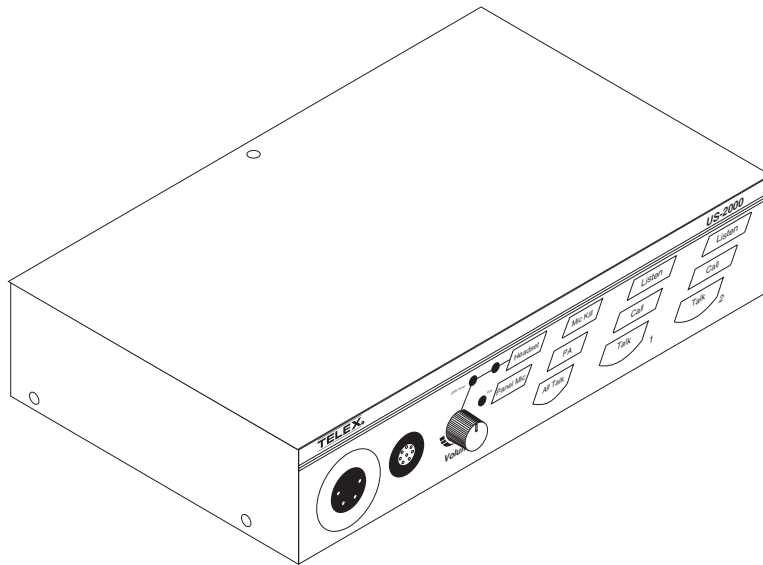


Telex[®]

Operating Instructions



US-2000 User Station Audiocom[®] Intercom System

TELEX[®]

GENERAL

The Audiocom® US-2000 is a microprocessor controlled two-channel intercom user station, that occupies only 1/2-rack space. The US-2000 can communicate with an entire intercom system or an individual channel, and can be expanded up to 18 channels. ES-4000 Expansion Stations can be “daisy chained” to the US-2000 to add four channels at a time to the intercom system. Each channel can be programmed for talk, listen or both. The US-2000 can use mono or stereo headsets, or panel mounted microphone. VOX operation can be selected for either headset or panel microphone. Internal switch and jumper settings allow the unit to be used with Clear-Com® components, if desired. Other internal switch and jumper settings allow the unit to be uniquely configured to the operator’s requirements.

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 product meets the Electromagnetic Compatibility Directive, 89/336/EEC.

OPERATION

SYSTEM POWER

The US-2000 receives power externally, in one of two ways:

- Via the *12-15 VDC* power input jack
- Via *CHN 1* or *CHN 2*, intercom channel connectors

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® Audiocom is a trademark of Telex Communications, Inc., Minneapolis, Minnesota 55420

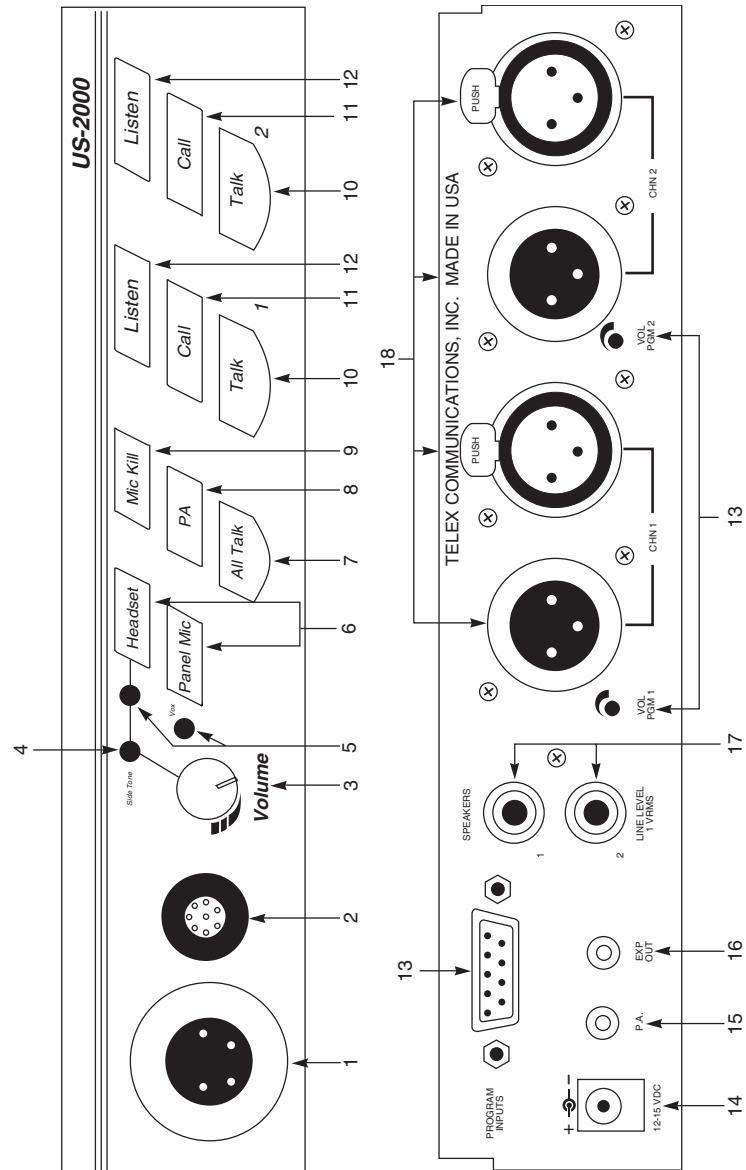


Figure 1. Front and Rear Panel Controls

INITIAL US-2000 SETUP

The channel termination is initially set for balanced operation, which is compatible with other Audiocom® equipment. If the unit is going to be connected to Clear-Com equipment, two jumpers and one switch must be changed as described in the section on Clear-Com Setup in this manual.

The US-2000 is factory set to allow all channels (including those of any attached ES-4000 units) to be heard through a single powered speaker, such as the Audiocom® SPK-1000. If the user wants to have each channel go to a separate powered speaker, three jumpers must be changed as described in the section on Speaker Setup in this manual.

The headset microphone termination is initially set for unbalanced operation. To change the headset microphone termination, refer to Table 2 in this manual for the position of jumper J16. If the termination requirement of a headset microphone is unknown, the recommended setting is unbalanced.

MICROPROCESSOR FUNCTIONS

RESET: Simultaneously press *All Talk* and channel 1 *Listen* keys to reset the US-2000 microprocessor to its power-up state.

TEST SIGNAL: Simultaneously press *All Talk* and *PA* keys to cause the microprocessor to generate 1 kHz test signal. Press any US-2000 or ES-4000 *Call* key to send the test signal down that channel. Press the same *Call* key to stop the test signal on that channel, then press any other key on that unit (except *Call*) to exit the test signal function.

EXTERNAL CONNECTIONS & CONTROLS

NOTE: The numbers refer to the callouts in Figure 1.

1. Mono Headset Connector

This connector accepts a Telex® boom-microphone headset.

2. Panel Microphone or Stereo Headset Connector

This connector accepts a Telex® gooseneck microphone (model EGM-12N or EGM-18N) or stereo headset.

3. **VOLUME Control**

Use this control to adjust the headset listen level.

4. **SIDETONE Control**

When using a headset, this control adjusts your own voice level heard in the earphones. To adjust the level, tap the *Headset* key once to turn on the headset microphone. Then, use a small flat-blade screwdriver to increase or decrease your voice level while talking into the microphone.

5. **VOX Level Adjustment**

There are separate *VOX* level controls for headset and panel microphone. These adjust the voice level required to activate the microphone when *VOX* mode is on.

To adjust the headset *VOX* level, place the *Headset* microphone key in *VOX* mode (see 6 below). While talking into the headset microphone in a normal voice, use a small flat-blade screwdriver to adjust the *VOX* control to the desired voice activation level. The *Headset* microphone key will turn from orange to green as the microphone turns on.

Use the same procedure to adjust the panel microphone *VOX* level using the *Panel Mic* key and *VOX* level control.

6. **Headset and Panel Mic keys**

The *Headset* key activates the headset microphone. The *Panel Mic* key activates the panel microphone. Either key selects one of three modes of microphone operation:

Latched Mode:

Tap the key once to turn the headset or panel microphone on. The key will glow green. Tap the key again to turn the headset or panel microphone off.

Momentary Mode:

Press and hold the key to momentarily turn on the headset or panel microphone. Release the key to turn the headset or panel microphone off.

VOX Mode:

With the headset or panel microphone off, tap the key twice to turn on VOX mode. The key will glow orange when there is no audio present, and green when you talk into the headset or panel microphone. (When in VOX mode you may have to adjust the VOX level.) Tap the key once to turn off VOX mode.

7. **All Talk key**

The All Talk function allows the user to talk on all attached channels simultaneously. To activate this function with either the *Headset* or *Panel Mic* selected, press and hold the *All Talk* key to talk on all US-2000 and ES-4000 channels at once. The key will glow green.

8. **PA key**

The PA function allows the user to talk over a public address system that is connected to the rear of the US-2000. With either the *Headset* or *Panel Mic* selected, press and hold the *PA* key to talk on a public address system connected to the *P.A.* output jack on the back panel of the US-2000. The key will glow green.

9. **Mic Kill key**

This key controls three features:

Microphone Kill Feature:

This feature sends a signal that causes the intercom stations on a selected channel to turn off any activated microphones on that channel. (Works with US-2000, ES-4000, SS-1000, BP1000 and BP2000 stations.) Tap the key once to access this feature. The key will blink green. To turn off all activated microphones on any channel, press the *Talk* or *Listen* key for the desired channels. To turn off all microphones on all channels, press the *All Talk* key. Tap the *Mic Kill* key to exit.

Program Kill Feature:

This feature allows the program audio to be individually disabled on each channel. Press and hold the key to access this feature. The key will glow green and the current Program Kill status will be displayed (when a *Talk* key is lit, program audio is enabled on that channel). Press a *Talk* key to enable or disable program au-

dio on that channel. Tap the *Mic Kill* key to exit the feature setup.

Headset Audible Call Alert Feature:

This feature will cause an audible beep in the headset whenever there is an incoming call from any channel. Press and hold the key to access this feature. The key will glow green and the current Headset Audible Call Alert status will be displayed (when both *Call* keys are lit, Headset Audible Call Alert is enabled). Press either *Call* key to enable or disable Headset Audible Call Alert on both US-2000 channels. Tap the *Mic Kill* key to exit the feature setup.

10. **Talk keys**

There is a *Talk* key for each channel. With either the *Headset* or *Panel Mic* selected, the *Talk* keys operate in two ways:

Latched Mode:

Tap the key once to talk. The key will glow green. Tap the key again when finished with a conversation.

Momentary Mode:

Press and hold the key to talk momentarily. Release the key when finished talking.

11. **Call keys**

The Call function allows the user to signal other devices on the intercom system. There is a *Call* key for each channel. The *Call* keys operate in two ways:

Call receive:

When there is an incoming call signal, the key blinks red. (If Headset Audible Call Alert is enabled, incoming calls will cause a beep in the headset.) To respond to an incoming call, turn on the *Talk* key for that channel and begin talking.

Call send:

To send a call signal to a station on a channel, press and hold the *Call* key until a verbal response is received. The *Listen* key

for that channel automatically turns on when the *Call* key is pressed.

12. ***Listen* keys**

There is a *Listen* key for each channel. The *Listen* keys operate in two ways:

Latched Mode:

Tap the key once to turn on listen. Tap it again to turn off listen. The key glows green when listen is on.

Momentary Mode:

Press and hold the key to listen momentarily. Release the key to turn off listen.

13. ***Program Inputs Connector and Program Volume Controls***

In a television studio intercom system, the program input is usually the actual program audio signal. In another intercom system, the program input can be any auxiliary audio signal, such as background music.

There is a separate program input for each channel (see Connector Pin Configurations for connector details). The *VOL PGM 1* control adjusts the program 1 level heard on intercom channel 1. The *VOL PGM 2* control adjusts the program 2 level heard on intercom channel 2. As supplied, the US-2000 does not interrupt the program inputs during talk. Program interrupt during talk requires an internal switch change (see Table 1, switches SW2-4 and SW2-5).

14. ***12-15 VDC Input Jack***

Normally the US-2000 is powered from the intercom system and will turn on with the intercom system. The US-2000 may also be powered from an optional Telex® Wall Pack (part number 532006-000). Plug the Wall Pack into the *12-15 VDC* jack and into an AC outlet.

15. ***P.A. Output Jack***

To use the US-2000 with a public address system, connect this jack to the input of the public address amplifier.

16. **EXP OUT Jack**

Connects audio and data to the EXP IN jack of an optional Telex® ES-4000 expansion station.

17. **SPEAKERS Output Jacks**

Connects channel audio to the Input jacks of an optional Telex® SPK-1000 Powered Speaker. May also be connected to the auxiliary input of an amplifier. These outputs should not be directly connected to an unpowered speaker. Refer to the speaker setup section in this manual.

18. **CHN 1 and CHN 2 Intercom Channel Connectors**

Each intercom channel has a pair of connectors (one male and one female) for convenient interconnection of stations. Each pair of connectors is wired together in parallel, providing a “loop through” at each connector pin. Use one connector of each pair to connect to the intercom power supply. Use the other connector of each pair to run a cable to another user station.

CHANNEL TERMINATION

Each channel of the US-2000 must be terminated to prevent audio oscillations. When a channel is connected to a Telex® power supply, channel termination is provided within the power supply for that channel.

External channel termination must be installed when a channel is:

- Used in a “dry-line” (non-powered channel) application
- Unused and un-powered

If necessary, install external channel termination by connecting a 300Ω resistor across pins 2 and 3 of the intercom channel connector (either *CHN1* or *CHN2*) at the rear of the US-2000.

INTERNAL SWITCHES, JUMPERS AND ADJUSTMENTS

There are several internal switches, jumpers and adjustments that affect operation. These are described below. To gain access to the switches, jumpers and adjustments, remove one screw from the top of the cover and two screws on each side. Switch, jumper and adjustment locations

are shown in Figure 2. The adjustments are also accessible from the underside of the US-2000, as shown in Figure 3.

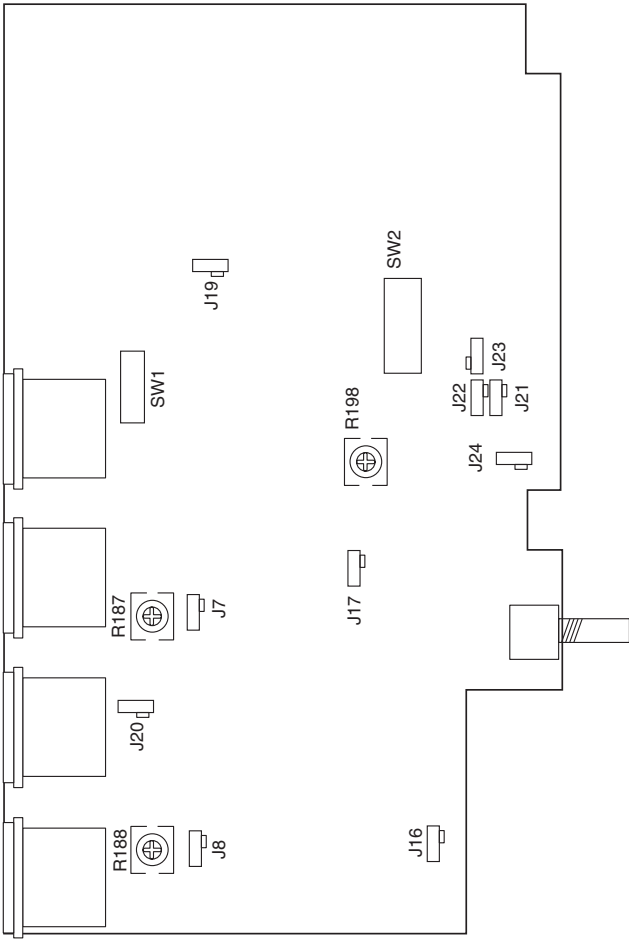


Figure 2. Internal Switches, Jumpers and Adjustments

NOTE: To activate a changed switch or jumper setting, either perform a RESET or cycle the power on and off.

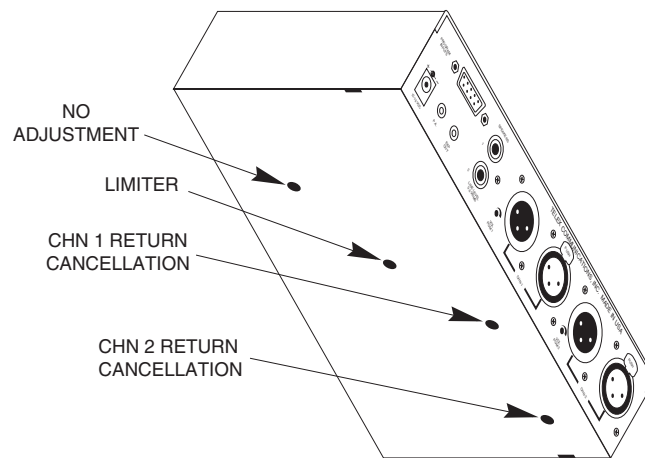


Figure 3. Adjustments Accessible From the Underside

Clear-Com Setup

Make the following switch and jumper changes when the US-2000 is used with Clear-Com equipment:

- SW1 (BAL/UNBAL) must be placed in the UNBAL position.
- J17 (Clear-Com/Audiocom® Mic Level Select) must have pins 1 and 2 shorted.
- J21 (DC call enable/disable) must have pins 2 and 3 shorted.

Speaker Setup

Make the following switch and jumper changes to allow the audio from each channel to go to separate powered speakers:

- J22 must have pins 1 and 2 shorted.
- J23 must have pins 1 and 2 shorted.
- J24 must have pins 2 and 3 shorted.

DIP Switches (SW2)

Table 1. SW2 Functions and Settings

SWITCH NUMBER	SWITCH FUNCTION	DEFAULT SETTING
1	Headset audible key press beep on/off On: No beep Off: Beep activated	Off
2	Mic Kill on/off (Enables/disables another user station from killing the microphone on this station) On: Mic kill enabled Off: Mic kill disabled	On
3	Channel 1 20-kHz call/send On: Enable 20 kHz signalling Off: Disable 20 kHz signalling	On
4	Channel 2 Program Interrupt On: Program interrupted during talk Off: No program interrupt	Off
5	Channel 1 Program Interrupt On: Program interrupted during talk Off: No program interrupt	Off
6	Left Earpiece Source On: Both channels Off: Channel 2 only	On
7	Right Earpiece Source On: Both channels Off: Channel 1 only	On
8	Channel 2 20-kHz call/send On: Enable 20 kHz signalling Off: Disable 20 kHz signalling	On

NOTE: The Program Interrupt feature individually controls the program audio for each channel. When the Program Interrupt feature is enabled, program audio is shut off on that channel when the *Talk* key is pressed. If the Program Kill feature is enabled for a channel, the Program Interrupt feature will have no effect on that channel.

Balanced/Unbalanced Switch (SW1)

Set this switch to the balanced (BAL) position to use the US-2000 with Audiocom® intercom channels. Set the switch to the unbalanced (UNBAL) position for use with a Clear-Com® intercom system. (The factory default setting is the balanced position for use with Audiocom®.)

Table 2. Jumper Functions And Settings

JUMPER NUMBER	JUMPER FUNCTION	DEFAULT SETTING
J7	Program 1 Local Listen Both pins shorted: Program 1 audible in local headset or speaker during CH1 listen No pins shorted: Program audio not audible	No pins shorted *
J8	Program 2 Local Listen Both pins shorted: Program 2 audible in local headset or speaker during CH2 listen No pins shorted: Program audio not audible	No pins shorted *
J16	Balanced/Unbalanced Headset Mic Select Pins 1&2 shorted: Unbalanced Pins 2&3 shorted: Balanced	Pins 1&2 shorted
J17	Clear-Com / Audiocom Mic Level Select Pins 1&2 shorted: Clear-Com Pins 2&3 shorted: Audiocom	Pins 2&3 shorted
J19	Channel 1 20-kHz Call Receive enable/disable: Pins 1&2 shorted: Disabled Pins 2&3 shorted: Enabled	Pins 2&3 shorted
J20	Channel 2 20-kHz Call Receive enable/disable: Pins 1&2 shorted: Disabled Pins 2&3 shorted: Enabled	Pins 2&3 shorted
J21	DC Call enable/disable: Makes the US-2000 compatible with Clear-Com DC call signalling Pins 1&2 shorted: Disabled Pins 2&3 shorted: Enabled	Pins 1&2 shorted
J22	Multi-Channel Speaker enable/disable: Pins 1&2 shorted: Disabled Pins 2&3 shorted: Enabled	Pins 2&3 shorted
J23	Single Channel Speaker enable/disable: Pins 1&2 shorted: Enabled Pins 2&3 shorted: Disabled	Pins 2&3 shorted
J24	Multi-Channel Speaker Sidetone enable/disable: Pins 1&2 shorted: Disabled Pins 2&3 shorted: Enabled	Pins 1&2 shorted

* For no pins shorted, the jumper is placed on one pin only.

Adjustments

The following adjustments are accessible either internally (refer to Figure 2) or from the underside of the US-2000, as shown in Figure 3.

Return Cancellation Adjustments (R187, R188)

Adjusted at the factory to cancel audio output that may be reflected from the line. There is a separate adjustment for each channel. The Return Cancellation should only require adjustment when the channel impedance or capacitance changes significantly. To adjust one channel; connect powered speaker (set for full volume), enable TEST SIGNAL on desired channel, and adjust appropriate Return Cancellation to minimize signal volume on the speaker.

Limiter Adjustment (R198)

Adjusted at the factory for 1 Vrms audio output to the line. If the microphone input is higher than 4 mVrms, adjust the pre-amp Limiter to reduce clipping of the audio output signal, if necessary.

CONNECTOR PIN CONFIGURATIONS

Mono Headset Connector

Type: XLR-4M

Pin 1	Headset microphone low
Pin 2	Headset microphone high
Pin 3	Headphone high
Pin 4	Headphone low

Panel Microphone or Stereo Headset Connector

Type: NTRK-8F

Pin 1	Panel microphone low
Pin 2	Panel microphone high
Pin 3	12 VDC
Pin 4	Headset microphone high
Pin 5	Right headphone high
Pin 6	Right headphone low
Pin 7	Left headphone high
Pin 8	Left headphone low

Program Inputs

Type: DB9F

Pin 1	Ground
Pin 2	Program 1 input low
Pin 3	Program 2 input low
Pin 4	NC
Pin 5	NC
Pin 6	Program 1 input high
Pin 7	Program 2 input high
Pin 8	NC
Pin 9	NC

P.A. Output

Type: 1/8-inch Stereo Phone Jack

Unbalanced Wiring (-000 Model)

Tip: PA output high
Ring: Not used
Sleeve: Common

Balanced Wiring (-001 Model)

Tip: PA output high
Ring: PA output low
Sleeve: Common

Speaker Outputs

(Connect to a powered speaker or the auxiliary input of an amplifier)

Type: RCA Phone Jack

Tip: Speaker output high
Sleeve: Common

Intercom Channel Connectors

Type: One XLR-3M and XLR-3F pair for each channel

Audiocom® Mode (Internal switch SW1 set to BAL position)

- Pin 1 Common
- Pin 2 Intercom audio low and +24 VDC input
- Pin 3 Intercom audio high and +24 VDC input

Clear-Com Mode (Internal switch SW1 set to UNBAL position)

- Pin 1 Common
- Pin 2 +24 VDC input
- Pin 3 Intercom audio high

Expansion Out

Type: 2.0 mm stereo jack

- Tip: Talk output
- Ring: Listen input
- Sleeve: Common

External Power

Type: 2.0 mm jack

- Internal pin: positive (+)
- External shell: negative (-)

SPECIFICATIONS

GENERAL

Power Requirements:

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

External supply: 12 to 15 VDC, 65 to 150 mA

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

Dimensions:

1.75" (44.5 mm) H x 8.25" (209.5 mm) W x 5.25" (133.4 mm) D

Weight:

1.3 pounds (0.59 kg)

INTERFACE REQUIREMENTS:

Headset:

50 to 200 Ω dynamic microphone

150 to 600 Ω headphones

Panel Microphone:

5 k Ω Electret microphone (-57 dB)

Balanced Intercom Channel:

Output Level: 1 Vrms nominal

Input Impedance: 300 Ω

Bridging Impedance: greater than 10,000 Ω

Return Cancellation: -40 dB, 35 dB adjustable range

Call Signalling:

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

Receive: 20 kHz \pm 800 Hz, 100 mVrms

Mic-Off Frequency:

Send: 24 kHz \pm 300 Hz, 0.5 Vrms \pm 10%

Detect: 24 kHz \pm 800 Hz, 100 mVrms

Noise Contribution: less than -70 dB

Common Mode Rejection Ratio: greater than 50 dB

Unbalanced Intercom Channel:

Output Level: 200 mVrms $\pm 10\%$

Input Impedance: 150 Ω

Bridging Impedance: greater than 10,000 Ω

Return Cancellation: -40 dB, 35 dB adjustable range

Call Signalling:

Send: 11 ± 3 VDC

Receive: 4 VDC minimum

PROGRAM INPUT

Voltage Gain Range:

25 ± 3 dB

Output Level:

1.0 Vrms nominal, 2.3 Vrms maximum

Input Impedance:

Balanced: 75 k Ω

Unbalanced: 38 k Ω

Common Mode Rejection:

Greater than 50 dB

PA OUTPUT

Output Level:

235 mVrms nominal

HEADPHONE AMPLIFIER

Voltage Gain:

30 ± 3 dB

Maximum Output:

250 mW $\pm 10\%$ into 150 Ω , 65 mW $\pm 10\%$ into 600 Ω

Frequency Response:

200 Hz to 8 kHz +1/-3db

Audible Alert:

2 kHz, at the headset

Total Harmonic Distortion:
Less than 0.2% at 200 mW

Sidetone:
18 \pm 2 dB, adjustable

PANEL MICROPHONE AMPLIFIER:

Voltage Gain:

- Mic to CHN; 25 \pm 3 dB, before limiting
- Mic to Headphone; adjustable, 45 dB \pm 10% maximum, into 150 Ω
- Mic to PA; 15 \pm 3 dB, 235 mVrms \pm 10%

Frequency Response:
200 Hz to 8 kHz +1/-3dB

Total Harmonic Distortion:
Less than 0.2% at CHN output

VOX Range:
-75 to -30 dB, -60 dB factory set

SPEAKER OUTPUT:

Output Level:
0 dB nominal (1.0 Vrms)

Output Impedance:
1000 Ω nominal

Frequency Response:
200 Hz to 15 kHz +1/-3dB

FACTORY SERVICE

All equipment returned for repair must be accompanied by documentation stating your return address, telephone number and proof of date of purchase, along with a description of the problem. In lieu of this, you may obtain a Return Authorization form from our Customer Service Department.

Customer Service Department
Telex Communications, Inc.
9600 Aldrich Avenue South
Minneapolis, Minnesota 55420 U.S.A.
Telephone: (612) 884-4051
(Collect calls not accepted)

Return equipment to:

Service Department
Telex Communications, Inc.
West 1st Street
Blue Earth, Minnesota 56013 U.S.A.

Warranty Repairs - If in warranty, no charge will be made for the repairs. Equipment being 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. Once your approval for repair, and repair of equipment is completed, 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 (the estimate includes the shipping charge).

US-2000/ES-4000 QUICK REFERENCE

Reset US-2000	Press <i>All Talk</i> and <i>Listen 1</i>
Reset ES-4000	Press <i>All Talk 4</i> and <i>Listen 5</i>
Test signal on	Press <i>All Talk</i> and <i>PA</i> , then tap <i>Call</i>
Test signal off	Tap <i>Call</i> , then tap any other key
Mic latched on	Tap <i>Headset</i> or <i>Panel Mic</i> (key is green)
Mic latched off	Tap <i>Headset</i> or <i>Panel Mic</i>
Mic momentary on	Hold <i>Headset</i> or <i>Panel Mic</i>
Mic momentary off	Release <i>Headset</i> or <i>Panel Mic</i>
VOX mode on	Tap twice: <i>Headset</i> or <i>Panel Mic</i> (key is orange)
VOX mode off	Tap <i>Headset</i> or <i>Panel Mic</i>
All talk on	Hold <i>All Talk</i> when <i>Headset</i> or <i>Panel Mic</i> is lit (<i>All Talk</i> key is green)
All talk off	Release <i>All Talk</i>
Public address	Hold <i>PA</i> when <i>Headset</i> or <i>Panel Mic</i> is lit (<i>PA</i> key is green)
Mic kill	Tap <i>Mic Kill</i> , then tap <i>Talk</i> or <i>Listen</i> (<i>Mic Kill</i> key will blink green, and the <i>Talk</i> and <i>Listen</i> keys are green)
Mic kill all channels	Tap <i>Mic Kill</i> , then tap <i>All Talk</i> (<i>Mic Kill</i> key will blink green, and all <i>Talk</i> and <i>Listen</i> keys are green)
Program kill on	Hold <i>Mic Kill</i> , then tap channel <i>Talk</i> (<i>Talk</i> key is green)
Program kill off	Hold <i>Mic Kill</i> , then tap channel <i>Talk</i>
Audible call alert on	Hold <i>Mic Kill</i> , then tap either <i>Call</i> (all <i>Call</i> keys are red)
Audible call alert off	Hold <i>Mic Kill</i> , then tap either <i>Call</i>
Exit mic kill features	Tap <i>Mic Kill</i>
Talk latched on	Tap <i>Talk</i> (key is green)
Talk latched off	Tap <i>Talk</i>
Talk momentary on	Hold <i>Talk</i>
Talk momentary off	Release <i>Talk</i>
Call signal on	Hold <i>Call</i>
Call signal off	Release <i>Call</i>
Receive call signal	(<i>Call</i> key blinks red)
Listen latched on	Tap <i>Listen</i> (key is green)
Listen latched off	Tap <i>Listen</i>
Listen momentary on	Hold <i>Listen</i>
Listen momentary off	Release <i>Listen</i>



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