

Remote SAFEPATH **Operation and Installation** **Manual**

Models:
RSAPE-B
RSAPE-R

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Part Number A83666 Revision A

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Conventions Used in This Manual

This manual uses the following conventions for notes, cautions, and warnings.

NOTE: All **CAUTIONS** and **WARNINGS** are identified by the symbol . All warnings are printed in bold capital letters.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

WARNING: **INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN PROPERTY DAMAGE AND SERIOUS PERSONAL INJURY OR DEATH TO YOU AND OR OTHERS.**

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Remote SAFEPATH Manual
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Preface

The Remote SAFEPATH panel provides remote amplification and live announcement capabilities. Live announcements can be made at either the central or remote location. Pre-recorded messages, however, can only be initiated from the central SAFEPATH panel.

This panel does not sense an emergency condition or hazardous fires; it is only a part of a system that does sense such conditions. The Remote SAFEPATH panel, when activated by a central SAFEPATH panel, provides a pre-recorded tone and/or voice message(s) to notification appliances. When used as part of a protective signaling system, the Remote SAFEPATH panel must be properly connected to a central SAFEPATH panel and to LISTED compatible notification appliances for proper operation.

PERSONNEL PROPERLY QUALIFIED IN THE APPLICATION AND USE OF LIFE SAFETY EQUIPMENT MUST READ THIS MANUAL CAREFULLY BEFORE PERFORMING ACTIONS TO SPECIFY, APPLY, INSTALL, MAINTAIN AND OPERATIONALLY TEST SAFEPATH PRODUCTS IN ACCORDANCE WITH THE INSTRUCTIONS IN THIS MANUAL.

⚠WARNING: IF SAFETY PRECAUTIONS, INSTALLATION AND TESTING INSTRUCTIONS ARE NOT PERFORMED PROPERLY, THIS SAFEPATH PANEL MAY NOT OPERATE IN AN EMERGENCY SITUATION WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

- **DO NOT** assume any installation, operation and testing details not shown in this manual.
- This SAFEPATH panel should only be operated with **covers** properly **in place**.
- **KEEP THIS MANUAL WITH THIS PANEL FOR FUTURE REFERENCE** for the life of the system and make it available to all qualified personnel who operate, test, maintain, or service this product. We strongly recommend that such personnel read and understand this manual and all other relevant product instructions.

This panel WILL NOT WORK WITHOUT POWER. This panel is powered by 120VAC. Back-up power is provided by 24VDC batteries. If both sources of power are cut off for any reason, the SAFEPATH panel will not provide the desired tone and/or voice warning.

WHEELOCK EXPRESSLY DISCLAIMS ALL LIABILITY FOR THE CONTENT, CLARITY AND LANGUAGES OF, AND OUTPUT CHANNEL AND PRIORITY LEVEL ASSIGNED TO, ANY AND ALL MESSAGES. IT IS ESSENTIAL THAT YOU HAVE MESSAGE CONTENT AND LANGUAGE, SEQUENCE, OUTPUT CHANNEL AND PRIORITY ASSIGNMENTS REVIEWED AND APPROVED BY QUALIFIED LEGAL AND SAFETY ADVISORS, QUALIFIED REPRESENTATIVE(S) OF OWNER(S) AND USER(S), AND AUTHORITIES HAVING JURISDICTION.

⚠CAUTION: This panel's printed circuit boards are sensitive to static electricity and have delicate components mounted on them. Before handling either a board or any component on a board, discharge any static electricity from your body by touching a grounded object such as a metal screw which is connected to earth ground. Handle the board by its edges, and be careful not to twist or flex it. This panel is to be installed in a static free area and the user is to properly attach grounded wrist straps before touching any static sensitive areas. After handling this panel's printed circuit boards, the panel should be tested in accordance with the "System Checkout" guidelines in the "Installation" section of this manual to verify that the printed circuit boards are undamaged and functioning properly.

COMPLY WITH ALL OF THE LATEST APPLICABLE CODES, REGULATIONS, LAWS, STANDARDS, GUIDELINES.

For emergency, hazardous, security, life safety and fire protective signaling system applications, the SAFEPATH products must be used within their published specifications and only with a LISTED compatible control panel in accordance with sound engineering judgment and the instructions of the manufacturer and in accordance with local, state and federal codes, regulations and laws. SAFEPATH products must be PROPERLY specified, applied, installed, operated, maintained and operationally tested in accordance with these instructions at the time of installation and at least twice a year or more often as required by local, state and federal codes, regulations and laws. Installation, testing and maintenance must be performed by qualified personnel for proper operation in accordance with all of the latest National Fire Protection Association (NFPA), Underwriters' Laboratories (UL), National Electrical Code (NEC), Occupational Safety and Health Administration (OSHA), local, state, county, province, district, federal and other applicable building and fire standards, guidelines, regulations, laws and codes including, but not limited to, all appendices and amendments and the requirements of the local authority having jurisdiction (AHJ).

⚠WARNING: IF THE PROTECTIVE SIGNALING SYSTEM SOUNDS AND/OR FLASHES, IT IS A WARNING OF A POSSIBLY SERIOUS SITUATION AND REQUIRES YOUR IMMEDIATE ATTENTION.

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

Request that the local authority having jurisdiction inspect the proposed placement of the notification appliances and receive their approval.

The output of the audio system may not be heard in all cases. Sound can be blocked or reduced by walls, doors, carpeting, wall covering, furniture, insulation, bed coverings, and other obstacles that may temporarily or permanently impede the output of the audio system. Sound is also reduced by distance and masked by background noise. The output of the audio system may not be sufficient to alert all occupants, especially those who are asleep, those who are hearing-impaired, those who are wearing devices that plug or cover the ears, and those who have recently used drugs or alcohol. The output of the audio system may not be heard by an alert person if the output device is placed in an area which is isolated by a closed door, or is located on a different floor from the person in a hazardous situation or is placed too far away to be heard over ambient noise such as, but not limited to, running water, traffic, air conditioners, machinery or musical appliances.

⚠WARNING: **AUDIBLE SIGNALS MAY MASK MEDICAL EQUIPMENT MONITORING ALARMS. WHERE MEDICAL EQUIPMENT MONITORING ALARMS ARE IN USE, DO NOT USE AUDIBLE SIGNALS; PROVIDE VISUAL NOTIFICATION APPLIANCES IN HIGHLY VISIBLE LOCATIONS.**

If audible tones and/or voice messages cannot be readily heard and understood clearly within the protected areas as intended, it is necessary to increase the number and/or sound output intensity of speakers within those areas so that they are heard and understood clearly when activated.

Notification equipment cannot last forever. Even though this panel is expected to last up to ten years, any of its parts or components could fail before then. Therefore testing of the entire protective signaling system, including this panel, all notification equipment, as well as all messages and their output channel, and priority assignment, must be conducted at least twice each year, or more often as required by local, state and federal codes, regulations and laws, by qualified personnel. If the notification equipment is not working properly, immediately contact the installer and have all/any problems corrected immediately. Malfunctioning components should be replaced immediately. Do not attempt to repair malfunctioning components. Malfunctioning components should be returned for factory repair or replacement. In the event you cannot contact the installer, contact the manufacturer.

⚠WARNING: **CERTAIN HARDWARE FUNCTIONS ON THIS SAFEPATH PANEL ARE NOT SUPERVISED. IF ANY SUCH HARDWARE FUNCTIONS FAIL, THE REMOTE SAFEPATH PANEL MAY NOT PROVIDE THE INTENDED WARNING AND/OR NOT INDICATE A TROUBLE CONDITION.**

THE FOLLOWING HARDWARE FAILURES WOULD PREVENT THE REMOTE SAFEPATH PANEL FROM PROVIDING THE INTENDED WARNING:

- 1. THE POLARITY DETECTION CIRCUITRY FOR THE LINE LEVEL INPUT.**
- 2. THE ALARM CONTACT.**

THE FOLLOWING HARDWARE FAILURES WOULD PREVENT THE REMOTE SAFEPATH PANEL FROM INDICATING A TROUBLE CONDITION.

- 1. THE "OPEN CIRCUIT" AND "SHORT CIRCUIT" DETECTION CIRCUITRY FOR ANY ONE OR ALL OF THE NOTIFICATION APPLIANCE OUTPUT CIRCUITS.**
- 2. THE AMPLIFIER SUPERVISION CIRCUITRY FOR ANY ONE OR ALL OF THE AMPLIFIERS.**
- 3. THE STATUS CONTACT.**

THESE HARDWARE FUNCTIONS MUST BE PERIODICALLY CHECKED FOR PROPER OPERATION.

Additional copies of this manual may be obtained from the manufacturer.

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Introduction

Remote SAFEPATH provides remote amplification and remote live announcement capabilities to a centrally located SAFEPATH panel. Remote SAFEPATH is capable of providing up to four zones of audible and visual signals. Figure 1 illustrates the basic capabilities of the remote SAFEPATH panel.

This manual describes the remote SAFEPATH panel, which features:

- A multitone generator with field selectable sounds for a manual evacuation signal.
- Field upgradable.
- Up to four audio and strobe circuits, zone selectable.
- Supervision of input and output lines and many internal operations with trouble diagnosis and notification.
- An optional Remote Microphone (RMS-1).
- An optional Zone Splitter Module (SPL).

THE REMOTE SAFEPATH PANEL MUST BE PROPERLY INSTALLED, PROGRAMMED AND CONNECTED TO A CENTRALLY LOCATED SAFEPATH PANEL TO FUNCTION IN A VOICE EVACUATION SYSTEM.

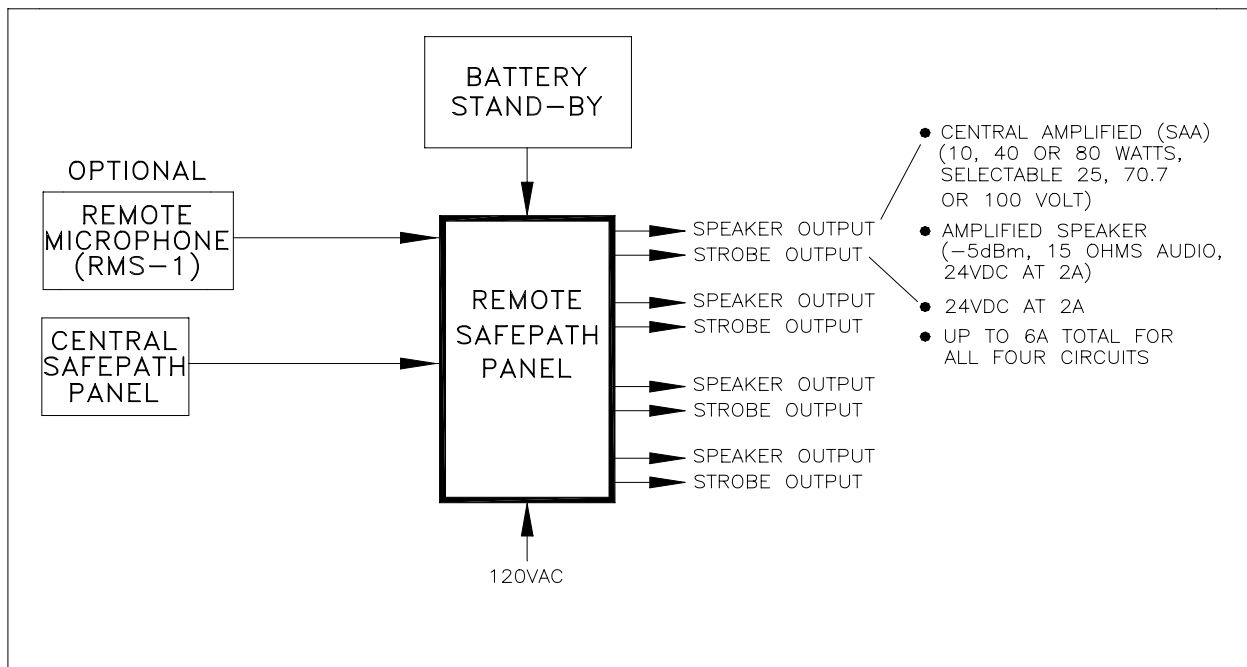


Figure 1.
Basic Capabilities of the Remote SAFEPATH Panel

Operation

This chapter describes the operating characteristics of the remote SAFEPATH panel. Included is information about the following features:

- Operator's Console
- Input and Output Options
- Supervision
- Operators Instructions
- Back-up Battery Requirements

Operator's Console

An operator's console, which allows for manual override of the automatic message playing, is provided. The operator's console includes a microphone, an "ACKNOWLEDGE" push-button, a "MANUAL/AUTOMATIC" switch, "ALL-CALL" switch, four "ZONE DISARRANGEMENT" switches, and "NORMAL" and "TROUBLE" indicators. The operator's console is accessed by opening the enclosure door. See Figure 2.

Input and Output Options

One line level input is provided for connecting to the central SAFEPATH panel.

Up to four audio outputs are available. Each output may be either a 15 Ohm line level output or a 25V, 70.7V or 100V amplifier output. The 15 Ohm line level output can drive up to twenty 600 Ohm line level input appliances. The 25V, 70.7V or 100V amplifier can drive up to 10, 40 or 80 Watts of speaker notification appliances.

Up to four visual appliance outputs are available. These outputs are rated for 24VDC and can each supply up to 2 amps of current. Total current for all four outputs may not exceed 6 amps.

Up to four amplified speaker notification appliance power outputs are available. Each output is rated for 24VDC and can supply up to 2 amps of current. Total current for all four outputs may not exceed 8 amps.

Supervision

A trouble condition indicates that the supervision functions have detected a malfunction in this panel. When a trouble condition is detected, the panel may not be capable of playing emergency announcements.

If a trouble condition is detected by any of the supervision functions, the Form C status relay (normally energized) will change state, the green system normal LED will turn off, and the amber trouble LED will turn on. The status relay contact closure must be properly connected to and used by the control panel to indicate a system trouble. At the same time, an amber trouble location LED will identify the location of the trouble condition. If a trouble condition is indicated, follow the procedures in the "Troubleshooting and Servicing" section.

⚠WARNING: DO NOT LEAVE THIS SAFEPATH PANEL IN A TROUBLE CONDITION AS, IT MAY NOT PLAY WARNING MESSAGES WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS. IF SAFEPATH INDICATES A TROUBLE CONDITION: (1) PROVIDE UL REQUIRED ALTERNATIVE SIGNALING AND (2) HAVE QUALIFIED SERVICE PERSONS IMMEDIATELY REPLACE UNIT(S) THAT HAVE MALFUNCTIONED.

⚠WARNING: MESSAGES MADE BEFORE AND DURING A TROUBLE CONDITION MAY NOT BE HEARD, WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS. IF MESSAGES MADE BEFORE AND DURING A TROUBLE CONDITION ARE STILL NECESSARY, THEY SHOULD BE REPEATED WHEN THIS SAFEPATH PANEL IS RETURNED TO NORMAL.

Input Voltage Supervision

Input voltage is supervised, and if the input voltage drops below the operating minimum voltage, this panel will transfer to battery back-up power and indicate a trouble condition.

Microprocessor Supervision

Each microprocessor within this panel has a watchdog circuit that supervises the processor and resets it (if necessary) or maintains a trouble condition if the microprocessor cannot be restarted. Each watchdog circuit constantly monitors the functioning of its microprocessor and, if the microprocessor fails to function properly, will attempt to reset and restart the microprocessor.

Line Level Input Supervision

The line level input wiring is supervised by the central panel only. If either an open or short in the wiring should occur, the remote panel will indicate an alarm condition.

Visual Notification Appliance Output Line Supervision

All visual notification appliance output lines are supervised. The lines are supervised for open circuits, short circuits, and ground faults when the output is de-energized; and ground faults only when the output is energized. Output line supervision requires a LISTED 10K end-of-line resistor to be installed on each output circuit and across the terminals of unused output circuits.

Audio Notification Appliance Output Line Supervision

All audio notification appliance output lines are supervised. The lines are supervised for open circuits, short circuits, and ground faults when the output is de-energized. The lines are unsupervised when the output is energized. Output line supervision requires a LISTED 10K end-of-line resistor to be installed on each output circuit and across the terminals of unused output circuits.

Amplified Speaker Notification Appliance Power Output Line Supervision

All amplified speaker notification appliance power output lines are supervised. The lines are supervised for open circuits, short circuits, and ground faults when the output is de-energized, and ground faults only when the output is energized. Output line supervision requires a LISTED 10K end-of-line resistor to be installed on each output circuit and across the terminals of unused output circuits.

Battery Back-Up Line Supervision

The battery back-up lines are supervised for open circuits, short circuits and ground faults.

Back-Up Battery Supervision

The back-up battery is supervised for low voltage conditions.

Remote Microphone Supervision

The optional remote microphone is supervised for proper operation and for open circuits, short circuits and ground faults.

Operator Instructions

The SAFEPATH panel provides an operator console for manually activating the panel. The operator console includes a microphone, a green "NORMAL" indicator, a yellow "TROUBLE" indicator, an "ACKNOWLEDGE" push-button switch, a "RESET" push-button, a "MANUAL/AUTOMATIC" switch, an "ALL-CALL" switch and four "ZONE SELECT" switches. The operator interface allows the operator to manually override automatically playing pre-recorded messages with live announcements or an evacuation tone, to silence internal and external trouble audibles, and to ascertain if the panel has detected a trouble condition. The operator interface is shown in Figure 3.

The "TROUBLE" and "NORMAL" indicators are visible through a window on the panel door, when door is closed. All other operator controls are only accessible by opening the panel door.

The "SELECT" LED's indicate the zones selected for live announcements.

The "ALARM" LED's indicate the zones actively in alarm.

The two indicators identify to the operator when the SAFEPATH panel has detected a trouble condition. The yellow "TROUBLE" indicator will be illuminated whenever there is a trouble detected by the SAFEPATH panel. If no troubles are detected, the green "NORMAL" indicator will be illuminated.

The "ACKNOWLEDGE" push-button allows the operator to silence the trouble audibles, both internal and external. When a trouble condition is detected, both the internal and external trouble audibles are sounded. When the "ACKNOWLEDGE" push-button is depressed, the internal and external trouble audibles will be silenced. The trouble audibles will resound for subsequent trouble conditions. The Form C trouble output contact will remain in the trouble condition and the "TROUBLE" indicator will remain illuminated until all trouble conditions have been corrected.

The "RESET" push-button resets the strobe circuits after all initiating circuits are reset.

The "MANUAL/AUTOMATIC" switch has two positions, manual (down) and automatic (up). When the "MANUAL/AUTOMATIC" toggle switch is in the automatic position, pre-recorded messages may be selected to play in individual circuits via dry contact inputs and/or a serial communication interface. When the "MANUAL/AUTOMATIC" switch is in the manual position, pre-recorded messages will not play, and the visual notification appliances are energized and the evacuation tone sounds in all circuits.

The "ALL-CALL" switch overrides any zone selection and allows audible signals to be heard regardless of the position of the four zone select switches.

The four "ZONE SELECT" switches are numbered 1 through 4. They are used to silence any audible signal and turn off visual signals in the respective zones, for live announcements only.

Operation Instructions

To make a live announcement:

1. Select specific zones or use "ALL-CALL" as necessary.
2. Remove microphone from its holder.
3. Hold down microphone's push-to-talk button and talk into microphone.

To manually sound evacuation tone:

1. Move "MANUAL/AUTOMATIC" switch to the manual position.

The evacuation tone will sound in all circuits.

To silence trouble audibles:

1. Depress the "ACKNOWLEDGE" push-button.

To reset strobes:

1. All initiating circuits must be reset.
2. Momentarily depress the "RESET" push-button.

When the GREEN "NORMAL" LED is ON the system is functioning properly.

When the YELLOW "TROUBLE" LED is ON there is a FAULT in the system which MUST BE CORRECTED.

⚠ WARNING

IF THE YELLOW "TROUBLE" LIGHT IS ON, THIS UNIT MAY NOT BE ABLE TO PROVIDE EMERGENCY ANNOUNCEMENT CAPABILITIES AND COULD RESULT IN PROPERTY DAMAGE, SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS. IN THE EVENT THE "TROUBLE" LIGHT IS ON, YOU SHOULD CONTACT YOUR SERVICE REPRESENTATIVE IMMEDIATELY.

ACKNOWLEDGEMENT

To Acknowledge a Trouble Condition:
1. Momentarily depress TROUBLE ACKNOWLEDGE button.

This will only silence the internal sounder and any external trouble signaling devices. The system will remain in the trouble condition with the yellow "TROUBLE" LED on and the system trouble contact will remain in the trouble position until all trouble conditions have been corrected.

MANUAL OPERATION

To Sound Evacuation Tone:
1. Slide the AUTOMATIC/MANUAL switch DOWN to the MANUAL position.

MICROPHONE OPERATION

1. Hold the microphone within 2 inches of mouth and press push-to-talk switch on microphone.
2. Deliver message. Activation of the microphone will deliver the message to all circuits.

ZONE SELECTION

To select zones individually for live announcements, set each desired zone switch to the ON position. To select all zones at once, set the ALL-CALL switch to the ON position.

Each zone's "SELECT" LED indicates that zone has been selected for announcements

Each zone's "ALARM" LED indicates that zone is active.

RESET

- To Turn OFF Strobes:
1. All initiating circuits must be reset.
 2. Momentarily depress the RESET button.

⚠ WARNING

ANY ZONE SWITCH SET IN THE "OFF" POSITION WILL SILENCE IT'S RESPECTIVE ZONE.

FOR ADDITIONAL INFORMATION:
REFER TO OPERATION AND INSTALLATION MANUAL.

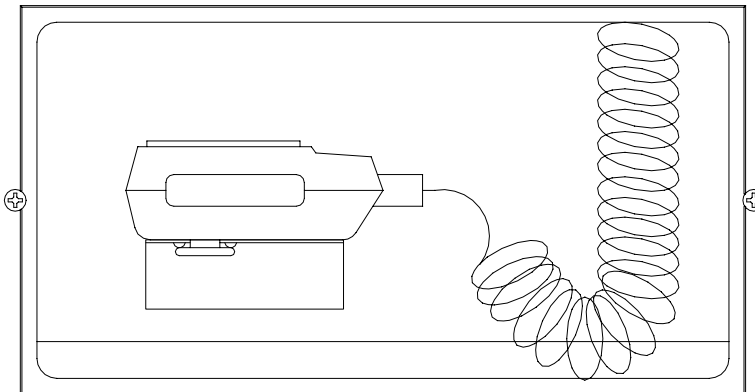
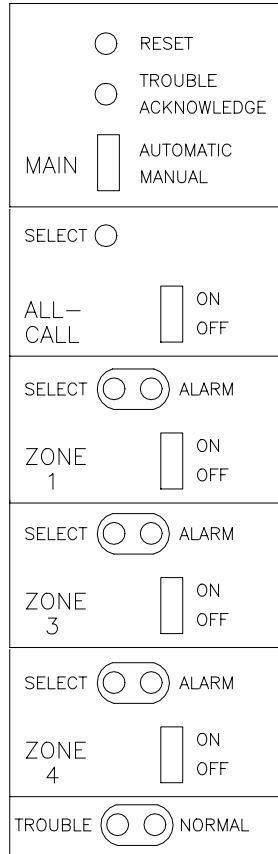


Figure 2.
Operator's Console

Power Calculations

It is necessary to calculate the current draw for battery back-up requirements. The current requirements depend on the system configuration and the options installed. The total current is the sum of the currents of all the components in the system. There are two different system current ratings:

Standby Current

Alarm Current

Standby Current Calculations:

System Controller Board	150mA
Amplifier 1	See Note 1
Amplifier 2	See Note 1
Amplifier 3	See Note 1
Amplifier 4	See Note 1
Optional RMS-1	40mA (If Installed)
Optional Trouble Audible	See Note 2
Optional SPL	40mA (If Installed)

Total: _____

Note 1: If no amplifier is installed in the slot then the current for that amplifier is zero. If there is an amplifier the standby current depends on the model of the amplifier installed in the slot and the pre-selected 1 of 8 evacuation tones.

Model	Standby Current As per UL full power SIN wave testing	Temporal CODE-3 TONE	Worst case
			tone HI/LO
SALL-15S	100mA	100mA	100mA
SAA10S/SE Series	240mA	125mA	150mA
SAA40S/SE Series	400mA	300mA	300mA
SAA80S/SE Series	600mA	300mA	400mA

Note 2: Use the rated current for the optional trouble audible attached to the system.

Alarm Current Calculations:

System Controller Board	150mA
Amplifier 1	See Note 4
Amplifier 2	See Note 4
Amplifier 3	See Note 4
Amplifier 4	See Note 4
Digital Voice	See Note 5
Optional RMS-1	75mA (If Installed)
Optional Trouble Audible	See Note 6
Zone 1 Strobes	See Note 7
Zone 2 Strobes	See Note 7
Zone 3 Strobes	See Note 7
Zone 4 Strobes	See Note 7
Optional SPL	190mA (If Installed)

Total: _____

Note 3: If no amplifier is installed in the slot then the current for that amplifier is zero. If there is an amplifier the alarm current depends on the model of the amplifier installed in the slot and the signal used for evacuation.

Model	Alarm Current full power SIN wave as per UL testing		
SALL-15S Series	The sum of the currents of the self amplified speakers.		
SAA-10S/SE Series	(total wattage of connected speakers) x 69 + 240mA		
SAA-40S/SE Series	(total wattage of connected speakers) x 55 + 400mA		
SAA-80S/SE Series	(total wattage of connected speakers) x 56 + 600mA		
	Alarm Current for:	Temporal	Worst case
		CODE-3	tone
	Typical Voice	TONE	HI/LO
SAA10S/SE Series	250mA	350mA	750mA
SAA40S/SE Series	600mA	750mA	1600mA
SAA80S/SE Series	1000mA	1050mA	2500mA

Note 4: Use the rated current for the optional trouble audible attached to the system.

Note 5: If no strobes are installed in the zone the current is zero. If strobes are installed, the current is the sum of the current ratings of all the strobes attached to the zone.

Battery Capacity Calculations:

The battery capacity depends on two factors; the current being drawn from the battery and the amount of time that the current is being drawn. The battery capacity is measured in amp hours. The total amp hours of batteries needed is (the standby current) x (time in standby) + (the alarm current) x (time in alarm).

Sample Calculation:

The system is equipped with an RMS-1, a remote trouble audible that is rated for 100mA, and three amplifiers. The first amplifier is an SAA-10S Series with 10 watts of speakers attached and 1 amp of strobes attached. The second amplifier is an SAA-80S Series with 60 watts of speakers attached and 2 amps of strobes attached. The third amplifier is an SALL-15S Series with 10, 100mA self amplified speakers attached and no strobes attached. The system is designed for 24 hours of standby and 15 minutes of alarm.

Standby Calculations:

System Controller Board	150mA
Amplifier 1	125mA
Amplifier 2	300mA
Amplifier 3	100mA
Amplifier 4	0mA
Optional RMS-1	40mA
Optional Trouble Audible	100mA

Total: 815mA = .815 amps

Alarm Current Calculations:

System Controller Board	150mA
Amplifier 1	350mA
Amplifier 2	1050mA
Amplifier 3	1000mA
Amplifier 4	None
Optional RMS-1	750mA
Optional Trouble Audible	100mA
Zone 1 Strobes	1000mA
Zone 2 Strobes	2000mA
Zone 3 Strobes	0mA
Zone 4 Strobes	0mA

Total: 5725mA = 5.725 amps

Battery Capacity Calculations:

24 hours x .815 amps + 1/12 hour (5 minutes) x 5.725 amps = 20.04 amp hours minimum capacity. Any de-rating factor must also be included.

Installation

The lives of people depend upon your safe installation of this panel. Please read, understand and carefully follow the specific installation instructions set forth below to avoid damage to this panel and the equipment connected to it. Installation should be conducted only by qualified persons in accordance with the procedures in this manual.

⚠WARNING: **SHUT OFF ALL POWER BEFORE STARTING THE INSTALLATION. ELECTRICAL SHOCK CAN CAUSE DEATH OR SERIOUS INJURY.**

⚠CAUTION: This panel's printed circuit boards are sensitive to static electricity and have delicate components mounted on them. Before handling either a board or any component on a board, discharge any static electricity from your body by touching a grounded object such as a metal screw which is connected to earth ground. Handle the board by its edges, and be careful not to twist or flex it. This panel is to be installed in a static free area and the user is to properly attach grounded wrist straps before touching any static sensitive areas. After handling this panel's printed circuit boards, the panel should be tested in accordance with the "System Checkout" guidelines in the "Installation" section of this manual to verify that the printed circuit boards are undamaged and functioning properly.

⚠CAUTION: The Authorities Having Jurisdiction (AHJ) should be consulted by the installer prior to installation.

1. Prepare a drawing of the complete system wiring (Keep a copy of the system wiring drawing with this manual as a permanent record of the system wiring). See the "Wiring Guidelines" and the "Field Wiring" sections to help develop this drawing.
2. Carefully unpack the panel and make sure each item described on the packing slip is present and undamaged.
3. Mount the panel in the desired location as described in the "Mounting" section.
4. Mount any additional wiring boxes or junction boxes needed to interconnect field wiring.
5. Connect conduit fittings or bushings as needed using knockouts provided on the top and bottom of the panel.
6. Install field wiring in conduit when necessary, following the National Electrical Code and local codes for the type of system being installed. Make all necessary connections at any additional wiring or junction boxes.

⚠CAUTION: Provide proper strain relief for all wiring not in conduit.

7. Connect the panel to earth ground, following the National Electrical Code and local codes for the type of system being installed, as described in the "Grounding" section.
8. Check the integrity of all field wiring following the directions in the "Field Wiring Checkout" section. Confirm that the specified cable is installed and that there is continuity between required points (no open circuits), with no unwanted connections (shorts) to other conductors, chassis, or earth ground.
9. Connect the wiring to the appropriate terminals of the panel's modules following the directions in the "Field Wiring" section and the system wiring drawing created in Step 1.
10. Install the appropriate amplifier modules into slots 1 thru 4 of the mother board.
11. Configure the dip switches on the controller module and install into slot 5 of the mother board.
12. Apply power and perform the operational tests described in the "System Checkout" section.

Wiring Guidelines

⚠WARNING: ALL AUDIO WIRING SHOULD BE ROUTED AWAY FROM ANY HIGH VOLTAGE OR HIGH CURRENT LINES (SUCH AS AC OR DC POWER LINE, AUDIO POWER LINES, AND MOTOR OR RELAY ACTUATION LINES) AND SHOULD BE INSTALLED IN SEPARATE CONDUIT FROM HIGH VOLTAGE OR HIGH CURRENT LINES. FAILURE TO DO SO MAY CAUSE ELECTRICAL SHOCK RESULTING IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

The National Electrical Code defines two types of circuits for protective signaling systems: **power limited** circuits and **non-power limited** circuits. All circuits in this panel are **non-power limited**.

⚠CAUTION: The National Electric Code limits the maximum number of conductors that can be installed in conduit and wiring boxes depending on the size of the conduit, the volume of the boxes, and the gauge of the wire used. Make sure that wiring used for installation complies with the latest NEC requirements.

See the "Field Wiring Connection" section for recommended wire sizes and wire type to use for all input and output circuits.

Mounting

This panel shall be mounted in a location within the environmental limits specified in the latest UL Standard for indoor control panels. This panel shall not be located in a hazardous location. Refer to the "Technical Specifications" section.

Refer to Figure 3 for panel mounting hole layout. Drill mounting holes for appropriate screws and anchors to ensure secure mounting to the type of surface at the selected location. Keep out dust and dirt during installation, as they can interfere with the operation and reduce the life of the equipment.

Remove the door and mount the panel at the selected location. **Use care to avoid damage to the module PC boards during installation.** Do not apply excessive pressure to any PC board or its components, including field wiring terminals and connectors.

Grounding

This panel should be connected to earth ground in accordance with the National Electrical Code. Connecting this panel to earth ground will reduce static discharge failures, improve transient protection, and reduce the chance of electrical shock. This panel should be grounded as follows:

1. Connect a wire between the ground lug (labeled "EARTH GROUND") in Figure 6 and earth ground.

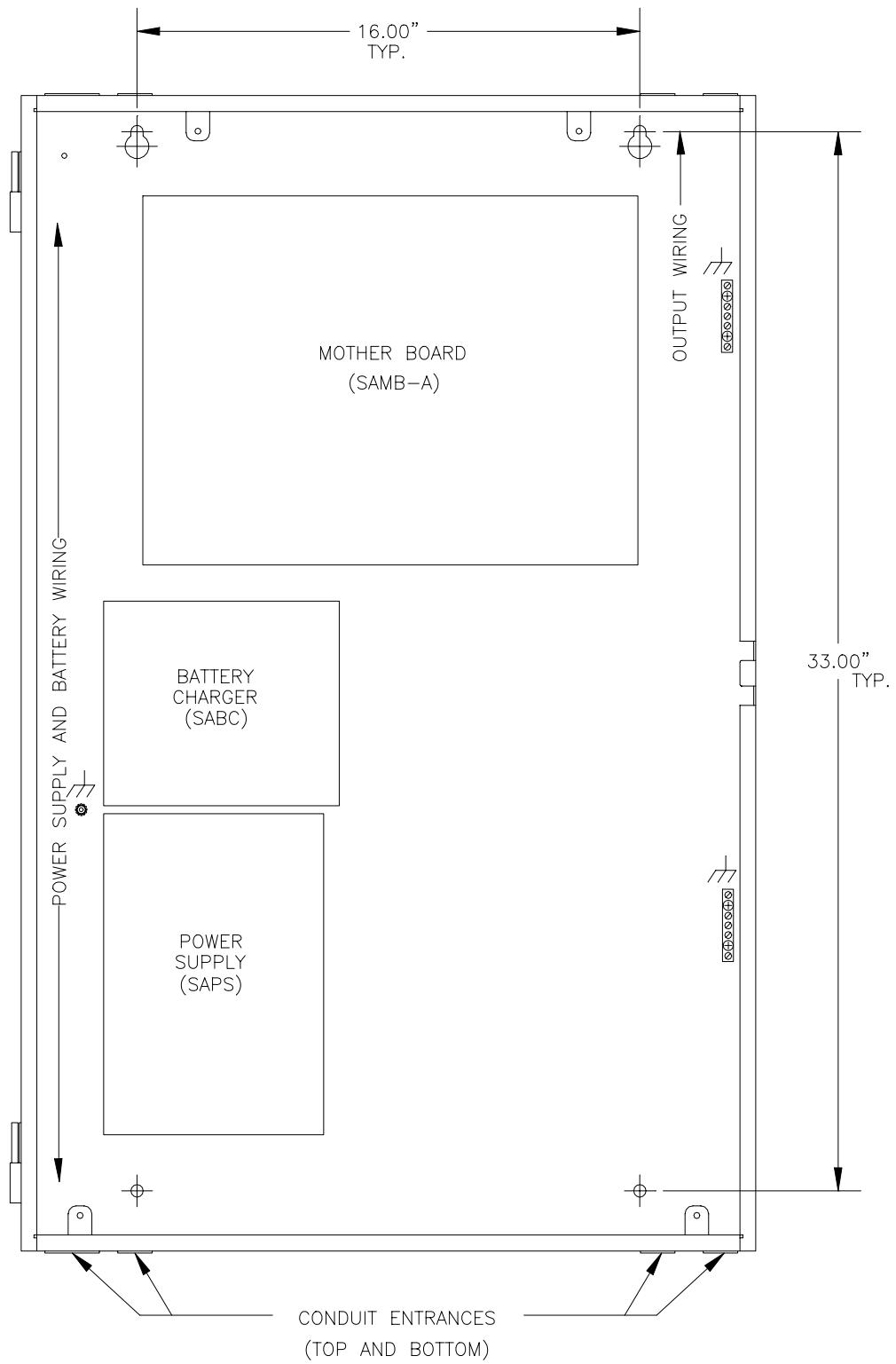


Figure 3.
Panel Mounting

Field Wiring

Before installation, the system specifier must determine the proper wire gauge for all field wiring. The field wiring is broken down into two categories, inputs and outputs.

NOTE: All field wiring shall conform to applicable codes and standards including NFPA, UL, local, state, county, province, district and federal codes and standards.

Field Wiring Connection

All wiring terminals are designed to accept #22 AWG to #12 AWG wiring (one wire per terminal). Connect the field wiring to the terminals while referring to the following sections.

Install field wiring following the latest National Electrical Code and local codes for the type of system being installed. Make all necessary connections. See Figure 4 for typical system block diagram.

Check the integrity of all field wiring following directions in the "Field Wiring Checkout" section. Confirm that the specified cable is installed and there is continuity between required points (no "open circuits"), with no unwanted connections ("shorts") to other conductors, chassis, or earth ground. **Perform the field wiring checkout before continuing with any connections to the wiring terminals.**

⚠WARNING: TO REDUCE THE RISK OF ELECTRICAL SHOCK, NEVER CONNECT OR DISCONNECT FIELD WIRING WHEN INPUT VOLTAGE OR BACK-UP BATTERIES ARE CONNECTED TO THIS SAFEPATH PANEL.

Input Wiring Descriptions

This panel has four types of inputs, the locations of which are shown in Figure 5. Detail of the power input and ground terminals is shown in Figure 6.

Line Level Input Wiring

Determination of the wire gauge for the line level input wiring should consider all factors, including wire loop length and the maximum allowable wire loop resistance of 10 ohms. The line level input wiring diagram's are shown in Figure 7.

AC Input Voltage Wiring

Determination of wire gauge for the input voltage wiring should consider all factors, including wire loop length, AC power line voltage, the panel's maximum AC current consumption, and the panel's AC input voltage range.

IT IS IMPORTANT THAT THE WIRING USED FOR INPUT VOLTAGE WIRING IS LARGE ENOUGH TO CARRY THE MAXIMUM CURRENT REQUIRED BY THIS SAFEPATH PANEL WITHOUT EXCESSIVE VOLTAGE DROP. IF VOLTAGE DROPS FROM AC POWER LINE LOADING AND WIRING RESISTANCE ARE NOT WITHIN THE SPECIFIED OPERATING VOLTAGE RANGE, THE SAFEPATH PANEL WILL NOT FUNCTION PROPERLY.

A typical AC input voltage wiring diagram is shown if Figure 8. This panel shall have its own branch circuit on the main power panel. The wiring from the main power panel shall terminate in the SAFEPATH panel on the power supply terminals as shown in Figure 8. Wire jumpers shall then be run from the battery charger terminals to the power supply terminals as shown in Figure 8. The wire jumpers between the battery charger terminals and the power supply terminals shall be the same gauge as the wire between the main power panel and this panel.

Battery Wiring

Determination of the wire gauge for the battery wiring should consider all factors, including wire loop length and the maximum allowable wire loop resistance. The maximum wire loop resistance is 0.05 ohms. A typical battery wiring diagram is shown in Figure 9.

Earth Ground Wiring

Determination of the wire gauge for the earth ground wiring should consider all factors, including wire length and the maximum allowable wire resistance. A typical earth ground wiring diagram is shown in Figure 10.

If the RSAPE is connected to the direct output of the amplifier at the audio outputs on the SAMB-A, then wire to the LLIM as shown in Figure 7A. If the RSAPE is connected to the output of a splitter (SPL, SC-SPL), then wire to the LLIM as shown in Figure 7B.

Output Wiring Descriptions

This panel has six types of outputs. The location of the outputs' terminal blocks within this panel are shown in Figure 5. Detail of the terminal blocks is shown in Figure 11.

Alarm Output Contact Wiring

One alarm output contact is provided. It is Form C and is rated for 0.5A at 24VDC, resistive load. A detail of the alarm output contact terminal connections is shown in Figure 12. The contact in Figure 12 is shown in the non-alarm position. Determination of wire gauge for the alarm output contact wiring should consider all factors, including wire loop length, maximum current capacity, and maximum voltage drop allowable.

System Trouble Output Contact Wiring

One system trouble output contact is provided. It is Form C and is rated for 0.5 amps at 24VDC, resistive load. A detail of the system trouble output contact terminal connections is shown in Figure 13. The contact in Figure 13 is shown in the trouble position. Determination of wire gauge for the system trouble output contact wiring should consider all factors, including wire loop length, maximum current capacity, and maximum voltage drop allowable.

Trouble Audible Output Wiring

One trouble audible output is provided. The output is rated for 24VDC, 0.1 amps maximum. The output is unsupervised. The wiring diagram for the trouble audible output is shown in Figure 14. Determination of wire gauge for the trouble audible output wiring should consider all factors, including wire loop length, maximum current capacity, and maximum voltage drop allowable.

Visual Notification Appliance Output Wiring

Up to four visual notification appliance outputs may be provided. Each output provided is rated for 24VDC, 2.0 amps maximum. All four outputs combined may not exceed 6.0 amps maximum. Each output meets Class B, Style Y supervision requirements for notification appliance circuits.

The wiring diagram for the visual notification appliance output using visual only appliances is shown in Figure 15. The wiring diagram for a notification appliance output using combination audio/visual appliances in central amplified applications is shown in Figure 18. The wiring diagram for a notification appliance output using combination audio/visual appliances in amplified speaker applications is shown in Figure 19.

Each output circuit must have a LISTED 10K end-of-line resistor installed across the last visual notification appliance. All unused outputs must have a LISTED 10K end-of-line resistor across the output terminals. The LISTED 10K end-of-line resistors must have a 1/8W minimum power rating and a 5% maximum tolerance.

The gauge of the wire necessary for the wiring may vary for each visual notification appliance output on the SAFEPATH panel. Determination of wire gauge should consider all factors including wire loop length, the maximum current draw of each appliance, the number of appliances, and the maximum voltage drop allowable.

Audio Notification Appliance Output Wiring

Up to four audio notification appliance outputs may be provided. Each output is either a central amplified output or an amplified speaker output. Central amplified outputs are a 25V, 70.7V or 100V audio output, rated for 10, 40, or 80 watts maximum. Amplified speaker outputs are 15 Ohm, -5dBm maximum. Each output meets Class B, Style Y supervision requirements for notification appliance circuits.

The wiring diagram for the audio notification appliance output using audio only appliances in central amplified applications is shown in Figure 16. The wiring diagram for the audio notification appliance output using audio only appliances in amplified speaker applications is shown in Figure 17. The wiring diagram for a notification appliance output using combination audio/visual appliances in central amplified applications is shown in Figure 18. The wiring diagram for a notification appliance output using combination audio/visual appliances in amplified speaker applications is shown in Figure 19.

Each output circuit must have a LISTED 10K end-of-line resistor installed across the last audio notification appliance. All unused outputs must have a LISTED 10K end-of-line resistor across the output terminals. The LISTED 10K end-of-line resistors must have a 1W minimum power rating and a 5% maximum tolerance.

The gauge of the wire necessary for the wiring may vary for each audio notification appliance output on the SAFEPATH panel. When speaker with transformer appliances are used (central amplified outputs), determination of wire gauge should consider all factors including wire loop length, appliance power ratings, the number of appliances, and the maximum voltage drop allowable. When amplified speaker appliances are used, determination of wire gauge should consider all factors including wire loop length, output level, the output resistance, the input resistance of each appliance, the number of appliances, and the appliance input sensitivity.

Amplified Speaker Notification Appliance Power Output Wiring

Up to four amplified speaker notification appliance power outputs may be provided. Each output is rated for 24VDC, 2.0 amps maximum. Each output meets Class B, Style Y supervision requirements for notification appliance circuits. The wiring diagram for the amplified speaker notification appliance power output using audio only appliances is shown in Figure 17. The wiring diagram for the amplified speaker notification appliance power output using combination audio/visual appliances is shown in Figure 19.

Each output circuit must have a LISTED 10K end-of-line resistor installed across the last appliance. All unused outputs must have a LISTED 10K end-of-line resistor across the output terminals. The LISTED 10K end-of-line resistors must have a 1W minimum power rating and a 5% maximum tolerance

The gauge of the wire necessary for the wiring may vary for each amplified speaker notification appliance power output on the SAFEPATH panel. Determination of wire gauge should consider all factors including wire loop length, the maximum current draw of each appliance, the number of appliances, and the maximum voltage drop allowable.

Remote Microphone Station (RMS-1) Wiring

Use twisted shielded wiring between the remote microphone station and the SAFEPATH panel. Connect shield to the panel ground connection only. The maximum distance between the RMS-1 and the SAFEPATH panel is 1000 Ft. with a minimum wire size of 22 AWG, with a maximum capacitance of 50pF/Ft. or .05uF/Total run. The wiring diagram for the remote microphone station is shown in Figure 20.

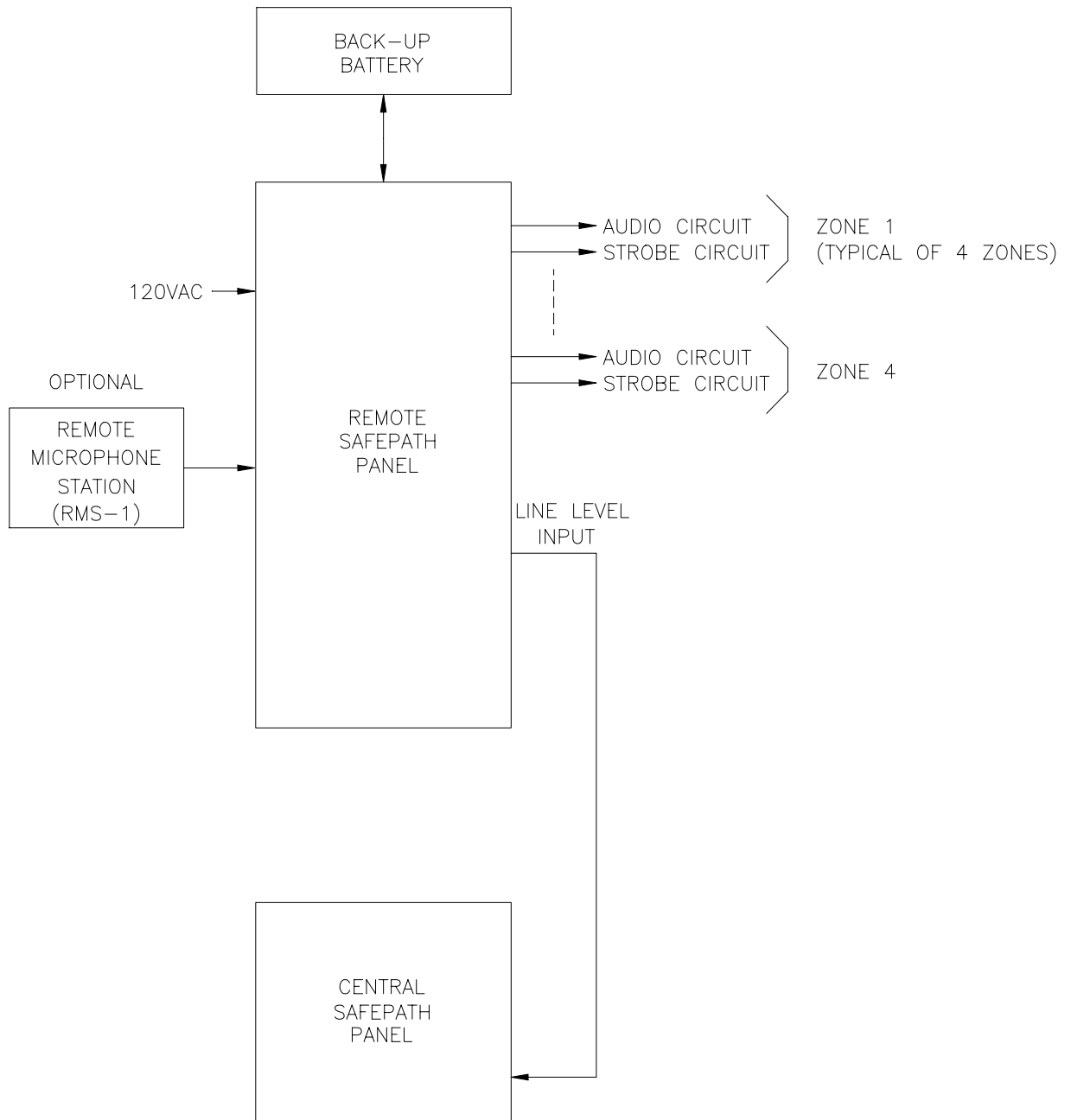


Figure 4.
Typical System Block Diagram

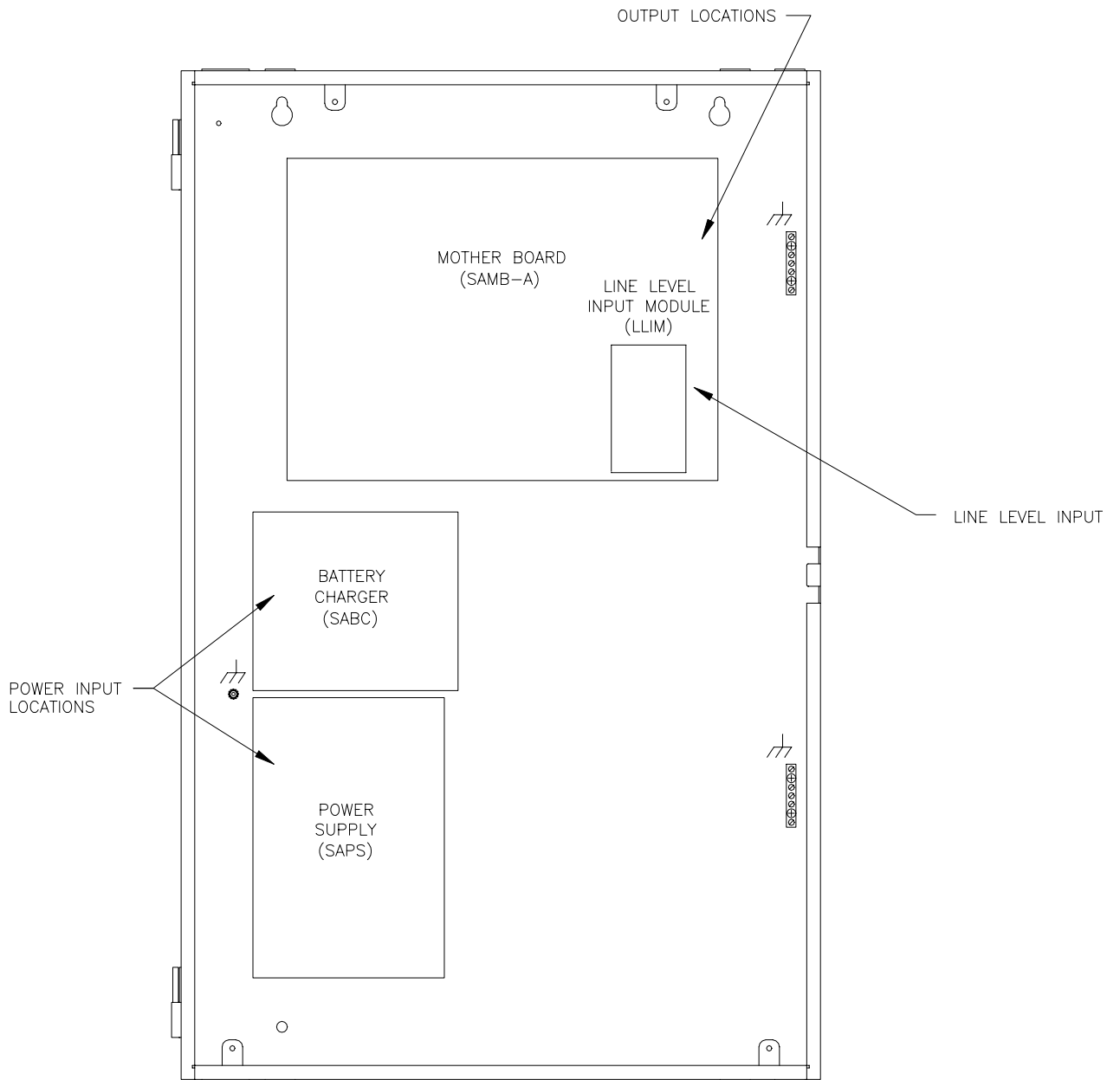


Figure 5.
Field Wiring
Input/Output Terminal Block Locations

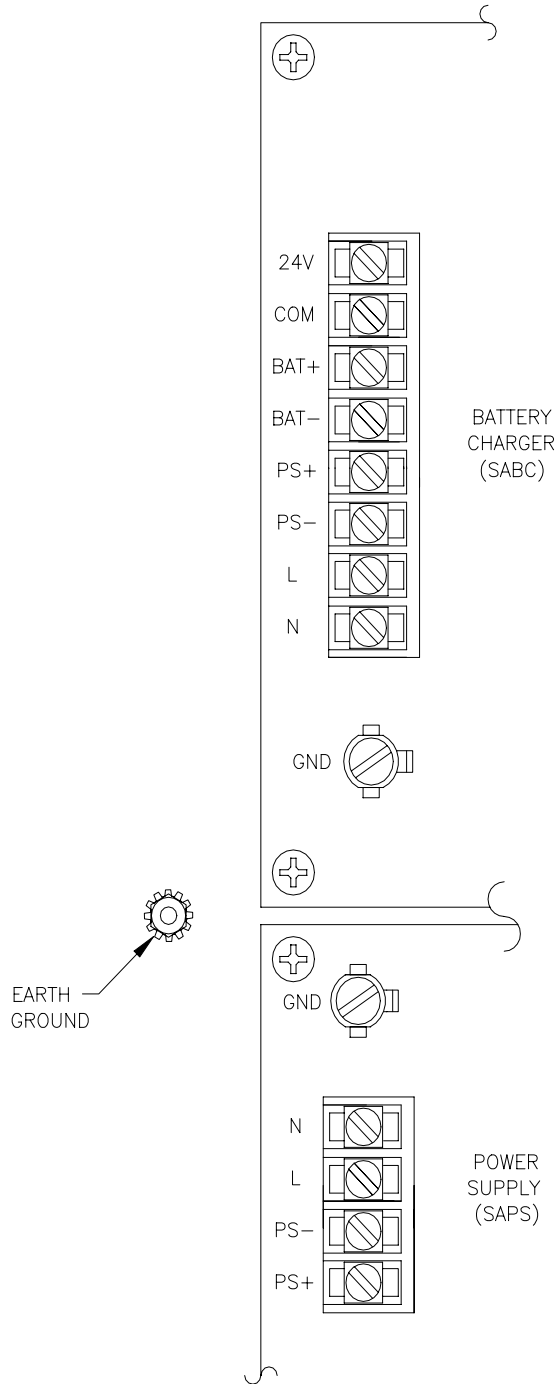


Figure 6.
Power Supply, Battery Charger And Earth Ground Terminal Blocks

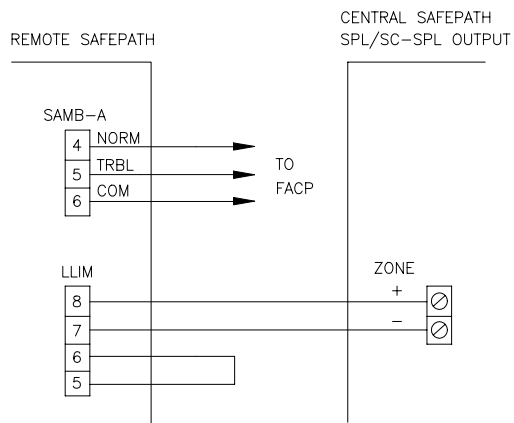


Figure 7A.
Line Level Input Wiring Diagram From Splitter
Output Diagram

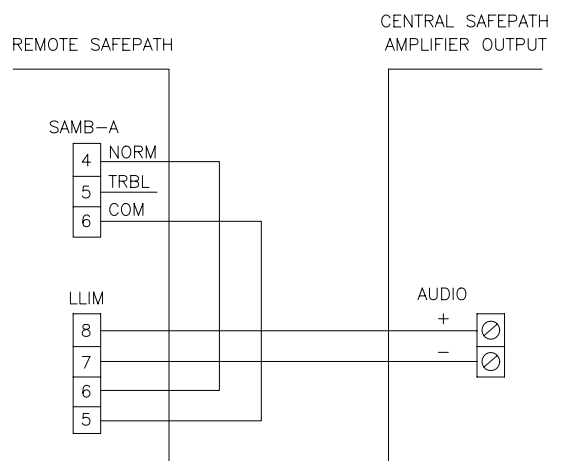


Figure 7B.
Line Level Input Wiring Diagram From Amplifier
Output Diagram

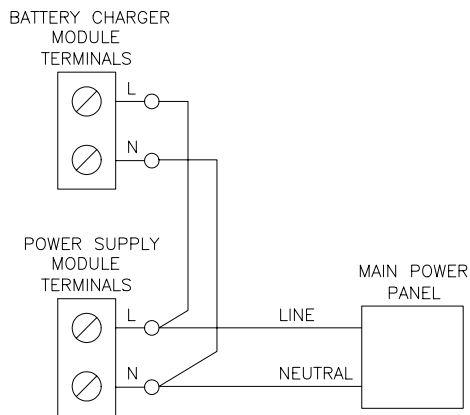


Figure 8.
Typical AC Input Voltage Wiring

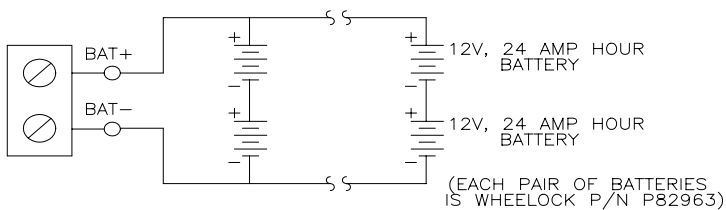


Figure 9.
Typical Battery Wiring

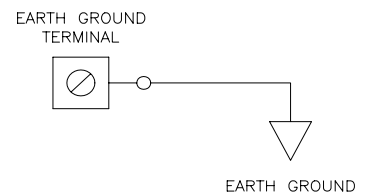


Figure 10.
Typical Earth Ground Wiring

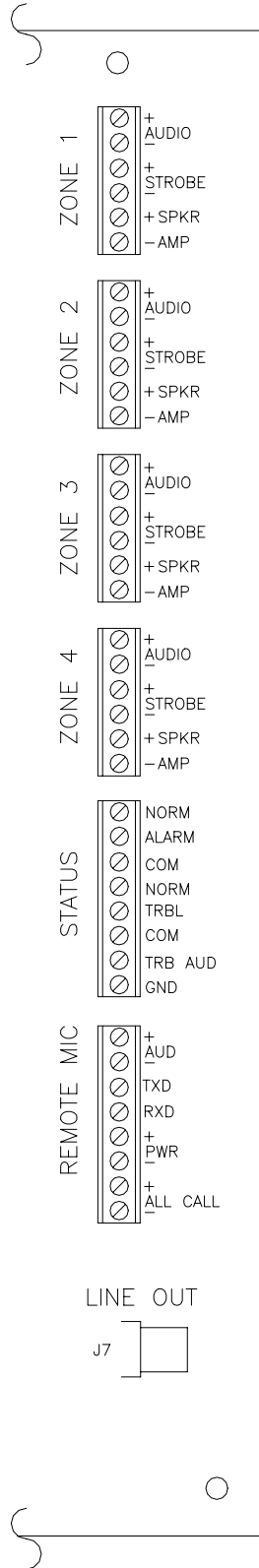


Figure 11.
Output Terminal Block Detail

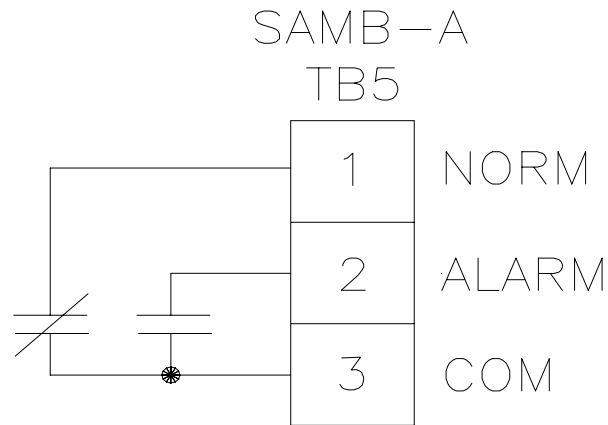


Figure 12.
Alarm Output Contact Connection Diagram

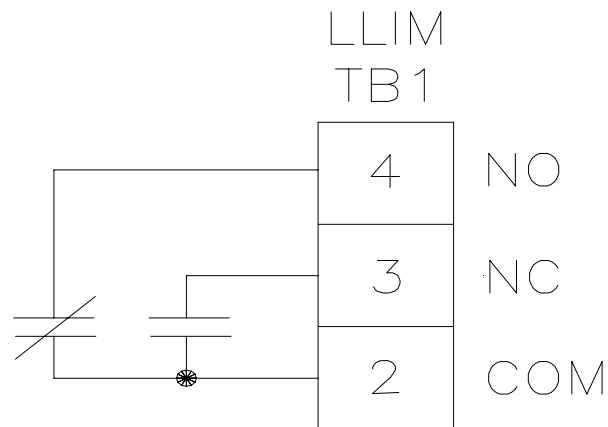


Figure 13.
System Trouble Output Contact Connection Diagram
(Contact shown in trouble condition)

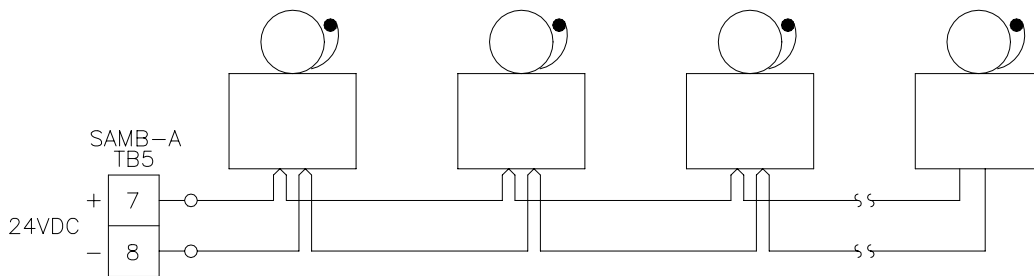


Figure 14.
Trouble Audible Output Wiring Diagram

CAUTION: Do not loop wire under terminals. Break wire run to provide supervision of connection.

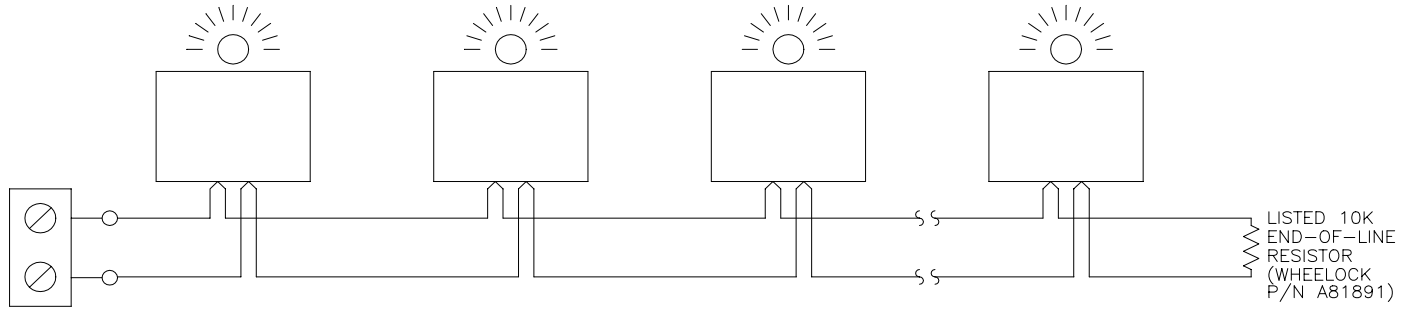


Figure 15.
Visual Notification Appliance Output Wiring Diagram

⚠ CAUTION: Do not loop wire under terminals. Break wire run to provide supervision of connection.

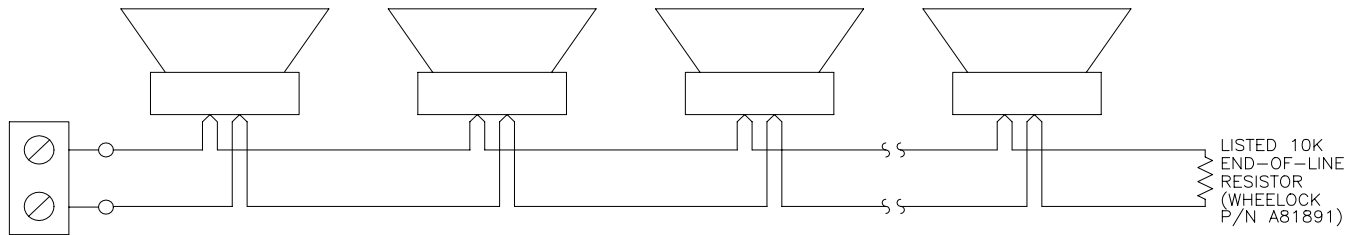


Figure 16.
Audio Notification Appliance Output Wiring Diagram
Using Audio Only Appliances In Central Amplified Applications

⚠ CAUTION: Do not loop wire under terminals. Break wire run to provide supervision of connection.

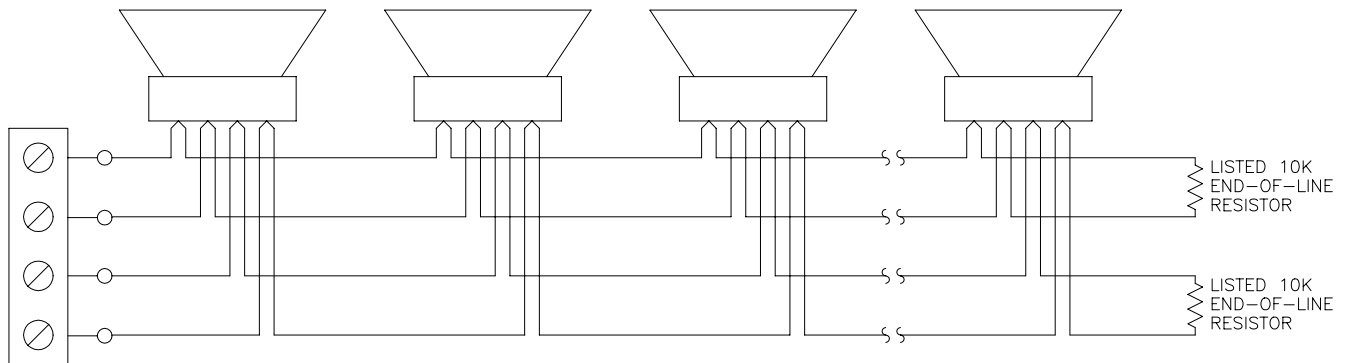


Figure 17.
Audio Notification Appliance Output Wiring Diagram
Using Audio Only Appliances In Amplified Speaker Applications

⚠ CAUTION: Do not loop wire under terminals. Break wire run to provide supervision of connection.

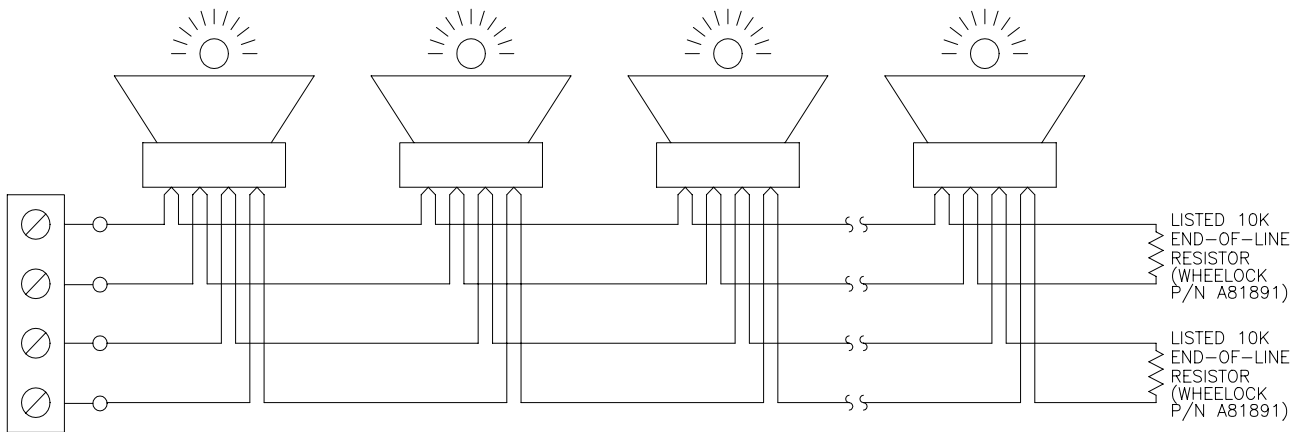


Figure 18.
Notification Appliance Output Wiring Diagram
Using Combination Audio/Visual Appliances In Central Amplified Applications

CAUTION: Do not loop wire under terminals. Break wire run to provide supervision of connection.

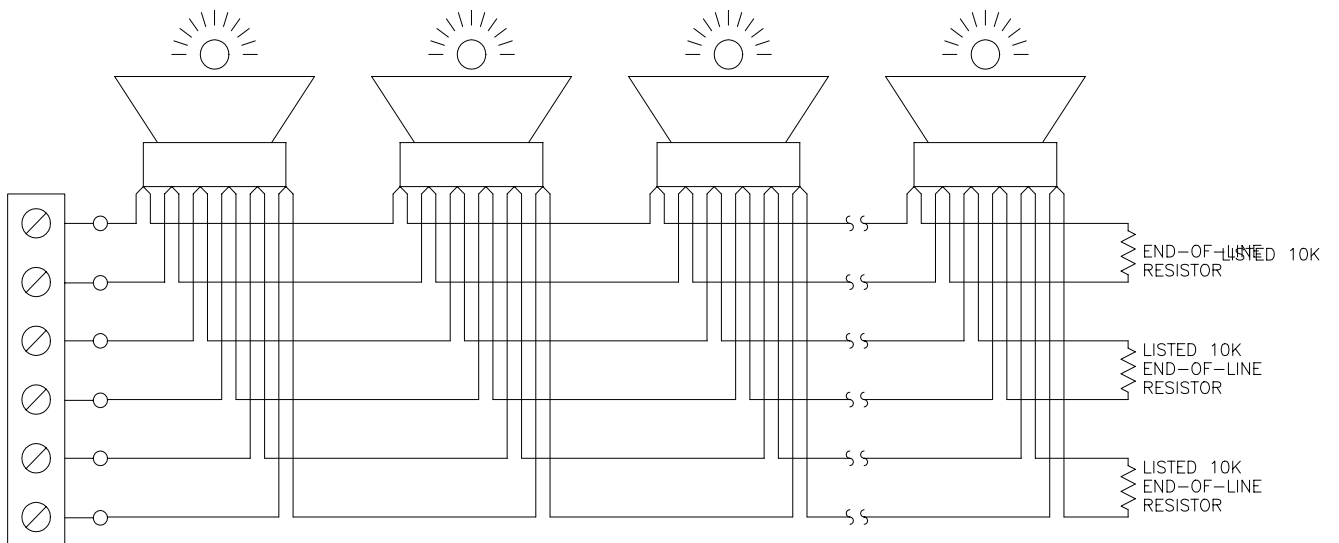


Figure 19.
Notification Appliance Output Wiring Diagram
Using Combination Audio/Visual Appliances In Amplified Speaker Applications

CAUTION: Do not loop wire under terminals. Break wire run to provide supervision of connection.

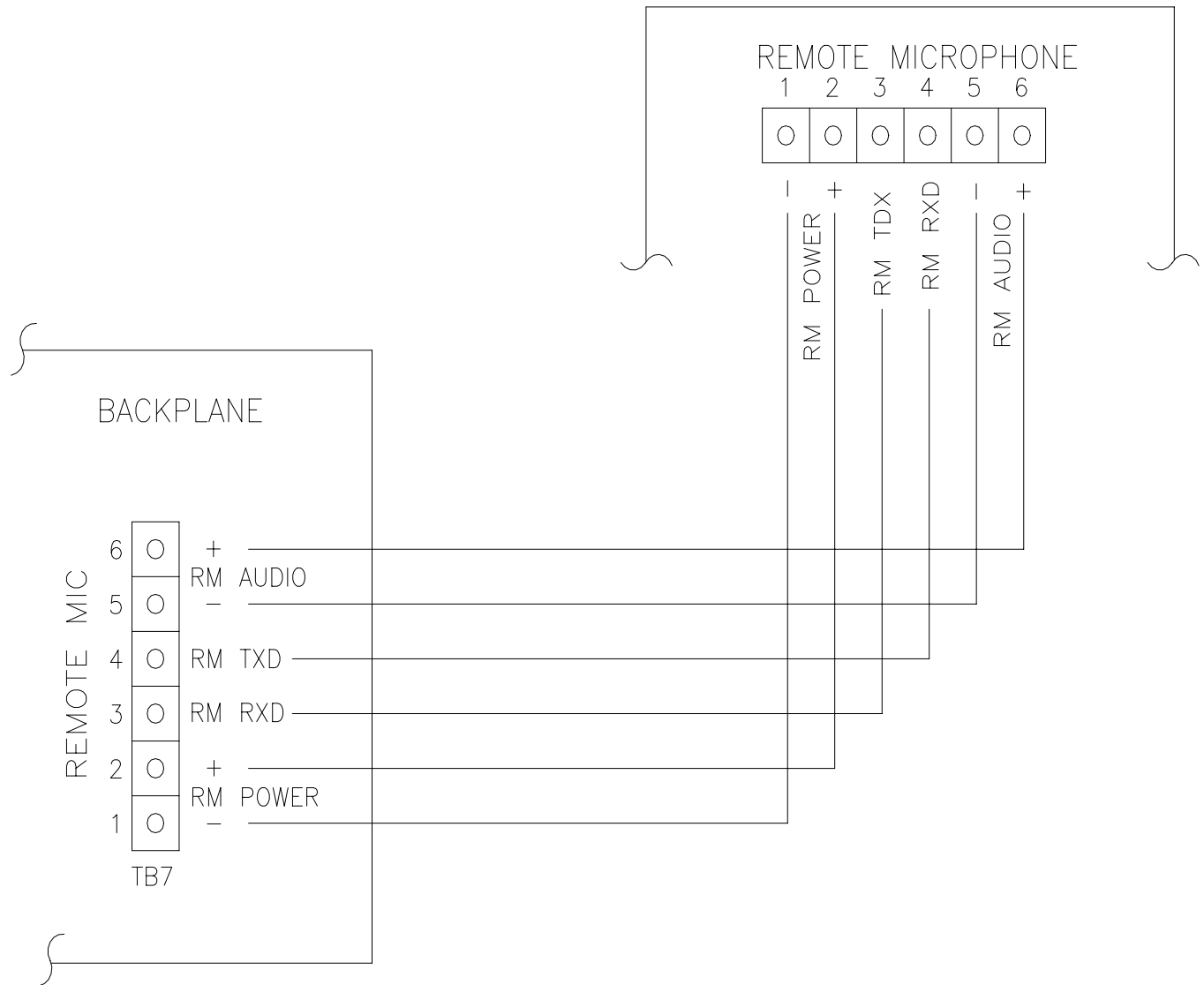


Figure 20.
Optional Remote Microphone Station (RMS-1) Wiring Diagram

Field Wiring Checkout

Refer to NFPA for guidelines on testing signaling system wiring.

CAUTION: Do not connect input voltage to any equipment until the field wiring has been inspected and approved.

Verify that the field wiring is in full agreement with this manual and with the detailed wiring layout prepared for this installation.

Ensure that no unwanted voltages are present on circuit conductors and ground. Test all ungrounded connectors for electrical isolation from ground. Test all wires that are not intentionally connected for electrical isolation from each other. Measure and record the resistance of each circuit pair (this can be done by temporarily short circuiting one end of the circuit).

System Checkout

Refer to NFPA for guidelines on testing signaling systems.

When rated input voltage is applied to this panel, the unit initializes its program and broadcasts a tone signal through each output channel for several seconds. The green system normal LED indicator should be on to indicate normal operation. If the amber system trouble LED is on, a trouble condition is indicated. Refer to the "Troubleshooting and Servicing" section to diagnose and correct the trouble condition.

The system checkout should include:

1. Testing all inputs and outputs.
2. Testing all connections to equipment that is interconnected with this panel.
3. Testing all message files for proper audibility, intelligibility, content, and priority (message files are stored in the central panel).

If a malfunction is discovered during testing, the problem should be corrected immediately before continuing with testing.

WARNING: ALL PROTECTIVE SIGNALING SYSTEMS REQUIRE PERIODIC TESTING. ALL PROTECTIVE SIGNALING SYSTEM EQUIPMENT SHALL BE TESTED BY QUALIFIED PERSONNEL AT LEAST TWICE A YEAR FOR PROPER OPERATION, OR MORE OFTEN IF REQUIRED BY CODES, REGULATIONS AND LAWS. FAILURE TO MAINTAIN AND TEST PROTECTIVE SIGNALING SYSTEM EQUIPMENT CAN RESULT IN AN INABILITY TO DETECT EQUIPMENT FAILURE THAT CAN RESULT IN PROPERTY DAMAGE AND SERIOUS PERSONAL INJURY OR DEATH TO YOU AND/OR OTHERS DURING AN EMERGENCY SITUATION.

Installation and Care of Sealed Lead Acid Batteries

Sealed lead acid batteries are designed to operate in standby service for approximately five years. This is based upon a normal service condition where there is an ambient of 20 degrees C (68 degrees F) and batteries are completely discharged once every three months. LENGTH OF SERVICE LIFE WILL BE DIRECTLY EFFECTED BY THE NUMBER OF DISCHARGE CYCLES, DEPTH OF DISCHARGE, AND AMBIENT TEMPERATURE.

Use Guidelines:

1. Avoid installation and/or operation in close proximity to heat sources. While the operating temperature range is 0 to 49 degrees C (32-120 degrees F), battery life will be maximized at an ambient of 20 degrees C (68 degrees F).
2. Batteries may generate ignitable gases. Because of this, batteries shall be installed in a well ventilated location, away from spark producing equipment.
3. Batteries shall not be installed in an atmosphere where organic solvents or adhesives may be present. The batteries shall not be cleaned with oils, thinners, or similar substances. The case and cover of the batteries are ABS plastic resin which may suffer damage from these chemicals.
4. Batteries shall not be installed in a heavy vibration or shock location.
5. Batteries shall have a 1/4" minimum separation between cells.
6. Insulated gloves shall always be worn when handling batteries.
7. Batteries shall not be crushed, incinerated, or dismantled. The electrolyte contains sulfuric acid which can cause serious damage to eyes and skin. If contact does occur, flush with water and seek immediate medical attention.
8. Batteries of different capacities, age, or manufacturer shall not be used together.

Battery Storage

Batteries which are to be stored for an extended period of time should be given a supplementary charge monthly. Batteries should never be stored in a discharged condition.

The self-discharge rate of batteries is approximately 3% per month when the storage temperature is maintained at 20 degrees C (68 degrees F). The self-discharge rate will vary depending upon temperature. Cooler temperatures cause the self-discharge rate to decrease. Warmer temperatures cause the self-discharge rate to increase.

Troubleshooting

⚠WARNING: **SOME ELECTRONIC COMPONENTS STORE A HIGH VOLTAGE CHARGE, EVEN THOUGH POWER IS NOT CONNECTED, AND CAN CAUSE A DANGEROUS SHOCK IF TOUCHED. DO NOT TOUCH EXPOSED CIRCUITRY ON THIS PANEL UNLESS THE CIRCUITRY HAS DISCHARGED FOR ONE HOUR AND A SAFE DISCHARGE PROCEDURE IS USED.**

⚠WARNING: **PROVIDE UL REQUIRED ALTERNATIVE SIGNALING MEANS DURING TROUBLE CONDITIONS AND SERVICING TO ASSURE ADEQUATE PROTECTION OF PEOPLE AND PROPERTY. HAVE QUALIFIED SERVICE PERSONS IMMEDIATELY REPLACE ANY MODULES THAT HAVE MALFUNCTIONED.**

⚠CAUTION: Troubleshooting and servicing should be conducted only by qualified persons in accordance with the procedures in this manual. Do not attempt to make other adjustments, modifications, or repairs. Never use water, steam, cleaning liquids or sprays on this SAFEPATH panel.

⚠CAUTION: User servicing of this is limited to the following:

- Field wiring changes following the instructions in the "Installation" section of this manual.
- The procedures set forth in this section.

⚠CAUTION: Do not paint or in any way cover window or LED's.

AFTER ANY TROUBLESHOOTING PROCEDURE IS COMPLETED, PERFORM A COMPLETE SYSTEM CHECKOUT.

This SAFEPATH panel monitors system integrity. Items monitored for integrity are:

1. Strobe circuit field wiring.
2. Speaker circuit field wiring.
3. Amplified speaker audio circuit field wiring.
4. Amplified speaker power circuit field wiring.
5. AC input voltage.
6. Battery voltage level.
7. Battery circuit field wiring.
8. Amplifier functionality.
9. Internal wiring.
10. Internal fuses.
11. Remote microphone functionality and wiring.

System status is indicated to the operator via the NORMAL and TROUBLE indicators. If a trouble condition is detected, this SAFEPATH panel will respond as follows:

1. Turn off the NORMAL indicator.
2. Turn on the TROUBLE indicator.
3. Transfer the Form C trouble contact to the trouble position.
4. Turn on the internal trouble sounder.
5. Turn on the external trouble audible.
6. Turn on a trouble location indicator, if appropriate.

If the ACKNOWLEDGE push-button is pressed, the internal trouble sounder and the external trouble audible will be silenced. All other trouble indicators will still indicate a trouble condition. The internal trouble sounder and the external trouble audible will not resound for subsequent trouble conditions, until all trouble conditions have cleared. If the main power fuse on the controller board is blown, the internal trouble sounder and the external trouble audible will not sound. All other trouble indications occur normally. When there are no trouble conditions detected, the NORMAL indicator will always be on and the TROUBLE indicator will always be off. When a trouble condition is detected, the NORMAL indicator will always be off and the TROUBLE indicator will always be on.

This panel has trouble location indicators which provide information as to what trouble condition has been detected and on which part of the system the trouble is located. Figure 21 shows the location of all trouble location indicators within the panel. Table 1 cross references the trouble location indicators on the SABC, SALL-15S and SAA modules to the proper troubleshooting procedure.

Trouble Location Indicator/Troubleshooting Procedure Cross Reference					
NORMAL Indicator	TROUBLE Indicator	Module	Indicator	What it Means	Troubleshooting Procedure
On	Off	----	----	Normal	----
Off	Off	----	----	Power Loss	A
On	On	----	----	Faulty Controller Module	B
Off	On	SABC	PWR LOW	Input Power Low	C
			BAT LOW	Battery Voltage Low	D
			BAT OPEN	Battery Trouble	E
		SAA	AMP	Amplifier Trouble	F
			SPK	Audio Output Wiring Trouble	G
			STR	Visual Notification Output Wiring Trouble	H
		SALL-15S	AMP	Amplifier Trouble	I
			AUDIO	Audio Output Wiring Trouble	J
			STROBE	Visual Notification Output Wiring Trouble	K
		Off	On	SADC	AMP
D10	DV CH Play 10K Resistor Missing				W
D11	Battery Charger Trouble				X
D12	Remote Microphone Trouble				Y

Table 1.

Module Replacement Procedure

Return any modules that are malfunctioning, after all troubleshooting operations have been performed, for factory repair or replacement. If it is necessary to return an individual module, replace the malfunctioning modules immediately in the following manner:

1. Disconnect AC input power from the panel.
2. Disconnect battery back-up power from the panel.
3. Identify all wiring connections to make sure they will be reconnected identically on the replacement.
4. Disconnect all wiring connections.
5. Remove the malfunctioning module(s) and install the replacement module(s). Perform all checkout procedures described in the "Installation" section of this manual to make sure the replacement module(s) is (are) operating properly.

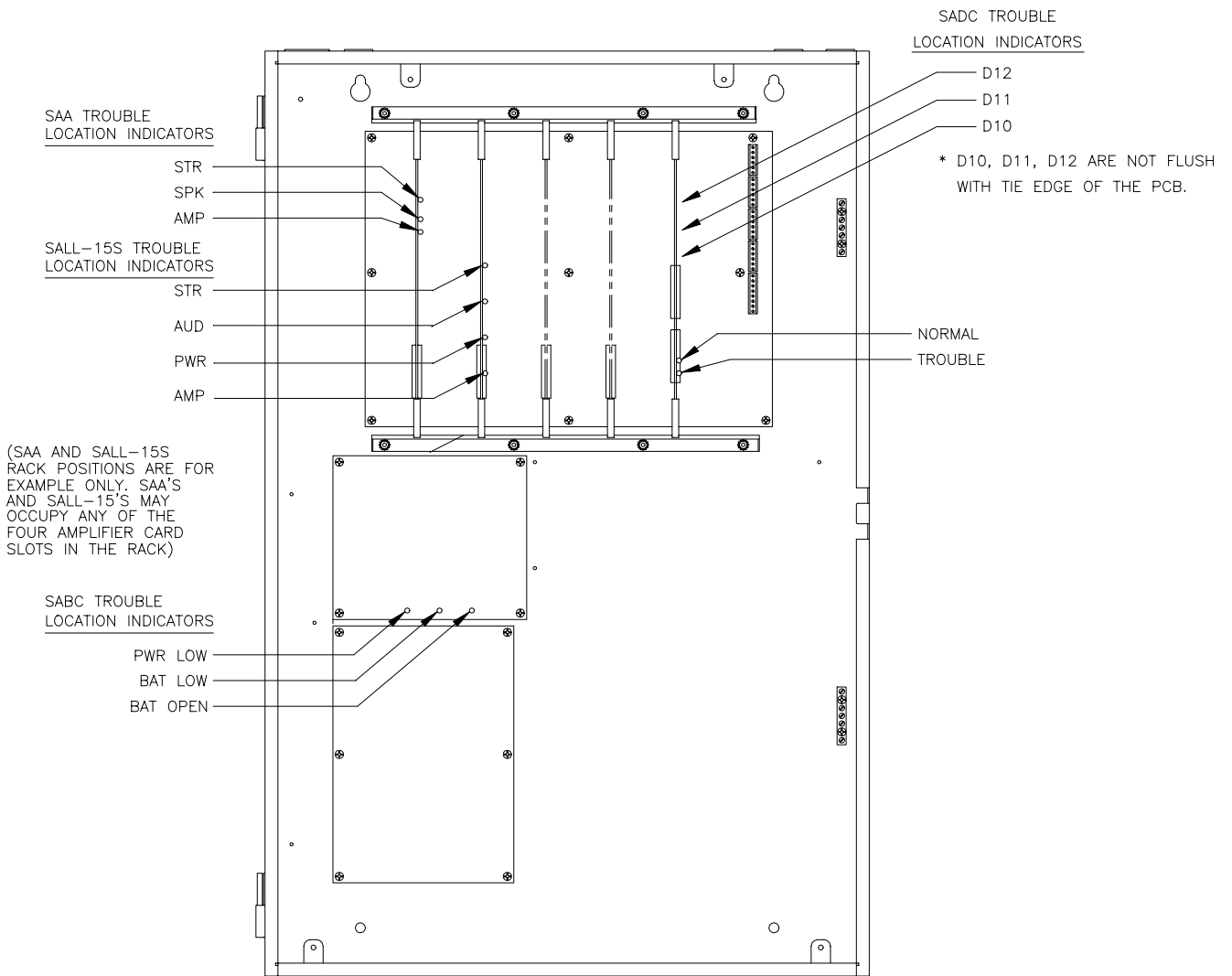


Figure 21.
Trouble Location Indicator Locations

BEFORE PERFORMING ANY OF THE FOLLOWING TROUBLESHOOTING PROCEDURES, THE PRELIMINARY TROUBLESHOOTING INFORMATION AT THE BEGINNING OF THIS "TROUBLESHOOTING" SECTION MUST BE READ, UNDERSTOOD, AND FOLLOWED.

Procedure A

If the green NORMAL indicator is off, the yellow TROUBLE indicator is off, and no module indicators are on, a power loss condition has occurred. A power loss condition may be caused by:

1. A blown fuse on the SAPS module.
2. A blown fuse on the SADC module
3. Loss of AC input power and battery back-up power.
4. Faulty internal wiring between the SAPS module and the SABC module.
5. Faulty internal wiring between SABC module and the backplane module.
6. Faulty SAPS module.
7. Faulty SABC module.
8. Faulty SADC module.
9. Faulty backplane module.

Perform the following:

1. Verify that all fuses on the SAPS module are intact.
2. Verify that all fuses on the SADC module are intact.
3. Verify that AC input power and battery back-up power are present.
4. Verify that the wiring between the SAPS module and the SABC module is intact.
5. Verify that the wiring between the SABC module and the backplane module is intact.
6. Verify that the output voltage of the SAPS module is within its specification.
7. Verify that the output voltage of the SABC module is within its specification.
8. Swap SADC module with a known good module.
9. Replace the backplane module.

Procedure B

If the green NORMAL indicator is on and the yellow TROUBLE indicator is on, a faulty controller module condition has occurred. A faulty controller module condition may be caused by:

1. A faulty SADC module.

Perform the following:

1. Replace the SADC module.

Procedure C

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and the PWR LOW indicator on the SABC is on, an input power low condition has occurred. An input power low condition may be caused by:

1. A fuse on the SABC module is blown.
2. Low AC input power.
3. A faulty SABC module.

Perform the following:

1. Verify that all fuses on the SABC module are intact.
2. Verify that the AC input power is within the correct operating range.
3. Replace the SABC.

Procedure D

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and the BAT LOW indicator on the SABC module is on, a battery voltage low condition has occurred. A battery voltage low condition may be caused by:

1. Fully discharged batteries.
2. Faulty batteries.
3. A faulty SABC module.

Perform the following:

1. Charge the batteries for 24 hours.
2. Replace the batteries.
3. Replace the SABC module.

Procedure E

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and the BAT OPEN indicator on the SABC module is on, a battery trouble condition has occurred. A battery trouble condition may be caused by:

1. A fuse on the SABC module is blown.
2. Faulty field wiring to batteries.
3. A faulty SABC module.

Perform the following:

1. Verify that all fuses on the SABC module are intact.
2. Verify that the field wiring to the batteries is intact.
3. Replace the SABC module.

Procedure F

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and the AMP indicator on the SAA module is on, an amplifier trouble condition has occurred. An amplifier trouble condition may be caused by:

1. Faulty internal wiring between the backplane module and the digital voice module.
2. A faulty SAA module.
3. A faulty SADC module.
4. A faulty backplane module.

Perform the following:

1. Verify that the wiring between the backplane module and the digital voice module is intact.
2. Replace the SAA.
3. Replace the SADC module.
4. Replace the backplane module.

Procedure G

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and the SPK indicator on the SAA module is on, an audio output wiring trouble condition has occurred. An audio output wiring trouble condition may be caused by:

1. Missing end-of-line resistor on the audio output.
2. The audio output field wiring is open or shorted.
3. A fuse on the SAA module is blown.
4. A faulty SAA module.
5. A faulty backplane module.

Perform the following:

1. Verify that the end-of-line resistor is properly in place.
2. Verify that the audio output field wiring is intact.
3. Verify that all fuses on the SAA module are intact.
4. Replace the SAA module.
5. Replace the backplane module.

Procedure H

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and the STR indicator on the SAA module is on, a visual notification output wiring trouble condition has occurred. A visual notification output wiring trouble condition may be caused by:

1. Missing end-of-line resistor on the visual notification output.
2. The visual notification output field wiring is open or shorted.
3. A fuse on the SAA module is blown.
4. A faulty SAA module.
5. A faulty backplane module.

Perform the following:

1. Verify that the end-of-line resistor is properly in place.
2. Verify that the visual notification output field wiring is intact.
3. Verify that all fuses on the SAA module are intact.
4. Replace the SAA module.
5. Replace the backplane module.

Procedure I

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and the AMP indicator on the SALL-15S module is on, an amplifier trouble condition has occurred. An amplifier trouble condition may be caused by:

1. Faulty internal wiring between the backplane module and the digital voice module.
2. A faulty SALL-15S module.
3. A faulty SADC module.
4. A faulty backplane module.

Perform the following:

1. Verify that the wiring between the backplane module and the digital voice module is intact.
2. Replace the SALL-15S module.
3. Replace the SADC module.
4. Replace the backplane module.

Procedure J

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and the AUDIO indicator on the SALL-15S module is on, an audio output wiring trouble condition has occurred. An audio output wiring trouble condition may be caused by:

1. Missing end-of-line resistor on the audio output.
2. The audio output field wiring is open or shorted.
3. A fuse on the SALL-15S module is blown.
4. A faulty SALL-15S module.
5. A faulty backplane module.

Perform the following:

1. Verify that the end-of-line resistor is properly in place.
2. Verify that the audio output field wiring is intact.
3. Verify that all fuses on the SALL-15S module are intact.
4. Replace the SALL-15S module.
5. Replace the backplane.

Procedure K

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and the STROBE indicator on the SALL-15S module is on, a visual notification output wiring trouble condition has occurred. A visual notification output wiring trouble condition may be caused by:

1. Missing end-of-line resistor on the visual notification output.
2. The visual notification output field wiring is open or shorted.
3. A fuse on the SALL-15S module is blown.
4. A faulty SALL-15S module.
5. A faulty backplane module.

Perform the following:

1. Verify that the end-of-line resistor is properly in place.
2. Verify that the visual notification output field wiring is intact.
3. Verify that all fuses on the SALL-15S module are intact.
4. Replace the SALL-15S module.
5. Replace the backplane module.

Procedure L

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and the PWR indicator on the SALL-15S module is on, an amplified speaker power output wiring trouble condition has occurred. An amplified speaker power output wiring trouble condition may be caused by:

1. Missing end-of-line resistor on the amplified speaker power output.
2. The amplified speaker power output field wiring is open or shorted.
3. A fuse on the SALL-15S module is blown.
4. A faulty SALL-15S module.
5. A faulty backplane module.

Perform the following:

1. Verify that the end-of-line resistor is properly in place.
2. Verify that the amplified speaker power output field wiring is intact.
3. Verify that all fuses on the SALL-15S module are intact.
4. Replace the SALL-15S module.
5. Replace the backplane module.

Procedures M thru V

Reserved for future use

Procedure W

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and SADC D10 is on, the wiring between the DV channel play contacts and the backplane is defective or the 10K ohm resistor attached to the DV channel play contacts is defective or missing.

Perform the following:

1. Verify field wiring between the backplane and the DV is intact.
2. Verify the 10K ohm resistor across the DV channel play contacts is intact. Refer to procedures C, D and E.

Procedure X

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and SADC D11 is on, the Battery Charger is defective or mis-wired

Perform the following:

1. Check the wiring between the backplane and the Battery Charger board.
2. Refer to procedures C, D and E.

Procedure Y

If the green NORMAL indicator is off, the yellow TROUBLE indicator is on, and SADC D12 is on, the Remote Microphone (RMS-1) has 1 or more troubles.

Perform the following:

1. Verify that field wiring between the backplane and Remote Microphone Station is intact.
2. Verify that all fuses on the SADC are intact.

Periodic Testing

IMPORTANT: Periodic testing, including this panel, all notification equipment and all messages, including their audibility and intelligibility, content and language, sequence, output channel, and priority assignment, must be conducted frequently, at least twice each year, or more often as required by local, state and federal codes, regulations and laws, by qualified personnel to ensure proper operation of all equipment. If the notification equipment is not working properly, immediately contact the installer and have all/any problems corrected immediately. Malfunctioning units should be replaced immediately. Do not attempt to repair malfunctioning units. Malfunctioning units should be returned for factory repair or replacement. In the event you cannot contact the installer, contact the manufacturer.

⚠WARNING: **PROVIDE ALTERNATIVE SIGNALING MEANS DURING PERIODIC TESTING TO ASSURE ADEQUATE PROTECTION OF PEOPLE AND PROPERTY. FAILURE TO PROVIDE ALTERNATIVE SIGNALING MAY CAUSE PEOPLE TO NOT BE WARNED OF AN EMERGENCY CONDITION WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.**

In addition to testing required by relevant fire codes, regulations and laws, several hardware functions should also be tested. The hardware functions that should be tested are as follows:

1. The polarity detection circuitry for line level input.
2. The alarm contact.
3. The "open circuit" and "short circuit" detection circuitry for any one or all of the notification appliance output circuits.
4. The amplifier supervision circuitry for any one or all of the amplifiers.
5. The status contact.

These hardware functions may be tested as follows:

1. Make a live announcement from the central SAFEPATH and verify that the proper message plays.
2. Monitor the alarm contact to verify proper operation while making a live announcement from the remote panel.
3. While in the standby condition, open and short circuit each notification appliance circuit and verify that the proper trouble condition is indicated.
4. Listen to a message playing out each zone and check for audibility of message.
5. Monitor the status contact while causing the panel to alternate between trouble and normal states to verify proper operation.

If the Remote SAFEPATH panel fails to perform any of the above tests correctly, immediately replace the malfunctioning module(s) following the Module Replacement Procedure given in the "Troubleshooting" section.

Module Description

Introduction

The thirteen modules in the SAFEPATH product line which can be used in the Remote SAFEPATH are:

1. Supervised Audio System Mother Board (SAMB-A)
2. Supervised Audio System Common Control Module (SADC)
3. Supervised Audio System Amplifier/Signal Circuit Module (SAA-10S)
4. Supervised Audio System Amplifier/Signal Circuit Module (SAA-10SE)
5. Supervised Audio System Amplifier/Signal Circuit Module (SAA-40S)
6. Supervised Audio System Amplifier/Signal Circuit Module (SAA-40SE)
7. Supervised Audio System Amplifier/Signal Circuit Module (SAA-80S)
8. Supervised Audio System Amplifier/Signal Circuit Module (SAA-80SE)
9. Self Amplified Speaker Control/Signal Circuit Module (SALL-15S)
10. Supervised Audio System Power Supply Module (SAPS)
11. Supervised Audio System Battery Charger Module (SABC)
12. Remote Microphone Station (RMS-1)
13. Line Level Interface Module (LLIM)

Each SAFEPATH panel is configured with:

- One SAMB-A
- One SADC
- Between one and four amplifier modules (any combination of SAA's and SALL-15S's)
- One SAPS
- One SABC
- One LLIM

The interior view of the panel with the modules in place is shown in Figure 22. The location of the amplifier modules (SAA and SALL-15S) is not shown. The amplifier modules may be used in any combination by installing into slots 1 thru 4 in the SAMB-A. A block diagram of the panel is shown in Figure 23.

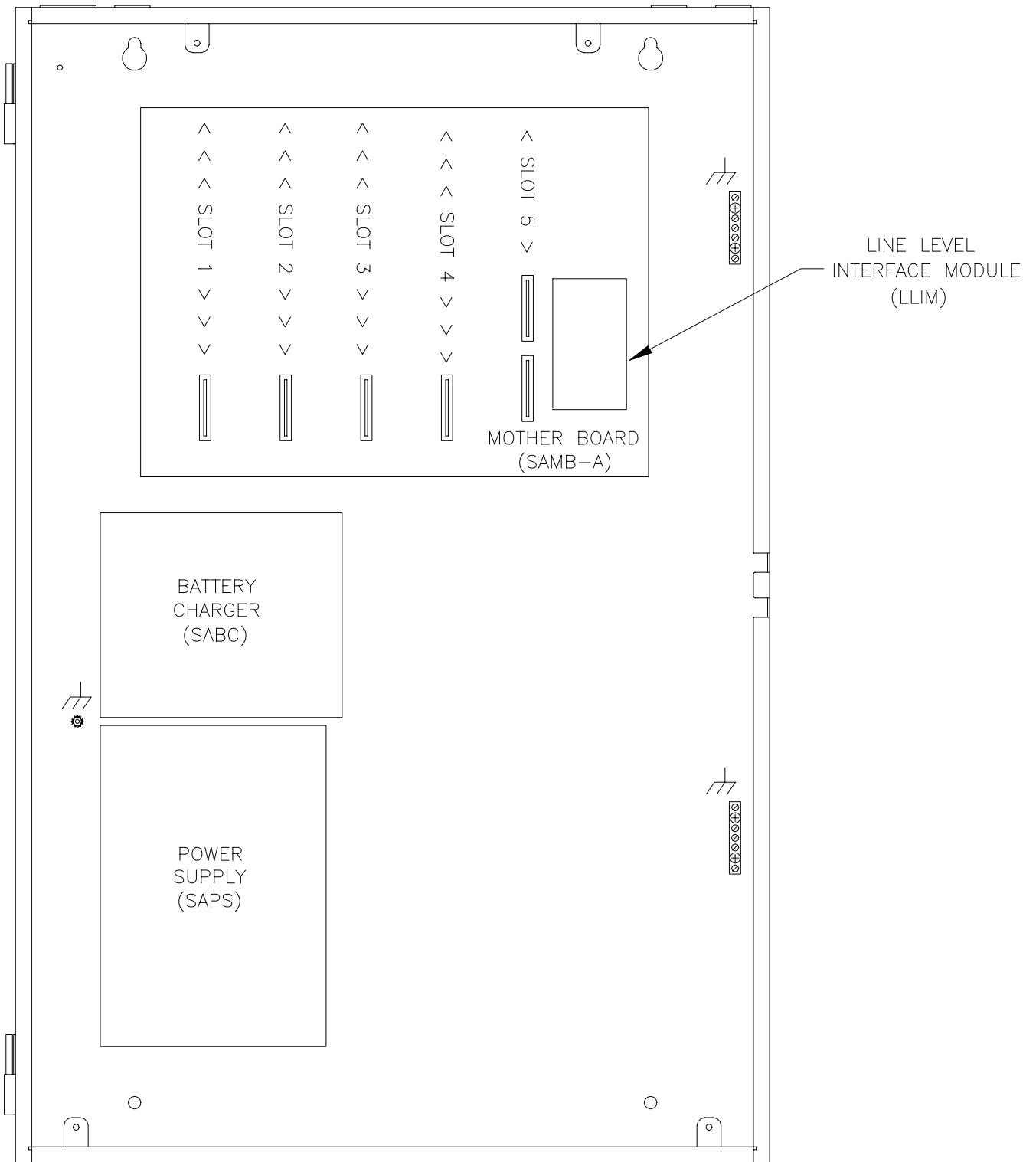


Figure 22.
Module Layout of the Panel

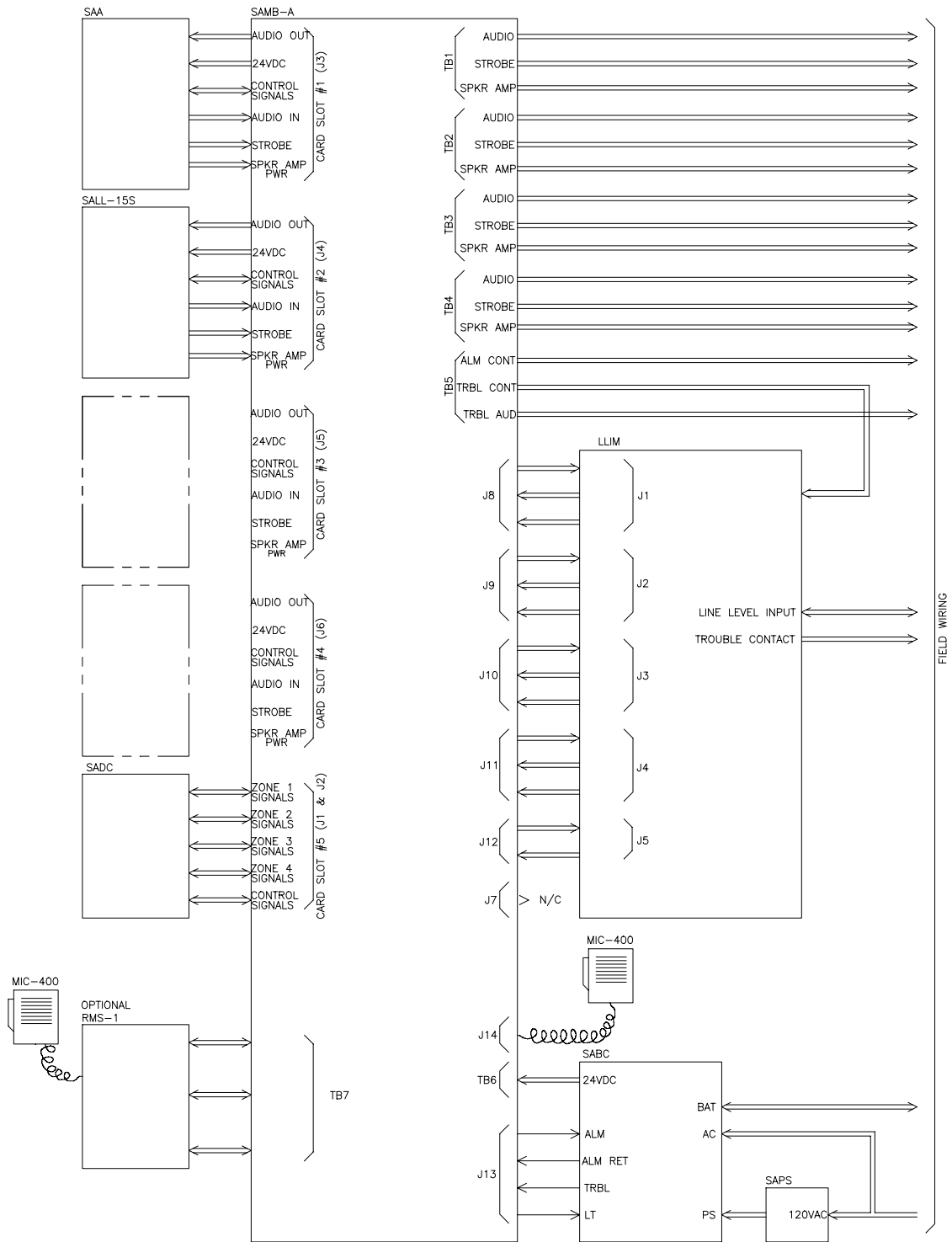


Figure 23.
Panel Block Diagram

Supervised Audio System Mother Board (SAMB-A)

The supervised audio system mother board (SAMB-A) provides all signal handling capabilities between the SADC and the amplifier modules, terminal blocks for output wiring, and connectors for handling signals between the SADC and the digital voice module and the SABC.

The SAMB-A is illustrated in Figure 24.

Up to four amplifier modules may be connected to the SAMB-A. The amplifier modules may be installed in any order in slots 1 through 4. Installing an amplifier module in slot 1 thru 4 will result in the module's output appearing in the correspondingly numbered terminal block (labeled "Zone 1" thru "Zone 4"). For example, when an amplifier module is installed in slot 1, the amplifier module's output appears at the terminal block labeled "Zone 1".

Only one SADC may be connected to the SAMB-A. The SADC may only be installed in slot 5.

Up to four channels from a digital voice module may be connected to the SAMB-A. The digital voice module channels may be connected in any order to connectors J8 through J11. The digital voice module channel connected to J8 will play through Zone 1; if connected to J9, it will play through Zone 2; if connected to J10, it will play through Zone 3; if connected to J11, it will play through Zone 4.

Connector J14 is the microphone input. J7 is the line out which should be connected to the DX-200's auxiliary input (J7 should be left unconnected in DX-100 configured systems). J12 is used to bring power to the digital voice module and monitor the digital voice module's status contact. J13 is used to monitor the SABC's status.

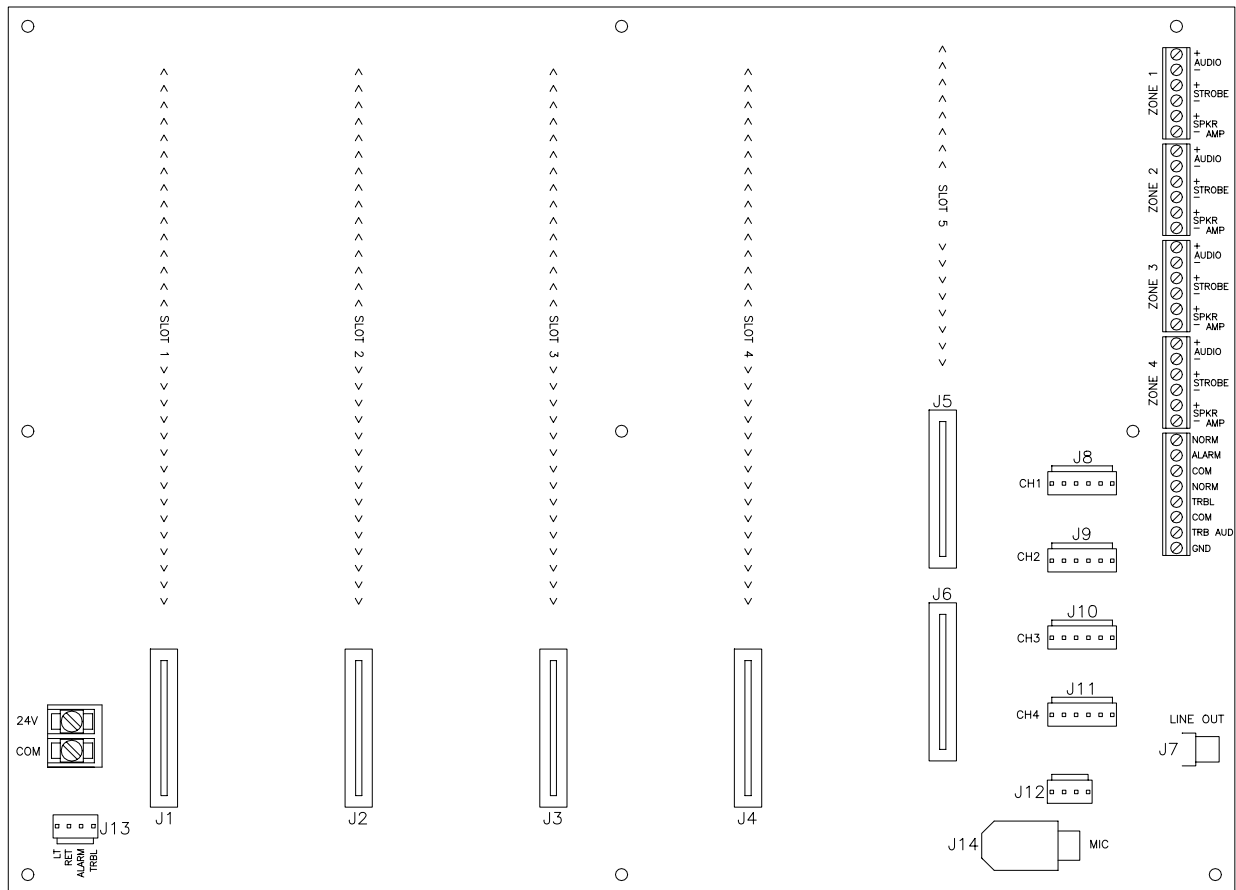


Figure 24.
Supervised Audio System Mother Board

Supervised Audio System Common Control Module (SADC)

The supervised audio system common control module (SADC) provides all of the control capabilities to the SAFEPATH panel. The controller module monitors the digital voice module or line level interface module, the battery charger module, and the amplifier modules for proper operation. The microphone is monitored for connection.

The line level input is monitored to determine its status, active or inactive. If the status is inactive, the control module routes a supervision tone to each of the amplifier modules and monitors the amplifier for functionality. If the status is active, the control module routes the audio from the line level input to the four amplifier modules.

The battery charger module is monitored for three conditions: low AC input power, battery wiring trouble, and battery voltage low. The wiring between the controller module and the battery charger is supervised for open and short circuit conditions.

The amplifier modules are supervised for two failure conditions: field wiring trouble conditions and amplifier audio output trouble conditions. The controller module only supervises the audio output during standby conditions. When either a message is playing from the digital voice module or a live announcement is being made from the microphone, the field wiring and audio output are not supervised.

If at any time a trouble condition is detected, the controller module will energize the internal and external trouble audibles, transfer the Form C trouble contact to the trouble position, turn off the "NORMAL" indicator, and turn on the "TROUBLE" indicator.

There are two fuses on the printed circuit board, F1 and F2. F1 is the remote microphone power fuse and F2 is the fuse for the external trouble audible. See Figure 25 for fuse location.

<u>Fuse</u>	<u>Rating</u>
F1	0.5A
F2	0.5A

Nominal Specifications:

Input Voltage Range	20 to 28VDC
Supply Current (Idle) @ 24VDC	75mA
Supply Current (Full Load) @ 24VDC	150mA
Operating Temperature Range	0 to 49 Degrees C (32-120 Degrees F)
Humidity Range	0 to 85%, Non-condensing

Configuration

There are 8 dip switches used to configure the SAFEPATH system:

They are:

- SW8 Position 1, REMOTE MICROPHONE ENABLE (RM). ON configures the system to use an optional Remote Microphone. OFF configures the system to use no Remote Microphone.
- SW8 Position 2, SYNCHRONIZED STROBES ENABLE (SS). ON configures the system to use synchronized strobes. OFF configures the system to use non-synchronized strobes.
- SW8 Position 3, Remote SAFEPATH ENABLE (SL). ON configures the system to be a remote SAFEPATH panel. OFF configures the system to be a central or stand-alone SAFEPATH panel.
- SW8 Position 4, Future Use (FU). Leave in OFF position.
- SW9 Position 1, LAMP TEST ENABLE (LT). ON lights the panel LED'S for test purposes, leave in OFF position.
- SW9 Position 2, 3, & 4, MULTITONE SELECT (TS1, TS2, & TS3) selects 1 of 8 tones used for the primary evacuation signal. Use Table 2 below to select the tone.

SWITCH SETTINGS FOR AVAILABLE TONE SOUNDS			
TONE SOUND	SW9-2	SW9-3	SW9-4
Horn (Continuous)	ON	ON	ON
Bell (1560Hz Modulated)	ON	OFF	ON
March Time Horn (.25 Sec ON .25 Sec. OFF)	OFF	OFF	ON
Code-3 Horn (ANSI S3.41 Temporal Pattern)	ON	ON	OFF
Code-3 Tone 500Hz (ANSI S3.41 Temporal Pattern)	OFF	ON	ON
Slow Whoop (500-1200Hz Sweep)	OFF	ON	OFF
Siren (600-1200 Hz Sweep)	ON	OFF	OFF
HI/LO (1000/800Hz)	OFF	OFF	OFF

Table 2.

Figure 25.
Supervised Audio System Common Control Module

Self Amplified Speaker Control/Signal Circuit Module, (SALL-15S)

The self amplified speaker control/signal circuit module, (SALL-15S) provides audio output for the SAFEPATH system. The circuit module has a -5 dBm, 15 ohm audio output, a 24VDC, 2A speaker amplifier power output, and a 24VDC, 2A strobe output. The circuit module contains a linear amplifier and supervision circuitry.

The circuit module supervises the strobe field wiring, the speaker amplifier audio field wiring, the speaker amplifier power field wiring, and the amplifier. The strobe field wiring and the speaker amplifier power wiring are supervised with a reverse polarity technique, which applies a DC voltage with one polarity to supervise the wiring and then reverses the polarity to energize the strobes. The speaker amplifier audio field wiring is supervised with a DC current which is removed when audio is being played. Both field wiring circuits are only supervised in the standby state. The amplifier is supervised by monitoring the amplifier output for audio. The state of each of the four supervision features is indicated via four indicators on the printed circuit board. See Figure 26 for indicator locations.

There are three fuses on the printed circuit board, F1 and F2, and F3. Fuse F1 is the fuse for the strobe power. F2 is the fuse for the speaker amplifier power. F3 is the main fuse for the entire board. See Figure 26 for fuse locations.

<u>Fuse</u>	<u>Rating</u>
F1	3A
F2	3A
F3	6A

Nominal Specifications:

Rated Output @ 1kHz	500m Vrms, 15 ohm load
Input Sensitivity	1Vrms
S/N Ratio	-75dB
Frequency Response	275Hz to 4kHz
Input Voltage	24VDC
Supply Current (Idle) @ 24VDC	50mA
Supply Current (Full Load) @ 24VDC	135mA
Operating Temperature Range	0 to 49 Degrees C (32-120 Degrees F)
Humidity Range	0 to 85%, Non-condensing

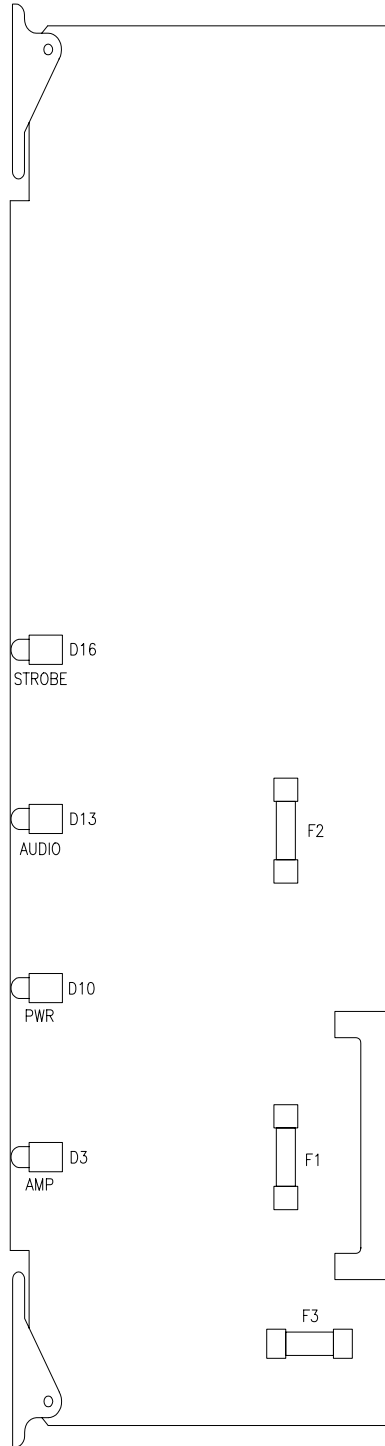


Figure 26.
Self Amplified Speaker Control/Signal Circuit Module

Supervised Audio System Power Supply Module (SAPS)

The supervised audio system power supply module (SAPS) converts 120VAC line voltage to 24VDC output voltage. The power supply module is capable of converting up to 500W and its output is over current protected.

There is one fuse on the printed circuit board, F1. Fuse F1 is the main fuse for the entire board. See Figure 27 for fuse location.

<u>Fuse</u>	<u>Rating</u>
F1	10A

Nominal Specifications:

Rated Output	500W
Input Voltage	120VAC
Supply Current (Full Load) @ 120VAC	6.4A
Efficiency @ 120VAC, Full Load	88%
Operating Temperature Range	0 to 49 Degrees C (32-120 Degrees F)
Humidity Range	0 to 85%, Non-condensing

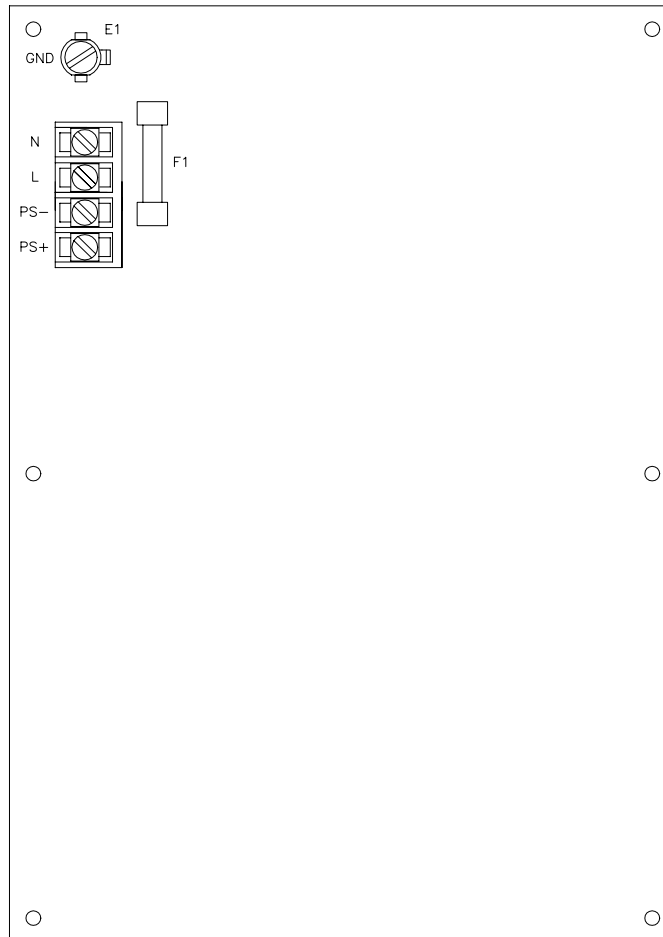


Figure 27.
Supervised Audio System Power Supply Module

Supervised Audio System Battery Charger Module (SABC)

The supervised audio system battery charger module (SABC) provides battery charging and supervision as well as AC power supervision for the SAFEPATH system.

The SABC monitors three parameters: AC input power, battery wiring and battery voltage. When a low AC input power condition is detected, the PWR LOW indicator is illuminated. When a battery wiring open condition is detected, the BAT OPEN indicator is illuminated. When a low battery voltage condition is detected, the BAT LOW indicator is illuminated. See Figure 28 for the indicator locations on the SABC.

The battery charger operates on the dual voltage charging principal, thereby achieving the highest possible level of charge in the shortest amount of time while maintaining battery reliability. The charging circuit is enabled when the AC voltage is within the specified range, the SAFEPATH system is not in alarm, and the battery voltage is above the charge enable threshold level.

When charging begins, the current will be limited to the fast charge rate. As the batteries charge, the terminal voltage increases. The terminal voltage is eventually limited to the overcharge voltage level and the charging current begins to drop. When the charging current drops below the overcharge termination current the float state is entered. At this time the batteries are approximately 90% charged.

There are three fuses on the printed circuit board, F1, F2, and F3. F1 is the fuse for the battery wiring. Fuse F2 is the DC supply fuse which directly powers the charging circuitry. F3 is the fuse for the AC input voltage supervision circuitry. See Figure 28 for fuse locations.

<u>Fuse</u>	<u>Rating</u>
F1	30A
F2	10A
F3	0.5A

Nominal Specifications:

AC Supply Voltage	120VAC
DC Supply Voltage Range	20.4VDC to 26.4VDC
DC Supply Current @ 24VDC, Bulk Charge Rate	3.7A
Fast Charge Rate Current @ Vbat = 26VDC	2.6A
Overcharge Voltage	28.9VDC
Overcharge Termination Current	469mA
Float State Voltage	27.3VDC
Charge Enable Voltage	20VDC
Battery Type	Lead Acid Starved Electrolyte
Nominal Battery Voltage	24VDC
Maximum Battery Capacity	72AH

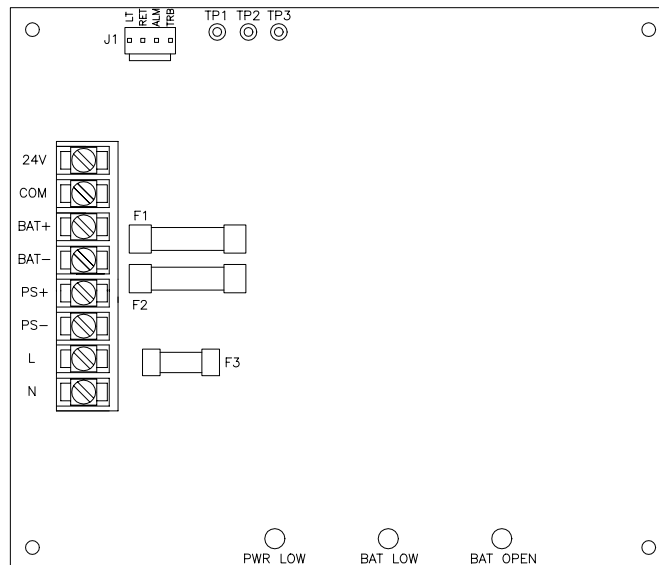


Figure 28.
Supervised Audio System Battery Charger Module

Technical Specifications

Mechanical

Dimensions (H x W x D)	36" by 24" x 6"
Weight	90 pounds
Enclosure	0.050" Steel
Finish	Black
Mounting	Indoor Surface Mount Top and Bottom Wiring Entry

Environmental

(Meets UL requirements)	
Operating Temperature	0° to +49° C (32 to 120 Degrees F)
Storage Temperature	-20° to 70° C (-4 to 158 Degrees F)
Humidity	85±5% @ 30±2° C (86 ± 4 Degrees F) Non-condensing

Electrical

Input Voltage:	120VAC
Input Current (max):	8.0 at 120VAC

Outputs

Visual Notification Appliance Output	1 to 4 output channels optionally provided; each output is rated for 2.0 Amps at 24V. Total of all output channels may not exceed 6.0 Amps.
Central Amplified Output	1 to 4 output channels optionally provided; each programmable for Audio either 25V, 70.7V or 100V output.
Amplified Speaker Audio Output	1 to 4 output channels optionally provided; each through 15 Ohm isolation transformer. Output level is -5 dBm maximum
Amplified Speaker Power Output	1 to 4 output channels optionally provided; each output is rated for 2.0 Amps at 24V.
Trouble Audible Output	Output is rated for 0.100 Amps at 24VDC
Status Contact	Form C contact normally energized. Contacts transfer during trouble. Rated 0.5 Amps at 24VDC max, resistive load.

⚠ WARNING: DO NOT EXCEED THE RATINGS OF THE STATUS CONTACT. EXCEEDING THE RATINGS MAY CAUSE THE RELAY TO FAIL AND PREVENT A TROUBLE CONDITION FROM BEING INDICATED.

Alarm Contact Form C contact normally de-energized. Contact transfers during alarm. Rated 0.5 Amps at 24VDC max, resistive load.

⚠ WARNING: DO NOT EXCEED THE RATINGS OF THE ALARM CONTACT. EXCEEDING THE RATINGS MAY CAUSE THE RELAY TO FAIL AND PREVENT MESSAGES FROM BEING PLAYED.

Wiring Connections

Screw Terminals Each terminal accepts one conductor from #22 to #12 AWG.

End-of-Line Resistor

Visual Notification Appliance Outputs	10K, 1/8W Minimum, 5%
Audio Notification Appliance Outputs	10K, 1W Minimum, 5%
Amplified Speaker Appliance Power Outputs	10K, 1/8W Minimum, 5%

Limited Warranty

Wheelock products must be used within their published specifications and must be PROPERLY specified, applied, installed, operated, maintained and operationally tested in accordance with these instructions at the time of

installation and at least twice a year or more often and in accordance with local, state and federal codes, regulations and laws. Specification, application, installation, operation, maintenance and testing must be performed by qualified personnel for proper operation in accordance with all of the latest National Fire Protection Association (NFPA), Underwriters' Laboratories (UL), Underwriters' Laboratories of Canada (ULC), National Electrical Code (NEC), Occupational Safety and Health Administration (OSHA), local, state, county, province, district, federal and other applicable building and fire standards, guidelines, regulations, laws and codes including, but not limited to, all appendices and amendments and the requirements of the local authority having jurisdiction (AHJ). Wheelock products when properly specified, applied, installed, operated, maintained and operationally tested as provided above are warranted against mechanical and electrical defects for a period of three years from date of manufacture (as determined by date code). Correction of defects by repair or replacement shall be at Wheelock's sole discretion and shall constitute fulfillment of all obligations under this warranty. THE FOREGOING LIMITED WARRANTY SHALL IMMEDIATELY TERMINATE IN THE EVENT ANY PART NOT FURNISHED BY WHEELOCK IS INSTALLED IN THE PRODUCT. THE FOREGOING LIMITED WARRANTY SPECIFICALLY EXCLUDES ANY SOFTWARE REQUIRED FOR THE OPERATION OF OR INCLUDED IN A PRODUCT. WHEELOCK MAKES NO REPRESENTATION OR WARRANTY OF ANY OTHER KIND, EXPRESS, IMPLIED OR STATUTORY WHETHER AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER MATTER.

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