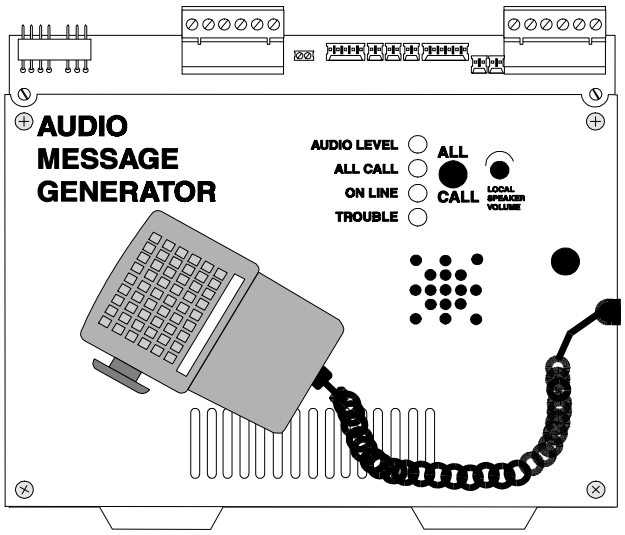
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The Voice Alarm System

Voice Evacuation Equipment for the System 5000 Fire Alam Control Panel

Supplement to the System 5000 Installation Manual

Document 15890

02/17/98 **Revision: E**

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1. System Overview

Description

The Voice Alarm System 5000 (VAS-5000) is a cost-effective hardwired audio subsystem for use with the Notifier System 5000 Fire Alarm Control Panel. The VAS-5000 uses standard system cabinets and microprocessor technology to give the system flexibility in its application and reliability in its operation.

Features

The VAS-5000 provides the following features:

- Prerecorded evacuation message using solid-state electronics
- Page-by-phone from anywhere in building
- Large system capacity
- Dual channel option
- Style Y or Z speaker circuit operation
- Speaker and telephone zone select switches with custom labels
- Audio amplifiers with switch-mode power supplies
- Standby amplifier network allows cost-effective backup amplifier
- Field configurable and programmable modules

Applications

The VAS-5000 is designed to be used in today's large multizone buildings to provide a reliable and cost-effective life safety system. The VAS-5000 provides automatic evacuation messages, or local fire fighter control of paging and 2-way communications in an emergency situation. A paging microphone and a master telephone handset and control unit are coupled with a fully electronic emergency message recorder and easy to use operator controls to provide the System 5000 with a state-of-the-art emergency communications subsystem.

Operation

The VAS-5000 Audio Subsystem functions as an integral part of a System 5000 Fire Alarm Control Panel. Manual or automatic alarm signals generated by the control panel are used to generate audio evacuation signals or messages, which are distributed throughout the building's speaker circuits. All field circuits (either speaker circuits or telephone circuits) are fully supervised and power-limited by the main control panel. The Fire Fighter's Command Center is fully field-programmable, and does not require the use of any special tools or equipment.

Frequently Used Terms

Table 1 contains a list of frequently-used terms. Unless stated otherwise, the terms in Table 1 are used throughout this manual.

This Term	Refers to
AMG-1	Audio Message Generator models: AMG-1 and AMG-E
FFT-7	Fire Fighter's Telephone models: FFT-7 and FFT-7S
AA-30	Audio Amplifier models: AA-30 and AA-30E
AA-100	Audio Amplifier models: AA-100 and AA-100E
AA-120	Audio Amplifier models: AA-120 and AA-120E
S5000	System 5000 control panel
CPU	CPU-5000
MPS-24A	Main Power Supplies MPS-24A and MPS-24AE
MPS-24B	Main Power Supplies MPS-24B and MPS-24BE

Table 1 Definitions of Frequently-Used Terms

Voice System Configurations

VCC-1 Voice Control Center

The VCC-1 Voice Control Center is a basic equipment package for single-channel audio evacuation systems that do not require a Fire Fighter's Telephone system. The VCC-1 occupies one cabinet row and includes the following:

- One AMG-1 Audio Message Generator with microphone
- One CHS-4L Chassis for mounting the AMG-1
- Cable assemblies for connection to the CPU-5000
- One DPSW1 single-well dress panel.

VCC-2 Voice Control Center

The VCC-2 Voice Control Center is a basic equipment package for single- or dual-channel audio evacuation systems that do not require a Fire Fighter's Telephone system. The VCC-2 occupies one cabinet row and includes the following:

- One ATG-2 Audio Tone Generator with microphone
- One CHS-4L Chassis for mounting the ATG-2
- Cable assemblies for connection to the CPU-5000
- One DPSW1 single-well dress panel

Continued on the next page...

The VTCC-1 Voice/Telephone Control Center

The VTCC-1 Voice/Telephone Control Center is a basic equipment package for single-channel audio evacuation systems employing a Fire Fighter's Telephone system. The VTCC-1 occupies one cabinet row and includes the following:

- One AMG-1 Audio Message Generator
- One FFT-7 Fire Fighter's Telephone
- One CHS-4L Chassis for mounting the AMG-1 and the FFT-7
- Cable assemblies for connection to the CPU-5000
- One DPDW-1 double-well dress panel

VTCC-2 Voice/Telephone Control Center

The VTCC-2 Voice/Telephone Control Center is a basic equipment package for single- or dual-channel audio evacuation systems employing a Fire Fighter's Telephone system. The VTCC-2 occupies one cabinet row and includes the following:

- One ATG-2 Audio Tone Generator
- One FFT-7 Fire Fighter's Telephone
- One CHS-4L Chassis for mounting the ATG-2 and the FFT-7
- Cable assemblies for connection to the CPU-5000
- One DPDW-1 double-well dress panel

TCC-1 Telephone Control Center

The TCC-1 Telephone Control Center is a basic equipment package for a Fire Fighter's Telephone system with no voice evacuation or paging capabilities. The TCC-1 occupies one cabinet row and includes the following:

- One FFT-7S Fire Fighter's Telephone
- One CHS-4L Chassis for mounting the FFT-7
- Cable assemblies for connection to the CPU-5000
- Two TBP-1 blank panels for either side of the FFT-7S
- One DPDW-1 double-well dress panel

Notes

2. Design Considerations

Speaker Circuit Power Limitations

The total power available from any group of speaker circuits cannot exceed the limitations of the audio amplifiers feeding that group. The maximum load connect to any one speaker circuit cannot exceed 30 watts. For typical amplifier and speaker circuit configurations for the System 5000, refer to Appendix A.

This section does not contain installation drawings or information. Section 3 contains checklists that you can use to determine the equipment required for your installation. For installation drawings and information, refer to Section 4.

Activating Audio Functions with an AMG-1

Through an EIA-485 communication loop, the System 5000 can automatically activate programmed tones or messages on the AMG-1. You can also manually select tones according to the instructions in "How to Select Voice Messages" on page 19.

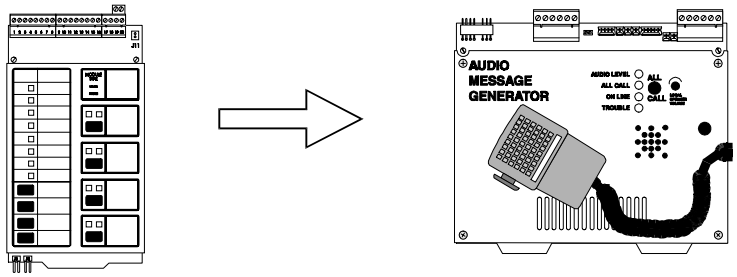


Figure 1 System 5000 and AMG-1 Modules

Activating Audio Functions with an ATG-2

Through a hard-wire connection with the System 5000, the control panel can automatically activate tones on the ATG-2.

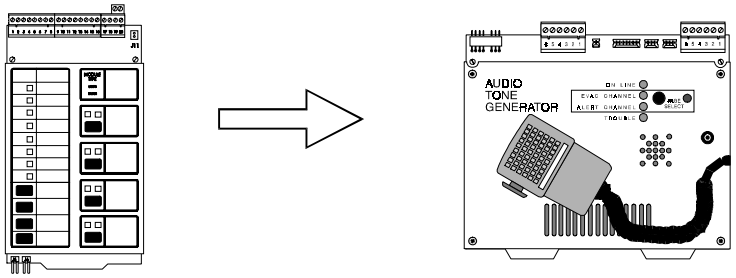


Figure 2 System 5000 and ATG-2 Modules

Amplifying the Audio Signal

The AMG-1 and ATG-2 produce low-level (unamplified) tones or messages. To drive speaker circuits, the audio signal must be fed through an AA-30/AA-30E, AA-100/AA-100E, or AA-120/AA-120E Audio Amplifier. The output of the amplifiers is then fed to the modules that control the speaker zones. The AMG-1 or ATG-2 can drive up to 50 amplifiers.

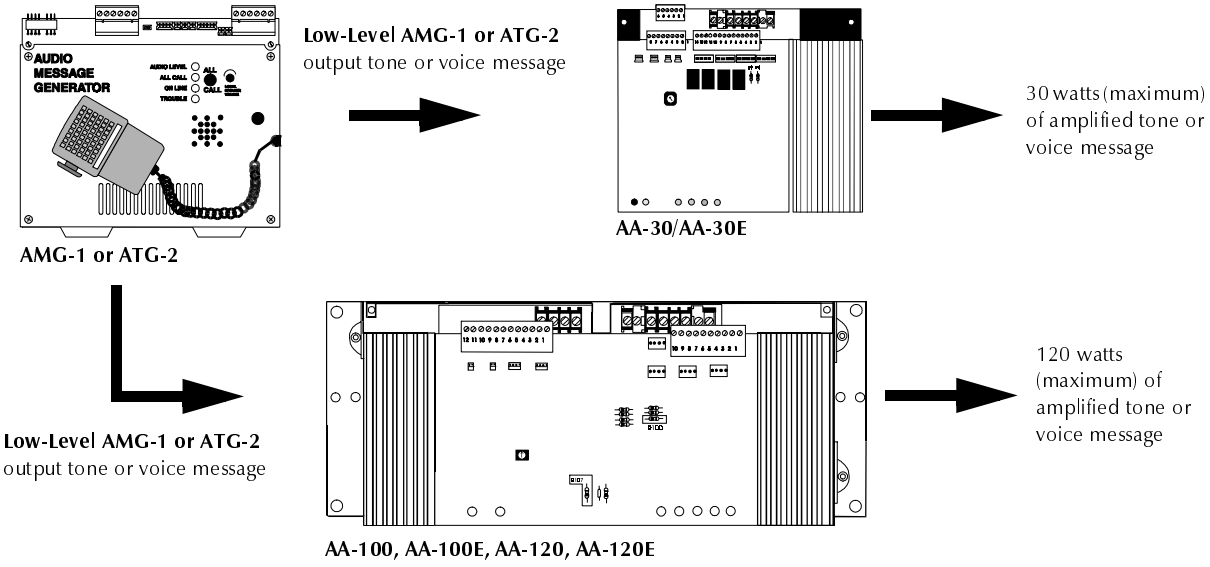


Figure 3 Amplifying AMG-1 and ATG-2 Tones and Voice Messages

Driving Speaker Circuits

The amplified signal from each AA-30/AA-30E, AA-100/AA-100E, or AA-120/AA-120E audio amplifier must be connected to a Voice Control Module (VCM-4) that will switch the signal to a speaker circuit. The VCM-4 takes its instructions from the CPU-5000 via the ribbon cable connection. The VCM-4 is fed an amplified audio signal from an audio amplifier. When a circuit is activated, this audio power is switched to a speaker zone just as notification appliance power would be connected to a Notification Appliance Circuit (NAC).

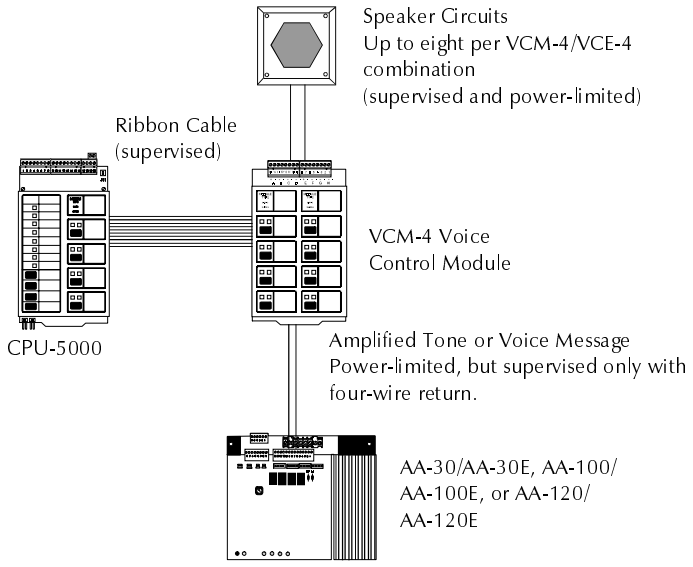


Figure 4 Amplifying Speaker Circuits

3. Voice Alarm Installation

Section Overview

This section contains installation checklists for installing VAS-5000 modules and System 5000 Components.

What's in This Section

Table 2 contains topics and references for using this section:

Topic	Refer to Page
Basic System Installation	8
Preliminary System Wiring	9
Internal Connections	10
Dress Panels	11

Table 2 Voice Alarm Installation Tasks

Additional Documents

This manual covers the installation of voice alarm equipment for the System 5000. The following documents contain information for general installation of the System 5000 and its equipment.

- System 5000 Installation Manual, Document 15583.
- TCM-2 Installation Manual, Document 15805.
- TCM-4 Installation Manual, Document 15924.
- The Annunciator Control System, Document 15842.
- The AIM-200 Addressable Intelligent Module, Document 15949.
- The LDM Series Lamp Driver Modules, Document 15885.

Basic System Installation

Table 3 provides a checklist for basic system installation.

Note: Do not wire any system components during basis system installation.

❑	Cabinet	Mount the cabinet(s) and draw all field wiring through the cabinet knockouts. If your installation requires more than one cabinet, mount cabinets adjacent to each other and install all interconnecting wiring in conduit. **Note**: Install all System 5000 cabinets in one location.
❑	Chassis	Mount all chassis. Refer to the System 5000 Installation Manual.
❑	System Main Power Supply	Mount the Main System Power Supply (MPS-24A/ MPS-24AE or MPS-24B/MPS-24BE). Refer to the System 5000 Installation Manual.
❑	Audio Visual Power Supplies	If using any optional Audio Visual Power Supplies (AVPS-24/AVPS-24E or APS-6R), mount them to the chassis. Refer to the System 5000 Installation Manual.
❑	Audio Message Generator	Mount the Audio Message Generator (AMG-1 or AMG-E) to the CHS-4L Chassis, as shown in Figure 6 on page 14. **Note**: Do not wire anything at this time.
❑	Audio Tone Generator	Mount the Audio Tone Generator (ATG-2) to the CHS-4L Chassis, as shown in Figure 6 on page 14. **Note**: Do not wire anything at this time.
❑	Fire Fighter's Telephone	If using an optional Fire Fighter's Telephone (FFT-7 or FFT-7S), mount it to the CHS-4L Chassis. For mounting instructions, see Figure 19 on page 30. **Note**: Do not wire anything at this time.
❑	30-Watt audio amplifier	Mount the amplifier(s) (AA-30 or AA-30E) to the CHS-4L Chassis, as shown in Figure 24 on page 36. To ensure proper electrical connections, use the nuts and provided lockwashers. **Note**: Do not wire anything at this time.
❑	100-Watt and 120-Watt audio amplifier	Mount an AA-100/AA-100E or AA-120/AA-120E Amplifier(s) to the backbox, as illustrated in Figure 24 on page 36. To ensure proper electrical connections, use the nuts and provided lockwashers. **Note**: Do not wire anything at this time.
❑	Auxiliary Relay Modules	If using any Auxiliary Relay Modules (ARM-4), mount them to the chassis. Refer to the System 5000 Installation Manual.

Table 3 Basic System Installation

Preliminary System Wiring

Table 4 provides a checklist for preliminary system wiring:

❑	Power Connections	The main power supplies, all audio visual power supplies and all audio amplifiers require AC and secondary (battery) power. Field-wire these supplies, but **do not apply AC power or connect the batteries**. Refer to the following for complete wiring information: • AA-30/AA-30E: Refer to "How to Connect AA-30 Terminals and Connectors" on page 37. • AA-100/AA-100E or AA-120/AA-120E: Refer to "How to Connect AA-100 and AA-120 Terminals and Connectors" on page 40. • Main Power Supply, Audio Visual Power Supplies: Refer to the System 5000 Installation Manual.
❑	Audio Signal Wiring	Connect the audio signal between FFT-7, AMG-1, AA-30, VCM-4/VCE-4, and DCM-4. • For AMG-1 terminal connections, refer to "How to Wire the AMG-1" on page 15. • For information on ATG-2 terminal connections, refer to "ATG-2 Terminal Connections" on page 25. • For the FFT-7 and FFT-7S connections, refer to "How to Install a Fire Fighter's Telephone (FFT-7 and FFT-7S)" on page 30. • For AA-30 connections, see Figure 25 on page 37 and Figure 26 on page 37. • For AA-100/AA-100E or AA-120/AA-120E connections, see Figure 28 on page 40 and Figure 29 on page 40. • For information on general audio signal wiring, refer to Section 8.
❑	Auxiliary Relay Modules	If using any ARM-4 Auxiliary Relay Modules, wire them at this time while their terminals are readily accessible. All circuit control by ARM-4 relays should be de-energized. Refer to the System 5000 Installation Manual.
❑	Central Processor (CPU-5000)	Connect the first row ribbon cable to the CPU-5000. For each additional row of System 5000 modules, connect an expander ribbon cable to the CPU-5000. Install the CPU-5000 module in the top-left cabinet position.
❑	EIA-485 Connection	Connect the EIA-485 output from the CPU-5000 to the AMG-1(s) and then to any ACM or LDM annunciator, as shown in Figure 39 on page 53.
❑	Modules and Expanders	Connect any optional expanders for system modules. Connect each module to the first row or expander row ribbon cable as appropriate. Mount each module to its respective chassis position.

Note: The **VCM-4** has a jumper that must be set to configure the module for either speaker or telephone operation. Select the desired configuration before installing the module. Refer to Figure 35 on page 48 for settings.

Note: Each module is auto-configured to the position it assumes on the ribbon cable. You do not need to use every connector on the ribbon cable or connect the modules in any order on the ribbon cable.

Table 4 Preliminary System Wiring

Internal Connections

Table 5 provides a checklist for internal connections:

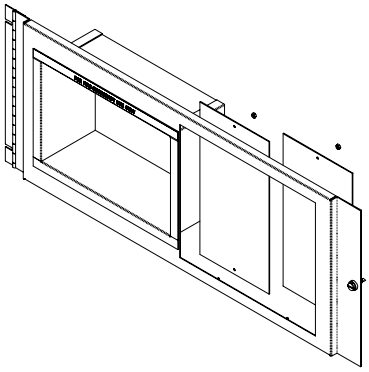
❑	System Power Cables	Connect operating power to each AMG-1 and FFT-7, as illustrated in Figure 37 on page 52.
❑	System Trouble Cables	Connect the trouble condition bus from the main power supply or audio visual power supply to the AMG-1 or AMG-E, as shown in Figure 45 on page 56.
❑	Field Wiring	Field-wire each module, using the following references: • VCM-4/VCE-4 (Voice): Figure 33 and Figure 35. • VCM-4/VCE-4 (Telephone): Figure 34 and Figure 35. • DCM-4: Figure 36. • All other System 5000 modules: refer to the respective manuals.
❑	Power-on Check	Apply AC power to the system. **Do not connect the batteries at this time.** To silence the audible trouble sounder, push the ACKNOWLEDGE switch on the CPU-5000. The system should reflect the following status: *On the CPU-5000* • Green AC POWER LED is on. • SYSTEM TROUBLE and POWER FAILURE LEDs light due to the absence of batteries. • MODULE FAILURE LED may light shortly after AC power is applied. *On each module*, the yellow trouble LEDs may light approximately 10 seconds after AC power is applied. (This only applies only to systems not previously configured.) *On each AVPS-24/AVPS-24E or APS-6R*: The yellow LEDs will light due to the absence of batteries. *On the MPS-24/MPS-24E*: The BATTERY FAIL LED will light due to the absence of batteries.
❑	Programming	To configure and program the system, refer to the System 5000 Field Programming Guide, Document 15584.
❑	Batteries	Once the system is programmed and is functional, connect the batteries as illustrated in the System 5000 Installation Manual. Only the AC POWER LED should light.
❑	Testing	Fully field-test the system for correct input-to-output operation by conducting the test procedures listed in the System 5000 Installation Manual, Document 15583.

Note: If the AC POWER LED fails to light, or if you get any indications not listed under Power-On Check, you may have an installation problem. To isolate the problem, carefully review the installation instructions.

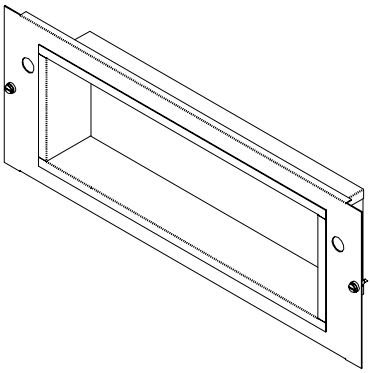
Table 5 Internal Connections

Dress Panels

Complete the installation of the System 5000 by first installing the cabinet door, then the BP-1 Battery Dress Panel, and finally all remaining dress panels (VP-1, DP-1, and so on).



Single Well Dress Plate (**DPSW-1**) Use when using an AMG-1 or ATG-2 with no FFT-7.



Double Well Dress Plate (**DPDW-1**) Use when using an AMG-1 or ATG-2 with an FFT-7.

Figure 5 Dress Panels

Notes

4. Audio Message/Tone Generators

Overview

AMG-1 Audio Message Generator

Note: The AMG-E is an AMG-1 without a microphone. For dual-channel applications, order the AMG-E for the second channel.

The Audio Message Generator (AMG-1) is the heart of the Voice Alarm System. This unit provides up to two digitally recorded voice messages on the System 5000, each of which may be up to 24 seconds long. A built-in microphone allows paging through speaker circuits. If employed with an optional Fire Fighter's Telephone (FFT-7), the AMG-1 provides system paging capability from telephones installed throughout the installation. Additionally, the AMG-1 produces a variety of tones such as, slow whoop, yelp, wail, hi/lo, Boston Code, and steady tone.

Operation

You can use the AMG-1 to produce any one of its tones or messages through an EIA-485 communications loop. There is one output channel on each AMG-1; for dual-channel systems, an additional AMG-1 or AMG-E must be installed. An AMG-1 or AMG-E can directly drive up to fifty audio amplifiers.

Voice Messages

Various prerecorded voice messages are available from the factory. One or two factory-programmed messages can be installed in the AMG-1. For a listing of the various factory messages, refer to the VROM Series Voice Messages, Document 15945.

With the optional VRAM-1 memory chips installed, up to two user-defined messages may be programmed into the AMG-1 (one per VRAM-1). Each message can be up to 24 seconds in length, and can be produced at the AMG-1 through the built-in microphone or downloaded into the AMG-1 through a standard audio cassette recorder.

What's in This Section

Table 6 contains topics and references for using this section:

Topic	Refer to Page
How to Mount an AMG-1 and ATG-2	14
How to Wire the AMG-1	15
How to Configure the AMG-1	16
How to Use Voice Message Options (VROM and VRAM)	18
How to Operate the AMG-1	22
ATG-2 Audio Tone Generator	24
ATG-2 Terminal Connections	25
How to Operate the ATG-2	26
How to Select Tones for the ATG-2	27

Table 6 AMG-1 and ATG-2 Topics

How to Mount an AMG-1 and ATG-2

Figure 6 contains instructions for installing an AMG module into a CHS-4L chassis:

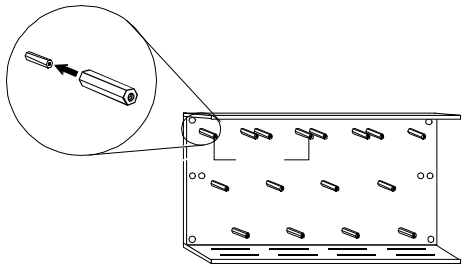
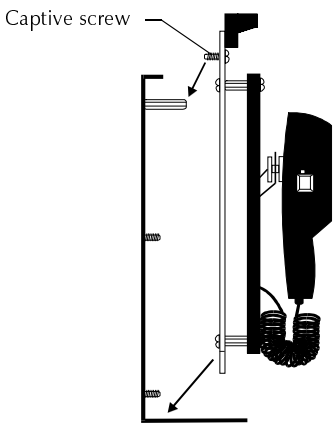
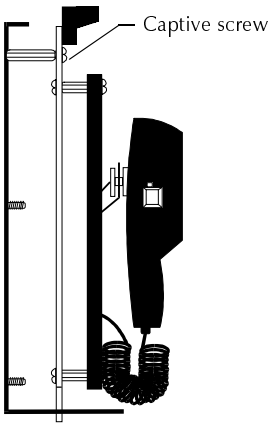
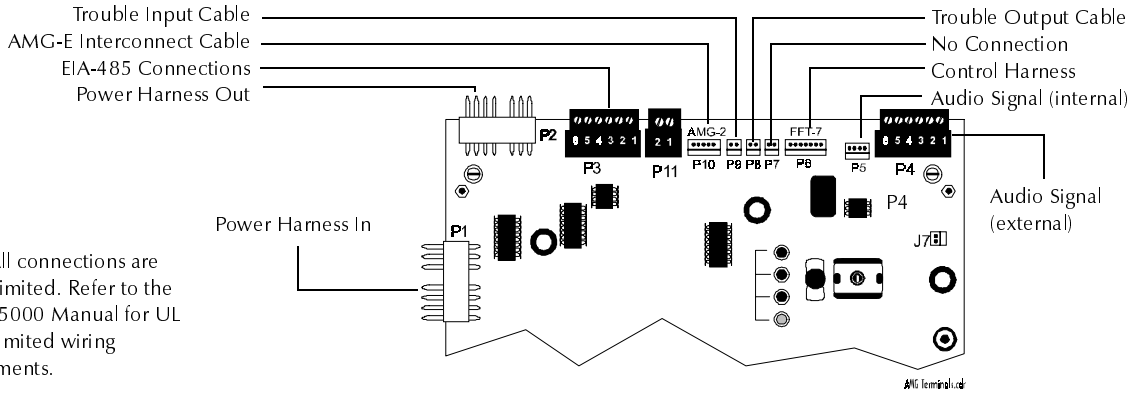
Step	Action	
1	Put a standoff on the first and fourth studs from the top-left corner of the CHS-4L chassis.	
2	Angle the bottom edge of the module into the bottom slot of the CHS-4L.	
3	Secure the module to the CHS-4L with the captive screws.	

Figure 6 Installing an AMG-1 or ATG-2 Module

How to Wire the AMG-1

Figure 7 shows the AMG-1 terminals:



Note: All connections are power-limited. Refer to the System 5000 Manual for UL Power-limited wiring requirements.

Figure 7 AMG-1 Terminals

Table 7 contains descriptions of the AMG-1 terminals:

Input/Output	Plug	Used to
Trouble Input Cable (normally open trouble contacts) PN 75098	P9	Transmit trouble signals to another system device. (Connect the other end to the Trouble Input of the other device in the system.
Trouble Output Cable (normally open trouble contacts) PN 71033	P8	Transmit trouble signals to another device in the system.
Power Harness Out PN 75099	P2	Connect to another power supply in a power supply chain.
Power Harness In PN 75396 or 75100	P1	Provides power for the AMG-1 from the Main Power Supply. (Connect the other end to the main power supply.)
AMG-1 Interconnect Cable PN 75136	P10	Connect from the Trouble Output contacts on another AMG-1. A closure signals the AMG-1 that the connected device is in trouble.
EIA-485 Connections	P3	Allows the control panel to communicate with the AMG-1 through the ACS mode EIA-485 port.
No connection	P7	N/A
Audio Signal Connections PN 75110	P5	Allow harnessing the audio signal from the AMG-1 to audio amplifiers in the same cabinet via P5, or wired to amplifiers in remote cabinets through P4.
Control Harness PN 75097	P6	Connect to P4 on a Fire Fighter's Telephone (FFT-7) or cable from the Audio Voice Link (AVL-1).
Low-Level Audio PN 75100	P4	Allows wiring of the AMG audio output to an audio amplifier as follows:

Connector	From AMG	To AA
Low-Level Audio Output to first amplifier	P4-5 P4-4	P3-5 P3-4
Low-Level Audio Output Return to last amplifier (optional)	P4-2 P4-1	P3-2 P3-1

Table 7 AMG-1 Terminal Connections

How to Configure the AMG-1

Installing an AMG requires programming the control panel and setting the AMG-1 DIP switch. The AMG always appears as an annunciator to the System 5000 and operates on address 01. Therefore, the AMG will affect System 5000 programming and annunciator's switch setting. An AMG may be set to receive only (DIP 3) but with this selection, the operation of the ALL CALL switch is lost. Table 8 contains AMG programming and switch settings:

For	Do This
AMG and no remote annunciator	Program System 5000 for 1-64 points of annunciation
AMG and 1-64 points of remote annunciation	Program System 5000 for dual 1-64 point annunciator. Set address on annunciator to 02
AMG and 65-128 points of remote annunciation	Program for a 65-128 point annunciator. Set annunciator addresses to 01 on all annunciators that display points 1-64 and 02 on all annunciators that display points 65-128. Set address 01 annunciator to Receive Only.
single-channel application	Set Receive Only switch of AMG-1 to “OFF”.
dual-channel application	Set Receive Only switch on EVAC channel AMG-1 to “OFF” and set Receive Only switch on ALERT CHANNEL AMG-E to “ON.”

Table 8 Programming and Switch Settings

Note: You can set an AMG to Receive Only (DIP 3) but you cannot use the ALLCALL switch.

Figure 8 shows typical wiring for an AMG-1 configured for four-wire operation:

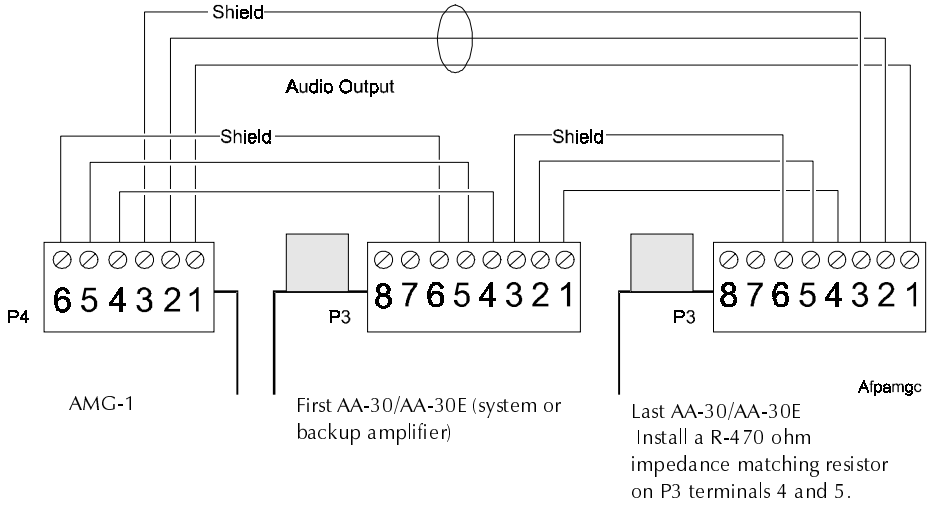


Figure 8 Typical Wiring for an AMG-1 Four-Wire Configuration

Continued on the next page...

Figure 9 contains descriptions of the pins on the AMG-1 DIP switch: To set a switch ON, push the rocker down in the ON position.

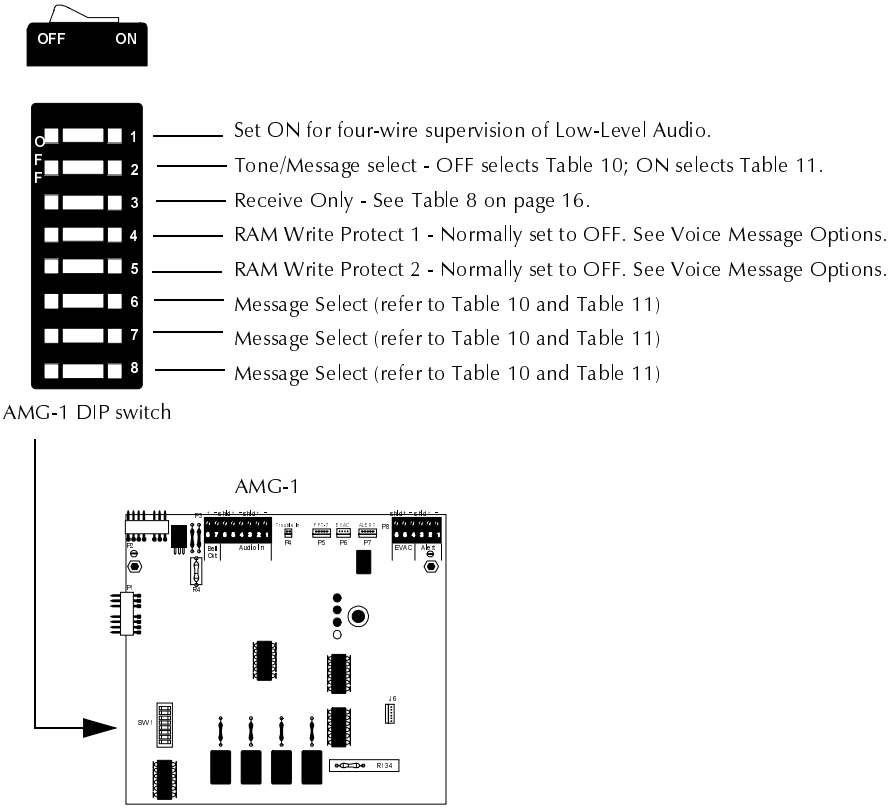


Figure 9 How to Set the AMG-1 DIP Switch

How to Use Voice Message Options (VROM and VRAM)

Overview of VROM and VRAM

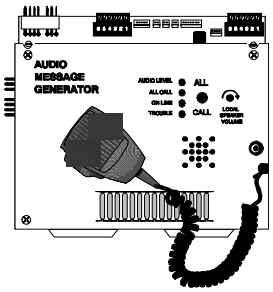
You can install two types of message chips into an AMG-1:

VROM – A nonvolatile memory chip containing a factory-programmed evacuation message (up to 24 seconds). You can install one or two VROMs into an AMG-1. Refer to Document 15945 for contents of available VROMs.

VRAM – A programmable memory chip that contains a user-created evacuation message up to 24 seconds long. Create a message from the AMG-1 microphone or a cassette tape. You can install one or two VRAMs into an AMG-1.

How to Install VROM and VRAM

To install the VROM and VRAM chips, follow the steps in Table 37 and also refer to Figure 10 as needed.



AMG-1 with Dress Panel

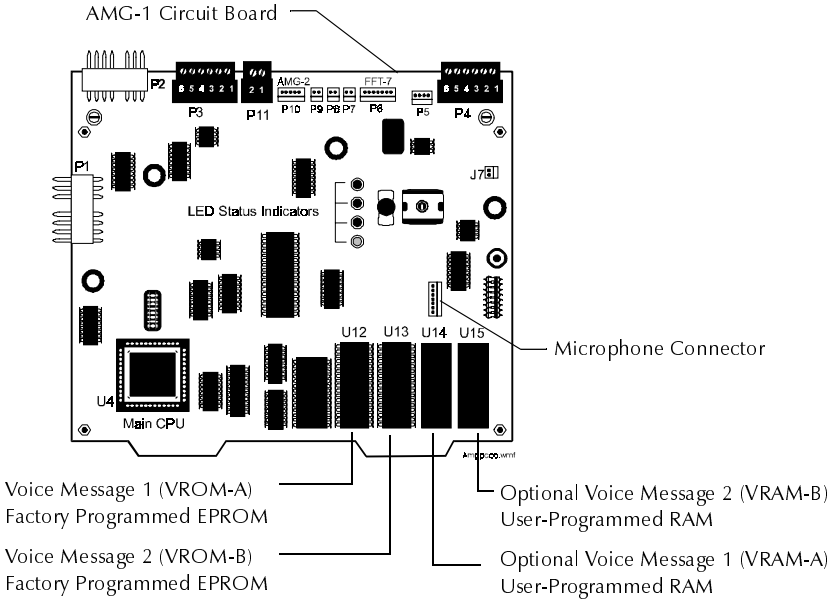


Figure 10 AMG-1 Dress Panel and Circuit Board

To install VROM or VRAM chips, follow the steps in Table 9.



CAUTION: Remove AC power at the main service circuit breaker (not the circuit breaker on the main power supply):

Step	Action
1	Remove battery power, then remove AC power from the system.
2	Remove the dress panel covering the AMG-1.
3	Remove the four screws that hold the AMG-1 dress panel to the component board.
4	Remove the dress panel and disconnect the microphone connector.
5	Install the VROM or VRAM chips in the positions as in Figure 10.
To assemble the AMG-1, reverse these instructions.	

Table 9 How to Install VROM and VRAM

How to Select Voice Messages

Operation of the various tones and messages available in a voice alarm application depends on the type and number of VROM chips installed and the function groups selected by DIP switch settings on the AMG-1.

You select function groups by setting DIP switch positions 6, 7 and 8 on the AMG-1 as shown in Table 10 on page 20 and Table 11 on page 21.

Factory Messages (VROM installed)

You can use VROM chips, if installed as shown in Figure 10 on page 18, to select a factory-programmed message. For example, VROM-101 provides the following message in a male voice.

"ATTENTION PLEASE! ATTENTION PLEASE! THERE HAS BEEN AN EMERGENCY REPORTED. WHILE THIS REPORT IS BEING VERIFIED, WALK, DO NOT RUN, TO THE NEAREST EXIT AND LEAVE THE BUILDING. DO NOT USE THE ELEVATORS. THEY ARE REQUIRED FOR EMERGENCY PERSONNEL."

Custom Messages (VRAM Installed)

Custom user messages can be recorded either through the microphone on the AMG-1 or by downloading the message from a standard audio cassette recorder through the low-level input connector on the AMG-1 (Figure 10 on page 18). DIP switch positions 4 and 5 are used for this purpose.

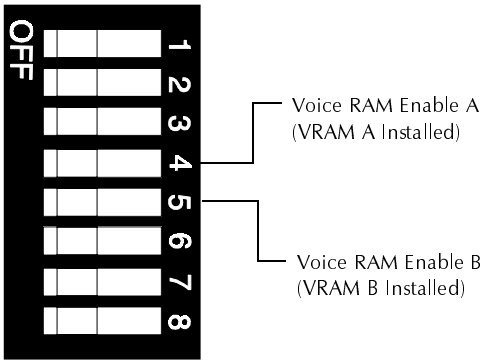


Figure 11 VRAM DIP Switch

To record a custom message, follow these steps:

1. Set the respective Voice RAM Enable switch to the “ON” position.
2. Record or download the message, which can be up to 24 seconds in length.
3. Set the respective Voice RAM Enable switch to the “OFF” position.

AMG-1 and AMG-E Tone/Message Selections (SW2=Off)

Table 10 lists the audio tone and message selections available when DIP switch 2 (Tone/Message Switch) is Off:

SW2 Rocker Switches			System Status	NAC 1 Condition	Audio Tone or Message
S6	**S7**	**S8**			
X	X	X	No Alarm	Off	Standby
Off Off	Off Off	Off Off	No Alarm Alarm	On X	1000 Hz 1/2 sec on, 1/2 sec off Slow whoop
Off Off	Off Off	On On	No Alarm Alarm	On X	Horn 120 ppm (March Time)
Off Off	On On	Off Off	No Alarm Alarm	On X	Horn Yelp
Off Off	On On	On On	No Alarm Alarm	On X	Yelp Wail
On On	Off Off	Off Off	No Alarm Alarm	On X	3 slow whoops, VRAM-B plays 3 slow whoops, VRAM-A plays
On On	Off Off	On On	No Alarm Alarm	On X	VROM-B message plays VROM-A message plays
On On	On On	Off Off	No Alarm Alarm	On X	20 ppm (Two-Stage) VROM-A and VROM-B play
On On	On On	On On	No Alarm Alarm	On X	Horn NFPA Uniform Code 3 Temporal pattern fast whoop

X = Indicates that switch or control point can be On or Off.

1. Notification Appliance Circuit 1 on the S5000 can be manually selected with an ACM-16AT to produce a desired tone or can be activated through Control-by-Event by a non-alarm input.
2. If selecting a VROM or VRAM, and a VROM or VRAM chip is not installed: a) a trouble indication appears at the AMG-1 when the message is due to begin; and b) the AMG-1 generates the 1 kHz default tone.

Table 10 AMG Tone/Message Selections (SW2=Off)

AMG-1 and AMG-E Tone/Message Selections (SW2=On)

Table 11 lists the tone and message selections available when DIP switch 2 (Tone/ Message Switch) is On:

AMG-1 SW2 Rocker Switches			System Status	NAC 1 Condition	Audio Tone or Message
S6	**S7**	**S8**			
X	X	X	No Alarm	Off	Standby
Off Off	Off Off	Off Off	No Alarm Alarm	On Off	Horn 1000 Hz 1/2 sec on, 1/2 sec off for 5 minutes then slow whoop
Off Off Off	Off Off Off	On On On	No Alarm Alarm Alarm	On Off On	Horn 20 ppm for 5 Min., then 120 ppm 120 ppm (March Time)
Off Off Off	On On On	Off Off Off	No Alarm Alarm Alarm	On Off On	VROM-B 444, pause, VROM-A Boston Code
Off Off Off	On On On	On On On	No Alarm Alarm Alarm	On Off On	VROM-B Fast whoop 3 fast whoops, pause, VROM-A
On On On	Off Off Off	Off Off Off	No Alarm Alarm Alarm	On Off On	Beep Fast whoop 3 fast whoops, pause, VROM-A and VROM-B
On On On	Off Off Off	On On On	No Alarm Alarm Alarm	On Off On	Beep 3 slow whoops, pause, VROM-A 3 slow whoops, pause, VROM-A and VROM-B
On On On	On On On	Off Off Off	No Alarm Alarm Alarm	On Off On	Wail 3 hi-low tones, pause, VROM-A 3 hi-low, pause, VROM-A and VROM-B
On On On	On On On	On On On	No Alarm Alarm Alarm	On Off On	Hi-low 20 ppm (Two-Stage) 3 Slow whoops, pause, VROM-A

"X" = Indicates that Switch or Control Point can be "On" or "Off."

1. Notification Appliance Circuit 1 can be manually selected with an ACM-16AT to produce a desired tone or can be activated through Control-by-Event by a non-alarm input.
2. If selecting a VROM or VRAM that is not installed, a trouble will be generated at the AMG-1 and the AMG-1 generates the1 kHz default tone.
3. Boston Code (order VROM 109, which must be installed in VROM-B position) – 900 Hz alert tone pulsed to produce one round of code 4 at approximately 1-second intervals, followed by female voice message:

   "Attention please. The signal tone you have just heard indicates a report of an emergency in this building. If your floor evacuation signal sounds after this message, walk to the nearest stairway and leave the floor. While the report is being verified, occupants on other floors should await further instructions."

   This message repeats. The evacuation signal is a slow-whoop tone—an ascending tone starting at approximately 600 Hz and ending at approximately 1100 Hz—with a duration of approximately 3-1/2 seconds and an interruption between tones of approximately 1/2 second.

Table 11 AMG Tone/Message Selections (SW2=On)

How to Operate the AMG-1

AMG-1 System Status Indicator LEDs

Figure 12 shows the AMG-1 System Status Indicator LEDs:

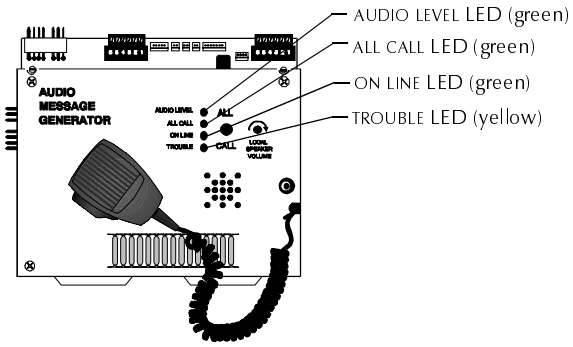


Figure 12 AMG-1 LEDs

Table 12 lists descriptions of the AMG-1 System Status Indicator LEDs:

LED	Lights
AUDIO LEVEL	When the audio level is correct.
ALL CALL	Toggles on or off each time you press the ALL CALL switch.
ON LINE	To show communication between the control panel and the AMG-1 over the EIA-485 communications circuit.
TROUBLE	To show a trouble signal in local audio subsystem equipment (AMG-1, AA-30/AA-100/AA-120, FFT-7/FFT-7S).

Table 12 Description of AMG-1 LEDs

Continued on the next page...

AMG-1 Operating Components

Figure 13 shows the AMG-1 operating controls:

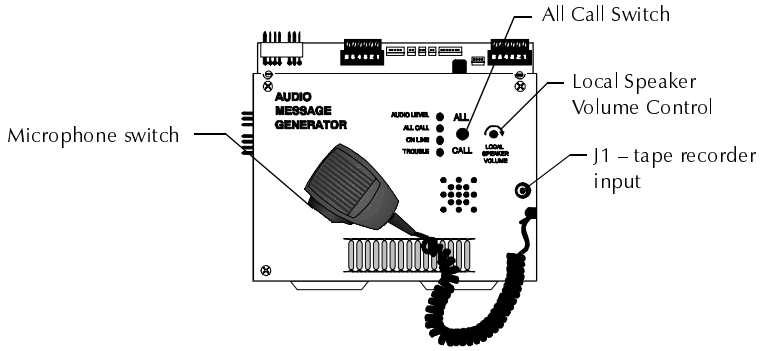


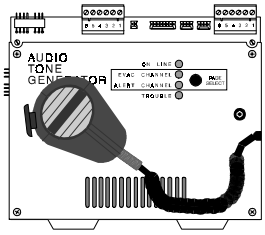
Figure 13 AMG-1 Operating Components

Table 13 contains instructions for operating the AMG-1.

To	Do this	Comments
Turn on the speakers	Toggle the ALL CALL switch until the ALL CALL LED goes on.	The ALL CALL switch activates all speaker circuits (that are not switch inhibited) or a specific programmed group of speakers. For dual-channel applications, press either ALL CALL switch.
Turn off the speakers	Toggle the ALL CALL switch until the ALL CALL LED goes off.	If an alarm exists, speaker circuits remain on until you turn them off or reset the system.
Adjust the volume of the AMG-1 speaker	Turn the Local Speaker Volume Control knob.	If necessary, turn the volume down to prevent feedback during paging.
Page through the system	1. Press the ALL CALL switch. 2. Press the switch on the side of microphone. 3. Speak into the microphone.	Talk loudly enough to cause the green AUDIO LEVEL LED to light. **Note**: If the AUDIO LEVEL LED remains off for 15 seconds, a system trouble can result.
Select the speaker circuit for paging	Select the control switches on the respective VCM-4 module connected to the AMG-1.	Refer to the System 5000 Installation and Programming Manuals for instructions.

Table 13 AMG-1 Operating Instructions

ATG-2 Audio Tone Generator



The Audio Tone Generator (ATG-2) provides user-selected tones for single- or dual-channel output. The ATG-2 generates either a slow whoop, Hi/Lo, or steady tone on the Evac (primary) channel. In dual-channel operation, the ATG-2 also generates either a chime or a 20 pulses-per-minute tone on the Alert (secondary) channel. The ATG-2 includes a built-in microphone with a PAGE SELECT switch which allows for paging through speaker circuits on either or both channels. If employed with an optional Fire Fighter's Telephone (FFT-7), the ATG-2 provides a system paging capability from telephones installed throughout the installation.

You can also configure the ATG-2 as a remote paging microphone. With this configuration, the ATG-2 relays the audio tone or message received from an AMG-1 or another ATG-2 while allowing override paging capabilities from the ATG-2 microphone. The ATG-2 can directly drive up to fifty audio amplifiers. Unless configured for remote paging microphone operation, all communication is accomplished through a Notification Appliance Circuit (NAC) connection with the S5000.

Mount the ATG-2 on the left side of a CHS-4L chassis as shown in Figure 6 on page 14.

ATG-2 Terminal Connections

Figure 14 shows ATG-2 terminal connections:

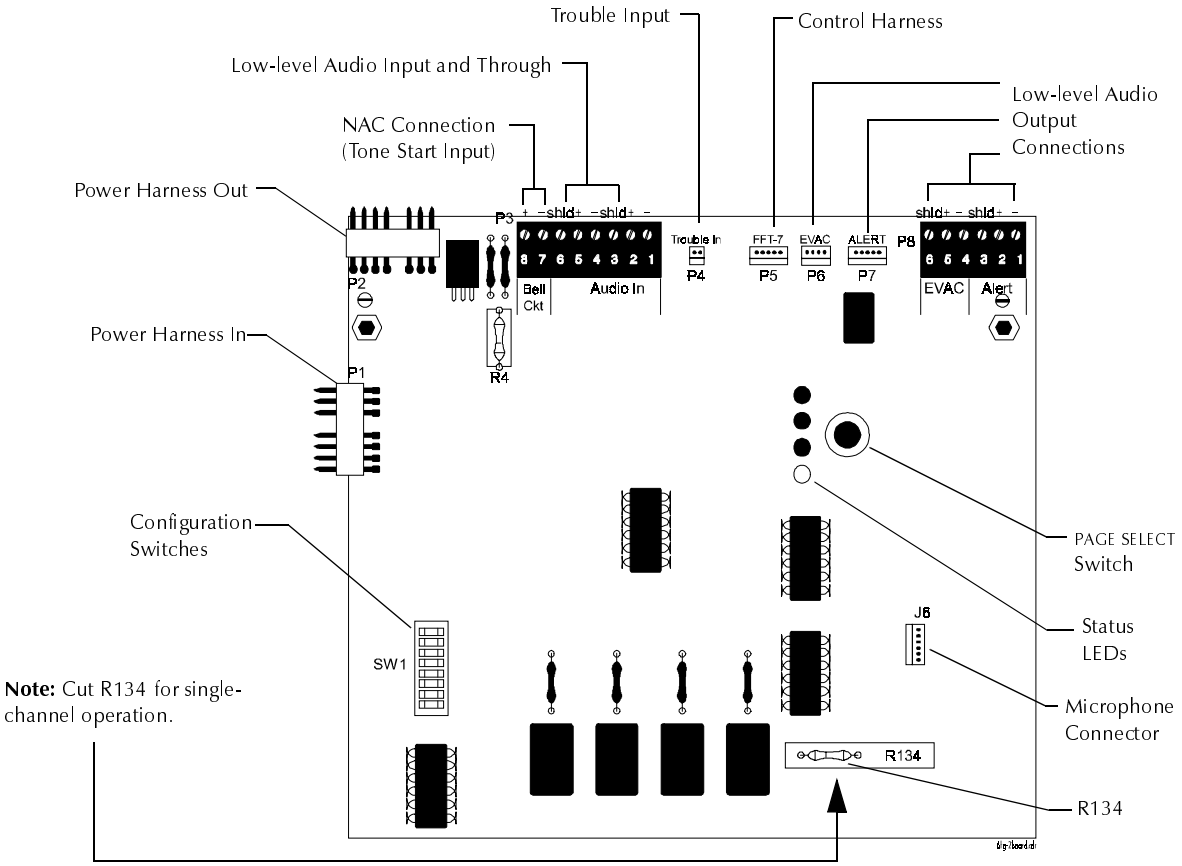


Figure 14 ATG-2 Terminal Connections

Table 14 lists descriptions for each of the ATG-2 connections:

Input/Output	Connections	Used for
Trouble Input	P4	Connecting trouble output contacts from an audio amplifier. A closure signals the ATG-2 when a device is in trouble. The trouble signal is relayed through the Notification Appliance Circuit connection.
Low-Level Audio Input and Through	P3-1 to P3-6	When using the ATG-2 for remote paging, the Low-Level audio output from the main ATG-2 or AMG is passed through the remote ATG-2, then passed on to the audio amplifiers.
Notification Appliance Circuit	P3-7 P3-8	Connecting 24 VDC regulated power if using Notification Appliance Circuits.
Power Harness In	P1	Connecting to the main power supply for providing power to the ATG-2.
Control Harness	P5	Connecting to P4 on a Fire Fighter's Telephone (if installed).
Low-Level Audio Output Connections	P5 - FFT7 P6 - EVAC P7 - ALERT	Harnessing the ATG-2 audio signal to audio amplifiers in the same cabinet through P6 or P7; or wired to the audio amplifiers in other cabinets through P8.
Power Harness Out	P2	Connecting to another power supply in the power supply chain.

Table 14 Descriptions of ATG-2 Connections

How to Operate the ATG-2

Figure 15 shows the operating features of the ATG-2:

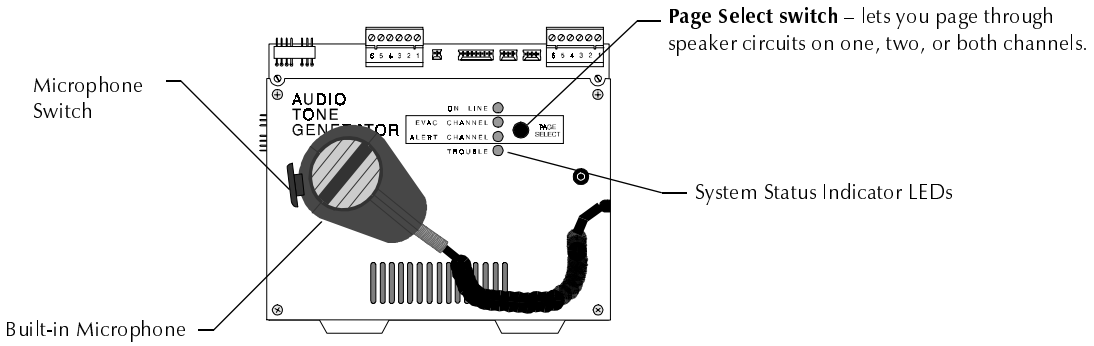


Figure 15 Operating Features of the ATG-2

Table 15 contains descriptions of the four System Status Indicator LEDs:

LED	Color	Lights to show
ON LINE	green	Proper connection between the CPU-5000 with the ATG-2.
EVAC CHANNEL	green	Paging will take place over the Evac (primary) channel.
ALERT CHANNEL	green	Paging will take place over the Alert (secondary) channel.
TROUBLE	yellow	A trouble in local audio subsystem equipment (AMG-1, AA-30, FFT-7).

Table 15 ATG-2 LEDs

Table 16 contains instructions for operating the ATG-2.

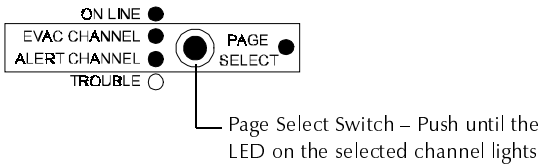
To	Do this
Select the paging channel	Press the EVAC CHANNEL switch to select the evacuation (primary) channel or Press the ALERT CHANNEL switch to select the Alert (secondary) channel. 
Verify the active channel	Check the EVAC CHANNEL and ALERT CHANNEL LEDs.
Page	Press the microphone switch and speak into the microphone (loudly enough to light the green ON LINE LED).

Table 16 Operating the ATG-2

How to Select Tones for the ATG-2

The ATG-2 DIP switch—S1 located on the ATG-2 board shown in Figure 16—provides rocker switches for selecting output tones and selecting the ATG-2 operating mode. When finished setting rocker switches, check the ATG-2 for proper operation. Figure 16 shows the ATG-2 board layout and identifies DIP switch S1:

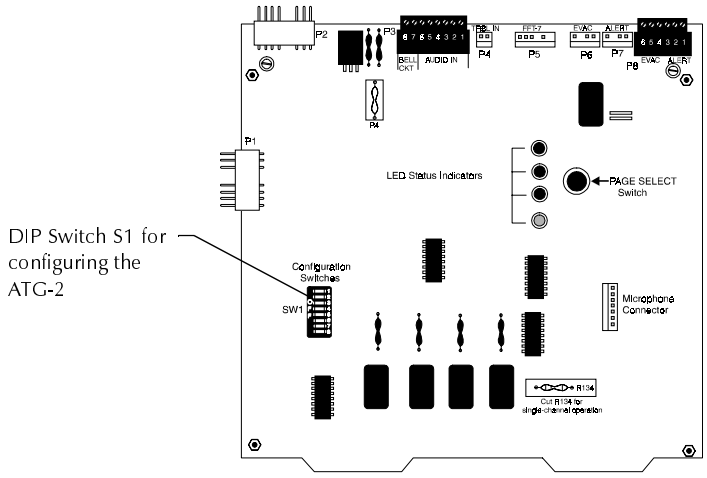


Figure 16 ATG-2 Board Components

Figure 17 shows the functions of the ATG-2 DIP switch S1 pins:

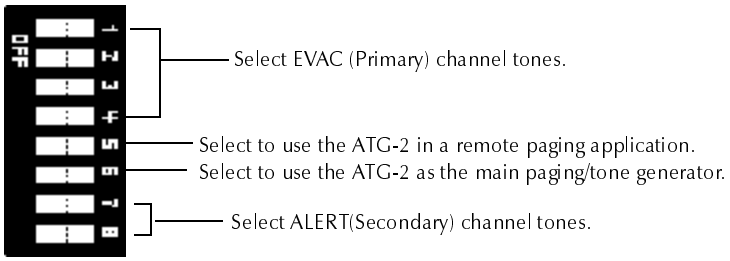


Figure 17 ATG-2 DIP Switch S1

How to Select an Evac Channel Tone

Use ATG-2 switch S1 rocker switches 1–4 to select one of the following tones: slow whoop, Hi/Lo, or steady tone. Select a tone by setting the ATG-2 DIP switch as shown in Table 17:

Rocker Switch	Whoop	Hi/Lo	Steady
1	Off	On	On
2	On	Off	Off
3	On	On	Off
4	Off	On	Off

Table 17 Evacuation Tone Settings

Continued on the next page...

How to Select an Alert Channel Tone

The ATG-2 can produce a chime or a 20 pulses-per-minute tone on the secondary (Alert) channel. To select tones for the secondary channel, set ATG-2 DIP switch S1 rocker switches 7 and 8 in one of the combinations shown in Table 18:

Rocker Switch	Chime	20 PPM
7	Off	On
8	On	Off

Table 18 Secondary (Alert) Tone Settings

How to Select the ATG-2 Operating Mode

You can set the ATG-2 for one of two modes of operation: 1) remote paging only; or 2) tone generation and paging capability. Set ATG-2 DIP switch S1 rocker switches 5 and 6 as shown in Table 19. After setting rocker switches, test the ATG-2 for proper operation.

Rocker Switch	Remote Paging Only	Paging and Tone Generate
5	On	Off
6	Off	On

Table 19 Operating Mode Settings

5. Fire Fighter's Telephones

Overview

The Fire Fighter’s Telephone includes two models: the FFT-7 and FFT-7S, which are described below:

The FFT-7 Fire Fighter’s Telephone

The FFT-7 provides the Voice Alarm System with Fire Fighter's Telephone capability. With the FFT-7, up to seven telephones may conduct a simultaneous conversation. If using an FFT-7, note the following:

- Use an FFT-7 with an Audio Message Generator (AMG-1) or an Audio Tone Generator (ATG-2).
- Mount the FFT-7 on the right side of a CHS-4L chassis. A special dress panel covers the AMG-1/ATG-2/FFT-7 assembly.

The FFT-7S Fire Fighter’s Telephone

The FFT-7S provided with the TCC-1 basic equipment package operates like the FFT-7 without paging capabilities. The FFT-7S mounts in the middle of a CHS-4L chassis. Two special dress panels (TBP-1) mount on either side of the FFT-7S.

What’s in This Section

Table 20 contains topics and references for using this section:

Topic	Refer to Page
How to Mount an FFT-7 or FFT-7S	30
How to Connect the FFT-7	31
How to Connect the FFT-7S	32
FFT-7 and FFT-7S Operating Requirements	33
FFT-7 and FFT-7S Operating Components	33
FFT-7 and FFT-7S Operating Modes	34

Table 20 FFT-7 and FFT-7S Topics

How to Install a Fire Fighter's Telephone (FFT-7 and FFT-7S)

Overview

The FFT-7 and the FFT-7S modules mount on designated studs on the CHS-4L chassis. The module installation kit includes standoffs to secure the module to the studs on the CHS-4L.

How to Mount an FFT-7 or FFT-7S

To mount an FFT-7 or FFT-7S, follow these steps:

1. Install standoffs for an FFT-7 or FFT-7S on the CHS-4L chassis mounting studs as shown in Figure 18:

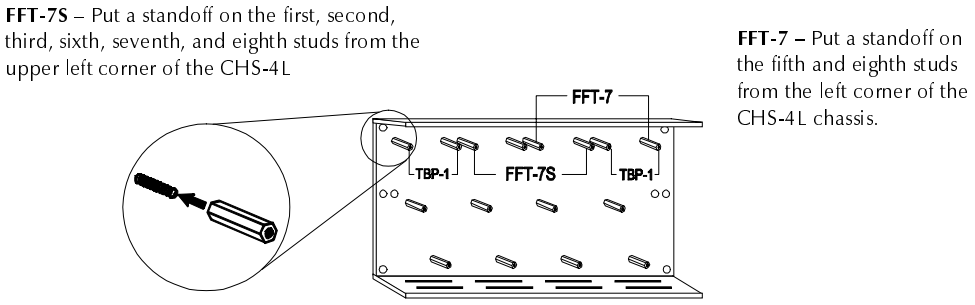


Figure 18 Installing Standoffs for an FFT-7 or FFT-7S

2. Angle the bottom of the FFT-7 or FFT-7S module into the bottom slot of the CHS-4L chassis and secure the module as shown in Figure 19:

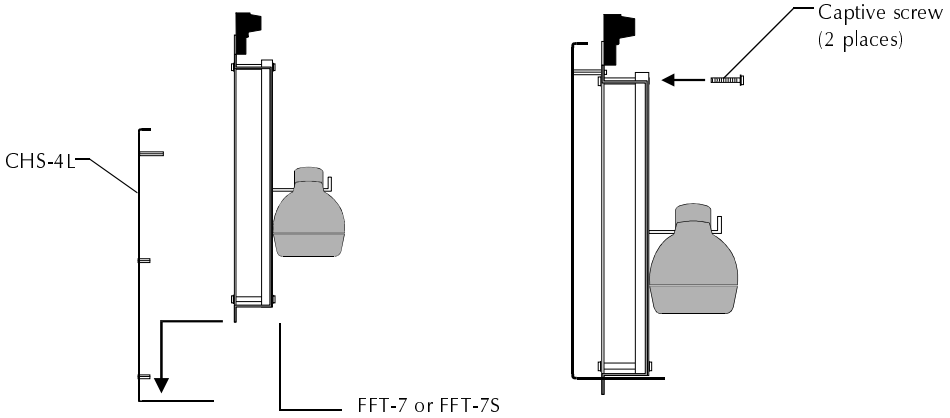


Figure 19 Mounting the FFT-7 or FFT-7S to a CHS-4L

3. Mount TBP-1 dress panels on the FFT-7S as shown in Figure 20:

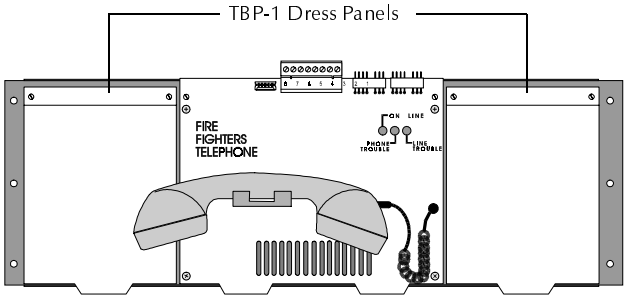


Figure 20 FFT-7S with Dress Panels

How to Connect the FFT-7

Figure 21 shows FFT-7 terminals and connections to other devices in the system. When connecting an FFT-7, note the following:

- All connections are power-limited.
- Style Y two-wire connections require a 27K resistor.
- Refer to the System 5000 Installation Manual for UL power-limited wiring requirements.
- You must set the System 5000 for four-wire operation. To do so, remove the FFT-7 cover to access the Two-Wire/Four-Wire selector switch (SW1).

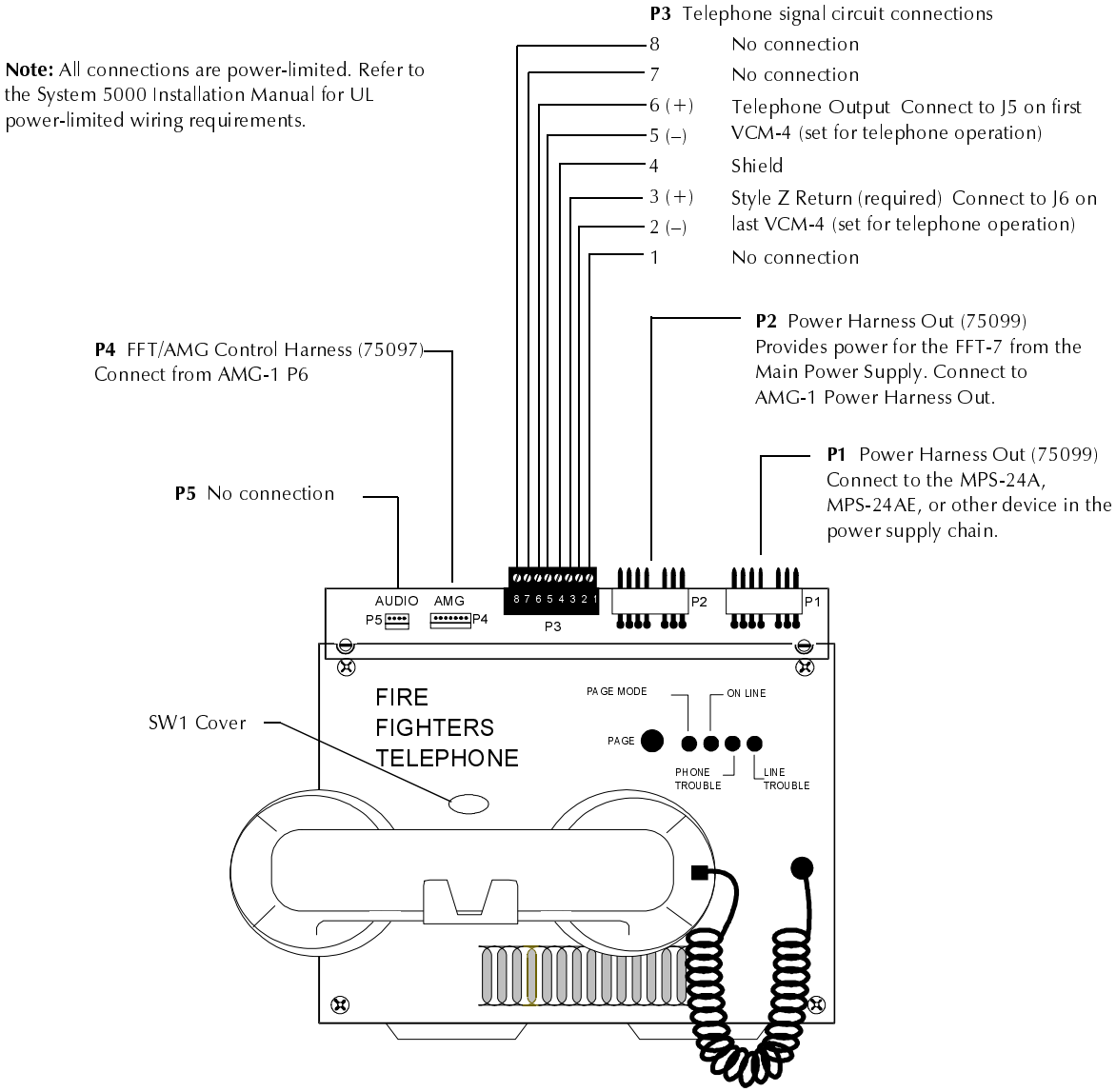


Figure 21 FFT-7 Terminals

How to Connect the FFT-7S

Figure 21 shows FFT-7S terminals and connections to other devices in the system. When connecting an FFT-7S, note the following:

- All connections are power-limited.
- Style Y two-wire connections require a 27K resistor.
- Refer to the System 5000 Installation Manual for UL power-limited wiring requirements.
- You must set the System 5000 for four-wire operation. To do so, remove the FFT-7S cover to access the Two-Wire/Four-Wire selector switch (SW1).

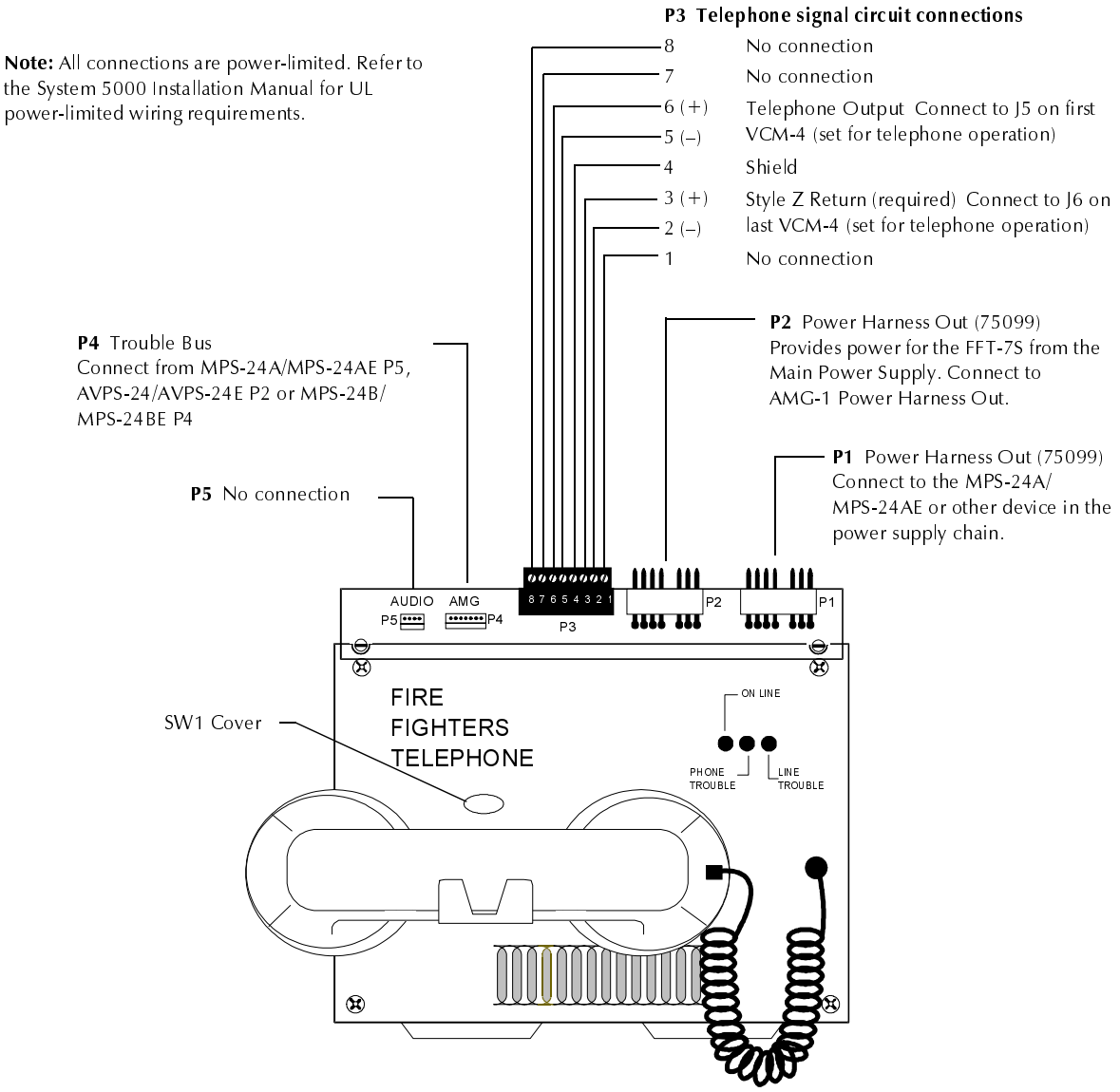


Figure 22 FFT-7 Terminals

How to Operate the FFT-7 or FFT-7S

Description

A Fire Fighter's Telephone provides the Voice Alarm System with fire-fighter control of paging, and two-way communications in an emergency situation. Connect the FFT-7 to an Audio Message Generator (AMG-1) or Audio Tone Generator (ATG-2). Up to seven telephones can converse at the same time. Fire Fighter's Telephones come in two models:

- FFT-7 – provides full capability including paging.
- FFT-7S – provides same features as the FFT-7, without paging capabilities.

FFT-7 and FFT-7S Operating Requirements

An FFT-7 or FFT-7S does not operate unless:

- A power source is connected to the FFT-7.
- The AMG-1/FFT-7 control harness is connected between the AMG-1 and the FFT-7.
- The AMG-1 is set up for EIA-485 communication through the CPU-5000 ACS port (TB4).

Refer to the System 5000 Installation Manual for instructions on making these connections.

FFT-7 and FFT-7S Operating Components

An FFT-7 or FFT-7S contains the following operating components:

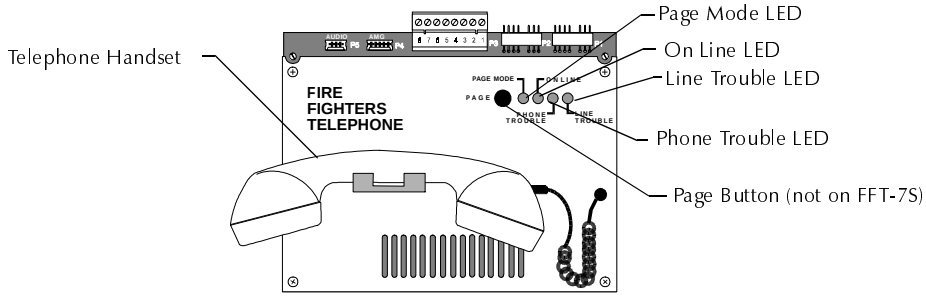


Figure 23 FFT-7 Telephone Operating Components

Table 21 contains descriptions of the FFT-7 LED indicators and Page button:

Component	Function
PAGE MODE LED	Toggles on or off when you press the PAGE button.
ON LINE LED	Lights continuously to indicate the FFT-7 is receiving power.
PAGE Button	Press the PAGE button to initiate a page (FFT-7 only).
LINE TROUBLE LED	Lights to indicate a trouble exists on another device with trouble contacts wired to the FFT-7 trouble input connector.
PHONE TROUBLE LED	Lights to indicate a trouble exists on the FFT-7.

Table 21 Description of FFT-7 Operating Components

FFT-7 and FFT-7S Operating Modes

Paging Operation (FFT-7 only)

To page through the FFT-7, follow these instructions:

1. Make sure the ON LINE green LED is on; then, pick up the telephone handset.
2. Press the PAGE BUTTON (the PAGE MODE green LED goes on) and speak into the telephone handset.

When finished paging, press the PAGE button (the PAGE MODE green LED goes out) and hang up the telephone handset.

Two-Way Conversation

To answer a call with an FFT-7 or FFT-7S, follow these instructions:

1. When the VCM-4 sounder produces a steady tone and the telephone circuit green LED goes on, pick up the telephone handset and speak into the telephone headset.
2. When finished speaking, hang up the telephone handset.

6. Audio Amplifiers

Overview

Audio amplifiers provide audio power for the Voice Audio System. The System 5000 supports three models of audio amplifiers as listed in Table 22:

Amplifier	Audio Power	Speaker Circuits
AA-30, AA-30E See Figure 27 on page 38	30 watts – compatible with 25 Vrms speakers	up to 30 watts each
AA-100, AA-100E See Figure 30 on page 41	100 watts of 70.7 Vrms audio	up to 100 watts each
AA-120, AA-120E See Figure 30 on page 41	120 watts of 25 Vrms audio	up to 120 watts each

Table 22 Audio Amplifier Models

Audio Amplifier Features

Audio amplifiers provide the following features:

- **Built-in Supervision** Each audio amplifier contains a set of normally-open trouble contacts that close to light an LED showing the type of trouble. Types of trouble include: brownout, loss of low-level supervision tone at the input, battery failure, audio output wiring failure (if set for four-wire output), and amplifier failure. During total loss of primary AC power, all LEDs extinguish to conserve battery power.
- **Backup** You can set up an audio amplifier as a backup amplifier for multiple amplifiers. If an amplifier fails, the System 5000 automatically switches to the backup amplifier.
- **Speaker zone selection** Set by Control-By-Event (CBE) or set manually using control switches on the VCM-4, DCM-4, or ACM-16AT modules.

What's in This Section

Table 23 contains topics and references for using this section:

Topic	Refer to Page
How to Install an AA-30	36
How to Operate the AA-30	38
How to Install the AA-100 and AA-120	39
How to Operate the AA-100 and AA-120	41
How to Adjust the Audio Gain Level	42
How to Select the AA-100 and AA-120 Backup Tone	42
How to Install a Backup Amplifier	43

Table 23 Audio Amplifier Topics

How to Install an AA-30

How to Mount an AA-30

The AA-30 mounts in a CHS-4L chassis, which can hold two AA-30s placed side by side. In addition to mounting, do the following:

1. Connect a primary (AC) and a secondary (24 VDC battery) power source to each AA-30.
2. Provide an external device (such as a main power supply) for charging the batteries.

Mount an AA-30 into a CHS-4L chassis by following these steps.

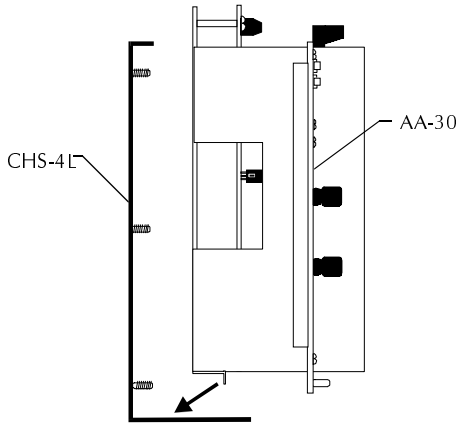
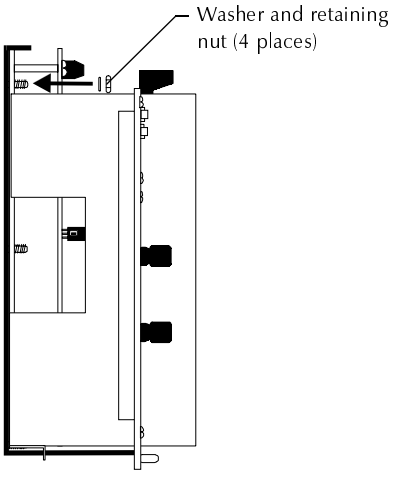
Step	Action	
1	Put the bottom end of the AA-30 assembly into the slot in the bottom of the CHS-4L chassis. Swing the assembly into the chassis.	
2	Secure the AA-30 to the chassis with the washers and retaining nuts.	

Figure 24 How to Mount an AA-30 into a CHS-4L Chassis

How to Connect AA-30 Terminals and Connectors

Figure 25 and Figure 26 show terminal connections to an AA-30.

- The low-level audio input and high-level audio output connectors are primarily for in-cabinet applications where the wiring to or from the AA-30 remains in the cabinet. For multiple-cabinet applications, hard-wire the system using terminal blocks P3 and P8.
- Cut resistors R8 and R9 when using high-level audio in four-wire mode.

AA-30 Lower Board Connections

Figure 25 shows terminal connections to an AA-30 lower board:

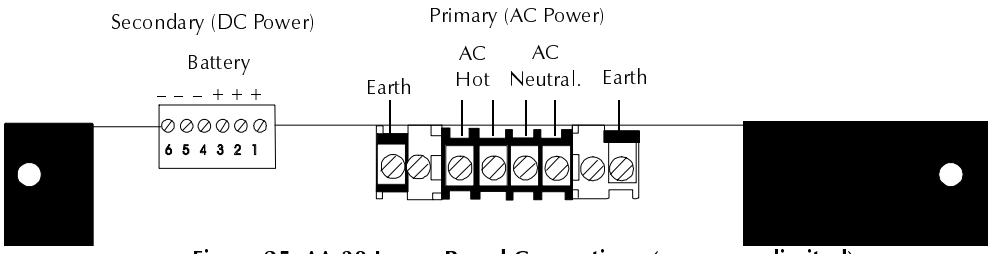


Figure 25 AA-30 Lower Board Connections (nonpower-limited)

AA-30 Upper Board Connections

Figure 26 shows terminal connections to an AA-30 upper board:

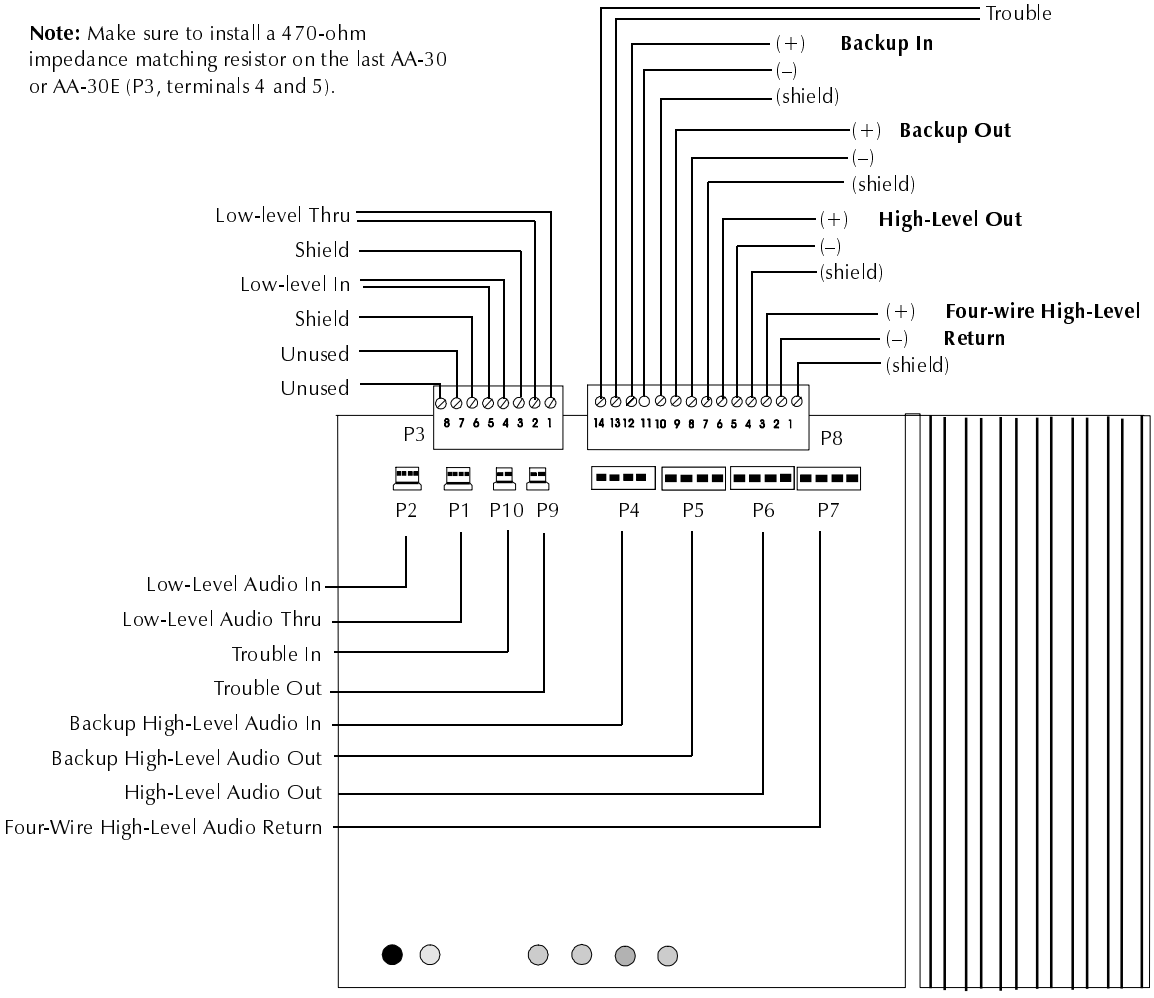


Figure 26 AA-30 Upper Board Connections (nonpower-limited)

How to Operate the AA-30

Note: For instructions on setting the Audio Gain Rotary Switch, refer to "How to Adjust the Audio Gain Level" on page 42.

Figure 27 shows the layout of the AA-30 circuit board and identifies AA-30 operating components:

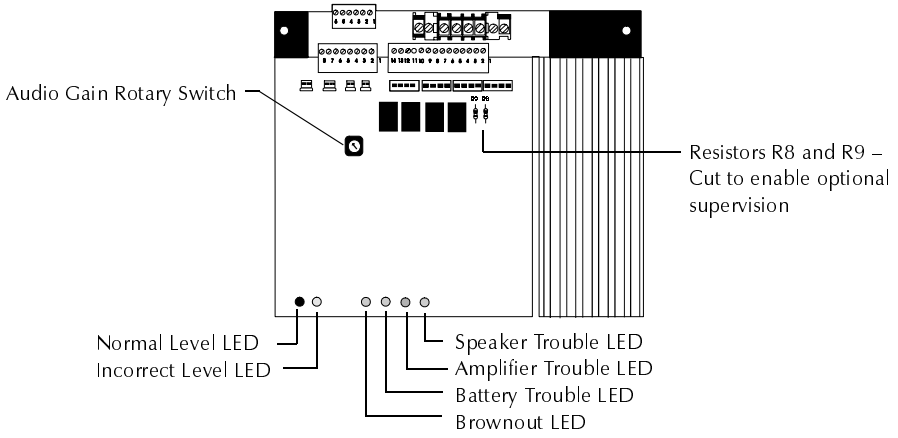


Figure 27 AA-30 Circuit Board

Table 24 lists the conditions that cause each AA-30 System Status Indicator LED to light:

LED	Lights when
Normal Level	The audio amplifier is adjusted properly and operating correctly during normal (non-alarm) conditions.
Incorrect Level	The audio amplifier is out of adjustment during normal (non-alarm) conditions.
Speaker Trouble	An open circuit condition occurs in the four-wire, high-level output.
Amplifier Trouble	A loss of the low-level audio input signal, or an amplifier failure.
Battery Trouble	The battery voltage is below a sufficient level.
Brownout	The AC power source is below a sufficient level. During a complete loss of AC power, no LEDs will light on the AA-30.

Table 24 AA-30 LEDs

Notes:

1. The amplifier does not indicate a trouble condition until 40 seconds after these faults occur.
2. You can calibrate an AA-30 audio amplifier by installing an R-470 resistor (470 ohms, 1/2 watt) at the end of the low-level audio circuit. If the low-level audio circuit is configured as four wire circuit, install a 470-ohm resistor at the point furthest from the AMG-1 or ATG-2.

How to Install the AA-100 and AA-120

Overview

The AA-100 and AA-120 mounts directly to the cabinet backbox. In addition to mounting, do the following:

1. Connect primary (AC) and secondary (24 VDC battery) power source to each audio amplifier.
2. Provide an external device for charging the batteries (such as a main power supply).
3. To enable four-wire supervision, cut R100 as shown in Figure 30 on page 41.

How to Mount an AA-100 or AA-120

AA-100 and AA-120 audio amplifiers mount directly to the backbox. To do so, follow the steps in Table 25:

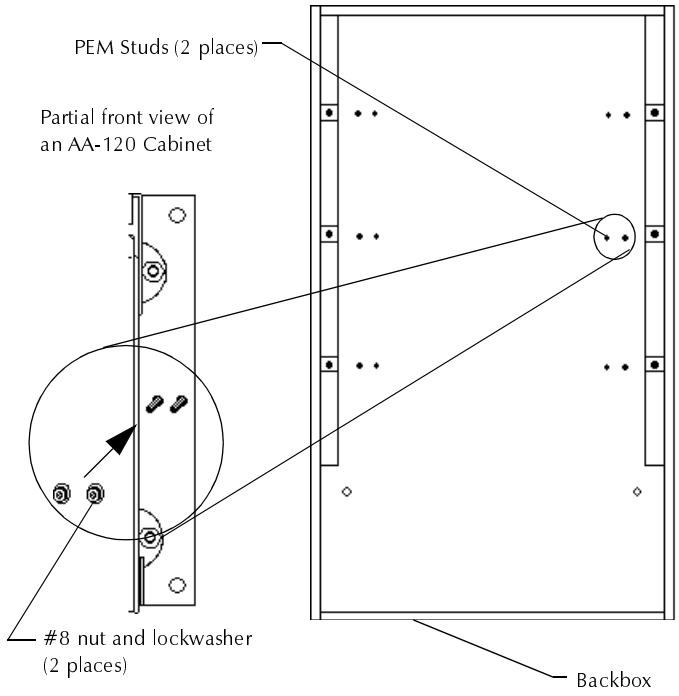
Step	Action
1	Mount the AA-100/AA-120 onto the PEM studs on the cabinet backbox (in the same way as the CHS-4 and CHS-4L chassis) as shown below: 
2	Install the two #8 nuts and lockwashers onto the PEM studs and tighten until secure.

Table 25 Mounting the AA-100 and AA-120

How to Connect AA-100 and AA-120 Terminals and Connectors

Low-level audio input and high-level audio output connectors are primarily for in-cabinet applications where the wiring to or from the AA-100 and AA-120 remains in the cabinet. For multiple-cabinet applications, use the terminals.

AA-100 and AA-120 Lower Board Connections

Figure 28 shows terminal connections to an AA-100 and AA-120 lower board:

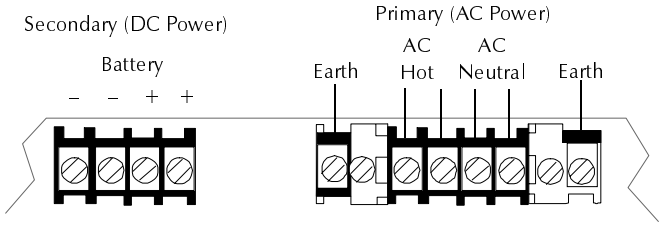


Figure 28 AA-100 and AA-120 Lower Board Connections (nonpower-limited)

AA-100 and AA-120 Upper Board Connections

Figure 29 shows terminal connections to an AA-100 and AA-120 upper board:

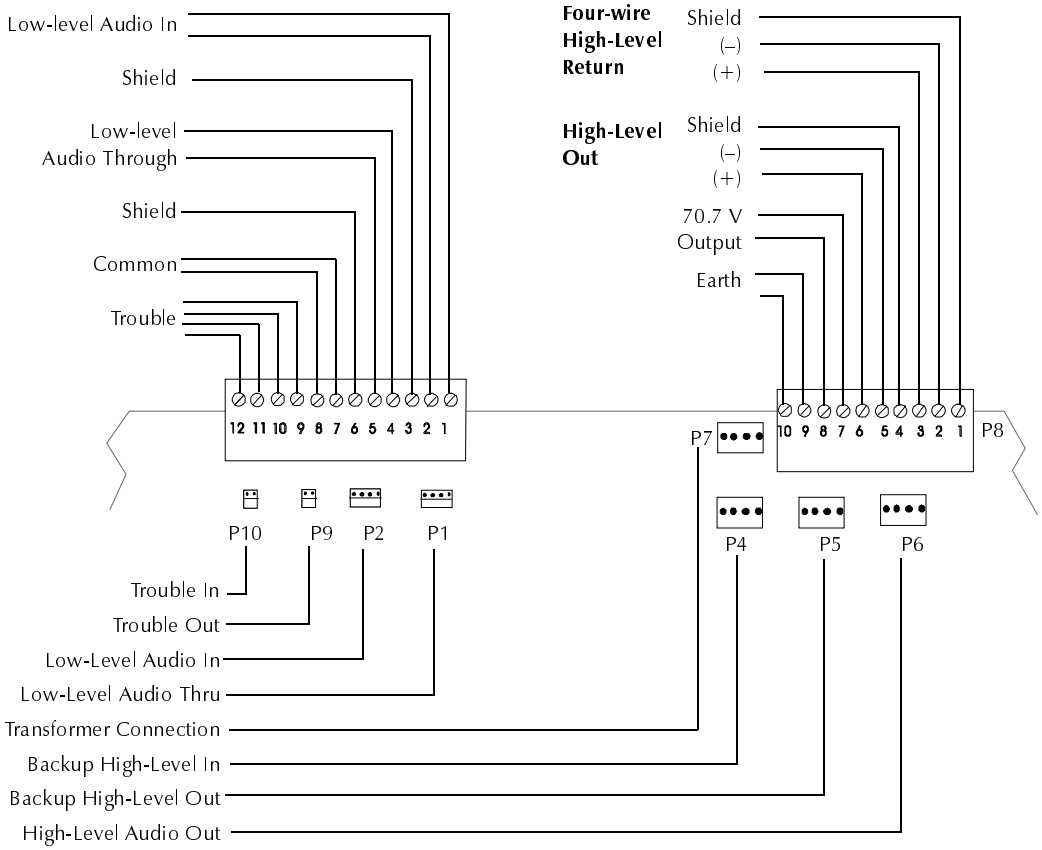


Figure 29 AA-100 and AA-120 Upper Board Connections (power-limited)

How to Operate the AA-100 and AA-120

Figure 30 shows the AA-100/AA-120 circuit board and identifies key components:

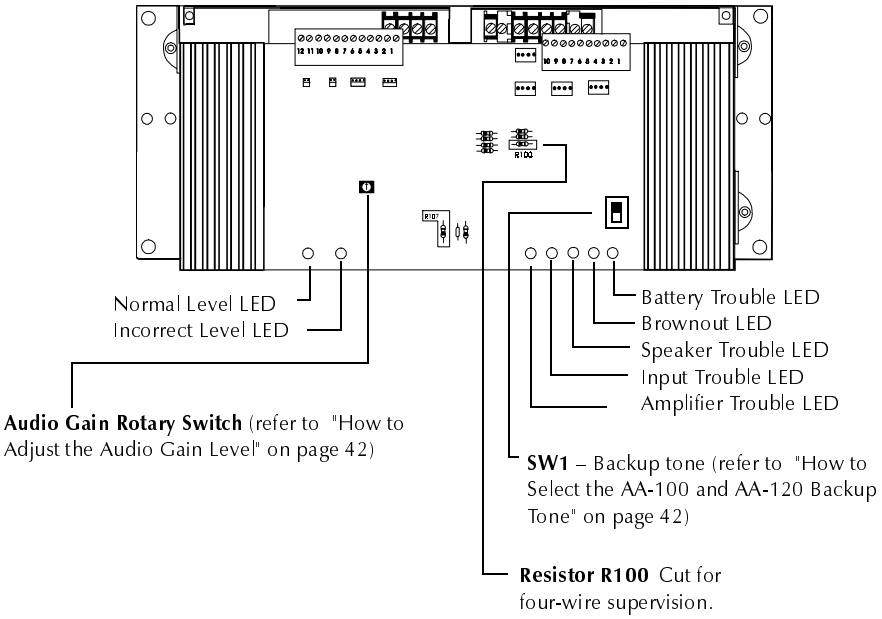


Figure 30 AA-100/AA-120 Circuit Board

LED	Lights when
Normal Level	The audio amplifier is adjusted properly and operating correctly during normal (non-alarm) conditions.
Incorrect Level	The audio amplifier is out of adjustment during normal (non-alarm) conditions.
Battery Trouble	The battery voltage is below a sufficient level.
Brownout	The AC power source is below a sufficient level. During a complete loss of AC power, no LEDs will light on the AA-100/AA-120.
Speaker Trouble	An open circuit condition occurs in the four-wire, high-level output.
Input Trouble	A loss of the low-level audio input signal, or an amplifier failure. (See note below)
Amplifier Trouble	A loss of the low-level audio input signal, or an amplifier failure. (See note 3 below)

Table 26 AA-100/AA-120 LEDs

Notes:

1. During complete loss of primary (AC) power, the AA-100/AA-120 operates on secondary (battery) power. To conserve secondary power, no LEDs light on the AA-100 or AA-120 while operating on batteries.
2. An audio amplifier does not indicate a trouble condition until 40 seconds after a fault occurs.
3. You can calibrate an AA-100 or AA-120 audio amplifier by installing an R-470 resistor (470 ohms, 1/2 watt) at the end of the low-level audio circuit. If the low-level audio circuit is configured as four wire circuit, install a 470-ohm resistor at the point furthest from the AMG-1 or ATG-2.

How to Adjust the Audio Gain Level

An audio amplifier contains a multi-position rotary switch that lets you adjust the gain of the audio output signal. This adjustment compensates for audio line losses. After correct adjustment, an audio amplifier can produce its maximum rated output power of 25 Vrms (AA-30, AA-120) or 70.7 Vrms (AA-100). Refer to Figure 30 on page 41 for the location of the Audio Gain Rotary Switch.

When finished installing all amplifiers and associated circuitry, adjust the audio gain as follows:

1. Locate the Audio Gain Rotary Switch on the AA-30 (Figure 27) or the AA-100 and AA-120 (Figure 30).
2. Use a small slotted screwdriver to turn the Audio Gain Rotary Switch until the Normal Level LED and Incorrect Level LED are properly adjusted as shown in Table 27.
3. Install a resistor assembly R-470 (470 ohm, 1/2 watt) on P3 terminals 4 and 5.

Audio Level	Normal Level LED	Incorrect Level LED
Properly adjusted	★	☆
Adjusted too low	☆	★
Adjusted too high	★	★
	★ LED on ☆ LED off	

Table 27 Adjusting the AA-30/AA-100/AA-120 Audio Level

How to Select the AA-100 and AA-120 Backup Tone

An audio amplifier automatically produces a backup tone when the low-level audio input is lost. You can select the backup tone by following these steps.

1. Locate SW1 in the lower right-hand corner of the AA-100 and AA-120 circuit board (See Figure 30 on page 41).
2. Set SW1 to Hi/Lo or Slow Whoop as the default backup tone (Figure 31).

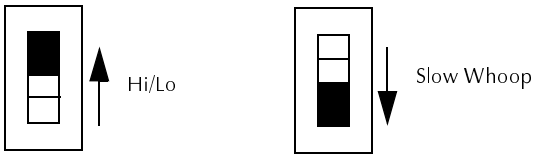


Figure 31 LSW1 Backup Tone Switch (AA-100/AA-120 only)

How to Install a Backup Amplifier

Use an AA-30, AA-100, or AA-120 audio amplifier to back up one or more amplifiers. If an amplifier fails, backup amplifier switching is automatic. Figure 32 shows a typical wiring configuration using an AA-120 as a backup amplifier:

Note: Cables must enter from top of the plug.

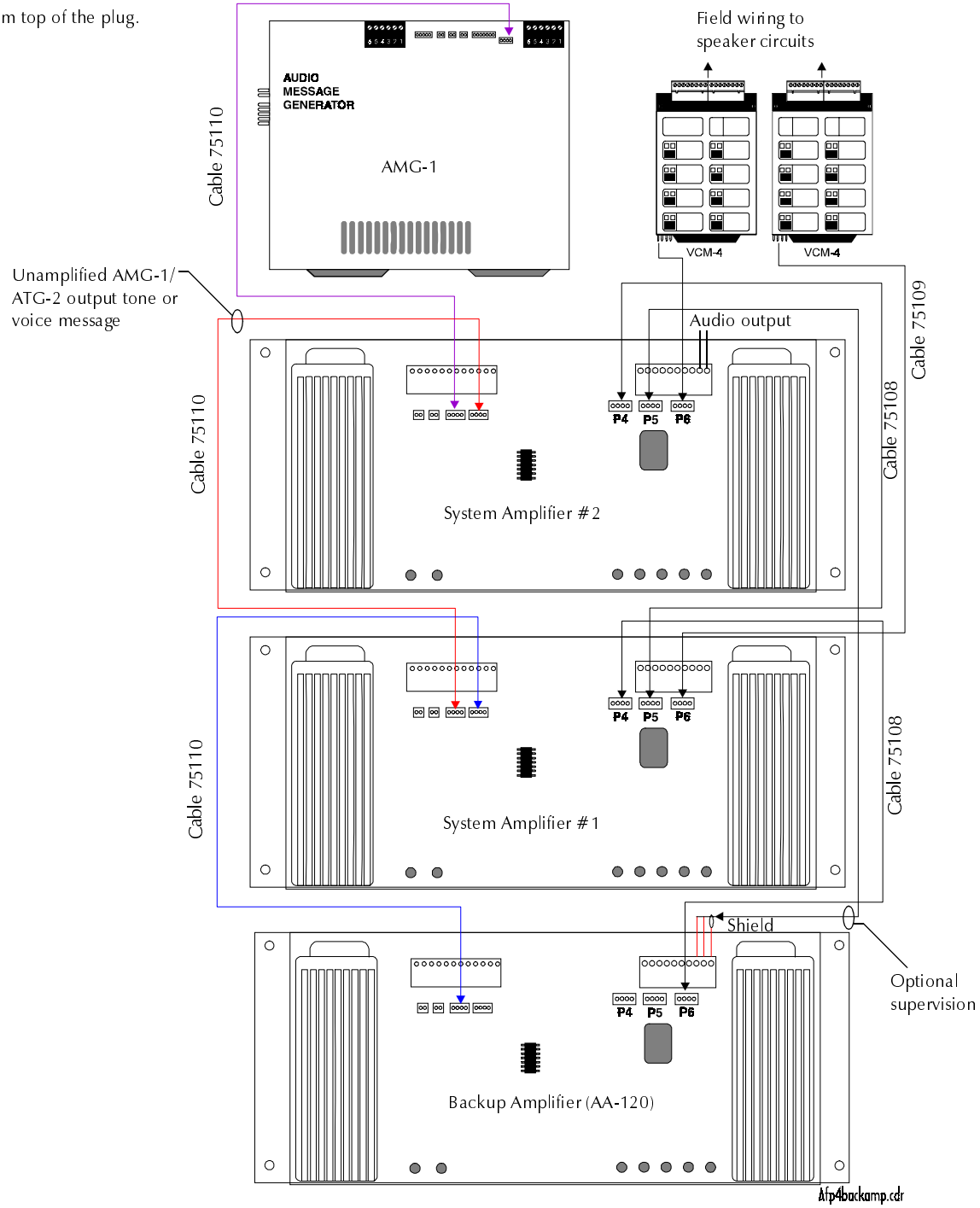


Figure 32 System Configuration with a Backup Amplifier

Notes

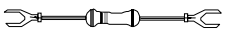
7. Voice Alarm Modules

Voice Module Descriptions

Voice alarm modules for the System 5000 feature removable terminal blocks that simplify installation and servicing of the control panel. These modules include the Voice Control Module (VCM-4), the Voice Control Expander (VCE-4), and the Dual Channel Module (DCM-4). For instructions on mounting modules, refer to the System 5000 Installation Manual.

Table 28 contains descriptions of the voice alarm modules and the components that come with each module.

24" Audio Cable Assembly



4.7K, 1/2 watt
End-of-Line Resistor
Model ELR-4.7K



4.7K, 1/2 watt
Dummy Load Resistor

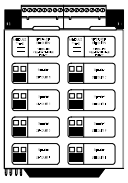
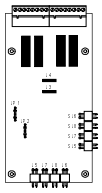
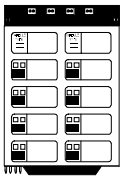
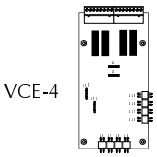
Module	Description	Components
Voice Control Module-4 (VCM-4)  VCM-4	A board that provides the control panel with up to four Style Y or Style Z speaker circuits. Moving a jumper on the VCM-4 sets the VCM-4 to drive telephone (FFT-7 or FFT-7S) circuits. When set for telephone operation, a VCM-4 accepts its signal directly from an FFT-7 or FFT-7S.	• VCM-4 board • four End-of-Line resistors (71252) • four dummy load resistors (71245) • one 24-inch cable assembly (71091) for interboard connection • a set of slide-in speaker labels • a set of slide-in telephone labels
Voice Control Expander-4 (VCE-4)  VCE-4	A board that plugs into the back of the VCM-4. This expands the voice unit up to eight Style Y or Style Z speaker circuits. When set for telephone circuit operation with a VCM-4, the VCE-4 provides four additional Style Y FFT-7 or FFT-7S telephone circuits.	• VCE-4 board • four End-of-Line resistors (71252) • four dummy load resistors (71245) • one 24-inch cable assembly (71091) • three 1-1/4 inch cables(75106)
Dual Channel Module (DCM-4)  DCM-4  VCE-4	A two-board assembly (DCM-4 and VCE-4) that provides the control panel with capability to select one of two audio sources for switching to a selected speaker circuit. The DCM-4 can use up to four circuits.	• DCM-4 board VCE-4 board • four End-of-Line resistors (71252) • four dummy load resistors (71245) • one 24-inch cable assembly (71091) • four 24-inch cable assemblies (71091) for interboard connection • six 54 inch cable assemblies (75071) for connecting a DCM-4 to an AMG-1 and AA-30/ AA-120s • a slide-in label set (15831)

Table 28 Voice Alarm Modules

How to Connect VCM-4 Speaker Circuits

Follow these guidelines when connecting VCM-4 speaker circuits:

- Speaker circuits are supervised and power-limited. For power-limited requirements, refer to the System 5000 Manual.
- Use twisted-pair cable for telephone circuit wiring. Shielding is required when telephone circuit wire runs with electrically noisy circuits, such as SLCs and NACs.
- Maximum speaker circuit wire resistance depends on wattage required for each speaker.
- Use only UL-listed speakers rated for 25 Vrms.
- For systems with AA-100 amplifiers, you can use 70.7 Vrms speakers. Use 4.7K, 2W ELRs with 70.7 Vrms speakers.
- Install End-of-Line resistors according to Table 29.

For ELR connection to devices	Use resistor part number
with terminals	71252
with flying leads	71245
used in Canada also include	N-ELR Resistor Plate

Table 29 VCM-4 Speaker Resistor Requirements

Figure 33 shows typical speaker wiring for a VCM-4 module:

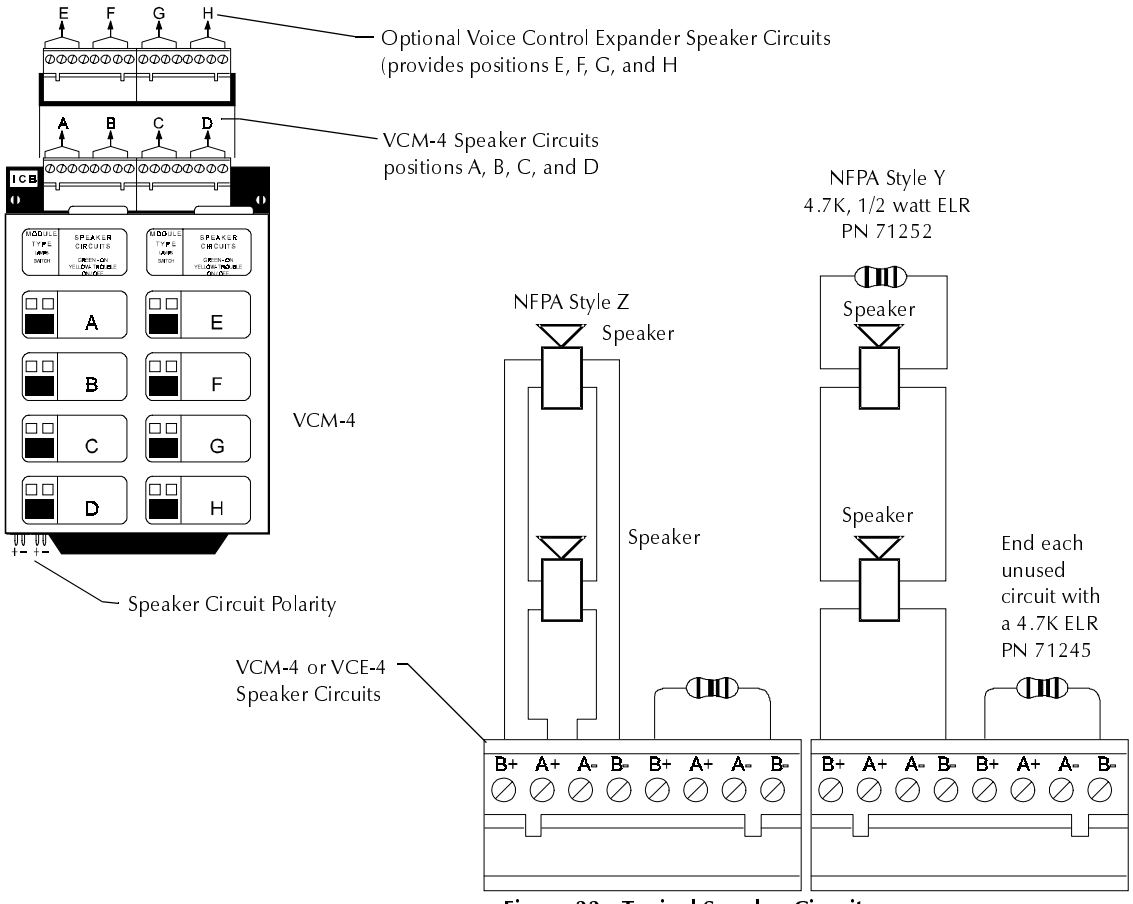


Figure 33 Typical Speaker Circuits

How to Connect VCM-4 Telephone Circuits

Follow these guidelines when connecting VCM-4 telephone circuits:

- Telephone circuits are supervised and power-limited. Refer to the System 5000 Installation Manual for UL power-limited requirements.
- Use twisted-pair cable for telephone circuit wiring. Shielding is required when telephone circuit wire runs with electrically noisy circuits, such as SLCs and NACs.
- Maximum telephone circuit wire resistance is 40 ohms.
- Install End-of-Line Resistors according to Table 30.

For ELR connection to devices	Use resistor part number
with terminals	71252
with flying leads	71245
used in Canada also include	N-ELR Resistor Plate

Table 30 VCM-4 Telephone Resistor Requirements

Figure 34 shows typical telephone wiring for a VCM-4 or VCE-4 module:

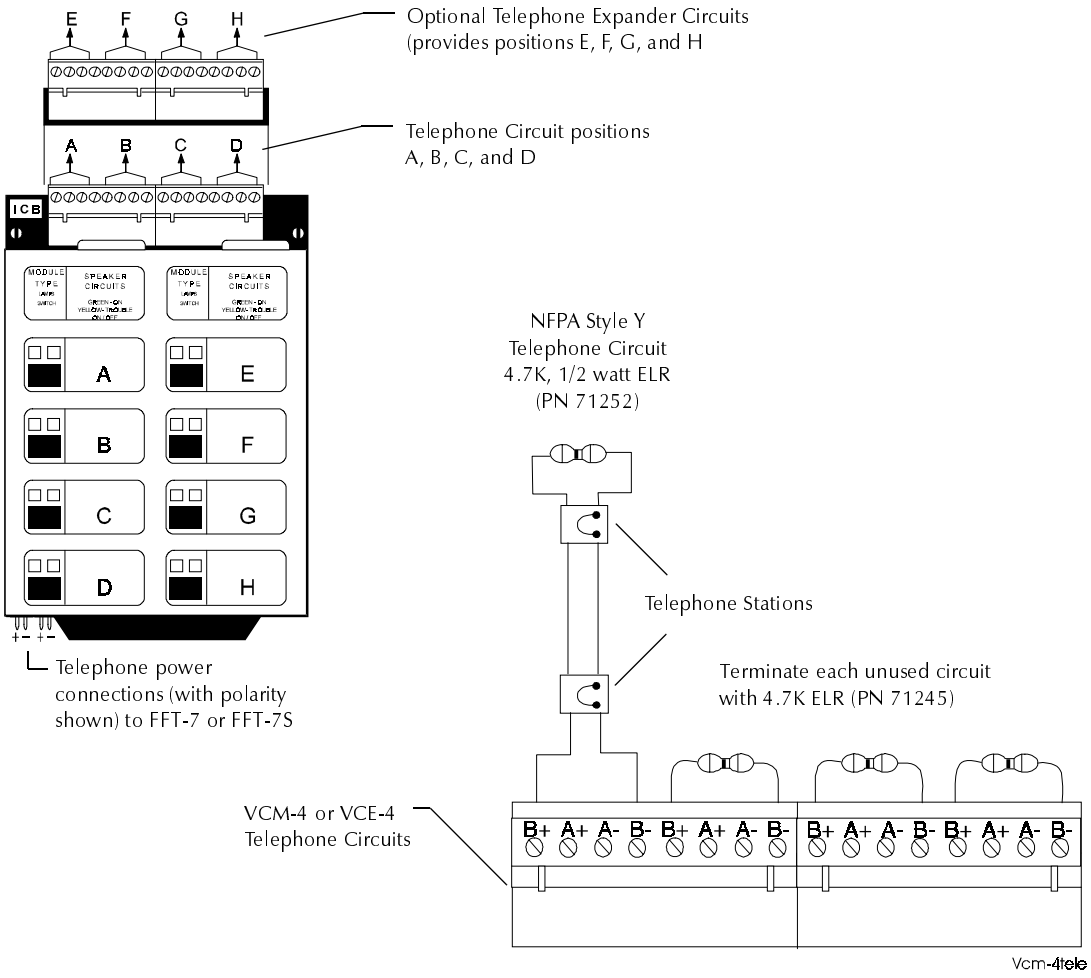


Figure 34 Typical Telephone Circuits

How to Set the VCM-4 to Speaker or Telephone Mode

The VCM-4 comes with a factory-installed jumper plug on JP3. Use the jumper to select the operating mode of the entire module (VCM-4 plus optional VCE-4). Select Speaker or Telephone mode as detailed in Table 31:

Select	Do this
Speaker mode (factory setting)	Leave the jumper on JP3.
Telephone mode	1. Remove the jumper from JP3 2. Install the jumper on JP4.

Table 31 Selecting Telephone and Speaker Mode

Note: Do not mix speaker and telephone circuits on the same module.

Figure 35 shows how to select Speaker or Telephone mode for a VCM-4 module:

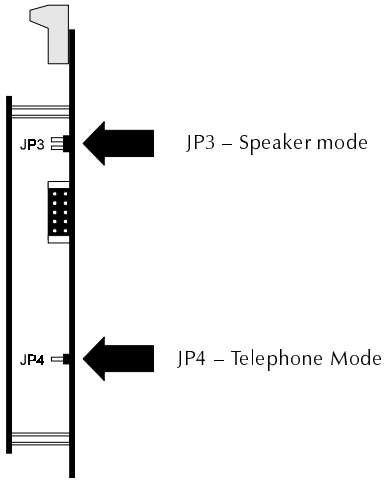


Figure 35 Selecting Speaker or Telephone Mode

How to Connect Dual Channel Module Circuits

Follow these guidelines when connecting DCM-4 speaker circuits:

- All speaker circuits are supervised and power-limited. Refer to the System 5000 Installation Manual for UL power-limited requirements.
- Use twisted-pair cable for speaker circuit wiring. Shielding is required when telephone circuit wire runs with electrically noisy circuits, such as SLCs and NACs.
- Maximum speaker circuit wire resistance depends on the wattage required at each speaker.
- Refer to Table 32 for resistor values.
- Use only UL-listed speakers rated for 25 Vrms (AA-30, AA-120) or 70.7 Vrms (AA-100).

For ELR connection to devices	Use resistor part number
with terminals	71252
with flying leads	71245
used in Canada also include	N-ELR Resistor Plate.

Table 32 DCM-4 Resistor Requirements

Figure 36 shows typical connections between a DCM-4 and speaker circuits:

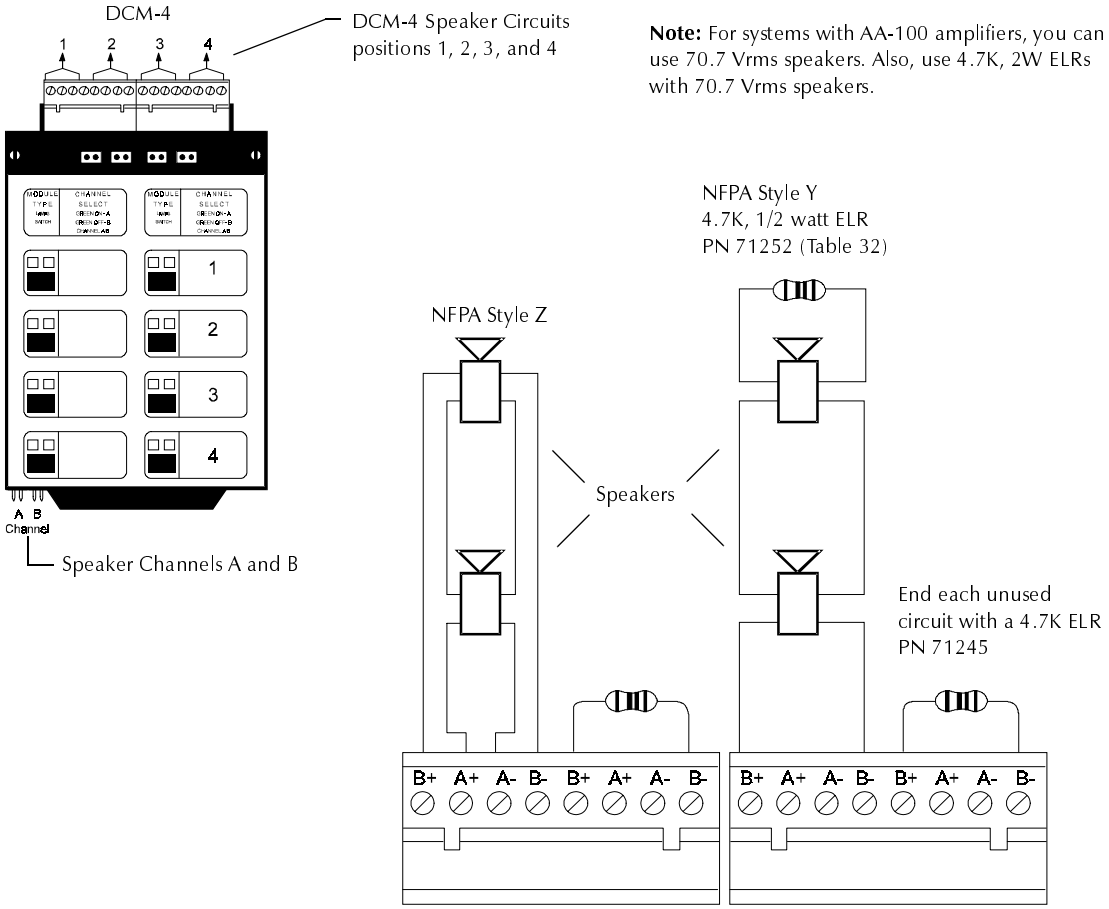


Figure 36 Typical Wiring for DCM-4 Speaker Circuits (NFPA Style Y)

Notes

8. Voice System Configurations

Voice Systems Wiring Overview

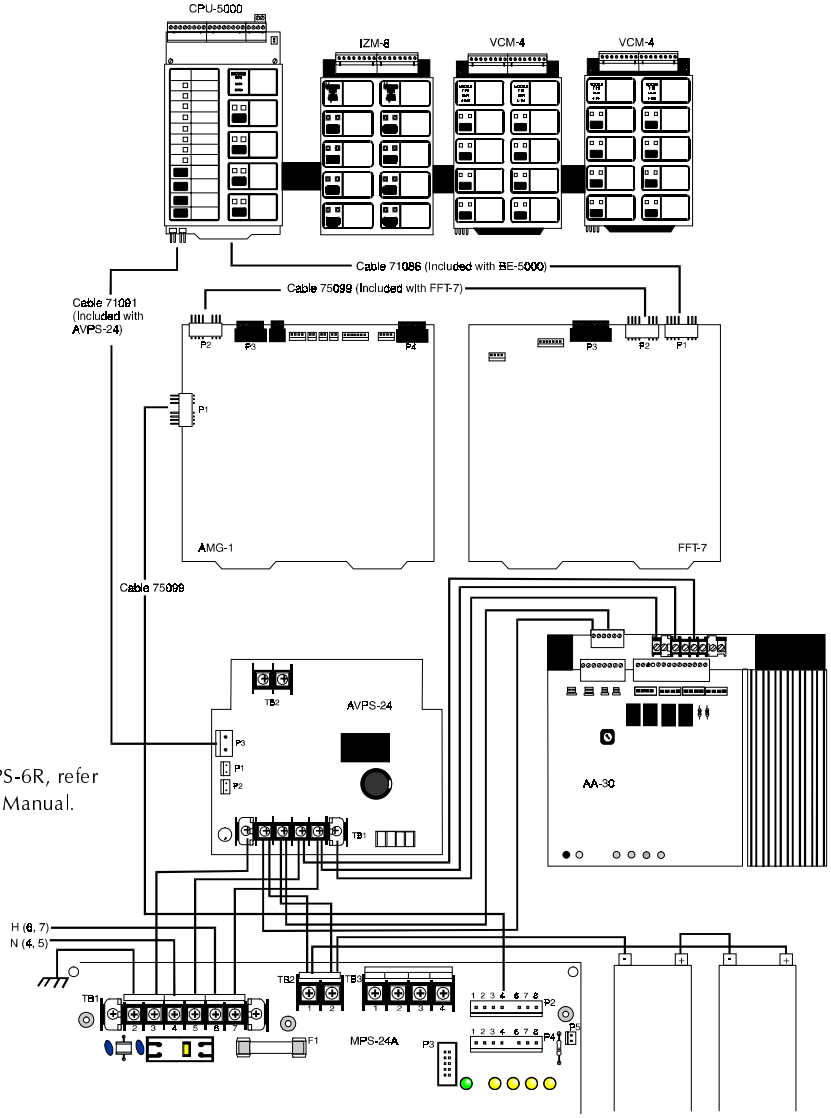
This section contains typical configurations for voice systems as outlined in Table 33:

Configuration	Refer to
Internal Power Distribution	Figure 37 on page 52 Figure 38 on page 52
CPU-5000 EIA-485 Connections	Figure 39 on page 53 Figure 40 on page 53
Wiring an Audio Signal without a Backup Amplifier	Figure 41 on page 54 Figure 42 on page 54
Audio Signal Wiring Using a Backup Amplifier	Figure 43 on page 55 Figure 44 on page 55
CPU-5000 Trouble Bus Connections	Figure 45 on page 56 Figure 46 on page 56

Table 33 Voice System Configurations

Internal Power Distribution

Figure 38 shows typical wiring for distributing power within a voice system:



Note: If connecting an APS-6R, refer to the APS-6R Instruction Manual.

Figure 37 System Configuration – Internal Power Distribution

Figure 38 shows a simplified block diagram for distributing internal power within a voice system:

Note: You can also connect the CPU directly to P4 on the MPS-24 or MPS-24B or P1 on the FFT-7.

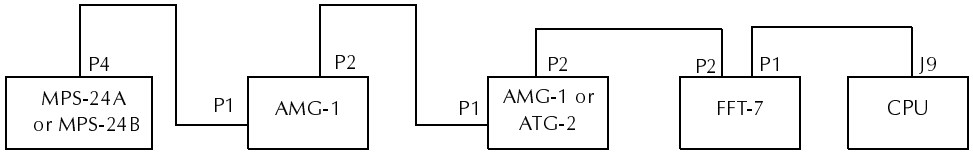


Figure 38 Distribution of Internal Power Block Diagram

CPU-5000 EIA-485 Connections

Figure 39 shows typical wiring of EIA-485 connections between the CPU-5000, AMG-1, and annunciators:

Note: Use 18 AWG to 12 AWG twisted-pair cable for EIA-485 connections.

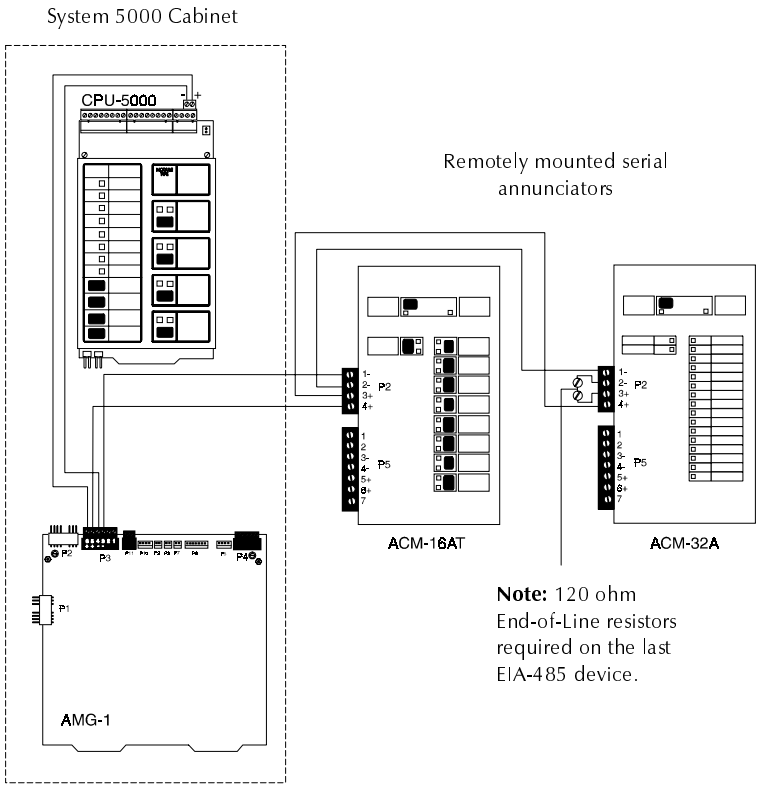


Figure 39 CPU-5000 EIA-485 Connections

Figure 40 shows a simplified block diagram connections between the CPU-5000 and EIA-485 devices:

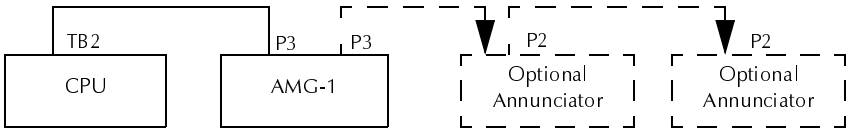


Figure 40 Block Diagram for Distribution of EIA-485

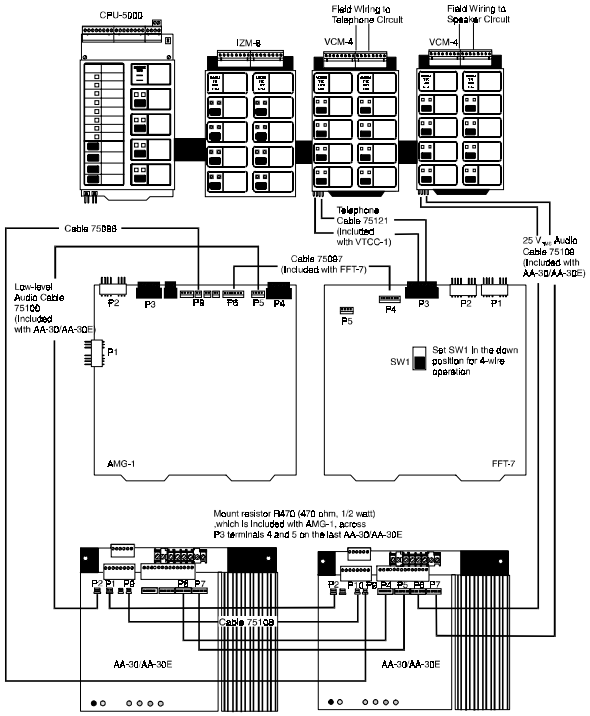
How to Wire an Audio Signal without a Backup Amplifier

Figure 41 and Figure 42 shows the use of two AA-30s without a backup amplifier. Table 34 lists wiring components used in Figure 41 and Figure 42.

Item	Supplied with	Part Number
Low-Level Audio cable	AA-30, AA-100, AA-120	75100
Telephone cable	VTCC-1 package	75121
25-volt Audio cable	AA-30, AA-100, AA-120	75109
Cable	FFT-7	75097
470 ohm resistor	AMG-1	R-470

Table 34 Wiring Inventory

Figure 41 shows typical wiring of two AA-30s without a backup amplifier.



Note: Mount an R-470 resistor (470 ohms, 1/2 watt) across P3 terminals 4 and 5 on the last audio amplifier.

Figure 41 Wiring an Audio Signal without a Backup Amplifier

Figure 42 shows a simplified block diagram for wiring an audio signal without using a backup amplifier. The first and second speaker circuits share 30 watts of power from one AA-30, and the third and fourth speaker circuits share 30 watts of power from the second AA-30.

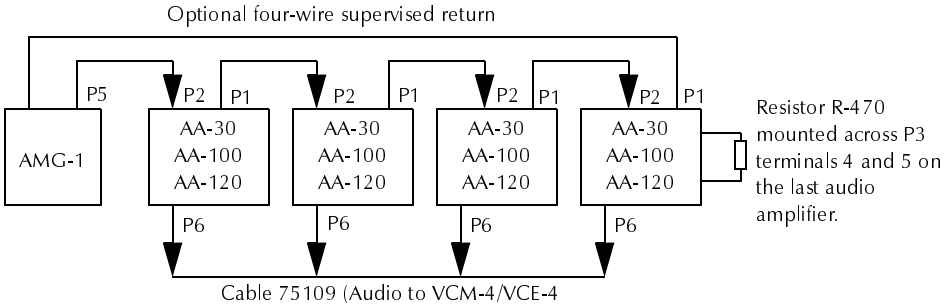


Figure 42 Distribution for Audio Block Diagram

How to Wire an Audio Signal with a Backup Amplifier

Figure 43 and Figure 44 show speaker wiring using two AA-30s with a backup AA-30. Table 35 lists the inventory for wiring the speakers.

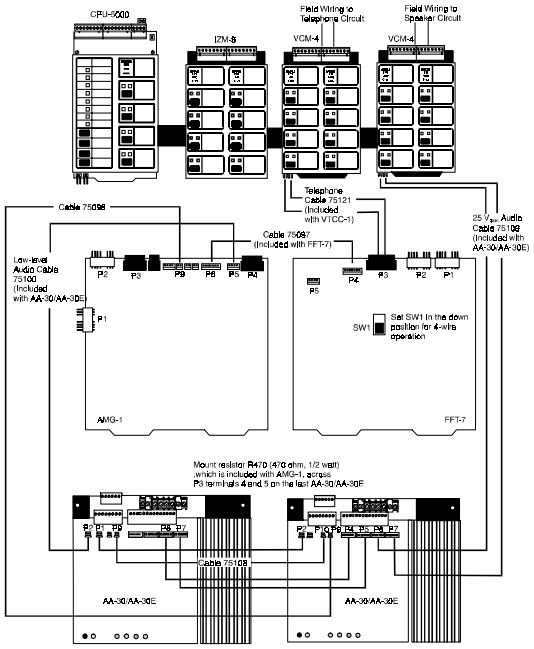
Note: Use 18 AWG to 12 AWG twisted-pair cable for EIA-485 connections. This wiring diagram applies to AA-30, AA-100, and AA-120 audio amplifiers. Connections to plugs P1, P2, P4, P5, P6, P7, P9, and P10 are identical.

- To enable four-wire operation, set FFT-7 SW1 in the down position.
- Mount resistor R-470 across P3-4 and P3-5 on the last amplifier (Figure 43).

Item	Supplied with	Part Number
Low-Level Audio cable	AA-30, AA-100, AA-120	75100
Telephone cable	VTCC-1 package	75121
25-volt Audio cable	AA-30, AA-100, AA-120	75109
Cable	FFT-7	75097
470 ohm resistor	AMG-1	R-470

Table 35 Wiring Inventory

Figure 43 shows typical wiring of four speaker circuits using two AA-30s, with the AA-30 shown on the left used as a backup amplifier. These four speaker circuits share 30 watts of power from one AA-30.



Note: To enable optional four-wire supervision, cut resistors R8 and R9 on the AA-30.

Figure 43 Wiring an Audio Signal with a Backup Amplifier

Figure 44 shows two simplified block diagrams for using a backup amplifier:

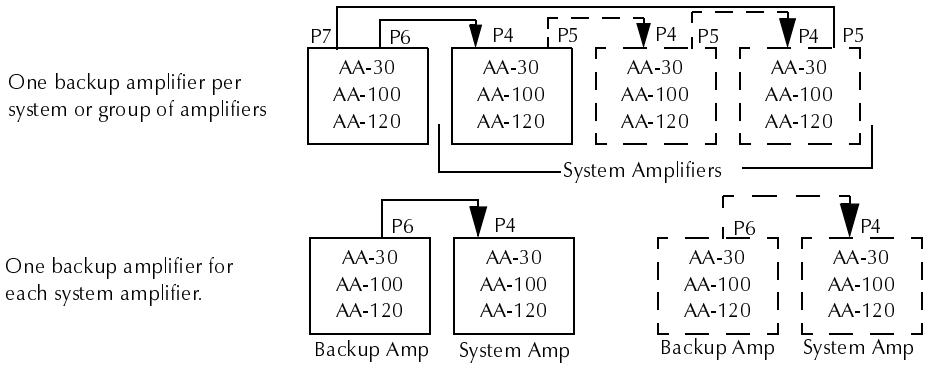


Figure 44 Backup Amplifier Block Diagrams

CPU-5000 Trouble Bus Connections

When connecting the CPU-5000 trouble bus, note the following:

- P9 and P10 on audio amplifiers (AA-30, AA-100, and AA-120) and P1 and P2 on the AVPS-24 are interchangeable.
- Trouble cable part numbers are: 75098 (24-inch) or 71033 (60-inch).

Figure 45 shows typical wiring for connecting a trouble bus to a CPU-5000:

Note: If connecting an APS-6R, refer to the APS-6R Instruction Manual.

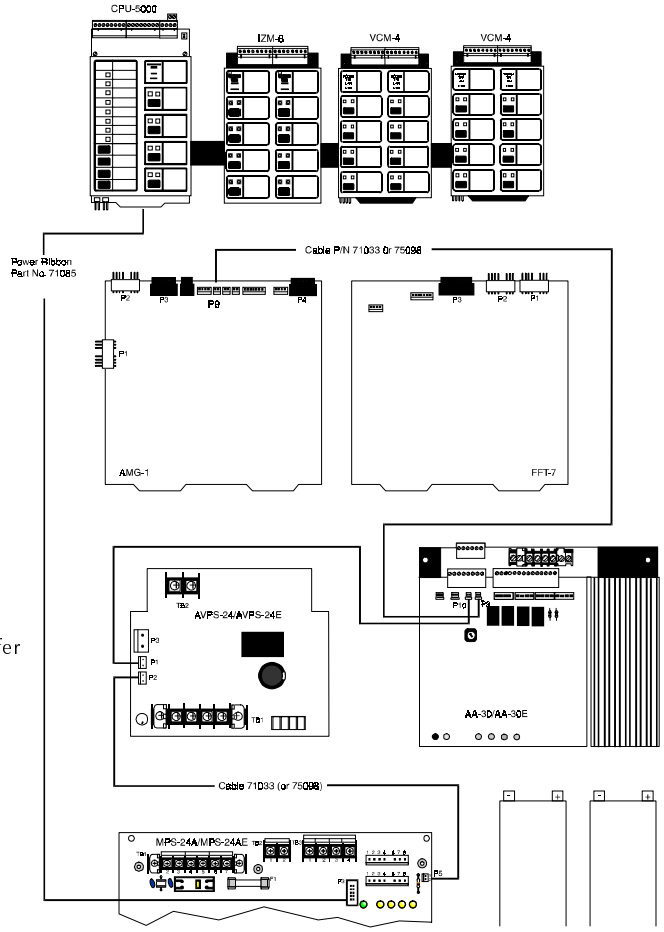


Figure 45 CPU-5000 Trouble Bus Connections

Figure 46 shows a simplified block diagram for connecting a trouble bus:

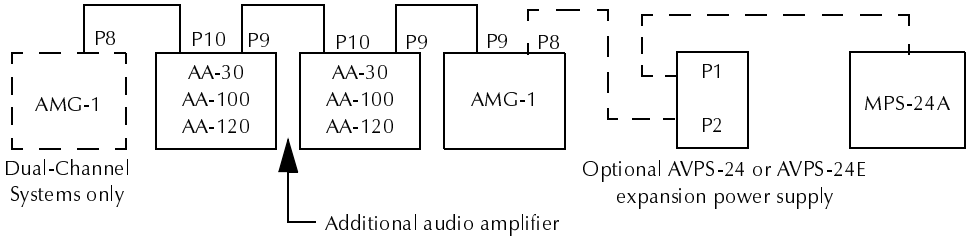


Figure 46 Trouble Bus Block Diagram

Appendix A: Wiring Speaker Circuits

Wiring Speaker Circuit Overview

This section contains typical wiring diagrams for wiring speaker circuits in the configurations listed in Table 36:

Configuration	Refer to
30 Watt/Four and Eight Speaker Circuits	Four speakers – Figure 47 on page 58 Eight speakers – Figure 48 on page 58
120 Watt/Four and Eight Speaker Circuits	Four speakers – Figure 49 on page 59 Eight speakers – Figure 50 on page 59
90 Watt/Eight Speaker Circuit	Figure 51 on page 60
240 Watt/Eight Speaker Circuit	Figure 52 on page 61
180 Watt/Eight Speaker Circuit	Figure 53 on page 62
30 Watt Dual Channel	Figure 54 on page 63
120 Watt Dual Channel (AA-30s)	Figure 55 on page 64
120 Watt Dual Channel (AA-120)	Figure 56 on page 65

Table 36 Topics Covered in Wiring Speaker Circuits

How to Wire Four and Eight Speaker Circuits with 30 Watts

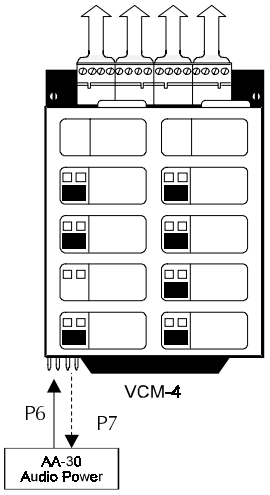
When wiring four-and eight-speaker circuits using 30 watts of power, note the following:

- An AA-30 supplies audio power through plug P6, or terminals 5 and 6 on terminal block P8. This audio power run is not supervised. If using the optional supervised four-wire return, a loss of audio power (due to a break in the wiring) generates a trouble signal at the AA-30.
- If using an optional supervised four-wire return, cut resistors R8 and R9, located directly under plug P6 on the AA-30.
- Each speaker circuit can share a maximum of 30 watts.

Note: For the location of resistors R8 and R9, see Figure 27 on page 38.

Wiring Four Speaker Circuits

Figure 47 shows typical wiring for four speaker circuits using 30 watts of power:

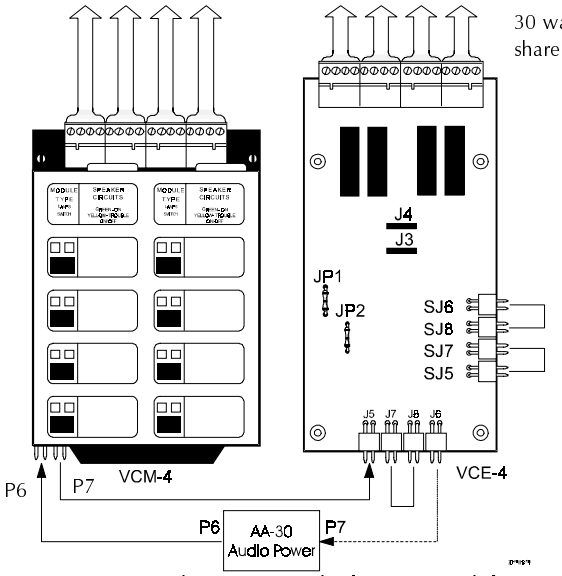


Optional supervised four-wire return. To enable, cut resistors R8 and R9 directly under plug P6 on the AA-30.

Figure 47 Typical 30 Watt, Four-Speaker Circuit

Wiring Eight Speaker Circuits

Figure 48 shows typical wiring for eight speaker circuits using 30 watts of power:



Optional supervised four-wire return. To enable, cut resistors R8 and R9 directly under plug P6 on the AA-30.

Figure 48 Typical 30 Watt, Eight-Speaker Circuit

How to Wire Four and Eight Speaker Circuits with 120 Watts

When wiring four-and eight-speaker circuits using 120 watts of power, note the following:

- The AA-120 draws audio power from plug P6, or terminals 5 and 6 of terminal block P8. This audio power run is not supervised. If using the optional supervised four-wire return, a loss of audio power (due to a break in the wiring) generates a trouble signal at the AA-120.
- If using an optional supervised four-wire return, cut resistor R100 on the AA-120.
- Each circuit can handle a maximum of 30 watts.

Note: For the location of resistor R100, see Figure 30 on page 41.

Wiring Four Speaker Circuits

Figure 49 shows typical wiring for four speaker circuits using 120 watts of power:

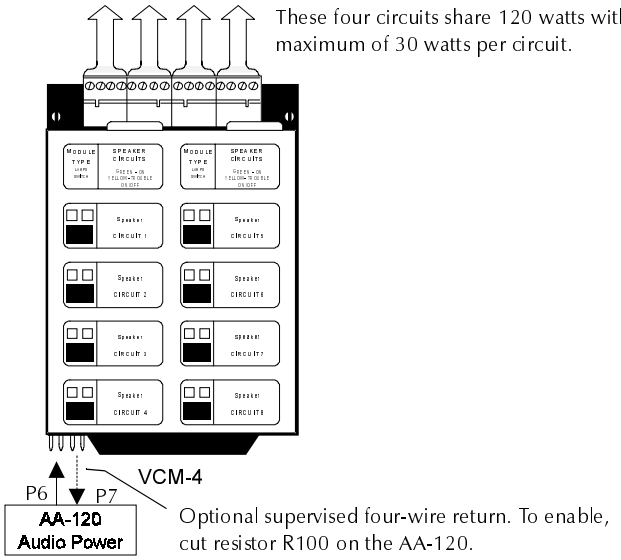


Figure 49 Typical 120-Watt, Four-Speaker Circuit

Wiring Eight Speaker Circuits

Figure 50 shows typical wiring for eight speaker circuits using 120 watts of power:

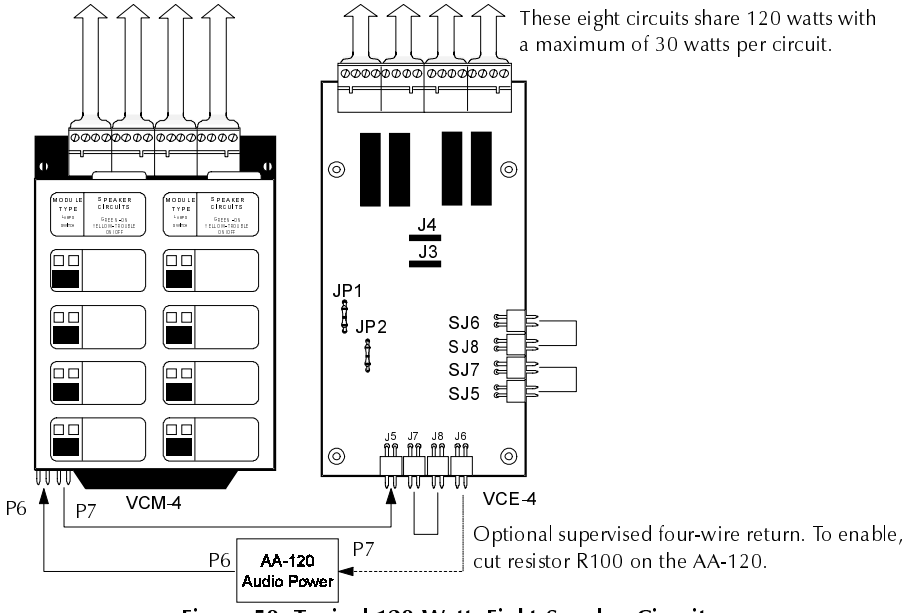


Figure 50 Typical 120-Watt, Eight-Speaker Circuit

How to Wire Eight Speaker Circuits with 90 Watts

When wiring eight speaker circuits using 90 watts of power, note the following:

- The AA-30 supplies audio power through plug P6, or terminals 5 and 6 on terminal block P8. (This audio power run is not supervised.) If using the optional supervised four-wire return, a loss of audio power (due to a break in the wiring) will generate a trouble signal at the AA-30.
- If using an optional supervised four-wire return, cut resistors R8 and R9, located directly below plug P6 on the AA-30.
- Each circuit can handle a maximum of 30 watts.
- In the configuration shown below, cut VCE-4 jumpers JP1 and JP2.

Note: To locate resistors R8 and R9 on the AA-30, see Figure 27 on page 38.

Figure 51 shows typical wiring for a 90-watt (the VCM-4 provides 30 watts and the VCE-4 provides 60 watts for a total of 90 watts), eight-speaker circuit:

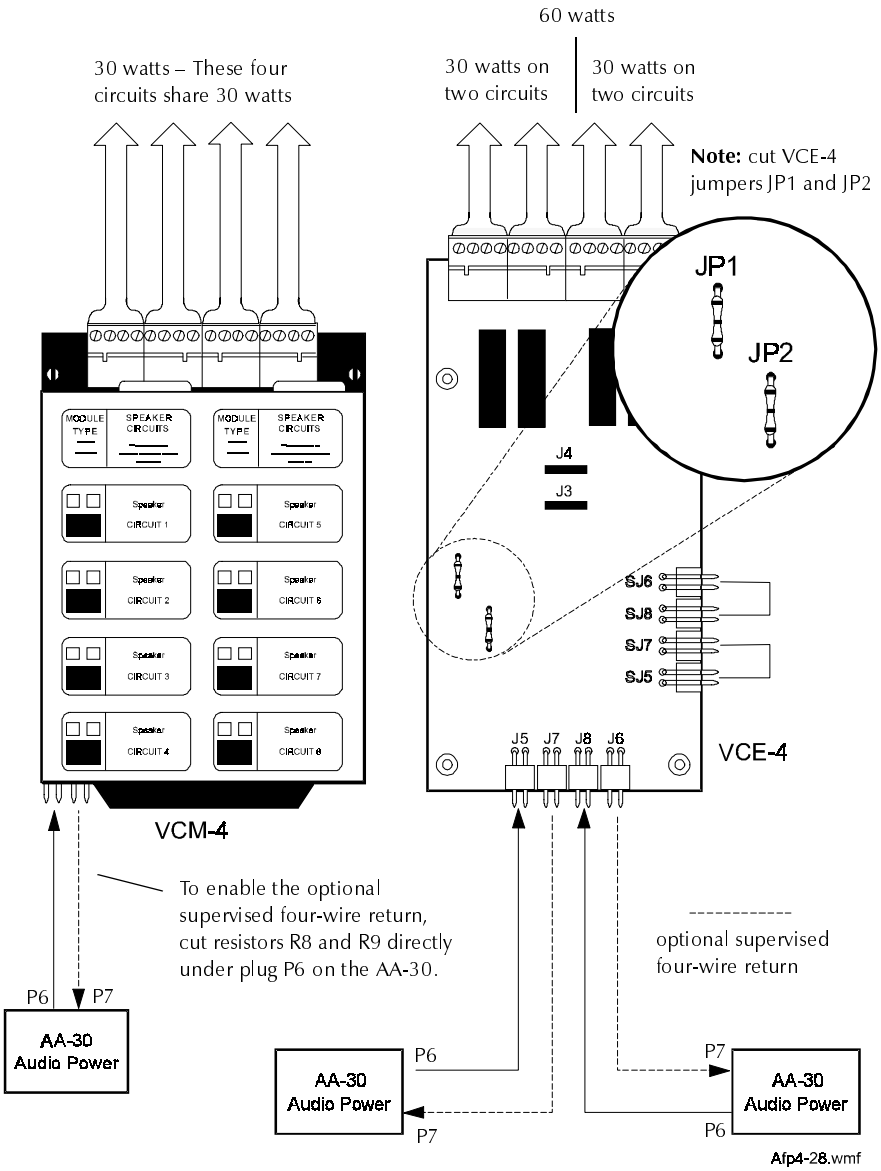


Figure 51 Typical 90-Watt, Eight-Speaker Circuit

How to Wire Eight Speaker Circuits with 240 Watts

When wiring eight speaker circuits using 240 watts of power, note the following:

- The AA-120 draws audio power from plug P6, or terminals 5 and 6 of terminal block P8. This audio power run is not supervised. If using the optional supervised return, a loss of audio power (due to a break in the wiring) will generate a trouble signal at the AA-120.
- If using an optional supervised four-wire return, cut resistor R100 on the AA-120.
- Each circuit can handle a maximum of 30 watts.

Note: To locate resistor R100, see Figure 30 on page 41.

Figure 52 shows typical wiring for a 240-watt, eight-speaker circuit:

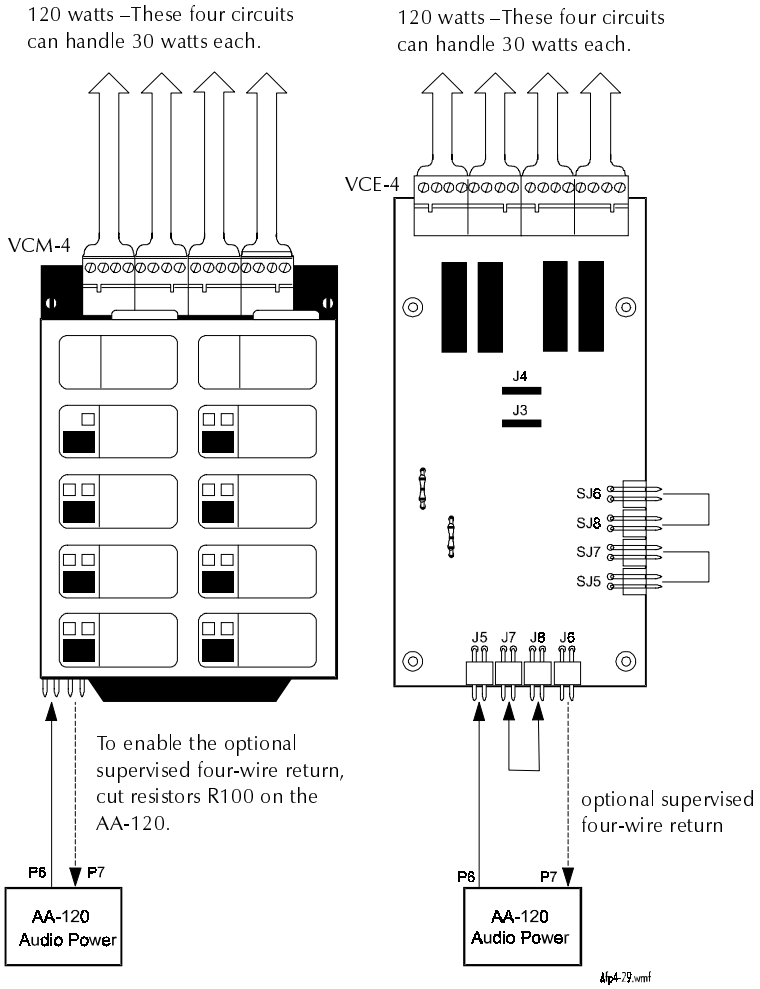


Figure 52 Typical 240-Watt, Eight-Speaker Circuit

How to Wire Eight Speaker Circuits with 180 Watts

When wiring eight speaker circuits using 180 watts of power, note the following:

- AA-30 audio power is drawn from plug P6 or terminals 6 and 7 of terminal block P8. This audio power run is not supervised. If using the optional supervised four-wire return (plug P7 or terminals 2 and 3 of block P8), a loss of audio power due to a break in the wiring will generate a trouble signal at the AA-30.

Note: To locate resistors R8 and R9 on the AA-30, see Figure 27 on page 38.

- If using an optional supervised four-wire return, cut resistors R8 and R9 on the AA-30.
- Each circuit can handle a maximum of 30 watts.
- In this configuration, cut VCE-4 and VCM-4 jumpers JP1 and JP2.

Figure 53 shows typical wiring for a 180-watt, eight-speaker circuit:

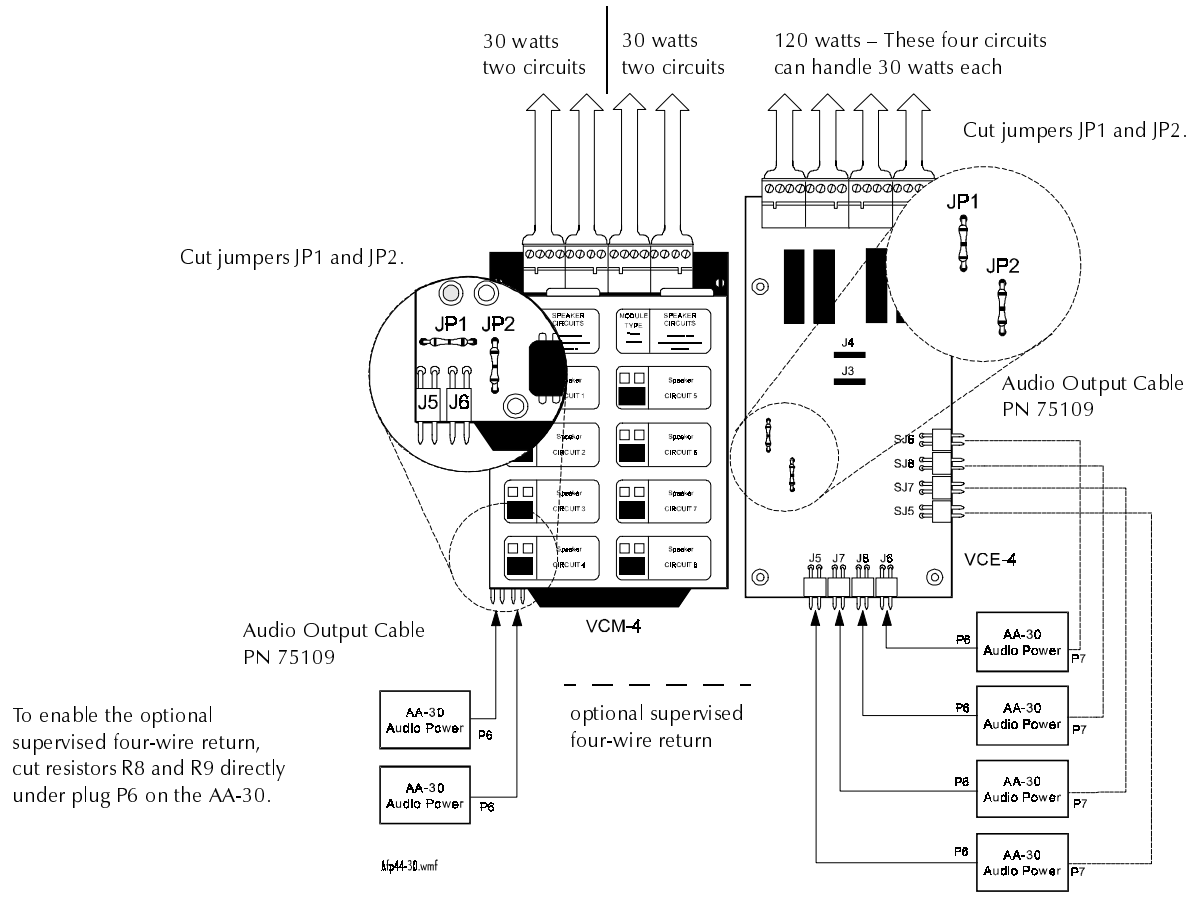


Figure 53 Typical 180-Watt, Eight-Speaker Circuit

How to Wire a 30-Watt Dual-Channel Configuration

When wiring circuits in a dual-channel configuration using 30 watts of power, note the following:

- Plug P6 or terminals 5 and 6 of terminal block P8 provide AA-30 audio power. This audio power run cannot be supervised in this configuration.
- Maximum power is 30 watts per circuit.
- For dual-channel operation, cut VCE-4 jumpers JP1 and JP2 (Figure 54).

Figure 54 shows typical wiring for a 30-watt, dual-channel configured circuit:

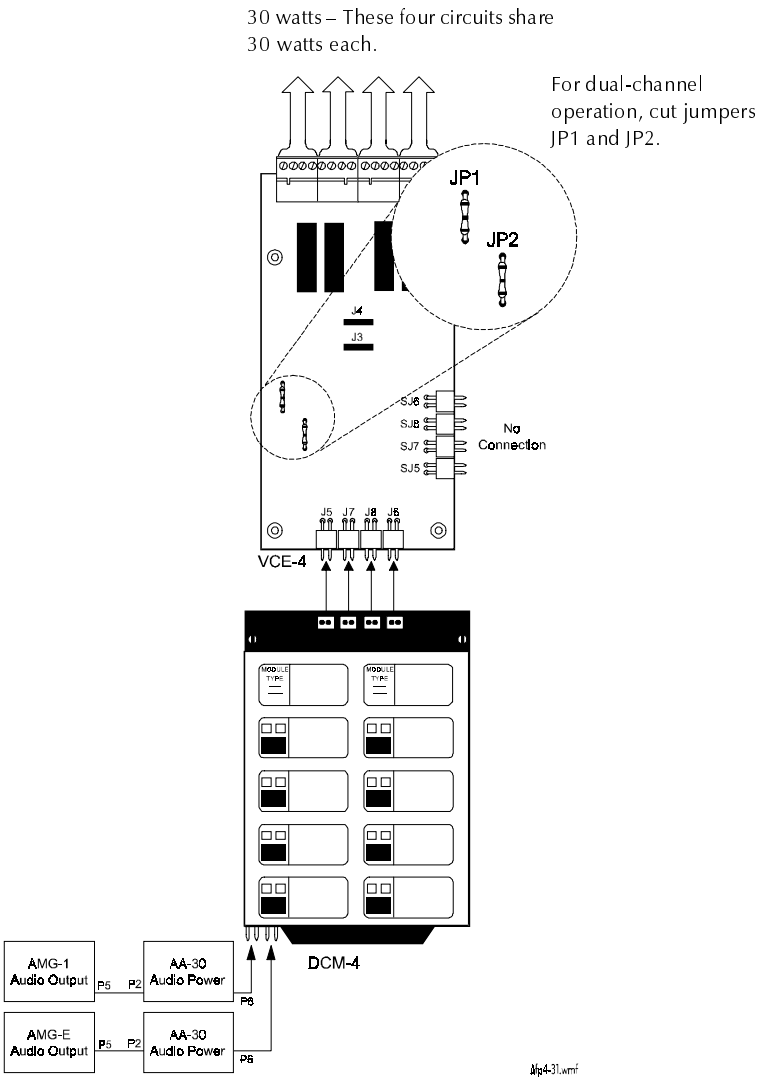


Figure 54 Typical 30-Watt Dual-Channel Configuration

How to Configure a 120-Watt Dual-Channel (Four AA-30s)

When wiring circuits in a dual-channel configuration using 120 watts of power with four AA-30s, note the following:

- AA-30 audio power is drawn from plug P6 or terminals 6 and 7 of terminal block P8. (This audio power run is not supervised.) If using the optional supervised four-wire return (plug P7, or terminals 2 and 3 of terminal block P8), loss of audio power due to a break in the wiring generates a trouble signal at the AA-30.
- If using an optional supervised return, cut resistors R8 and R9 on the AA-30 (for location of R8 and R9, see Figure 55).
- Maximum power per circuit equals 30 watts.
- For dual-channel operation, cut VCE-4 jumpers JP1 and JP2 (Figure 55).

Figure 55 shows typical wiring for a 120-watt (using four AA-30s), dual-channel configured circuit:

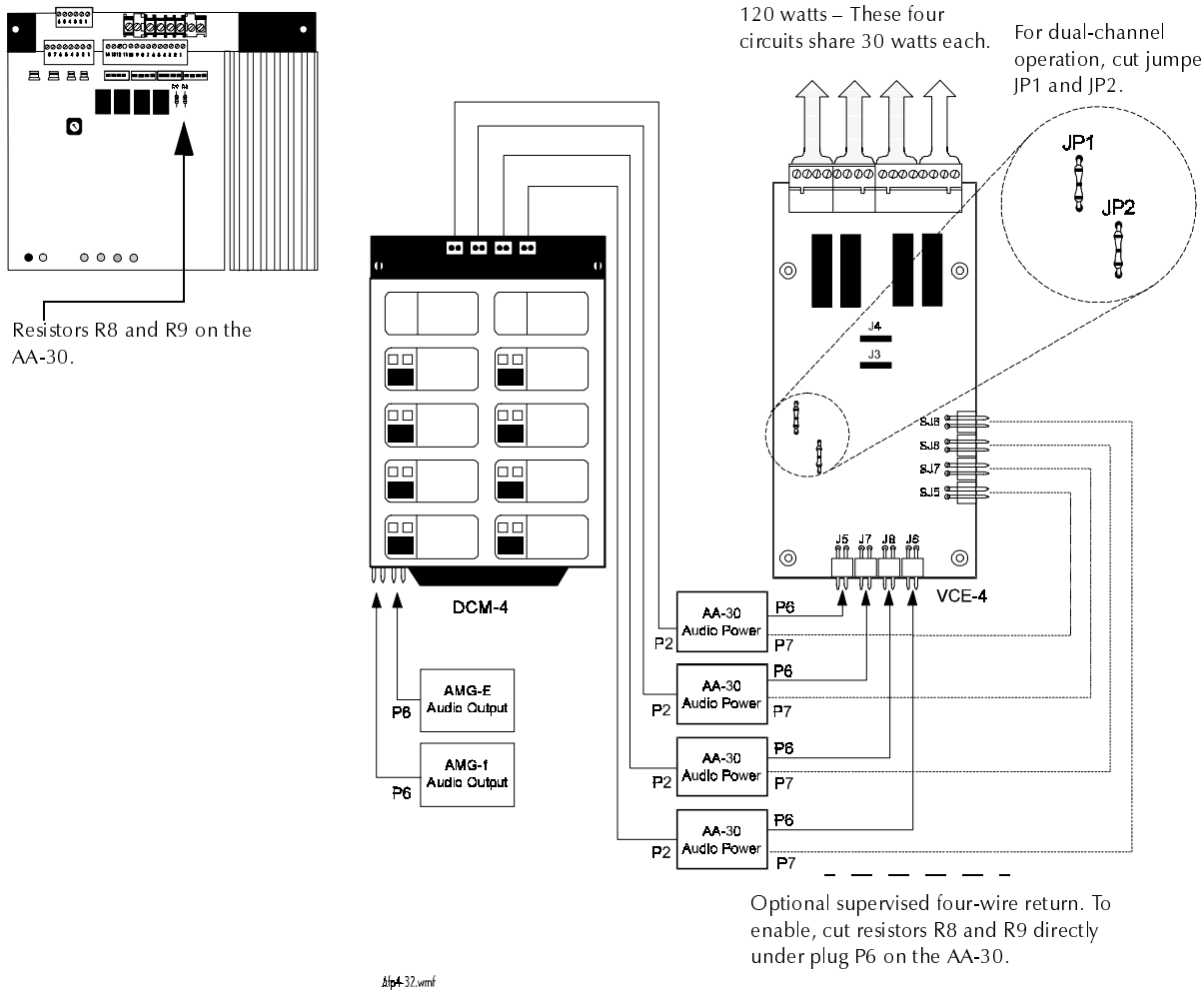


Figure 55 Typical 120-Watt Dual-Channel Configuration (AA-30)

How to Configure a 120-Watt Dual-Channel (Two AA-120s)

When wiring circuits in a dual-channel configuration using 120 watts of power with two AA-120s, note the following:

- AA-120 audio power is drawn from plug P6 or terminals 5 and 6 of terminal block P8. This audio power run cannot be supervised in this configuration.
- Each circuit can handle a maximum of 30 watts.
- In this configuration, cut VCE-4 jumpers JP1 and JP2.

Figure 56 shows typical wiring for a 120-watt (using two AA-120s), dual-channel configured circuit:

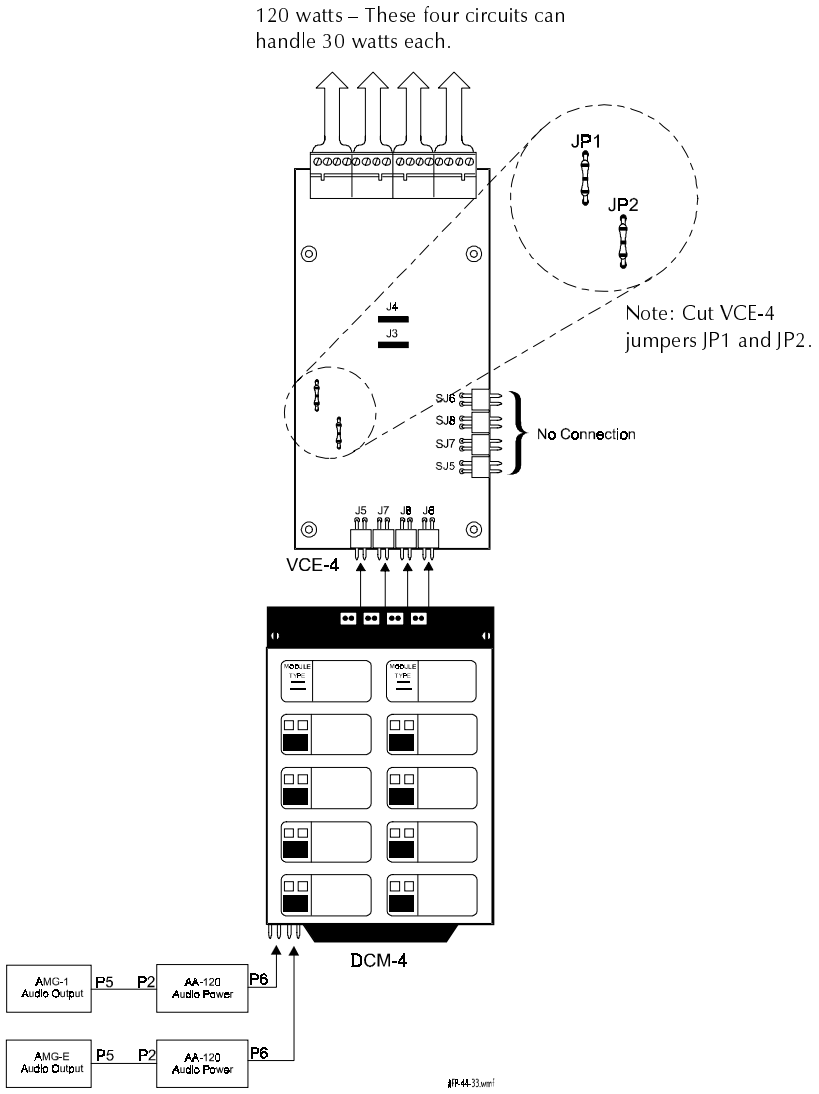


Figure 56 Typical 120-Watt Dual-Channel Configuration (AA-120)

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Appendix B: Voice Message Options

Overview of VROM and VRAM

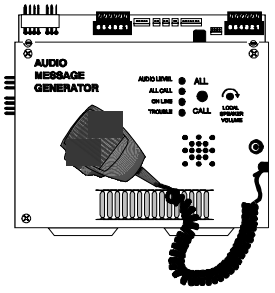
You can install two types of message chips into an AMG-1:

VROM – A nonvolatile memory chip containing a factory-programmed evacuation message (up to 24 seconds). You can install one or two VROMs into an AMG-1. Refer to Document 15945 for contents of available VROMs.

VRAM – A programmable memory chip that contains a user-created evacuation message up to 24 seconds long. Create a message from the AMG-1 microphone or a cassette tape. You can install one or two VRAMs into an AMG-1.

How to Install VROM and VRAM Chips

To install VROM and VRAM chips, follow the steps in Table 37 and refer to Figure 57:



AMG-1 with Dress Panel

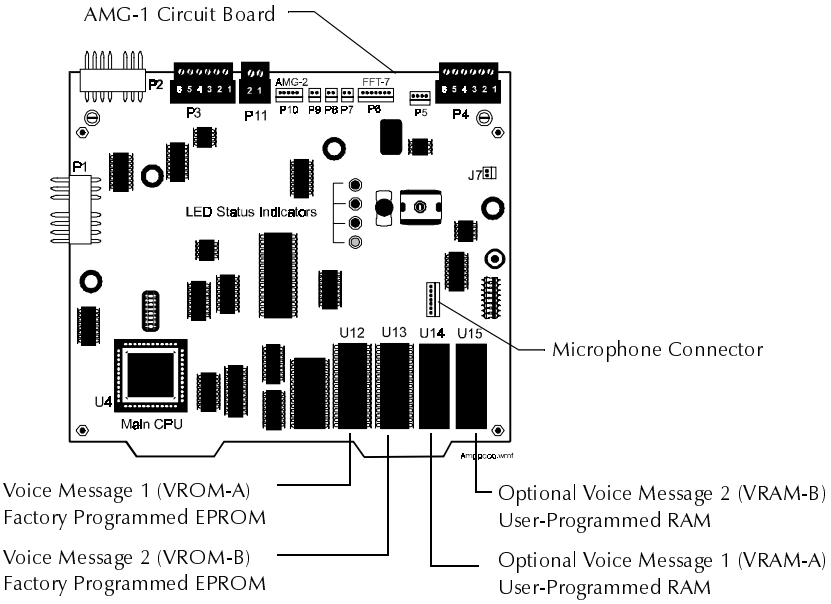


Figure 57 AMG-1 Dress Panel and Circuit Board

To install VROM or VRAM chips, follow the steps in Table 37.

CAUTION: Remove AC power at the main service circuit breaker (not the circuit breaker on the main power supply):

Step	Action
1	Remove battery power, then remove AC power from the control panel.
2	Remove the dress panel covering the AMG-1.
3	Remove the four screws that hold the AMG1 dress panel to the component board as shown below. Remove the dress panel and disconnect the microphone connector.
4	Install the VROM or VRAM chips in the positions as shown below
To assemble the AMG-1, reverse these instructions.	

Table 37 Installing VROM and VRAM

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