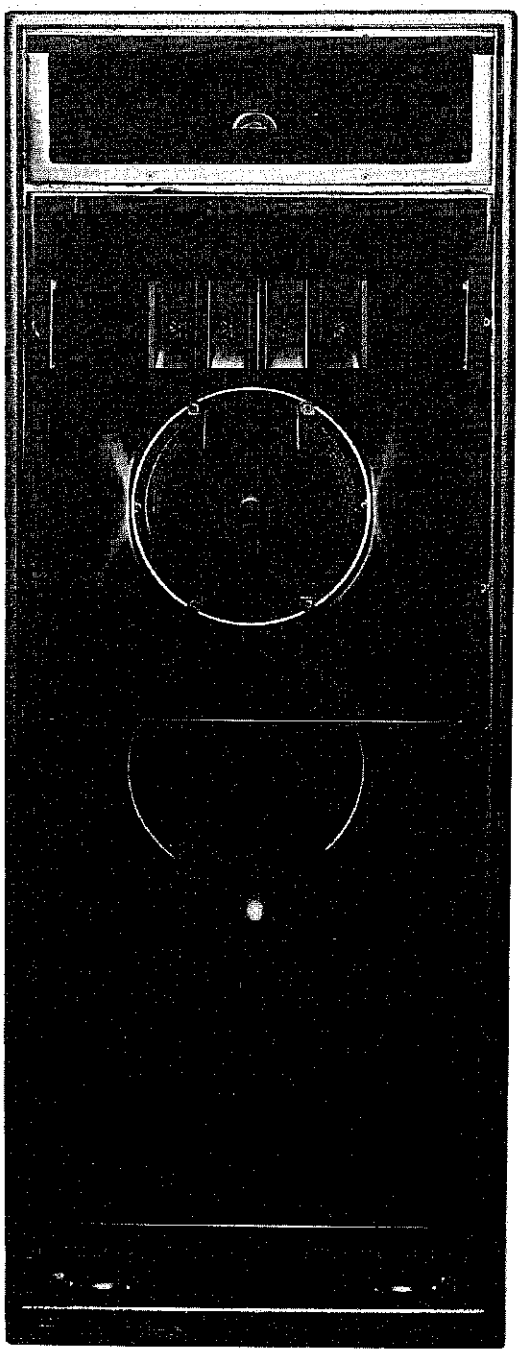
MSL-3 Loudspeaker System

Operating Instructions



The Meyer Sound MSL-3 is a high-power, arrayable loudspeaker designed to perform in a wide variety of sound reinforcement applications. It is a bi-amplified system consisting of two proprietary 12-inch low frequency cone drivers in a unique horn-loaded vented enclosure, a single high frequency driver with 70-degree horn, and a very high frequency tweeter array.

The MSL-3 is designed to be operated as a system with the Meyer Sound M-3 Control Electronics Unit (one M-3 per channel). The M-3 comprises electronic crossover, Meyer Sound exclusive SpeakerSense™ driver protection circuitry, and amplitude and phase response alignment circuitry optimized for the loudspeaker.

Meyer Sound

Meyer Sound Laboratories, Inc.
2832 San Pablo Avenue
Berkeley CA 94702

MSL-3 Loudspeaker System

Operating Instructions

Amplifier Requirements

The MSL-3 requires a professional quality two-channel power amplifier capable of delivering 250 watts per channel into 8 ohms, and 400 watts per channel continuously into 4 ohms. Use of amplifiers of lower power will not allow the full power and headroom of the MSL-3 system to be realized (though this may be acceptable in applications where high pressure levels are not required). Conversely, use of amplifiers rated at more than 300 watts per channel into 8 ohms may endanger the loudspeaker, and is not recommended.

The impedance of the MSL-3 high frequency section (compression driver and tweeter array) is 8 ohms, and the impedance of the low frequency section is 4 ohms. While two HF sections may be operated in parallel from one amplifier output, only **one** LF section may be driven from a single amplifier channel. When using one amplifier channel to drive two MSL-3 HF sections, be sure to check that the Hi and Lo amplifier gains of the complete system are balanced. To do this, refer to **Balancing Amplifier Gain** in the M-3 Operating Instructions.

For further information on power amplifiers, please refer to **Choosing a Power Amplifier,** a Meyer Sound Technical Note available from your dealer.

Connections

The MSL-3 is a bi-amplified system and **must** be used with the **M-3 Control Electronics Unit.** The M-3 functions as an active crossover, dividing the input signal by frequency. The connection terminals of the low and high frequency drivers appear on a single Cannon P-type 4-pin connector located on the rear of the MSL-3 cabinet. The pin assignments for this connector are:
Pin 1—Low frequency drivers, hot
Pin 2—Low frequency drivers, common
Pin 3—High frequency drivers, common
Pin 4—High frequency drivers, hot
(When the cabinet is fitted with a Cannon EP-5 connector, Pin 5 is unconnected.)

When the MSL-3 is fitted with a Pyle National Star Line connector, the pin assignments are:
Pin 1—Low frequency drivers, common
Pin 2—Low frequency drivers, hot
Pin 3—No connection
Pin 4—High frequency drivers, common
Pin 5—High frequency drivers, hot
Pin 6—No connection
Pin 7—No connection

The minimum wire size for connections between the MSL-3 and the power amplifier should be 14 gauge (larger for runs of over 100 feet).

Note. If you are using standard Meyer Sound loudspeaker cables and adapters, simply connect the female end of the loudspeaker cable to the MSL-3, the male end of the cable to the Meyer Sound pigtail adapter, and the banana connectors of the adapter to your amplifier outputs. In making connections between the MSL-3 and the amplifier, be sure to connect the 12-inch drivers to the **Lo** channel, and the horn driver to the **Hi** channel.
The adapter banana plugs are color-coded as follows:
Red —Low frequency drivers
Black —High frequency drivers

For connections between the M-3 and the power amplifier, refer to the **M-3 Operating Instructions.**

Verifying System Phase

All Meyer Sound loudspeakers are thoroughly tested in all stages of manufacture and correct polarity of individual cabinets is assured. However, accidental polarity reversal is possible when there are multiple amplifier connections and a single cabinet which is 180 degrees out of phase with the rest of its array will cause severe cancellation. This will result in a noticeable decrease in SPL and possible component damage.

Because of the extensive signal processing circuitry of the M-3 Control Electronics Unit, the "phase-popper" type of speaker phase checkers cannot reliably be used to test for correct polarity of the low and high drivers of the MSL-3. However, because the MSL-3 is phase-corrected through crossover, many of the portable spectrum analyzers can be used, with a pink noise source, to test for driver polarity as follows:

1. Single cabinets. First, verify polarity of the woofers by connecting a 9 volt battery at the end of the loudspeaker cable.

Cannon connector	Battery
Pin 1	+ terminal
Pin 2	- terminal

- The woofer cones should move outward toward the listener. Connect the speaker cable to the amplifier
- Input the pink noise source to the M-3 and advance the M-3 Level control to a convenient measuring level
- Standing in front of the loudspeaker, position the analyzer microphone directly between the HF horn and the 12-inch drivers, at right angles to the cabinet face, and about 3 feet in front of the MSL-3
- If polarity of the high frequency driver is reversed, a trough will appear in the response curve, centered near 800Hz. If in doubt, reverse the polarity of the **Hi** amplifier output while you watch the analyzer display

2. Multiple cabinet arrays. Each cabinet should first be tested as above.

- Connect one loudspeaker and advance the pink noise to a convenient measuring level. Position the measuring microphone on the axis between the loudspeaker and the cabinet adjacent to it, and about 6 feet distant. Note the frequency response and overall level
- Leaving the first loudspeaker connected, connect the adjacent one and observe the analyzer display. The entire curve should jump up in level, indicating correct addition between the loudspeakers. A polarity reversal between the loudspeakers will show up as severe broadband cancellation
- Similarly, connect the rest of the cabinets in the array one by one, looking for correct addition as each loudspeaker is connected. (It will be necessary to reposition the microphone.)

Meyer Sound

Meyer Sound Laboratories, Inc.
2832 San Pablo Avenue
Berkeley CA 94702

MSL-3 Loudspeaker System

Operating Instructions

Rigging

The MSL-3 loudspeaker has six steel rigging brackets internally mounted as an integral part of the cabinet design and the cabinet is supplied with either aircraft pan fittings (ring and stud) or 3/8"-16 nut plates, according to user preference. A flat plate is supplied when no rigging hardware is specified. All plates are held in place by six Phillips-head machine screws and can be interchanged at any time. The handles on the MSL-3 cabinet are provided solely for moving and carrying the loudspeaker and are **not** to be used for rigging purposes.

The rigging hardware is so designed that a single point can support the normal load for the cabinet. In the case of the MSL-3, the recommended maximum load is 600lbs. (270kg) (this is equivalent to the weight of the cabinet itself plus the weight of a second MSL-3 and a UPA-1A hung beneath). Any of the individual rigging points are capable of supporting this load with an adequate safety margin. However, Meyer Sound strongly recommends that safety lines be run to the other points. If the structural integrity of any cabinet has been compromised by damage or negligence, then the safety of the rigging cannot be assured. **All rigging should be done by competent professionals.**

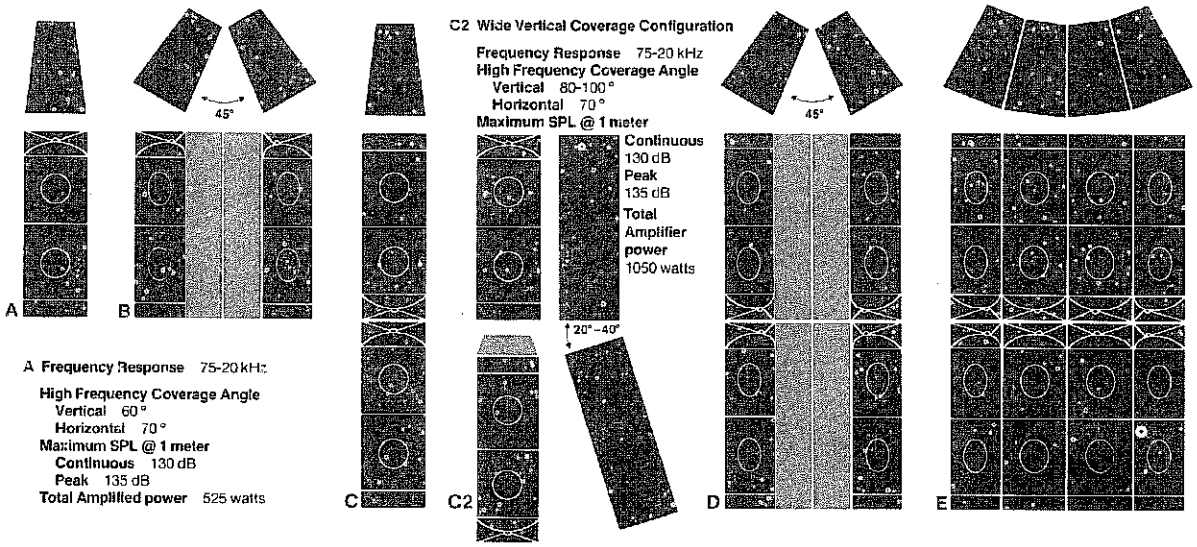
Placement and Arraying

The MSL-3 is designed to function as both a stand-alone loudspeaker and as a modular building block capable of being arranged in multiples to satisfy a wide range of power and coverage requirements. The MSL-3 Arraying Diagrams below give examples of a number of different array configurations, along with brief performance specifications for each configuration.

A body of basic rules must be followed in building arrays with the MSL-3 in order for the performance quality of the array to be preserved. When multiple MSL-3s are arrayed according to these rules, the resulting system behaves acoustically as a section of a radiating spherical surface. Such arrays offer precisely controlled coverage and propagate coherent wavefronts, acting as a close approximation of a point source.

These are the basic rules for forming arrays with the MSL-3:

- Keep the rear corners of adjacent loudspeakers together or close to one another
- For wider horizontal coverage, spread the angle between adjacent loudspeakers (to a maximum of 45 degrees), by moving the front corners apart (see diagram B)
- Never angle adjacent loudspeakers to cross directly into the same coverage area
- To narrow the vertical coverage angle, achieving greater forward power, stack cabinets with high horns together. The two top surfaces of the cabinets must remain flush. Do not spread the cabinets in the vertical axis when this configuration is used (see diagram C)
- Two loudspeakers may be stacked vertically for greater headroom and wider vertical coverage. Units should be stacked with ducts together, HF horns apart. Spread the angle between them as necessary (see diagram C2)



A Frequency Response 75-20 kHz
High Frequency Coverage Angle
Vertical 60°
Horizontal 70°
Maximum SPL @ 1 meter
Continuous 130 dB
Peak 135 dB
Total Amplified power 525 watts

B Wide Coverage Configuration
Frequency Response 70-20 kHz
High Frequency Coverage Angle
Vertical 60°
Horizontal 120°
Maximum SPL @ 1 meter
Continuous 130 dB
Peak 135 dB
Total Amplifier power 1050 watts

C Long Throw Configuration
Frequency Response 70-20 kHz
High Frequency Coverage Angle
Vertical 30°
Horizontal 70°
Maximum SPL @ 1 meter
Continuous 135 dB
Peak 140 dB
Total Amplifier power 1050 watts

C2 Wide Vertical Coverage Configuration
Frequency Response 75-20 kHz
High Frequency Coverage Angle
Vertical 80-100°
Horizontal 70°
Maximum SPL @ 1 meter
Continuous 130 dB
Peak 135 dB
Total Amplifier power 1050 watts

D Long Throw/Wide Coverage Configuration
Frequency Response 60-20kHz
High Frequency Coverage Angle
Vertical 30°
Horizontal 120°
Maximum SPL @ 1 meter
Continuous 135 dB
Peak 140 dB
Total Amplifier power 2100 watts

E High Power System
Frequency Response 50-20 kHz
High Frequency Coverage Angle
Vertical 30°
Horizontal 100°
Maximum SPL @ 1 meter
Continuous 145 dB
Peak 150 dB
Total Amplifier power 4200 watts

Meyer Sound

Meyer Sound Laboratories, Inc.
2832 San Pablo Avenue
Berkeley CA 94702

MSL-3 Loudspeaker System

Operating Instructions

Specifications

Acoustical—MSL-3/M-3 System

Frequency Response[1]	75-20,000 Hz +/- 4dB	
Maximum SPL[2] with Amplifier rated at	400W/4 ohms/ch.	150W/4 ohms/ch.
Continuous	130 dB	125 dB
Peak	135 dB	130 dB
HF Distribution Pattern		
Horizontal	70 degrees	
Vertical	60 degrees	

MSL-3 Loudspeaker

Driver Complement	
Low Frequency Drivers	MS-12 (two)
High Frequency Driver	MS-2001
VHF Tweeter Array	MS-P4
High Frequency Horn	70 degree modified radical
HF Network	X-M3, (VHF Crossover)
HF DC Protection	20 μF Polypropylene capacitor
Enclosure	Vented, horn loaded, multi-ply Finnish Birch plywood
Finish	Black textured
Physical Dimensions	21,¼"W x 56,¾"H x 30"D
Weight	265 lbs. (121kg)
Protective Grill	Expanded metal screen, vinyl damped, charcoal-grey foam covering
Connector	Cannon EP-4(male), EP-5 (male, Europe only), Pyle
Rigging (optional)	Aircraft pan fittings, or ⅜"-16 nut plate

Notes:
1. Measured 1 meter on-axis, half-space conditions, pink noise input, in third-octave bands.
2. Loudspeaker driven with weighted noise

Meyer Sound Part Number 05071030.01 Revision A, January 1985.

Meyer Sound

Meyer Sound Laboratories, Inc.
2832 San Pablo Avenue
Berkeley CA 94702

Meyer Sound

MSL-3A Manual Addendum

05.071.030.02 Rev A

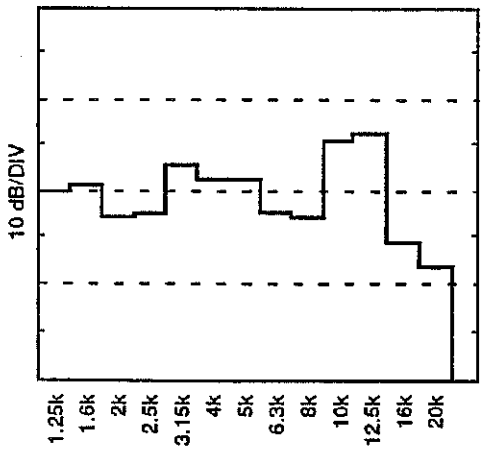
The MSL-3 Reinforcement Loudspeaker has been replaced with a new model, designated the MSL-3A. The MSL-3A works with either the M-3 or the M-3T Control Electronics Unit and offers significant performance advantages over the unit it replaces, including flatter response in the region from 1 kHz to 16 kHz and improved arraying behavior.

The MSL-3A employs the newly-developed MS-2001A two-inch throat high-frequency driver. The result of several years' field research with the MSL-10A System, the MS-2001A features superior diaphragm control for exceptional high-frequency performance. The diaphragm employs a unique aluminum/silicone sandwich structure that greatly reduces fatigue at high continuous power levels, enhancing long-term reliability. Ferrofluid cooling further reduces the risk of damage due to overheating.

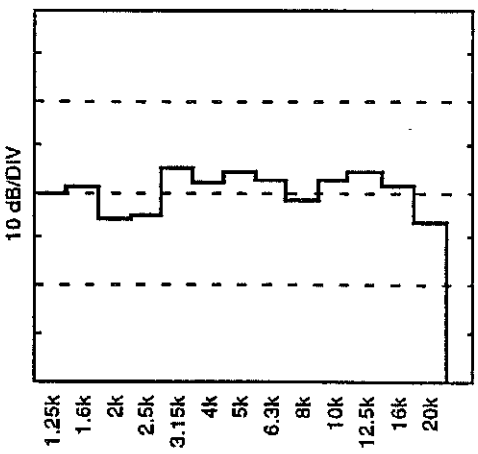
Because the MS-2001A affords very flat frequency response to 20 kHz, the MSL-3A does not employ a tweeter array to reproduce the 8-20 kHz region. As a result, the MSL-3A offers improved polar performance in multiple-cabinet arrays, with reduced high-frequency combing and more coherent, extended long-throw response.

Pricing, Repair and Upgrade Policy

Pricing, repair policy and salvage credits for the new MSL-3A and MS-2001A driver remain unchanged from those for the previous models; consult your current price list or contact your dealer or Meyer Sound.



MSL-3 HF Response



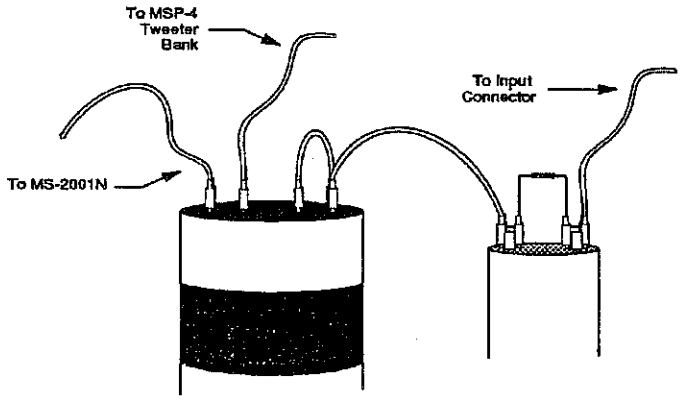
MSL-3A HF Response

Measured at 1 meter on axis of the high-frequency horn, M-3T Control Electronics VHF switch set to CAL position (TC out for MSL-3A, in for MSL-3). Pseudorandom noise excitation, FFT analysis, third-octave data display.

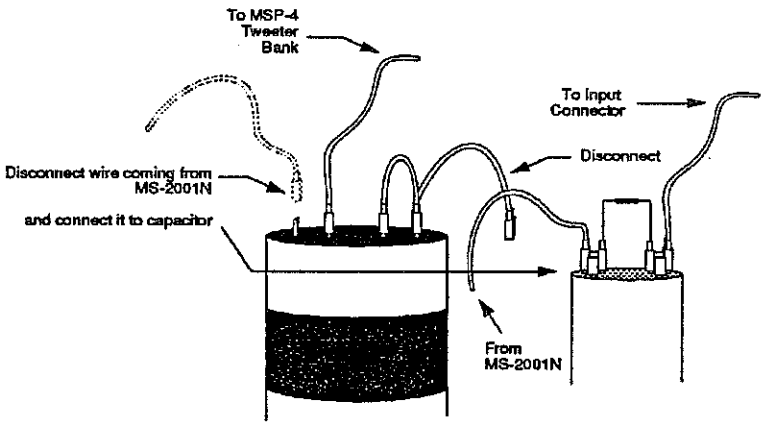
MSL-3A
Manual Addendum

Modifying MSL-3 Systems Employing MS-2001N Driver for Compatibility With MSL-3A

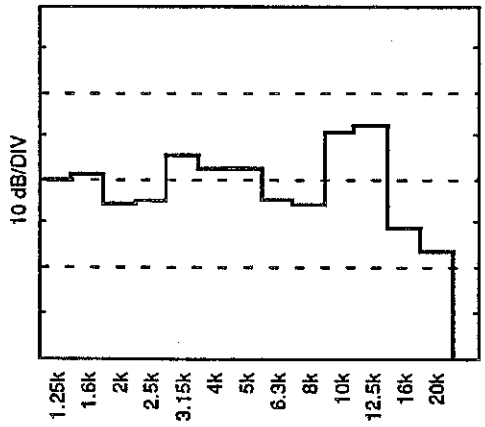
Users having MSL-3/M-3T systems which utilize the MS-2001N high-frequency driver may modify their MSL-3's to retain compatibility with new MSL-3A systems. The simple connection change, which bypasses the MSP4 tweeter bank and its associated crossover, is shown below. To gain access to the high-frequency driver connections, remove the top-face access door. When operating the modified system, switch the M-3T TC circuit out (preset panel).



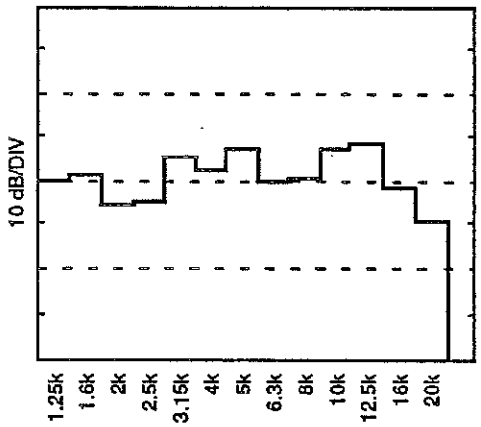
Stock MSL-3 HF Network Connections



Connection to Bypass MSP4 Tweeters



MSL-3 With MS-2001N, Tweeters Connected



Same, Tweeters Bypassed

Measured at 1 meter on axis of the high-frequency horn, M-3T Control Electronics VHF switch set to CAL position (TC in for stock MSL-3, out for MSL-3 w/o MSP4). Pseudorandom noise excitation, FFT analysis, third-octave data display.

Meyer Sound Laboratories, Inc.
2832 San Pablo Avenue
Berkeley, California 94702
Tel. (510) 486-1166
Fax (510) 486-8356