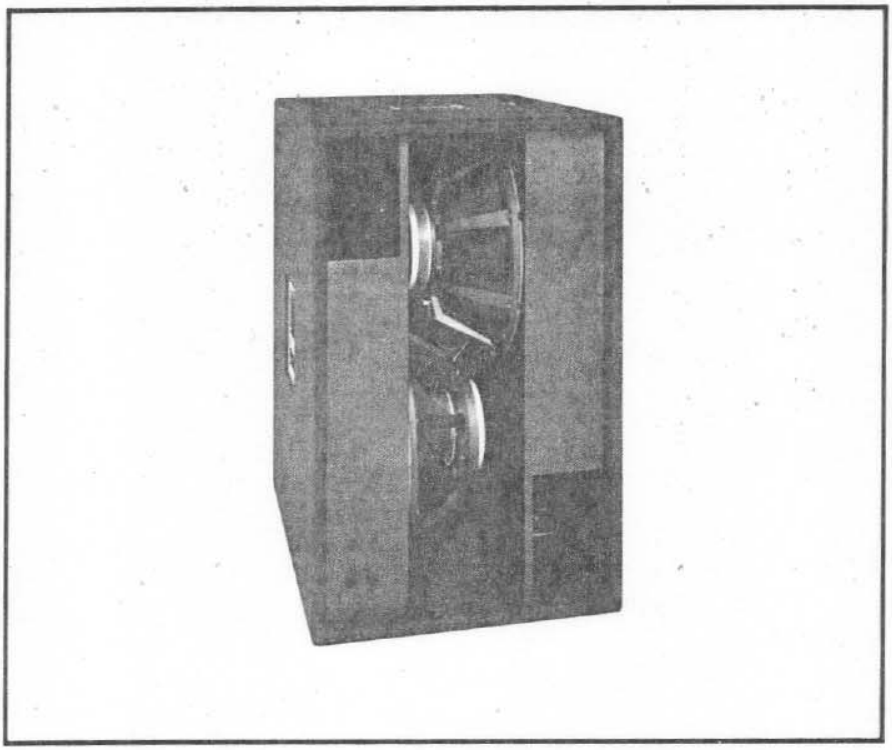

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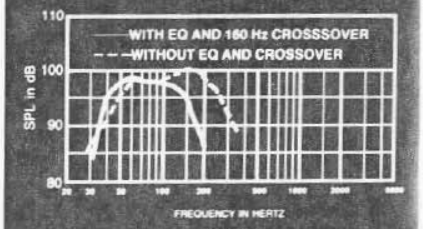

FIGURE 1
Axial Frequency Response
1 Watt/1 Meter

MTL-2A

Manifold Technology® Low-Frequency 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 (2.00 V at 80 Hz), Anechoic Environment (see Figure 1):
40-200 Hz

Low-Frequency 3-dB-Down Point:
40 Hz

Usable Low-Frequency Limit (10-dB-down point):
35 Hz

Half-Space Reference Efficiency:
6.1%

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

Short-Term Power Handling Capacity (10 milleseconds):
3,200 watts

Maximum Long-Term Average Midband Acoustic Output:
40 watts

Sound Pressure Level at 1 Meter, Indicated Input Power, Anechoic Environment, Band-Limited Pink-Noise Signal, 50-200 Hz,
1 Watt: 98
800 Watts: 127
3,200 Watts: 133

Dispersion Angle Included by 6-dB-Down Points on Polar Responses, Indicated Bands of One-Third-Octave Pink Noise (see Figure 3),
63-100 Hz Horizontal:
285° (+75°, -52°)
63-100 Vertical:
240° (+120°, -77°)

Directivity Factor R_θ (Q), 63-100 Hz Median (see Figure 4):
1.84 dB (+0.36 dB, -0.37 dB)

Directivity Index D_I, 63-100 Hz Median (see Figure 4):
2.66 dB (+0.77 dB, -0.99 dB)

Distortion, 0.1 Full Power Input (see Figure 7),
Second Harmonic,
50 Hz:
2.4%
100 Hz:
0.2%
Third Harmonic,
50 Hz:
0.8%
100 Hz:
0.2%

Distortion, Full Power Input: (see Figure 8),
Second Harmonic,
50 Hz:
2.8%
100 Hz:
1.0%
Third Harmonic,
50 Hz:
4.5%
100 Hz:
0.6%

Tranducer Complement:
Two DL18MT

Box Tuning Frequency:
37 Hz

Impedance,
Nominal:
Two 8-ohm loads
Minimum:
Two 8-ohm loads

Input Connections:
Neutrik Speakon™ NL4MPR

Enclosure Materials:
14-ply birch plywood

Finish:
Black Ozite Super TNT carpet

Hanging:
Two-point flying system (tracks accept Kinedyne 32102-1 and 32111-1 fittings)

Dimensions,
Height:
91.4 cm (36.0 in.)
Width:
57.2 cm (22.50 in.)
Depth:
76.2 cm (29.0 in.)
Net Weight:
75.5 kg (166 lb)
Shipping Weight:
80.5 kg (177 lb)

DESCRIPTION

The Electro-Voice MTL-2A Manifold Technology low-frequency loudspeaker system is designed to compliment the MTH-2/94A and MTH-2/64 midbass/high-frequency loudspeaker systems. They combine to produce the three-way active MT-2A high-output compact concert sound reinforcement system ideally suited for both the touring and the fixed installation markets. Optimum performance of the full-range MT-2A system is obtaines when used with the XEQ-3 electronic crossover/equalizer/time delay unit with the dedicated EQMT2 plug-in modules. The MTL-2A is a vented box design incorporating two DL18MT woofers facing into a central manifold chamber. Manifold Technology, pioneered in the MTL-4A, is an Electro-Voice patented method (U.S. patent no. 4,733,749) of combining the output of two, or more drivers, and increasing their acoustic load. Compated to conventional direct radiating designs, manifold allows increased low-frequency effieciency and reduced distortionin a singularly compact box. Typically, the MTL-2A is 2-3 dB more efficient in the crucial

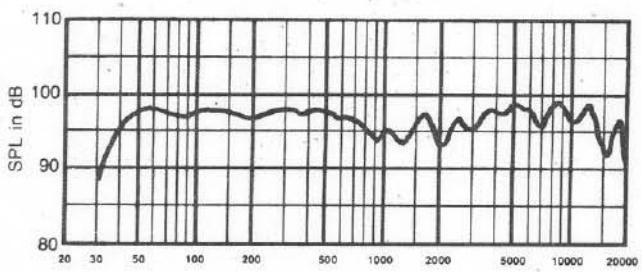

Figure 2—Axial Frequency Response of MT-2/94A System Using Recommended Crossover, Equalization and Time Delay

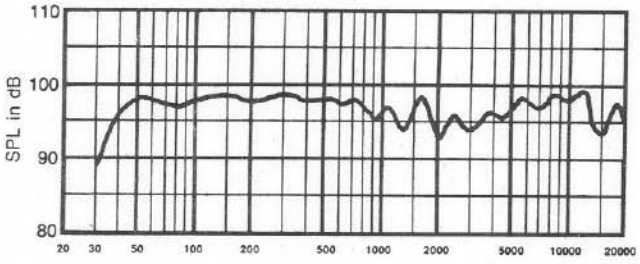

FIGURE 3—Axial Frequency Response of MT-2/64 System Using Recommended Crossover, Equalization and Time Delay

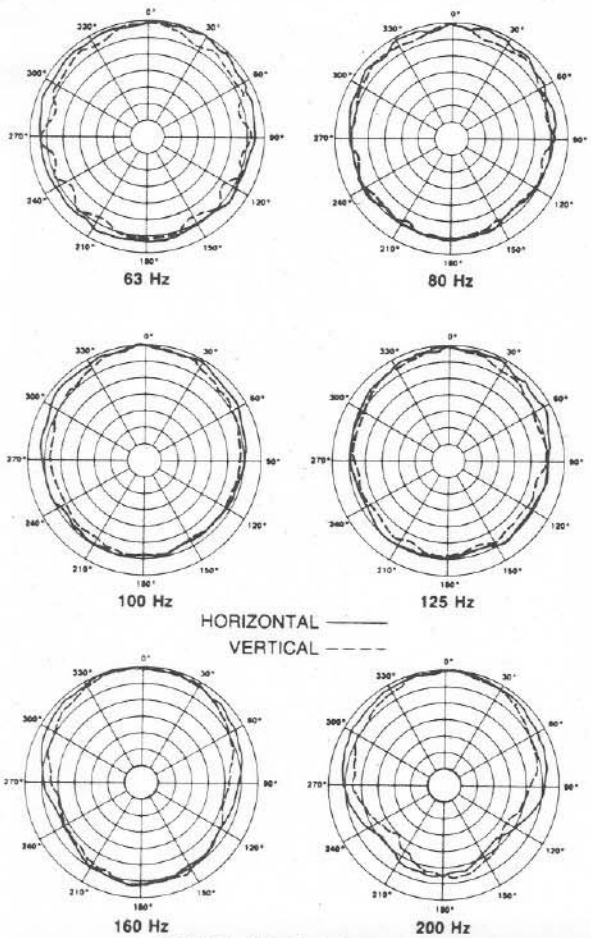

FIGURE 4—MTL-2 Polar Response (1/3-octave pink noise, 4 volts at 20 feet)

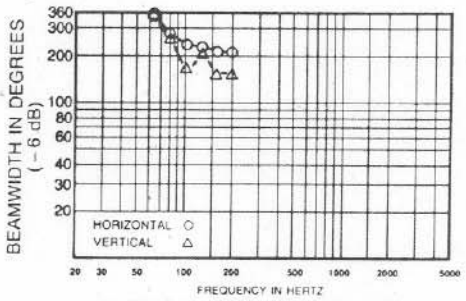

FIGURE 5—MTL-2 Beamwidth vs. Frequency Whole Space (anechoic)

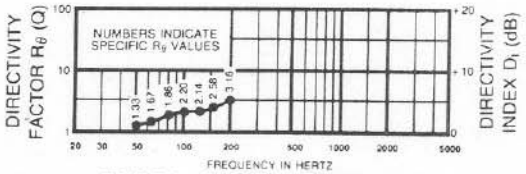

FIGURE 6 — MTL-2 Directivity Factor R_θ (Q) and Directivity Index D_I vs. Frequency Whole Space (anechoic)

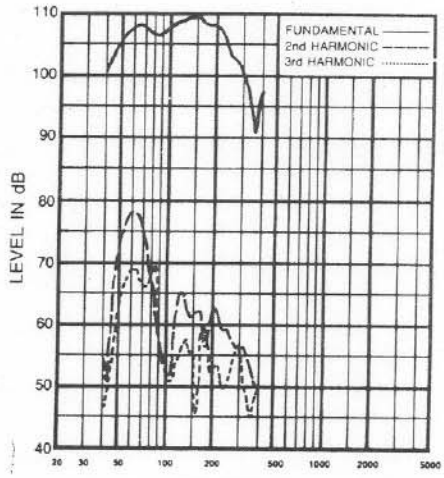

FIGURE 7— MTL-2 Harmonic Distortion 0.1 Rated Power Input (80 Watts), 10 Feet on Axis

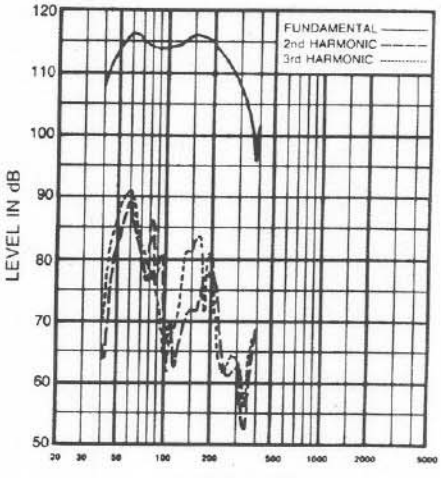

FIGURE 8 — MTL-2 Harmonic Distortion 1.0 Rated Power Input (800 watts), 10 Feet on Axis

40-80 Hz region than a comparable horn. Manifolding, in this configuration, has the added benefit of exposing the magnet assemblies to help minimize thermal build-up. The DML-18MT 18-inch woofer was designed specifically for manifolding to achieve optimal performance in the MTL-2A enclosure. Its design assures linear, low-distortion output. The high-power, high-excursion drive of the DL18MT is augmented by two exclusive Electro-Voice features, the Thermo Inductive Ring,TIR™, and PROTEF™ coating (U.S. Patent No. 4,547,632). The TIR acts as a control on drive inductance and, more importantly, provides a major heat-transfer path from the top of the drive coil, reducing thermal dynamic-range compression. PROTEF is a Teflon-based coating applied to physically protect the voice coil from rubbing during violent power peaks.

The MTL-2A is designed to survive the rigors of the road. 14-ply birch plywood is used throughout. Electro-Voice's unique two-point flying is installed as standard. The Kinnedyne quick-release tracks are recessed below the surface to prevent damage and mechanical interference (see Hanging section). The cabinet is covered in black Ozite Super TNT carpet, the most rugged available. A black, nylon, cloth, grille is supplied as standard.

APPLICATIONS

The MTL-2A is designed with the professional end user in mind. Whether used in regional touring or fixed installations the MTL-2A delivers high level, low distortion, low frequency performance. The small bulk, volume and frontal area of the MTL-2A belies the performance obtainable with Manifold Technology and allows the construction of compact, tight arrays.

The dimensions of the MTL-2A were selected to allow efficient truck packing and unobtrusive installations.

It is possible to use the MTL-2A to augment the bass of any system but it has been optimized to compliment the MTH-2/94A and MTH-2/64 high-frequency cabinets. Combining the MTL-2A with either of the MTH-2A systems, the XEQ-3 electronic crossover and the EQMTs EQ modules produces a fully integrated full-range sound system. Both cabinets are dimensionally identical and have similar hardware.

FREQUENCY RESPONSE

The frequency response of the MTL-2A 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 the recommended crossover and equalization (see the Crossover, Equalization and Time Delay section). Drive level was set for one watt of power (2.00 volts rms into 4 ohms), delivered to the midband of the woofer section. Also shown in Figure 1 is the frequency response of the MTL-2A without equalization or crossover with a one-watt input. The frequency responses of the complete MT-2/94A system (the MTL-2A and the MTH-2/94A together) and the MT-2/64 system (the MTL-2A and the MTH-2/64 together) are shown in Figures 2 and 3). Both full-range MT-2A systems were set up using the XEQ-3 electronic crossover/equalizer/time-delay unit and the EQMT2 plug-in modules, with the crossover frequencies at 160 and 1,600 Hz. One watt of power (2.00 volts) was delivered to the MTL-2A.

DIRECTIVITY

Figure 4 illustrates the directional characteristics of the MTL-2A. The measurements were taken in EV's large anechoic chamber at a distance of 20 feet using pink noise at selected one-third-octave bands. Beamwidth is illustrated in Figure 5 and Directivity Factor R_θ (Q) and Directivity Index D_i, in Figure 6. AcoustaCADD™ data is available for the MTL-2A.

DISTORTION

Inherent in the Manifold Technology design are the greatly reduced distortion components, when compared to conventional vented enclosures. Figure 7 and Figure 8 illustrate the second and third harmonic distortion components of the MTL-2A at 10% and 100% rated power. The XEQ-3 electronic crossover and dedicated EQMT2 module set were in operation when the measurements were taken.

POWER HANDLING CAPACITY

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 reliablilty. 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 average, just like actual program. The long-term average level-stresses the speaker thermally (heat). The instaneous peaks test mechanical reliability (cone and diaphragm excursion). Note that the sine-wave test signals sometimes used have a much less demanding peak value relative to their average level. In actual use, long-term average peaks exist from several seconds on up, but we apply the long-term average for several hours, adding another extra measure of reliability.

Specifically, the MTL-2A 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 or 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 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 amplifiers with continuous power set at 400 watts into each of the 6.9-ohm EIA-equivalent-impedance inputs (52.5 volts true rms), resulting in a total of 800 watts of continuous power being delivered to the MTL-2A.

Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 3,200 watts peak (105 volts per input). this procedure provides a rigorous test of both thermal and mechanical failure modes.

SUBPASSBAND SPEAKER PROTECTION

If the MTL-2A is used without the MTH-2A and the recommended EQMT2 module then subpassband protection should be incorporated. Below the enclosure tuning frequency, cone excursion increases rapidly with the little acoustic output. It is therfore highly recommended that a high-pass filter be used. A 32-Hz 12-dB-per-octave filter is sufficient. Without protection, subpassband signals may "bottom" the woofer. Damage may occur, amplifier power is wasted and modulation of the signal will impair performance. Woofer distortion and "muddy bass" are often caused by lack of subpassband protection.

USE IN MULTIPLES

MTL-2A's may be used in multiples to increase acoustic output. In the following discussion, it is assumed that all speaker cones are operating in unison (in phase) when a common signal is applied. A 6-dB increase in maximum acoustic output results when two speaker systems are located side by side. For operation at very low frequencies, the woofer cones "mutually couple" acting as one system with cone area and power-handling capacity twice that of a single system. The doubling of cone area doubles efficiency, providing a 3-dB increase in sound pressure level. The second 3 dB comes from the doubling of power capacity.

Mutual coupling occurs when the frequency is such that the center-to-center distance between the two woofer manifolds is less than about one-half wavelength. When the distance is greater than one-half wavelength, as would occur if two MTL-2A's were widely spaced, the level increase tends to be limited to the 3-dB power-handling increase.

SYSTEM POSITIONING

Subwoofer systems such as the MTL-2A are often located on the floor. This is both convenient and can provide a desired high acoutic impact when the speakers are, for example, placed near the periphery of a dance floor. In other installations, such as theatre or auditorium, the audible location of a subwoofer operating at a sufficiently low crossover frequency (below about 150 Hz) will not be particularly evident. The other system elements operating above the subwoofer range can be positioned for the desired locational cues and uniform audience coverage.

Floor location provides the acoustic half-space environment associated with the 6.1% system efficiency noted in the Specifications sections. Location at a floor-wall junction (acoustic quarter space) double efficiency (a 3-dB increase in acoustic power level) and tends to promote the full excitation of more room modes, or standing waves, important in achieving overall bass output in the room. Corner placement (acoutic eighth space)

double efficiency again and guarantees excitation of all room modes. (Such placement for maximum efficiency and room-mode excitation is not necessary and may not be desirable or possible for a variety of reasons, including aesthetics and practicality.)
The MTL-2A can also be successfully operated away from any nearby acoustic boundaries, particularly when multiple systems are used for increased output ability (see Use in Multiples section), such as in a flown concert system.

CROSSOVER, EQUALIZATION AND TIME DELAY

The useable frequency response of the Electro-Voice MTL-2A low-frequency loudspeaker system is 35-225 Hz. For maximum performance of the MTL-2A in full-range applications, the addition of the Electro-Voice MTH-2/94A or MTH-2/64 midbass/high-frequency loudspeaker system is recommended. Maximum acoustic performance of the full-range MT-2A systems is obtained when used with the EQMT2 plug-in modules with crossover frequencies at 160 and 1,600 Hz.
The XEQ-3 is a three-way electronic crossover with adjustable crossover frequencies utilizing Linkwitz-Riley 24-dB-per-octave filters and time delay equalization to achieve zero lobing error. In addition, the XEQ-3 offers high-pass filtering to protect woofers from infrasonic frequencies and frequency response equalization in each frequency band through the use of plug-in modules. Optimum performance of the MT-2A loudspeaker systems is obtained when used with the XEQ-3 with crossover frequencies at 160 Hz and 1,600 Hz and with EQMT2 plug-in modules (a package of three EQ modules dedicated to the MT-2A system). Information is included with the EQMT2 package detailing the front-panel settings necessary to achieve the performance described in this data sheet.

CONNECTIONS

Electrical connections are made on the back of the MTL-2A via a 4-pin connector. The two 8-ohm woofers are wired on separate pairs of pins for individual access. There are two connectors on the enclosure to allow paralleling of other MTL-2A systems. The Neutrik Speakon™ NL4MPR panel-mount connector is used for both connections. One mating Neutrik Speakon NL4FC cable-end connector is supplied with each system. Both low-frequency inputs present a nominal 8-ohm load to the amplifier. The pin-out arrangement is as follows:

Pin 2+ : LF2 (+)
Pin 2- : LF2 (-)
Pin 1+ : LF1 (+)
Pin 1- : LF1 (-)

Neutrik Speakon cables, connectors and wiring accessories are available 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 Ave.
Lakewood, NJ 08701

HANGING

The MTL-2A has been conceived to "fly" from the outset. It incorporates EV's exclusive two-point flying hardware permitting a wide range of aiming angles and maximum flexibility. The cabinet is reinforced and structurally sound allowing the MTL-2A and the MTH-2A to be combined to form tight arrays. The tracks are recessed to avoid box-to-box interference when flying and during transportation. The track mates with the Kinnedyne 32102-1 and 32111-1 double-stud ring fittings. Electro-Voice offers a complete line of flying accessories for use with the MT-2A flying systems.

CAUTION: The MTL-2A 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 SERVICE

The MTL-2A was designed for expedient field repair. To access the drivers, first remove the nylon grille. The grille may be removed by simply grabbing the tabs and gently pulling it off. Next, remove the eight ¼-20 hex-head bolts which secure each woofer. Use a 3/8-inch nutdriver or a rachet with a 3/8-inch socket. The woofers then slide straight out of the enclosure.

Subwoofer: Complete DL18MT 18-inch woofer. EV Part No. 818-0882.

Complete service information can be found in the Service Data Sheet available from the Service Department in Buchanan, Michigan.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker shall be a low-frequency system with two manifolded 18-inch low-frequency woofers. Each woofer shall have an 8-ohm 2.5-inch-diameter voice coil constructed of edge-wound rectangular copper wire and shall be capable of handling a 400-watt shaped pink noise signal with 6-dB crest factor for 8 hours (as per EIA RS-426A standard). The loudspeaker system shall have a sensitivity of 98 dB one watt at one meter from 50-100 Hz.
The loudspeaker system shall have an enclosure constructed of .75-inch 14-ply birch plywood and shall have a black nylon cloth grille. The loudspeaker dimensions shall be 36.0 inches high, 22.5 inches wide and 29.9 inches deep and shall weigh 166 lbs.
The loudspeaker system shall be the Electro-Voice MTL-2A.

WARRANTY (Limited)

Electro-Voice MT Speakers and Speaker Systems (excluding active electronics) are guaranteed for five years from date of purchase against malfunction due to defects in workmanship and materials. Electro-Voice MT flying hardware (rigging straps and enclosure-mounted hardware) is guaranteed for one year from date of original purchase against malfunction due to defects in workmanship and materials. Electro-Voice MT accessories (including dollies) 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 exclusion or limitation 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 service centers is available from Electro-Voice, Inc., 600 Cecil St., Buchanan, MI 49107 (616-695-6831); and Electro-Voice West, 8234 Doe Ave., Visalia, CA 93291 (209-651-7777). Or Mark IV Audio Canada, Inc., 345 Herbert St., Gananoque, Ontario K7G2V1 Canada (613-382-2141); Mark IV Audio, A.G., Keltenstrasse 5, CH-2563 Ipsach, Switzerland (41-32-51-6833); Mark IV Vertriebs, GmbH., Larchenstrasse 99, 6230 Frankfort/Main 80, West Germany (49-69-380-100); Mark IV Audio Japan, Ltd., 2-5-60 Izumi, Suginami-ku, Tokyo 168, Japan (81-3-325-7900); Electro-Voice, Pty., Unit 24/Block C, Slough Business Park, Slough Ave., Silverwater N.S.W. 2141 Australia (61-2-648-3455). This warranty gives you specific legal rights which may vary from state to state or province to province.

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

Specifications subject to change without notice.

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