

**Electro-Voice®**

a MARK IV company

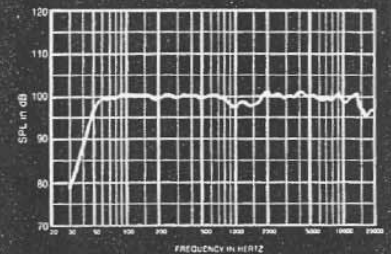


FIGURE 1 — DML-1152A/DMC-1152A Axial Frequency Response (1 watt/1 meter into LF midband)

## DML-1152A Series

DeltaMax™  
Two-Way Full-Range  
Electronically-Controlled  
Sound Reinforcement System

### SPECIFICATIONS

Frequency Response Measured in Far Field Calculated to One Meter on Axis, Swept One-Third-Octave Pink Noise, One Watt into LF Midband (2.83 V at 250 Hz), Anechoic Environment,  $\pm 3$  dB (see Figure 1):  
50-20,000 Hz

Crossover Frequency:  
1,100 Hz

Efficiency,  
LF/HF:  
5.0/25%

Long-Term Average Power Handling Capacity Per EIA Standard RS-426A (see Power Handling section),

LF/HF:  
400/75 watts

Short-Term Power Handling Capacity (10 milliseconds),

LF/HF:  
1,600/300 watts

Maximum Long-Term Midband Acoustic Output,

LF/HF:  
20.0/18.8 watts

Sound Pressure Level at One Meter, One Watt Input Power, Anechoic Environment, Band-Limited Pink-Noise Signal,

LF/HF:  
100/112 dB

Typical System Maximum Sound Pressure Level at One Meter, Anechoic Environment, Continuous:

126 dB

Peak:  
132 dB

Beamwidth Angle Included by 6-dB-Down Points on Polar Responses for One-Third-Octave Bands of Pink Noise,

1,200-20,000 Hz Horizontal (see Figure 3):  
60° (+25°, -5°)

1,200-20,000 Hz Vertical (see Figure 3):  
40° (+25°, -5°)

Directivity Factor  $D_s$  (Q), 1,000-20,000-Hz Median (see Figure 4):  
19.3 (+12.8, -7.3)

Directivity Index  $D_i$ , 1,000-20,000-Hz Median (see Figure 4):  
12.1 dB (+3.0 dB, -1.3 dB)

Distortion, 120 dB SPL at One Meter, Shaped Spectrum (see Figure 5),

Second Harmonic,  
100 Hz: 4.3%  
800 Hz: 1.0%  
2,000 Hz: 0.7%  
5,000 Hz: 1.5%  
Third Harmonic,  
100 Hz: 0.7%  
800 Hz: 1.4%  
2,000 Hz: 0.7%  
5,000 Hz: 1.7%

Transducer Complement,  
HF: DH1A compression driver  
HP64 60° x 40° horn

LF: DL15X woofer

Impedance,  
Nominal LF/HF:  
8.0/8.0 ohms  
Minimum, LF/HF:  
7.9/6.5 ohms

Recommended Amplifier Power (see Amplifier Requirements section),

HF:  
125-250 watts

LF:  
400-800 watts

Input Connections:  
Neutrik Speakon™ NL4MP-R

Enclosure Materials,  
Structural:

.75-inch 14-ply birch plywood

Finish,  
DML-1152AP and DML-1152APF:  
Black textured paint

DML-1152AC and DML-1152ACF:  
Black carpet covered

Grille:  
Steel with charcoal-gray foam

Hanging (DML-1152APF and DML-1152ACF only):

Six steel-reinforced aircraft-type pan fittings (accepts Kinedyne 32326 and 32343 fittings)

Stand Mount Socket (DML-1152AC and DML-1152ACF only):

1 $\frac{1}{8}$ -inch diameter

Dimensions,  
Height: 75.9 cm (29.88 in.)  
Width: 45.2 cm (17.78 in.)  
Depth: 41.4 cm (16.28 in.)

Net Weight:  
44.7 kg (99 lb)

Shipping Weight:  
48.7 kg (108 lb)

### DESCRIPTION

The Electro-Voice DML-1152A full-range loudspeaker system is part of the DeltaMax™ series and is intended for high-level sound reinforcement in touring-sound and permanent-installation applications. The DML-1152A is a two-way biamped loudspeaker system designed to be used with the DMC-1152A dedicated electronic controller. In addition to providing conventional frequency division, time delay and equalization, the electronic control unit offers unique speaker-protection circuitry which monitors the excursion and temperature of both the woofer and compression driver, as well as amplifier clipping. When an overload condition is sensed at the amplifier terminals the input signal is modified to eliminate the problem without changing the crossover frequency or spectral balance of the program material. The loudspeakers and electronics were designed as an integral

package to achieve maximum acoustic output with optimal sonic quality. There are four models in the DML-1152A series: the DML-1152AP (painted finish), the DML-1152AC (carpet finish), the DML-1152APF (painted finish with flying hardware) and the DML-1152ACF (carpet finish with flying hardware).

The DML-1152A employs a 15-inch DL15X woofer for low-frequency reproduction, which makes use of the Electro-Voice "DL" technology that features the Thermo Inductive Ring, TIR™, and PROTEF™ coating (U.S. Patent No. 4,547,632). The TIR is a non-magnetic pole-piece extension that acts as a control on drive inductance and, more importantly, provides a major heat-transfer path from the top of the voice coil, minimizing thermal power compression. PROTEF is a Teflon-based coating applied to the top plate that protects the the voice coil during violent power peaks.

For high frequencies, the DML-1152A utilizes a standard two-inch-exit DH1A compression driver. Its unique one-piece geometrically optimized titanium dome and suspension combined with its unusually powerful magnetic motor provide maximum efficiency and precise control of the diaphragm motion. A high-temperature voice-coil design and PROTEF-coated front plate assure excellent reliability with high-power operation.

The compression driver is coupled to the HP64 flat-front, constant-directivity horn. This 60° x 40° design, optimized for performance from 1,250 Hz to 20,000 Hz, is based on the Electro-Voice HP horn series (U.S. Patent No. 4,685,532) that features integral fiber-glass-and-zinc construction for exceptional strength. The HP series also features beamwidth control vanes — special waveguides in the horn throat — that correct the very-high-frequency dispersion anomalies of other two-inch-throat horns.

The DML-1152A enclosure is constructed of .75-inch 14-ply birch plywood and has a choice of a wear-resistant, black textured paint finish or a rugged black carpet finish that are suited for both touring roadwork and permanent installations. The system is trapezoidal in shape, forming a 30° wedge, and includes a protective steel grille covered with charcoal-gray foam. Optional flying versions include three steel-reinforced aircraft-type pan fittings on the top and bottom of the enclosure to facilitate the hanging of multi-cabinet arrays.

In addition, the DML-1152AC and DML-1152ACF have a built-in socket for mounting the loudspeaker system on a 1.375-inch-diameter pole stand (such as the Electro-Voice Model 100BK).

#### APPLICATIONS

The DML-1152A loudspeaker system is ideal for any professional touring or installation application requiring accurate, full-range reproduction of speech or music at high sound pressure levels from a compact enclosure. The DeltaMax™ electronic-protection technology allows the loudspeaker to be operated at full capacity with maximum fidelity and reliability. The trapezoidal cabinet shape allows tight cluster designs, enabling maximum mutual coupling and single-point-source arrays.

The DML-1152A/DMC-1152A combination is recommended for applications requiring full bandwidth down to 50 Hz. Where very high

levels of deep bass are required, maximum performance may be achieved with the addition of the DML-2181A/DMC-2181 DeltaMax™ subwoofer system. The DML-2181A loudspeaker cabinet, with two manifolded eighteen-inch speakers, and the DMC-2181 electronic controller were designed specifically to work in conjunction with the DML-1152A/DMC-1152A combination to provide extremely high-level low-frequency output down to 35 Hz.

#### FREQUENCY RESPONSE

The frequency response of the DML-1152A shown in Figure 1 was measured on axis in the far field of an anechoic environment, using a swept one-third-octave input and calculated to a one-meter equivalent distance using the inverse-square law. The system was set up using DMC-1152A crossover, equalization and time-delay network. Drive level was set for one watt of power (2.83 volts rms) delivered to the midband of the woofer section.

#### DIRECTIVITY

The polar response of the DML-1152A speaker system at selected one-third-octave bandwidths is shown in Figure 2. These polar responses were measured in an anechoic environment at 20 feet using one-third-octave pink-noise inputs and the DMC-1152A crossover, equalization and time-delay unit. The frequencies selected are fully representative of the polar response of the system. Beamwidth of the system utilizing the complete one-third-octave polar data is shown in Figure 3.  $R_p$  (Q) and directivity index (D) is plotted in Figure 4.

#### DISTORTION

Using the DMC-1152A crossover, equalization and time-delay unit, distortion for the DML-1152A speaker system was measured in the far field with an input power that would result in a sound pressure level of 120 dB at one meter using a tailored frequency spectrum typical of contemporary close-miked rock music. Plots of second- and third-order harmonic distortion are shown in Figure 5.

#### POWER HANDLING TEST

To our knowledge, Electro-Voice was the first U.S. manufacturer to develop and publish a power test closely related to real-life conditions. First, we use a random noise input signal because it contains many frequencies simultaneously, just like real voice or instrument program. Second, our signal contains more energy at extremely high and low frequencies than typical actual program, adding an extra measure of reliability. Third, the test signal includes not only the overall "long-term average" or "continuous" level — which our ears interpret as loudness — but also short-duration peaks which are many times higher than the average, just like actual program. The long-term average level stresses the speaker thermally (heat). The instantaneous peaks test mechanical reliability (cone and diaphragm excursion).

Specifically, the low-frequency driver is designed to withstand the power test described in EIA Standard RS-426A. The EIA test spectrum is applied for eight hours. To obtain the spectrum, the output of a white noise generator (white noise is a particular type of random noise with equal energy per bandwidth in Hz) is fed to a shaping filter with 6-dB-per-octave slopes below 40 Hz and above 318 Hz. When measured with the usual constant-percentage bandwidth analyzer (one-third-octave), this shaping filter produces a spectrum whose 3-dB-down points are at 100 Hz and 1,200 Hz with a 3-dB-per-octave slope above 1,200 Hz.

This shaped signal is sent to the power amplifier with the continuous power set at 400 watts into the EIA equivalent impedance (52.5 volts rms). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 1,600 watts peak (105.0 volts peak).

Specifically, the high-frequency driver is designed to withstand the AES Standard AES2-1984 (ANSI S4.26-1984). The AES test spectrum is applied for two hours. To obtain this spectrum, the output of a pink-noise generator (pink noise is a particular type of random noise with equal energy per octave bandwidth) is fed into a bandpass filter with 12-dB-per-octave slopes and 3-dB-down points at 1,000 Hz and 10,000 Hz. This shaped signal is sent to the power amplifier with the continuous power set at 75 watts into the nominal impedance (24.5 volts rms). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 300 watts peak (49.0 volts rms).

#### CROSSOVER, EQUALIZATION AND TIME-DELAY PROCESSOR

The DML-1152A speaker system was designed as part of an integrated package that utilizes the DMC-1152A processor. Optimal performance of the DML-1152A speaker system can only be assured when used with the DMC-1152A electronics. Use with other electronic crossovers and/or processors is discouraged.

The DMC-1152A electronic control unit has a fixed crossover frequency of 1,100 Hz, utilizes 24-dB-per-octave Linkwitz-Riley filters, and contains fixed time delay and equalization set for optimum performance of the DML-1152A speaker system. Protection circuitry monitors excursion and temperature of both the woofer and compression driver voice coils as well as amplifier clipping, and automatically makes adjustments to the input signal to eliminate overload conditions without altering the spectral balance. This combination enables maximum acoustic output while maintaining maximum sonic fidelity.

#### CONNECTIONS

The DML-1152A is equipped with four-pin Neutrik Speakon™ NL4MP-R connectors for electrical connection to the woofer and compression driver. Two connectors are installed for paralleling additional DML-1152A loudspeakers. One mating Neutrik Speakon™ NL4FC connector is supplied with each system.

Cables, connectors and wiring accessories are available for the DML speaker systems from Pro Co Sound, Inc., and Whirlwind Music Distributors, Inc. To find your local Pro Co, Whirlwind or Neutrik dealer, contact:

Pro Co Sound, Inc.  
135 E. Kalamazoo Ave.  
Kalamazoo, MI 49007

Whirlwind Music Distributors, Inc.  
P.O. Box 1075  
Rochester, NY 14603

Neutrik USA, Inc.  
195-S3 Lehigh  
Lakewood, NJ 08701

The pin-out arrangement is as follows:

1 - = LF (-)  
1 + = LF (+)  
2 - = HF (-)  
2 + = HF (+)

Both the low-frequency and high-frequency inputs present a nominal 8-ohm load to the

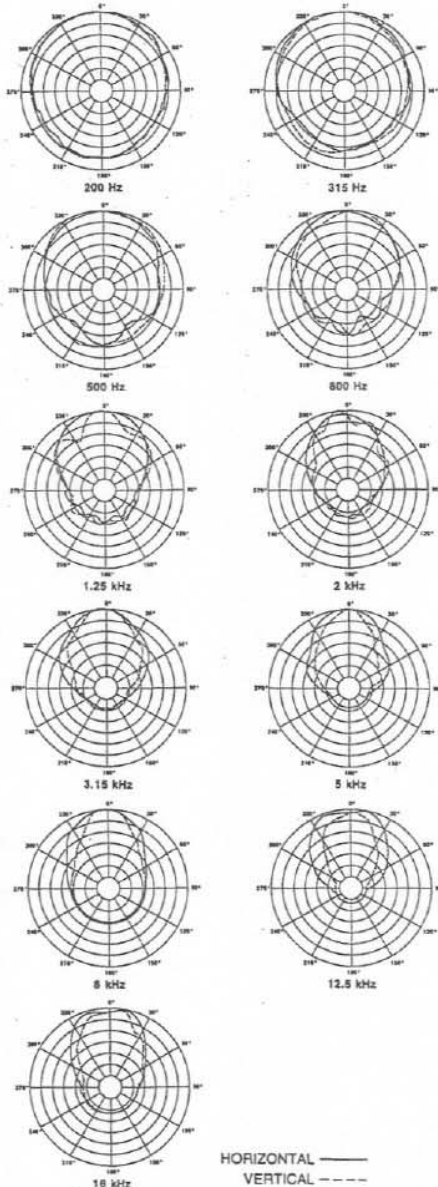


FIGURE 2 — DML-1152A/DMC-1152A Polar Response ( $\frac{1}{3}$ -octave pink noise, 4 volts at 20 feet)

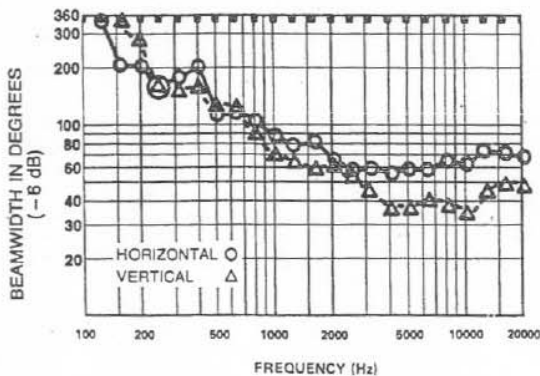


FIGURE 3 — DML-1152A/DMC-1152A Beamwidth vs. Frequency Whole Space (anechoic)

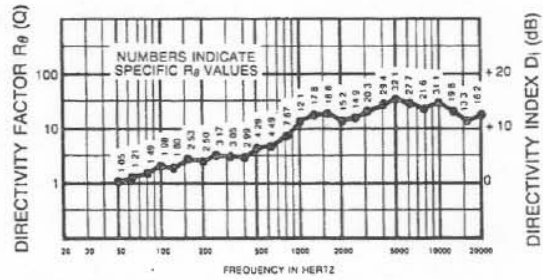


FIGURE 4 — DML-1152A/DMC-1152A Directivity Factor and Directivity Index vs. Frequency Whole Space (anechoic)

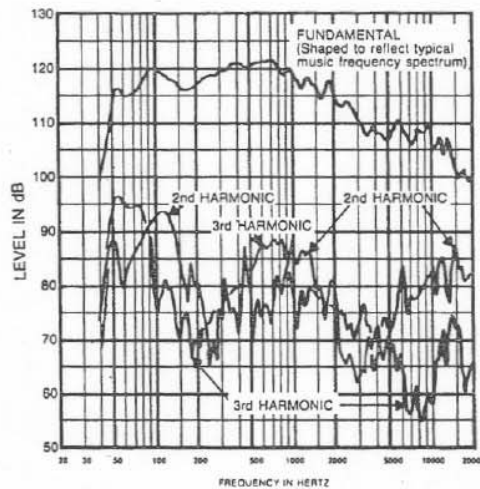
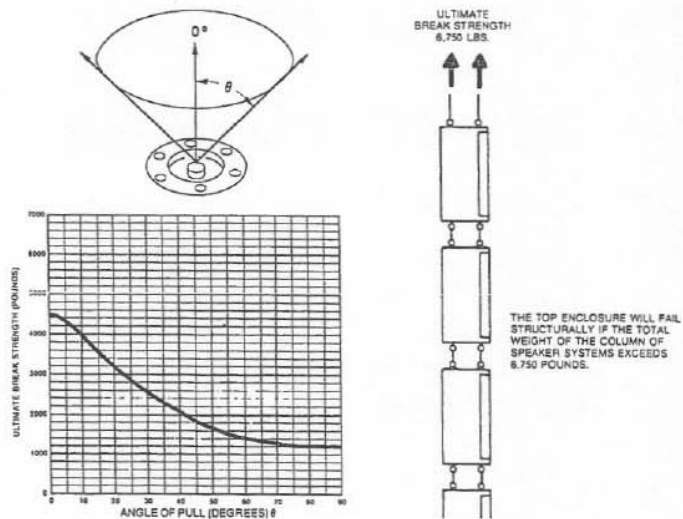


FIGURE 5 — DML-1152A/DMC-1152A Harmonic Distortion (120 dB SPL/1 meter using typical music frequency spectrum)



6a. Break-Strength Rating of Each Individual Rigging Point

6b. Break-Strength Rating of Overall Enclosure

FIGURE 6 — DML-1152APF and DML-1152ACF Ultimate-Break-Strength Ratings



amplifier; however, the compression driver has a low-frequency protection capacitor in series.

#### AMPLIFIER REQUIREMENTS

The DML-1152A speaker system requires professional power amplifiers rated at:

- LF: 400-800 watts continuous into 8 ohms
- HF: 125-250 watts continuous into 8 ohms

DML-1152A speakers may be paralleled only with other DML-1152A speakers if the amplifier is capable of delivering full power at the lower impedances. The use of amplifiers with lower power ratings is acceptable; however, the full-power capabilities of the DML speakers will not be realized. The use of amplifiers with significantly higher power ratings may endanger the loudspeakers and is generally not recommended. Under certain circumstances higher rated power amplifiers are acceptable. It is acceptable to drive the DML-1152A speakers with a stereo power amp utilizing one channel to drive the low frequencies and the other channel to drive the high frequencies. In this configuration, the user should set the "HF Amplifier Calibration" level to the 125-250-watt range to limit excessively high power levels from reaching the compression driver. The user is instructed to consult the DeltaMax Owner's Manual for details of this procedure. The manual is included with the DMC-1152A processor.

#### HANGING

The DML-1152APF and DML-1152ACF are flying-option versions. Each cabinet has a total of six steel-reinforced aircraft-type pan fittings (three on the top and three on the bottom). This three-point flying system makes maximum use of the trapezoidal cabinets permitting a wide range of angle adjustments and offering maximum flexibility in array design and implementation for both the touring sound company and the sound contractor. The pan fittings mate with the Kinedyne 32343 and 32326 twelve-jaw fittings. Electro-Voice offers the DMS series of rigging hardware; a complete line of flying accessories to be used with the DML speaker systems.

The ultimate-break strength of each of the individual rigging points on the DML-1152APF and DML-1152ACF enclosures are a function of the angle of pull relative to the pan fitting and the surface on which it is mounted as shown in Figure 6a. The ultimate break-strength of the overall DML-1152APF and DML-1152ACF enclosures is a function of the total suspended weight as shown in Figure 6b. The ratings indicated in Figure 6 are identical for use with all of the DMS accessories.

**CAUTION:** The DML-1152APF and DML-1152ACF speaker systems should be suspended overhead only in accordance with the procedures and limitations specified in the Flying Manual included with the flying loudspeakers.

#### FIELD REPLACEMENT

The DML-1152A was designed for expedient field service. Loosening the four woofer-clamp bolts allows the woofer to be easily removed. Removing the horn mounting screws allows access to the compression driver, both through the horn and woofer baffle cutouts. A woofer failure will require replacement of the entire driver. In the case of a compression driver failure, a diaphragm assembly replacement kit with instructions is available. If desired, the complete driver may be returned for service.

The following replacement parts are available from the Electro-Voice service department in Buchanan, Michigan:

- LF: Complete woofer; EV Part No. 815-1317
- HF: Diaphragm kit; EV Part No. 81147XX

#### ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker system shall be a two-way biamped system with performance controlled by a dedicated electronic control unit. The loudspeaker system shall have a 15-inch low-frequency direct-radiating driver with an 8-ohm, 2.5-inch-diameter voice coil constructed of edge-wound rectangular aluminum wire, and which shall be capable of handling a 400-watt shaped pink-noise signal with a 6-dB crest factor for 8 hours (as per EIA RS-426A standard). The loudspeaker system shall have a 2.0-inch-exit compression driver mounted on a fiberglass high-frequency horn. The compression driver shall have a 3.0-inch diameter, .0015-inch thick titanium dome and an 8-ohm, 3.0-inch-diameter voice coil constructed of edge-wound rectangular aluminum wire, and which shall be capable of handling a 75-watt, 1,000-to-10,000 Hz pink-noise signal with a 6-dB crest factor for 2 hours (as per AES2-1984 and ANSI S4.26-1984 standards). The high-frequency horn shall be of the constant-directivity type and shall produce a horizontal beamwidth (6-dB-down angle) of 60° (+30°, -5°) from 2,000 Hz to 20,000 Hz and a vertical beamwidth of 40° (+20°, -5°) from 1,600 Hz to 20,000 Hz. The loudspeaker system enclosure shall be constructed of .75-inch thick 14-ply birch plywood, trapezoidal in shape, forming a 30° wedge, and shall have a foam-covered steel grille.

The DML-1152A loudspeaker system shall be used only with the DMC-1152A electronic control unit (see DMC-1152A spec sheet for electronic control unit architects' and engineers' specifications), having a single channel two-way crossover circuit with fourth-order Linkwitz-Riley filters, equalization, time delay and protection circuitry to prevent destruction of the low- and high-frequency drivers due to excessive drive level. When used with the electronic control unit, the loudspeaker system shall have a flat ( $\pm 3$  dB) on-axis frequency response from 50 Hz to 20,000 Hz.

The loudspeaker enclosure dimensions shall be 29.88 inches high, 17.78 inches wide and 16.28 inches deep and shall weigh 96 lbs. Each rigging point on the enclosure (flying option only) shall have an ultimate break-strength rating of 4,500 lbs at 0 degrees, 1,800 lbs at 45 degrees and 1,200 lbs at 90 degrees. The overall enclosure shall have an ultimate-break strength of 6,750 lbs.

The loudspeaker system shall be the Electro-Voice DML-1152A and the electronic control unit shall be the DMC-1152A.

#### WARRANTY (Limited)

Electro-Voice DML Speakers and Speaker Systems (excluding active electronics) are guaranteed for five years from the date of original purchase against malfunction due to defects in workmanship and materials. Electro-Voice DML flying hardware (DMS rigging straps, fittings and enclosure-mounted flying hardware) is guaranteed for one year from date of original purchase against malfunction due to defects in workmanship and materials. Electro-Voice DMC electronic controllers are guaranteed for two years from date of original purchase against malfunction due to defects in workmanship and materials. Electro-Voice DML speaker accessories are guaranteed for one year from date of original purchase against malfunction due to defects in workmanship and materials. If such malfunction occurs, unit will be repaired or replaced (at our option) without charge for materials or labor if delivered prepaid to the proper Electro-Voice service facility. Unit will be returned prepaid. Warranty does not extend to finish, appearance items, burned coils, or malfunction due to abuse or operation under other than specified conditions, nor does it extend to incidental or consequential damages. Some states do not allow the limitation or exclusion of incidental or consequential damages, so the above exclusion may not apply to you. Repair by other than Electro-Voice or its authorized service agencies will void this guarantee. A list of authorized warranty service agencies is available from Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107 (AC/616-695-6831); or Electro-Voice West, 8234 Doe Avenue, Visalia, CA 93291 (AC/209-651-7777). Or Mark IV Audio Canada, Inc., 345 Herbert St., Gananoque, Ontario, Canada K7G 2V1 (AC/613-382-2141); Electro-Voice, S.A., Keltenstrasse 5, CH-2563 IPSACH, Switzerland (41)32-51-58-33; Electro-Voice, Ltd., 2-5-80 Izumi, Suginami-ku, Tokyo, Japan 168, (81)3-325-7900; Mark IV Vertriebs GmbH, Larchenstrasse 99, 6230 Frankfurt/Main 80, Germany (49)69-380-100; Electro-Voice Pty., 59 Waratah St., Kirrawee N.S.W. 2232, Australia (61)2-521-5322. This warranty gives you specific legal rights and you may also have other rights which vary from state to state or province to province.

Service and repair address for this product: Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107.

Specifications subject to change without notice.



**ELECTRO-VOICE, INC., 600 Cecil Street, Buchanan, Michigan 49107**

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