

## MTH-1

### Biampable, Mid/High Coaxial Module Speaker System

- Two-way mid/high horn-loaded system
- 350-watt long-term power capacity
- Rotatable coaxial mid/high section
- Rugged, road-ready cabinet; metal grille; black carpet finish
- High "Q" system for increased intelligibility
- Neutrik Speakon® inputs
- Biampable
- When combined with the MLT-1 or MTL-1X, forms an MT-1 system which is a highly efficient and compact system

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#### Description

The Electro-Voice MTH-1 is a 350-watt, two-way, constant directivity horn-loaded, high-efficiency main loudspeaker system. The system may be biamplified or used full range with the internal passive crossover.

The MTH-1 mid/high module, combined with an MTL-1 or MTL-1X low-frequency system, forms a high-output sound reinforcement for a club, large hall, or outdoor events in a compact package which can be used easily by a two-person crew.

The 60° x 40° high- and mid-frequency horns are coaxially mounted and are easily rotated together, allowing the horizontal and vertical coverage patterns to be interchanged. The high "Q" pattern gives increased intelligibility. Combined with the trapezoidal enclosure, the high "Q" and rotatable horns give many options in placing this versatile enclosure in tight spaces.

The high-frequency section operates above 1,600 Hz. The DH2T compression driver is coupled to the HP64M 60° x 40° constant-directivity horn for smooth and extended high-frequency performance to 16,000 Hz. The HP64M is a polypropylene horn with exceptional strength and performance. The

horn/driver combination is securely mounted to the mid horn by a heavy-duty steel bracket.

The mid-frequency section operates between 160 Hz and 1,600 Hz. This horn-loaded section uses a DL10X. A proprietary phase plug (U.S. Patent No. 4,718,517) is used to extend the high-end output and blend seamlessly into the coaxial high-frequency section.

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#### Crossover

To optimize performance with a low-frequency system, such as the MTL-1, the MTH-1 should be used in conjunction with an active crossover with a minimum slope of 12-dB-per-octave and a crossover frequency of 160 Hz. Due to the high efficiency of the MTH-1, less amplifier input is needed to achieve a given sound output level.

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#### Biamping

The MTH-1 can be biamped by removing the input panel and following the instructions given. The usable frequency ranges for the individual sections are 125-2,000 Hz for the mid-frequency band and 1,200-16,000 Hz for the high-frequency band. Minimum crossover slopes of 12-dB-per-octave are recommended. A protection capacitor with a 3-dB-

down point of 1,100 Hz is included in the high-frequency section when in biamp mode.

The usable frequency response of the overall biamped system is 125-16,000 Hz, the same response that is expected with the passive setup. For maximum performance of the MTH-1 in a full-range application, the addition of the MTL-1 low-frequency loudspeaker system is recommended. This combination forms the MT-1 full-range high-level sound-reinforcement system. For use as an MT-1 system, the Electro-Voice's Dx34 Digital Signal Processing unit or XEQ-3 electronic crossover/equalizer/time delay unit with the EQMT1 plug-in modules may be used for crossing over the two sections.

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#### Amplifier Power recommendations

As noted in the Power-Handling section, below, the MTH-1 has a random-noise power capacity of 350-watts long term (1,400 watts peak) per EIA RS-426-A 1980. The following guidelines will help relate this to an appropriate power amplifier output rating.

1. To use the MTH-1 to full capacity, skilled experts in sound system installation and operation will obtain the best results if the power amplifier is 2.0 to 4.0 times the long-term average noise power rating of the

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speaker system. For the MTH-1, this is 700 to 2,800 watts.

The caution cannot be made strongly enough, however, that this arrangement is only for experts or those who can discipline themselves against "pushing" the system for ever-higher sound levels and who can avoid "accidents" such as catastrophic feedback or dropped microphones.

2. A more conservative, "normal" amplifier size, which will produce audible results nearly equal to those of the "expert" recommendation, is 1.0 to 1.4 times the long-term average noise power rating of the speaker. For the MTH-1, this is 350 to 490 watts.

3. To be very conservative, one can use an amplifier rated at 0.5 to 0.7 times the long-term average noise power rating of the loudspeaker. For the MTH-1, this is 175 to 245 watts.

Request P.A. Bible Addition No. Two ("Power- Handling Capacity") for more background on these recommendations.

### Speaker Protection

A self-resetting high-frequency protection circuit, Electro-Voice's PRO™ circuit, is included in the MTH-1 to prevent against accidental overdrive and improve reliability. If the input power to the high-frequency driver exceeds the nominal rating, the protection circuit is activated and reduces the power delivered to the driver. The system will remain in this mode of operation until the input power is reduced to a safe level.

### Frequency Response

The MTH-1's axial frequency response was measured in Electro-Voice's large anechoic chamber at a distance of 3 meters (10 feet) with a swept sine-wave input. Figure 2 has been averaged and corrected for 1 watt at 1 meter.

### Enclosure Construction

Intended to be used as a portable speaker system, the MTH-1 is ruggedly constructed of 3/4-inch, void-free plywood. All joints are dado cut, and the cabinet is finished with a densely-woven, abuse-resistant carpet that is both attractive and highly durable. A full-

length steel grille protects the system from damage. Large, heavy-duty metal corner protectors, firmly secured rubber feet, and recessed handles complete the picture, ensuring that the MTH-1 speaker system is ideally suited for a long and reliable life on the road.

### MTH-1 Connections

The MTH-1 is equipped with two paralleled Neutrik Speakon® NL4MD-V connectors, selected for their ability to reliably deliver to the speaker components the high currents delivered by high-wattage power amplifiers. The NL4FC is a four-pin mating connector for the NL4MD-V, and Figure 5 shows how the usual two-conductor speaker cable should be wired to pins 1+ and 1- of the connector. Two typical connectors at the power amplifier end of the cable are shown: banana and 1/4-inch phone plugs. (The banana plug provides the more reliable connection.)

Full-range pin arrangements are:

- 1- = IN (-)
- 1+ = IN (+)
- 2- = Not Used
- 2+ = Not Used

Biamp pin arrangements are:

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

To find your local Neutrik dealer, contact:

Neutrik USA, Inc.  
195-S3 Lehigh Ave.  
Lakewood, NJ 08701  
908/901-9488

### Service

In the unlikely event the MTH-1 requires service, the woofers can be replaced or serviced from the front. A service data sheet is available from Electro-Voice.

### Power-Handling

The MTH-1 comes in full-range mode. This switchable to biamp mode. In biamp mode, the long-term average power-handling capacity is as follows:

Mid Frequency: 300 watts

High Frequency: 60 watts

Electro-Voice components and systems are manufactured to exacting standards, ensuring they will hold up, not only through the most rigorous of power tests, but also through continued use in arduous, real-life conditions. The EIA Loudspeaker Power Rating Full Range (EIA RS-426-A 1980) uses a noise spectrum which mimics typical music and tests the thermal and mechanical capabilities of the components. Electro-Voice will support relevant additional standards as and when they become available. Extreme, in-house power tests, which push the performance boundaries of the woofers, are also performed and passed to ensure years of trouble-free service.

Specifically, the MTL-1 passes EIA RS-426-A 1980 with the following values:

$$R_{SR} = 7.6 (1.15 \times R_p)$$

$$P_{E(MAX)} = 350 \text{ watts}$$

$$\text{Test voltage} = 51.5 \text{ volts rms,}$$

$$103.1 \text{ volts peak}$$

The "peak" power-handling capacity of a system is determined by the peak test voltage amount. For the MTH-1, a 103.1-volt peak test voltage translates into 1,400-watts short-term peak power-handling capacity. This is the equivalent of four times the "average" power-handling capacity, and is a peak that can be sustained for only a few milliseconds. However, this sort of short duration peak is very typical in speech and music. Provided the amplifier can reproduce the signal accurately, without clipping, the system will also perform accurately and reliably, even at these levels.

### Suspending MTH-1 Enclosures

The MTL-1 has been developed in conjunction with the HSMT-1 series of hanging hardware. The HSMT-1 kit allows the MTH-1 to be hung safely in a variety of orientations. The combination of the HSMT-1 kit and MTL-1 enclosure has been certified by an independent structural engineer to be safe and secure. Each HSMT-1 kit consists of a tube, two brackets, two eyebolys and the necessary fasteners. The installer must assemble the HSMT-1 kit by first drilling two holes in

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to the MTH-1 enclosure, in predefined positions, and then screwing the brackets onto the steel tube, which passes through the enclosure. Full instructions are included with each HSMT-1 kit. A single MTH-1 requires two HSMT-1's to suspend it horizontally or vertically, both singly and in multiples.

A maximum of two cabinets can be suspended in this manner. Vertical is defined by having the central EV logo in its correct orientation as delivered, although the logo is rotatable to allow it to remain upright in either rotation. *Full attention must be given to the instructions and limitations in the HSMT-1 kit instruction sheet.*

### Architects' and Engineers' Specifications

The loudspeaker shall be a horn-loaded type. The mid frequencies shall be reproduced with one 300-watt (EIA RS-426-A 1980) DL10X 254-mm (10-in.) woofer mounted on a 60° x 40° constant-directivity horn. The system will reproduce the frequencies from 160 to 16,000 Hz. The system shall be capable of producing average sound levels in excess of 130 dB in the long term, and short-term peaks of 136 dB.

The enclosure shall be constructed of black, carpeted, multilayer plywood and have a metal grille which attaches with four screws. The dimensions shall be 591 mm (23.3 in.) tall, 572 mm (22.5 in.) wide, and 758 mm (29.9 in.) deep. The system shall weigh 43.1 kg (95 lb).

The loudspeaker system shall be the Electro-Voice MTH-1.

### 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 fin-

ish 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 Service or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice Service 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 Service at 600 Cecil Street, Buchanan, MI 49107 (800/234/6831 or FAX 616/695/4743). **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 Speakers and Speaker Systems** are guaranteed against malfunction due to defects in materials or 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 improperly designed enclosures. 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 Electronics** are guaranteed against malfunction due to defects in mate-

rials 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.

For warranty repair, service information, or a listing of the repair facilities nearest you, contact the service repair department at: 616/695-6831 or 800/685-2606.

**For technical assistance,** contact Technical Support at 800/234-6831 or 616/695-6831, M-F, 8:00 a.m. to 5:00 p.m. Eastern Standard time.

Specifications subject to change without notice.

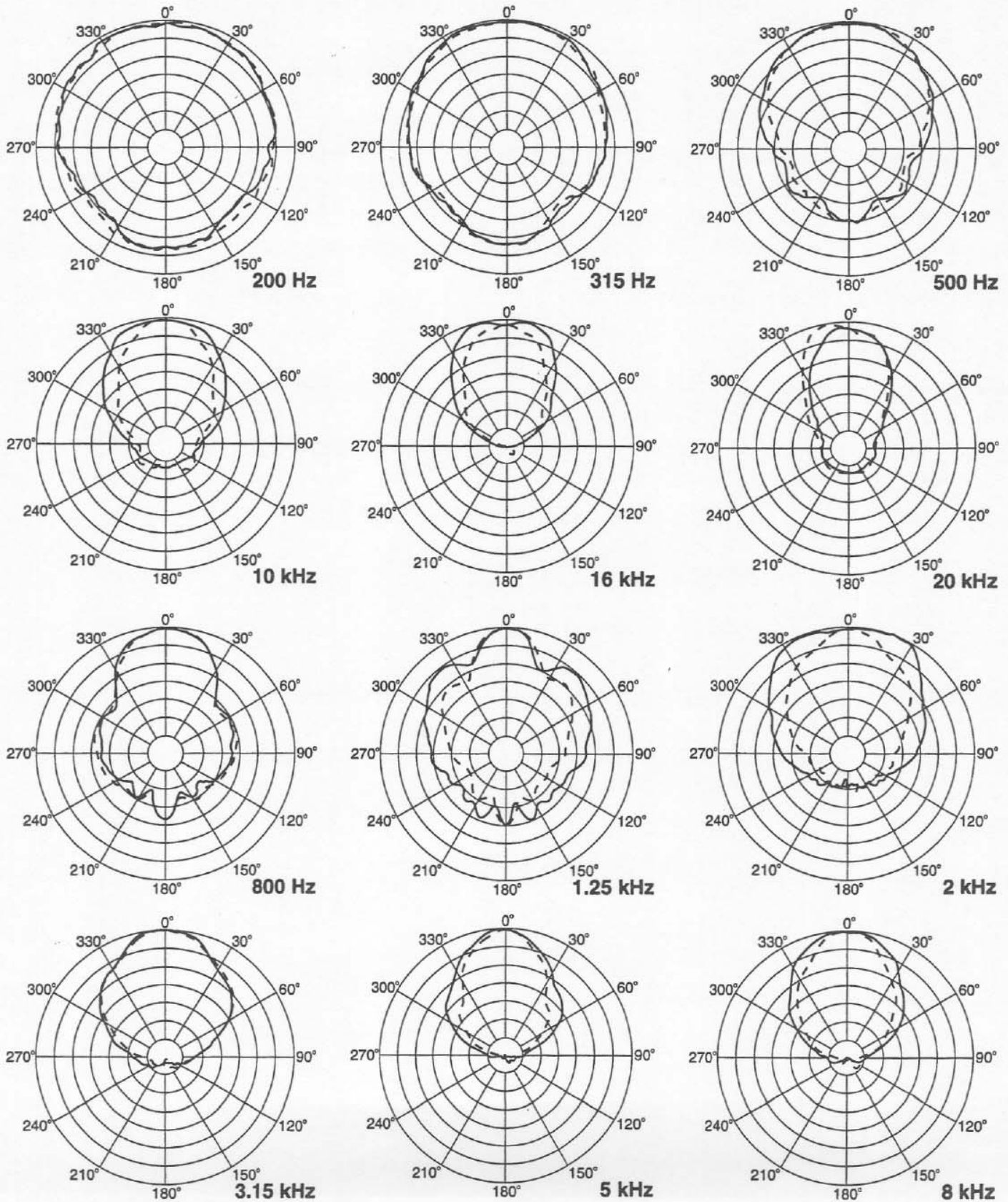
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Figure 1 — One-Third-Octave Polar Responses (anechoic environment)

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Figure 2—Axial Frequency Response

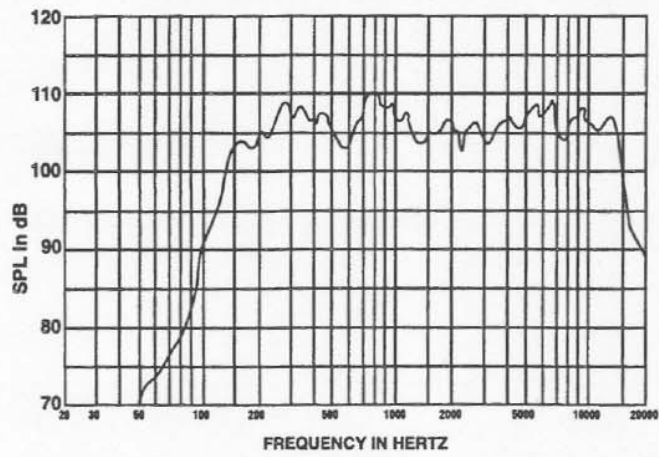
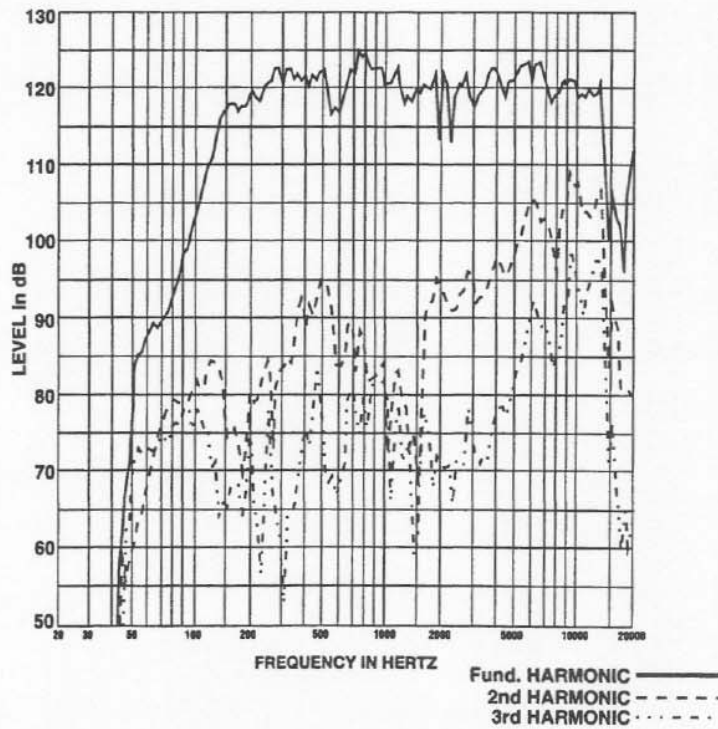
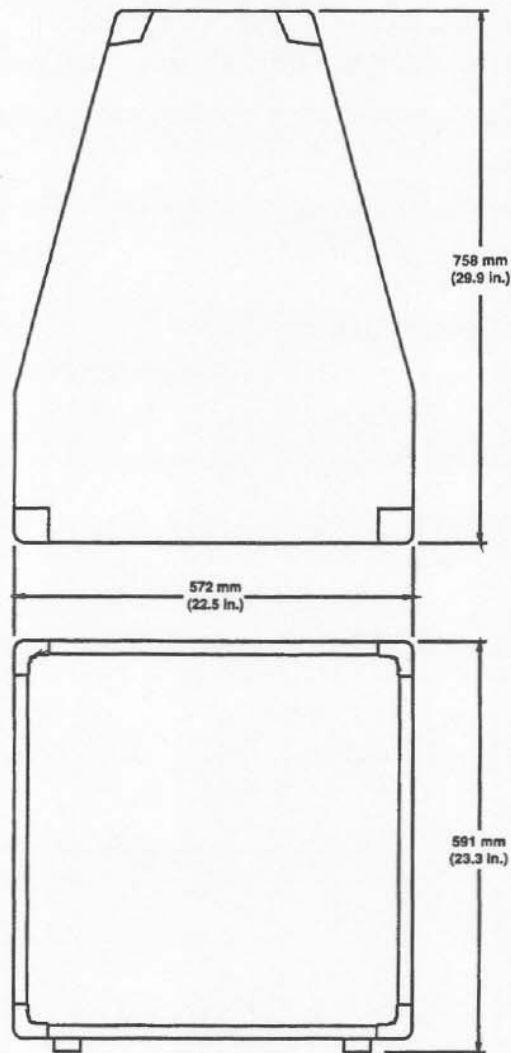


Figure 3—Harmonic Distortion 0.1 Full Power Input



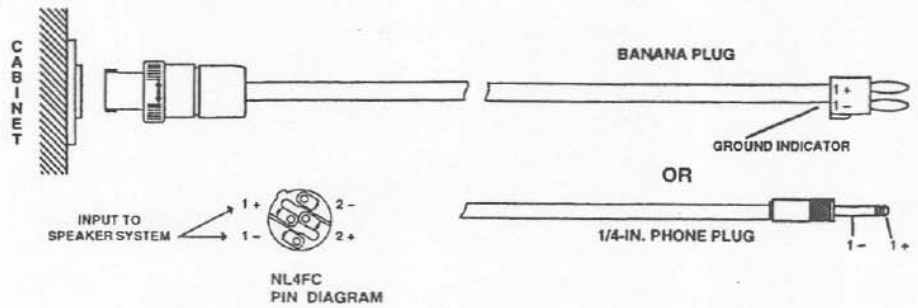
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Figure 4—Dimension



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Figure 5—Two-Conductor Cable Configurations Using Neutrik Speakon® NL4FC Four-Pin Connector



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Figure 6 — Beamwidth vs Frequency  
(whole-space anechoic environment)

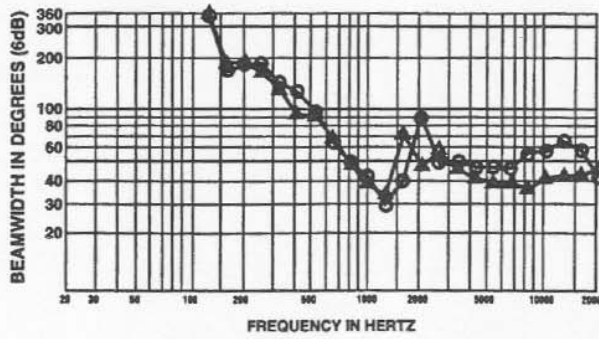
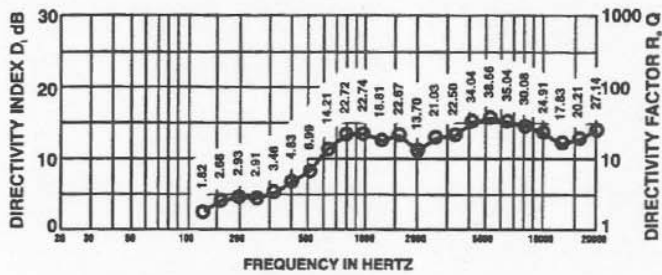


Figure 7 — Directivity vs Frequency  
(whole-space anechoic environment)



# MTH-1 Biampable, Mid/High Coaxial Module Speaker System

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## specifications

**Typical Axial Frequency Response,** (swept sine wave, 4 volts at 10 feet, anechoic environment, normalized for 1 watt, 1 meter into woofer) (see Figure 1);  
160-16,000 Hz

**Low-Frequency 3-dB-Down Point:**  
160 Hz

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

**Half-Space Reference Efficiency:**  
18.5%

**Long-Term Average Power-Handling Capacity per EIA RS-426-A 1980 (see Power-Handling section):**

- Full Range:**  
350 watts
- Mid Frequency:**  
300 watts
- High Frequency:**  
60 watts

**Sensitivity (SPL at 1 watt, 1 meter input, anechoic environment, swept sine wave):**  
105 dB

**Dispersion Angle Included by 6-dB-Down Points on Polar Responses, Indicated One-Third-Octave Bands of Pink Noise (see Figure 6),**

**2,500-16,000 Hz, Horizontal:**  
60° (+10°, -15°)

**2,500-16,000 Hz, Vertical:**  
40° (+20°, -10°)

**Directivity Factor  $R_q(Q)$ , 630- 16,000-Hz Median (see Figure 7):**  
23.9 (+14.8, -10.2)

**Directivity Index  $D_i$ , 630- 16,000-Hz Median (see Figure 7):**  
13.6 dB (+14.8, -10.2)

**Distortion, 0.1 Full Power Input (see Figure 3)**

- Second Harmonic,**
  - 100 Hz: 8.9%
  - 1,000 Hz: 1.1%
  - 10,000 Hz: 21.1%
- Third Harmonic, 100 Hz:**
  - 100 Hz: 5.3%
  - 1,000 Hz: 0.8%
  - 10,000 Hz: 6.0%

**Transducer Complement,**

- Mid Frequency:**  
DL10X woofer (10 in.); MB horn
- High Frequency:**  
DH2T driver; HP64M horn

**Box Tuning Frequency:**  
160 Hz

**Recommended Crossover Frequency:**  
160 Hz, 1,600 Hz

**Crossover Slopes, suggested:**  
24 dB per octave

**Impedance,**

- Nominal:**  
8 ohms
- Minimum:**  
6 ohms

**Input Connections:**  
Two paralleled Neutrik Speakon® connectors

**Suspension (see Suspending MTH-1 Enclosures section):**  
HSMT-1 independently certified hanging kit

**Materials,**

- Enclosure:**  
Black, carpet-covered 3/4-in. void-free plywood
- Grille:**  
Black, heavy-duty perforated metal

**Enclosure Dimensions (see Figure 4),**

- Height:**  
591 mm (23.3 in.)
- Width:**  
572 mm (22.5 in.)
- Depth:**  
758 mm (29.9 in.)

**Net Weight:**  
43.1 kg (95 lb)

**Shipping Weight:**  
49.9 kg (110 lb)

## Electro-Voice®

600 Cecil Street, Buchanan, MI 49107

616/695-6831, 616/695-1304 Fax