

## MTL-1

### Double 18-inch SubScoop™ Low-Frequency Speaker System

- Subwoofer for augmenting the low-frequency performance of the MTH-1 mid/high module, and other stage systems
- Two DL18MT woofers for reliable, extended low-frequency output
- 800-watt long-term power capacity
- Horn loading provides increased throw
- Rugged, road-ready cabinet; metal grille; black carpet finish
- Neutrik Speakon® inputs
- Rear casters for improved portability

#### 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;

50-160 Hz

Low-Frequency 3-dB-Down Point:

50 Hz

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

45 Hz

Half-Space Reference Efficiency:

6.1%

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

800 watts

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

100 dB

Dispersion Angle Included by 6-dB-Down Points on Polar Responses:

Essentially omnidirectional

Distortion, 0.1 Full Power Input into Mid/Bass, (see Figure 2)

Second Harmonic, 100 Hz:

0.3%

Third Harmonic, 100 Hz:

0.4%

Transducer Complement:

Two DL18MT's

Box Tuning Frequency:

38 Hz

Recommended Crossover Frequency:

160 Hz

Crossover Slopes, suggested:

24 dB per octave

Impedance,

Nominal:

4 ohms

Minimum:

3 ohms

Input Connections:

Two paralleled Neutrik Speakon® connectors

Supplied Accessory:

Neutrik Speakon® NL4FC input cable connector

Suspension (see Suspending MTL-1

Enclosure section):

HS7 independently certified hanging kits available

Materials,

Enclosure:

Black, carpet-covered 3/4-in. void-free plywood

Grille:

Black, heavy-duty perforated metal

Enclosure Dimensions (see Figure 3),

Height:

1.16 m (45.8 in.)

Width:

572 mm (22.5 in.)

Depth:

758 mm (29.9 in.)

Net Weight:

70.3 kg (155 lb)

Shipping Weight:

81.6 kg (180 lb)

#### DESCRIPTION

The Electro-Voice MTL-1 is an 800-watt subwoofer loudspeaker system which combines the attributes of both horn-loaded and vented box designs. The MTL-1 design utilizes the unique double SubScoop™ cabinet construction with two DL18MT woofers, as used in Manifold Technology® concert systems. The design behaves like a horn over much of its range, but without the time delay and weight problems usually associated with conventional

designs. Vented-box principles take over for the lowest octave and assist in producing exceptionally high levels of clean, punchy bass from a modest-sized box. The reverse woofer orientation has been used to optimize the rear chamber volume and decrease the horn flare rate for extended low-end performance.

When used with the MTH-1 mid/high module, the MTL-1 provides 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.

Although the MTL-1 was designed for use with the MTH-1 system, it may be used to augment the bass performance of any Electro-Voice stage system.

#### USE IN MULTIPLES

The MTL-1 may be used in multiples to increase acoustic output. When two speaker systems are placed side by side, the woofer cones "mutually couple," causing the two systems to act as one system with twice the effective cone area at very-low frequencies, giving an additional 3-dB increase in maximum acoustic output.

Mutual coupling will occur when the frequency is such that the center-to-center distance between the two woofer manifolds is less than about one-half wavelength.

#### CROSSOVER

To optimize performance, the MTL-1 should be used in conjunction with an active crossover with a minimum slope of 12-dB per octave and a crossover frequency in the range of 100 Hz to 160 Hz. Due to the high efficiency of the MTL-1, less amplifier input is needed to achieve a given sound output level.

## AMPLIFIER POWER RECOMMENDATIONS

As noted in the Power-Handling Capacity section, above, the MTL-1 has a random-noise power capacity of 800-watts long term (3,200 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 MTL-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 speaker system. For the MTL-1, this is 800 to 3,200 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 MTL-1, this is 800 to 1,120 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 MTL-1, this is 400 to 560 watts.

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

## SPEAKER PROTECTION

When in the vented-box mode, the SubScoop™, like all other vented systems, experiences rapidly increasing cone excursion below the box-tuning frequency. The acoustic output is also decreasing rapidly; therefore, it is sensible to protect the MTL-1 and maximize the power output of the subwoofer by inserting an active 32-Hz high-pass filter with a slope of at least 12 dB per octave into the circuit. Such subpassband filters are found in many commercially available crossovers and equalizers including items manufactured by Electro-Voice.

## FREQUENCY RESPONSE

The MTL-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 1 has been averaged and corrected for 1 watt at 1 meter.

## ENCLOSURE CONSTRUCTION

Intended to be used as a portable speaker system, the MTL-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 woofer from damage. Large, heavy-duty metal corner protectors, firmly secured rubber feet, rugged casters, and recessed handles complete the picture, ensuring that the MTL-1 speaker system is ideally suited for a long and reliable life on the road.

## MTL-1 CONNECTIONS

The MTL-1 is equipped with two paralleled Neutrik Speakon® NL4MPR-V connectors, selected for their ability to reliably deliver to the

speaker components the high currents delivered by high-wattage power amplifiers. An NL4FC mating connector is supplied. The NL4FC is a four-pin connector, and Figure 4 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.)

If it is desired to use the MTL-1 with one amplifier for each woofer, remove the input panel and follow the instructions. In this configuration, the upper woofer is fed through pins 1+ and 1-, and the lower woofer through pins 2+ and 2-.

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

## POWER-HANDLING TEST

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:

$$R_{SR} = 3.45 (1.15 \times R_E)$$

$$P_{E(MAX)} = 800 \text{ watts}$$

$$\text{Test voltage} = 52.5 \text{ volts rms,} \\ 105.0 \text{ volts peak}$$

The "peak" power-handling capacity of a woofer is determined by the peak test voltage amount. For the MTL-1, a 105.0-volt peak test voltage translates into 3,200-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 woofer will also perform accurately and reliably, even at these levels.

## SUSPENDING MTL-1 ENCLOSURES

The MTL-1 has been developed in conjunction with the HS series of hanging hardware. The HS kit allows the MTL-1 to be hung safely in a

variety of orientations. The combination of the correct HS kit and the MTL-1 enclosure has been certified by an independent structural engineer to be safe and secure. Each HS kit consists of a steel tube, two brackets, two eyebolts and the necessary fasteners. The installer must assemble the HS kit by first drilling two holes into the MTL-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 HS kit. A single MTL-1 requires two HS7's to suspend it horizontally or one HS7 to suspend it vertically. For hanging in multiples, two HS7's are still needed for hanging horizontally. A maximum of two cabinets can be suspended in this manner. It is not recommended to suspend multiples of the MTL-1 vertically. 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 HS kit instructions sheet.*

## ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker shall be a horn-loaded type. The low frequencies shall be reproduced with two 400-watt (EIA RS-426-A 1980) DL18MT 457-mm (18-in.) woofers. The system will reproduce the frequencies from 45 to 160 Hz. The system shall be capable of producing average sound levels in excess of 129 dB in the long term, and short-term peaks of 135 dB.

The enclosure shall be constructed of black, carpeted, multilayer plywood and have a metal grille which attaches with six screws. The dimensions shall be 1.16 m (45.8 in.) tall, 572 mm (22.5 in.) wide, and 758 mm (29.9 in.) deep. The system shall weigh 70.3 kg (155 lb). Neutrik Speakon® connections shall be provided.

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

## UNIFORM 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 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 or 800/234-6831). **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 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, Michigan 49107 (616/695-6831 or 800/234-6831).

Specifications subject to change without notice.



**ELECTRO-VOICE** a MARK IV company 600 Cecil Street, Buchanan, Michigan 49107

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MTL-1 SPECIFICATION GRAPHICS

FIGURE 1 — Axial Frequency Response

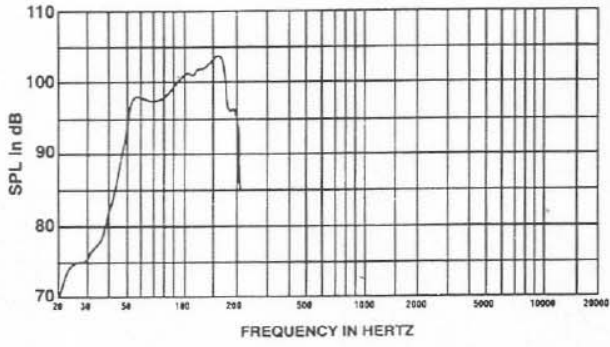


FIGURE 2 — Harmonic Distortion 0.1 Rated Power Input (80 watts)

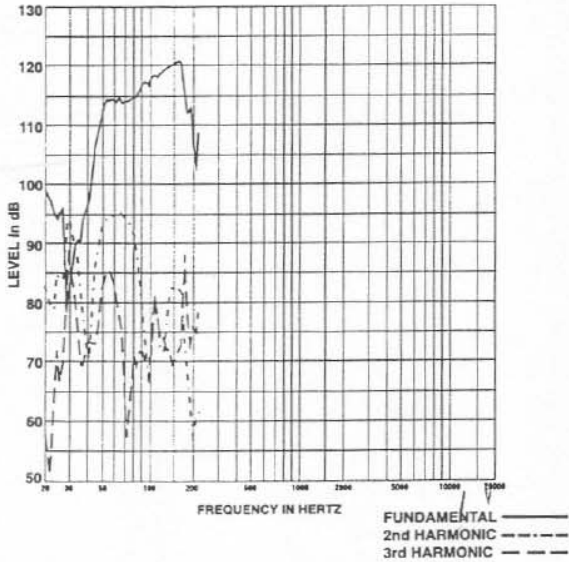


FIGURE 3 — Dimensions

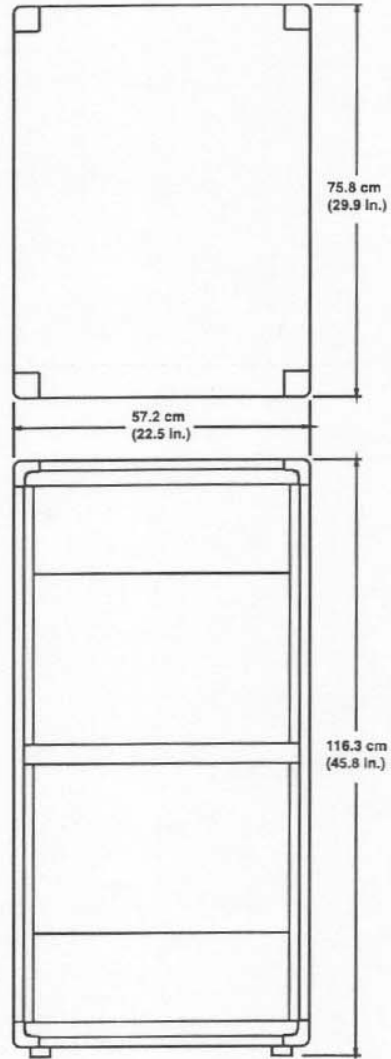
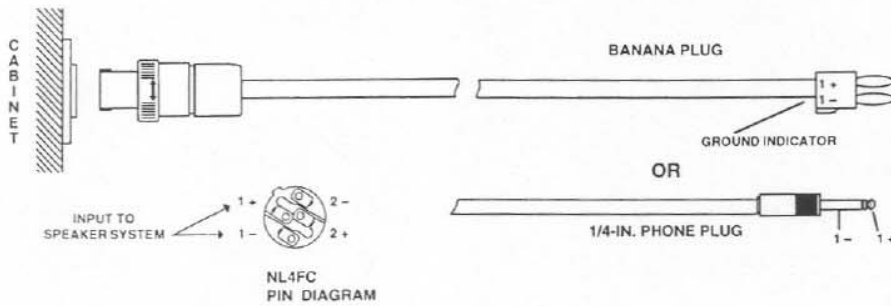


FIGURE 4 — Two-Conductor Cable Configurations Using Neutrik Speakon® NL4FC Four-Pin Connector



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