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**INSTALLATION INSTRUCTIONS
REMOTE MICROPHONE EXPANSION MODULE**

Use this product according to this instruction manual. Please keep this instruction manual for future reference.


Model Numbers:

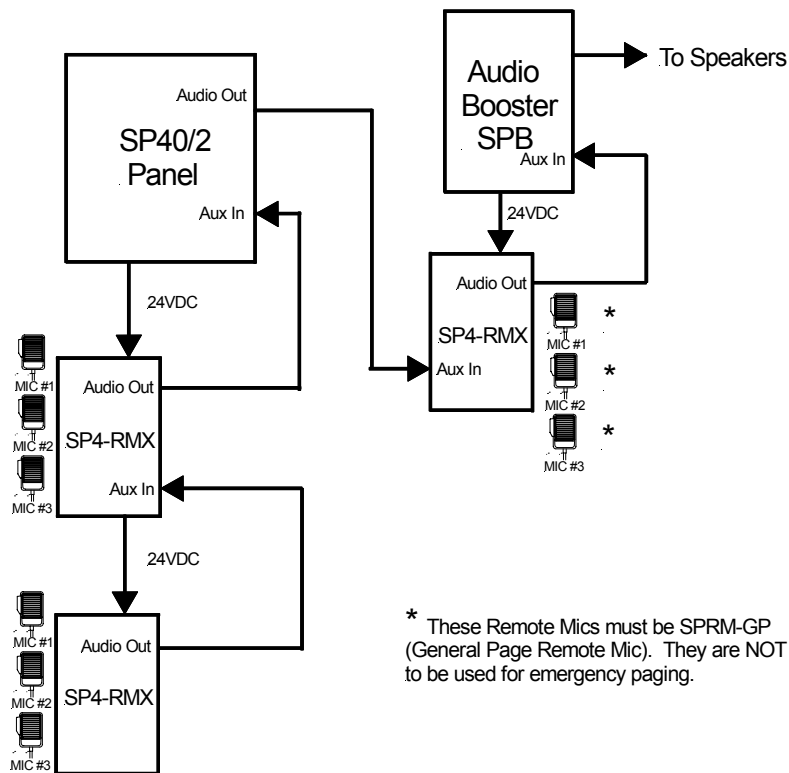
SP4-RMX 109919 Remote Microphone Expansion Module

General:

The SP4-RMX is an outboard expansion module for use with the SafePath4 system. It is used to expand the number of optional Remote Microphones (SPRM or SPRM-GP) to three. The PCB assembly is mounted in an enclosure.

READ THESE INSTRUCTIONS CAREFULLY BEFORE USING THIS PRODUCT.

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



**Figure 1:
Basic Capabilities of the SP4-RMX**

Two SP4-RMX modules can be ganged together when connecting them to an SP40/2 panel. This provides a maximum of six remote microphones providing “All Call” for the entire system. One SP4-RMX can be connected to each audio booster providing three non-alarm/general page remote microphones for that audio booster audio output. Each SP4-RMX provides a line level, 600 Ohm auxiliary audio input.

There are two configurations for the Priority levels of the remote microphones can be set. One configuration sets the priorities as: RM1, priority 1; RM2, priority 2; and RM3, priority 3. For instance, if RM3 is broadcasting, RM1 or RM2 can override RM3. The other configuration allows the first remote microphone to broadcast to have the top priority until it completes its message. The remote microphones operate on a first in – first out basis.

Technical Specifications:

Electrical

Input Voltage	24 VDC
Input Current	52mA max RM Page 62mA max Standby
Auxiliary Audio Input	1Vrms
Relay Ratings	K1 and K3: 2A, 30Vdc, 1pF K2, K4, K5, and K6: 1A, 30Vdc, 1pF
Remote Microphone (SPRM)	

Mechanical

Dimensions (H x W x D)	13.0" x 7.6" x 2.15", 33cm x 19.4cm x 5.4cm
Weight	3.8 pounds, 1.7kg
Enclosure	0.050" Steel
Finish	Black
Mounting	Indoor Surface Mount Top and Bottom Wiring Entry

Environmental

(Meets UL requirements)	
Operating Temperature	32° to 120.2 ° F (0° to +49° C)
Storage Temperature	-4° to 158° F (-20° to 70° C)
Humidity	85±5% @ 30±2° C Non-condensing

Installation:

The lives of people depend upon your safe installation of the SP4-RMX. Please read, understand and follow the specific installation instructions set forth below to avoid damage to the SP4-RMX and equipment connected to it. Installation should be conducted only by qualified persons in accordance with procedures in this manual.

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

⚠ CAUTION: The SP4-RMX printed circuit board is sensitive to static electricity and has delicate components mounted on it. Before handling either a board or any component on a board, discharge any static electricity from your body by touching a grounded object such as a metal screw which is connected to earth ground. Handle the board by its edges, and be careful not to twist or flex it.

⚠ CAUTION: When the SPRM-GP is used on a SP4-RMX and SPB-80/160/320 location, the paging from that microphone will only be heard from zones that have BGM turned on in the software.

Install the SP4-RMX in a static free area and the user is to properly attach grounded wrist straps before touching any static sensitive areas. After handling printed circuit boards, the SP4-RMX should be tested in accordance with the "System Checkout" section to verify that the printed circuit boards are undamaged and functioning properly.

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

Installation Guidelines:

1. Prepare a drawing of the complete system wiring. (Keep copies of the system wiring drawing and this SP4-RMX Installation Instructions with the SAFEPTH4 panel for reference.) These Installation Instructions shall be made available to all qualified personnel who operate, test, maintain, or service SAFEPTH4 products.
2. Carefully unpack the SP4-RMX and make sure each item described on the packing slip is present and undamaged.
3. Mount the SP4-RMX in the desired location as described in the "Mounting" section.
4. Mount any additional wiring boxes or junction boxes needed to interconnect field wiring.
5. Connect conduit fittings or bushings as needed using knockouts provided on the top and bottom of the SP4-RMX units (see Figure 2).
6. Install field wiring in conduit when necessary, following the National Electrical Code and local codes for the type of system being installed. Make all necessary connections at any additional wiring or junction boxes.

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

7. Connect the SP4-RMX to earth ground, following the National Electrical Code and local codes for the type of system being installed.
8. Check the integrity of all field wiring following the directions in the "Field Wiring Checkout" section. Confirm that the specified cable is installed and that there is continuity between required points (no open circuits), with no unwanted connections (shorts) to other conductors, chassis, or earth ground.
9. Connect the wiring to the appropriate terminals of the SP4-RMX modules following the directions in the "Field Wiring" section and the system wiring drawing you created in Step 1.
10. Set the switches for the proper configuration as described in the "Application" sections.

Wiring Guidelines:

Use shielded twisted pair wire for all audio input and output wiring. Follow national and local regulations for conduit use.

The shield of each cable should be connected only at one end. Each shield of each cable that connects to the SP4-RMX is to connect to the grounding terminal provided near the right edge of the chassis (see Figure 2).

⚠ CAUTION: All SP4-RMX wiring should be routed away from any high voltage or high current lines (such as AC or DC power lines, audio power lines, and motor or relay actuation lines) and should be installed in separate conduit from high voltage or high current lines.

The National Electrical Code defines two types of circuits for protective signaling systems: power limited circuits and non-power limited circuits. All SP4-RMX circuits have been designed as power limited circuits. Do not run power limited and non-power limited in the same conduit.

⚠ 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 complies with the latest NEC requirements for power limited circuits.

Wiring Specifications:

Between SP40/2 (or Audio Booster) and SP4-RMX

Cable Size:	14 - 22 AWG Shielded. One end of the shield must be connected at the SafePath4 panel or SP4-RMX enclosure.
Maximum Length:	20 Feet
Restrictions:	All wiring between SP40/2 (or Audio Booster) and SP4-RMX must be run in conduit and within the same room.

Between each SPRM and SP4-RMX

Cable Size:	14 - 22 AWG Shielded. The shield must be connected only at the SP4-RMX enclosure.
Maximum Length:	2000 Feet
Maximum Capacitance:	05uF/Total Run (50pF/foot for 1000 FT.)

Mounting:

The SP4-RMX shall be mounted in a location within the environmental limits specified in the latest UL Standard for indoor control panels. It shall not be located in a hazardous location. Refer to the "Technical Specifications" section.

⚠ CAUTION: In order to comply with the latest NFPA and UL requirements for interconnection of fire alarm control equipment, the SP4-RMX unit must be located in the same room as, and within 20 feet of the SAFEPATH4 Panel it is connected to.

Refer to Figure 2 for SP4-RMX mounting hole layout. Drill mounting holes for appropriate screws and anchors to ensure secure mounting to the type of surface at the selected location. Keep out dust and dirt during installation. Dust and dirt can interfere with the operation and reduce the life of the equipment.

Remove the outer cover and mount at the selected location. ***Use care to avoid damage to the PC board during installation.*** Do not apply excessive pressure to the PC board or its components; including field wiring terminals and connectors or damage may occur.

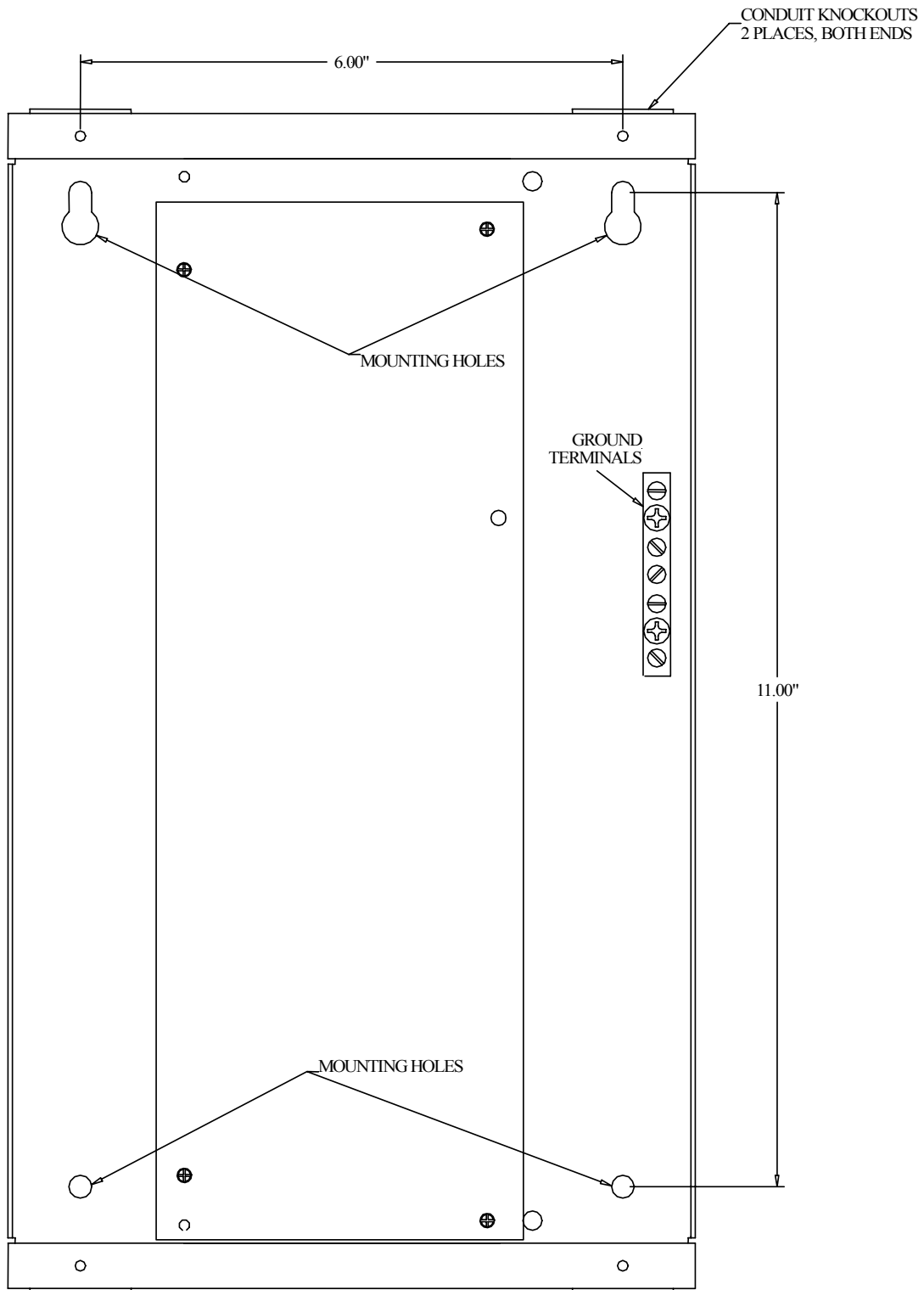


Figure 2:
SP4-RMX Mounting

NOTE: Drawing is not to scale.

SP40/2 Applications:

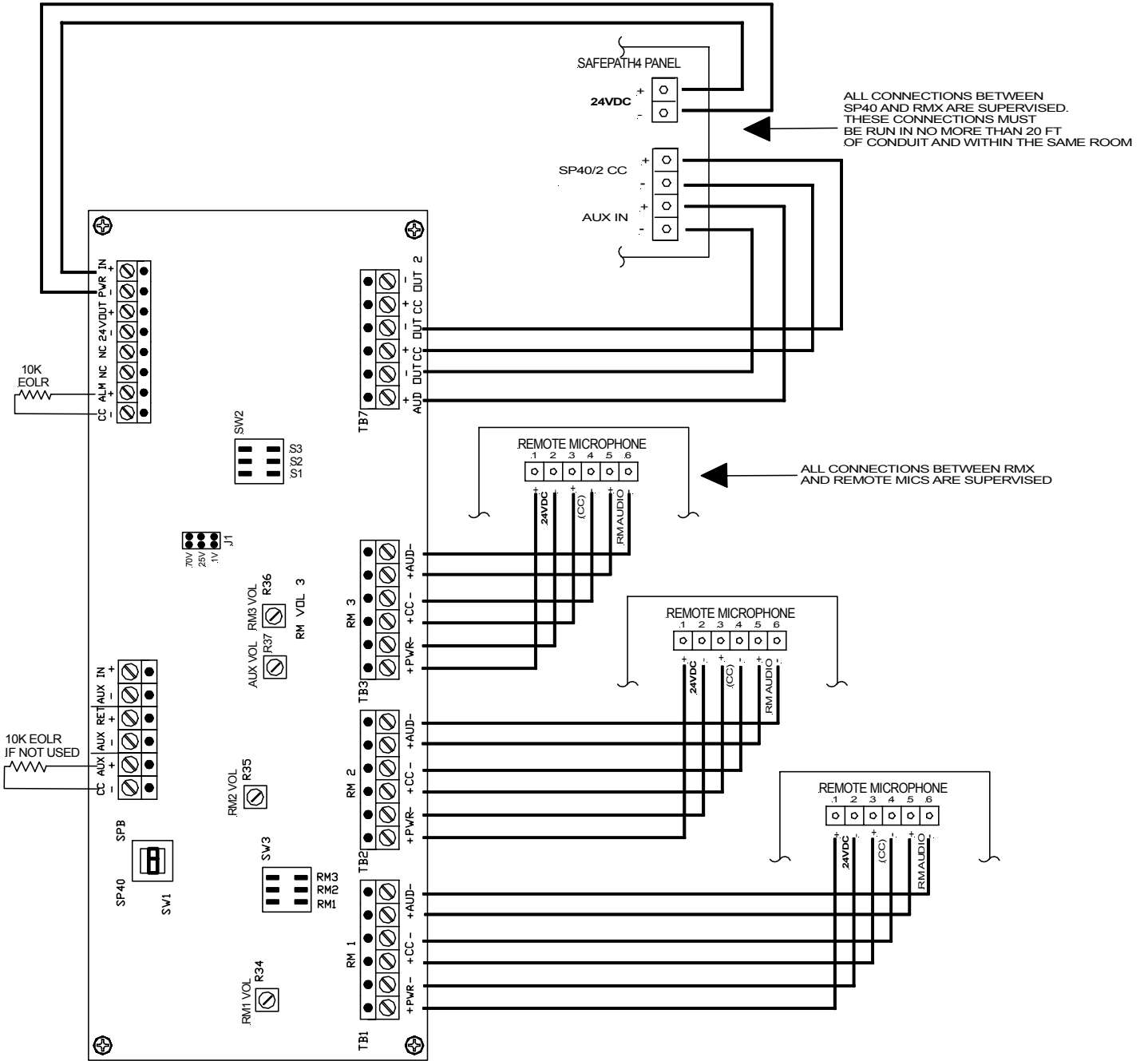


Figure 3:
Wiring Diagram with up to 3 Remote Microphones to an SP40/2

NOTE: If the SP4-RMX is configured for less than 3 Remote Microphones, the DIP switch for the unused Remote Microphone port (SW3) must be turned OFF.

NOTE: When the RMX is connected in SP40/2 mode, all wiring to and from the SP4-RMX are Power Limited.

Set switches and jumpers on the SP40/2 as follows:

- Set jumper J2 to 1V position.
- Set SW4 to the contact closure (CC) position.
- Remove jumper W5 to enable supervision of the CC input wiring.

Set switches and jumpers on the SP4-RMX as follows

- Set SW1 to the SP40 position.
- Set Jumper J1 to 1V.
- Set switches on switch block SW3 to the ON position for each SPRM connected. Insure the corresponding switch is OFF for any SPRM inputs not used.
- Set S1 switch on SW2 to the desired position according to Table 1. Set S2 to ON. Switch S3 to the ON Position.

SP40/2 with Two Ganged SP4-RMX Modules

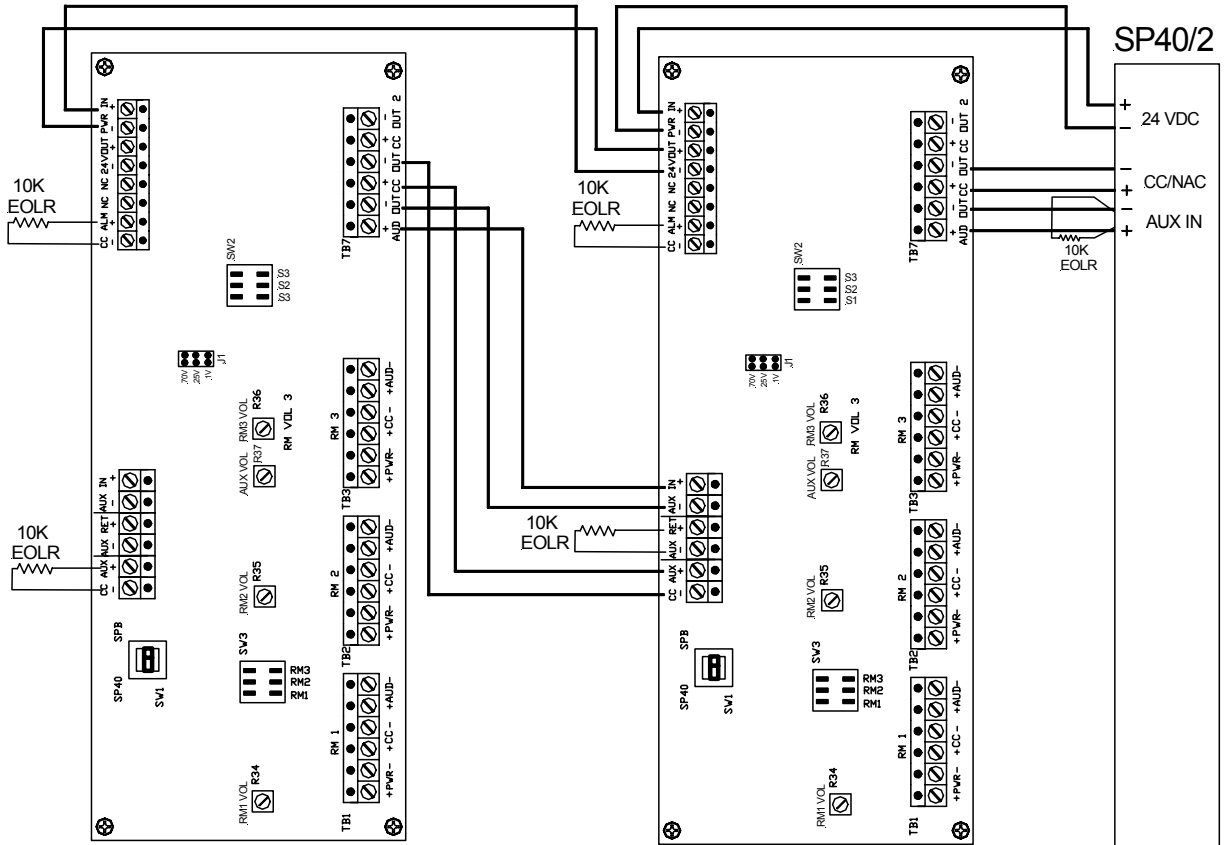


Figure 4:
Two Ganged SP4-RMS Modules

Set switches and jumpers on the SP40/2 as follows:

- Set jumper J2 to 1V position.
- Set SW4 to the contact closure (CC) position.
- Remove jumper W5 to enable supervision of the CC input wiring.

Set switches and jumpers on the SP4-RMX as follows

- Set SW1 to the SP40 position.
- Set Jumper J1 to 1V.
- Set switches on switch block SW3 to the ON position for each SPRM connected. Insure the corresponding switch is OFF for any SPRM inputs not used.
- Set switch S1 on SW2 to the desired position according to Table 1. Set S2 to ON. Switch S3 to the OFF position.

ALL CONNECTIONS BETWEEN SPB AND RMX ARE SUPERVISED. THESE CONNECTIONS MUST BE RUN IN NO MORE THAN 20FT OF CONDUIT AND WITHIN THE SAME ROOM.

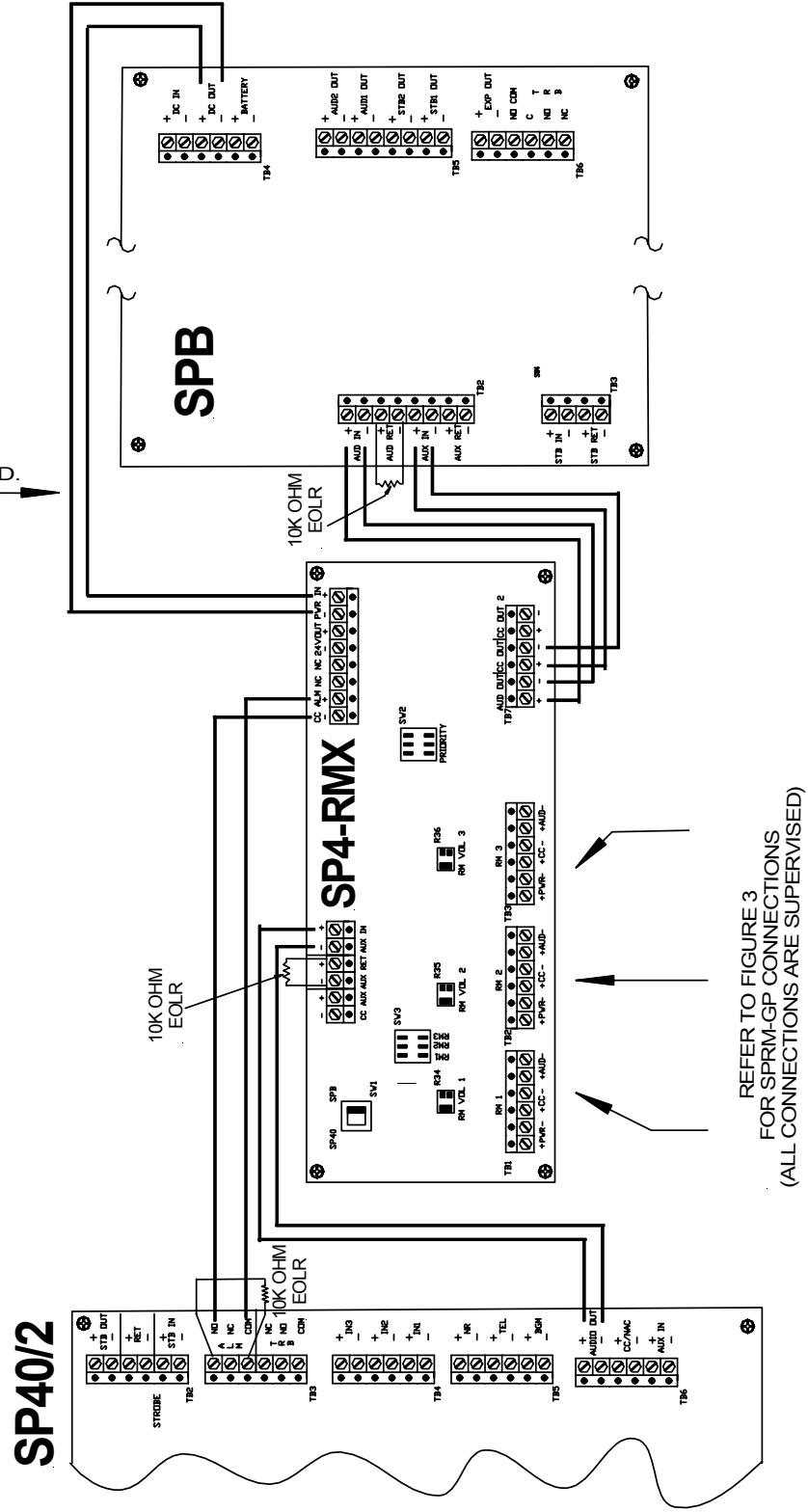


Figure 5: SP4-RMX Connections Diagram When Using an SPB

Instructions for Connecting to an Audio Booster Panel

NOTE: The SP4-RMX cannot be connected to an Audio Amplifier (SPB) with a PC board revision “K” or lower. The SP4-RMX can only be connected to SPB PC board with revisions “N” or higher.

One SP4-RMX can be used with each Audio Booster panel. When one of the remote microphones is used, it will only broadcast on the circuit(s) connected to the audio booster audio output.

The SP4-RMX is connected to the Audio Booster when the SPB is in the 4-wire mode.

The 25V or 70V audio output of the SP40/2 is wired to the AUX IN on the SP4-RMX. The AUD OUT of the SP4-RMX is then wired to the AUDIO IN on the SPB.

Set switches and jumpers on the SP4-RMX as follows


- Set SW1 to the SPB position.
- Set Jumper J1 to 25V or 70V matching the voltage setting of the SP40/2 audio output..
- Set switches on switch block SW3 to the ON position for each SPRM connected. Insure the corresponding switch is OFF for any SPRM inputs not used.
- Set switch S1 on SW2 to the desired position according to Table 1. Set S2 to ON. Switch S3 to the ON position.

Set switches and jumpers on the SPB as follows:

- Set SW1 to the CC (contact closure) position.
- Remove jumper W1 to enable supervision of the CC input wiring.
- Move jumper J2 to the 1V position.

Field Wiring Checkout:

Refer to NFPA for guidelines on testing signaling system wiring.

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

1. Verify that the field wiring is in full agreement with this manual and with the detailed wiring layout prepared for this installation. Ensure that no unwanted voltages are present on circuit conductors and ground.
2. Test all ungrounded connectors for electrical isolation from ground.
3. Test all wires that are not intentionally connected for electrical isolation from each other.
4. Measure and record the resistance of each circuit pair (this can be done by temporarily short circuiting one end of the circuit).

Configuration:

The following table describes the switch and jumper settings on the SP4-RMX

**Table 1:
Switch and Jumper Descriptions**

Switches	Remarks
SW1 – SP40/SPB Select	Selects SP40 or SPB use
SW2	
S1 - Priority	ON – Sets priority order of RM1, RM2, RM3. OFF – Sets remote microphones for first in use, first out.
S2 – Not Used	For future use. Leave in ON position.
S3 – Gang Mode	OFF – Gang mode. Both SP4-RMX modules set to OFF. ON – Single SP4-RMX module.
SW3 – RM Input Select	ON – Selects Corresponding RM input. OFF – proper position when RM input not used.
Jumper	Remarks
J1 – AUX Input Voltage Select	
1V	Set for SP40/2.
25V/70V	Set for audio output of SP40/2 during SPB mode.

Operation:

The SP4-RMX is capable of expanding the remote microphone capabilities of the SP40/2 and SPB audio boosters. In SP40 mode, each SP4-RMX provides the capability of connecting and supervising up to three SPRM emergency remote microphone modules. In SPB mode, the SPRM-GP (General Page Remote Microphones) must be used. These microphones are for general pages only. These pages are non-emergency messages. Any trouble condition on the SPRM modules, input and output wiring will light the system trouble LED indicator and one of the trouble location LED indicators. Follow the trouble shooting procedures if these LED indicators are lit.

When the SP4-RMX is used to expand the remote microphone modules for the SP40/2, it is connected to the AUX IN on the SP40/2. The priority selection of the remote microphone modules will be after the SP40/2 onboard microphone (Priority 1). The priorities of the SPRM modules of a second SP4-RMX gang connected to the first will follow the priorities of the SPRM modules connected to the first SP4-RMX.

Priority Levels on SP40/2 with SP4-RMX Connected

*Table 2:
Priority Levels SP40/2 to SP4-RMX*

Priority	Source	Remarks
1	SP40/2 Onboard Mic	
2	SPRM #1 or First In First Out	Can be configured to operate as First In First Out
3	SPRM #2 or First In First Out	
4	SPRM #3 or First In First Out	
5	AUX IN or Second SP4-RMX	Can be configured to operate as First In First Out
6 to 8	SP40/2 DV Messages from 3MEM module	
9 to 11	SP40/2 DV Messages	IN1, IN2, IN3
12 to 14	SP40/2 Non Alarm Audio Outputs	NR, TEL, BGM

When the SP4-RMX is used for connecting SPRM modules to any of the SPB audio booster modules, the SP40/2 AUDIO OUT is connected to the SP4-RMX AUX IN and the SP4-RMX AUDIO OUT is connected to the SPB AUDIO IN. This means that the priority level of the SPRM-GP modules are after the digital voice messages on the SP40/2 and are considered non-alarm conditions.

Priority Levels on SPB with SP4-RMX Connected

*Table 3
Priority Levels SP4-RMX to SPB*

Priority	Source	Remarks
1	SP40/2 Onboard Mic	
2	SP40/2 AUX IN	Can be a single SPRM or an SP4-RMX used for ALL CALL
3 to 5	SP40/2 DV Messages from 3MEM module	
6 to 8	SP40/2 DV Messages	IN1, IN2, IN3
9	SPRM-GP #1 or First In First Out	Can be configured to operate as First In First Out. NOT FOR EMERGENCY USE.
10	SPRM-GP #2 or First In First Out	
11	SPRM-GP #3 or First In First Out	
12 to 14	SP40/2 Non Alarm Audio Outputs	NR, TEL, BGM

TROUBLESHOOTING:

The SP4-RMX contain yellow LED indicators that, when illuminated, indicate a trouble condition. A trouble condition will also occur on the SP40/2.

LED trouble indication on the SP40/2 when the SP4-RMX is connected to it

The D13 TRB LED indicator and D49 AUX IN LED indicator on the SP40/2 will illuminate when the SP4-RMX has a trouble condition.

LED trouble indications on the SP40/2 and SP4-RMX when the SPB indicates a trouble condition

The D13 TRB LED indicator and D54 AUDIO SHORT LED indicator on the SP40/2 will illuminate; D29 SYS TRB and D23 WIRE SHT on the SP4-RMX when the SPB has a trouble condition.

Use the following troubleshooting table to locate the trouble area.

Table 4:
Trouble LED Indicators

D30 SYS PWR	D29 SYS TRB	LED Indicator	Remarks
ON	OFF		Normal
OFF	OFF		24VDC not applied. Check PWR IN terminals. If 24VDC is present then SP4-RMS module is defective. Replace.
ON	ON		RM CC input shorted in excess of 2 1/2 minutes or Defective SP4-RMX module.
		D22 WIRE Open	AUD OUT circuit open or 10K Ohm EOLR missing.
		D23 WIRE SHT	AUD OUT circuit shorted.
		D24 AUX TRB	AUX IN circuit open or 10K Ohm EOLR missing.
		D25 ALM TRB	ALM TRB circuit open or 10K Ohm EOLR missing.
		D26 RM1 TRB	RM1 CC circuit open or RM1 module in trouble condition.
		D27 RM2 TRB	RM2 CC circuit open or RM2 module in trouble condition.
		D28 RM3 TRB	RM3 CC circuit open or RM3 module in trouble condition.

Malfunctioning modules should be returned to the manufacturer for repair or replacement.

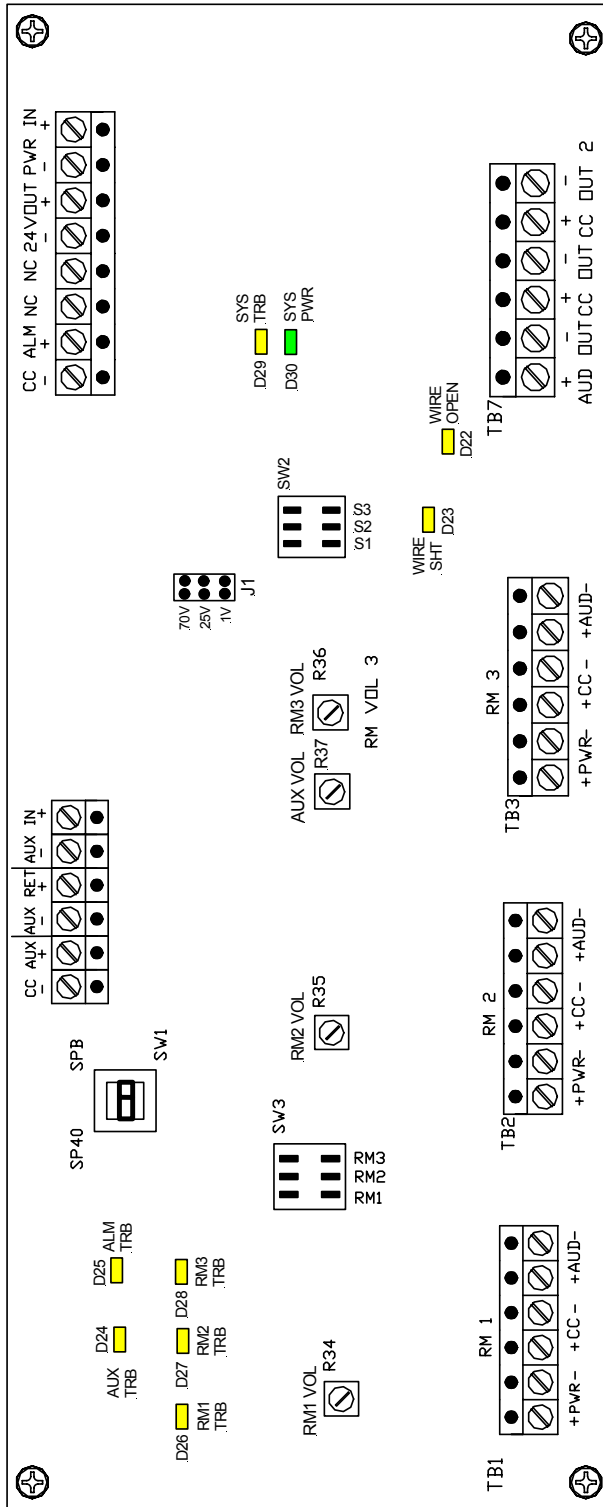


Figure 6:
SP4-RMX PC Board Layout

Limited Warranty

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

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