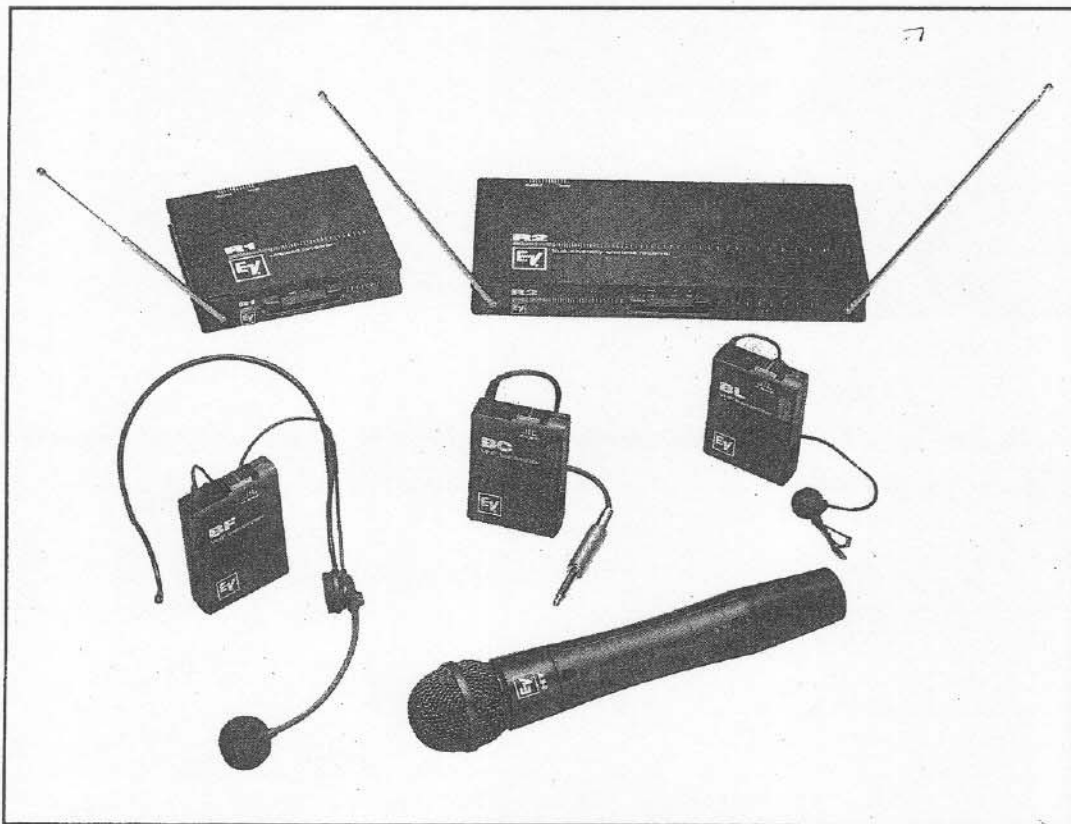




Electro-Voice®

WIRELESS SYSTEMS

OWNER'S MANUAL



R-SERIES™ WIRELESS MICROPHONE SYSTEMS

INTRODUCTION

Welcome to the world of wireless. You will enjoy new-found freedom now that your movements are no longer limited by a cable. Thank you for your purchase.

WHAT IS A WIRELESS MICROPHONE SYSTEM?

In a wireless microphone system, a radio-frequency (rf) signal substitutes for the cable, forming a circuit between the microphone and the amplification system. The wireless microphone system consists of two parts, the transmitter and the receiver. The transmitter sends the audio signal from the microphone to the receiver. An audio cable connects the output of the receiver to the amplification system.

At any given rf frequency, only one transmitter at a time can be used to send a signal to a receiver of the same frequency. If multiple wireless systems are needed, a separate receiver is required for each individual transmitter. Each wireless system must operate on a different radio-frequency band in order to avoid interference.

R-Series™ wireless systems operate in the radio-frequency bands between 169 to 172 MHz and 174 to 216 MHz.

FEATURES

R1 Wireless Receiver

- Compact single channel design.
- 100 dB signal-to-noise ratio for noiseless operation.
- Clean undistorted sound reproduction using proprietary companding circuitry.
- Wide-range adjustable audio output on 1/4 in. phone connector.

R2 True-Diversity Receiver

- True dual-receiver space diversity system for maximum range and reliability.
- 100 dB signal-to-noise ratio for noiseless operation.
- Clean, undistorted sound reproduction using proprietary compander circuitry for audio processing.
- Wide-range adjustable audio output on 1/4 in. phone connector.

HT Handheld Transmitter

- Electro-Voice N/D157B N/DYM® cardioid dynamic microphone element.
- Separate LED's for "power on" and "battery status" – operate wireless with confidence.
- Separate "power on" and "audio mute" transmitter switches.
- Up to 10 hours of operation on a 9-volt alkaline battery.

BL Bodypack Transmitter

- Permanently attached omnidirectional microphone.
- LED indicator for "on/off" and "battery condition" status.
- Switch for "power on" and "audio mute."
- Up to 10 hours of operation on a 9-volt alkaline battery.

BC Instrument Transmitter

- Permanently attached cable with 1/4 in. phone connector
- LED indicator for "on/off" and "battery condition" status.
- Switch for "power on" and "audio mute."
- Up to 10 hours of operation on a 9-volt alkaline battery.

BF Headset Transmitter

- Permanently attached cable with unidirectional headset microphone
- LED indicator for "on/off" and "battery condition" status.
- Switch for "power on" and "audio mute."
- Up to 10 hours of operation on a 9-volt alkaline battery.

QUICK START

To get your system into operation immediately, use the following instructions. Review the remainder of the manual for additional setup and operation details.

- 1 Place the receiver where there is a clear line of sight to the area where the transmitter will be used (figure 1). Extend receiver's antenna(s) to full length.
- 2 At this point in the setup, make sure the sound system's volume is set "Low" or "Off" on the channel where you intend to connect the wireless.
- 3 Plug the receiver power adapter into a standard 120-V_{ac} outlet and the other end into the receiver (figure 2A); the receiver will then be "on."
- 4 Plug one end of your audio cable (not supplied) into the output connector (1/4 inch) on the rear panel of the receiver. Plug the other end of the audio cable into the sound system's input (figure 2B).
- 5 Turn the receiver audio control to the mid-way (12:00 o'clock) position (figure 2C).
- 6 Setup and adjust the transmitter level as described on the following pages (figures 3 and 4).
- 7 Turn up the level on the mixer/preamp/ amplifier to the normal setting.
- 8 Speak into the transmitter's microphone and, if necessary, adjust the receiver's audio (figure 2C) until the volume level from the wireless system approximates the level of an equivalent wired system.
- 9 "Walk" the coverage area to check for problems. If problems occur, see the troubleshooting section.

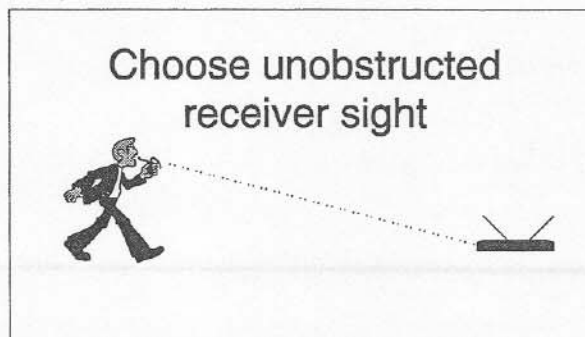


Figure 1 - Place the receiver where there is a clear line of sight to the area where the transmitter will be used.

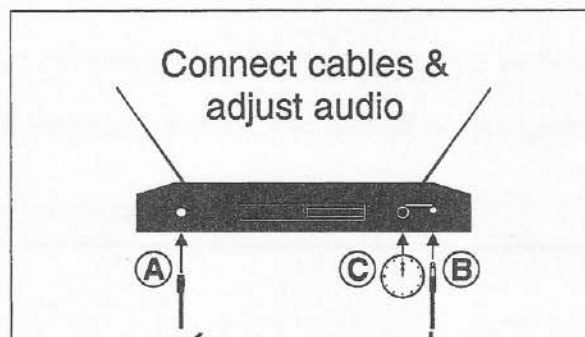


Figure 2 - Connect audio output and power cords. Adjust receiver audio output.

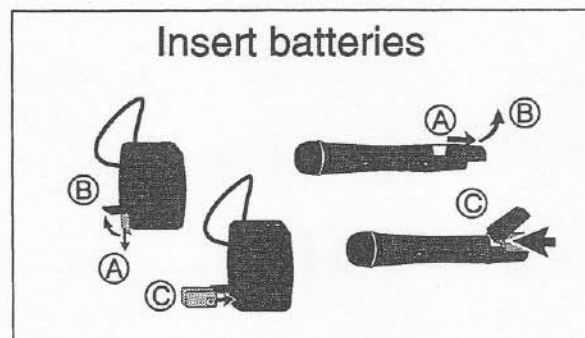


Figure 3 - Install 9-Volt alkaline battery into transmitter

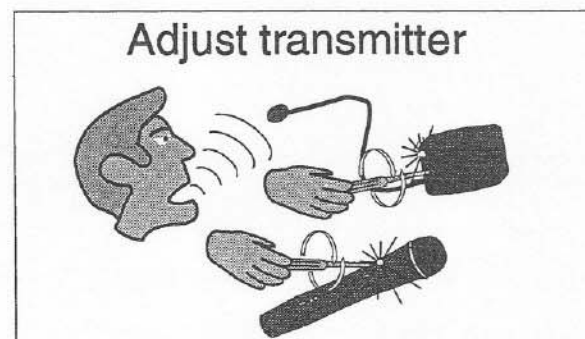


Figure 4 - Setup and adjust the transmitter level as described on the following pages.

HT HANDHELD TRANSMITTER SETUP

1) Insert battery. Slide open the battery compartment cover by pressing with your thumb on the horizontal grooves (at the tail end of the transmitter) while pulling back (figure 3). Lift up the hinged cover. Slide a fresh 9-volt alkaline battery into the battery compartment, with the positive (smaller) terminal to the right (with the battery-compartment end of the case toward you). Push the battery all the way in gently, close the hinged door, and press on the horizontal grooves while sliding the cover back into place.

2) Turn on the transmitter by sliding the power switch (nearest the battery compartment) forward, toward the mic element. Both the red and the green LEDs above the power switch should be lit, indicating power to the circuitry and good battery condition.

3) Check Reception. Position the transmitter in the approximate center of the area to be covered by the wireless system. Observe that the receiver power LED is lit, and that one of the diversity channel LEDs (R2 Receivers only) is lit.

4) Turn on the audio transmission by sliding the audio switch (nearest the mic element) towards the windscreen.

5) Adjust the gain if necessary. Gently insert the provided screwdriver or other 3/32 in. (2.5 mm) screwdriver into the hole near the head of the transmitter (see figure 4). Turn **lightly** until the screwdriver tip drops into the slot in the level control. Gently turn counterclockwise until the control stops (the mic output is attenuated but is not "off"). Slowly turn the mic-level control clockwise while listening to the audio; if the audio becomes distorted, turn the mic level control counter-clockwise about 1/8 turn.

BC, BL, & BF TRANSMITTER SETUP

1) Insert battery. Open the hinged door by sliding down and then lifting to a 90 degree angle (figure 3). Place a fresh 9-volt alkaline battery, terminals first, with the positive (smaller) terminal away from the battery door hinge, into the battery compartment. Close the door, and slide up to latch.

2) BC: Plug cable into instrument. **BF:** Place headset on user's head. **BL:** Attach the lavalier microphone to the user. Clip the microphone to the chest/collar area of the user's clothing.

3) Turn on the transmitter by sliding the switch to its center position. The transmitter is now on but the audio is muted.

4) Check Reception. Position the transmitter in the approximate center of the area to be covered by the wireless system. Observe that the receiver's power LED is lit, and one of the diversity channel LEDs (R2 Receivers only) is lit.

5) Turn on the audio transmission by sliding the audio switch to the "on" position.

6) Adjust the gain if necessary. Gently insert the provided screwdriver or other 3/32 in. (2.5 mm) screwdriver into the hole at the top of the transmitter (see figure 4). Turn **lightly** until the screwdriver tip drops into the slot in the level control. Gently turn counterclockwise until the control stops (the mic output is attenuated but not "off"). Slowly turn the mic-level control clockwise while listening to the audio; if the audio becomes distorted, turn the mic level control counter-clockwise about 1/8 turn.

7) Clip the bodypack to the user's belt or place loosely in a pocket. Make sure that the antenna is not twisted around the mic cable. Ideally, the cable should be free, extended, and should run in the opposite direction of the mic cable. Placing the bodypack higher on the body can increase range.

SPECIFICATIONS

R-SERIES SYSTEM

FREQUENCY RANGE (Standard Frequencies)
from 169 to 172 MHz and 174 to 216 MHz

EMISSION/MODULATION
Direct FM, crystal-controlled, 25-kHz deviation, 8CF3

FREQUENCY RESPONSE
70 Hz to 11 kHz, ± 1.5 dB,
50 Hz to 14 kHz, ± 3 dB

HARMONIC DISTORTION
0.9% maximum, below transmitter limiting;
0.4% typical at 1 kHz

DYNAMIC RANGE
100 dB

ULTIMATE S/N
(processed, 20-kHz bandwidth)
100 dB (flat) minimum (102 dB typical A-weighted)

AUDIO PROCESSOR
2:1 logarithmic compressor and expander

OPERATING TEMPERATURE
-20 °C to +50 °C (-4 °F to +122 °F)

FCC DATA
Approved under Parts 15, 74, and 90, as applicable

R1 and R2 RECEIVERS

RECEIVER TYPE
Single-frequency, single-conversion, superheterodyne FM

FM IMAGE REJECTION
70 dB, typical

SENSITIVITY
3 μ V for 50 dB S/N (processed), 20-kHz bandwidth

ULTIMATE QUIETING (S/N)
100 dB (20 kHz flat); 102 dB (A-weighted)

SQUELCH QUIETING
Greater than 100 dB (referenced to 30 kHz deviation)

AUDIO OUTPUT
+8 to -18 dBm (at full deviation), +10 dBm minimum at clipping

IF SELECTIVITY
200 kHz, 7 poles, monolithic ceramic and LC filters

RF SELECTIVITY
Approximately 7 MHz, 3-pole LC filter

ADJUSTMENTS AND CONTROLS
Output level adjust control

INDICATORS
R2: Diversity rf signal detect A/B LEDs,
power on/off LED
R1: Power/Transmit LED

POWER
+12 to +16 V_{dc} via external wall-type power supply

WEIGHT
R1: 0.45 k (16 oz.)
R2: 0.82 k (28.8 oz.)

DIMENSIONS (excluding connector/control protrusions)

12.2 × 3.5 × 14.5 cm (4.8 × 1.4 × 5.7 in.)
12.2 × 3.5 × 27.4 cm (4.8 × 1.4 × 10.8 in.)

HT HANDHELD TRANSMITTER

MIC ELEMENT
Electro-Voice N/D157N N/DYM® cardioid

FREQUENCY STABILITY
 $\pm 0.005\%$

SPURIOUS OUTPUT
-45 dB minimum, -55 dB typical

CONTROLS
Power on/off, mic-audio on/off, mic-level adjust

AUDIO ADJUSTMENT RANGE
30 dB

BATTERY LIFE
8-10 hours with one 9-V alkaline

Length
27.3 cm (10.75 in) long

WEIGHT
284 g (10.0 oz) with battery

BL, BC and BF BODYPACK TRANSMITTER

MICROPHONE
BL: Permanently attached omnidirectional lavalier electret
BC: Permanently attached instrument cable with 1/4-inch connector
BF: Permanently attached unidirectional headset microphone

FREQUENCY STABILITY
 $\pm 0.005\%$

SPURIOUS OUTPUT
-45 dB minimum, -55 dB typical

ADJUSTMENTS AND CONTROLS
3-position off/mute/audio-on switch, mic-level adjust,
dual-color mute/audio-on LED

AUDIO ADJUSTMENT RANGE
30 dB

BATTERY LIFE
8-10 hours with one 9-V alkaline

ANTENNA
Attached external limp wire

SIZE
2.6 cm × 6.4 cm × 10.2 cm
1.0 in. × 2.5 in. × 4 in. without belt clip

WEIGHT
156 g (5.5 oz) with battery

COMPATIBILITY

The receiver's VHF high-band frequency must be the same as the transmitter's frequency. Because of the very high performance of these units and the specialized test equipment required to adjust them properly, owners should not attempt to change the frequency themselves.

If two or more systems are used at the same location, proper frequency selection is required to avoid interference. Frequency spacing is only one factor. Frequency mixing is another factor, involving not only the wireless frequencies but also frequencies of other transmitters such as local TV stations. Many complex formulas must be used to determine frequencies resulting from a mix. Contact your dealer or Electro-Voice for frequency-selection assistance if you are planning to add more wireless systems to be run simultaneously at the same location.

DIVERSITY OPERATION (R2 Receivers only)

The R2 receiver is a true dual-receiver space diversity design, which is the optimum technique for eliminating potential dropouts caused by reflected signals. A signal from the transmitter can reflect off surfaces such as air conditioning ducts, equipment cabinets or other metal objects, and arrive 180 degrees out of phase with the direct or other reflected signals, causing a "phase cancellation" of the entire signal. With a diversity system, such a phase-cancelling condition rarely exists on more than one antenna at the same time. A true dual-receiver diversity system, such as the R2, is constantly switched to the antenna/receiver with the strongest signal, thus providing maximum reliability.

NOTE ON INTERFERENCE

Digital signal processors (reverb/multi-effects units), electronic keyboards, digital lighting controllers, computers and other such sources emit rf energy that can affect the performance of your wireless system. It is best to place your receiver away from such devices. Usually a distance of several inches to several feet will solve this potential problem. Also, keeping the transmitter "on" will usually prevent the negative noise effects of such interference.

RECEIVER CONTROLS, CONNECTORS, AND INDICATORS

The R-Series™ diversity receivers are easy to set up and operate. Once an initial setup has been performed, the output level control will probably not require resetting unless the system is used for a different application.

Front Panel

Power LED: Indicates when the power is active.

Diversity Channel LEDs (R2 receivers only): Indicate which receiver channel has been selected by the diversity circuitry. Proper diversity-circuit operation is indicated when these indicators switch back and forth (except at very short ranges, when one of the indicators locks on, due to strong-signal saturation of both channels).

Antenna(s): Extendable rotatable whip antennas.

Rear Panel

Audio Output Connector: 1/4-inch phone, output only.

Audio Adjust Control: Provides a wide range of level control to the audio output connector.

HANDHELD TRANSMITTER CONTROLS AND INDICATORS

Power Switch: Recessed switch located near the battery compartment; turns transmitter rf and audio circuitry on and off.

Audio Switch: Switch located near the mic head; turns the audio transmission on and off without affecting the rf circuit and the wireless connection with the receiver.

Audio Gain Control: 3/32 in. (2.5 mm) or provided screwdriver adjustment for transmitter preamplifier gain, with approximately 30 dB of range. The control is recessed and is accessible through a hole in the mic handle, located to the left of the mute switch.

LED Indicators: Two separate LED's are provided, indicating transmitter on/off status and battery condition. The red LED remains lit to indicate that the transmitter rf and audio circuits are on. The green LED remains lit until battery power reaches a level where it will soon need replacement.

BODYPACK TRANSMITTER CONTROLS AND INDICATORS

Off/Mute/On Switch: In "mute" position, rf is transmitted (maintaining rf link with the receiver) but audio is not transmitted (audio is "muted"). In the "on" position, audio is transmitted.

Audio Gain Control: 3/32 in. (2.5 mm) or provided screwdriver adjustment for transmitter preamplifier gain, with approximately 30 dB of range. The control is in a recessed hole next to the off/mute/on switch.

LED Indicator: Is red when in standby ("mute") mode; green when transmitting audio ("on").

230-VOLT CONVERSION

Contact your dealer, or MARK IV Audio Service to obtain an approved 230-Volt, 50 Hz power supply for the R1 or R2 receiver.

IN CASE OF DIFFICULTY

Problem	Possible Causes	Solutions
No audio	Transmitter audio switch is off.	Turn on transmitter audio switch.
	Disconnected or damaged receiver audio cable.	Connect, repair, or replace cable.
	Transmitter power switch is off.	Turn transmitter power switch on, with level down on mixer/preamp/amplifier.
	Receiver is off.	Turn on receiver.
	No (or dead) battery in transmitter.	Insert a fresh alkaline battery into transmitter battery compartment (Duracell MN 1604 recommended).
	Faulty battery contacts in transmitter.	Clean contacts.
	Gain down on mixer/preamp/amplifier.	Increase mixer/preamp/amplifier gain.
Low gain/ volume	Gain not up sufficiently on mixer/preamp/ amplifier input.	Increase mixer/preamp/amplifier gain.
	Receiver audio too low.	Increase receiver audio.
	Transmitter audio level too low.	Turn up transmitter audio level.
Distortion	Transmitter audio level too high, overloading transmitter circuit.	Turn down transmitter audio level.
	Receiver audio set too high, overloading the mixer/preamp/ amplifier input.	Turn down receiver audio level.
	Battery level low in transmitters.	Insert a fresh battery.
Signal interference	Another wireless microphone in the immediate vicinity operating on the same frequency, or on a frequency that mixes with another transmitter (such as a TV broadcast transmitter) onto the wireless frequency.	If interference is weak, keep transmitter on to override interference whenever receiver is on (or "fade" audio on mixer/preamp/amplifier). If interference is strong, turn off all other wireless in area to find the one causing the problem.
	Placement too close to a digital signal processor or similar device.	Move receiver to another location.
	Strong electromagnetic field from stage lighting or other source near the transmitter or receiver, producing "rf noise" on or near the operating frequency of the wireless system.	Repair or remove source of interference.
Short range or frequent drop-outs	Faulty receiving antenna system.	Reposition antennas or receiver.
	Faulty transmitter antenna.	Return to factory or authorized service station.
	Many rf-reflective metal obstacles between the transmitter and receiver.	Move the obstacles or reposition the receiver.
Only one diversity LED lights (R2)	Transmitter very close to receiver.	Not a problem. Diversity switching will start when transmitter distance is increased.

SERVICE INFORMATION

Shipping Damage

Inspect the shipping carton for possible damage. If damage is found, notify the transportation company immediately. Save the carton as evidence for the carrier to inspect. If damage occurs during shipping, it is the responsibility of the consignee to file a claim with the carrier. If the carton is in good condition but the equipment is damaged, call Electro-Voice.

Warning!

R-Series™ wireless microphone systems are approved by the Federal Communications Commission. Tuning and other internal adjustments by other than FCC-licensed technicians may nullify the equipment's FCC approval and result in illegal operation.

Factory Service

If factory service is required, ship the unit prepaid in its original carton to:

Mark IV Audio Service West
9130 Glen Oaks Ave.
Sun Valley, CA 91352

Enclose a note describing the problem along with any other helpful information such as where and how the unit is used.

UNIFORM LIMITED WARRANTY

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than Electro-Voice or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice at 600 Cecil Street, Buchanan, MI 49107 (616/695-6831 or 800/234-6831). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Electro-Voice Wireless Systems are guaranteed against malfunction due to defects in materials or workmanship for a period of one (1) year from the date of original purchase. The Limited Warranty does not extend to cables or cable connectors. Additional details are included in the Uniform Limited Warranty Statement.

Service and repair address for this product:

Mark IV Audio Service West
9130 Glen Oaks Ave.,
Sun Valley, CA 91352

Specifications subject to change without notice.



Electro-Voice a MARK IV company

600 Cecil Street, Buchanan, Michigan 49107, Phone (616) 695-6831 (800/234-6831), Fax: (616) 695-1304

Mark IV Audio Canada, Inc., 345 Herbert St., Gananoque, Ontario, Canada K7G 2V1, Phone (613) 382-2141, Fax (613) 382-7466

Mark IV Audio, A.G., Keltenstrasse 5, CH-2563 IPSACH, Switzerland, Phone (011) 41/32-51-6833, Fax (011) 41/32-51-1221

Mark IV Audio Japan, Ltd., 2-5-60 Izumi, Suginami-ku, Tokyo, Japan 168, Phone (011) 81/3-3325-7900, Fax (011) 81/3-3325-7789

Mark IV Audio (Aust.) Pty. Ltd., Unit 24, Block C, Slough Business Park, Slough Ave., Silverwater, N.S.W. 2141, Australia, Phone (011) 61/2-648-3455, Fax (011) 61/2-648-5585

Mark IV Audio Hong Kong, Unit E & F, 21/F., LukHop Industrial Bldg., 8 LukHop St., San Po Kong, Kowloon, Hong Kong, Phone (011) 852/351-3628, Fax (011) 852/351-3329