

P83459 REV.
DCSP MOTHER BOARD

SAFEPATH®

Installation, Testing, Operation, and Maintenance Manual

FOR

Dual-Circuit SAFEPATH® Systems

- DCSP-4RP (108954)
- DCSP-8RP (108955)
- DCSP-15SP (108970)



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Typographical Notation Conventions

Thank you for using our products. Use this product according to this instruction manual. Please keep this instruction manual for future reference.

ANY MATERIAL EXTRAPOLATED FROM THIS DOCUMENT OR FROM WHEELLOCK MANUALS OR OTHER DOCUMENTS DESCRIBING THE PRODUCT FOR USE IN PROMOTIONAL OR ADVERTISING CLAIMS, OR FOR ANY OTHER USE, INCLUDING DESCRIPTION OF THE PRODUCT'S APPLICATION, OPERATION, INSTALLATION AND TESTING IS USED AT THE SOLE RISK OF THE USER AND WHEELLOCK WILL NOT HAVE ANY LIABILITY FOR SUCH USE.

Certain information contained in this manual has been extracted from the NFPA 72 Manual (1999 Edition) and the Life Safety Code 101™ Manual (2000 Edition).

Notation Conventions

This manual uses the following notation conventions:



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



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

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Chapter 1 - Safety Precautions

Section 1-1 - Read This Manual


Personnel properly qualified in the application and use of life safety equipment ("qualified personnel") shall read this manual carefully before performing any actions to specify, apply, install, maintain and operationally test **SAFEPATH**[®] Panel products in accordance with the instructions in this manual.

This manual shall be kept with the **SAFEPATH**[®] panel for reference during the life of the system. This manual shall be made available to all qualified personnel who operate, test, maintain, or service **SAFEPATH**[®] Panel products. It is strongly recommend that such personnel read and understand the entire manual.

Section 1-2 - Operational Safety

 **Warning:** IF SAFETY PRECAUTIONS, INSTALLATION AND TESTING INSTRUCTIONS ARE NOT PERFORMED PROPERLY, THE **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.

 **Warning:** IF THE PROTECTIVE SIGNALING SYSTEM SOUNDS AND/OR FLASHES, IT IS A WARNING THAT A POSSIBLE SERIOUS SITUATION AND REQUIRES IMMEDIATE ATTENTION.

 **Caution:** The **SAFEPATH**[®] printed circuit boards are sensitive to static electricity and have delicate components. 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. The **SAFEPATH**[®] 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 **SAFEPATH**[®] printed circuit boards, the panel should be tested in accordance with Section 3-5 "System Checkout" of this manual to verify that it is functioning properly.

This **SAFEPATH**[®] panel **will not work without power.** The **SAFEPATH**[®] panel is powered by 120VAC or 220VAC. 24VDC re-chargeable batteries provide back-up power. If both sources of power are cut off for any reason, the **SAFEPATH**[®] panel will not operate.

DO NOT assume any installation, operation and testing details not shown in this manual.

The **SAFEPATH**[®] panel shall only be operated with the dead front panel **properly in place.**



Warning: FOR PROPER OPERATION, THE **SAFEPATH[®]** PANEL SHALL BE CONNECTED TO A LISTED COMPATIBLE AND PROPERLY OPERATING CONTROL PANEL, WHICH CONTROLS ITS ACTIVATION. ALL EQUIPMENT SHALL BE PROPERLY INTERCONNECTED AND OPERATING. THE INSTALLER SHALL CHECK COMPATIBILITY OF ALL EQUIPMENT PRIOR TO INSTALLATION, OTHERWISE THE **SAFEPATH[®]** PANEL AND/OR THE CONTROL PANEL MAY BE DAMAGED AND/OR FAIL TO OPERATE IN AN EMERGENCY SITUATION.

Notification equipment cannot last forever. Even though **SAFEPATH[®]** 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 the **SAFEPATH[®]** panel, all notification equipment, as well as all messages and their output channel, and priority assignment, shall 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 THE **SAFEPATH[®]** PANEL ARE NOT SUPERVISED. IF ANY SUCH HARDWARE FUNCTIONS FAIL, THE **SAFEPATH[®]** PANEL MAY NOT PROVIDE THE INTENDED WARNING AND/OR NOT INDICATE A TROUBLE CONDITION. THE FOLLOWING ARE NOT SUPERVISED:

1. THE "SHORT CIRCUIT" DETECTION CIRCUITRY FOR ANYONE OR ALL OF THE EIGHT CONTACT INPUTS.

THE FOLLOWING HARDWARE FAILURES WOULD PREVENT THE **SAFEPATH[®]** PANEL FROM INDICATING A TROUBLE CONDITION:

1. THE "OPEN CIRCUIT" DETECTION CIRCUITRY FOR ANY ONE OR ALL OF THE EIGHT CONTACT INPUTS.
2. THE AUDIO SUPERVISION CIRCUITRY FOR EACH OF THE TWO OUTPUT CHANNELS.
3. THE STATUS CONTACT.

THESE HARDWARE FUNCTIONS SHALL BE PERIODICALLY CHECKED FOR PROPER OPERATION.

Section 1-3 - Compliance with Applicable Codes, Regulations, Laws, Standards, and Guidelines

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

**Warning:**

FOR EMERGENCY, HAZARDOUS, SECURITY, LIFE SAFETY, AND FIRE PROTECTIVE SIGNALING SYSTEM APPLICATIONS USING THE SAFEPATH® PANEL INSTALLATION, TESTING AND MAINTENANCE SHALL BE PERFORMED BY QUALIFIED PERSONNEL IN ACCORDANCE WITH ALL THE LATEST NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), UNDERWRITER'S LABORATORY (UL), NATIONAL ELECTRIC CODE (NEC), OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), STATE, COUNTY, LOCAL, 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 REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ).

It is recommended that the local AHJ inspect and approve the proposed placement of all the notification appliances.

Section 1-4 - Property Insurance Recommendation

The **SAFEPATH®** panel is not a substitute for insurance. All users should have adequate levels of life and property insurance.

Section 1-5 - Audio Output Considerations

**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.

**Caution:**

The output of the audio system may not be heard in all cases. Sound can be blocked or reduced by walls, doors, carpeting, wall coverings, 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.

If live microphone announcements, audible tones and/or voice messages cannot be readily heard and understood clearly within the protected areas as intended, it will be 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.

Section 1-6 - RF Interference

The **SAFE**PATH[®] Panel 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 the user's own expense.

Section 1-7 - General

Each manufacturer's fire alarm control panel, and notification appliances operate differently and have different features. Before specifying, installing, operating, testing, maintaining or servicing a system, carefully read the installation, operation and testing manual for each piece of equipment and applicable codes.

Additional copies of this manual may be obtained from:

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Chapter 2 - Overview and Features

Section 2-1- Description

General

The Dual-Circuit **SAFEPATH**[®] Panel is a stand alone, single or dual channel supervised audio fire and emergency evacuation system. Figure 2-1 on Page 2-2 illustrates the basic capabilities of the Dual-Circuit **SAFEPATH**[®] panel.

The control panel that activates the Dual-Circuit **SAFEPATH**[®] Panel can range from simple push buttons to a sophisticated computer based control panel providing dry contact closures.

The Dual-Circuit **SAFEPATH**[®] Panel does not sense an emergency condition or hazards such as fire; it is only a part of a system that does sense such conditions. The Dual-Circuit **SAFEPATH**[®] Panel, when activated, provides a pre-recorded tone and/or voice message(s) to notification appliances. When used as part of a protective signaling system, the Dual-Circuit **SAFEPATH**[®] Panel must be properly connected to a compatible control panel that has been approved by a nationally recognized testing laboratory. The **SAFEPATH**[®] Panel has been tested, approved and LISTED by the Underwriter Laboratories (UL) and is compatible with LISTED control panels and notification appliances for proper operation.

THE DUAL-CIRCUIT SAFEPATH[®] PANEL MUST BE PROPERLY INSTALLED, PROGRAMMED, AND CONNECTED TO A COMPATIBLE FIRE ALARM CONTROL PANEL TO FUNCTION AS A VOICE EVACUATION SYSTEM.

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.

Standard Features

- One or two zones of audio and strobe NAC outputs.
- Multiple contact closure inputs
- A hand held, push-to-talk microphone (PTT) for live, emergency voice announcements and instructions. The microphone overrides (mutes) any voice message or tones in progress.
- A multi-tone tone generator with 8 field selectable sounds for optional evacuation signal
- Visual NAC circuit of up to 2 amps at 24VDC for each amplifier installed. Visual NAC circuits may be selected to be compatible with Wheelock, Inc. synchronized or non-synchronized visual notification appliances.
- Supervised Audio Amplifier (SAA-40S, or 80S/SE) modules power 25, 70.7 or 100-volt speakers or: Line Level Audio Amplifier (SALL-15S) to drive external power amplifiers and/or self-amplified speakers.
- Digital Voice Module (MDX-2) with a Standard Message Kit (SMK) containing 8 standard messages
- Full supervision with on-board diagnostics and trouble reporting circuits for:
 - Audio NAC circuit wiring — open and short conditions
 - Strobe NAC circuit wiring — open and short conditions

- Self Amplified power output circuit wiring — open and short conditions
 - Microphone — open condition
 - Amplifier— operation
 - Selected optional evacuation signal
 - Optional remote microphone station
 - Digital Voice Module (MDX-2)
 - Alarm input activation wiring
 - Input voltage/low battery
- Built-in audible alert indicates any supervision loss
 - Auxiliary trouble output for notification appliance connection
 - Remote reporting via output contacts for system trouble or alarm activation.
 - An internal 6 amp power supply/battery charger (DCPS)

Optional Features

- Remote Microphone Station (RMS-3) for live, emergency announcements.
- Programmed Message Kit (PMK) for up to two minutes of messages tailored to customer's needs.
- Four Zone Audio Splitter (SPL) (maximum of two)
- Auxiliary Input Module (AIM-3) used to connect three Remote Microphone Stations or two Remote Microphone Stations and a telephone page input.
- Redundant Amplifier Module (RAM-1)

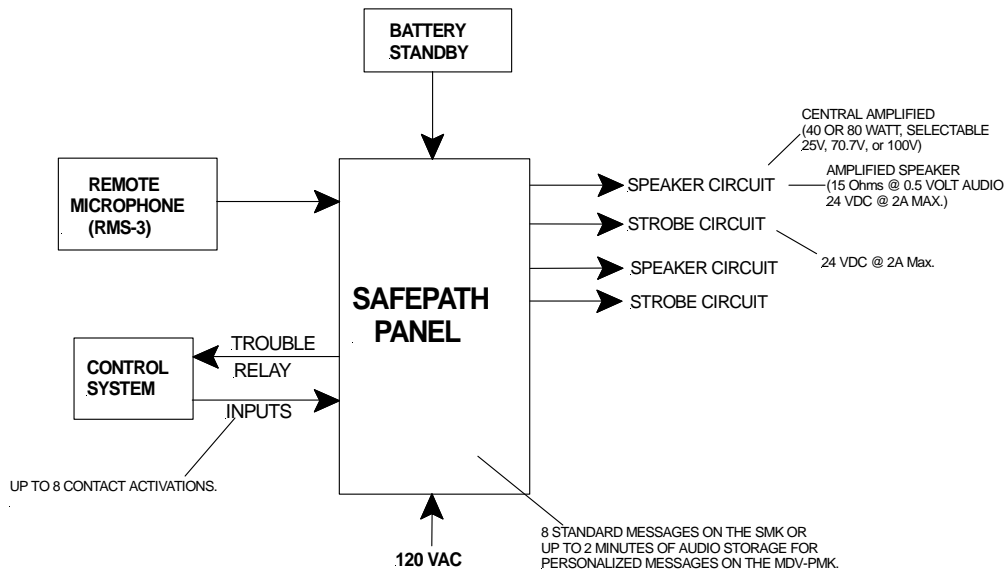


Figure 2-1
Basic Capabilities of the Dual-Circuit SAFEPATH[®] Panel

Section 2-2 - Enclosure and Configuration

See Chapter 8 for Technical Specifications

Section 2-3 - Nominal Electrical Data

See Chapter 8 for Technical Specifications.

Section 2-4 - Module Configurations

The Dual-Circuit **SAFEPATH**[®] Panel is equipped with a combination of the following modules:

There are twelve modules in the Dual-Circuit **SAFEPATH**[®] Panel product line.

The twelve modules are:

DCMB (Dual-Circuit Mother Board)

DCDC (Dual-Circuit Control Module)

DCPS (Dual-Circuit Power Supply)

SAA-40S (40 Watt Supervised Audio Amplifier with 2 Amps of Synchronized Strobe Power)

SAA-80S/SE* (80 Watt Supervised Audio Amplifier with 2 Amps of Synchronized Strobe Power)

SALL-15S (Line Level Module Supervised Audio Amplifier with 2 Amps of Synchronized Strobe Power)

SPL (Dual or Multi-Circuit Speaker Circuit Splitter, 4 zone)

NACIM (Notification Appliance Circuit Interface Module)

MDX-2 (Modular Digital Voice Module (MDX-2)

AM-MDV-OCM (Optional Output Channel Module for MDX-2)

RMS-3 (Dual-Circuit Remote Microphone Station)

AIM-3 (Auxiliary Input Module FOR telephone Interface and Multiple Remote Microphone Stations)

RAM-1 (1 FOR 1 Redundant Amplifier Module)

* 100-Volt Export Installations

Section 2-5 - Dual-Circuit **SAFEPATH**[®] Panel Basic Configuration

Each Dual-Circuit **SAFEPATH**[®] panel is configured with:

DCMB (Dual-Circuit Mother Board)

MDX-2 (Digital Voice Module)

SMK (Standard Message Kit) or PMK (Programmed Message Kit)

DCDC (Dual-Circuit Control Module)

One or two amplifier modules (any combination of SAA's and/or SALL-15S's)

DCPS (Dual-Circuit Power Supply)

Optional Modules:

One or two SPL (Speaker Circuit Splitter (4 zone))

One to eight NACIM (Notification Appliance Circuit Interface Module)

One RMS-3 (Remote Microphone Station)

One AIM-3 (Auxiliary Input Module)

One RAM-1 (Redundant Amplifier Module)

The module layout of the Dual-Circuit **SAFE**PATH[®] Panel is shown in Figure 2-2.

Section 2-6 - Remote Microphone Station (RMS-3) (Optional)

The Remote Microphone Station (RMS-3) is a 4 ganged switch-plate consisting of a push-to-talk (PTT), hand-held microphone, pre-amplifier and associated LED's and activation switches which provides a remote live voice input. Additional Information is found in the Installation Manual.

Section 2-7 - Operation Modes

The Dual-Circuit **SAFE**PATH[®] Panel has two operation modes:

1. Standby
2. Alarm

Standby Mode

Standby is the normal mode. The Dual-Circuit **SAFE**PATH[®] Panel supervises the connections and internal components to maintain proper operation. All strobes and speaker appliances are off.

Alarm Mode

Alarm mode occurs when an emergency signal is initiated manually, or by the FACP or control equipment.

Section 2-8 – Glossary of Terms

AHJ – Authority having jurisdiction

EOLR – End of Line Resistor

FACP – Fire Alarm Control Panel

NAC – Notification Appliance Circuit

NEC – National Electric Code (NFPA-70)

NFPA – National Fire Protection Association

PTT – Push to Talk (Microphone)

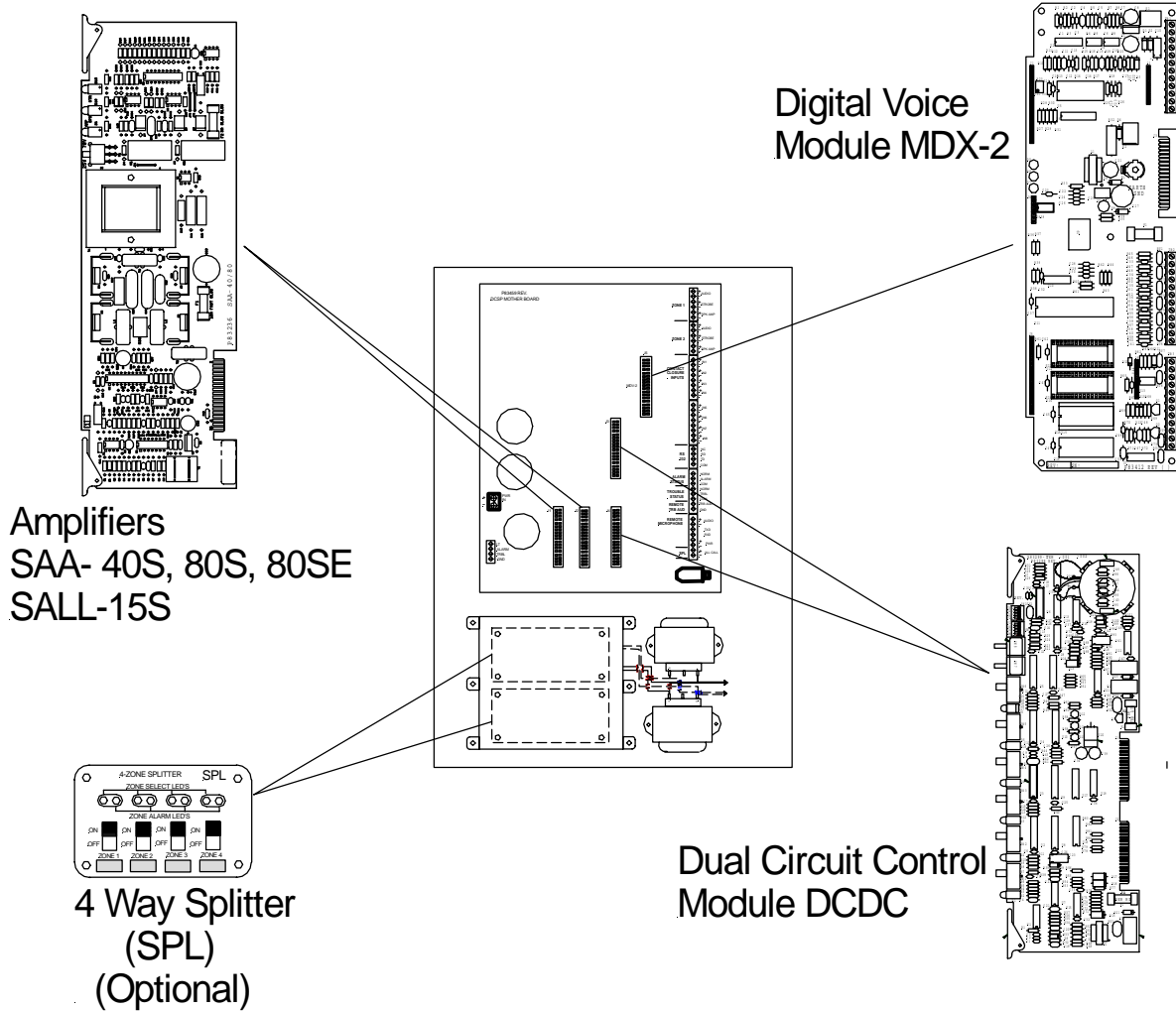


Figure 2-2.
Module Layout of a Typical Dual-Circuit SAFEPATH® Panel

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Chapter 3 - Installation and Setup

Section 3-1 - Introduction

The lives of people depend upon your safe and proper installation of the **SAFEPATH**[®] Panel. Please read, understand and carefully follow the specific installation instructions set forth below to avoid damage to the **SAFEPATH**[®] Panel and equipment connected to it. Only qualified personnel in accordance with the procedures in this manual should conduct installation.



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



Warning: DO NOT CONNECT AC POWER OR BATTERY BACKUP POWER UNTIL SYSTEM WIRING HAS BEEN CONNECTED, MODULES HAVE BEEN INSTALLED, AND FIELD WIRING HAS BEEN INSPECTED.



Caution: The **SAFEPATH**[®] 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. The **SAFEPATH**[®] 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 **SAFEPATH**[®] printed circuit boards, verify that the printed circuit boards are undamaged and functioning properly.

The installer, prior to installation should consult with the authorities having jurisdiction (AHJ).

Section 3-2 - Fire Alarm Control Panel Wiring Applications

The **SAFEPATH**[®] Panel can be connected to either the FACP alarm output dry contact or to the FACP Notification Appliance Circuit (NAC). If it is connected to the NAC, then the Notification Appliance Circuit Interface Module (NACIM) must be used. Follow the NACIM instruction sheet (P83478) for proper mounting and wiring.

The **SAFEPATH**[®] Panel may be connected to either a “silenceable” or “non-silenceable” notification appliance circuit depending upon system requirements. When the **SAFEPATH**[®] Panel is connected to a “silenceable” NAC circuit on the FACP, activating the FACP’s alarm silence switch will silence it. The Strobe NAC circuit on the **SAFEPATH**[®] Panel will also be silenced. In order for the strobes to remain in alarm when the audible is silenced, the Strobe NAC circuit must be connected to a “non-silenceable” NAC circuit on the FACP instead of to the **SAFEPATH**[®] Panel.

A Panel connected to a “non-silenceable” NAC circuit cannot be silenced.

“TROUBLE”, Form “C” relay terminals are available for monitoring the condition of the **SAFEPATH**[®] Panel.

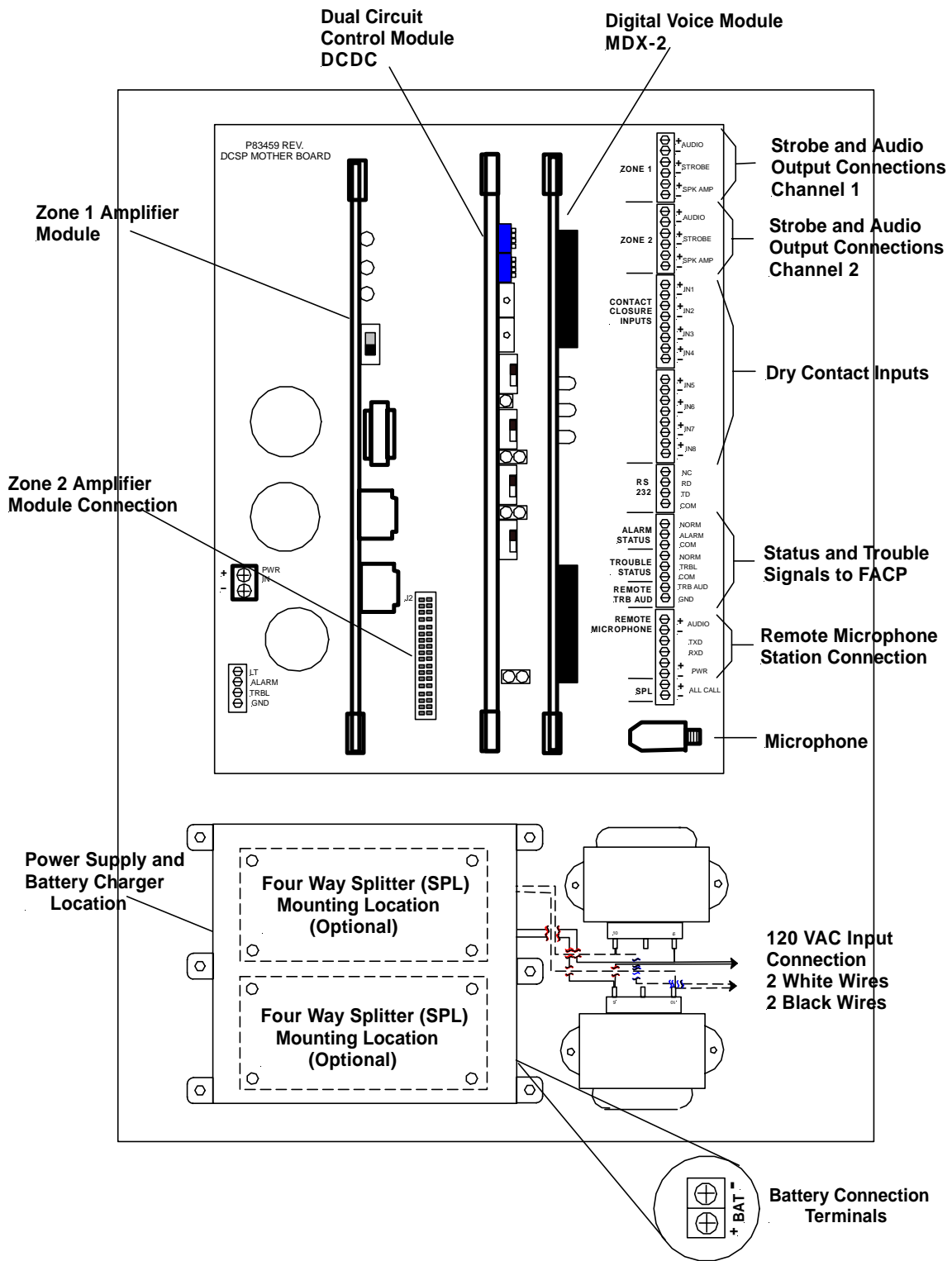


Figure 3-1
Location of Plug-in Modules and Wire Connections

Section 3-3 - General Installation Instructions

Refer to Figure 3-1 on Page 3-2, which shows the location of modules and wiring connections used in the installation of the **SAFEPATH®** Panel.

Prepare a System Wiring Diagram

1. Using Section 3-4 on Page 3-5, prepare a complete system-wiring diagram.
Keep a copy of the system-wiring diagram with the **SAFEPATH®** Panel manual as a permanent record of the system wiring.

Unpack and Check Inventory

2. Carefully unpack the **SAFEPATH®** Panel and make sure each item described on the packing slip is present and undamaged.

Mounting

3. Mount the **SAFEPATH®** Panel and optional expansion modules in the desired locations as described in Section 3-5 on Page 3-15.
4. Mount any additional wiring boxes or junction boxes needed to interconnect field wiring.
5. Connect conduit fittings or bushings as needed through the knockouts provided on the top and bottom of the **SAFEPATH®** Panel.

Field Wiring Connections

6. Install field wiring in conduit when required, following the most current National Electrical Code (NFPA-70) and local codes for the type of system being installed. Make all necessary connections at any additional wiring or junction boxes.
7. Wire all ancillary equipment, power connections, and Fire Alarm Control Panel correctly and prepare all wires for hookup to the **SAFEPATH®** Panel. **Do not connect Ancillary equipment or NAC speaker and strobe appliance wiring to the SAFEPATH® Panel.** This will be done starting with Step 13 of this procedure.
8. Connect supplied 10K Ohm, ¼ Watt test resistors to Strobe and Audio NAC Circuit output connections on Mother Board. (If SALL-15S amplifier module is being used, connect a 10K Ohm ¼ Watt resistor to the "SPK AMP" terminals also. See Figure 3-2 for location.

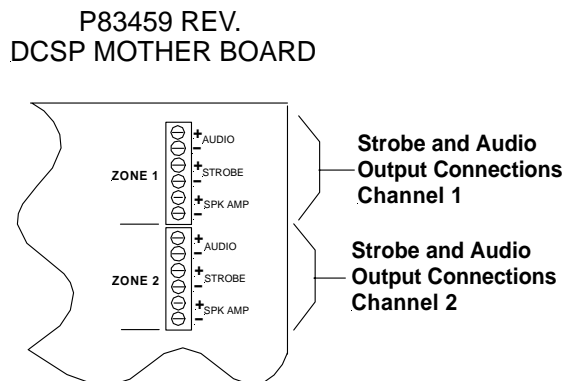




Figure 3-2
Strobe and Audio Output Connections

 **Caution:** Provide proper strain relief for all wiring not in conduit.


9. Connect the **SAFEPATH**[®] Panel to earth ground, following the National Electrical Code and local codes for the type of system being installed.


Wire gauge selection of the earth ground wiring should involve consideration of all factors, including maximum allowable wire resistance and length. The panel is tied to earth ground by connecting the ground terminals to an earth ground. The location of the ground terminals within the panel is shown in Figure 3-17 on Page 3-16.

 **Caution:** Do not connect input voltage to any equipment until the field wiring has been tested, inspected and approved.

10. Check the integrity of all field wiring. Confirm that the specified cable is installed, and that there is continuity between required points (no open circuits), with no unwanted shorts to other conductors, chassis, or earth ground.
 - a. Verify that the field wiring complies with the instructions of this manual and the detailed wiring diagram prepared for this installation.
 - b. Ensure that no unwanted voltages are present on circuit conductors and ground.
 - c. Test all ungrounded connectors for electrical isolation from ground.
 - d. Measure and record the resistance of each NAC circuit. Conduct this test reversing polarity.
11. Install Amplifier Module(s) (SAA-40S, 80S/SE or SALL-15S), Control Module (DCDC) and Digital Voice Module (MDX-2) in the proper slots on the Mother Board.
12. Conduct the **Initial Checkout** procedures as described in Section 3-6 – System Checkout.

Initial Checkout

 **Warning:** **TWO DIFFERENT SOURCES OF POWER MAY BE CONNECTED TO THE SAFEPATH[®] PANEL. DISCONNECT BOTH SOURCES OF POWER BEFORE SERVICING. FAILURE TO DO SO COULD RESULT IN PROPERTY DAMAGE, SERIOUS INJURY, OR DEATH TO YOU AND/OR OTHERS.**

 **Caution:** Connect the AC power source before connecting the battery backup power. Disconnect the battery backup power before disconnecting the AC power source.

Final Checkout

13. Remove all EOLR Resistors on Zones 1 and 2 Audio and Visual NAC Circuits.
14. Connect all Strobe and Speaker NAC Circuits to the proper connections on the **SAFEPATH**[®] Mother Board. See Figure 3-2 on Page 3-3.
15. Connect all Optional Equipment to the Dual-Circuit **SAFEPATH**[®] Panel in accordance with each Installation Sheet.
16. Where NAC Circuit outputs are not being used in the applicable zones connect a Wheelock, Inc. LISTED 10K Ohm, 1W EOLR Resistor to the terminals on the Mother Board.

17. Perform **Final Checkout** Procedures as described in Section 3-6 - System Checkout on Page 3-17.
18. Calculate and Install proper sized Backup Batteries.


Section 3-4 – Prepare a System Wiring Diagram


Wiring Guidelines

Although the **SAFEPATH**[®] Panel products incorporate signal verification and noise filtering circuitry on their inputs, induced voltages or noise on the input wiring can cause improper operation. Therefore, use shielded twisted pair wire for all dry contact input wiring.

The shield of each cable should be connected only at one end. Each shield of each cable that connects to the **SAFEPATH[®] Panel is to be connected to the grounding points provided near the knockout locations on the chassis (see Figure 3-17 on Page 3-16).**

All input and output circuits on the Dual-Circuit **SAFEPATH**[®] Panel are considered **non-power limited circuits**. Power limited wiring within the **SAFEPATH**[®] Panel must have a 1/4" separation.

 **Warning:** ALL **SAFEPATH**[®] PANEL DRY CONTACT INPUT WIRING AND AUDIO WIRING SHOULD BE ROUTED AWAY FROM ANY HIGH VOLTAGE OR HIGH CURRENT WIRING (SUCH AS AC OR DC WIRING, AUDIO POWER WIRING, AND MOTOR OR RELAY ACTUATION WIRING). DRY CONTACT WIRING SHOULD BE INSTALLED IN SEPARATE CONDUIT FROM THESE WIRINGS. FAILURE TO DO SO MAY CAUSE ELECTRICAL SHOCK RESULTING IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND /OR OTHERS.

 **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 **SAFEPATH**[®] Panel installation complies with the latest NEC, NFPA, Local, State, County or Province requirements.

Field Wiring Connections

All **SAFEPATH**[®] Panel wiring terminals are designed to accept #12 AWG through #22 AWG wiring (one wire per terminal). Proper wire gage considerations for the Notification Circuit must take into account current requirements versus length of run.

Prepare System Wiring Diagram.

1. Prepare a system-wiring diagram to include all Notification Appliances, ancillary equipment, and internal connections and power sources as required.

THE MAXIMUM CURRENT OUTPUT OF THE DUAL-CIRCUIT **SAFEPATH[®] PANEL 24VDC POWER SUPPLY IS 6 AMPS.**

Visual Notification Appliance Output Wiring

Available alarm strobe current varies depending on the amount of alarm current used by the Dual-Circuit **SAFEPATH**[®] Panel modules without the strobe function. The audio alarm current of the amplifier module(s) depends on the number of speakers on the circuit, length and gauge of wire of the audio circuit, and the audio mode in use. Table 3-1 shows available strobe current for each model using the standard calculation for a Temporal Code 3 signal. The **SAFEPATH**[®] Panel

does not include any optional modules. **The maximum strobe output on each amplifier module is 2 Amps.** Complete calculation information for other configurations is located in Section 3-7 – Backup Battery Calculations.

**Table 3-1
Available Strobe Alarm Current for Temporal Code 3 Signal**

Model	Current Draw in Temporal Code 3 w/o Strobes	Available Strobe Current
DCSP-4RP	0.990 Amps	2.0 Amps
DCSP4RP + SAA-40S	1.740 Amps	4.0 Amps
DCSP4RP + SAA-80S	2.040 Amps	3.9 Amps
DCSP4RP + SALL-15S	1.090 Amps + 2 Amps Max for SALL-15S Speaker Power ¹	2.9 to 4.0 Amps ¹
DCSP-8RP	1.290 Amps	2.0 Amps
DCSP-8RP + SAA-40S	2.040 Amps	3.9 Amps
DCSP-8RP + SAA-80S	2,340 Amps	3.6 Amps
DCSP-8RP + SALL-15S	1.390 Amps + 2 Amps Max for SALL-15S Speaker Power ²	2.6 to 4.0 Amps ²
DCSP-15SP	0.340 Amps + 2 Amps Max for SALL-15S Speaker Power	2.0 Amps
DCSP-15SP + SALL15S	0.440 Amps + 4 Amps Max for SALL-15S Speaker Power ³	1.5 Amps to 4.0 Amps ³

Note 1: A maximum of 4.9 Amps is available for a combination of Speaker Power and Strobe currents.

Note 2: A maximum of 4.6 Amps is available for a combination of Speaker Power and Strobe currents.

Note 3: A maximum of 5.5 Amps is available for a combination of Speaker Power and Strobe currents.

Wire gauge may vary for each visual notification appliance output circuit on the panel. Wire gauge selection should involve consideration of all factors including, wire loop length, maximum current draw of each appliance, number of appliances, and maximum voltage drop allowable.

When laying out each NAC circuit for the speakers, calculate the total wattage required. Good engineering practice is to not exceed 85% of the amplifier rating that you plan to use. If calculations exceed this, an larger capacity amplifier or additional amplifier(s) can solve this problem.

- Each Strobe NAC has a 24 VDC, 2.0 amps maximum output
- Each Strobe NAC meets Class B supervision requirements for notification appliance circuits.
- Each output circuit shall have a UL LISTED, 10K Ohm, EOLR resistor. (1W), installed across the last visual notification appliance. If the output is unused, a UL LISTED, 10K Ohm, EOLR resistor (1W) shall be placed across the output terminals. Each amplifier module contains the required number of EOLRs for the supervised outputs. If more are needed, recommend using Wheelock, Inc. End of Line Resistor Kit (Model Number EOLK, Part# 5076), which contains Eight (8) UL LISTED 10K Ohm 1W resistors.

Wiring Diagrams for Visual Portion of Audio/Visual Notification Appliances

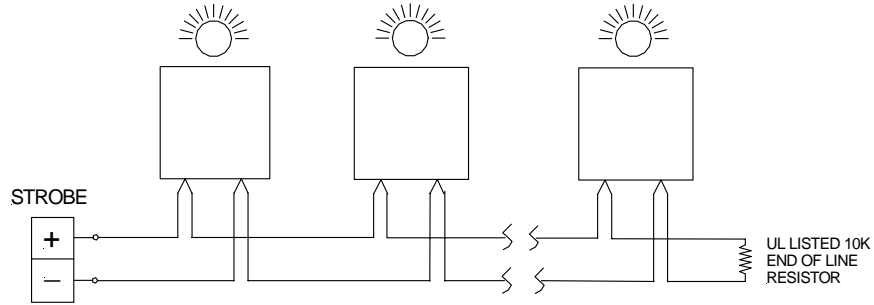


Figure 3-3
Wiring Diagram for Visual Notification Appliance Output

! **Caution:** Do not loop wire under terminals. Break wire run to provide supervision of connection.

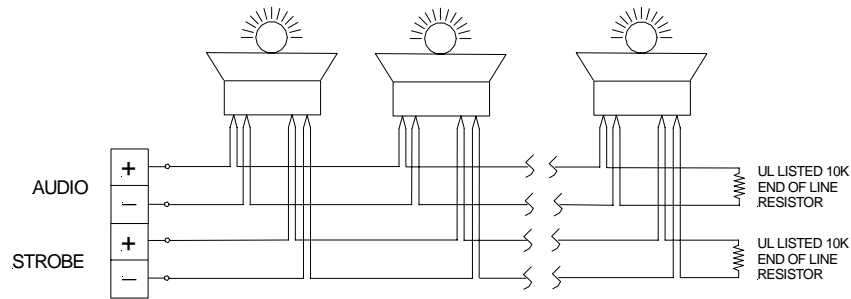


Figure 3-4
Wiring Diagram for Combination Audio/Visual Notification Appliances in Central Amplifier Applications

! **Caution:** Do not loop wire under terminals. Break wire run to provide supervision of connection.

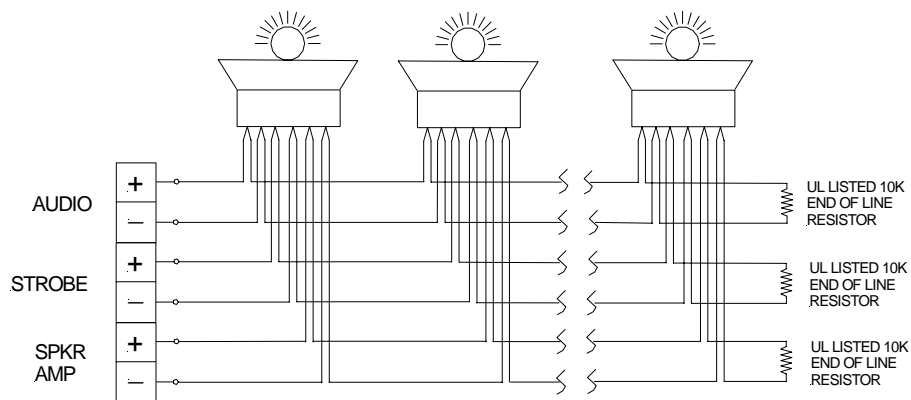


Figure 3-5
Wiring Diagram for Combination Audio/Visual Notification Appliances in Amplified Speaker Applications

! **Caution:** Do not loop wire under terminals. Break wire run to provide supervision of connection.

Central Amplified Speaker Notification Appliance Output Wiring

Wire gauge may vary for each audio appliance output on the panel. When:

- Speaker (with transformer) appliances are used with supervised audio amplifier module (central amplified outputs). Wire gauge selection should involve consideration of all factors including, wire length, appliance power ratings, and the number of appliances.
- The central amplified output is either a selectable 25, 70.7 or 100 volt audio output, rated for 40, or 80 watts maximum, depending upon the amplifier and its configuration.
- The output meets Class B supervision requirements for notification appliance circuits.
- Each output circuit shall have a UL LISTED, 10K Ohm EOLR resistor (1W) installed across the last audio notification appliance. If the output is unused, it shall have a UL LISTED, 10K Ohm EOLR resistor (1W) across the output terminals. Each amplifier module contains the required number of EOLRs for the supervised outputs. If more are needed, recommend using Wheelock, Inc. End of Line Resistor Kit (Model Number EOLK, Part# 5076), which contains Eight (8) UL LISTED 10K Ohm 1W resistors.

Wiring Diagrams for the Audio Portion of Audio/Visual Notification Appliances

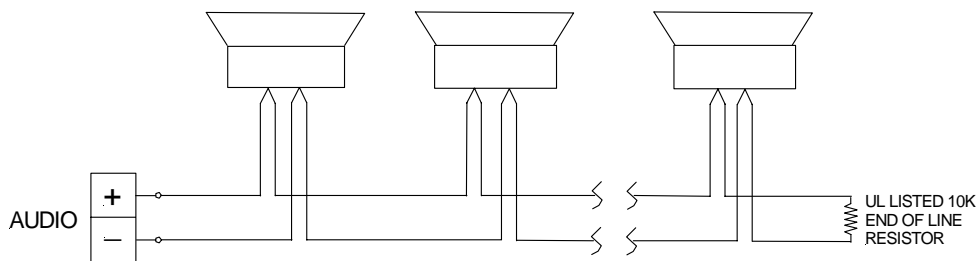


Figure 3-6

Wiring Diagram for Audio Notification Appliance Output

! **Caution:** Do not loop wire under terminals. Break wire run to provide supervision of connection.

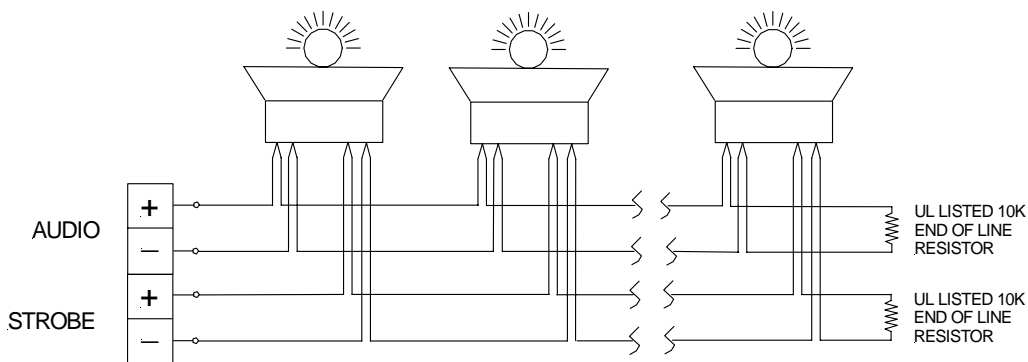


Figure 3-7

Wiring Diagram for Combination Audio/Visual Notification Appliances for Central Amplifier Applications

! **Caution:** Do not loop wire under terminals. Break wire run to provide supervision of connection.

Amplified Speaker Notification Appliance Power Output Wiring

Wire gauge selection for the amplified speaker notification appliance power output should involve consideration of all factors including wire loop length, maximum current draw of each appliance, number of appliances, and maximum voltage drop allowable.

- The Speaker Amp (SPK AMP) output is rated for 24 VDC, 2.0 amps maximum.
- The output meets Class B supervision requirements for notification appliance circuits.
- The amplified speaker output is 15 Ohms, -5dBm maximum.
- Each output circuit shall have a UL LISTED, 10K Ohm EOLR resistor (1W) installed across the last appliance. All unused outputs shall have a UL LISTED, 10K Ohm EOLR resistor (1W) across the output terminals. Each amplifier module contains the required number of EOLRs for the supervised outputs. If more are needed, recommend using Wheelock, Inc. End of Line Resistor Kit (Model Number EOLK, Part# 5076), which contains Eight (8) UL LISTED 10K Ohm 1W resistors.

Wiring Diagrams for Audio and “SPK AMP” Portions of Self-Amplified Audio/Visual Notification Appliances

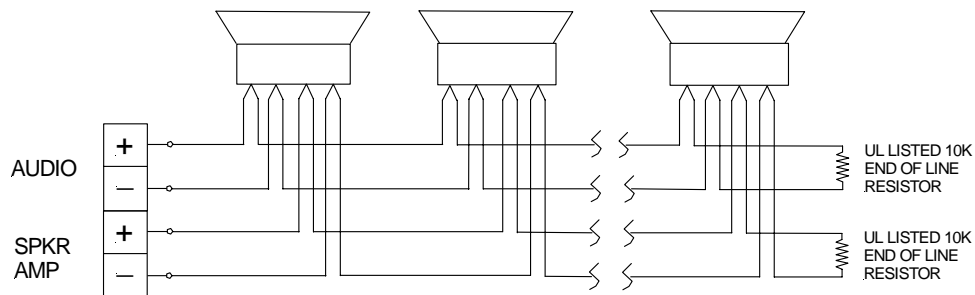


Figure 3-8
Wiring Diagram for Audio Notification Appliances
in Amplified Speaker Applications

! **Caution:** Do not loop wire under terminals. Break wire run to provide supervision of connection

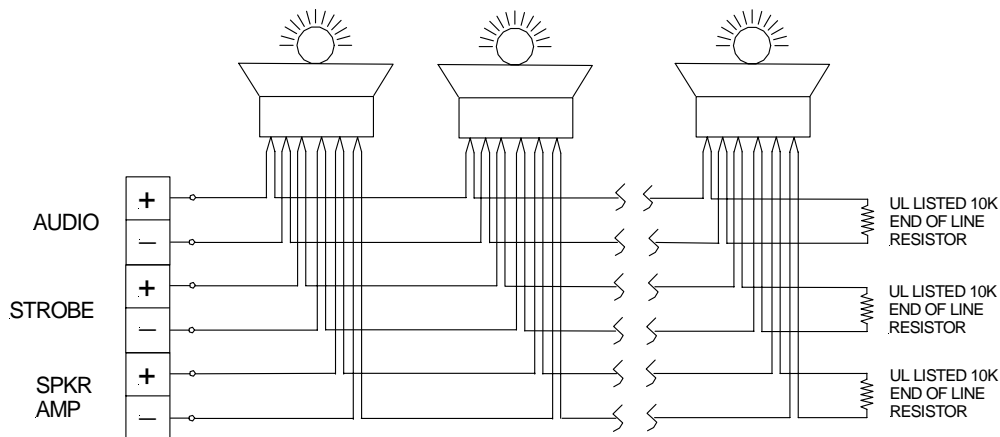


Figure 3-9
Wiring Diagram for Combination Audio/Visual Notification Appliances
for Amplified Speaker Applications

Optional Equipment Connections

RMS-3 (Remote Microphone Station)

See the Remote Microphone Station instruction sheet P83452 for additional information.

NACIM (Notification Appliance Circuit Interface Module)

See the Notification Appliance Circuit Interface Module instruction sheet P83487 for additional information.

SPL (4 Zone Splitter)

See the Four Zone Splitter instruction sheet P83541 for additional information.

RAM-1 (Redundant Amplifier Module)

See the Redundant Amplifier Module instruction sheet P83776 for additional information.

AIM-3 (Auxiliary Interface Module)

See the Auxiliary Interface Module instruction sheet P83667 for additional information.

INTERNAL WIRING CONNECTIONS

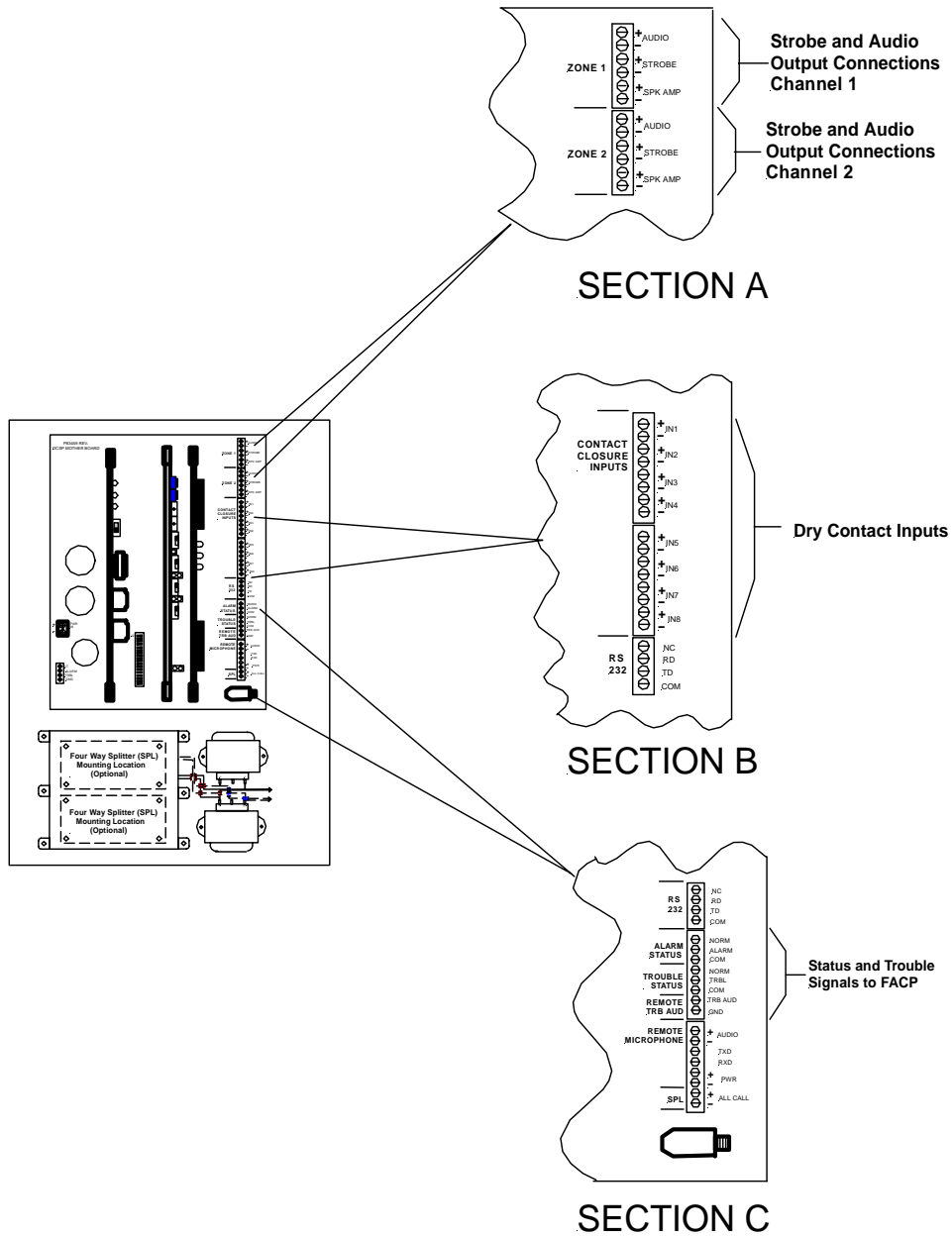


Figure 3-10
Wiring Connection Locations

Dry Contact Input Wiring

The dry contact inputs shall be dry contacts or open collector devices. The locations of the dry contact inputs are shown in Figure 3-10 Section B. A magnified view of this area on the Mother Board is shown in Figure 3-11 on Page 3-12.

P83459 REV.
DCSP MOTHER BOARD

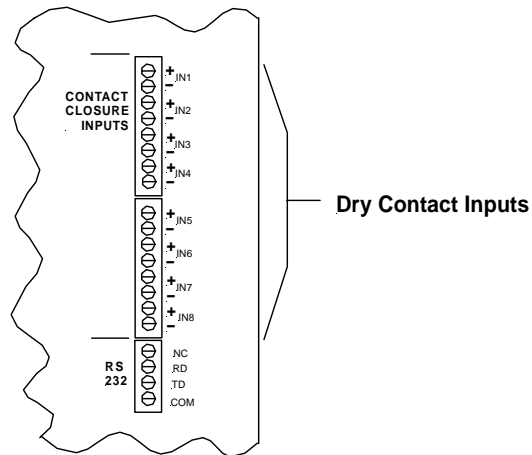


Figure 3-11
Dry Contact Input Connections

- The dry contact input meets the requirements for power limited fire protective signaling circuits as defined in the National Electrical Code (NFPA-72). The dry contact inputs are not supervised. If supervision is required, use Model Number NACIM (Notification Appliance Circuit Interface Module)
- The field wiring for the dry contact input shall not exceed 100 Ohms of resistance or 0.050 μF of capacitance.
- IN1 through IN8 are the contact closure inputs for as many as 8 separate messages.
- The RS-232 input terminals shown in Figure 3-11 are not used.



Warning: IT IS IMPORTANT THAT THE WIRING USED FOR INPUT VOLTAGE WIRING IS LARGE ENOUGH TO CARRY THE MAXIMUM CURRENT REQUIRED BY THE DUAL-CIRCUIT *SAFEPATH*[®] PANEL WITHOUT EXCESSIVE VOLTAGE DROP. IF VOLTAGE DROPS FROM AC POWER LINE LOADING AND WIRING RESISTANCE IS NOT WITHIN THE SPECIFIED OPERATING VOLTAGE RANGE, THE *SAFEPATH*[®] PANEL WILL NOT FUNCTION PROPERLY.

ALARM STATUS OUTPUT CONTACT WIRING

The location of the Alarm Status output connections are shown in Figure 3-10 Section C. A magnified view of this area on the Mother Board is shown in Figure 3-12 on Page 3-13.

- Wire gauge selection of the Alarm Status output contact wiring should involve consideration of all factors including, wire loop length, maximum current capacity, and maximum voltage drop allowable.
- The Alarm Status output contact is Form C, rated for 0.5 amps at 24 VDC, resistive load.
- For terminal connection details of the Alarm Status output contact (shown in the non-alarm mode) see Figure 3-13 on Page 3-13.

P83459 REV.
DCSP MOTHER BOARD

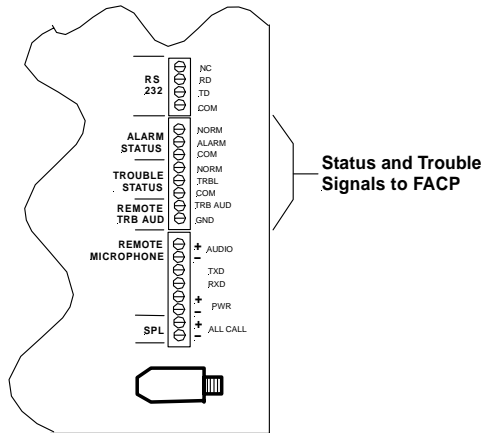


Figure 3-12
Alarm and Trouble Status Output Connections

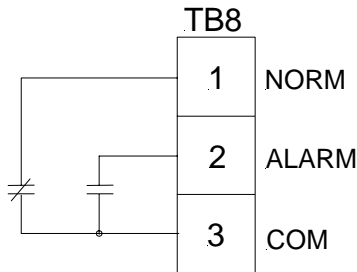


Figure 3-13
Alarm Relay Contacts

System Trouble Status Output Contact Wiring

The location of the Trouble Status output connections are shown in Figure 3-10 Section C. A magnified view of this area on the Mother Board is shown in Figure 3-12.

- Wire gauge selection of the system Trouble Status output contact wiring should involve consideration of all factors including, wire length, maximum current capacity, and maximum voltage drop allowable.
- The system Trouble Status output contact is Form C, rated for 0.5 amps at 24 VDC, resistive load.
- For a detail of the system Trouble Status output contact Terminal connections (shown in the trouble position), see Figure 3-14 on Page 3-14.

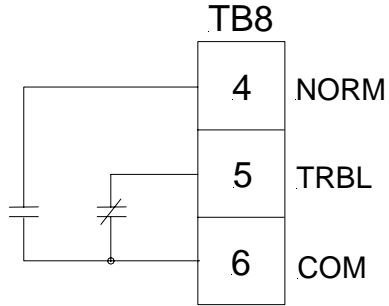


Figure 3-14
Trouble Status Relay Contacts

Trouble Audible Output Wiring

- Wire gauge selection of the System Trouble Output Contact wiring involves consideration of all factors including wire loop length, maximum current capacity, and maximum voltage drop allowable.
- The Trouble Audible output is rated for 24 VDC, 0.1 amps maximum. The output is unsupervised.
- Figure 3-15 is the wiring diagram for the unsupervised Trouble Audible output connection.

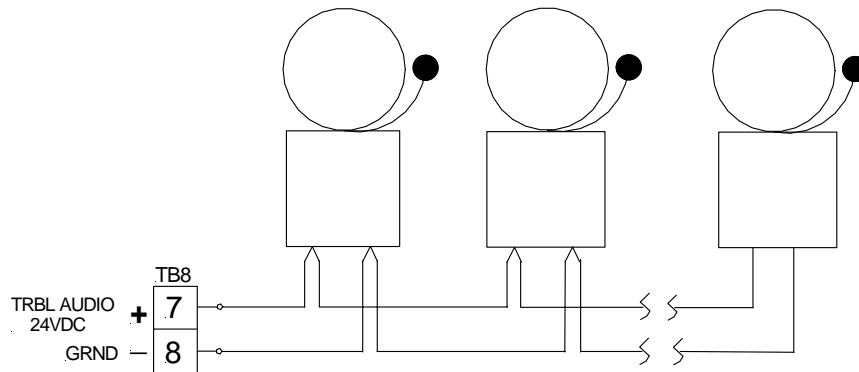


Figure 3-15
Trouble Audible Connection

POWER CONNECTION REQUIREMENTS

The Dual-Circuit **SAFEPATH**[®] Panel contains a 24VDC, 6 Amp Power Supply and a Battery Charger for the battery backup. Connections for the input power and batteries are shown in Figure 3-16. Calculate proper backup battery requirements using Section 3-7 on Page 3-23.

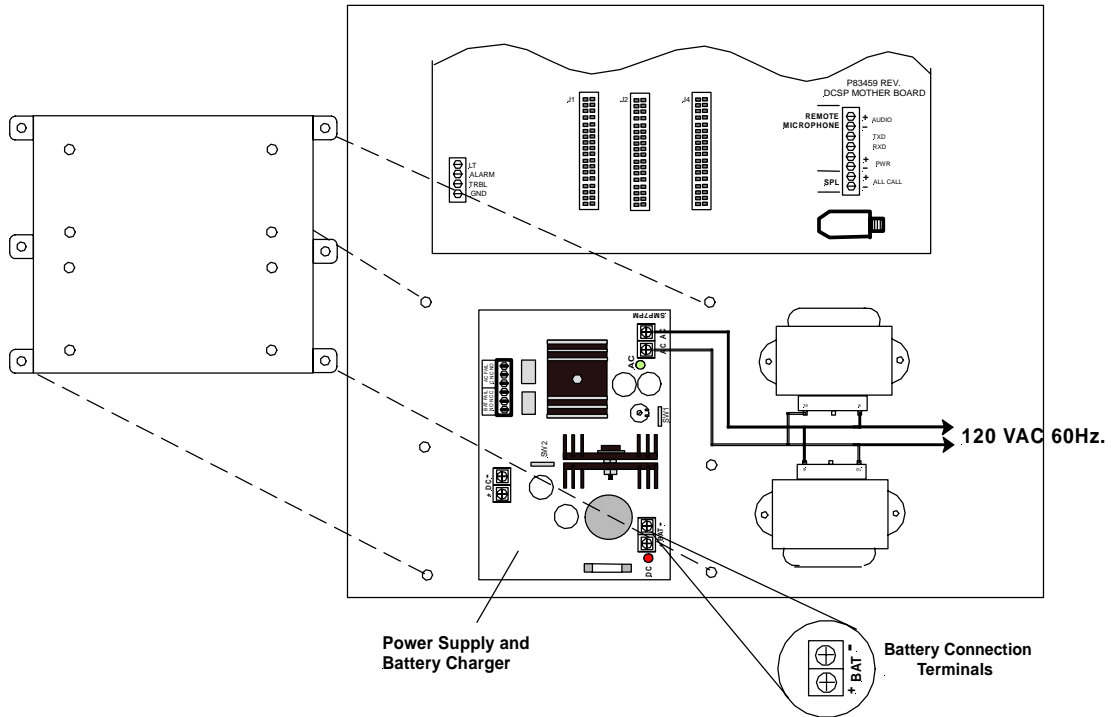


Figure 3-16
Input Power and Battery Connection Locations

Section 3-5 - Mounting

Location

The **SAFEPATH**[®] Panel shall be mounted in a location within the environmental limits specified in the latest UL Standard 864 for indoor control panels. The **SAFEPATH**[®] Panel shall not be located in a hazardous area.

! Caution: In order to comply with the latest NFPA and UL requirements for interconnection of fire alarm control equipment, the **SAFEPATH**[®] Panel shall be located in the same room, and within 20 feet of, a UL LISTED compatible fire alarm control panel. Wiring shall be enclosed in conduit and properly connected to such control panel.

Procedure

1. See Figure 3-17 on Page 3-16 for **SAFEPATH®** Panel mounting hole layout.
2. **Remove Amplifier Module(s), Digital Voice Module, and Control Module from the enclosure.**
3. Mark and drill mounting holes for appropriate screws and anchors to ensure secure mounting to the type of surface at the selected location.
4. Prevent dust and dirt contamination of the **SAFEPATH®** Panel during installation. This contamination can interfere with the operation and reduce the life of the equipment.
5. Open the door and mount the **SAFEPATH®** 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.
6. Replace Amplifier Module(s), Digital Voice Module, and Control Module. Plug in Microphone.
7. For SAA-40S, 80S Amplifier Module, set 25V / 70V Switch to correct setting for speakers. (See Figure 3-18 on Page 3-18)

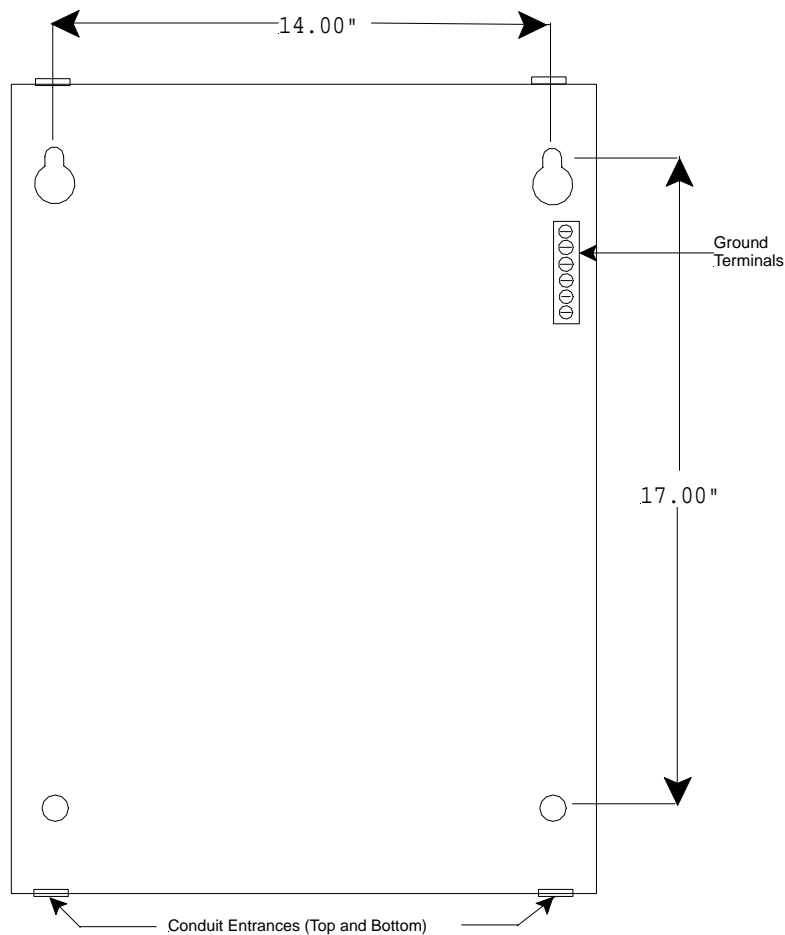



Figure 3-17
Dual-Circuit SAFEPATH® Panel Mounting

Section 3-6 System Checkout

Refer to NFPA 72 (1999 Edition) for guidelines on testing notification systems.

 **Caution:** If a malfunction, or system trouble occurs during testing, **STOP TESTING**. Correct the problem *before* you resume testing.

Insure that speaker and strobe NAC Circuits are not connected to the SAFEPATH[®] Panel and that 10K Ohm, ¼ W, EOLR test resistors are connected in their place on the Mother Board.


1. Place switches on the Dual-Circuit Control Module (DCDC) as follows (See Figure 3-20 for enlarged view of DIP Switches):

DIP Switch SW10: T3 – OFF, T2 – ON, T1 – ON, F2 – OFF
(See Figure 3-20)

DIP Switch SW9: F1 – ON, RS – OFF, SS – ON, RM – OFF
(See Figure 3-20)

MAIN (Automatic / Manual) Switch: UP or “AUTOMATIC” position.
“ALL CALL” Switch, UP or “ON” position. (See Figure 3-18)

ZONE 1 and ZONE 2 Switches: UP or “ON” position. (See Figure 3-18)

 **Caution:** Connect the AC power source before connecting the battery backup power. Disconnect the battery backup power before disconnecting the AC power source.

2. Connect AC Power, then connect battery backup.

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 Chapter 7 “Troubleshooting and Servicing” to diagnose and correct the trouble condition.

Initial Checkout

3. With both AC Power and battery backup power applied observe the following indicators (See Figure 3-18 on Page 3-18 for LED locations):

Dual-Circuit Control Module (DCDC)

ALL CALL “Select” LED (Single Red) “ON”
All Dual Red LEDs left “ON”, right “OFF”
TROUBLE / NORMAL LEDs (Dual) Yellow “OFF”, Green “ON”
LEDs D10, D11, and D12 “OFF”

Digital Voice Module (MDX-2)

LED D5 (Green) “ON”
LED D6 (Yellow) “OFF”
LED D7 (Yellow) “OFF”

Amplifiers (SAA-40S, SAA-80S,80SE, SALL-15S)

SAA-40S, SAA-80S/80SE
LED D15 (STR) “OFF”
LED D10 (SPK) “OFF”
LED D6 (AMP) “OFF”
SALL-15S
LED D16 (STROBE) “OFF”
LED D13 (AUDIO) “OFF”

LED D10 (PWR) "OFF"
 LED D3 (AMP) "OFF"

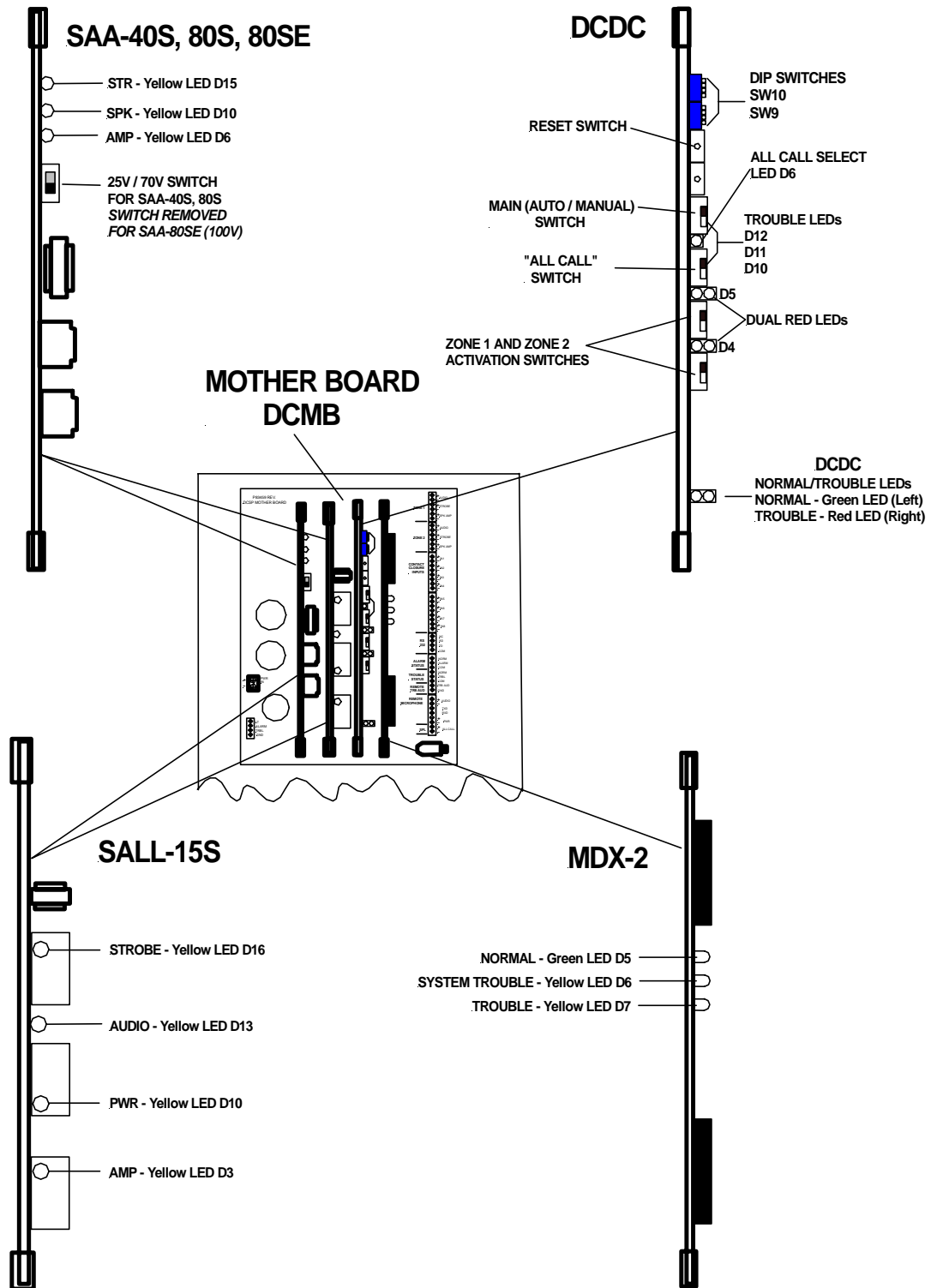


Figure 3-18

System Checkout LED and Switch Locations

4. Play first message by momentarily shorting IN1 on the DCMB (Mother Board). (See Figure 3-11 on Page 3-12 for location)

Control Module (DCDC): Right (RED) LEDs D4 and D5 "ON". Relay on DCDC clicks at 1 click per second. When message ends, right LEDs on D4 and D5 "OFF", relay stops clicking. (See Figure 3-18)

Amplifier Modules: All LEDs "OFF".

5. Key Microphone in panel.

Control Module (DCDC): Right (RED) LEDs D4 and D5 "ON". Relay on DCDC clicks at 1 click per second. When microphone button is released, right LEDs D4 and D5 "OFF", relay continues to click. (See Figure 3-18 on Page 3-18)

Amplifier Modules: All LEDs "OFF".

Press RESET button on DCDC Relay will stop clicking. (See Figure 3-18).

6. Press MAIN (Auto/Manual) Switch to the DOWN position.


Control Module (DCDC): Right (RED) LEDs D4 and D5 "ON". Relay on DCDC clicks at 1 click per second. Return MAIN Switch to the UP position, right LEDs D4 and D5 "OFF", relay continues to click. (See Figure 3-18 on Page 3-18)


Amplifier Modules: All LEDs "OFF".

Press RESET button on DCDC Relay will stop clicking. (See Figure 3-18 on Page 3-18).

7. Disconnect Battery Backup, then AC Power.
8. Return to Section 3-2 - General Installation Instructions, Step 12. (Page 3-1)

Final Checkout

 **Caution:** If a malfunction, or system trouble occurs during testing, **STOP TESTING**. Correct the problem *before* you resume testing.

 **Caution:** Connect the AC power source before connecting the battery backup power. Disconnect the battery backup power before disconnecting the AC power source.

1. Set Configuration Switches to desired settings for supervision tone. See Figure 3-20 for switch location on the Control Module (DCDC). See Tables 3-2 and 3-3 on Page 3-21 for switch descriptions.

NOTE:

The tone selected is used to supervise the amplifiers in STANDBY condition. It is also the tone when the "AUTOMATIC/MANUAL" switch is placed in the "MANUAL" position. The tone will also play in ALARM if the MDX-2 Module is removed and the Shunt PCB (Figure 3-19 on Page 3-20) is put in its place.

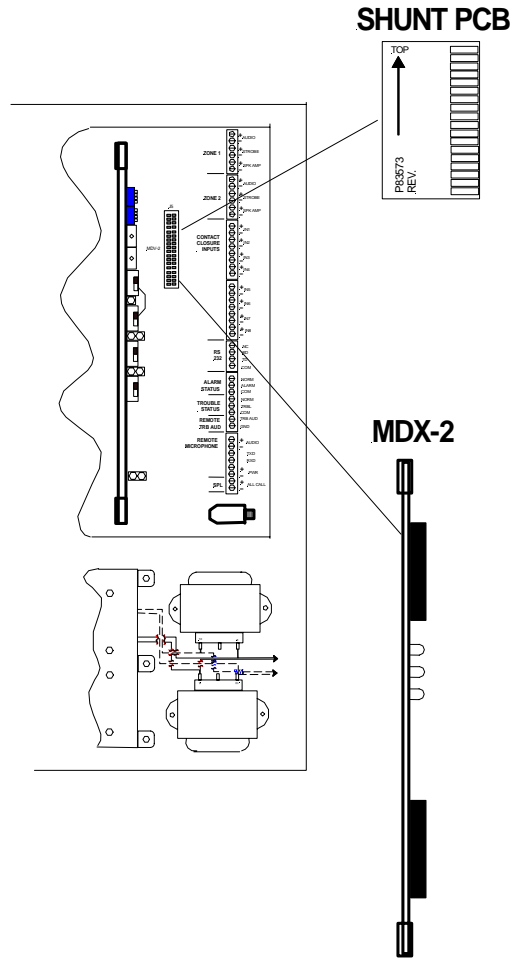


Figure 3-19
Shunt PCB Placement

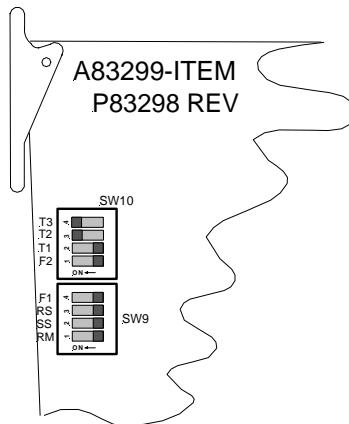


Figure 3-20
Configuration DIP Switch Location on DCDC Module

**Table 3-2
DCDC DIP Switch Setting Description**

DCDC DIP Switch	SETTING/DESCRIPTION
SW9 Position 1 (RM)	REMOTE MICROPHONE ENABLE. “ ON ” enables optional Remote Microphone Station. “ OFF ” disables Remote Microphone Station circuit.
SW9 Position 2, (SS)	SYNCHRONIZED STROBES ENABLE. “ ON ” enables Strobe NAC to work with Wheelock’s synchronized strobes.
SW9 Position 3, (RS)	Remote SAFEPATH [®] ENABLE. Leave in “OFF” position. (Used only with Remote SAFEPATH [®] Panel and when Digital Voice Message has the highest priority.)
SW9 Position 4, (F1)	Leave in “ OFF ” position
SW10 Position 1, (F2)	Leave in “ OFF ” position.
SW10 Positions 2, 3, & 4, (T1, T2, & T3)	MULTITONE SELECT. Selects 1 of 8 tones used for the primary evacuation signal. Use chart below to select the tone.

**Table 3-3
DIP Switch Settings for Available Tone Sounds**

SWITCH SETTINGS FOR AVAILABLE TONE SOUNDS			
TONE SOUND	SW10-2 T1	SW10-3 T2	SW10-4 T3
Horn (Continuous)	ON	ON	ON
Bell (1560 Hz Modulated)	ON	OFF	ON
March Time Horn (.25 Sec ON, .25 Sec OFF)	OFF	OFF	ON
Code-3 Horn (ANSI S3.41 Temporal)	ON	ON	OFF
Code-3 Tone 500Hz (ANSI S3.41 Temporal)	OFF	ON	ON
Slow Whoop (500-1200Hz Sweep)	OFF	ON	OFF
Siren (600-1200 Hz Sweep)	ON	OFF	OFF
HI/LO (1000/800 Hz)	OFF	OFF	OFF

2. Connect AC Power and Battery Backup.
3. Observe the following indicators: (See Figure 3-18 on Page 3-18 for LED locations)

Dual-Circuit Control Module (DCDC)

ALL CALL “Select” LED (Single Red) “ON”
 All Dual Red LEDs left “ON”, right “OFF”
 TROUBLE / NORMAL LEDs (Dual) Yellow “OFF”, Green “ON”
 LEDs D10, D11, and D12 “OFF”

Digital Voice Module (MDX-2)

LED D1 (Green) “ON”
 LED D2 (Yellow) “OFF”
 LED D3 (Yellow) “OFF”

Amplifiers (SAA-40S, SAA-80S, 80SE, SALL-15S)

SAA-40S, SAA-80S, 80SE

LED D15 (STR) "OFF"

LED D10 (SPK) "OFF"

LED D6 (AMP) "OFF"

SALL-15S

LED D16 (STROBE) "OFF"

LED D13 (AUDIO) "OFF"

LED D10 (PWR) "OFF"

LED D3 (AMP) "OFF"

3. Play all messages by momentarily shorting IN1 through IN8 on Mother Board. (See Figure 3-11 on Page 3-12 for location.)

Control Module: Right (RED) LEDs D4 and D5 "ON". (Figure 3-18)

Messages will broadcast on all appliance circuits. If Strobe NAC circuits are in use, Strobes will also flash. With SW9 DIP Switch SS in ON position (Figure 3-20 on Page 3-20), relay on DCDC clicks at 1 click per second. When message ends, Strobes will stop flashing and relay on DCDC will stop clicking.

Amplifier Module: All LEDs "OFF"

4. Key Microphone in panel for live voice test.

Control Module: Right (RED) LEDs D4 and D5 "ON". If Strobe NAC circuits are in use, Strobes will also flash. With SW9 DIP Switch SS in ON position (Figure 3-20 on Page 3-20), relay on DCDC clicks at 1 click per second. When microphone button is released, right LEDs D4 and D5 "OFF", strobes and relay on DCDC will continue to operate.

Amplifier Module: All LEDs "OFF"

Press RESET button on DCDC. Strobes and Relay "OFF"

5. Press MAIN (Auto/Manual) Switch to the DOWN position.

Control Module (DCDC): Right (RED) LEDs D4 and D5 "ON". If Strobe NAC circuits are in use, Strobes will also flash. With SW9 DIP Switch SS in ON position (Figure 3-20 on Page 3-20), relay on DCDC clicks at 1 click per second. Return MAIN Switch to the UP position, right LEDs D4 and D5 "OFF", strobes and relay on DCDC will continue to operate. (See Figure 3-18)

Amplifier Modules: All LEDs "OFF".


Press RESET button on DCDC Relay will stop clicking. (See Figure 3-18 on Page 3-18).

6. If Remote Microphone Station (RMS-3) is included, enable it by switching SW9-1 (RM) DIP Switch to "ON" on the Dual-Circuit Control Module (DCDC). (See Figure 3-20 on Page 3-20)
7. Test the Remote Microphone Station.
8. Turn "OFF" ALL CALL, and ZONE 1 and ZONE 2 Switches. On the DCDC Module, all LEDs should be "OFF" except the NORMAL (Green) LED. (Figure 3-18 on Page 3-18)
9. System is fully operational.

Additional system checkout should include:

Testing all Alarm and Trouble circuits.

Testing all connections to equipment that is interconnected with the **SAFEPATH**[®] Panel.

 **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 NOT DETECTING EQUIPMENT FAILURE THAT CAN CAUSE PROPERTY DAMAGE AND SERIOUS PERSONAL INJURY OR DEATH TO YOU AND/OR OTHERS DURING AN EMERGENCY SITUATION.

Section 3-7 - Battery Care and Backup Battery Calculations

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 temperature of 20 degrees C (68 degrees F) and batteries are completely discharged once every three months. LENGTH OF SERVICE LIFE WILL BE DIRECTLY AFFECTED BY THE NUMBER OF DISCHARGE CYCLES, DEPTH OF DISCHARGE, AND AMBIENT TEMPERATURE.

Use Guidelines:

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 temperature of 20 degrees C (68 degrees F).


Batteries may generate ignitable gases. Because of this, batteries shall be installed in a well-ventilated location, away from spark producing equipment.

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.

Batteries shall not be installed in a heavy vibration or shock location.

Batteries shall have a minimum of ¼" separation between cells.

Insulated gloves shall always be worn when handling batteries.

 **Warning:** 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.

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 supplement 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.

Calculating Backup Battery Requirements

It is necessary to calculate the current draw for battery backup requirement, The current requirements depend on the system configuration and the optional modules installed. Battery Backup current has two separate calculations that are added together. They are Standby Current and Alarm Current.



Caution: The **SAFEPATH**[®] Power Supply generates 24 VDC at a maximum of 6 Amps. The sum of the currents from all modules, speaker circuits, and Strobe NAC circuits, and Speaker Amp circuits (when SALL-15S are used) determine the current output of the panel and cannot exceed 6 Amps. If the **SAFEPATH**[®] Panel output current exceeds 6.0 amps, it is recommended that strobe circuits be routed through an external power supply.

Backup Battery Worksheet

Worksheet for assisting in calculating battery backup is available as Appendix B.

Standby Current

Standby current consumes the largest part of the storage battery capacity. Table 3-4 represents the Standby Current of the Dual-Circuit **SAFEPATH**[®] Panel using the test signal as the supervision signal. Standby calculations can use the appropriate value from this table. The Dual-Circuit **SAFEPATH**[®] Panel Models in this table contain the Power Supply (DCPS), Digital Voice Module (MDX-2) and the listed amplifiers.

Standby current from any optional module used is listed in Table 3-5 on Page 3-26. These values added to the Panel current complete the total Standby current for the panel

Standby Current Calculating Procedure

1. From Table 3-4 on Page 3-25, select the desired value of current from the proper Model.
2. From Table 3-5 on Page 3-26, select the standby current from all modules selected for the panel and add them to the value of Step 1. (If multiple RMS-3, SPL and/or NACIM Modules are used, calculate the standby current for each one.)
3. Multiply the results of Step 2 by the number of standby hours required. (i.e. 24 or 60). Record this value as the Standby Amp-hours.

**Table 3-4
Standby Current for Dual-Circuit *SAFE*PATH® Panel**

Model	Standby Current per UL Full Power SIN Wave Testing¹	Standby Current when DCDC is in Temporal Code 3 Tone²	Standby Current when DCDC is in HI/LO³ (Worst Case Tone)
DCSP-4RP	0.630 Amps	0.530 Amps	0.530 Amps
DCSP-4RP + SAA-40S	1.030 Amps	0.830 Amps	0.830 Amps
DCSP-4RP + SAA-80S	1.230 Amps	0.830 Amps	0.930 Amps
DCSP-4RP + SALL-15S	0.730 Amps ⁴	0.630 Amps ⁴	0.630 Amps ⁴
DCSP-8RP	0.830 Amps	0.530 Amps	0.630 Amps
DCSP-8RP + SAA-40S	1.230 Amps	0.830 Amps	0.930 Amps
DCSP-8RP + SAA-80S	1.430 Amps	0.830Amps.	1.030 Amps
DCSP-8RP + SALL-15S	0.930 Amps	0.630 Amps	0.730 Amps
DCSP-15SP	0.330 Amps	0.330 Amps	0.330 Amps
DCSP-15SP + SAA-40S	0.730 Amps	0.630 Amps	0.630 Amps
DCSP-15SP + SAA-80S	0.930 Amps	0.630 Amps	0.730 Amps
DCSP-15SP + SALL-15S	0.430 Amps	0.430 Amps	0.430 Amps

¹ The UL Test is performed with the amplifiers out of the Panel and in a bench test condition.

² This column uses the standard current calculation when Temporal Code 3 is selected on the Control Module (DCDC). This is the recommended configuration for operation.

³ This column shows the current value of the Panel with the Control Module configured on the highest current reading (HI/LO).

**Table 3-5
Standby and Alarm Current for Dual-Circuit
SAFE[®]PATH[®] Modules**

SAFE[®]PATH[®] Module	Standby Current	Alarm Current
DCSP-PS ⁴	0.150	0.150
MDX-2	0.070	0.090
SPL	0.040	0.190
AIM-3	0.040	0.060
RAM-1	0.000	0.050
RMS-3	0.040	0.060 ⁵
NACIM	0.000	0.007

⁴ Current draw with no amplifier and no Digital Voice Module installed.

⁵ Current during RMS-3 page is 0.060 Amps. Current during telephone page is 0.100 Amps.

**Table 3-6
Standby Current for Dual-Circuit
SAFE[®]PATH[®] Amplifier Modules**

Amplifier Module⁶	Standby Current per UL Full Power SIN Wave Testing	Standby Current when DCDC is in Temporal Code 3 Tone	Standby Current when DCDC is in HI/LO (Worst Case Tone)
SAA-40S	0.400	0.300	0.300
SAA-80S/SE	0.600	0.300	0.400
SALL-15S ⁷	0.100	0.100	0.100

⁶ Maximum strobe current on each amplifier in the panel is 2 Amps.

⁷ Maximum "SPKR AMP" current on each SALL-15S Module is 2 Amps at 24 VDC.

Alarm Current

Table 3-5 lists the alarm current of the Dual-Circuit **SAFE[®]PATH[®]** Modules. Table 3-7 on Page 3-27 lists the alarm current for each amplifier. If no amplifiers are installed in the amplifier slot the current for that slot is zero.

If no strobes are installed in the zone, the current is zero. If strobes are installed, add the sum of the current ratings of the strobe in each circuit to the corresponding amplifier.

UL alarm speaker current calculations are measured with a full SIN wave input with a maximum output are as follows:

Alarm Current Calculating Procedure

1. Using Table 3-7 on Page 3-27, calculate the alarm current for each amplifier module installed.
2. Using Table 3-5, add up the alarm currents of all optional modules. If multiple RMS-3 with an AIM-3, calculate the alarm current for one. If SPL and/or NACIM Modules are used, calculate the alarm current for each one.
3. Add together the strobe current from both amplifier NAC circuits.
4. Total the results of Steps 1 through 3.

! Warning: THE DUAL-CIRCUIT SAFEPATH® POWER SUPPLY HAS A MAXIMUM OUTPUT CURRENT CAPACITY OF 6 AMPS. EXCEEDING THIS SPECIFICATION WILL CAUSE THE SAFEPATH® PANEL TO FAIL OR OPERATE IMPROPERLY IN THE ALARM CONDITION.

If the current value exceeds 6 Amps and the Strobe NAC Circuit is being used, recommend powering the Strobe NAC Circuit separately or from a power Booster (Wheelock, Inc. PS-12/24-8).

5. Divide Step 3 results by 12 (5 minutes of alarm) or 4 (15 minutes of alarm) and record this value as Alarm Amp-hours.

**Table 3-7
Calculations for Amplifier Alarm Current**

Amplifier Module	Alarm Current Calculation
SAA-40S ¹	$[(\text{Total wattage of connected speakers}) \times 0.055] + 0.4\text{A}$
SAA-80S/SE ¹	$[(\text{Total wattage of connected speakers}) \times 0.056] + 0.6\text{A}$
SALL-15S ^{1,2}	(Sum of the "SPKR AMP" current) + 0.1A

¹ If Strobe NAC Circuit is used, add total strobe current on that circuit to the corresponding amplifier module calculation. A Strobe NAC Circuit cannot exceed 2 Amps.

² "SPKR AMP" circuit on each amplifier module cannot exceed 2 Amps.

**Table 3-8
Average Current Output Measured by Wheelock, Inc.**

Amplifier Model	Typical Voice	Temporal CODE-3 Tone	Worst Case Tone HI/LO	Strobe Current
SAA-40S	0.600 Amps	0.750 Amps	1.600 Amps	2.000 Amps Max.
SAA-80S/SE	1.000 Amps	1.050 Amps	2.500 Amps	2.000 Amps Max.
SALL-15S	0.100 Amps + "SPKR AMP" current	0.100 Amps + "SPKR AMP" current	0.100 Amps + "SPKR AMP" current	2.000 Amps Max.

Calculating Backup Battery Requirements

Good engineering practices recommend the total Amp-hours required for backup should not exceed 80% of the Backup Battery capacity.

Backup Battery Calculation Procedure

1. Add the total standby current to the total Alarm current.
2. Multiply Step 1 by 1.25. This is the minimum Backup Battery requirement for this Panel.
3. Record results on Worksheet (Appendix B)

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Chapter 4 - OPERATION

Section 4-1- Introduction

This chapter describes the operating characteristics of the **SAFEPATH®** Panel. Included is information about the following **SAFEPATH®** Panel features:

- Operator's Console
- Supervision
- Visual Notification Appliance Output Circuit Supervision
- Audio Notification Appliance Output Circuit Supervision
- Amplified Speaker Notification Appliance Power Output Supervision
- Amplifier Supervision
- Remote Microphone Station Supervision (Optional RMS-3)
- Actions that Initiate Alarms

Section 4-2 - 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, a "RESET" pushbutton, a "TROUBLE ACKNOWLEDGE" pushbutton, a main "AUTOMATIC/MANUAL" switch, an "ALL-CALL ON/OFF" switch, two "Zone" select switches, and "NORMAL", "TROUBLE", Zone "SELECT", Zone "ALARM" and an all-call "SELECT" LEDs. Opening the enclosure door accesses the operator's console. See Figure 5-1 on Page 5-3 for front panel layout.

Section 4-3 - Supervision

A trouble condition indicates that the supervisory functions have detected a malfunction in the panel. When a trouble condition is detected, the panel may not be able to receive and/or remember message requests from the control panel. The installer and/or user must make sure that any message requests to the panel during a trouble condition are reactivated if necessary, when the panel returns to normal.

If a trouble condition is detected by any of the supervisory functions, the panel Form C status relay (normally energized) will change state, the green "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 Chapter 7 "Troubleshooting".



Warning: DO NOT LEAVE THE 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 THE PANEL 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 REQUESTED 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 REQUESTED BEFORE AND DURING A TROUBLE CONDITION ARE STILL NECESSARY, THEY SHOULD BE REPEATED WHEN THE *SAFE*PATH[®] PANEL IS RETURNED TO NORMAL.

Visual Notification Appliance Output Circuit Supervision

The visual notification appliance output circuit is supervised for open and short circuits when the *SAFE*PATH[®] Panel is in Standby mode. Output circuit supervision requires installation of the supplied UL LISTED, 10K Ohm EOLR resistor on the NAC circuit. Any sensed trouble will illuminate the “STR” LED on the amplifier module. See Figure 3-18 for LED location.

Audio Notification Appliance Output Circuit Supervision

The audio notification appliance output circuit is supervised for open and short circuits when the *SAFE*PATH[®] Panel is in Standby mode. Output circuit supervision requires installation of the supplied UL LISTED, 10K Ohm EOLR resistor on the output circuit. Any sensed trouble will illuminate the “SPK” LED on the amplifier module. See Figure 3-18 for LED location.

Amplified Speaker Notification Appliance Power Output Circuit Supervision

The amplified speaker notification appliance power output circuit supervised for open and short circuits *SAFE*PATH[®] Panel is in Standby mode. Output circuit supervision requires installation of the supplied UL LISTED, 10K Ohm EOLR resistor on the output circuit. Any sensed trouble will illuminate the “PWR” LED on the SALL-15S module. See Figure 3-18 for LED location.

Amplifier Supervision

A supervisory tone plays through the amplifier during standby for supervision purpose. Any sensed trouble illuminates the “AMP” LED on the amplifier module. See Figure 3-18 for LED location.

Remote Microphone Supervision (Optional RMS-3)

The audio circuit is supervised on the Remote Microphone Station circuit board.

Section 4-4 - Actions That Initiate Alarms

Table 4-1 indicates what can initiate an alarm condition and the resulting Dual-Circuit *SAFEPATH*[®] Panel actions.

NOTE: The list is arranged in order of priority: e.g, Number 1 in Table 4-1 supersedes Number 2 priority.

Table 4-1 Alarm Conditions and Results

PRIORITY OF EVENT	INITIATING ACTION	RESULT
1.	Panel microphone push-to-talk button, is depressed.	a. Panel microphone live voice broadcast enabled b. Strobes enabled (See Note 2)
2.	Automatic /Manual switch placed in manual position.	a. Selected tone broadcasts b. Strobes enabled (See Note 2)
3.	Optional remote Mic key is on, and remote Mic push-to-talk button is depressed.	a. Remote microphone live voice broadcast enabled b. Strobes enabled (See Note 2)
4.	Optional remote Mic key is on, and remote Mic auto/manual switch is in manual position.	a. Selected tone broadcasts b. Strobes enabled (See Note 2)
5.	Contact closure inputs	a. Selected tone broadcasts b. Strobes enabled c. MDX-2: 1) Recorded message plays (see note 1) 2) Strobes enabled (See Note 3)

Notes:

1. If the Digital Voice Module reports a trouble during condition 5c, the alarm condition is the selected tone instead of the pre-recorded message.
2. The strobe circuit is a latching output. Once the strobe circuit is energized, it will stay energized until the "RESET" switch is activated. Activating the "RESET" switch has no effect while an evacuation signal is initiated.
3. The strobe circuit does not latch on when a digital voice message is being played from the MDX-2. When the message ends the strobe circuit will revert back to standby mode.

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Chapter 5 - Operational Procedures

Section 5-1 - Operator Instructions

The **SAFEPATH**[®] Panel provides an operator console for manually activating the panel. The operator console includes a microphone, a green "NORMAL" LED, a yellow "TROUBLE" LED, a "RESET" push button, a "TROUBLE ACKNOWLEDGE" push-button switch, a "MANUAL/AUTOMATIC" switch, an "ALL-CALL" switch, "ZONE 1", and "ZONE 2" 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 console instructions located on the dead front panel and are shown in Figure 5-1 on Page 5-3.

The "TROUBLE" and "NORMAL" LEDs identify to the operator the condition of the **SAFEPATH**[®] Panel. The yellow "TROUBLE" LED will be illuminated whenever there is a trouble detected by the Panel. If no troubles are detected, the green "NORMAL" LED will be illuminated.

The "TROUBLE 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" LED will remain illuminated until all trouble conditions have been corrected.

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 on individual circuits via dry contact inputs. When the "MANUAL/AUTOMATIC" switch is in the manual position, pre-recorded messages will not play, the visual notification appliances are energized, and the evacuation tone sounds on all circuits.

NOTE: When a dry contact closure occurs on any programmed input (IN1 through IN8), the "ALL CALL", "ZONE 1", and "ZONE 2" switches have no control over the output unless the live microphone is used. Live microphone is the highest priority, messaging source and overrides dry contact inputs.

The "ALL-CALL" switch overrides "ZONE 1" and "ZONE 2" switch positions allowing audible signals to be heard regardless of the position of these switches.

The "ZONE 1" and "ZONE 2" on/off switches are used to select zones for live audible from the microphone. When a zone is switched "ON" the respective strobe circuit is also energized.

Section 5-2 - To Make Live Announcements

From Panel

1. Select Zones or use "ALL-CALL" for all zones. See Figure 5-1 for switch locations.
2. Hold the microphone within 2 inches of your mouth, press push-to-talk switch and begin speaking.

From Optional Remote Microphone Station (RMS-3)

1. Turn the key switch from the OFF position to the ON position.
2. Select Zones or use "ALL-CALL" for both zones. (See Figure 3 in Appendix B)
3. Hold the microphone within 2 inches of your mouth, press push-to-talk switch and begin speaking.

See the Remote Microphone Station instruction sheet or Appendix B for additional information.

Section 5-3 - To Sound Evacuation Tone

From Panel

1. Slide the "AUTO/MANUAL" switch on the panel down to the MANUAL position. The selected tone will play. Turn off the tone by returning the AUTOMATIC/MANUAL Switch to the UP position. See Figure 5-1 on Page 5-3 for switch location. All zones will be selected.

From Optional Remote Microphone Station (RMS-3)

1. Turn the key switch from the "OFF" position to the "ON" position.
2. Slide the "AUTO/MANUAL" switch down to the MANUAL position. The selected tone will play. Turn off the tone by returning the AUTOMATIC/MANUAL Switch to the UP position. See Figure 5-1 on Page 5-3 for switch location.

See the Remote Microphone Station instruction sheet for additional information.

Automatic Operation

1. With the Digital Voice Module installed, the contact closure inputs IN1 through IN8 on the Mother Board initiate files 1 through 8 on the digital voice module respectively.
2. If the Digital Voice Module is not installed and the Shunt PCB (See Figure 3-19 on Page 3-20) is in its place, the contact closure inputs IN1 and IN2 initiate zones 1 and 2 respectively and play the tone selected on the Control Module (DCDC).

Section 5-4 - To Reset Visual Appliances

1. All activation inputs must be cleared.
2. Momentarily depress the "RESET" pushbutton. See Figure 5-1 on Page 5-3 for pushbutton location.

Section 5-5 - To Acknowledge a Trouble Condition

1. Momentarily depress the "TROUBLE ACKNOWLEDGE" pushbutton. See Figure 5-1 on Page 5-3 for pushbutton location.

NOTE:

Acknowledging a trouble condition silences the internal sounder and any external trouble signaling devices. The system will remain in the trouble condition with the yellow "TROUBLE" light on. The system trouble contact will remain in the trouble position until all trouble conditions have been corrected. Any faults, which occur after acknowledgment, will resound the trouble circuit.

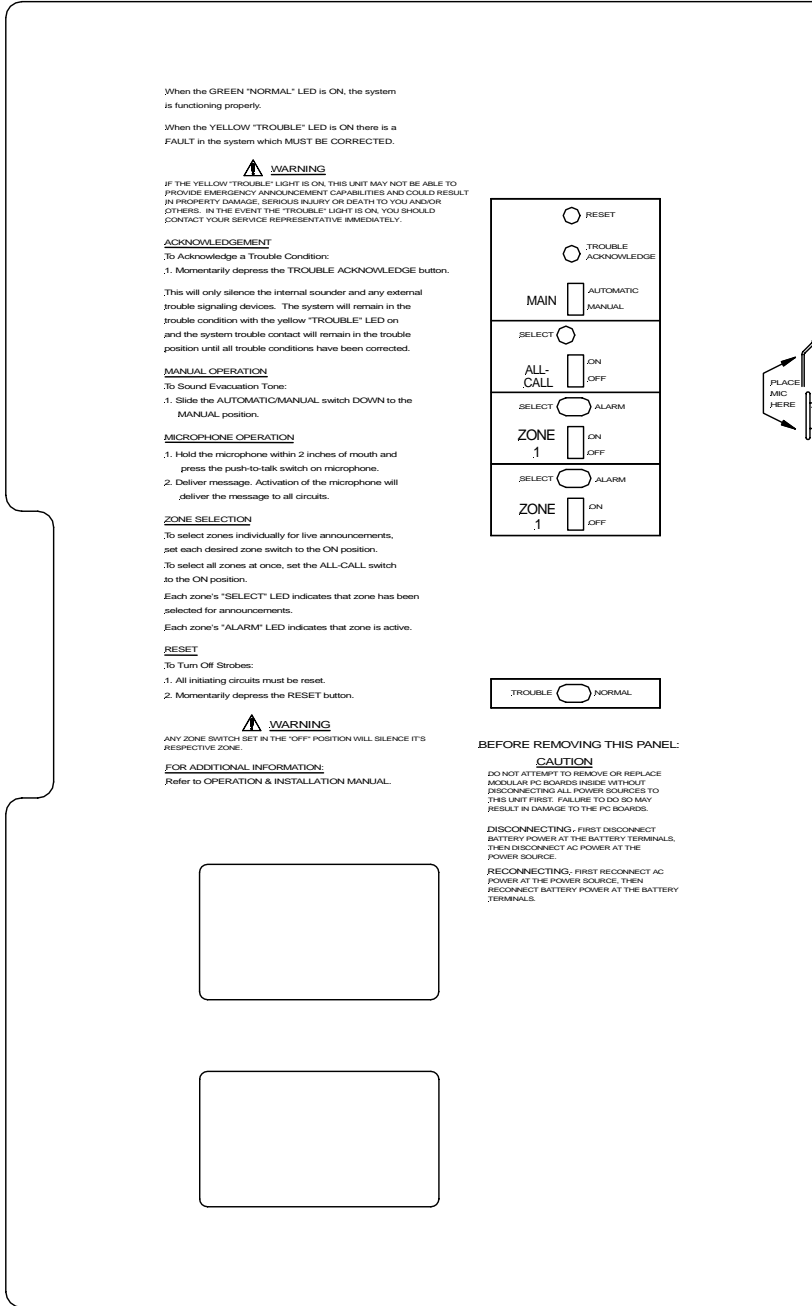


Figure 5-1
Dual-Circuit SAFEPATH® Panel Operator Console

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CHAPTER 6 - PERIODIC TESTING AND MAINTENANCE

Section 6-1 - Introduction

Periodic testing, including the Dual-Circuit **SAFEPATH**[®] 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.

To aid qualified personnel in performing necessary operational testing procedures, a script, listing all messages programmed in the Dual-Circuit **SAFEPATH**[®] Panel, must be kept with the Panel.

Section 6-2 - Periodic Testing

Test Frequency

Equipment shall be tested at least twice each year, or more often as required by local, state and federal codes, regulations and laws.

Equipment

The following equipment needs to be tested to ensure that equipment is operating properly:

- **SAFEPATH**[®] Panel
- All notification appliances
- All messages (if MDX-2 is installed), including:
 - Audibility
 - Intelligibility
 - Content and language
 - Sequence
 - Output channel
 - Priority assignment

NOTE:

As an aid to qualified personnel to perform necessary operational testing procedures, keep a script of all programmed messages with the Dual-Circuit **SAFEPATH[®] Panel.**

Section 6-3 - Faulty Equipment

- If the notification equipment is not working properly, contact the service representative and have problems corrected immediately. If the service representative is not available, contact the manufacturer.

- Malfunctioning modules in the panel shall be replaced immediately. Do not attempt to repair them.
- Malfunctioning modules should be returned to the manufacturer for repair or replacement.

Section 6-4 - Qualified Personnel

Qualified personnel are those who can evaluate proper equipment functionality and ensure its proper operation and perform all testing procedures on the **SAFE**PATH® Panel.



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.

Section 6-5 - Miscellaneous Hardware Testing


In addition to testing required by relevant fire codes, regulations, and laws, the following hardware functions shall be tested (see Table 6-1).


Table 6-1
Miscellaneous Hardware Tests


TEST/HARDWARE	TEST DESCRIPTION
Short circuit detection/Contact inputs	Activate (short circuit) each contact input, and verify that proper tone sounds.
Proper operation/Status Contact	Monitor the status contact, while causing the panel to alternate between trouble and normal states to verify proper operation.


If the panel fails to perform any of the above tests correctly, replace the malfunctioning modules and/or panel immediately.

Chapter 7 - 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 THE *SAFEPATH*[®] 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:** Only qualified persons in accordance with the procedures in this manual should conduct troubleshooting and servicing. Do not attempt to make other adjustments, modifications, or repairs. Never use water, steam, and/or cleaning liquids or sprays on the panel.

 **Caution:** User servicing of the *SAFEPATH*[®] Panel is limited to the following:

- Field-wiring changes. Follow the instructions in Chapter 3 of this manual.
- The procedures set forth in this chapter.

AFTER ANY TROUBLESHOOTING PROCEDURE IS COMPLETED, PERFORM A COMPLETE SYSTEM CHECKOUT AS DESCRIBED IN CHAPTER 3.

The panel monitors system integrity. Items monitored for integrity are:

1. Visual appliance circuit field wiring.
2. Audio appliance circuit field wiring.
3. Amplified Speaker Audio Circuit field wiring.
4. Amplified Speaker Power Circuit field wiring.
5. Input voltage. AC (120 VAC or 220VAC). DC (Backup Battery 24VDC).
6. Battery voltage level.
7. Battery circuit field wiring.
8. Amplifier functionality.
9. Digital Voice Module functionality.
10. Internal wiring.
11. Internal fuses.
12. Optional Remote Microphone Station functionality and wiring.

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

1. Turn "OFF" the NORMAL LED.
2. Turn "ON" the TROUBLE LED.
3. Turn "ON" coded trouble LEDs D10, D11, and D12 on DCDC Module
4. Transfer the Form C trouble contact to the TROUBLE position.

5. Turn "ON" the Internal Trouble Sounder.
6. Turn "ON" the Remote Trouble Audible Output.
7. Turn "ON" a trouble location indicator, if appropriate.

If the TROUBLE ACKNOWLEDGE pushbutton 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 resound for subsequent trouble conditions. When there are no trouble conditions detected, the NORMAL LED will always be "ON" and the TROUBLE LED will always be "OFF". When a trouble condition is detected, the NORMAL LED will always be "OFF" and the TROUBLE LED will always be "ON".

The panel has trouble location LEDs, which provide information as to what trouble condition has been detected, and on which part of the system the trouble is located. Figure 7-1 shows the location of all trouble location indicators within the panel. Table 7-1 on Page 7-3 cross-references the trouble location LEDs on the plug-in modules to the proper troubleshooting procedure. Table 7-2 on Page 7-3 addresses the LEDs on the MDX-2.

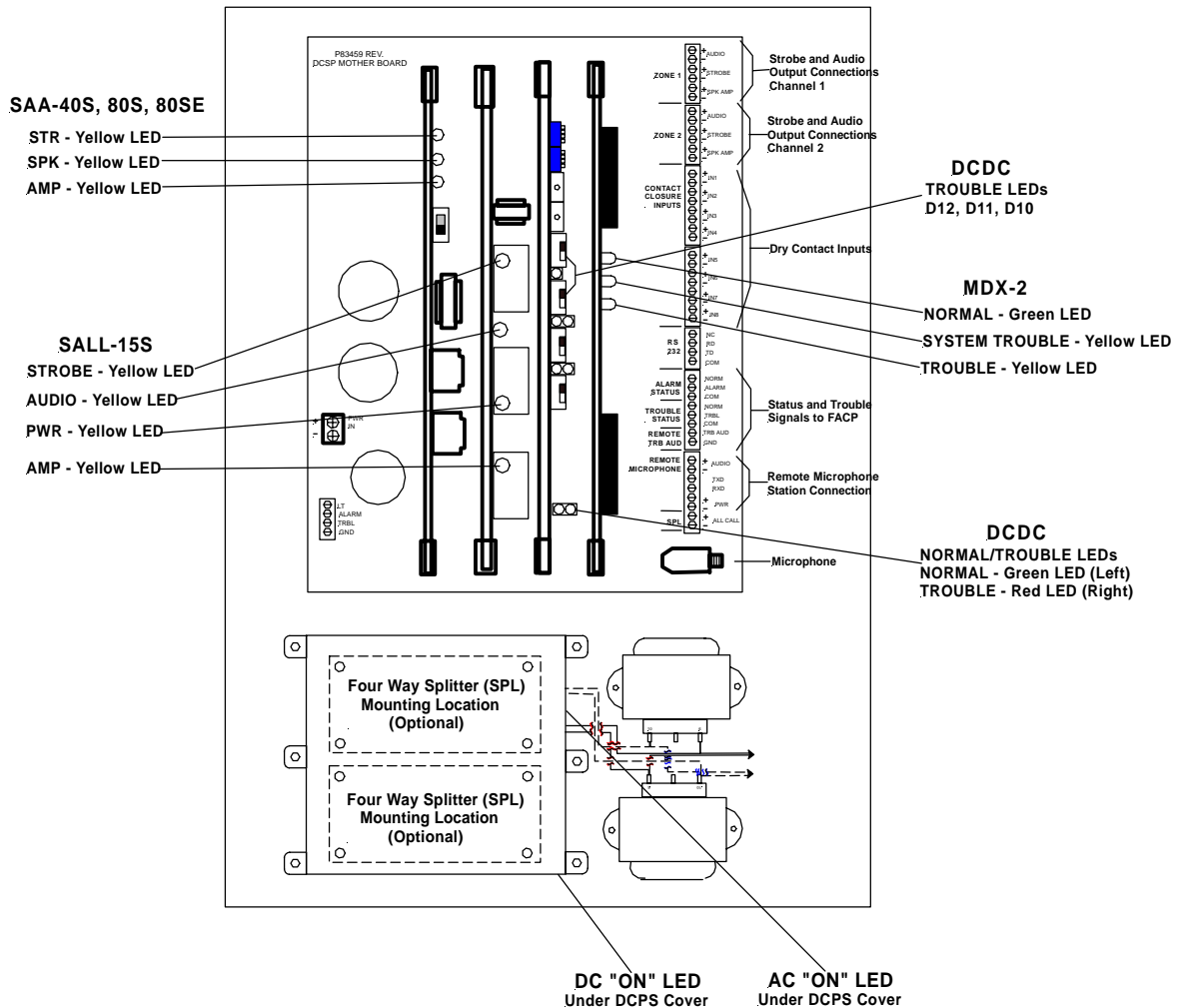


Figure 7-1
Trouble LED Locations
Table 7-1
DCDC Module Trouble Procedure Cross Reference

Trouble Location LEDs/Troubleshooting Procedure Cross Reference								
Control Module (DCDC) Trouble LEDs					Module	LED	Trouble Description	Troubleshooting Procedures
NORMAL LED	TROUBLE LED	D12	D11	D10				
ON	OFF	OFF	OFF	OFF			Normal	
OFF	OFF	OFF	OFF	OFF			Power Loss	A
ON	ON	OFF	OFF	OFF			Faulty Control Module	B
OFF	ON	OFF	ON	OFF	MDX-2		DV PLAY EOLR Missing	C
		OFF	OFF	ON	SAA/SALL	STROBE	Trouble on Visual Notification Ckt.	D
						AUDIO	Trouble on Audio Output Wiring	E
						PWR	Trouble on 24VDC Speaker Power	F
						AMP	Trouble on SAA/SALL Module	G
		ON	ON	OFF	RMS-3		Any Remote Microphone Trouble	H
		ON	OFF	ON	DCPS		Power Supply Trouble	I
		ON	OFF	OFF	MDX-2		DV Status Trouble	See Table 7-2
OFF	ON	ON	Panel Mic		Panel Microphone Trouble	J		

**Table 7-2
MDX-2 Trouble Procedure Cross Reference**

DV Module System Normal LED (Green)	DV Module System Trouble LED (Amber)	DV Module Trouble Indicator LED (Amber)	What it Means	Troubleshooting Procedure
On	Off	Off	Normal	----
Off	Off	Off	Power Loss	K
Off	On	Off	DV Module Inoperative	L
Off	On	Steady-On	DV Module Inoperative	M
Off	On	2 Blink Pattern	Message Memory PSRAM Error	N
Off	On	4 Blink Pattern	Output Channel Error	O

Figure 7-2 on Page 7-4 is the basic troubleshooting flowchart describing the troubleshooting procedure in a graphic manner. The following flowcharts contain the same information as described in Tables 7-1 and 7-2.

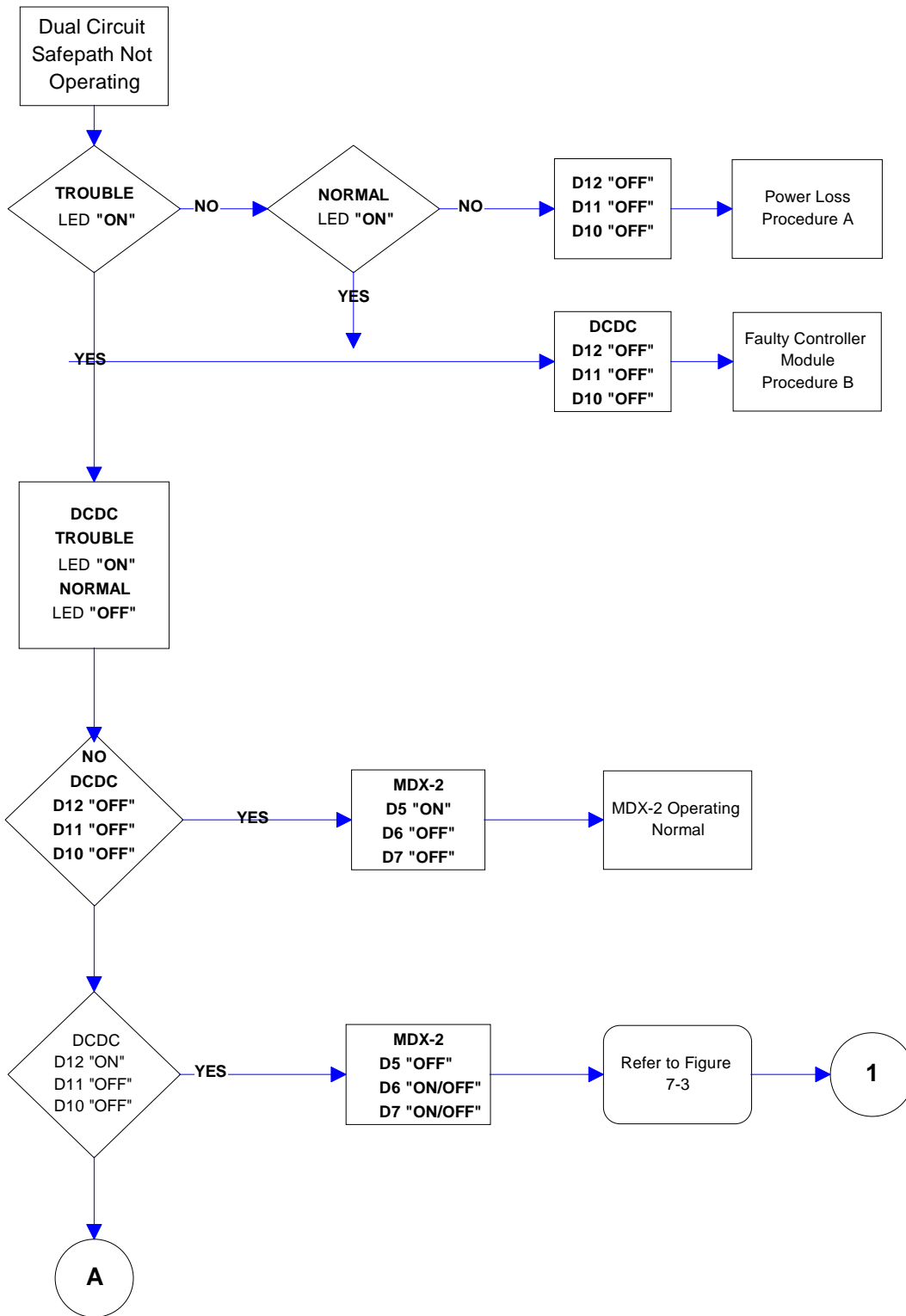


Figure 7-2, Sheet 1 of 2
Basic Troubleshooting Flowchart

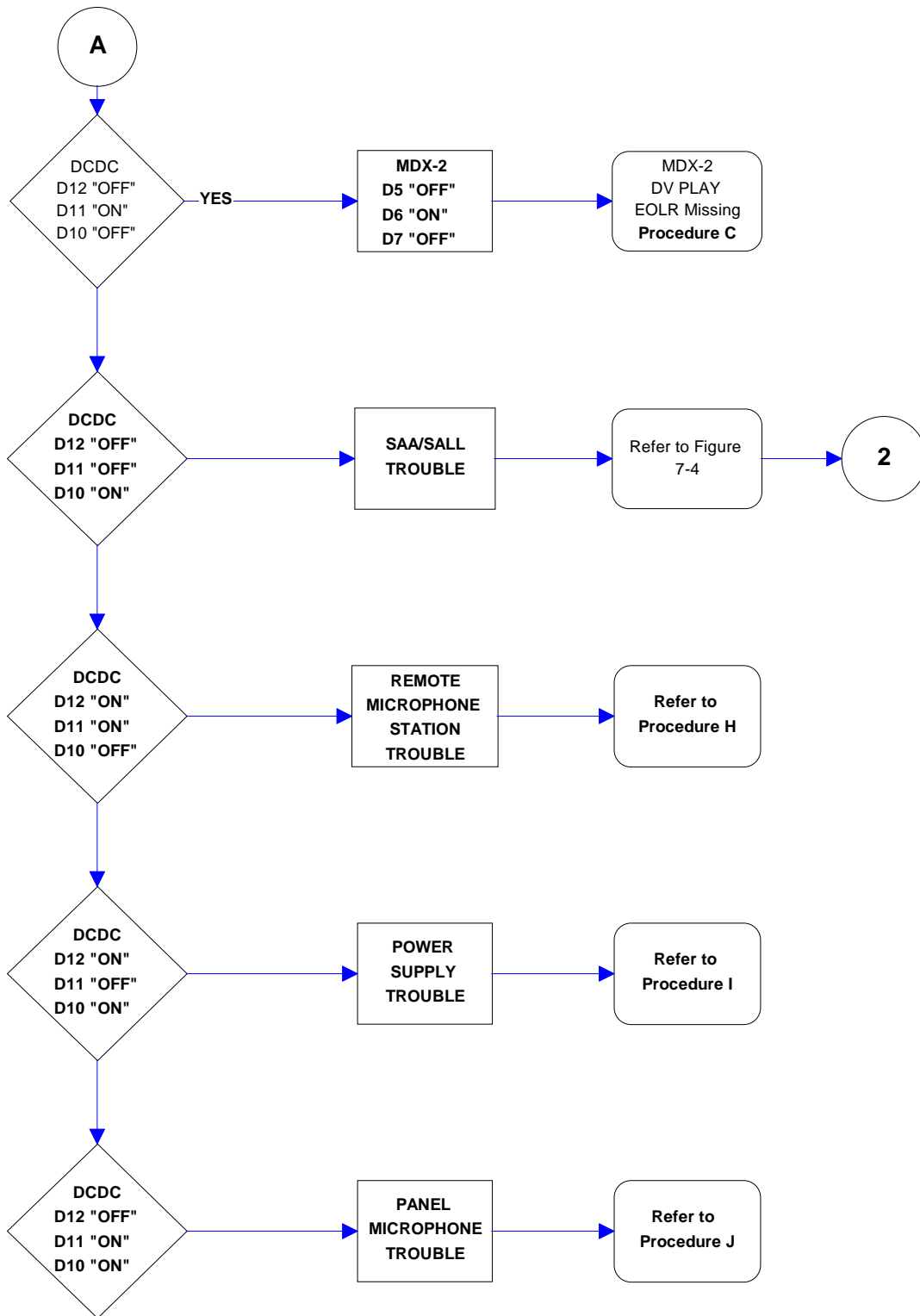


Figure 7-2, Sheet 2 of 2
Basic Troubleshooting Flowchart

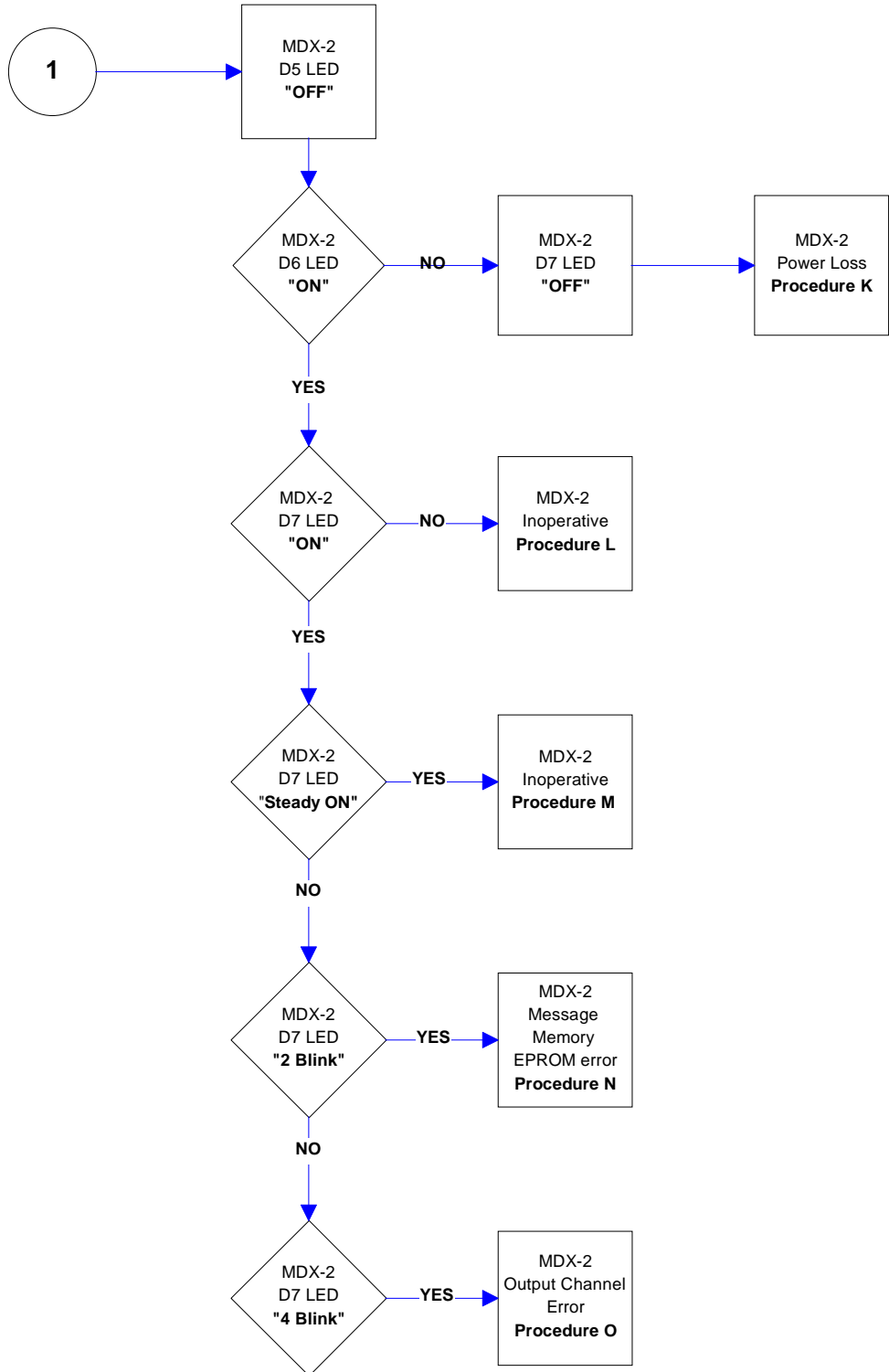


Figure 7-3
Digital Voice Module (MDX-2)
Troubleshooting Flowchart

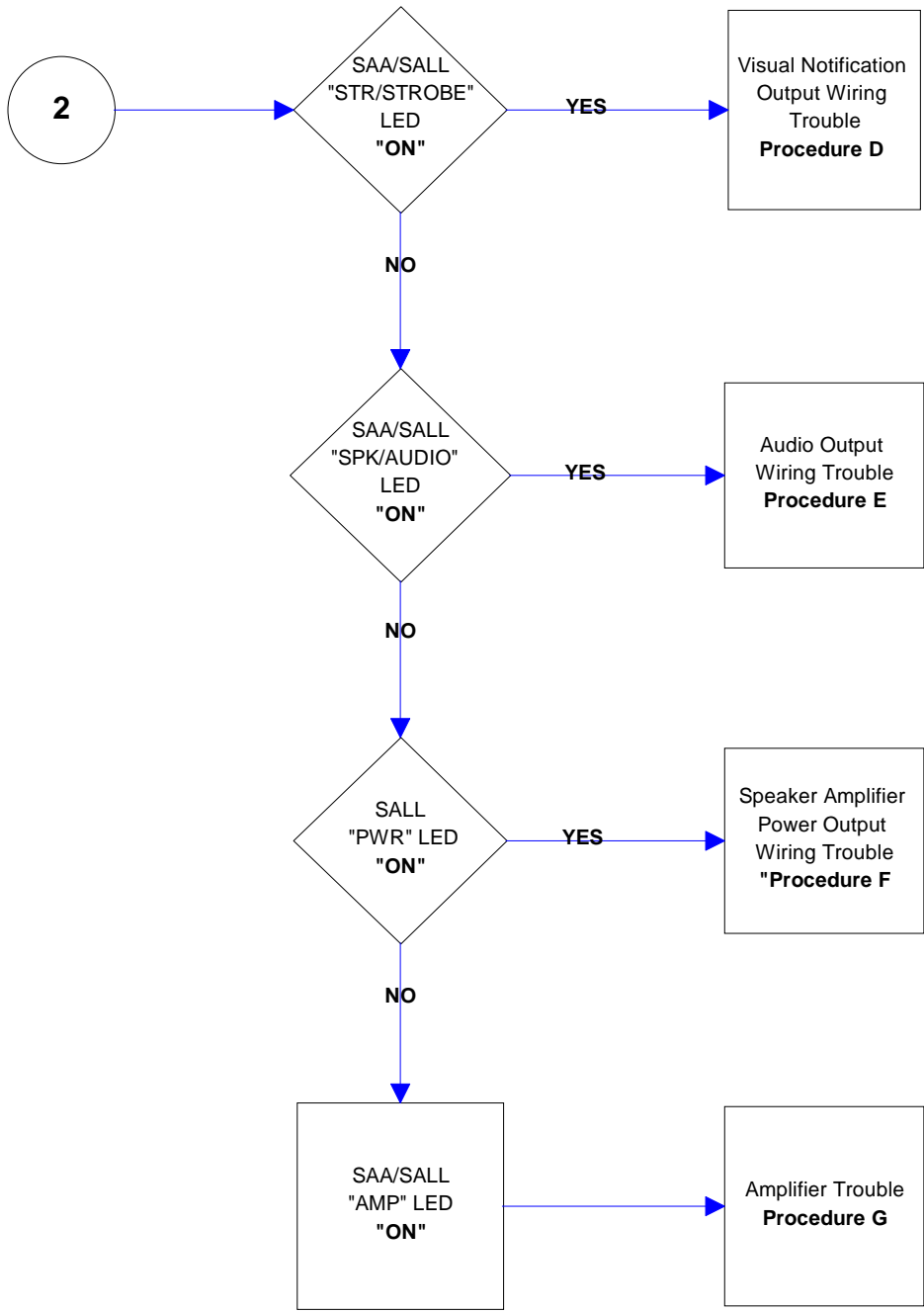


Figure 7-4
Amplifier (SAA/SALL)
Troubleshooting Flowchart



Warning: 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 LED is “OFF”, the yellow TROUBLE LED is “OFF”, and no module LEDs “ON”, a power loss condition has occurred. A power loss condition may be caused by:

1. Loss of AC input voltage and/or battery back-up voltage.
2. Faulty internal wiring between the DCPS (Dual-Circuit Power Supply) module and the Motherboard (DCMB).
3. Faulty DCPS module.
4. Faulty Motherboard (DCMB).

Perform the following:

1. Check for 24 +/- 5VDC at TB1 on the DCMB. If voltage is not present, perform steps 2 through 5.
2. Remove DCPS Cover. (See Figure 3-16 on Page 3-15) Observe if AC LED and DC LED are “ON” (See Figure 9-5 on Page 9-9 for locations).
 - a) **If both LEDs are “ON”, inspect wiring and connections between the DCPS and TB2 on DCMB.**
 - b) If both LEDs are “OFF”, check 120VAC input to DCPS. If AC is not present, check AC source. If AC is present, replace DCPS.
 - c) If AC LED is “ON” and DC LED is “OFF”, remove AC Power and Battery Power from the DCPS, disconnect 24VDC wires from TB2 on DCMB and allow panel to cool for 20 minutes. Re-apply AC power. If DC LED remains “OFF”, replace DCPS. If DC LED is “ON”, problem is a high current draw on the DCMB or DCDC module.
3. Replace the DCDC module.
4. Replace the Mother Board (DCMB) module.

When the trouble is repaired and before testing, mark all wires then replace all wires to the proper locations and replace all covers.

Procedure B

On the Dual-Circuit Control Module (DCDC), if the green NORMAL LED is “ON” and the yellow TROUBLE LED is “ON”, and D12, D11, D10 are “OFF”, a faulty controller module (DCDC) condition has occurred. A faulty controller module condition may be caused by:

1. DCDC module inoperable.

Perform the following:

1. Replace the DCDC module.

Procedure C

On the Dual-Circuit Control Module (DCDC), the green NORMAL LED is “OFF”, the amber TROUBLE LED is “ON”, D12 “OFF”, D11 “ON”, D10 “OFF”, and On the Digital Voice Module (MDX-2), the green NORMAL LED is “ON”, and the amber SYSTEM TROUBLE LED is “ON” This condition is caused by:

1. Digital Voice Module Inoperable.

Perform the following:

1. Replace Digital Voice Module (MDX-2)

When replacing digital Voice Module (MDX-2), properly remove the Voice Module Chips (See Figure 9-4 for locations) and the optional Output Channel Module (MDV-OCM) if installed. Install these items in the new MDX-2 prior to the MDX-2 installation in the panel.

Procedure D

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", D12 "OFF", D11 "OFF", D10 "ON", and on the SAA/SALL module the STR/STROBE LED is "ON", a visual notification output wiring trouble condition has occurred. A visual notification output wiring trouble condition might 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/SALL module is blown.
4. A faulty SAA/SALL module.
5. A faulty Motherboard (DCMB) module.

Perform the following:

1. Check EOLR resistor and verify that it is a UL LISTED a 10K Ohm, 5% Tolerance, 1W Resistor.
2. Check that the EOLR resistor is properly in place.
3. Verify that the Visual Notification Output field wiring is intact.
4. Verify that all fuses on the SAA/SALL module are good.
5. If trouble does not clear, remove strobe appliance circuit from Motherboard and place a 10K Ohm 1/4W minimum resistor on strobe output. If STR/STROBE LED turns "OFF", the trouble is in the Strobe NAC Circuit. If trouble does not clear, replace the SAA/SALL module.
6. Replace the Motherboard (DCMB).

Procedure E

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", D12 "OFF", D11 "OFF", D10 "ON", and on the SAA/SALL module, the SPK/AUDIO LED is "ON", an audio output wiring trouble condition has occurred. An audio output wiring trouble condition might be caused by:

1. Missing EOLR resistor on the audio output.
2. The audio output field wiring is open or shorted.
3. A faulty SAA/SALL module.
4. A faulty Motherboard (DCMB).

Perform the following:

1. Check EOLR resistor and verify that it is a UL LISTED a 10K Ohm, 5% Tolerance, 1W Resistor.
2. Verify that the EOLR resistor is properly in place.
3. Verify that the audio output field wiring is intact.
4. If trouble does not clear, remove audio appliance circuit from Motherboard and place a 10K Ohm 1/4W minimum resistor on audio output. If SPK/AUDIO LED turns "OFF", the trouble is in the Audio NAC Circuit. If trouble does not clear, replace the SAA/SALL module.

5. Replace the Motherboard (DCMB).

Procedure F

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", D12 "OFF", D11 "OFF", D10 "ON", and on the SALL-15S module the PWR LED is "ON", an amplified speaker power output wiring trouble condition has occurred. An amplified speaker power output wiring trouble condition might be caused by:

1. Missing EOLR 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 Motherboard (DCMB).

Perform the following:

1. Check EOLR resistor and verify that it is a UL LISTED a 10K Ohm, 5% Tolerance, 1W Resistor.
2. Verify that the EOLR resistor is properly in place.
3. Verify that the Amplified Speaker Power Output field wiring is intact.
4. Verify that all fuses on the SALL-15S module are intact. (See Figure 9-8 for locations)
5. If trouble does not clear, remove SPKR AMP appliance circuit from Motherboard and place a 10K Ohm 1/4W minimum resistor on the output. If PWR LED turns "OFF", the trouble is in the Speaker Power NAC Circuit. If trouble does not clear, replace the SALL-15S module.
6. Replace the Motherboard (DCMB).

Procedure G

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", D12 "OFF", D11 "OFF", D10 "ON", and the AMP LED on the SAA/SALL module is "ON", an amplifier trouble condition has occurred. An amplifier trouble condition may be caused by:

1. A faulty SAA/SALL module.
2. A faulty DCDC module.
3. A faulty Motherboard (DCMB).
4. Missing or Faulty MDX-2 Module or missing Shunt PCB.

Perform the following:

1. Replace the SAA/SALL module.
2. Replace the DCDC module.
3. Replace the Motherboard (DCMB).
4. If MDX-2 Module is installed, remove MDX-2 and replace with Shunt PCB. If Trouble clears, replace MDX-2 Module.

Procedure H

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", and D12 "ON", D11 "ON", D10 "OFF", then a faulty remote microphone condition has occurred. A faulty remote microphone condition may be caused by:

1. Improperly configured panel.
2. Faulty wiring between the panel and the remote microphone station.
3. Faulty REM MIC Fuse (F1) on the DCDC module.
4. Faulty Remote Microphone Station.

Perform the following:

1. If the system does not have a remote microphone attached then switch the Remote Microphone DIP switch (RM) "OFF". (See Figure 3-18 for switch location)
2. Verify field wiring between the panel and the remote microphone station. (See Appendix B)
3. Replace Fuse F1 on the DCDC module. (See Figure 9-3 for fuse location)
4. Replace the Remote Microphone Station.

Procedure I

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", D12 "ON", D11 "OFF", D10 "ON", an input power condition to the Dual-Circuit Power Supply (DCPS) has occurred. This condition may be caused by:

1. Loss or low AC input power.
2. Fully discharged or low Battery Backup power.
3. Faulty DCPS Module.

Perform the following:

1. Remove Power Supply Cover. Observe AC LED "ON". If "OFF", check AC input. If "ON", disconnect AC and check Battery Backup. If Battery Backup low, replace batteries.
2. Replace the DCPS.

Procedure J

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", D12 "OFF", D11 "ON", D10 "ON", panel microphone trouble has occurred. A panel microphone trouble condition may be caused by:

1. The panel microphone is not properly plugged in.
2. Faulty wiring in the panel microphone circuit.

Perform the following:

1. Check to insure that the panel microphone is properly plugged in.
2. Unplug and re-plug panel microphone.
3. Replace panel microphone.

Procedure K

On the DCDC Module, the green NORMAL indicator is "OFF", the yellow TROUBLE indicator is "ON", D12 "ON", D11 "OFF", D10 "OFF", and the Digital Voice Module NORMAL LED, SYSTEM TROUBLE LED, and TROUBLE LED are "OFF", the Digital Voice Module (MDX-2) may be completely inoperative due to power loss. This condition is caused by:

1. Input voltage is not within proper range or polarity is incorrect.
2. Blown fuse (F2) on the MDX-2.
3. Faulty MDX-2 Module.
4. One or more LED's are broken.
5. Faulty Motherboard (DCMB)

Perform the following:

1. Check voltage at TB1 on the Motherboard (DCMB) for 24VDC \pm 5VDC and that correct polarity.
2. Check Fuse F2 on MDX-2. If Fuse is good, replace MDX-2 Module.

3. Replace Motherboard.

Procedure L

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", D12 "ON", D11 "OFF", D10 "OFF", and the MDX-2 SYSTEM NORMAL LED is "OFF", SYSTEM TROUBLE LED is "ON", and the TROUBLE LED is "OFF", the digital voice module may be completely inoperative. This condition is caused by:

1. Too low input voltage on the digital voice module.
2. Missing or improperly installed program memory EPROM.
3. Broken TROUBLE LED (digital voice module is operative if this is the cause).
4. Failed circuitry on the digital voice module.

Perform the following:

1. Verify that the input voltage at TB1 on DCMB is 24VDC \pm 5VDC.
2. Verify that the program memory EPROM is present and inserted into S15 properly of the MDX-2 Module.
3. Attempt to play a message file. If the file plays then the digital voice module trouble indicator LED is broken. Replace MDX-2 Module.
4. Replace MDX-2 Module.

If, after the above procedure is completed, the trouble condition persists, the trouble condition is caused by failed circuitry on the digital voice module. There are no field correctable failed circuitry problems on the digital voice module. Digital voice modules with failed circuitry shall be replaced immediately, following Section 7-1 - **SAFE***PATH*[®] Module Replacement Procedure on Page 7-14.

Procedure M

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", D12 "ON", D11 "OFF", D10 "OFF", and the MDX-2 SYSTEM NORMAL LED is "OFF", SYSTEM TROUBLE LED is "ON", and the TROUBLE LED is "STEADY ON", the digital voice module is partially or completely inoperative. The digital voice module can be rendered inoperative by:

1. Too low input voltage on the digital voice module.
2. Failed audio channel on the digital voice module.
3. Failed Message Kit (SMK or PMK)
4. Other failed circuitry on the Series MDX-2 or Output Channel Module (MDV-OCM).
5. An improperly installed Output Channel Module (MDV-OCM).

If the error was either due to the first or third cause, the digital voice module will not play messages. If the error was due to the second cause, the digital voice module might play messages.

When the digital voice module is rendered inoperative, perform the following:

1. Verify that the input voltage is 24 +/- 5 VDC.
2. Attempt to play messages on all installed audio channels.
3. Remove Message Kit (SMK or PMK). If the TROUBLE LED on the MDX-2 goes to a "2 Blink" pattern, then the Message Kit is in error. Replace Message Kit.
4. If Output Channel Module (MDV-OCM) is not installed then there is circuit failure on the MDX-2.
5. If installed, check pin alignment on the Output Channel Module. If trouble persists, remove the MDV-OCM. If the TROUBLE LED goes to a "4 Blink" pattern, then the MDV-OCM has failed,

Replace MDV-OCM. If TROUBLE LED remains "STEADY ON" then there is circuitry failure on the MDX-2. Replace.

There are no field correctable failed circuitry problems. Digital voice modules with failed circuitry shall be replaced immediately, following Section 7-1 - **SAFE**PATH[®] Module Replacement Procedure on Page 7-14.

Procedure N

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", D12 "ON", D11 "OFF", D10 "OFF", and the MDX-2 SYSTEM NORMAL LED is "OFF", SYSTEM TROUBLE LED is "ON", and the TROUBLE LED flashes a "2-blink" pattern, a message memory EPROM error has occurred on the MDX-2 module. A message memory EPROM error may be caused by:

1. Pre-programmed message memory EPROM's not installed into Series MDX-2 in proper order.
2. No messages programmed into message memory EPROM's.
3. Missing or improperly installed message memory EPROM's.
4. One or more of the messages were not programmed completely.
5. Failed circuitry on the MDX-2.
6. The optional Output Channel Module (MDV-OCM) is installed when not required.

If the error was due to one of the first four causes, the trouble will clear automatically when the cause is corrected. The first four causes should only occur when power is first turned on to the Series MDX-2.

When a message memory error is indicated, perform the following:

1. Verify that the preprogrammed message memory EPROM's were installed in the correct sockets on the Series MDX-2. See Figure 9-4 on Page 9-8 for proper chip location. An EPROM must always be installed in socket S14. If between one and two minutes of message memory is required, the first EPROM must be installed into socket S14 and the second EPROM into socket S12.
2. Verify, at least one message is programmed into the message memory EPROM's.
3. Verify that all message memory EPROM's are inserted into their sockets properly.
4. Verify that there are no partially programmed messages on the message memory EPROM's. This can only be done using commands on the serial port, which is located on the optional Ground Fault Detection/Computer Interface Module.
5. Remove the optional Output Channel Module if the message files require only channel one.

If, after the above procedure is completed, the trouble condition persists, the trouble condition is caused by failed circuitry on the Series MDX-2. There are no field correctable failed circuitry problems on the Series MDX-2. Series MDX-2's with failed circuitry shall be replaced immediately, following Section 7-1 - **SAFE**PATH[®] Module Replacement Procedure on Page 7-14.

Procedure O

On the DCDC Module, the green NORMAL LED is "OFF", the yellow TROUBLE LED is "ON", D12 "ON", D11 "OFF", D10 "OFF", and the MDX-2 SYSTEM NORMAL LED is "OFF", SYSTEM TROUBLE LED is "ON", and the TROUBLE LED flashes a "4-blink" pattern, an audio channel error has occurred. An audio channel error may be caused by:

1. Too low an audio level while playing a message.
2. Pause in message while playing a message that lasts longer than 3 seconds.

3. The optional Output Channel Module for channel two is not installed or is improperly installed. The number of output channels installed must agree with the number of output channels used in the Programmed Message Kit (PMK). The Standard Message Kit (SMK) is always programmed for single channel output.
4. Failed audio channel on Series MDX-2 or an optional Output Channel Module.

If the error occurs while playing a file, the error was due to one of the first three possible causes. If the error occurs immediately after turning on power to the Series MDX-2, the error was due to the last possible cause.

If the error was due to the first or second cause while playing a message, the trouble will clear automatically when audio is again detected while a message is playing. If the error is due to the third cause, the trouble will clear automatically when the output is no longer loaded down while a message is playing. If the error was due to the fourth cause, the trouble will clear automatically when the module is properly installed and input power is cycled off and on.

When an audio channel error is indicated, perform the following:

1. Have the message re-recorded, shortening duration of the pause.
2. Verify that the optional Output Channel Module is installed properly.

If, after the above procedure is completed, the trouble condition persists, the trouble condition is caused by failed circuitry on the Series MDX-2. There are no field correctable failed circuitry problems on the Series MDX-2 or Output Channel Module (MDV-OCM) and these components if defective shall be replaced immediately following Section 7-1 - **SAFEPATH[®]** Module Replacement Procedure on Page 7-14.

Section 7-2 - SAFEPATH[®] Panel 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 a Dual-Circuit **SAFEPATH[®]** Panel module, replace the malfunctioning modules immediately in the following manner:

1. Disconnect battery backup power from the Dual-Circuit **SAFEPATH[®]** Panel.
2. Disconnect AC input power from the Dual-Circuit **SAFEPATH[®]** 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 operating properly.

Chapter 8 Technical Data

Section 8-1- Mechanical

Dimensions (H x W x D)	21 x 16 x 6 in.
Weight	40 lb.
Finish	Red
Enclosure Construction Type	0.050" steel
Mounting	Indoor surface mount
Wiring Entry	Top and bottom knockouts (3/4", 1")
Door Lock	Standard Wheelock key-lock
PC Boards	1 Mother Board (DCMB) 1 Control Module (DCDC) 1 Power Supply (DCPS) 1 Digital Voice Module (MDX-2) 1 or 2 Amplifier Modules

Section 8-2 - Environmental

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

Section 8-3 - Electrical

Inputs

Input Voltage	120 VAC, 2.50A, 60Hz 220 VAC, 1.1A, 50-60Hz for Export
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Battery Current Calculations

The current draw of the Dual-Circuit **SAFEPATH**[®] Panel is determined by the configuration being utilized. Section 3-7 on Page 3-23 Battery Care and Battery Backup Calculation will assist you in developing the current requirements.

Automatic Activation

Dry contact inputs or use of NACIM or other open collector device to activate from a NAC.

Outputs

Visual Notification Appliance Output	1 output circuit. 2.0 amps @ 24 VDC per zone. Supervised.
Central Amplified Audio Output	1 output circuit. Selectable 25, 70.7volt output at 40W or 80W max, or 100v (export) at 80W max. (Depending on amplifier configuration), per zone. Supervised.
Amplified 10k Ohms Speaker Audio Output	1 output circuit, 15 Ohms, -5dBm output max (when configured with a SALL-15S), per zone. Supervised
Amplified Speaker Power Output	1 output circuit. 2.0 amps @ 24 VDC (when configured with a SALL-15S), per zone. Supervised.
Trouble Audible Output	0.100 amps @ 24 VDC. Non-Supervised.
Status Contact	Form C contact normally energized. Contacts transfer during trouble: 0.5 amps @ 24 VDC max, resistive load (see following warning). Non-Supervised.
Alarm Contact	Form C contact normally de-energized. Contact transfers during alarm: 0.5 amps @ 24 VDC max, resistive load (see following warning). Non-Supervised.

Table 8-1 Outputs



Warning: DO NOT EXCEED THE RATINGS OF THE STATUS CONTACTS. EXCEEDING THIS RATING MAY CAUSE THE RELAY TO FAIL AND PREVENT A TROUBLE CONDITION FROM BEING INDICATED.

DO NOT EXCEED THE RATINGS OF THE ALARM CONTACTS. EXCEEDING THIS RATING MAY CAUSE THE RELAY TO FAIL AND PREVENT THE MESSAGES FROM BEING PLAYED.

Wiring Connections

Screw terminals	Accept #12 to #22 AWG
-----------------	-----------------------

End-of-Line Resistor

Visual Notification Appliance Outputs	UL LISTED 10K Ohm, 1/8W Minimum $\pm 5\%$
Audio Notification Appliance Outputs	UL LISTED 10K Ohm, 1W Minimum $\pm 5\%$
Amplified Speaker Appliance Power Outputs	UL LISTED 10K Ohm, 1W Minimum $\pm 5\%$

NOTE:

A package of 8 UL LISTED 10K Ohm, 1W resistors are available through Wheelock, Inc. Model Number EOLK (Part# 5076).

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Chapter 9 - Module Descriptions

Section 9-1 - Introduction

There are twelve modules in the Dual-Circuit **SAFEPATH**[®] Panel product line.

The twelve modules are:

1. Dual-Circuit Mother Board (DCMB) (Section 9-2 on Page 9-3)
2. Dual-Circuit Control Module (DCDC) (Section 9-3 on Page 9-5)
3. Digital Voice Module (MDX-2) (Section 9-4 on Page 9-7)
Output Channel Module (MDV-OCM)
4. Dual-Circuit Power Supply (DCPS) (Section 9-5 on Page 9-9)
5. Supervised Audio System Amplifier/Signal Circuit Module (SAA-40S) (Section 9-6 on Page 9-10)
6. Supervised Audio System Amplifier/Signal Circuit Module (SAA-80S/SE*) (Section 9-7 on Page 9-12)
7. Supervised Audio Line Level Module (SALL-15S) (Section 9-8 on Page 9-14)
8. Notification Appliance Circuit Interface Module (NACIM) (Section 9-9 on Page 9-16)
9. Speaker Circuit Splitter (4 way) (SPL) (Section 9-10 on Page 9-17)
10. Auxiliary Input Module (AIM-3) (Section 9-11 on Page 9-18)
11. Redundant Amplifier Module (RAM-1) (Section 9-12 on Page 9-20)
12. Remote Microphone Station (RMS-3) (Section 9-13 on Page 9-21)

* 100 Volt European Installations

Location of Plug-In Modules

The interior view of the Dual-Circuit **SAFEPATH**[®] Panel with the modules is shown in Figure 9-1. The amplifier modules may be used in any combination by installing into slots 1 and 2 in the DCMB. Also Figure 9-1 shows the locations of the MDX-2, DCDC, and optional SPLs. The DCPS is mounted under the protective cover holding the SPL(s).

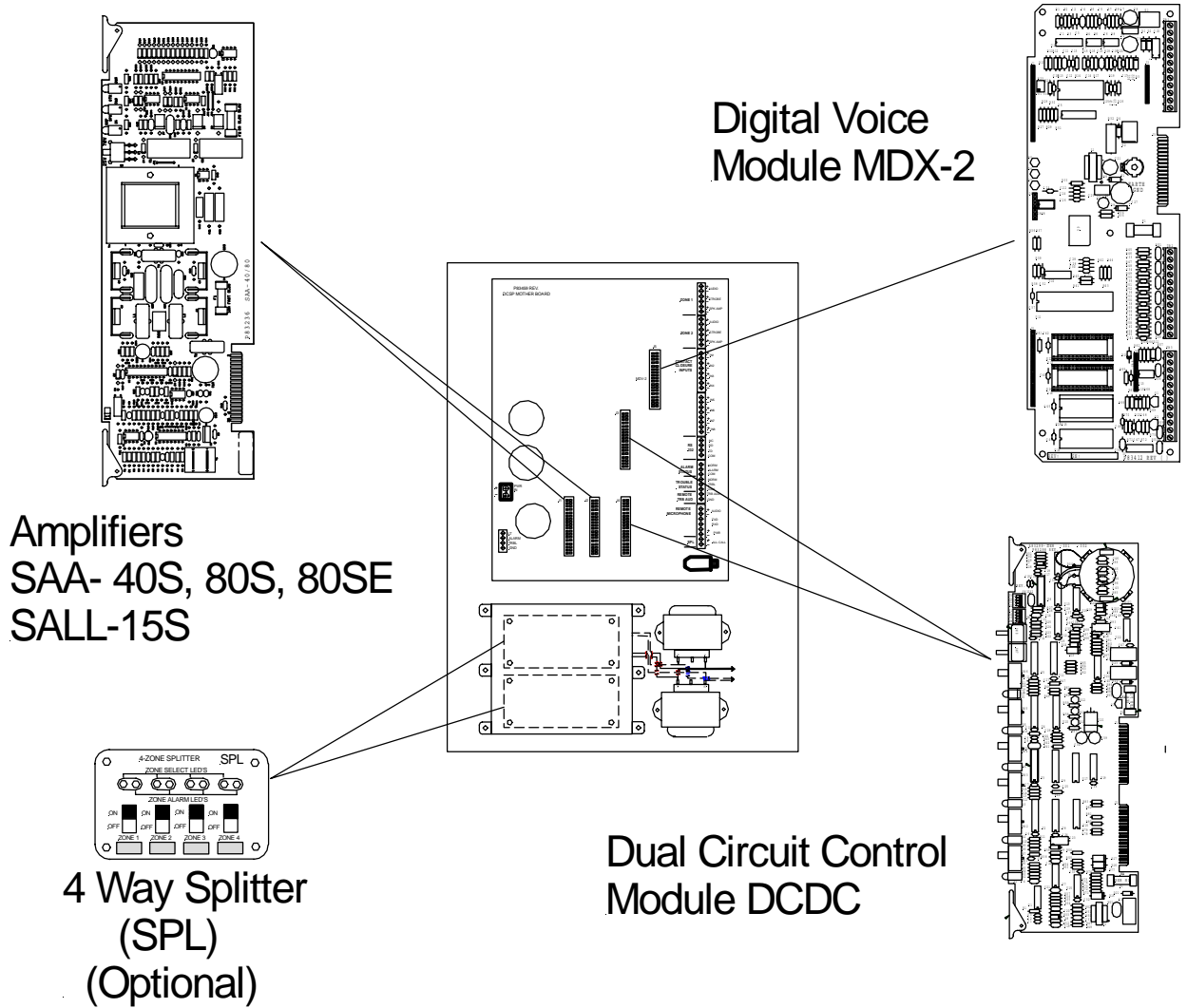


Figure 9-1
Location of Plug-in Modules

Section 9-2 - Dual-Circuit System Mother Board (DCMB)

Wheelock, Inc. Part Number: 107372

The Dual-Circuit System Mother board (DCMB) provides all signal handling capabilities between the DCDC and the amplifier modules, terminal blocks for output wiring, and connectors for handling signals between the DCDC and the digital voice module.

The DCMB is illustrated in Figure 9-2 on Page 9-4

Up to two amplifier modules may be connected to the DCMB. The amplifier modules may be installed in any order in slots 1 and 2. Installing an amplifier module in slot 1 and 2 will result in the module's output appearing in the correspondingly numbered terminal block (labeled "Zone 1" and "Zone 2"). For example, when an amplifier module is installed in slot 1, the amplifier module's output appears at the terminal block labeled "Zone 1".

Up to 2 channels from the Digital Voice Module (MDX-2) may be connected to the DCMB. The digital voice module is inserted into J5. The digital voice module channel will play through Zone 1 and Zone 2 if amplifier modules are installed.

IN1 through IN8 are the dry contact inputs used to trigger the automatic alarm circuits. With the MDX-2 Module installed, IN1 through IN8 provide access to as many as 8 programmed messages on the MDX-2.

If the MDX-2 is not used and the Shunt PCB is used, IN1 initiates Zone 1 and IN2 initiates Zone 2. IN3 through IN8 are not used.

The microphone input is located in the lower right corner of the board and is used for live voice announcements.

Form C contacts are available for remote monitoring of Alarm Status and Trouble Status. Also remote trouble power is available at 24 VDC, 0.100 Amps that is non-supervised.

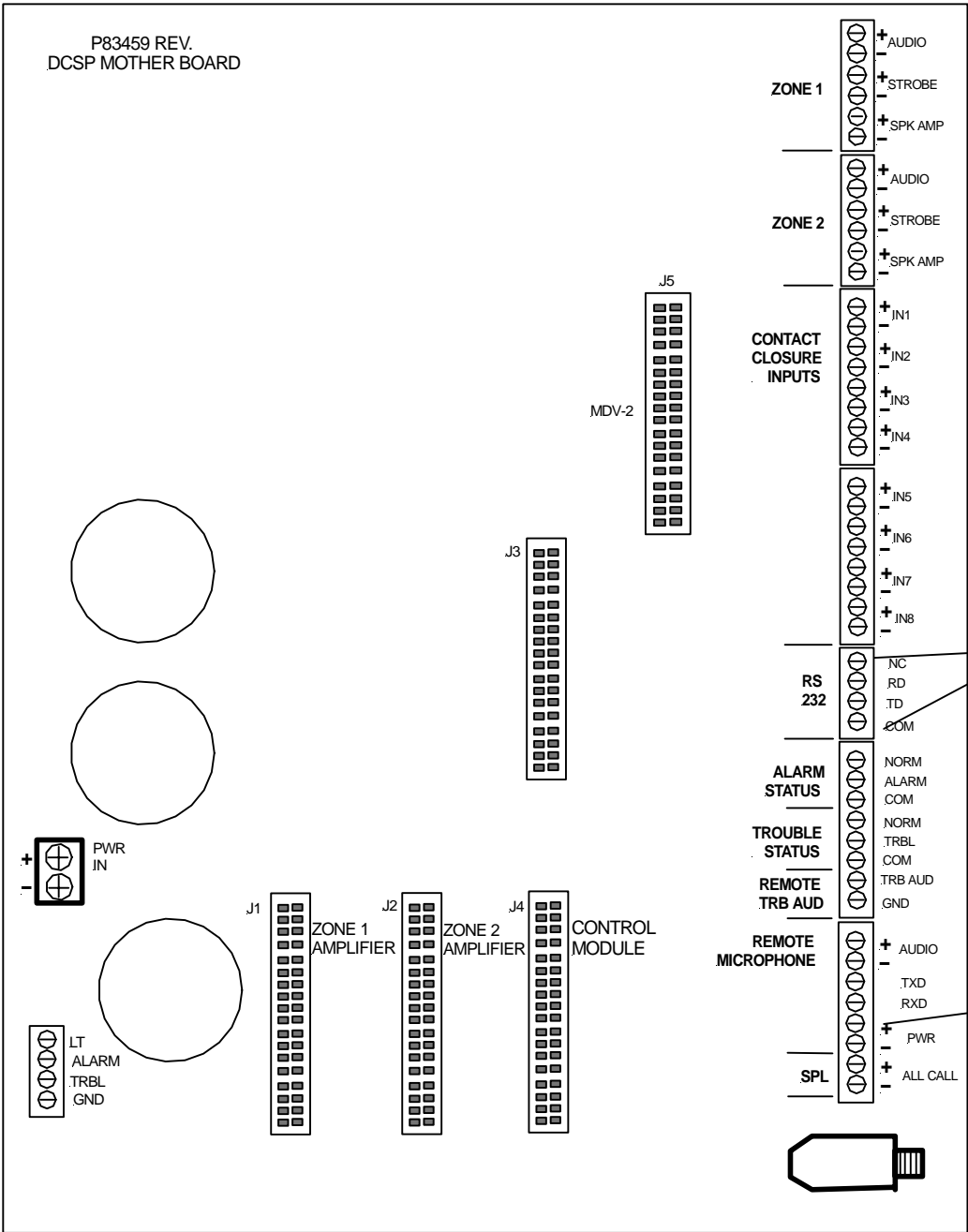


Figure 9-2
Dual-Circuit SAFEPATH® Motherboard (DCMB)

Section 9-3 - Dual-Circuit Control Module (DCDC)

Wheelock, Inc. Part Number: 107373

The Dual-Circuit Control Module (DCDC) provides all of the control capabilities for the **SAFEPATH**[®] panel. The controller module supervises the Digital Voice Module (MDX-2), Dual-Circuit Power Supply (DCPS), and amplifier modules (SAA-40S, SAA-80S/SE, and SALL-15S) for proper operation. The microphone is supervised for connection.

The channel playing contacts from the digital voice module (MDX-2) are monitored to determine their status (e.g. active or inactive). If the channel playing contact is inactive, the control module routes a supervision tone to each of the amplifier circuit modules and monitors the amplifier for functionality. If the channel playing contact is active, the control module routes the audio from that channel's line output from the digital voice module to the respective amplifier circuit module. Wiring used to monitor the channel playing contacts and to route the line outputs from the digital voice module is supervised for open and short circuit conditions.

The DCPS module is supervised 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 audible and the external trouble audible circuit transfer the Form C trouble contact to the trouble position, turn off the "NORMAL" indicator, and turn on the "TROUBLE" indicator.

Synchronized signal for the Strobe NAC circuits can be energized by turning ON DIP switch SS. This will cause the Wheelock Synchronized Strobes to flash at the same time.

Other controls from the DIP Switches are, Remote Microphone ON/OFF (RM), and selection of supervisory tone from the built in tone generator (T1, T2, T3).

There are two 0.5A fuses on the printed circuit board. F1 is the fuse for Remote Microphone power, and F2 is the fuse for the external trouble audible. See Figure 9-3 on Page 9-6 for fuse location.

Nominal Specifications:

Input Voltage Range	20 to 28VDC
Supply Current (Idle) @ 24VDC	75mA
Supply Current (Full Load) @ 24VDC	130mA
Operating Temperature Range	0 to 49 Degrees C (32-120 Degrees F)
Humidity Range	0 to 85%, Non-condensing

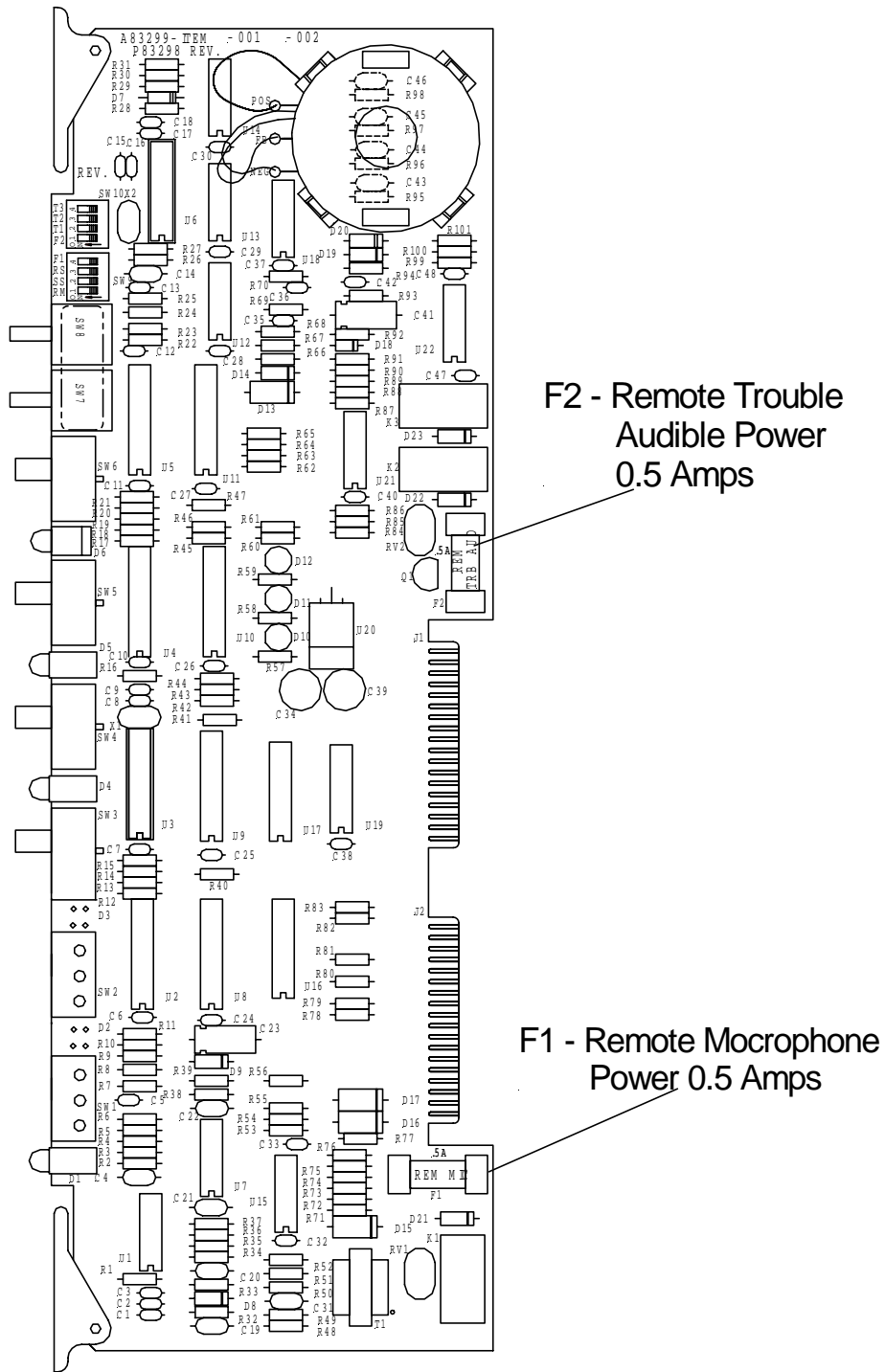


Figure 9-3
Dual-Circuit Control Module

Section 9-4 - Digital Voice Module (MDX-2)

Wheelock, Inc. Part Number: 105094

The Digital Voice Module (MDX-2) is a plug-in module that provides playback capability of pre-recorded messages. The MDX-2, when activated, provides a pre-recorded tone and/or message to the Dual-Circuit **SAFEPATH**[®] Panel which then broadcasts it through the amplifiers and to the audio appliances.

The MDX-2 can have up to 8 pre-recorded messages that can be initiated by dry contact closure or open collector for each one. Figure 9-4 on Page 9-8 shows the location of these inputs. Up to 2 minutes of audio storage are recorded on UV-erasable EPROM memory chips. Any dry contact closure or open collector can include Acknowledgment of the playing file and Reset initiation. (The reset switch is required to be in a locked enclosure.)

The memory chips are normally recorded at Wheelock, Inc. The Standard Message Kit (SMK) which has 8 common messages and tones, is programmed for a single channel output. Jumper wires are in place on the MDX-2 so the same message will play on both channels. The Programmed Message Kit (PMK) is tailor made to the customer's desires including separate messages on the two channels. The location of these kits are shown in Figure 9-4 on Page 9-8

The MDX-2 has a maximum of two line-level outputs that can play two different messages, one to each amplifier, simultaneously. This is done by installing an Output Channel Module (AM-MDV-OCM), Wheelock, Inc. Part Number 105097 on the MDX-2 Module.

The MDX-2 for the Dual-Circuit **SAFEPATH**[®] Panel is configured for the same message to be transmitted on both amplifier modules. This is done with the jumper wires in the upper right hand corner shown in Figure 9-4 on Page 9-8.

The Standard Message Kit (SMK) has a variety of configurations. Consult the current Wheelock, Inc. Catalog for the up to date configurations.

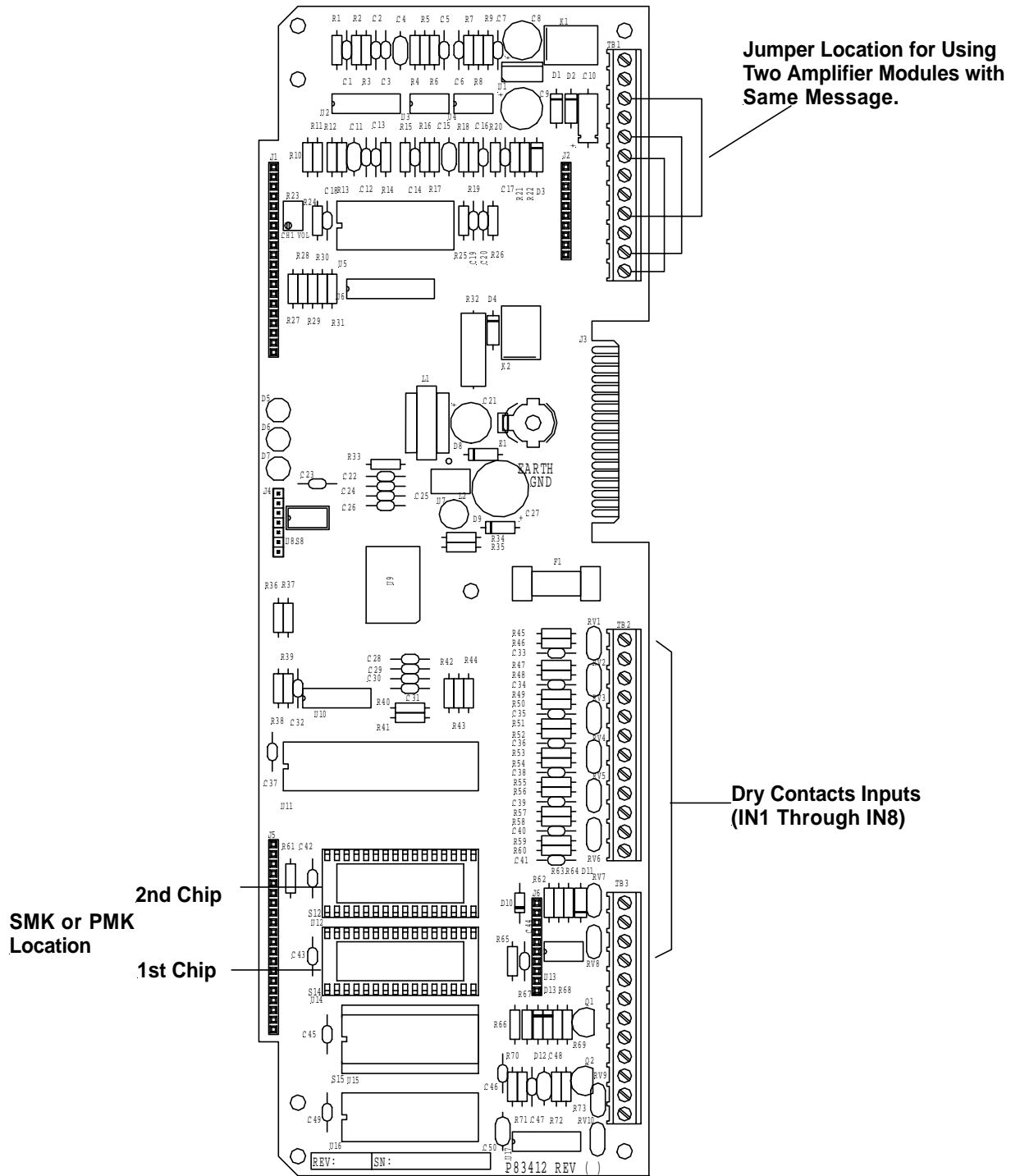


Figure 9-4
Digital Voice Module (MDX-2)

Section 9-5 - Dual-Circuit Power Supply (DCPS)

Wheelock, Inc. Part Number: 107378

The Dual-Circuit Power Supply (DCPS) provides the Dual-Circuit **SAFEPATH**[®] Panel with power supply/charger with an output of 24VDC with a maximum current of 6 Amps. The battery charger section is capable of charging a 40 AH battery in 48 hours.

The DCPS is protected with short circuit protection and thermal shutdown. It also contains Form C contacts for external monitoring of AC Failure and Battery Failure. "AC FAIL" is indicated with a minimum of (6) hour delay. LOW BATTERY is indicated on the "BATT FAIL" contacts when the battery voltage drops below 20VDC. NO BATTERY PRESENT is indicated on "BATT FAIL" terminals within 2 minutes.

The AC LED indicates that AC is applied to the DCPS. The DC LED indicates that the DCPS output is 24VDC.

Figure 9-5 shows the layout of the DCPS.

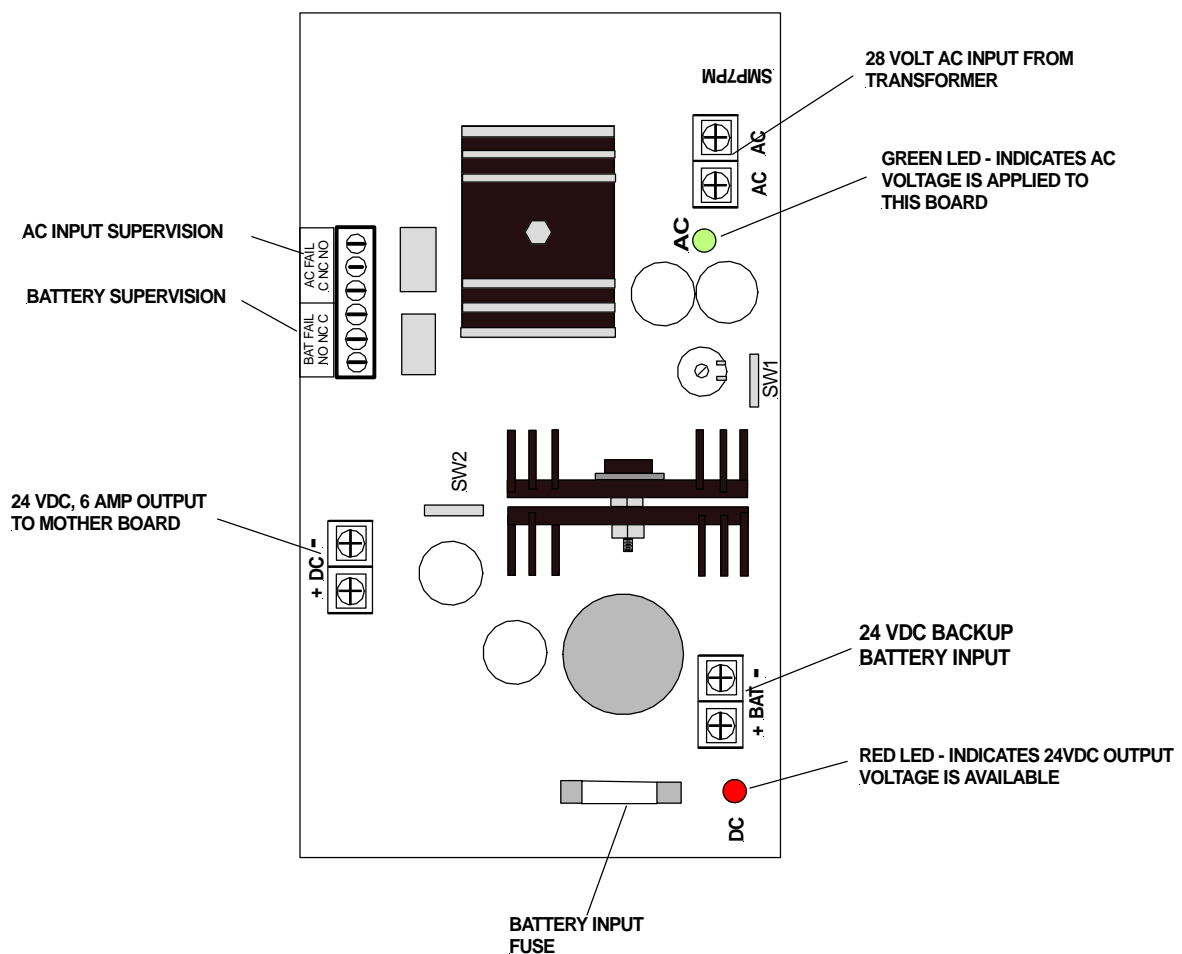


Figure 9-5
Dual-Circuit Power Supply (DCPS)

Section 9-6 - SAA-40S (Supervised Audio System Amplifier/Signal Circuit Module, 40 Watts)

Wheelock, Inc. Part Number: 105493

The SAA-40S is a supervised audio system amplifier/strobe circuit module. It is capable of providing 40 watts of audio amplification and a 24V, 2.0 Amp strobe NAC circuit for the **SAFEPATH[®]** Panel. The amplifier section can select either a 25V or a 70.7V audio output. The amplifier contains a switch mode power supply, a linear amplifier, and supervision circuitry.

The switch mode power supply is used to provide a constant DC voltage to the amplifier while the input voltage is allowed to fluctuate over its operating range. The amplifier amplifies the low-level 600-ohm audio to 40 watts output at either 25V or 70.7V. The supervision circuit monitors field speaker wiring integrity, field strobe wiring integrity, and amplifier functionality.

The board can be field configured for either 25V or 70.7V output. The configuration is done using a two-position slide switch (S1) on the printed circuit board. The down position configures the amplifier for a 25V output and the up position configures the amplifier for a 70.7V output. See Figure 9-6 for switch location.

The amplifier supervises both the strobe field wiring and the speaker field wiring with a DC current. The strobe field wiring is 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 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 three supervision features is indicated via three LEDs on the printed circuit board. See Figure 9-6 for LED locations.

There are two fuses on the printed circuit board, F1 and F2. Fuse F1 is the main fuse for the entire board. F2 is the fuse for the strobe power. See Figure 9-6 on Page 9-11 for fuse locations.

Two UL LISTED 10K Ohm, 1W EOLR Resistors are included.

<u>Fuse</u>	<u>Rating</u>
F1	10A
F2	3A

Nominal Specifications:

Rated Output @ 1kHz	40 Watts
Input Sensitivity	1Vrms
S/N Ratio	72dB
Frequency Response	275Hz to 6kHz
Input Voltage Range	24VDC
Supply Current (Standby) @ 24VDC	400mA
Supply Current (Full Load) @ 24VDC (Including 2.0 Amp Strobe Current)	3.6A
Operating Temperature Range	0 to 49 Degrees C (32-120 Degrees F)

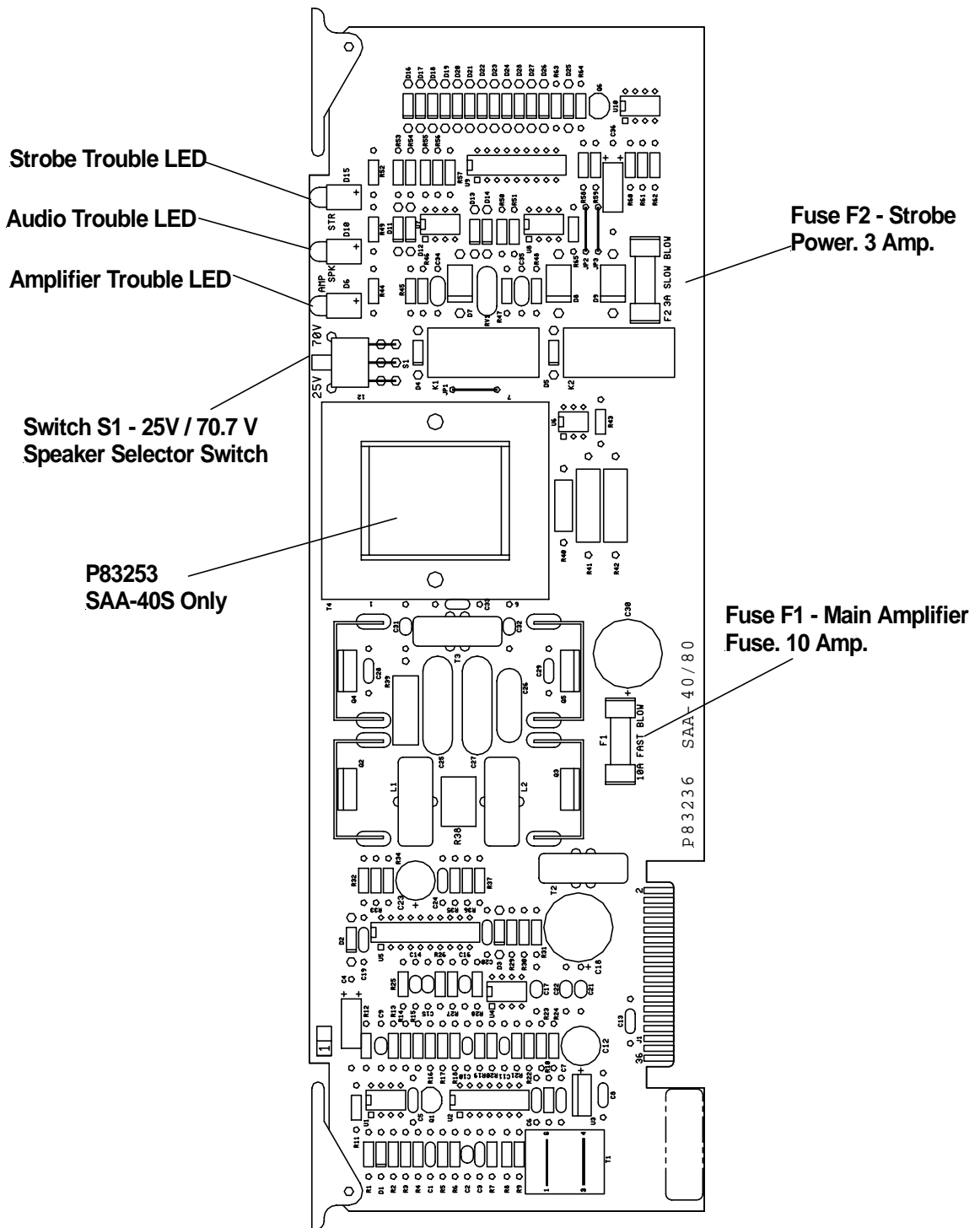


Figure 9-6
Supervised Audio System Amplifier/Signal Circuit Module, 40 Watts
(SAA-40S)

Section 9-7 - SAA-80S/SE (Supervised Audio System Amplifier/Signal Circuit Module, 80 Watts)

Wheelock, Inc. Part Number: SAA-80S – 105495, SAA-80SE - 105496

The supervised audio system amplifier/signal circuit module, 80 watts (SAA) provides audio amplification for the **SAFEPATH[®]** Panel. The amplifier can be selected to have either a 25V or a 70.7V audio output. The SAA-80SE (Export version) has only a 100V audio output. The amplifier contains a switch mode power supply, a linear amplifier, and supervision circuitry.

The switch mode power supply is used to provide a constant DC voltage to the amplifier while the input voltage is allowed to fluctuate over its operating range. The amplifier amplifies the low-level 600-ohm audio to 80 watts output. The supervision circuit monitors field speaker wiring integrity, field strobe wiring integrity, and amplifier functionality.

The board of the SAA-80S can be field configured for either 25V or 70.7V output. The configuration is done using a two-position slide switch (S1) on the printed circuit board. The down position configures the amplifier to have a 25V audio output and in the up position configures the amplifier to have a 70.7V audio output. See Figure 9-7 on Page 9-13 for switch location.

The board of the SAA-80SE is configured for a 100V output only. The two-position slide switch is removed.

The amplifier supervises both the strobe field wiring and the speaker field wiring with a DC current. The strobe field wiring is 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 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 three supervision features is indicated via three LEDs on the printed circuit board. See Figure 9-7 on Page 9-13 for LED locations.

There are two fuses on the printed circuit board, F1 and F2. Fuse F1 is the main fuse for the entire board. F2 is the fuse for the strobe power. See Figure 9-7 on Page 9-13 for fuse locations.

Two UL LISTED 10K Ohm, 1W, EOLR Resistors are included.

<u>Fuse</u>	<u>Rating</u>
F1	10A
F2	3A

Nominal Specifications:

Rated Output @ 1kHz	80 Watts
Input Sensitivity	1Vrms
S/N Ratio	72dB
Frequency Response	275Hz to 6KHz
Input Voltage Range	24VDC
Supply Current (Standby) @ 24VDC	600mA
Supply Current (Full Load) @ 24VDC (Including 2.0 Amps Strobe Current)	4.5A
Operating Temperature Range	0 to 49 Degrees C (32-120 Degrees F)

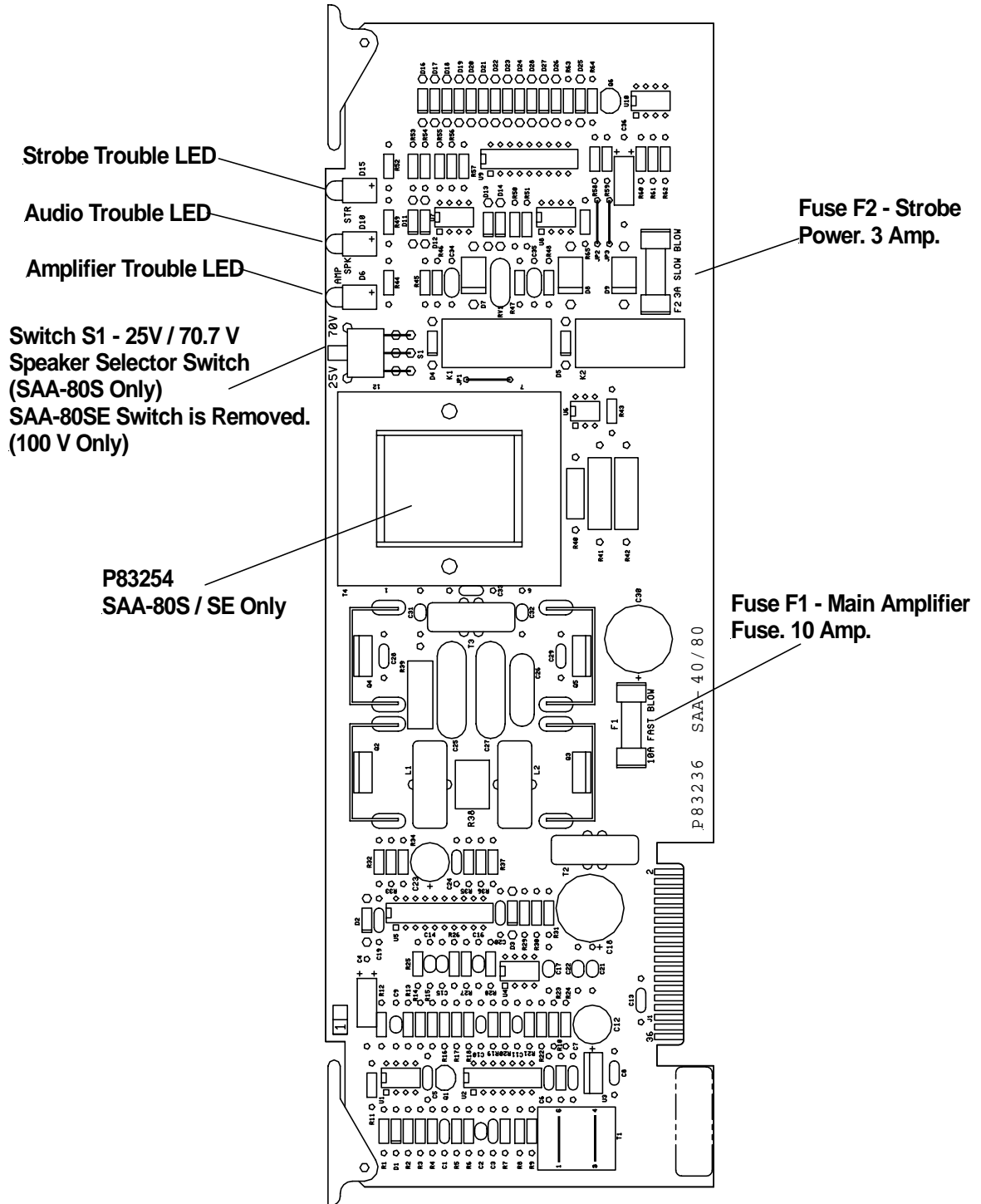


Figure 9-7
Supervised Audio System Amplifier/Signal Circuit Module, 80 Watts
(SAA-80S/SE)

Section 9-8 - SALL-15S (Supervised Audio Line Level Module)

Wheelock, Inc. Part Number: 105497

The Supervised Audio Line Level Module (SALL-15S) provides audio output for the **SAFEPATH®** Panel. The circuit module has a 0.5Vrms, 15 ohm audio NAC circuit, a 24VDC, 2A speaker amplifier power output, and a 24VDC, 2A strobe NAC Circuit. The circuit module contains a linear amplifier and supervision circuitry.

The module supervises the strobe NAC circuit field wiring, the speaker amplifier audio field wiring, the speaker amplifier power NAC circuit field wiring, and the amplifier. The strobe NAC circuit 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 strobe NAC circuit. The speaker amplifier audio NAC circuit 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 condition. The amplifier is supervised by monitoring the amplifier output for audio. The state of each of the four supervision features is indicated via four LEDs on the printed circuit board. See Figure 9-8 on Page 9-15 for LED locations.

There are three fuses on the printed circuit board, F1 and F2, and F3. Fuse F1 is the fuse for the strobe NAC circuit. F2 is the fuse for the speaker amplifier power. F3 is the main fuse for the entire board. See Figure 9-8 on Page 9-15 for fuse locations.

Three UL LISTED 10K Ohm, 1W, EOLR Resistors are included.

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

Nominal Specifications:

Rated Output @ 1kHz	500m Vrms, 30 ohm load
Input Sensitivity	1Vrms
S/N Ratio	-75dB
Frequency Response	275Hz to 4kHz
Input Voltage	24VDC
Supply Current (Standby)	50mA
Supply Current (Alarm) Add maximum of 2.0 Amps for Strobe current Add maximum of 2.0 Amps for Speaker Amp current	135mA (Maximum total current draw is 4.135 Amps)
Operating Temperature Range	0 to 49 Degrees C (32-120 Degrees F)
Humidity Range	0 to 85%, Non-condensing

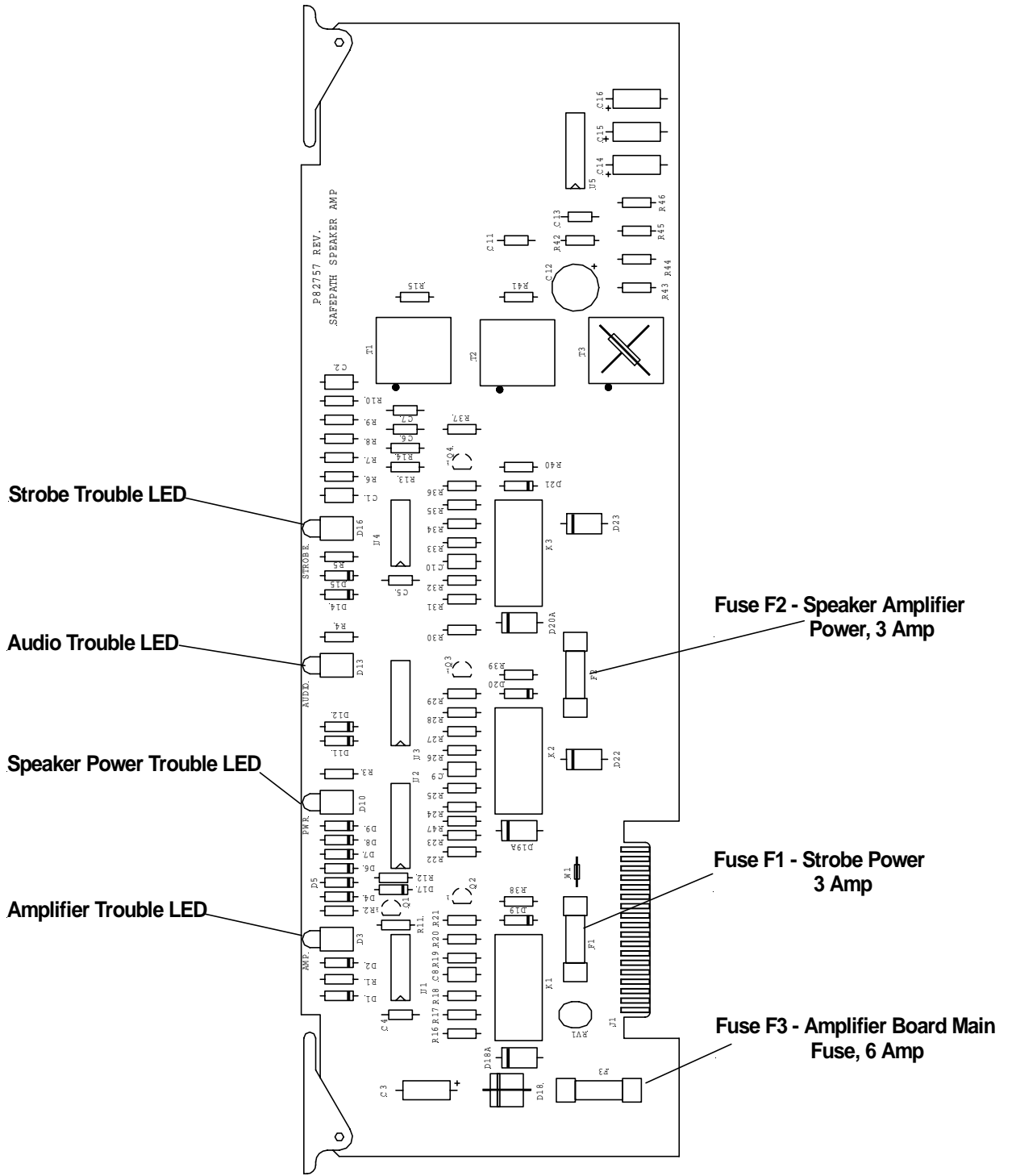


Figure 9-8
Supervised Audio Line Level Module
(SALL-15S)

Section 9-9 - NACIM (Notification Appliance Circuit Interface Module)

Wheelock, Inc. Part Number: 105498

The Notification Appliance Circuit Interface Module (NACIM) is used to convert the Notification Appliance Circuit (NAC) of a Fire Alarm Control Panel (FACP) to an open collector circuit to operate the inputs of the Digital Voice Module (MDX-2), Digital Voice Expansion Module (DV-EM) and **SAFEPATH**[®] Panels. The NACIM can be connected to either a 12-volt or a 24-volt NAC circuit. An End-Of-Line Resistor (EOLR) that is LISTED for use with the FACP shall be installed across the two terminals of the TB2 on the NACIM.

Additional Information is available on the NACIM Installation Instructions P83487.

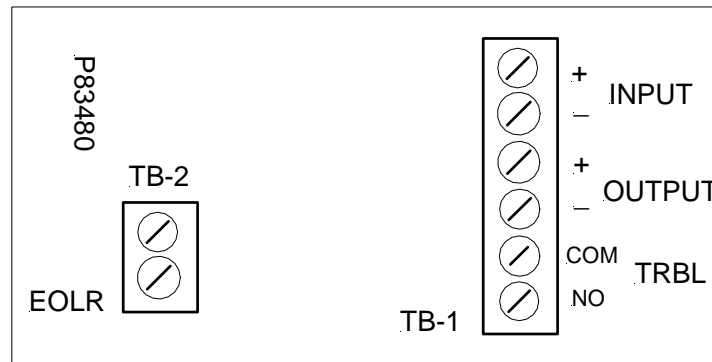


Figure 9-9
Notification Appliance Circuit Interface Module
(NACIM)

Section 9-10 - FOUR ZONE SPLITTER (SPL)

Wheelock, Inc. Part Number: 107369

The Four Zone Splitter is designed to be used with Wheelock's multiple circuit **SAFEPATH**[®] Panels and it provides a means for expanding a supervised audio output zone from one to four sub zones. The Four Zone Splitter is UL Listed under UL Standard 864, Control Units for Fire Protective Signaling Systems. They are listed for indoor use only. Only 1 Four-Zone Splitter can be connected to each zone. They are to be mounted inside the **SAFEPATH**[®] Panel enclosure onto the power supply printed circuit board (PCB) cover. The splitter works with all Wheelock amplifier modules. If the splitter is used with a power amplifier, the maximum power per sub zone cannot exceed what is listed in table below.

Additional Information is available on the SPL Installation Instructions P83541.

SPECIFICATIONS:

Table 1

	SAA-40S/80S/80SE			SALL-15S
Audio Output Voltage	25.0V	70.7V	100.0V	1.0V
Maximum Output Power Per Zone	25.0W	70.0W	100.0W	150 Speaker Inputs

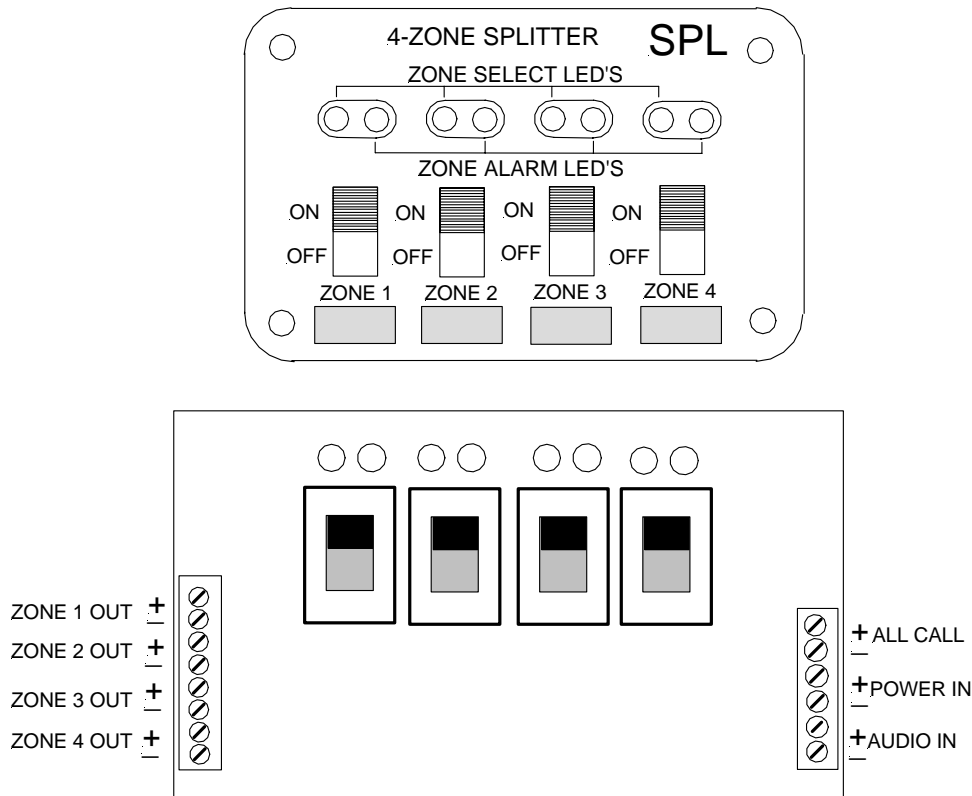


Figure 9-10
4 Way Splitter Module
(SPL)

Section 9-11 - Auxiliary Input Module (AIM-3)

Wheelock, Inc. Part Number: 107387

The AIM-3 is an outboard module, in its own enclosure, for use with the **SAFEPATH**[®] Panels to expand the number of optional Remote Microphone Stations from one to three. It also has the capability of using one of the Remote Microphone Inputs to connect to a telephone system page port. Appendix F is the installation instruction sheet.

See Figure 9-11 on Page 9-19.

Additional Information is available on the AIM-3 Installation Instructions P83667.

Electrical

Input Voltage	24 VDC
Input Current	100 mA Telephone Page 60 mA RMS Page 40 mA Standby
Audio Input	1Vrms
Dimensions (H x W x D)	13.0" X 7.6" X 2.15" (33CM X 19.4CM X 5.4CM)

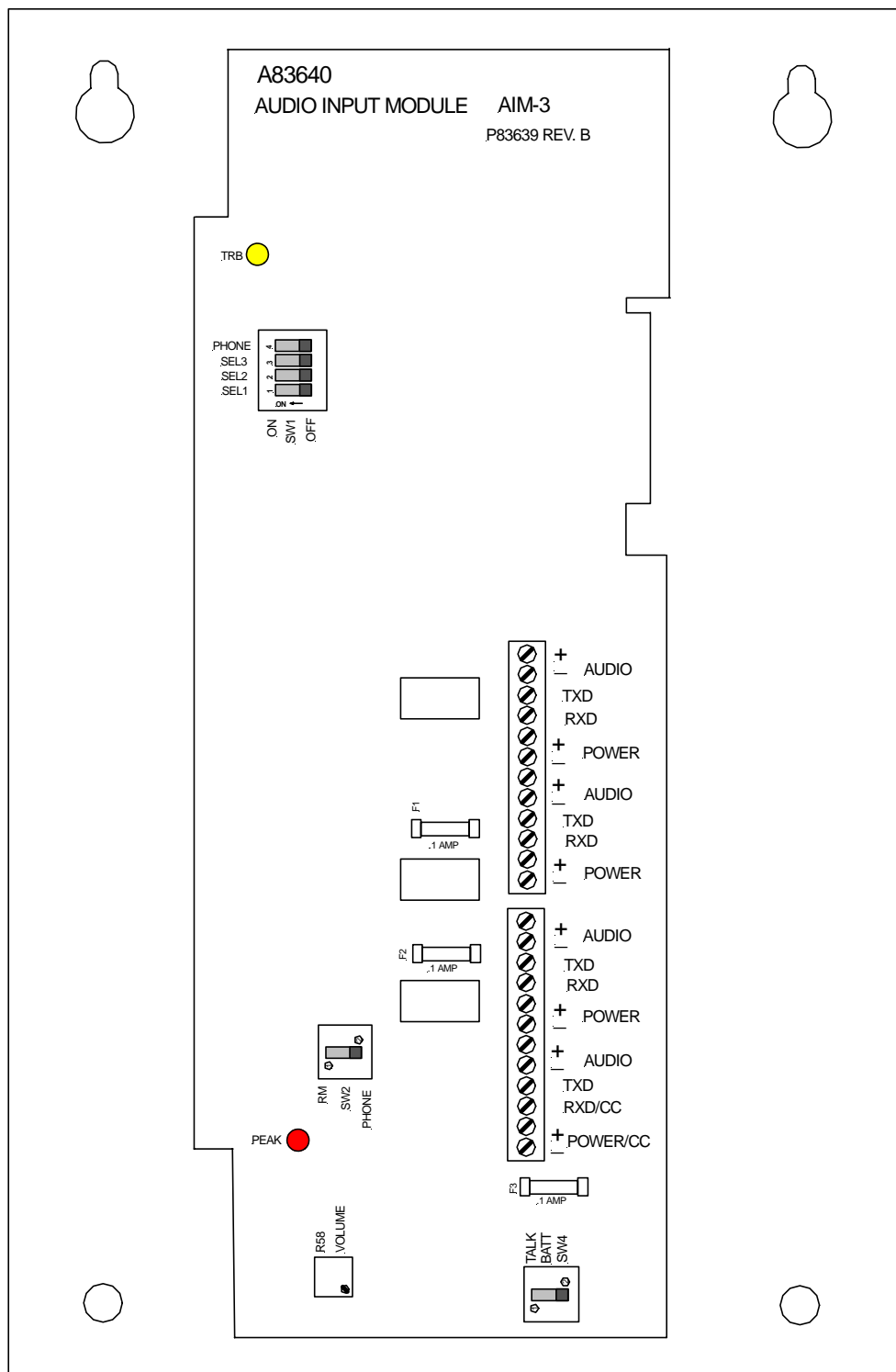


Figure 9-11
Auxiliary Input Module (AIM-3)

Section 9-12 - RAM-1 (Redundant Amplifier Module)

Wheelock, Inc. Part Number: 108956

The Redundant Amplifier Module (RAM-1) allows the **SAFEPATH**[®] Panel to be configured to meet the need for redundant amplification specifications. The RAM-1 provides 1 for 1 amplifier redundancy. One RAM-1 is used with two amplifier modules of equal power rating (a primary and a backup) to create one zone audio output. It mounts to the power supply cover in the panel in lieu of a SPL.

The RAM-1 draws no power during stand-by and 50 mA during alarm. During alarm, only one amplifier is energized. The second draws its standby current.

Additional Information is available on the RAM-1 Installation Instructions P83776.

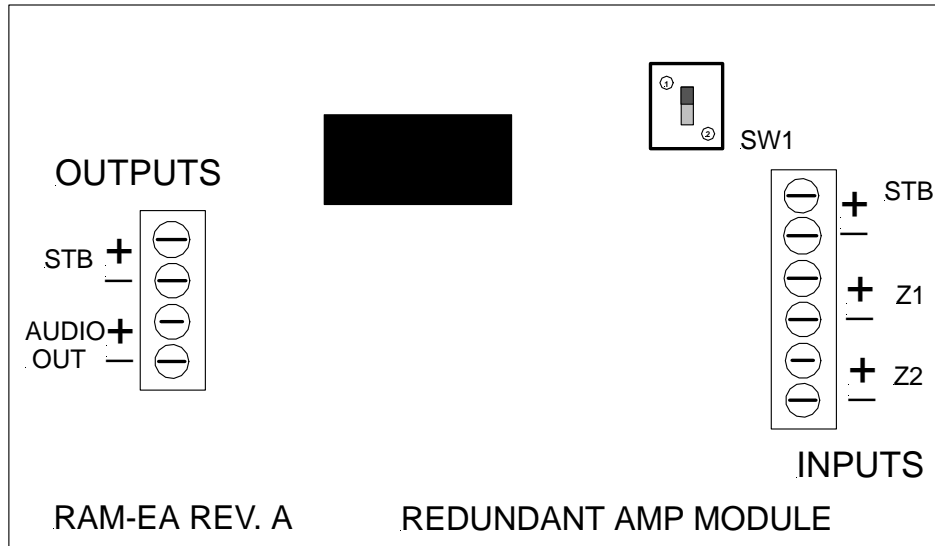


Figure 9-12
Redundant Amplifier Module (RAM-1)

Section 9-13 - Remote Microphone Station (RMS-3)

Wheelock, Inc. Part Number: RMS-3R (Red) 107375

The Remote Microphone Station (RMS-3) is designed to be used with the Dual-Circuit **SAFEPATH**[®] Panel. It provides a means of emergency voice announcements from a remote location. Only 1 Remote Microphone Station connection is available on the **SAFEPATH**[®] Panel. A single RMS-3 can be connected, or an Auxiliary Input Module (AIM-3) can be connected, allowing as many as three RMS-3 modules to be used.

Additional Information is available on the RMS-3 Installation Instructions P83542.

Specifications:

Power Input Voltage:	20-31 VDC
Audio Output Level:	1.05 VRMS
Output Impedance:	600 Ohms
Input Current:	50 mA

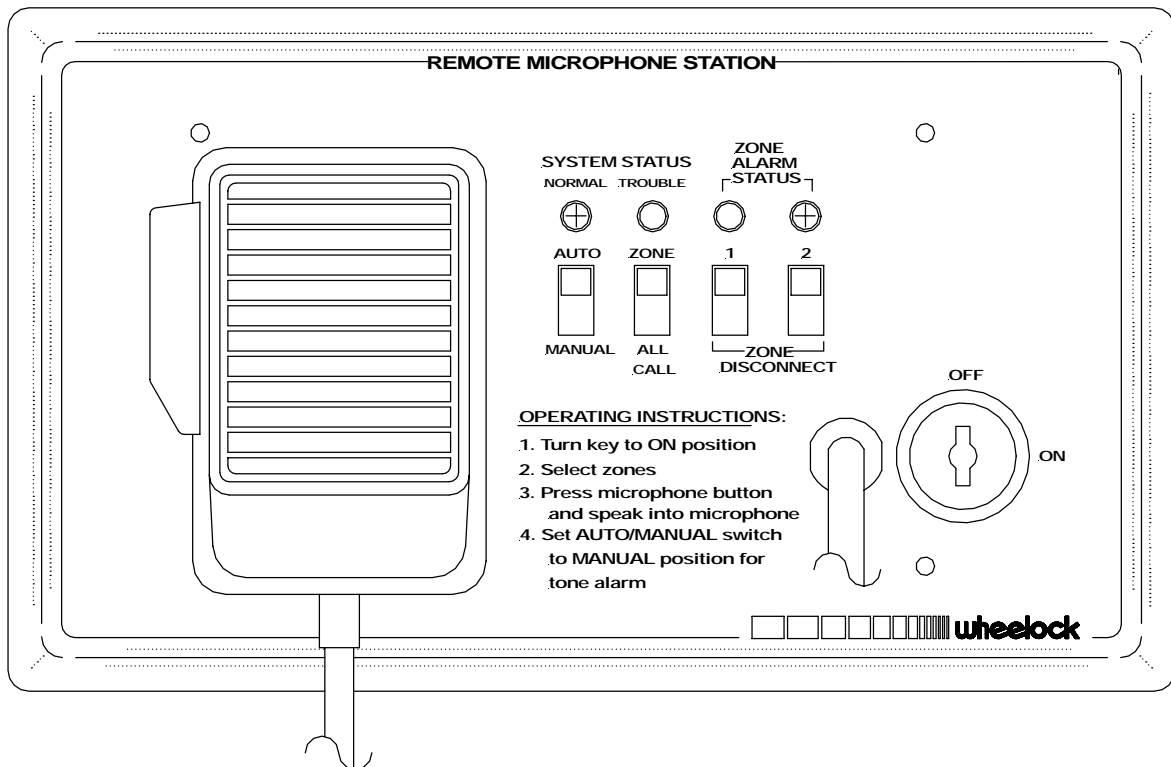


Figure 9-13
Remote Microphone Station (RMS-3)

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Chapter 10 - MEA and Warranty

Recommendations - That the above units be accepted on condition that all uses, configurations, arrangements and functions, locations and installations comply with the New York City Building Code, specifically Subchapter 17 and with the Referenced Standard RS 17-3 through 17-3C including the NFPA as appropriate, the UL Listing, the manufacturer's instructions, the Fire Department Rules and the Electrical Code of the City of New York, and on further condition that:

- (a) The use, installation and application of the **SAFEPATH**[®] Panel shall be restricted exclusively to connection with a BSA/MEA approved compatible Class E, Class J or Class C Fire Command Station.
- (b) The Fire Command Station shall have the capability of overriding any function of the **SAFEPATH**[®] Panel.
- (c) Prior to the installation of any **SAFEPATH**[®] Panel, a specific approval for a specific installation must be obtained from the Fire Department.
- (d) A priority voice message matrix must be submitted to the Fire Department for approval before the installation is performed and shall include the following information:
 - 1. The duration of each message.
 - 2. The content of each message.
 - 3. The duration of the audible and visual alarm signals prior to the initiation of the subsequent prerecorded message transmission.
 - 4. The interval between the cessation of the audible and visual alarm signals and the generation of prerecorded messages.
- (e) The **SAFEPATH**[®] Panel must be located in the room as, and within 20 feet of a BSA/MEA approved Fire Command Station. The wiring between the **SAFEPATH**[®] Panel Control Unit and the Fire Command Station must be enclosed in conduit.
- (f) Power supply wiring to the **SAFEPATH**[®] Panel Control Unit shall be installed in the same conduit containing the input and output wiring.
- (g) When used with central office communicator or transmitter, the installation and operation of the equipment and devices listed herein shall comply with Fire Department Rule #3 - RCNY 17-01, NFPA 71, and shall have the capability of transmitting separate and distinct signals to indicate manual pull station alarm, automatic smoke/heat detection alarm, sprinkler waterflow alarm, supervisory signal indications and trouble indications.
- (h) The connection of security/burglar devices and equipment to that submitted for acceptance for fire alarm usage under this MEA application is prohibited within New York City and such equipment and devices shall be so permanently labeled.

All shipments and deliveries of such equipment shall be provided with a metal tag suitably placed, certifying that the equipment shipped or delivered is equivalent to that tested and accepted for use, as provided for in Section 27-131 of the Building Code.

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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BATTERY BACKUP CALCULATION WORKSHEET

Tables for this worksheet are in Section 3-5 of this manual.

STANDBY CURRENT CALCULATIONS

1. Select and record Standby Current for Model from Table 3-4. _____
2. Select Standby Current for Optional Modules from Table 3-5.
List them in Table 1.

Table 1

Module	Qty	Standby Current	Qty X Standby Current

3. Calculate total Standby Current from Table 1. _____
4. Add Standby Current from Step 1 and Step 3. _____
5. Multiply results of Step 3 by the number of hours of Standby required.
 - 24 Hours - Multiply By 24 _____
 - 60 Hours - Multiply By 60 _____

TOTAL STANDBY CURRENT IN AMP HOURS. _____

ALARM CURRENT CALCULATIONS

NOTE: DO NOT EXCEED THE WATTAGE VALUE OF THE AMPLIFIER.

Good engineering practices call for amplifier to operate at 85% Max wattage.

1. In Table 2 list the speaker and strobe requirements for each amplifier used.

Table 2

	NOTFICATION APPLIANCE	SPEAKER WATTAGE <small>SAA Only</small>	STROBE CURRENT	"SPKR AMP" CURRENT <small>SALL Only</small>
Amplifier 1				
Amplifier 2				

2. Using Table 2, calculate total **STROBE CURRENT** for each .
Amplifier Module _____
3. For SAA Series Amplifier Modules, use Table 2 and calculate
total **SPEAKER WATTAGE** for each Amplifier Module. _____
4. For SALL-15S Module, use Table 2 and calculate total "**SPKR AMP**"
current for each Amplifier Module. _____
5. SAA Series Modules, calculate the Alarm Current of each Amplifier
Module using the total **SPEAKER WATTAGE** from Step 3 and
Table 3-7 in this manual. _____
6. In Table 3, using Table 3-5, list all alarm currents of Modules installed.

Table 3

Module	Qty	Alarm Current	Total Alarm Current
DCSP-PS	1	0.150	0.150
MDX-2	1	0.090	0.090

7. Calculate the **Total Alarm Current** in Table 3. _____
8. Add Steps 2, 4, 5, and 7 together as appropriate. _____

NOTE: THE MAXIMUM CURRENT OUTPUT IN ALARM CONDITION IS 6 AMPS.

9. Divide Step 8 by the appropriate value for Alarm Time in Amp Hours.
 - 5 minutes of Alarm - divide Step 8 by 12 _____
 - 15 minutes of Alarm - divide Step 8 by 4 _____

TOTAL ALARM CURRENT IN AMP HOURS _____

BACKUP BATTERY REQUIREMENT

1. Enter results from **Standby Current** section. _____
 2. Enter results from **Alarm Current** section. _____
 3. Add Steps 1 and 2 together, enter total _____
 4. Multiply Step 3 by 1.25 for Minimum Backup Battery requirement. _____
- Ampere Hours

Appendix E

Compatible Signaling Appliances

The following Wheelock products are LISTED compatible with the audio notification appliance output and the visual notification output circuits of the SAA-40S and SAA-80S Supervised Audio System Amplifiers.

Speakers

ET-1010-R	ET70-R	E70-R
ET-1080-W	ET90-W	E90-W
ET-1090-R		

Strobes

RSS-24MCW	RSS-2415C	RSSP-2415W
RSS-2415W	RSS-2430C	RSSP-241575W
RSS-241575W	RSS-2475C	RSSP-2430W
RSS-2430W	RSS-24100C	RSSP-2475W
RSS-2475W	RSSP-24MCW	RSSP-24110W
RSS-24110W		

Speaker/Strobe Combination

ET-1080-IS-24	ET70-2415W	E70-2415W
ET-1080-LS-24	ET70-241575W	E70-241575W
ET-1080-LSM-24	ET70-2430W	E70-2430W
ET-1080-MS-24	ET70-2475W	E70-2475W
ET-1080-SL-24	ET70-24110W	E70-24110W
ET-1080-SLM-24	ET90-2415C	E90-2415C
ET-1090-IS-24-C	ET90-2430C	E90-2430C
ET-1090-LS-24-C	ET90-2475C	E90-2475C
ET-1090-SL-24-C	ET90-24100C	E90-24100C
ET70-24MCW	E70-24MCW	

The following Wheelock products are LISTED compatible with the trouble audible output.

Bells:

MB-G6-24-R
MB-G10-24-R

The following Wheelock products are LISTED compatible with the audio notification appliance output, the amplified speaker notification appliance power output, and the visual notification appliance output circuits of the SALL-15S Self Amplified Speaker Control/Signal Circuit Module.

Amplified Speakers

SA-70

SA-90

Strobes

RSS-24MCW-FR
RSS-2415W-FW
RSS-241575W-FR
RSS-2430W-FW
RSS-2475W-FR

RSS-24110W-FW
RSS-2415C-FR
RSS-2430C-FW
RSS-2475C-FR
RSS-24100C-FW
RSSP-24MCW-FR

RSSP-2415W-FR
RSSP-241575W-FW
RSSP-2430W-FW
RSSP-2475W-FR
RSSP-24110W-FW

Amplified Speaker/Strobe
Combinations

SA-70S-IS-24
SA-70S-LS-24
SA-70S-LSM-24
SA-70S-MS-24

SA-70S-SL-24
SA-70S-SLM-24
SA-90S-IS-24

SA-90S-LS-24
SA-90S-MS-24
SA-90S-SL-24