Honeywell

Gamewell FCI FIRE CONTROL INSTRUMENTS

AA-100/AA-120 Audio Amplifiers

Installation/Operation 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 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 0-49º C/ 32-120º F and at a relative humidity . 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 15-27º C/60-80º 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. Over-tightening 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 present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

Software Downloads

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.

Documentation Feedback

Your feedback helps us keep our documentation up-to-date and accurate. If you have any comments or suggestions about our online Help or printed manuals, you can email us.

Please include the following information:

- Product name and version number (if applicable)
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- Brief description of content you think should be improved or corrected
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Send email messages to:

FireSystems.TechPubs@honeywell.com

Please note this email address is for documentation feedback only. If you have any technical issues, please contact Technical Services.

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Section 1: Description

1.1 Overview AA-100/AA-100E and AA-120/AA-120E Audio Amplifiers

1.1.1 AA-100/AA-100E Audio Amplifier

The AA-100/AA-100E audio amplifier provides up to 100 watts of power. There are two outputs provided:

- one output at 70.7 V_{RMS}
- one output at 25 V_{RMS}

The combined power taken from one or both of these outputs must not exceed a total of 100 watts. When output wiring supervision is required, a four-wire high-level output/return circuit must be employed. The AA-100/AA-100E output wiring must always employ the four-wire configuration. Cut R-100 to enable output wiring supervision in the AA-100/AA-100E. When using both outputs of the AA-100/AA-100E, (25 V_{RMS} and 70.7 V_{RMS}), only the 70.7 V output wiring can and must be supervised. Therefore, the 25 V_{RMS} output wiring must NOT leave the cabinet and must NOT be connected to the four-wire return input. The speaker zone selection is performed by the INI-VGE Voice Gateway.

NOTE: UL 10th Edition Standard Requirement:
For UL 10th Edition standard applications, these amplifiers support only one audio zone.

Figure 1.1.1.1 illustrates the AA-100/AA-100E amplifier.

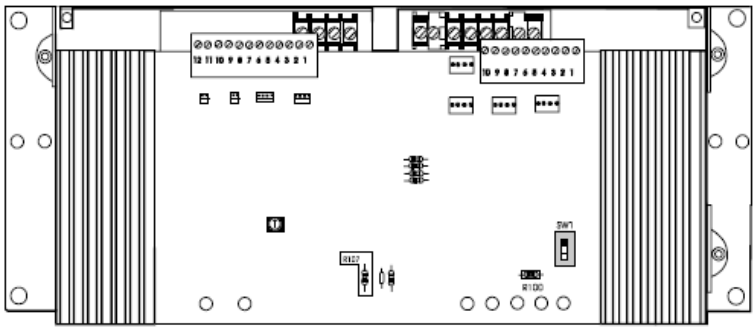

Figure 1.1.1.1 AA-100/AA-100E Audio Amplifier Diagram

1.1.2 AA-120/AA-120E Audio Amplifier

The AA-120/AA-120E audio amplifier provides up to 120 watts of power. One 25 V_{RMS} output is provided. The power taken from this output must not exceed 120 watts total. A four-wire high-level output/return circuit must be employed when output wiring supervision is required. The AA-120/AA-120E output wiring must employ the 4-wire configuration when the output wiring connects to the AOM modules located in another cabinet. Cut R-100 to enable output wiring supervision in the AA-120/AA-120E. Speaker zone selection is performed by the INI-VGE Voice Gateway.

1.1.3 Trouble Contacts

Trouble contacts on the amplifiers close to report problems with audio input wiring, brown out, batteries, output wiring, or the amplifier itself. Trouble contact wiring must not leave the cabinet.

1.1.4 Backup Amplifiers

Only an AA-120/AA-120E may be used as a backup amplifier for one or more AA-100/AA-100E and AA-120/AA-120E amplifiers. In the event of an amplifier failure, backup amplifier switching is automatic. When one backup amplifier is serving multiple primary amplifiers, only one primary amplifier failure will be supported. Individual LEDs signal each source of trouble to aid in troubleshooting. The supervision of the backup amplifier output is done through the four-wire return circuit on the backup amplifier. The high-level backup input on the AA-100/AA-100E or AA-120/AA-120E must be 25 V_{RMS} only. Use output wiring supervision whenever high-level audio amplifier output leaves the cabinet.

1.1.5 Cabinet Mounting

The AA-100/AA-100E and AA-120/AA-120E mounts directly in the FCI-DR-C4B or FCI-DR-D4B cabinet backbox. Primary (AC) and secondary (24V battery) power source connections must be made to each amplifier. The AA-100 and AA-120 amplifiers require 120 VAC, 50/60 Hz primary power and the AA-100E and AA-120E require 220/240 VAC, 50/60 Hz primary power. Some external listed means of charging the batteries (such as a CHG-120) must be provided.

1.2 Mass Notification System (MNS)

Use the AA-100/AA-120 amplifiers in the E3 Series Classic System of the Mass Notification System. The Gamewell-FCI, Mass Notification System (MNS) is a combination in-building fire and mass notification system. It comprises the E3 Series Broadband Emergency Voice Evacuation, E3 Series Classic Systems and the E3 Series Broadband networked fire alarm system. This design allows a wide range of configurations to form an integrated, distributed fire alarm system in combination with audio evacuation for both Fire and Mass Notification functions as desired. The design also allows for its use as a dedicated standalone Mass Notification System without fire alarm service. The network communication conveys all Fire alarm and Mass Notification control functions, audio evacuation, voice paging, and fire fighter communications over a single pair of wires or fiber-optic cable. The modular design offers several configurations to accommodate the following audio components:

- Autonomous Control Unit (ACU) (Main Command Center)
- Local Operating Console (LOC), (Remote Command Center)
- E3 Series Broadband Voice Evacuation System
- E3 Series Classic Voice Evacuation System

Table 1.2.1 lists the E3 Series sub-assemblies that can be used in the Gamewell-FCI, MNS (Mass Notification System).

Autonomous Control Unit (ACU) Main Command Center	E3 LOC Remote Command Center	E3 Broadband System (Distributed System)	E3 Classic System (Bulk Amplifier System)
AM-50 Series Amplifiers	AOM-TELF/AOM-2SF	AM-50 Series Amplifiers	AA-100/AA-120 Amplifiers
ANU-48 (Remote Annunciator)	ASM-16 (Addressable Switch Module)	ANU-48 (Remote Annunciator)	ACT-1/ACT-4 (Interface to INI-VGE amplifier)
ASM-16 (Addressable Switch Module)	INI-VG Series (Intelligent Network Interface Voice Gateway)	ASM-16 (Addressable Switch Module)	ANU-48 (Remote Annunciator)
ILI-MB-E3 (Intelligent Loop Interface-Main Board)	INCC-MIC (Microphone)	ILI-MB-E3 (Intelligent Loop Interface-Main Board)	ASM-16 (Addressable Switch Module)
ILI-S-E3 (Intelligent Loop Interface-Expansion Board)	NGA (Network Graphic Annunciator)	ILI-S-E3 (Intelligent Loop Interface-Expansion Board)	FCI-CHG-120 (Power Supply)
ILI95-MB-E3 (Intelligent Loop Interface-Main Board)	INCC-TEL (Telephone)	ILI95-MB-E3 (Intelligent Loop Interface-Main Board)	ILI-MB-E3 (Intelligent Loop Interface-Main Board)
ILI95-S-E3 (Intelligent Loop Interface95-Expansion Board)		ILI95-S-E3 (Intelligent Loop Interface95-Expansion Board)	ILI-S-E3 (Intelligent Loop Interface95-Expansion Board)
INCC-MIC (Microphone)		INCC-MIC (Microphone)	ILI95-MB-E3 (Intelligent Loop Interface95-Main Board)
INCC-TEL (Telephone)		INCC-TEL (Telephone)	ILI95-S-E3 (Intelligent Loop Interface95-Expansion Board)
INI-VG Series (Intelligent Network Interface Voice Gateway)		INI-VGC (Intelligent Network Interface Voice Gateway)	INI-VGE (Intelligent Network Interface Voice Gateway)
NGA (Network Graphic Annunciator)		INI-VGX (Intelligent Network Interface Voice Gateway)	INCC-MIC (Microphone)
PM-9/PM-9G (Power Supply)		NGA (Network Graphic Annunciator)	INCC-TEL (Telephone)
RPT-E3 (Communication Circuit)		PM-9/PM-9G (Power Supply)	NGA (Network Graphic Annunciator)
		RPT-E3 (Communication Circuit)	PM-9/PM-9G (Power Supply)
			RPT-E3 (Communication Circuit)
Note: In the E3 Series, Mass Notification System, the LCD-E3 Display panel is not used.			

Table1.2.1 Mass Notification System

1.2.1 Mass Notification System - Documentation

The following MNS System information is available in the Gamewell-FCI, *Mass Notification System (MNS) Installation/Operation Manual, Part Number:LS10013-000GF-E*.

- System Configurations
- Class 2 Power-Limited Requirements
- System Operation
- Cabinets Installations
- Wiring
- Testing/Maintenance

1.3 Standards

These products have been designed and tested to comply with the following Standards.

National Fire Protection Association

- AHJ Authority Having Jurisdiction
- NFPA72 National Fire Alarm Code
- NFPA 70 National Electrical Code
- NFPA 101 Life Safety Code

UL Standards UL 864 9th and 10th Edition

- Per the UL Continuing Certification Program, UL 864 9th edition fire alarm control equipment will retain certification after the roll-out of UL 10th edition (12/2/2018).
- Installations of UL 864 10th Edition certified equipment are permitted to use UL864 9th Edition certified equipment when approved by the local Authority Having Jurisdiction (AHJ).

For product compliance, refer to the UL/ULC listing cards located on the UL online certification directory. https://iq.ulprospector.com

Section 2: Speaker Switching

The amplified signal from each audio amplifier must be connected to a control module, which will switch the signal to a speaker circuit when necessary. Figure 2.1 through Figure 2.4 illustrate the wiring configurations for the AA-100 and AA-120 audio amplifiers.

NOTE: SURVIVABILITY CLAUSE:
Per the National Fire Alarm Code, NFPA 72, all circuits necessary for the operation of the notification appliances shall be protected until they enter the evacuation signaling zone that they serve. Any of the following methods shall be considered acceptable as meeting these requirements.
1) A 2-hour rated cable or cable system
2) A 2-hour rated enclosure
3) Performance alternatives approved by Authority Having Jurisdiction (AHJ)

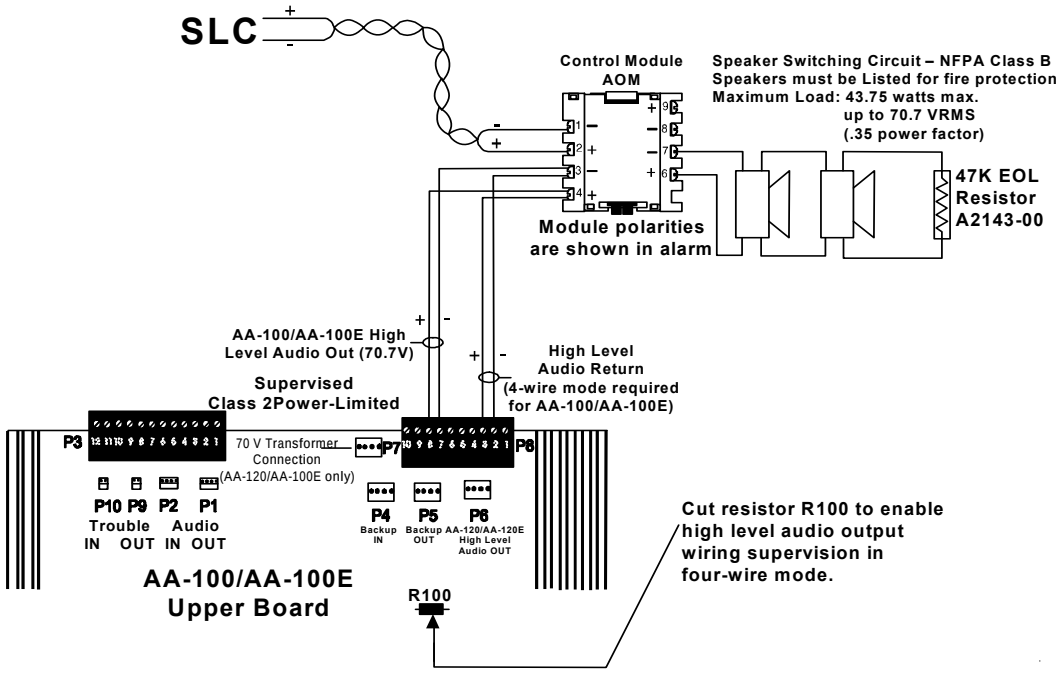

Figure 2.1 Speaker Switching Configuration for the AA-100/AA-100E (Class B) with AOM-2SFor AOM-MUXF (Class B)

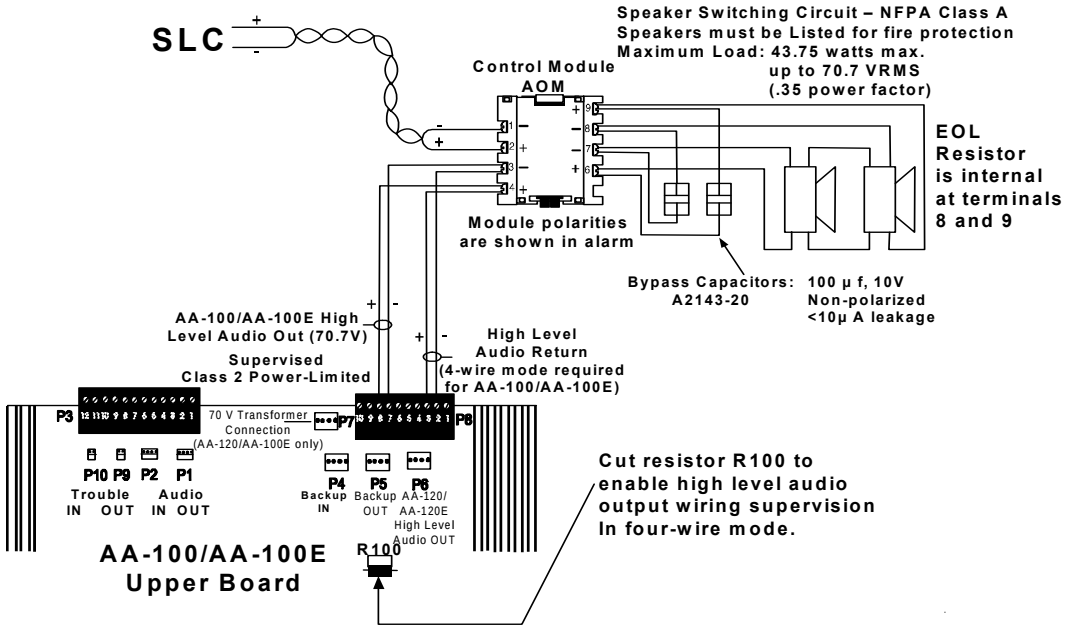

Figure 2.2 Speaker Switching Configuration for the AA-100/AA-100E (Class B) with AOM-2SF or AOM-MUXF (Class A)

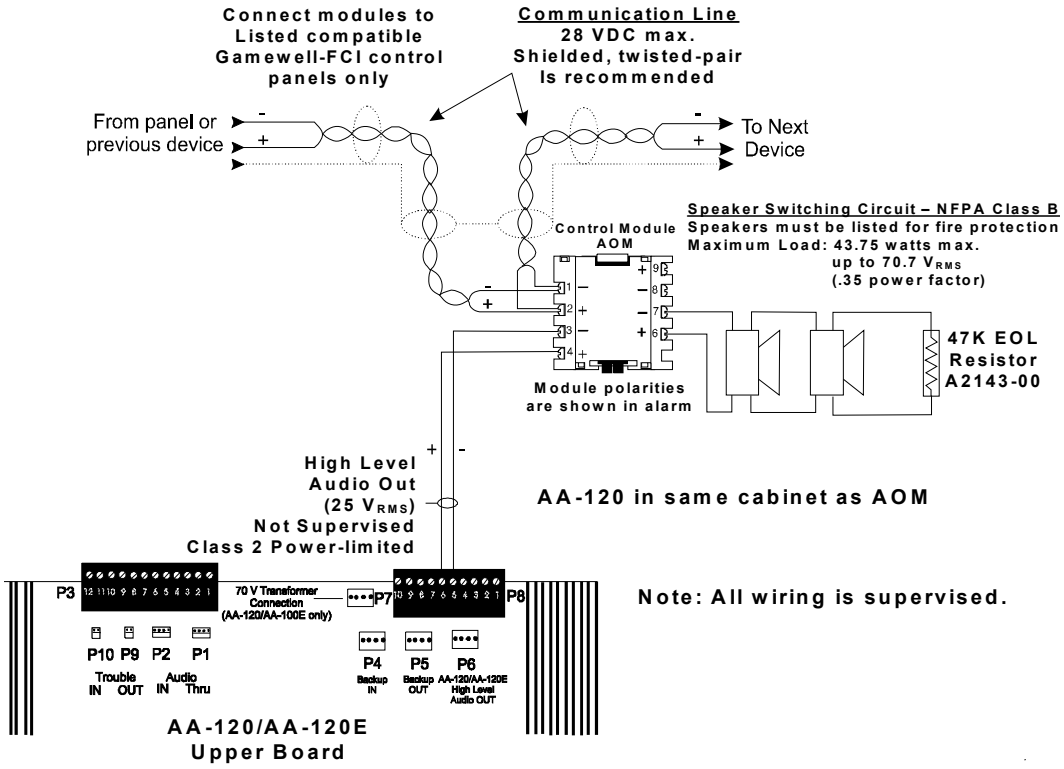

Figure 2.3 Speaker Switching Configuration for the AA-120/AA-120E (Class B) with AOM-2SF or AOM-MUXF (Class B)

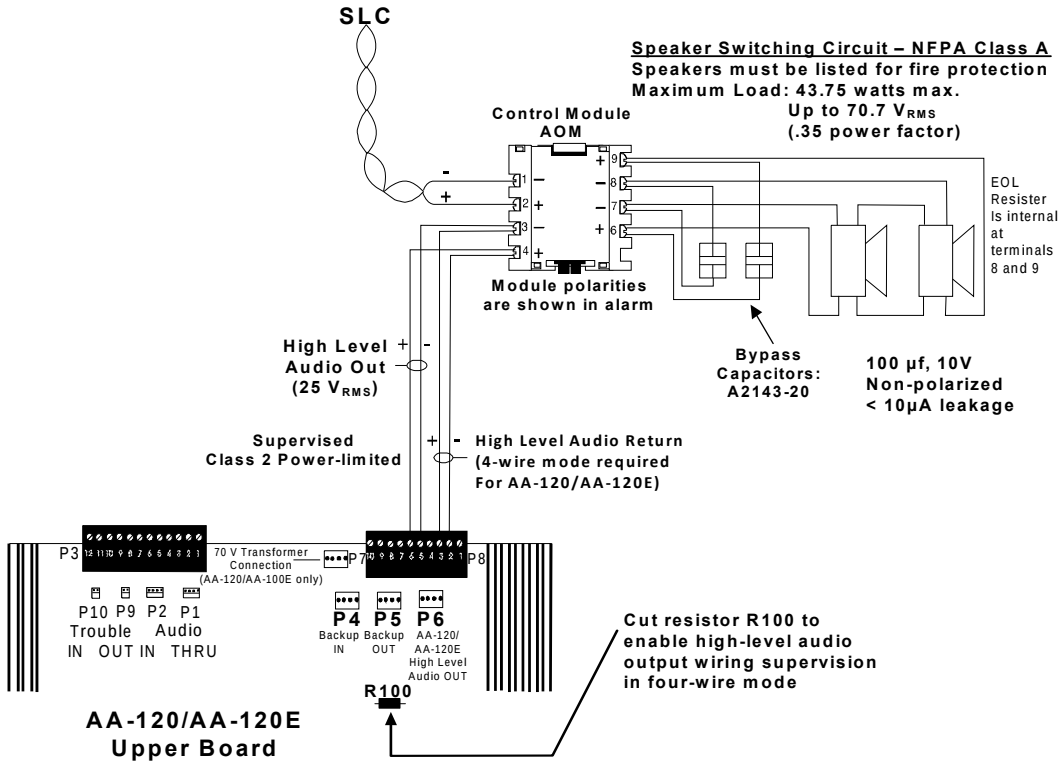

Figure 2.4 Speaker Switching Configuration for the AA-120/AA-120E (Class B) with AOM-2SF or AOM-MUXF (Class A)

Section 3: Primary and Secondary Power for the Audio Amplifiers

Primary power required the for AA-100, and AA-120 Amplifiers are 120 VAC and primary power required for the AA-100E, and AA-120E are 220/240 VAC. Secondary power (24 VDC battery) connections must be made at the designated terminals shown in Figure 2.2 and Figure 2.4. Secondary power may be obtained from any source of 24 VDC which is Listed for Fire Alarm Signaling and has sufficient alarm and standby capacity (CHG-120). Use Table 3.1, Table 3.2 and Table 3.3 to calculate amplifier secondary (battery) power requirements.

NOTE: AC POWER MUST BE CONNECTED TO THE SAME CIRCUIT AS THE 7100 SERIES CONTROL PANEL.

Device	Number of Devices		Secondary Current Draw in Standby		Standby Current in Amps
AA-100/AA-100E Primary Amplifiers	[ ]	x	0.050	=	
AA-120/AA-120E Primary Amplifiers	[ ]	x	0.050	=	
AA-120/AA-120E Backup Amplifiers	[ ]	x	0.050	=	
Additional devices powered from the power supply during a standby condition	[ ]	x	[ ]	=	
		Total Amplifier Current Draw in Standby		=	

NOTE: The AA-120/AA-120E must be used to back-up the AA-100/AA-100E.

Table 3.1 Secondary Current in Standby

Device	Number of Devices		Secondary Current Draw in Alarm		Standby Current in Amps
AA-100/AA-100E Primary Amplifiers	[ ]	x	7.3	=	
AA-120/AA-120E Primary Amplifiers	[ ]	x	7.3	=	
AA-120/AA-120E Backup Amplifiers	[ ]	x	0.30	=	
Additional devices powered from the power supply during a standby condition	[ ]	x	[ ]	=	
			Total Amplifier Current Draw in Alarm	=	

Table 3.2 Secondary Current in Alarm

Secondary Current Draw in Standby (from Table 3.1)		Required Standby Time		Battery Requirements in Amp/Hours
[ ]	x	24 or 60 Hours	=	
Secondary Current Draw in Alarm (from Table 3.2)			=	
[ ]	x	(Enter 0.25 for 15 minutes)	=	

Table 3.3 Total Amplifier Secondary Current Draw

NOTE: Maximum alarm current from 25AH batteries must not exceed 9A.
Maximum alarm current from 55AH batteries must not exceed 20A.

Section 4: Installing the Amplifiers

The AA-100/AA-100E and AA-120/AA-120E amplifiers mount directly in the FCI-DR-C4B or DR-D4B backbox. Use the two #8 nuts and lock washers provided to secure the amplifier to the PEM studs on the back panel of the backbox.

Figure 4.1 illustrates the DR-D4B cabinet installation.

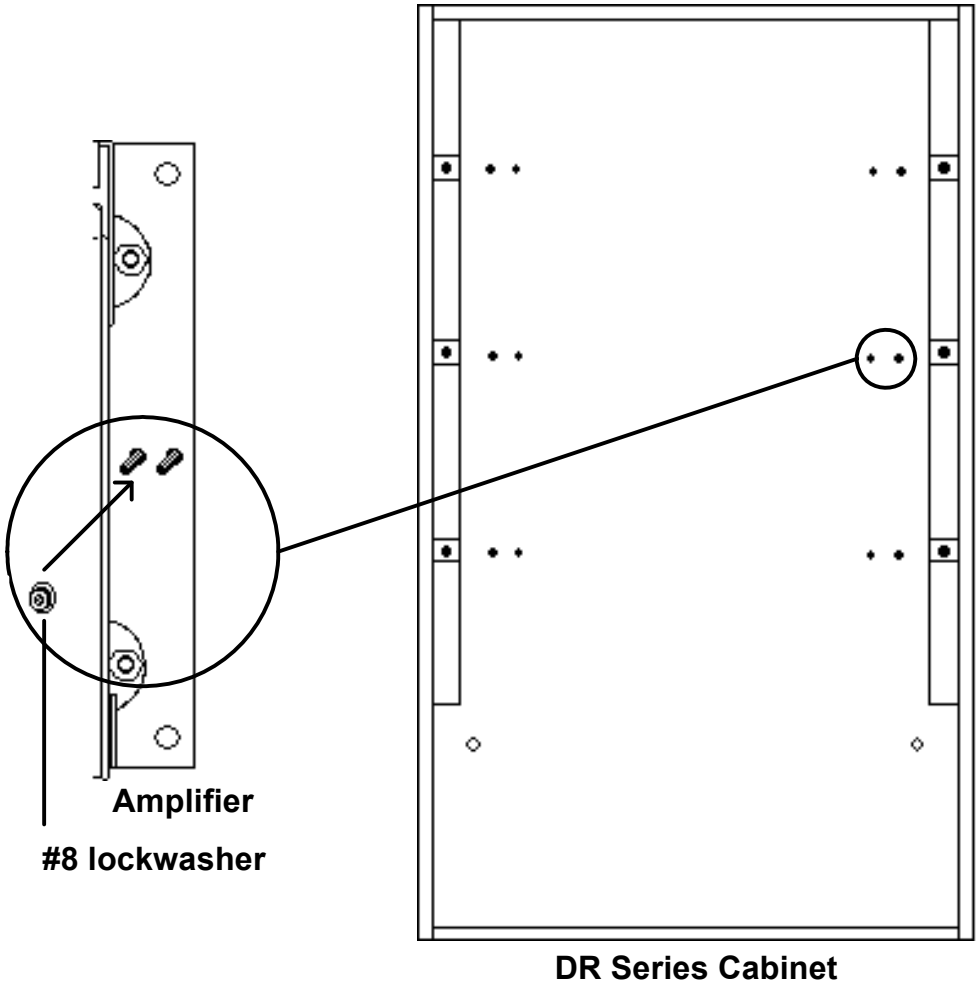

Figure 4.1 DR Series Cabinet Diagram

Section 5: Terminals and Connectors

Figure 5.1 illustrates the AA-100/AA-100E and AA-120/AA-120E terminals and connectors.

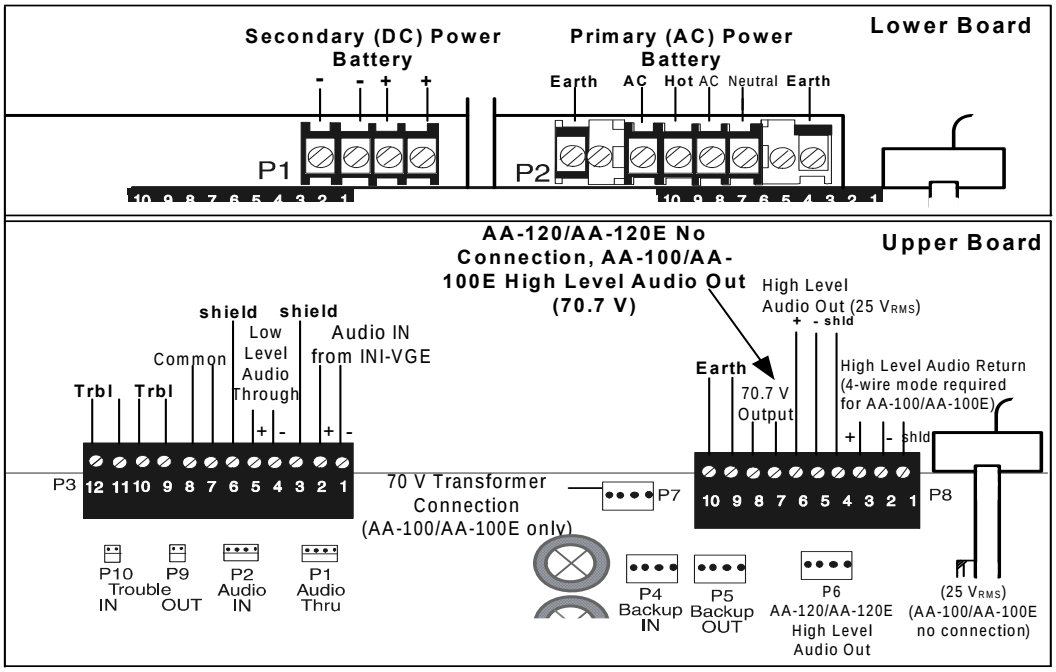

Figure 5.1 AA-100/AA-100E and AA-120/AA-120E Terminals and Connectors

NOTE 1: The low-level input and high-level output "P" connectors are primarily used for in-cabinet applications where the wiring to or from the amplifier remains in the same cabinet. For "multiple-cabinet" applications, hardwire the systems using Terminal blocks P3 and P8. When more than one cabinet is required, cabinets must be mounted adjacent to each other and all interconnecting wiring must be installed in conduit.

NOTE 2: Cut resistor R100 to enable high-level audio output wiring supervision in four-wire mode. Output supervision is always required in the AA-100/AA-100E. This option is only required in the AA-120/AA-120E when output wiring leaves the cabinet.

NOTE 3: If the amplifier is being used in stand-alone mode where the backup high/low or slow whoop tone generator is being used, R107 must be cut to prevent the amplifier from generating a trouble condition. The amplifier will indicate trouble within 90 seconds.

NOTE 4: Use of the ACT-1/ACT-4 Audio Coupling Transformer is recommended.

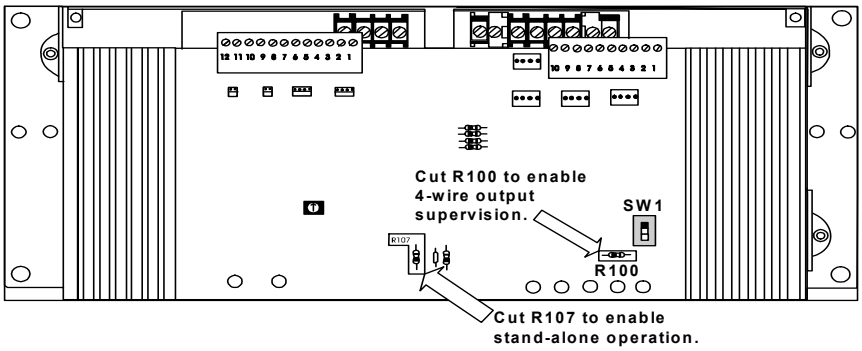

Figure 5.2 Terminals and Connectors

5.1 Adjusting the Audio Gain Level

The Installer can use a multi-position rotary switch to adjust the gain of the audio output signal to compensate for audio line losses. After you make the correct adjustment, the audio amplifier produces its maximum rated output power.

5.1.1 Procedure to Adjust the Audio Gain Level

After you complete the installation of all amplifiers and associated circuitry, adjust the low-level audio input to the amplifier set for normal standby. To adjust the audio gain level, do the following:

1. Use a small slotted screwdriver to position the rotary switch until the NORMAL LEVEL LED is lit and the INCORRECT LEVEL LED is off.
2. The audio gain is properly adjusted.

Figure 5.1.1.1 shows the Audio Gain switch.

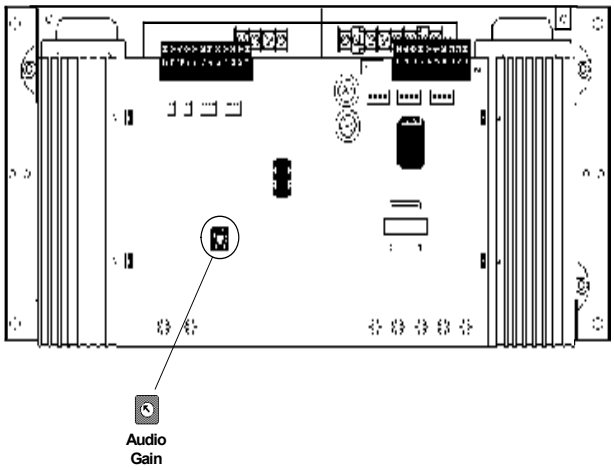

Figure 5.1.1.1 Audio Gain Level Diagram

NOTE: R-470 Resistor Installation Requirement:
You can install an R-470 resistor assembly across P3, (pins 4 and 5) of the last directly connected device on the low-level audio riser. This installation calibrates the audio amplifier. Failure to do so will cause a calibration difficulty.

5.2 Status LEDs

Figure 5.2.1 lists the Status LEDs.

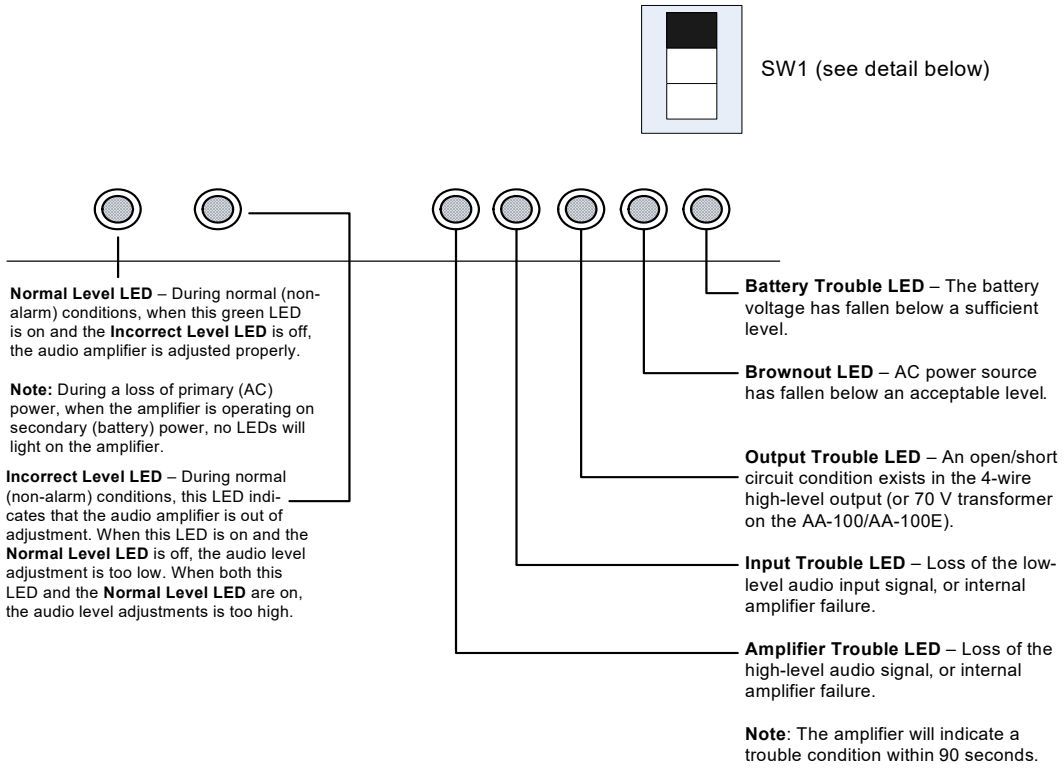

Figure 5.2.1 Status LEDs

5.3 Selecting the Default Backup Tone

1. Use SW1, located in the lower right-hand corner of the amplifier circuit board, to select Hi/Lo or Slow Whoop as the default backup tone.
2. The backup tone will start automatically if low-level audio input to the amplifier is lost or when the amplifier has been configured for stand-alone operation.

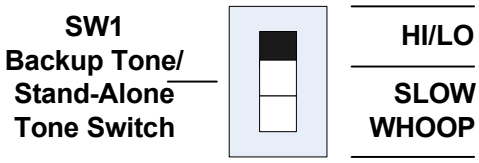

Figure 5.3.1.1 SW1 Backup Tone

Section 6: Using a Back-up Amplifier

Use an audio amplifier to backup one or more amplifiers. In the event of an amplifier failure, the backup amplifier switching is automatic. Figure 6.1 illustrates the back-up amplifiers wiring.

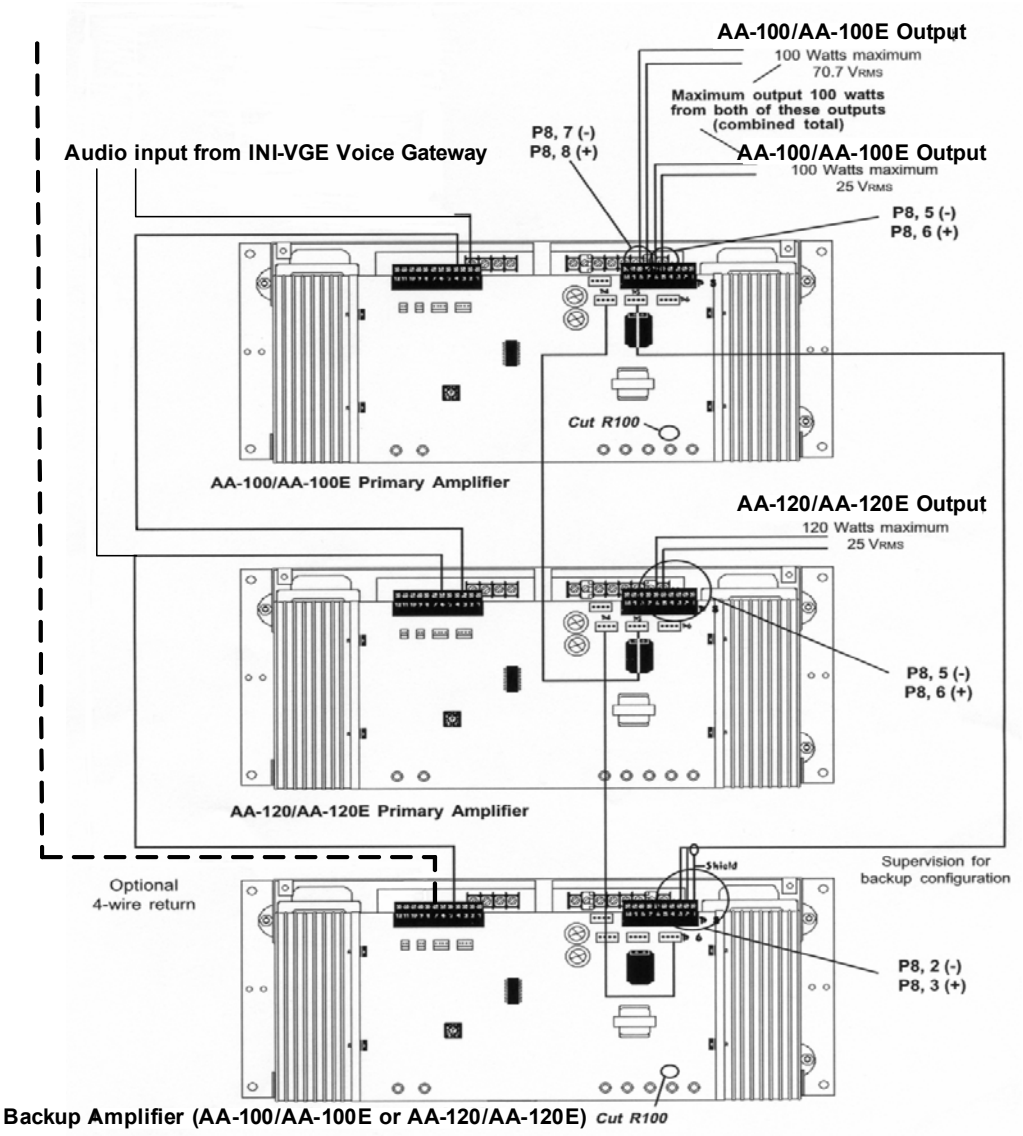

Figure 6.1 Back-up Amplifiers Wiring Diagram

Notes

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