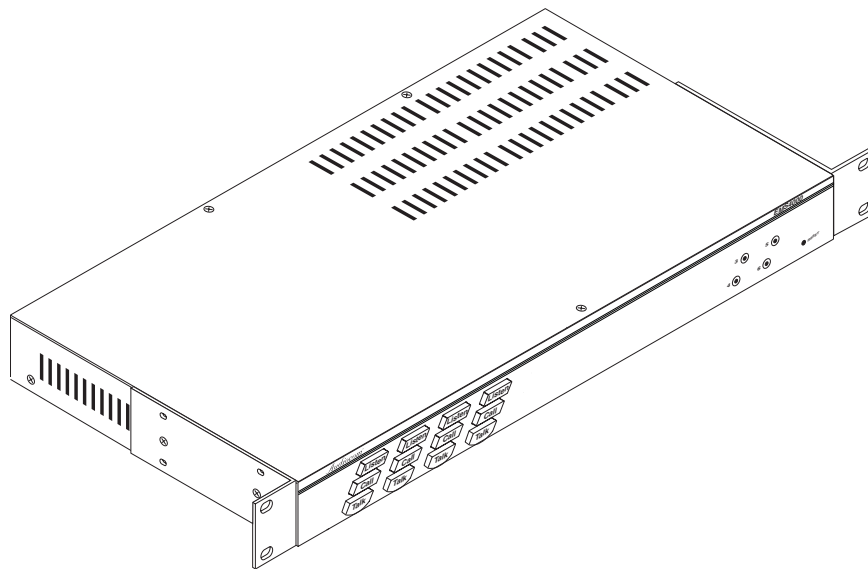# Telex®

User Instructions

**Model EMS4000
Four-channel Expansion Master
Station and Power Supply**

Audiocom® Intercom Systems

TELEX®

FCC Statement

This equipment uses and can radiate radio frequency energy that may cause in-
terference to radio communications if not installed in accordance with this man-
ual. 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 op-
erated 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.

$C\mathcal{E}$ This product meets Electromagnetic Compatibility Directive 89/336/EEC.

Introduction.

Thank you for purchasing the Audiocom EMS4000 Four-channel Expansion
Master Station and Power Supply. We hope the many design features of this
product will satisfy your intercommunication requirements for many years to
come. To get the most out of the EMS4000, please take a few moments to look
through this booklet before using the Intercom Expansion Station for the first
time.

Table of Contents

Audiocom®

Description

The EMS4000 adds four powered intercom channels to an MS2000 Master Station, and it provides talk, listen and call buttons for the added channels. Up to 4 EMS4000 Expansion Master Stations may be connected to the MS2000 to add up to 16 channels (18 channels total). The MS2000 microphone is used to talkback to the EMS4000 channels, and the MS2000 speaker is typically used for listening. However, there are also separate speaker jacks on the back panel of the EMS4000 for independent monitor speakers, if desired. There are also 4 additional program inputs on the back of the EMS4000, 1 for each added channel.

The MS2000 / EMS4000 combination can be used as a simple, multi-channel intercom user station. In this configuration, the program inputs (and possibly the PA output of the MS2000) are most likely not used, and the station operator has only talk, listen and call capability. It is also possible that advanced features of the MS2000, such as Mic Kill Send, might be turned off. Alternatively, the MS2000 / EMS4000 can be used as a master station. In this application, one 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 MS2000. Additionally, the Mic Kill Send feature can be enabled, and microphones on any channels may then be turned off from the MS2000.
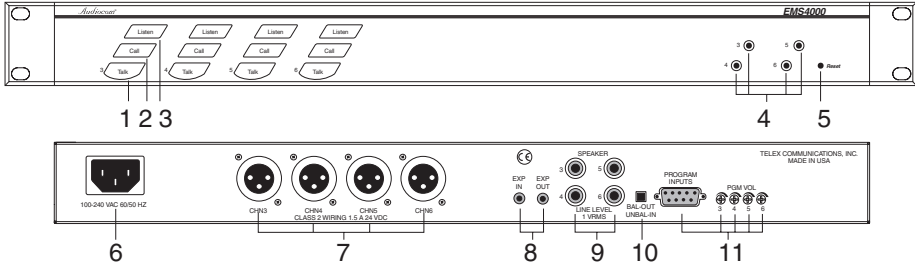

Figure 1. ES4000A Reference View (See numbered features on next page)

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. Reset Button: Used to resume normal operation after an overload condition has been corrected.

6. Universal AC Power Connector: Accepts a variety of international power cord types.

7. Intercom Channel Connectors: These connectors provide the power and audio connections for each of the 4 intercom channels.

8. EXP IN and EXP OUT Connectors: The EXP IN connector receives the microphone audio signal from the MS2000, and it sends the monaural mix of the four EMS4000 channels to the MS2000 speaker or headset. The EXP OUT connector connects to the EXP IN connector of an additional EMS4000. Up to 4 EMS4000 Expansion Master Stations may be daisy chained with the EXP IN and EXP OUT connectors. An EXP IN/OUT cable is supplied with each EMS4000.

9. SPEAKERS: Usually, the listen mix of all 4 EMS4000 channels is sent to the MS2000 speaker or headset via the EXP IN connector. Alternatively, speakers may be connected to one or more of the speaker outputs of the EMS4000.

10. BAL / UNBAL Switch: This selector switch sets the EMS4000 for compatibility with either Audiocom or Clear-Com* channel connector pin-outs, channel power requirements, and call signaling requirements. Important! The internal switches S200 and S600 must be set the same as the back panel BAL/UNBAL switch.

* Brand names mentioned are the property of their respective companies.

11. Program Inputs 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 MS2000 headset or speaker (default setting). Additionally, the program signal to the intercom channel may be turned on or off via the MS2000 front panel programming. There is also an internal program interrupt DIP switch which selects either automatic program interrupt when the station operator activates a channel's talk key, or no program interrupt during talk. The EMS4000 program inputs connector may be broken out to common 3-pin XLR audio cables using an optional XP-4PGM Breakout Panel.

12. Configuration Switches, Jumpers and Sidetone Controls (Figure 2). These let you customize the operation of the EMS4000 to match your intercom system requirements. See "Configuration Pre-check", page 7, for details.
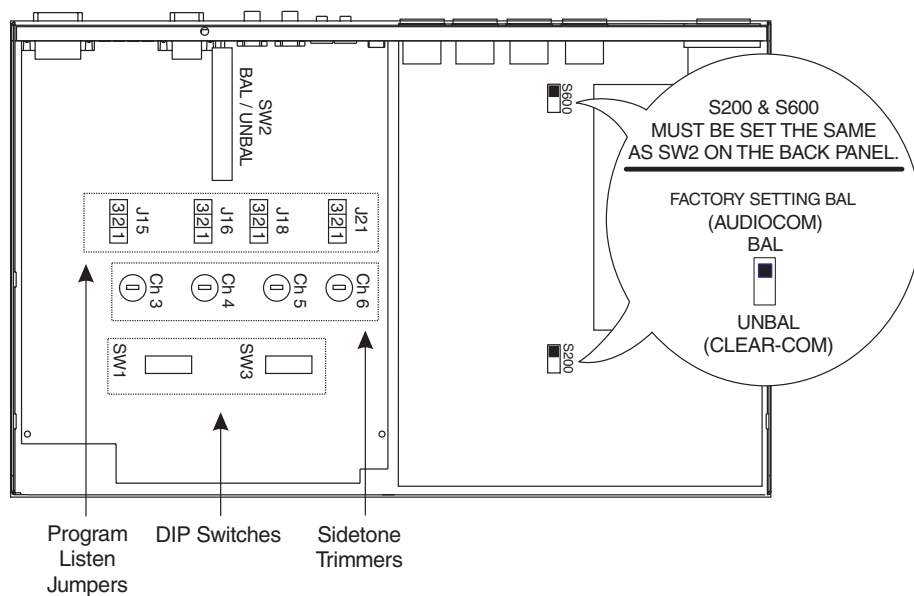

Figure 2. Locations of configuration switches, jumpers, and sidetone controls. (Top cover removed.)

Installation

Unpacking

The EMS4000 is supplied with the following items. Contact the shipper or your Audiocom dealer immediately if anything is damaged or missing. Detach and fill out the registration card and return it to Telex to properly register your intercom station.

Quantity	Description
1	EMS4000 Expansion Master Station and Power Supply
1	Warranty and registration card
1	User Instructions
1	EXP IN/OUT Cable, with 1/8-inch (3.5 mm) phone plugs
2	Rack Mount Cosmetic Covers

WARNING

The following instructions are for use by qualified personnel only. To avoid electric shock, do not remove the cover un less you are qualified to do so.

AVERTISSEMENT

Les instructions qui suivent s'adressent uniquement a un technicien qualifie. Pour evite des chocs electriques, ne pas ouvrir le boitier, a moins d'y entre habilite.

Configuration Pre-check

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

DIP Switches

DIP switches and their default settings are listed in Table 1, page 8. The following paragraphs provide additional details.

Table 1. Configuration Switch Settings

Switch Number	Description	Settings	Default Setting
DIP Switch SW1 (Internal)			
SW1-1	Program Interrupt, Ch 6	On (Closed): Enabled Off (Open): Disabled	Off
SW1-2	Program Interrupt, Ch 5	On (Closed): Enabled Off (Open): Disabled	Off
SW1-3	Program Interrupt, Ch 4	On (Closed): Enabled Off (Open): Disabled	Off
SW1-4	Program Interrupt, Ch 3	On (Closed): Enabled Off (Open): Disabled	Off
SW1-5	Audiocom Call Send, Ch 3*	On (Closed): Enabled Off (Open): Disabled	On
SW1-6	Audiocom Call Receive, Ch 3*	On (Closed): Enabled Off (Open): Disabled	On
SW1-7	Audiocom Call Send, Ch 4*	On (Closed): Enabled Off (Open): Disabled	On
SW1-8	Audiocom Call Receive, Ch 4*	On (Closed): Enabled Off (Open): Disabled	On
Balanced (BAL) - Unbalanced (UNBAL) Operation **Important! All three switches must be set the same. Factory default is Balanced.**			
SW2	Audiocom or Clear-Com operation	Out: Audiocom (Balanced) In: Clear-Com (Unbalanced)	Out (BAL)
S200 S600	Audiocom or Clear-Com operation	BAL: Audiocom UNBAL: Clear-Com	BAL
DIP Switch SW3 (Internal)			
SW3-1	Audiocom Call Send, Ch 5*	On (Closed): Enabled Off (Open): Disabled	On
SW3-2	Audiocom Call Receive, Ch 5*	On (Closed): Enabled Off (Open): Disabled	On
SW3-3	Audiocom Call Send, Ch 6*	On (Closed): Enabled Off (Open): Disabled	On
SW3-4	Audiocom Call Receive, Ch 6*	On (Closed): Enabled Off (Open): Disabled	On
SW3-5	Not used	On (Closed): N/A Off (Open): N/A	Don't care
SW3-6	Not used	On (Closed): N/A Off (Open): N/A	Don't care
SW3-7	Not used	On (Closed): N/A Off (Open): N/A	Don't care
SW3-8	Not used	On (Closed): N/A Off (Open): N/A	Don't care

*   These switches apply only when the BAL/UNBAL switches SW2 (back panel), S200 and S600 (both internal) are set to the BAL position for Audiocom usage (see Figure 2). When the switches are set to the UNBAL position, call send and receive are always enabled.

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 intercom channels. If external program sources will be connected to the EMS4000, you have a choice of whether or not you want the program audio to interrupt (shut off) on the intercom channel while the MS2000A/EMS4000 station operator is talking.

Audiocom Call Send and Receive DIP Switches

By default, all channels of the EMS4000 can send and receive Audiocom call signals. You can disable call send or call receive capability for selected channels if desired.

Balanced/Unbalanced Switches

The switches are located on the back panel (SW2) and internal (S200 & S600). These switches must be set to the balanced (BAL) position for use with an Audiocom Intercom System. Set the switches to the unbalanced (UNBAL) position when using the MS2000A / EMS4000 with a Clear-Com Intercom System. All switches must be set the same.

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 MS2000 front panel programming. See "Turning the Program Inputs On and Off" in the Operation section of the MS2000 User Instructions.) Additionally, all program signals can be heard directly in the MS2000 speaker or headset, and each program is output at the corresponding speaker jack on the back of the EMS4000. To disable direct program listening for a program input, reset the appropriate jumper as shown in Table 2. Locations of the jumpers are shown in Figure 2, page 6.

Table 2. Direct Program Listen Enable / Disable Jumpers

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

Audiocom / RTS Select Jumpers.

These internal jumpers (W102 through W802) are for special applications which are not applicable to the EMS4000. Leave the jumpers in the factory default position (pins 2 & 3 shorted).

Sidetone Trimmers

These trimmers are normally adjusted after all components are connected, and they can be accessed through the bottom cover (Figure 3). Refer to the MS2000 User Manual for the sidetone adjustment procedure.
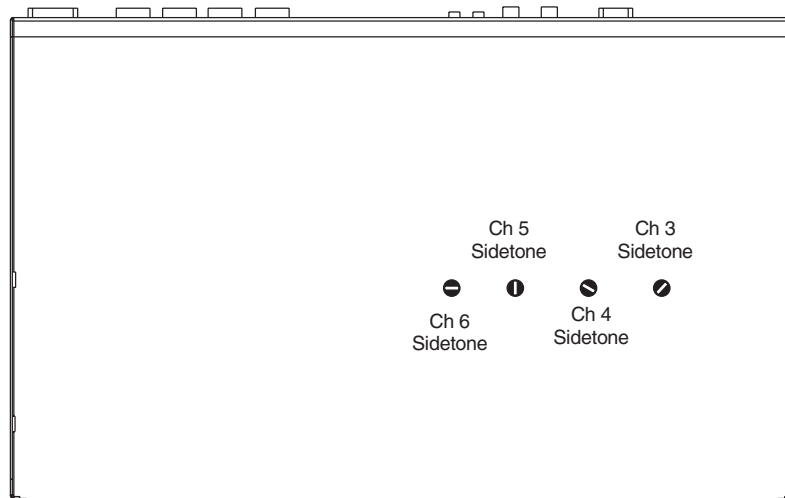

Figure 3. Sidetone Trimmer Access on Bottom of ES4000A

Mounting Configurations

The EMS4000 mounts in a standard 19 inch equipment rack and is 1 rack unit high. Install the 2 supplied rack mount cosmetic covers when installing the EMS4000 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.
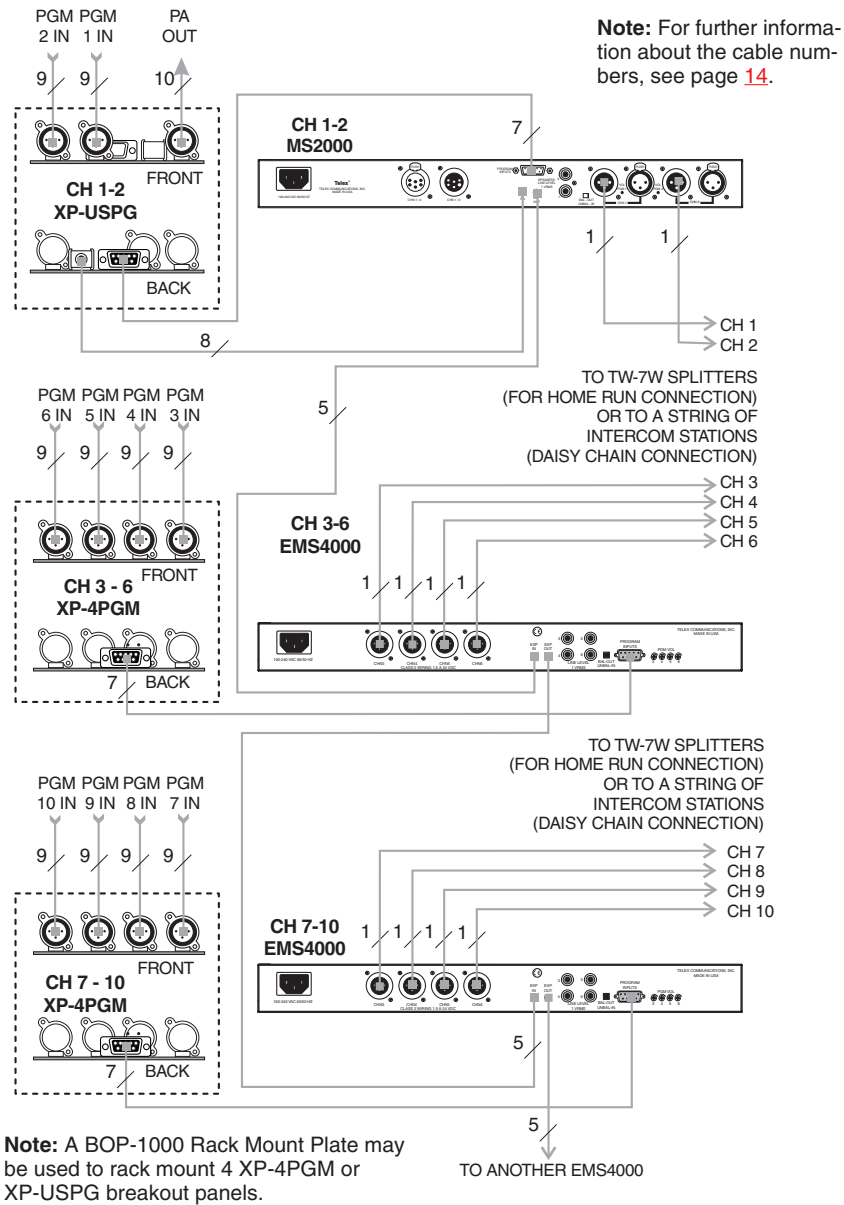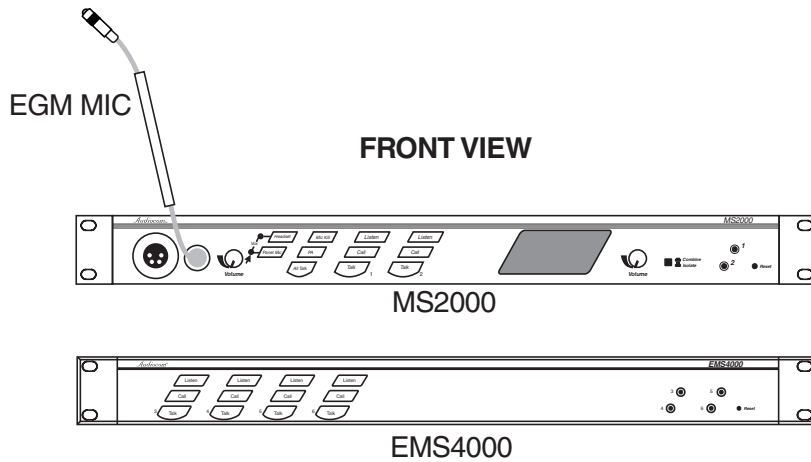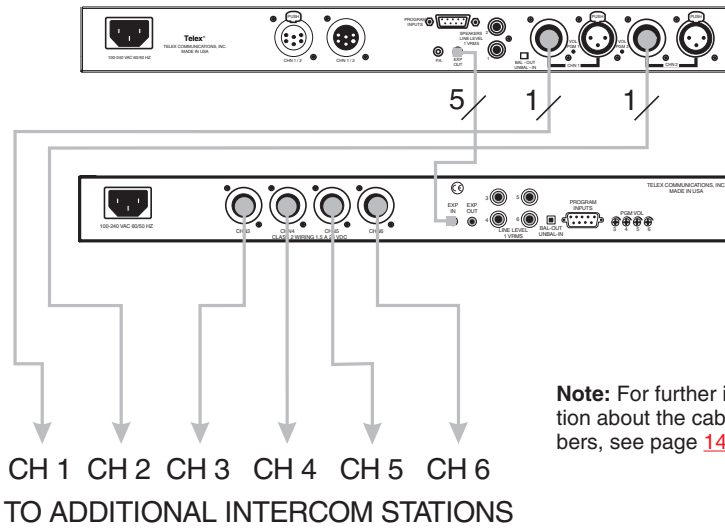
PGM PGM   PA
2 IN 1 IN   OUT

9   9   10

CH 1-2
MS2000   7

CH 1-2
XP-USPG
FRONT

BACK

Note: For further informa-
tion about the cable num-
bers, see page 14.

1   1

CH 1
CH 2

8

5

TO TW-7W SPLITTERS
(FOR HOME RUN CONNECTION)
OR TO A STRING OF
INTERCOM STATIONS
(DAISY CHAIN CONNECTION)

PGM PGM PGM PGM
6 IN 5 IN 4 IN 3 IN

9   9   9   9

CH 3-6
EMS4000

CH 3 - 6
XP-4PGM
FRONT

7   BACK

1   1   1   1

CH 3
CH 4
CH 5
CH 6

TO TW-7W SPLITTERS
(FOR HOME RUN CONNECTION)
OR TO A STRING OF
INTERCOM STATIONS
(DAISY CHAIN CONNECTION)

PGM PGM PGM PGM
10 IN 9 IN 8 IN 7 IN

9   9   9   9

CH 7-10
EMS4000

CH 7 - 10
XP-4PGM
FRONT

7   BACK

1   1   1   1

CH 7
CH 8
CH 9
CH 10

5

5

TO ANOTHER EMS4000

Note: A BOP-1000 Rack Mount Plate may
be used to rack mount 4 XP-4PGM or
XP-USPG breakout panels.

*Figure 4.   Master station with multiple EMS4000 Expansion Stations. This con-
figuration provides all of the channel power and program input connections for
10-channel intercom station. It also interfaces the PA jack of the MS2000 to a stan-
dard, 3-pin XLR audio cable. **Note:** The MS2000 includes a speaker and is typically
used for intercom listening, with a gooseneck microphone connected to the
MS2000 for talk-back. Alternatively, a headset with a microphone may be used.*
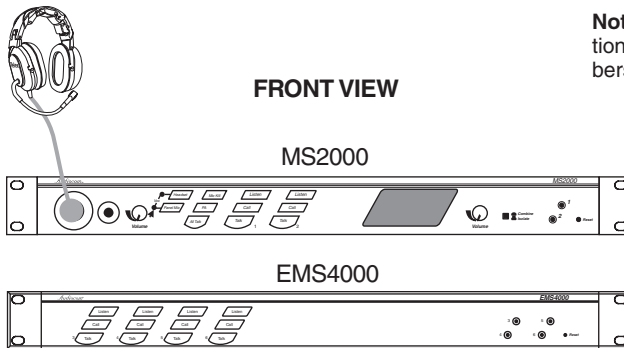
Audiocom®

EGM MIC

FRONT VIEW

MS2000

EMS4000

BACK VIEW

5   1   1

CH 1   CH 2   CH 3   CH 4   CH 5   CH 6

TO ADDITIONAL INTERCOM STATIONS

Note: For further information about the cable numbers, see page 14.

Figure 5. 6 Channel Daisy Chain Configuration This configuration adds four additional channels to the MS2000. All intercom channels will be monitored through the MS2000 internal speaker.

FRONT VIEW

MS2000

EMS4000

BACK VIEW FOR HOME-RUN CONNECTION

TO ADDITIONAL
TW-7W SPLITTERS

CH 1
CH 2

TW-7W
CH 3

TW-7W
CH 5

TW-7W
CH 4

TW-7W
CH 6

Note: A BOP-1000 Rack Mount Plate may be used to mount 2 TW-7W splitters.

TO ADDITIONAL INTERCOM STATIONS

* KEEP CABLES FROM MS2000 TO
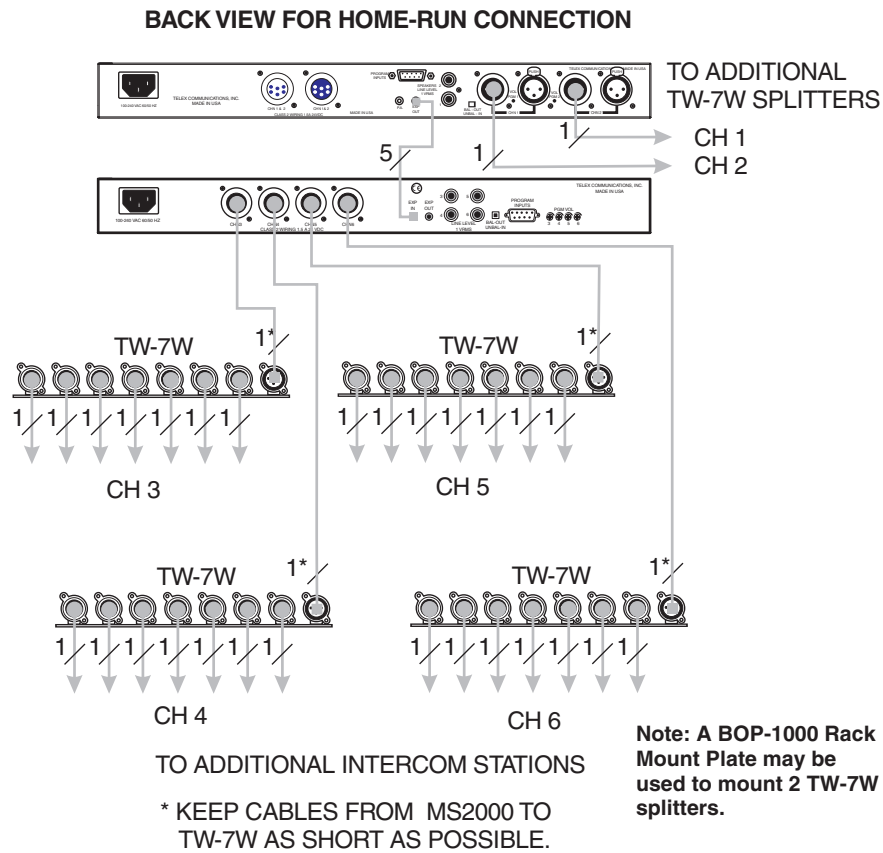 TW-7W AS SHORT AS POSSIBLE.

Figure 6. 6 channel Home-run configuration: *With a headset connected to the front panel of the MS2000 the DIP switches must be set to monaural operation (default setting) so that all intercom channels are heard in the monaural headphones (binaural headphone operation is not supported). Refer to the MS2000 User Instructions "Monaural or Binaural Operations DIP Switches".*

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Connection Notes

Typical connections for the MS2000/EMS4000 are shown starting with Figure 4, page 11. Select the configuration which most closely matches your intended usage.

Cables

The numbers below correspond to the cable numbers in the connection drawings on the previous pages.

1.   1-channel intercom cable. Sold separately. Use Telex "ME" cables, below. Or, build per Figure .
     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.

2.   2-channel intercom cable. Sold separately. Use Telex "ME /2" cables, below. Or, build per Figure .
     ME-25/2: 25' (7.6 m) cable with Male and Female 6-pin XLR connectors.
     ME-50/2: 50' (15.2 m) cable with Male and Female 6-pin XLR connectors.
     ME-100/2: 100' (30.4 m) cable with Male and Female 6-pin XLR connectors.

3.   Y adapter cable. Sold separately. Use Telex CA-23-16. Or, build per Figure .

4.   3 ft (0.91 m) speaker cable with RCA plugs. One supplied with each SPS2000A, SPK-1000, and SPK-2000.

5.   18" (457 mm) EXP IN/OUT cable, stereo miniplug to stereo miniplug. One supplied with each ES4000A.

6.   18" (457 mm) CHANNEL OUTPUT cable, 15-pin Male Dsub to 15-pin Male Dsub. One supplied with each ES4000A.

7.   Shielded patch cable, 9-pin Male Dsub to 9-pin Female Dsub. Customer local purchase: available at Radio Shack, etc. Note: All pins must be connected straight through: do not use an RS232 computer cable!

8.   Shielded patch cable, stereo miniplug to stereo miniplug. Customer local purchase. Available at Radio Shack, etc.

9. Shielded audio cable. Must have male 3-pin XLR connector at one end for con-
    nection to the XP-USPG or XP-4PGM program inputs. Pin-out for program in-
    puts is as follows:
    Pin 1: common
    Pin 2: + program input
    Pin 3: - program input

10. Shielded audio cable. Must have male 3-pin XLR connector at one end for con-
    nection to the XP-USPG PA output. Pin-out for PA output is as follows:
    Pin 1: common
    Pin 2: + PA output
    Pin 3: - PA output

11. 18" (457 mm) CHANNEL OUTPUT cable, 15-pin Male Dsub to 15-pin Female
    Dsub. One supplied with each XP-ES4000A.

Power-Up

Plug in the power cord. The EMS4000 channels power-up identically to channels 1
and 2 of the MS2000. Refer to the MS2000 User Instructions for all power-up infor-
mation. The MS2000 and EMS4000 can be powered up in any order.

Sidetone Adjustments

Use the sidetone adjustment procedure as described in the MS2000 User Instruc-
tions, except substitute channel 3, channel 4, etc. The locations of the MS4000
sidetone trimmers are shown in Figure 3.

Operation

The EMS4000 channels operate identically to channels 1 and 2 of the MS2000. Re-
fer to the MS2000 User Instructions for all operating information.

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Specifications

General

    Power Requirements:

        AC Input: 100-240 VAC, 50/60 Hz

        Channel Power: 24 VDC nominal (12 to 30 VDC) 65 to 150 mA

        Local Power (with PS-L Wall-pack Power Supply or equivalent): 14 to 15 VDC

        Current: 65 mA, quiescent; 150 mA maximum

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

    Weight: approximately 4.5lb (2kg)

    Environmental Requirements:

        Storage: -20°C to 80°C; 0% to 95% humidity, non-condensing

        Operating: -15°C to 60°C; 0% to 95% humidity, non-condensing

PROGRAM INPUTS Connector

    Input Level: 100mV maximum

    Voltage Gain: 25 ±3 dB

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

    Input Impedance: 75 kohm

    Common Mode Rejection: Greater than 50 dB

    Connector Type: DB9F Female, 9-pin D-subminiature

        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 (All BAL / UNBAL switches set to BAL position)

    Output Level: 1 Vrms nominal

    Input Impedance: 300 ohms

    Bridging Impedance: greater than 10,000 ohms

    Sidetone: -40 dB, 35 dB adjustable range

    Call Signaling:

        Send: 20 kHz ±100 Hz, 0.5 Vrms ± 10%

        Receive: 20 kHz ±800 Hz, 100 mVrms

    Mic-Kill Frequency:

        Send: 24 kHz ±300 Hz, 0.5 Vrms ± 10%

        Detect: 24 kHz ±800 Hz, 100 mVrms

    Noise Contribution: less than -70 dB

    Common Mode Rejection Ratio: greater than 50 dB

Connector type: One XLR-3M for each channel.

Balanced Configuration Pinouts

Pin 1: Common

Pin 2: Intercom audio low and +24 VDC input

Pin 3: Intercom audio high and +24 VDC input

Intercom Channel, Unbalanced Mode (All BAL / UNBAL switches set to UNBAL position)

Output Level: 1 Vrms ±10%

Input Impedance: 150 ohms

Bridging Impedance: greater than 10,000 ohms ±5%

Call Signaling:

Send: 11 ±3 VDC

Receive: 4 VDC minimum

Connector Type: Uses the same connectors as for balanced mode, above, but with pinouts modified by BAL/UNBAL switch on back panel as follows:

XLR-3 Unbalanced Configuration Pinouts

Pin 1: Common

Pin 2: +24 VDC input

Pin 3: Intercom audio high

Expansion Input/Output

Connector Type: 1/8" (2.0 m) stereo phone jack

Tip: Talk output

Ring: Listen input

Sleeve: Common

Factory Service and Parts Information

When returning equipment for repair include your return address, telephone number and proof of date of purchase, along with a description of the problem.*

The address for Audiocom equipment returns and parts information is:

> Service Department
> Telex Communications, Inc.
> West 1st Street
> Blue Earth, Minnesota 56013 U.S.A.
> Telephone: (507) 526-3205
> Toll Free: 800-218-2412
> Fax: (507) 526-2295

Warranty Repairs - If in warranty, no charge will be made for the repairs. Equipment returned for warranty repair must be sent prepaid and will be returned prepaid.

Non-Warranty Repairs - Equipment that is not under warranty must be sent prepaid to Telex. If requested, an estimate of repair costs will be issued prior to service. After your approval and completion of the repairs, the equipment will be returned on a collect basis. Collect charges may be avoided by sending a signed check for payment in full along with your signed estimate approval form (shipping charges are included in the estimate).

* For sales / technical support and system design contact:

> Pro Audio Sales Department
> Telex Communications, Inc.
> 9600 Aldrich Avenue South
> Minneapolis, Minnesota 55420 U.S.A.
> Telephone: (612) 884-4051
> Toll Free 800-392-3497
> Fax: 800-323-0498

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