NOTIFIER®
A Pittway Company

12 Clintonville Road
Northford, CT 06472
(203) 484-7161 Fax: (203) 484-7118

AM2020
AFP1010

VOICE
ALARM
MULTIPLEX

Document 15889
12/11/97 Rev: F
P/N 15889:F1 ECN 97-421

Installation Precautions Page

Table of Contents

Section One: Voice Alarm Equipment 5
Section 1.0 Introduction 5
Figure 1.0-1 Dress Panel, Single Well (DPSW-1) 5
Figure 1.0-2 Fire Fighter's Telephone System Components 6
Figure 1.0-3 Dress Panel, Double Well (DPDW-1) 6
Section 1.1 Related Documentation 8
Table 1-1 Voice Multiplex System Related Documentation 8
Section Two: Design Considerations 9
Section 2.0 Section Objective 9
Section 2.1 Executing Audio Functions with an AMG-1 9
Figure 2.1-1 AMG-1 Audio Functions 9
Section 2.2 Executing Tone Generation with an ATG-2 9
Figure 2.2-2 ATG-2 Audio Functions 9
Section 2.3 Amplifying the Audio Signal 10
Figure 2.3-1 Audio Signal Amplification 10
Figure 2.3-2 ACT-1 Audio Coupling Transformer 10
Section 2.4 Driving the Speaker Circuits 10
Figure 2.4-1 Speaker Circuits 11
Section 2.5 Cascading AMG's for Multi-channel Audio 14
Section Three: Audio Message/Tone Generators 15
Section 3.1 Operating the AMG-1 Audio Message Generator 16
Figure 3-1 AMG-1 and ATG-2 Installation 17
Figure 3-2 AMG-1 Terminal Connections 18
Table 3-1 AMG-1 Tone/Message Functions 21
Table 3-2 AMG-1 Tone/Message Functions 22
Section 3.2 Zone-Coded Voice for the AM2020/AFP1010 23
Section 3.3 ATG-2 Audio Tone Generator 26
Figure 3-3A ATG-2 Terminal Connections 27
Figure 3-3B ATG-2 Activation Circuit 28
Section Four: Fire Fighter's Telephone 30
Figure 4-1 FFT-7 and FFT-7S Installation 30
Figure 4-2 FFT-7 Terminals and Connections 32
Figure 4-3 FFT-7S Terminal and Connections 33
Section Five: Audio Amplifiers 34
Figure 5-1 Installing the AA-30 or AA-30E 34
Figure 5-2 AA-30/AA-30E Terminals and Connectors 35
Figure 5-3 AA-30/AA-30E Audio Amplifier Status LEDs 36
Figure 5-4 Speaker Switching Configuration, AA-30/AA-30E (Class A) with CMX-2 (Style Z) 38
Figure 5-5 Speaker Switching Configuration, AA-30/AA-30E (Class B) with CMX-2 (Style Y) 38
Figure 5-6 Speaker Switching Configuration, AA-100/AA-100E (Class B) with CMX-2 (Style Y) 39
Figure 5-7 Speaker Switching Configuration, AA-100/AA-100E (ClassB) with CMX-2 (Style Z) 39
Figure 5-8 Speaker Switching Configuration, AA-120/AA-120E (Class B) with CMX-2 (Style Y) 40
Figure 5-9 Speaker Switching Configuration, AA-120/AA-120E (Class B) with CMX-2 (Style Z) 40
Table 5-1 Secondary Current Draw in Standby 41
Table 5-2 Secondary Current Draw in Alarm 41
Table 5-3 Total Amplifier Secondary Current Draw 41
Figure 5-10 Installing the AA-100/AA-100E and AA-120/AA-120E 42
Figure 5-11 AA-100/AA-100E and AA-120/AA-120E Terminals and Connectors 43
Figure 5-12 AA-100/AA-100E and AA-120/AA-120E Audio Amplifier Status LEDs 44

Table of Contents

Section Six: Voice Alarm Peripherals 46
Section 6.1 The RPJ-1 Remote Paging Jack 47
Appendix A: Voice Message Options 48
Section A.1 VROM/VRAM Installation 48
Appendix B: ACT-1 Audio Coupling Transformer 49

SECTION ONE
VOICE ALARM EQUIPMENT

1.0 INTRODUCTION

Voice alarm equipment for the AM2020/AFP1010 is offered under the basic packages detailed below. For voice alarm equipment installation, refer to the Installation Chapter of the AM2020/AFP1010 Manual, Document 15088.

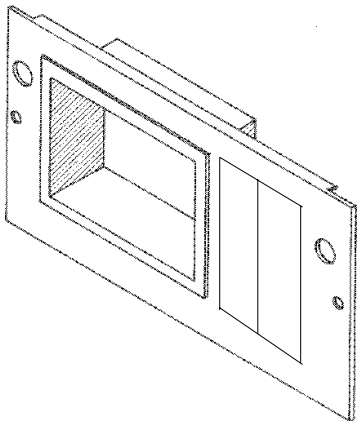
- **The VCC-1 Voice Command Center**

  The VCC-1 Voice Command Center is a basic equipment package for single-channel audio evacuation systems which do not require a fire fighter's telephone system. The VCC-1 provides one AMG-1 Audio Message Generator, one CHS-4L Chassis for mounting the AMG-1, cable assemblies for connection to the AM2020/AFP1010, and a DPSW-1 single-well dress panel (refer to **Figure 1.0-1**).

- **The VCC-2 Voice Command Center**

  The VCC-2 Voice Command Center is a basic equipment package for single- or dual-channel audio evacuation systems that do not require a fire fighter's telephone system or pre-recorded voice messages. The VCC-2 provides one ATG-2 Audio Tone Generator with a microphone, one CHS-4L Chassis for mounting the ATG-2, cable assemblies for connection to the AM2020/AFP1010, and a DPSW-1 single-well dress panel.

  In an AM2020/AFP1010 system, the ATG-2 Audio Tone Generator should be used for its paging capability only. Tone generation used with the ATG-2 in an AM2020/AFP1010 system requires the use of a LIB-200 and CMX module. The LIB-200A and LIB-400 cannot be employed for tone generation on the ATG-2.



A DPSW-1 is used when an AMG-1 or ATG-2 is employed with no FFT-7 or FFT-7S.

Figure 1.0-1 Dress Panel, Single Well (DPSW-1)

- **The VTCC-1 Voice/Telephone Command Center**

  The VTCC-1 Voice/Telephone Command Center is a basic equipment package for single-channel audio evacuation systems employing a fire fighter's telephone system (refer to **Figure 1.0-2**). The VTCC-1 provides 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 AM2020/AFP1010, and a double-well dress panel (refer to **Figure 1.0-3**).

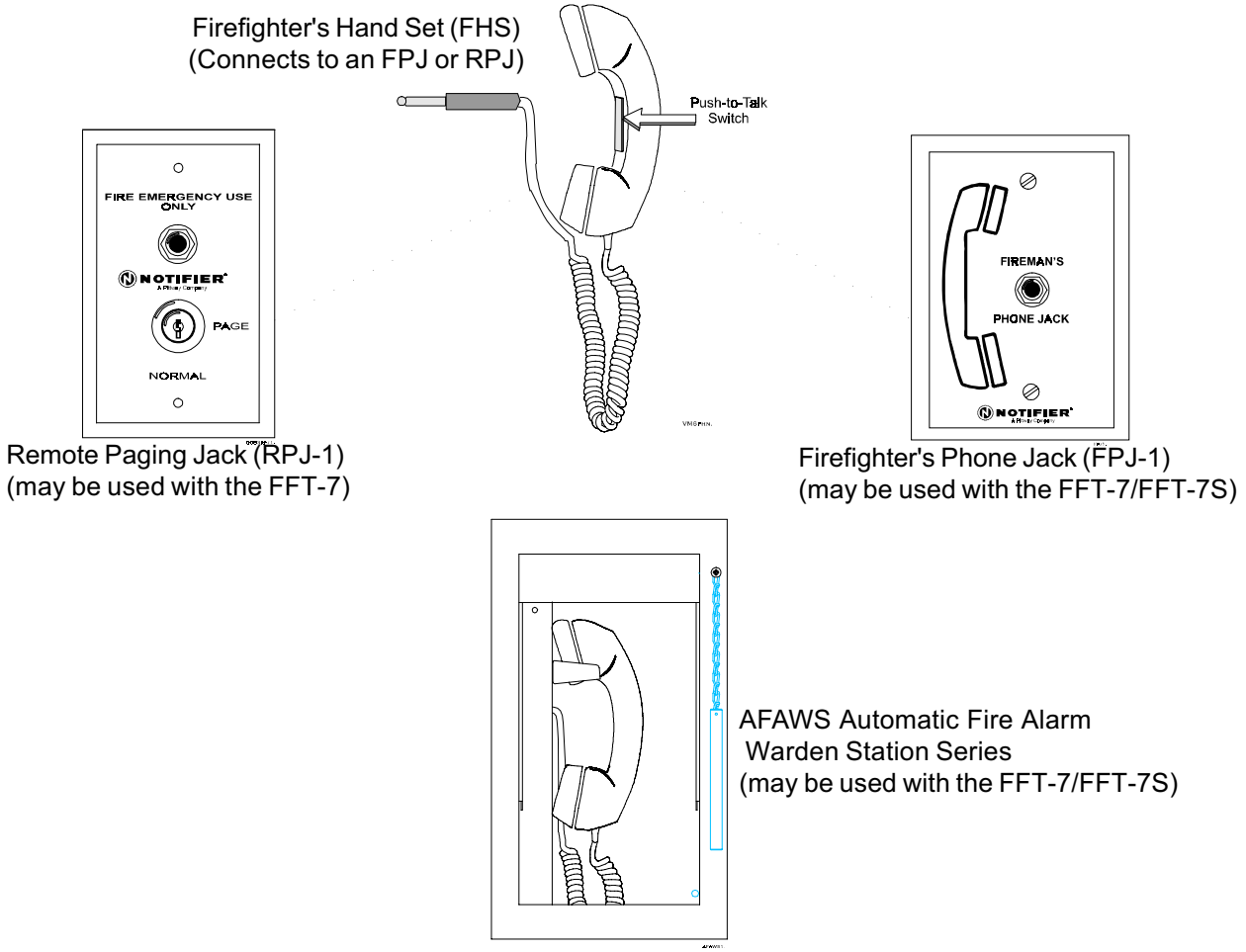
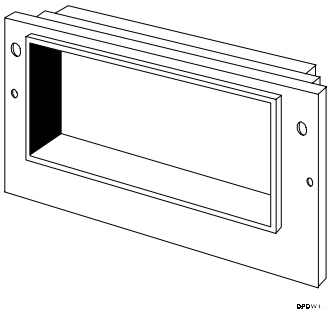


Figure 1.0-2 Firefighter's Telephone System Components



A DPDW-1 is used when an AMG-1 or ATG-2 is employed with an FFT-7 or FFT-7S (stand-alone).

Figure 1.0-3 Dress Panel, Double Well (DPDW-1)

- **The VTCC-2 Voice/Telephone Command Center**

  The VTCC-2 Voice/Telephone Command Center is a basic equipment package without prerecorded voice messages. The VTCC-2 is for single- or dual-channel audio evacuation systems employing a fire fighter's telephone system. The VTCC-2 provides 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 AM2020/AFP1010, and a double-well dress panel.

  In an AM2020/AFP1010 system, the ATG-2 Audio Tone Generator should be used for its paging capability only. Tone generation used with the ATG-2 in an AM2020/AFP1010 system requires the use of a LIB-200 and CMX module. The LIB-200A and LIB-400 cannot be employed for tone generation on the ATG-2.

- **The VTCC-AVL Voice/Telephone Command Center for Audio Voice Link Systems**

  The VTCC-AVL Voice/Telephone Command Center with Audio Voice Link is a basic equipment package for single-channel audio evacuation systems employing the AVL-1 Audio Voice Link. The VTCC-AVL includes one AMG-1 Audio Message Generator, one FFT-7S stand-alone fire fighter's telephone, one CHS-4L Chassis for mounting the AMG-1 and FFT-7S, cable assemblies for connection to the AM2020/AFP1010, and a double-well dress panel.

  NOTE

  The AVL-1 is not included in this package; it must be ordered separately.

- **The TCC-1 Telephone Command Center**

  The TCC-1 Telephone Command Center is a basic equipment package for single-channel audio evacuation systems requiring a fire fighter's telephone system with no AMG-1 or paging capabilities. The TCC-1 provides an FFT-7S fire fighters telephone (an FFT-7 with no paging capability), one CHS-4L Chassis for mounting the FFT-7S, cable assemblies for connection to the AM2020/AFP1010, two TBP-1 blank panels, and a double-well dress panel.

Voice alarm equipment is supplemented by the following optional components:

- **Audio Amplifiers**
  The AA-30/AA-30E and AA-120/AA-120E Audio Amplifiers amplify the signal from an AMG-1 or ATG-2 to 25 V_{RMS} before distribution to speaker circuits. The AA-100/AA-100E has dual outputs at 25 V_{RMS} and 70.7 V_{RMS}.

- **Chassis**
  Additional CHS-4L Chassis are needed to mount AA-30/AA-30E audio amplifiers, ATG-2s or AMG-1s.

1.1 Related Documentation

To obtain a complete understanding of specific features of the Voice Multiplex System or to become familiar with functions in general, refer to the documentation listed in **Table 1.1-1**. The Notifier document (DOC-NOT) chart provides the current document revision.

TITLE	NUMBER	TITLE	NUMBER
AM2020/AFP1010 Fire Alarm Control Panel	15088	Annunciator Control System	15842
Liquid Crystal Display (LCD-80)	15037	Lamp Driver Modules (LDM)	15885
Network Reporting Terminal (NRT)	15090	Voice Alarm Multiplex	15889
Intelligent Network Annunciator (INA)	15092	The XP Series Transponder System	15888
Universal Zone Coder Installation (UZC-256)	15216	Network Adaptor Module (NAM-232)	50038
Product Installation Document (CCM-1)	15328	The UDACT Universal Digital Alarm Communicator/Transmitter	50050
Product Installation Document (MPS-TR)	15331	FCPS-24/FCPS-24E Field Charger/Power Supply Installation, Operation and Application Manual	50059
AM2020/AFP1010 Operator Instructions	15337	Video Graphics Annunciator System (VGAS) Installation Manual	50251
Notifier Device Compatibility Document	15378	Media Interface Board (MIB)	50255
Analog Fire Panel (AFP-200)	15511	Repeater (RPT)	50256
Canadian Requirements for the AM2020/AFP1010	15631	**NOTI-FIRE-NET™**	50257
Network Interface Board (NIB-96)	15666	Telephone/Panel Interface (TPI-232)	50372
Smoke Control Manual	15712	Media Evaluation Tool (MET-1)	50480
Analog Fire Panel (AFP-300/AFP-400)	50253/50259/ 50260	Automatic Fire Alarm Warden Station Series Product Installation Drawing	50705
NR45-24 Charger	15760	MMX-2 Installation Instructions	M500-03-00

allndocs.tbl 11/14/97

Table 1.1-1 Voice Multiplex System Related Documentation

SECTION TWO
DESIGN CONSIDERATIONS

2.0 SECTION OBJECTIVE

Section Two is a brief overview of the role each voice alarm component plays in audio evacuation applications. The figures contained in this section are not installation drawings. Mechanical Installation is covered in the Installation chapter of the AM2020/AFP1010 Fire Alarm Control Panel, Document 15088.

2.1 EXECUTING AUDIO FUNCTIONS WITH AN AMG-1

Through an EIA-485 communication loop, the control panel can automatically activate programmed tones or messages on the AMG-1. An ACM-16AT annunciator is required to activate tones or messages on the AMG-1 (refer to **Figure 2.1-1**).

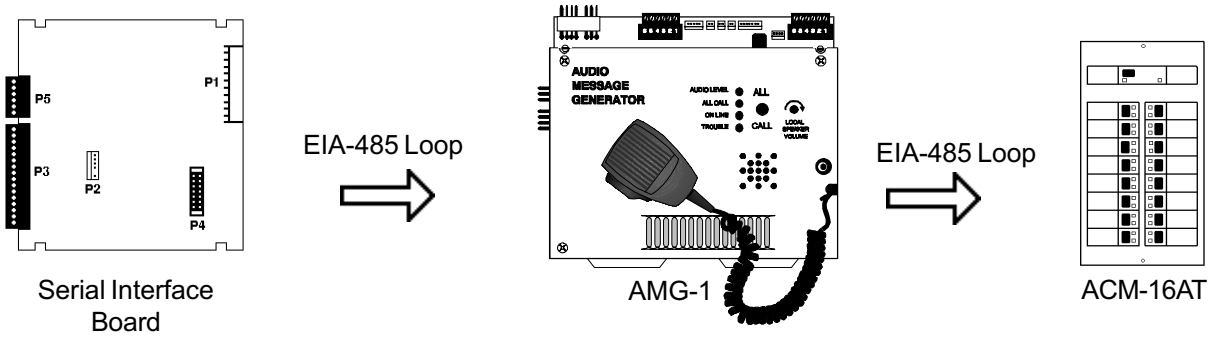


Figure 2.1-1 AMG-1 Audio Functions

2.2 EXECUTING TONE GENERATION WITH AN ATG-2 (FOR USE WITH THE LIB-200 ONLY)

Through a hardwired connection with a LIB-200 and CMX only, the control panel can automatically activate tones on the ATG-2 (refer to **Figures 2.2-1 and 3-3B**). The ATG-2 contains an End-of-Line resistor. No additional End-of-Line resistor needs to be installed on the input.

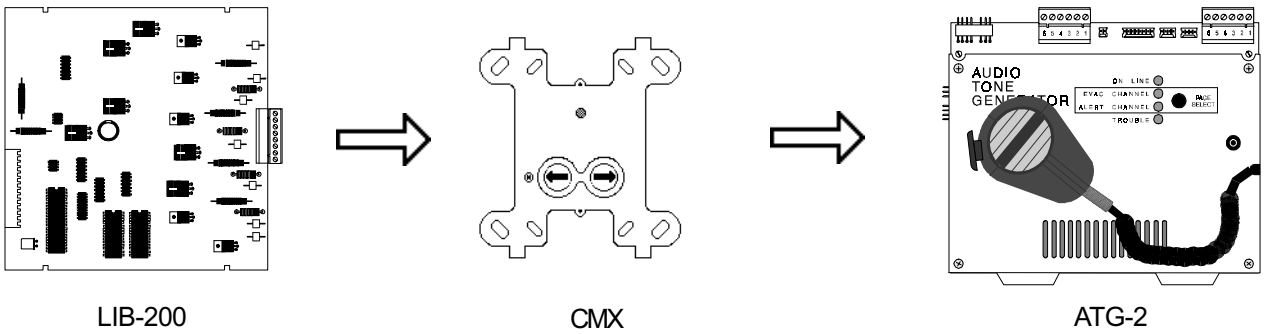


Figure 2.2-1 ATG-2 Audio Functions

NOTE

Refer to the AM2020/AFP1010 Installation Manual for power-limited and non power-limited wiring instructions.

2.3 Amplifying the Audio Signal

The AMG-1 and ATG-2 produce low-level tones or messages. To drive speaker circuits, the audio signal must be fed through an AA-30, AA-30E, AA-100, AA-100E, AA-120, or AA-120E Audio Amplifier. The output of the amplifiers is then fed to the modules that control the speaker zones (refer to **Figure 2.3-1**). The AMG-1 or ATG-2 can drive up to 50 amplifiers per channel. The use of an ACT-1 is required in some applications (refer to **Figure 2.3-2**).

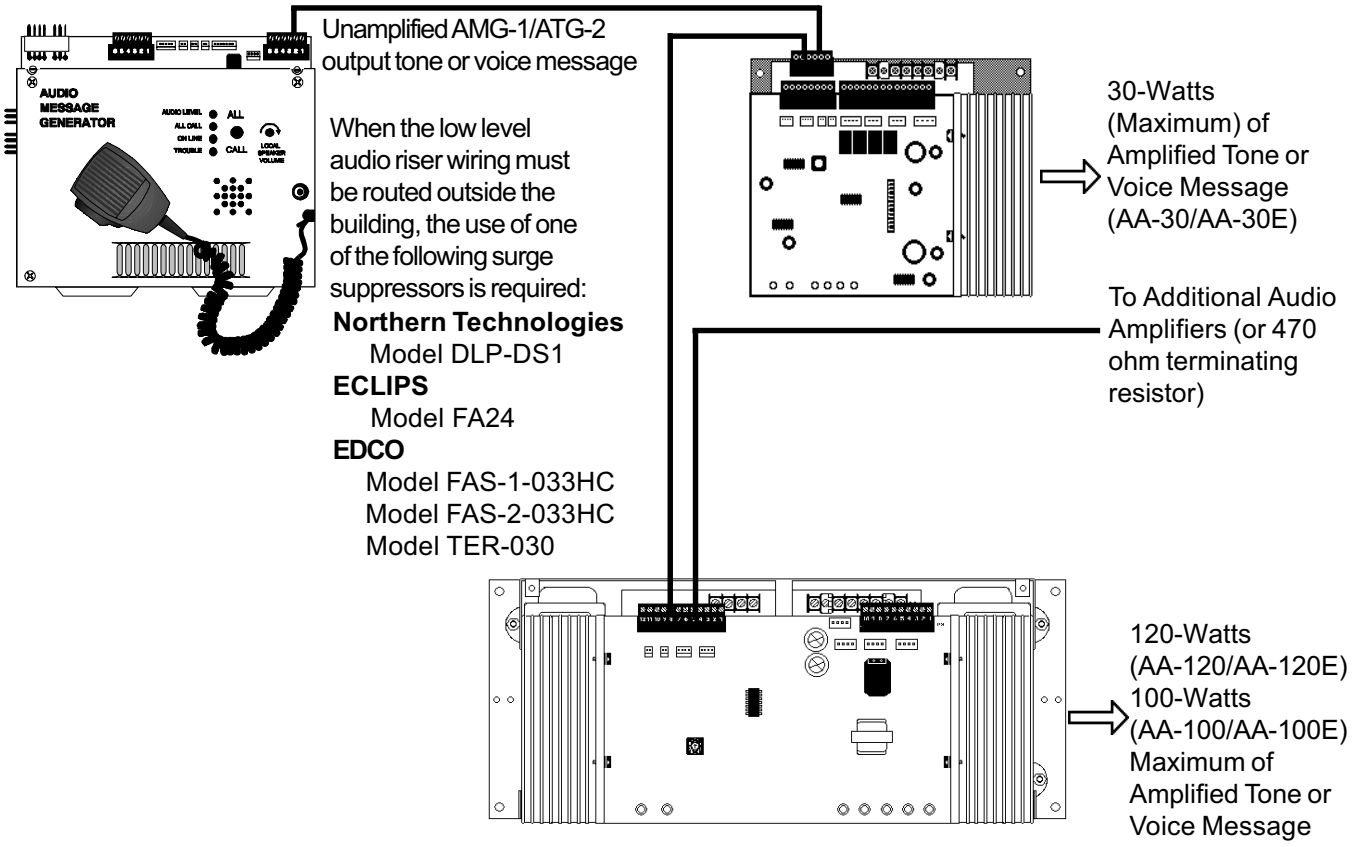


Figure 2.3-1 Audio Signal Amplification

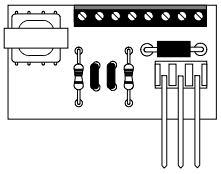


Figure 2.3-2 ACT-1 Audio Coupling Transformer

2.4 Driving the Speaker Circuits

The amplified signal from each Audio Amplifier needs to be connected to a control module that will switch the signal to a speaker circuit when needed. The module takes its instructions from the Loop Interface Board. This is not an installation drawing, refer to Appendix A in the AM2020/AFP1010 Manual, Document 15088 for circuit/device ratings. A Control Module (CMX) may be used for individual speaker circuits (refer to **Figure 2.4-1**).

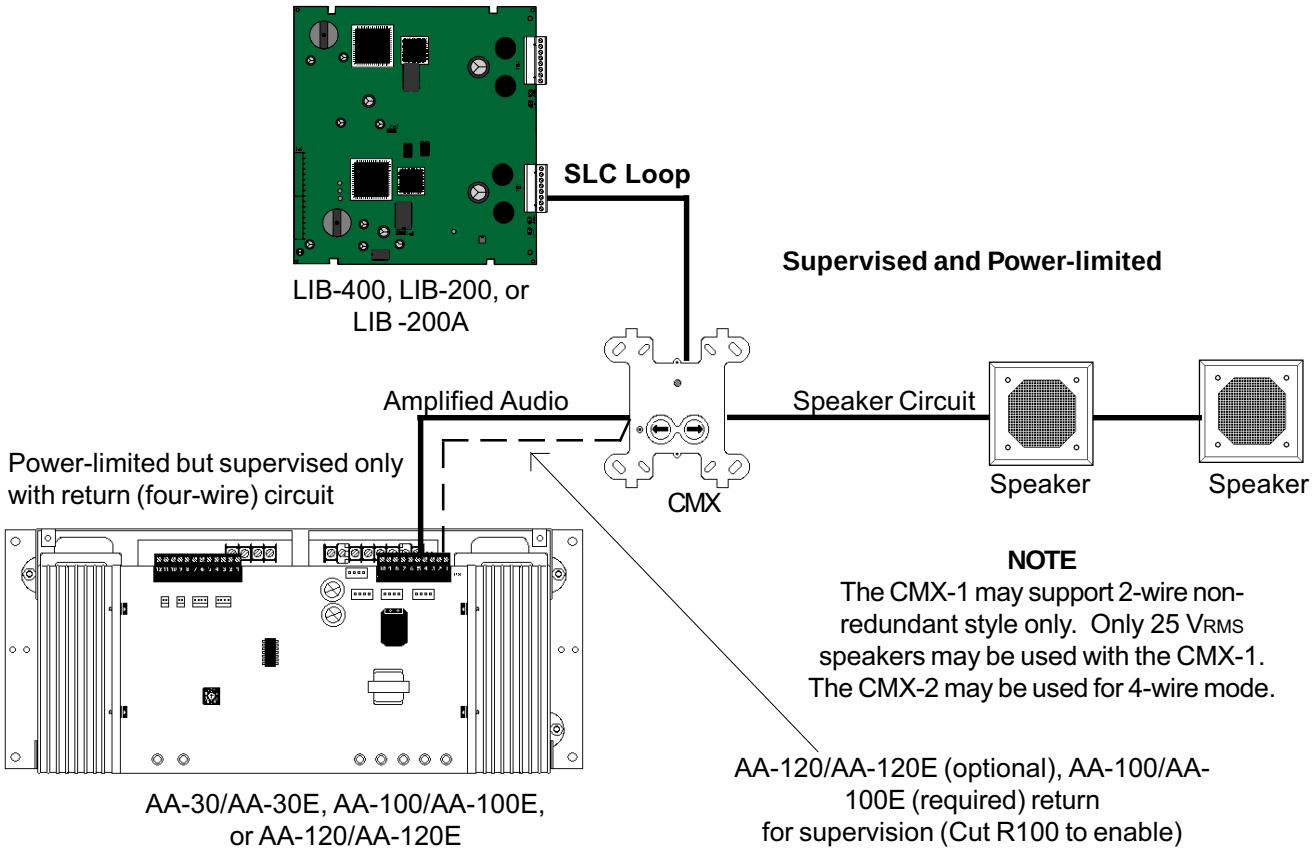
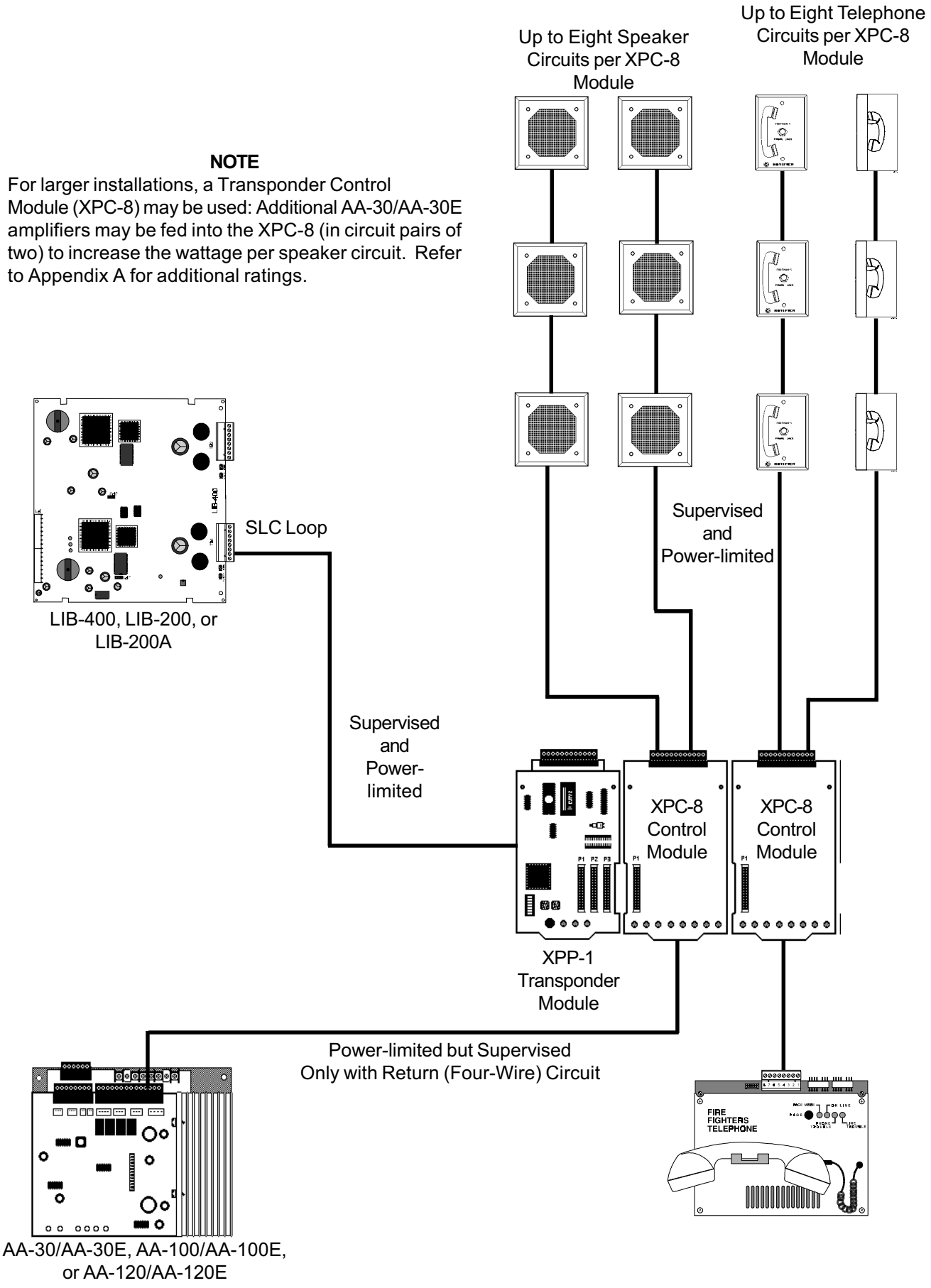


Figure 2.4-1 Speaker Circuits

NOTE

For larger installations, a Transponder Control Module (XPC-8) may be used: Additional AA-30/AA-30E amplifiers may be fed into the XPC-8 (in circuit pairs of two) to increase the wattage per speaker circuit. Refer to Appendix A for additional ratings.

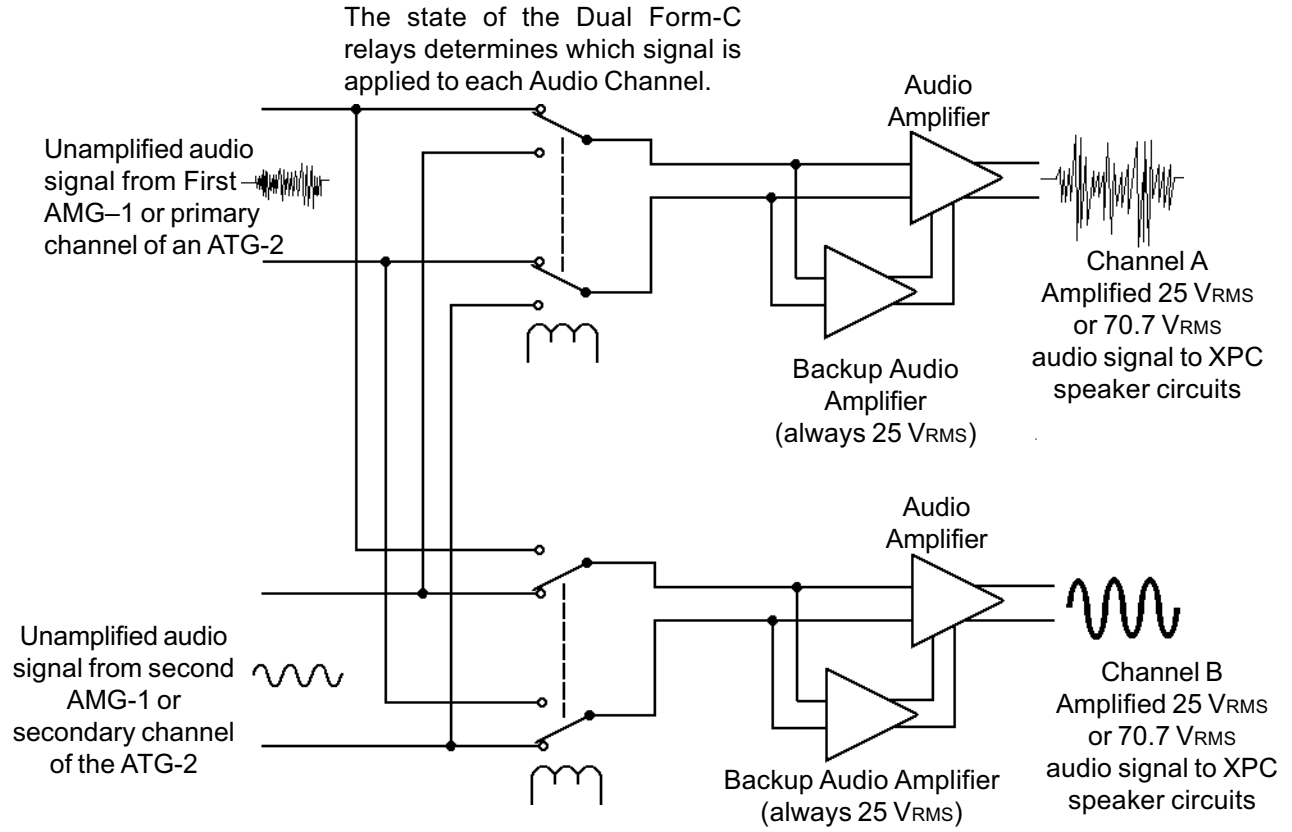


Dual-Channel Audio

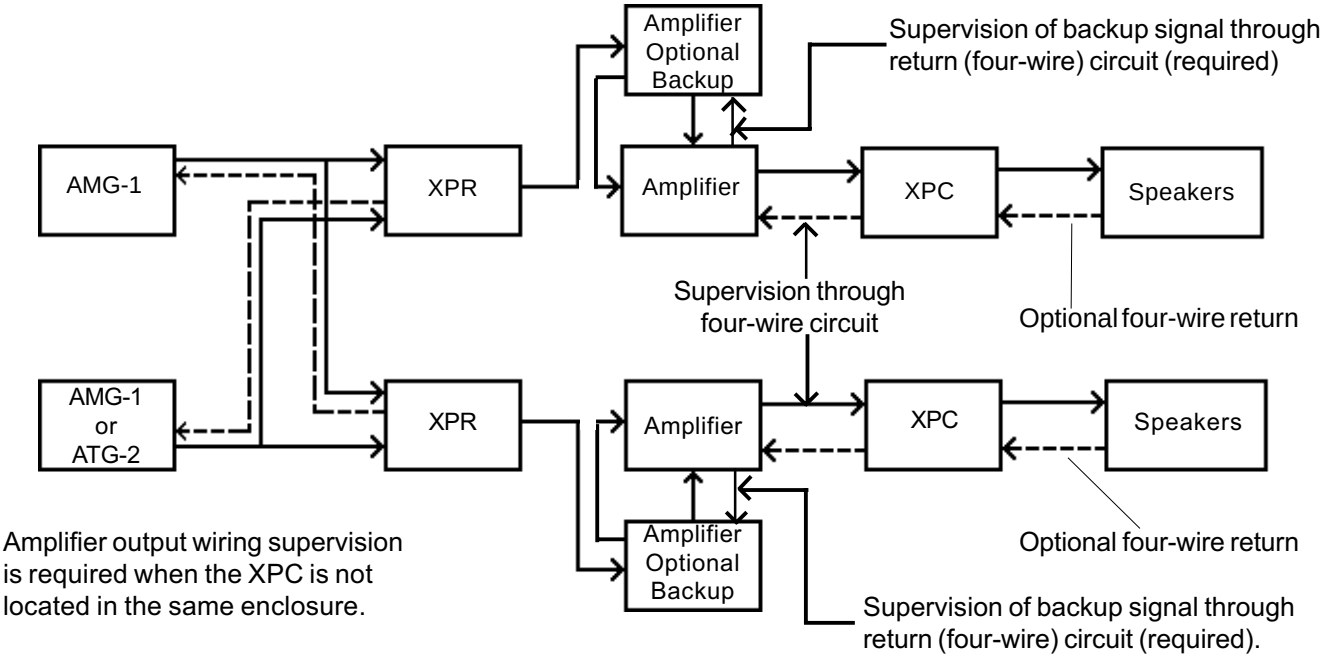
The AM2020/AFP1010 dual-channel audio system can be configured as follows:

- Two AMG-1s, each providing one audio channel.
- One AMG-1 and one ATG-2 configured for single-channel operation.
- One ATG-2 providing two audio Channels.

Dual-Channel Audio Schematic



Dual-Channel Audio Block Diagram

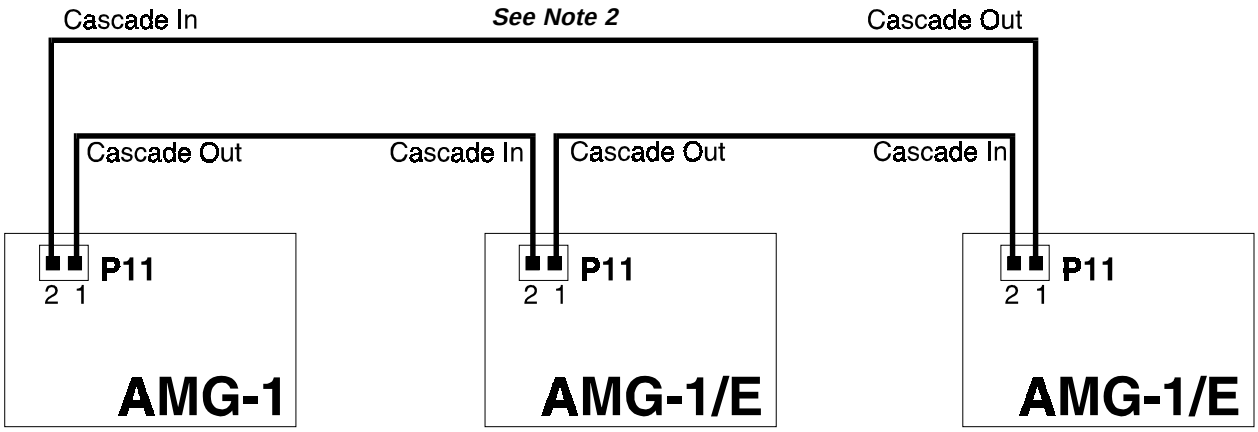


2.5 Cascading AMG's for Multi-channel Audio

Multi-channel Audio

Multiple AMG-1's and AMG-E's may be connected together to produce a multi-channel audio system (eight channels are the maximum allowed). In a multi-channel system, the connection shown below is required to pass the "PAGE" signal between each AMG.

A typical three-channel installation is shown below:



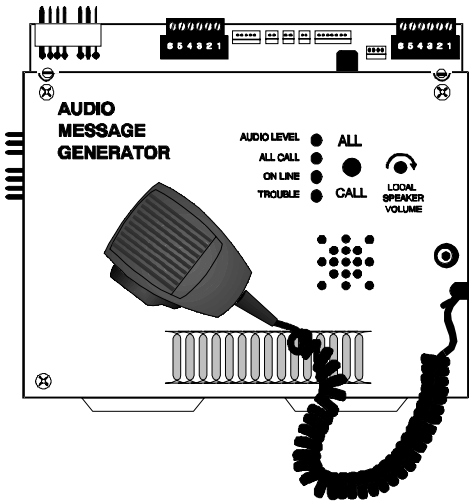
Note 1: *All AMG's must be mounted in the same cabinet.*

Note 2: *This connection is required only if the last Audio Message Generator is an AMG-1. The connection provides paging feedback between the third and first AMG-1's.*

Section Three:
Audio Message/Tone Generators

AMG-1 Audio Message Generator

The Audio Message Generator (AMG-1) is the heart of the Voice Alarm System. This unit provides up to four digitally-recorded voice messages, 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 Audio Message Generator provides system paging capability from telephones installed throughout the installation. Additionally, the AMG-1 produces a variety of tones, including slow whoop, yelp, yeow, siren, hi/lo, and steady tone. See Tables 3-1 and 3-2 for available options.



Factory Voice Messages

Various pre-recorded 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, see the VROM-(n) Voice Messages document.

Field Programmable Messages

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

Operation

The AMG-1 may be commanded 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 must be installed. Up to fifty Audio Amplifiers may be driven directly by each AMG.

AMG-E Audio Message Generator

For multiple Dual-Channel applications that do not require two microphones, order the AMG-E for the second channel.

AMG-X4 Audio Message Generator

If more than four AMG-1s are needed, a software revision of the AMG-1s EPROM chip is required. The AMG-X4 chip provides the capability to support up to eight AMGs in the system. Once the AMG-X4 chip has been installed, the AMG-1 must be set for an EIA-485 address in the range 25-28. A separate Group Function Chart to the AMG-X4 is provided in Table 3-2.

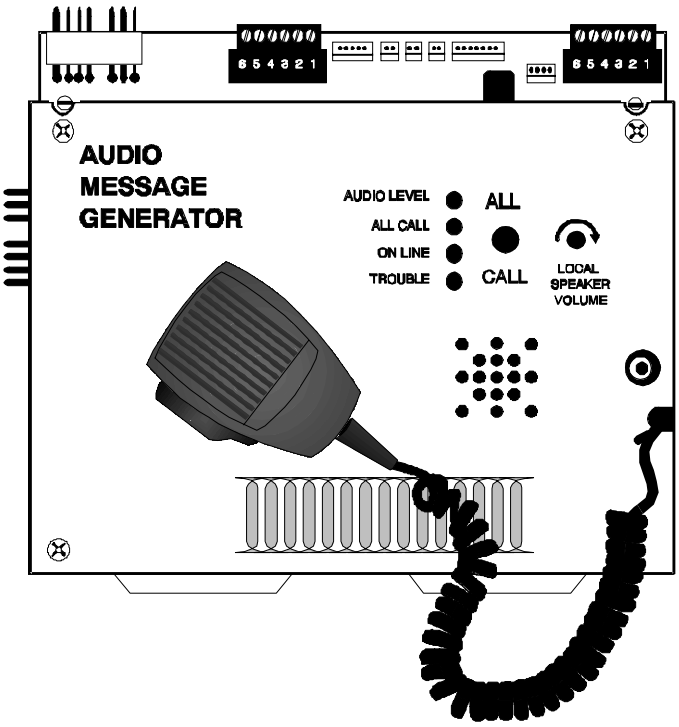
Zone Coded Voice (AMG-ZC)

Zone-coding is available through a software revision of the AMG-1s EPROM chip. The AMG-ZC chip allows the AMG-1 to announce the annunciator point address that is in alarm. The AMG-1 will only respond to an alarm. Simultaneous alarms will be announced in numerical order (1 to 256). Each alarm will be repeated four times before proceeding to the next alarm.

AVL-1 Audio Voice Link

The AVL-1 may be used to provide up to 16 minutes of audio recording library space. Words from the library may be combined to form up to 999 messages. See the AVL-1 Installation manual for further details.

Section 3.1: Operating the AMG-1 Audio Message Generator



The **Audio Level** LED is illuminated when the audio level is correct. When paging, talk loudly enough to cause this LED to illuminate. If the AUDIO Level LED is allowed to remain off for 30 seconds, a system trouble will result.

The **All Call** LED toggles on and off with each depression of the All Call Switch.

The **On Line** LED indicator is normally illuminated to show that the AM2020/AFP1010 is communicating with the Audio Message Generator.

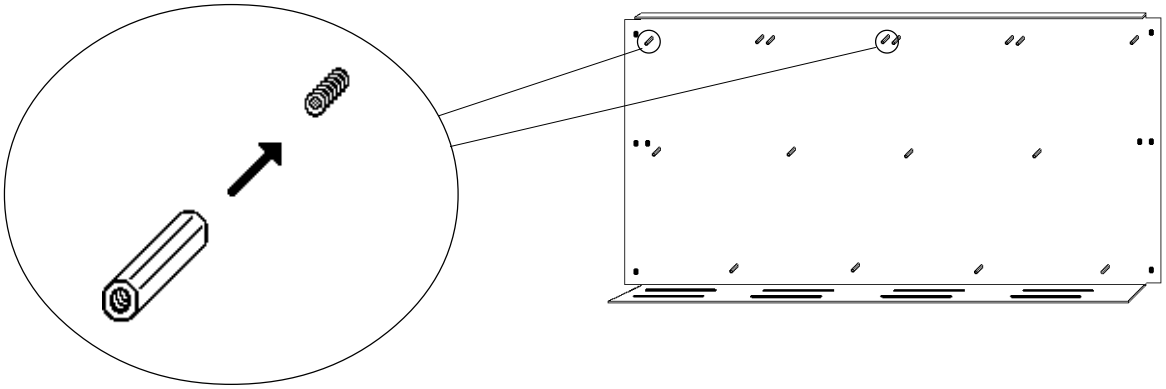
The **Trouble** LED illuminates to indicate the presence of a trouble in local audio subsystem equipment (AMG, AA-30/AA-30E, AA-100/AA-100E, AA-120/AA-120E, FFT-7).

The All Call Switch is used to activate all speaker circuits. These speaker circuits will deactivate when the All Call Switch is pressed again (toggle function), providing an alarm is not present. If an alarm is present, speaker circuits that have been programmed TO ACTIVATE during an alarm condition will remain activated until manually turned off or until the system is reset. For multi-channel applications, any All Call switch can be pushed, but a microphone must be installed on each AMG (i.e., no AMG-E). ***Note:*** To perform the All-Call function, the AMG-1 cannot be in receive only mode.

The Local Speaker Volume control adjusts the volume of the speaker located on the AMG. It will not affect the volume of the speakers installed throughout the building. If necessary, turn the volume down to prevent feedback during paging.

The microphone is used for paging. To page, select the speaker circuit(s) that you wish to page through by using the control switches on the corresponding ACM-16AT Annunciator or by using the All Call Switch. Depress the switch on the side of microphone and speak into the microphone. Talk loudly enough to cause the green Audio Level LED to illuminate.

Figure 3-1: AMG-1 and ATG-2 Installation

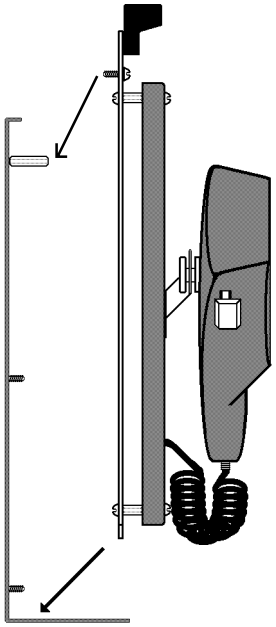


Step 1

To install the AMG-1 or ATG-2, affix a standoff to the first and fourth studs from the top-left corner of the CHS-4L Chassis.

Step 2

Angle the bottom edge of the unit into the bottom slot of the CHS-4L.



Step 3

Secure the unit to the CHS-4L with the captive screws on the unit.

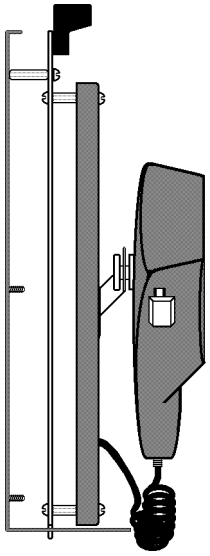
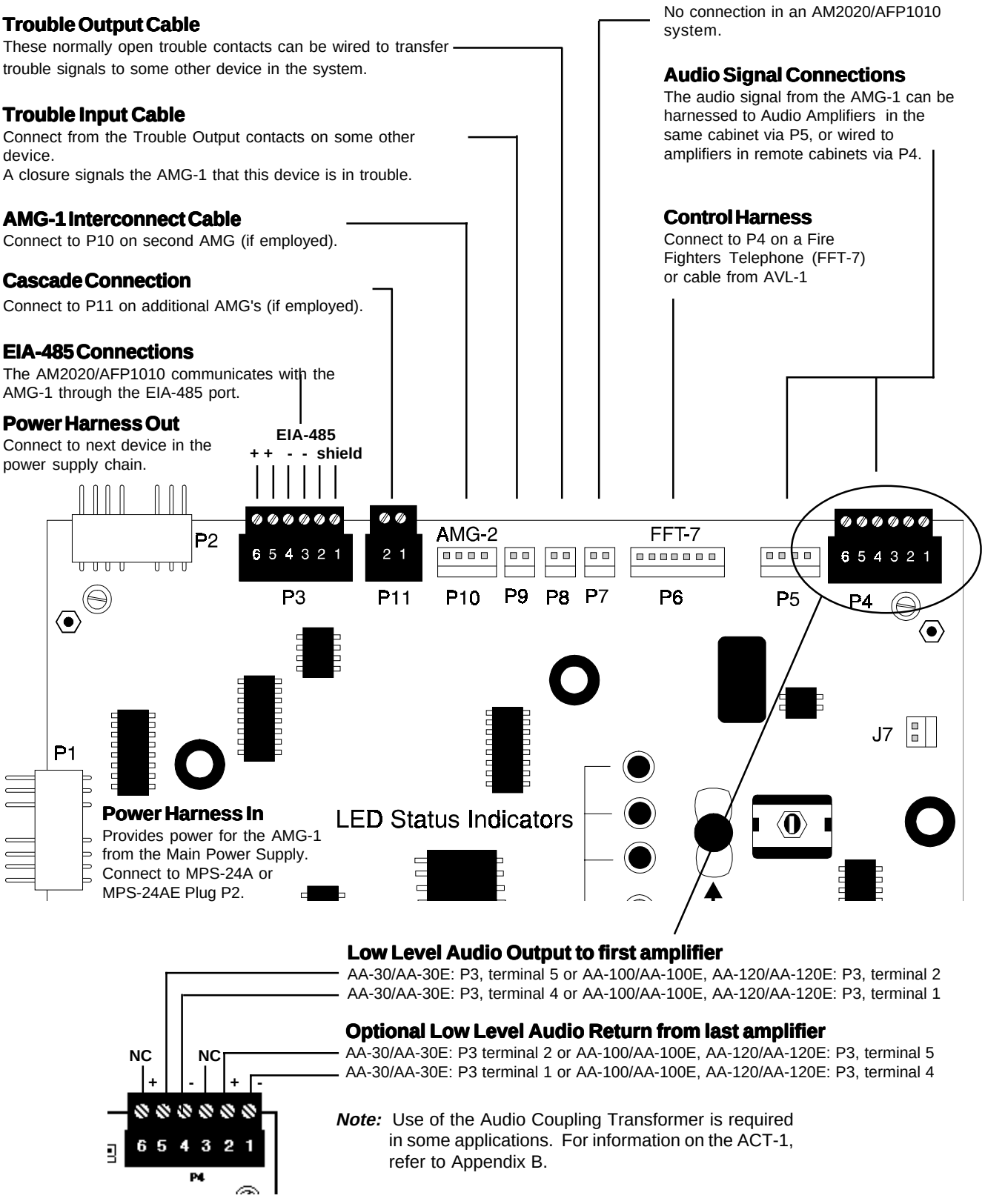
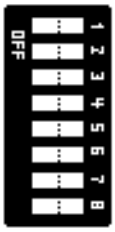


Figure 3-2: AMG-1 Terminal Connections



Configuration DIP Switches

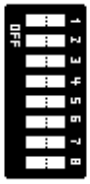
The AMG-1's configuration DIP switches are defined at right.



Set ON for 4-Wire audio loop supervision.
Address Switch
Address Switch
VRAM Enable A (VRAM "A" installed)
VRAM Enable B (VRAM "B" installed)
Group Function Selection switch
Group Function Selection switch
Group Function Selection switch

Setting the Address

Use the table below to set the desired address on the AMG-1. To set a switch "ON," push the rocker down in the ON position. When only one AMG is present, use Address 32.



	Address 32 *or Address 28**	**Address 31** *or Address 27**	**Address 30** *or Address 26**	**Address 29** *or Address 25**
Address Switch	ON	ON	OFF	OFF
Address Switch	ON	OFF	ON	OFF

**Italics* denote setting the address for an AMG-1 with an AMG-X4 EPROM installed.

Selecting Group Functions

Operation of the various tones and messages available in a voice alarm application is dependent upon the type and number of ROM chips installed and the functional groups selected by DIP switch settings on the AMG-1. Group selection is accomplished by setting DIP switch positions 6, 7 and 8 on the AMG-1. See the AMG-1 Group Function Tables (Tables 3-1 and 3-2).

Factory Messages *

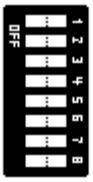
With VROM-(n) chips installed, a factory-programmed message can be selected. For example, VROM-101 provides the following message in a male voice.

> "MAY I HAVE YOUR ATTENTION PLEASE! MAY I HAVE YOUR ATTENTION PLEASE! THERE HAS BEEN A FIRE REPORTED ON YOUR FLOOR. THERE HAS BEEN A FIRE REPORTED ON YOUR FLOOR. PLEASE PROCEED TO THE STAIRWAYS AND EXIT THE BUILDING. DO NOT USE THE ELEVATORS."

Custom Messages * (with VRAM chips 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. DIP switch positions 4 and 5 are used for this purpose.

1) Set the respective VRAM Enable switch "ON."
2) Record or download the message, up to 24 seconds.
3) Set the respective VRAM Enable switch "OFF."



VRAM Enable A (VRAM "A" installed)
VRAM Enable B (VRAM "B" installed)

Note: If a digitally-stored voice message fails, the AMG-1 will automatically switch to the primary evacuation tone, and will generate a trouble condition.

Selecting ALL CALL

Pressing the ALL CALL switch will activate all speaker circuits programmed with software type "SPKR." In dual-channel systems, the signal generated by the particular AMG-1 on which the ALL CALL button has been pressed will immediately go out across both channels.

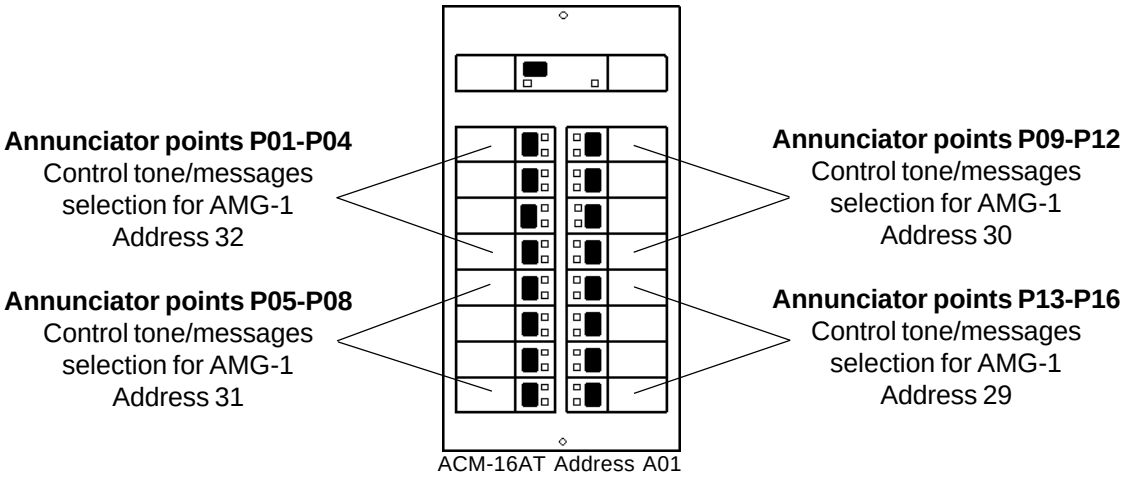
AM2020 AMG Programming

During programming of the AM2020/AFP1010 (and after the installation of any AMG-1s), each AMG-1 must be programmed as if they were annunciators. The address is set on the AMG-1 (25-32) and must correspond to the programmed annunciator address. ***Note:*** All speaker circuits must be programmed with software type "SPKR." When an FFT-7 is used, it must be attached to an AMG at Address 32.

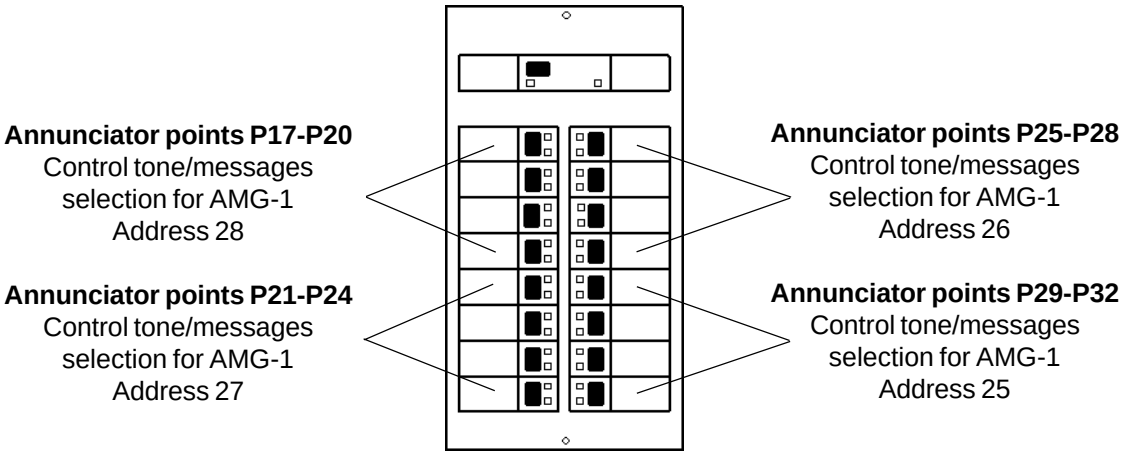
AMG-1 and the ACM-16AT

Set the address of the AMG-1 Audio Message Generator via DIP switches 2 and 3. This address can only be set for 29-32 for a standard AMG-1 or 25-28 for an AMG-1 with an AMG-X4 EPROM installed. The highest possible address setting is recommended. This allows the AMG-1 functions to assume the first four points on an ACM-16AT set to address "1." Up to eight AMG-1s may be installed in an AM2020/AFP1010 system.

For AMG-1s set in the address range A29-A32:



For AMG-1s set in the address range 25-28 (AMG-X4 EPROM required):



Boston Code (***Note:*** requires VROM-109 to be installed in VROM-B position)
The special Boston Code, which appears on the following two pages, will function as follows:

1) Pause.
2) All Call is initiated.
3) Four rounds of Code Four (four pulses of a 900 Hz tone followed by a 1 second pause, repeated four times).
4) VROM B (VROM-109) is played twice.
5) All Call is deactivated.
5) Fifteen second pause.
6) Continuous Slow Whoop.

Table 3-1: AMG-1 Tone/Message Functions

(for AMG-1 addresses A32 through A29)

Audio Message Generator DIP Switch Settings			Annunciator Control Points on ACM-16AT Address A01 AMG-1 at Address				Tone/Voice Message Group Functions
S6	S7	S8	A32	A31	A30	A29	
Off	Off	Off	P01	P05	P09	P13	VROM A
Off	Off	Off	P02	P06	P10	P14	VROM B
Off	Off	Off	P03	P07	P11	P15	VRAM A
Off	Off	Off	P04	P08	P12	P16	VRAM B
Off	Off	On	P01	P05	P09	P13	3 Fast Whoops, Pause, VROM A
Off	Off	On	P02	P06	P10	P14	3 Hi/Low Tones, Pause, VROM B
Off	Off	On	P03	P07	P11	P15	3 Yeows, Pause, VRAM A
Off	Off	On	P04	P08	P12	P16	3 Slow Whoops, Pause, VRAM B
Off	On	Off	P01	P05	P09	P13	3 Fast Whoops, Pause, VROM A, VROM B
Off	On	Off	P02	P06	P10	P14	3 Hi/Low Tones, Pause, VRAM A
Off	On	Off	P03	P07	P11	P15	3 Yeows, Pause, VRAM B
Off	On	Off	P04	P08	P12	P16	Wail
Off	On	On	P01	P05	P09	P13	3 Slow Whoops, Pause, VROM A
Off	On	On	P02	P06	P10	P14	3 Hi/Low Tones, Pause, VROM B
Off	On	On	P03	P07	P11	P15	Yelp
Off	On	On	P04	P08	P12	P16	Wail
On	Off	Off	P01	P05	P09	P13	3 Slow Whoops, Pause, VRAM A
On	Off	Off	P02	P06	P10	P14	3 Hi/Low Tones, Pause, VRAM B
On	Off	Off	P03	P07	P11	P15	Yelp
On	Off	Off	P04	P08	P12	P16	Wail
On	Off	On	P01	P05	P09	P13	3 Slow Whoops, Pause, VROM A
On	Off	On	P02	P06	P10	P14	3 Hi/Low Tones, Pause, VRAM A
On	Off	On	P03	P07	P11	P15	Boston Code
On	Off	On	P04	P08	P12	P16	Horn
On	On	Off	P01	P05	P09	P13	California Uniform Fire Code (10s Yelp, Pause)
On	On	Off	P02	P06	P10	P14	California Uniform Fire Code (10s Fast Whoops, Pause)
On	On	Off	P03	P07	P11	P15	3 Hi/Low Tones, Pause, VROM A, Pause
On	On	Off	P04	P08	P12	P16	3 Slow Whoops, Pause, VRAM A, Pause
On	On	On	P01	P05	P09	P13	Yelp
On	On	On	P02	P06	P10	P14	Hi/Low Tones
On	On	On	P03	P07	P11	P15	Slow Whoop
On	On	On	P04	P08	P12	P16	NFPA Code (3s Pause, 3 Fast Whoops)

Notes:

1) All the above tone/messages sequences will repeat until they have been deselected through the annunciator control point. Priority within each group of four is from top (highest priority) to bottom (lowest priority).
2) If a digitally-stored voice message fails, the AMG-1 will automatically switch to the primary evacuation tone and will generate a trouble condition.
3) All pauses are 5 seconds long unless otherwise noted.

Table 3-2: AMG-1 Tone/Message Functions

(for AMG-1 addresses A28 through A25, AMG-X4 EPROM required)

Audio Message Generator DIP Switch Settings			Annunciator Control Points on AEM-16AT Address A01 AMG-1 at Address				Tone/Voice Message Group Functions
S6	S7	S8	A28	A27	A26	A25	
Off	Off	Off	P17	P21	P25	P29	VROM A
Off	Off	Off	P18	P22	P26	P30	VROM B
Off	Off	Off	P19	P23	P27	P31	VRAM A
Off	Off	Off	P20	P24	P28	P32	VRAM B
Off	Off	On	P17	P21	P25	P29	3 Fast Whoops, Pause, VROM A
Off	Off	On	P18	P22	P26	P30	3 Hi/Low Tones, Pause, VROM B
Off	Off	On	P19	P23	P27	P31	3 Yeows, Pause, VRAM A
Off	Off	On	P20	P24	P28	P32	3 Slow Whoops, Pause, VRAM B
Off	On	Off	P17	P21	P25	P29	3 Fast Whoops, Pause, VROM A, VROM B
Off	On	Off	P18	P22	P26	P30	3 Hi/Low Tones, Pause, VRAM A
Off	On	Off	P19	P23	P27	P31	3 Yeows, Pause, VRAM B
Off	On	Off	P20	P24	P28	P32	Wail
Off	On	On	P17	P21	P25	P29	3 Slow Whoops, Pause, VROM A
Off	On	On	P18	P22	P26	P30	3 Hi/Low Tones, Pause, VROM B
Off	On	On	P19	P23	P27	P31	Yelp
Off	On	On	P20	P24	P28	P32	Wail
On	Off	Off	P17	P21	P25	P29	3 Slow Whoops, Pause, VRAM A
On	Off	Off	P18	P22	P26	P30	3 Hi/Low Tones, Pause, VRAM B
On	Off	Off	P19	P23	P27	P31	Yelp
On	Off	Off	P20	P24	P28	P32	Wail
On	Off	On	P17	P21	P25	P29	3 Slow Whoops, Pause, VROM A
On	Off	On	P18	P22	P26	P30	3 Hi/Low Tones, Pause, VRAM A
On	Off	On	P19	P23	P27	P31	Boston Code
On	Off	On	P20	P24	P28	P32	Horn
On	On	Off	P17	P21	P25	P29	California Uniform Fire Code (10s Yelp, Pause)
On	On	Off	P18	P22	P26	P30	California Uniform Fire Code (10s Fast Whoops, Pause)
On	On	Off	P19	P23	P27	P31	3 Hi/Low Tones, Pause, VROM A, Pause
On	On	Off	P20	P24	P28	P32	3 Slow Whoops, Pause, VRAM A, Pause
On	On	On	P17	P21	P25	P29	Yelp
On	On	On	P18	P22	P26	P30	Hi/Low Tones
On	On	On	P19	P23	P27	P31	Slow Whoop
On	On	On	P20	P24	P28	P32	NFPA Code (3s Pause, 3 Fast Whoop)

Notes:

1) All the above tone/messages sequences will repeat until they have been deselected through the annunciator control point. Priority within each group of four is from top (highest priority) to bottom (lowest priority). The AEM-16AT must be the first expander attached to the ACM-16AT.
2) If a digitally-stored voice message fails, the AMG-1 will automatically switch to the primary evacuation tone and will generate a trouble condition.
3) All pauses are 5 seconds long unless otherwise noted.

Section 3.2: Zone-Coded Voice for the AM2020/AFP1010

Zone-coded voice is a software version of the AMG that announces the annunciator point address that is in alarm. It may be used by the AM2020/AFP1010 system. The AMG will emulate standard annunciators. If the AMG cannot find the data for the desired tone, or if the VROM for the original voice message has not been installed, the AMG will beep to indicate that there is a problem. ***Note:*** The zone-coded version of the AMG-1 does not monitor annunciators.

For any point that becomes active, the appropriate message will be repeated four times. If the point clears, a re-activation of the same point will lead to the outputting of the associated message once again.

Data Communications

The AMG communicates over a multi-drop EIA-485 interface with the AM2020/AFP1010 panel. The EIA-485 uses two wires and operates half-duplex. All characters comply with the ASCII code.

Receive-Only Annunciators

Any annunciators wishing to use the same address as the AMG must be Receive Only, as the AMG used in a Zone-Coded application must always be able to respond to the panel.

Panel Interface

The AMG will use four fixed annunciator addresses (2,3,4,5). This provides for announcement of up to 256 code numbers. It is not necessary to set any address on the AMG. If the AM2020/AFP1010 only requires 64 codes or less, it will only map non-control points to the first address. Any annunciators wishing to use these addresses must be Receive-only.

The AMG will only respond to an alarm condition. Troubles and control commands from the CPU are ignored. Simultaneous alarms will be announced in numerical order (1 to 256). Each alarm will be repeated four times before proceeding to the next alarm.

Zone-Coded Voice

If VROM-A has been installed and contains the required voice segments, then any alarms will be processed as zone-coded voice.

The AMG will broadcast the annunciator address number using digitally stored numbers (0,1,2,3,4,5,6,7,8, and 9). The number spoken will follow in the order of the annunciator point addresses. For example:

Annunciator Point	Number Spoken
Address 2, Point 1	"one"
Address 2, Point 10	"one zero"
Address 2, Point 29	"two nine"
Address 3, Point 1	"six five"
Address 5, Point 64	"two five six"

A tone may be selected to precede the code announcement. Four selections are allowed and set via DIP switches 7 and 8.

Switch 7	Switch 8	
0	0	No Tone
0	1	Whoop
1	0	Hi-Low
1	1	Chime

A "definer" word will always precede the announcement of the alarm point number. One of four words can be chosen via DIP switches 2 and 3.

Switch 2	Switch 3	
0	0	Zone
0	1	Code
1	0	Floor
1	1	Area

A voice message may be selected to follow the codes. This message will be stored on VROM-B and will be from the same message library available for the non-zone-coded AMG. It may be up to 24 seconds in length. The voice message is selectable via DIP switch 6 (ON = YES, OFF = NO).

The entire voice sequence is as follows:

- Tone (Optional)
- Definer word
- Number of first alarm (1-256)

Repeated 4 times

- 2-Second pause
- Definer word
- Number of subsequent alarm

Repeated 4 times

- 2-Second pause
- Voice message (Optional)
- Repeat

The above sequence will repeat indefinitely until the alarm condition has cleared or the system has been reset.

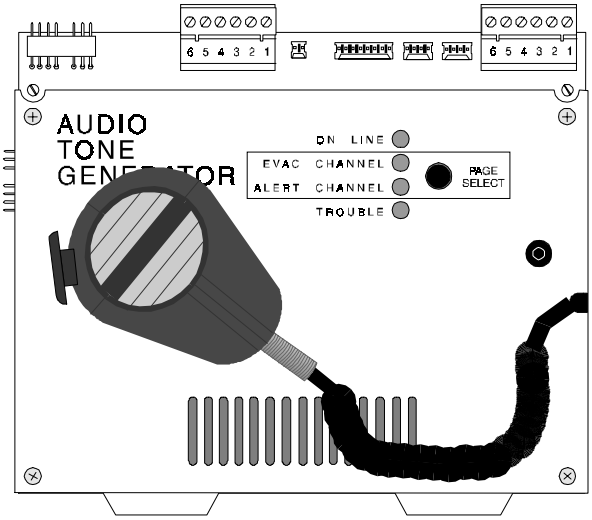
Zone-Coded Chimes

If VROM has not been installed, alarms will be processed as zone-coded chimes. The AMG will chime the code associated with the annunciator address number. Each code is repeated four times. The code output will follow in order of the annunciator point address. The designated codes are as follows:

1: 2,2,2,2,	2: 2,2,2,3	3: 2,2,2,4	4: 2,2,2,5	5: 2,2,3,2
6: 2,2,3,3	7: 2,2,3,4	8: 2,2,3,5	9. 2,2,4,2	10: 2,2,4,3
11: 2,2,4,4	12: 2,2,4,5	13: 2,2,5,2	14: 2,2,5,3	15: 2,2,5,4
16: 2,2,5,5	17: 2,3,2,2	18: 2,3,2,3	19: 2,3,2,4	20: 2,3,2,5
21: 2,3,3,2	22: 2,3,3,3	23: 2,3,3,4	24: 2,3,3,5	25: 2,3,4,2
26: 2,3,4,3	27: 2,3,4,4	28: 2,3,4,5	29: 2,3,5,2	30: 2,3,5,3
31: 2,3,5,4	32: 2,3,5,5	33: 2,4,2,2	34: 2,4,2,3	35: 2,4,2,4
36: 2,4,2,5	37: 2,4,3,2	38: 2,4,3,3	39: 2,4,3,4	40: 2,4,3,5
41: 2,4,4,2	42: 2,4,4,3	43: 2,4,4,4	44: 2,4,4,5	45: 2,4,5,2
46: 2,4,5,3	47: 2,4,5,4	48: 2,4,5,5	49: 2,5,2,2	50: 2,5,2,3
51: 2,5,2,4	52: 2,5,2,5	53: 2,5,3,2	54: 2,5,3,3	55: 2,5,3,4
56: 2,5,3,5	57: 2,5,4,2	58: 2,5,4,3	59: 2,5,4,4	60: 2,5,4,5
61: 2,5,5,2	62: 2,5,5,3	63: 2,5,5,4	64: 2,5,5,5	65: 3,2,2,2
66: 3,2,2,3	67: 3,2,2,4	68: 3,2,2,5	69: 3,2,3,2	70: 3,2,3,3
71: 3,2,3,4	72: 3,2,3,5	73: 3,2,4,2	74: 3,2,4,3	75: 3,2,4,4
76: 3,2,4,5	77: 3,2,5,2	78: 3,2,5,3	79: 3,2,5,4	80: 3,2,5,5
81: 3,3,2,2	82: 3,3,2,3	83: 3,3,2,4	84: 3,3,2,5	85: 3,3,3,2
86: 3,3,3,3	87: 3,3,3,4	88: 3,3,3,5	89: 3,3,4,2	90: 3,3,4,3
91: 3,3,4,4	92: 3,3,4,5	93: 3,3,5,2	94: 3,3,5,3	95: 3,3,5,4
96: 3,3,5,5	97: 3,4,2,2	98: 3,4,2,3	99: 3,4,2,4	100: 3,4,2,5
101: 3,4,3,2	102: 3,4,3,3	103: 3,4,3,4	104: 3,4,3,5	105: 3,4,4,2
106: 3,4,4,3	107: 3,4,4,4	108: 3,4,4,5	109: 3,4,5,2	110: 3,4,5,3
111: 3,4,5,4	112: 3,4,5,5	113: 3,5,2,2	114: 3,5,2,3	115: 3,5,2,4
116: 3,5,2,5	117: 3,5,3,2	118: 3,5,3,3	119: 3,5,3,4	120: 3,5,3,5
121: 3,5,4,2	122: 3,5,4,3	123: 3,5,4,4	124: 3,5,4,5	125: 3,5,5,2

126: 3,5,5,3	127: 3,5,5,4	128: 3,5,5,5	129: 4,2,2,2	130: 4,2,2,3
131: 4,2,2,4	132: 4,2,2,5	133: 4,2,3,2	134: 4,2,3,3	135: 4,2,3,4
136: 4,2,3,5	137: 4,2,4,2	138: 4,2,4,3	139: 4,2,4,4	140: 4,2,4,5
141: 4,2,5,2	142: 4,2,5,3	143: 4,2,5,4	144: 4,2,5,5	145: 4,3,2,2
146: 4,3,2,3	147: 4,3,2,4	148: 4,3,2,5	149: 4,3,3,2	150: 4,3,3,3
151: 4,3,3,4	152: 4,3,3,5	153: 4,3,4,2	154: 4,3,4,3	155: 4,3,4,4
156: 4,3,4,5	157: 4,3,5,2	158: 4,3,5,3	159: 4,3,5,4	160: 4,3,5,5
161: 4,4,2,2	162: 4,4,2,3	163: 4,4,2,4	164: 4,4,2,5	165: 4,4,3,2
166: 4,4,3,3	167: 4,4,3,4	168: 4,4,3,5	169: 4,4,4,2	170: 4,4,4,3
171: 4,4,4,4	172: 4,4,4,5	173: 4,4,5,2	174: 4,4,5,3	175: 4,4,5,4
176: 4,4,5,5	177: 4,5,2,2	178: 4,5,2,3	179: 4,5,2,4	180: 4,5,2,5
181: 4,5,3,2	182: 4,5,3,3	183: 4,5,3,4	184: 4,5,3,5	185: 4,5,4,2
186: 4,5,4,3	187: 4,5,4,4	188: 4,5,4,5	189: 4,5,5,2	190: 4,5,5,3
191: 4,5,5,4	192: 4,5,5,5	193: 5,2,2,2	194: 5,2,2,3	195: 5,2,2,4
196: 5,2,2,5	197: 5,2,3,2	198: 5,2,3,3	199: 5,2,3,4	200: 5,2,3,5
201: 5,2,4,2	202: 5,2,4,3	203: 5,2,4,4	204: 5,2,4,5	205: 5,2,5,2
206: 5,2,5,3	207: 5,2,5,4	208: 5,2,5,5	209: 5,3,2,2	210: 5,3,2,3
211: 5,3,2,4	212: 5,3,2,5	213: 5,3,3,2	214: 5,3,3,3	215: 5,3,3,4
216: 5,3,3,5	217: 5,3,4,2	218: 5,3,4,3	219: 5,3,4,4	220: 5,3,4,5
221: 5,3,5,2	222: 5,3,5,3	223: 5,3,5,4	224: 5,3,5,5	225: 5,4,2,2
226: 5,4,2,3	227: 5,4,2,4	228: 5,4,2,5	229: 5,4,3,2	230: 5,4,3,3
231: 5,4,3,4	232: 5,4,3,5	233: 5,4,4,2	234: 5,4,4,3	235: 5,4,4,4
236: 5,4,4,5	237: 5,4,5,2	238: 5,4,5,3	239: 5,4,5,4	240: 5,4,5,5
241: 5,5,2,2	242: 5,5,2,3	243: 5,5,2,4	244: 5,5,2,5	245: 5,5,3,2
246: 5,5,3,3	247: 5,5,3,4	248: 5,5,3,5	249: 5,5,4,2	250: 5,5,4,3
251: 5,5,4,4	252: 5,5,4,5	253: 5,5,5,2	254: 5,5,5,3	255: 5,5,5,4
256: 5,5,5,5				

Section 3.3:
ATG-2 Audio Tone Generator



In an AM2020/AFP1010 system (with any LIB), the ATG-2 serves as a remote paging microphone. Under this configuration the ATG-2 buffers the audio message (or tone) received from an AMG-1 (or another ATG-2) while allowing override paging capabilities.

When used with the LIB-200 (see Figure 3-3B), 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 primary (EVAC) channel. In dual-channel operation, the ATG-2 generates a chime tone or a 20 pulses-per-minute tone on a secondary (ALERT) channel.

The ATG-2 includes a built-in microphone with a page select switch which allows paging through speaker circuits on either or both channels. If employed with the optional FFT-7, the ATG-2 allows system paging capability from telephones installed throughout the installation. Up to 50 AA-30/AA-30E, AA-100/AA-100E, or AA-120/AA-120E Audio Amplifiers may be driven directly by the ATG–2.

ATG-2 Operation

The AMG-1 audio output is passed through the ATG-2 on connector P3. Normally, this signal is fed through both channels. This audio signal can be cut off by keying the microphone on the ATG-2 or by activation of the LIB-200 CMX circuit connection on P3 (see Figure 3-3B). The CMX circuit is controlled by an annunciator control switch point mapped to it.

Cabinet Mounting

The ATG-2 must be mounted on the left side of a CHS-4L chassis.

Operating the ATG-2

On Line: **This green LED** indicator is normally illuminated to show that the AM2020/AFP1010 is communicating with the Audio Tone Generator.

Evac Channel: **This green LED** illuminates to show that paging will occur over the EVAC channel

Alert Channel: **This green LED** illuminates to show that paging will occur over the ALERT channel.

Trouble: **This yellow LED** illuminates to indicate the presence of a trouble in local audio subsystem equipment (AA-30/AA-30E, AA-100/AA-100E, AA-120/AA-120E, FFT-7).

PAGE SELECT Switch: **The Page Select Switch**, when pressed, is used to choose between EVAC and ALERT channels for paging. The respective LED will illuminate when that channel has been selected.

Microphone: **The microphone** is used for paging. To page, select the desired channel by pressing the PAGE SELECT SWITCH until the respective LED illuminates. Depress switch on side of microphone and speak into the microphone.

Figure 3-3A: ATG-2 Terminal Connections

Note: Use of the ACT-1 Audio Coupling Transformer is required in some applications. For information on the ACT-1, refer to Appendix B.

Trouble Input
Connects from the Trouble Output contacts on AA-30/AA-30E, AA-100/AA-100E, and AA-120/AA-120E Audio Amplifiers. A closure signals the ATG-2 that a device is in trouble. The trouble signal is relayed through the Bell Circuit connection.

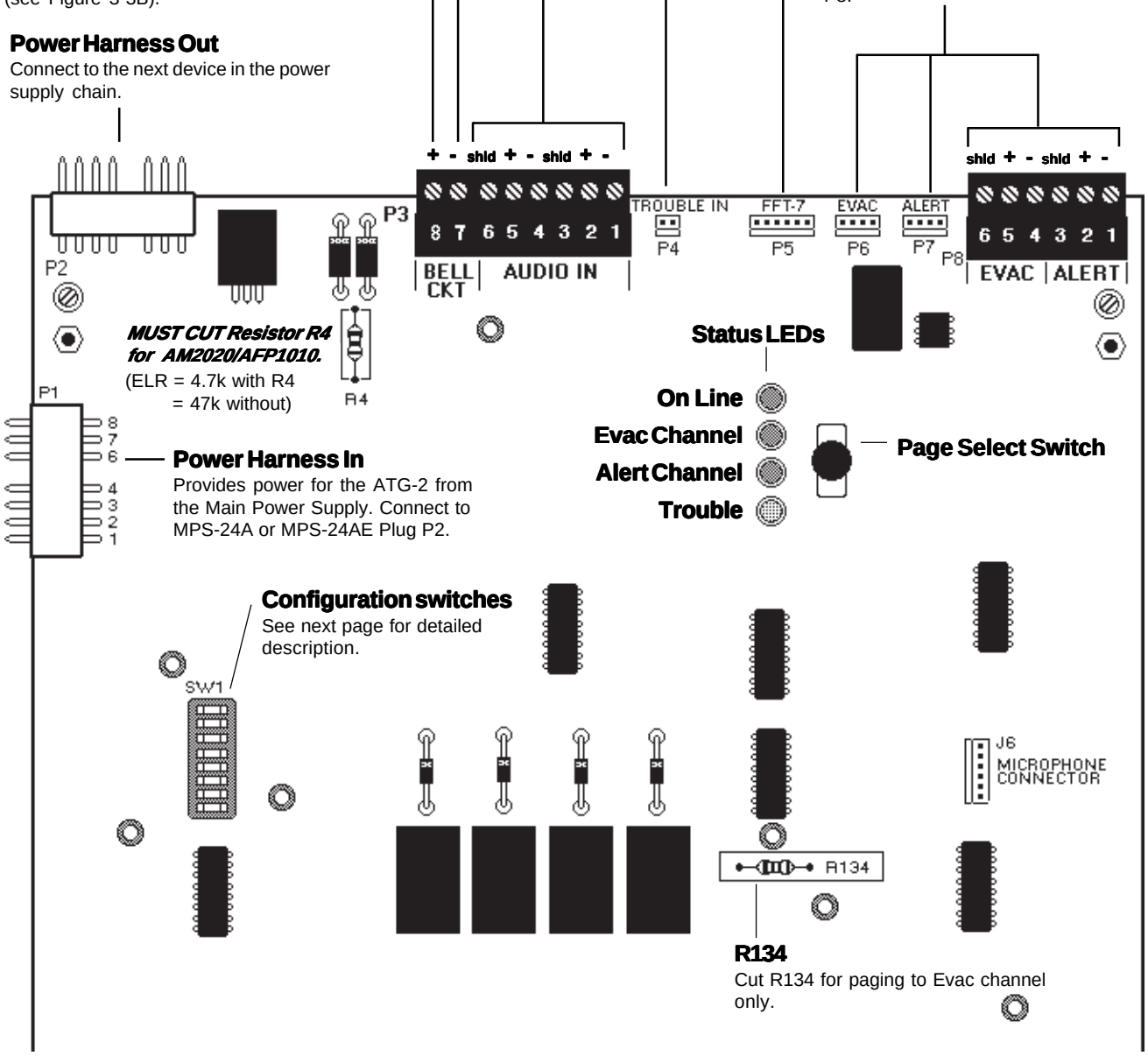
Low-level Audio Input and Thru
From AMG-1 and thru to other device when ATG-2 is used for remote paging.

CMX Connection (Use with LIB-200 only)
Provides the activation circuit for the ATG-2 (see Figure 3-3B).

Power Harness Out
Connect to the next device in the power supply chain.

Control Harness
Connect to P4 on a Fire Fighters Telephone (if employed).

Low-level Audio Output Connections
The audio signal from the ATG-2 can be harnessed to Audio Amplifiers in the same cabinet via P6 and P7, or wired to Audio Amplifiers in other cabinets via P8.



ATG-2 Activation (For Use with LIB-200 Only)

Unless configured for remote paging microphone operation, the ATG-2 must be activated by a CMX Control Module. Activation occurs when the CMX circuit (connected to ATG-2 Connector P3, Terminals 7 and 8) is turned on, reversing the polarity of the voltage wired to the ATG-2. For proper operation of the ATG-2, it is required that both the Loop Interface Board (use LIB-200 only) and the 24V source connected screws (3 and 4 of the CMX) are referenced to the power supply powering the ATG-2. ***Note:*** An XP Transponder XPC-8 Notification Appliance Circuit and CMX Control Modules connected to a LIB-400 or LIB-200A cannot be used for this purpose.

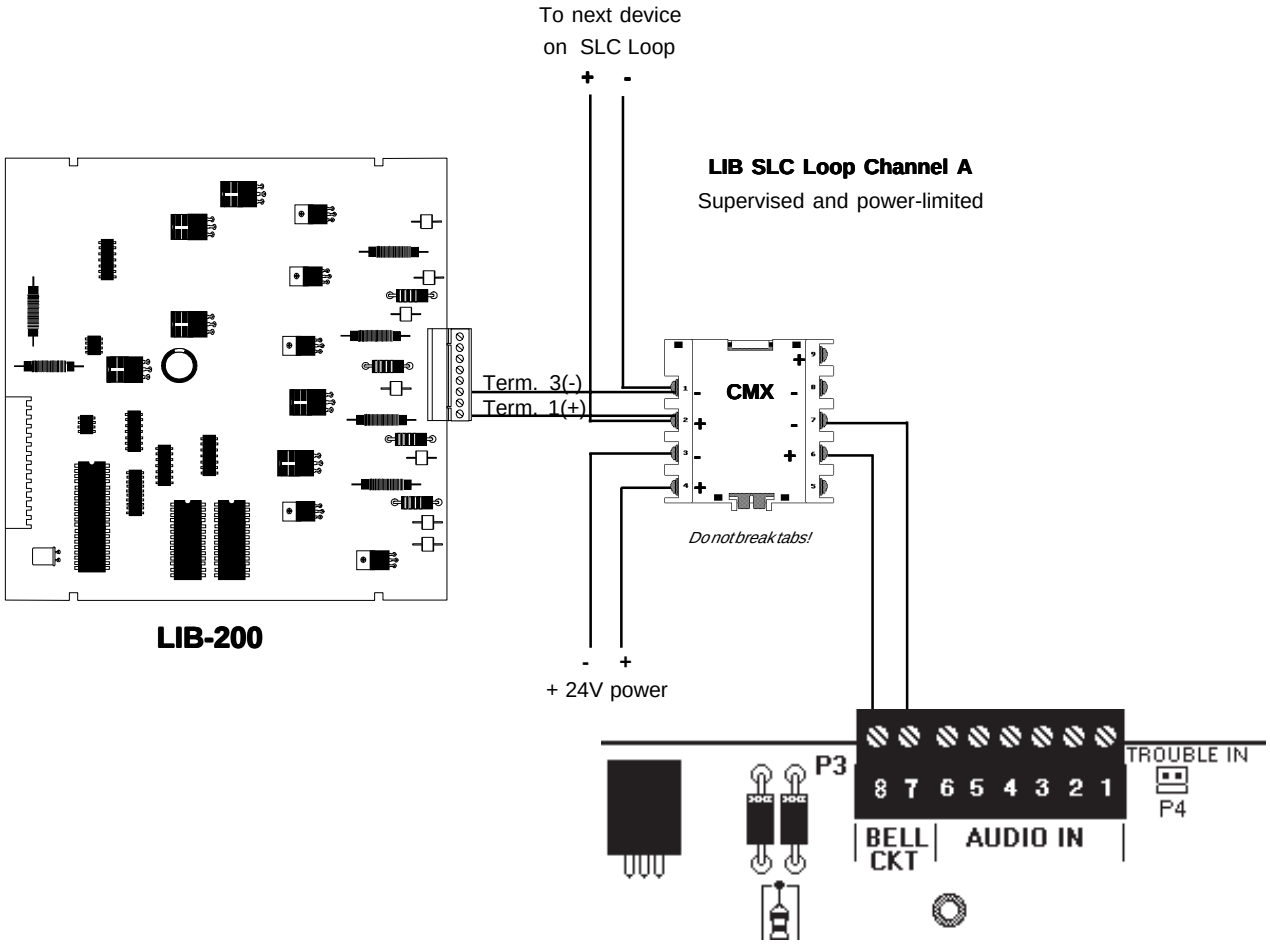
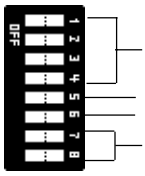


Figure 3-3B: ATG-2 Activation Circuit

Use supervised module-type Software ID (not Form-C type). Wire as Style Y, terminate at ATG-2 without end-of-line resistor. Cut R4 out of the ATG-2 in order to configure it for use with the AM2020/AFP1010.

ATG-2 DIP Switch Settings



EVAC Channel Tone Selection

Select when the ATG-2 is used in a remote paging application.

Select when the ATG-2 is used as the main paging/tone generator (use with LIB-200 only).

ALERT Channel Tone Selection

Operating Mode Selection

The ATG-2 can be configured for either of two modes of operation: remote paging only or tone generation and paging capability. The tone generation and paging mode can only be employed with the LIB-200 (see Figure 3-3B). DIP Switches 5 and 6 must be set in one of the configurations shown in the table to the right. Proper operation should be verified after setting these switches.

DIP Switch	Remote Paging Only	Paging/Tone Generation
5	ON	OFF
6	OFF	ON

Evacuation Channel Tone Selection

(Use with LIB-200 only)

The ATG-2 will generate a slow whoop, Hi/Lo, or steady tone on the primary (EVAC) channel. DIP Switches 1 through 4 must be set in one of the configurations shown in the table to the right. Proper operation should be verified after setting these switches.

DIP Switch	Whoop	Hi/Lo	Steady
1	OFF	ON	ON
2	ON	OFF	OFF
3	ON	ON	OFF
4	OFF	ON	OFF

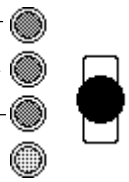
Alert Channel Tone Selection

(Use with LIB-200 only)

The ATG-2 will generate a chime or a 20 pulses-per-minute tone on the secondary (ALERT) channel. DIP Switches 7 and 8 must be set in one of the configurations shown in the table to the right. Proper operation should be verified after setting these switches.

DIP Switch	Chime	20 ppm
7	OFF	ON
8	ON	OFF

Setting paging options with the Page Select Switch



ON-LINE (green):
Illuminated continuously during operation.

EVAC CHANNEL (green):
When illuminated, paging will be broadcast over this channel.

ALERT CHANNEL (green):
When illuminated, paging will be broadcast over this channel.

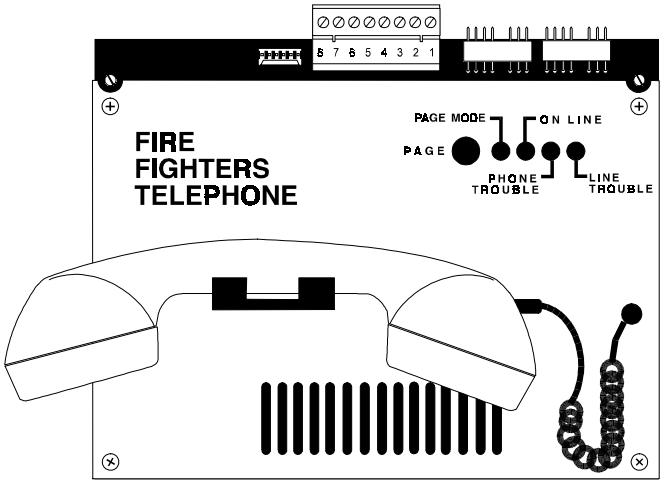
Page Select Switch
Push the switch until the LED for the desired paging channel(s) is illuminated.

TROUBLE (yellow):
Illuminates when trouble condition exists on FFT-7 or any audio amplifiers that have their trouble contacts wired to the ATG-2 trouble input connector.

Section Four:
Fire Fighter's Telephone

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. The FFT-7 must be employed with an Audio Message Generator (AMG-1) or Audio Tone Generator (ATG-2).



Cabinet Mounting

The FFT-7 must be mounted on the right side of a CHS-4L chassis. A special dress panel (DPDW-1) covers the AMG-1/ATG-2/FFT-7 assembly.

FFT-7S Fire Fighter's Telephone

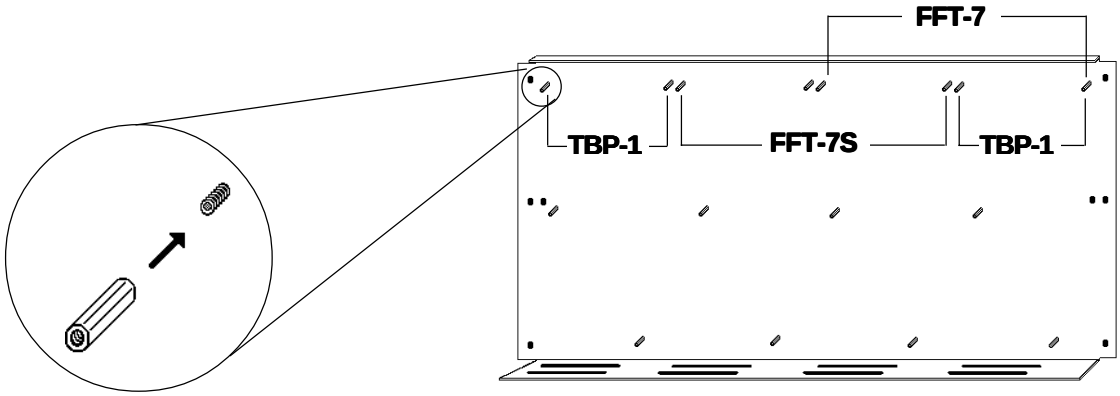
The FFT-7S provided with the TCC-1 and VTCC-AVL basic equipment packages operate like the FFT-7 without paging capabilities.

Cabinet Mounting

The FFT-7S, when used alone, mounts in the middle of a CHS-4L chassis. In this case, two special dress panels (TBP-1) mount on either side of the FFT-7S. When installing an FFT-7S with an AMG-1/AVL-1 combination, the FFT-7S must be mounted on the right side of the CHS-4L.

Step 1 To install the FFT-7 or FFT-7S with an AVL-1, affix a standoff to the fifth and eighth studs from the left corner of the CHS-4L Chassis.

To install the FFT-7S alone, affix a standoff to the third and sixth studs from the left corner of the CHS-4L Chassis. To install the two TBP-1 blank panels, affix standoffs to the first, second, seventh and eight studs.

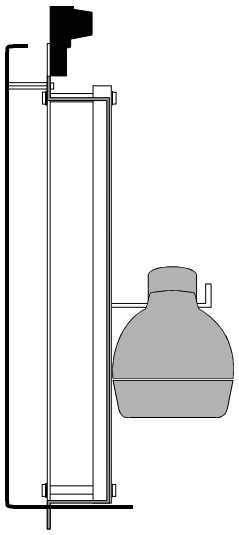


Affix standoffs provided with each module to the studs on the CHS-4L.

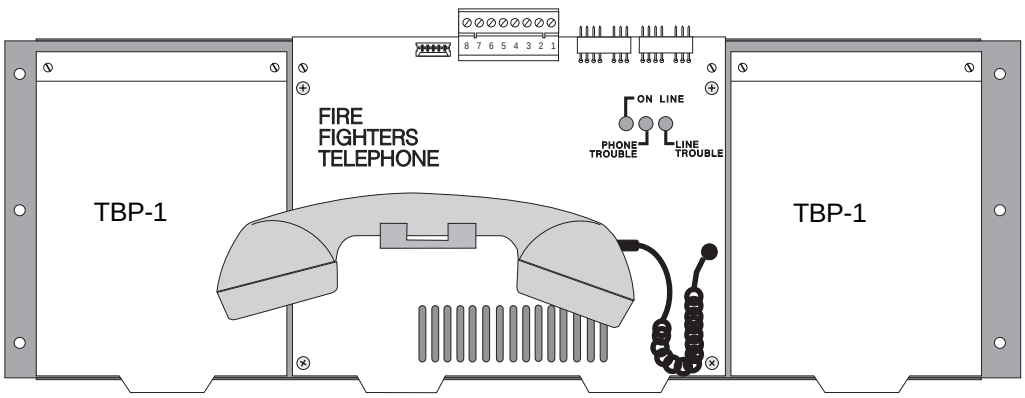
Module mounting locations in the CHS-4L chassis.

Figure 4-1: FFT-7 and FFT-7S Installation

Step 2 Angle the bottom edge of the unit into the bottom slot of the CHS-4L.



Step 3 Secure the unit to the CHS-4L with the captive screws on the unit.



Mounted TCC-1 Telephone Command Center

Figure 4-2: FFT-7 Terminals and Connections

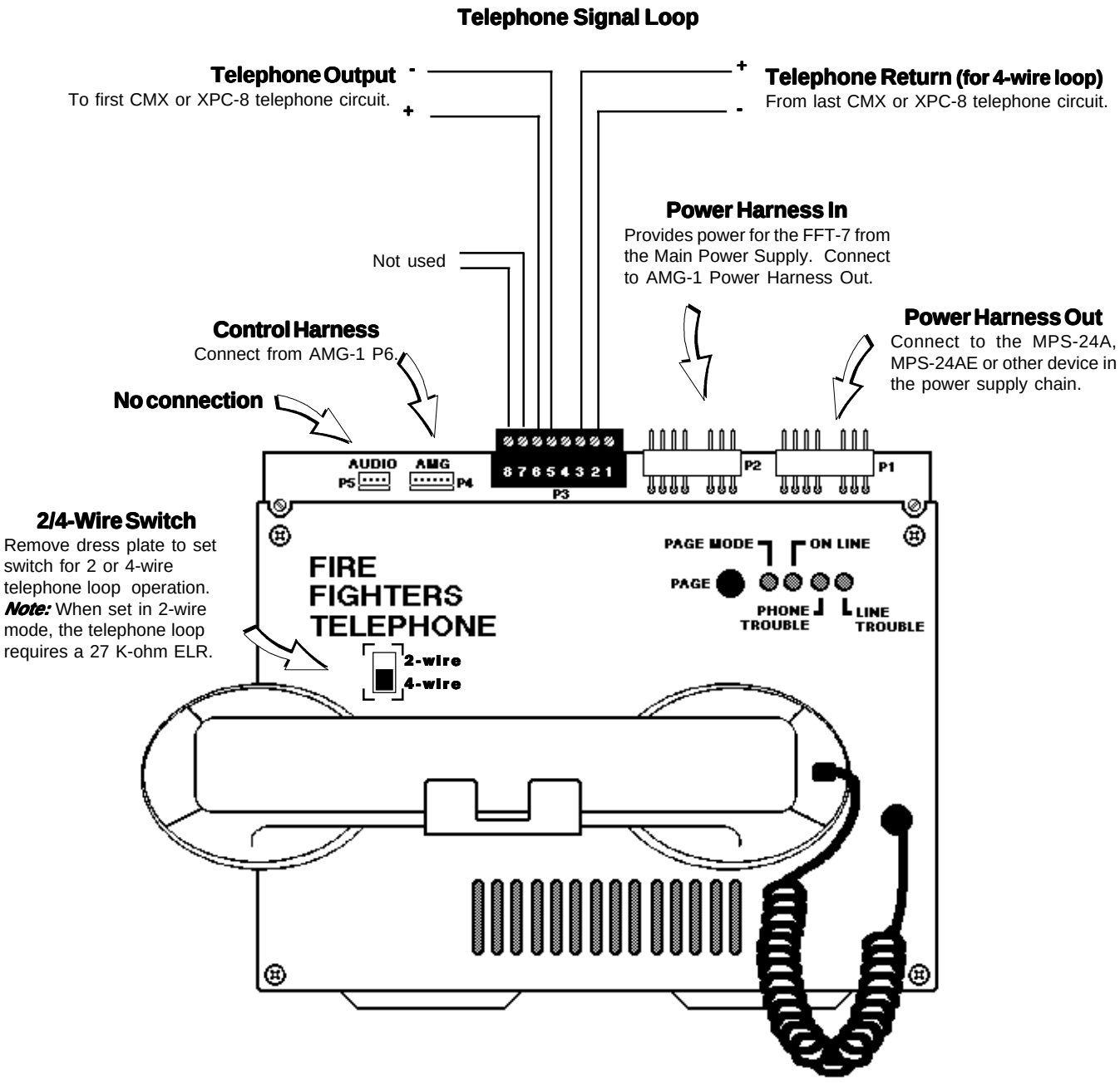
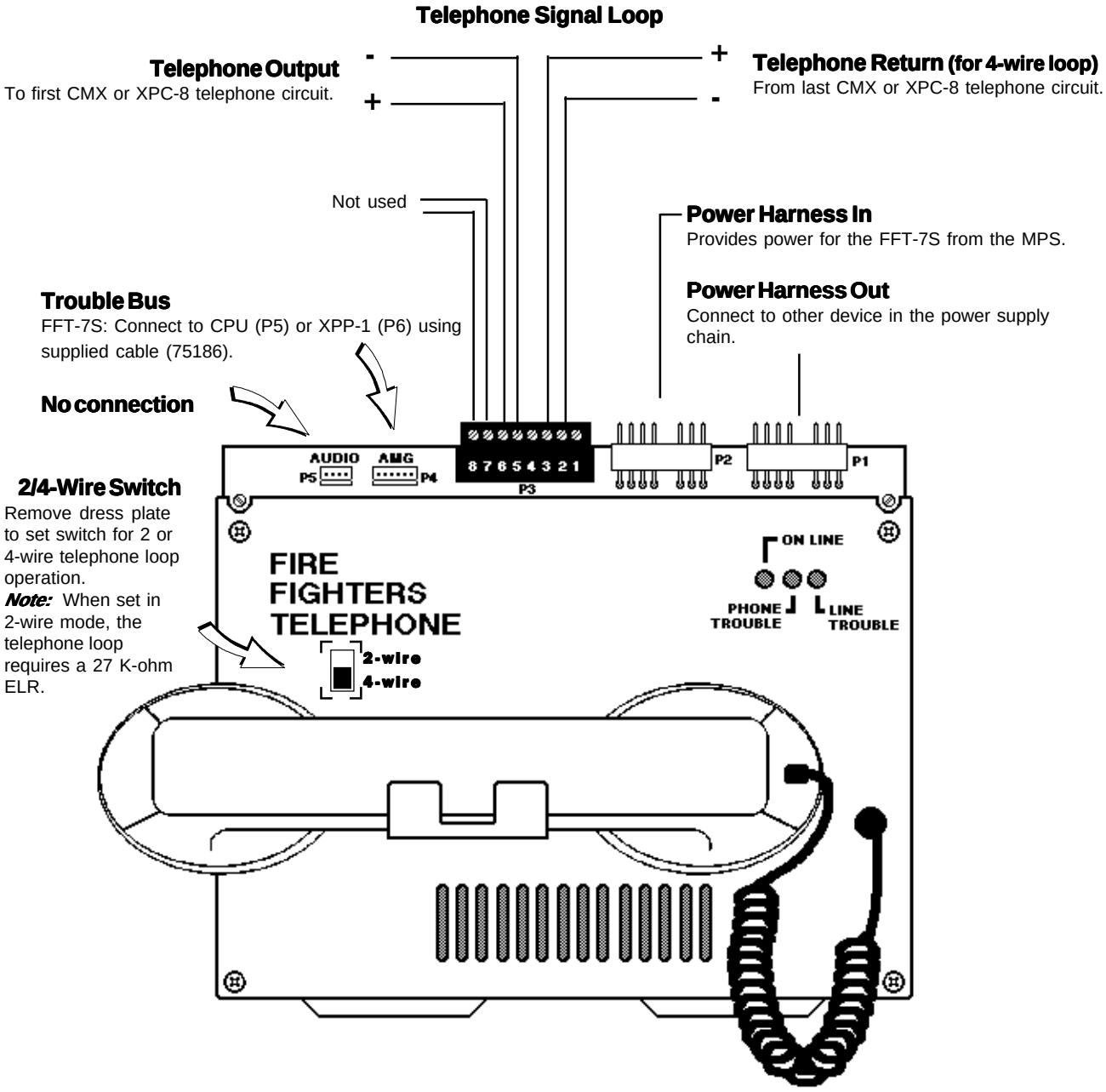
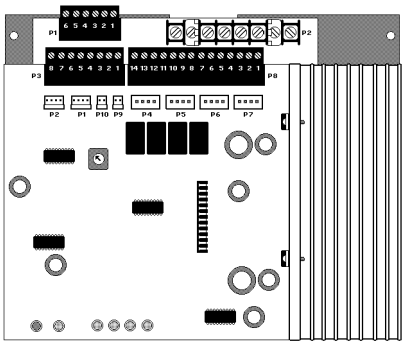


Figure 4-3: FFT-7S Terminals and Connections



Section Five:
Audio Amplifiers

The AA-30/AA-30E Audio Amplifier



The AA-30/AA-30E Audio Amplifier provides 30 watts of audio power that is compatible with 25 VRMS speakers. Speaker zone selection is performed by AM2020/AFP1010 Control-By-Event or manually, via control switches on an ACM-16AT Annunciator. Speaker circuits may be up to 30 watts each.

Built-in Supervision

The AA-30/AA-30E has a set of normally-open trouble contacts. The contacts close to report brownout, loss of batteries, failure of audio output wiring (if configured for four wire output), and amplifier failure. Individual LEDs signal each source of trouble to aid in troubleshooting. During total loss of primary AC, all LEDs are extinguished to conserve battery power.

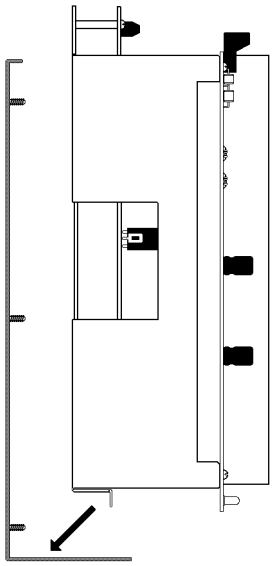
Backup Amplifiers

An AA-30/AA-30E or AA-120/AA-120E may be configured as a backup amplifier for one or more other AA-30/AA-30E 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.

Cabinet Mounting

The AA-30/AA-30E mounts in a CHS-4L chassis. Two AA-30/AA-30E amplifiers can be placed side by side in a CHS-4L. Primary (AC) and secondary (24V battery) power source connections must be made to each AA-30/AA-30E. The AA-30 requires 120 VAC, 50/60 Hz primary power and the AA-30E requires 220/240 VAC, 50/60 Hz primary power. Some external listed means of charging the batteries (such as an MPS-24A/MPS-24AE or NR45-24/NR45-24E) must be provided.

Note: For information on the ACT-1, refer to Appendix B.



Step 1
Position the lower end of the AA-30/AA-30E Audio Amplifier into the slot in the bottom of the CHS-4L and swing the assembly into the chassis as illustrated at left.

Step 2
Secure the AA-30/AA-30E to the chassis with the washers and nuts provided as illustrated at right.

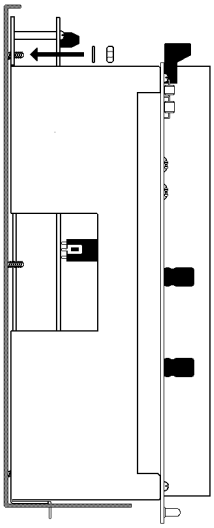


Figure 5-1: Installing the AA-30 or AA-30E

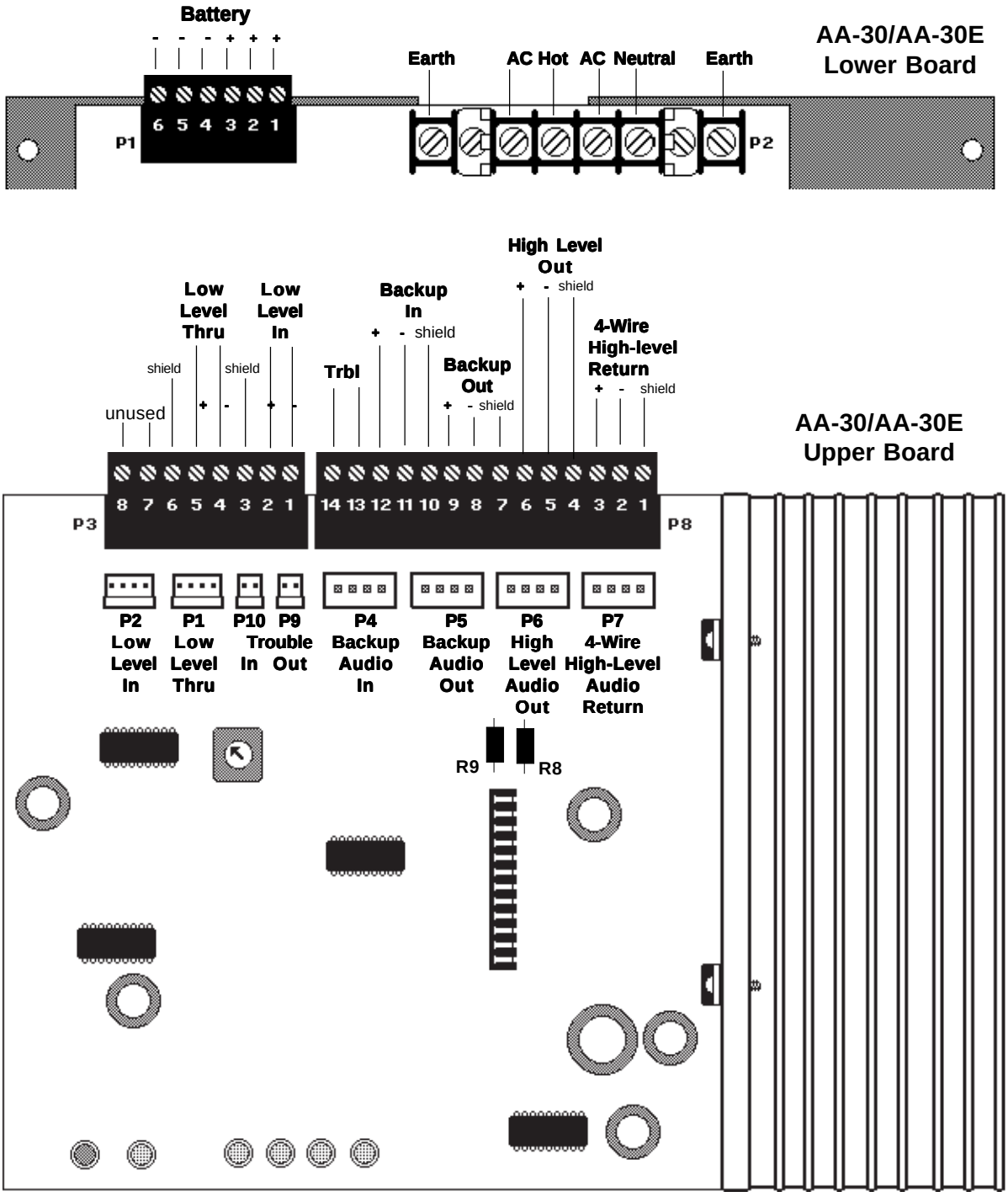


Figure 5-2: AA-30/AA-30E Terminals and Connectors

Note: The low-level input and high-level output "P" connectors are primarily for applications where the wiring to or from the AA-30/AA-30E remains in the cabinet. For "multiple-cabinet" applications, hard-wire the system using the terminal blocks P3 and P8. When more than one cabinet is required, they must be mounted adjacent to each other and all interconnecting wiring must be installed in conduit.

Note: Resistors R8 and R9 must be cut when using the high level audio in four-wire mode. Resistors R8 and R9 are located on the AA-30/AA-30E directly below Plug P6.

Note: Use of an ACT-1 Audio Coupling Transformer is required in some installations. For information on the ACT-1, refer to Appendix B.

Adjusting the Audio Gain Level

This multi-position rotary switch allows the installer to adjust the gain of the audio output signal to compensate for audio line losses. After correct adjustment, the AA–30/AA-30E Audio Amplifier will produce its maximum rated output power of 25 VRMS.

To adjust:

After complete installation of all amplifiers and associated circuitry and after the amplifier is set for normal standby, use a small slotted screwdriver to position the rotary switch until the **NORMAL LEVEL LED** is lit and the **INCORRECT LEVEL LED** is off. At this point, the audio gain is properly adjusted.

Note: Ensure that a 470-ohm impedance matching resistor has been installed on the last AA-30/AA-30E (P3, terminals 4 and 5). Failure to do so will result in calibration difficulty.

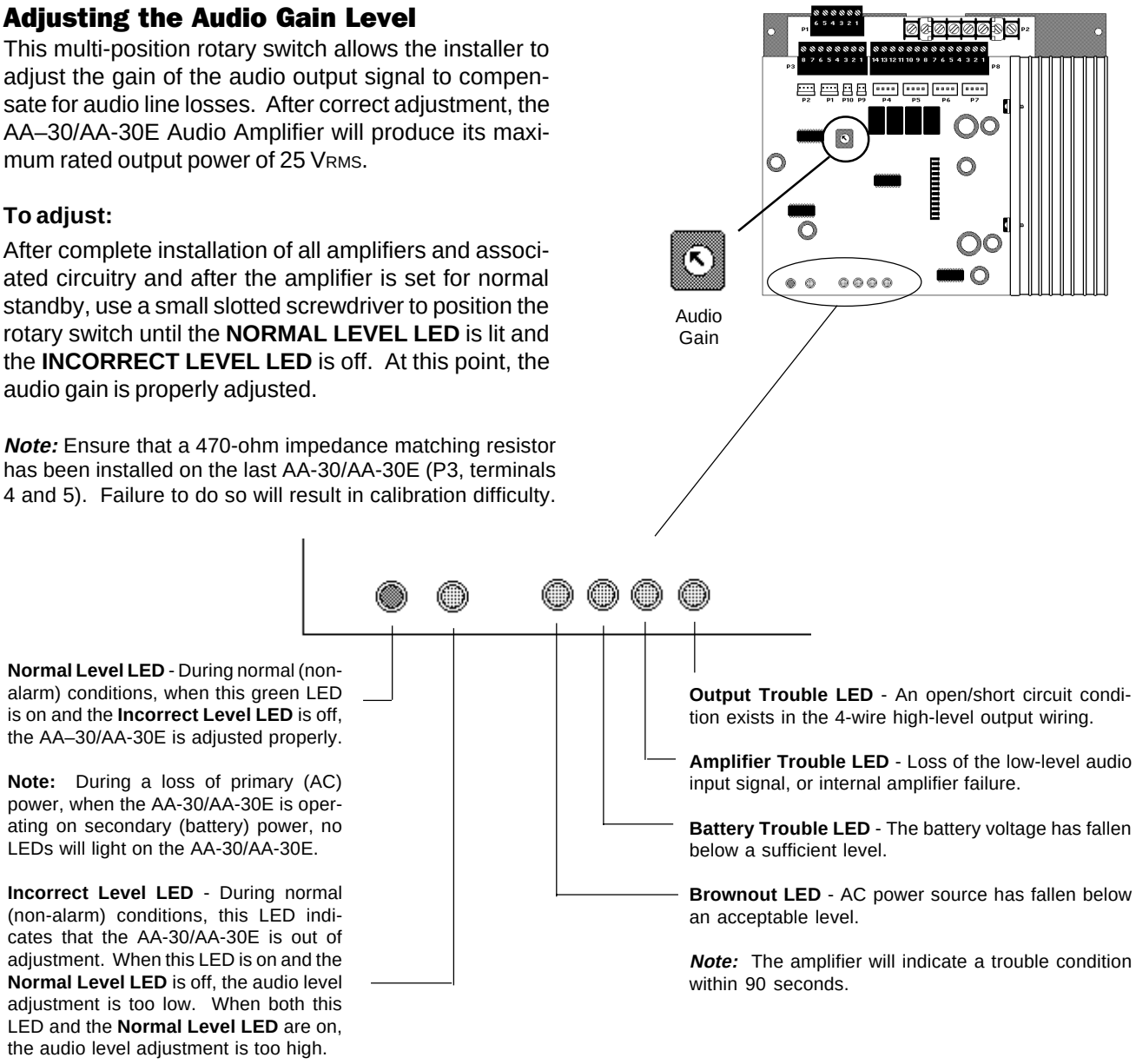
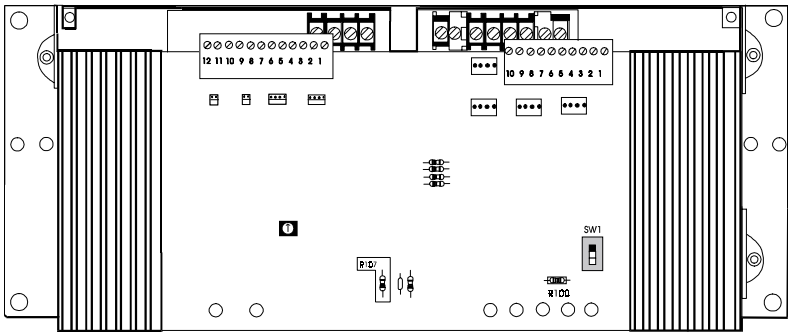


Figure 5-3: AA-30/AA-30E Audio Amplifier Status LEDs

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



AA-100/AA-100E and AA-120/AA-120E Audio Amplifier

AA-100/AA-100E Audio Amplifier

The AA-100/AA-100E audio amplifier provides up to 100 watts of power. Two outputs are provided, one at 70.7 VRMS and one at 25 VRMS. The power taken from one or both of these outputs combined must not exceed 100 watts total. A four-wire high-level output/return circuit must be employed when output wiring supervision is required. 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 VRMS and 70.7 VRMS), only the 70.7 V output wiring can and must be supervised. Therefore, the 25 VRMS output wiring must NOT leave the cabinet and must NOT be connected to the four-wire return input. Speaker zone selection is performed by AM2020/AFP1010 Control-By-Event or manually, via control switches on an ACM-16AT Annunciator.

AA-120/AA-120E Audio Amplifier

The AA-120/AA-120E audio amplifier provides up to 120 watts of power. One 25 VRMS 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 XPC or CMX 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 AM2020/ AFP1010 Control-By-Event or manually, via control switches on an ACM-16AT Annunciator.

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.

Backup Amplifiers

Only an AA-120/AA-120E may be used as a backup amplifier for more than one AA-30/AA-30E audio amplifier or 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-30/AA-30E, AA-100/AA-100E or AA-120/AA-120E must be 25 VRMS only. Use output wiring supervision whenever high-level audio amplifier output leaves the cabinet.

Cabinet Mounting

The AA-100/AA-100E and AA-120/AA-120E mounts directly to the 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 an MPS-24A or MPS-24AE) must be provided.

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. Following are drawings (Figures 5-4 through 5-10) illustrating the wiring configurations for the AA-30, AA-100, and AA-120 audio amplifiers.

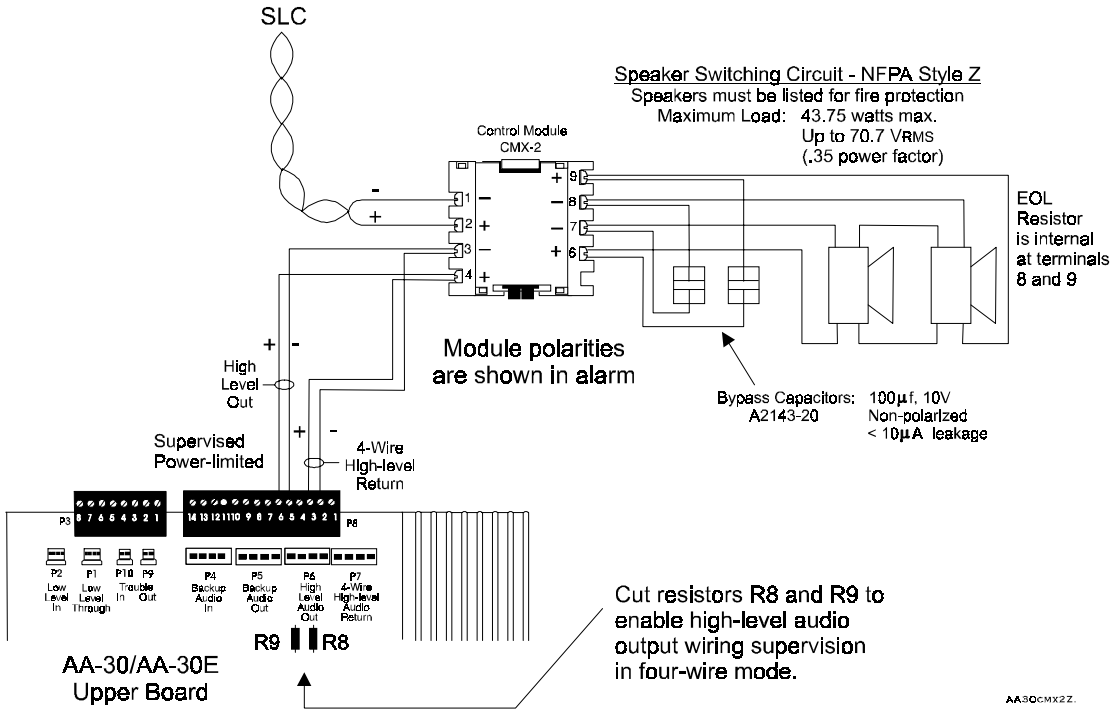


Figure 5-4: Speaker Switching Configuration for the AA-30/AA-30E (Class A) with CMX-2 (Style Z)

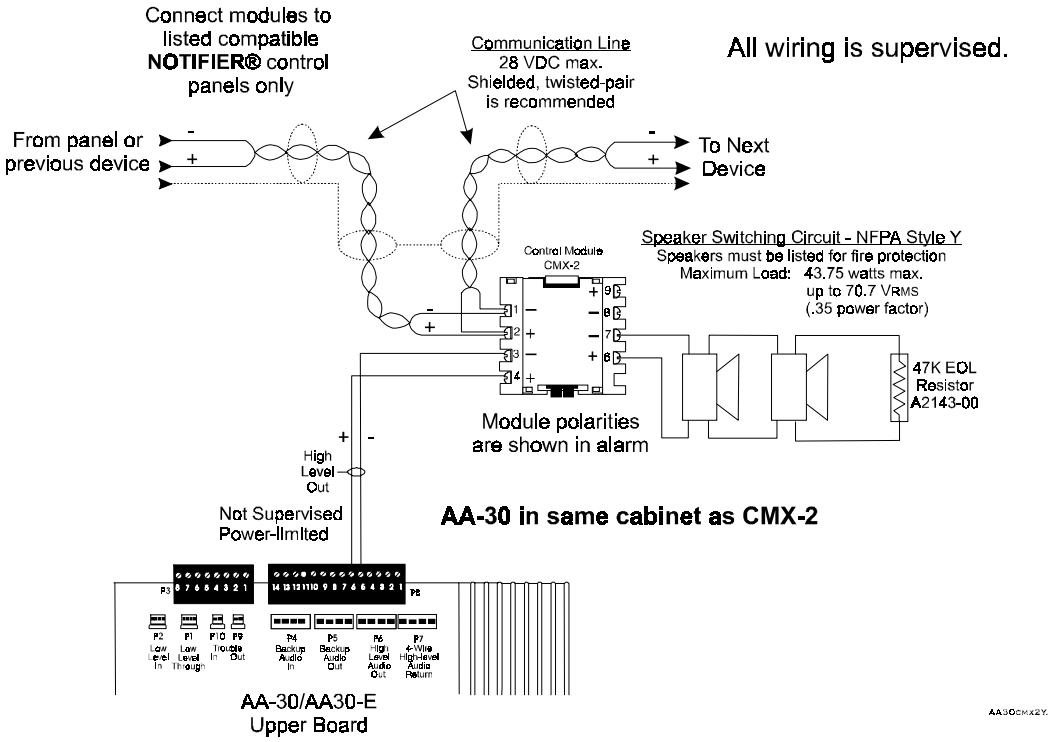


Figure 5-5: Speaker Switching Configuration for the AA-30/AA-30E (Class B) with CMX-2 (Style Y)

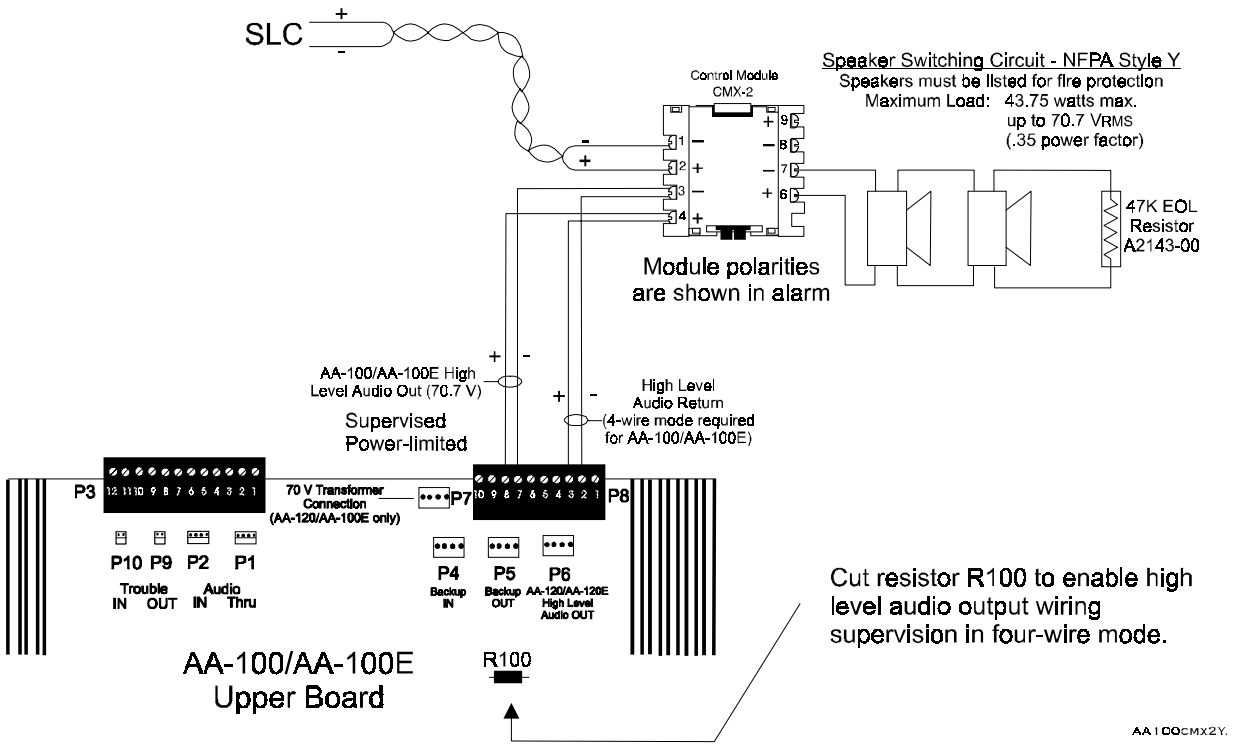


Figure 5-6: Speaker Switching Configuration for the AA-100/AA-100E (Class B) with CMX-2 (Style Y)

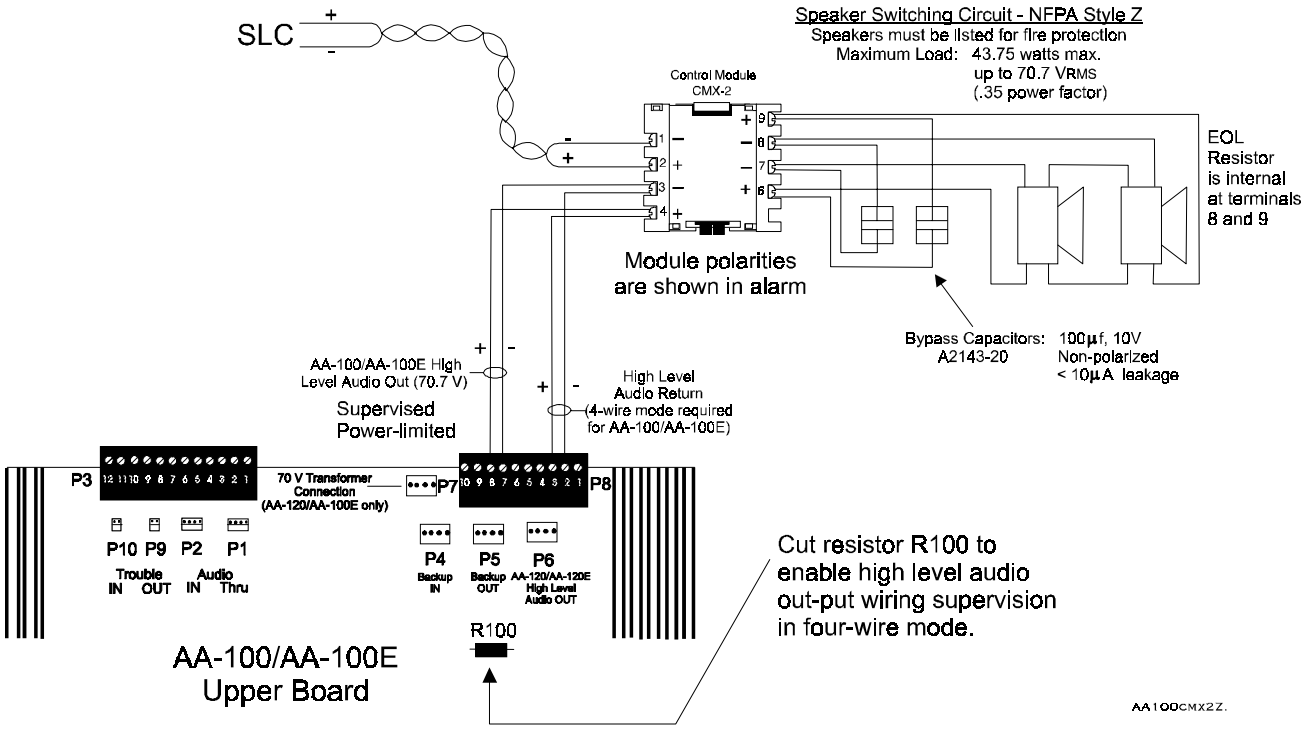


Figure 5-7: Speaker Switching Configuration for the AA-100/AA-100E (Class B) with CMX-2 (Style Z)

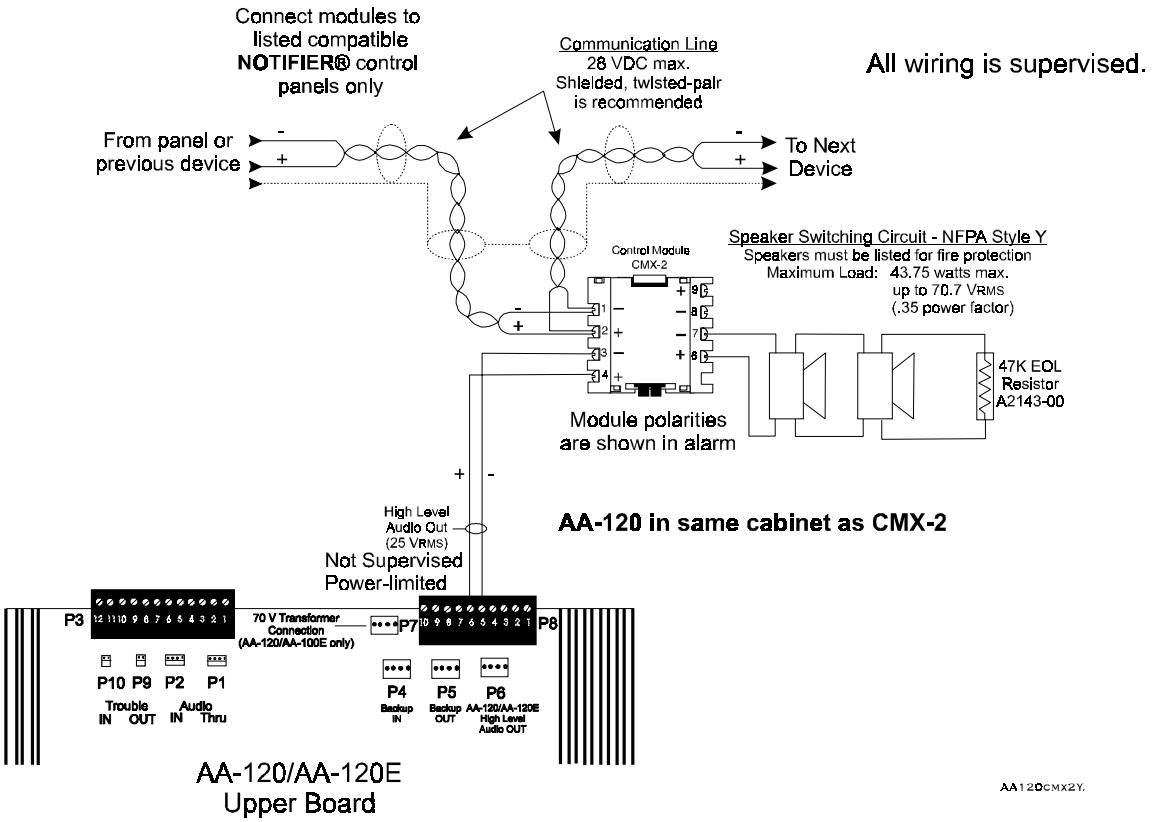


Figure 5-8: Speaker Switching Configuration for the AA-120/AA-120E (Class B) with CMX-2 (Style Y)

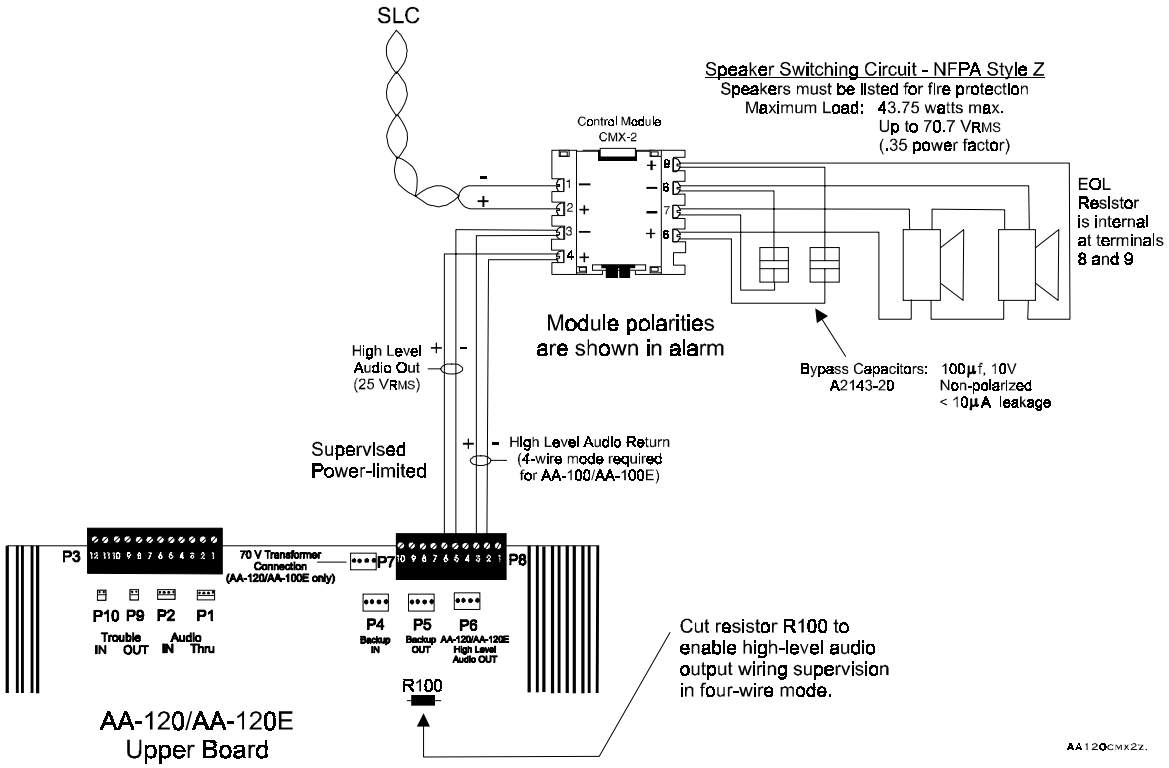


Figure 5-9: Speaker Switching Configuration for the AA-120/AA-120E (Class B) with CMX-2 (Style Z)

Primary and Secondary Power for the AA-30/AA-30E, AA-100/AA-100E, and AA-120/AA-120E Audio Amplifiers

Primary power required the for AA-30, AA-100, and AA-120 Amplifiers is 120 VAC and primary power required for the AA-30E, AA-100E, and AA-120E is 220/240 VAC. Secondary power (24 VDC battery) connections must be made at the designated terminals shown in Figures 5-2 and 5-5. 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 (MPS-24A/MPS-24AE, NR45-24/NR45-24E, etc.). Use Tables 5-1, 5-2, and 5-3 to calculate amplifier secondary (battery) power requirements.

Device	Number of Devices		Secondary Current Draw in Standby		Standby Current in Amps
AA-30/AA-30E Primary Amplifiers	[ ]	x	0.045	=	
AA-100/AA-100E Primary Amplifiers	[ ]	x	0.050	=	
AA-120/AA-120E Primary Amplifiers	[ ]	x	0.050	=	
AA-30/AA-30E Backup Amplifiers	[ ]	x	0.045	=	
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 5-1: Secondary Current Draw in Standby

Device	Number of Device		Secondary Current Draw in Alarm		Alarm Current in Amps
AA-30/AA-30E Primary Amplifiers	[ ]	x	3.0	=	
AA-100/AA-100E Primary Amplifiers	[ ]	x	7.3	=	
AA-120/AA-120E Primary Amplifiers	[ ]	x	7.3	=	
AA-30/AA-30E Backup Amplifiers	[ ]	x	0.25	=	
AA-120/AA-120E Backup Amplifiers	[ ]	x	0.30	=	
Additional devices powered from the power supply during an alarm condition	[ ]	x	[ ]	=	
Total Amplifier Current Draw in Alarm				**=**	

Table 5-2: Secondary Current Draw in Alarm

Secondary Current Draw in Standby (from Table 5-1)		Required Standby Time		Battery Requirements in Amp/Hours
[ ]	x	24 or 60 hours	=	
Secondary Current Draw in Alarm (from Table 5-2)				
[ ]	x	(Enter 0.25 for 15 minutes)	=	
Total Secondary Requirements			**=**	

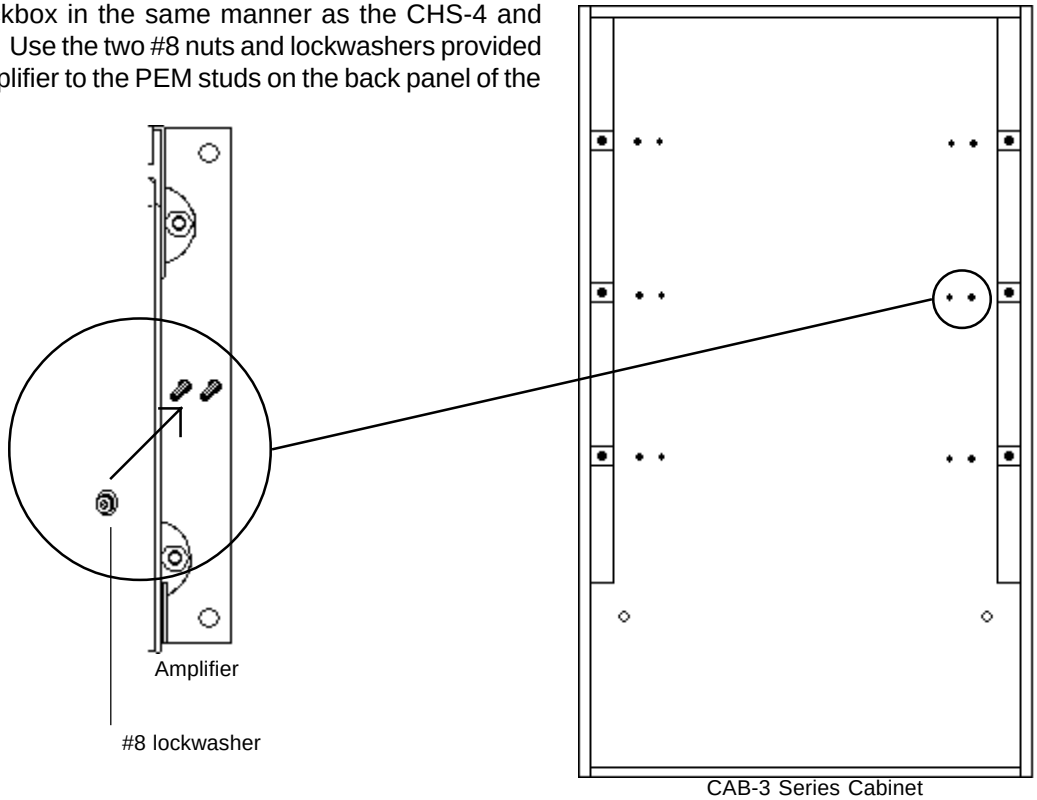
Table 5-3: Total Amplifier Secondary Current Draw

NOTES

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

Figure 5-10: Installing the AA-100/AA-100E and the AA-120/AA-120E

The AA-100/AA-100E and AA-120/AA-120E amplifiers mount directly to the backbox in the same manner as the CHS-4 and CHS-4L chassis. Use the two #8 nuts and lockwashers provided to secure the amplifier to the PEM studs on the back panel of the backbox.



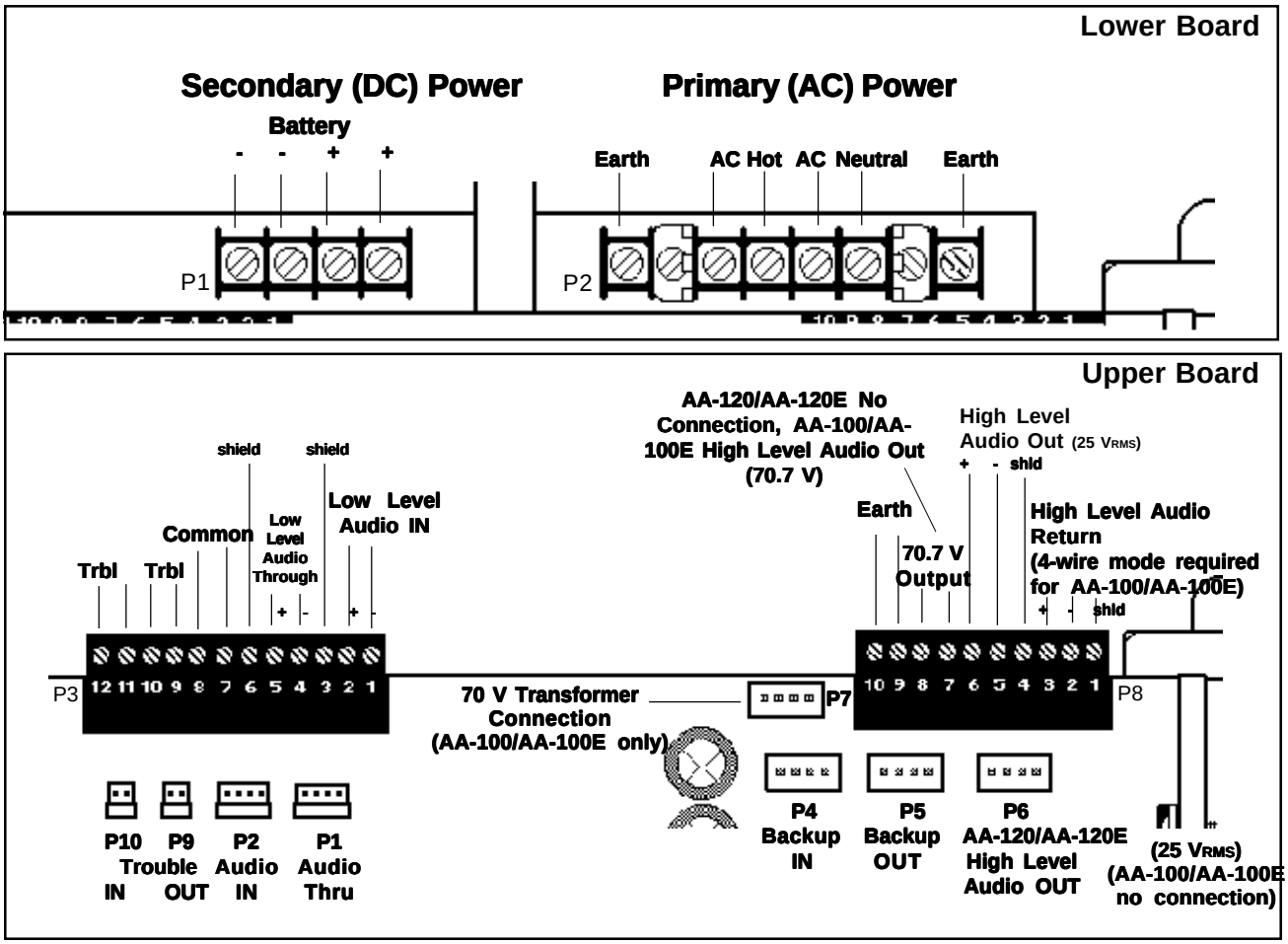


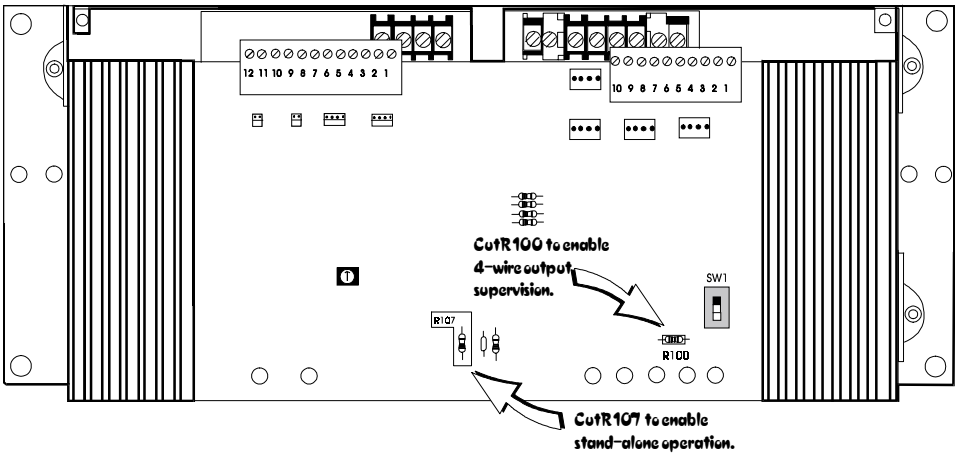
Figure 5-11: AA-100/AA-100E and AA-120/AA-120E Terminals and Connectors

Note: The low-level input and high-level output "P" connectors are primarily 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: 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.

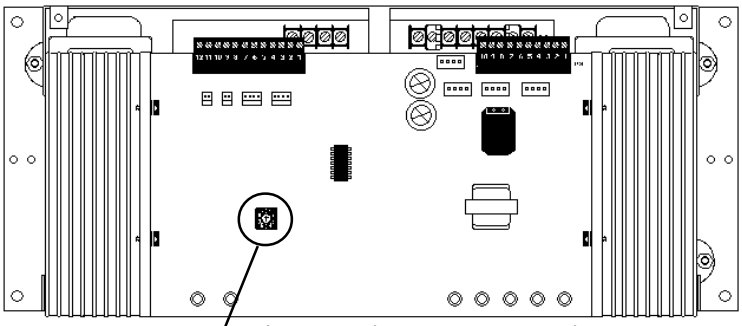
Note: If the amplifier is being used in stand-alone mode (no connection to an AMG) where the backup high/low or slow whoop tone generator is being used, R107 must be cut to prevent the amplifier from generating a trouble condition. The amplifier will indicate trouble within 90 seconds

Note: Use of the ACT-1 Audio Coupling Transformer is recommended. For information on the ACT-1, refer to Appendix B.



Adjusting Audio Gain Level

A multi-position rotary switch allows the installer to adjust the gain of the audio output signal to compensate for audio line losses. After correct adjustment, the audio amplifier will produce its maximum rated output power.



The AA-100/AA-100E or AA-120/AA-120E Audio Amplifier

Audio Gain

To adjust:

After complete installation of all amplifiers and associated circuitry, with the low-level audio input to the amplifier set for normal standby, use a small slotted screwdriver to position the rotary switch until the **NORMAL LEVEL LED** is lit and the **INCORRECT LEVEL LED** is off. At this point, the audio gain is properly adjusted.

Note: Ensure that a 470-ohm impedance matching resistor has been installed on the last amplifier (P3 terminals 1 and 2). Failure to do so will result in calibration difficulty.

SW1 (see detail below)

Normal Level LED - During normal (non-alarm) conditions, when this green LED is on and the **Incorrect Level LED** is off, the audio amplifier is adjusted properly.

Note: During a loss of primary (AC) power, when the amplifier is operating on secondary (battery) power, no LEDs will light on the amplifier.

Incorrect Level LED - During normal (non-alarm) conditions, this LED indicates that the audio amplifier is out of adjustment. When this LED is on and the **Normal Level LED** is off, the audio level adjustment is too low. When both this LED and the **Normal Level LED** are on, the audio level adjustment is too high.

Battery Trouble LED - The battery voltage has fallen below a sufficient level.

Brownout LED - AC power source has fallen below an acceptable level.

Output Trouble LED - An open/short circuit condition exists in the 4-wire high-level output (or 70 V transformer on the AA-100/AA-100E).

Input Trouble LED - Loss of the low-level audio input signal, or internal amplifier failure.

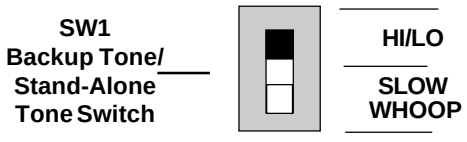
Amplifier Trouble LED - Loss of the high-level audio signal, or internal amplifier failure.

Note: The amplifier will indicate a trouble condition within 90 seconds.

Figure 5-12: AA-100/AA-100E and AA-120/AA-120E Audio Amplifier Status LEDs

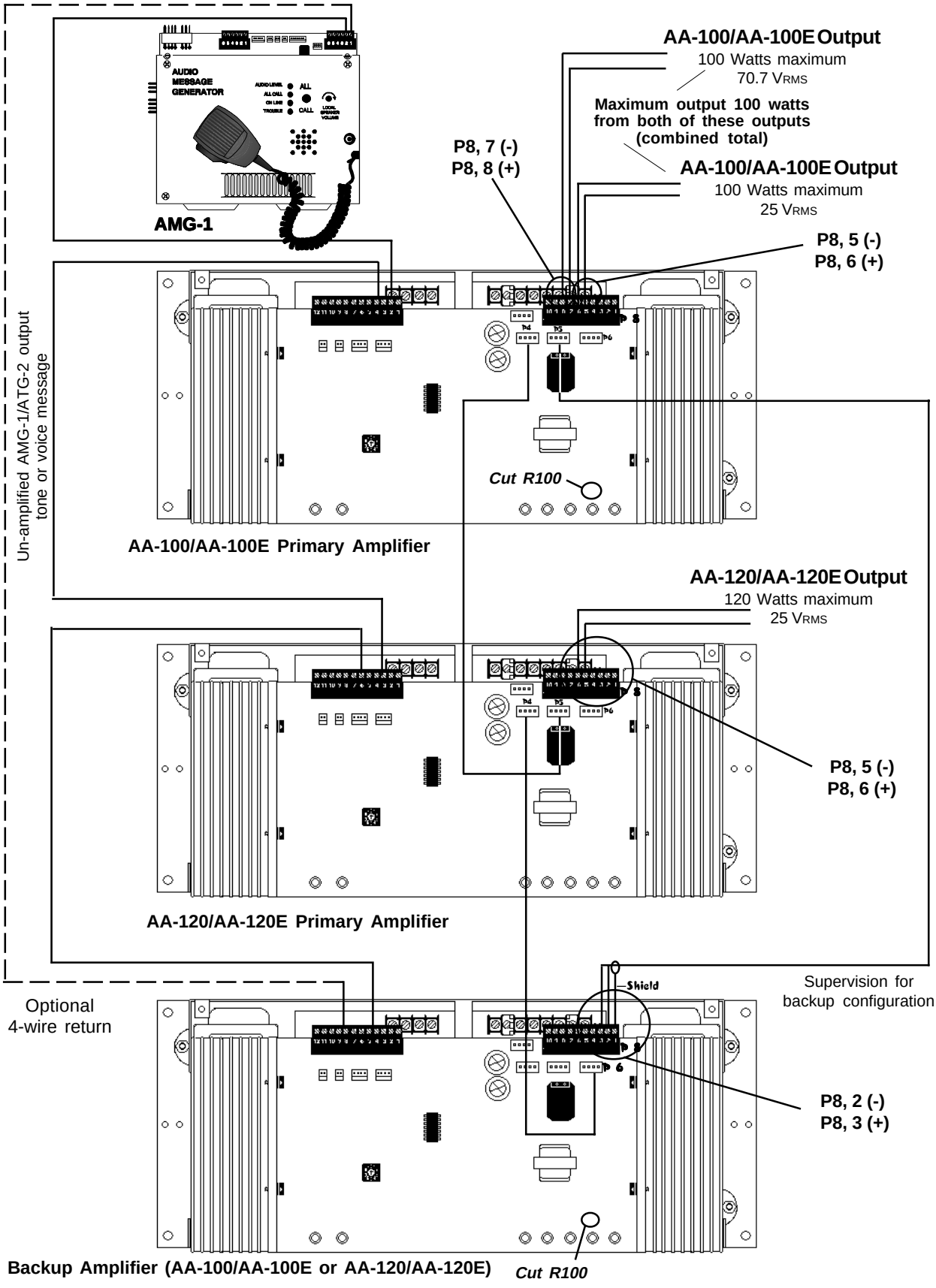
Selecting the AA-100/AA-100E or AA-120/AA-120E Default Backup Tone

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. 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.



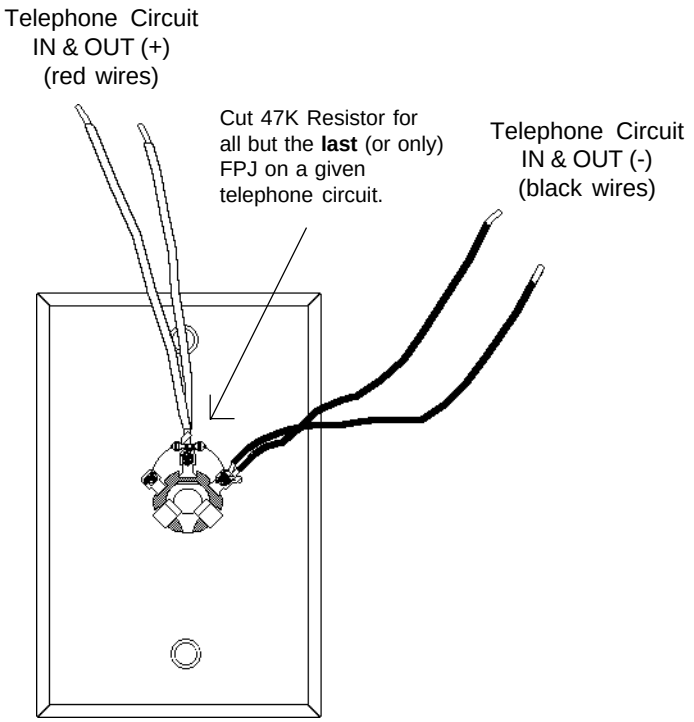
Employing a Backup Amplifier

An Audio Amplifier can be used to backup one or more amplifiers. In the event of an amplifier failure, backup amplifier switching is automatic. ***Note:*** For information on the ACT-1, refer to Appendix B.



Section Six:
Voice Alarm Peripherals

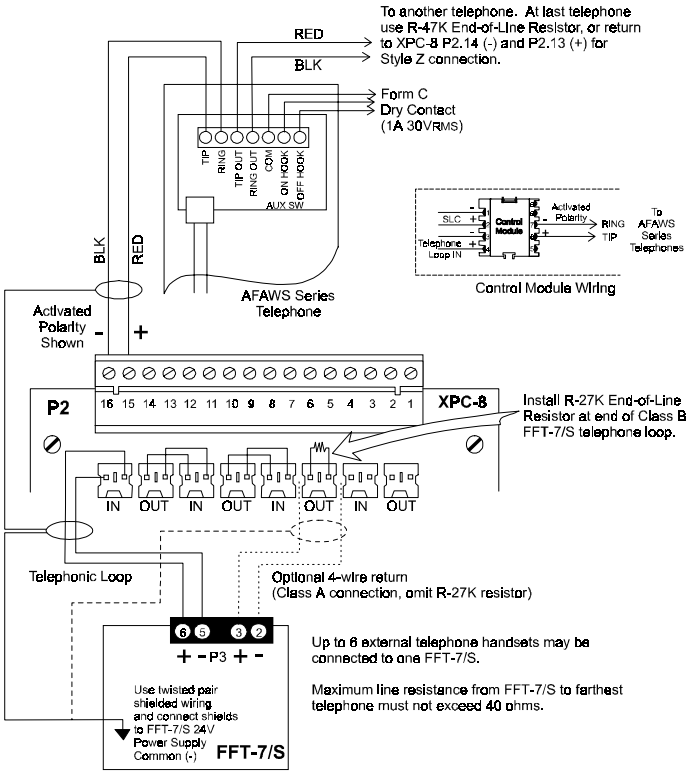
FPJ-1 Connections



Thru devices:
If the FPJ is not the last device on the telephone circuit (or the only device), cut the 47K resistor soldered across the terminals of the FPJ.

Sole or End-Of-Line devices:
Do not cut the 47K resistor for the last or only device on a telephone circuit. Connect both red wires together and wire nut to the telephone circuit positive (+) lead. Connect both black wires together and wire nut to the telephone circuit negative (-) lead.

AFAWS SERIES



Section 6.1: The RPJ-1 Remote Paging Jack

The RPJ-1 Remote Page Jack allows a fire fighter to page to all speaker circuits (provides an "All Call") from a remote location.

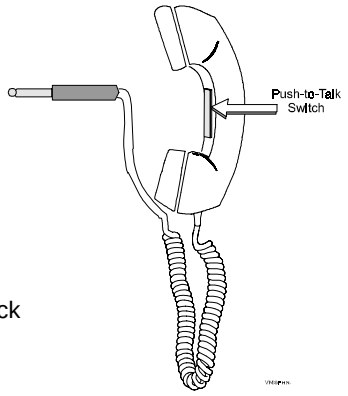
The RPJ-1 mounts to a standard UL-listed single-gang electrical box, requires an AFP1010/AM2020 (equipped with software release 5.0 or later), an AMG-1 with software version **73254** or greater, a MMX (or XPM circuit) to initiate the "All Call" and a CMX (or XPC circuit) to connect the telephone circuit. Connect the red and black leads to the CMX control module as illustrated. Connect the key switch to the monitored circuit of the MMX monitor module.

To operate: Insert a Notifier key into the RPJ-1 key switch and turn to the right. This will signal the control panel (through the Monitor circuit) to activate the "PAGE" control circuit. Plug an FHS handset into the RPJ-1 and begin an "All Call" page.

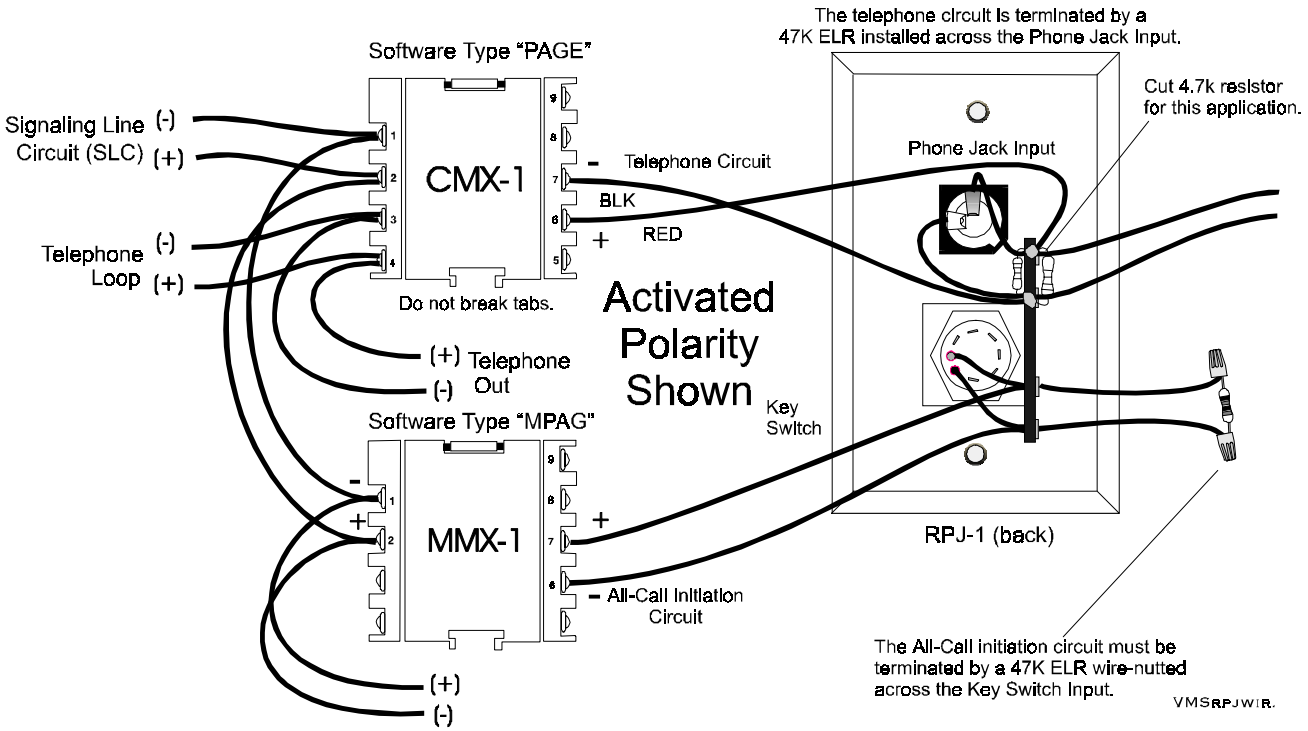
Notes: The RPJ-1 is dedicated for paging and cannot be used as a standard telephone circuit. It is not intended for systems that include "Zone Coded Voice."



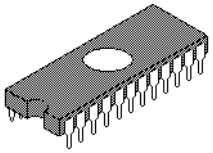
RPJ-1
Remote Paging Jack



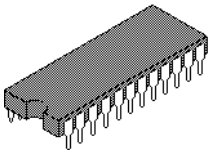
FHS
Firefighter's Hand Set



Appendix A:
Voice Message Options



VROM-(n) Factory programmed message for installation in AMG-1. Provides 24 seconds of evacuation message on non-volatile memory chip. Choice of one of many standard messages available. One or two of these messages may be installed in an AMG-1. See Document 15945 for text of available VROMs.



VRAM-1 Field programmed memory to be installed in AMG-1. Provides 24 seconds of field-programmable evacuation message on non-volatile memory chip. Message is programmed from microphone or cassette tape. One or two of these chips can be installed in an AMG-1.

Section A.1: VROM/VRAM Installation

1) Remove battery power followed by AC power from the AM2020/AFP1010.

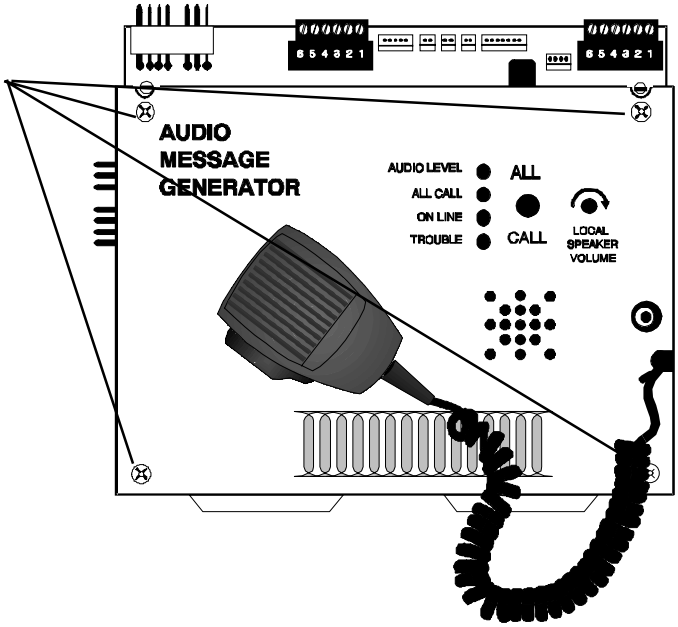
***Caution**: Remove AC power at the main service circuit breaker (not the circuit breaker on the main power supply).*

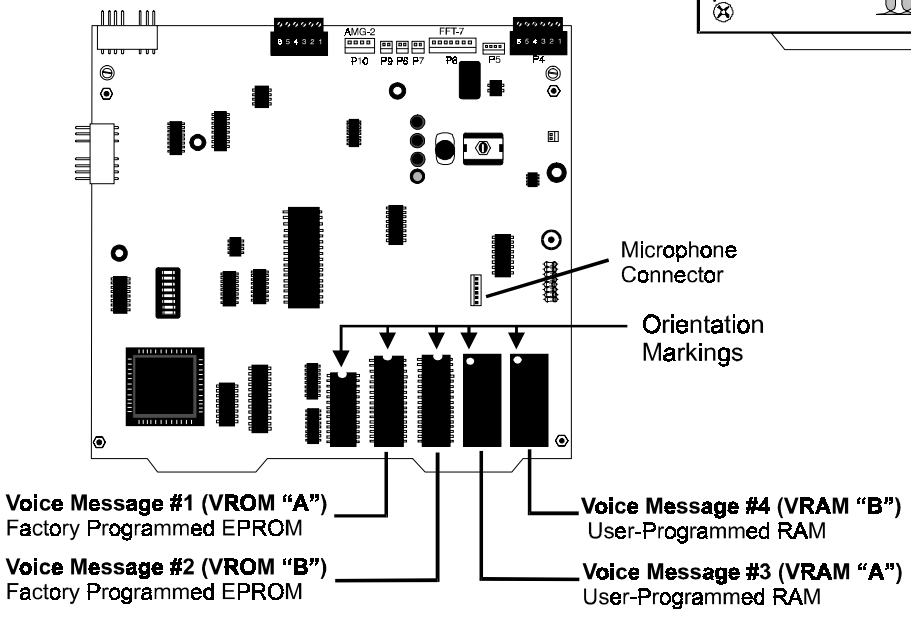
2) Remove dress panel covering the AMG-1.

3) Remove the four screws that affix the AMG dress plate to the component board as illustrated at right. Remove the dress plate and disconnect the microphone connector.

4) Install the VROM or VRAM chips in their respective positions. Observe orientation markings on the chips and align them with the markings in the illustration below.

5) Assembly of the AMG-1 is the reverse of removal.

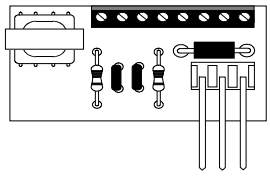




Appendix B:
ACT-1 Audio Coupling Transformer

General

The ACT-1 Audio Coupling Transformer couples low-level audio to audio amplifiers or other audio inputs, such as the ATG-2 Audio Tone Generator. A single ACT-1 can be used to couple a low-level audio signal to up to eight devices in the same cabinet. It provides electrical isolation between the low level audio riser and equipment to which the signal is to be fed (amplifiers or the ATG-2). In addition, the ACT-1 provides Common Mode Noise Rejection (CMNR), greatly reducing crosstalk from the signaling line circuits.



Applications

The ACT-1 can be installed in any application that employs AA-30/AA-30E, AA-100/AA-100E, or AA-120/AA-120E Audio Amplifiers. *However, the ACT-1 must be installed in situations where the following conditions exist:*

1) The amplifiers are mounted remotely from the source of low level audio (AMG, ATGs, etc).
2) Ground fault detection is enabled on multiple power supplies within the system.

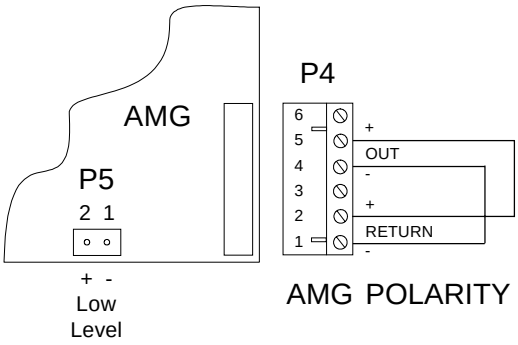
Note: Isolated power supplies, each with their respective ground fault detection circuits enabled, are often employed to facilitate the quick location of ground faults in large systems. This task would be inherently more difficult if the entire system (main and all remotes) were common together and ground fault detection was provided only by the power supply in the main control panel cabinet. In this type of system, the ACT-1 is not required.

In larger systems, capacitance begins to play a critical role in creating sporadic and difficult-to-find ground faults along a single common connection. In these systems, the ACT-1 is recommended for use.

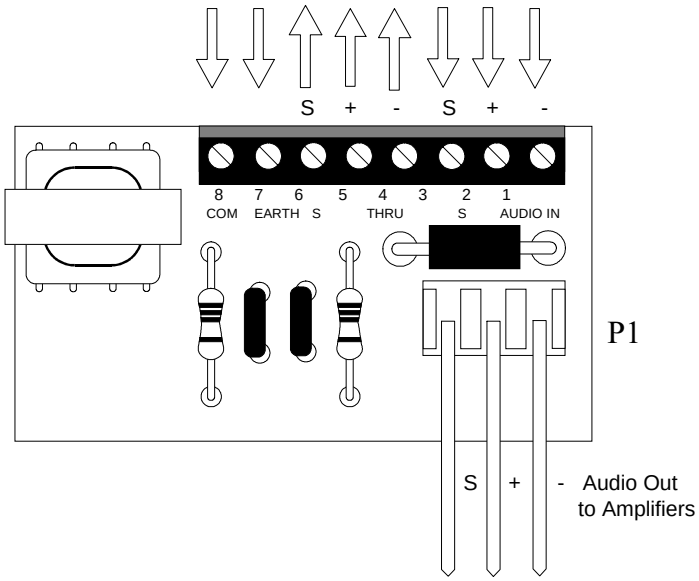
Installation

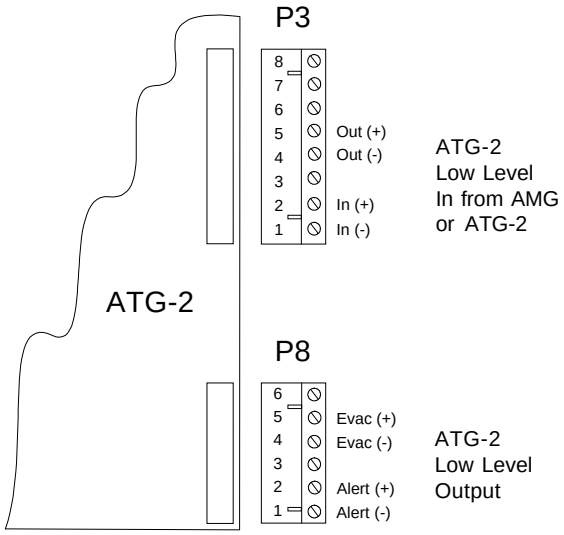
The ACT-1 connects to one of up to eight amplifiers on a given channel. Multiple ACT-1s are required for amplifiers on multiple channels.

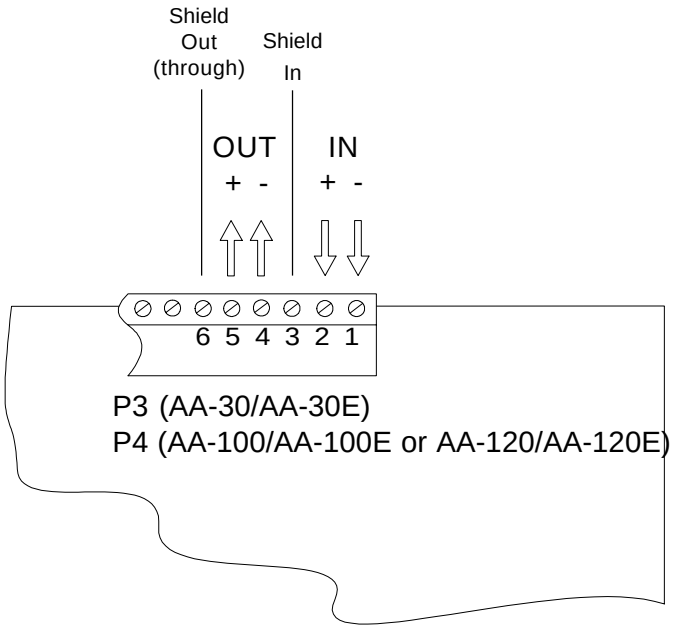
To install, connect the low level audio loop to the terminal block on the ACT-1 as illustrated on the next page. Then connect the ACT-1 to the first amplifier in the chain as illustrated.

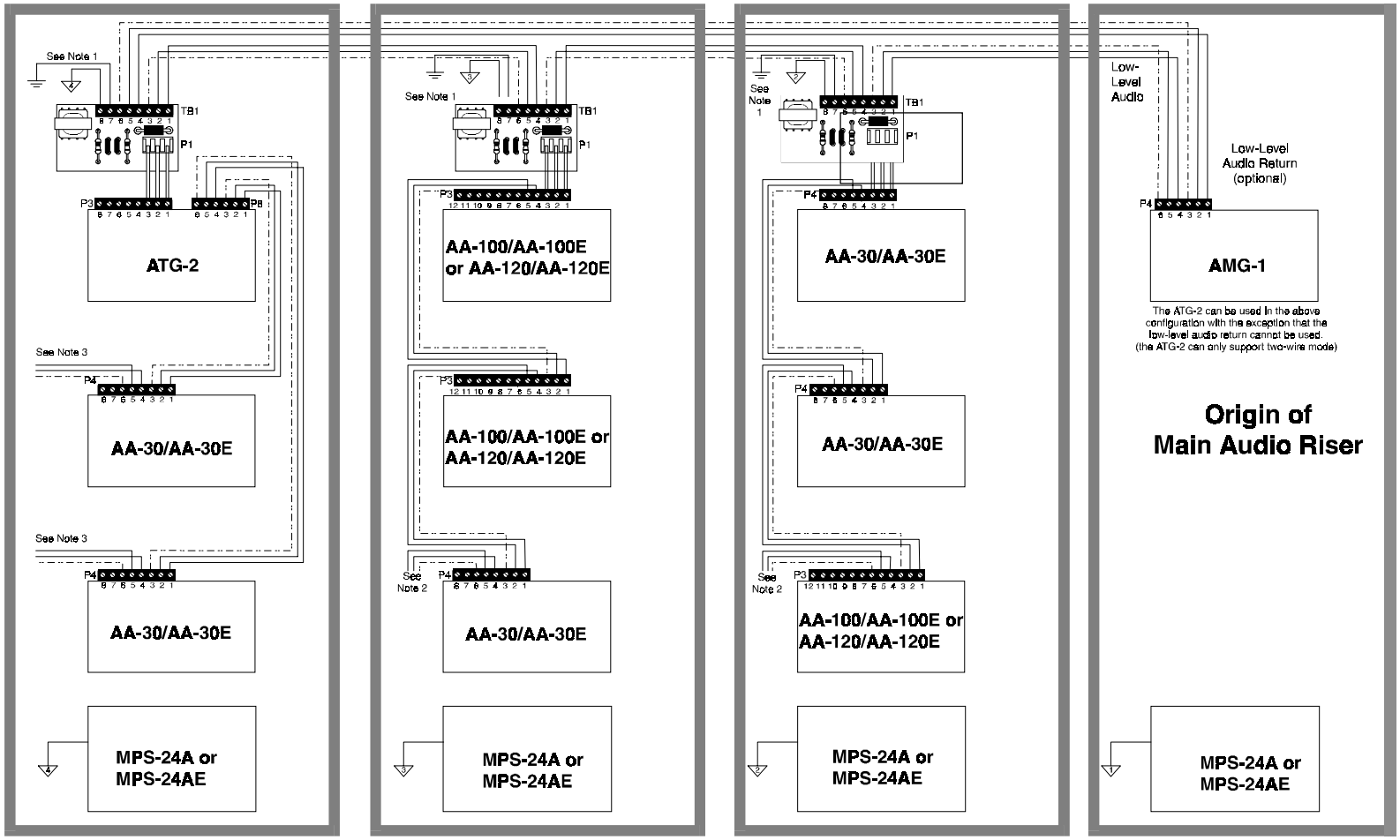


Terminal Designation on the ACT-1









Remote Amplifier Cabinet | Remote Amplifier Cabinet | Remote Amplifier Cabinet | Main Control Panel Cabinet

Note 1: Using the supplied cable, connect the "EARTH" ground terminal of each ACT-1 to terminal P8-10 on the AA-100/AA-100E or AA-120/AA-120E or to a screw on the upper left corner of the AA-30/AA-30E. The "COM" terminal is intended for optional shielding of the secondary side of the ACT-1 (the low level audio from the ACT-1 through each of the amplifiers). If this shield is desired, connect to the common of the local power supply (do not, at any point connect the shield from the primary side of the ACT-1).

Note 2: The secondary side of the ACT-1 (low-level audio) may be daisy chained to a maximum of eight audio amplifiers.

Note 3: Additional low-level audio risers, isolated from the main riser, may be drawn from this point.

Note 4: ⧸3⧹ This symbol denotes a local common, in this case for supply number three.

Note 5: A maximum of seven ACT-1 Audio Coupling Transformers may be connected to the AMG or VTG (primary side). The number of amplifiers connected to the primary side of the ACT-1 (AMG/VTG output) must be reduced by eight for each ACT-1 connected, regardless of the number of amplifiers connected to the secondary side of each ACT-1