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#### SPECIFICATIONS

Frequency Response, Measured in Farfield Calculated to One Meter on Axis, Swept One-Third-Octave Pink Noise, One Watt into MB Midband (2.0 V at 500 Hz),

Anechoic Environment (see Figure 1):  
150-20,000 Hz

Recommended Crossover Frequencies:  
160 Hz, 1,600 Hz

Efficiency, MB/HF:  
25/25%

Long-Term Average Power Handling Capacity per EIA Standard RS-426A (see Power Handling section),  
MB/HF: 600/150 watts

Short-Term Power Handling Capacity (10 milliseconds),  
MB/HF: 2,400/600 watts

Maximum Long-Term Average Midband Acoustic Output:  
180 watts

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

MB/HF,  
1/1 Watt: 107, 112 dB  
600/150 Watts: 135, 134 dB  
2,400/600 Watts: 141, 140 dB

Dispersion Angle Included by 6-dB-Down Points on Polar Responses, Indicated One-Third-Octave Bands of Pink Noise,  
700-20,000 Hz Horizontal (see Figure 3):

60° (+20°, -10°)  
900-20,000 Hz Vertical (see Figure 3):  
40° (+20°, -10°)

Directivity Factor  $R_0$  (Q), 600-20,000-Hz Median (see Figure 4):  
19.5 (+14.0, -10.1)

Directivity Index-D, 600-20,000-Hz Median (see Figure 4):  
12.9 dB (+2.4 dB, -3.1 dB)

Distortion, 120 dB SPL at 1 Meter, Shaped Spectrum (see Figure 6),  
Second Harmonic,  
200 Hz: 0.4%  
1,000 Hz: 1.0%  
3,000 Hz: 3.2%  
10,000 Hz: 1.8%

Distortion, 120 dB SPL at 1 meter, Shaped Spectrum (see Figure 6),  
Third Harmonic,  
200 Hz: 0.4%  
1,000 Hz: 1.0%  
3,000 Hz: 0.4%  
10,000 Hz: 0.6%

#### Transducer Complement,

MB: Two DL10X  
60° x 40° fiberglass horn  
HF: Two DH1A variant compression  
drivers

HP64 variant 60° x 40° horn

Impedance (MB/HF wired in parallel),  
Nominal, MB/HF:  
8 ohms/8 ohms  
Minimum, MB/HF:  
5.6 ohms/7.7 ohms

Input Connections:  
Two Neutrik Speakon™ NL4MP

#### 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)

# Electro-Voice®

a MARK IV company

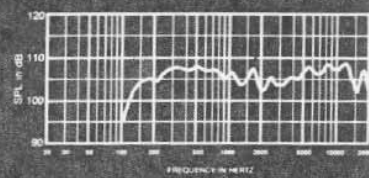


FIGURE 1  
Axial Frequency Response using  
Recommended Crossover, Equalization  
1 Watt/1 Meter into MB Section

## MTH-2/64 Manifold Technology® MidBass/High-Frequency Sound Reinforcement System

#### Dimensions,

Height: 91.4 cm (36.0 in.)  
Width: 57.2 cm (22.5 in.)  
Depth: 76.2 cm (29.9 in.)

#### Net Weight:

93.2 kg (205 lb)

#### Shipping Weight:

100 kg (215 lb)

#### DESCRIPTION

The Electro-Voice MTH-2/64 Manifold Technology® midbass/high-frequency loudspeaker system is designed for the touring-sound and permanent-installation markets. The MTH-2/64 is a two-way, active horn-loaded system with two drivers manifolded together in each frequency band. There are four drivers contained within the MTH-2/64's compact dimensions.

The combination of the MTH-2/64 midbass/high-frequency loudspeaker system and the MTL-2A low-frequency loudspeaker system form the three-way active MT-2/64 concert sound loudspeaker system. Optimum performance of the MT-2/64 is obtained when used with the XEQ-3 electronic crossover/equalizer/time delay unit with the dedicated EQMT2 plug-in modules.

The midbass frequencies (160-1,600 Hz) are reproduced by two DL10X 10-inch drivers. The drivers are loaded by Electro-Voice's proprietary aperiodic phase plug (U.S. Patent No. 4,718,517) for extended upper-end response. The phase plug makes use of the fact that at higher-frequencies only the apex area of the cone near the voice coil is in motion and automatically adjusts acoustic loading to maximize high-frequency output. The outputs of the two drivers are summed using Electro-Voice's patented Manifold Technology (U.S. Patent No. 4,923,031) and

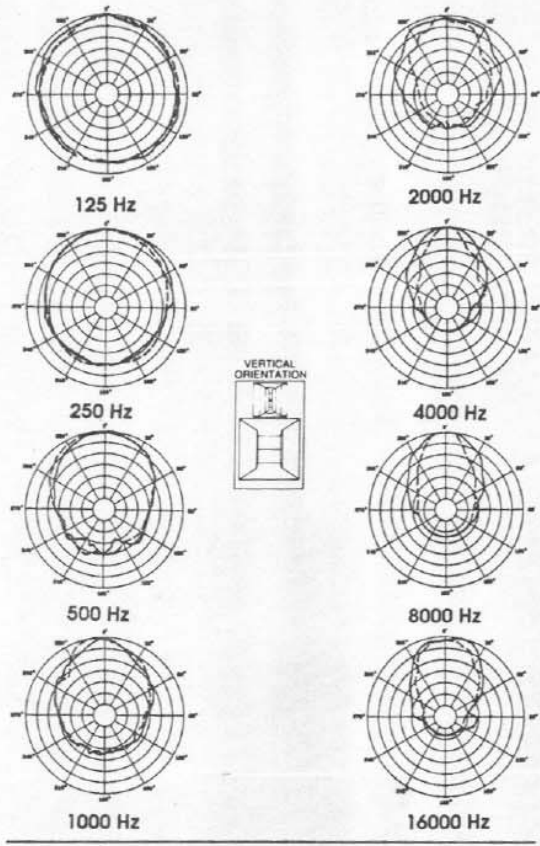


FIGURE 2 - MTH-2/64 Polar Response (1/2-octave 4 volts at 20 feet nominal)

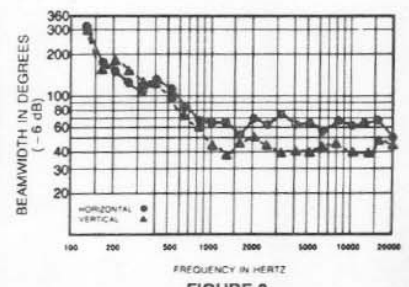
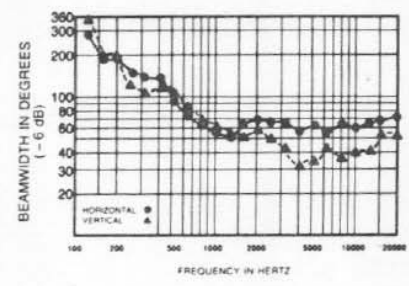


FIGURE 3 MTH-2/64 Beamwidth vs. Frequency

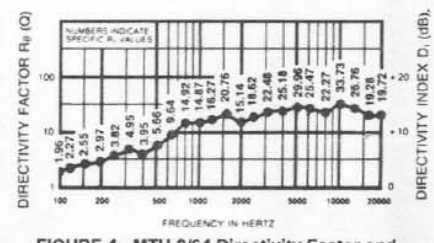


FIGURE 4 - MTH-2/64 Directivity Factor and Directivity Index vs. Frequency Response (composite of both orientations)

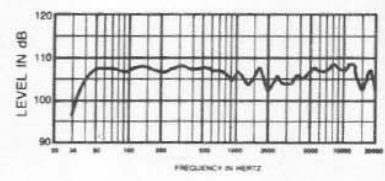


FIGURE 5 - MTH-2/64 Axial Frequency Response using Recommended Crossover, Equalization and MTL-2A Low-Frequency System

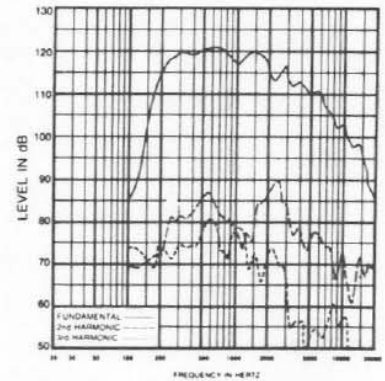


FIGURE 6 - MTH-2/64 Harmonic Distortion (120 dB SPL/1 meter using typical music frequency spectrum)

fed directly into a new 60° x40° fiberglass horn. The horn provides a uniform coverage pattern with exceptional control and natural sound. A special feature of the horn is that it is structurally independent of the drivers. This makes it very easy to re-orient the horn to suit prevailing circumstances (see Horn Rotation section).

The higher frequencies (1,600-20,000 Hz) are reproduced by two modified DH1A compression drivers, manifolded on the MTA-22 (U.S. Patent No. 4,629, 029) and mounted on a special modified HP64 60° x 40° constant-directivity horn. The HP series horn (U.S. Patent No. 4,685,532) features integral fiberglass-and-zinc construction, which helps eliminate unwanted vibrations and allows the construction of beamwidth control vanes - special waveguides in the horn throat - that correct for very-high frequency dispersion anomalies. The HP64 is also structurally independent of its drivers, allowing it to be easily removed and matched to the orientation of the midbass horn (see Horn Removal section).

The MTH-2/64 is designed to survive the rigors of the road. 14-ply birch plywood is used throughout the external cabinet. Electro-Voice's unique two-point flying system 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.

When an extended low-end response is needed, the MTH-2/64 can be used with the MTL-2A low-frequency loudspeaker system.

#### APPLICATIONS

The MTH-2/64 is designed with the professional end user in mind. Whether used in regional touring or fixed installations, the MTH-2/64 delivers versatile, high-level, low-distortion, wide-coverage performance. The relative lightweight and small volume of the MTH-2/64 belies the performance obtainable with Manifold Technology®. The compact dimensions, and trapezoidal shape allow the construction of very tight arrays.

It is possible and often beneficial to use the MTH-2/64 as a stand alone device, for example in pure speech reproduction. However, the MTL-2A low-frequency loudspeaker system has been designed to compliment the MTH-2/64 and produce a fully-integrated full-range sound system. The cabinets are dimensionally identical and have matching hardware.

The dimensions of the MTH-2/64 were selected to allow efficient truck packing. All fittings and fixtures are recessed to allow easy packing and unobtrusive installations.

The 60° x40° coverage pattern is independent of cabinet orientation. The midbass and high-frequency horns are mounted from the front and are independent of their respective drivers (see Horn Removal section). This means it is possible to use the MTH-2/64

either horizontally or vertically without losing the desired coverage pattern.

It is strongly recommended that when the MTH-2/64 is operated in isolation or with the MTL-2A that an XEQ-3 electronic crossover/equalizer/time-delay unit be used. The dedicated EQMT2 EQ modules should be used and the setup, described in the Crossover, EQ and Time Delay section, followed.

#### FREQUENCY RESPONSE

The MTH-2/64 frequency response, shown in Figure 1, was measured on axis in the farfield in an anechoic environment using a swept one-third-octave input and calculated to a one meter equivalent distance by using the inverse-square law. The MTH-2/64 system was set up using the XEQ-3 electronic crossover/equalizer/time-delay unit and the EQMT2 plug-in modules with the crossover frequency at 1,600 Hz and no crossover on the bottom of the midbass section. One watt of power (2.83 V at 500 Hz) was delivered to the midband of the midbass section. The frequency response of the complete MT-2/64 system (the MTH-2/64 and the MTL-2A together) using the XEQ-3 with one watt (2.83 V at 500 Hz) being delivered to the midbass section (of the MTH-2/64) is shown in Figure 5).

#### DIRECTIVITY

Directional information is provided for both horn orientations. Figure 2 illustrates the directional characteristics of the MTH-2/64. 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. Crossover equalization and time delay were set as recommended in the Crossover, EQ and Time Delay section. Beamwidths are illustrated in Figure 3 and directivity factors  $R_0$  ( $Q$ ) and directivity indexes  $D_0$  in Figure 4. These figures show how smooth and controlled the MTH-2/64 is over its entire operating range. AcoustaCADD™ data is available for the MTH-2/64.

#### DISTORTION

Using the recommended crossover, equalization and time delay, distortion for the MTH-2/64 was measured in the farfield with an input power that would result in a sound pressure level of 120 dB at one meter. A frequency spectrum typical of contemporary close-miked rock music was employed. Plots of second- and third-order harmonic distortion are shown in Figure 6.

#### 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 - 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). 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 MTH-2/64 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 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 recommended crossover, equalization and time delay. The midbass frequency amplifier was adjusted to deliver 600 watts into the 3.45-ohm EIA-equivalent impedance (45.5 volts true rms). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power or 2,400 watts peak (91.0 volts peak). The high frequency was adjusted to deliver 150 watts into 5.92 ohms EIA-equivalent impedance (29.8 volts true rms). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power or 600 watts peak (59.6 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

#### CROSSOVER, EQ AND TIME DELAY

The usable frequency ranges of the individual sections of the MTH-2/64 are 150-2,000 Hz for the midbass and 1,200-20,000 Hz for the high-frequency band. Minimum crossover slopes of 12-dB-per-octave are recommended. Low-frequency protection capacitors are included in the high-frequency section, with a 3-dB-down point of 800 Hz.

The usable frequency response of the overall MTH-2/64 midbass/high-frequency loudspeaker system is 150-20,000 Hz. For maximum performance of the MTH-2/64 in a full-range application, the addition of the Electro-Voice MTL-2A low-frequency loudspeaker system is recommended. This combination forms the MT-2/64 full-range high-level sound-reinforcement system. For maximum acoustic performance, use the Electro-Voice XEQ-3 electronic crossover/equalizer/time delay unit with the EQMT2 plug-in modules.

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 MTH-2/64 and MTL-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-2/64 system). Information is included with the EQMT2 package detailing the front-panel setting necessary to achieve the performance described in this data sheet.

#### CONNECTIONS

Electrical connections are made on the back of the MTH-2/64 via a 4-pin connector. The midbass has two 8-ohm loudspeakers; however, the acoustic loading of the midbass phase plugs and horn increases their electrical impedance to 16 ohms each. The two loudspeakers are wired in parallel resulting in an 8-ohm load accessed by two pins of the connector. The high-frequency section has two 16-ohm drivers wired in parallel resulting in an 8-ohm load accessed by the remaining two pins of the connector. There are two connectors on the enclosure to allow paralleling of other MTH-2/64 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.

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

Both the midbass and high-frequency inputs present a nominal 8-ohm load to the amplifier; however, the HF compression drivers have a low-frequency protection capacitor in series. The pin-out arrangement is as follows:

Pin 2+ : HF (+)  
Pin 2- : HF (-)  
Pin 1+ : MB (+)  
Pin 1- : MB (-)

#### HANGING

The MTH-2/64 has been conceived to "fly" from the outset. It incorporates EV's exclusive two-point hanging hardware, permitting a wide range of aiming angles and maximum flexibility. The trapezoidal cabinet is reinforced and structurally sound allowing the MTL-2A and the MTH-2/64 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 Kinedyne 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 MTH-2/64 speaker systems should be suspended overhead only in accordance with the procedures and limitations specified in the Flying Manual included with the flying loudspeakers.

#### HORN ROTATION

Place MTH-2/64 on a flat surface with horns facing up. Remove grille by pulling black ribbons. Remove all screws from around both the horn's mouths. Lift the midbass horn and rotate through 90°. Lower horn back into cabinet. Make sure the rear flange of the horn is seated correctly. Repeat procedure with the high-frequency horn. Special care must be taken to locate and seal the rear flange into Electro-Voice's new proprietary sealing gasket.

Replace all screws, tighten down firmly but do not over tighten. It is also possible to re-orient the EV logo on the grille by removing the central screw, rotating the logo and replacing the screw. Replace the grille.

#### DRIVER ACCESS

It is possible to access the high-frequency compression drivers by removing the cabinet handles. To access the midbass drivers it is necessary to remove the midbass horn and remove the manifold assembly. Full details of these procedures can be found in the Service Data sheet available from the Service Department in Buchanan, Michigan.

#### ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker system shall be a two-way active midbass/high-frequency system with two drivers manifolded in each frequency band for a total of four drivers. The midbass section shall have two 10-inch drivers, each having an 8-ohm, 2.5-inch-diameter voice coil constructed of edge-wound rectangular aluminum wire, and shall be capable of handling a 300-watt shaped pink-noise signal with 6-dB crest factor for 8 hours (as per EIA RS-426-A standard). These two drivers shall each be loaded on a phase plug and manifolded onto a single 60° x 40° constant-directivity-type horn. The high-frequency section shall have two 1.3-inch compression drivers, each having a 16-ohm, 3.0-inch-diameter voice coil constructed of edge-wound rectangular aluminum wire mounted on a 0.0015-inch-thick titanium diaphragm, and shall be capable of handling a 75-watt 1,000-10,000-Hz pink-noise signal with a 6-dB crest factors for 2 hours (as per AES2-1984 and ANSI S4.26-1984 standards). These two drivers shall be manifolded onto a single 60° x 40° constant-directivity-type horn.

The loudspeaker system shall produce a horizontal beamwidth of 60°(+20°, -10°) from 700 to 20,000 Hz and a vertical beamwidth of 40°(+20°, -10°) from 600 to 20,000 Hz. The loudspeaker system shall have a uniform on-axis frequency response from 160-20,000 Hz when used with the Electro-Voice XEQ-3

electronic crossover with crossover frequency at 1,600 Hz. The overall system shall have an efficiency of 25%.

The loudspeaker system shall have an enclosure constructed of .75-inch 14-ply birch plywood and shall have a black nylon grille. The loudspeaker enclosure shall be trapezoidally shaped. Dimensions shall be 36.0 inches high, 22.5 inches wide and 29.9 inches deep. Weight shall be 205 lb.

The loudspeaker system shall be the MTH-2/64.

#### 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 Frankfurt/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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