

*Model EMS-4001*  
*Expansion Master Station*  
*User Instructions*



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See the enclosed warranty card for further details.

## CUSTOMER SUPPORT

Technical questions should be directed to:  
Customer Service Department  
Bosch Security Systems, Inc.  
12000 Portland Avenue South  
Burnsville, MN 55337 USA  
Telephone: 800-392-3497  
Fax: 800-323-0498

## RETURN SHIPPING INSTRUCTIONS

Customer Service Department  
Bosch Security Systems, Inc. (Lincoln, NE)  
Telephone: 402-467-5321  
Fax: 402-467-3279  
Factory Service: 800-553-5992

Please include a note in the box which supplies the company name, address, phone number, a person to contact regarding the repair, the type and quantity of equipment, a description of the problem and the serial number(s).

## SHIPPING TO THE MANUFACTURER

All shipments of product should be made via UPS Ground, prepaid (you may request from Factory Service a different shipment method). Any shipment upgrades will be paid by the customer. The equipment should be shipped in the original packing carton. If the original carton is not available, use any suitable container that is rigid and of adequate size. If a substitute container is used, the equipment should be wrapped in paper and surrounded with at least four (4) inches of excelsior or similar shock-absorbing material. All shipments must be sent to the following address and must include the Proof of Purchase for warranty repair. Upon completion of any repair the equipment will be returned via United Parcel Service or specified shipper, collect.

Factory Service Department  
Bosch Security Systems, Inc.  
8601 East Cornhusker Hwy.  
Lincoln, NE 68507 U.S.A.  
Attn: Service




## FCC STATEMENT

This equipment uses, and can radiate radio frequency energy that may cause interference to radio communications if not installed in accordance with this manual. The equipment has been tested and found to comply with the limits of a Class A computing device pursuant to Subpart J, Part 15 of FCC Rules which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment

in a residential area may cause interference which the user (at his own expense) will be required to correct.

This package should include:

QTY	DESCRIPTION	PART NO.
		90107713000 (US)
1	EMS4000 Final Assembly	or 90107713001 (EU)
2	Power Cord	2504000300
3	User Manual	93507713000
4	Warranty Card	38110390
5	User Information	38110668
6	Statement of Conformity	38110675
7	Int'l Cordsets, European model only	550024000

 THE LIGHTNING FLASH AND ARROWHEAD WITHIN THE TRIANGLE IS A WARNING SIGN ALERTING YOU OF "DANGEROUS VOLTAGE" INSIDE THE PRODUCT.	 CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER-SERVICABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.	 THE EXCLAMATION POINT WITHIN THE TRIANGLE IS A WARNING SIGN ALERTING YOU OF IMPORTANT INSTRUCTIONS ACCOMPANYING THE PRODUCT
SEE MARKING ON BOTTOM/BACK OF PRODUCT		


**WARNING:** APPARATUS SHALL NOT BE EXPOSED TO DRIPPING OR SPLASHING AND NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHALL BE PLACED ON THE APPARATUS.

**WARNING:** THE MAIN POWER PLUG MUST REMAIN READILY OPERABLE.

**CAUTION:** TO REDUCE THE RISK OF ELECTRIC SHOCK, GROUNDING OF THE CENTER PIN OF THIS PLUG MUST BE MAINTAINED.

**WARNING:** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

**WARNING:** TO PREVENT INJURY, THIS APPARATUS MUST BE SECURELY ATTACHED TO THE FLOOR/WALL/RACK IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS.

	This product is AC only.
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## *Important Safety Instructions*

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



# Table of Contents

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<i>IMPORTANT SAFETY INSTRUCTIONS</i> .....	3
<b>INTRODUCTION</b> .....	<b>7</b>
<i>Description</i> .....	7
<i>Features</i> .....	8
<b>INSTALLATION</b> .....	<b>11</b>
<i>Configuration Pre-check</i> .....	11
<i>DIP Switches</i> .....	11
<i>PROGRAM INTERRUPT DIP SWITCHES</i> .....	11
<i>AUDIO CALL SEND AND RECEIVE DIP SWITCHES</i> .....	11
<i>Balanced/Unbalanced Switch</i> .....	11
<i>Direct Program Listen Enable/Disable Jumpers</i> .....	12
<i>Sidetone Trimmers</i> .....	12
<i>Mounting Configurations</i> .....	14
<i>Connection Notes</i> .....	14
<i>Cables</i> .....	15
<b>OPERATION</b> .....	<b>17</b>
<i>Power-Up</i> .....	17
<i>Sidetone Adjustments</i> .....	17
<i>Operation</i> .....	18
<i>Specifications</i> .....	19

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# *Introduction*

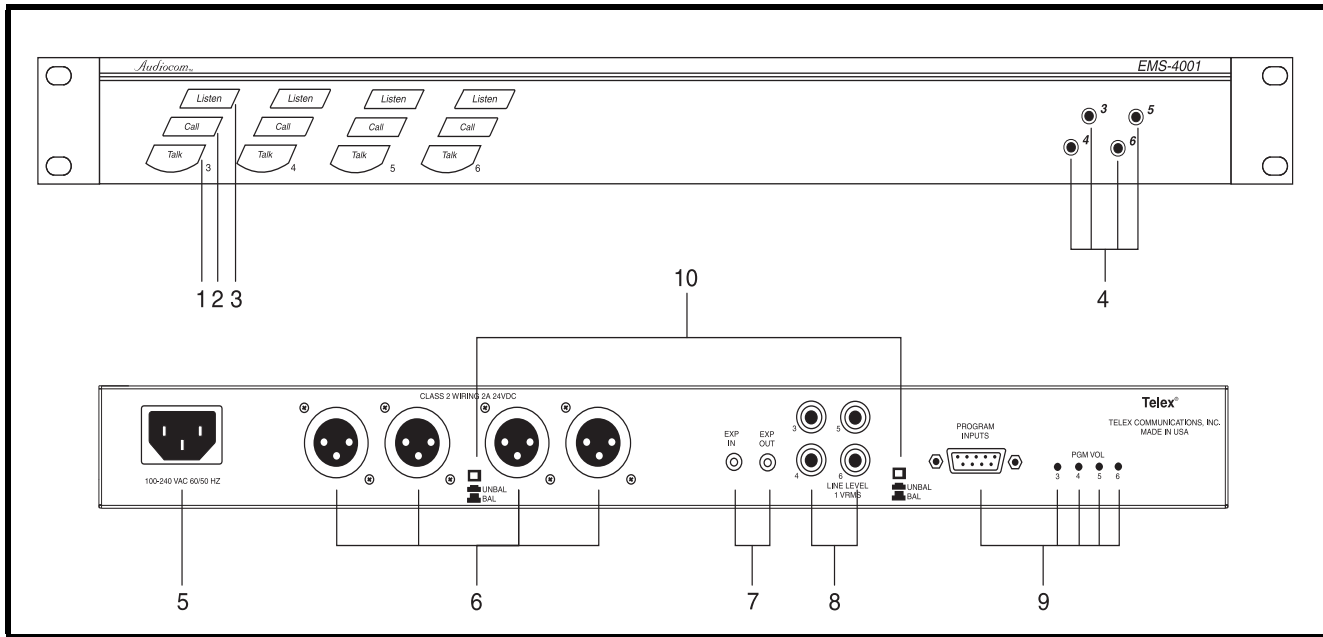
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## *Description*

The EMS-4001 adds four (4) powered intercom channels to an MS-2001 Master Station, and it provides talk, listen and call buttons for the added channels. Up to four (4) EMS-4001 Expansion Master Stations may be connected to the MS-2001 allowing up to 16 channels (18 channels total). The MS-2001 microphone is used to talk back to the EMS-4001 channels, and the MS-2001 speaker is typically used for listening. However, there are also separate speaker jacks on the back panel of the EMS-4001 for independent monitor speakers, if desired. There are also four (4) additional program inputs on the back of the EMS-4001, one (1) for each added channel.

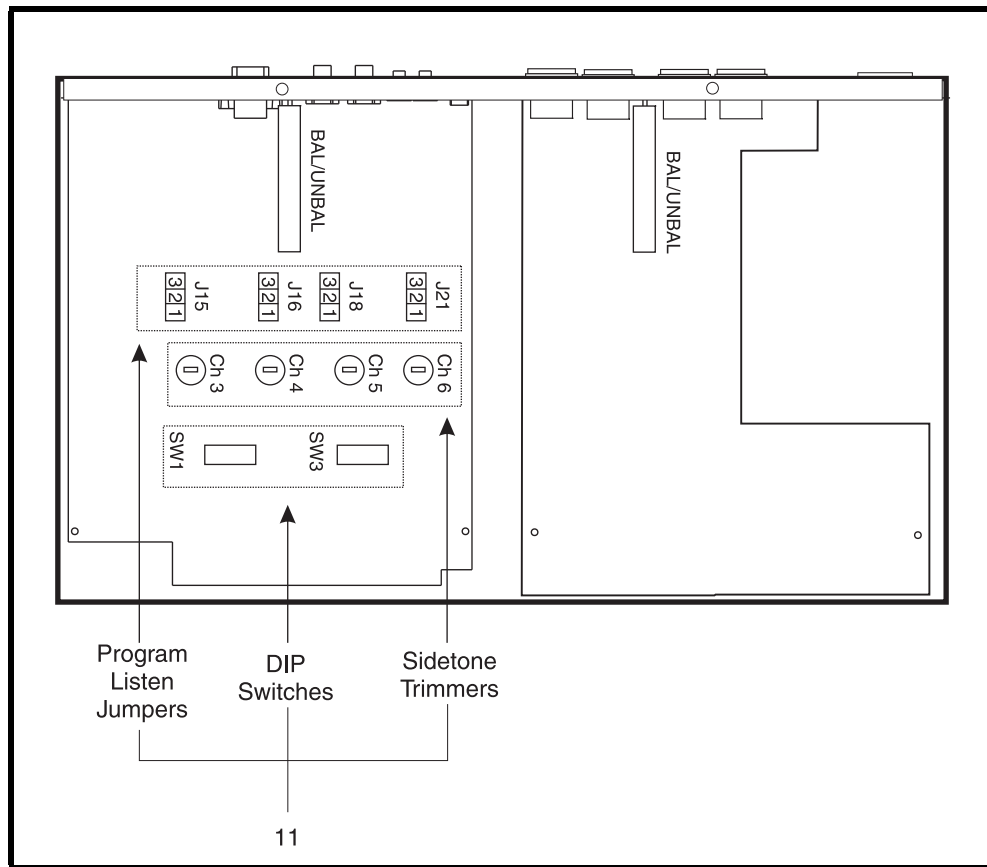
The MS-2001/ EMS-4001 combination can be used as a simple, multi-channel intercom user stations. In this configuration, the program inputs (and possibly the PA output of the MS-2001) are most likely not used, and the station operator has only talk, listen and call capability. It is also possible the advanced features of the MS-2001, such as Mic Kill Send, might be turned off. Alternatively, the MS2001/ EMS-4001 can be used as a master station. In this application, one (1) or more program inputs and the PA output may be connected, and the program signals to the intercom channels can be turned on or off from the MS-2001. Additionally, the Mic Kill Send feature can be enabled, and microphones on any channels may then be turned off from the MS-2001.



**FIGURE 1.** EMS-4001 Front and back features

1. **Intercom Talk Keys** - Momentary or latching (hands-free operation possible).
2. **Call Keys** - Used to call intercom channels and to indicate incoming calls.
3. **Intercom Listen Keys** - Momentary or latching operation possible.
4. **Channel Power Status Indicators** - The indicators are green for normal operation and change to red if there is a short circuit or overload condition on a power output line. If an indicator turns red, either disconnect the corresponding channel connector or turn off the intercom system and locate the problem before resuming operation.
5. **Universal AC Power Connector** - The unit accepts any input power in the range of 100-240VAC, 50/60Hz.
6. **Intercom Channel Connectors** - These connectors provide the power and audio connections for each of the four (4) intercom channels.
7. **EXP IN and EXP OUT Connectors** - The EXP IN connector receives the microphone audio signal from the MS-2001, and it sends the monaural mix of the four (4) EMS-4001 channels to the MS-2001 speaker or headset. The EXP OUT connector connects to the EXP IN connector of an additional EMS-4001. Up to four (4) EMS-4001 Expansion Master Stations may be daisy chained with the EXP IN and EXP OUT connectors. An EXP IN/OUT cable is supplied with each EMS-4001.
8. **Speakers** - Usually, the listen mix of all four (4) EMS-4001 channels is sent to the MS-2001 speaker or headset via the EXP IN connector. Alternatively, speakers may be connected to one (1) or more of the speaker outputs of the EMS-4001.
9. **Program Input Connector and Trimmers** - Each intercom channel has its own program input and level adjust trimmer. For each program input, there is an internal jumper which routes the program either to the intercom channel only, or to both the intercom channel and the MS-2001 headset or speaker (default setting). Additionally, the program signal to the intercom channel may be turned on or off via the MS-2001 front panel programming. There is also an internal program interrupt DIP switch that selects either automatic program interrupt when the station operator activates a channel's talk key, or no program interrupt during talk. The EMS-4001 program input connectors may be broken out to common 3-pin XLR audio cables using the optional XP-4PGM Breakout Panel.
10. **BAL/UNBAL Switch** - This selector switch sets the EMS-4001 for compatibility with either Audiocom or Clear-Com channel connector pinouts, channel power requirements, and call signaling requirements.
11. **Configuration Switches, Jumpers and Sidetone Controls** - These let you customize the operation of the EMS-4001 to match your intercom system requirements.





**FIGURE 2.** EMS-4001 Internal DIP switches, jumpers, and adjustments



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### *Configuration Pre-check*

Before making connections, read the following configuration notes, and make sure all switches and jumpers are properly set for your intended usage. Locations of configuration switches and jumpers are shown in Figure 2 on page 9. Only the DIP switches and jumpers require internal access. If access is required, remove three (3) screws from the top cover and three (3) screws along the bottom edge from each side.

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### *DIP Switches*

DIP Switches and their default settings are listed in Table 1 on page 13.

#### **Program Interrupt DIP Switches**

Each intercom channel has a dedicated program input. These can be used to feed background music, mix-minus audio (for broadcasting usage) etc. to the channels. If external program sources are connected to the EMS-4001, you have a choice of whether or not you want the program audio to interrupt (shut off) on the intercom channel while the MS-2001/EM-4001 station operator is talking.

#### **Audio Call Send and Receive DIP Switches**

By default, all channels of the EMS-4001 can send and receive Audiocom call signals. You can disable call send or call receive capability for selected channels, if desired.

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### *Balanced/Unbalanced Switch*

The **BAL/UNBAL Switch** is located on the back panel. The switch must be set to the balanced (BAL) position for use with an Audiocom Intercom System. Set the switch to the unbalanced (UNBAL) position when using the unit with a Clear-Com Intercom System.

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## *Direct Program Listen Enable/Disable Jumpers*

By default, each program input can be heard by intercom stations on the corresponding intercom channel. This can be turned on or off for each program input via the MS-2002 front panel programming.

**REFERENCE:** See Turning the Program Inputs ON and OFF in the Operations section of the MS-2002 User Instructions (P/N 9350-7749-000) which can be found at <http://www.telexaudiocom.com/manuals.php>.

Additionally, all program signals can be heard directly in the MS-2001 speaker or headset, and each program is output at the corresponding speaker jack on the back of the EMS-4001.

To **disable direct program listening for a program input**, do the following:

- > Reset the appropriate jumper as shown in table 2 on page 14.

**NOTE:** Jumper locations are shown in figure 2 on page 9.

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## *Sidetone Trimmers*

These trimmers are normally adjusted after all components are connected, and they can be accessed through the bottom cover as depicted in Figure 4 on page 18.

**REFERENCE:** See the sidetone adjustment procedure in the MS-2002 User Instructions (P/N 9350-7749-000) which can be found at <http://www.telexaudiocom.com/manuals.php>.

**TABLE 1.** EMS-4001 configuration switch settings

SWITCH NUMBER	DESCRIPTION	SETTINGS	DEFAULT SETTING
<b>DIP Switch SW1 (Internal)</b>			
SW1-1	Program Interrupt, CH6	On (Closed): Enabled Off (Open): Disabled	Off
SW1-2	Program Interrupt, CH5	On (Closed): Enabled Off (Open): Disabled	Off
SW1-3	Program Interrupt, CH4	On (Closed): Enabled Off (Open): Disabled	Off
SW1-4	Program Interrupt, CH3	On (Closed): Enabled Off (Open): Disabled	Off
SW1-5	Audio Call Send, CH3 <sup>a</sup>	On (Closed): Enabled Off (Open): Disabled	On
SW1-6	Audio Call Receive, CH3 <sup>a</sup>	On (Closed): Enabled Off (Open): Disabled	On
SW1-7	Audio Call Send, CH4 <sup>a</sup>	On (Closed): Enabled Off (Open): Disabled	On
SW1-8	Audio Call Receive, CH4 <sup>a</sup>	On (Closed): Enabled Off (Open): Disabled	On
<b>Balanced (BAL) - Unbalanced (UNBAL) operation</b> <b>Important!</b> Both switches on the back of the unit must be set the same			
SW1	Audiocom or Clear-Com Operation	Out (Audiocom): BAL In (Clear-Com): UNBAL	Out
SW2	Audiocom or Clear-Com Operation	Out (Audiocom): BAL In (Clear-Com): UNBAL	Out
<b>DIP Switch SW3 (Internal)</b>			
SW2-1	Audiocom Call Send, CH 5 <sup>a</sup>	On (Closed): Enabled Off (Open): Disabled	On
SW2-2	Audiocom Call Receive, CH 5 <sup>a</sup>	On (Closed): Enabled Off (Open): Disabled	On
SW2-3	Audiocom Call Send, CH 6 <sup>a</sup>	On (Closed): Enabled Off (Open): Disabled	On
SW2-4	Audiocom Call Receive, CH 6 <sup>a</sup>	On (Closed): Enabled Off (Open): Disabled	On
SW2-5	Not Used	On (Closed): Enabled Off (Open): Disabled	N/A
SW2-6	Not Used	On (Closed): Enabled Off (Open): Disabled	N/A
SW2-7	Not Used	On (Closed): Enabled Off (Open): Disabled	N/A
SW2-8	Not Used	On (Closed): Enabled Off (Open): Disabled	N/A

a. These switches apply only when in Audiocom (BAL) mode. Call send and receive are always enabled in Clear-Com (UNBAL) mode.

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**TABLE 2.** EMS-4001 jumper settings

<b>Jumper</b>	<b>Description</b>	<b>Settings for All Jumpers</b>
J15	Program 3 direct to Headset or Speaker	Pins 2&3 Shorted: Enable Pins 1&2 Shorted: Disable
J16	Program 4 direct to Headset or Speaker	Pins 2&3 Shorted: Enable Pins 1&2 Shorted: Disable
J18	Program 5 direct to Headset or Speaker	Pins 2&3 Shorted: Enable Pins 1&2 Shorted: Disable
J21	Program 6 direct to Headset or Speaker	Pins 2&3 Shorted: Enable Pins 1&2 Shorted: Disable

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### *Mounting Configurations*

The EMS-4001 mounts in a standard 19-inch equipment rack and is 1 rack unit high. Install the two (2) supplied rack mount cosmetic covers when installing the EMS-4001 in the rack.

When rack mounting components, you may not be able to access the sidetone trimmers after the components have been mounted. In this case, you can position the components in the rack and make all required connections. Then adjust the sidetone trimmers before installing and tightening all rack mount screws.

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### *Connection Notes*

Typical connections for the MS-2001/EMS-4001 are shown in figure 3 on page 17.

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## *Cables*

The numbers below correspond to the cable numbers in the connection drawing in figure 3 on page 17.

- Single channel intercom cable. Sold separately. Use Telex ME cables, below, or can also be built by using two (2) twisted pairs in a shielded cable: Pair 1 is used for pins 2 and 3. Pair 2 has both wires connected to pin 1.
  - ME-25: 25' (7.6 m) cable with male and female 3-pin XLR connectors.
  - ME-50: 50' (15.2 m) cable with male and female 3-pin XLR connectors.
  - ME-100: 100' (30.4 m) cable with male and female 3-pin XLR connectors.
- Shielded patch cable, 9-pin Male D-sub to 9-pin Female D-sub. Customer local purchase: available at most electronic stores. Note, all pins must be connected straight through (i.e., pin 1 to pin 1, pin 2 to pin 2, etc.).
- Shielded patch cable, stereo miniplug to stereo miniplug. Customer local purchase. Available at most electronic stores.
- 18" (457 mm) EXP IN/OUT cable, stereo miniplug to stereo miniplug. One (1) supplied with each EMS-4001.
- Shielded audio cable. Must have male 3-pin XLR connector at one (1) end for connection to the XP-USPG or XP-4PGM program inputs. Pin-out for program inputs is as follows:
  - Pin 1: common
  - Pin 2: + program input
  - Pin 3: - program input
- Shielded audio cable. Must have male 3-pin XLR connector at one (1) end for connection to the XP-USPG or XP-4PA output. Pin-out for PA output is as follows:
  - Pin 1: common
  - Pin 2: + PA output
  - Pin 3: - PA output





## Power-Up

To **power up the EMS-4001**, do the following:

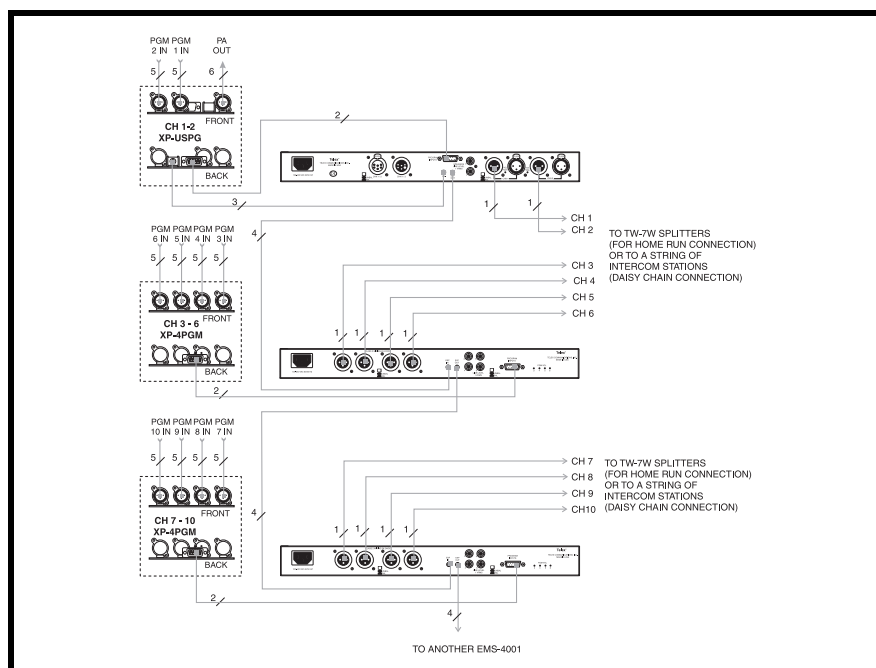
- > Plug in the **power cord**.

*The EMS-4001 channels power-up identically to channels one (1) and two (2) of the MS-2001.*

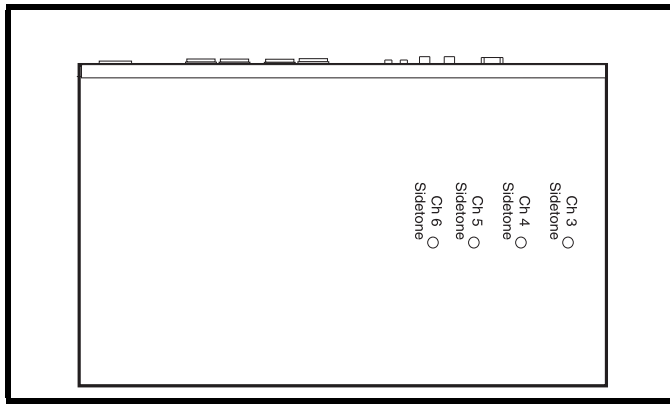
**REFERENCE:** For more information see the MS-2002 User Instructions (p/n 9350-7749-000) which can be found at <http://www.telexaudiocom.com/manuals.php> for all power-up information. The MS-2002 and EMS-4001 can be powered up in any order.

## Sidetone Adjustments

**REFERENCE:** Use the sidetone adjustment procedure as described in the MS-2001 user instructions (p/n 9350-7749-000 which can be found at <http://www.telexaudiocom.com/manuals.php>), except substitute channel 3, channel 4, etc. The locations of the EMS-4001 sidetone trimmers are shown in figure 4 on page 18.



**FIGURE 3.** Example of EMS-4001 in a system.



**FIGURE 4.** EMS-4001 sidetone adjustment locations

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## *Operation*

The EMS-4001 channels operate identically to channels one (1) and two (2) of the MS-2001.

**REFERENCE:** For more information, see the MS-2001 user instructions (p/n 9350-7749-000) which can be found at <http://www.telexaudiocom.com/manuals.php> for all operating information.

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## Specifications

### GENERAL

#### Input and Output Power:

AC Input: 100-200 VAC, 50/60Hz

Channel Power (each channel): 24  $\pm$ 1 VDC, 1  
Amp per channel (3A maximum total)

#### Dimensions:

1.75" (44.5mm) high, 19" (483mm) wide, 10.31"  
(261.9mm) deep

**Weight:** approximately 4.5 lbs (2 kg)

#### Environmental Requirements:

Storage: -20°C to 80°C (-4°F to 176°F);  
0% to 95% humidity, non-condensing

Operating: -15°C to 60°C (5°F to 140°F);  
0% to 95% humidity, non-condensing

### PROGRAM INPUT CONNECTORS

**Input Level:** 100mV maximum

**Voltage Gain:** 25  $\pm$ 3dB

**Output Level (to intercom channel):** 1.0VRMS  
nominal, 2.3VRMS max.

**Input Impedance:** 75k Ohms

**Common Mode Rejection:** Greater than 50dB

**Connector Type:** DB9F female, 9-pin D-Sub

Pin 1: Common

Pin 2: Channel 3 program in low

Pin 3: Channel 4 program in low

Pin 4: Channel 5 program in low

Pin 5: Channel 6 program in low

Pin 6: Channel 3 program in high

Pin 7: Channel 4 program in high

Pin 8: Channel 5 program in high

Pin 9: Channel 6 program in high

### INTERCOM CHANNELS, BALANCED MODE (BAL/UNBAL SWITCH SET TO BAL)

Output Level: 1VRMS nominal

Input Impedance: 300 Ohms  $\pm$ 10%

Bridging Impedance: greater than 10,000 ohms

Sidetone: -40dB, 35dB adjustable range

#### Call Signaling:

Send: 20kHz  $\pm$ 100Hz, 0.5VRMS  $\pm$ 10%

Receive: 20kHz  $\pm$ 800Hz, 100m VRMS

#### Mic Kill Frequency:

Send: 24kHz  $\pm$ 100Hz, 0.5VRMS  $\pm$ 10%

Receive: 24 kHz  $\pm$ 800 Hz, 100m VRMS

**Noise Contribution:** less than -70dB

**Common Mode Rejection Ratio:** greater than 50dB

**Connector Type:** One SLR-3M for each channel

#### Balanced Configuration Pinouts

Pin 1: DC/audio Common

Pin 2: Intercom audio low and +24 VDC output

Pin 3: Intercom audio high and +24 VDC output

### INTERCOM CHANNEL UNBALANCED MODE (BAL/UNBAL SWITCH SET TO UNBAL)

**Output Level:** 2 Vp-p (750m VRMS)

**Input Impedance:** 200 Ohms  $\pm$ 10%

**Bridging Impedance:** greater than 10k Ohms

#### Call Signaling:

Send: 11  $\pm$ 3VDC

Receive: 4VDC minimum

**Connector Type:** One XLR-3M for each channel

Pin 1: Common

Pin 2: +30  $\pm$ 1VDC output

Pin 3: Intercom audio high

### EXPANSION INPUT/OUTPUT

**Connector Type:** 3.5mm Stereo Phone Jack

Tip: Talk output

Ring: Listen input

Sleeve: Common

