



**For the DVC Digital Voice  
Command System  
DAA2 and DAX  
Amplifiers  
Manual**

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# Fire Alarm & Emergency Communication System Limitations

*While a life safety system may lower insurance rates, it is not a substitute for life and property insurance!*

**An automatic fire alarm system**—typically made up of smoke detectors, heat detectors, manual pull stations, audible warning devices, and a fire alarm control panel (FACP) with remote notification capability—can provide early warning of a developing fire. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire.

**An emergency communication system**—typically made up of an automatic fire alarm system (as described above) and a life safety communication system that may include an autonomous control unit (ACU), local operating console (LOC), voice communication, and other various interoperable communication methods—can broadcast a mass notification message. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire or life safety event.

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premises following the recommendations of the current edition of the National Fire Protection Association Standard 72 (NFPA 72), manufacturer's recommendations, State and local codes, and the recommendations contained in the Guide for Proper Use of System Smoke Detectors, which is made available at no charge to all installing dealers. This document can be found at <http://www.systemsensor.com/appguides/>. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons:

**Smoke detectors** may not sense fire where smoke cannot reach the detectors such as in chimneys, in or behind walls, on roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second-floor detector, for example, may not sense a first-floor or basement fire.

**Particles of combustion or "smoke"** from a developing fire may not reach the sensing chambers of smoke detectors because:

- Barriers such as closed or partially closed doors, walls, chimneys, even wet or humid areas may inhibit particle or smoke flow.
- Smoke particles may become "cold," stratify, and not reach the ceiling or upper walls where detectors are located.
- Smoke particles may be blown away from detectors by air outlets, such as air conditioning vents.
- Smoke particles may be drawn into air returns before reaching the detector.

The amount of "smoke" present may be insufficient to alarm smoke detectors. Smoke detectors are designed to alarm at various levels of smoke density. If such density levels are not created by a developing fire at the location of detectors, the detectors will not go into alarm.

Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectronic sensing chambers tend to detect smoldering fires better than flaming fires, which have little visible smoke. Detectors that have ionizing-type sensing chambers tend to detect fast-flaming fires better than smoldering fires. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is necessarily best and a given type of detector may not provide adequate warning of a fire.

Smoke detectors cannot be expected to provide adequate warning of fires caused by arson, children playing with matches (especially in bedrooms), smoking in bed, and violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).

**Heat detectors** do not sense particles of combustion and alarm only when heat on their sensors increases at a predetermined rate or reaches a predetermined level. Rate-of-rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-of-rise feature of each detector should be tested at least once per year by a qualified fire protection specialist. Heat detectors are designed to protect property, not life.

**IMPORTANT! Smoke detectors** must be installed in the same room as the control panel and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/or power. If detectors are not so located, a developing fire may damage the alarm system, compromising its ability to report a fire.

**Audible warning devices such as bells, horns, strobes, speakers and displays** may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building. Any warning device may fail to alert people with a disability or those who have recently consumed drugs, alcohol, or medication. Please note that:

- An emergency communication system may take priority over a fire alarm system in the event of a life safety emergency.
- Voice messaging systems must be designed to meet intelligibility requirements as defined by NFPA, local codes, and Authorities Having Jurisdiction (AHJ).
- Language and instructional requirements must be clearly disseminated on any local displays.
- Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.
- Studies have shown that certain people, even when they hear a fire alarm signal, do not respond to or comprehend the meaning of the signal. Audible devices, such as horns and bells, can have different tonal patterns and frequencies. It is the property owner's responsibility to conduct fire drills and other training exercises to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.
- In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

**A life safety system** will not operate without any electrical power. If AC power fails, the system will operate from standby batteries only for a specified time and only if the batteries have been properly maintained and replaced regularly.

**Equipment used in the system** may not be technically compatible with the control panel. It is essential to use only equipment listed for service with your control panel.

**Telephone lines** needed to transmit alarm signals from a premises to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup radio transmission systems are recommended.

**The most common cause** of life safety system malfunction is inadequate maintenance. To keep the entire life safety system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of NFPA 72 shall be followed. Environments with large amounts of dust, dirt, or high air velocity require more frequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled monthly or as required by National and/or local fire codes and should be performed by authorized professional life safety system installers only. Adequate written records of all inspections should be kept.

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# Installation Precautions

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

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

**CAUTION - System Re-acceptance Test after Software Changes:** To ensure proper system operation, this product must be tested in accordance with NFPA 72 after any programming operation or change in site-specific software. Re-acceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring. All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

**This system** meets NFPA requirements for operation at 0-49° C/32-120° F and at a relative humidity 93% ± 2% RH (non-condensing) at 32°C ± 2°C (90°F ± 3°F). However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a normal room temperature of 15-27° C/60-80° F.

**Verify that wire sizes are adequate** for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

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

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

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

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

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

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

Precau-D1-9-2005

## FCC Warning

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

## Canadian Requirements

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

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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In order to supply the latest features and functionality in fire alarm and life safety technology to our customers, we make frequent upgrades to the embedded software in our products. To ensure that you are installing and programming the latest features, we strongly recommend that you download the most current version of software for each product prior to commissioning any system. Contact Technical Support with any questions about software and the appropriate version for a specific application.

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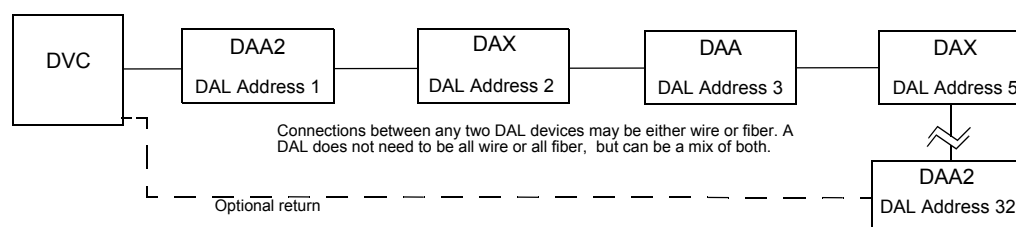
# Section 1: General Information

## 1.1 Overview

This manual describes the DAA2 and DAX digital audio amplifiers, which may be used as devices on a digital audio loop (DAL). It also describes compatible backup amplifiers and fiber option conversion modules. They include:

- DAA2 and DAX digital audio amplifiers, which connect directly to the DAL. These boards each occupy one of the 32 addresses on the DAL.
- BDA backup digital amplifiers, which connect to DAA2 and DAX amplifiers for backup. Alternately, when used with a DAA2 series amplifier, a BDA can be added to support a second audio channel.
- Fiber option modules, which convert DAA2 and DAX boards from wire to fiber, as well as provide compatibility with fiber DVCs and DAAs.

All wire and fiber models of the DVC, DAA2, DAX and DAA are compatible together on a DAL.



**Figure 1.1 DAL (Digital Audio Loop) Block Diagram**

Digital audio amplifiers are backed up by BDAs, or by another amplifier of the same digital type: that is, a DAA2 must be backed up by a BDA or another DAA2, a DAX must be backed up by a BDA or another DAX, etc.

DAA-PCA and -PCB boards are described in Appendix C of this manual..



**NOTE:** For Mass Notification applications, the Class A (Style 7) circuits called out in this manual are Class X.

## 1.2 Standards and Other Documents

The Digital Series products in this manual comply with the following standards:

- NFPA 72 2007 National Fire Alarm Code
- Underwriter Laboratories Standard UL 864
- Underwriter Laboratories of Canada (ULC) ULC-S527-99 Standard of Control Units for Fire Alarm Systems
- Part 15 Class A conducted and radiated emissions as required by the FCC
- UL 2572 Mass Notification Systems Standard

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

### **NFPA Standards**

NFPA 72 2007 National Fire Alarm Code

### **Underwriter Laboratories**

UL 464 Audible Signaling Appliances

UL 864 Standard for Control Unit and Accessories for Fire Alarm Systems

UL 1481 Power Supplies for Fire Protective Signaling Systems

UL 1638 Visual Signaling Appliances - Private-Mode Emergency and General Utility Signaling

UL 1711 Amplifiers for Fire Protective Signaling Systems

UL 60950 Safety of Information Technology Equipment

UL 1971 Signaling Devices for the Hearing Impaired

UL 2572 Mass Notification Systems Standard  
**Underwriters Laboratories of Canada (ULC)**  
 ULC-S527-99 Standard of Control Units for Fire Alarm Systems  
**Other**  
 FCC Part 15 Class A Conducted and Radiated Emissions

## 1.3 Supplemental Documentation

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

VeriFire Tools CD help file and CD pamphlet	VERIFIRE-TCD, 51690
DVC Digital Voice Command Manual	52411
Wire Guide Addendum for Digital Audio Loops	52916ADD
DVC-AO Audio Option Board Installation Document	52728
Heat Dissipation for Cabinets with Digital Audio Products	53645
NFS2-3030 Listing Document	LS10006-051NF-E
NFS2-640 Listing Document	52741LD
AMPS-24 Manual	51907
ACPS-610 Addressable Power Supply Manual	53018
NCA-2 Network Control Annunciator Manual	52482
ONYXWorksI Workstation Manual	52342
DAL Devices Product Information Sheet	52410
AA Series Audio Amplifier Manual	52526
ACS Annunciator Manual	15842
AFAWS Automatic Fire Alarm Warden Station	50705
CFFT-1 Chassis for FireFighter Telephone Product Information Document	53289
FTM-1 Firephone Control Module	156-1391-02
ACT-4 Audio Coupling Transformer	53431
ACT-25 Audio Coupling Transformer	53432
ACT-70 Audio Coupling Transformer	53240
RM-1 Series Remote Microphones	51138
CAB-4 Series Cabinets Installation Instructions	15330
EQ-CAB Series Installation Instructions	53412
RSM-1A Residential Silence Module	156-006-000
AIM-1A Audible Isolation Module	156-006-002
CIM-2A/CSM-1A Isolator and Silencing Modules	156-2200-002
RPJ-1 Remote Paging Jack	15058
FPJ Firefighter Phone Jack	15510

**Related Documentation Table**

## 1.4 Cautions and Warnings

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



**CAUTION:**

INFORMATION ABOUT PROCEDURES THAT COULD CAUSE PROGRAMMING ERRORS, RUNTIME ERRORS, OR EQUIPMENT DAMAGE.



**WARNING:**

INDICATES INFORMATION ABOUT PROCEDURES THAT COULD CAUSE IRREVERSIBLE DAMAGE TO THE CONTROL PANEL, IRREVERSIBLE LOSS OF PROGRAMMING DATA, OR PERSONAL INJURY.

# Section 2: DAA2 Digital Audio Amplifiers

## 2.1 Description

The DAA2 Digital Audio Amplifiers are multi-featured amplifiers with digital audio functionality. They are designed to work with the DVC Digital Voice Command.



**NOTE:** The term DAA2 is used in this manual to refer to all the model versions listed in Table 2.1. Individual part numbers are used to distinguish features or functions that differ.

50 Watt DAA2s	Speaker Circuit Output
DAA2-5025 (120 VAC)	25V <sub>RMS</sub>
DAA2-5025E (220 - 240 VAC)	25V <sub>RMS</sub>
DAA2-5070 (120 VAC)	70V <sub>RMS</sub>
DAA2-5070E (220 - 240 VAC)	70V <sub>RMS</sub>
75 Watt DAA2s	
DAA2-7525 (120 VAC)	25V <sub>RMS</sub>
DAA2-7525E (220 - 240 VAC)	25V <sub>RMS</sub>
NOTE: All boards are wire. They may be converted to fiber by using a fiber option module.	

**Table 2.1 Digital Audio Amplifier Models**



**NOTE:** The term DVC is used in this manual to refer to all DVC wire and fiber model versions. Individual part numbers are used in this manual only to distinguish features or functions that differ. Available models are described in the DVC Digital Voice Command manual.

Refer to Figure 1.1 on page 9 for a simplified illustration of DAL devices on a digital audio loop.



**NOTE:** Speaker placement must be given careful consideration when planning an audio system.

- Place speakers from different DALs (Digital Audio Loops) so they are not within the audible areas of other DALs.
- Carefully consider the audible distance of speakers within a DAL; overlapping audio messages can be confusing.

### 2.1.1 Features

The DAA2 audio amplifiers have the following features:

- 50W total output power at 25V<sub>RMS</sub> (all DAA2-5025 model versions) or 70 V<sub>RMS</sub> (all DAA2-5070 model versions).
- 75W total output power at 25V<sub>RMS</sub> (all DAA2-7525 model versions).
- Two Class A connections for high-level audio output, or alternately, four Class B connections.
- Audio output activation via network control-by-event equations resident within the DVC.
- Isolated alarm bus input, to be used for backup activation of alarm messages when normal digital communication is lost.

- Amplifies one channel of digital audio (two channels using the BDA card as a second channel) and distributes it on up to four outputs.
- Remote microphone paging option with RM-1.
- FireFighter telephone (FFT) riser.
- Auxiliary input for 1.6V<sub>p-p</sub> max. for each circuit when both AUXA L and AUXA R are used, or 3.2V<sub>p-p</sub> max. for one when only one circuit (AUXA L or AUXR) is used, to be used for background music input, an interface with a telephone paging source, or other compatible audio sources. Includes user audio level adjustment feature.
- Uploads and downloads via the DVC. Programmable through VeriFire Tools.
- Up to 106 seconds of Backup Digital message storage (Emergency tone, Non-Emergency tone, and FFT busy tone) for use in the event of communication loss- either standard quality or high quality, from the VeriFire Tools message library or created by the installer.
- Disconnect of deeply-discharged battery (low battery disconnect).
- Backup amplifier options.
- Meets UL THD Distortion requirements for 500 Hz to 4 KHz bandwidth.  
Meets ULC THD Distortion requirements for 400 Hz to 4 KHz bandwidth.

## 2.1.2 Specifications

### CPS-24 Power Supply Board

#### ■ AC Power - TB1

120 VAC 60 Hz input\*

220-240 VAC 50/60 Hz input (“E” versions)\*

\*Maximum AC draw varies by DAA2 model. These draws are given in Appendix A, “AC Current Draw Calculations”, along with a worksheet to determine the actual AC draw.

Recommended 12-14 AWG (1.6 mm O.D.) with 600 VAC insulation.

Fuse: 8 amps, 250V, 5 x 20 mm, Fast-Acting, ceramic. Notifier p/n 12117.

#### ■ Secondary Power 5V and 24V AUX Outputs - TB2

24V AUX:

Power-limited (Class 2): 24V @ 0.5A

Utilizes wire sizes 12-18 AWG (3.31 mm<sup>2</sup> - 2.08 mm<sup>2</sup>)

5V: Future Use

#### ■ Battery Connections - TB3

Supplied cable connections to batteries for CAB-4 and CHS-BH1. For battery sharing, use 12 AWG either in the same cabinet or in conduit for no more than 20 ft (6.09 m).

#### ■ Battery Charger

Current-limited sealed lead acid battery charger which charges two 12 volt batteries in series, up to 200AH. Table 2.2 gives battery-charging capabilities for the DAA2 boards. The charger enable/disable option is available for all DAA2 models.

	Charge Batteries Less Than 26AH	Charge 26AH to < 50AH Batteries	Charge 50AH to 200AH Batteries
DAA2-5025	Yes	Yes	Yes
DAA2-5070	Yes	Yes	Yes
DAA2-7525	Yes	Yes	No

**Table 2.2 Battery Charging Capabilities**

	Charge Batteries Less Than 26AH	Charge 26AH to < 50AH Batteries	Charge 50AH to 200AH Batteries
DAA2-5025 w/ BDA in Group 2 of VeriFire Tools programming*	No	No	No
DAA2-5070 w/ BDA in Group 2 of VeriFire Tools programming*	No	No	No
* Refer to "DAA2-50 Configurations with BDA" on page 72 for further explanation.			

**Table 2.2 Battery Charging Capabilities**

Charger voltage: 27.6 VDC.

For battery calculation worksheet and standby operating times, refer to Appendix B.1, "DAA2 Battery Calculations", on page 84.

Utilizes wire sizes 12-18 AWG.



**NOTE:** A 50 watt DAA2 with 2 groups will have its charger disabled automatically. Groups are explained in the Audio Groups appendix of the DVC Digital Voice Command manual.

When AC power is lost, the deeply-discharged battery cutoff protection will be invoked at 17 volts. The power supply will be disconnected from the batteries. The power supply's normal operation will be restored when AC power returns.

### DAA2-5025/70 and DAA2-7525 Boards

#### ■ Wire Digital Audio Ports A and B - TB2, TB3

Refer to the Wiring Guide, p/n 52916ADD, for acceptable wire types.

EIA-485 format.

Power-limited (Class 2) and supervised.

Refer to Section 5, "Fiber Option Modules", on page 75 for fiber connection information.

When a fiber option module is mounted on a DAA2, it disables the corresponding wire terminals. TB2 (Digital Audio Port A) is disabled when a fiber option board is connected at J9. TB3 (Digital Audio Port B) is disabled when a fiber option board is connected at J10.

#### ■ Alarm Bus - TB4

Power-limited (Class 2) and supervised by source.

Recommended wiring: 14-18 AWG twisted-pair.

Requires 16VDC minimum @ 20mA across the terminals to activate. Nominal 24 VDC.

#### ■ Remote Microphone Interface - TB5

RMI Power - +24VDC, power-limited @ 100mA.

Recommended wiring: 14-18 AWG twisted-pair, Max. 14 AWG.

Nominal AC signal strength  $2.5V_{RMS}$ ,  $3V_{RMS}$  Max.

Power-limited (Class 2).

Supervised.

Max. distance between remote microphone and DAA2: 1000 ft (304.8 m).

#### ■ FFT Riser - TB7

Power-limited (Class 2) output.

Supervised.

Class A or Class B operation.

Class B 2-wire connections require a 3.9k ohm 1/2 watt resistor (P/N R-3.9K).

Max. wiring resistance (including individual telephone zone to last handset) permitted is 50 ohms, 10,000 ft (3048 m) max. wiring distance at 14 AWG to last handset.

### ■ Auxiliary Input A (AUX A) - TB 9

Signal strength from low-level analog audio input (such as background music or telephone paging): 1.6V<sub>p-p</sub> max. for each circuit when both AUX A L and AUX A R are used. 3.2V<sub>p-p</sub> max. for one when only one (AUX A L or AUX A R) is used.

Optional supervision through programming.

Recommended wiring: 14-18 AWG, twisted-pair.

Supervision programmable.

Auxiliary input source must be within 20 ft. ( 6.1 m) of the DAA2, and within the same room.

### ■ Speaker Circuits - TB10, TB11, TB12 and TB13

Power-limited (Class 2) outputs.\*

\* Exception: A DAA2-5070 speaker circuit used with any Canadian Room Isolator module is non-power-limited. Speaker circuit 1 (TB10) can not be used.

DAA2-5025/70 - Each circuit rated up to 50 watts.\*\*

DAA2-7525 - Each circuit rated up to 75 watts.\*\*

\*\*Total wattage may vary. Refer to “BDA Backup Digital Amplifiers” on page 67 for configurations.

Supervision determined by programming.

25V<sub>RMS</sub> - DAA2-5025/DAA2-7525 speaker circuits, 70V<sub>RMS</sub> - DAA2-5070 speaker circuits.

Recommended wiring: 12-18 AWG twisted-pair (shielded recommended).

Class B or Class A:

Class B requires 20k end-of-line resistors (included, P/N ELR-20K).

Class A requires 10k end-of-line resistors (included, P/N R-10K) on the return.

### ■ Backup - BKUP1 (TB14), BKUP2 (TB15), BKUP3 (TB16), BKUP4 (TB17)

High-level audio input.

• 25V<sub>RMS</sub> (DAA2-5025 and DAA2-7525).

• 70V<sub>RMS</sub> (DAA2-5070).

Recommended wiring: 14-18 AWG twisted-pair (shielded recommended).

Supervision:

•Not supervised when inactive. Supervised by backup source when active.

•Must be in the same room or enclosure.

## 2.1.3 DAA2 Layout

### Connection Locations

A DAA2 is comprised of two boards; a larger rear board, and a smaller front power supply board. Figures 2.1 and 2.2 below show the layout.

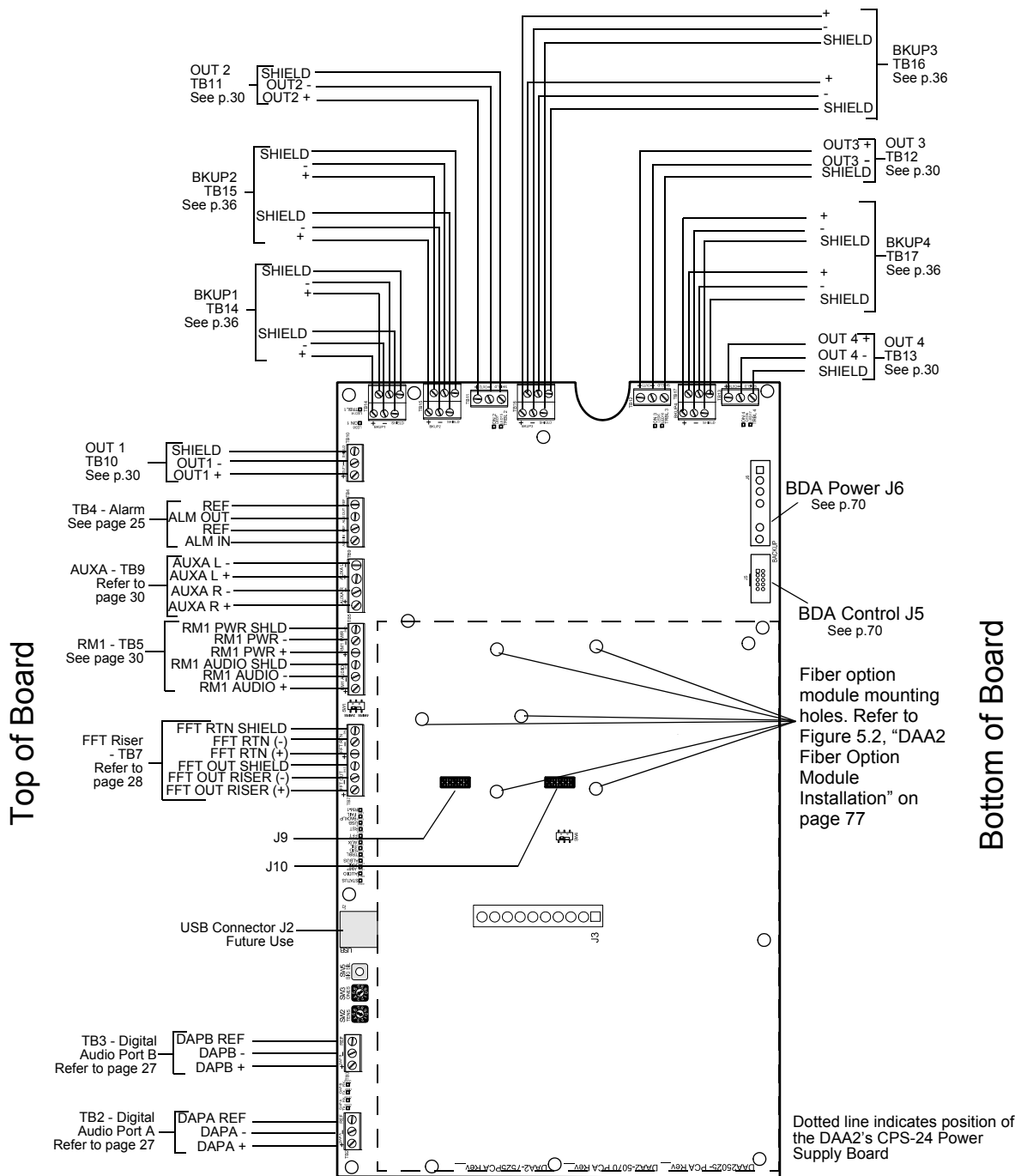


Figure 2.1 DAA2 Rear Board

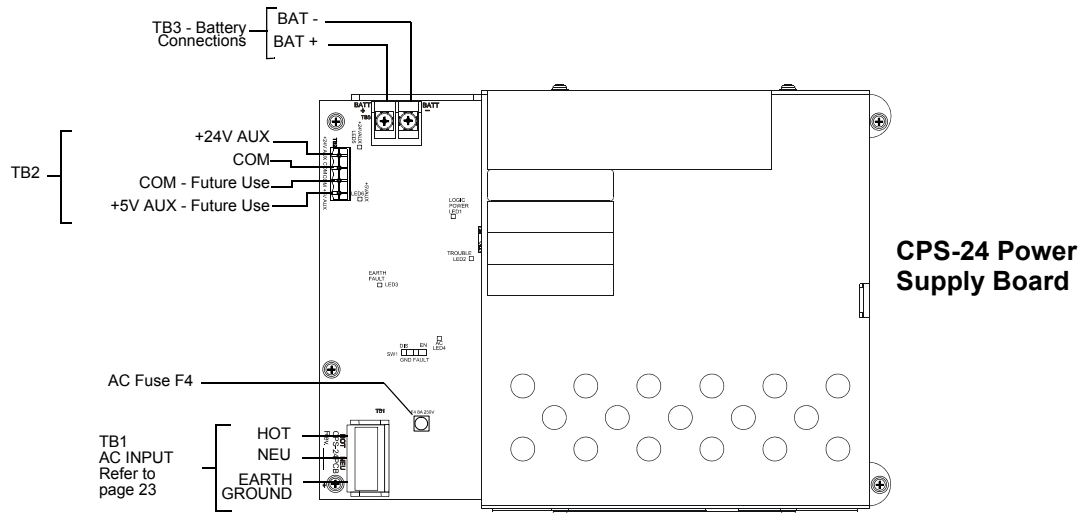


Figure 2.2 DAA2's CPS-24 Power Supply Board



■ Indicator, Jumper and Switch Locations

Switches and LED indicator locations are illustrated in Figure 2.3.

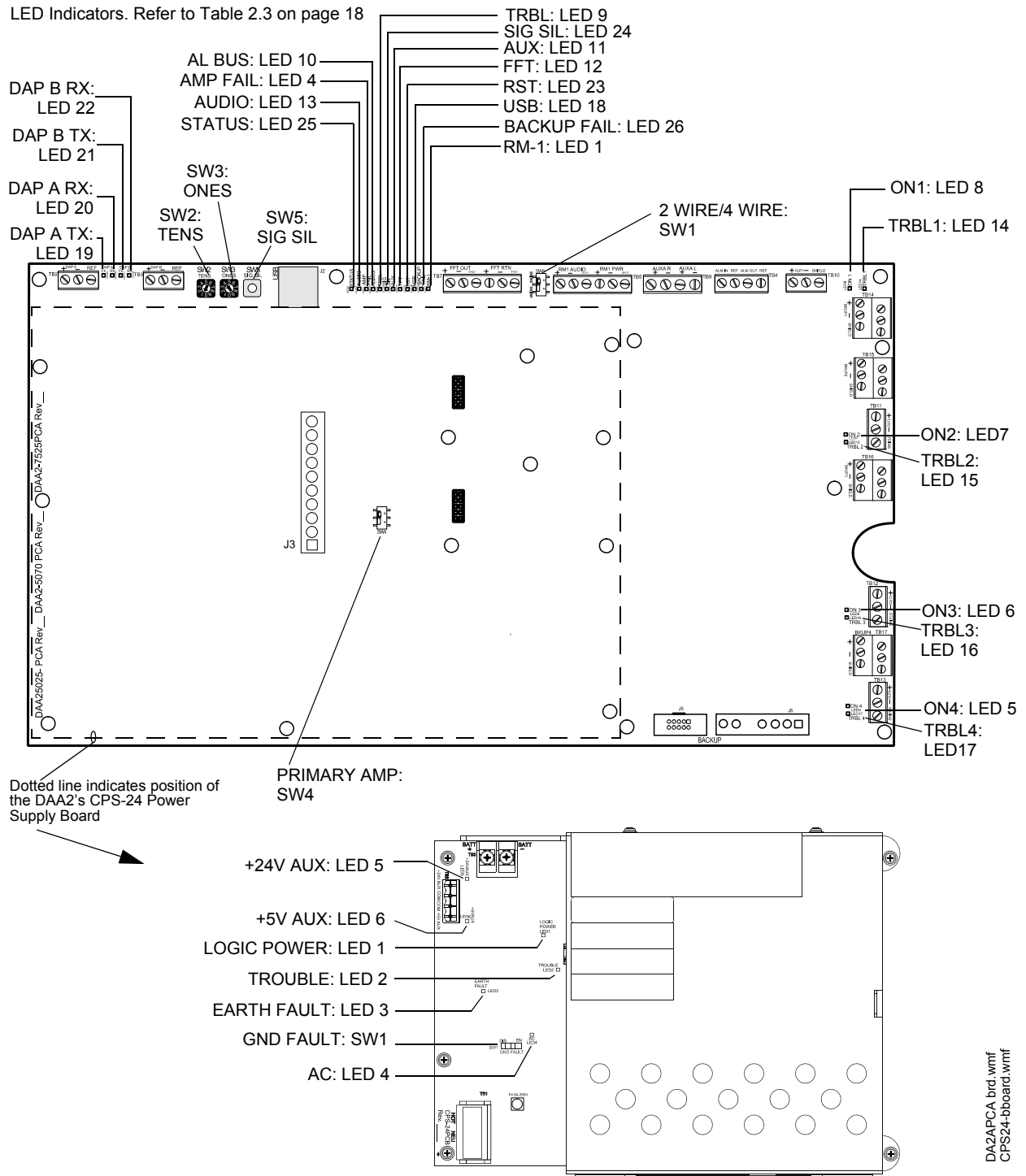


Figure 2.3 LED Indicator, Jumper and Switch Locations

## Indicators

Diagnostic colored LEDs indicate various conditions and troubles. Table 2.3 lists and describes each.

DAA2 Board			
LED Name	Color	Description	LED #
RM-1	Green	Illuminates steadily while the RM-1 has a channel.	1
AMP FAIL	Yellow	Illuminates steadily while audio amplifier failure detected.	4
ON 4	Green	Illuminates steadily while analog signal is on speaker circuit 4, or while 200Hz tone is on speaker circuit 4.	5
ON 3	Green	Illuminates steadily while analog signal is on speaker circuit 3, or while 200Hz tone is on speaker circuit 3.	6
ON 2	Green	Illuminates steadily while analog signal is on speaker circuit 2, or while 200Hz tone is on speaker circuit 2.	7
ON 1	Green	Illuminates steadily while analog signal is on speaker circuit 1, or while 200Hz tone is on speaker circuit 1.	8
TRBL	Yellow	Blinks when there is an unacknowledged trouble, illuminates steadily when a trouble is acknowledged but unresolved.	9
AL BUS	Red	Illuminates steadily while alarm bus input is active.	10
AUX	Green	Illuminates while audio detected on AUX IN A.	11
FFT	Green	Illuminates steadily when the FFT has been granted a digital phone channel. Flashes when an FFT on a DAA2 requests a phone channel.	12
AUDIO	Green	OFF - No audio signal is present. Fast blink (4 times a second) - The DAA2 is receiving audio from the DVC. Slow blink (once a second) - The DAA2 is playing audio from stored backup tones. Steady - The DAA2 is playing audio from its AUX input.	13
TRBL 1	Yellow	Illuminates steadily while a short is detected on speaker circuit 1. Blinks slowly (once a second) while an open is detected. Blinks fast (4 times a second) when this speaker circuit is disabled.	14
TRBL 2	Yellow	Illuminates steadily while a short is detected on speaker circuit 2. Blinks slowly (once a second) while an open is detected. Blinks fast (4 times a second) when this speaker circuit is disabled.	15
TRBL 3	Yellow	Illuminates steadily while a short is detected on speaker circuit 3. Blinks slowly (once a second) while an open is detected. Blinks fast (4 times a second) when this speaker circuit is disabled.	16
TRBL 4	Yellow	Illuminates steadily while a short is detected on speaker circuit 4. Blinks slowly (once a second) while an open is detected. Blinks fast (4 times a second) when this speaker circuit is disabled.	17
USB	Green	Illuminated while communication is established on the USB port. Future Use.	18
DAP A TX	Green	Illuminates while data transmitted on Digital Audio Port A (wire only). Light will flicker, turning on when activity is detected and off when it is not. Does not illuminate for fiber connections. Check the RX and TX LEDs on the fiber option module for activity indication.	19
DAP A RX	Green	Illuminates while data received on Digital Audio Port A (wire only). Light will flicker, turning on when activity is detected and off when it is not. Check the RX and TX LEDs on the fiber option module for activity indication.	20
DAP B TX	Green	Illuminates while data transmitted on Digital Audio Port B (wire only). Light will flicker, turning on when activity is detected and off when it is not. Check the RX and TX LEDs on the fiber option module for activity indication.	21
DAP B RX	Green	Illuminates while data received on Digital Audio Port B (wire only). Light will flicker, turning on when activity is detected and off when it is not. Check the RX and TX LEDs on the fiber option module for activity indication.	22
RST	Yellow	Illuminates when the board is not operational and maintenance is required. Call the factory.	23
SIG SIL	Yellow	Illuminates when the SIG SIL button is pressed to silence local speaker outputs 1 through 4.	24
STATUS	Green	Blinks slowly (once a second) under normal operation, Blinks fast (4 times a second) when the DAA2 is in bootload or diagnostic mode. Does not blink when the board is not operational or starting up. Call the factory if this LED is off for a prolonged period of time.	25
BACKUP FAIL	Yellow	Illuminates for diagnostics of the BDA amplifier.	26
CPS-24 Power Supply Board			
LED Name	Color	Description	LED #

Table 2.3 DAA2 LED Indicators (1 of 2)

DAA2 Board			
LED Name	Color	Description	LED #
LOGIC POWER	Green	+5V logic power is OK.	1
TRBL	Yellow	Software-controlled as follows: – OFF when the following system troubles are not present. – 1 blink - AC FAIL. Priority 1, highest priority. – 2 blinks - HIGH BATTERY. Priority 2. – 3 blinks - LOW BATTERY. Priority 3. – 4 blinks - CHARGER TROUBLE. Priority 4, lowest priority. If multiple troubles are present, the highest priority trouble will blink until cleared, then the next priority trouble will blink until cleared, etc.	2
EARTH FAULT	Yellow	When earth fault switch SW1 is enabled: • Illuminates while earth fault is detected anywhere on the DAA2 except DAP A. • If batteries are shared, illuminates when an earth fault is detected on any non-isolated circuits in the sharing set.	3
AC	Green	AC power is on.	4
+24V AUX	Green	Illuminated while +24V auxiliary power is on.	5
+5V AUX	Green	Future Use	6

Table 2.3 DAA2 LED Indicators (2 of 2)

## Switches

The switches described in Table 2.4 are for configuring the DAA2.

DAA2 Board			
Name	Switch #	Description	Default
2 WIRE/4 WIRE	SW1	Changes FFT Riser indication to 2- or 4-wire, depending on whether the riser is wired Class B or Class A.	2-wire
TENS	SW2	BCD rotary address tens selection switch. Refer to page 40.	0
ONES	SW3	BCD rotary address ones selection switch. Refer to page 40.	0
PRIMARY AMP	SW4	ON is the normal state. OFF will induce an AMP FAIL trouble. Refer to page 41.	ON
SIG SIL	SW5	Pushbutton to silence speaker circuits during communication loss with DVC.	N/A
CPS-24 Power Supply Board			
GND FAULT	SW 1	Ground fault detection switch. When this switch is set to enable it will enable earth fault detection for Digital Audio Port A. Refer to page 40	Enable

Table 2.4 DAA2 Switches

## 2.2 DAA2 Installation

### 2.2.1 Cabinet

The DAA2 arrives from the factory already installed on its chassis. A BDA-25/70V, NCM, or HS-NCM, can be mounted on it. (Refer to Figure 2.5). A CHS-BH1 Battery Chassis may be mounted to the left of the DAA2. The DAA2 chassis mounts in a CAB-4 Series cabinet, as well as in the EQCAB Series backboxes.

Prior to installation,

- Review the installation precautions at the front of this manual.
- Installers should be familiar with the standards and codes specified in “Standards and Other Documents” on page 9.
- Ensure all wiring will comply with national and local codes.

- Review the installation instructions in this section.

**WARNING:**

Wear a static discharge wrist strap to prevent equipment damage.

Locate the cabinet backbox on a surface that is in a clean, dry, vibration-free area. The top should be located so that all operational buttons, switches, displays, etc. are easily accessible and/or viewable to the operator - usually no more than 66 inches (1.7 m) above the floor. Allow sufficient clearance around the cabinet for the door to swing freely, and for easy installation and maintenance of equipment.

Follow the instructions below.

1. Mark and pre-drill two holes for the keyhole mounting bolts. Install bolts.
2. Select and punch open the appropriate cabinet knock-outs. (For selection guidelines, see “UL Power-limited (Class 2) Wiring Requirements” on page 39.)
3. Using the keyholes, mount the backbox on the two bolts.
4. Mark the location of the two lower holes, remove backbox and drill the mounting holes.
5. Mount the backbox over the top two screws, then install the remaining fasteners. Tighten all fasteners securely.
6. Feed wires through appropriate knockouts.
7. Install DAA2 according to the following instructions before installing the door per the CAB-4 Series Cabinet Installation Document.

The DAA2 fills one row of any EQ or CAB-4 series cabinet.

**EQ Series Cabinets and Doors**

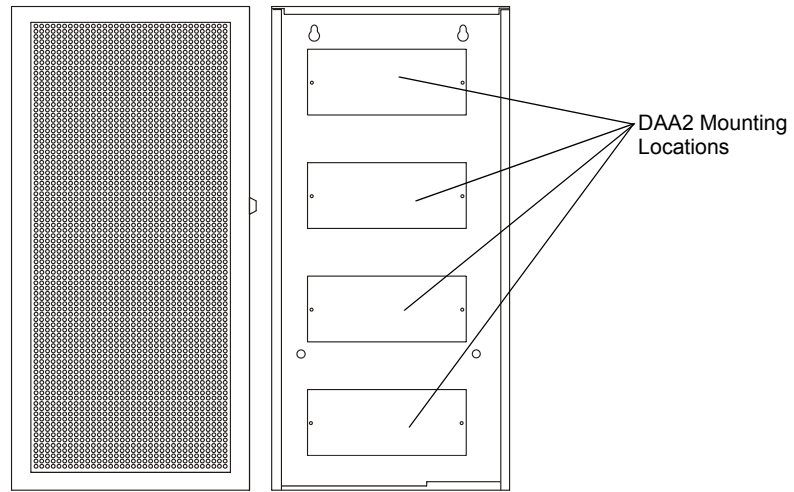
The EQ Series cabinets come in B, C, and D sizes. The row spacing allows DAA2 amplifiers to be mounted in any row, and the doors are equipped with ventilated panels for heat dissipation. The cabinets were designed so that all DAA2 boards can be used in any or all cabinet rows. Batteries must be accommodated in separate cabinets or battery backboxes.

The following models are available:

- EQCAB-D4 - Four rows. Accommodates four DAA2s. Consists of P/Ns EQBB-D4 (black backbox) and EQDR-D4 (black door with ventilated panels).
- EQCAB-C4 - Three rows. Accommodates three DAA2s. Consists of P/Ns EQBB-C4 (black backbox) and EQDR-C4 (black door with ventilated panels).
- EQCAB-B4 - Two rows. Accommodates two DAA2s. Consists of P/Ns EQBB-B4 (black backbox) and EQDR-B4 (black door with ventilated panels).



**NOTE:** Digital amplifiers can produce significant heat during their duty cycles. Different cabinets can handle different amounts of heat. Refer to the Heat Dissipation Calculation document (53645) to determine dissipation figures for the equipment you are installing, and match it with an appropriate cabinet.

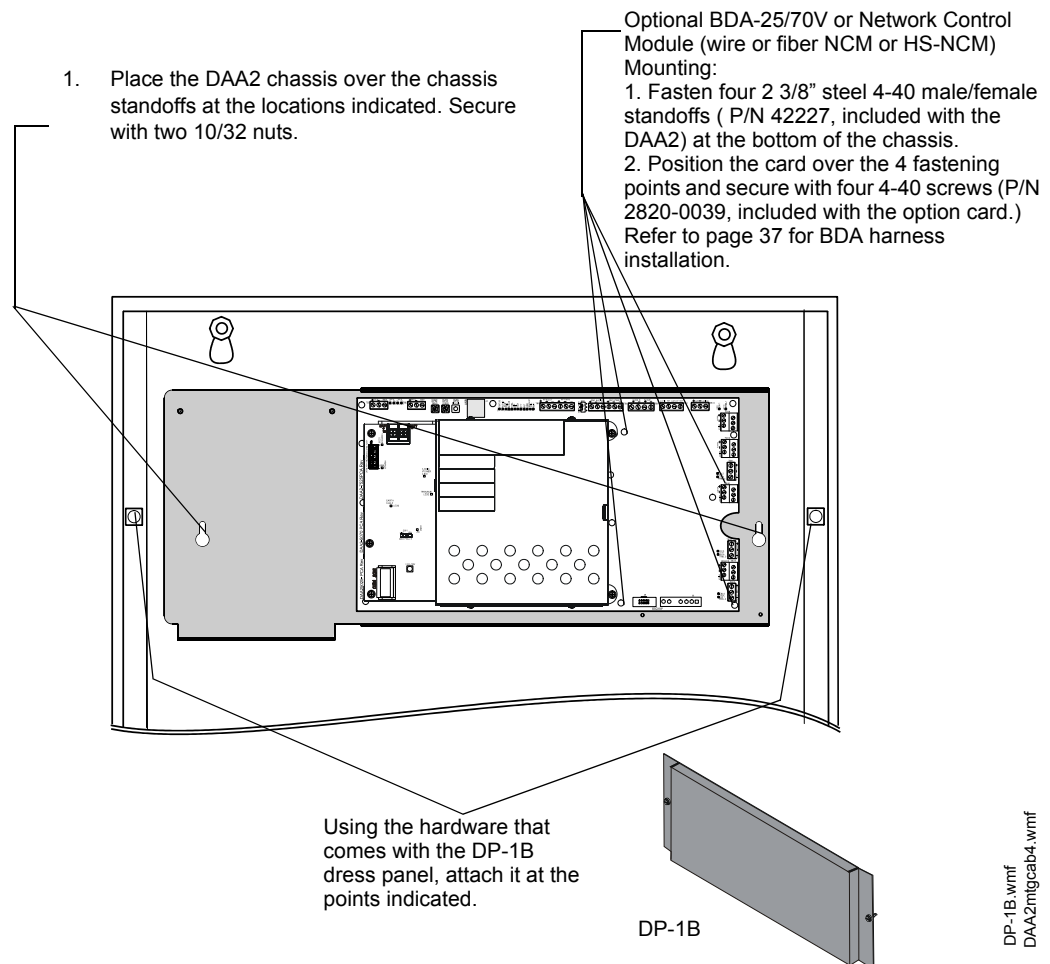


CABDAA\_D4.wmf

**Figure 2.4 EQCAB-D4 Backbox and EQDR-D4 Door**

## CAB-4 Series

Figure 2.5 illustrates a typical DAA2 installation. A DP-1B dress panel, ordered separately, can be used to cover the row.



**Figure 2.5 DAA2 Cabinet Installation**



**NOTE:** Digital amplifiers can produce significant heat during their duty cycles. Different cabinets can handle different amounts of heat. Refer to the Heat Dissipation Calculation document (53645) to determine dissipation figures for the equipment you are installing, and match it with an appropriate cabinet.

## 2.2.2 Batteries



**WARNING:** Batteries contain sulfuric acid which can cause severe burns to the skin and eyes, and can destroy fabrics. If contact is made with sulfuric acid, immediately flush skin or eyes with water for 15 minutes and seek immediate medical attention.

The DAA2 works with two 12 volt batteries. See Appendix B.1, “DAA2 Battery Calculations”, on page 84 for current draw calculations to determine the battery size required for this installation.

Batteries for the DAA2 may be installed in any of the following configurations:

- In a CHS-BH1 battery chassis (12AH batteries only), designed for use with the DAA2 chassis.
- In the bottom of a CAB-4 series cabinet that holds the DAA2.

- In a cabinet adjacent to the cabinet that holds a DAA2, with connections in conduit.

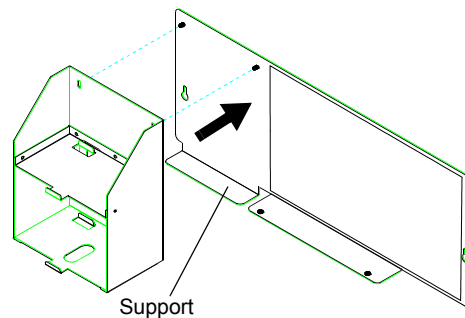
### CHS-BH1 Battery Chassis

This chassis will hold two 12AH batteries, and will mount on the left side of the DAA2 chassis, so that the DAA2 and batteries are contained in a single cabinet row.

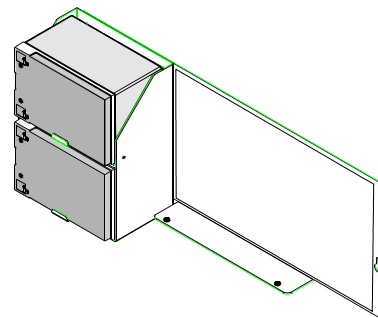
**To mount the CHS-BH1 onto the DAA2 chassis:** Place battery holder against DAA2 chassis, resting on support as shown in Figure 2.6. Align chassis standoffs with holes. Fasten with the two 8/32" hex nuts supplied.

Place the batteries on their sides in their trays before wiring. Refer to "Batteries" on page 24 for wiring instructions.

Place battery holder against DAA2 chassis, resting on support. Align chassis standoffs with holes. Fasten with the two washers (P/N 43123) and 8-32 KEPS hex nuts (P/N 36047) supplied.



Place batteries in the trays.



CHS-BH1watts.wmf  
CHS-BH1toDAAchassis.wmf

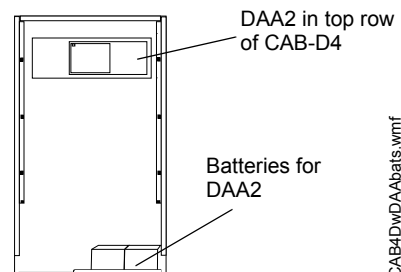
Figure 2.6 Mounting the CHS-BH1

### Within the CAB-4 Enclosure

If the batteries will not be housed in a CHS-BH1, place the batteries in the bottom of the cabinet, as shown in Figure 2.7. Refer to "Batteries" on page 24 for wiring instructions.

### Outside the DAA2 Enclosure

Batteries may be installed outside the DAA2 enclosure. The battery cables must be in conduit between the enclosures for the batteries and the DAA2. Refer to "Batteries" on page 24 for wiring instructions.



CAB4DwDAAbats.wmf

Figure 2.7 Battery Installation Within the Cabinet

## 2.2.3 Wiring

### AC Power



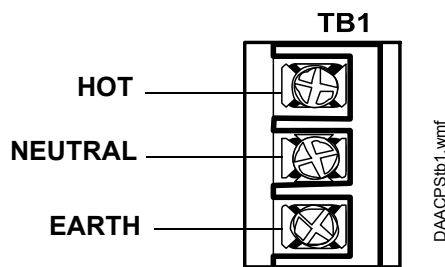
**WARNING:** High Voltages Present.

Use extreme caution when working with the DAA2. High voltage and AC line-connected circuits are present. Turn off and remove all power sources. To reduce the risk of electric shock, make sure to properly ground the DAA2.

Close the hinged cover for TB1 after wiring but before energizing.

The DAA2 power supply requires connection to a separate dedicated AC branch circuit. Follow these guidelines when connecting the AC branch circuit:

- Label the branch circuit “Fire Alarm”.
- Connect the branch circuit to the line side of the main power feed of the protected premises.
- Do not power other equipment from the fire alarm branch circuit.
- Run the AC branch circuit wire continuously, without any disconnect devices, from the power source to the power supply.
- Overcurrent protection for the AC branch circuit must comply with Article 760 of the National Electrical Codes, as well as local codes.
- Use 12-14 AWG (1.6mm O.D.) wire with 600 VAC insulation for the AC branch circuit.



**Figure 2.8 AC Power Connection**

### Connect primary power as follows:

1. Turn off the circuit breaker at the main power distribution panel.
2. Connect the earth ground terminal (TB1 EARTH) to a solid earth ground (a metallic, cold water pipe may be suitable in some installations). This connection is vital to maintaining the power supply's immunity to unwanted transients generated by lightning and electrostatic discharge.
3. Connect the primary power neutral line to the terminal marked NEUTRAL and the primary power AC line to the terminal marked HOT.

## Batteries



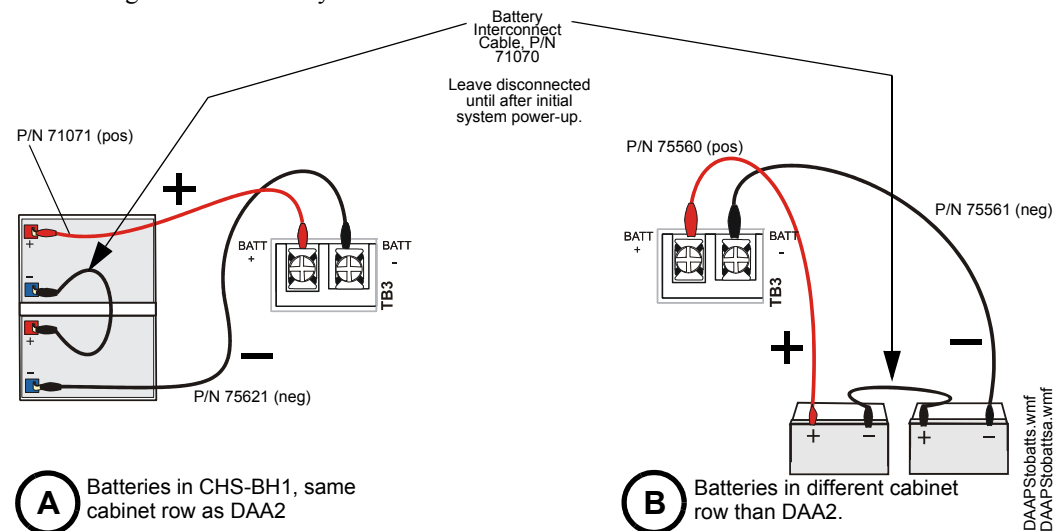
**WARNING:** Do not connect the battery interconnect cable (See Figure 2.9) at this time. Leave the battery interconnect cable disconnected until after initial system power-up.

The DAA2 works with two 12 volt batteries. See Appendix B.1, “DAA2 Battery Calculations”, on page 84 for current draw calculations to determine the battery size required for this installation.

Battery cables (90”, 2.28 m) are included with the DAA2 for battery installation in any CAB-4 series cabinet that includes a DAA2 in one of the rows. Shorter battery cables (18”, 0.5 m) are included with the CHS-BH1. For battery sharing, use 12 AWG wire either in the same cabinet, or in conduit for no more than 20 ft. (6.09 m.).

### ■ Batteries Within the Same Enclosure as the DAA2

Refer to Figure 2.9 for battery connections.



**Figure 2.9 Connecting Batteries to TB3 on the CPS-24**



### ■ Batteries Outside the DAA2 Enclosure

When the batteries are installed outside the DAA2 cabinet, connections are the same as in Figure 2.9. However, the battery cables between the two enclosures must be in conduit and the enclosures must be within 20 feet (6.09 m) of each other within the same room.

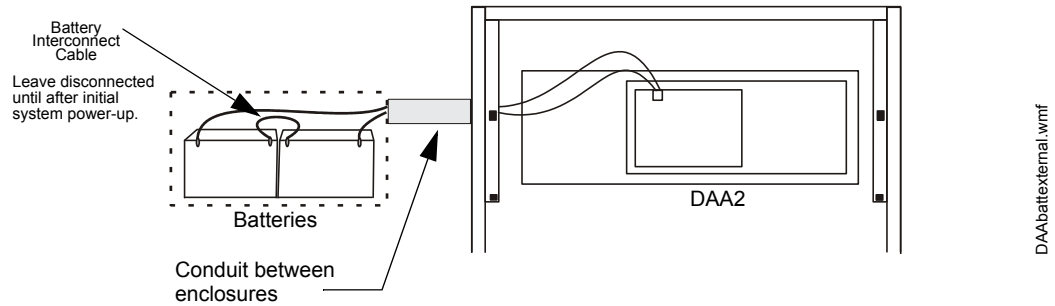


Figure 2.10 Using Conduit

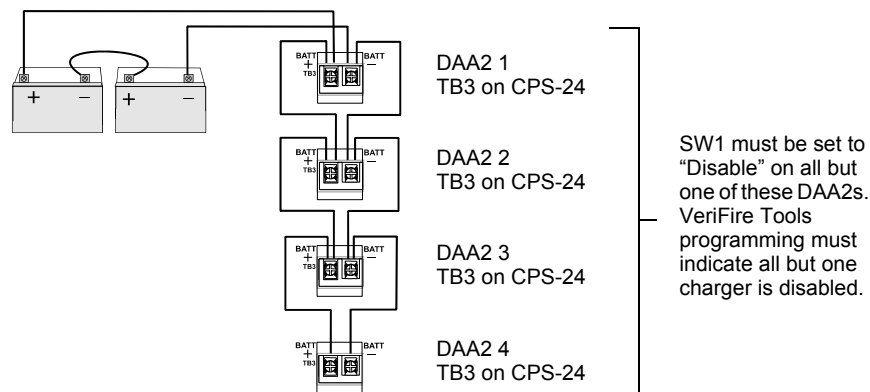
### ■ Battery Sharing

Up to four DAA2s may share a set of batteries. When DAA2s share batteries

- the ground fault switch on the DAA2 power supply (SW1) must be set to “Disable” on all but one DAA2 attached to the set of batteries.
- In VeriFire Tools programming, “Disable Charger” must be checked in the “DAA2 Amplifier Programming Service - General II” screen for all but one DAA2.

The enabled ground fault switch does not have to be on the same DAA2 as the enabled charger.

Connect all DAA2s sharing a set of batteries directly to the batteries using 12 AWG. If the batteries are located outside of the DAA2 cabinet, the wiring must be in conduit that is no greater than 20 ft (6.09 m) long.



If batteries are not in the same cabinet as the DAA2s, wiring must be in conduit that is 20 ft. long (6.09 m) or less.

Figure 2.11 Four DAA2s Sharing Batteries

### Alarm Bus

The DAA2 general alarm connections are used to receive general alarm messages from an FACP via an SLC device, or via the Notification Appliance Circuit of an FACP or power supply.

The Alarm Bus can be used for local activations when the DAA2 has lost communications with the DVC. The Alarm Bus can also be used as a point in logic equations in the local DVC or network DVCs.

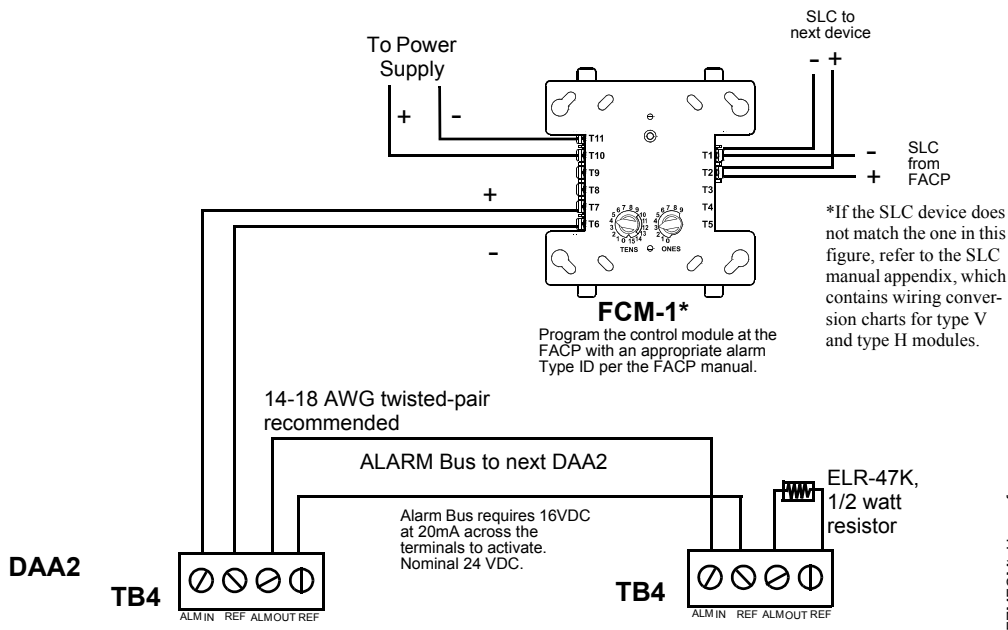


Figure 2.12 Alarm Bus Connections to FCM-1

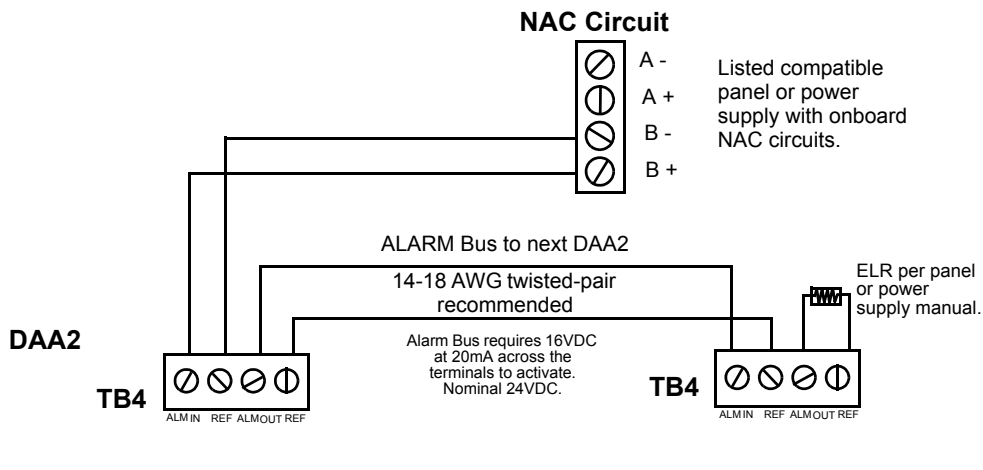


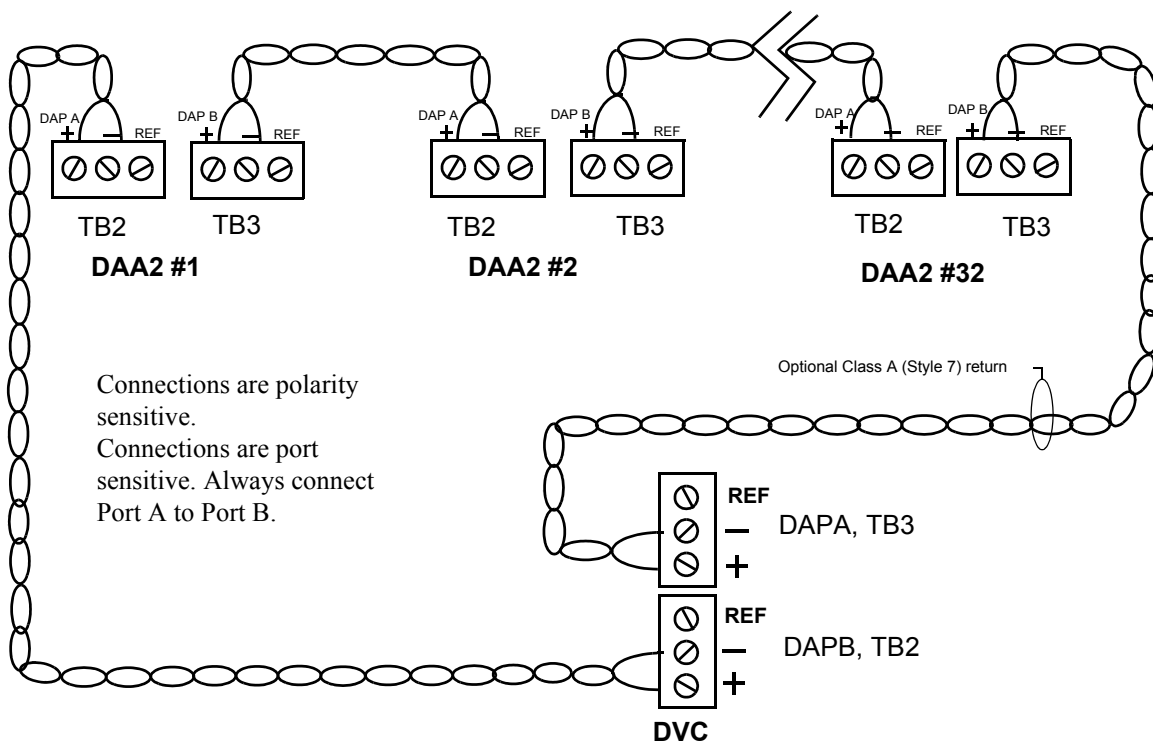
Figure 2.13 Alarm Bus Connections to NAC

Refer to the SLC manual and specific panel or power supply manual for more information.

## Digital Audio Ports A and B, Wire Connections

Digital Audio Ports A and B (DAP A and DAP B) allow digital communication with the DVC over the Digital Audio Loop (DAL); Amplifier programming from the DVC; control, audio, trouble, address and firefighter telephone data; and live voice paging can be communicated through these ports. They may also act as repeaters, in that what is received at one port is transmitted out the other. Events generated at the DAA2 will be transmitted out both ports.

Refer to the Wiring Guide, p/n 52916ADD, for acceptable wire types and associated distances between ports. Do not splice a cable. Splicing will degrade the signal, and the recommended distance will no longer apply.



**Figure 2.14 Wire the DAA2 Digital Audio Loop Connections**



**NOTE:** Digital Audio Ports A and B must be wired in Class B (Style 4) or Class A (Style 7) configuration. Do not wire them in bus configuration.



**NOTE:** Class B (Style 4) configuration must be installed in accordance with the requirements for survivability from attack by fire in the National Fire Alarm Code, NFPA 72.

## Digital Audio Ports A and B, Fiber and Wire/Fiber Connections

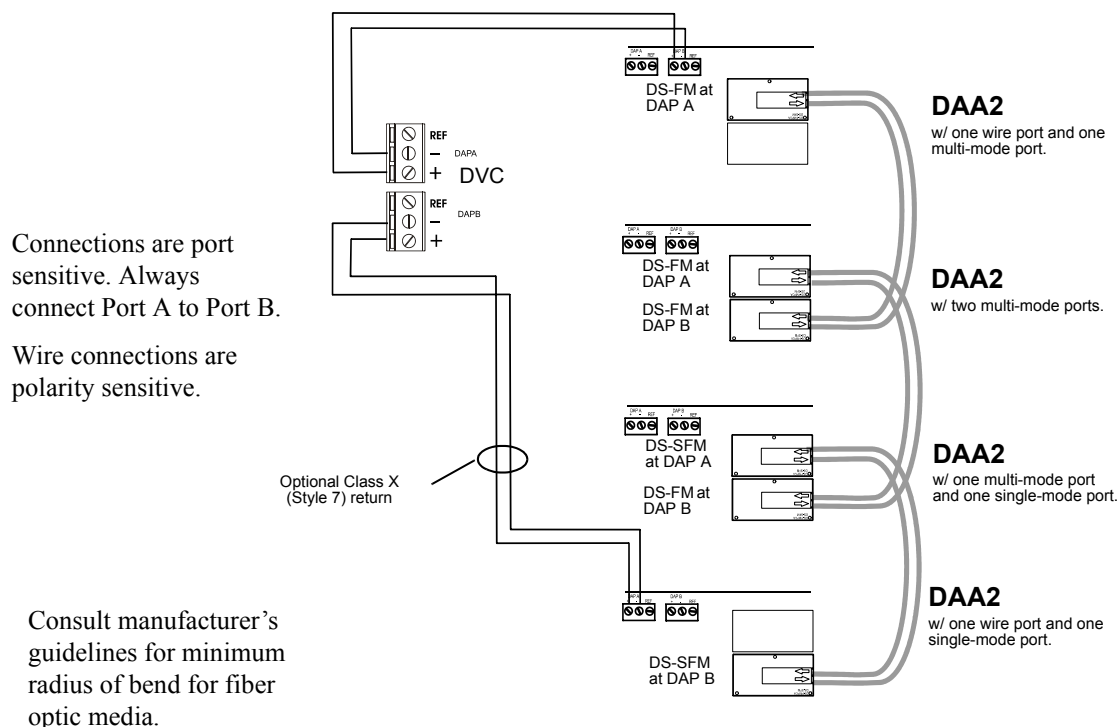
DAA2 boards are wire, but may be converted partially or fully to fiber boards with the use of fiber option modules DS-FM and DS-SFM. (Refer to Section 5.3.1, “DAA2 Installation”, on page 77 for information on installing fiber option modules.) The fiber, or wire/fiber cabling between these ports provides a Digital Audio Loop (DAL) for programming; alarm, control, trouble, automatic audio messages, address and firefighter telephone data; and live voice paging communications.

Figure 2.15 illustrates an example of how a DAL can be formed using mixed wire and fiber connectors.

A DS-RFM fiber module must be used to connect a DAA2 to a multi-mode fiber DVC or DAA. Refer to “Fiber Option Modules” on page 75 for more information on this module.



**NOTE:** If a fiber option module is installed at a DAP, that DAP may *not* also be used for a wire connection.



**Figure 2.15 Fiber/Wire DAL Configuration**



**NOTE:** Style 4 configuration must be installed in accordance with the requirements for survivability from attack by fire in the National Fire Alarm Code, NFPA 72.

## FFT Riser Connections

The Firefighter Telephone Riser connections (TB7) provide for the use of firefighter telephones (FFTs) on an analog network. They are a means of connecting various FFT telephone control modules and devices, such as FTM-1 modules, AFAWS, FPJ or RPJ-1 telephone circuits to the DAA2.

The FFT riser may be wired in NFPA Class A or Class B configuration. For trouble supervision, VeriFire Tools must be used to indicate whether a riser is installed or not. SW1 must be set to indicate whether the wiring is Class A or Class B. (Refer to page 40 for switch settings.) Class B 2-Wire configurations require a 3.9K ohm 1/2 watt end-of-line resistor (P/N R-3.9K). Class A 4-wire configurations have an internal ELR and do not require an external ELR

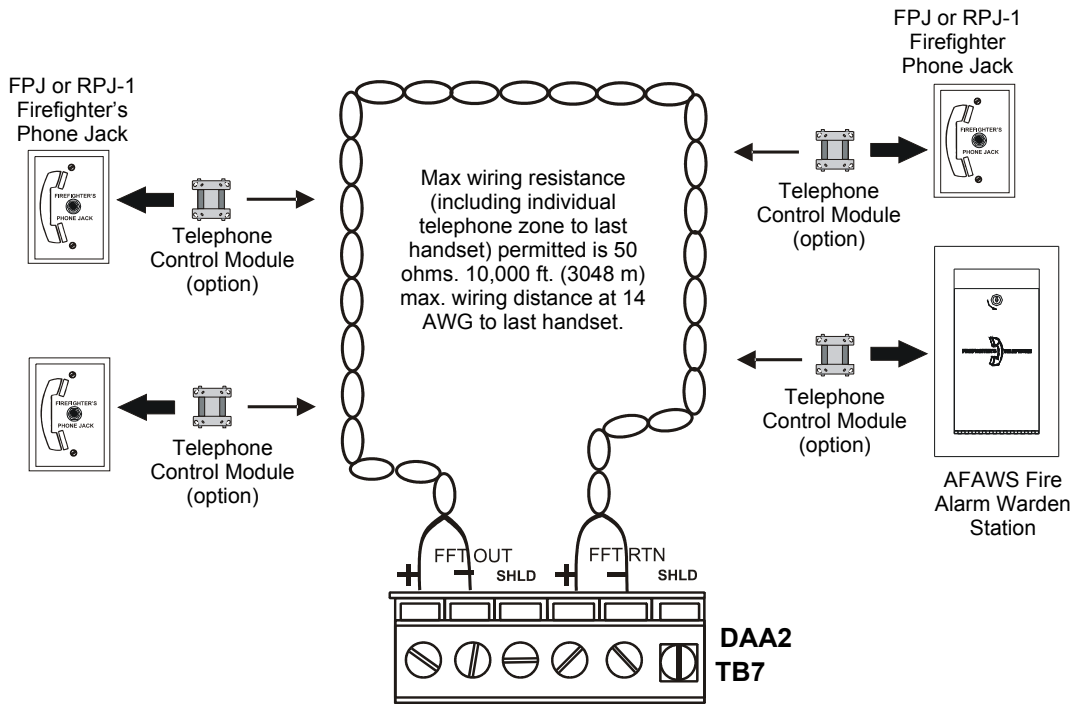
There are two ways that firefighter telephones may be installed on a DAA2 FFT riser. Both configurations have a limit of seven active phones. (Refer to the FFT appendix in the DVC Digital Voice Command manual for more information on limits.)

1. “Install FTM” selected - FireFighter Telephones must be wired to the output of the FTM modules. The telephone points will be SLC addresses.

2. “Install FTM” not selected - FireFighter Telephones must be wired directly to the DAA2 FFT riser. The telephone point will be a DAA2 phone point. (AxT; where x = the DAA2 address.)

Programming must reflect whether the riser contains modules or not. (Refer to the programming section of the DVC Digital Voice Command manual.)

**NOTE:** If an FFT riser is not programmed for modules, telephone modules are not options.



**Figure 2.16 FFT Riser (Class A Example)**

An FHS firefighter handset may be used with the phone jacks in Figure 2.16. For a description of the DVC firefighter telephone network operation, refer to the FFT appendix in the DVC Digital Voice Command manual.

### RM-1 Remote Microphone Interface

The Remote Microphone Interface (RMI, TB5) accomodates one RM-1 Series microphone, providing the DAA2 with remote paging and/or message override capabilities. The RM-1 may be used for paging locally or to Noti-Fire-Net.

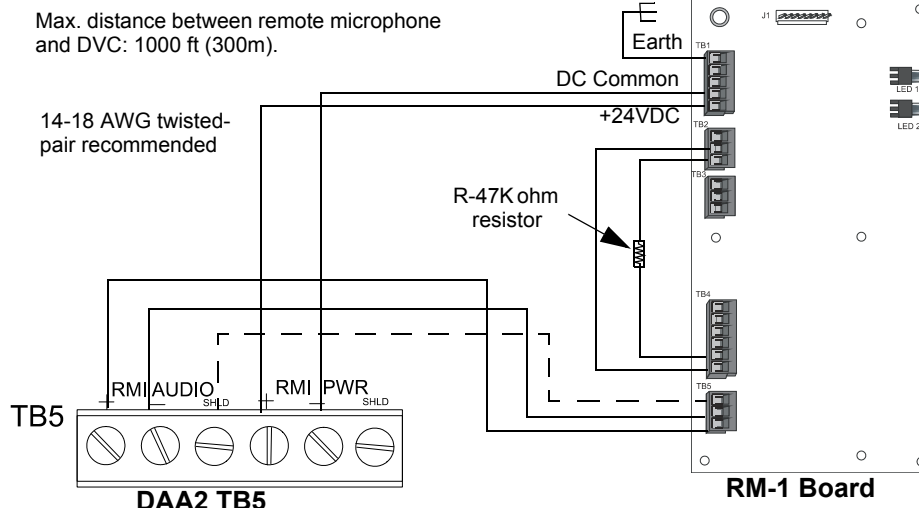


Figure 2.17 RM-1 to DAA2 Connections

The RM-1 requires VeriFire Tools programming for DAA2 applications. See the DAA2 programming section of the DVC Digital Voice Command manual for programming instructions. See the RM-1 document for further applications.

### Auxiliary Input A

Auxiliary Input A (AUXA) provides a high-fidelity connection to common audio appliances such as a radio, CD player, or tape deck, or to a telephone paging source. It can be used for background music. Two-channel stereo signals are changed to monophonic signals. AHJ approval required.

14-18 AWG twisted-pair recommended

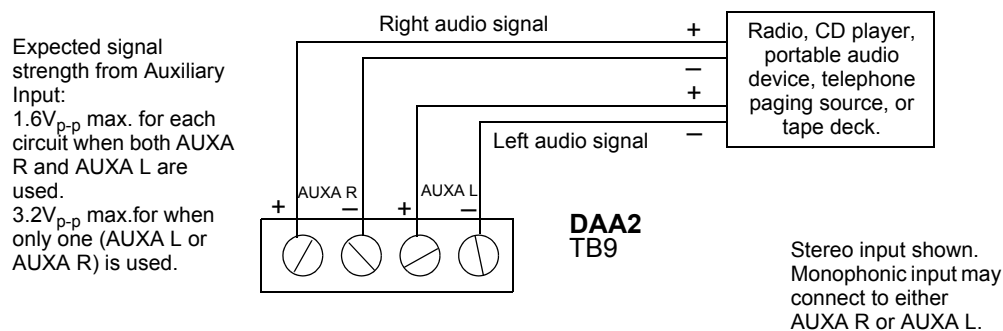


Figure 2.18 AUX A Auxiliary Audio Input

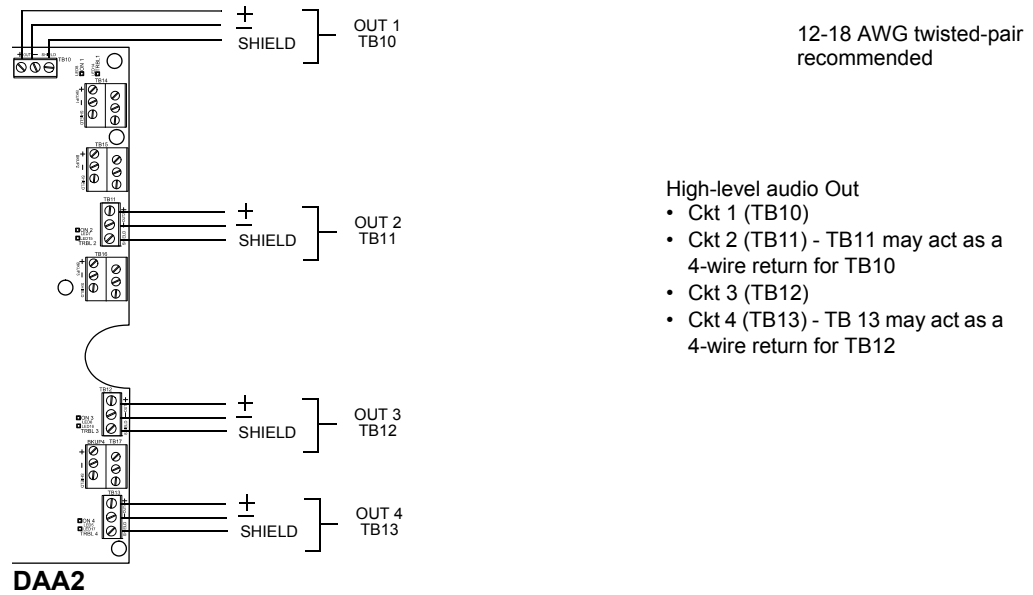
Background music will be silenced while batteries greater than 26AH are being fully charged.

### Speaker Circuits

Speaker circuits 1 through 4 (terminals 10 through 13) provide for two NFPA Class A (Style Z) connections for high-level audio output, four NFPA Class B (Style Y) connections, or One Class A and two Class B connections. These connections dynamically share the 50W or 75W output

capability of the DAA2. The speaker circuit supervises the output with a DC voltage. Anything greater than 6.9VDC will be considered an open circuit and anything less than 1.5VDC will be considered a short circuit.

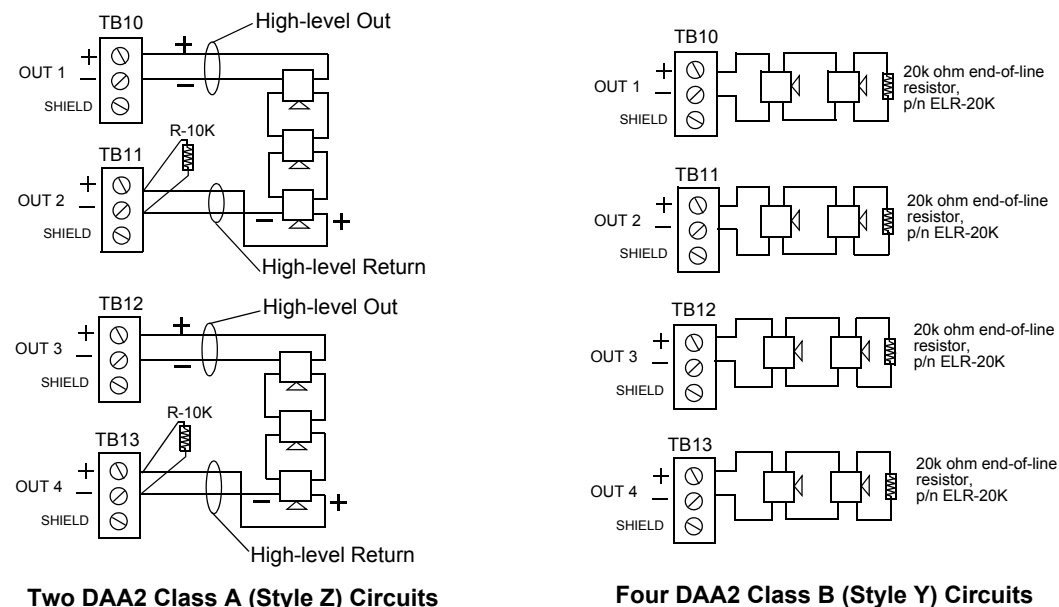
Speaker connections are illustrated in Figure 2.19



**Figure 2.19 Speaker Circuit Connections**

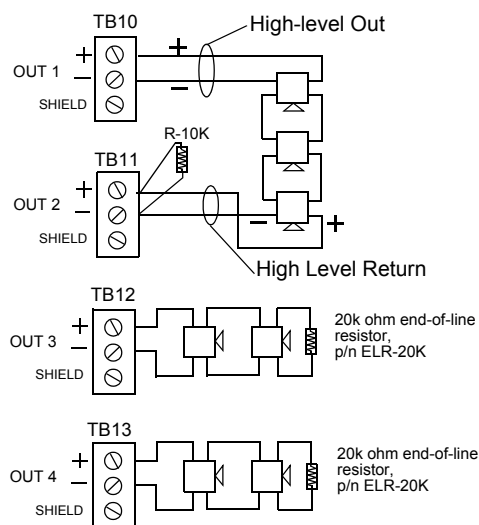
■ In Normal (NAC) Mode

When a DAA2's Riser Mode is programmed **NORMAL (NAC)** (refer to the DVC Digital Voice Command manual for programming description), the amplified signal from the DAA2 may be connected directly to speakers. Following are illustrations of Class A and Class B configurations (Figure 2.20).



Two DAA2 Class A (Style Z) Circuits

Four DAA2 Class B (Style Y) Circuits



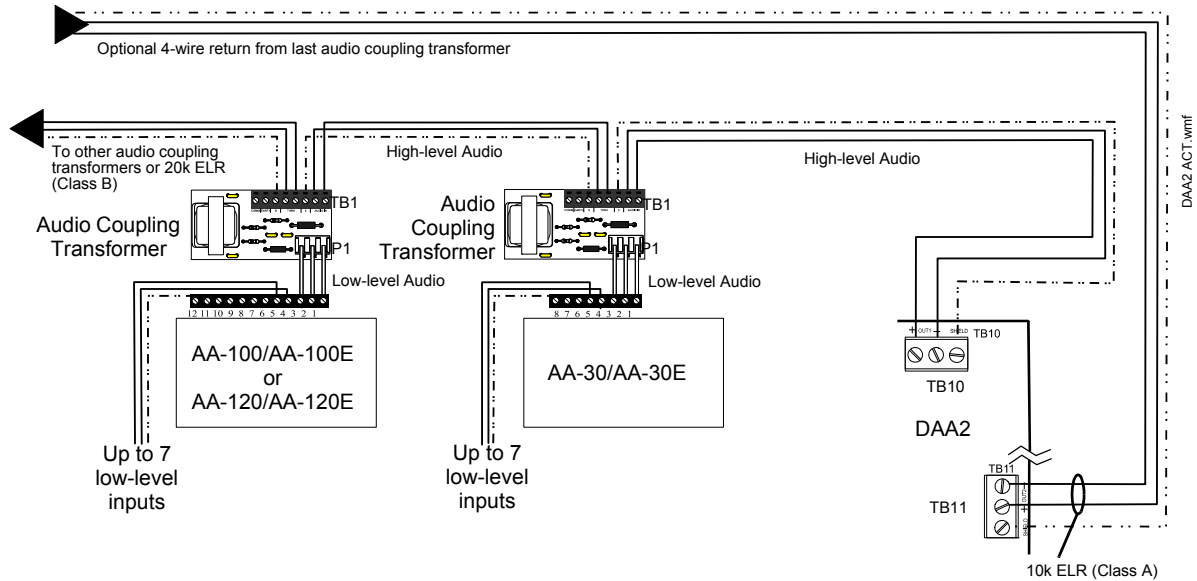
One DAA2 Class A Circuit, Two Class B Circuits

Figure 2.20 Normal Riser Mode Class Configurations



### ■ In Riser Mode to Additional Amplifiers

When a DAA2's Riser Mode is programmed `RISER MODE TO ADDITIONAL AMPLIFIERS` (refer to the DVC Digital Voice Command manual for programming), the amplified signal from the DAA2 may be connected to an audio coupling transformer (ACT-25 for 25V amplifiers, ACT-70 for 70V amplifiers) to drive additional AA-Series amplifiers. This mode provides a 200 Hz supervisory tone required by analog amplifiers.



**Figure 2.21 DAA2 Riser Mode to Additional Amplifiers**

Refer to the ACT-25 or ACT-70 installation document for more information.

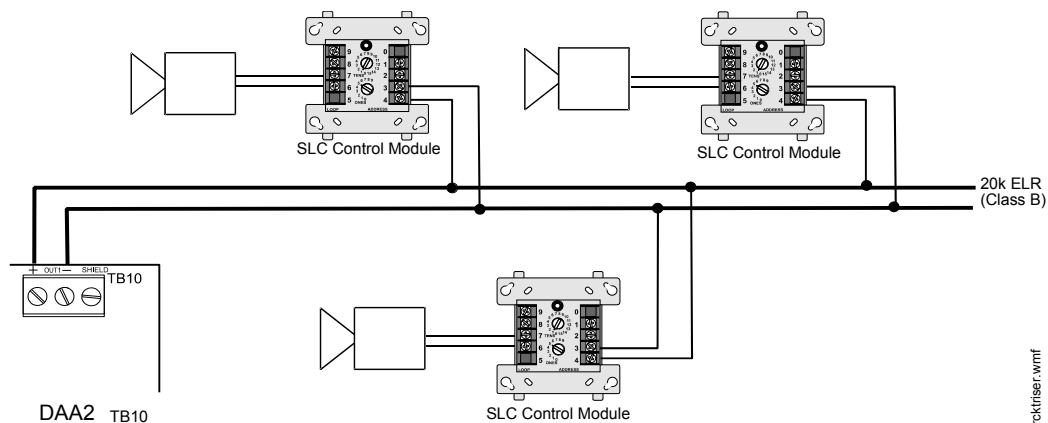
### ■ In Riser Mode to Control Modules

When a DAA2's Riser Mode is programmed `RISER MODE TO CONTROL MODULES` (refer to the DVC Digital Voice Command manual for programming), the amplified signal from the DAA2 may be routed to multiple speaker circuits using SLC control modules.

The control module must disable the power supply monitoring to prevent acting as a load on the supervision voltage. For V-type control modules, this requires a resistor cut under the label. For H-type modules, a jumper must be removed under the label. For XP6-C modules, a jumper must be removed for each address.

To prevent unnecessarily charging and discharging the supervision voltage of a control module and the supervision voltage of the DAA2, connect the amplifier (+) to the power supply (-) on the control module. Connect the amplifier (-) to the control module power supply (+) input.

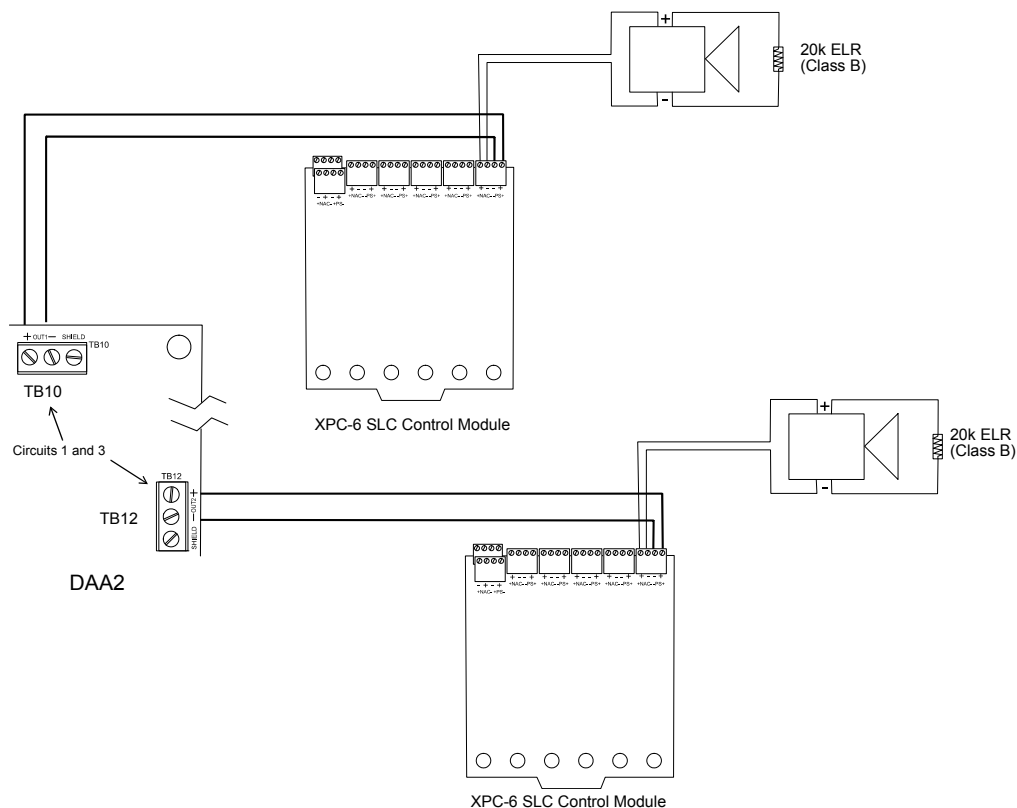
Do not use background music in this mode. The DAA2 will provide speaker circuit supervision only when idle.



**Figure 2.22 DAA2 Riser Mode to Control Modules, Single Riser**

DAA2 spkrctriser.wmf

Two separate risers are a possible configuration when using a DAA2 with a BDA set for a second channel, in a second group.



**Figure 2.23 DAA2 Riser Mode to Control Modules, Two Separate Risers**

DAA2 spkrctriser2.wmf

■ **In Riser Mode to RSM/AIM Series Canadian Room Isolator Modules**

When a DAA2’s Riser Mode is programmed **RISER MODE TO RSM/AIM SERIES MODULES** (refer to the DVC Digital Voice Command manual for programming), the amplified signal from the DAA2 is routed to RSM-1A or AIM-1A room isolator modules.

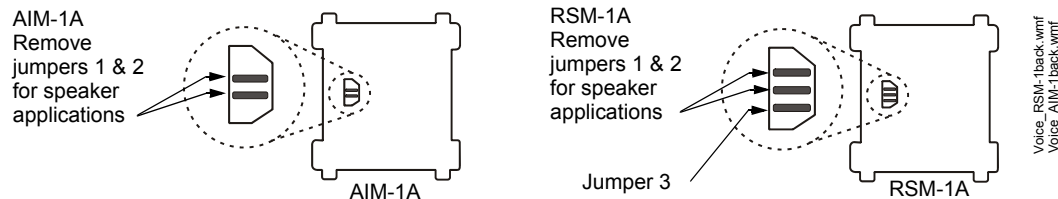
AIM-1A - Provides isolation to a separate circuit on an audio riser. A short circuit on an AIM-1A speaker circuit will not disable other speaker circuits on the riser.

RSM-1A - Works same as the AIM-1A, with the exception that there is a silence button for in-suite operation. The silence button will silence the audible signal to the module's circuit for ten minutes during alarm. Resounding will occur automatically after ten minutes. To override the ten minute silence, CBE programming must be done at the FACP so that it interrupts the module's 24VDC power for two seconds.

NFS2-3030 example:

Give the isolator module's 24VDC source a common ground with the DAA2 amplifier. Power the isolator module through a relay module that has Special Zone 14 in its CBE list. Special Zone 14 will activate for ten seconds when a reset is initiated at the panel. This period is used to disable the 24VDC for those 10 seconds to clear a local silence.

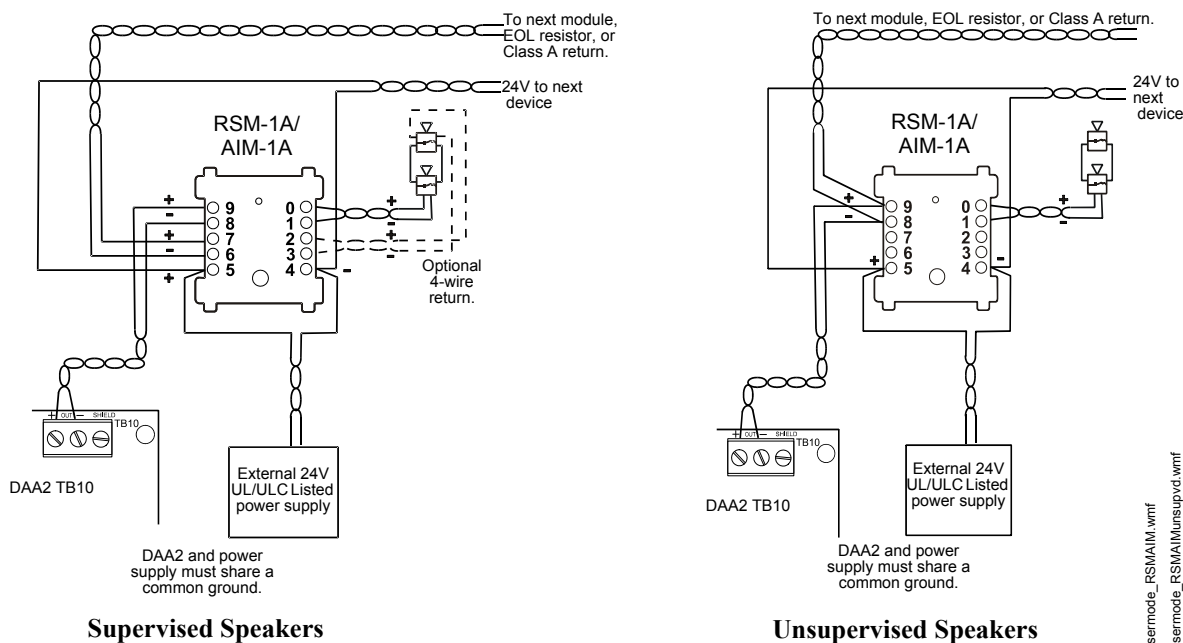
Remove jumpers for speaker applications. (Refer to Figure 2.24.)



**Figure 2.24 Jumper Settings for Speaker Applications**



**NOTE:** The DAA2-5070 speaker circuit risers are non-power-limited when used with Canadian room isolator modules. Speaker Circuit 1 can not be used with these modules. All DAA2-5025 and DAA2-7525 speaker circuit risers are power-limited (Class 2) when used with Canadian room isolator modules.



**Figure 2.25 DAA2 Riser Mode to RSM-1A/AIM-1A Modules**

■ **In Riser Mode to CIM/CSM Series Canadian Room Isolator Modules**

When a DAA2's Riser Mode is programmed RISER MODE TO CIM/CSM SERIES MODULES (Refer to the DVC Digital Voice Command manual for programming), the amplified signal from the DAA2 is routed to a CIM-2A module, which feeds the signal to one or two CSM-1A modules.

A pre-announce tone of 800 Hz will clear a local silence.

Do not use background music in this mode. The DAA2 will provide speaker circuit supervision only when idle.



**NOTE:** The DAA2-5070 speaker circuit risers are non power-limited when used with Canadian room isolator modules. Speaker Circuit 1 can not be used with these modules. All DAA2-5025 and DAA2-7525 speaker circuit risers *are* power-limited (Class 2) when used with Canadian room isolator modules.

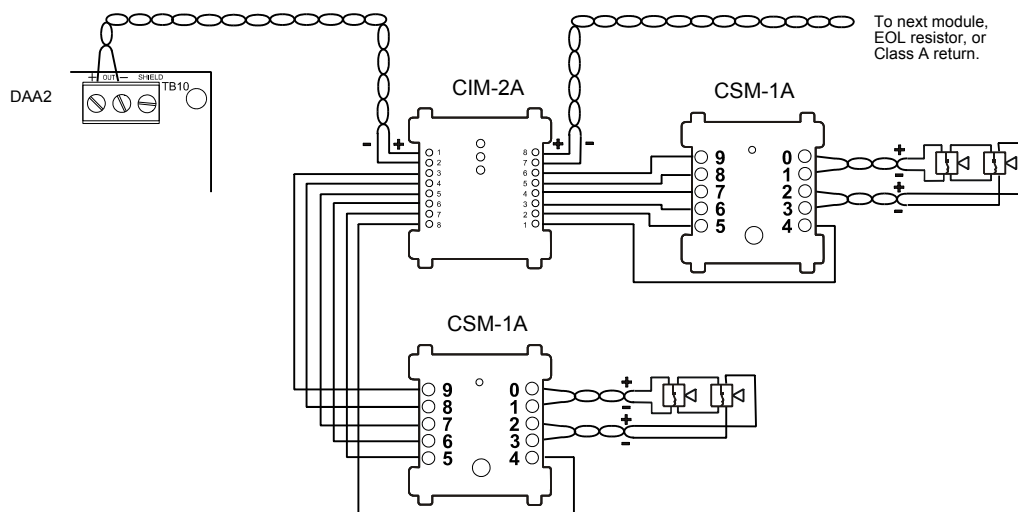


Figure 2.26 DAA2 Riser Mode to CIM-2A/CSM-1A Modules

DAA2risermode\_CIMCSM.wmf

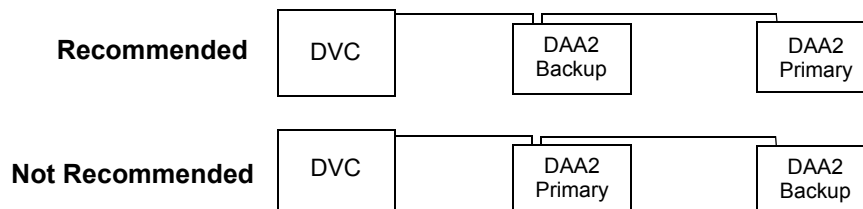
#### ■ Speaker Backup Circuits - TB1, TB14, TB15, TB16

The DAA2 supports one-to-one or one-to-many backup amplifier applications. A BDA-25/70V backup amplifier may be used in a one-to-one backup application. Refer to “BDA Backup Digital Amplifiers” on page 67 for information on the BDA-25/70V amplifier. Each DAA2 must be designated a primary or backup amplifier through VeriFire Tools programming. The speaker wiring from backup to primary is unsupervised when the backup amplifier is not active; therefore the backup and primary amplifiers must be in the same enclosure, or in conduit within the same room.

Each backup terminal block contains two sets of terminals. One set may be used for “Backup In” applications, the other set for “Backup Through” applications..



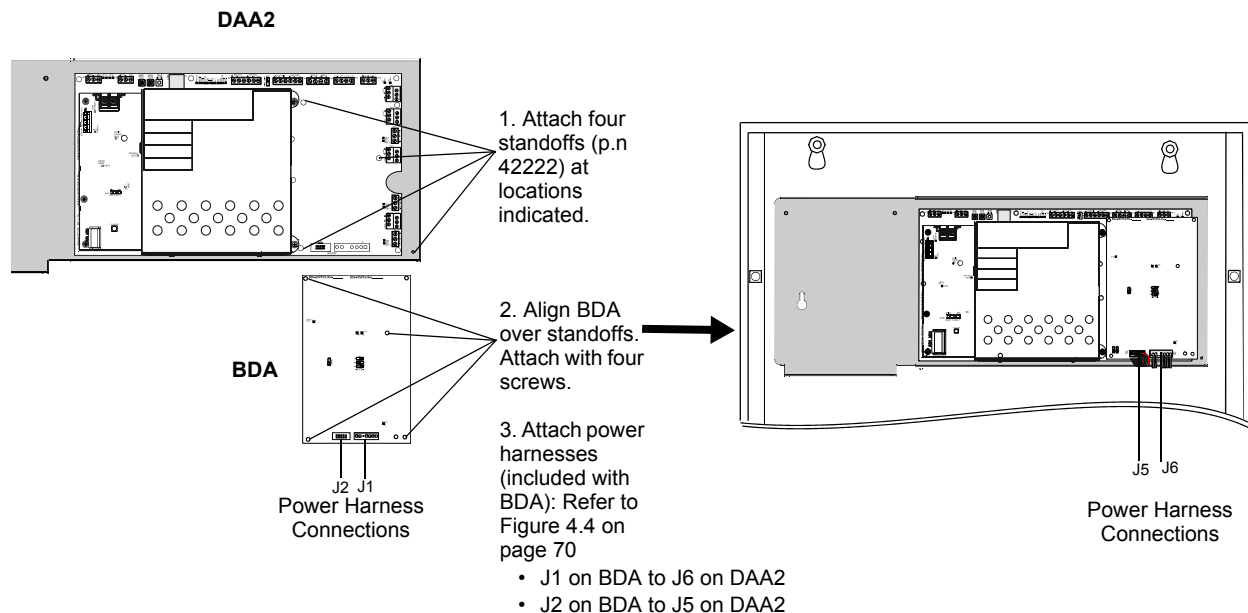
**NOTE:** In Style 4 wiring arrangements of the DAL (digital audio loop), it is recommended that the backup amplifier be located closer to the DVC than the primary DAA2 amplifiers on the DAL.



Each DAA2 acts as a repeater for the digital audio signal. If a primary amplifier falls off-line, the backup will not receive the signal if it is further down the DAL chain.

### ■ One-to-One Backup Using BDA-25/70V

Figure 2.27 shows the installation of a BDA-25/70V backup digital amplifier onto the primary amplifier. Should the primary amplifier fail, all its messages will still be played by the BDA as programmed.



**Figure 2.27 One-to-one Backup Using BDA-25/70V**

### ■ One-to-One or One-to-Many Backup Using BKUP Terminal Blocks

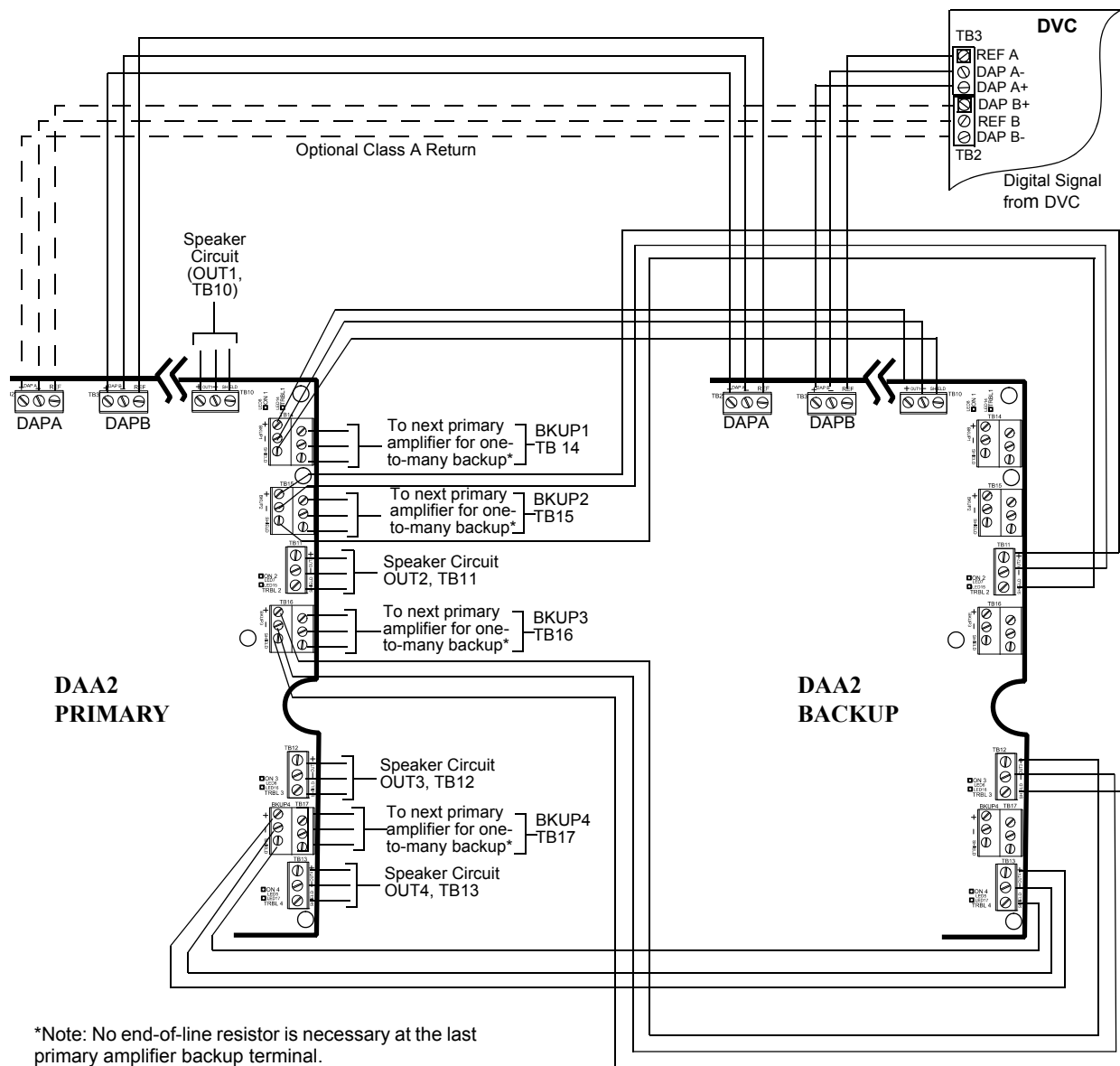
The BKUP1 through BKUP4 terminals on the DAA2 may be used to connect a backup amplifier to one or more primary amplifiers.



**NOTE:** Each backup terminal block contains two sets of terminals. One set may be used for “Backup In” applications, the other set for “Backup Through” applications.

One backup amplifier may be used to back up as many as 31 primary amplifiers. All primary amplifiers backed by the same backup amplifier must each be wired in the same style or combination of styles; for example, all wired Class A, or all wired Class B, or all wired with one Class A and two Class B circuits.

A backup amplifier can support one failed primary amplifier at a time. Should another primary amplifier also fail, depending on load, the backup amplifier may also fail, generating an **AMPLIFIER LIMIT** trouble until the load is reduced or reset.



**Figure 2.28 One-to-one or One-to-Many Backup Using BKUP Terminal Blocks**

### Wiring Fault Testing

Test wire-to-wire faults with 0 (zero) ohm impedance.

### UL Power-limited (Class 2) Wiring Requirements

Power-limited and non-power-limited circuit wiring must remain separated in the cabinet. All power-limited circuit wiring must remain at least 0.25 inches (6.35 mm) from any non-power-limited circuit wiring. All power-limited and non-power-limited circuit wiring must enter and exit the cabinet through different knockouts and/or conduits.

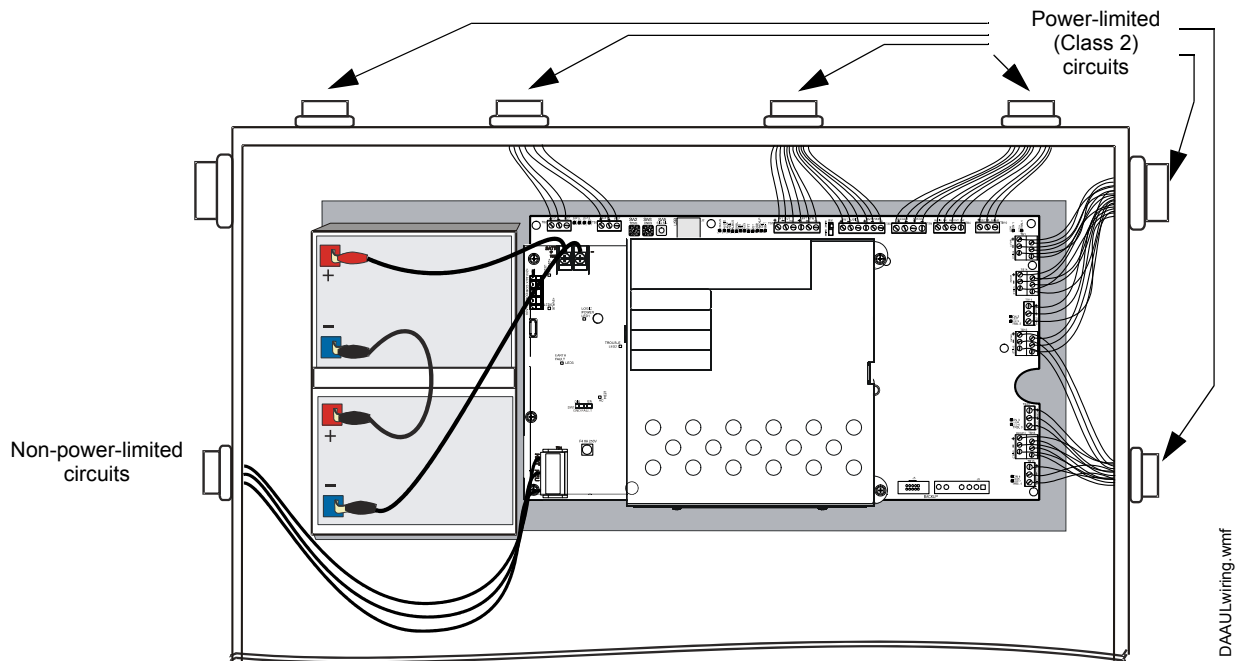


Figure 2.29 Typical Backbox Wiring

Figure 2.30 below illustrates power-limited wiring specific to a DAA2-5070 when it is used with any Canadian room isolator module.

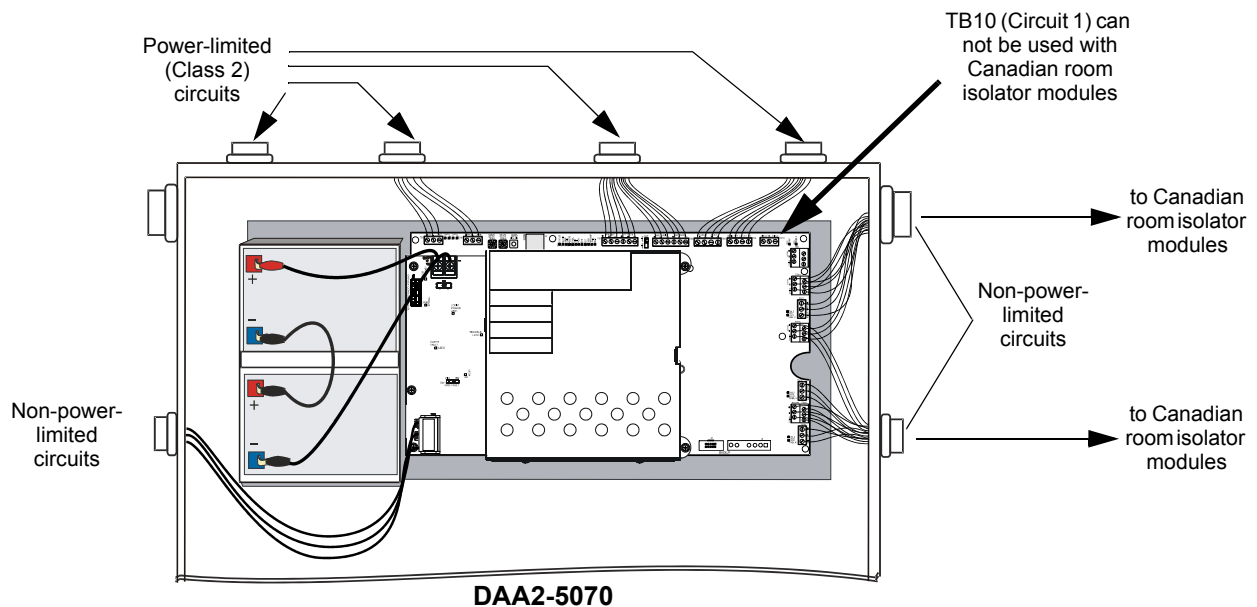


Figure 2.30 DAA2-5070-specific Wiring with Canadian Room Isolator Modules

## 2.3 DAA2 Configuration

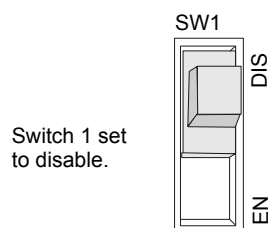
### 2.3.1 Setting the Configuration Switches

#### GND Fault Switch - SW1 on CPS-24

The DAA2 has a ground fault switch that can be set to EN (enable) to detect ground faults on the board's external wiring (except DAL Port A) and on a DAL (digital audio loop) segment (Port B). Port A is isolated, and ground fault detection on Port A will be performed at the other end of the connection. A general ground fault error for the device will be generated when a ground fault is detected.

The default state of the switch is for Earth Fault detection to be disabled. When sharing batteries, only one Earth Fault detection circuit can be enabled. When batteries are not shared, each Earth Fault detection circuit must be enabled.

Refer to "Battery Sharing" on page 25, as well as the DAL Earth Fault Detection appendix in the DVC Digital Voice Command manual for more information on how to set this switch.

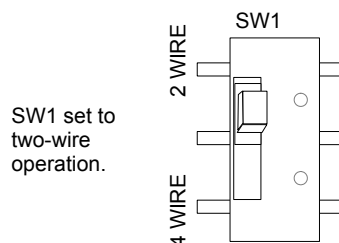


SWgen.wmf

Figure 2.31 Ground Fault Switch

#### 2WIRE/4WIRE Switch - SW1 on DAA2 Board

The FFT riser may be wired in a Class A four-wire or a Class B two-wire configuration.



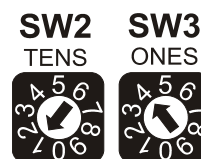
DAA2 switch 1 and 4.wmf

Figure 2.32 2/4WIRE Switch

#### Address Switches - SW2, SW3

A maximum of 32 digital audio loop devices may be connected to one DVC. Each device must have its own address. Refer to Figure 2.33 for an illustration of address settings and to Figure 2.3 on page 17 for the location of the switches.

The SW2 arrow points to one (1). Tens switch set to one (1).



The SW3 arrow points to four (4). Ones switch set to four (4).

DAA2 Address set to 14

Figure 2.33 DAA2 Address Switches

DAA Addressswitches.wmf

Addresses one (1) through 32 may be used for digital communication. Address 00 and addresses above 32 will generate a DAA2 trouble.

The default address setting for the DAA2 as it arrives from the factory is 00.



### PRIMARY AMP Switch - SW4

Set this switch to ON for normal amplifier operation.  
Set the switch to OFF to safely disable the primary amplifier, forcing a switch to backup amplifiers.

The switch should be set to OFF *only* when testing the system's operation. Otherwise it should always be ON.

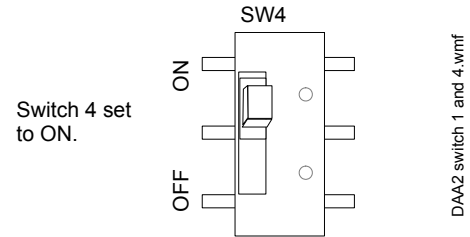


Figure 2.34 PRIMARY AMP Switch

## 2.3.2 Programming

The DAA2 is programmed through VeriFire Tools. Refer to the DVC Digital Voice Command manual as well as the VeriFire Tools CD and Help file for information on how to create, prioritize and download audio messages, create system equations for message distribution, and set system parameters.

## 2.4 DAA2 Operation

### 2.4.1 Sig Sil Control

This pushbutton control silences speaker outputs on circuits 1 through 4. This switch is enabled by the DAA2 when there is a communication loss with the DVC.

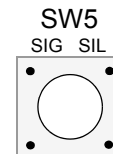


Figure 2.35 Sig Sil Switch

### 2.4.2 Volume Control - Master and Auxiliary

The volume of audio messages is determined through FACP/network annunciator programming and VeriFire Tools Read Status Service Form.

### 2.4.3 FFT Communication

Refer to the FFT appendix in the DVC Digital Voice Command manual for information on firefighter telephone communication.

### 2.4.4 Trouble Messages

DAA2s will send trouble messages to the DVC through the wire or fiber DAL (Digital Audio Loop). The DVC in turn sends them to the panel or network annunciator. Refer to the System Troubles appendix in the DVC Digital Voice Command manual for a list and description of trouble messages.

### 2.4.5 Read/Alter Status

An NCA-2, NFS2-3030 and network workstation, as well as a computer running VeriFire Tools and connected to the NUP port of the DVC, will be able to read the status of a DAA2 and its speaker circuits. Refer to the appropriate panel manual or the VeriFire Tools Read Status Service Form.

A DAA2 speaker circuit may be disabled through NCA-2 and NFS2-3030 Alter Status panel programming and ACS programming.

# Section 3: DAX Digital Audio Amplifiers

## 3.1 DAX Overview

### 3.1.1 Description

These Digital Audio Amplifiers are multi-featured amplifiers with digital audio functionality. They are designed to work with the DVC Digital Voice Command.



**NOTE:** The term DAX is used in this manual to refer to all the DAX model versions listed in Table 3.1.

Individual part numbers are used to distinguish features or functions that differ.

50 Watt DAXs	Speaker Circuit Output
DAX-5025 (120 VAC)	25 <sub>RMS</sub>
DAX-5025E (220-240 VAC)	25 <sub>RMS</sub>
DAX-5070 (120 VAC)	70 <sub>RMS</sub>
DAX-5070/E (220-240 VAC)	70 <sub>RMS</sub>
35 Watt DAXs	
DAX-3525 (120 VAC)	25 <sub>RMS</sub>
DAX-3525E (220-240 VAC)	25 <sub>RMS</sub>
DAX-3570 (120 VAC)	70 <sub>RMS</sub>
DAX-3570E (220-240 VAC)	70 <sub>RMS</sub>
NOTE: All boards are wire. They may be converted to fiber by using a fiber option module.	

**Table 3.1 DAX Models**

Refer to Figure 1.1 on page 9 for a simplified illustration of DAL devices on a digital audio loop.



**NOTE:** Speaker placement must be given careful consideration when planning an audio system:

- Place speakers from different DALs (Digital Audio Loops) so they are not within the audible areas of other DALs.
- Carefully consider the audible range of speakers within a DAL; overlapping audio messages can be confusing.

### 3.1.2 Features

The DAX audio amplifiers have the following features:

- 50W total output power at 25V<sub>RMS</sub> (DAX-5025) or 70 V<sub>RMS</sub> (DAX-5070).
- 35W total output power at 25V<sub>RMS</sub> (DAX-3525) or 70 V<sub>RMS</sub> (DAX-3570).
- One Class A connection for high-level audio output, or alternately, two Class B connections.
- Audio output activation via network control-by-event equations resident within the DVC.
- Isolated alarm bus input, to be used for backup activation of alarm messages when normal digital communication is lost, or for retrofit applications.

- Amplifies one channel of digital audio and distributes it on up to two outputs (50W maximum for DAX-50, 35W maximum for DAX-35).
- Uploads and downloads via the DVC.
- Up to 106 seconds of digital message storage for use during communication loss (emergency tone, non-emergency tone, and FFT busy tone) from the VeriFire Tools message library, or created by the installer.
- Battery charger (35 watt DAXs only).
- Backup amplifier options.
- Programmable through VeriFire Tools.
- Meets UL THD Distortion requirements for 500 Hz to 4 KHz bandwidth.  
Meets ULC THD Distortion requirements for 400 Hz to 4 KHz bandwidth.

### 3.1.3 Specifications

#### AC Power - TB7

120 VAC, 50/60 Hz input.\*

220-240 VAC, 50/60 Hz input.\*

\*Maximum AC draw varies by DAX model. These draws are given in Appendix A, “AC Current Draw Calculations”, along with a worksheet to determine the actual AC draw.

Recommended wiring: 12-14 AWG (1.6mm O.D.) with 600 VAC insulation.

#### Battery Connections - TB8, TB9

Supplied cable connections to batteries for CAB-4. For battery sharing, use 12 AWG either in the same cabinet or in conduit for no more than 20 ft (6.09 m).

#### Battery Charger (DAX-35 Boards Only)

Current-limited sealed lead acid battery charger which charges two 12 volt batteries in series, up to 26AH.

Charger voltage: 27.6 VDC.

For battery calculation worksheet and standby operating times, refer to Appendix B, “Battery Calculations”, on page 84.

Utilizes wire sizes 12-18 AWG.

Battery Fuse (F2) 10A.




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**NOTE:** 50 Watt DAX boards do not have an onboard battery charger. A UL 864 listed power supply rated for the battery requirements of the specific application is suitable for charging purposes.

---

#### Wire Digital Audio Ports A and B - TB1, TB2

Refer to the Wiring Guide, p/n 52916ADD, for acceptable wire types.

EIA-485 format.

Power-limited (Class 2).

Refer to Section 5, “Fiber Option Modules”, on page 75 for fiber connections. When a fiber option module is mounted on a DAX, it disables the corresponding wire terminals. TB1 (Digital Audio Port A) is disabled when a fiber option board is connected at J2. TB2 (Digital Audio Port B) is disabled when a fiber option board is connected at J3.

#### Alarm Bus - TB3

Power-limited (Class 2) and supervised by source.

Recommended wiring: 14-18 AWG twisted-pair.

Requires 16 VDC @ 20mA across the terminals to activate. Nominal 24 VDC.

## Speaker Circuits - TB4 and TB5

Power-limited (Class 2) outputs\*

\* Exception: A DAX-3570 and DAX-5070 speaker circuit used with any Canadian Room Isolator modules is non-power-limited.

DAX-5025/70 - Each circuit rated up to 50 watts.\*\*

DAX-3525/70 - Each circuit rated up to 35 watts.\*\*

\*\*Total wattage may vary. Refer to “BDA Backup Digital Amplifiers” on page 67 for configurations.

Supervision determined by programming.

25V<sub>RMS</sub> - DAX-5025/DAX-3525 speaker circuits, 70V<sub>RMS</sub> - DAX-5070/DAX-3570 speaker circuits.

Recommended wiring: 12-18 AWG twisted-pair (shielded recommended).

Class B or Class A:

Class B requires 20k end-of-line resistors (included, P/N ELR-20K).

Class A requires 10k end-of-line resistors (included, P/N R-10K) on the return.

## Backup from Alternate Amplifier - TB10 and TB11

High-level audio input.

• 25V<sub>RMS</sub> (DAX-5025 and DAX-3525)

• 70V<sub>RMS</sub> (DAX-5070 and DAX-3570)

Recommended wiring: 14-18 AWG twisted-pair (shielded recommended).

• 25V (DAX-5025 and DAX-3525)

• 70V (DAX-5070 and DAX-3570)

Supervision:

• Not supervised when inactive. Supervised by backup source when active.

• Must be in the same room or enclosure.

### 3.1.4 DAX Board Layouts

#### Connection Locations

Figure 3.1 below shows the layout for the DAX boards.

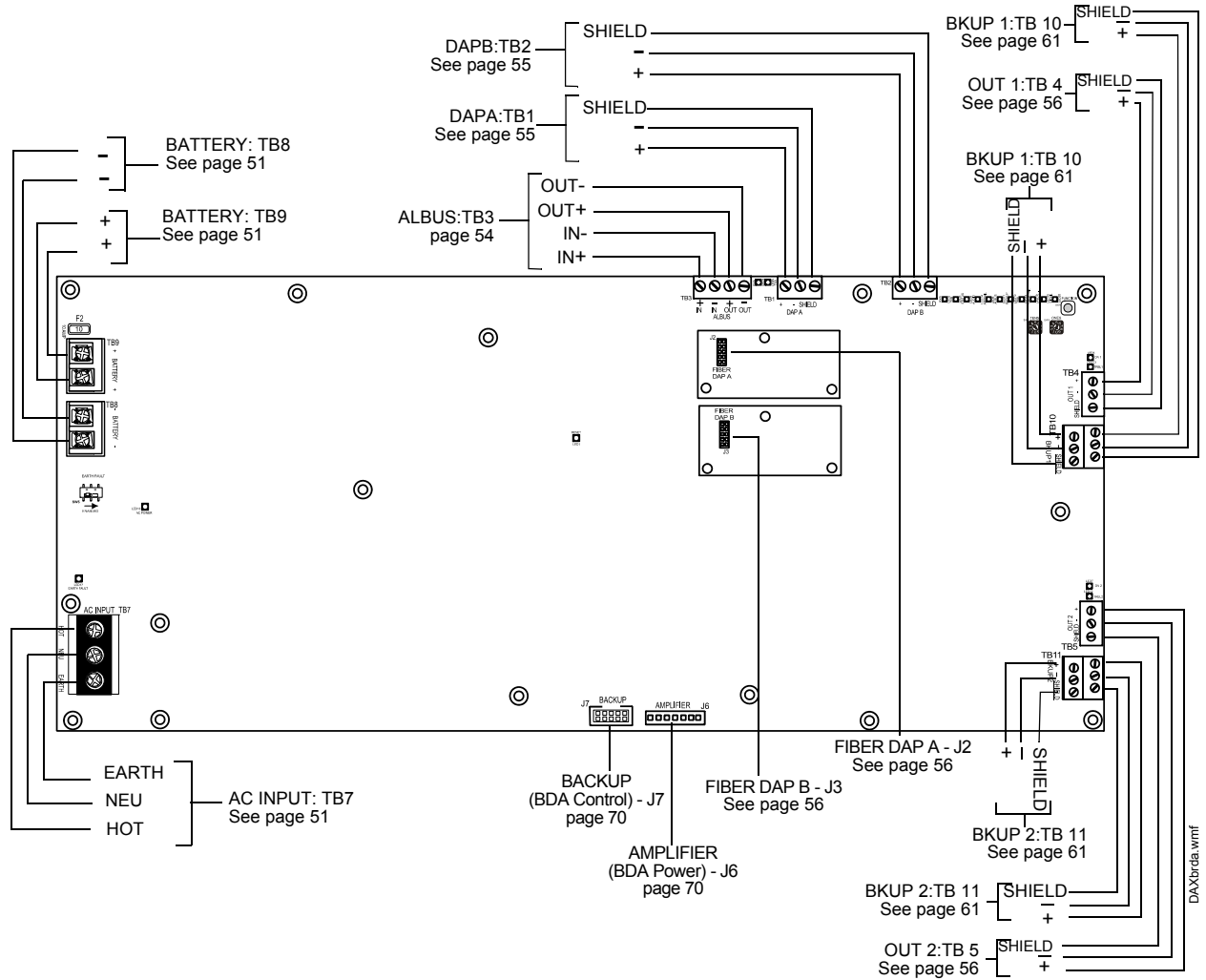
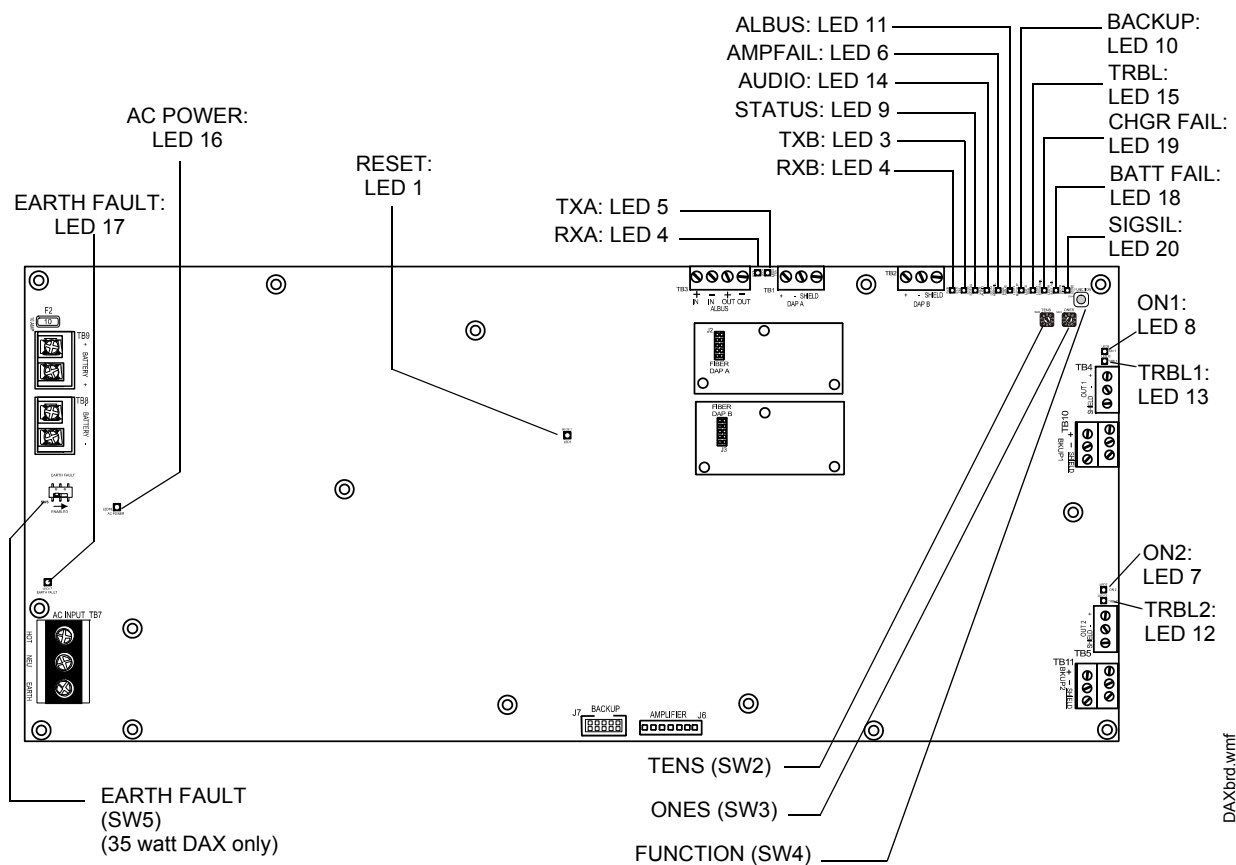


Figure 3.1 Connection Locations

### DAX Indicators, Switches, and Jumper

LED indicators, switches and jumpers are illustrated in below.



**Figure 3.2 LED Indicators, Switches, and Jumper**

#### ■ Indicators

Diagnostic colored LEDs indicate various conditions and troubles. Table 3.1 lists and describes each.

DAX Board			
LED Name	Color	Description	LED #
RESET	Yellow	Illuminates when the board is not operational and maintenance is required. Call the factory.	1
RXB	Green	Illuminates while data received on Digital Audio Port B (wire only). Light will flicker, turning on when activity is detected and off when it is not. Check the RX and TX LEDs on the fiber option module for activity indication.	2
TXB	Green	Illuminates while data transmitted on Digital Audio Port B (wire only). Light will flicker, turning on when activity is detected and off when it is not. Check the RX and TX LEDs on the fiber option module for activity indication.	3
RXA	Green	Illuminates while data received on Digital Audio Port A (wire only). Light will flicker, turning on when activity is detected and off when it is not. Check the RX and TX LEDs on the fiber option module for activity indication.	4
TXA	Green	Illuminates while data transmitted on Digital Audio Port A (wire only). Light will flicker, turning on when activity is detected and off when it is not. Does not illuminate for fiber connections. Check the RX and TX LEDs on the fiber option module for activity indication.	5
AMPFAIL	Yellow	Illuminates steadily while audio amplifier failure is detected.	6
ON2	Green	Illuminates steadily while analog signal is on speaker circuit 2, or while 200Hz tone is on speaker circuit 2.	7

**Table 3.1 DAX LED Indicators (1 of 2)**

DAX Board			
LED Name	Color	Description	LED #
ON1	Green	Illuminates steadily while analog signal is on speaker circuit 1, or while 200Hz tone is on speaker circuit 1.	8
STATUS	Green	Blinks slowly (once a second) under normal operation, Blinks fast (4 times a second) when the DAX is in bootload or diagnostic mode. Does not blink when the board is not operational or starting up. Call the factory if this LED is off for a prolonged period of time	9
BACKUP	Yellow	Illuminates for diagnostics of the BDA amplifier.	10
ALBUS	Red	Illuminates steadily while the alarm bus is active.	11
TRBL2	Yellow	Illuminates steadily while a short is detected on speaker circuit 2. Blinks slowly (once a second) while an open is detected. Blinks fast (4 times a second) when this speaker circuit is disabled.	12
TRBL1	Yellow	Illuminates steadily while a short is detected on speaker circuit 1. Blinks slowly (once a second) while an open is detected. Blinks fast (4 times a second) when this speaker circuit is disabled.	13
AUDIO	Green	OFF - No audio signal is present. Fast blink (4 times a second) - The DAX is receiving audio from the DVC. Slow blink (once a second)- The DAX is playing audio from stored backup tones. Steady - The DAX is playing audio from its AUX input.	14
TRBL	Yellow	Blinks when there is an unacknowledged trouble, illuminates steadily when a trouble is acknowledged but unresolved.	15
AC POWER	Green	Illuminates while AC power is present.	16
EARTH FAULT	Yellow	When EARTH FAULT switch SW5 is enabled: <ul style="list-style-type: none"> <li>• Illuminates while earth fault is detected anywhere on the DAX except DAP A.</li> <li>• If batteries are shared, illuminates when an earth fault is detected on any non-isolated circuits in the sharing set.</li> </ul>	17
BATT FAIL	Yellow	Illuminates for a high or low battery trouble condition. <ul style="list-style-type: none"> <li>• Fast blink (4 times a second) - high battery condition.</li> <li>• Slow blink (once a second) - low battery condition.</li> </ul>	18
CHGR FAIL	Yellow	Illuminates during a fault with the battery charger. (DAX-35 only.)	19
SIGSIL	Yellow	Illuminates when local signal silence button has silenced one or more outputs.	20

Table 3.1 DAX LED Indicators (2 of 2)

## Switches and Jumper

The switches described in Table 3.2 are for configuring the DAX.

Switches			
Name	Switch/Jumper	Description	Default
TENS	SW2	BCD rotary address tens selection switch. Refer to page 65.	0
ONES	SW3	BCD rotary address ones selection switch. Refer to page 65.	0
FUNCTION	SW4	When not communicating with the DVC, this push-button switch acts as a signal silence/resound toggle switch for backup tones.	n/a
EARTH FAULT	SW5	When this switch is set to enable it will enable earth fault detection for Digital Audio Port A. 35 watt DAX only.	Enabled

Table 3.2 DAX Switches and Jumper

## 3.2 DAX Installation

### 3.2.1 Cabinet

The DAX arrives from the factory already installed on its chassis. A BDA-25/70V, NCM, or HS-NCM can be mounted on it. (Refer to Figure 3.4). The DAX chassis mounts in an EQ Series cabinet, as well as in a CAB-4 Series cabinet.

Prior to installation,

- Review the installation precautions at the front of this manual.

- Installers should be familiar with the standards and codes specified in “Standards and Other Documents” on page 9.
- Ensure all wiring will comply with national and local codes.
- Review the installation instructions in this section.

**WARNING:**

Wear a static discharge wrist strap to prevent equipment damage.

Locate the cabinet backbox on a surface that is in a clean, dry, vibration-free area. The top should be located so that all operational buttons, switches, displays, etc. are easily accessible and/or viewable to the operator - usually no more than 66 inches (1.7 m) above the floor. Allow sufficient clearance around the cabinet for the door to swing freely, and for easy installation and maintenance of equipment.

Follow the instructions below.

1. Mark and pre-drill two holes for the keyhole mounting bolts. Install bolts.
2. Select and punch open the appropriate cabinet knock-outs. (For selection guidelines, see “UL Power-limited (Class 2) Wiring Requirements” on page 64.)
3. Using the keyholes, mount the backbox on the two bolts.
4. Mark the location of the two lower holes, remove backbox and drill the mounting holes.
5. Mount the backbox over the top two screws, then install the remaining fasteners. Tighten all fasteners securely.
6. Feed wires through appropriate knockouts.
7. Install DAX according to the following instructions before installing the door per the CAB-4 Series Cabinet Installation Document.

The DAX fills one row of any EQ or CAB-4 series cabinet.

**EQ Series Cabinets and Doors**

The EQ Series cabinets come in B, C, and D sizes. The row spacing allows DAX amplifiers to be mounted in any row, and the doors are equipped with ventilated panels for heat dissipation. The cabinets were designed so that all DAX boards can be used in any or all cabinet rows. Batteries must be accommodated in separate cabinets or battery backboxes.

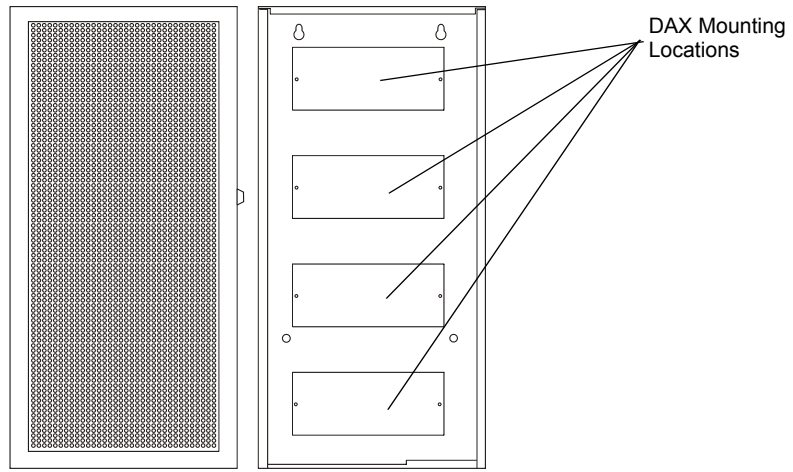
The following models are available:

- EQCAB-D4 - Four rows. Accommodates four DAXs. Consists of P/Ns EQBB-D4 (black backbox) and EQDR-D4 (black door with ventilated panels).
- EQCAB-C4 - Three rows. Accommodates three DAXs. Consists of P/Ns EQBB-C4 (black backbox) and EQDR-C4 (black door with ventilated panels).
- EQCAB-B4 - Two rows. Accommodates two DAXs. Consists of P/Ns EQBB-B4 (black backbox) and EQDR-B4 (black door with ventilated panels).



**NOTE:** Digital amplifiers can produce significant heat during their duty cycles. Different cabinets can handle different amounts of heat. Refer to the Heat Dissipation Calculation document (53645) to determine dissipation figures for the equipment you are installing, and match it with an appropriate cabinet.



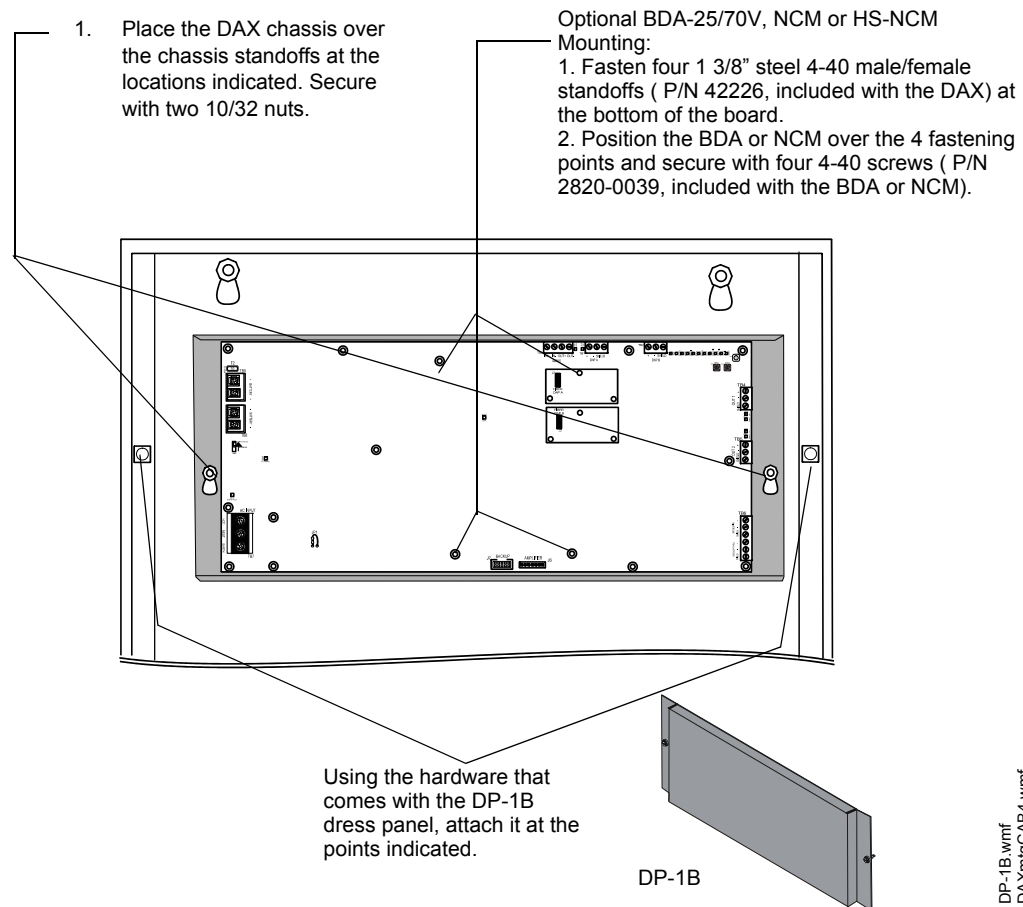


CABDAA\_D4.wmf

**Figure 3.3 EQCAB-D4 Backbox and EQDR-D4 Door**

## CAB-4 Series

Figure 3.4 illustrates a typical DAX installation. A DP-1B dress panel, ordered separately, can be used to cover the row.



**Figure 3.4 DAX Cabinet Installation**



**NOTE:** Digital amplifiers can produce significant heat during their duty cycles. Different cabinets can handle different amounts of heat. Refer to the Heat Dissipation Calculation document (53645) to determine dissipation figures for the equipment you are installing, and match it with an appropriate cabinet.

### 3.2.2 Batteries



**WARNING:** Batteries contain sulfuric acid which can cause severe burns to the skin and eyes, and can destroy fabrics. If contact is made with sulfuric acid, immediately flush skin or eyes with water for 15 minutes and seek immediate medical attention.

The DAX works with two 12 volt batteries. See Appendix B.2, “DAX Battery Calculations” for current draw calculations to determine the battery size required for this installation.

Batteries for the DAX may be installed in any of the following configurations:

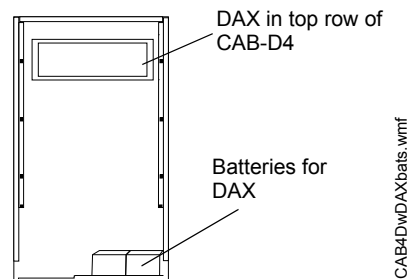
- In the bottom of a CAB-4 series cabinet that holds the DAX.
- In a cabinet adjacent to the cabinet that holds a DAX, with connections in conduit.

### Within the CAB-4 Enclosure

Place the batteries in the bottom of the cabinet, as shown in Figure 3.5. Refer to “Batteries” on page 51 for wiring instructions.

### Outside the DAX Enclosure

Batteries may be installed outside the DAX enclosure. The battery cables must be in conduit between the enclosures for the batteries and the DAX. Refer to “Batteries” on page 51 for wiring instructions.



**Figure 3.5 Battery Installation Within the Cabinet**

## 3.2.3 Wiring

### AC Power

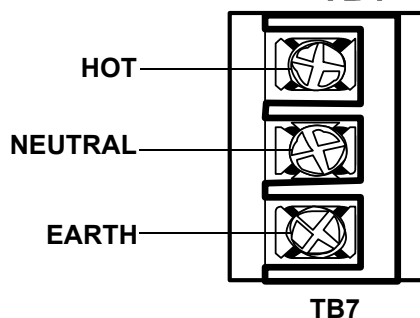


**WARNING:** High Voltages Present.

Use extreme caution when working with the DAX. High voltage and AC line-connected circuits are present. Turn off and remove all power sources. To reduce the risk of electric shock, make sure to properly ground the board.

The DAX requires connection to a separate dedicated AC branch circuit. Follow these guidelines when connecting the AC branch circuit:

- Label the branch circuit “Fire Alarm”.
- Connect the branch circuit to the line side of the main power feed of the protected premises.
- Do not power other equipment from the fire alarm branch circuit.
- Run the AC branch circuit wire continuously, without any disconnect devices, from the power source to the power supply.
- Overcurrent protection for the AC branch circuit must comply with Article 760 of the National Electrical Codes, as well as local codes.
- Use 12-14 AWG (1.6mm O.D.) wire with 600 VAC insulation for the AC branch circuit.



**Figure 3.6 AC Power Connection**

### Connect primary power as follows:

1. Turn off the circuit breaker at the main power distribution panel.
2. Connect the earth ground terminal (TB7 EARTH) to a solid earth ground (a metallic, cold water pipe may be suitable in some installations). This connection is vital to maintaining the power supply’s immunity to unwanted transients generated by lightning and electrostatic discharge.
3. Connect the primary power neutral line to the terminal marked NEUTRAL and the primary power AC line to the terminal marked HOT.

### Batteries



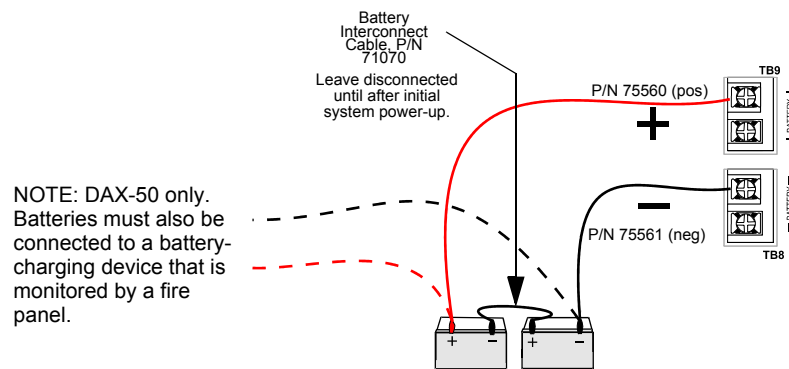
**WARNING:** Do not connect the battery interconnect cable (See Figure 3.7) at this time. Leave the battery interconnect cable disconnected until after initial system power-up.

The DAX works with two 12 volt batteries. See Appendix B.2, “DAX Battery Calculations” for current draw calculations to determine the battery size required for this installation.

Battery cables (90”, 2.28 m) are included with the DAX for battery installation in any CAB-4 series cabinet that includes a DAX in one of the rows. Shorter battery cables (18”, 0.5 m) are included with the CHS-BH1. For battery sharing, use 12 AWG wire either in the same cabinet, or in conduit for no more than 20 ft. (6.09 m..

### ■ Batteries Within the Same Enclosure

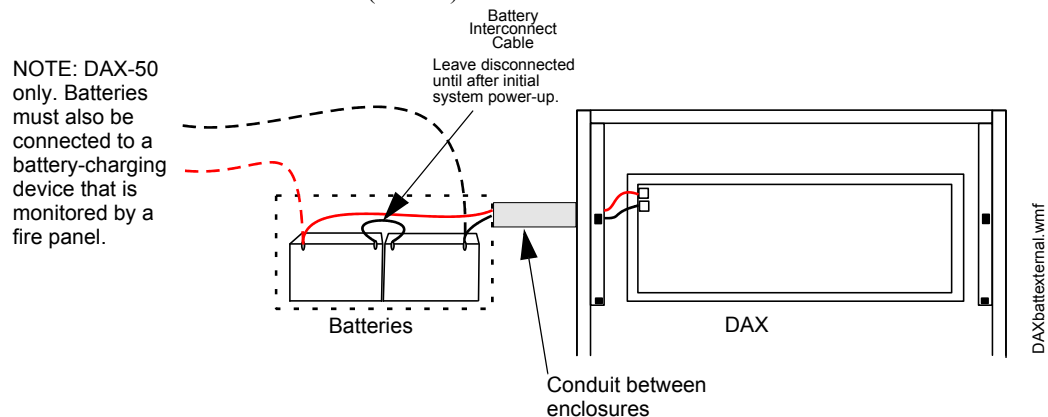
Refer to Figure 3.7 for battery connections.



**Figure 3.7 Connecting Batteries to TB8 and TB9**

### ■ Batteries Outside the DAX Enclosure

When the batteries are installed outside the DAX cabinet, connections are the same as in Figure 3.7. However, the battery cables between the two enclosures must be in conduit and the enclosures must be within 20 feet (6.09 m) of each other within the same room.



**Figure 3.8 Using Conduit**

### ■ Battery Sharing

#### DAX-35:

Up to four DAX-35s may share a set of batteries.

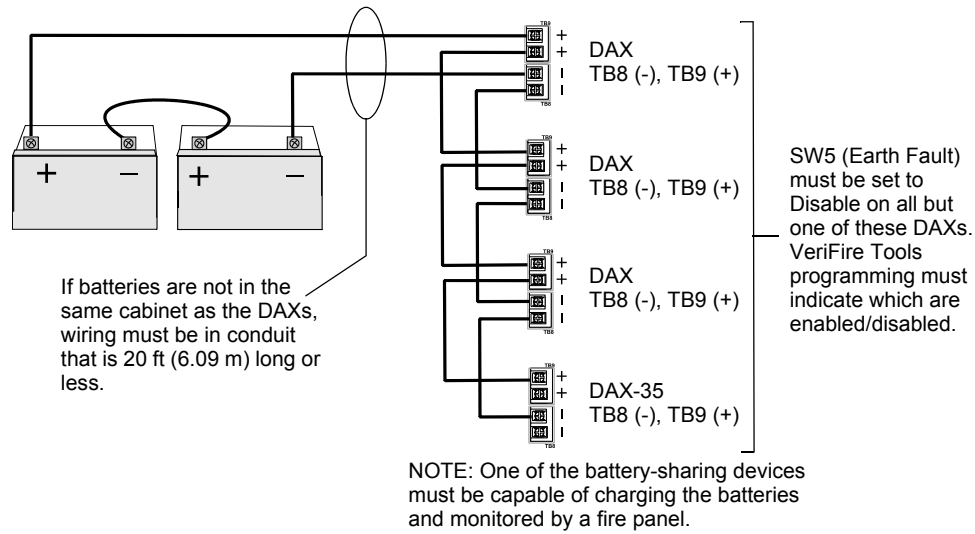
- The ground fault switch on the DAX (SW5) must be set to “Disable” on all but one 35 watt DAX attached to the set of batteries.
- In VeriFire Tools programming, “Disable Charger” must be checked in the “DAX Amplifier Programming Service - General II” screen for all but one 35 watt DAX.

The enabled ground fault switch does not have to be on the same DAX as the enabled charger.

**DAX-50:**

DAX-50 amplifiers do not have onboard battery chargers, and must share batteries with devices that are capable of charging batteries. A UL 864 listed power supply rated for charging of the required batteries must be used.

Connect all DAXs sharing a set of batteries directly to the batteries using 12 AWG. If the batteries are located outside of the DAX cabinet, the wiring must be in conduit that is no greater than 20 ft. (6.09 m) long.



DAXbatshare.wmf

**Figure 3.9 Four DAX Amplifiers Sharing Batteries**

### Alarm Bus

The DAX general alarm connections are used to receive general alarm messages from an FACP via an SLC device, or via the Notification Appliance Circuit of an FACP or power supply.

The Alarm Bus can be used for local activations when the DAA2 has lost communications with the DVC. The Alarm Bus can also be used as a point in logic equations in the local DVC or network DVCs.

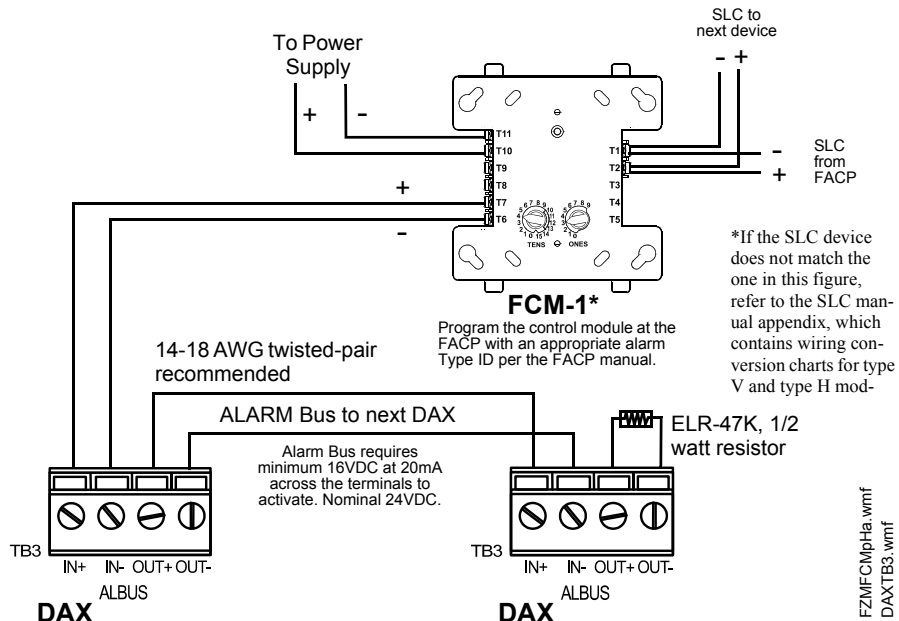


Figure 3.10 Alarm Bus Connections to FCM-1

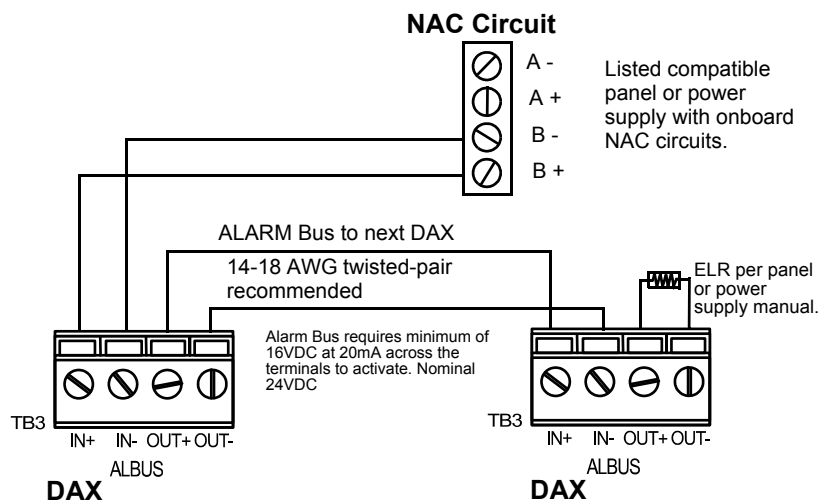


Figure 3.11 Alarm Bus Connections to NAC

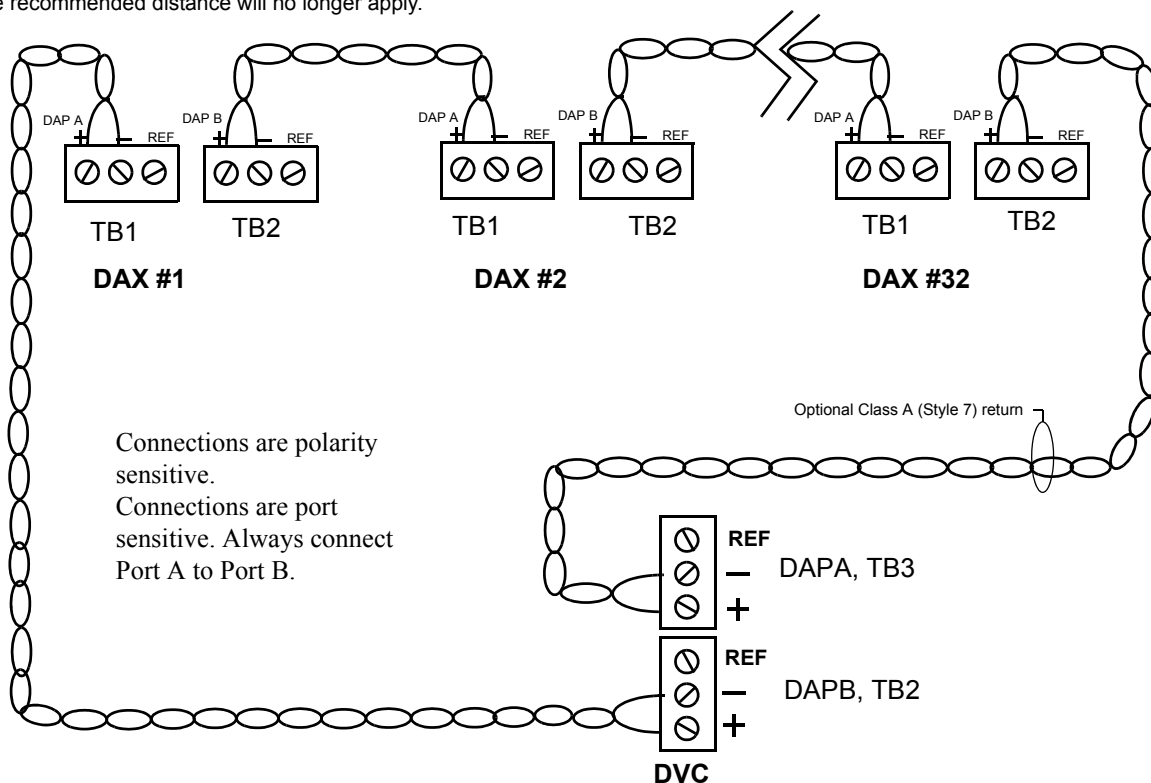
Refer to the SLC manual and specific panel or power supply manual for more information.

### Digital Audio Ports A and B

Digital Audio Ports A and B (DAP A and DAP B) allow digital communication with the DVC over the Digital Audio Loop (DAL); amplifier programming from the DVC; control, audio, trouble, and address data; and live voice paging can be communicated through these ports. They may also act as repeaters, in that what is received at one port is transmitted out the other. Events generated at the DAX will be transmitted out both ports.

#### ■ Wire Connections

Refer to the Wiring Guide, p/n 52916ADD, for acceptable wire types and associated distances between ports. Do not splice a cable. Splicing will degrade the signal, and the recommended distance will no longer apply.



**Figure 3.12 Wire the Digital Audio Loop Connections**



**NOTE:** Digital Audio Ports A and B must be wired in Class B (Style 4) or Class A (Style 7) configuration. Do not wire them in bus configuration.



**NOTE:** Class B (Style 4) configuration must be installed in accordance with the requirements for survivability from attack by fire in the National Fire Alarm Code, NFPA 72.

Refer to “EARTH FAULT (Switch 5) - DAX-35 Only” on page 65 for information on enabling earth fault detection on the wire DAL.

## ■ Fiber and Wire/Fiber Connections

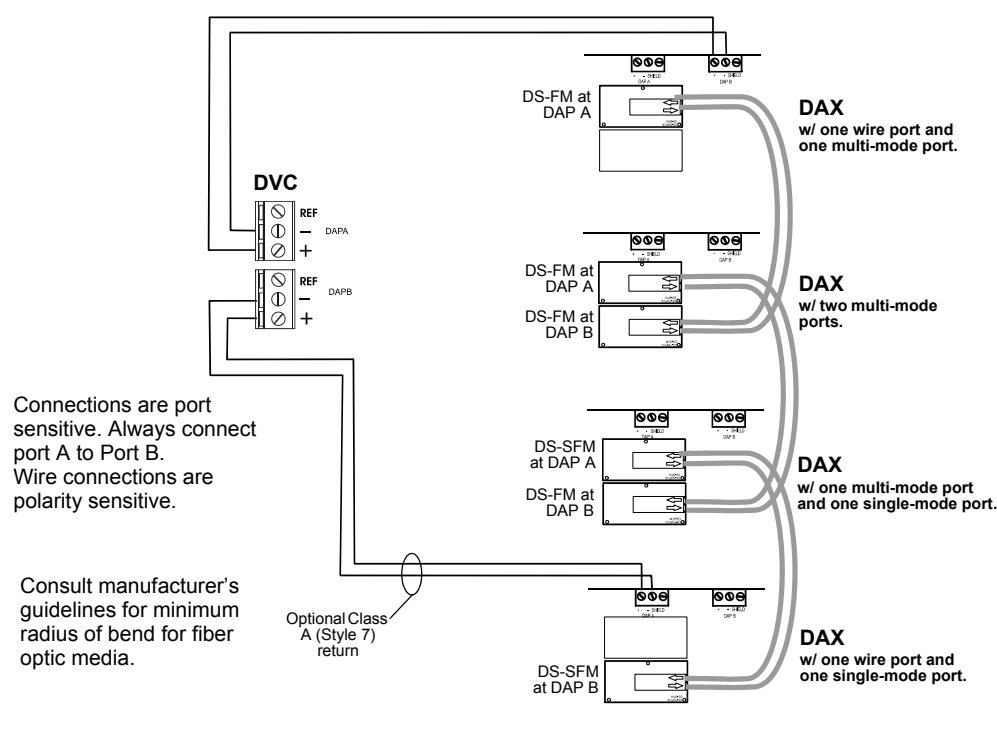
DAX boards are wire, but may be converted partially or fully to fiber boards with the use of DS-FM or DS-SFM fiber option modules. Refer to Section 5, “Fiber Option Modules”, on page 75 for installation instructions. The fiber, or wire/fiber cabling between these ports provides a Digital Audio Loop (DAL) for programming; alarm, control, trouble, automatic audio messages, address and firefighter telephone data; and live voice paging communications.

Figure 3.13 gives an example of how a DAL can be formed using mixed wire and fiber connectors.

A DS-RFM fiber module must be used to connect a DAX to a multi-mode fiber DVC or DAA. Refer to “Fiber Option Modules” on page 75 for more information on this module.



**NOTE:** If a fiber option module is installed at a DAP, that DAP may *not* also be used for a wire connection.



**Figure 3.13 Fiber/Wire DAL Configuration**



**NOTE:** Class B (Style 4) configuration must be installed in accordance with the requirements for survivability from attack by fire in the National Fire Alarm Code, NFPA 72.

## Speaker and Backup Circuits

Speaker circuits 1 and 2 (terminals 4 and 5) provide for one NFPA Class A connection for high-level audio output, or two NFPA Class B connections. These connections dynamically share the 35W or 50W output capability of the DAX. The speaker circuit supervises the output with a DC voltage. Anything greater than 6.9VDC will be considered an open circuit and anything less than 1.5VDC will be considered a short circuit.



A DAX may be wired using TB10 and TB11, “BACKUP IN” and “BACKUP THRU” to back up an amplifier. If a DAX fails, the signal automatically switches to the backup DAX.

Each backup terminal block contains two sets of terminals. One set may be used for “backup in” applications, the other set for “backup through” applications.

Speaker and backup connections are illustrated in Figure 3.14.

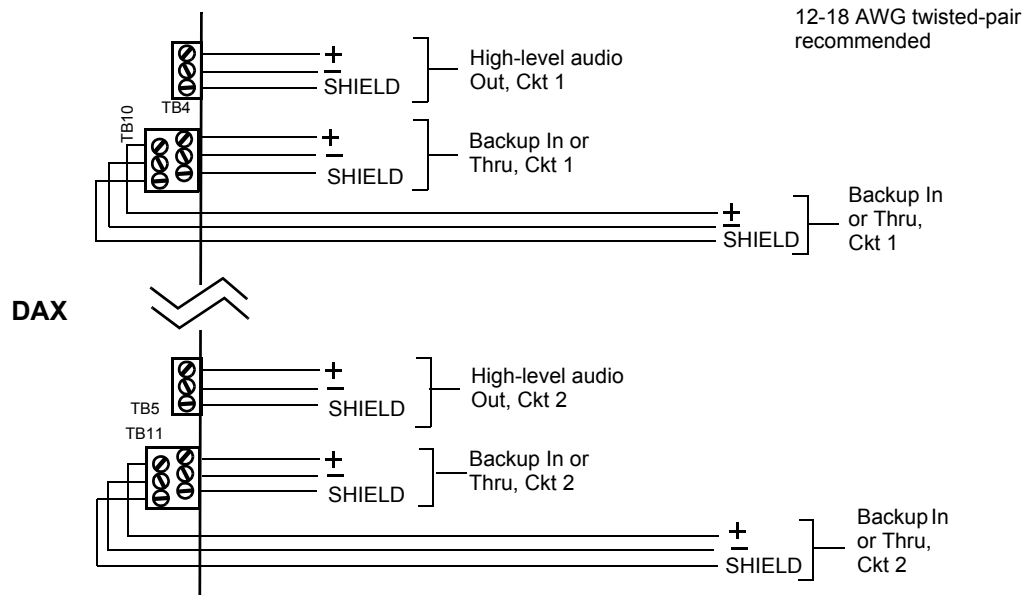


Figure 3.14 Speaker Circuit and Backup Connections



**NOTE:** The shield is connected at one end only.

■ In Normal (NAC) Mode

When a DAX’s Speaker Riser Mode is programmed NORMAL (refer to the DVC Digital Voice Command manual for programming description), the amplified signal from the DAX may be connected directly to speakers. Following are illustrations of Class A and Class B configurations (Figure 3.15).

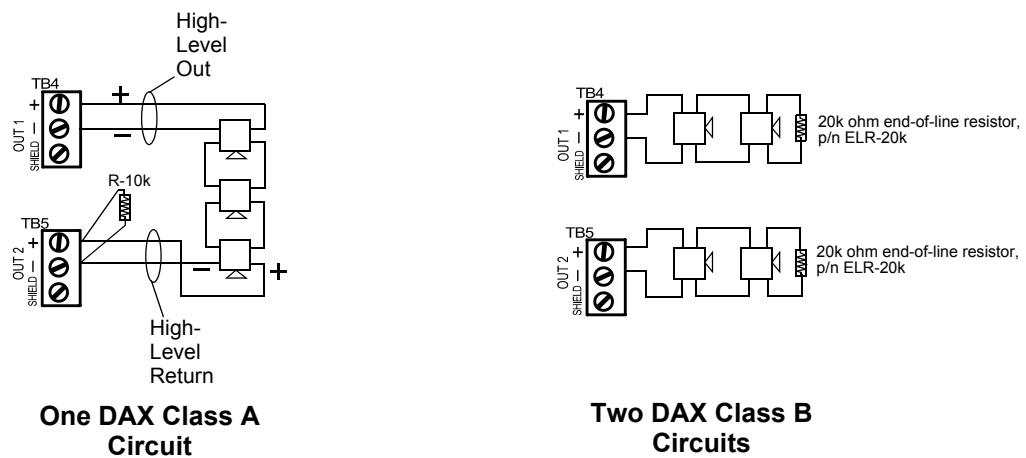
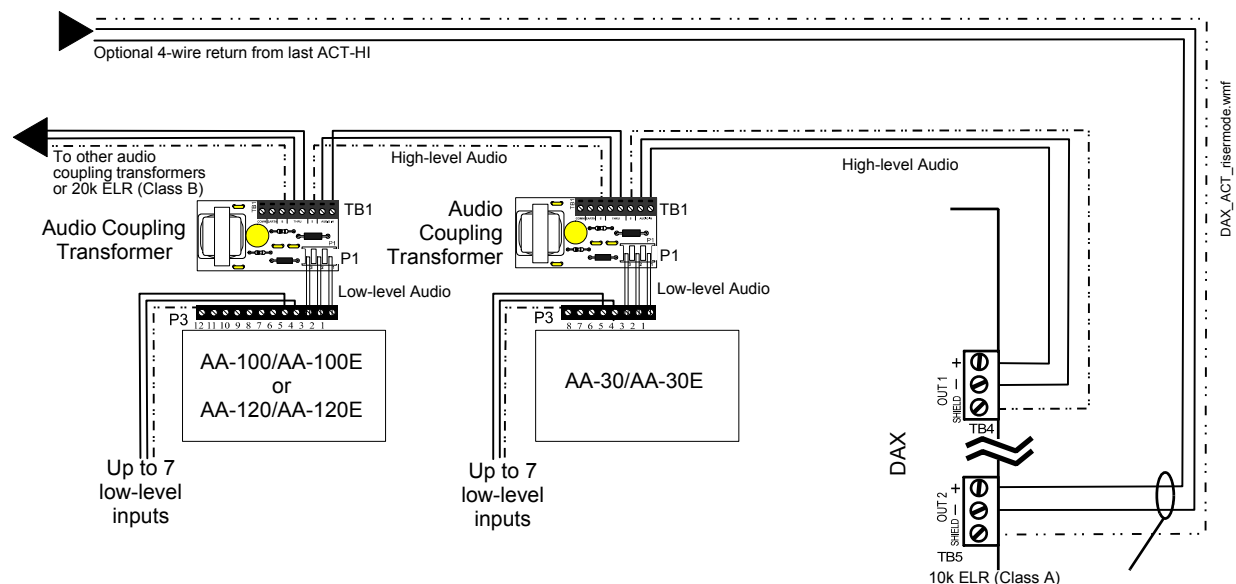


Figure 3.15 Speaker Riser Mode: Normal

### ■ In Riser Mode to Additional Amplifiers

When a DAX's Speaker Riser Mode is programmed `RISER TO ADDITIONAL AMPLIFIERS` (refer to the DVC Digital Voice Command manual for programming), the amplified signal from the DAX may be connected to an ACT-25 or ACT-70 Audio Coupling Transformer to drive additional AA-Series amplifiers. This mode provides a 200 Hz supervisory tone required by analog amplifiers.



**Figure 3.16 DAX Riser Mode to Additional Amplifiers**

Refer to the the ACT-25 and ACT-70 installation documents for more information.

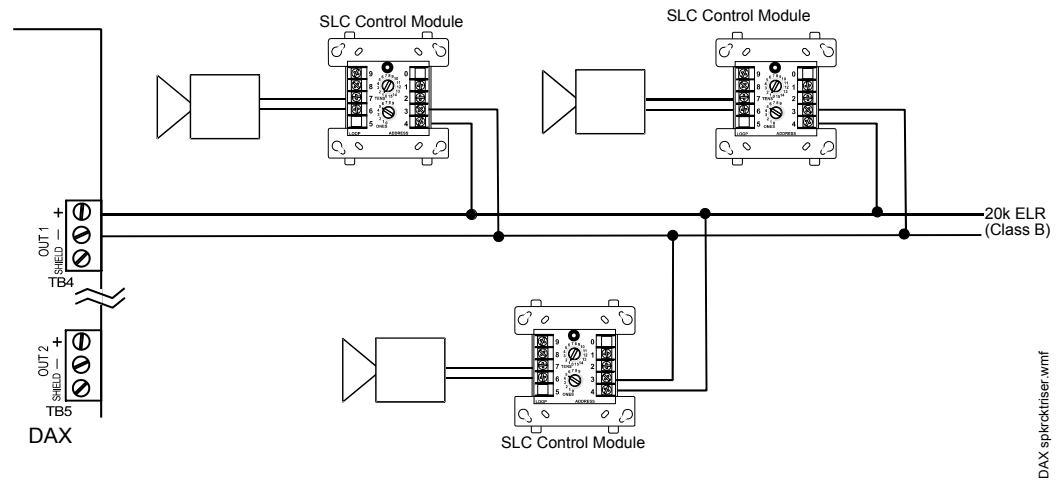
### ■ In Riser Mode to Control Modules

When a DAX's Speaker Riser Mode is programmed `RISER TO CONTROL MODULES` (refer to the DVC Digital Voice Command manual for programming), the amplified signal from the DAX may be routed to multiple speaker circuits using SLC control modules.

The control module must disable the power supply monitoring to prevent acting as a load on the supervision voltage. For V-type control modules, this requires a resistor cut under the label. For H-type modules, a jumper must be removed under the label. For XP6-C modules, a jumper must be removed for each address.

To prevent unnecessarily charging and discharging the supervision voltage of a control module and the supervision voltage of the DAA2, connect the amplifier (+) to the power supply (-) on the control module. Connect the amplifier (-) to the control module power supply (+) input.

Do not use background music in this mode. The DAX will provide speaker circuit supervision only when idle.



**Figure 3.17 DAX Riser Mode to Additional Control Modules**

■ **In Riser Mode to Room Isolators (RSM or AIM Series) - Canadian Room Isolator Modules**

When a DAX’s Speaker Riser Mode is programmed ROOM ISOLATORS (RSM OR AIM SERIES) (refer to the DVC Digital Voice Command manual for programming), the amplified signal from the DAX is routed to RSM-1A or AIM-1A room isolator modules.

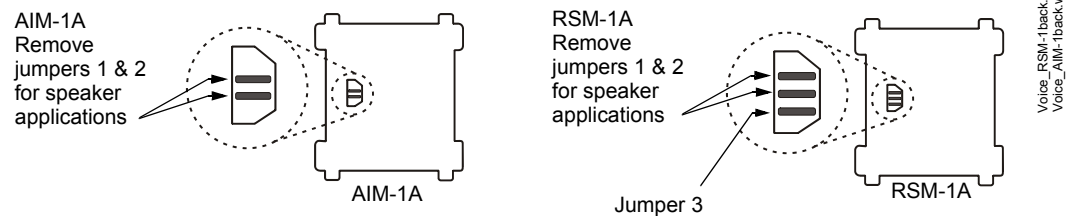
AIM-1A - Provides isolation to a separate circuit on an audio riser. A short circuit on an AIM-1A speaker circuit will not disable other speaker circuits on the riser.

RSM-1A - Works same as the AIM-1A, with the exception that there is a silence button for in-suite operation. The silence button will silence the audible signal to the module’s circuit for ten minutes during alarm. Resounding will occur automatically after ten minutes. To override the ten minute silence, CBE programming must be done at the FACP so that it interrupts the module’s 24VDC power for two seconds.

NFS2-3030 example:

Give the module’s 24VDC source a common ground with the DAX amplifier. Power the isolator module through a relay module that has Special Zone 14 in its CBE list. Special Function Zone 14 will activate for ten seconds when a reset is initiated at the panel. This period is used to disable the 24VDC for those 10 seconds to clear a local silence.

Remove jumpers for speaker applications. (Refer to Figure 3.18.)

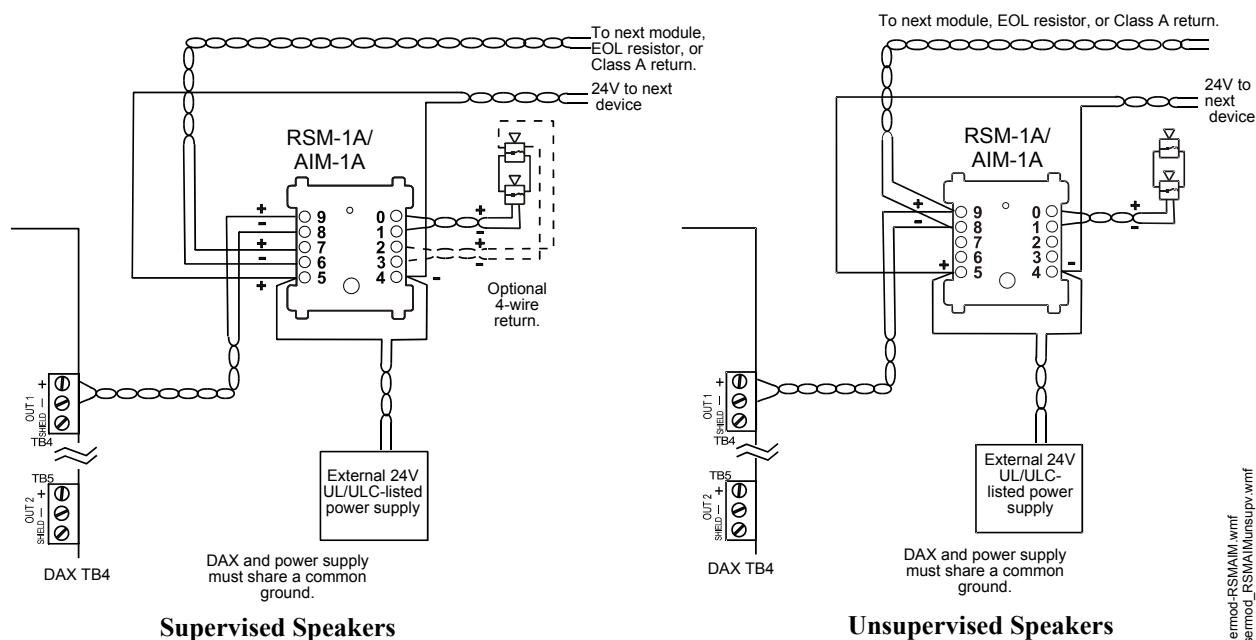


**Figure 3.18 Jumper Settings for Speaker Applications**



**NOTE:** The DAX-3570 and DAX-5070 speaker circuit risers are non power-limited when used with Canadian room isolator modules.

DAX-3525 and DAX-5025 speaker circuit risers are power-limited (Class 2) when used with Canadian room isolator modules.



**Supervised Speakers**

**Unsupervised Speakers**

**Figure 3.19 DAX Riser Mode to RSM-1A/AIM-1A Modules**

**■ In Riser Mode to Room Isolators (CIM or CSM Series) - Canadian Room Isolator Modules**

When a DAX’s Speaker Riser Mode is programmed ROOM ISOLATORS (CIM OR CSM SERIES) (Refer to the DVC Digital Voice Command manual for programming), the amplified signal from the DAX is routed to a CIM-2A module, which feeds the signal to one or two CSM-1A modules.

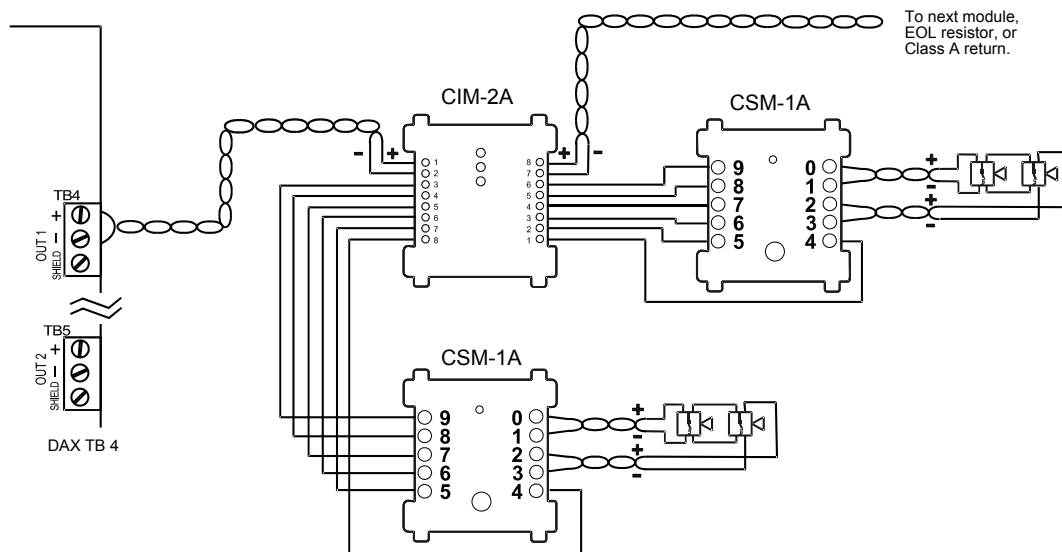
A pre-announce tone of 800 Hz will clear a local silence.

Do not use background music in this mode. The DAX will provide speaker circuit supervision only when idle.



**NOTE:** The DAX-3570 and DAX-5070 speaker circuit risers are non power-limited when used with Canadian room isolator modules.  
 DAX-3525 and DAX-5025 speaker circuit risers are power-limited (Class 2) when used with Canadian room isolator modules.

DAXrisermod-RSM/AIM.wmf  
 DAXrisermod-RSM/AIMunsup.v.wmf



**Figure 3.20 DAX Riser Mode to Room Isolators (CIM or CSM Series)**

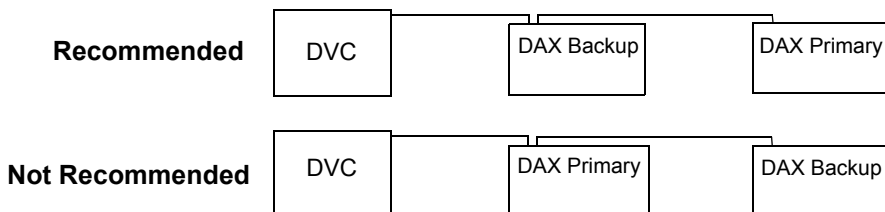
■ **Speaker Backup Circuits - TB10 and TB 11**

The DAX supports one-to-one or one-to-many backup amplification. A BDA-25/70V backup amplifier may be used in a one-to-one backup application. Each DAX must be designated a primary or backup amplifier through VeriFire Tools programming. The speaker wiring from backup to primary is unsupervised when the backup amplifier is not active; therefore the backup and primary amplifiers must be in the same enclosure, or in conduit within the same room.

Each backup terminal block contains two sets of terminals. One set may be used for “backup in” applications, the other set for “backup through” applications.



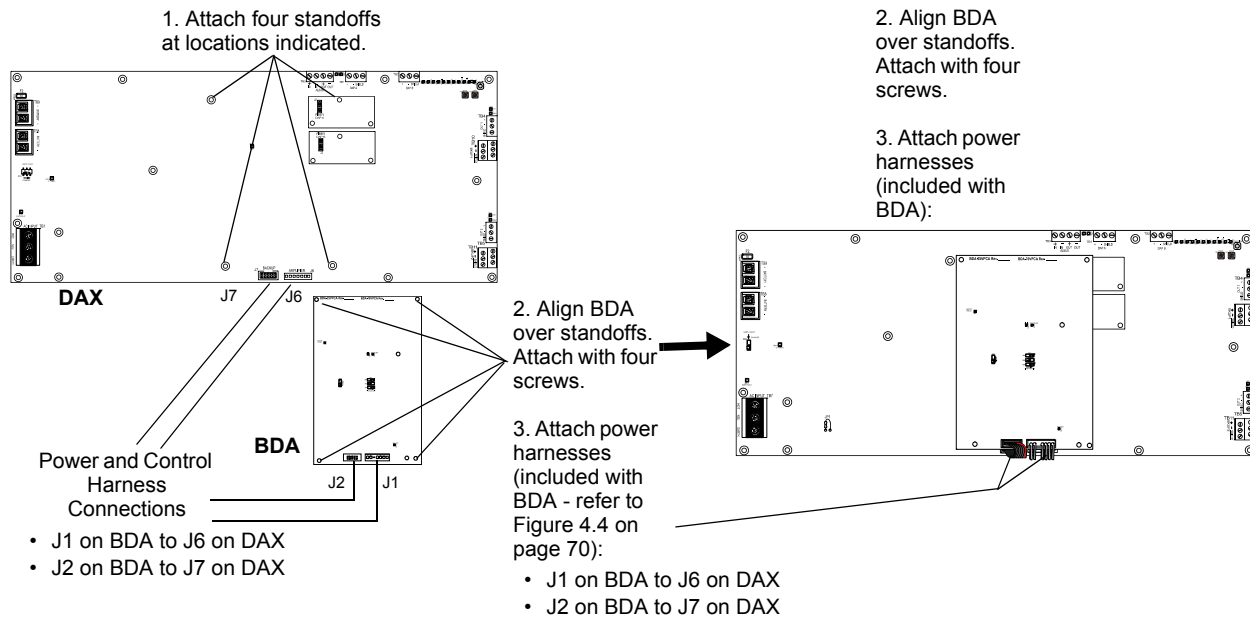
**NOTE:** In Style 4 wiring arrangements of the DAL (digital audio loop), it is recommended that the backup amplifier be located closer to the DVC than the primary DAX amplifiers on the DAL.



Each DAX acts as a repeater for the digital audio signal. If a primary amplifier falls off-line, the backup will not receive the signal if it is further down the DAL chain.

### ■ One-to-One Backup Using BDA-25/70V

Figure 3.21 shows the installation of a BDA-25/70V backup digital amplifier onto the primary amplifier. Should the amplifier portion of the DAX fail, all its messages will still be played by the BDA as programmed.



**Figure 3.21 One-to-one Backup Using BDA-25/70V**

### ■ One-to-One or One-to-Many Backup Using DAX

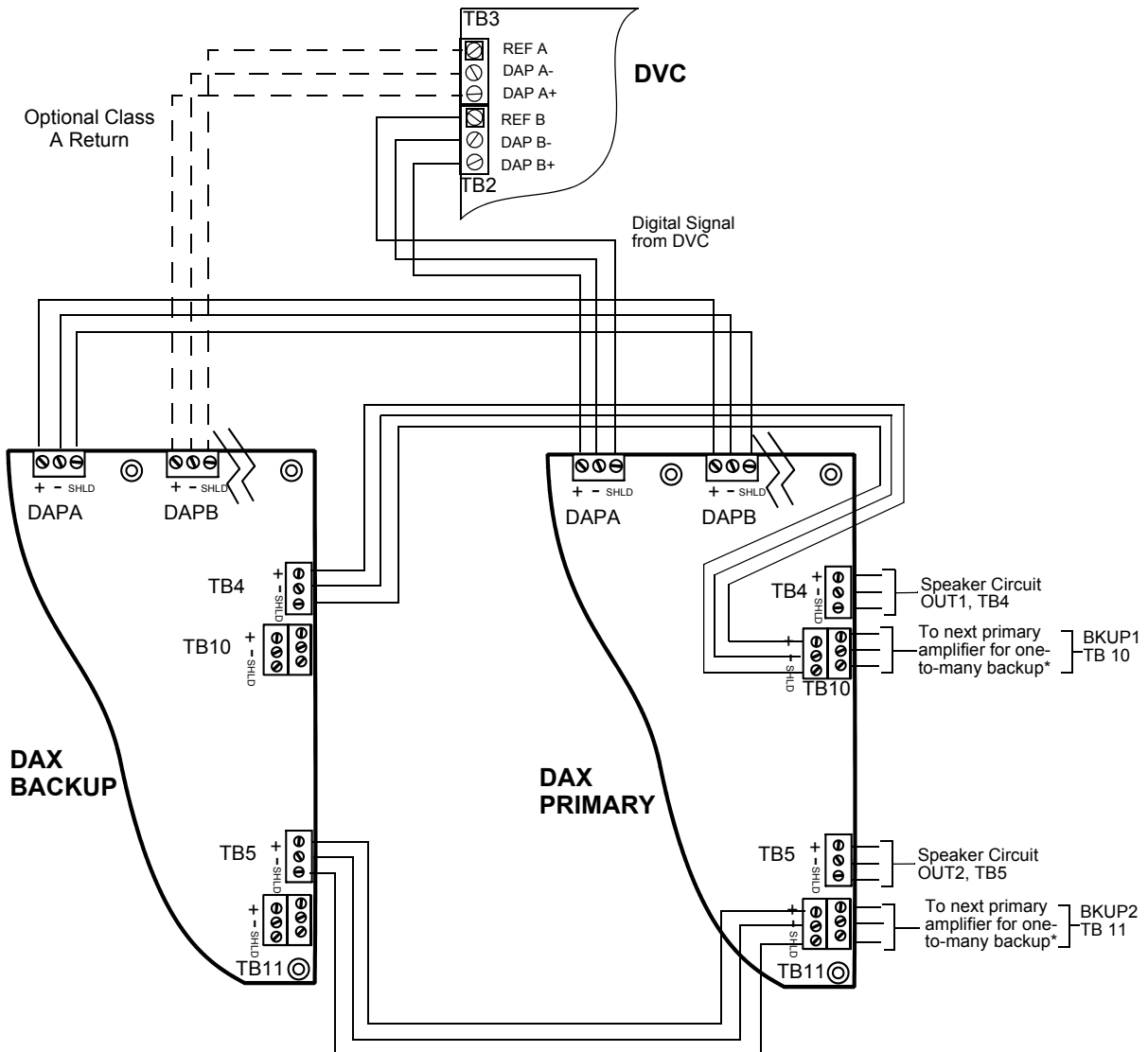
BKUP1 and BKUP2 terminals on the DAX may be used to connect a backup amplifier to one or more primary amplifiers.



**NOTE:** Each backup terminal block contains two sets of terminals. One set may be used for “Backup In” applications, the other set for “Backup Through” applications.

One backup DAX may be used to back up as many as 31 primary DAX amplifiers. All primary amplifiers backed by the same backup amplifier must each be wired in the same style or combination of styles; for example, all wired Class A, or all wired Class B, or all wired with one Class A and two Class B circuits.

A backup amplifier can support one failed primary amplifier at a time. Should another primary amplifier also fail, depending on load, the backup amplifier may also fail, generating an AMPLIFIER LIMIT trouble until the load is reduced or reset.



\*Note: No end-of-line resistor is necessary at the last primary amplifier backup terminal.

**Figure 3.22 One-to-one or One-to-Many Backup Using BKUP Terminal Blocks**

### Wiring Fault Testing

Test wire-to-wire faults with 0 (zero) ohm impedance.

### UL Power-limited (Class 2) Wiring Requirements

Power-limited and non-power-limited circuit wiring must remain separated in the cabinet. All power-limited circuit wiring must remain at least 0.25 inches (6.35 mm) from any non-power-limited circuit wiring. All power-limited and non-power-limited circuit wiring must enter and exit the cabinet through different knockouts and/or conduits.

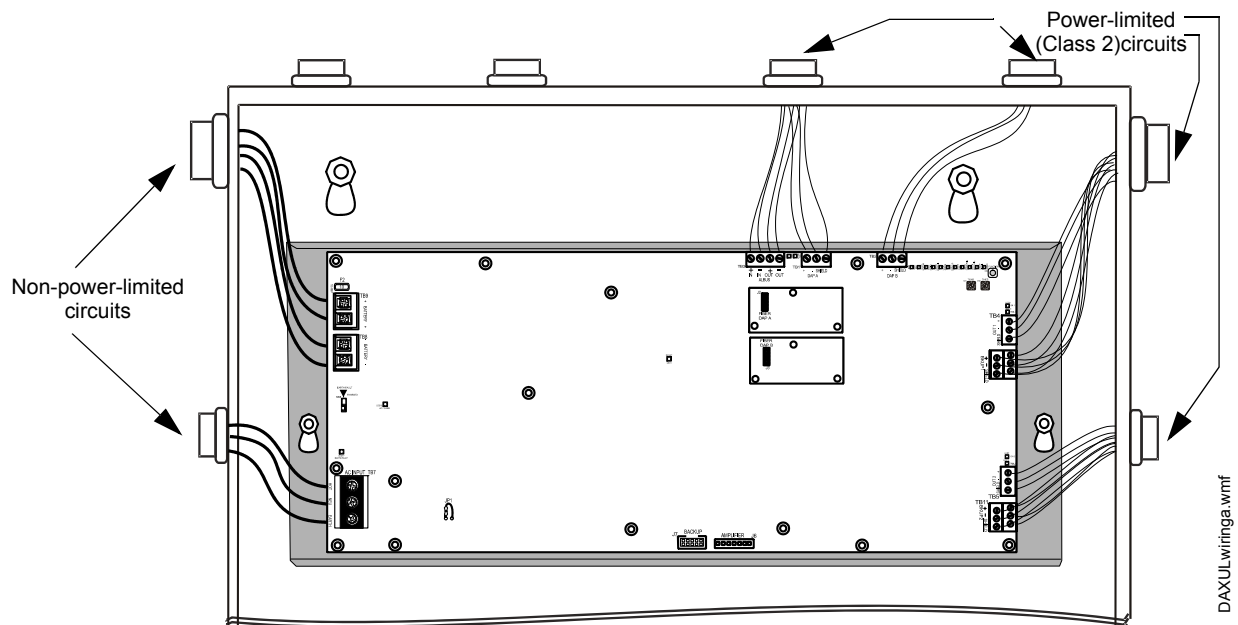


Figure 3.23 Typical Backbox Wiring

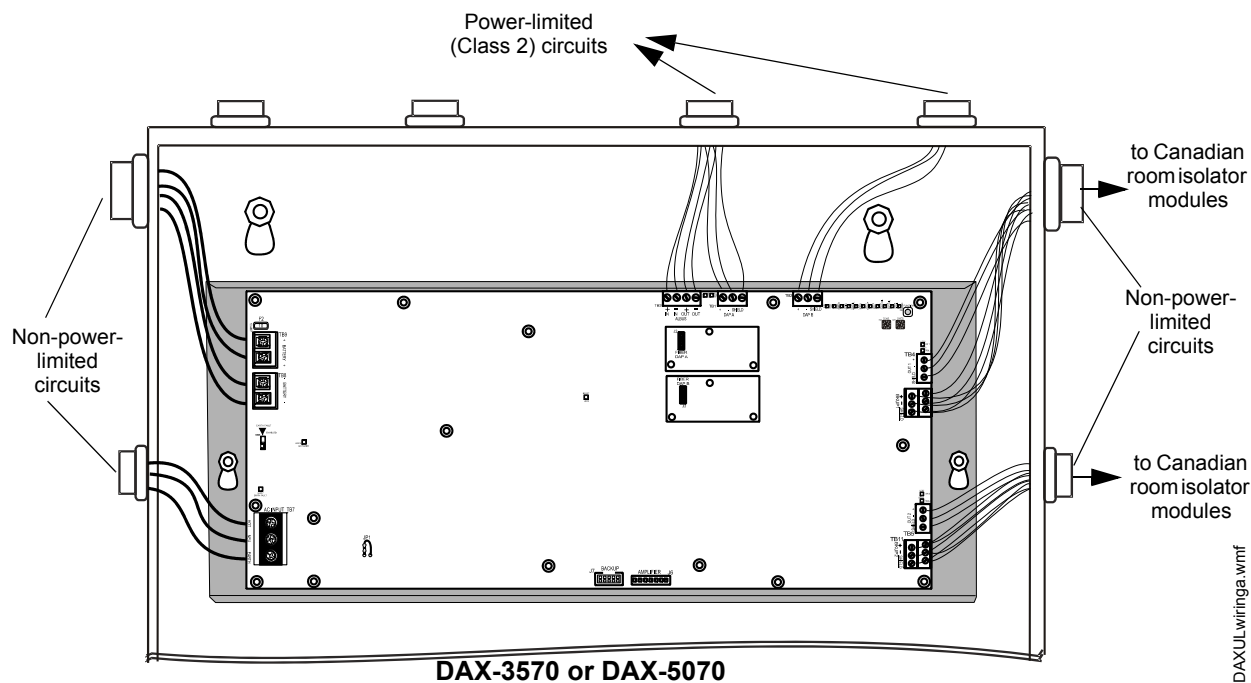


Figure 3.24 Backbox Wiring with DAX-3570 or DAX-5070 and Canadian Room Isolator Modules

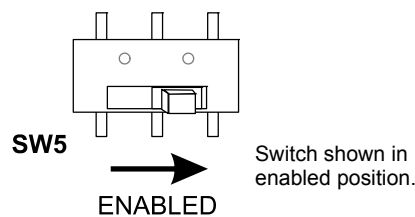


### 3.3 DAX Configuration

#### 3.3.1 Setting the Configuration Switches

##### EARTH FAULT (Switch 5) - DAX-35 Only

The DAX-35 has a ground fault switch that can be set to EN (enable) to detect ground faults on the board’s external wiring (except DAL Port A) and on a DAL (digital audio loop) segment (Port B). Port A is isolated, and ground fault detection on Port A will be performed at the other end of the connection. A general ground fault error for the device will be generated when a ground fault is detected.

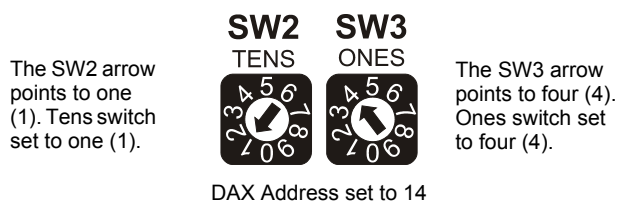


**Figure 3.25 Earth Fault**

Refer to the DAL Earth Fault Detection appendix in the DVC Digital Voice Command manual, as well as “Battery Sharing” on page 52, for more information on how to set this switch.

##### Address Switches

A maximum of 32 DAL devices may be connected to one DVC. Each device must have its own address. Refer to Figure 3.26 for an illustration of address settings and to Figure 3.2 on page 46 for the location of the switches.



**Figure 3.26 DAX Address Switches**

Addresses one (1) through 32 may be used for digital communication.

Address 00 and addresses above 32 will generate a DAX trouble.

The default address setting for the DAX as it arrives from the factory is 00.

#### 3.3.2 Programming

The DAX is programmed through VeriFire Tools. Refer to the DVC Digital Voice Command manual as well as the VeriFire Tools CD and Help file for information on how to create, prioritize and download audio messages, create system equations for message distribution, and set system parameters.

### 3.4 DAX Operation

#### 3.4.1 Volume

The volume of audio messages is determined through FACP/network annunciator programming and VeriFire Tools Read Status Service Form.

#### 3.4.2 Trouble Messages

DAXs will send trouble messages to the DVC through the wire or fiber DAL (Digital Audio Loop). The DVC in turn sends them to the panel or network annunciator. Refer to the System Troubles appendix in the DVC Digital Voice Command manual for a list and description of system troubles.

### **3.4.3 Read/Alter Status**

An NCA-2, NFS2-3030, NFS-3030, and network workstation, as well as a computer running VeriFire Tools, will be able to read the status of a DAX and its speaker circuits. Refer to the appropriate panel manual or the VeriFire Tools Read Status Service Form.

## Section 4: BDA Backup Digital Amplifiers

The BDA-25V and BDA-70V backup digital amplifiers provide an economical means of backing up DAA2 and DAX amplifiers in a one-to-one primary/backup configuration. A BDA can also provide a second audio channel for a DAA2 when programmed as a primary amplifier in VeriFire Tools. Table 4.1 lists BDA amplifier models.

BDA Models			
BDA-25V	25 V <sub>RMS</sub>	Switch settings for: <ul style="list-style-type: none"><li>• 75 watt operation</li><li>• 50 watt operation</li><li>• 35 watt operation</li></ul>	Compatible with DAA2, DAX
BDA-70V	70 V <sub>RMS</sub>	Switch settings for: <ul style="list-style-type: none"><li>• 50 watt operation</li><li>• 35 watt operation</li></ul>	Compatible with DAA2, DAX

**Table 4.1 BDA Amplifier Models**

A BDA is not addressable: it is considered a part of the digital amplifier to which it is attached.

### 4.1 Features

- Programmable with VeriFire Tools to be either a backup or a primary amplifier.
- Provides backup for DAA2 and DAX.
- Provides second audio channel for DAA2.

### 4.2 Specifications

#### 4.2.1 When Used with DAA2-75

- With BDA-25V used as backup, 75 watts audio output from the DAA2, or 75 watts audio output from the BDA-25V.
- With BDA-25V used as a second channel, 75 watts total audio output shared between the DAA2 and BDA.

#### 4.2.2 When Used with DAA2-50

- With BDA-25V/70V used as backup, 50 watts audio output from the DAA2, or 50 watts audio output from the BDA.
- With BDA-25V/70V used as a second channel, 50 watts total audio output shared between the DAA2 and BDA.
- Group Considerations:
  - When the BDA-25V/70V and its DAA2 are in the same group, 50 watts total output.
  - When the BDA-25V/70V and its DAA2 are not in the same group, 50 watts output apiece for a total of 100 watts. (Charger disabled automatically in VeriFire Tools. with this configuration.)

See “DAA2-75 Configurations with BDA” on page 73, as well as the Audio Groups appendix in the DVC Digital Voice Command manual for more information on audio groups.

### 4.2.3 When Used with DAX-50

- With BDA-25/70 card used as backup, 50 watts audio output from the DAX, or 50 watts audio output from the BDA.

### 4.2.4 When Used with DAX-35

- With BDA-25/70 card used as backup, 35 watts audio output from the DAX, or 35 watts audio output from the BDA.

## 4.3 Board Layout

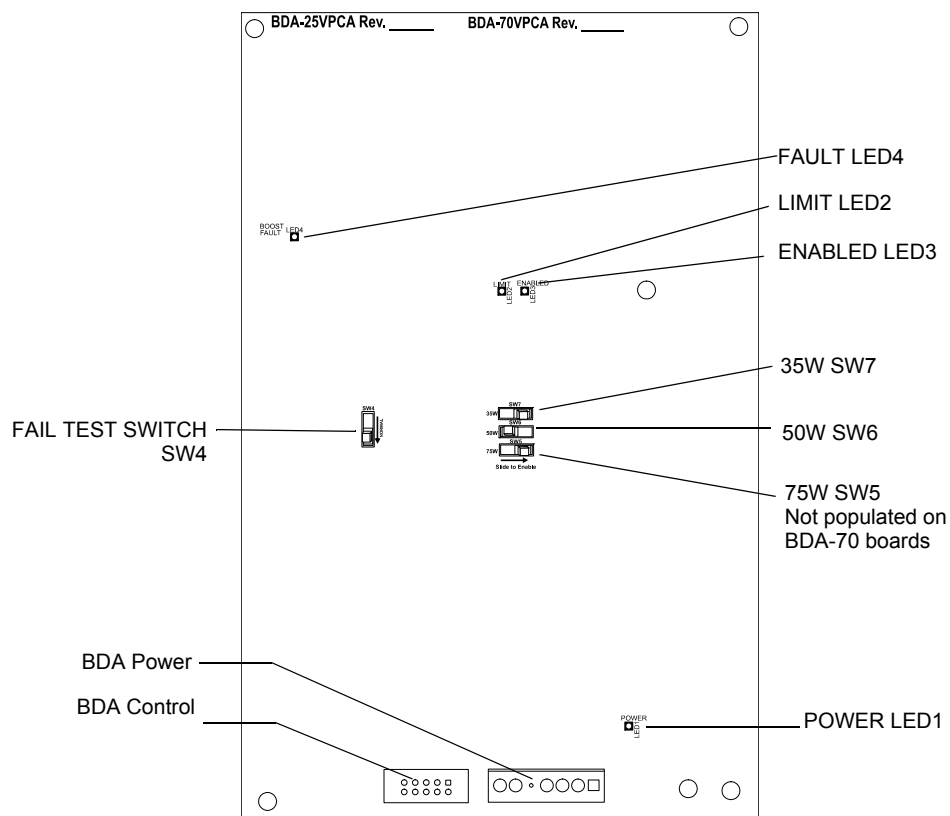


Figure 4.1 BDA-25V/70V Layout

LED #	NAME	COLOR	DESCRIPTION
1	Power	Green	Illuminates when power is applied.
2	Limit	Yellow	Illuminates when output current is limited. The amplifier is overloaded.
3	Enabled	Green	Illuminates when amplifier is enabled.
4	Fault	Yellow	Illuminates when boost voltage is not present. Board is defective and should be returned.

Table 4.2 BDA-25V/70V LED Indicators

The switches described in Table 4.3 are for configuring the BDA-25/70.

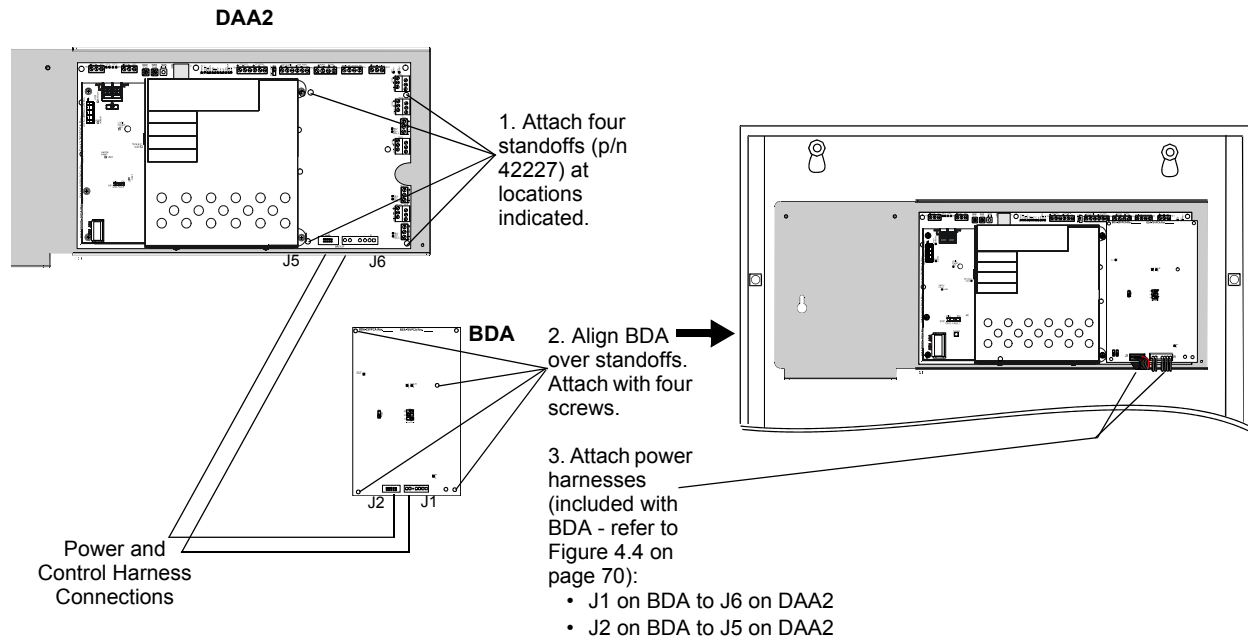
Name	Switch #	Description	Default
FAIL TEST SWITCH	SW4	Simulates an amplifier failure for testing backup amplifiers. Refer to page 71.	Normal
75W	SW5	Sets the board for 75 watt operation. Not populated for BDA-70's.	Disabled
50W	SW6	Sets the board for 50 watt operation.	Disabled
35W	SW7	Sets the board for 35 watt operation.	Disabled

**Table 4.3 BDA-25V/70V Switches**

## 4.4 Installation

### 4.4.1 DAA2

Figure 4.2 shows the installation of a BDA-25/70V onto a DAA2 amplifier. The BDA may be programmed and wired for backup or for providing a second audio channel.



**Figure 4.2 BDA-25V/70V Installation, DAA2**

### 4.4.2 DAX

Figure 4.3 shows the installation of a BDA-25/70V onto a DAX amplifier. The BDA may be programmed and wired for backup.

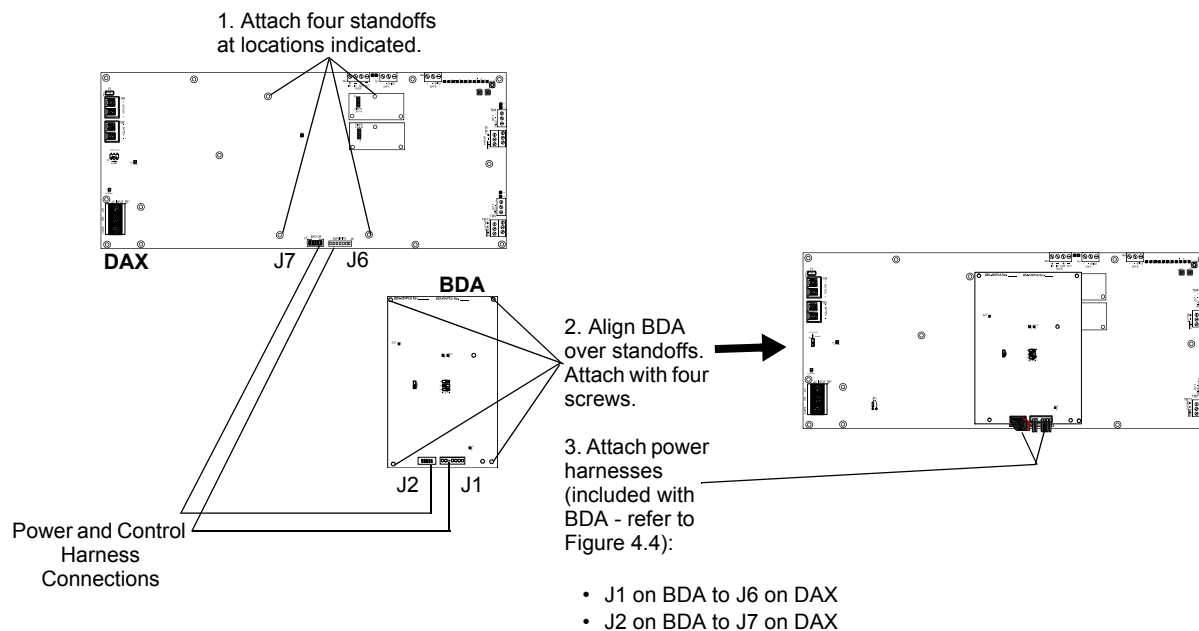


Figure 4.3 BDA-25V/70V Installation, DAX

### 4.4.3 BDA Power and Control Cables

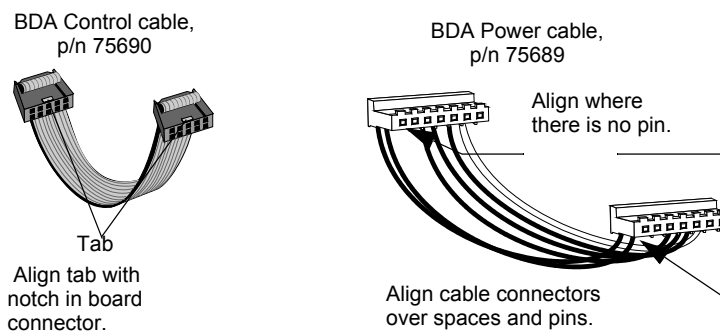


Figure 4.4 BDA Control and Power Cables

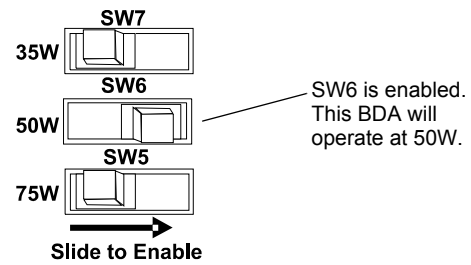
## 4.5 Configuration

### 4.5.1 Wattage Switches, SW5 - SW7

These switches allow the installer to select whether the BDA will operate at 35, 50, or 75 watts.

The BDA-70 does not have a 75 watt switch.

Switches come from the factory disabled.

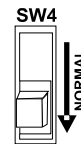


**Figure 4.5 Wattage Switches**

### 4.5.2 FAIL TEST Switch, SW4

This switch arrives from the factory set to “Normal”. Change the setting to simulate an amplifier failure for testing backup amplifiers.

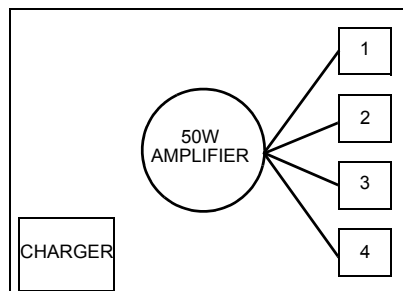
This switch should be set to off-normal *only* when testing the system’s operation. Otherwise it should always be set to NORMAL.



**Figure 4.6 FAIL TEST Switch**

### 4.5.3 DAA2-50 Configurations with BDA

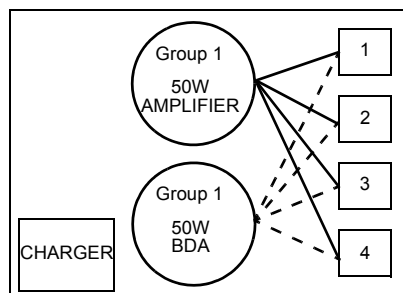
Following are descriptions of group configurations for 50 and 75 watt DAA2s with BDAs. The descriptions pull together group, backup, class, and charging information. A DAA2 can have up to two groups. Refer to the Audio Groups appendix in the DVC Digital Voice Command manual for more information on audio groups.



**One Group**

- 50W.
- Single channel.
- Four Class B or Two Class A Outputs.
- No Backup. Requires external backup.
- All three charging capabilities available (see Table 2.2, "Battery Charging Capabilities," on page 12).

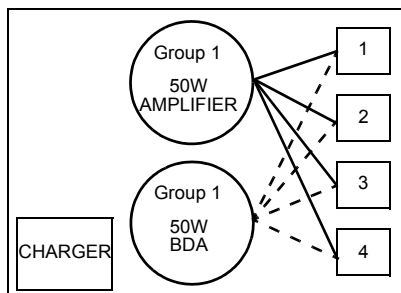
**Figure 4.7 Basic (No BDA)**



**One Group**

- 50W.
- Single channel.
- Four Class B or Two Class A Outputs.
- BDA is the backup.
- All three charging capabilities available (see Table 2.2, "Battery Charging Capabilities," on page 12).
- Does not require external backup.

**Figure 4.8 One Group with Backup**

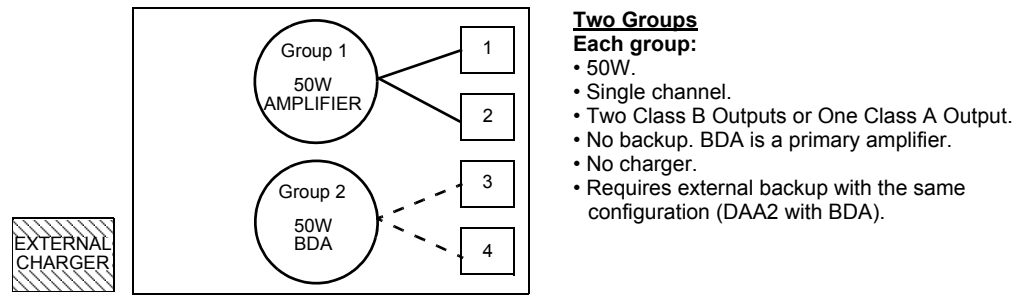


**One Group**

- 50W.
- Dual channel.
- Four Class B or Two Class A Outputs.
- No backup. BDA is a primary amplifier.
- All three charging capabilities available (see Table 2.2, "Battery Charging Capabilities," on page 12).
- Requires external backup with the same configuration (DAA2 with a BDA).

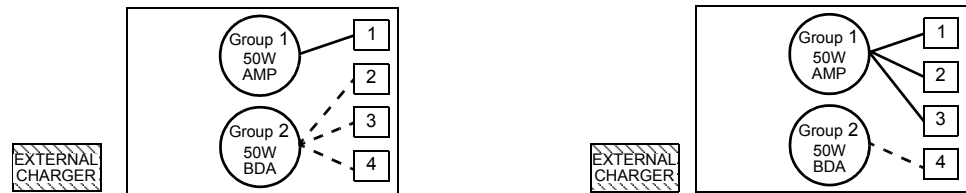
**Figure 4.9 One Group, Two Channel**





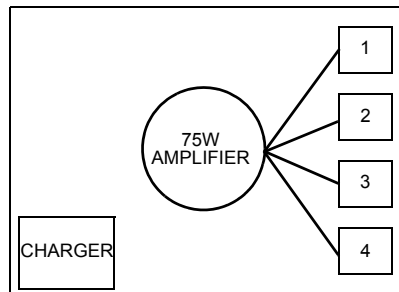
**Two Groups - Variations:**

Both variations require Class B for the smaller group.



**Figure 4.10 Two Groups**

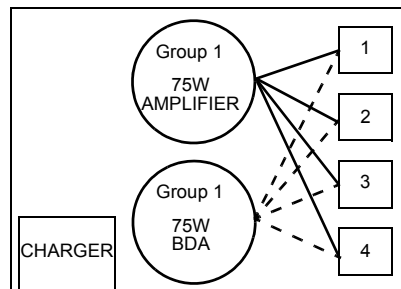
**DAA2-75 Configurations with BDA**



**One Group**

- 75W.
- Single channel.
- Four Class B or Two Class A Outputs.
- No backup. Requires external backup.
- Two charger settings available. See Table 2.2, "Battery Charging Capabilities," on page 12 for settings.

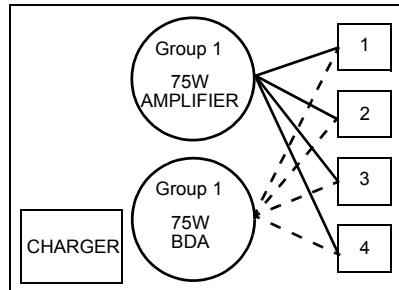
**Figure 4.11 Basic (No BDA)**



**One Group**

- 75W.
- Single channel.
- Four Class B or Two Class A Outputs.
- BDA as backup.
- Two charger settings available. See Table 2.2, "Battery Charging Capabilities," on page 12 for settings.
- Does not require external backup.

**Figure 4.12 One Group with Backup**

**One Group**

- 75W.
- Dual channel.
- Four Class B or Two Class A Outputs.
- No backup. BDA is extra channel.
- Requires external backup.
- Two charger settings available. See Table 2.2, "Battery Charging Capabilities," on page 12 for settings.

**Figure 4.13 One group, Two Channel**

## 4.5.4 Operation

### Volume

The volume of the BDA's group can be changed using VeriFire Tools, NCA-2, ONYXWORKS, or direct-connect NFS2-3030.

## Section 5: Fiber Option Modules

The DVC-PCC and all other DAL devices except fiber DAA amplifiers support wire media as shipped. The use of fiber optic media requires the use of fiber option modules. Each DAL device can be used with either one or two modules. This flexibility allows for the creation of digital audio networks with mixed wire, multi-mode fiber, and single-mode fiber segments on the same loop.

Fiber option modules consist of the following models:

Model	Fiber Type	For direct fiber connection between....	Not Used on
DS-FM	multi-mode	Two DAL devices	Single or multi-mode DVC-PCA, DVC-PCB or DAA.
DS-SFM	single-mode	Two DAL devices. An ST® style connector is required at a single-mode DVC/DAA end.	Multi-mode DVC-PCA, DVC-PCB or DAA.
DS-RFM	multi-mode	Two DAL devices, one of which is a multi-mode fiber DVC or DAA. An ST® style connector is required at the multi-mode DVC/DAA end.	Single-mode DVC-PCA, DVC-PCB or DAA.

**Table 5.1 Fiber Option Module Models**



**NOTE:** Whenever a fiber option module is used on a DAL device port, the next DAL device that is linked to that port must have the same model fiber option module (with the exception of single- and multi-mode DVCs and DAAs).

One or two fiber option modules may be connected to a DAX or DAA2 board to convert it from a board with two wire DAP ports to:

- a board with one wire and one fiber port,
- a board with two single-mode fiber ports,
- a board with two multi-mode fiber ports, or
- a board with one single-mode and one multi-mode fiber port.

When a fiber option module is mounted on a DAA2 or DAX, it disables the corresponding wire terminals.

- DAA2: TB2 (Digital Audio Port A) is disabled when a fiber option board is connected at J9. TB3 (Digital Audio Port B) is disabled when a fiber option board is connected at J10.
- DAX: TB1 (Digital Audio Port A) is disabled when a fiber option board is connected at J2. TB2 (Digital Audio Port B) is disabled when a fiber option board is connected at J3.

### 5.1 Specifications

Single- and Multi-mode Fiber-Optic Digital Audio Ports

LC Style connection.

Supervised.

Fiber optic cable, multi-mode: 50/125 or 62.5/125 micrometers.

Fiber optic cable, single-mode: 9/125 micrometers.

Attenuation of cabling between two nodes (fiber-optic circuits are point-to-point) must not exceed the maximum attenuation, specified below.

To determine attenuation:

1. Find the rated dB loss per foot within the cable manufacturer's specifications. Determine the total attenuation between the two nodes due to the cable.

$$\text{Loss} = (\text{loss/ft.}) \times (\text{length in feet})$$

2. Establish the dB loss for each connector and splice. Sum all the losses.
3. Total the attenuation factors obtained in steps 1 and 2. This will provide an approximate attenuation total. The actual attenuation should be measured end-to-end with fiber-optic industry standard equipment.

#### DS-FM and DS-SFM

The maximum attenuation:

6.5dB for multi-mode with 50/125 micrometer cable @ 1310 nm.

10dB for multi-mode with 62.5/125 micrometer cable @ 1310 nm.

30dB for single-mode with 9/125 micrometer cable @ 1310 nm.

#### DS-SFM/Single-mode fiber DVC/DAA Connection

The maximum attenuation:

17dB for single-mode with 9/125 micrometer cable at 1310 nm going *from* the DS-SFM *to* the fiber DVC or fiber DAA.

4dB for single-mode with 9/125 micrometer cable going *from* the fiber DVC or fiber DAA *to* the DS-SFM

The minimum attenuation:

12dB going *from* the DS-SFM *to* the fiber DVC or fiber DAA.

#### DS-RFM/Multi-mode fiber DVC/DAA Connection

Attenuation going *from* the fiber DVC or fiber DAA *to* the DS-RFM:

2dB maximum for multi-mode with 50/125 micrometer cable @ 850 nm for the DS-RFM.

4dB maximum for multi-mode with 62.5/125 micrometer cable @ 850 nm for the DS-RFM.

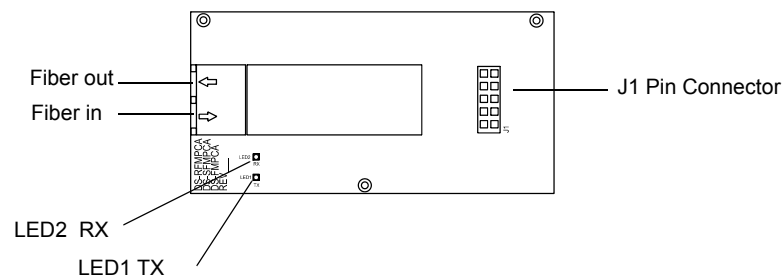
Attenuation going *from* the DS-RFM *to* the fiber DVC or fiber DAA:

12dB minimum\*, 16dB maximum for both cable types.

\*If the length of the fiber run results in an attenuation of less than 12dB, a suitable attenuator must be used.

## 5.2 Layout

The DS-FM, DS-SFM and DS-RFM look the same. The silkscreened board names that do not apply will be crossed off.



**Figure 5.1 Fiber Conversion Module**

LED #	NAME	COLOR	DESCRIPTION
1	TX	Green	Illuminates while data is transmitted on the digital audio port. Light will flicker, turning on when activity is detected and off when it is not.
2	RX	Green	Illuminates while data is received on the digital audio port. Light will flicker, turning on when activity is detected and off when it is not.

**Table 5.2 DS-FM LED Indicators**

## 5.3 Installation

### 5.3.1 DAA2 Installation

The DAA2's power supply must be removed to install these option modules.

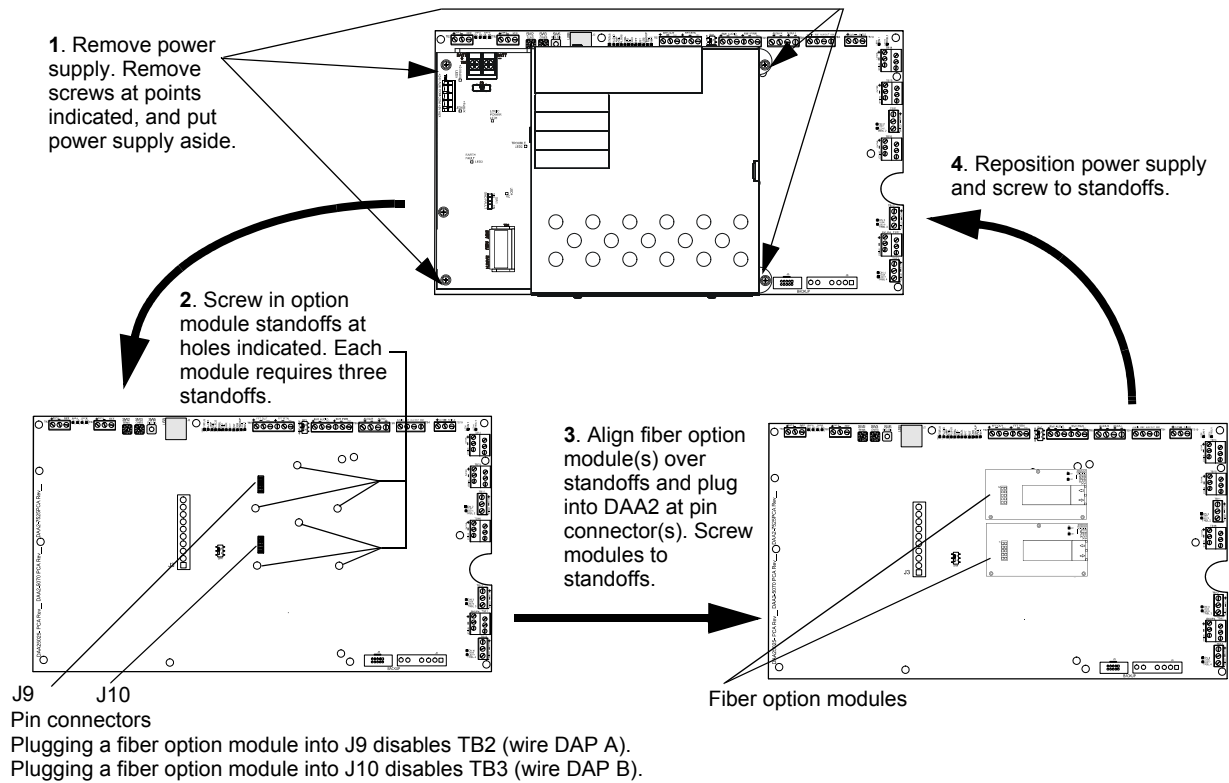


Figure 5.2 DAA2 Fiber Option Module Installation

### 5.3.2 DAX Installation

Install the fiber option modules as indicated.

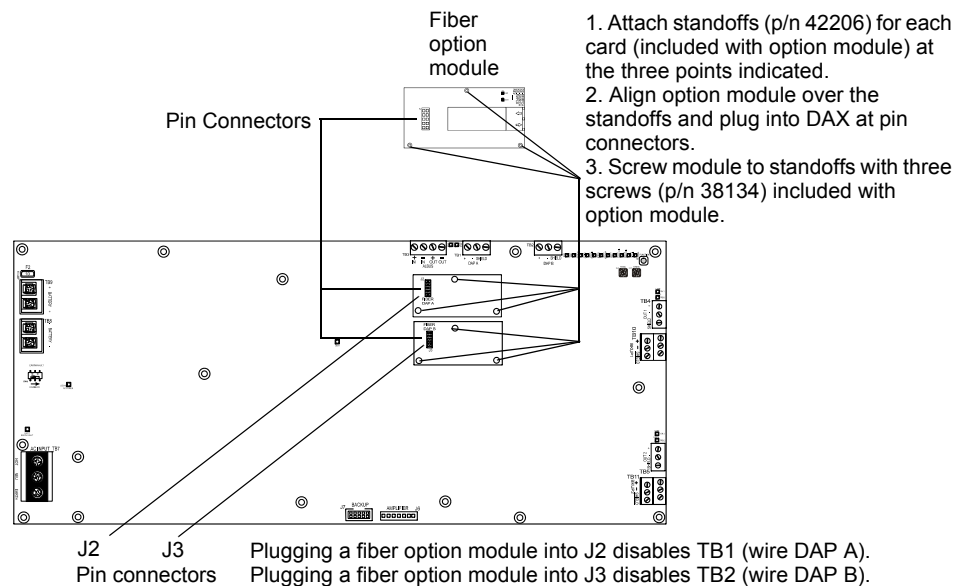


Figure 5.3 DAX Fiber Option Module Installation

### 5.3.3 Single- or Multi-mode DVC (DVC-PCB or less) or DAA Installation

#### Single-mode

A DS-SFM must be used to connect a DAA2 or DAX to a single-mode fiber DVC or DAA.

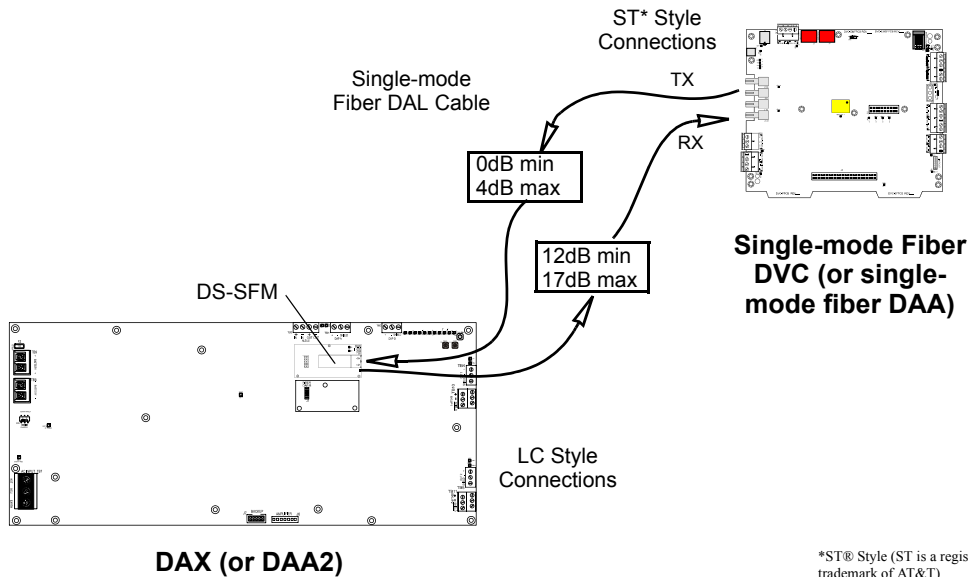


Figure 5.4 Single-mode Fiber DVC or DAA Installation

#### Multi-mode

A DS-RFM must be used to connect a DAA2 or DAX to a multi-mode fiber DVC or DAA.

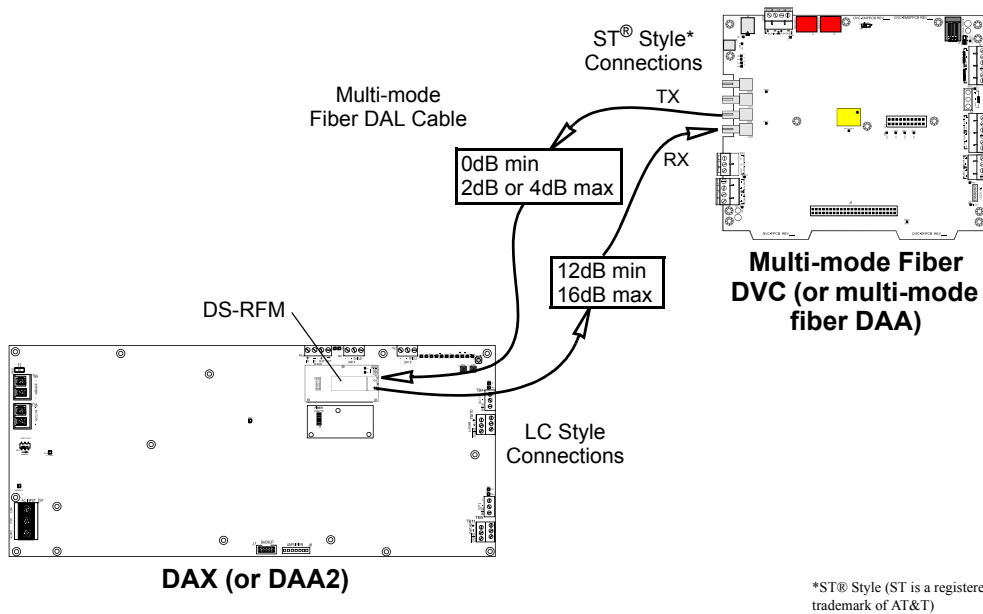


Figure 5.5 Multi-mode Fiber DVC or DAA Installation

# Appendix A: AC Current Draw Calculations

## A.1 DAA2 Current Draw Calculations

Maximum AC current draw varies by DAA2 model. Refer to the appropriate table worksheet in Section A.1.2 for the maximum AC draw figure. Follow the procedures in Section A.1.1 to calculate AC draw.

### A.1.1 Worksheet Procedures

1. Two columns must be filled out and totaled for each amplifier. Enter the “Basic Draw” figure into the appropriate columns (either A and B, or C and D).
2. In those same two columns, enter the figures for the application draws that apply.
3. Sum both columns, and enter the totals in the “AC Draw Totals” row. The figure in the column with the highest total must be equal to or less than the maximum AC current draw indicated.

### A.1.2 Worksheets

DAA2-5025						
Application	120V 50/60Hz 4.78A max.			220-240V 50/60Hz 2.74A max.		
	AC Draw	A Calculation for when amplifier is active	B Calculation for when amplifier is not active	AC Draw	C Calculation for when amplifier is active	D Calculation for when amplifier is not active
Basic draw	0.54	0.54	0.54	0.32	0.32	0.32
Used as a primary amplifier*	1.51	+ 1.51		0.85	+ 0.85	
Charger - less than 26AH**	0.79	+ _____	+ _____	0.58	+ _____	+ _____
Charger - 26AH to less than 50AH**	1.49		+ _____	0.87		+ _____
Charger - 50AH to less than or equal to 200AH**	3.75		+ _____	2.15		+ _____
BDA as a backup or 2nd channel in Audio Group 1	0.10	+ _____	+ _____	0.06	+ _____	+ _____
BDA as a 2nd channel in Audio Group 2	1.57	+ _____	+ _____	0.92	+ _____	+ _____
AUX power (on CPS-24)	0.39	+ _____	+ _____	0.21	+ _____	+ _____
AC Draw Totals		= _____	= _____	or	= _____	= _____
		The highest total of column A and column B must be $\leq$ the maximum AC current draw allowed of 4.78A.		The highest total of column C and column D must be $\leq$ the maximum AC current draw allowed of 2.74A.		

\* A DAA2-5025 used as a backup will draw the same power as a primary when it is active.  
 \*\* When the amplifier is active, the column A charger entry must be 0.79 or the column C entry must be 0.58, no matter what size the charger is.

**Table A.1 AC Draw Worksheet for DAA2-5025**

<b>DAA2-5070</b>						
Application	120V 50/60Hz 4.86A max.			220-240V 50/60Hz 2.78A max.		
	AC Draw	A Calculation for when amplifier is active	B Calculation for when amplifier is not active	AC Draw	C Calculation for when amplifier is active	D Calculation for when amplifier is not active
Basic draw	0.55	0.55	0.55	0.32	0.32	0.32
Used as a primary amplifier*	1.58	+ 1.58		0.90	+ 0.90	
Charger - less than 26AH**	0.79	+ _____	+ _____	0.58	+ _____	+ _____
Charger - 26AH to less than 50AH**	1.49		+ _____	0.87		+ _____
Charger - 50AH to less than or equal to 200AH**	3.75		+ _____	2.15		+ _____
BDA as a backup or 2nd channel in Audio Group 1	0.17	+ _____	+ _____	0.10	+ _____	+ _____
BDA as a 2nd channel in Audio Group 2	1.68	+ _____	+ _____	1.00	+ _____	+ _____
AUX power (on CPS-24)	0.39	+ _____	+ _____	0.21	+ _____	+ _____
AC Draw Totals	= _____	= _____	= _____	or	= _____	= _____
	The highest total of column A and column B must be $\leq$ the maximum AC current draw allowed of 4.86A.			The highest total of column C and column D must be $\leq$ the maximum AC current draw allowed of 2.78A.		

\* A DAA2-5070 used as a backup will draw the same power as a primary when it is active.

\*\* When the amplifier is active, the column A charger entry must be 0.79 or the column C entry must be 0.58, no matter what size the charger is.

**Table A.2 AC Draw Worksheet for DAA2-5070**



DAA2-7525						
Application	120V 50/60Hz 4.1A max.			220-240V 50/60Hz 2.51A max.		
	AC Draw	A Calculation for when amplifier is active	B Calculation for when amplifier is not active	AC Draw	C Calculation for when amplifier is active	D Calculation for when amplifier is not active
Basic draw	0.54	0.54	0.54	0.32	0.32	0.32
Used as a primary amplifier*	2.28	+ 2.28		1.34	+ 1.34	
Charger - less than 26AH**	0.79	+ _____	+ _____	0.58	+ _____	+ _____
Charger - 26AH to less than 50AH**	1.49		+ _____	0.87		+ _____
BDA as a backup or 2nd channel in Audio Group 1.	0.10	+ _____	+ _____	0.06	+ _____	+ _____
AUX power (on CPS-24)	0.39	+ _____	+ _____	0.21	+ _____	+ _____
AC Draw Totals		= _____	= _____	or	= _____	= _____
		The highest total of column A and column B must be ≤ the maximum AC current draw allowed of 4.1A.		The highest total of column C and column D must be ≤ the maximum AC current draw allowed of 2.51A.		

\* A DAA2-7525 used as a backup will draw the same power as a primary when it is active.  
 \*\* When the amplifier is active, the column A charger entry must be 0.79 or the column C entry must be 0.58, no matter what size the charger is.

**Table A.3 AC Draw Worksheet for DAA2-7525**

## A.2 DAX Current Draw Calculations

Maximum AC draw varies by DAX model. Refer to the appropriate table worksheet in Section A.2.2 for the maximum AC draw figure. Follow the procedures in Section A.2.1 to calculate AC draw.

### A.2.1 Worksheet Procedures

1. Enter the “Basic Draw” figure into the appropriate column (either A or B).
2. In that same column, enter the figures for the application draws that apply.
3. Sum the column, and enter the total in the “Total AC Draw” row. The total must be equal or less than the maximum indicated.

### A.2.2 Worksheets

DAX-5025				
Application	120V 50/60Hz 2.09A max.		220-240V 50/60Hz 1.18A max.	
	AC Draw	A	AC Draw	B
Basic draw	0.50	0.50	0.29	0.29
Used as a primary amplifier*	1.39	+ _____	0.79	+ _____
BDA as a backup	0.20	+ _____	0.10	+ _____

**Table A.4 AC Draw Worksheet for DAX-5025**

DAX-5025				
Application	120V 50/60Hz 2.09A max.		220-240V 50/60Hz 1.18A max.	
	AC Draw	A	AC Draw	B
Total AC Draw		= _____ Total must be ≤ the maximum AC current draw allowed of 2.09A	or	= _____ Total must be ≤ the maximum AC current draw allowed of 1.18A
* A DAX-5025 used as a backup will draw the same power as a primary when it is active.				

Table A.4 AC Draw Worksheet for DAX-5025

DAX-5070				
Application	120V 50/60Hz 2.35A max.		220-240V 50/60Hz 1.31A max.	
	AC Draw	A	AC Draw	B
Basic draw	0.55	0.55	0.32	0.32
Used as a primary amplifier*	1.58	+ _____	0.86	+ _____
BDA as a backup	0.22	+ _____	0.13	+ _____
Total AC Draw		= _____ Total must be ≤ the maximum AC current draw allowed of 2.35A	or	= _____ Total must be ≤ the maximum AC current draw allowed of 1.31A
* A DAX-5070 used as a backup will draw the same power as a primary when it is active.				

Table A.5 AC Draw Worksheet for DAX-5070

DAX-3525				
Application	120V 50/60Hz 2.97A max.		220-240V 50/60Hz 1.66A max.	
	AC Draw	A	AC Draw	B
Basic draw	0.50	0.50	0.29	0.29
Used as a primary amplifier*	1.07	+ _____	0.60	+ _____
Charger - less than or equal to 26AH	1.20	+ _____	0.67	+ _____
BDA as a backup	0.20	+ _____	0.10	+ _____
Total AC Draw		= _____ Total must be ≤ the maximum AC current draw allowed of 2.97A	or	= _____ Total must be ≤ the maximum AC current draw allowed of 1.66A
* A DAX-3525 used as a backup will draw the same power as a primary when it is active.				

Table A.6 AC Draw Worksheet for DAX-3525

<b>DAX-3570</b>				
Application	120V 50/60Hz 3.06A max.		220-240V 50/60Hz 1.72A max.	
	AC Draw	<b>A</b>	AC Draw	<b>B</b>
Basic draw	0.55	0.55	0.32	0.32
Used as a primary amplifier*	1.09	+ _____	0.60	+ _____
Charger - less than or equal to 26AH	1.20	+ _____	0.67	+ _____
BDA as a backup	0.22	+ _____	0.13	+ _____
Total AC Draw		= _____ Total must be ≤ the maximum AC current draw allowed of 3.06A	or	= _____ Total must be ≤ the maximum AC current draw allowed of 1.72A
* A DAX-3570 used as a backup will draw the same power as a primary when it is active.				

**Table A.7 AC Draw Worksheet for DAX-3570**

# Appendix B: Battery Calculations

## B.1 DAA2 Battery Calculations

Description	Column A Amps in Standby			Column B Amps in Alarm		
	QTY	X current draw =	Total	QTY	X current draw =	Total
DAA2-5025 <sup>1,2</sup> or DAA2-7525 <sup>1,2</sup>	[ ]	X [ 0.400A ] =		[ ]	X [ 0.500A ] =	
DAA2-5070 <sup>1,2</sup>	[ ]	X [ 0.400A ] =		[ ]	X [ 0.550A ] =	
BDA-25V	[ ]	X [ 0.100A ] =		[ ]	X [ 0.225A ] =	
BDA-70V	[ ]	X [ 0.100A ] =		[ ]	X [ 0.235A ] =	
AUX 24V	[ ]	X [ 0.500A ] =		[ ]	X [ 0.500A ] =	
RM-1 <sup>3</sup>	[ ]	X [ 0.015A ] =		[ ]	X [ 0.075A ] =	
DS-FM (all models)	[ ]	X [ 0.06A ] =		[ ]	X [ 0.06A ] =	
Speakers:						
1/4 watt				[ ]	X [ 0.016A ] =	
1/2 watt				[ ]	X [ 0.032A ] =	
3/4 watt				[ ]	X [ 0.0485A ] =	
1 watt				[ ]	X [ 0.064A ] =	
2 watt				[ ]	X [ 0.132A ] =	
ACT-25 <sup>2</sup>				[ ]	X [ 0.0015A ] =	
ACT-70 <sup>2</sup>				[ ]	X [ 0.002A ] =	
Other _____	[ ]	X [ ] =		[ ]	X [ ] =	
		<b>Total Column A</b>	_____		<b>Total Column B</b>	_____
<sup>1</sup> Includes FFT Riser Draw <sup>2</sup> Riser To Additional Amplifiers" mode is always active and driving the risers with a supervision tone. For this reason, it is never in standby, and the figures in Column B should be used for all calculations. <sup>3</sup> Alarm draw is for activated microphone.						

**Table B.1 Current Draw Calculations Per DAA2**



**NOTE:** Battery Sharing - When batteries are shared by two or more DAA2s, Table B.1 must be completed for each DAA2. The totals for Columns A and Columns B must be summed and entered into Table B.2 where indicated.

Load Totals		Multiplied By	Time		Equals	Secondary Amp Hour Totals	
Enter total from Column A in Table B.1. (Standby Load)	[ ]	X	Required Secondary Non-fire Alarm Standby Time (24 or 60 hours)	[ ]	=	[ ]	Non-fire Alarm Secondary Standby Amp Hours
Enter total from Column B in Table B.1. (Alarm Load)	[ ]	X	Required Fire Alarm Time in Decimal Form*	[ ]	=	[ ]	Secondary Fire Alarm Amp Hour Requirement
Sum column for Total Secondary Ampere Hours (AH) Calculated					=		
Multiply by the derating factor X 1.2					=	[ ]	Total Secondary Ampere Hours Required
*Following are decimal conversions for standard numbers of minutes:							
5 minutes	0.084						
10 minutes	0.167						
15 minutes	0.250						
30 minutes	0.50						
60 minutes	1.0						
Standby operating times:							
<ul style="list-style-type: none"> <li>NFPA 72 Local, Proprietary, Auxiliary, Remote Station, and Central Station systems require 24 hours of standby power followed by 5 minutes in alarm.</li> <li>Some jurisdictions require 60 hours of standby power followed by 5 minutes in alarm for Auxiliary and Remote Station systems, based on previous NFPA 72 requirements.</li> <li>24 hours of standby/supervisory condition followed by 2 hours of alarm.</li> <li>The following battery derating factors must be used for Canadian installations. Derating factors are subject to local AHJ approval. <ul style="list-style-type: none"> <li>- For 12 - 26 AH capacity, use derating factor of 1.2.</li> <li>- For 55 AH capacity, use derating factor of 1.8.</li> <li>- For 100 - 200 AH capacity, use derating factor of 2.5.</li> </ul> </li> </ul>							

**Table B.2 Secondary Power Standby and Fire Alarm Load**

Battery Size	Voltage Rating	Required Number	Model Number
7 AH	12 volts	Two	BAT-1270
12 AH	12 volts	Two	BAT-12120
26 AH	12 volts	Two	BAT-12260
55 AH	12 volts	Two	BAT-12550

**Table B.3 Battery Size Requirements**

## B.2 DAX Battery Calculations

Description	Column A Amps in Standby			Column B Amps in Alarm		
	QTY	X current draw =	Total	QTY	X current draw =	Total
DAX-5025 or DAX-3525	[ ]	X [ 0.275A ] =		[ ]	X [ 0.400A ] =	
DAX-5070 or DAX-3570	[ ]	X [ 0.285A ] =		[ ]	X [ 0.460A ] =	
BDA-25V	[ ]	X [ 0.100A ] =		[ ]	X [ 0.240A ] =	
BDA-70V	[ ]	X [ 0.100A ] =		[ ]	X [ 0.310A ] =	
DS-FM (all models)	[ ]	X [ 0.06A ] =		[ ]	X [ 0.060A ] =	
Speakers:						
1/4 watt				[ ]	X [ 0.0160A ] =	
1/2 watt				[ ]	X [ 0.0320A ] =	
3/4 watt				[ ]	X [ 0.0485A ] =	
1 watt				[ ]	X [ 0.064A ] =	
2 watt				[ ]	X [ 0.132A ] =	
ACT-25 <sup>1</sup>				[ ]	X [ 0.0015A ] =	
ACT-70 <sup>1</sup>				[ ]	X [ 0.0020A ] =	
Other _____	[ ]	X [ ] =		[ ]	X [ ] =	
		<b>Total Column A</b>	_____		<b>Total Column B</b>	_____

<sup>1</sup>Riser To Additional Amplifiers" mode is always active and driving the risers with a supervision tone. For this reason, it is never in standby, and the figures in Column B should be used for all calculations.

**Table B.4 Current Draw Calculations Per DAX**



**NOTE:** Battery Sharing - When batteries are shared by two or more DAXs, Table B.4 must be completed for each DAX. The totals for Columns A and Columns B must be summed and entered into Table B.5 where indicated.

Load Totals		Multiplied By	Time		Equals	Secondary Amp Hour Totals	
Enter total from Column A in Table B.1. (Standby Load)	[ ]	X	Required Secondary Non-fire Alarm Standby Time (24 or 60 hours)	[ ]	=	[ ]	Non-fire Alarm Secondary Standby Amp Hours
Enter total from Column B in Table B.1. (Alarm Load)	[ ]	X	Required Fire Alarm Time in Decimal Form*	[ ]	=	[ ]	Secondary Fire Alarm Amp Hour Requirement
Sum column for Total Secondary Ampere Hours (AH) Calculated					=		

Multiply by the derating factor X 1.2		=	[      ]	Total Secondary Ampere Hours Required
*Following are decimal conversions for standard numbers of minutes:				
5 minutes	0.084			
10 minutes	0.167			
15 minutes	0.250			
30 minutes	0.50			
60 minutes	1.0			
Standby operating times:				
<ul style="list-style-type: none"> <li>NFPA 72 Local, Proprietary, Auxiliary, Remote Station, and Central Station systems require 24 hours of standby power followed by 5 minutes in alarm.</li> <li>Some jurisdictions require 60 hours of standby power followed by 5 minutes in alarm for Auxiliary and Remote Station systems, based on previous NFPA 72 requirements.</li> <li>24 hours of standby/supervisory condition followed by 2 hours of alarm.</li> </ul>				

**Table B.5 Secondary Power Standby and Fire Alarm Load**

Battery Size	Voltage Rating	Required Number	Model Number
7 AH	12 volts	Two	BAT-1270
12 AH	12 volts	Two	BAT-12120
26 AH	12 volts	Two	BAT-12260
55 AH	12 volts	Two	BAT-12550

**Table B.6 Battery Size Requirements**

# Appendix C: DAA Digital Audio Amplifiers

## C.1 Overview

### C.1.1 Description

The DAA Digital Audio Amplifiers are multi-featured amplifiers with digital audio functionality. They are designed for a networked or non-networked environment with the DVC Digital Voice Command.

DAA models are compatible with other types of DAL devices (e.g. DAA2, DAX) on a wire, fiber, or mixed wire/fiber digital audio loop. A DS-RFM (for multi-mode DAAs) or DS-SFM (for single-mode DAAs) is required for a fiber DAA used on a DAL with other types of DAL devices.



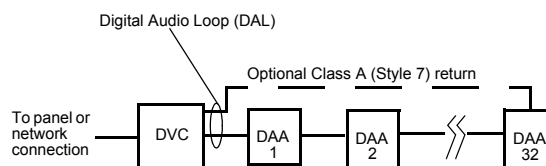
**NOTE:** The term DAA is used in this manual to refer to all the model versions listed in the bullets below this note. Individual part numbers are used to distinguish features or functions that differ.

50 Watt Digital Audio Amplifiers		
	Speaker Circuit Output	Medium
DAA-5025 (120 VAC)	25 <sub>RMS</sub>	Wire
DAA-5025E (220-240 VAC)	25 <sub>RMS</sub>	Wire
DAA-5070 (120 VAC)	70 <sub>RMS</sub>	Wire
DAA-5070E (220-240 VAC)	70 <sub>RMS</sub>	Wire
DAA-5025F (120 VAC)	25 <sub>RMS</sub>	Multi-mode fiber
DAA-5025EF (220-240 VAC)	25 <sub>RMS</sub>	Multi-mode fiber
DAA-5070F (120 VAC)	70 <sub>RMS</sub>	Multi-mode fiber
DAA-5070EF (220-240 VAC)	70 <sub>RMS</sub>	Multi-mode fiber
DAA-5025SF (120 VAC)	25 <sub>RMS</sub>	Single-mode fiber
DAA-5025ESF (220-240 VAC)	25 <sub>RMS</sub>	Single-mode fiber
DAA-5070SF (120 VAC)	70 <sub>RMS</sub>	Single-mode fiber
DAA-5070ESF (220-240 VAC)	70 <sub>RMS</sub>	Single-mode fiber
75 Watt Digital Audio Amplifiers		
	Speaker Circuit Output	Medium
DAA-7525 (120 VAC)	25 <sub>RMS</sub>	Wire
DAA-7525E (220-240 VAC)	25 <sub>RMS</sub>	Wire
DAA-7525F (120 VAC)	25 <sub>RMS</sub>	Multi-mode fiber
DAA-7525EF (220-240 VAC)	25 <sub>RMS</sub>	Multi-mode fiber
DAA-7525SF (120 VAC)	25 <sub>RMS</sub>	Single-mode fiber
DAA-7525ESF (220-240 VAC)	25 <sub>RMS</sub>	Single-mode fiber

**Table C.1 Digital Audio Amplifier Models**



Figure C.1 gives a simplified illustration of DAAs and their positions in the Digital Audio Loop (DAL) of a DVC.



**Figure C.1 DAL Block Diagram**



**NOTE:**

Speaker placement must be given careful consideration when planning an audio system.

- Place speakers from different DALs (Digital Audio Loops) so they are not within the audible areas of other DALs.
- Carefully consider the audible range of speakers within a DAL; overlapping audio messages can be confusing.

## C.1.2 Features

The DAA audio amplifiers have the following features:

- 50W total output power at 25V<sub>RMS</sub> (all DAA-5025 model versions) or 70 V<sub>RMS</sub> (all DAA-5070 model versions).
- 75W total output power at 25V<sub>RMS</sub> (all DAA-7525 model versions).
- Two Class A (Style Z) connections for high-level audio output, or alternately, four Class B (Style Y) connections, which dynamically share the 50W output capability.
- Audio output activation via network control-by-event equations resident within the DVC.
- Isolated alarm bus input, to be used for backup activation of alarm messages when normal digital communication is lost.
- Amplifies one channel of digital audio and distributes it on up to four outputs (50W maximum).
- Auxiliary input for 12V<sub>P-P</sub> analog low-level AMG-1 type audio sources.
- Auxiliary input for 1.6V<sub>P-P</sub> max. for each circuit when both AUX A L and AUX A R are used, or 3.2V<sub>P-P</sub> max. for one when only one circuit (AUX A L or AUX R) is used, to be used for background music input, an interface with a telephone paging source, or other compatible audio sources. Includes user audio level adjustment feature.
- Uploads and downloads via the DVC.
- Up to 106 seconds of Backup Digital message storage (Emergency tone, Non-Emergency tone, and FFT busy tone) for use in the event of communication loss- either standard quality or high quality, from the VeriFire Tools message library or created by the installer.
- Battery charger (50 watt DAAs only) and power supply capable of supporting up to 55AH batteries.
- Relay contacts that will activate on a trouble condition.
- Backup amplifier function.
- Programmable through VeriFire Tools.
- Meets UL requirements for 800 Hz to 2.8 KHz bandwidth.  
Meets ULC requirements for 400 Hz to 4 KHz bandwidth.

## C.1.3 Specifications

### DAA-PS Power Supply Board

#### ■ AC Power - TB1

115-120 VAC 60 Hz input, 4.5 A max.

220-240 VAC 50/60 Hz input, 2.3 A max. (“E” versions)

Recommended wiring: 12-14 AWG (1.6mm O.D.) with 600 VAC insulation.

#### ■ Battery Connections - TB3

Supplied cable connections to batteries for CAB-4 and CHS-BH1. For battery sharing, use 12 AWG either in the same cabinet or in conduit for no more than 20 ft. (6.09 m).

#### ■ Battery Charger (50 Watt Boards Only)

Current-limited sealed lead acid battery charger which charges two 12 volt 7-55 AH batteries in series.

Charger current: Up to 1.0 A or 5.5 A setting based on battery size programming.

Charger voltage: 27.6 VDC.

For battery calculation worksheet and standby operating times, refer to “Battery Calculations” on page 121.

Utilizes wire sizes 12-18 AWG.

Battery Fuse (F2) 15A, (Notifier p/n 12057).



**NOTE:** DAA-75 products do not have an onboard battery charger. A UL 864 listed power supply rated for the battery requirements of the specific application is suitable for charging purposes.

### DAA-5025/70 and DAA-7525 Boards

#### ■ Digital Audio Ports A and B - TB2, TB3

Refer to Table C.2, and also to the Wiring Guide, p/n 52916ADD, for other acceptable wire types.)

Cable Type	Maximum Distance between Ports
Belden 5320UJ (18 AWG, TP) FPL	1900 ft (609.6 m)
Genesis 4050 (18 AWG, TP) FPL	1000 ft (305.8 m)

**Table C.2 Recommended Digital Audio Port Cable Types**

EIA-485 format.

Power-limited (Class 2).

#### ■ Single- and Multi-mode Fiber-Optic Digital Audio Ports - RXA, TXA, RXB and TXB (J100, J101, J102, and J103)

ST® Style (ST is a registered trademark of AT&T).

Supervised.

Fiber optic cable, multi-mode: 50/125 or 62.5/125 micrometers.

Fiber optic cable, single-mode: 9/125 micrometers.

Attenuation of cabling between two nodes (fiber-optic circuits are point-to-point) must not exceed the Maximum attenuation, specified below.

To determine attenuation:

1. Find the rated dB loss per foot within the cable manufacturer's specifications. Determine the total attenuation between the two nodes due to the cable.  
Loss = (loss/ft.) x (length in feet)
2. Establish the dB loss for each connector and splice. Sum all the losses.
3. Total the attenuation factors obtained in steps 1 and 2. This will provide an approximate attenuation total. The actual attenuation can be measured end-to-end with fiber-optic industry standard equipment using a test wavelength of 850 nanometers (multi-mode)/1300 nanometers (single-mode).

The Maximum attenuation\*:

4.2dB for multi-mode with 50/125 micrometer cable @ 850 nm.

8dB for multi-mode with 62.5/125 micrometer cable @ 850 nm.

5.0dB for single-mode with 9/125 micrometer cable @ 1300 nm.

\* Use for connections between DVCs and DAAs only. Refer to "Fiber Option Modules" on page 75 for information on DAA fiber connections to the DAA2 and DAX.

#### ■ Alarm Bus - TB4

Power-limited (Class 2) by source.

Non-supervised.

Recommended wiring: 14-18 AWG twisted-pair.

Requires 16VDC minimum @ 20mA across the terminals to activate.

#### ■ Trouble Bus - TB5

Dry contact.

Common, non-supervised, contact rating 2A, 30VDC.

Recommended wiring: 14-18 AWG twisted-pair.

#### ■ FFT Riser - TB7

Power-limited (Class 2) output.

Supervised.

Class A (Style Z) or Class B (Style Y) operation.

Style Y 2-wire connections require a 3.9k ohm 1/2 watt resistor (P/N R-3.9K).

Max. wiring resistance (including individual telephone zone to last handset) permitted is 50 ohms, 10,000 ft. (3048 m) max. wiring distance at 14 AWG to last handset.

#### ■ Auxiliary Input A (AUX A) - TB 9

Signal strength from low-level analog audio input (such as background music or telephone paging): 1.6V<sub>p-p</sub> max. for each circuit when both AUX A L and AUX A R are used. 3.2V<sub>p-p</sub> max. for one when only one (AUX A L or AUX A R) is used.

Optional supervision through programming.

Recommended wiring: 14-18 AWG twisted-pair.

Supervision programmable.

Auxiliary input source must be within 20 ft. ( 6.1 m) of the DAA, and within the same room.

#### ■ Auxiliary Input B (AUX B) - TB 8

Signal strength from low-level analog audio input: 12V<sub>p-p</sub> nominal, 15V<sub>p-p</sub> max.

Recommended wiring: 14-18 AWG twisted-pair.

Supervision programmable.

#### ■ Speaker Circuits - TB10, TB11, TB12 and TB13

Power-limited (Class 2) outputs.

DAA-5025/70 - 50 Watts dynamically shared among the four outputs.

DAA-7525 - 75 Watts dynamically shared among the four outputs.

Supervision determined by programming.

25V<sub>RMS</sub> - DAA-5025/DAA-7525 speaker circuits, 70V<sub>RMS</sub> - DAA-5070 speaker circuits

Recommended wiring: 12-18 AWG twisted -pair (shielded recommended).

Class B (Style Y) or Class A (Style Z):

Class B requires 20k end-of-line resistors (included, P/N ELR-20K).

Class A requires 10k end-of-line resistors (included, P/N R-10K) on the return.

## C.1.4 DAA Board Layouts

### Wire Versions

#### ■ Connection Locations

Wire DAAs are each comprised of two boards; a larger rear board, and a smaller front power supply board. Figure C.2 below shows the layouts for these boards.

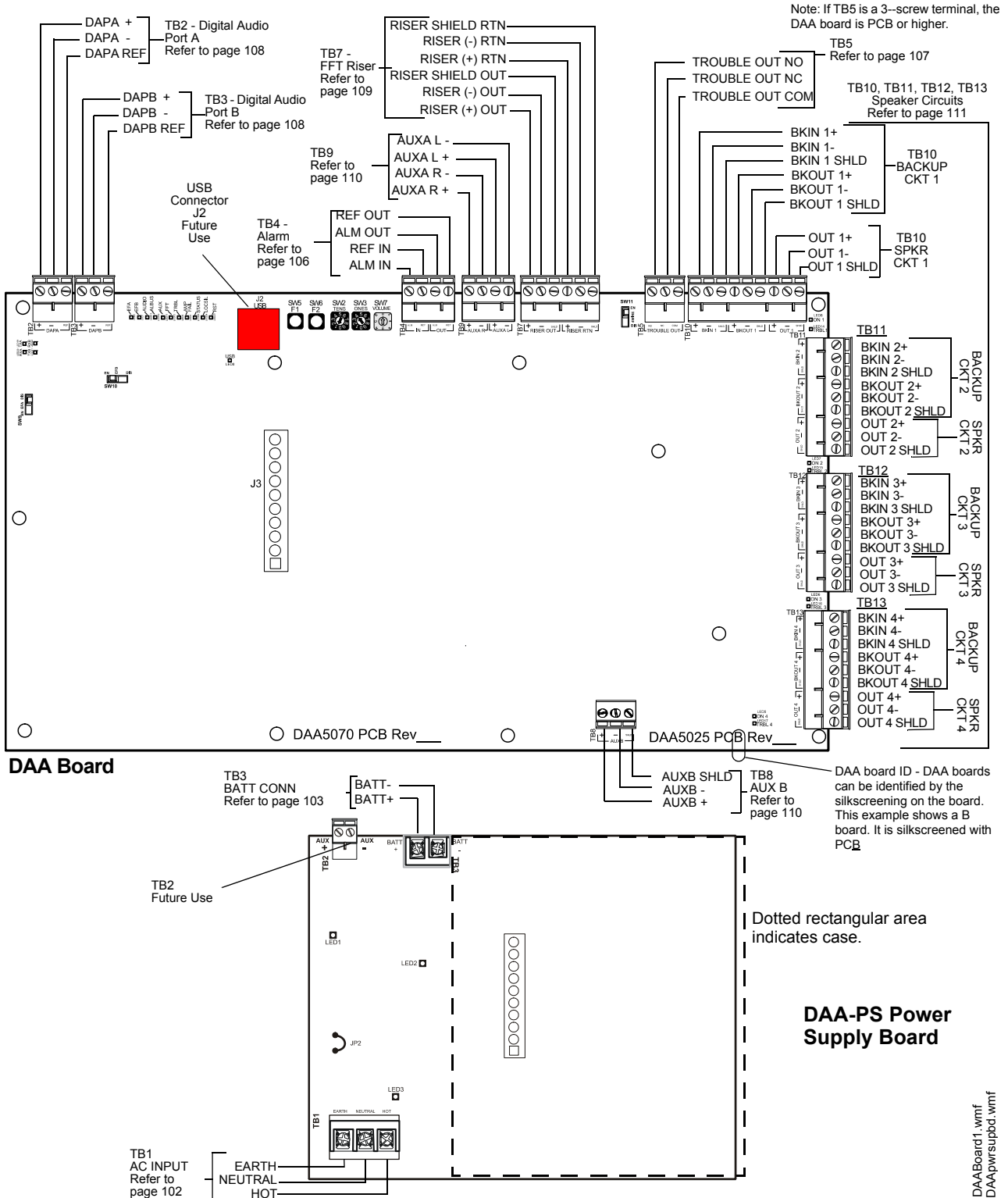


Figure C.2 Connection Locations for Wire Version DAA Boards

■ Indicator, Jumper and Switch Locations

Switches and LED indicator locations are illustrated in Figure C.3.

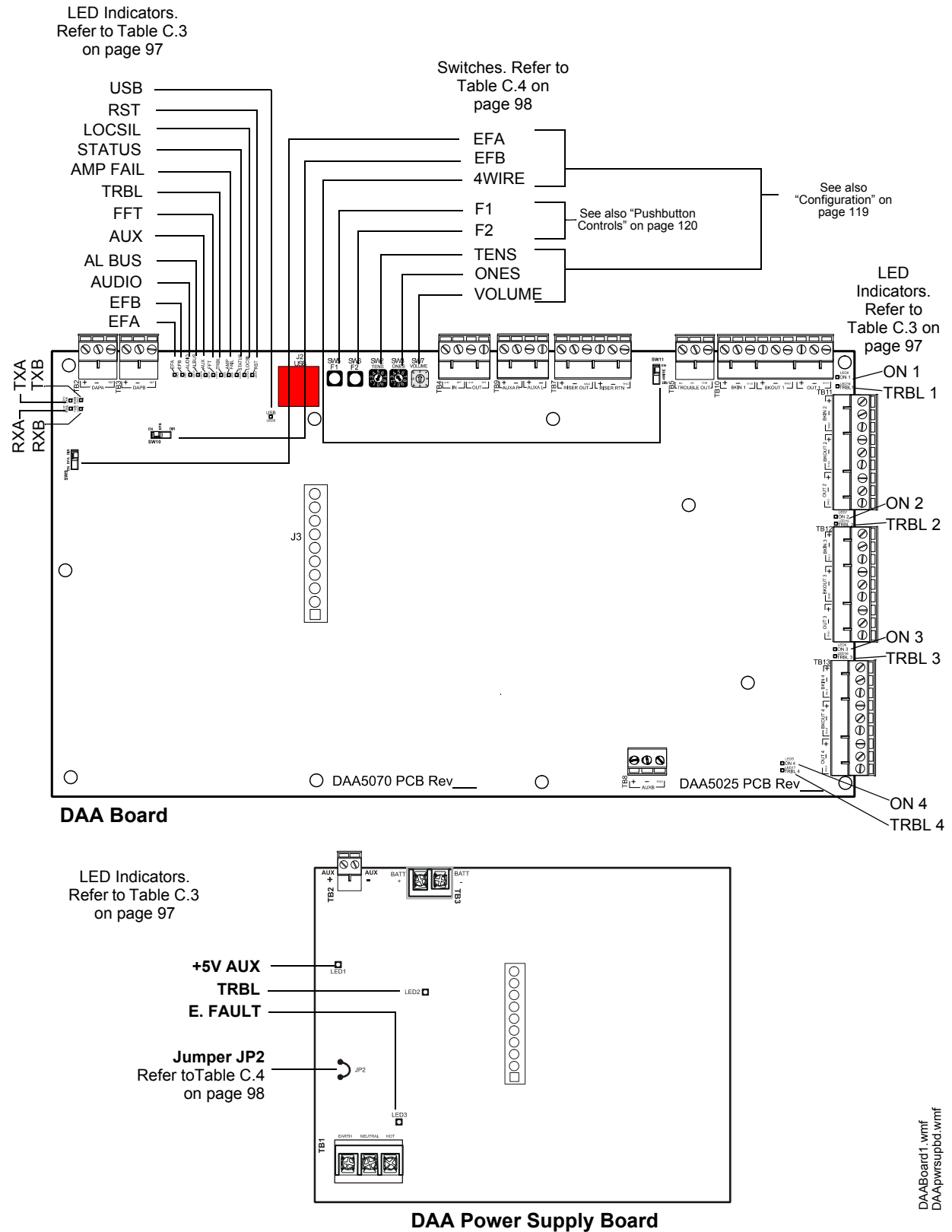


Figure C.3 LED Indicator, Jumper and Switch Locations

DAABoard1.wmf  
DAApwrsupbd.wmf

## Fiber Versions

### ■ Connection Locations

Fiber DAAs are each comprised of two boards; a larger rear board, and a smaller front power supply board. Figure C.4 below shows the layout for the larger rear board. The connections for the smaller front board, the DAA-PS, are the same for all DAAs, and are illustrated in Figure C.2, “Connection Locations for Wire Version DAA Boards”.

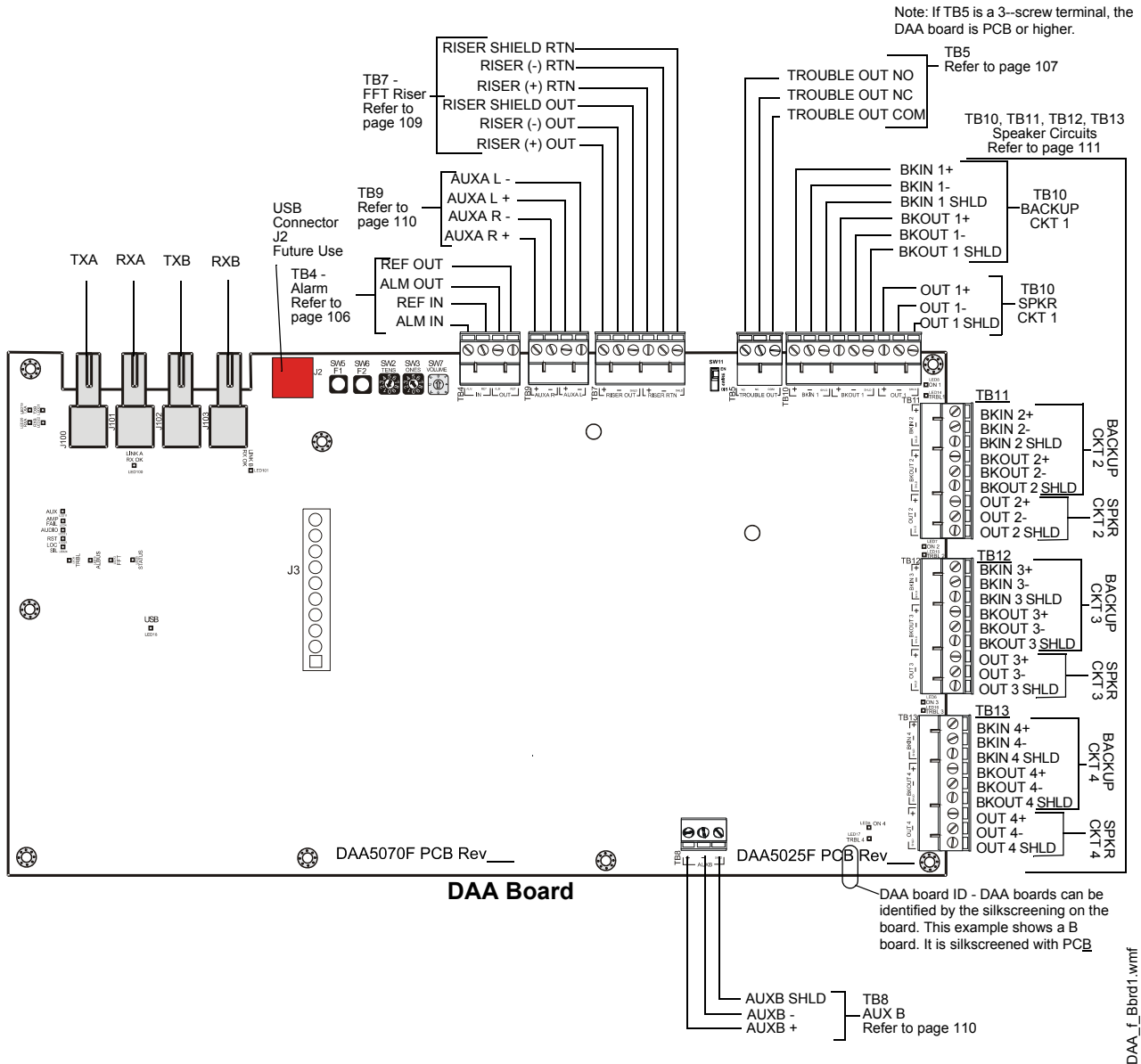


Figure C.4 Connection Locations for Fiber Version DAA Boards

■ Indicator and Switch Locations

Switches and LED indicator locations are illustrated in Figure C.5. The connections for the smaller front board, the DAA-PS, are the same for all DAAs, and are illustrated in Figure C.3, “LED Indicator, Jumper and Switch Locations”.

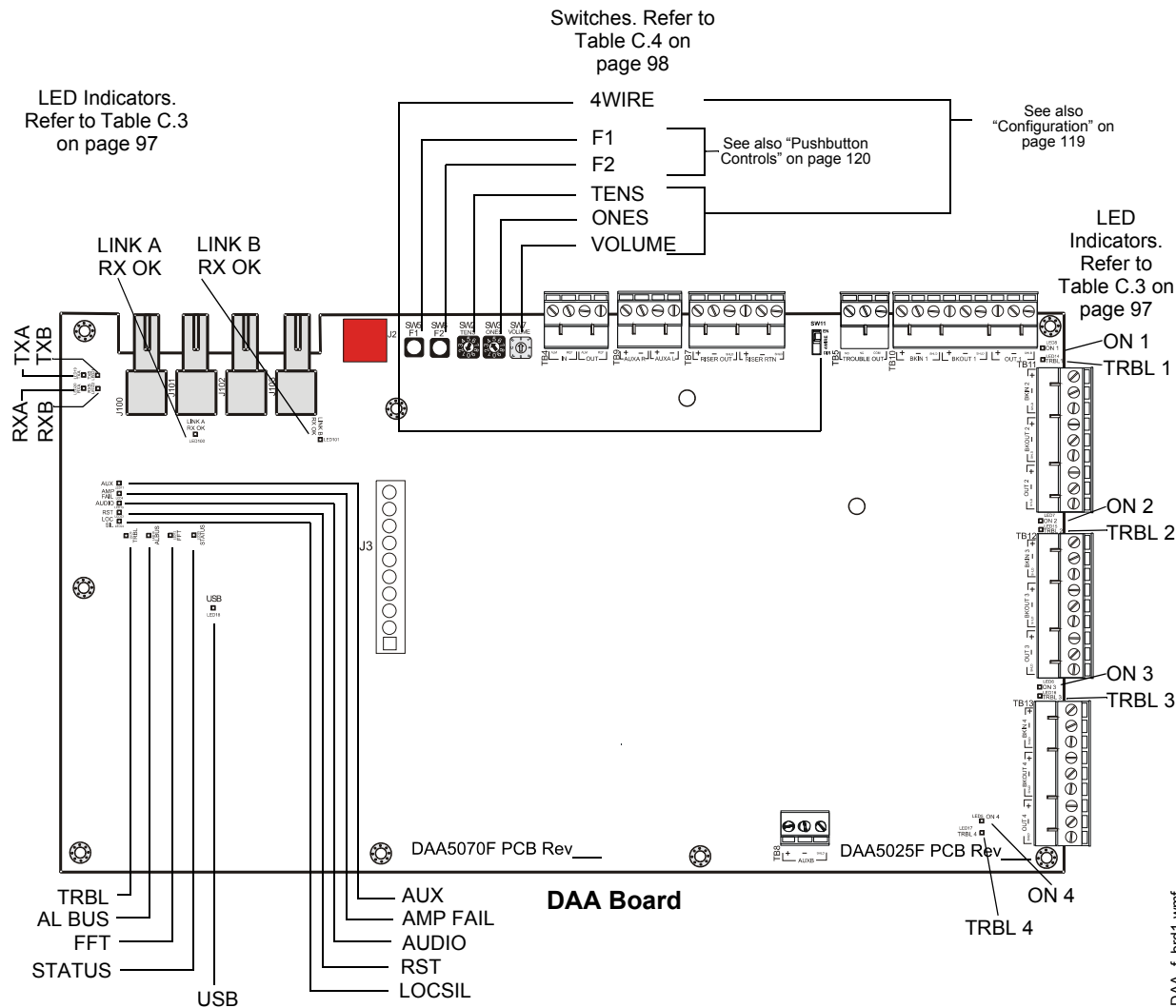


Figure C.5 LED Indicator and Switch Locations, Fiber Boards

Indicators

Diagnostic colored LEDs indicate various conditions and troubles. Table C.3 lists and describes each.

DAA Board			
LED Name	Color	Description	LED #
EFB	Yellow	Illuminates steadily when an earth fault has been detected at digital audio port DAP B. LED is on wire versions only.	1
EFA	Yellow	Illuminates steadily when an earth fault has been detected at digital audio port DAP A. LED is on wire versions only.	2
AMP FAIL	Yellow	Illuminates steadily while audio amplifier failure detected.	4
ON 4	Green	Illuminates steadily while analog signal is on speaker circuit 43, or while 200Hz tone is on speaker circuit 4.	5



<b>DAA Board</b>			
<b>LED Name</b>	<b>Color</b>	<b>Description</b>	<b>LED #</b>
ON 3	Green	Illuminates steadily while analog signal is on speaker circuit 3, or while 200Hz tone is on speaker circuit 3.	6
ON 2	Green	Illuminates steadily while analog signal is on speaker circuit 2, or while 200Hz tone is on speaker circuit 2.	7
ON 1	Green	Illuminates steadily while analog signal is on speaker circuit 1, or while 200Hz tone is on speaker circuit 1.	8
TRBL	Yellow	Blinks when there is an unacknowledged trouble, illuminates steadily when a trouble is acknowledged but unresolved.	9
AL BUS	Red	Illuminates steadily while alarm bus input is active.	10
AUX	Green	Illuminates while audio detected on either AUX IN A or AUX IN B.	11
FFT	Green	Illuminates steadily when it has been granted a digital phone channel. Flashes when a DAA requests a phone channel.	12
AUDIO	Green	OFF - No audio signal is present. Fast blink - The DAA is receiving audio from the DVC. Slow blink - The DAA is playing audio from stored backup tones. Steady - The DAA is playing audio from its AUX input.	13
TRBL 1	Yellow	Illuminates steadily while a short is detected on speaker circuit 1. Blinks slowly while an open is detected. Blinks fast when this speaker circuit is disabled.	14
TRBL 2	Yellow	Illuminates steadily while a short is detected on speaker circuit 2. Blinks slowly while an open is detected. Blinks fast when this speaker circuit is disabled.	15
TRBL 3	Yellow	Illuminates steadily while a short is detected on speaker circuit 3. Blinks slowly while an open is detected. Blinks fast when this speaker circuit is disabled.	16
TRBL 4	Yellow	Illuminates steadily while a short is detected on speaker circuit 4. Blinks slowly while an open is detected. Blinks fast when this speaker circuit is disabled.	17
USB	Green	Illuminated while communication is established on the USB port.	18
DAP A TX	Green	Illuminates while data transmitted on Digital Audio Port A (wire or fiber). Illumination will flicker, turning on when activity is detected and off when it is not.	19
DAP A RX	Green	Illuminates while data received on Digital Audio Port A (wire or fiber). Illumination will flicker, turning on when activity is detected and off when it is not.	20
DAP B TX	Green	Illuminates while data transmitted on Digital Audio Port B (wire or fiber). Illumination will flicker, turning on when activity is detected and off when it is not.	21
DAP B RX	Green	Illuminates while data received on Digital Audio Port B (wire or fiber). Illumination will flicker, turning on when activity is detected and off when it is not.	22
RST	Yellow	Illuminates when the board is not operational and maintenance is required. Call the factory.	23
LOCSIL	Yellow	Illuminates when the Local Silence (F1) button is pressed to silence speaker outputs 1 through 4.	24
STATUS	Green	Blinks slowly (once a second) under normal operation, Blinks fast (4 times a second) when the DAA is in bootload or diagnostic mode. Does not blink when the board is not operational or starting up. Call the factory if this LED is off for a prolonged period of time.	25
RXA OK	Green	Illuminates steadily when there is a successful single- or multi-mode fiber connection on the RXA connector. LED is on fiber versions only.	100
RXB OK	Green	Illuminates steadily when there is a successful single- or multi-mode fiber connection on the RXB connector. LED is on fiber versions only.	101
<b>DAA-PS Power Supply Board</b>			
<b>LED Name</b>	<b>Color</b>	<b>Description</b>	<b>LED #</b>
+5V	Green	Illuminated while 5V is present.	1
E FAULT	Yellow	Illuminated while Earth fault is detected anywhere on the DAA except DAPs or AUX IN (A or B).	2
TRBL	Yellow	Software-controlled as follows: – OFF when the following system troubles are not present. – 1 blink - BROWNOUT. Priority 1, highest priority. – 2 blinks - HIGH BATTERY. Priority 2. – 3 blinks - LOW BATTERY. Priority 3. – 4 blinks - CHARGER TROUBLE. Priority 4, lowest priority. If multiple troubles are present, the highest priority trouble will blink until cleared, then the next priority trouble will blink until cleared, etc.	3

Table C.3 LED Indicators

## Switches and Jumper

The switches described in Table C.4 are for configuring the DAA.

DAA Board			
Name	Switch #	Description	Default
TENS	SW2	BCD rotary address selection switch. Refer to page 120.	0
ONES	SW3	BCD rotary address selection switch. Refer to page 120.	0
F1	SW5	Pushbutton to silence speaker circuits during communication loss with DVC.	N/A
F2	SW6	Pushbutton to reset the DAA. See page 120.	N/A
VOL	SW7	BCD rotary switch for local background music.	0 (low)
EFA	SW9	Enable/disable Digital Audio Port A Earth fault detection. Switch is on wire versions only.	Off (disable)
EFB	SW10	Enable/disable Digital Audio Port B Earth fault. Switch is on wire versions only.	Off (disable)
4 WIRE	SW11	Changes FFT Riser indication to 2- or 4-wire, depending on whether the riser is wired Class B or Class A.	2-wire
DAA-PS Power Supply Board			
Name	Number	Description	
Jumper	JP2	When DAAs are sharing batteries, cut this jumper for all but one of the DAAs to disable Earth Fault detection. <i>Only the DAA intended to report Earth Faults should have this jumper intact.</i> Note that this jumper does not enable/disable Earth Fault detection on the Digital Audio Ports. That function is determined by SW9 and SW10.	N/A

**Table C.4 Switches and Jumper**

## C.2 Installation

### C.2.1 Cabinet

The DAA arrives from the factory already installed on its chassis. An NCM or HS-NCM can be mounted on it. (Refer to Figure C.7). The DAA chassis mounts in a CAB-4 Series cabinet, as well as in the EQCAB Series backboxes. It is compatible with CAB-3 Series cabinets per the instructions on page 99.

Prior to installation,

- Review the installation precautions at the front of this manual.
- Installers should be familiar with the standards and codes specified in “Standards and Other Documents” on page 9.
- Ensure all wiring will comply with national and local codes.
- Review the installation instructions in this section.



**WARNING:**

Wear a static discharge wrist strap to prevent equipment damage.

Locate the cabinet backbox on a surface that is in a clean, dry, vibration-free area. The top should be located so that all operational buttons, switches, displays, etc. are easily accessible and/or viewable to the operator - usually no more than 66 inches (1.7 m) above the floor. Allow sufficient clearance around the cabinet for the door to swing freely, and for easy installation and maintenance of equipment.

Follow the instructions below.

1. Mark and pre-drill two holes for the keyhole mounting bolts. Install bolts.

2. Select and punch open the appropriate cabinet knock-outs. (For selection guidelines, see “UL Power-limited (Class 2) Wiring Requirements” on page 118.)
3. Using the keyholes, mount the backbox on the two bolts.
4. Mark the location of the two lower holes, remove backbox and drill the mounting holes.
5. Mount the backbox over the top two screws, then install the remaining fasteners. Tighten all fasteners securely.
6. Feed wires through appropriate knockouts.
7. Install DAA according to the following instructions before installing the door per the CAB-4 Series Cabinet Installation Document.

The DAA fills one row of any CAB-4 series cabinet.

### CAB-3 Cabinets



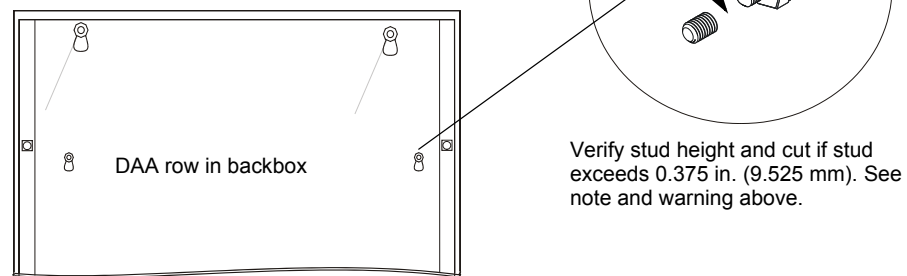
**NOTE:** The DAA is compatible with the CAB-3 Series backboxes. However, when installing the DAA in a CAB-3 Series or gray CAB-4 Series non-ONYX backboxes, the stud indicated in Figure C.6 must be shortened to allow room for the TB12 connector. Stud height must not exceed. Gray versions of the CAB-4 Series backboxes and all CAB-3 Series backboxes have studs that require shortening.

**WARNING:**

- Do not cut without nut in place to protect threading.
- Remove all electronics from the backbox prior to cutting to avoid damage to electronics.
- Wear protective eye covering.

**Procedure:**

1. Prior to DAA installation, apply nut to mounting stud to protect threading.
2. Cut stud to proper length.
3. Loosen nut slightly to allow DAA chassis installation, then tighten nut securely.

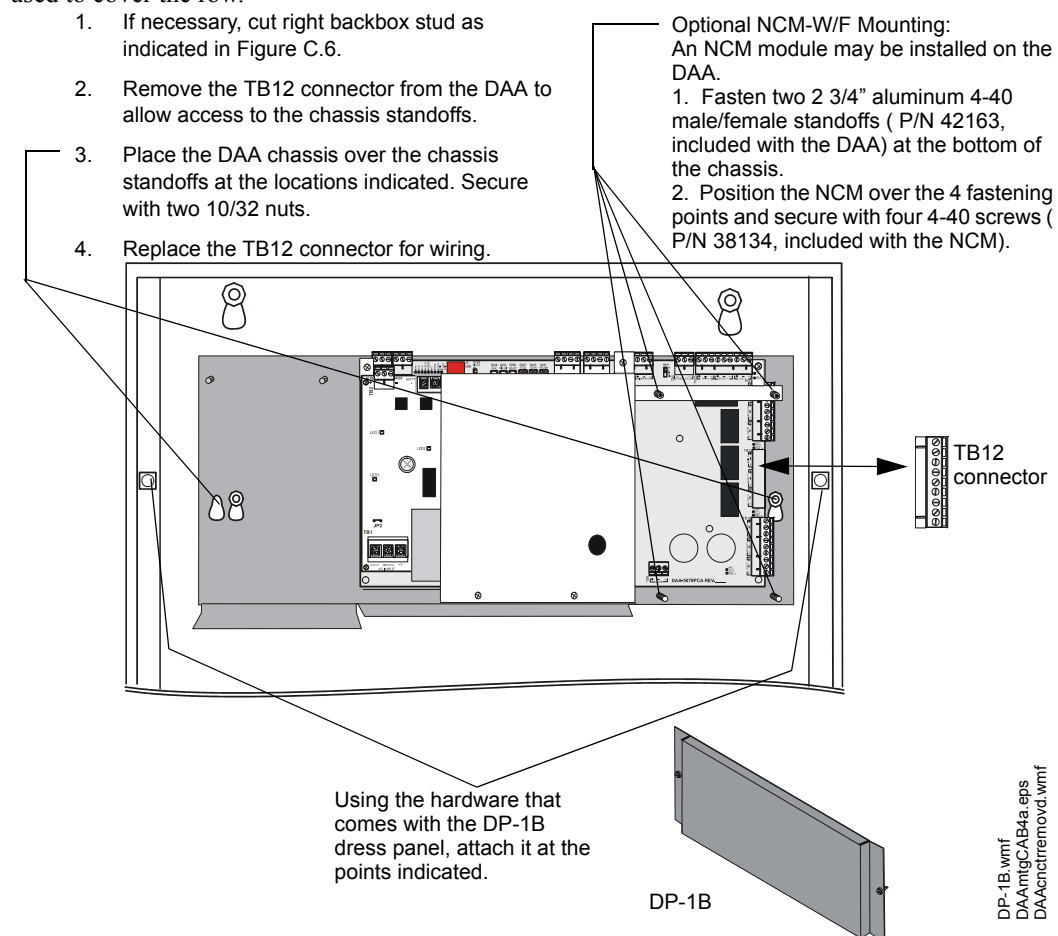


DAA\CAB\retro.eps  
DAA\_CAB3stud.ctb

**Figure C.6 Using Older Backboxes**

## CAB-4 Series

Figure C.7 illustrates a typical DAA installation. A DP-1B dress panel, ordered separately, can be used to cover the row.



**Figure C.7 DAA Cabinet Installation.**



**NOTE:** Digital amplifiers can produce significant heat during their duty cycles. Different cabinets can handle different amounts of heat. Refer to the Heat Dissipation Calculation document (53645) to determine dissipation figures for the equipment you are installing, and match it with an appropriate cabinet.



**NOTE:** Fiber versions of the DAA must be installed in the top row of a CAB-4 Series cabinet, or below an empty row, to allow installation of the fiber cable.

## EQCAB Series Cabinets

The EQCAB cabinets come in CAB-4 B, C, and D sizes. The row spacing is different, allowing DAA amplifiers as well as other digital audio devices and power supplies to be mounted in any row, and the doors are equipped with ventilated panels for heat dissipation. The cabinets were designed so that all DAA boards manufactured after the DAA PCA (e.g., the DAAPCB), can be used in any or all cabinet rows. DAAPCA boards may be mounted in these cabinets if a row is skipped between each one. Refer to Figure C.2 on page 93 for how to determine board type. Batteries other than the 12 AH batteries in the DAA chassis must be accommodated in separate cabinets or battery backboxes.

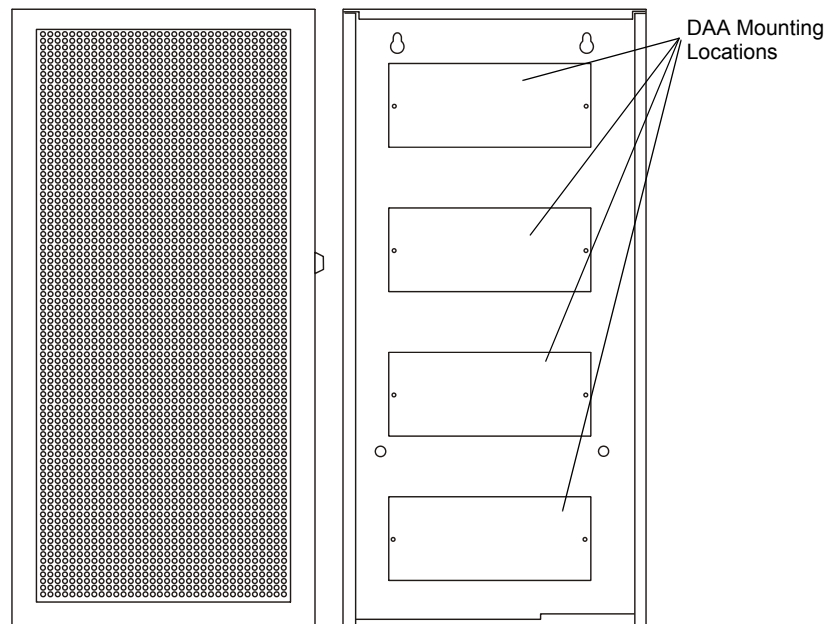
The following models are available:

- EQCAB-D4 - Accommodates four DAAs. Consists of P/Ns EQBB-D4 (black backbox) and EQDR-D4 (black door with ventilated panels).
- EQCAB-C4 - Accommodates three DAAs. Consists of P/Ns EQBB-C4 (black backbox) and EQDR-C4 (black door with ventilated panels).



**NOTE:** Digital amplifiers can produce significant heat during their duty cycles. Different cabinets can handle different amounts of heat. Refer to the Heat Dissipation Calculation document (53645) to determine dissipation figures for the equipment you are installing, and match it with an appropriate cabinet.

- EQCAB-B4 - Accommodates two DAAs. Consists of P/Ns EQBB-B4 (black backbox) and EQDR-B4 (black door with ventilated panels).



CABDAA\_D4.wmf

Figure C.8 EQCAB-D4 Cabinet

## C.2.2 Batteries



**WARNING:** Batteries contain sulfuric acid which can cause severe burns to the skin and eyes, and can destroy fabrics. If contact is made with sulfuric acid, immediately flush skin or eyes with water for 15 minutes and seek immediate medical attention.

The DAA works with two 7AH minimum to 55 AH maximum batteries. See “Battery Calculations” on page 121 for current draw calculations to determine the battery size required for this installation.

Batteries for the DAA may be installed in any of the following configurations:

- In a CHS-BH1 battery chassis (12AH batteries only), designed for use with the DAA chassis.
- In the bottom of a CAB-4 series cabinet that holds the DAA.
- In a cabinet adjacent to the cabinet that holds a DAA, with connections in conduit.

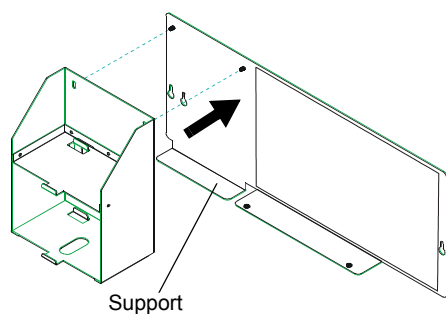
### In a CHS-BH1 Battery Chassis

This chassis will hold two 12AH batteries, and will mount on the left side of the DAA chassis, so that the DAA and batteries are contained in a single cabinet row.

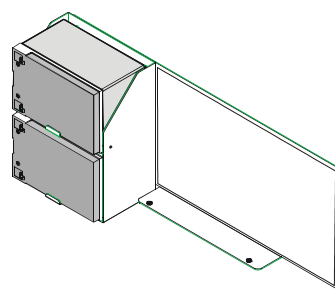
**To mount the CHS-BH1 onto the DAA chassis:** Place battery holder against DAA chassis, resting on support as shown in Figure C.9. Align chassis standoffs with holes. Fasten with the two 8/32" hex nuts supplied.

Place the batteries on their sides in their trays before wiring. Refer to “Connecting the DAA Power Supply to the Batteries” on page 103 for wiring instructions.

Place battery holder against DAA chassis, resting on support. Align chassis standoffs with holes. Fasten with the two washers (P/N 43123) and 8-32 KEPS hex nuts (P/N 36047) supplied.



Place batteries in the trays.



CHS-BH1batts.wmf  
CHS-BH1toDAAchassis.wmf

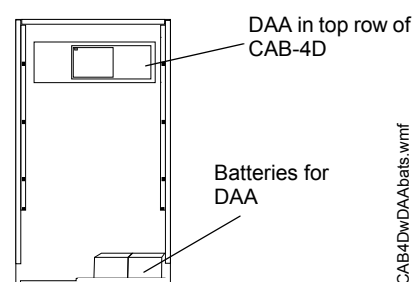
**Figure C.9 Mounting the CHS-BH1**

### Within the CAB-4 Enclosure

Place the batteries in the bottom of the cabinet, as shown in Figure C.10. Refer to “Connecting the DAA Power Supply to the Batteries” on page 103 for wiring instructions.

### Outside the DAA Enclosure

Batteries may be installed outside the DAA enclosure. The battery cables must be in conduit between the enclosures for the batteries and the DAA. Refer to “Connecting the DAA Power Supply to the Batteries” on page 103 for wiring instructions.



CAB4DwDAAbatts.wmf

**Figure C.10 Battery Installation Within the Cabinet**

## C.2.3 Wiring

### Connecting the DAA Power Supply to AC Power



**WARNING:** High Voltages Present.

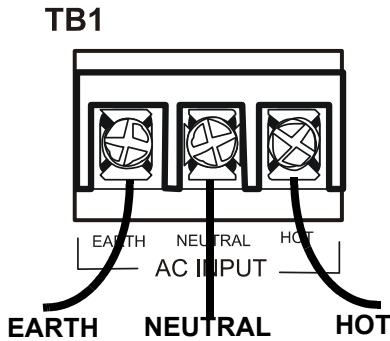
Use extreme caution when working with the DAA. High voltage and AC line-connected circuits are present. Turn off and remove all power sources. To reduce the risk of electric shock, make sure to properly ground the DAA.

Close the hinged cover for TB1 after wiring but before energizing.

The DAA power supply requires connection to a separate dedicated AC branch circuit. Follow these guidelines when connecting the AC branch circuit:

- Label the branch circuit “Fire Alarm”.

- Connect the branch circuit to the line side of the main power feed of the protected premises.
- Do not power other equipment from the fire alarm branch circuit.
- Run the AC branch circuit wire continuously, without any disconnect devices, from the power source to the power supply.
- Overcurrent protection for the AC branch circuit must comply with Article 760 of the National Electrical Codes, as well as local codes.
- Use 12-14 AWG (1.6mm O.D.) wire with 600 VAC insulation for the AC branch circuit.



**Figure C.11 AC Power Connection**

### Connect primary power as follows:

1. Turn off the circuit breaker at the main power distribution panel.
2. Connect the earth ground terminal (TB1 EARTH) to a solid earth ground (a metallic, cold water pipe may be suitable in some installations). This connection is vital to maintaining the power supply's immunity to unwanted transients generated by lightning and electrostatic discharge.
3. Connect the primary power neutral line to the terminal marked NEUTRAL and the primary power AC line to the terminal marked HOT.

DAAP5b1.wmf

### Connecting the DAA Power Supply to the Batteries



**WARNING:** Do not connect the battery interconnect cable (See Figure C.12) at this time. Leave the battery interconnect cable disconnected until after initial system power-up.

The DAA works with two 7 AH minimum to 55 AH maximum batteries. See “Battery Calculations” on page 121 for current draw calculations to determine the battery size required for this installation.

DAAs can share batteries as follows:

- 26 AH batteries can accommodate one or two DAA.
- 55 AH batteries can accommodate up to four DAA.

Battery cables (90”, 2.28 m) are included with the DAA for battery installation in any CAB-4 series cabinet that includes a DAA in one of the rows. Shorter battery cables (18”, 0.5 m) are included with the CHS-BH1. For battery sharing, use 12 AWG wire either in the same cabinet, or in conduit for no more than 20 ft. (6.09 m.).

■ Batteries Within the Same Enclosure as the DAA

Refer to Figure C.12 for battery connections.

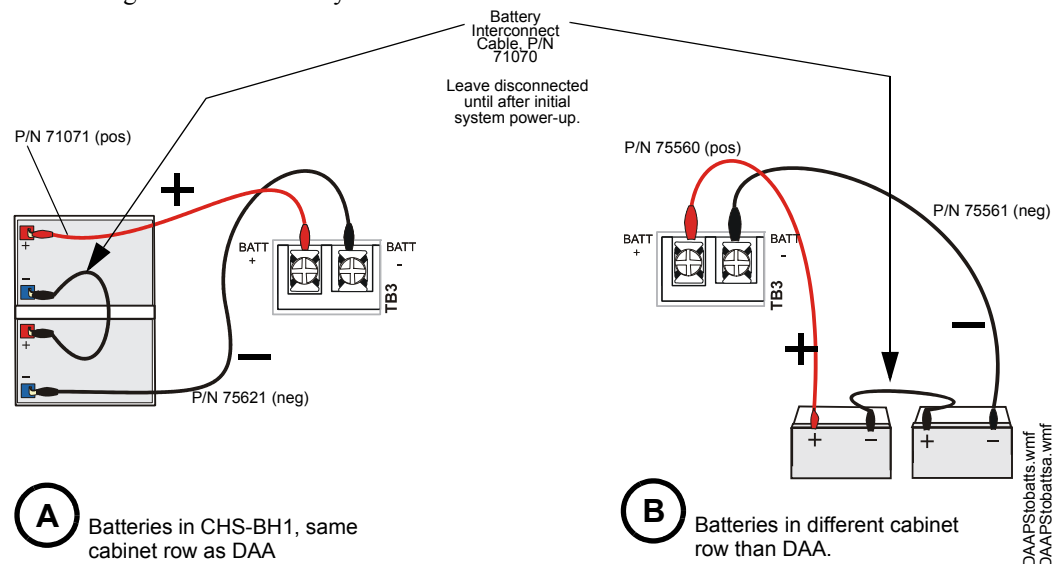


Figure C.12 Connecting Batteries to TB3 on the DAA-PS

■ Batteries Outside the DAA Enclosure

When the batteries are installed outside the DAA cabinet, connections are the same as in Figure C.12. However, the battery cables between the two enclosures must be in conduit and the enclosures must be within 20 feet (6.09 m) of each other within the same room.

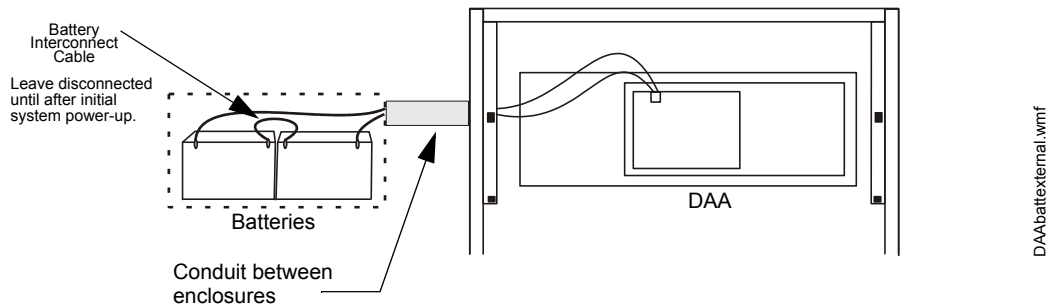


Figure C.13 Using Conduit

■ Battery Sharing

Up to four DAAs may share a set of batteries. When DAAs share batteries, JP2 jumpers must be cut on all but one DAA attached to a set of batteries, to disable Earth Fault detection. (Refer to Figure C.3 on page 94.)

VeriFire programming must designate all DAAs but one as having the charger disabled.

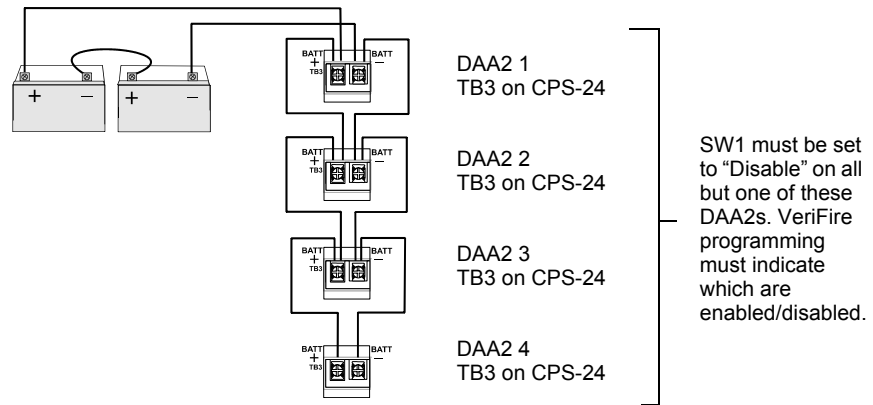


**NOTE:** This designation must be made for the 75 watt boards as well as the 50 watt boards.

Only one DAA should have its JP2 set to Enable, and only one DAA should have a working charger. These DAAs do not have to be the same.



Connect all DAAs sharing a set of batteries directly to the batteries using 12 AWG. If the batteries are located outside of the DAA cabinet, the wiring must be in conduit that is no greater than 20 ft. (6.09 m) long.



CPS-24tb3batshare.wmf

If batteries are not in the same cabinet as the DAA2s, wiring must be in conduit that is 20 ft. (6.09 m) long or less.

**Figure C.14 Four DAAs Sharing 55AH Batteries**

## Connecting the Alarm and Trouble Buses

### ■ Alarm Bus

The DAA general alarm connections are used to receive general alarm messages from an FACP via an SLC device, or via the Notification Appliance Circuit of an FACP or power supply.

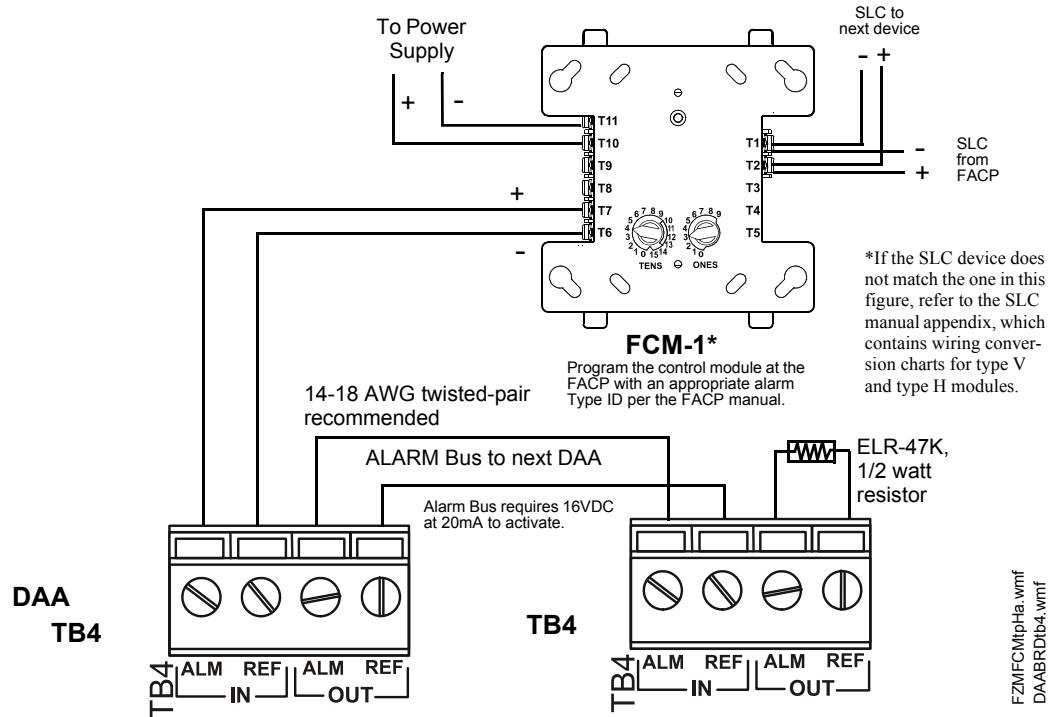


Figure C.15 Alarm Bus Connections to FCM-1

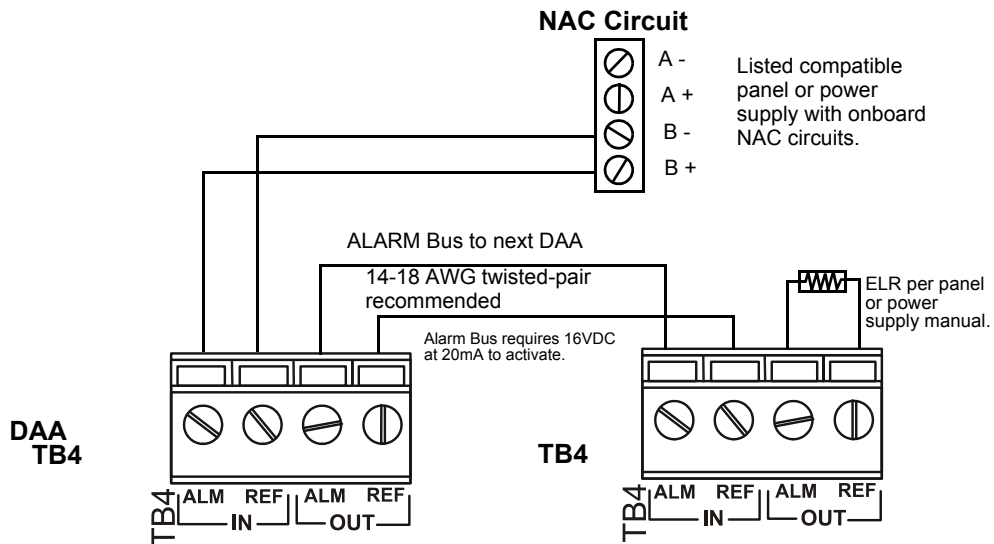
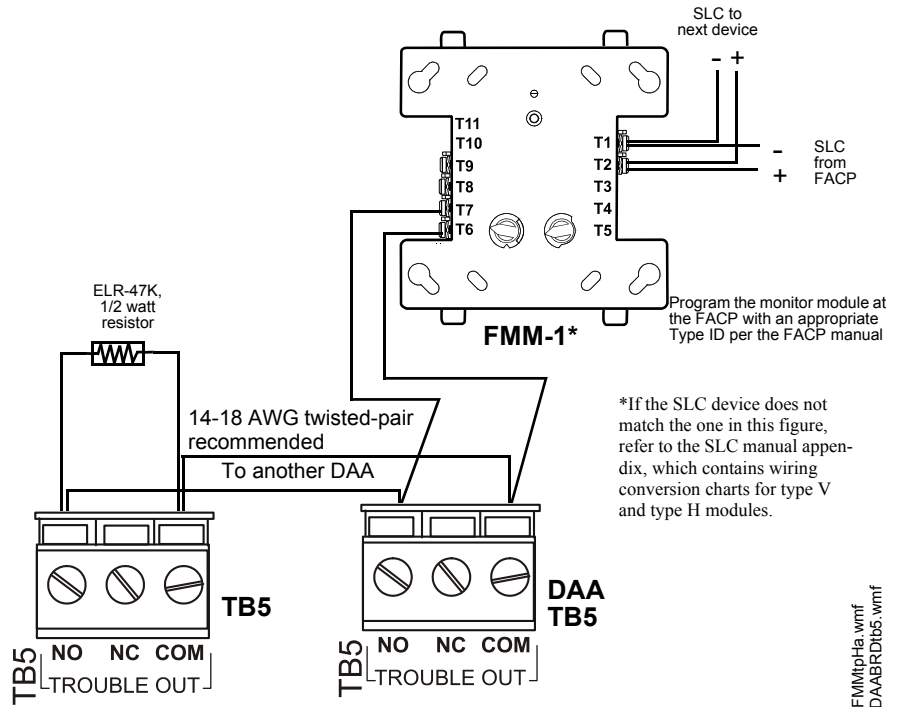


Figure C.16 Alarm Bus Connections to NAC

Refer to the SLC manual and specific panel or power supply manual for more information.

■ **Trouble Bus**

The DAA trouble bus connections are used to send general trouble messages to an FACP. The trouble relay is used mainly as a backup in the event the monitoring panel loses communication with the DVC over a standard or high-speed Noti-Fire-Net, or with direct-connect to a panel. Figure C.17 illustrates wiring the Common and Normally Open out connections to an FMM-1 monitor module.



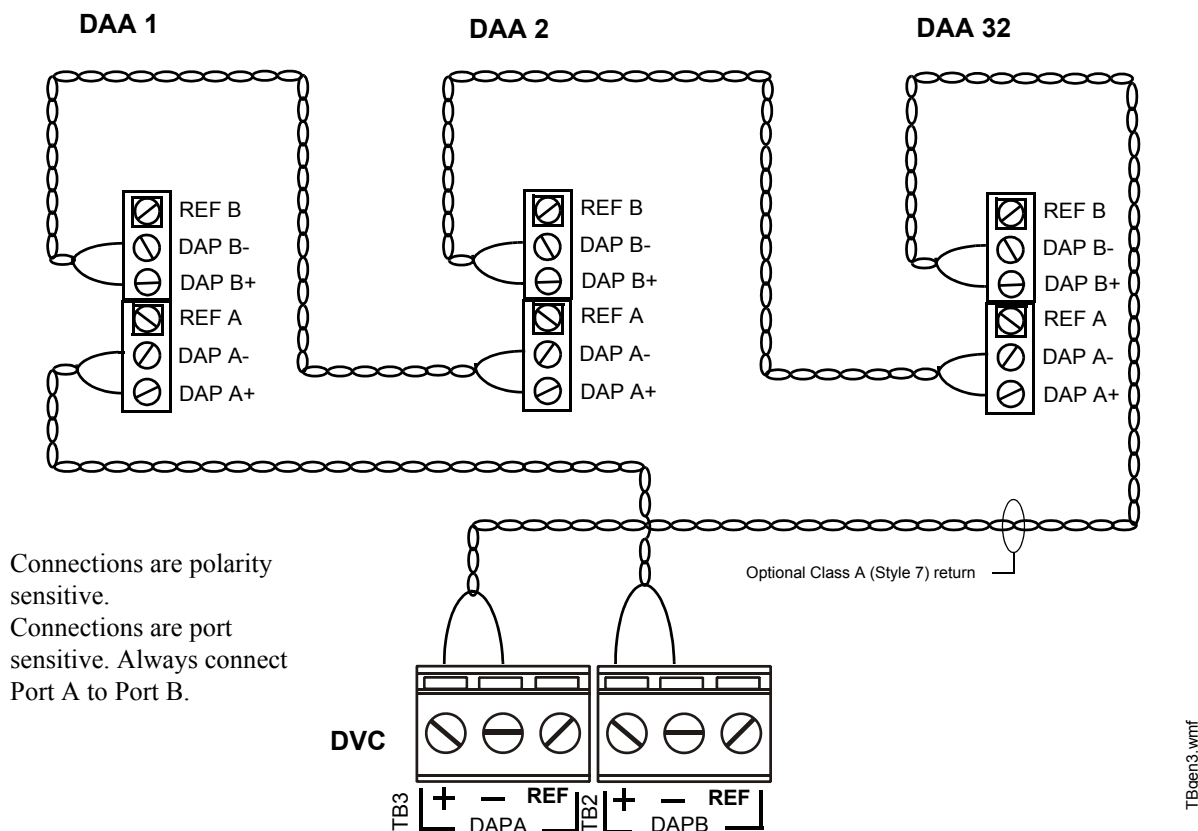
**Figure C.17 Trouble Bus to FMM-1**

Refer to the SLC manual and specific panel manual for more information on panel and SLC wiring.

## Digital Audio Ports A and B on Wire Version Boards

Digital Audio Ports A and B (DAP A and DAP B) allow digital communication with the DVC over the Digital Audio Loop (DAL); amplifier programming from the DVC; control, audio, trouble, address and firefighter telephone data; and live voice paging can be communicated through these ports. They may also act as repeaters, in that what is received at one port is transmitted out the other. Events generated at the DAA will be transmitted out both ports.

Refer to the Wiring Guide, p/n 52916ADD, for acceptable wire types and associated distance between points.



**Figure C.18 Wire the DAA Digital Audio Loop Connections**



**NOTE:** Digital Audio Ports A and B must be wired in Class B (Style 4) or Class A (Style 7) configuration. Do not wire them in bus configuration.



**NOTE:** Class B (Style 4) configuration must be installed in accordance with the requirements for survivability from attack by fire in the National Fire Alarm Code, NFPA 72.

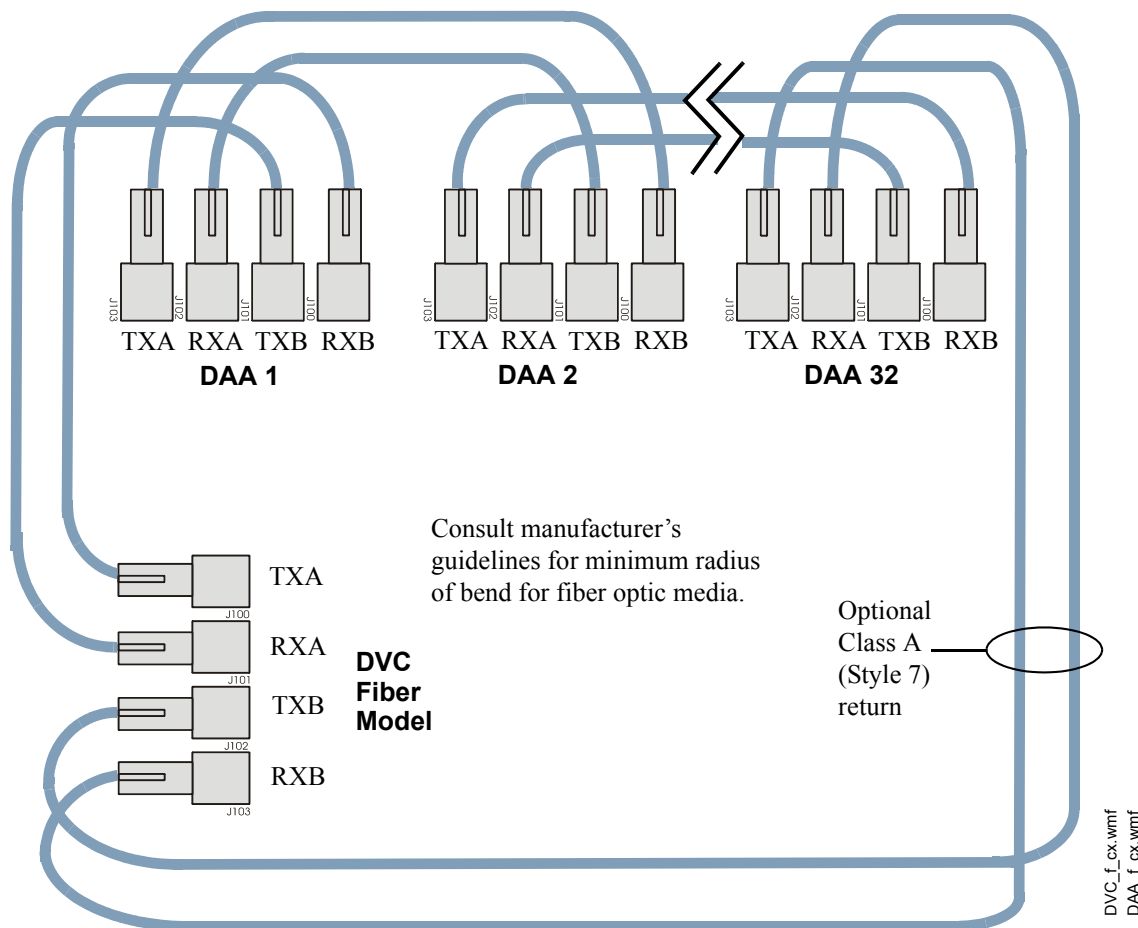
Refer to “EFA and EFB (Switches 9 and 10)” on page 119 for information on enabling earth fault detection on the wire DAL.

## RXA, RXB, TXA, TXB Fiber Version Board Connections

Fiber ports RXA, RXB, TXA and TXB allow digital communication with DVC fiber boards. When used with other types of DAL devices (e.g. DAA2, DAX) a DS-RFM or DS-SFM fiber option module is required on the DAL device. (Refer to Section 5 on page 75.)

The fiber cabling between these ports provides a Digital Audio Loop (DAL) for programming; alarm, control, trouble, automatic audio messages, address and firefighter telephone data; and live voice paging communications

When a fiber DAA is used only with other fiber DAAs (no other type of DAL device, such as a DAA2, is present on the DAL), the DAL must be composed of either all single-mode fiber, or all multi-mode fiber. Multi-mode and single-mode can not be mixed on an all-DAA DAL.



**Figure C.19 Fiber Digital Audio Loop Connections**



**NOTE:** Style 4 configuration must be installed in accordance with the requirements for survivability from attack by fire in the National Fire Alarm Code, NFPA 72.

**FFT Riser Connections**

The Firefighter Telephone Riser connections (TB7) provide for the use of firefighter telephones (FFTs) on an analog network. They are a means of connecting various FFT telephone control modules and devices, such as FTM-1 modules, AFAWS, FPJ, or RPJ-1 telephone circuits to the DAA.

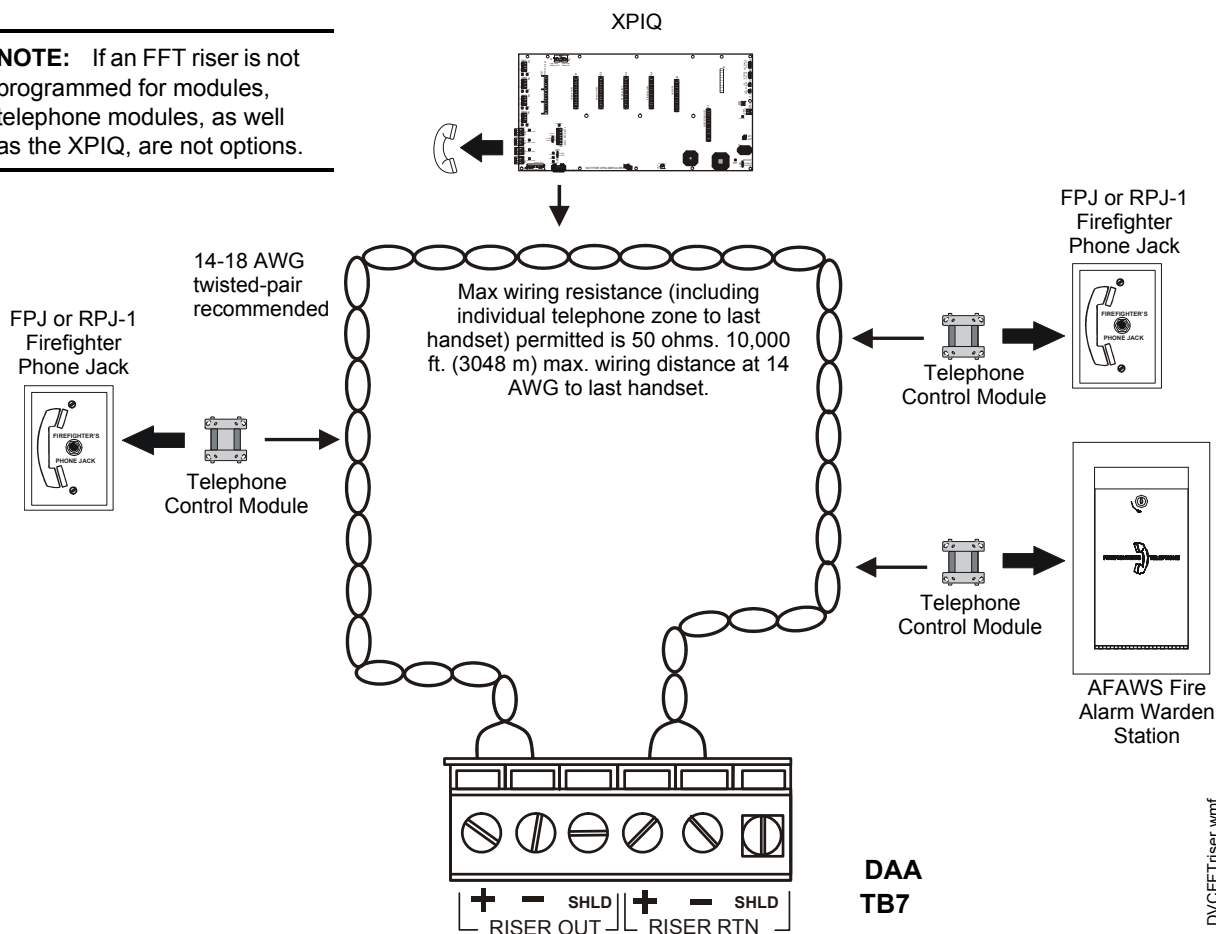
The FFT riser may be wired in NFPA Class A or Class B configuration. VeriFire Tools must be used to select Class A or Class B for trouble supervision. Class B 2-Wire configurations require a 3.9K ohm 1/2 watt end-of-line resistor (P/N R-3.9K).

There are two ways that FireFighter Telephones may be installed on a DAA FFT riser. Both configurations have a limit of 7 active phones.

Programming must reflect whether the riser contains modules or not. Use VeriFire Tools to set these parameters.

1. “Install FTM” selected - Firefighter Telephones must be wired to the output of the FTM modules or an XPIQ. The telephone points will be SLC addresses.
2. “Install FTM” not selected - Firefighter Telephones must be wired directly to the DAA FFT riser. The telephone point will be a DAA phone point. (AxT; where x = the DAA address)

**NOTE:** If an FFT riser is not programmed for modules, telephone modules, as well as the XPIQ, are not options.



**Figure C.20 FFT Riser (Class A Example)**

An FHS firefighter handset may be used with the phone jacks in Figure C.20. For a description of the DVC firefighter telephone network operation, refer to the FFT appendix in the DVC Digital Voice Command manual..



**NOTE:** Digital audio software Version 2.0 and above does not support FFT risers on DVC or DAA PCA boards. Refer to Figure C.2 on page 93 for how to determine DAA board type. Refer to the DVC Digital Voice Command manual for how to distinguish PCA from PCB board types. Check VeriFire or an appropriate network display to determine the software version.

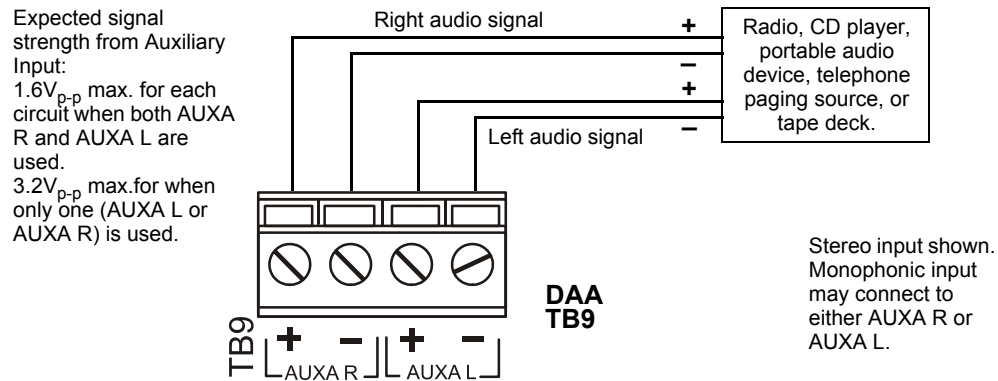
### Auxiliary Inputs A and B

The DAA provides two analog audio connections. One or the other may be used, not both.

■ **Auxiliary Input A**

Auxiliary Input A (AUXA) provides a high-fidelity connection to common audio appliances such as a radio, CD player, or tape deck, or to a telephone paging source. It can be used for background music. Two-channel stereo signals are changed to monophonic signals. AHJ approval required.

14-18 AWG twisted-pair recommended

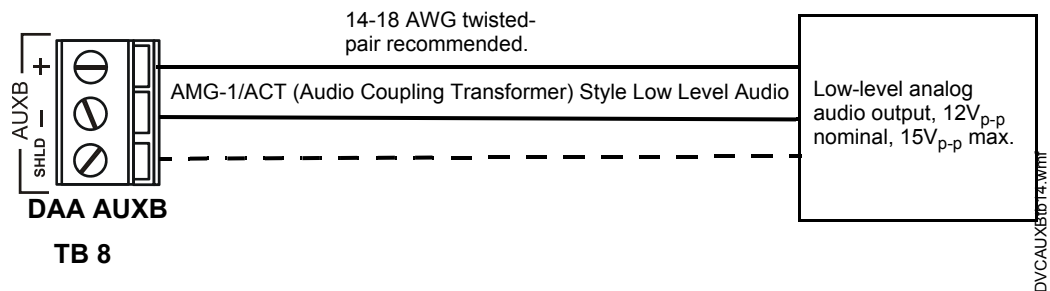


**Figure C.21 AUX A Auxiliary Audio Input**

Background music will be silenced while batteries greater than 26AH are being fully charged.

■ **Auxiliary Input B**

Auxiliary Input B (AUXB) is provided to accept low-level analog audio input at 12V<sub>p-p</sub> nominal, 15V<sub>p-p</sub> max. The messages are then transmitted out as high level audio to DAA speaker circuits as designated by programming. VeriFire Tools programming determines if signal supervision of AUXB is enabled.



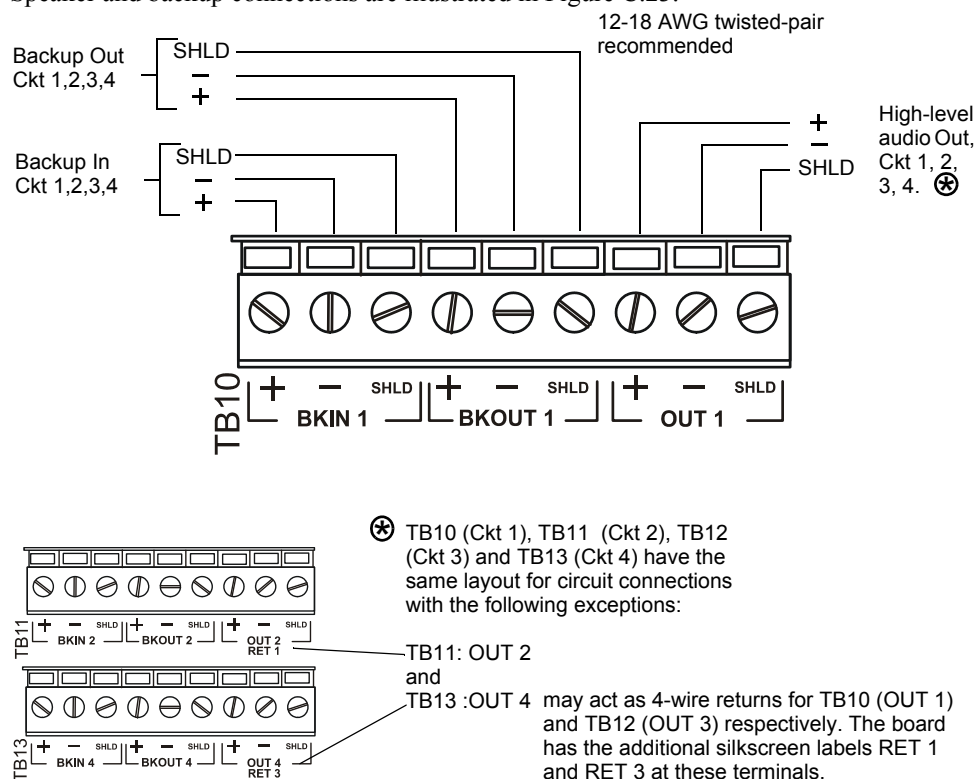
**Figure C.22 AUXB Auxiliary Audio Input**

**Speaker and Backup Circuits**

Speaker circuits 1 through 4 (terminals 10 through 13) provide for two NFPA Class A (Style Z) connections for high-level audio output, four NFPA Class B (Style Y) connections, or One Class A and two Class B connections. These connections dynamically share the 50W or 75W output capability of the DAA.

A DAA may be wired using the “BKIN” and “BKOUT” terminals to back up an amplifier. If an amplifier fails, the signal automatically switches to the backup amplifier.

Speaker and backup connections are illustrated in Figure C.23.

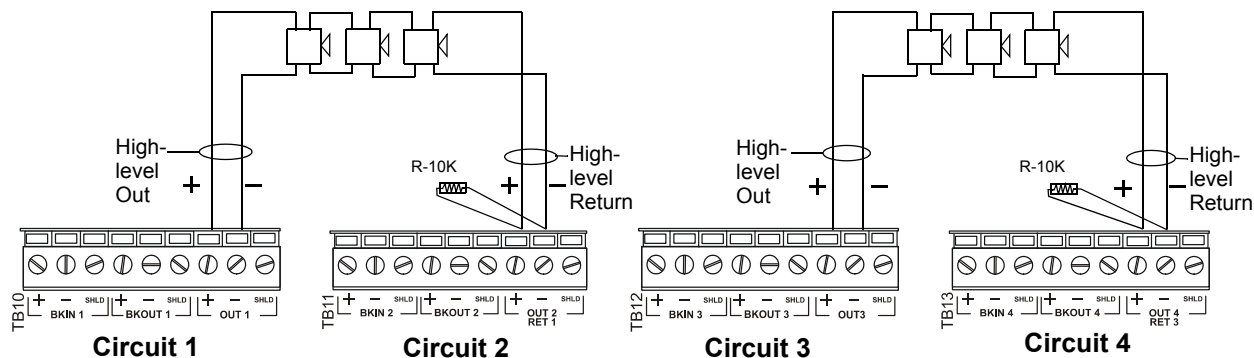


DAABRD10.wmf  
DAABRD11.wmf  
DAABRD12.wmf  
DAABRD13.wmf

**Figure C.23 Speaker Circuit and Backup Connections**

■ In Normal (NAC) Mode

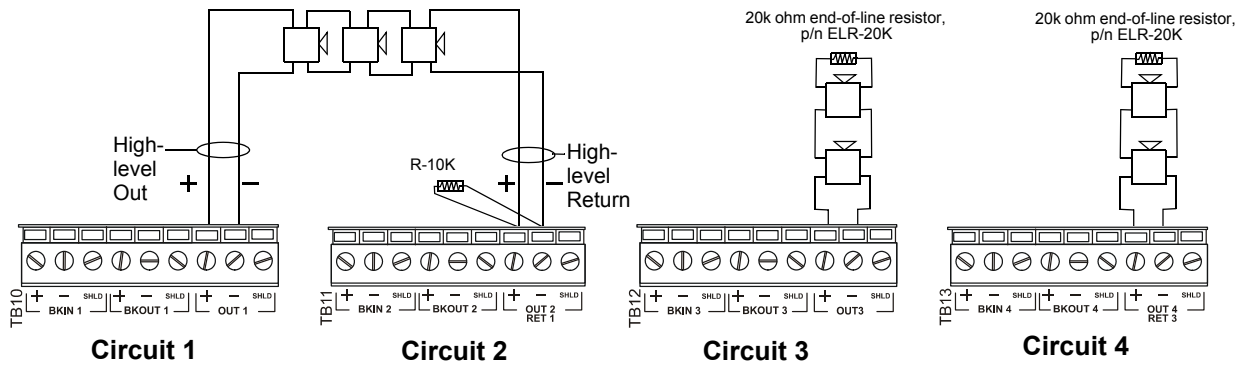
When a DAA's Riser Mode is programmed NORMAL (NAC) (refer to VeriFireTools help file or the DVC Digital Voice Command manual for programming description), the amplified signal from the DAA may be connected directly to speakers. Following are illustrations of Class A and Class B configurations (Figures C.24 and C.25).



DAABRD10.wmf  
DAABRD11.wmf  
DAABRD12.wmf  
DAABRD13.wmf

**Figure C.24 Two DAA Class A (Style Z) Circuits**

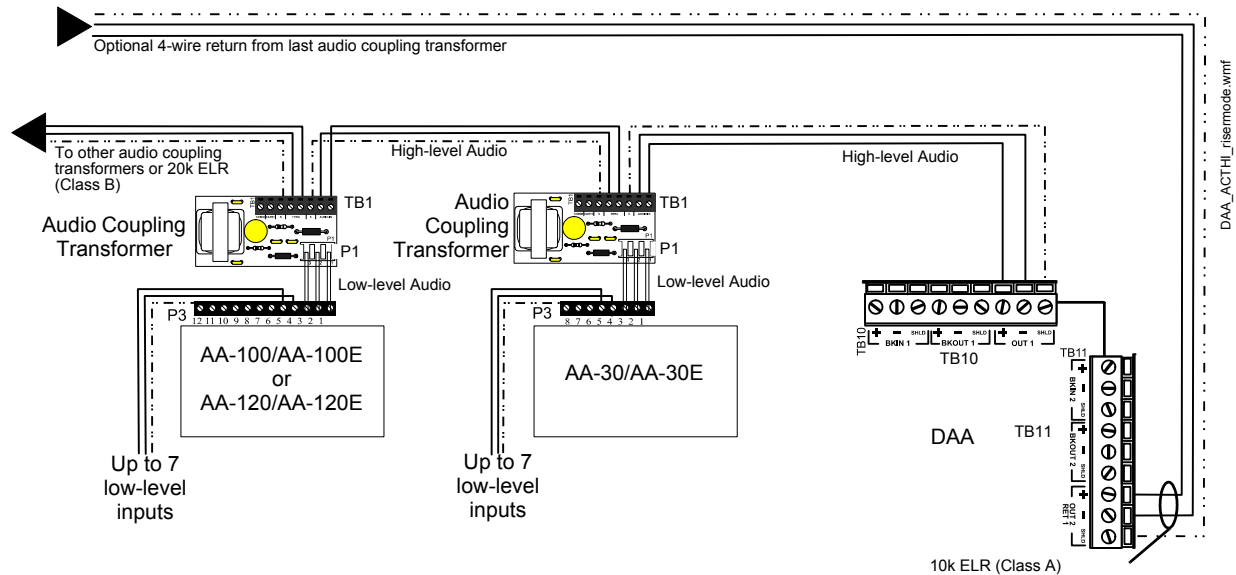




**Figure C.25 One DAA Class A (Style Z) Circuit, Two Class B (Style Y) Circuits**

■ **In Riser Mode to Additional Amplifiers**

When a DAA’s Riser Mode is programmed `RISER MODE TO ADDITIONAL AMPLIFIERS` (refer to VeriFireTools help file or the DVC Digital Voice Command manual for programming description), the amplified signal from the DAA may be connected to an audio coupling transformer (ACT-25 for 25V amplifiers, ACT-70 for 70V amplifiers) to drive additional AA-Series amplifiers. This mode provides a 200 Hz supervisory tone required by analog amplifiers.



**Figure C.26 DAA Riser Mode to Additional Amplifiers**

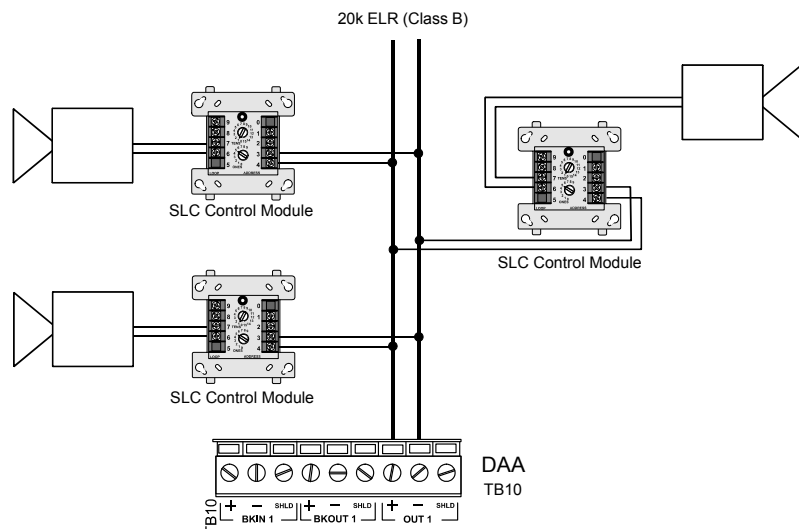
Refer to the ACT-25 or ACT-70 installation document for more information.

■ **In Riser Mode to Control Modules**

When a DAA’s Riser Mode is programmed `RISER MODE TO CONTROL MODULES` (refer to VeriFireTools help file or the DVC Digital Voice Command manual for programming description), the amplified signal from the DAA may be routed to multiple speaker circuits using SLC control modules.

Only one Class A or Class B DAA speaker circuit may be installed when operating in this mode.

Do not use background music in this mode. The DAA will provide speaker circuit supervision only when idle.



**Figure C.27 DAA Riser Mode to Control Modules**

#### ■ In Riser Mode to RSM/AIM Series Canadian Room Isolator Modules

When a DAA's Riser Mode is programmed `RISER MODE TO RSM/AIM SERIES MODULES` (refer to VeriFireTools help file or the DVC Digital Voice Command manual for programming description), the amplified signal from the DAA is routed to RSM-1A or AIM-1A room isolator modules.

Only one Class A or Class B DAA speaker circuit may be installed when operating in this mode.

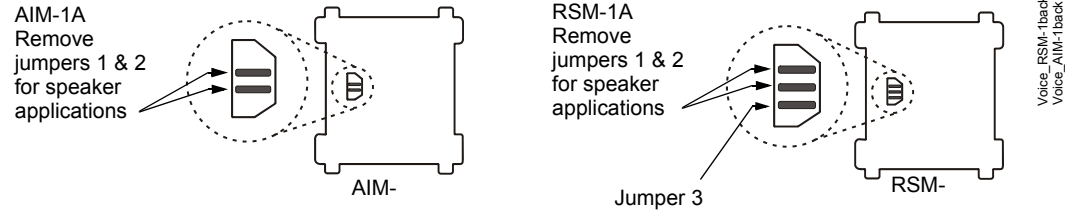
AIM-1A - Provides isolation to a separate circuit on an audio riser. A short circuit on an AIM-1A speaker circuit will not disable other speaker circuits on the riser.

RSM-1A - Works same as the AIM-1A, with the exception that there is a silence button for in-suite operation. The silence button will silence the audible signal to the module's circuit for ten minutes during alarm. Resounding will occur automatically after ten minutes. To override the ten minute silence, CBE programming must be done at the FACP so that it interrupts the module's 24VDC power for two seconds.

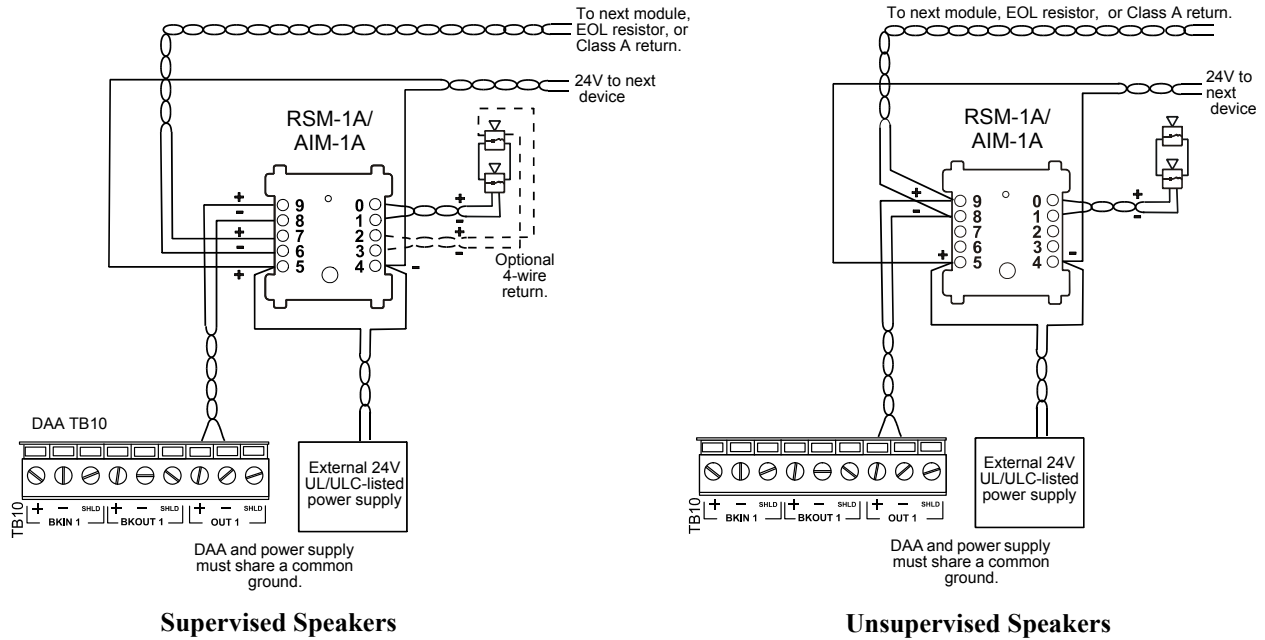
NFS2-3030 example:

Give the isolator module's 24VDC source a common ground with the DAA2 amplifier. Power the isolator module through a relay module that has Special Zone 14 in its CBE list. Special Zone 14 will activate for ten seconds when a reset is initiated at the panel. This period is used to disable the 24VDC for those 10 seconds to clear a local silence.

Remove jumpers for speaker applications. (Refer to Figure C.28.)



**Figure C.28 Jumper Settings for Speaker Applications**



**Supervised Speakers**

**Unsupervised Speakers**

**Figure C.29 DAA Riser Mode to RSM-1A/AIM-1A Modules**

**In Riser Mode to CIM/CSM Series Canadian Room Isolator Modules**

When a DAA’s Riser Mode is programmed RISER MODE TO CIM/CSM SERIES MODULES (Refer to VeriFireTools help file or the DVC Digital Voice Command manual for programming description), the amplified signal from the DAA is routed to a CIM-2A module, which feeds the signal to one or two CSM-1A modules.

A pre-announce tone of 800 Hz will clear a local silence.

Only one Class A or Class B DAA speaker circuit may be installed when operating in this mode.

Do not use background music in this mode. The DAA will provide speaker circuit supervision only when idle.

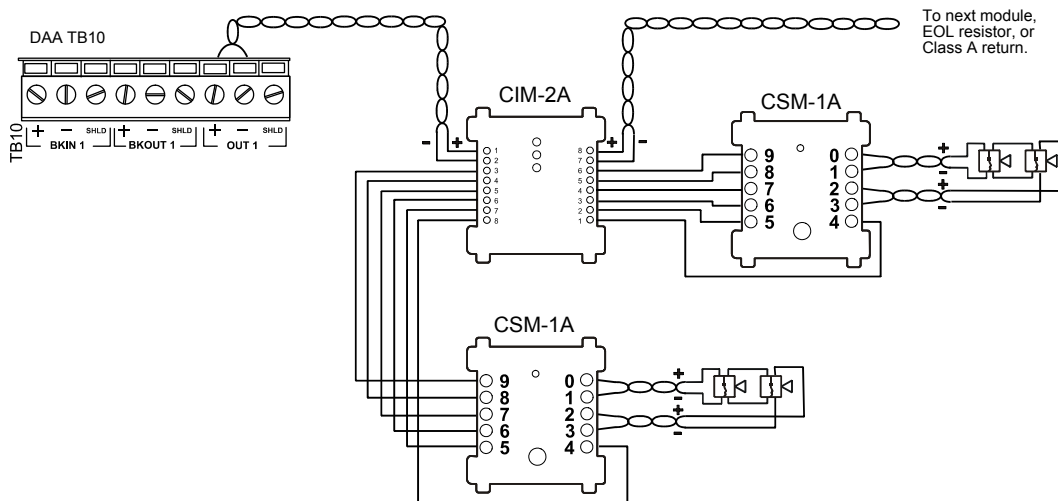


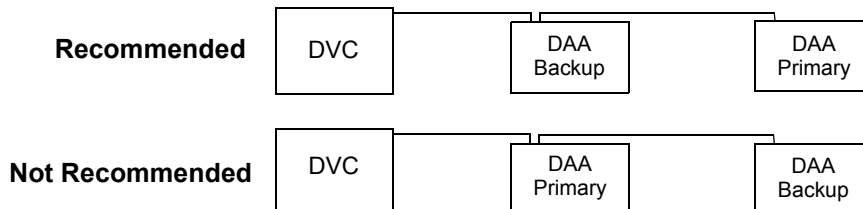
Figure C.30 DAA Riser Mode to CIM-2A/CSM-1A Modules

■ Speaker Backup Circuits

The DAA supports one-to-one or one-to-many backup amplifier applications. Each DAA must be designated a primary or backup amplifier through VeriFire Tools programming. The speaker wiring from backup to primary is unsupervised when the backup amplifier is not active; therefore the backup and primary amplifiers must be in the same enclosure, or in conduit within the same room.



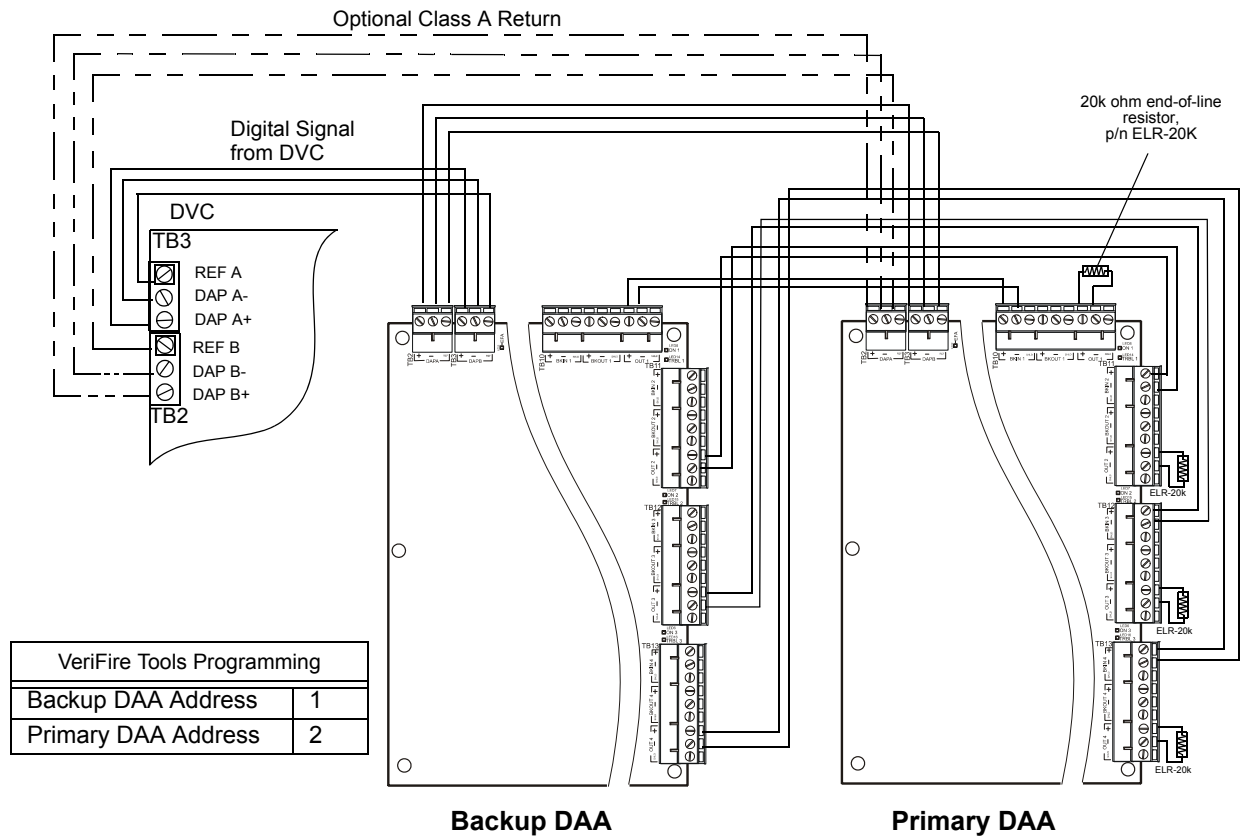
**NOTE:** In Style 4 wiring arrangements of the DAL (digital audio loop), it is recommended that the backup amplifier be located closer to the DVC than the primary DAA amplifiers on the DAL.



Each DAA acts as a repeater for the digital audio signal. If a primary amplifier falls off-line, the backup will not receive the signal if it is further down the DAL chain.

- **One-to-One Backup**

Figure C.31 illustrates output sources 1, 2, 3 and 4 on the primary amplifier backed up by the backup amplifier. Should the primary amplifier fail, all its messages will still be played as programmed.

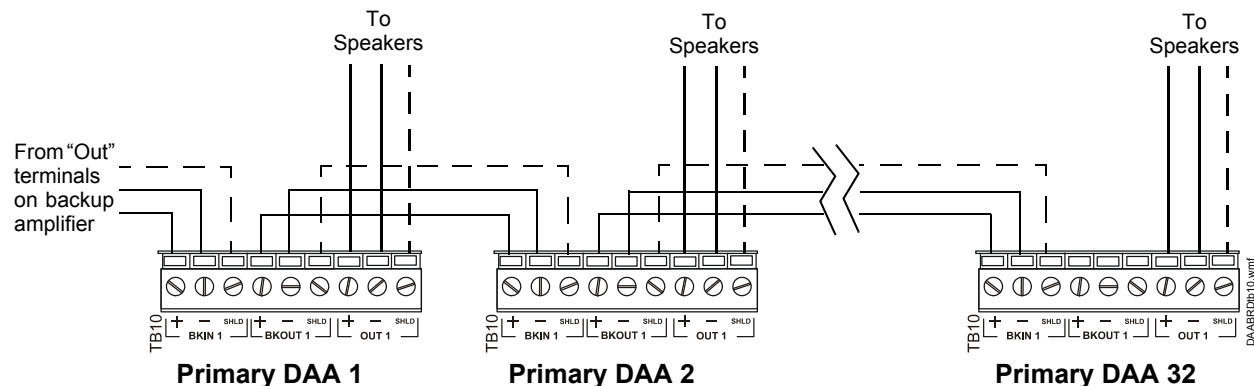


**Figure C.31 One-to-one, All Sources Backed Up**

- **One-to-Many Backup**

One amplifier may be used to back up as many as 31 primary DAA amplifiers. All primary amplifiers backed by the same backup amplifier must each be wired in the same style or combination of styles; for example, all wired Class A (Style Z), or all wired Class B (Style Y), or all wired with one Class A and two Class B circuits.

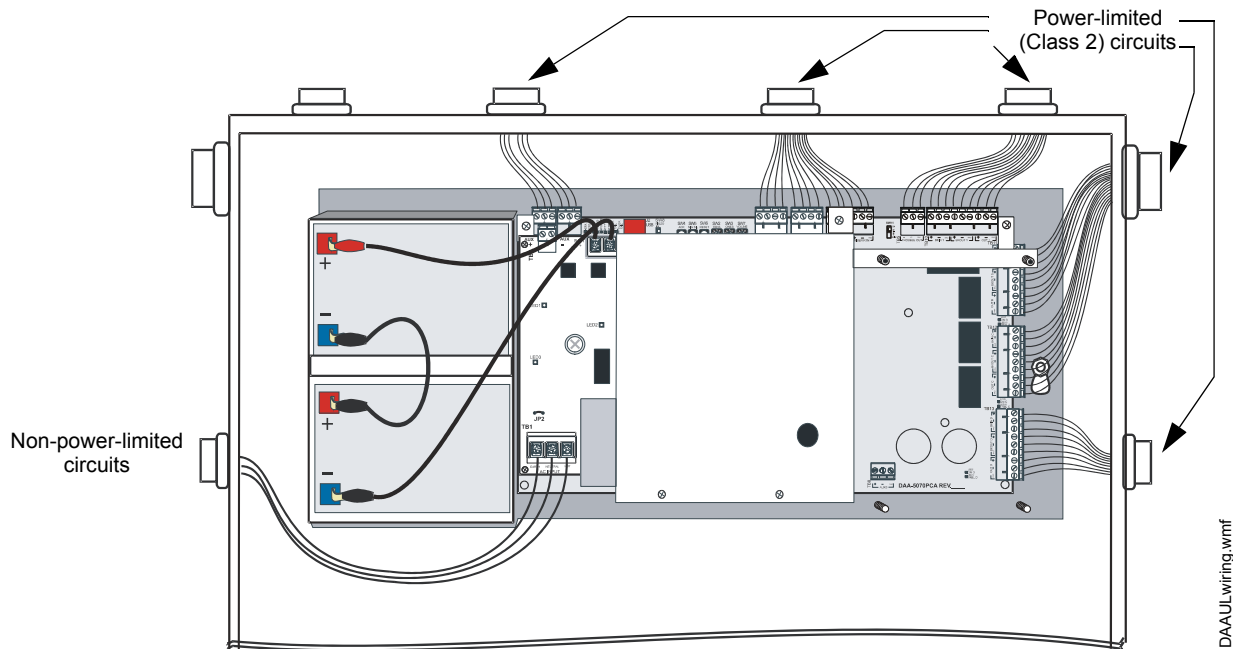
A backup amplifier can support one failed primary amplifier at a time. Should another primary amplifier also fail, the backup amplifier may also fail, generating an **AMPLIFIER LIMIT** trouble until the load is reduced or reset.



**Figure C.32 One-to-Many Backup**

**UL Power-limited (Class 2) Wiring Requirements**

Power-limited and non-power-limited circuit wiring must remain separated in the cabinet. All power-limited circuit wiring must remain at least 0.25 inches (6.35 mm) from any non-power-limited circuit wiring. All power-limited and non-power-limited circuit wiring must enter and exit the cabinet through different knockouts and/or conduits.



**Figure C.33 Typical Backbox Wiring**

## C.3 Configuration

### C.3.1 Setting the Configuration Switches

#### EFA and EFB (Switches 9 and 10)

The wire versions of the DAA boards have two earth fault detection switches for use with Digital Audio Ports (DAPs) A and B. The switches arrive from the factory disabled, and may require resetting if earth fault detection is desired.

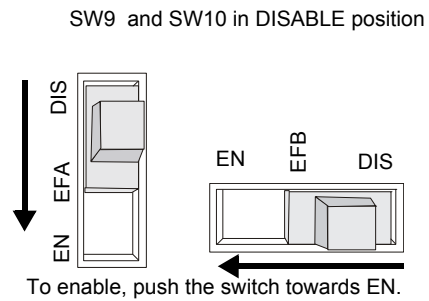
Each DAP on a DAA or DVC is electrically isolated from the other DAP and all other circuitry on the DAA or DVC.

A DAP with its associated earth fault switch *enabled* must be connected to a DAP with its associated earth fault switch *disabled* for detection to occur. Otherwise, either

- no detection will occur (when two connected DAPs have their associated switches disabled), or
- an earth fault will be generated (when two connected DAPs have their associated switches enabled).

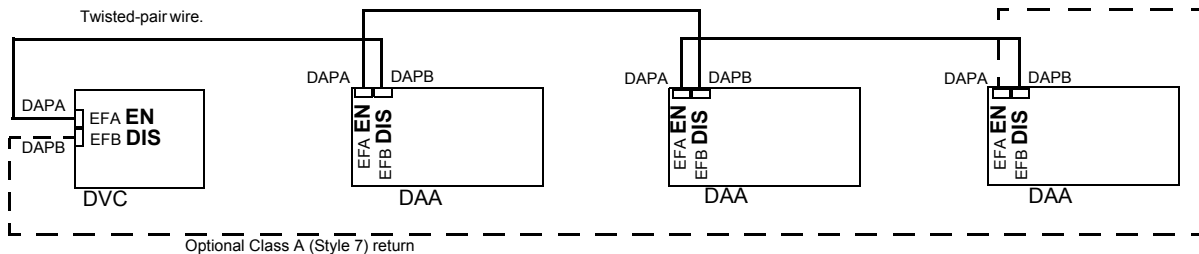
Refer to Figure C.35.

For specific DAP wiring instructions refer to “Digital Audio Ports A and B on Wire Version Boards” on page 108.



**Figure C.34 EFA/EFB Enable/Disable**

SW1gen.wmf  
SW1gena.wmf



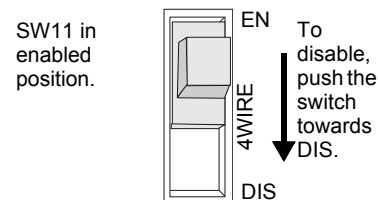
**Figure C.35 Earth Fault Switch Settings for a Wire Digital Audio Loop (DAL)**

DAAs may be used on a DAL with other devices that have different earth fault detection (e.g., DAA2, DAX). Refer to the DAL Earth Fault Detection appendix in the DVC Digital Voice Command manual for examples of how to mix devices with different earth fault detection.

#### 4WIRE (Switch 11)

The FFT riser may be wired in a Class A four-wire or a Class B two-wire configuration. For Class A installations, enable the switch. For Class B, disable the switch.

VeriFire Tools programming must be set the same as this switch.



**Figure C.36 4WIRE Enable/Disable**

## Address Switches

A maximum of 32 DAAs may be connected to one DVC. Each DAA (or other DAL device) must have its own address so the events it generates can be distinguished from those of other DAL devices, for unique routing of messages and sounds, and for speaker circuit control. Address switches SW2

(tens) and SW3 (ones) are used to address the DAA. Refer to Figure C.37 for an illustration of address settings and to Figure C.3 on page 94 for the location of the switches.

Addresses one (1) through 32 may be used for digital communication. Address 00 and addresses above 32 will generate a DAA trouble.

The default address setting for the DAA as it arrives from the factory is 00.

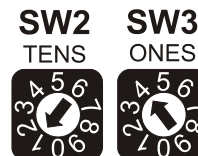
## Volume Control

A rotary switch (SW7) is supplied to adjust the volume for local background music from the AUXA input.

The default volume setting for the DAA as it arrives from the factory is 0 (Low). Turning the arrow counter-clockwise to increase the volume.

Refer to Figure C.3 on page 94 for the location of this control.

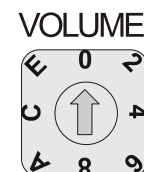
The SW2 arrow points to one (1). Tens switch set to one (1).



The SW3 arrow points to four (4). Ones switch set to four (4).

DAA AddressSwitches.wmf

**Figure C.37 DAA Address Switches**



DAA volletSW7.wmf

**Figure C.38 DAA Volume Control**

## C.4 Programming

The DAA is programmed through VeriFire Tools. Refer to the programming section in the DVC Digital Voice Command manual as well as the VeriFire Tools CD and Help file for information on how to create, prioritize and download audio messages, create system equations for message distribution, and set system parameters.

## C.5 Operation

### C.5.1 Pushbutton Controls

Table C.5 summarizes the functions of each pushbutton control.

Pushbutton	Function	When to use
F1	Silences speaker circuits 1 through 4. This pushbutton is enabled by the DAA when there is a communication loss with the DVC.	To turn off speaker outputs on speaker circuits 1 through 4.
F2	Clears local signal silences and reinitializes the amplifier if it turned off due to overcurrent protection.	After causes of DAA trouble messages have been cleared.

**Table C.5 Pushbutton Controls**



### C.5.2 Volume Control

The DAA provides a volume control for background music from auxiliary port A or B (See “Volume Control” on page 120). The volume of other audio messages is determined through the VeriFire Tools Read Status Service Form and FACP/network annunciator programming.

### C.5.3 Read/Alter Status

An NCA-2, NFS2-3030 and network workstation, as well as a computer running VeriFire Tools and connected to the NUP port of the DVC, will be able to read the status of a DAA and its speaker circuits. Refer to the appropriate panel manual or the VeriFire Tools Read Status Service Form.

A DAA speaker circuit may be disabled through NCA-2 and NFS2-3030 Alter Status panel programming and ACS programming.

### C.5.4 FFT Communication

Refer to the FFT appendix in the DVC Digital Voice Command manual for information on Firefighter Telephone system communication.

### C.5.5 Trouble Messages

Refer to the System Troubles appendix in the DVC Digital Voice Command manual for a description of system troubles.

## C.6 Battery Calculations

Description	Column A Amps in Standby			Column B Amps in Alarm		
	QTY	X current draw =	Total	QTY	X current draw =	Total
DAA*	1	X [ 0.350A ] =	0.350A	1	X [ 0.600A ] =	0.600A
Speakers:						
1/4 watt				[ ]	X [ 0.016A ] =	
1/2 watt				[ ]	X [ 0.032A ] =	
3/4 watt				[ ]	X [ 0.0485A ] =	
1 watt				[ ]	X [ 0.064A ] =	
2 watt				[ ]	X [ 0.132A ] =	
Other _____	[ ]	X [ ] =		[ ]	X [ ] =	
		<b>Total Column A</b>	_____		<b>Total Column B</b>	_____
* Includes FFT Riser Draw						

**Table C.6 Current Draw Calculations Per DAA**



**NOTE:** Battery Sharing - When batteries are shared by two or more DAAs, Table C.6 must be completed for each DAA. The totals for Columns A and Columns B must be summed and entered into Table C.7 where indicated.

Load Totals	Multiplied By	Time	Equals	Secondary Amp Hour Totals
-------------	---------------	------	--------	---------------------------

Enter total from Column A in Table C.6. (Standby Load)	[ ]	X	Required Secondary Non-fire Alarm Standby Time (24 or 60 hours)	[ ]	=	[ ]	Non-fire Alarm Secondary Standby Amp Hours
Enter total from Column B in Table C.6. (Alarm Load)	[ ]	X	Required Fire Alarm Time in Decimal Form*	[ ]	=	[ ]	Secondary Fire Alarm Amp Hour Requirement
Sum column for Total Secondary Ampere Hours (AH) Calculated					=		
Multiply by the derating factor X 1.2					=	[ ]	Total Secondary Ampere Hours Required
*Following are decimal conversions for standard numbers of minutes:							
5 minutes	0.084						
10 minutes	0.167						
15 minutes	0.250						
30 minutes	0.50						
60 minutes	1.0						
Standby operating times:							
<ul style="list-style-type: none"> <li>NFPA 72 Local, Proprietary, Auxiliary, Remote Station, and Central Station systems require 24 hours of standby power followed by 5 minutes in alarm.</li> <li>Some jurisdictions require 60 hours of standby power followed by 5 minutes in alarm for Auxiliary and Remote Station systems, based on previous NFPA 72 requirements.</li> <li>24 hours of standby/supervisory condition followed by 2 hours of alarm.</li> </ul>							

**Table C.7 Secondary Power Standby and Fire Alarm Load**

Battery Size	Voltage Rating	Required Number	Model Number
7 AH	12 volts	Two	BAT-1270
12 AH	12 volts	Two	BAT-12120
26 AH	12 volts	Two	BAT-12260
55 AH	12 volts	Two	BAT-12550

**Table C.8 Battery Size Requirements**

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