About Cooper Notification: Cooper Notification fulfills its mission of Helping People Take Action by providing high quality and advanced products and services for the life safety, communications, and security markets. Cooper Notification has served the needs of commercial, educational, industrial, health care, and government users for more than eighty-five years.

Today the company continues to focus on designing and manufacturing advanced technological products to meet the world’s needs for Emergency Incident Management and Notification, Multi-Function Communications, and Mass Notification.

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# Table of Contents

Chapter 1. **Foreword**  
1.1 Intended Use ........................................................................................................ 1-1  
1.2 Design Change Disclaimer ..................................................................................... 1-1  
1.3 User Operation Assistance .................................................................................... 1-1  
1.4 Typographical Notation Conventions ..................................................................... 1-2

Chapter 2. **Safety Precautions**  
2.1 Read This Manual .................................................................................................. 2-1  
2.2 Operational Safety ................................................................................................ 2-1  
2.2.1 Expected Equipment Lifecycle ...................................................................... 2-2  
2.2.2 Periodic Testing ............................................................................................. 2-2  
2.3 Compliance with Applicable Codes, Regulations, Laws, Standards, and Guidelines 2-3  
2.4 Insurance Recommendation ............................................................................... 2-3  
2.5 Audio Output Considerations .............................................................................. 2-3  
2.6 RF Interference .................................................................................................... 2-4  
2.7 General ................................................................................................................. 2-4

Chapter 3. **Overview**  
3.1 Standard Features ................................................................................................ 3-2  
3.2 Enclosure and Configuration ................................................................................ 3-5  
3.3 Nominal Electrical Data ....................................................................................... 3-5  
3.4 User Interface ........................................................................................................ 3-6  
3.4.1 Basic Operation of User Interface .................................................................. 3-7  
3.5 Additional Drawings ............................................................................................. 3-8  
3.6 User Settings .......................................................................................................... 3-14  
3.6.1 Switch Descriptions ..................................................................................... 3-14  
3.6.2 Jumper Descriptions .................................................................................... 3-17  
3.7.3 LED Descriptions ............................................................................................ 3-18

Chapter 4. **Installation**  
4.1 Introduction .......................................................................................................... 4-1  
4.2 Fire Alarm Control Panel Wiring Applications .................................................... 4-1  
4.3 General Installation Instructions ........................................................................... 4-2  
4.4 Preparing the System Wiring Diagram .................................................................. 4-6  
4.4.1 Unpacking and Taking Inventory .................................................................. 4-6  
4.4.2 Locating the Panel ......................................................................................... 4-6  
4.4.3 Installing Field Wiring Connections ............................................................. 4-9  
4.4.4 Installing Strobe Connections (Can be Used for MNS Strobes Only) .......... 4-10  
4.4.5 Installing Audio Output Connections ......................................................... 4-10  
4.4.6 Installing Auxiliary Circuit Connections ..................................................... 4-11  
4.4.7 Installing Digital Voice Initiating Connections .......................................... 4-11
4.4.8 Installing Alarm and System Trouble Output Connections .......... 4-12
4.4.9 Installing the Safepath Interface (SPIF) Module ......................... 4-13
4.5 Wiring the System............................................................................. 4-16
4.5.1 Wiring Guidelines............................................................................ 4-16
4.5.2 Field Wiring Connections................................................................. 4-16
4.5.3 Preparing a System Wiring Diagram .............................................. 4-16
4.5.4 Visual Notification Appliance Output Wiring ................................. 4-17
4.5.5 Speaker Notification Appliance Output Wiring ............................. 4-17
4.5.6 System Wiring Diagram................................................................. 4-18
4.5.7 Wiring Diagrams for Audio/Visual Notification Appliances .......... 4-18
4.5.8 Wiring the System Trouble Connections ..................................... 4-19
4.6 Performing System Checkout............................................................. 4-20
4.6.1 System Control Settings................................................................. 4-20
4.6.2 Checkout Procedure....................................................................... 4-21
4.7 Ground Fault Detection...................................................................... 4-23
4.8 Battery Care and Backup Battery Calculations.................................. 4-23
4.8.1 Caring for Sealed Lead Acid Batteries ........................................... 4-23
4.8.2 Storing Batteries........................................................................... 4-23
4.8.3 Calculating Backup Battery Requirements.................................... 4-24
4.9 Installing AC Power and Batteries.................................................... 4-25
4.9.1 Installing AC Power....................................................................... 4-25
4.9.2 Installing Batteries......................................................................... 4-26

Chapter 5. Operation

5.1 Introduction....................................................................................... 5-1
5.2 User Interface.................................................................................... 5-1
5.3 Supervision....................................................................................... 5-1
5.3.1 Visual Notification Appliance Output Circuit Supervision ............ 5-2
5.3.2 Audio Notification Appliance Output Circuit Supervision ........... 5-2
5.3.3 Amplifier Supervision.................................................................... 5-2
5.3.4 Ground Fault Supervision.............................................................. 5-2
5.4 Actions that Initiate Audio Alarms.................................................... 5-3

Chapter 6. Operational Procedures

6.1 Making Live Announcements............................................................ 6-1
6.2 Recording Digital Voice Messages.................................................... 6-1
6.3 Recording Messages on the Digital Voice Section............................ 6-2
6.4 Verifying Messages........................................................................... 6-3
6.5 Fire Alarm Activation........................................................................ 6-4
6.6 MNS Activation................................................................................ 6-4
6.7 MNS Activation Following Fire Activation....................................... 6-4
6.8 MNS Reset....................................................................................... 6-4

Chapter 7. Periodic Testing and Maintenance

7.1 Introduction....................................................................................... 7-1
7.2 Periodic Testing................................................................................ 7-1
7.2.1 Test Frequency............................................................................. 7-1
7.2.2 Equipment ...................................................................................................... 7-1
7.3 Faulty Equipment ....................................................................................................... 7-1
7.4 Qualified Personnel .................................................................................................... 7-1

Chapter 8. Troubleshooting 8-1
8.1 Introduction ................................................................................................................ 8-1
8.2 General ....................................................................................................................... 8-2
8.2.1 Procedure A ................................................................................................... 8-5
8.2.2 Procedure B ...................................................................................................... 8-5
8.2.3 Procedure C ...................................................................................................... 8-6
8.2.4 Procedure D ...................................................................................................... 8-6
8.2.5 Procedure E ...................................................................................................... 8-7
8.2.6 Procedure F ...................................................................................................... 8-7
8.2.7 Procedure G ...................................................................................................... 8-7
8.2.8 Procedure H ...................................................................................................... 8-8
8.2.9 Procedure I ...................................................................................................... 8-8
8.2.10 Procedure J................................................................................................... 8-9
8.2.11 Procedure K ................................................................................................. 8-9
8.2.12 Procedure L................................................................................................... 8-9
8.2.13 Procedure M................................................................................................... 8-10
8.2.14 Procedure N................................................................................................... 8-10
8.2.15 Procedure O................................................................................................... 8-10
8.2.16 Procedure P................................................................................................... 8-10
8.2.17 Procedure Q................................................................................................... 8-11
8.2.18 Procedure R................................................................................................... 8-11
8.2.19 Procedure S................................................................................................... 8-12
8.2.20 Procedure T................................................................................................... 8-12

Chapter 9. Technical Data 9-1
9.1 Mechanical ................................................................................................................. 9-1
9.2 Environmental .............................................................................................................. 9-1
9.3 Electrical ...................................................................................................................... 9-2
9.3.1 Input .................................................................................................................. 9-2
9.3.2 Battery Current Calculations.............................................................................. 9-2
9.3.3 Activation ............................................................................................................ 9-2
9.3.4 Outputs .............................................................................................................. 9-3
9.4 Wiring Connections ................................................................................................... 9-3
9.4.1 End of Line Resistor (EOLR) ........................................................................... 9-3

Chapter 10. Warranty 10-1
Chapter 11. Battery Backup Calculation Worksheet 11-1
Appendix E 11-2
Compatible Signaling Appliances .................................................................................. 11-2
### List of Figures

| Figure 3-1 | Basic Capabilities of the SPMNS Panel | 3-4 |
| Figure 3-2 | Layout of SPMNS Panel | 3-5 |
| Figure 3-3 | SPMNS User Interface | 3-6 |
| Figure 3-4 | SPMNS Terminal Blocks | 3-8 |
| Figure 3-5 | SPMNS Jumpers | 3-9 |
| Figure 3-6 | SPMNS Switches | 3-10 |
| Figure 3-7 | Diagnostic LEDs/Fuses | 3-11 |
| Figure 3-8 | SPMNS Potentiometers | 3-12 |
| Figure 4-1 | Location of Field Wiring Connections | 4-2 |
| Figure 4-2 | SPMNS Panel Mounting and Grounding/Conduit Location | 4-7 |
| Figure 4-3 | Removable Terminal Block | 4-9 |
| Figure 4-4 | Strobe Connections | 4-10 |
| Figure 4-5 | Audio Output Connections | 4-11 |
| Figure 4-6 | Digital Voice Initiating Connections | 4-11 |
| Figure 4-7 | SPIF Module | 4-13 |
| Figure 4-8 | System Wiring Diagram | 4-18 |
| Figure 4-9 | Wiring Diagram for Visual Only Notification Appliances | 4-18 |
| Figure 4-10 | Wiring Diagram for Combination Audio/Visual Notification Appliances | 4-19 |
| Figure 4-11 | Wiring Diagram for Audio Only Notification Appliance Output | 4-19 |
| Figure 4-12 | System Trouble Connections (Trouble Status Relay Contact) | 4-20 |
| Figure 4-13 | 120VAC Input Connection | 4-25 |
| Figure 4-14 | Battery Wire Connections | 4-26 |
| Figure 4-15 | Battery Alignment and Jumper Connection | 4-27 |
| Figure 6-1 | SPMNS User Interface | 6-3 |
| Figure 8-1 | Trouble LED and Fuse Locations | 8-4 |
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List of Tables

Table 3-1  SPMNS User Interface Pushbuttons/Indicators .......................................................... 3-6
Table 4-1  Terminal Block Connection Definitions ................................................................. 4-3
Table 4-2  Derating of SPMNS 24VDC Output Based on SPIV 12VDC Loading .................... 4-16
Table 4-3  Description of all SPIF Inputs and Outputs ............................................................ 4-17
Table 4-4  Digital Voice Message Tests ..................................................................................... 4-23
Table 5-1  Audio Alarm Conditions and Results ..................................................................... 5-3
Table 8-1  Trouble LED Procedure Cross Reference .............................................................. 8-3
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1. Foreword

1.1 Intended Use

This manual is designed to serve the installers and operators of the SPMNS Mass Notification System. All operating instructions, product illustrations, troubleshooting/error messages, and other relevant information are contained in this manual. It is the user’s responsibility to ensure that all instructions in this manual are applied strictly.

1.2 Design Change Disclaimer

Due to design changes and product improvements, information in this manual is subject to change without notice. Cooper Notification reserves the right to change product design, including illustrations and diagrams, at any time without notice to anyone, which may subsequently affect the contents of this manual.

Cooper Notification assumes no responsibility for any errors that may appear in this manual. Cooper Notification will make every reasonable effort to ensure that this manual is up to date and corresponds with the shipped Cooper Notification SPMNS Mass Notification System.

1.3 User Operation Assistance

Should you experience any difficulty in installing or operating your SPMNS Mass Notification System, please contact your Cooper Notification representative. The Troubleshooting chapter in this manual (Chapter 8) includes a list of common system problems, possible causes, and corrective operator actions. The information given here is general. Feel free to contact the Technical Support department of Cooper Notification at 1-800-631-2148. Hours are 8:00 a.m. - 7:00 p.m. (Eastern Time), Monday through Thursday and 8:00 a.m. – 5:00 p.m. (Eastern Time) on Friday.
1.4 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 Cooper Notification 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 Cooper Notification will not have any liability for such use.


WARNINGS

⚠️ WARNING: A Warning indicates a potentially hazardous situation that, if not avoided, could result in serious personal injury or death to you or others. Warnings are set off in boldface type, within boxed rules, indented, and referenced to a warning symbol.

CAUTIONS

🚫 CAUTIONS: Indicate a situation in which the equipment could be damaged or a situation in which not following the instructions correctly could result in the equipment not working properly. Cautions are set off with a stop sign symbol.
2. Safety Precautions

2.1 Read This Manual

1. Cooper Notification recommends that, before performing any actions to specify, apply, install, maintain, and operationally test the SPMNS Mass Notification System, personnel properly qualified in the application and use of life safety equipment read this manual carefully.

2. Keep this manual with the SPMNS Mass Notification System for reference during the life of the product. Make this manual available to all qualified personnel who operate, test, maintain, or service the SPMNS Mass Notification System. It is strongly recommended that such personnel read and understand the entire manual.

2.2 Operational Safety

⚠️ WARNING: If safety precautions, installation, and testing instructions are not performed properly, the SPMNS Mass Notification Systems may not operate in an emergency situation, which could result in 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 requires immediate attention.

⚠️ CAUTION: A SPMNS Mass Notification System printed circuit board is sensitive to static electricity and has delicate components mounted on it. (a) Before handling the board or any component on it, discharge any static electricity from your body by touching a grounded object, such as a metal screw, which is connected to earth ground. (b) Handle the board by its edges and be careful not to twist or flex it. Install the SPMNS Mass Notification System in a static-free area. (c) Attach grounded wrist straps properly before touching any static sensitive areas. (d) After handling a SPMNS Mass Notification System printed circuit board, test the panel as described in Section 4.6 to verify that it is functioning properly.

**NOTE:** In areas prone to lighting strikes, using a surge protection device is recommended. Reference TESAN number S002-99 for recommended manufacturers of surge protection equipment.

This TESAN (Technical Engineering Support Application Notice) is available from the Cooper Notification website (www.coopernotification.com) and is found under the Technical Support tab.
NOTE: This SPMNS Mass Notification System will not work without power. The SPMNS Mass Notification System is powered by 120VAC. 24VDC re-chargeable batteries provide backup power, should be purchased separately. If both sources of power are cut off for any reason, the SPMNS Mass Notification System will not operate.

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

CAUTION: DO NOT operate the SPMNS Mass Notification System without the dead front panel being properly in place.

2.2.1 Expected Equipment Lifecycle

Notification equipment cannot last forever. Even though the SPMNS Mass Notification System is expected to last up to ten years, any of its parts or components could fail before then.

2.2.2 Periodic Testing

1. Cooper Notification recommends testing of the entire protective signaling system, including the SPMNS Mass Notification System, all notification equipment, as well as all messages and their output channel, and priority assignment, at least twice each year, or more often as required by local, state and federal codes, regulations and laws, by qualified personnel.

2. If the notification equipment is not working properly, immediately contact the installer and have all/any problems corrected immediately.

3. Replace any malfunctioning components immediately; do not attempt to repair malfunctioning components. Return malfunctioning components for factory repair or replacement. In the event you cannot contact the installer, contact the manufacturer.

⚠️ WARNING: For proper operation in life safety applications, perform the following: (a) Connect the SPMNS Mass Notification System to a listed compatible and properly operating control panel, which controls its activation. (b) Ensure that all equipment is properly interconnected and operating. (c) Make sure the installer checks the compatibility of all equipment prior to installation; otherwise, the SPMNS Mass Notification System and/or the control panel may be damaged and/or fail to operate in an emergency situation.

⚠️ WARNING: Certain hardware functions on the SPMNS Mass Notification System are not supervised. If any such hardware functions fail, the SPMNS Mass Notification System may not provide the intended warning and/or not indicate a trouble condition.
2.3 Compliance with Applicable Codes, Regulations, Laws, Standards, and Guidelines

Comply with all of the latest applicable codes, regulations, laws, standards, and guidelines.

⚠️ WARNING: Ensure that for emergency, life safety applications using the SPMNS Mass Notification System, installation, testing and maintenance always 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 Authority Having Jurisdiction (AHJ) inspect and approve the proposed placement of all the notification appliances.

2.4 Insurance Recommendation

The SPMNS Mass Notification System is not a substitute for insurance. Make sure that you have adequate levels of life and property insurance.

2.5 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, increase the number and/or sound output intensity of speakers within those areas so that they are heard and understood clearly when activated.

2.6 RF Interference

The SPMNS Mass Notification System 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 is required to correct the interference at his own expense.

2.7 General

Each manufacturer's 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:

Cooper Notification
273 Branchport Ave.
Long Branch, N.J. 07740
Tel: (800) 631-2148
Fax: (732) 222-2588
E-mail: info@coopernotification.com
3. Overview

The SPMNS Mass Notification System is capable of supplying the following:

- 40 Watts of audio power
- 2 Amps of strobe power
- There is an additional 0.5 Amps of auxiliary power at 28 Volts that can be used to power other Safepath Products.

The SPMNS Mass Notification System is used for Alarm Announcements.
### 3.1 Standard Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
</table>
| One strobe NAC output section | - 24VDC @ 2 Amps Maximum.  
- Requires separate NAC Circuit (8 to 33VDC) input or can be programmed to operate when Digital Voice messages are played.  
- Auxiliary (AUX) input is active  
- Mass Notification Digital Voice message are played.  
- Return allows pass-through for Cooper Notification synchronized strobes, remote SPMNS panels, additional strobe appliances, or EOLR.  
- Synchronized output when using Cooper Notification’s synchronized strobe products.  
- Supervised with 10K Ohm end-of-line resistor (EOLR).  
- Trouble LEDs for Open and Short conditions.  
- Power limited to minimize overload condition. |
| 40-Watt Audio Amplifier section | - Selection of 25Vor 70V speaker output.  
- Supervised with 10K Ohm EOLR.  
- Trouble LEDs for Open and Short Conditions  
- Power limited to avoid overload condition. |
| Digital Voice Section | - Capable of playback and record (via 1/8” audio jack).  
- Digital Voice Message Chip contains the recording program and memory for eight message sections.  
- Memory in eight sections with corresponding inputs.  
  - A total of four minutes of messages.  
  - Each message is 30 seconds in duration.  
  - Messages can be combined for longer durations.  
- Activated by one of eight contact closure inputs (IN1 – IN8) or manual activation on user interface.  
- Each CC input (contact closure) can be supervised for an OPEN.  
- Preamplifier tone can be chosen for each Fire message only (code 3, continuous, or no pre-tone).  
- Messages can be selected to have a post-tone that matches the pre-tone. |
### Feature Description

#### Alarm Audio Processing Section
- Three Priority ordered audio inputs
- Auxiliary Input for MNS microphone (AUX IN, CC/NAC), Priority 1.
  - CC or NAC initiates AUX IN audio
  - CC is supervised. NAC is not supervised.
  - For use with SAFEPATH – Mass Notification Microphone (SPMNS-MIC)
- On board Hand-held, push-to-talk (PTT) microphone, priority 7.
  - For live, fire emergency voice announcements and instructions. The microphone overrides (mutes) only fire voice message or tones in progress (IN6, IN7, and IN8).
- Digital Voice Section inputs (IN1, IN2, IN3, IN4, IN5, IN6, IN7, IN8).
  - IN1, IN2, IN3, IN4, IN5, IN6, IN7, IN8 have priorities 2, 3, 4, 5, 6, 8, 9, and 10 respectively.
  - IN1 – IN8 are initiated via Contact Closure.
  - IN1, IN2, IN3, IN4, IN5, IN6, IN7, IN8 are supervised for an OPEN.
  - Messages can also be initiated via user interface.

#### Ground Fault Detection Section
- Monitors inputs and outputs for 40K Ohms minimum in relation to ground.
- A Dual-Tone Tone Generator with two field selectable sounds (Code 3 Tone, Slow Whoop) that sound when there is a Digital Voice Section Failure in alarm condition.
- Provides Code 3 tone or Slow Whoop (user selectable) in the instance of a Digital Voice failure or system timeout.

#### Full supervision with on-board diagnostics and trouble reporting circuits for:
- Audio NAC circuit wiring -- open and short conditions during standby AND active (Alarm and BGM) Ground Fault detection
- Strobe NAC circuit wiring -- open and short conditions
- PTT Microphone -- not installed or damaged
- Amplifier -- operation
- Digital Voice Section
- Input voltage/low battery
- Tone generator operation

#### Form C relay trouble contacts for external notification.
- Form C contact normally energized. Contacts transfer during a trouble, an alarm trouble, or an AC trouble: 2.0 amps at 24VDC max, resistive load. Non-Supervised.

#### Built-in Sounder
- To indicate trouble, with a trouble silence switch to silence it. If the trouble is not corrected in 20 hours, the sounder reacts. (Trouble Silence Switch does not change the state of the Form C Trouble relay.)

#### Remote reporting via output contacts for system trouble, alarm activation, and AC trouble.
- AC trouble can be configured for report separately or as a system trouble.
Figure 3-1 Basic Capabilities of the SPMNS Panel
3.2 Enclosure and Configuration

For technical specifications, see Chapter 9.

3.3 Nominal Electrical Data

For technical specifications, see Chapter 9.

Figure 3-2 Layout of SPMNS Panel
3.4 User Interface

- The User Interface of the SPMNS Mass Notification System displays the basic status of the unit as well as allowing for a limited amount of user controls. Table 3-1 identifies the pushbuttons and indicators.

![Figure 3-3 SPMNS User Interface](image)

#### Table 3-1  SPMNS User Interface Pushbuttons/Indicators

<table>
<thead>
<tr>
<th>Pushbutton or Indicator</th>
<th>Description/Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message 1 - 8 (there are 8 messages, 1 through 8)</td>
<td>Button manually actives Messages 1-8. Illuminated steady means contact closure is on a DV input. Illuminated blinking means DV is activated via button push.</td>
</tr>
<tr>
<td>POWER ON indicator</td>
<td>If illuminated, indicates SPMNS is powered by primary or secondary power.</td>
</tr>
<tr>
<td>SYSTEM TROUBLE indicator</td>
<td>If illuminated, indicates the SPMNS has a trouble.</td>
</tr>
<tr>
<td>AC TROUBLE indicator</td>
<td>If illuminated, indicates primary power is low or has failed and SPMNS is running on secondary power.</td>
</tr>
</tbody>
</table>
### Chapter 3: Overview

<table>
<thead>
<tr>
<th>Indicator/Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRE ACTIVE indicator</td>
<td>Indicates PTT MIC (push to talk microphone) or Fire DV (digital voice) has been initiated.</td>
</tr>
<tr>
<td>MNS ACTIVE indicator</td>
<td>Indicates AUX (auxiliary) or MNS DV has been initiated.</td>
</tr>
<tr>
<td>TROUBLE SILENCE/MNS RESET button</td>
<td>Temporarily silences the audible trouble indicator and resets the MNS mode when held for 4 seconds.</td>
</tr>
<tr>
<td>RECORD button and indicator</td>
<td>For message recording process, see Section 6.3.</td>
</tr>
</tbody>
</table>

#### 3.4.1 Basic Operation of User Interface

When a Message button is pressed, the user interface microcontroller processes the signal and outputs it to the Digital Voice microcontroller which plays the corresponding message. The user interface illuminates the corresponding message LED when a button is pressed or a message activation contact closure is received. The LED blinks if the activation was a button press and the LED remains ON constantly when a contact closure is present. If a button is pressed, the message LED remains blinking and the message remains active until the button is pressed again.
3.5 Additional Drawings

Figure 3-4 SPMNS Terminal Blocks
Figure 3-5 SPMNS Jumpers
NOTE: Do not change the default settings on SW3. Changing the default settings will violate the UL listing.

Figure 3-6 SPMNS Switches
Figure 3-7 Diagnostic LEDs/Fuses
Figure 3-8 SPMNS Potentiometers
Figure 3-9  Grounding Screws and Grounding Standoff Locations

These 8 parts must be installed and securely fastened.
### 3.6 User Settings

#### 3.6.1 Switch Descriptions

<table>
<thead>
<tr>
<th>PIN</th>
<th>FUNCTION</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ext. AC Loss Sup.</td>
<td>10k EOLR supervision On for SPB SUP Contacts</td>
</tr>
<tr>
<td>2</td>
<td>AC Loss Delay</td>
<td>170 minute AC Loss Delay (For Off Premise AC Loss Reporting)</td>
</tr>
<tr>
<td>3</td>
<td>Ext AC TRB Mode</td>
<td>Audio Booster AC Trouble Reported To SPMNS Separately</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PIN</th>
<th>FUNCTION</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DV1 Strobe</td>
<td>STB on when DV1 active</td>
</tr>
<tr>
<td>2</td>
<td>DV2 Strobe</td>
<td>STB on when DV2 active</td>
</tr>
<tr>
<td>3</td>
<td>DV3 Strobe</td>
<td>STB on when DV3 active</td>
</tr>
<tr>
<td>4</td>
<td>DV4 Strobe</td>
<td>STB on when DV4 active</td>
</tr>
<tr>
<td>5</td>
<td>DV5 Strobe</td>
<td>STB on when DV5 active</td>
</tr>
<tr>
<td>6</td>
<td>DV6 Strobe</td>
<td>STB on when DV6 active (OFF)</td>
</tr>
<tr>
<td>7</td>
<td>DV7 Strobe</td>
<td>STB on when DV7 active (OFF)</td>
</tr>
<tr>
<td>8</td>
<td>DV8 Strobe</td>
<td>STB on when DV8 active (OFF)</td>
</tr>
<tr>
<td>9</td>
<td>MIC Strobe</td>
<td>STB on when MIC active (OFF)</td>
</tr>
<tr>
<td>10</td>
<td>AUX Strobe</td>
<td>STB on when AUX active</td>
</tr>
</tbody>
</table>

**NOTE:** Do not change the default settings on SW3. Changing the default settings will violate the UL listing.
### SW4 (Tone Types)

<table>
<thead>
<tr>
<th>PIN</th>
<th>FUNCTION</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tone Type - DV1</td>
<td>Code 3 (OFF = continuous)</td>
</tr>
<tr>
<td>2</td>
<td>Tone Type - DV2</td>
<td>Code 3 (OFF = continuous)</td>
</tr>
<tr>
<td>3</td>
<td>Tone Type - DV3</td>
<td>Code 3 (OFF = continuous)</td>
</tr>
<tr>
<td>4</td>
<td>Tone Type - DV4</td>
<td>Code 3 (OFF = continuous)</td>
</tr>
<tr>
<td>5</td>
<td>Tone Type - DV5</td>
<td>Code 3 (OFF = continuous)</td>
</tr>
<tr>
<td>6</td>
<td>Tone Type - DV6</td>
<td>Code 3 (OFF = continuous)</td>
</tr>
<tr>
<td>7</td>
<td>Tone Type - DV7</td>
<td>Code 3 (OFF = continuous)</td>
</tr>
<tr>
<td>8</td>
<td>Tone Type - DV8</td>
<td>Code 3 (OFF = continuous)</td>
</tr>
<tr>
<td>9</td>
<td>Backup tone</td>
<td>Code 3 (OFF = slow whoop)</td>
</tr>
<tr>
<td>10</td>
<td>unused</td>
<td>--</td>
</tr>
</tbody>
</table>

### SW5 (Pre-tone/Post-tone Enable)

<table>
<thead>
<tr>
<th>PIN</th>
<th>FUNCTION</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre-tone - DV1</td>
<td>Pre-tone ON for Message 1 (OFF)</td>
</tr>
<tr>
<td>2</td>
<td>Pre-tone - DV2</td>
<td>Pre-tone ON for Message 2 (OFF)</td>
</tr>
<tr>
<td>3</td>
<td>Pre-tone - DV3</td>
<td>Pre-tone ON for Message 3 (OFF)</td>
</tr>
<tr>
<td>4</td>
<td>Pre-tone - DV4</td>
<td>Pre-tone ON for Message 4 (OFF)</td>
</tr>
<tr>
<td>5</td>
<td>Pre-tone - DV5</td>
<td>Pre-tone ON for Message 5 (OFF)</td>
</tr>
<tr>
<td>6</td>
<td>Pre-tone - DV6</td>
<td>Pre-tone ON for Message 6</td>
</tr>
<tr>
<td>7</td>
<td>Pre-tone - DV7</td>
<td>Pre-tone ON for Message 7</td>
</tr>
<tr>
<td>8</td>
<td>Pre-tone - DV8</td>
<td>Pre-tone ON for Message 8</td>
</tr>
<tr>
<td>9</td>
<td>Post-tone - All</td>
<td>Post-tones enabled (Post-tone Matches Pre-tone)</td>
</tr>
<tr>
<td>10</td>
<td>Message Repeat</td>
<td>ON = Message plays a minimum of 3 times  (\text{OFF} = \text{Message plays a minimum of 1 time})*</td>
</tr>
</tbody>
</table>

**NOTE:** Do not change the default settings on SW5 – positions 1 through 5. Changing the default settings will violate the UL listing.

*NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTIONS AND OTHER INVOLVED PARTIES:* In order for this product to comply with the requirements in the Standard for Control Units and Accessories for
Fire Alarm Systems, UL 864, Position 10 of SW5 must be kept in the ON position. UL 864, 9th Edition, section 34.2.1.1 requires the alert tone/prerecorded message combination shall be repeated a minimum of 3 times.

<table>
<thead>
<tr>
<th>SETTING</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC</td>
<td>Contact Closure Mode for use with RMX or SPRM</td>
</tr>
<tr>
<td>NAC</td>
<td>8 to 33VDC NAC Input</td>
</tr>
</tbody>
</table>

**NOTE:** Do not change the default settings on SW7. Changing the default settings will violate the UL listing.

<table>
<thead>
<tr>
<th>PIN</th>
<th>FUNCTION</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DV MES 1 CC Supervision</td>
<td>10k EOLR supervision ON for IN1</td>
</tr>
<tr>
<td>2</td>
<td>DV MES 2 CC Supervision</td>
<td>10k EOLR supervision ON for IN2</td>
</tr>
<tr>
<td>3</td>
<td>DV MES 3 CC Supervision</td>
<td>10k EOLR supervision ON for IN3</td>
</tr>
<tr>
<td>4</td>
<td>DV MES 4 CC Supervision</td>
<td>10k EOLR supervision ON for IN4</td>
</tr>
<tr>
<td>5</td>
<td>DV MES 5 CC Supervision</td>
<td>10k EOLR supervision ON for IN5</td>
</tr>
<tr>
<td>6</td>
<td>DV MES 6 CC Supervision</td>
<td>10k EOLR supervision ON for IN6</td>
</tr>
<tr>
<td>7</td>
<td>DV MES 7 CC Supervision</td>
<td>10k EOLR supervision ON for IN7</td>
</tr>
<tr>
<td>8</td>
<td>DV MES 8 CC Supervision</td>
<td>10k EOLR supervision ON for IN8</td>
</tr>
<tr>
<td>9</td>
<td>AUX Input Timeout</td>
<td>Timeout active (OFF)</td>
</tr>
<tr>
<td>10</td>
<td>unused</td>
<td>--</td>
</tr>
</tbody>
</table>
### 3.6.2 Jumper Descriptions

<table>
<thead>
<tr>
<th>Jumper</th>
<th>Description</th>
<th>Additional</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1</td>
<td>Audio Output Level Select (25/70/100V)</td>
<td></td>
</tr>
<tr>
<td>J4</td>
<td>AUX IN Select (1/25/70/100 V)</td>
<td></td>
</tr>
<tr>
<td>J5</td>
<td>FACP Interface (for future use)</td>
<td></td>
</tr>
<tr>
<td>J6</td>
<td>User Display Interface Connection</td>
<td>Trouble occurs if Interface is not connected</td>
</tr>
<tr>
<td>JP2</td>
<td>NOT USED</td>
<td>NOT USED</td>
</tr>
<tr>
<td>JP3</td>
<td>2-Wire / 4-Wire Mode</td>
<td>Removed = 4-Wire Mode</td>
</tr>
<tr>
<td>JP4</td>
<td>Contact Closure Supervision (AUX SUP)</td>
<td>REMOVED = CC input supervision active</td>
</tr>
<tr>
<td>JP5</td>
<td>DV Record</td>
<td>REMOVED = DV Record can be activated</td>
</tr>
<tr>
<td>JP6</td>
<td>NOT USED</td>
<td>NOT USED</td>
</tr>
</tbody>
</table>
### 3.7.3 LED Descriptions

<table>
<thead>
<tr>
<th>Head</th>
<th>Description</th>
<th>Additional</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>Audio Output Open</td>
<td>ON = Audio Output is open or missing EOLR</td>
</tr>
<tr>
<td>D2</td>
<td>Audio Output Short</td>
<td>ON = Audio Output is shorted</td>
</tr>
<tr>
<td>D3</td>
<td>DV, Digital Voice Section</td>
<td>ON = DV Audio is low or DV is damaged</td>
</tr>
<tr>
<td>D4</td>
<td>MIC, PTT MIC Missing or inoperable</td>
<td>ON = MIC missing or inoperable; Blinking = MIC preamp trouble</td>
</tr>
<tr>
<td>D5</td>
<td>AMP, Amplifier Section Trouble</td>
<td>ON = Amplifier trouble or audio current limiting; Blinking = AUX preamp trouble</td>
</tr>
<tr>
<td>D6</td>
<td>External AC Wiring trouble</td>
<td>ON = SPB SUP missing EOLR</td>
</tr>
<tr>
<td>D8</td>
<td>Battery Trouble</td>
<td>ON = BATT missing or low</td>
</tr>
<tr>
<td>D29</td>
<td>Audio Peak/Overload</td>
<td>ON = Audio level is too high</td>
</tr>
<tr>
<td>D44</td>
<td>AUX IN Trouble</td>
<td>ON = CC Open, or MNS- MIC Trouble</td>
</tr>
<tr>
<td>D47</td>
<td>User Interface trouble</td>
<td>User Interface is improperly connected</td>
</tr>
<tr>
<td>D55</td>
<td>DV1 – IN1 OPEN</td>
<td>ON = IN1 open or missing EOLR</td>
</tr>
<tr>
<td>D58</td>
<td>DV3 – IN3 OPEN</td>
<td>ON = IN3 open or missing EOLR</td>
</tr>
<tr>
<td>D62</td>
<td>DV2 – IN2 OPEN</td>
<td>ON = IN2 open or missing EOLR</td>
</tr>
<tr>
<td>D65</td>
<td>DV4 – IN4 OPEN</td>
<td>ON = IN4 open or missing EOLR</td>
</tr>
<tr>
<td>D67</td>
<td>GF, Ground Fault Trouble</td>
<td></td>
</tr>
<tr>
<td>D75</td>
<td>DV5 – IN5 OPEN</td>
<td>ON = IN5 open or missing EOLR</td>
</tr>
<tr>
<td>D78</td>
<td>DV7 – IN7 OPEN</td>
<td>ON = IN7 open or missing EOLR</td>
</tr>
<tr>
<td>D84</td>
<td>DV6 – IN6 OPEN</td>
<td>ON = IN6 open or missing EOLR</td>
</tr>
<tr>
<td>D87</td>
<td>DV8 – IN8 OPEN</td>
<td>ON = IN8 open or missing EOLR</td>
</tr>
<tr>
<td>D93</td>
<td>Battery Charger Trouble</td>
<td>ON = Battery charger circuit in trouble</td>
</tr>
<tr>
<td>D96</td>
<td>Strobe Short</td>
<td>ON = Short on strobe out</td>
</tr>
<tr>
<td>D97</td>
<td>Strobe Open</td>
<td>ON = Strobe out open or missing EOLR</td>
</tr>
<tr>
<td>D100</td>
<td>(Green) Power</td>
<td>ON = AC and or BAT Power is present</td>
</tr>
<tr>
<td>D109</td>
<td>(Green) AC Power</td>
<td>ON = AC Power is present</td>
</tr>
</tbody>
</table>
4. Installation

4.1 Introduction

Remember, the lives of people depend upon the safe and proper installation of the voice evacuation system and the SPMNS Mass Notification System. Please read, understand, and follow the specific installation instructions set forth in this chapter carefully to avoid damage to the panel and equipment connected to it. Ensure that only qualified personnel in accordance with the procedures in this manual conduct the 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 SPMNS printed circuit board is sensitive to static electricity and has delicate components mounted on it. Before handling the board or any component on it, discharge any static electricity from your body by touching a grounded object such as a metal screw, which is connected to earth ground. Install the panel in a static-free area; properly attach grounded wrist straps before touching any static-sensitive areas.

- If you or the installer have any questions about the installation, consult with the authorities having jurisdiction (AHJ), prior to installation.

4.2 Fire Alarm Control Panel Wiring Applications

The SPMNS Digital Voice Section inputs require Contact Closures to initiate. The Fire Alarm Control Panel (FACP) supplies these dry Contact Closures.

The SPMNS strobe input requires 8-33VDC to initiate. The FACP NAC Circuit of 12VDC or 24VDC initiates this circuit.

The SPMNS cannot be connected to an FACP that is also doing suppression.

The SPMNS must be located adjacent to the FACP.

The SPMNS must be used with an addressable FACP.

Notification Appliances are not permitted to be connected to the FACP. They are to be controlled by a PS-6/8. Refer to wiring diagram in Figure 4-8.

TROUBLE Form C relay terminals and an internal sounder are available for monitoring the condition of the SPMNS Mass Notification System.
4.3 General Installation Instructions

For a view of the location of wiring connections used in the installation of the SPMNS Mass Notification System, refer to Figure 4-1. Table 4-1 explains the functions of the different wiring connections.
### Table 4-1 Terminal Block Connection Definitions

<table>
<thead>
<tr>
<th>Terminal Block</th>
<th>Symbol</th>
<th>Alarm Connections</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alarm Connections</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TB1 Terminal Block 1 Section 1</td>
<td>ALM</td>
<td>Alarm connections</td>
<td>Alarm Form C relay changes state in Audio Alarm Conditions. These conditions are: Push-to-talk Button on MIC depressed, and IN6- IN8 inputs present. Contacts are rated at 24VDC, 2A. Resistive load.</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>Normally open</td>
<td>Alarm Relay contact open to Common (COM) in non-alarm condition.</td>
</tr>
<tr>
<td></td>
<td>NC</td>
<td>Normally closed</td>
<td>Alarm Relay contact closed to Common (COM) in non-alarm condition.</td>
</tr>
<tr>
<td></td>
<td>COM</td>
<td>Common</td>
<td>Alarm Relay Common (COM).</td>
</tr>
<tr>
<td><strong>System Trouble Connections</strong></td>
<td>TB2 Terminal Block 2 Section 2</td>
<td>TRB</td>
<td>System Trouble connections</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>Normally open</td>
<td>Trouble Relay contact open to Common (COM) when a system trouble is NOT present.</td>
</tr>
<tr>
<td></td>
<td>NC</td>
<td>Normally closed</td>
<td>Trouble Relay contact closed to Common (COM) when a system trouble is NOT present.</td>
</tr>
<tr>
<td></td>
<td>COM</td>
<td>Common</td>
<td>Trouble Relay Common (COM).</td>
</tr>
<tr>
<td><strong>AC Trouble Connections</strong></td>
<td>TB3 Terminal Block 3 Section 3</td>
<td>AC TRB</td>
<td>AC Trouble connections</td>
</tr>
<tr>
<td></td>
<td>NO</td>
<td>Normally open</td>
<td>AC Trouble Relay contact open to common (COM) when primary power is sufficient.</td>
</tr>
<tr>
<td></td>
<td>NC</td>
<td>Normally closed</td>
<td>AC Trouble Relay contact closed to common (COM) when primary power is sufficient.</td>
</tr>
<tr>
<td></td>
<td>COM</td>
<td>Common</td>
<td>AC Trouble common (COM).</td>
</tr>
</tbody>
</table>
### Terminal Block Symbol Alarm Connections Definitions

#### Audio Output Connections

<table>
<thead>
<tr>
<th>Block</th>
<th>Symbol</th>
<th>Alarm Connections</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB4</td>
<td>AUD OUT</td>
<td>Audio Output</td>
<td>Audio Output for 25V or 70V speakers. Supervised using UL Listed 10K Ohm, ½ W EOLR. Power Limited.</td>
</tr>
<tr>
<td></td>
<td>24V OUT</td>
<td>24 VDC, 0.5A Output</td>
<td>24 VDC, 0.5A Continuous Output Connection, Power Limited auxiliary power source. NOTE: Two 24V outputs combine for 0.5A.</td>
</tr>
<tr>
<td></td>
<td>SPB SUP</td>
<td>SAFEBAPTH4 Booster Supervision</td>
<td>Contact Closure indicates a primary power loss on the audio booster. Input is supervised using 10k Ohm EOLR. Used only when AC loss is reported separately from system trouble. <strong>Active only when SW2 Position 3 is ON.</strong></td>
</tr>
</tbody>
</table>

#### Night Ringer, Telephone Page, Background Connections

<table>
<thead>
<tr>
<th>Block</th>
<th>Symbol</th>
<th>Alarm Connections</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB5</td>
<td>NR</td>
<td>Night Ring</td>
<td>Contact Closure Input initiates chime sound for Night Ring. Non-supervised. Night Ring does not operate without 120VAC input and the Panel is operating on Battery.</td>
</tr>
<tr>
<td></td>
<td>TEL</td>
<td>Telephone Page Input</td>
<td>Telephone Page Input from a telephone Page Port. Non-Supervised. Telephone Page does not operate without 120VAC input and the Panel is operating on Battery.</td>
</tr>
<tr>
<td></td>
<td>BGM</td>
<td>Background Music Input</td>
<td>Line Level, 600 Ohm Background Music Input. Automatically mutes when any other input is in use. Non-Supervised. Background Music input does not operate without 120VAC input and the panel is operating on Battery</td>
</tr>
</tbody>
</table>

#### Auxiliary Input and 24VDC Output Connections (For Connection To SPMNS-MIC)

<table>
<thead>
<tr>
<th>Block</th>
<th>Symbol</th>
<th>Alarm Connections</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB6</td>
<td>AUX</td>
<td>Auxiliary Input Audio</td>
<td>Line Level Audio Input or SPMNS-MIC. Priority 1.</td>
</tr>
<tr>
<td></td>
<td>CC/NAC</td>
<td>Contact Closure/NAC</td>
<td>Contact closure or NAC will initiate AUX IN Audio. CC is supervised. Connects to SPMNS-MIC (CC Mode).</td>
</tr>
<tr>
<td></td>
<td>24V Out</td>
<td>24VDC, 0.5A output</td>
<td>Regulated, 24 VDC. 0.5A Continuous Output Connection, Power Limited auxiliary power source. NOTE: Two 24V outputs combine for 0.5A. Connects to SPMNS-MIC.</td>
</tr>
</tbody>
</table>
### Internal Digital Voice Module Input Connections

<table>
<thead>
<tr>
<th>Terminal Block</th>
<th>Symbol</th>
<th>Alarm Connections</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB7 Section 7</td>
<td>IN 1</td>
<td>Input 1</td>
<td>Digital Voice Initiating connection for message #1 (contact closure). MNS message. Priority 2.</td>
</tr>
<tr>
<td></td>
<td>IN 2</td>
<td>Input 2</td>
<td>Digital Voice Initiating connection for message #2 (contact closure). MNS message. Priority 3.</td>
</tr>
<tr>
<td>TB8 Section 8</td>
<td>IN 5</td>
<td>Input 5</td>
<td>Digital Voice Initiating connection for message #5 (contact closure). MNS message. Priority 6.</td>
</tr>
<tr>
<td></td>
<td>IN 7</td>
<td>Input 7</td>
<td>Digital Voice Initiating connection for message #7 (contact closure). FIRE message. Priority 9.</td>
</tr>
<tr>
<td>TB9 Section 9</td>
<td>AC</td>
<td>Primary Power (AC)</td>
<td>AC Input Voltage. Make sure Line (L), Neutral (N), and Ground (G) are connected. Non-power limited. Make sure power cord is run properly (see wiring diagram Figure 4-13 in Section 4.9.1).</td>
</tr>
<tr>
<td>TB10 Section 10</td>
<td>BAT</td>
<td>Secondary Power (Battery)</td>
<td>24VDC, up to 33 Ah Battery input connection. The enclosure can accommodate up to 12 Ah Batteries greater than 12 Amp-Hours (Ah) are required to be installed in a UL listed battery box. Non-power limited.</td>
</tr>
<tr>
<td>TB12 Section 11</td>
<td>STB OUT</td>
<td>Strobe Output</td>
<td>8-33 VDC, Regulated, 2A Maximum Strobe NAC Output Supervised with UL Listed 10k Ohm, ½ W EOLR. (Power limited).</td>
</tr>
<tr>
<td></td>
<td>RET</td>
<td>Return</td>
<td>Strobe Input Return for connecting additional strobe circuits, or UL Listed 10k Ohm, ½ W EOLR.</td>
</tr>
<tr>
<td></td>
<td>STB IN</td>
<td>Strobe Input</td>
<td>8-33 VDC, Strobe NAC Input. Triggers strobe in Alarm condition.</td>
</tr>
</tbody>
</table>

**NOTE:** All Outputs (Strobe Output, Audio Output, and 24VDC Auxiliary Power Source) are power limited circuits.
4.4 Preparing the System Wiring Diagram

- Keep a copy of the system-wiring diagram with the SPMNS manual as a permanent record of the system wiring.

4.4.1 Unpacking and Taking Inventory

Carefully unpack the panel and make sure each item described on the packing slip is present and undamaged.

1. Check the exterior of the shipping container(s) for any exterior damage, then the interior of the container(s).
2. Notify both the carrier and Cooper Notification immediately on the straight bill of lading (supplied by the carrier) if any damage is found both verbally and in writing; you may also request an inspection by the carrier. Such requests must usually be made within a specified time period from date of shipment. Cooper Notification is not responsible for damage to equipment occurring during shipping, and only furnishes replacement parts against a written purchase order. It is the customer’s responsibility to file a claim with the carrier.
3. Follow any instructions Cooper Notification and/or the carrier may supply about possible damage.
4. If no damage is found, compare the contents of the Inventory List against the contents of the shipping container(s), to ensure receipt of all components.
5. Save all shipping materials (any “bubble wrap” or plastic) for possible future use. Store in a safe, dry location.

4.4.2 Locating the Panel

Mount the panel in a location within the environmental limits specified in the latest UL Standard 864 for indoor/dry control panels. **DO NOT locate the panel in a hazardous area.**

**CAUTION:** To comply with the latest NFPA and UL requirements for interconnection of fire alarm control equipment, locate the SPMNS Mass Notification System in the same room, next to a listed compatible fire alarm control panel. Enclose the wiring in conduit and connect it properly to such control panel.

1. See Figure 4-2 for the panel mounting hole layout.
2. Mark and drill mounting holes for appropriate screws and anchors to ensure secure mounting to the type of surface at the selected location.
3. Prevent dust and dirt contamination of the SPMNS Mass Notification System during installation. This contamination can interfere with the operation and reduce the life of the equipment.
4. Open the door and remove the dead front panel, then mount the SPMNS Mass Notification System at the selected location. **Use care to avoid damage to the module during installation.** Do not apply excessive pressure to the PC board or its components, including field wiring terminals and connectors.
Figure 4-2 SPMNS Panel Mounting and Grounding/Conduit Location

**CAUTION:** Use care when punching out knock-outs to avoid damage to internal components.
### Wire Distance Chart For 25V Speaker Line in feet

<table>
<thead>
<tr>
<th>Watts</th>
<th>12 AWG</th>
<th>14 AWG</th>
<th>16 AWG</th>
<th>18 AWG</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2179</td>
<td>1374</td>
<td>865</td>
<td>543</td>
</tr>
<tr>
<td>10</td>
<td>1090</td>
<td>687</td>
<td>432</td>
<td>271</td>
</tr>
<tr>
<td>15</td>
<td>726</td>
<td>458</td>
<td>288</td>
<td>181</td>
</tr>
<tr>
<td>20</td>
<td>545</td>
<td>344</td>
<td>216</td>
<td>136</td>
</tr>
<tr>
<td>25</td>
<td>436</td>
<td>275</td>
<td>173</td>
<td>109</td>
</tr>
<tr>
<td>30</td>
<td>363</td>
<td>229</td>
<td>144</td>
<td>90</td>
</tr>
<tr>
<td>35</td>
<td>311</td>
<td>196</td>
<td>124</td>
<td>78</td>
</tr>
<tr>
<td>40</td>
<td>272</td>
<td>172</td>
<td>108</td>
<td>68</td>
</tr>
</tbody>
</table>

### Wire Distance Chart For 70V Speaker Line in feet

<table>
<thead>
<tr>
<th>Watts</th>
<th>12 AWG</th>
<th>14 AWG</th>
<th>16 AWG</th>
<th>18 AWG</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>17087</td>
<td>10775</td>
<td>6780</td>
<td>4256</td>
</tr>
<tr>
<td>10</td>
<td>8543</td>
<td>5387</td>
<td>3390</td>
<td>2128</td>
</tr>
<tr>
<td>15</td>
<td>5696</td>
<td>3592</td>
<td>2260</td>
<td>1419</td>
</tr>
<tr>
<td>20</td>
<td>4272</td>
<td>2694</td>
<td>1695</td>
<td>1064</td>
</tr>
<tr>
<td>25</td>
<td>3417</td>
<td>2155</td>
<td>1356</td>
<td>851</td>
</tr>
<tr>
<td>30</td>
<td>2848</td>
<td>1796</td>
<td>1130</td>
<td>709</td>
</tr>
<tr>
<td>35</td>
<td>2441</td>
<td>1539</td>
<td>969</td>
<td>608</td>
</tr>
<tr>
<td>40</td>
<td>2136</td>
<td>1347</td>
<td>847</td>
<td>532</td>
</tr>
</tbody>
</table>
4.4.3 Installing Field Wiring Connections

NOTE: The terminal blocks on the SPMNS Mass Notification System are removable. To remove a terminal block, pull the block straight up from the circuit board, as shown in Figure 4-3. Attach wires to the desired connections, then plug the terminal block back on the board, being careful to match the pins.

![Figure 4-3 Removable Terminal Block](image)

NOTE: For power limited circuits, make sure that all input power sources (Alarm and Trouble relay connections, NAC inputs, and auxiliary inputs) are power limited.

NOTE: The AC Power input wiring is non-power limited. Route it on the left side of the enclosure, using one of the knockouts on the left side of the enclosure. Route all power limited inputs and outputs on the right side and top of the enclosure.

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.

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

NOTE: Shielded wire is not required on any output circuits. If shielded wire is used, connect the shields to the ground terminal block as shown in Figure 4-2.
4.4.4 Installing Strobe Connections (Can be Used for MNS Strobes Only)

Strobe connections should be made at the PS-6/8 strobe power supply according to the “Power Path PS-6/8 Installation Manual”.

The Strobe Appliance Circuit consists of a NAC (8 to 33VDC) input and supervised NAC (regulated 27VDC) output. The strobe output provides a synchronized output for compatible Cooper Notification, synchronized strobes. When a synchronized signal from a previous module is used, turn OFF SW9-position 1. This action also allows for pass-through of the synchronized NAC Circuit on the RET connections. When connected with an SPB-80/4, strobe compatibility is system-wide.

![Figure 4-4 Strobe Connections](image)

1. Connect the Strobe Appliance Circuit to the Strobe output STB OUT connection on TB12. Observe correct polarity. See Figure 4-1 on page 4-2 for TB12’s location. Figure 4-4 is an enlarged picture of the referred area. The Strobe Appliance Output Circuit is supervised. A UL Listed 10K Ohm, ½ W EOLR is required at the end of the circuit for proper supervision.

**NOTE:** The strobe output circuit can be activated three ways: (1) During an AUX activation, (2) During one or all of the MNS digital voice messages – IN1 through IN5, and (3) The fourth way is to connect a NAC circuit input from an FACP to STB IN as described below.

2. Connect Strobe Circuit input (8 to 33VDC) from the FACP or other UL Listed control panels to the Strobe Input circuit (STB IN) connection on TB11. Observe correct polarity. The maximum line impedance of the strobe circuits is 40 ohms.

3. Connect the FACP EOLR, additional appliances or additional SPMNS panels to RET connection on TB11.
   - Position 2 (ON) of SW9 selects the Cooper Notification Sync Mode during MNS strobe activation.

4.4.5 Installing Audio Output Connections

1. Connect the Audio Appliance Circuit to the Audio Output (AUDIO OUT) connection on TB4. See Figure 4-1 on page 4-2 for TB4’s location. Figure 4-5 is an enlarged picture of the referred area. The Audio Output is supervised. A UL Listed 10K Ohm, ½ W EOLR is required at the end of the circuit for proper supervision.
Chapter 4: Installation

Section 4
Audio Output Connections

Figure 4-5 Audio Output Connections

2. Select the proper output voltage (25V or 70V) using the Audio Output Select Jumper J1.

4.4.6 Installing Auxiliary Circuit Connections

Refer to the MNSMIC Installation Manual for proper connections from 24V OUT, AUX IN, and CC/NAC to these products. All connections to these products are made from TB6.

4.4.7 Installing Digital Voice Initiating Connections

The Digital Voice Initiating Connections (IN1, IN2, IN3, IN4, IN5, IN6, IN7, and IN8) provide the initiation of the stored messages in the Digital Voice Section of the SPMNS panel. Each initiation circuit requires a Contact Closure input to trigger the respective voice message. Additionally, each initiating circuit is supervised for an open. A 10k Ohm, ½ W EOLR is required for each input that is supervised. If an input is not being used, supervision can be turned off via DIP switch (SW7, positions 1-8).

Figure 4-6 Digital Voice Initiating Connections

- While observing correct polarity, connect the Digital Voice Initiating connections (IN1, IN2, IN3, IN4, IN5, IN6, IN7, IN8) to the connections on TB7 or TB8 as desired. See Figure 4-1 on page 4-2 for TB7 and TB8’s locations. Figure 4-6 is an enlarged picture of the referred area.
4.4.8 Installing Alarm and System Trouble Output Connections

The Alarm Form C relay contacts change state when an AUX or a Mass Notification DV (Digital Voice) message is active. The System Trouble Form C relay contacts change state when the panel goes into any trouble condition. For additional information, see Table 4-1. An AC Loss can be delayed 170 minutes before it is reported as a system trouble (SW2 – Position 2 set to ON).

1. Connect the external alarm circuit to the proper Alarm (ALM) connections. See Figure 4-1, TB1, Section 1, for location.
2. Connect the external Trouble circuit to the proper Trouble (TRB) connections.
3. Connect the SPMNS 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 involves 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 4-2.

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

4. 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.
5. Perform Ground Fault Installation procedure as described in Section 4.7.
6. Calculate and install properly sized backup batteries as described in Section 4.8.3. The SPMNS panel is UL approved for 24VDC for a maximum of 33 Ah. Batteries greater than 12 Amp-Hour (Ah) are required to be installed in a UL listed battery box. The enclosure can accommodate up to 12 Ah.

**WARNING:** Two different sources of power should be connected to this unit. Disconnect both sources of power before servicing. Failure to disconnect both power sources before servicing could result in serious injury or death to you and/or others.

**WARNING:** Always apply AC voltage before applying battery backup voltage. Failure to do so may cause damage to the SPMNS panel.

7. Perform System Checkout procedures as described in Section 4.6.
4.4.9 Installing the Safepath Interface (SPIF) Module

The SPIF board is designed to be used with the SPMNS Evacuation panel and is designated solely for non-fire usage. The Interface board collects information from the SPMNS panel. This Interface board receives and transmits data via RS-232. Status of the SPMNS board is transmitted via these data lines. This Interface board can also receive limited, non-fire control data. All connections to this board and between this board and the SPMNS are to be no longer than 20 feet, in the same room, and through conduit.

⚠️ **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.

⚠️ **WARNING:** Read these instructions carefully. Failure to comply with any of the following instructions, cautions and warnings could result in improper application, installation and/or operation of these products in an emergency situation, which could result in property damage and serious injury or death to you and/or others.

⚠️ **WARNING:** Two different sources of power may be connected to the SPMNS panel. Disconnect both sources of power before servicing. Failure to disconnect both power sources before servicing could result in property damage, serious injury, or death to you and/or others.

---

Figure 4-7  SPIF Module
TECHNICAL SPECIFICATIONS:

Electrical:

Input Voltages: 28VDC
Input Current: 28VDC - 42mA Max in Standby, 42mA Max during operation.
12VDC OUT: 900 mAmps max
Input Current (@ full 12VDC OUT load): 28VDC - 475mA Max in Standby, 475mA Max during operation.
Input Current (@ full 12VDC OUT load): 24VDC - 532mA Max in Standby, 532mA Max during operation.
Input Current (@ full 12VDC OUT load): 18.5VDC - 710mA Max in Standby, 710mA Max during operation.
Audio Input: 1Vrms
Minimum Ground Fault: 20K Ohms
CC2 and CC3 ratings: 30VDC, 0.4 Amps, 0.8 pF, programmable
CC4 and CC5 ratings: 30VDC, 1 Amp, 1 pF, programmable
I/O1 and I/O2 ratings: 5VDC, 5 mAmps

When the 12VDC output of the SPIF is loaded, the maximum current rating on the SPMNS 24VDC output must be derated to maintain UL compliance. Table 4-2 shows the maximum allowable Auxiliary current of the 24VDC output of the SPMNS for different maximum loading values of 12VDC SPIF output on TB1.

Table 4-2 Derating of SPMNS 24VDC output based on SPIV 12VDC loading

<table>
<thead>
<tr>
<th>12VDC SPIF Max. Loading</th>
<th>24VDC SPMNS Allowable Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Amps</td>
<td>0.45 Amps</td>
</tr>
<tr>
<td>0.1 Amps</td>
<td>0.40 Amps</td>
</tr>
<tr>
<td>0.2 Amps</td>
<td>0.35 Amps</td>
</tr>
<tr>
<td>0.3 Amps</td>
<td>0.30 Amps</td>
</tr>
<tr>
<td>0.4 Amps</td>
<td>0.25 Amps</td>
</tr>
<tr>
<td>0.5 Amps</td>
<td>0.20 Amps</td>
</tr>
<tr>
<td>0.6 Amps</td>
<td>0.15 Amps</td>
</tr>
<tr>
<td>0.7 Amps</td>
<td>0.10 Amps</td>
</tr>
<tr>
<td>0.8 Amps</td>
<td>0.05 Amps</td>
</tr>
<tr>
<td>0.9 Amps</td>
<td>0 Amps</td>
</tr>
</tbody>
</table>

Wiring:

Cable size: 14 to 22 AWG
Maximum length: 20ft

RESTRICTIONS: All wiring to and from the SPIF must run in conduit and within the same room.
ALL OUTPUTS ARE POWER LIMITED
### Table 4-3 Description of all SPIF Inputs and Outputs

<table>
<thead>
<tr>
<th>REF</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB1</td>
<td>Audio +</td>
<td>Line level audio input signal (+). To be connected to a Non-Fire rated ancillary device.</td>
</tr>
<tr>
<td></td>
<td>Audio -</td>
<td>Line level audio input signal (-). To be connected to a Non-Fire rated ancillary device.</td>
</tr>
<tr>
<td></td>
<td>Audio Shield</td>
<td>Audio shield termination. To be connected to a Non-Fire rated ancillary device.</td>
</tr>
<tr>
<td></td>
<td>+12VDC</td>
<td>1Amp maximum 12VDC power output (+). To be connected to a Non-Fire rated ancillary device.</td>
</tr>
<tr>
<td></td>
<td>PWR Ground</td>
<td>1Amp maximum 12VDC power output (-). To be connected to a Non-Fire rated ancillary device.</td>
</tr>
<tr>
<td></td>
<td>RS-232 GND</td>
<td>Ground terminal of RS-232 protocol. To be connected to a Non-Fire rated ancillary device.</td>
</tr>
<tr>
<td></td>
<td>RS-232 TX</td>
<td>Transmit terminal of RS-232 protocol. To be connected to a Non-Fire rated ancillary device.</td>
</tr>
<tr>
<td></td>
<td>RS-232 RX</td>
<td>Receive terminal of RS-232 protocol. To be connected to a Non-Fire rated ancillary device.</td>
</tr>
<tr>
<td></td>
<td>I/O 1</td>
<td>General purpose Output signal. To be connected to a Non-Fire rated ancillary device.</td>
</tr>
<tr>
<td></td>
<td>I/O 2</td>
<td>General purpose Output signal. To be connected to a Non-Fire rated ancillary device.</td>
</tr>
<tr>
<td>TB2</td>
<td>AUX OUT +</td>
<td>Line level audio output signal (+).</td>
</tr>
<tr>
<td></td>
<td>AUX OUT -</td>
<td>Line level audio output signal (-).</td>
</tr>
<tr>
<td></td>
<td>CC OUT +</td>
<td>Contact closure signal (+).</td>
</tr>
<tr>
<td></td>
<td>CCOUT -</td>
<td>Contact closure signal (-).</td>
</tr>
<tr>
<td></td>
<td>+24 VDC Input</td>
<td>Power Input (+).</td>
</tr>
<tr>
<td></td>
<td>PWR Input GND</td>
<td>Power Input (-).</td>
</tr>
<tr>
<td>TB3</td>
<td>CC2</td>
<td>General purpose Contact Closure (Normally Open).</td>
</tr>
<tr>
<td></td>
<td>CC3</td>
<td>General purpose Contact Closure (Normally Open).</td>
</tr>
<tr>
<td></td>
<td>CC4</td>
<td>General purpose Contact Closure (Normally Open or Closed).</td>
</tr>
<tr>
<td></td>
<td>CC5</td>
<td>General purpose Contact Closure (Normally Open or Closed).</td>
</tr>
<tr>
<td>J1</td>
<td>30-pin header</td>
<td>Control/Command signals. Always connected to J2 on SPMNS</td>
</tr>
<tr>
<td>J2</td>
<td>RJ-11 Jack</td>
<td>NOT for field use. DO NOT CONNECT.</td>
</tr>
</tbody>
</table>
4.5 Wiring the System

4.5.1 Wiring Guidelines

Although the SPMNS panel incorporates signal verification and noise filtering circuitry on its 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.

- Connect the shield of each cable only at one end.
- Connect each shield of each cable that connects to the panel to the grounding points provided near the knockout locations on the chassis (see Figure 4-2).

The National Electrical Code defines two types of circuits for protective signaling systems: power limited circuits and non-power limited circuits. All outputs (STB OUT, AUDIO OUT, and ± 24VDC auxiliary power source) are power-limited circuits.

⚠️ WARNING: Route all SPMNS Mass Notification System audio wiring away from any high voltage or high current wiring (such as AC or DC power wiring, audio power wiring, and motor or relay actuation wiring). Failure to do so may cause electrical shock, resulting in 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 SPMNS installation complies with the latest NEC, NFPA, Local, State, County, or Province requirements.

4.5.2 Field Wiring Connections

All SPMNS wiring terminals are designed to accept #12 AWG through #18 AWG wiring for one wire per terminal or #16 AWG to #18 AWG for two wires per terminal. Proper wire gauge considerations for the Notification Circuit must take into account current requirements versus length of run.

NOTE: Only speakers with DC blocking capacitors provide for proper speaker supervision.

4.5.3 Preparing a System Wiring Diagram

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

NOTE: Separate the AC input power wiring from the other input and output wiring. Wire the AC input power to the left side of the motherboard (Figure 4-13) and the other input and output wiring to the right.
4.5.4 Visual Notification Appliance Output Wiring

Wire gauge selection involves consideration of all factors including, wire loop length, maximum current draw of each appliance, number of appliances, and maximum voltage drop allowable.

- Strobe NAC has a regulated 24VDC, 2.0 Amps maximum output.
- Strobe NAC meets Class B supervision requirements for notification appliance circuits.
- For the strobe output circuit, install a UL Listed 10K Ohm, ½ W EOLR across the last visual notification appliance. If the output is unused, place a UL Listed 10K Ohm, ½ W EOLR across the output terminals.
- Refer to the “Power Path PS-8 Installation Manual” for specific instructions regarding visual appliance connections to the PS-8.

4.5.5 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. Wire gauge selection involves consideration of all factors including, wire length, appliance power ratings, and the number of appliances.
- The amplified output is either a selectable 25 or 70.7Vrms audio output, rated for 40 watts maximum.
- The output meets Class B supervision requirements for notification appliance circuits.
- To meet Class A requirements, a Cooper Notification splitter (SP4-A/B or SP4-APS) is required.
- For the audio output circuit, install a UL Listed 10K Ohm, ½ W EOLR installed across the last notification appliance. If the output is unused, place a UL Listed 10K Ohm, ½ W EOLR across the output terminals.
4.5.6 System Wiring Diagram

Figure 4-8 System Wiring Diagram

4.5.7 Wiring Diagrams for Audio/Visual Notification Appliances

Figure 4-9 Wiring Diagram for Visual Only Notification Appliances

CAUTION: Do not loop wire under terminals. Break wire run to provide supervision of the connection.
4.5.8 Wiring the System Trouble Connections

The locations of the System Trouble (Trouble Status Output) Connections (TB2) are shown in Figure 4-1. A magnified view of this area on the motherboard is shown in Figure 4-12.

- Wire gauge selection of the system Trouble Status output contact wiring involves 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 2.0 amps at 24VDC, resistive load.
- For a detail of the system Trouble Status output contact terminal connections (shown in the trouble position), see Figure 4-12 below.
- An external 24VDC or the internal 24VDC connection (TB1) can be used to power Trouble indicating appliances.
- Trouble connections to the FACP are made using an addressable monitor module that is compatible with the FACP being used.
4.6 Performing System Checkout

For guidelines on testing notification systems, refer to the latest NFPA 72 code.

4.6.1 System Control Settings

Figures 3-4 thru 3-8 show the location of the controls used to configure the SPMNS Mass Notification System. Table 4-1 identifies and explains the functions of the terminal blocks, Section 3.6 the other user settings. The following procedure is a basic setup for the panel.

1. Ensure that the AC and Battery Power are not connected.
2. Plug in the microphone.
3. Select the proper audio output (25V or 70V) on J1 Audio Output Select.
4. Connect the speaker circuit(s) to terminal block TB4 AUD OUT. Verify that the speaker circuit has a UL Listed 10K Ohm, ½ W EOLR.
5. If applicable, connect the strobe circuit to TB12 STB OUT. Verify that the strobe circuit has a UL Listed 10K Ohm, ½ W EOLR.
6. If Strobe synchronization is to be defeated, turn OFF positions 1 and 2 of SW9 Strobe Synchronization Defeat.
4.6.2 Checkout Procedure

**WARNING:** Always connect the AC power source before connecting the battery backup power. Always disconnect the AC power source before disconnecting the battery backup power.

**NOTE:** All terminal blocks, jumpers, switches, LEDs, Fuses, and Potentiometers are illustrated in Figures 3-4 thru 3-8.

- Connect the interface ribbon cable to J6.
- Connect AC power, then connect the batteries.

When the AC power source is applied to the panel, the battery voltage check circuitry is activated. If batteries are not connected within 20 seconds, the panel trouble circuit activates. The battery voltage check circuitry re-checks for batteries every two minutes. If the batteries are installed during the two-minute period, the panel remains in trouble mode until the next re-check.

- D100 PWR LED and POWER ON (Interface) LED should be “ON” to indicate normal operation.
- If SYSTEM TROUBLE (Interface) LED (Yellow) is “ON,” and the internal sounder is operating, a trouble condition is indicated.
- In such a case, STOP TESTING. Refer to Chapter 8 of this manual, then troubleshoot and correct the problem before you resume testing. See Figure 3-7 for location of LEDs.
- Perform the following tests:

4.6.2.A Fire Microphone Test

1. Press the push-to-talk Button on the microphone and speak into the microphone.
2. Ensure your voice can be heard on the output speaker circuit.

4.6.2.B MNS Microphone Test

1. Press the push-to-talk Button on the microphone and speak into the microphone.
2. Ensure your voice can be heard on the output speaker circuit.

4.6.2.C Digital Voice Message Test

**Message 1**

1. Press the top message button. The message should be heard on output speaker circuit and the MNS strobes should flash. The top message button/LED on the interface should blink to indicate the button has been pressed.
2. Turn OFF message 1 by pressing the top message button again or removing contact closure from IN1. The message plays to completion at least three times, and the strobe circuit is ON until the message is complete.
3. Apply contact closure activation to TB7 (IN1) connection (Figure 4-6). The message should be heard from output speaker circuit and the MNS strobes should flash. The top message button/LED on the interface should illuminate steadily to indicate contact closure is present.
4. Remove the contact closure from TB7 (IN1). The message plays to completion at least three times, and the strobe circuit is ON until the message is complete. The top message button/LED on the interface should turn OFF once the contact closure is removed.

5. Perform Steps 3 through 4 on Messages 1 through 5. Use Table 4-4.

6. Perform steps 3 through 4 on messages 6 and 7 checking for Fire Strobe activation.

<table>
<thead>
<tr>
<th>Message Number</th>
<th>TB4</th>
<th>Interface Button</th>
<th>SW3 DV/Strobe Select</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message 1</td>
<td>IN1</td>
<td>Top</td>
<td>Position 1</td>
</tr>
<tr>
<td>Message 2</td>
<td>IN2</td>
<td>Second</td>
<td>Position 2</td>
</tr>
<tr>
<td>Message 3</td>
<td>IN3</td>
<td>Third</td>
<td>Position 3</td>
</tr>
<tr>
<td>Message 4</td>
<td>IN4</td>
<td>Fourth</td>
<td>Position 4</td>
</tr>
<tr>
<td>Message 5</td>
<td>IN5</td>
<td>Fifth</td>
<td>Position 5</td>
</tr>
<tr>
<td>Message 6</td>
<td>IN6</td>
<td>Sixth</td>
<td>Position 6</td>
</tr>
<tr>
<td>Message 7</td>
<td>IN7</td>
<td>Seventh</td>
<td>Position 7</td>
</tr>
<tr>
<td>Message 8</td>
<td>IN8</td>
<td>Eighth</td>
<td>Position 8</td>
</tr>
</tbody>
</table>

⚠️ WARNING: Perform mandatory testing of all protective signaling systems as required. Test all protective signaling system equipment using 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 serious personal injury or death to you and/or others during an emergency situation.
4.7 Ground Fault Detection

Ground fault detection sensitivity is a minimum of 40K Ohms for Class B, Style Y connections.

4.8 Battery Care and Backup Battery Calculations

4.8.1 Caring for 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 is 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 is maximized at an ambient temperature of 20 degrees C (68 degrees F).
- Batteries may generate ignitable gases. Because of this, install batteries in a well-ventilated location, away from spark producing equipment.
- DO NOT install batteries in an atmosphere where organic solvents or adhesives may be present. DO NOT clean the batteries with oils, thinners, or similar substances. The case and cover of the batteries are ABS plastic resin, which may suffer damage from these chemicals.
- DO NOT install batteries in a heavy vibration or shock location.
- ALWAYS wear insulated gloves when handling batteries.
- DO NOT use together batteries of different capacities, age, or manufacture.

⚠️ WARNING: DO NOT crush, incinerate, or dismantle batteries. 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.

4.8.2 Storing Batteries

- For batteries that are to be stored for an extended period of time, give a supplemental charge monthly.
- NEVER store batteries 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 varies depending upon temperature. Cooler temperatures cause the self-discharge rate to decrease. Warmer temperatures cause the self-discharge rate to increase.
4.8.3 Calculating Backup Battery Requirements

A Worksheet for assisting in calculating battery backup is available in Chapter 11.

Due to the current drain on the battery, the maximum battery size for the SPMNS Mass Notification System is 33 Amp-Hours (Ah). The enclosure can accommodate up to 12 Ah. Batteries greater than 12 Amp-Hours (Ah) are required to be installed in a UL listed battery box.

It is necessary to calculate the current draw for battery backup requirement. The current requirement depends on the system configuration and the appliances connected to the Speaker output circuits. Battery Backup current has two separate calculations that are added together: Standby Current and Alarm Current.

4.8.3.A Standby Current

The Standby Current consumes the largest part of the storage battery capacity. The Standby Current of the SPMNS Mass Notification System is 0.130 Amps. Multiply this value by the number of standby hours required. Normally this is 24 hours. This represents the total Standby current in Amp-Hours for the panel.

4.8.3.B Alarm Current

The maximum Alarm Current for the SPMNS Mass Notification System is 4.70 Amps (1.6 Amps for audio, 2.0 Amps for strobe, and 0.5 Amps for auxiliary power).

1. Calculate the strobe output current by adding the current draw of all strobes. Current draw is in Amps.
2. Calculate speaker output current by totaling all the speaker wattage settings. Multiply the sum by 0.040. The result is the current draw in Amps.
3. Add the strobe current, the speaker current, and auxiliary current together. The result is the total Alarm Current in Amps.

Alarm circuits are required to operate for 30 minutes on battery power. Multiply Step 3 by 0.5 hrs. The result is the total Alarm Capacity Required in Amp-Hours.

4.8.3.C Battery Calculations

Good engineering practices recommend the total Amp-hours required for backup should not exceed 90% of the Backup Battery capacity. The SPMNS Mass Notification System has been UL approved for a maximum of 33 Ah batteries. The enclosure can accommodate up to 12 Ah. Batteries greater than 12 Amp-Hours (Ah) are required to be installed in a UL listed battery box.

1. Add the total Standby Capacity Required to the total Alarm Capacity Required.
2. Multiply Step 1 by 1.1. This is the minimum Backup Battery requirement for this panel.
3. Record results on worksheet.
4.9 Installing AC Power and Batteries

**NOTE:** Power-limited and non-power limited wiring must be separated. Wire non-power limited wiring (AC power and battery) to the left of the motherboard. Wire power limited wiring to the right and top of the motherboard.

**WARNING:** Two different sources of power should be connected to this unit. Disconnect both sources of power before servicing. Failure to disconnect both power sources before servicing could result in serious injury or death to you and/or others.

**CAUTION:** Observe correct polarity requirements on all connections. Failure to do so may damage the equipment.

**CAUTION:** Always apply AC voltage before applying battery backup voltage. Failure to do so may cause damage to the SPMNS Mass Notification System.

4.9.1 Installing AC Power

1. Refer to Figure 4-13 and connect the line and neutral 120VAC input wiring to the L (Line) and N (Neutral) terminals on the terminal block TB9 (see Figure 4-1 for location) in the lower left corner of the chassis.

2. Ensure that the ground input wiring is connected to the ground terminal (TB9) on the left side of the chassis.

3. Secure the wire with the caps nut located in the hardware package.

---

**Figure 4-13 120VAC Input Connection**
4.9.2 Installing Batteries

**NOTE:** Batteries are not supplied with the SPMNS Mass Notification System and must be purchased separately.

1. Connect the supplied red battery wire to the (+) terminal and the supplied black battery wire to the (–) terminal of TB10 (see Figure 4-14).
2. Run jumpers along the bottom of the chassis in the battery compartment.

![Figure 4-14 Battery Wire Connections](image)

3. Refer to Figure 4-15 and place one 12 Volt battery with the battery terminals on top and to the right. Place the second battery to the right of the first battery with the battery terminals on top and to the left.

**CAUTION:** Always install the two batteries with the battery terminals pointing to the center and in the upright position as shown in Figure 4-15. Failure to do so may cause a short circuit which may damage the SPMNS panel or batteries and cause the panel to fail to operate in an emergency condition.
4. Connect the short jumper (included) to the back terminals (negative to positive) of the two batteries as shown in Figure 4-15. This connects the 12VDC batteries in series in order to produce 24VDC.

5. Place the batteries in the battery compartment with the battery terminals and jumper facing “UP” or toward the top of the SPMNS panel. Make sure that the red and black battery jumpers are clear of the batteries.

6. Attach the red and black battery wires (red to (+), black to (–)) to the proper battery terminals.
5. Operation

5.1 Introduction

This chapter describes the operating characteristics of the SPMNS Mass Notification System. Included is information about the following panel features:

- Supervision
- Audio Notification Appliance Output Circuit Supervision
- Amplifier Supervision
- Actions that Initiate Alarms

5.2 User Interface

The User Interface on the SPMNS displays the basic status of the unit as well as providing a limited number of user controls. The User Interface includes a Microphone and the manual activation or recording of the eight messages. There is also a button to silence the audible trouble indicator and reset the MNS mode. Status indicators include POWER ON, SYSTEM TROUBLE, AC TROUBLE, FIRE ACTIVE, and MNS ACTIVE (see Figure 3-3).

5.3 Supervision

A SYSTEM TROUBLE LED 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 broadcast messages from the control panel.

If a trouble condition is detected by any of the supervisory functions, the internal sounder operates the panel Form C TROUBLE relay (normally energized), changes state, and the yellow SYSTEM TROUBLE LED turns “ON.” The Trouble Status Relay (TB2) must be properly connected to and used by the control panel to indicate a system trouble. At the same time, one of the yellow trouble location LEDs identifies the location of the trouble condition. The internal sounder can be silenced for 20 hours by depressing the “Trouble Acknowledge” Switch (SW1, on the User Interface). Any subsequent troubles cause the sounder to be re-activated. If a trouble condition is indicated, follow the procedures in Chapter 8 “Troubleshooting.”

An AC Loss can be selected to be reported as a system trouble after 170 minutes (SW2-Position 2 = ON). This is desirable for off-premise trouble reporting. If SW2-Position 2 is OFF, AC Loss is reported as a system trouble after 30 seconds.
WARNING: Do not leave the SPMNS panel in a trouble condition, as it may not play warning messages, which could result in 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 serious injury or death to you and/or others. If messages requested before and during a trouble condition are still necessary, repeat them when the SPMNS panel is returned to normal.

5.3.1 Visual Notification Appliance Output Circuit Supervision

The Visual Notification Appliance Output Circuit uses Class B, Style Y wiring, and is supervised for open and short circuits when the output is de-energized. Output circuit supervision requires installation of UL Listed 10K Ohm, ½ W EOLR on the output circuit. A sensed strobe short circuit trouble illuminates D96 STB SHORT LED. A sensed strobe open circuit trouble illuminates D97 STB OPEN LED. See Figure 8-1 for LED location.

5.3.2 Audio Notification Appliance Output Circuit Supervision

The Audio Notification Appliance Output Circuit uses Class B, Style Y wiring, and is supervised for open and short circuits when the output is de-energized. Output circuit supervision requires installation of UL Listed 10K Ohm, ½ W EOLR on the output circuit. A sensed open circuit trouble illuminates D1 AUDIO OPEN LED. A sensed strobe short circuit trouble illuminates D2 AUDIO SHORT LED. See Figure 8-1 for LED location.

5.3.3 Amplifier Supervision

An inaudible supervisory tone plays through the Amplifier section during standby for supervision purpose. Any sensed trouble illuminates D5 “AMP” LED steadily. See Figure 8-1 for LED location.

5.3.4 Ground Fault Supervision

The SPMNS Mass Notification System supervises for Ground Fault conditions on Class B, Style Y field wiring that is not electrically isolated. The supervised wiring includes contact inputs, visual NAC circuits, audio NAC circuits, amplified speaker NAC circuits, and trouble audible output circuits. All other wiring is electrically isolated. If a Ground Fault condition exists, D67 GF LED illuminates. See Figure 8-1 for LED locations.
5.4 Actions that Initiate Audio Alarms

Table 5-1 indicates what can initiate an alarm condition and the resulting SPMNS Mass Notification System actions.

<table>
<thead>
<tr>
<th>PRIORITY OF EVENT</th>
<th>INITIATING ACTION</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remote Microphone push-to-talk button is depressed.</td>
<td>Remote MIC live voice broadcast is enabled.</td>
</tr>
<tr>
<td>7</td>
<td>Panel microphone push-to-talk button, is depressed.</td>
<td>Panel microphone live voice broadcast enabled.</td>
</tr>
<tr>
<td>2, 3, 4, 5, 6, 8, 9, 10</td>
<td>Digital Voice circuit Contact Closure inputs. (IN1, IN2, IN3, IN4, IN5, IN6, IN7, IN8)</td>
<td>Selected Digital Voice enabled. If digital voice is non-operational, program tone broadcasts.</td>
</tr>
</tbody>
</table>
6. Operational Procedures

6.1 Making Live Announcements

1. Hold the on board fire or remote MNS microphone within 2 inches from your mouth, press the Push-To-Talk (PTT) switch and begin speaking. (For best results, hold the microphone within a half inch from your mouth.)

2. When finished, release the PTT switch and return the microphone to its holder.

NOTE: If the on-board microphone push-to-talk button is depressed and remains depressed for two and a half minutes, the microphone circuit switches automatically to the selected supervision tone.

6.2 Recording Digital Voice Messages

The Digital Voice section of the SPMNS panel contains a digital voice memory chip that contains the digital voice program and the voice messages. The memory chip comes with eight messages installed. The DV Memory Chip can be removed and the messages remain on the chip. If tailored messages (messages with tones) are required from Cooper Notification Inc., the new chip can be installed when received.

- The message chip memory is divided into eight segments. Each segment is prioritized 1 through 8, matching the inputs IN1 through IN8.

- If the IN8 message is playing and a higher priority message is initiated, the message on IN8 stops immediately and the higher priority message plays.

- As long as the contact closure voltage is applied to the input, the message repeats. When the voltage is removed, the message plays to the end and stops. The message plays a minimum of three times completely.

- Each message can be selected to have a code3 pre-alert tone, a 1khz continuous pre-alert tone, or no pre-alert tone. This is based on SW4 and SW5, positions 1-8 settings.

- Post-tones are also selectable via SW5, position 9. Post-tones match pre-tones on an individual message basis.

- When the Digital Voice Section is set up for record mode, field recording is limited to 30-second segments.

NOTE: If the Digital Voice Section fails, the SPMNS panel plays the selected tone (Code 3 Tone or Slow Whoop). See Figure 3-6 for the location of SW3-position 9.

NOTE: Do not change the default settings on SW3. Changing the default settings will violate the UL listing.
6.3 Recording Messages on the Digital Voice Section

CAUTION: Recording of any new message permanently erases the previous message. If a Cooper Notification factory prerecorded fire or emergency message or a tailored message is accidentally or intentionally erased, a new factory recorded message kit must be purchased to restore the message.

- Decide which message segment to make the recording on.
- Read through this procedure carefully before attempting a recording.
- Identify all components mentioned.

1. Remove the DV Record Jumper JP5 (see Figure 3-5). Place jumper in a secure place; this is replaced at the end of the recording procedure.

2. Connect 1/8” line level audio to audio jack (J2) on the left side of the SPMNS unit.

3. Press and hold the RECORD button on the user interface.

4. Determine which one of the eight messages you wish to record.

5. Press the message button on the interface corresponding to the message you wish to record. The Record LED illuminates and recording begins. You may release the record button at this point.

6. When the message concludes, press the illuminated message button again. Recording then stops.

7. Check the recorded message by pressing the proper DV message button. The message plays in its entirety at least three times.

8. For additional message recording, repeat steps 2 through 7.

9. When recording is done, replace DV Record Jumper (JP5).
6.4 Verifying Messages

*NOTE:* Verify that DIP switch JP5 is in place. See Figure 3-5 on page 3-9 for location.

![Figure 6-1 SPMNS User Interface](image)

1. Press the button of the desired DV message. The message will begin playback and the corresponding DV message LED will blink.

2. Press the blinking button again to deactivate the DV message. The message plays in its entirety a minimum of three times.
6.5 Fire Alarm Activation

In the event of a fire alarm, the SPMNS will activate the fire audio/visual appliances and play the fire digital voice message that corresponds to the input connected to the FACP. Additionally, the local fire microphone located behind the front door of the SPMNS can be used to make live fire announcements. The live fire microphone will take priority over the fire digital voice message while the microphone button is pressed. Upon releasing the fire microphone button, the SPMNS will resume playing the active fire digital voice message until the FACP has reset.

6.6 MNS Activation

In the event that an MNS DV is activated or the MNS microphone is used to make an MNS announcement, the SPMNS will activate the MNS visual and audio appliances and latch in this mode until the SPMNS is manually reset at the front panel.

6.7 MNS Activation Following Fire Activation

In the event that an MNS event occurs, an MNS DV or the MNS microphone is used while a fire alarm is in progress, the MNS event will take priority. The SPMNS will deactivate the fire visual appliances and activate the MNS visual appliances. The MNS microphone will take priority over all fire digital voice and fire microphone messages. The SPMNS will remain in the MNS mode until the system is manually reset at the front panel.

6.8 MNS Reset

To reset the MNS operation, push and hold the “Trouble Silence/MNS Reset” button on the inside door of the SPMNS for 4 seconds.
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7. Periodic Testing and Maintenance

7.1 Introduction

- Conduct periodic testing and maintenance of the panel and all notification equipment frequently as required.
- Check local, state and federal codes, regulations and laws, for required tests.
- Make sure that only qualified personnel perform all tests and maintenance.

7.2 Periodic Testing

7.2.1 Test Frequency

- Perform mandatory testing of equipment at least twice each year, or more often as required by local, state and federal codes, regulations, and laws.

7.2.2 Equipment

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

- SPMNS Mass Notification System
- All notification appliances

7.3 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.
- Replace any malfunctioning modules in the panel immediately. Do not attempt to repair them.
- Return any malfunctioning modules to the manufacturer for repair or replacement.

7.4 Qualified Personnel

“Qualified personnel” are those who can evaluate proper equipment functionality and ensure its proper operation and perform all testing procedures on the SPMNS Mass Notification System.

⚠️ 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 serious injury or death to you and/or others.
8. Troubleshooting

8.1 Introduction

⚠️ 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 SPMNS Mass Notification System 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. Ensure that qualified service persons immediately replace any modules that have malfunctioned.

⚠️ CAUTION: Make sure that only qualified personnel in accordance with the procedures in this manual conduct troubleshooting and servicing. Do not attempt to make other adjustments, modifications, or repairs. Never use water, steam, cleaning liquids or sprays on the panel.

⚠️ CAUTION: User servicing of the panel is limited to field-wiring changes, PC board replacement, and following the instructions in the Installation chapter (Chapter 4) and troubleshooting procedures in this chapter.

- After any troubleshooting procedure is completed, perform a complete system checkout as described in Section 4.6.
8.2 General

The SPMNS Mass Notification System monitors system integrity. Items monitored for integrity are:

- Visual appliance circuit field wiring
- Audio appliance circuit field wiring
- Input voltage: AC (120VAC, 60 Hz), Backup Battery (24VDC)
- Battery voltage level
- Battery circuit field wiring
- Amplifier functionality
- Digital Voice Section functionality
- Battery charge voltage
- Tone generators
- Audio chain

System status is indicated to the visual indicators on the user interface, the internal Trouble Sounder, and the Trouble and AC Trouble Form "C" relay contacts. If the AC (primary power) is removed or low, the trouble the panel responds as follows:

- Turns "ON" the AC Trouble LED indicator on the user interface.
- Turns "ON" the System Trouble LED indicator on the user interface.
- Turns "ON" the internal sounder.
- Changes the state of the Form C AC Trouble contact to the TROUBLE position.
- Changes the state of the Form C General Trouble contact to the TROUBLE position. (After 170 minutes if SW2-Position 2=ON or after 30 seconds if SW2-Position 2=OFF)

Any other trouble detected by the panel is reported as follows:

- Turns "ON" the System Trouble LED indicator on the user interface.
- Turns "ON" the internal sounder.
- Changes the state of the Form C General Trouble contact to the TROUBLE position.

When there are no trouble conditions detected, the user interface has the POWER ON indicator illuminated while the SYSTEM TROUBLE and AC TROUBLE indicators are OFF. If the POWER ON indicator is not illuminated, check to see if D100 and/or D109 (on the PC board) are illuminated.

Figure 8-1 shows the location of all trouble location LED indicators within the SPMNS. Table 8-1 cross-references the trouble location LED indicators on the PC board to the proper troubleshooting procedure.

**NOTE:** When the System Trouble indicator is ON, indicating a panel Trouble, at least one of the other yellow LED indicators is also ON, indicating the trouble location.
## Table 8-1 Trouble Procedure Cross Reference

<table>
<thead>
<tr>
<th>Condition</th>
<th>Trouble Description</th>
<th>Troubleshooting Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>D109 (POWER ON LED) is OFF</td>
<td>AC and Battery power are missing or Low</td>
<td>Section 8.2.1 (A)</td>
</tr>
<tr>
<td>D96 AND D97 are ON</td>
<td>Strobe Over current Protection is active</td>
<td>Section 8.2.2 (B)</td>
</tr>
<tr>
<td>D8 (BAT) is ON</td>
<td>Battery voltage is below 20.4 VDC or battery is missing</td>
<td>Section 8.2.3 (C)</td>
</tr>
<tr>
<td>AC TROUBLE (of display) is ON</td>
<td>AC input voltage missing or low</td>
<td>Section 8.2.4 (D)</td>
</tr>
<tr>
<td>D3 (DV) is ON</td>
<td>Digital Voice Signal is too low or missing</td>
<td>Section 8.2.5 (E)</td>
</tr>
<tr>
<td>D4 (MIC) is ON steady</td>
<td>Push-to-Talk Microphone inoperable or missing</td>
<td>Section 8.2.6 (F)</td>
</tr>
<tr>
<td>D5 (AMP) is ON steady</td>
<td>Audio Over current Protection is active</td>
<td>Section 8.2.7 (G)</td>
</tr>
<tr>
<td>D96 (STB SHT) is ON</td>
<td>Strobe Notification Appliance Circuit is shorted</td>
<td>Section 8.2.8 (H)</td>
</tr>
<tr>
<td>D97 (STB OPEN) is ON</td>
<td>Strobe Notification Appliance Circuit is open</td>
<td>Section 8.2.9 (I)</td>
</tr>
<tr>
<td>D44 (AUX IN) is ON</td>
<td>Auxiliary input is open, RMX is in trouble, or remote MIC is in trouble</td>
<td>Section 8.2.10 (J)</td>
</tr>
<tr>
<td>D2 (AUD SHT) is ON</td>
<td>Audio Notification Appliance Circuit is Shorted, Splitter is in trouble, or Audio Booster is in trouble</td>
<td>Section 8.2.11 (K)</td>
</tr>
<tr>
<td>D1 (AUD OPEN) is ON</td>
<td>Audio Notification Appliance Circuit is Open</td>
<td>Section 8.2.12 (L)</td>
</tr>
<tr>
<td>D67 (GF) is ON</td>
<td>Ground Fault Trouble</td>
<td>Section 8.2.13 (M)</td>
</tr>
<tr>
<td>D47 (INT TRB) is ON</td>
<td>User Interface is incorrectly connected or damaged</td>
<td>Section 8.2.14 (N)</td>
</tr>
<tr>
<td>D6 (EXT AC WIR) is ON</td>
<td>SPB SUP is open or Audio Booster has AC failure</td>
<td>Section 8.2.15 (O)</td>
</tr>
<tr>
<td>D5 (AMP) is blinking</td>
<td>Auxiliary preamp failure</td>
<td>Section 8.2.16 (P)</td>
</tr>
<tr>
<td>D4 (MIC) is blinking</td>
<td>Microphone preamp failure</td>
<td>Section 8.2.17 (Q)</td>
</tr>
<tr>
<td>D93 (CHG TRB) is ON</td>
<td>Battery voltage is below 18.5 VDC or battery is missing</td>
<td>Section 8.2.18 (R)</td>
</tr>
<tr>
<td>D55 (DV1) is ON</td>
<td>IN1 (DV input 1) is open</td>
<td>Section 8.2.19 (S)</td>
</tr>
<tr>
<td>D62 (DV2) is ON</td>
<td>IN2 (DV input 2) is open</td>
<td>Section 8.2.19 (S)</td>
</tr>
<tr>
<td>D58 (DV3) is ON</td>
<td>IN3 (DV input 3) is open</td>
<td>Section 8.2.19 (S)</td>
</tr>
<tr>
<td>D65 (DV4) is ON</td>
<td>IN4 (DV input 4) is open</td>
<td>Section 8.2.19 (S)</td>
</tr>
<tr>
<td>D75 (DV5) is ON</td>
<td>IN5 (DV input 5) is open</td>
<td>Section 8.2.19 (S)</td>
</tr>
<tr>
<td>D84 (DV6) is ON</td>
<td>IN6 (DV input 6) is open</td>
<td>Section 8.2.19 (S)</td>
</tr>
<tr>
<td>D78 (DV7) is ON</td>
<td>IN7 (DV input 7) is open</td>
<td>Section 8.2.19 (S)</td>
</tr>
<tr>
<td>D87 (DV8) is ON</td>
<td>IN8 (DV input 8) is open</td>
<td>Section 8.2.19 (S)</td>
</tr>
<tr>
<td>EXCESSIVE NOISE FROM SPEAKERS</td>
<td>MOTHERBOARD MAY NOT BE PROPERLY GROUNDED TO ENCLOSURE</td>
<td>Section 8.2.20 (T)</td>
</tr>
</tbody>
</table>

Before performing any of the following troubleshooting procedures, make sure that you read, understand, and follow the preliminary troubleshooting information at the beginning of this “troubleshooting” chapter.
Chapter 8: Troubleshooting

Figure 8-1 Trouble LED and Fuse Locations
8.2.1 Procedure A

If the green PWR LED is “OFF” and all other LEDs are “OFF,” a power loss condition has occurred. A power loss condition may be caused by:

- Loss of AC input voltage and battery back-up voltage.
- Faulty wiring of the AC power cord and batteries missing or low.
- Faulty motherboard.

Perform the following:

1. Check for 120 VDC at TB9 on the motherboard. If voltage is not present, check for AC input wiring. If AC voltage is present, check to see if fuse (F2) is blown. If F2 is blown, replace the fuse (250V, 10A).
2. Check for at least 18.5 VDC at TB10 (Battery terminals). If sufficient voltage is present, check to see if fuse (F1) is blown. If F1 is blown, replace the fuse (125V, 8A).
3. If the problem persists, replace the motherboard.

NOTE: Mark all wires before removing components. When the trouble is repaired, and before testing, replace all wires to the proper locations and replace all covers.

8.2.2 Procedure B

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” and both D96 and D97 are ON, the SPMNS panel is in an Over current state.

- Check the strobe output for excessive current calculation. (2.0A for strobe circuit).

Perform the following:

1. If excessive current is calculated, remove appliances until the strobe current is below 2.0 Amps.
2. If excessive current does not exist, and strobe output is not operating, reset the SPMNS by removing AC and battery power.
3. Wait 30 seconds and reapply power. AC first and then batteries.
8.2.3 Procedure C

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” and D8, BAT LED is “ON,” Battery Voltage is below 18.5 VDC or the battery is missing. A Battery Trouble condition might be caused by:

- Batteries are missing.
- Battery wiring is incorrect.
- Batteries are defective.
- Battery charging section of the motherboard is inoperable.

Perform the following:

1. Check the battery compartment for the presence of batteries. If batteries are not installed, install them.
2. Ensure that batteries are properly wired. See Figure 4-14 and Figure 4-15 for reference.
3. With the batteries NOT connected to the SPMNS, measure the series voltage of the batteries. If the battery voltage is below 18.5VDC allow the SPMNS more time to charge the batteries.
4. With the batteries NOT connected, check for 24VDC at (+, -) BAT connection at TB10 on the motherboard. If the voltage is below 18.5VDC, the battery charging section of the motherboard is inoperable. Replace the motherboard.
5. If Steps 1 through 4 are satisfied, replace the batteries.

NOTE: The Batteries could take up to 24 hours to charge to capacity.

8.2.4 Procedure D

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” the AC TROUBLE LED is “ON,” and the D93 CHG TRB LED is “ON” the AC is low or missing. An AC Trouble condition might be caused by:

- AC input missing or low.
- AC fuse (F2) is blown.
- A faulty motherboard.

Perform the following:

1. Check fuse F2 on the motherboard. Replace if necessary (250V, 10A).
2. Check for 120VAC at TB9
   - If voltage is not present, check the wiring and circuit breaker.
   - If voltage is present AND fuse F2 is not open, replace the motherboard.
8.2.5 Procedure E

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” D3 DV LED is “ON,” the Digital Voice messages are missing or the DV output voltage is too low. A DV Low Output Voltage condition might be caused by:

- Missing or incorrectly installed memory chip.
- Digital Voice volume control (R73) set too low.
- No messages recorded on memory chip.

Perform the following:
1. Check memory chip (U31) to ensure it is installed properly.
2. Verify that messages are recorded on the chip by activating them using the display buttons.
3. Check Digital Voice volume control (R73) for proper volume level.
4. If messages were field recorded, make sure the message(s) were recorded properly and at the proper volume.
5. Replace the motherboard.

8.2.6 Procedure F

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” D4 MIC LED is “ON” steadily, the push-to-talk microphone is missing, improperly plugged in, or defective.

Perform the following:
1. Install the microphone.
2. Remove the microphone plug and plug it back in.
3. Replace the microphone.
4. Replace the motherboard.

8.2.7 Procedure G

An Amplifier Trouble is present, if the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” and D5 AMP LED is “ON” steady. An Amplifier Trouble condition may be caused by:

- Short on the audio output.
- Overloaded audio output.
- Over current circuit protection mode from improper power up.

Perform the following:
1. Check the TB4, Audio Out terminals and speaker wiring for shorts.
2. Check to ensure the speakers are tapped correctly.
3. Check to ensure the Output Select jumper (J1) is installed at the proper voltage level.
4. Reset the SPMNS by removing AC and Battery power. Wait 30 seconds and reapply power. AC first and then batteries.
5. Replace the motherboard.
8.2.8 Procedure H

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” and D96, STB SHORT LED is “ON,” a short condition exists on the STB OUT NAC output circuit. A STB SHORT trouble condition might be caused by:

- Shorted appliance on STB OUT (TB12).
- Faulty wiring between STB OUT and strobe notification appliance circuit is causing a short.

Perform the following: Check the wiring and strobe notification appliances for a short circuit condition.

8.2.9 Procedure I

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” and D97 STB OPEN LED is “ON,” an open condition exists on the STB OUT NAC output circuit. A STB OPEN trouble condition might be caused by:

- Missing UL Listed 10K OHM, ½ W EOLR on the STB OUT circuit (TB12).
- Faulty wiring causing an open on the Strobe Notification Appliance Circuit.

Perform the following:

1. Check for proper EOLR.
2. Check the strobe notification appliance circuit wiring for an open condition.
8.2.10 Procedure J

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” and D44 AUX IN LED is “ON,” an open condition exists on the CC/NAC input circuit. An AUX IN trouble condition might be caused by:

- A Remote Microphone or RMX trouble being reported to the SPMNS panel (if a remote MIC or RMX is connected).
- Faulty wiring is causing an open on the CC/NAC input circuit (TB6).
- Jumper JP2 being removed and missing a UL Listed 10K Ohm, ½ W EOLR on the CC/NAC circuit (TB6) (if a remote MIC is not connected).

Perform the following:

1. Check the Remote Microphone and/or RMX wiring for an open condition.
2. Check the jumper setting (JP4) if a Remote Microphone or RMX is not connected to the SPMNS panel.
3. If the Remote Microphone or RMX is in a trouble condition, refer to that installation manual to troubleshoot that particular product.

8.2.11 Procedure K

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” and D2, AUDIO SHORT LED is “ON,” a short condition exists on the AUDIO OUT circuit. An AUDIO SHORT trouble condition might be caused by:

- Shorted speaker appliance on AUDIO OUT (TB4).
- Faulty wiring between AUDIO OUT and Speaker Notification Appliance Circuit is causing a short.
- A trouble being reported from an Audio Splitter or Audio Booster.

Perform the following:

- Check the wiring and Audio Notification Appliances for a short circuit condition.
- If a Splitter or Audio Booster is in a trouble condition, refer to that manual to troubleshoot that particular product.

8.2.12 Procedure L

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” and D1 AUDIO OPEN LED is “ON,” an open condition exists on the STB OUT NAC output circuit. A STB OPEN trouble condition might be caused by:

- Missing UL Listed 10K OHM, ½ W EOLR on the AUDIO OUT circuit (TB4).
- Faulty wiring is causing an open on the speaker notification appliance circuit.

Perform the following:

1. Check for proper EOLR.
2. Check the speaker notification appliance circuit wiring for an open condition.
8.2.13 Procedure M

If the green PWR LED is “ON,” the yellow SYSTEM TROUBLE LED is “ON,” and D67 GF LED is “ON,” a ground fault condition exists on the output wiring. A GF trouble condition might be caused by:

- Appliance wiring touching conduit.
- Improper Installation of an appliance(s).

Perform the following:

1. Disconnect appliances from the strobe (TB12) and speaker (TB4) connection on the motherboard.
2. Troubleshoot the NAC circuits by checking for a resistance reading other than infinity between the appliance leads and the conduit.

8.2.14 Procedure N

If the green PWR LED is "ON," the yellow SYSTEM TROUBLE LED is "ON," and D47 INT TRB is "ON," an Interface Trouble exists. An Interface trouble might be caused by:

- The 30 pin ribbon cable being removed from the display or motherboard
- The 30 pin ribbon cable being connected to the wrong header.
- The 30 pin ribbon cable being damaged.

Perform the following:

1. Ensure that the ribbon cable is properly installed to the user interface and to the motherboard at J6 (Display Interface).
2. Check to see if the ribbon cable has been damaged in any way. If the ribbon cable is damaged, replace it.

8.2.15 Procedure O

If the green PWR LED is "ON," the yellow SYSTEM TROUBLE LED is "ON," and D6 EXT AC WIR is "ON," an open condition exists on the SPB SUP terminals (TB4). This trouble can be caused by:

- Switch SW2 position 1 is ON despite the SPB SUP terminals not being used.
- UL Listed 10k OHM ½ W EOLR not detected by the SUB SUP terminals.

Perform the following:

1. If AC is being reported separately from the Audio Booster, make sure that a 10k Ohm ½ W EOLR is properly installed at the Audio Booster and the Audio Booster is operating properly.
2. If AC is NOT being reported separately, make sure there is nothing on the SPB SUP terminals (TB4) AND Switch SW2 - position 1 (SPB SUP) is OFF.
8.2.16 Procedure P

If the green PWR LED is "ON," the yellow SYSTEM TROUBLE LED is "ON," and D5 AMP LED is blinking, an Auxiliary preamp trouble has occurred.

Perform the following:

1. Turn Aux Volume Pot (R100) fully clockwise.
2. Initiate the AUX input if it is being used (via Remote MIC).
3. Reset power to the SPMNS board by turning it OFF and reenergizing it. Remove battery power first, then remove AC power. Wait 30 seconds. Apply AC Power first, then apply battery power.
4. Replace the motherboard.

8.2.17 Procedure Q

If the green PWR LED is "ON," the yellow SYSTEM TROUBLE LED is "ON," and D4 MIC LED is blinking, a Mic preamp trouble has occurred.

Perform the following:

1. Initiate the MIC input to verify its functionality.
2. Reset power to the SPMNS board by turning it OFF and reenergizing it. Remove battery power first, then remove AC power. Wait 30 seconds. Apply AC Power first, then apply battery power.
3. Replace the motherboard.

8.2.18 Procedure R

If the green PWR LED is "ON," the yellow SYSTEM TROUBLE LED is "ON," and D93 BATT CHG TRB LED is "ON," a battery charger trouble has occurred.

NOTE: The CHG TRB LED turns ON during an AC TROUBLE. Restoring the AC Voltage turns OFF the CHG TRB LED.

Perform the following:

1. Remove batteries and measure the voltage at the battery terminals (TB10). If voltage is present, above 20 Volts there is no problem with the battery charger.
2. If there is no voltage at the battery terminals (TB10) while the SPMNS is running on AC power, then there is a problem with the battery charger. Replace the motherboard.
8.2.19 Procedure S

If the green PWR LED is "ON," the yellow SYSTEM TROUBLE LED is "ON," and one of the IN# LEDs (D55, D58, D62, D65, D75, D78, D84, or D87) are "ON," a DV Contact Closure Wiring Trouble exists.

Perform the following:

1. If a particular Contact Closure is not being used, make sure nothing is on the corresponding terminal block (TB7 or TB8) and the corresponding IN CC Supervision is turned OFF at switch SW7.
2. If a particular Contact Closure is being used, make sure that a UL approved 10k Ohm ½ W EOLR is installed on the proper terminals.

8.2.20 Procedure T

If the unit is in normal standby mode yet excessive noise is being heard from the speakers, the unit may not be properly grounded to the enclosure.

Perform the following:

1. Verify that the 4 metal standoffs are installed and securely fastened. Refer to Figure 3-9 for location of the grounding standoffs.
2. Verify that the 4 screws are installed and securely fastened. Refer to Figure 3-9 for location of the grounding screws.
9. Technical Data

9.1 Mechanical

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (H x W x D)</td>
<td>21 x 16 x 6 inches</td>
</tr>
<tr>
<td>Weight</td>
<td>36 lb</td>
</tr>
<tr>
<td>Finish</td>
<td>Red or Black</td>
</tr>
<tr>
<td>Enclosure Construction Type</td>
<td>Enclosure Door: 16 Gauge (.060) CRS</td>
</tr>
<tr>
<td></td>
<td>Enclosure Backbox: 16 Gauge (.060) CRS</td>
</tr>
<tr>
<td>Mounting</td>
<td>Indoor surface mount</td>
</tr>
<tr>
<td>Wiring</td>
<td>Top, left, right, and bottom knockouts (3/4˝-1˝) (18 total)</td>
</tr>
<tr>
<td>Entry</td>
<td>Top (2˝ - 2 ½˝ - 3˝) (2 total)</td>
</tr>
<tr>
<td>Door Lock</td>
<td>Standard Cooper Notification key-lock</td>
</tr>
<tr>
<td>PC Boards</td>
<td>1 Motherboard</td>
</tr>
<tr>
<td></td>
<td>1 Keypad board</td>
</tr>
</tbody>
</table>

9.2 Environmental

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>0 to 49 °C (32 to 120 °F)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-20 to 70 °C (-4 to 158 °F)</td>
</tr>
<tr>
<td>Humidity, Non-condensing</td>
<td>93% at 30 ± 2 °C (86 ± 4 °F)</td>
</tr>
</tbody>
</table>
9.3 Electrical

9.3.1 Input

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Input Voltage</td>
<td>120VAC, 2.4A, 60Hz</td>
</tr>
<tr>
<td>Secondary (Battery) Voltage</td>
<td>20.4-27.5VDC (33Ah)</td>
</tr>
</tbody>
</table>

9.3.2 Battery Current Calculations

The current draw of the SPMNS Mass Notification System is determined by the configuration being used. Section 4.8, Battery Care and Battery Backup Calculation, will assist you in developing the current requirements.

9.3.3 Activation

There are ten ways to activate the SPMNS panel. The table below lists these activation sources in order of priority.

<table>
<thead>
<tr>
<th>Priority Number</th>
<th>Method of Activation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Auxiliary Input</td>
<td>SPMNS-MIC</td>
</tr>
<tr>
<td>2</td>
<td>IN1</td>
<td>Contact Closure. Activates Message 1 on Digital Voice Section.</td>
</tr>
<tr>
<td>3</td>
<td>IN2</td>
<td>Contact Closure. Activates Message 2 on Digital Voice Section.</td>
</tr>
<tr>
<td>4</td>
<td>IN3</td>
<td>Contact Closure. Activates Message 3 on Digital Voice Section.</td>
</tr>
<tr>
<td>5</td>
<td>IN4</td>
<td>Contact Closure. Activates Message 4 on Digital Voice Section.</td>
</tr>
<tr>
<td>6</td>
<td>IN5</td>
<td>Contact Closure. Activates Message 5 on Digital Voice Section.</td>
</tr>
<tr>
<td>7</td>
<td>Push-to-Talk Microphone</td>
<td>Connected to Mother Board</td>
</tr>
<tr>
<td>8</td>
<td>IN6</td>
<td>Contact Closure. Activates Message 6 on Digital Voice Section.</td>
</tr>
<tr>
<td>9</td>
<td>IN7</td>
<td>Contact Closure. Activates Message 7 on Digital Voice Section.</td>
</tr>
<tr>
<td>10</td>
<td>IN8</td>
<td>Contact Closure. Activates Message 8 on Digital Voice Section.</td>
</tr>
</tbody>
</table>
9.3.4 Outputs

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Notification Appliance Output</td>
<td>1 output circuit. 2.0 amps at 24VDC. Supervised.</td>
</tr>
<tr>
<td>Central Amplified Audio Output</td>
<td>1 output circuit. Selectable 25 or 70.7 Volt output at 40W max. Supervised.</td>
</tr>
<tr>
<td>Trouble Contact</td>
<td>Form C contact normally energized. Contacts transfer during trouble: 2.0 amps at 24VDC max, resistive load (see following warning). Non-Supervised.</td>
</tr>
<tr>
<td>Alarm Contact</td>
<td>Form C contact normally energized. Contacts transfer during alarm trouble: 2.0 amps at 24VDC max, resistive load (see following warning). Non-Supervised.</td>
</tr>
<tr>
<td>AC Trouble Contact</td>
<td>Form C contact normally energized. Contacts transfer during AC trouble: 2.0 amps at 24VDC max, resistive load (see following warning). Non-Supervised.</td>
</tr>
</tbody>
</table>

⚠️ 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.

⚠️ WARNING: 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.

9.4 Wiring Connections

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw terminals</td>
<td>Accepts #12 to #18 AWG for single wire connection, or #16 to #18 AWG for double wire connection.</td>
</tr>
</tbody>
</table>

9.4.1 End of Line Resistor (EOLR)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Notification Appliance Outputs</td>
<td>UL Listed 10K Ohm ½ W, EOLR</td>
</tr>
<tr>
<td>Audio Notification Appliance Outputs</td>
<td>UL Listed 10K Ohm ½ W, EOLR</td>
</tr>
</tbody>
</table>
10. Warranty

10.1 LIMITED WARRANTY

Cooper Wheelock, Inc. dba Cooper Notification and Cooper Notification, Inc. (each, a “Seller”) 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), Underwriter’s Laboratories (UL), National Electrical Code (NEC), Occupational Safety and Health Administration (OSHA), local, state, county, province, district, federal and other applicable building and fire standards, guidelines, regulations laws and codes including, but not limited to, all appendices and amendments and the requirements of the local authority having jurisdiction (AHJ). Seller 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 (a) three (3) years from date of manufacture with respect to MEDC and Seller Industrial Signals and Seller Fire and Security Notification Appliances and Devices, or (b) one (1) year from date of manufacture with respect to Waves and SafePath Voice Evacuation and Mass Notification Systems (date of manufacture is determined by date code.) Correction of defects by repair or replacement shall be at Seller’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 SELLER IS INSTALLED IN THE PRODUCT. THE FOREGOING LIMITED WARRANTY SPECIFICALLY EXCLUDES ANY SOFTWARE REQUIRED FOR THE OPERATION OF OR INCLUDED IN A PRODUCT. SELLER 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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IN NO CASE WILL SELLER’S LIABILITY EXCEED THE PURCHASE PRICE PAID FOR A PRODUCT.

10.2 LIMITATION OF LIABILITY

SELLER’S LIABILITY ON ANY CLAIM OF ANY KIND, INCLUDING NEGLIGENCE AND BREACH OF WARRANTY, FOR ANY LOSS OR DAMAGE RESULTING FROM, ARISING OUT OF, OR CONNECTED WITH THIS CONTRACT, OR FROM THE MANUFACTURE, SALE, DELIVERY, RESALE, REPAIR OR USE OF ANY PRODUCT COVERED BY THIS ORDER SHALL BE LIMITED TO THE PRICE APPLICABLE TO THE PRODUCT OR PART THEREOF WHICH GIVES RISE TO THE CLAIM. SELLER’S LIABILITY ON ANY CLAIM OF ANY KIND SHALL CEASE IMMEDIATELY UPON THE INSTALLATION IN THE PRODUCT OF ANY PART NOT FURNISHED BY SELLER. IN ANY EVENT SHALL SELLER BE LIABLE FOR ANY CLAIM OF ANY KIND UNLESS IT IS PROVEN THAT ITS PRODUCT WAS THE DIRECT CAUSE OF SUCH CLAIM. FURTHER, IN NO EVENT, INCLUDING IN THE CASE OF A CLAIM OF NEGLIGENCE, SHALL SELLER BE LIABLE FOR INCIDENTAL, INDIRECT, CONSEQUENTIAL, SPECIAL, PUNITIVE OR EXEMPLARY DAMAGES. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE PRECEDING LIMITATION MAY NOT APPLY TO ALL PURCHASERS.
# 11. Battery Backup Calculation Worksheet

## SPMNS Battery Calculation Sheet

### Standby Current Calculations

1. The Standby Current for the SPMNS is 0.130 Amps.  
   \[ \text{___________ Amps} \]
2. Enter Auxiliary Current (If Applicable)  
   \[ \text{___________ Amps} \]
3. Add Steps 1 and 2. Multiply by the number of hours required.  
   24 Hours – Multiply by 24  
   \[ \text{___________ Hrs} \]

**Total Standby Capacity in Amp Hours**  
\[ \text{___________ Ah} \]

### Alarm Current Calculations

**Note:** Do not exceed 40 Watts.

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

1. List the speaker and strobe requirements.

<table>
<thead>
<tr>
<th>Notification Appliance</th>
<th>Speaker Wattage</th>
<th>Strobe Current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Calculate total Strobe current. (2. Amps Max.)  
   \[ \text{___________ Amps} \]
3. Calculate total speaker wattage. (40 Watts Max.)  
   \[ \text{___________ Watts} \]
4. Multiply the total speaker wattage on line 3 by 0.054.  
   \[ \text{___________ Amps} \]
5. Add Auxiliary Current (if applicable)  
   \[ \text{___________ Amps} \]
6. Add Steps 2, 4 and 5 together. (4.66 Amps Max.)  
   \[ \text{___________ Amps} \]
7. Multiply Step 6 by 0.5 (This represents 30 minutes of alarm.)  
   \[ \text{___________ Hrs} \]
8. Total Alarm Capacity in Amps-Hours.  
   \[ \text{___________ Ah} \]

### Backup Battery Requirements

1. Enter Standby Capacity.  
   \[ \text{___________ Ah} \]
2. Enter Alarm Capacity.  
   \[ \text{___________ Ah} \]
3. Add Steps 1 and 2 together.  
   \[ \text{___________ Ah} \]

Multiply Step 3 by 1.1 for minimum Backup Battery Requirements  
\[ \text{___________ Ah} \]

---

SPMNS Mass Notification System Manual, Revision A  
11-1
Appendix E

Compatible Signaling Appliances

The following Cooper Notification products are LISTED compatible with the audio notification appliance output and the visual notification output circuits for the SPMNS Panel. When connected to the SPB-80/4, strobe synchronization is system-wide. All strobe products can be fully synchronized.

### Speakers

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET-1010-R</td>
<td>E50</td>
<td>STH-15SR</td>
</tr>
<tr>
<td>ET-1080</td>
<td>E60</td>
<td>STH-4R</td>
</tr>
<tr>
<td>ET70-R</td>
<td>E70</td>
<td>STH-3R</td>
</tr>
<tr>
<td>ET80</td>
<td>E90</td>
<td>STH-2R</td>
</tr>
<tr>
<td>ET90</td>
<td>S8-70/25</td>
<td>STH-2G</td>
</tr>
</tbody>
</table>

### Strobes

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSS-24MCW</td>
<td>RSS-24MCC</td>
<td>RSSP-24MCW</td>
</tr>
<tr>
<td>RSS-24MCWH</td>
<td>RSS-24MCCH</td>
<td>RSSP-241575W</td>
</tr>
<tr>
<td>RSSWP-2475W</td>
<td>RSSP-24MCWH</td>
<td>DC-MAXS</td>
</tr>
<tr>
<td>ZRS-MCW</td>
<td>ST/ST-C</td>
<td></td>
</tr>
</tbody>
</table>

### Speaker/Strobe Combination

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET-1080-IS-24</td>
<td>ET70-24MCW</td>
<td>S8-25/70MCC</td>
</tr>
<tr>
<td>ET-1080-LS-24</td>
<td>ET70-24MCWH</td>
<td>S8-25/70MCCH</td>
</tr>
<tr>
<td>ET-1080-LSM-24</td>
<td>ET70-241575W</td>
<td>STH-2MSR</td>
</tr>
<tr>
<td>ET-1080-MS-24</td>
<td>ET80-24MCW</td>
<td>STH-3MSR</td>
</tr>
<tr>
<td>ET-1080-SLM-24</td>
<td>ET80-24MCWH</td>
<td>STH-4MSR</td>
</tr>
<tr>
<td>E50-24MCW</td>
<td>ET80-241575W</td>
<td>STH-2R24MCCH</td>
</tr>
<tr>
<td>E50-24MCWH</td>
<td>ET90-24MCC</td>
<td>STH-3R24MCCH</td>
</tr>
<tr>
<td>E50-241575W</td>
<td>ET90-24MCCH</td>
<td>STH-4R24MCCH</td>
</tr>
<tr>
<td>E60-24MCCH</td>
<td>E70-24MCW</td>
<td>STH-4M30WC</td>
</tr>
<tr>
<td>E60-24MCWH</td>
<td>E70-24MCCH</td>
<td>STH-90-R24MCCH</td>
</tr>
</tbody>
</table>

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

**Bells:**

MB-G6-24

MB-G10-24