

DMC-1122B

DeltaMax™ Controller for DML-1122A Series Sound Reinforcement Speaker Systems

- Fixed, optimized system equalization and signal delay for smooth frequency response
- Active sensing broadband compressor circuit, with varying compression ratio, provides speaker thermal protection
- Active sensing speaker overexcursion protection with soft-clip limiting
- User-adjustable power amplifier clip calibration circuitry
- LED displays for each band indicate protection mode

TO BE USED WITH DML-1122A SERIES SPEAKERS ONLY.

SYSTEM SPECIFICATIONS

System Frequency Response, DMC-1122B with DML-1122A Series Speaker, One Watt into LF Mid Band (2.83 volts at 250 Hz) on Axis in Anechoic Environment:
70-20,000 Hz, ± 3 dB (see Figure 1)

CONTROLLER SPECIFICATIONS

General Functions:

Two-way crossover, frequency and signal-delay equalizer, and protection system for DML-1122A series speaker systems

Channel Configuration:

Single channel two-way; two sense channels (LF and HF)

Crossover Frequency:

1,250 Hz

Crossover Filter:

4th-order Linkwitz-Riley

Gain:

+5 dB nominal, LF and HF outputs

Signal-Path Equalization, DMC-1122B (see Figure 2),

LF EQ: -3 dB at 40 Hz, +11 dB at 84 Hz

LF Signal Delay: 0.03 ms at crossover frequency

HF EQ: 4th order optimized for

DML-1122A series driver and horn

Total Harmonic Distortion, 20-20,000 Hz:

0.03% typical, 0.1% maximum

Noise, Each Output, 20-20,000-Hz

Bandwidth, Typical:

-86 dBu²

Signal Input,

Type: Active differential

Maximum Level: +18 dBu

Impedance: 20,000 ohms and 0.0015 μ F

Common-Mode Range: ± 24 volts

CMRR, Typical: -55 dB

Connector: Female 3-pin XLR-type

Signal Outputs (LF and HF),

Type: Transformer floating differential

Maximum Level: +18 dBu

Minimum Load Impedance for Full

Level: 600 ohms

Protection: Safe for short circuit or

± 25 volts dc

Connectors: Male 3-pin XLR-type

Sense Channel Inputs (LF and HF),

Type: Active differential

Maximum Level: 145 volts rms

Impedance: 200,000 ohms differential

Connector: Two binding posts/banana jacks, spaced 1.9 cm (0.75 in.)

Controls (all except power switch are screwdriver operated):

Output level, each output; amplifier limit calibration, each sense channel; amplifier clip/limit switch; power switch

Indicators:

3-LED Input level (-20, 0, and +16 dBu)

3-LED gain reduction (3, 6, and 12 dB)

3-LED LF output limits (amplifier, excursion, temperature)

3-LED HF output limits (amplifier, excursion, temperature)

1-LED power on

Power Requirements:

100, 120, 220, or 240 volts ac, 50-60 Hz,

13 watts

Chassis Construction:

Painted steel

Color:

Gray front panel and black chassis with

white graphics

Mounting and Overall Dimensions (see Figure 4):

EIA 19-inch (48.3-cm) rack mount, 4.45 cm (1.75 in.) high, 22.8 cm (8.97 in.) behind panel including connectors; supplied with front-panel security cover for controls

Weight,

Net: 3.6 kg (8 lb)

Shipping: 4.2 kg (9 lb, 3 oz)

DESCRIPTION

The DeltaMax™ system consists of a two-way, biamped, high-performance speaker system and a companion electronic controller. The electronic protection technology in the DMC-1122B DeltaMax controller allows the loudspeakers to be operated at full capacity with maximum fidelity and reliability. The DML-1122A is a compact, full-range loudspeaker system, intended for high-level sound reinforcement in touring sound and permanent installations.

The electronic circuits are designed to provide optimum audio performance, even when the audio drive level is increased for maximum loudness. A high-performance compressor, with automatically variable compression ratio, is controlled by special speaker modeling circuits to provide speaker temperature protection and amplifier anticlip limiting. Speaker excursion protection is accomplished with a voltage-limit system which operates from an excursion-vs.-frequency modeling circuit. Front panel indicator lights show input level, compressor gain reduction, and HF and LF output limit thresholds for excursion, temperature, and amplifier power. Operation of all protection functions is completely automatic.

The DeltaMax system will work with any professional power amplifier within the stated power and gain range. See Amplifier Requirements section.

1. See DML-1122A series engineering data sheets for detailed speaker system specifications.

2. 0 dBu is 0.775 volts rms sine wave.

FIGURE 1 — DMC-1122B/DML-1122A Series Frequency Response, on Axis in Anechoic Environment (1 watt/1 meter into LF mid band)

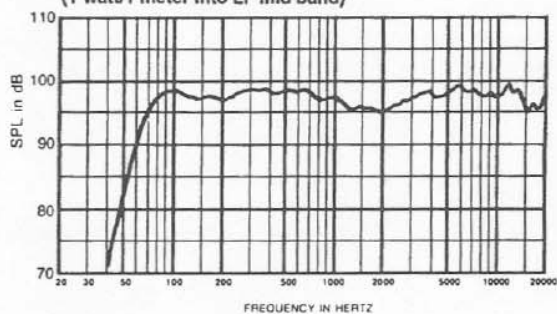


FIGURE 2 — DMC-1122B Frequency Response

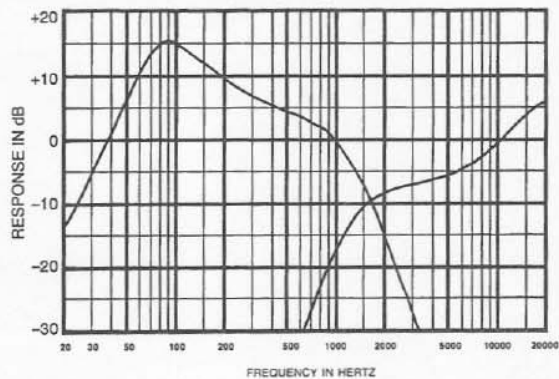


FIGURE 3 — DMC-1122B Block Diagram

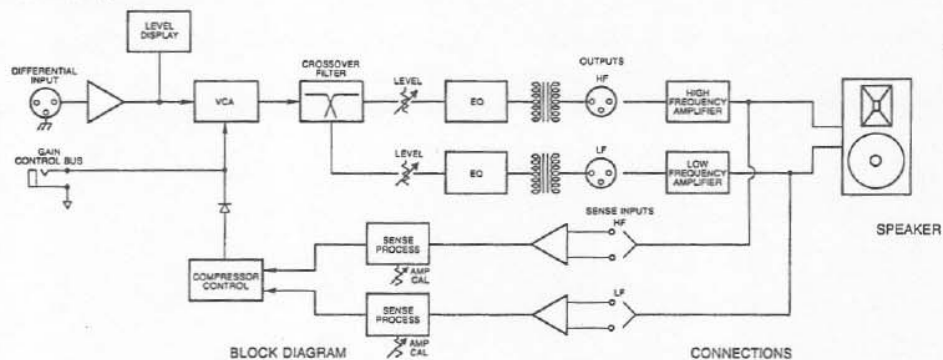
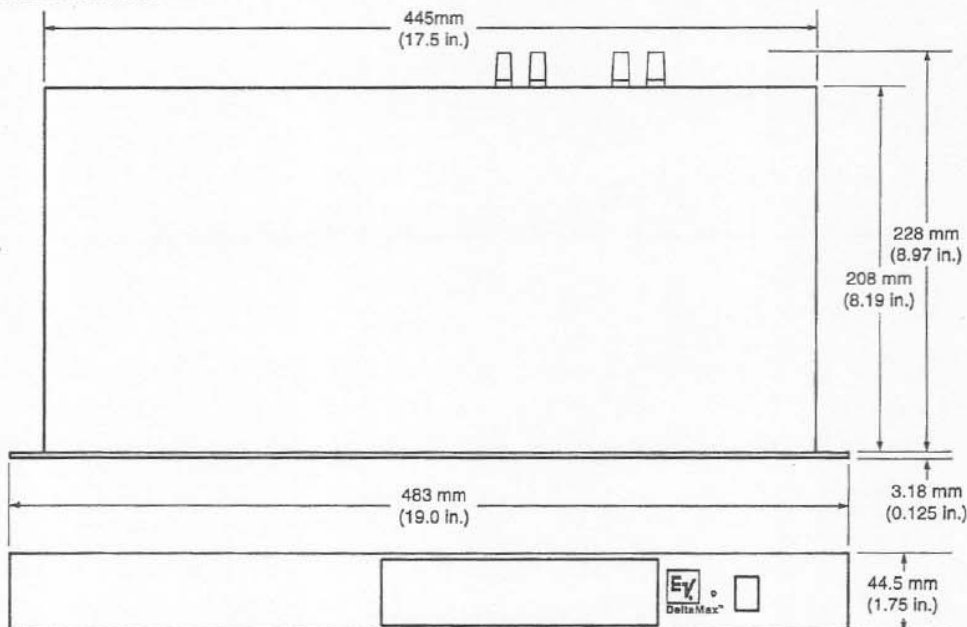


FIGURE 4 — DMC-1122B Dimensions



can only be attained in conjunction with the DMC-1122B electronic controllers. DO NOT DRIVE THESE SPEAKERS WITH OTHER ELECTRONIC CROSSOVERS OR PROCESSORS. DO NOT USE THE DMC-1122B CONTROLLERS ON OTHER SPEAKERS AS ALL PARAMETERS ARE SPECIFIC TO THE DML-1122A SERIES.

PRINCIPLE OF OPERATION

Refer to the block diagram in Figure 3.

The signal path consists of an active differential input circuit which drives a VCA, which is controlled by a special compressor circuit. After the VCA is a fourth-order Linkwitz-Riley crossover circuit.

The high-frequency output has an equalizer which flattens the frequency response of the constant-directivity horn and compression driver from their natural mass-loaded response characteristic.

The low-frequency output has a delay equalizer to compensate for the relative physical positioning of the LF and HF drivers, and their actual phase response at the crossover frequency. An underdamped second-order high-pass filter, combined with a variation of a first-order shelving low-boost function provides optimum low-frequency response with the DeltaMax loudspeakers.

The output sections provide transformer-isolated, low-distortion differential drive signals.

The compressor has both a signal control input and a compression-ratio control input. The control voltages are developed from the sense channels. The primary dynamic action (gain reduction) of the compressor is controlled by a dual-time-constant detection circuit driven by rectified audio sensed at the speaker terminals. The compression ratio above the threshold is determined by the condition of the speakers. Temperature modeling circuits will increase this compression ratio when it becomes necessary. Compression will also increase to prevent amplifier clipping if this function is selected.

The compressor gain transfer has a gradually changing slope across its threshold. This soft-knee design reduces the audibility of the compression. The compression ratio above the threshold can vary from 1:1 (no effect) to about 20:1 (hard limiting).

A dynamic, frequency-sensitive voltage limiter at the output of each frequency band protects the speakers from excursion damage. If one of the speakers approaches its excursion limit, the peak of the output waveform is clamped at a level above which excursion damage would occur.

INSTALLATION

Mounting

The unit is one rack-space high, 4.45 cm (1.75 in.), and fits a standard EIA 19-inch rack. Mount the DMC controller in a rack cabinet near the power amplifier(s) to make wiring easy.

Grounding

A widely accepted grounding technique for audio systems is the star connection (single-

point) ground. The final configuration will be determined by the size of the system and the equipment used in the system. However, the star-connection grounding system is recommended as a starting point.

Never lift the third wire safety ground of the ac power cable. It protects against possible shock hazard.

Ventilation

Adequate ventilation should be provided in the rack to maintain a reasonable operating temperature. Under any conditions the ambient temperature inside the rack cabinet should not exceed 60° C (140° F).

Security

A security cover and attachment screws are supplied to protect the control settings against uninvited adjustments.

CONNECTIONS

The DeltaMax controller has XLR-type connectors for signal input and outputs. Pin 1 is shield, pin 2 is high (+), and pin 3 is low (-). The input is active differential and the outputs are transformer-balanced differential. When used in an unbalanced configuration, pin 3 should be shorted to ground.

The LF and HF sense connections are dual-binding-post/banana jacks (five-way binding posts). The sense inputs are active differential, enabling connection to the output of mono-bridged amplifiers, and are high impedance, allowing small gauge wire (e.g. #22 AWG) to be used for the sense connection. Although current flow in the sense lines is negligible, they must be capable of handling the high-output voltages of the amplifiers.

AMPLIFIER REQUIREMENTS

The DML-1122A speaker system requires professional power amplifiers with the following ratings:

LF: 300-600 watts continuous into eight ohms

HF: 125-250 watts continuous into eight ohms

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 is wasteful and may endanger the loudspeakers; it is generally not recommended.

Under certain circumstances, however, higher rated power amplifiers are acceptable. It is acceptable to drive the DML-1122A speakers with a stereo power amp utilizing one channel to drive the low frequencies and the other channel to drive the high frequencies. For an extra degree of protection when operating in this configuration, the user may want to set the HF Amplifier Calibration level to the 250-watt position to limit excessively high power levels from reaching the compression driver.

DML-1122A speakers may be paralleled with other DML-1122A speakers if the amplifier is capable of delivering adequate power to each speaker at the lower impedance. Under no circumstances should DML-1122A and DML-1152A speakers be paralleled on the same amplifier channels.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The controller shall consist of a single-channel two-way crossover circuit with fourth-order Linkwitz-Riley filters, a compressor system with variable compression ratio and dual-time-constant detector, a voltage clamping circuit for excursion protection, and speaker modeling circuits which control the compressor and clamp circuits to prevent destruction of the high-frequency and low-frequency drivers due to excessive drive level without shifting high-pass, low-pass or crossover filters. Included in the signal path shall be special frequency and time-delay equalization to provide flat (± 3 dB) on-axis anechoic frequency response in the range of 70 Hz to 20 kHz for the DML-1122A series loudspeakers.

The total harmonic distortion through the signal path shall be nominally 0.03% and no greater than 0.1% from 20 Hz to 20 kHz, within the output's passband. The noise at the outputs, measured with a 20-20,000-Hz equivalent-noise-bandwidth filter, shall be typically -86 dBu.

The signal input shall be active differential with a level capability of +18 dBu, and a female 3-pin XLR-type connector. The outputs shall be transformer isolated with a level capability of +18 dBu into 600 ohms, and male 3-pin XLR-type connectors. There shall be two active differential sense inputs for speaker protection, with binding-post/banana-jack connectors.

Front panel controls shall include LF and HF level controls, LF and HF amplifier calibration controls, and a switch to control the amplifier limit function, all accessible with a screwdriver, after removing the security cover. There shall be a power switch on the front panel.

Front panel indicators shall include input level, gain reduction, LF output limits (for amplifier, excursion and temperature), HF output limits (for amplifier, excursion and temperature), and power on.

The chassis shall be made of painted steel with a gray front panel and white graphics. It shall be rack mountable in a 19-inch (48.3-cm) EIA rack, and be 4.45 cm (1.75 in.) high and 22.8 cm (8.97 in.) deep overall, including connectors. The unit shall weigh 3.6 kg (8 lb). The unit shall be an Electro-Voice DMC-1122B.

WARRANTY (Limited)

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 and/or Electro-Voice West at 8234 Doe Avenue, Visalia, CA 93291 (209) 651-7777. **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are 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 dam-

ages 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 Electronics are guaranteed against malfunction due to defects in materials or workmanship for a period of three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

Electro-Voice Speakers and Speaker Systems are guaranteed against malfunction due to defects in materials and workmanship for a period of five (5) years from the date of original purchase. The Limited Warranty does not apply to burned voice coils or malfunctions such as cone and/or coil damage resulting from an enclosure design inappropriate for the program material. Electro-Voice flying hardware (including enclosure-mounted hardware and rigging accessories) is guaranteed for one (1) year from the date of original purchase. Electro-Voice active electronics associated with the

speaker systems are guaranteed for three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

Electro-Voice Flying Hardware (including enclosure-mounted hardware and rigging accessories) is guaranteed against malfunction due to defects in materials or workmanship for a period of one (1) year from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

Electro-Voice Accessories are guaranteed against malfunction due to defects in materials or workmanship for a period of one (1) year from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

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

Specifications subject to change without notice.



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