



TO BE USED WITH DMC-1152 ELECTRONIC CONTROLLER

Electro-Voice®

a MARK IV company

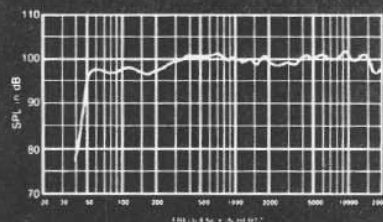


FIGURE 1 — DML-1152/DMC-1152 Axial Frequency Response (1 watt/1 meter into LF midband)

DML-1152 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, Anechoic Environment, ± 3 dB (see Figure 1):

50-20,000 Hz

Crossover Frequency:

1,250 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 400-1,200 Hz:

100 dB

Typical 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 R_0 (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:

ITT-Cannon EP-4-14 and EP-4-13

Enclosure Materials,

Structural:

14-ply birch plywood

Finish:

Black textured paint

Grille:

Steel with charcoal gray foam

Hanging (DML-1152F only):

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

Dimensions,

Height: 75.9 cm (29.88 in.)

Width: 45.2 cm (17.78 in.)

Depth: 41.4 cm (16.28 in.)

Net Weight:

43.3 kg (96 lb)

Shipping Weight:

47.4 kg (105 lb)

DESCRIPTION

The Electro-Voice DML-1152 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-1152 is a two-way biamped loudspeaker system designed to be used with the DMC-1152 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.

The DML-1152 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 voice coil during violent power peaks.

For high frequencies, the DML-1152 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 $60^\circ \times 40^\circ$ 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 beam-width control vanes — special waveguides in the horn throat — that correct the very-high-frequency dispersion anomalies of other two-inch-throat horns.

The DML-1152 enclosure is constructed of 14-ply birch plywood and has a wear-resistant, black textured paint finish that is 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. An optional flying version, available as the DML-1152F, includes three steel-reinforced aircraft-type pan fittings on the top and bottom of the enclosure to facilitate the hanging of multi-cabinet arrays.

APPLICATIONS

The DML-1152 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-1152/DMC-1152 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 a subwoofer.

FREQUENCY RESPONSE

The frequency response of the DML-1152 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-1152 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-1152 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-1152 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_s (Q) and directivity index (D) is plotted in Figure 4.

DISTORTION

Using the DMC-1152 crossover, equalization and time-delay unit, distortion for the DML-1152 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 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 reliability. Third, the test signal includes not only the overall "long-term average" or "continuous" level — 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). 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 levels exist from several seconds on up, but we apply the long-term average for several hours, adding another extra measure of reliability.

Specifically, the DML-1152 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 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 analyzer (one-third-octave), this shaping filter produces a spectrum whose 3-dB-down points are at 100 Hz and 1,200 Hz. This shaped signal is then divided into the two frequency bands of operation using the DMC-1152 crossover, equalization and time-delay unit with the protection circuitry disabled. The low-frequency amplifier is set with continuous power at 400 watts into the 6.90-ohm EIA-equivalent-impedance input (52.5 volts true RMS). Amplifier clipping sets instantaneous peaks at 6 dB above continuous power, or 1,600 watts peak (105.0 volts peak). The high-frequency amplifier is set with continuous power at 75 watts into the 5.18-ohm EIA-equivalent-impedance input (19.7 volts true RMS), with amplifier clipping setting instantaneous peaks at 300 watts peak (39.4 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

CROSSOVER, EQUALIZATION AND TIME-DELAY PROCESSOR

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

The DMC-1152 electronic control unit has a fixed crossover frequency of 1,250 Hz, utilizes 24-dB-per-octave Linkwitz-Riley filters, and contains fixed time delay and equalization set for optimum performance of the DML-1152 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-1152 is equipped with ITT-Cannon EP-4 connectors for electrical connection to the woofer and compression driver. Two connectors are installed; one male (EP-4-14) for input signal and one female (EP-4-13) for paralleling additional DML-1152 loudspeakers. The mating connectors for the cable ends are the EP-4-11-IC for the input connection and the EP-4-12-IC for the loop-thru connection.

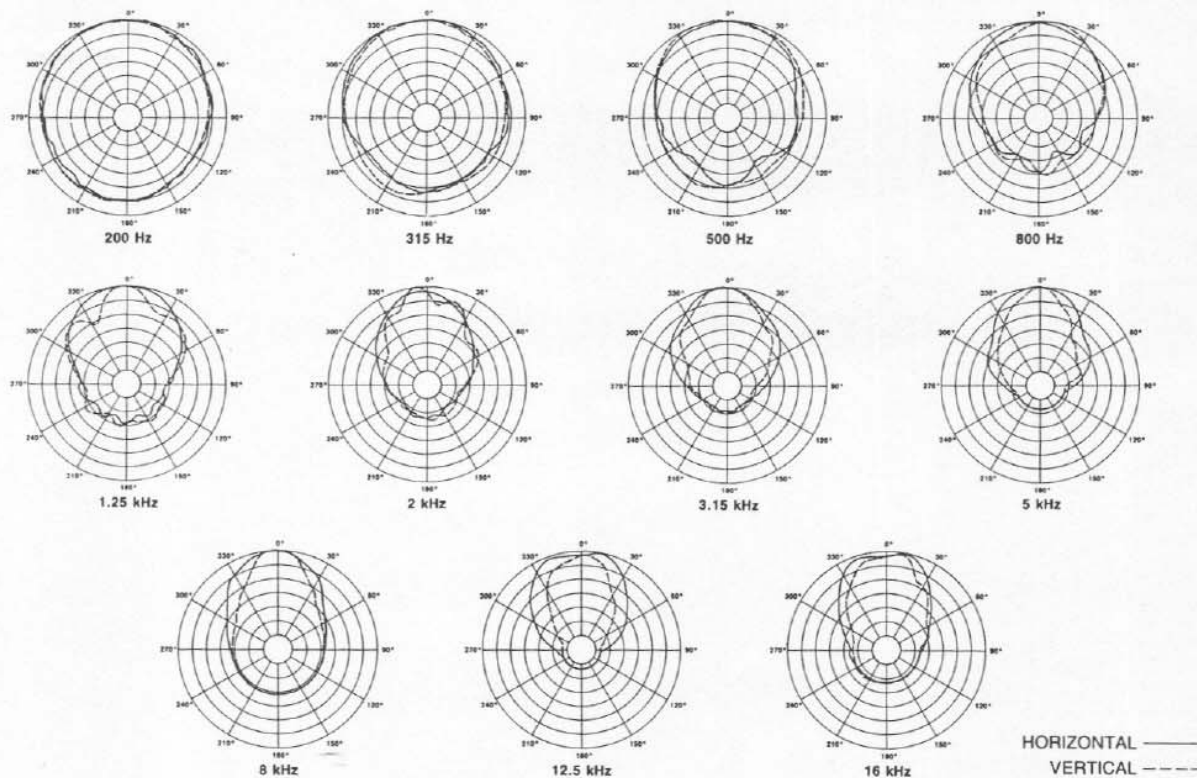


FIGURE 2 — DML-1152/DMC-1152 Polar Response
($\frac{1}{3}$ -octave pink noise, 4 volts at 20 feet)

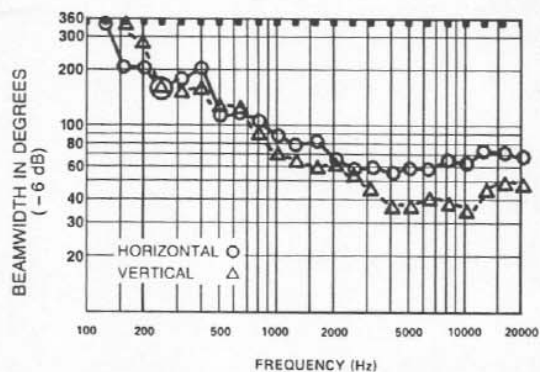


FIGURE 3 — DML-1152/DMC-1152
Beamwidth vs. Frequency
Whole Space (anechoic)

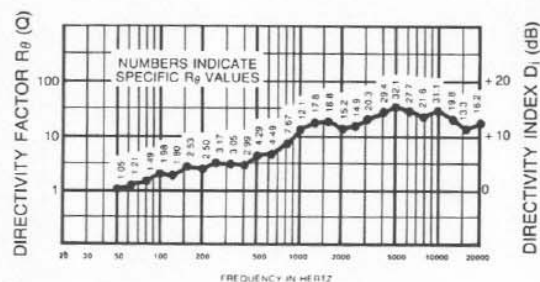


FIGURE 4 — DML-1152/DMC-1152 Directivity
Factor and Directivity Index vs. Frequency
Whole Space (anechoic)

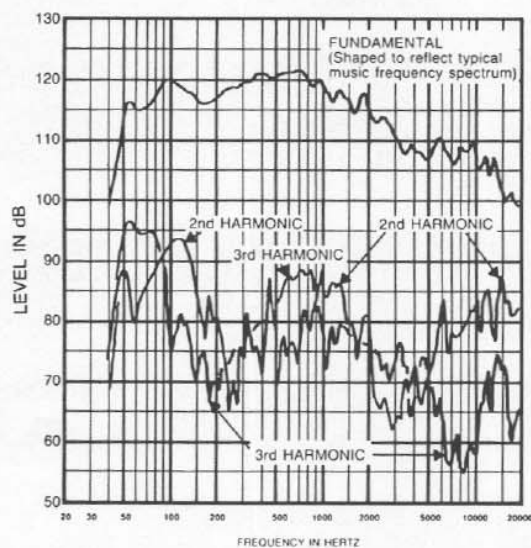


FIGURE 5 — DML-1152/DMC-1152
Harmonic Distortion (120 dB SPL/1 meter
using typical music frequency spectrum)

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

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

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

The pin-out arrangement is as follows:

- Pin 1 = LF (-)
- Pin 2 = LF (+)
- Pin 3 = HF (-)
- Pin 4 = HF (+)

Both the low-frequency and high-frequency inputs present a nominal 8-ohm load to the amplifier; however, the compression driver has a low-frequency protection capacitor in series.

AMPLIFIER REQUIREMENTS

The DML-1152 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-1152 speakers may be paralleled only with other DML-1152 speakers if the amplifier is capable of delivering full power at the lower impedances. The use of amplifiers with lower power rating 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-1152 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 "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 (EV Part No. 700221) for details of this procedure. The manual is included with DMC-1152 processor.

HANGING

The DML-1152F is a flying-option version. 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 Aeroquip 32343 and 32326 stud fittings. Electro-Voice offers a complete line of flying accessories to be used with the DML speaker systems.

CAUTION: The DML-1152F speaker system 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-1152 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. 815-1022
- HF: Diaphragm kit; EV Part No. 81147XX

WARRANTY (Limited)

Electro-Voice Speakers and Speaker Systems (excluding active electronics) are guaranteed for five years 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, including cone and/or coil damage resulting from improperly designed enclosures, 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 warranty service agencies is available from Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107 (AC/616-695-6831); Electro-Voice, Inc., 3810 148th Avenue N.E., Redmond, WA 98052 (AC/206-881-9555); and/or Electro-Voice West, 8234 Doe Avenue, Visalia, CA 93291 (AC/209-651-7777). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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

Specifications subject to change without notice.



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

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