Configurable	System Dry ALM 5	RU Dry Contact 5 Alarm
Yes	Configurable	System Dry ALM 6	RU Dry Contact 6 Alarm
Yes	Configurable	System Dry ALM 7	RU Dry Contact 7 Alarm
Yes	Configurable	System Dry ALM 8	RU Dry Contact 8 Alarm
Yes	Configurable	System OP RX Alarm	FOU to RU Optical Alarm
Yes	Configurable	System OP TX Alarm	FOU to RU Optical Alarm
Yes	Configurable	FOU 1 Comm. Fault Alarm	MU to FOU1 Comm Fault
Yes	Configurable	FOU 2 Comm. Fault Alarm	MU to FOU2 Comm Fault
Yes	Configurable	FOU 3 Comm. Fault Alarm	MU to FOU3 Comm Fault
Yes	Configurable	FOU 4 Comm. Fault Alarm	MU to FOU4 Comm Fault
Yes	Configurable	AP 1 Comm. Fault Alarm	Comba AP 1, hidden when no AP is connected
Yes	Configurable	AP 2 Comm. Fault Alarm	Comba AP 2, hidden when no AP is connected
Yes	Configurable	AP 3 Comm. Fault Alarm	Comba AP 3, hidden when no AP is connected
Yes	Configurable	AP 4 Comm. Fault Alarm	Comba AP 4, hidden when no AP is connected

Relationships between different alarms:

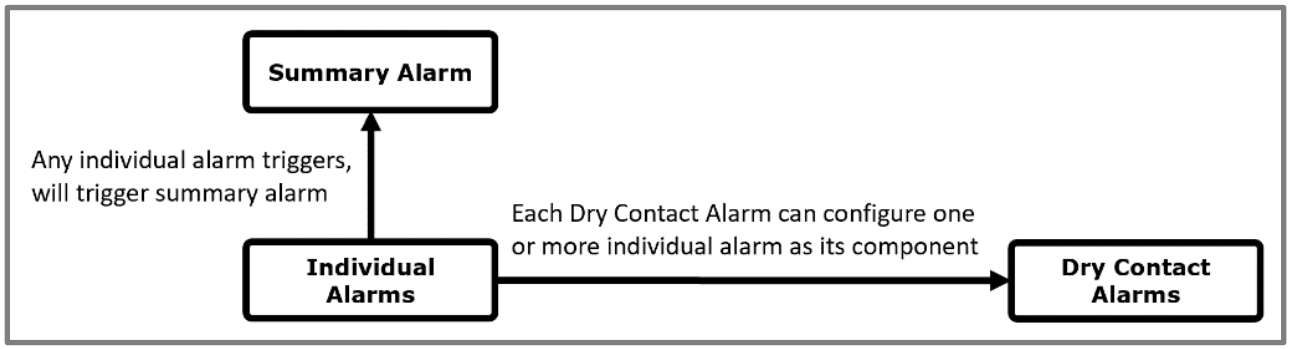


Figure 62: Alarms – Relationship between Individual, Dry Contact, and Summary Alarms

4.3 DRY-CONTACT AND AP ALARM SETTINGS

The user can easily configure the Dry Contact and External Alarms from the web GUI. The user can select a default alarm preset or they can create a custom user-defined configuration. See Figure 63 below.

Note: The V3 APs DO NOT have any Dry Contact Outputs. However, their LEDs mirror the Dry Contact Alarm configuration.

- Navigate to <Device – Overview - External/Dry Contact ALM>

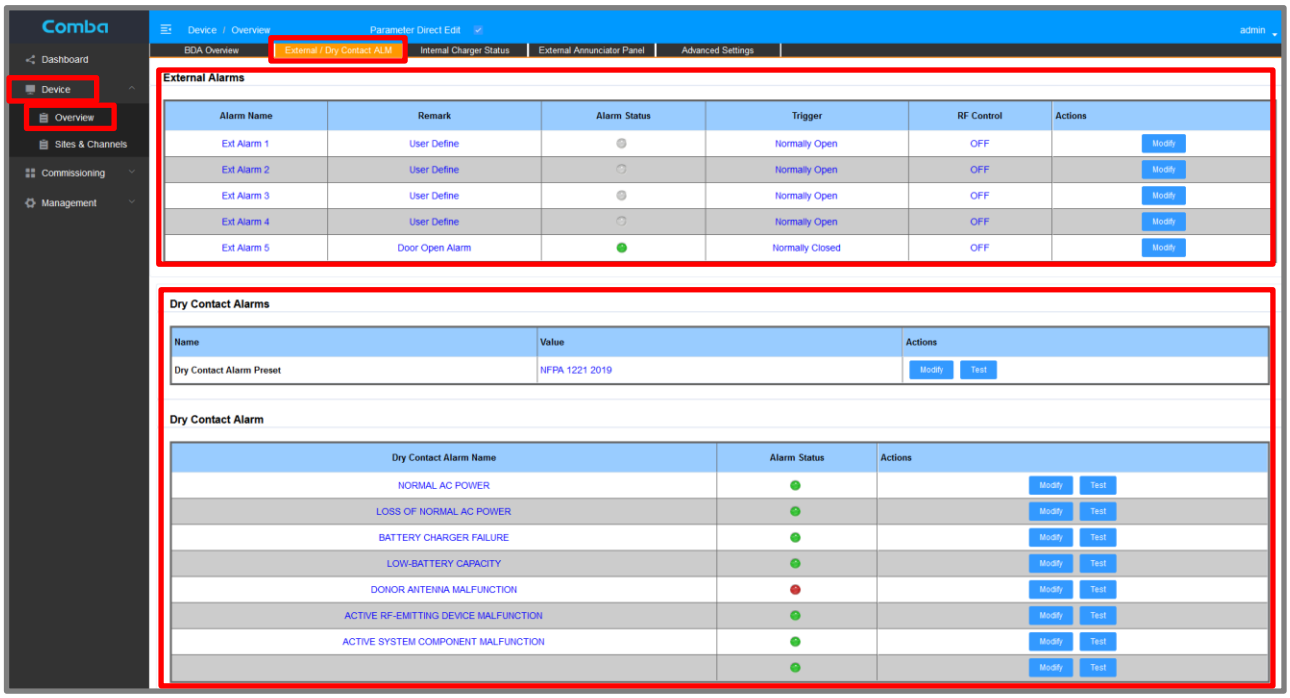


Figure 63: V3 BDA/MU/RU - Dry Contact and External Alarm Setup through web GUI

There is multiple alarm preset options in the BDA/MU/RU web GUI so the user can easily configure alarms for the local jurisdiction code requirements. The BDA/MU/RU and AP have replaceable alarm indicator plates that match the software alarm presets. These alarm plates are included in the device accessory kits. Furthermore, the user can define their own set of custom alarms for each Dry Contact Output. Refer to Table 11 below describing the available alarm presets.

Table 11: V3 BDA/MU/RU - Dry Contact and LED Alarm Presets

Dry Contact/AP LED Alarm Preset	Description
UL2524 Oct 2018	Dry Contacts and AP LEDs to meet UL2524 2nd Revision standard
NFPA 1221 2019 (DEFAULT)	Dry Contacts and AP LEDs to meet NFPA 1221 2019 standard
NFPA 1225 2022	Dry Contacts and AP LEDs to meet NFPA 1225 2022 standard
IFC 510 2021	Dry Contacts and AP LEDs to meet IFC 510 2021 standard
User Defined	Custom configuration for custom alarm requirements. User can set the specific internal device alarms for each Dry Contact

Dry contact alarms 1 through 8 and AP LED's 1 through 8 are configured according to these standard presets and the APs will display the alarms accordingly. See Tables 12 through 15 below that describe each Dry Contact/AP LED preset configuration and the associated internal system alarms that are configured to trigger them.

Table 12: NFPA 1221 2019 Alarm Preset Dry Contact and LED Operation

LED/Dry Contact	NFPA 1221 2019	Default Alarm Configuration
1	**NORMAL AC POWER**	AC Normal System Dry ALM 1
2	**LOSS OF NORMAL AC POWER**	AC Lost Alarm System Dry ALM 2
3	**BATTERY CHARGER FAILURE**	Charger Fault Alarm Charger Comm. Fault Alarm System Dry ALM 3
4	**LOW-BATTERY CAPACITY**	Battery Low Alarm Battery Connection Fail Alarm Battery Over Temperature Alarm Battery Comm. Fault Alarm Battery Over Discharge Alarm System Dry ALM 4
5	**DONOR ANTENNA MALFUNCTION**	DT ANT Disconnection Alarm System Dry ALM 5
6	**ACTIVE RF-EMITTING DEVICE MALFUNCTION**	PA Alarm 700/800 DL/UL DL P_in Over Alarm 700/800 DL DL P_out Over Alarm 700/800 DL LNA Alarm 700/800 DL/UL Oscillation Shutdown Alarm Oscillation Gain Reduction Alarm PLL Alarm Digital Clock Alarm VSWR Alarm DL 700/800 Over Temperature Alarm System OP TX Alarm System OP RX Alarm FOU Comm. Fault Alarm (FOU1~4) System Dry ALM 6
7	**ACTIVE SYSTEM COMPONENT MALFUNCTION**	Same as "ACTIVE RF-EMITTING DEVICE MALFUNCTION" System Dry ALM 7
8	**Blank**	Blank

Table 13: UL2524 Oct 2018 Alarm Preset Dry Contact and LED Operation

LED/Dry Contact	UL2524 OCT 2018	Default Alarm Configuration
1	**AC Input Normal**	AC Normal System Dry ALM 1
2	**Loss of normal AC power**	AC Lost Alarm System Dry ALM 2
3	**Loss of battery capacity**	Battery Low Alarm Battery Connection Fail Alarm Battery Over Temperature Alarm Battery Comm. Fault Alarm Battery Over Discharge Alarm System Dry ALM 3
4	**Battery charger failure**	Charger Fault Alarm Charger Comm. Fault Alarm System Dry ALM 4
5	**Active RF-emitting device malfunction**	PA Alarm 700/800 DL/UL DL P_in Over Alarm 700/800 DL DL P_out Over Alarm 700/800 DL LNA Alarm 700/800 DL/UL Oscillation Shutdown Alarm Oscillation Gain Reduction Alarm PLL Alarm Digital Clock Alarm VSWR Alarm DL 700/800 Over Temperature Alarm System OP TX Alarm System OP RX Alarm FOU Comm. Fault Alarm (FOU1~4) System Dry ALM 5
6	**Donor antenna malfunction**	DT ANT Disconnection Alarm System Dry ALM 6
7	**System component malfunction**	Same as “Active RF-emitting device malfunction” System Dry ALM 7
8	**Donor antenna disconnection**	DT ANT Disconnection Alarm System Dry ALM 8

Table 14: NFPA 1225 2022 Alarm Preset Dry Contact and LED Operation

LED/Dry Contact	NFPA 1225 2022	Default Alarm Configuration
1	**NORMAL AC POWER**	AC Normal System Dry ALM 1
2	**LOSS OF NORMAL AC POWER**	AC Lost Alarm System Dry ALM 2
3	**BATTERY-CHARGER FAILURE**	Charger Fault Alarm Charger Comm. Fault Alarm System Dry ALM 3
4	**LOW-BATTERY CAPACITY**	Battery Low Alarm Battery Connection Fail Alarm Battery Over Temperature Alarm Battery Comm. Fault Alarm Battery Over Discharge Alarm System Dry ALM 4
5	**SIGNAL SOURCE MALFUNCTION**	DT ANT Disconnection Alarm System Dry ALM 5
6	**ACTIVE RF-EMITTING DEVICE MALFUNCTION**	PA Alarm 700/800 DL/UL DL P_in Over Alarm 700/800 DL DL P_out Over Alarm 700/800 DL LNA Alarm 700/800 DL/UL Oscillation Shutdown Alarm Oscillation Gain Reduction Alarm PLL Alarm Digital Clock Alarm VSWR Alarm DL 700/800 Over Temperature Alarm System OP TX Alarm System OP RX Alarm FOU Comm. Fault Alarm (FOU1~4) System Dry ALM 6
7	**ACTIVE SYSTEM COMPONENT MALFUNCTION**	Same as “ACTIVE RF-EMITTING DEVICE MALFUNCTION” System Dry ALM 7
8	**Blank**	Blank

Table 15: IFC 510 2021 Alarm Preset Dry Contact and LED Operation

LED/Dry Contact	IFC 510 2021	Default Alarm Configuration
1	**LOSS OF NORMAL AC POWER SUPPLY**	AC Lost Alarm System Dry ALM 1
2	**SYSTEM BATTERY CHARGER(S) FAILURE**	Charger Fault Alarm Charger Comm. Fault Alarm System Dry ALM 2
3	**MALFUNCTION OF THE DONOR ANTENNA(S)**	DT ANT Disconnection Alarm System Dry ALM 3
4	**FAILURE OF ACTIVE RF-EMITTING DEVICE(S)**	PA Alarm 700/800 DL/UL DL P_in Over Alarm 700/800 DL DL P_out Over Alarm 700/800 DL LNA Alarm 700/800 DL/UL Oscillation Shutdown Alarm Oscillation Gain Reduction Alarm PLL Alarm Digital Clock Alarm VSWR Alarm DL 700/800 Over Temperature Alarm System OP TX Alarm System OP RX Alarm FOU Comm. Fault Alarm (FOU1~4) System Dry ALM 4
5	**LOW-BATTERY CAPACITY AT 70% REDUCTION OF OPERATING CAPACITY**	Battery Low Alarm Battery Connection Fail Alarm Battery Over Temperature Alarm Battery Comm. Fault Alarm Battery Over Discharge Alarm System Dry ALM 5
6	**FAILURE OF CRITICAL SYSTEM COMPONENTS**	Same as “FAILURE OF ACTIVE RF-EMITTING DEVICE(S)System Dry ALM 6
7	**ERRCS ANNUNCIATOR PANEL COMMUNICATION ALARM**	AP Comm. Fault Alarm (AP1~4) System Dry ALM 7
8	**OSCILLATION OF ACTIVE RF-EMITTING DEVICE**	Oscillation Shutdown Alarm Oscillation Gain Reduction Alarm System Dry ALM 8

4.4 USER DEFINED DRY CONTACT AND LED ALARM CONFIGURATION

In some cases, the user may require an alarm configuration that is not consistent with one of the available alarm presets. For the user to customize Dry Contact and LED alarm operation, they must access the web GUI and choose the “User Defined” option in the device Dry Contact preset dropdown. Once this option has been selected, the user can change the Dry Contact alarm name and configurations from the settings table. Each Dry Contact alarm can now be custom named and configured to trigger upon any system alarm the user chooses.

Figures 64 and 65 below are examples of how to configure a “User Defined” alarm option.

- In the BDA/MU/RU, navigate to <Device – Overview - External/Dry Contact ALM> and click on <Modify> in the Dry Contact Alarm Preset row.
- Change a specific alarm name by clicking on the blue text in the Dry Contact Alarm row.
- Click on <Modify> in an alarm row to select which internal system alarms will activate the alarm.

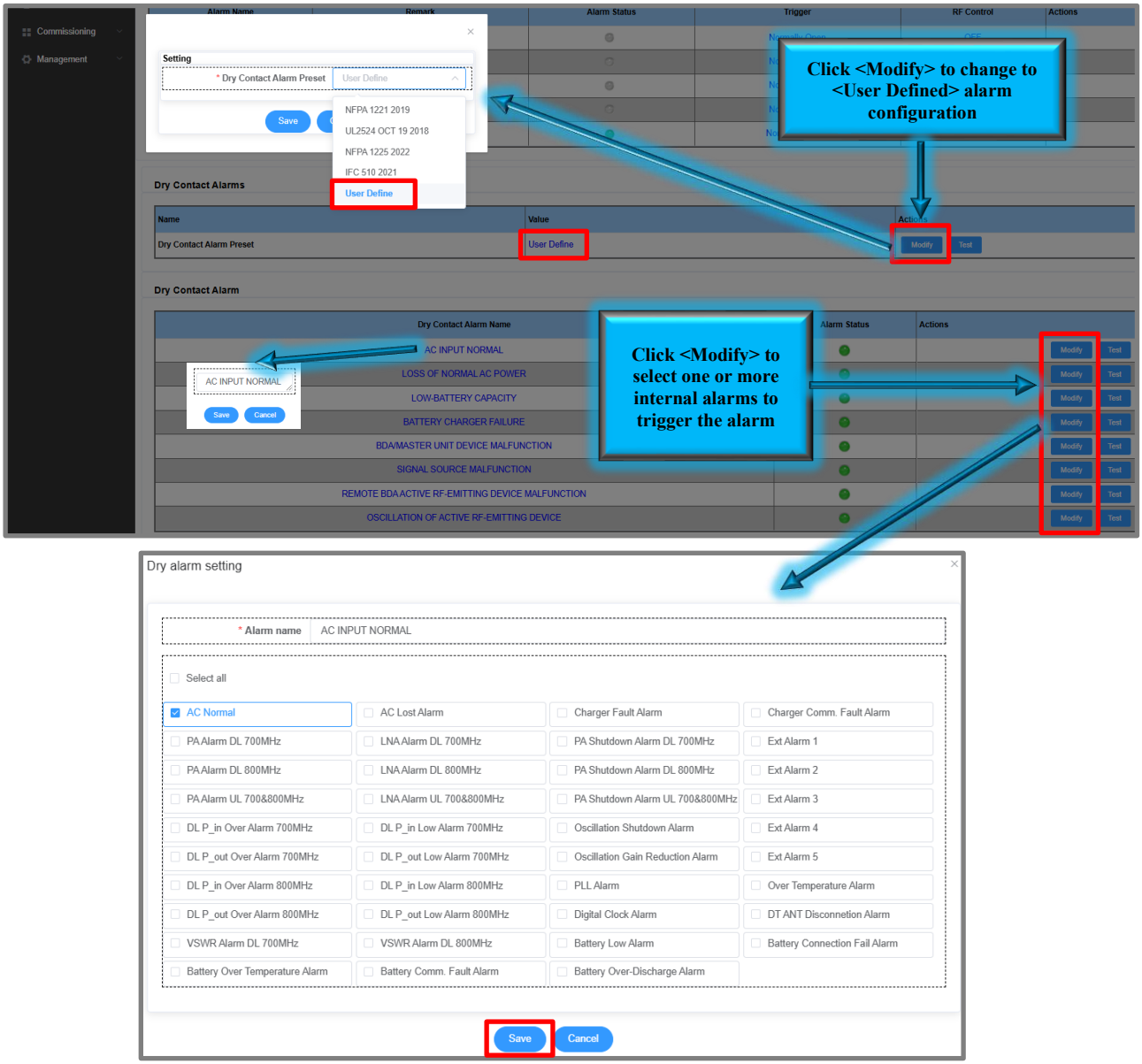


Figure 64: V3 BDA/MU/RU - User Defined Dry Contact Alarm Setup

4.5 EXTERNAL ALARMS

In some cases, the user may require incorporating external device alarms into the DAS solution and have them monitored at the FACP and displayed on the AP. An example would be a third-party bias-T system required to monitor a donor antenna or a room high-temp alarm. These third-party device alarm outputs can be connected to an external alarm input of the BDA/MU/RU device for the purpose of monitoring and sending out an alarm. Once an external input is enabled in the web GUI, configure the alarm on the Dry Contacts and AP LEDs by activating the external alarm within the Dry Contact. Figure 65 below is an example of how to configure the Dry Contact you wish to map the External Alarm. For further details, see the V3 BDA/DAS User Manual.

- Navigate to Device –> Overview -> External/Dry Contact ALM

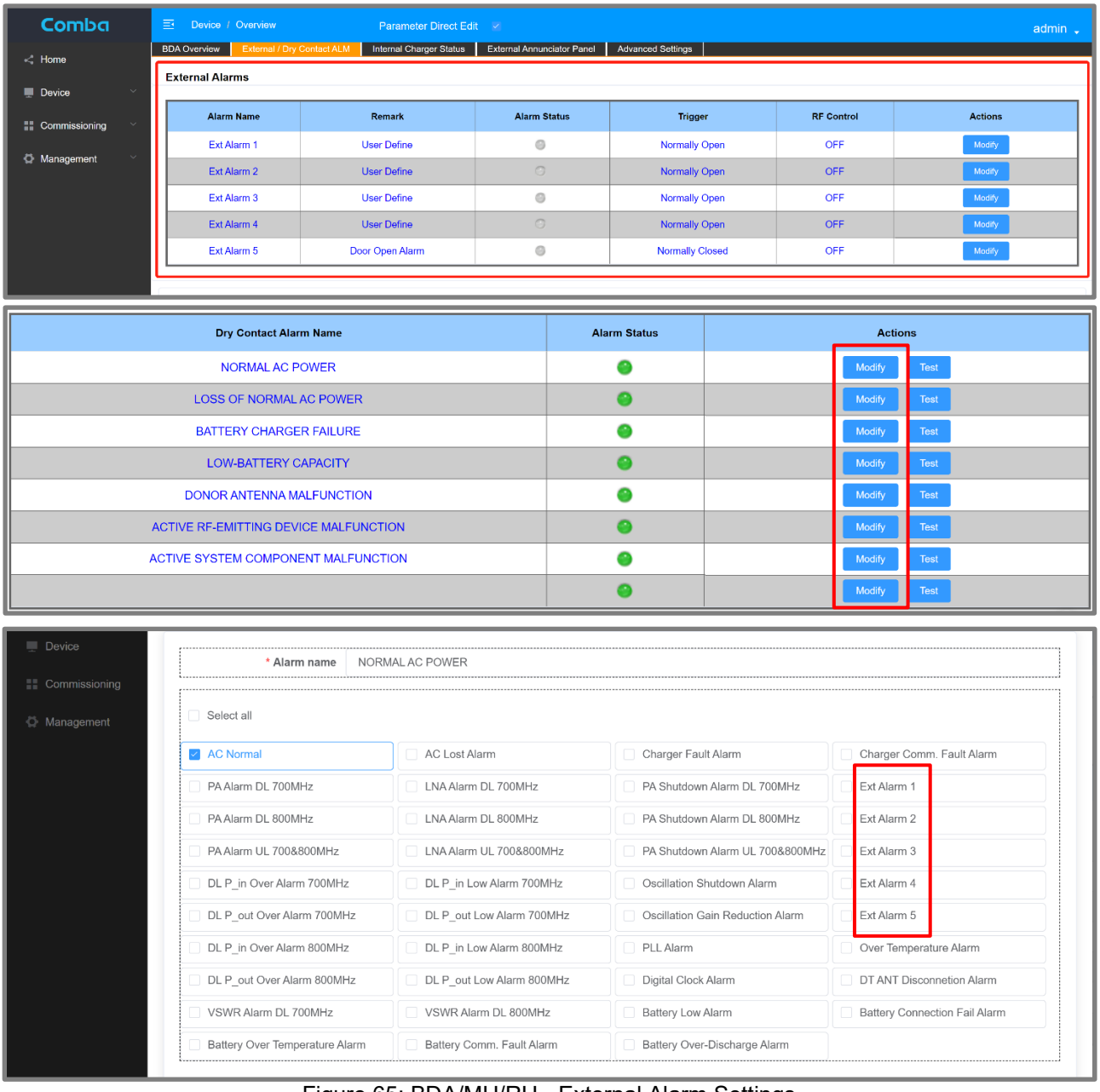


Figure 65: BDA/MU/RU - External Alarm Settings

4.6 V3 AP SILENCE AND LAMP TEST

The V3 AP models have both a Silence button and a Lamp Test button. The Silence button can be used to mute the buzzer after an alarm is activated. After a user defined period, the alarm buzzer will sound again. Furthermore, if a new alarm becomes active after the Silence button has been pushed, the buzzer will sound to indicate a new alarm is present. The Lamp Test button is used to test all the LEDs on the annunciator front panel. Since most of the time these LEDs remain off, a Lamp Test can check that all LEDs are still working as intended. To Silence an alarm or perform a Lamp Test, you must first activate the Key Switch with the key that is provided in the accessory kit. Refer to Figure 66 below.

To Silence an alarm:

- Insert key into Key Switch and turn 90 degrees clockwise.
- Hold the Silence button for 1s.

To perform a Lamp Test:

- Insert key into Key Switch and turn 90 degrees clockwise.
- Hold the Lamp Test button down for 5s. All the LEDs will illuminate. Release the button and the LEDs will clear.

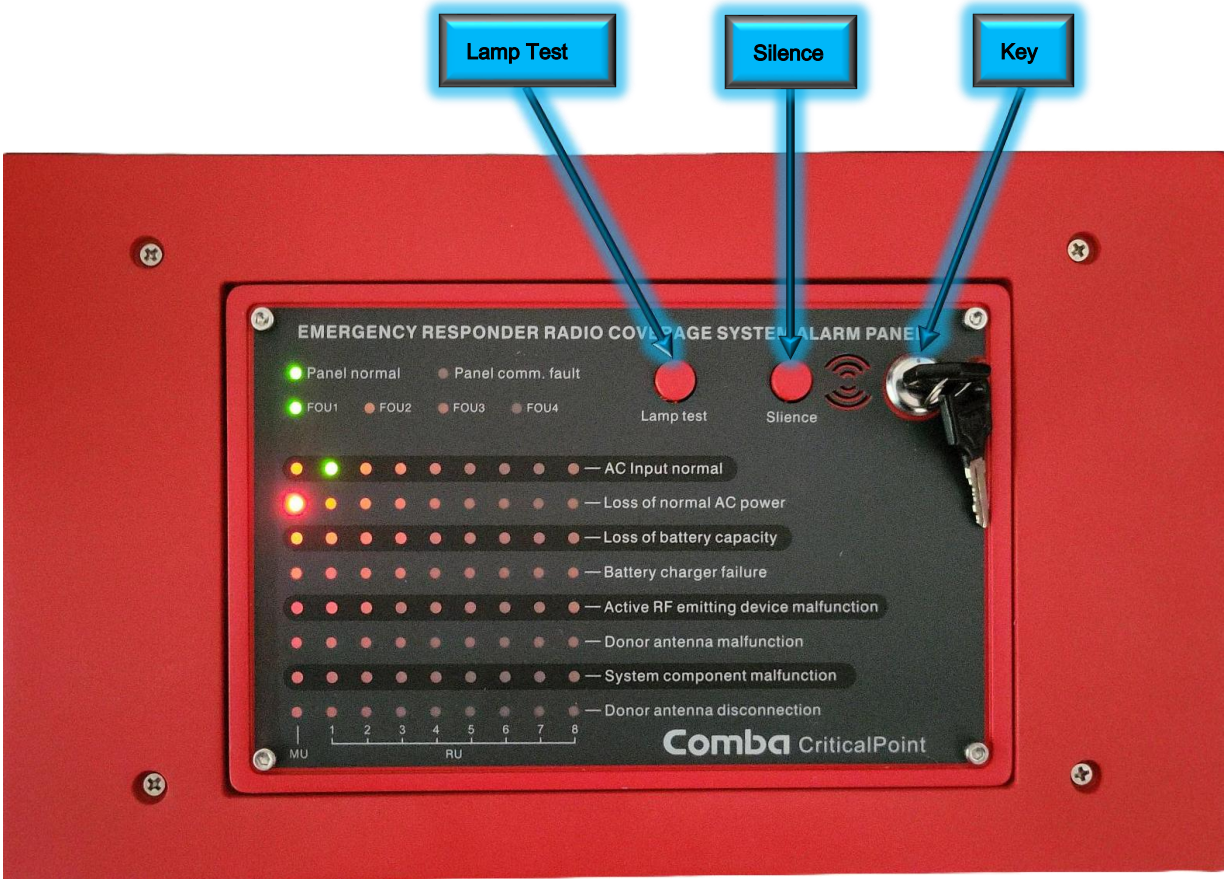


Figure 66: V3 AP - Silence Button, Lamp Test Button, and Key Switch

4.7 V3 AP ALARM SIMULATIONS

See Comba V3 BDA/BBU/DAS User Manual for details on simulating system alarms.

4.8 V3 AP TROUBLESHOOTING

If the V3 Annunciator Panel fails to power on or does not appear in the web GUI after running the detection process, check and verify proper wiring per the installation section of this manual. If wiring has been verified, and issues persist, use a multimeter to measure the terminal voltages and resistances at the BDA/MU/RU to confirm they are within factory specifications. See Figure 67 showing the V3 BDA/MU/RU RS485 Annunciator terminals. Detailed procedures and acceptable values are provided in the instructions and factory specifications tables below. For comprehensive guidance on troubleshooting general system alarms, refer to the Comba V3 BDA/BBU/DAS User Manual.

V3 BDA/MU/RU Annunciator Panel Terminal Measurements:

- Verify that the V3 BDA/MU/RU is powered ON and that the annunciator panel is correctly wired.
- Measure the voltage between terminal pins **B** and **GND**. Compare to factory specifications.
- Measure the voltage between terminal pins **A** and **GND**. Compare to factory specifications.
- Power OFF the V3 BDA/MU/RU.
- Disconnect all three (3) data wires (A, B, GND) connected to the V3 BDA/MU/RU or remove the phoenix connector so the BDA/MU/RU terminals can be measured without connection.
- With the BDA/MU/RU still OFF, measure the resistance between terminal **B** and **GND**. Compare to factory specifications.
- With the BDA/MU/RU still OFF, measure the resistance between terminal **A** and **GND**. Compare to factory specifications.
- With the BDA/MU/RU still OFF, measure the resistance between terminals **B** and **A**. Compare to factory specifications.

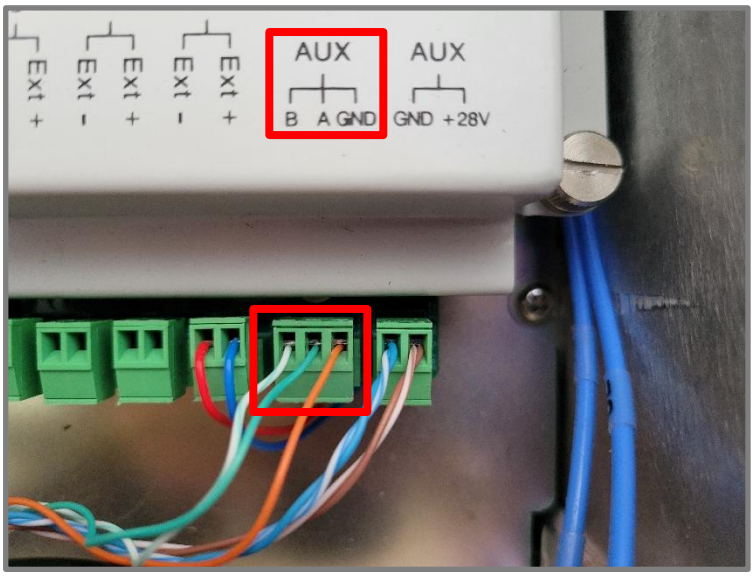


Figure 67: V3 AP Troubleshooting - V3 BDA/MU/RU RS485 Terminal Measurements

Table 16: V3 AP Troubleshooting - V3 BDA/MU/RU AUX RS485 Voltage Specifications

Terminals	Voltage
B to GND	~ 0.0 VDC
A to GND	~ 3.2 VDC

Table 17: V3 AP Troubleshooting – V3 BDA/MU/RU AUX RS485 Open-Circuit Resistance Specifications

Terminals	Resistance
B to GND	~ 2.3k Ohms
A to GND	~ 3.5k Ohms
B to A	~ 6.3k Ohms

If all BDA/MU/RU AUX RS-485 Annunciator Panel terminal measurements are confirmed to be within specification, proceed with the steps below to troubleshoot the V3 Annunciator Panel itself. Also, see Figure 68 and Table 18 below for more details.

V3 Annunciator Panel Terminal Measurements:

- The following measurements are to be made with the V3 AP disconnected from the V3 BDA/MU/RU. Power down the V3 BDA/MU/RU and disconnect the phoenix connectors associated with the V3 AP.
- Measure the resistance between terminal **B** and **GND (White/Green** and **Orange)**. Compare to factory specifications.
- Measure the resistance between terminal **A** and **GND (Green** and **Orange)**. Compare to factory specifications.
- Measure the resistance between terminal **B** and **A (White/Green** and **Green)**. Compare to factory specifications.

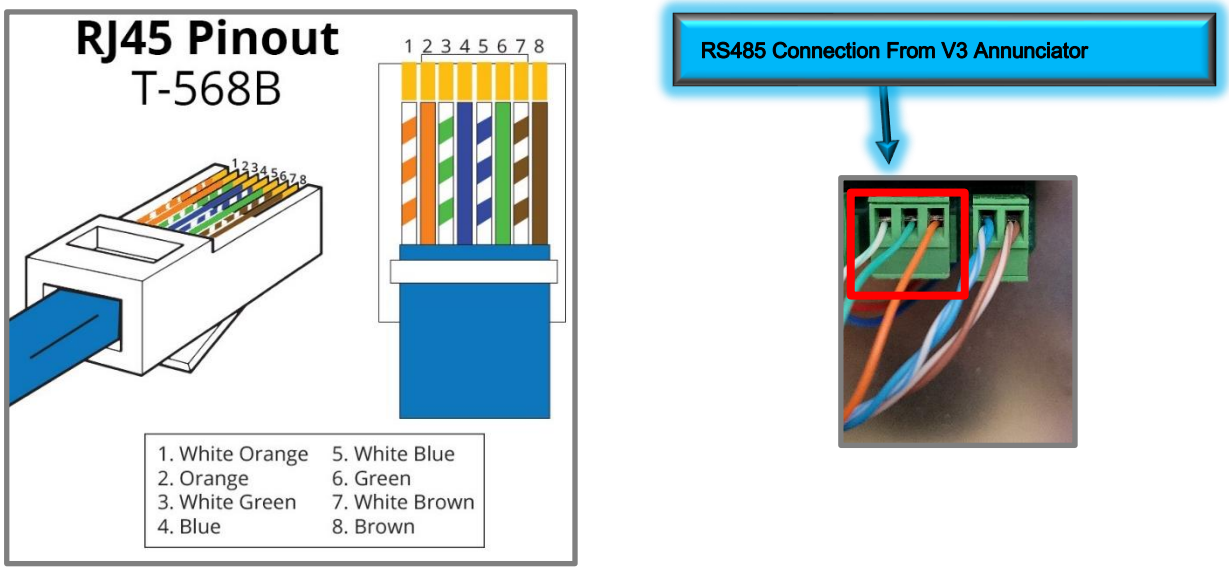


Figure 68: V3 AP Troubleshooting – V3 AP RS485 Terminal Measurements

Table 18: V3 AP Troubleshooting – V3 AP RS485 Open-Circuit Resistance Specifications

Terminals	Resistance
B to GND	~ 2.1k Ohms
A to GND	~ 2.1k Ohms
B to A	~ +/- 140 Ohms

If either the V3 BDA/MU/RU RS485 Terminals or the V3 AP RS485 terminals are measured and are not within factory specification, contact Comba technical support for further troubleshooting.

4.9 V3 AP MAINTENANCE RECOMMENDATIONS

Refer to below for recommended list of items to check when inspecting the V3 AP during a routine maintenance of the system.

- Ensure the device is installed in the same location without any visible damage.
- Check for any visible damage to cabling between the BDA/MU/RU device and the AP.
- Ensure the device is powered and operating by checking the status of the LED indicators.
- Perform a lamp test to ensure all LEDs are still working as intended.
- Simulate a few alarms to ensure proper communication between BDA/MU/RU and AP device.
- Disconnect the RJ45 connection to the BDA/MU/RU device to simulate an AP communication fault. Restore cabling connection and ensure alarm clears.
- Ensure the BDA/MU/RU device has the latest FW installed. The BDA/MU/RU device FW packages have the AP FWs embedded in them, and they are deployed to all the connected APs after the BDA/MU/RU device upgrade has been completed.

End of Section

5 APPENDICES

5.1 APPENDIX A: TOOLS

The following is the recommended list of tools for new installation and routine maintenance.

- Screwdrivers: Flathead and Phillips
- Pliers
- Level
- Tape Measure
- Power drill and drill bits
- Wire cutters
- Wire Strippers
- Craft Knife
- Anti-static Wrist Strap
- Multimeter
- Personal Protective Gear (Recommended. Follow your local codes and company safety policy for PPE. Additional PPE may be required.)
    - Hard Hat or Bump Cap
    - Protective Gloves
    - Foot Protection
    - Safety Glasses
    - Personal Fall Protection System (Installing at height)
    - Scissor Lift or Scaffolding (Installing at Height)

5.2 APPENDIX B: DECLARATION OF HARMFUL SUBSTANCES AND CONTENT

Product Name: Public Safety Annunciator Panel Version 3

Model: APV3

Harmful substance and content of this product as below table shown:

Part Name	Harmful Substance					
	Pb	Hg	Cd	Cr (VI)	PBB	PBDE
A	×	○	○	○	○	○
B	×	○	○	○	○	○

Note: Above table complies with SJ/T 11364.

○: Indicates that the harmful substance content in all homogeneous materials for corresponding part is under the limited requirement of GB/T 26572.

×: Indicates that the harmful substance content in at least one single, homogeneous material for the corresponding part exceeds the limited requirement of GB/T 26572.

Remark: The content of the parts marked with "×" above exceeds the requirement as there is still no mature alternative technologies to achieve the replacement of poisonous and harmful materials or elements.

5.3 APPENDIX C: DEVICE PACKING LIST EXAMPLE

PACKING LIST

BATCH NO. :

NO	Description	Model	QTY	Remarks
1	Public Safety Bi-Directional Amplifier V3	RX78V3	1	

ACCESSORIES INCLUDED

NO	Description	Item code	QTY	Remarks
2	1/2" Liquid Tight Connector	M22X1.5 Cable Gland	3	
3	3/4" Liquid Tight Connector	PG21C, Cable Gland	1	
4	6AWG, 2m Ground Wire	6AWG, 2m Ground Wire	1	
5	UL2524 2018 Alarm Plate	RX-1122D7W-5831	1	
6	NFPA 1225 2022 Alarm Plate	RX-1122D7W-5832	1	
7	IFC 510 2021 Alarm Plate	RX-1122D7W-5833	1	
8	Blank Alarm Plate	RX-1122D7W-5846	1	
9	Door Key	Door Key	2	
10	Security Mounting Screw	M8 x 30, Hexagon socket head combination	1	
11	6mm, Hexagonal wrench	6mm, Hexagonal wrench	1	
12	Spare screw sets for Mounting Bracket	M8 x 16, Hexagon socket head bolt (T)	2	
13	Spare screw sets for Alarm Plate	M3 x 10, GB 9074.4	4	
14	USB Flash Drive	USB Flash Drive	1	
15	Installation Guide	Installation Guide	1	

Completeness Check: _____ **Validated:** _____ **Date:** _____

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